INFORMATION HANDOUT

PERMITS

Central Valley Flood Protection Board
Permit No. 18579-1
San Joaquin River Overflow Bridge, Br. No. 39-0212

Central Valley Flood Protection Board
Permit No. 18579-2
San Joaquin River Bridge, Br. No. 39-0246

MATERIAL INFORMATION

Final Hydraulic Report
San Joaquin River Overflow Bridge Br. No. 39-0212,
San Joaquin River Bridge Br. No. 39-0246
dated February 7, 2011

Revised Foundation and Seismic Report
San Joaquin River Bridge, Br. No. 39-0246
dated March 17, 2011

Final Hydraulic Report
Salt Slough Bridge Br. No. 39-0209
dated March 22, 2011

3 **ADDED PER ADDENDUM NO. 3 DATED APRIL 5, 2011**

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., GOVERNOR

CENTRAL VALLEY FLOOD PROTECTION BOARD
3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-0685 FAX: (916) 574-0682

Permit No. 18579-1 BD

California Department of Transportation
1976 E. Dr. Martin Luther King Jr. Blvd.
Stockton, California 95205

Enclosed is your approved Central Valley Flood Protection Board Encroachment Permit Conditions.

Under the Standard General Condition Four (4) of the permit, you are required to accomplish the work under direction and supervision of the Department of Water Resources; therefore, you must advise the Department at 3310 El Camino Avenue, Sacramento, California 95821, attention Lorraine Pendlebury, telephone (916) 574-0609, at least ten days prior to starting your project. An addressed postcard is enclosed for your convenience.

Please note that the permit grants the work proposed in your application. This permit, in addition to the twelve (12) standard conditions, includes special conditions, which may place limitations on or require modifications to your project. You are advised to read all conditions prior to starting the project. Commencing any work under this permit shall constitute an acceptance of the provisions of the permit and an agreement to perform accordingly. This permit does not relieve you from the responsibility for obtaining authorization from any State, local, or federal agencies for your proposed project.

Please refer to your permit number when communicating with this office. For further information, contact Jon Tice at (916) 574-2380.

Sincerely,

Mitra Emami

Mitra Emami, Senior Engineer, WR
Floodway Protection Section
Central Valley Flood Protection Board

Enclosure

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18579-1 BD

This Permit is issued to:

California Department of Transportation
1976 E. Dr. Martin Luther King Jr. Blvd.
Stockton, California 95205

To widen existing San Joaquin River Overflow Bridge by 6.42-feet on each side by adding two 18-inch-diameter Cast-In Steel Shell (CISS) piles at each bent, one on either side of the bridge. The project is located north of the City of Los Banos along State Route 165 in Merced County (Section 26&27, T7S, R10E, MDB&M, Lower San Joaquin Levee District, San Joaquin River, Merced 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: APR - 1 2011

Jay S. Punia
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

DWR 3784 (Rev. 9/85)

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. 18579-1 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 and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), 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 State 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 and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), 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 State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SIXTEEN: The mitigation measures approved by the CEQA lead agency and the permittee are found in the Final Initial Study/Mitigated Negative Declaration adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

SEVENTEEN: The Central Valley Flood Protection Board and Department of Water Resources shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

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

NINETEEN: The permittee 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.

TWENTY: The permittee shall contact the Department of Water Resources by telephone, (916) 574-1206, 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.

TWENTY-ONE: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-TWO: Prior to start of any demolition and/or construction activities within the floodway, the applicant shall provide the Central Valley Flood Protection Board with two sets of layout plans for any and all temporary, in channel cofferdam(s), gravel work pad(s), work trestle(s), scaffolding, piles, and/or other appurtenances that are to remain in the floodway during the flood season from November 1 through July 15.

TWENTY-THREE: Debris that may accumulate on the permitted encroachment(s) and related facilities shall be cleared off and disposed of outside the floodway after each period of high water.

TWENTY-FOUR: All debris generated by this project shall be disposed of outside the floodway.

TWENTY-FIVE: Cleared trees and brush shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-SIX: Fill material shall be placed only within the area indicated on the approved plans.

TWENTY-SEVEN: 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-EIGHT: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the regulated channel.

TWENTY-NINE: Except with respect to activities expressly allowed under this permit, the work area shall be restored to the condition that existed prior to start of work.

THIRTY: The permittee shall provide supervision and inspection services acceptable to the Central Valley Flood Protection Board.

THIRTY-ONE: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

THIRTY-TWO: In the event that levee or bank erosion injurious to the adopted plan of flood control

occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

THIRTY-THREE: The permitted encroachment(s) shall not interfere with operation and maintenance of the present or future 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 or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

THIRTY-FOUR: 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 Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

THIRTY-FIVE: The permittee shall be responsible for securing any necessary permits incidental to habitat manipulation and restoration work completed in the flood control project, and will provide any biological surveying, monitoring, and reporting needed to satisfy those permits.

THIRTY-SIX: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

THIRTY-SEVEN: The abandoned or dismantled bridge shall be completely removed and disposed of outside the limits of the levee section and floodway.

THIRTY-EIGHT: Piers, bents, and abutments being dismantled shall be removed to at least 1 foot below the natural ground line and at least 3 feet below the bottom of the low-water channel.

THIRTY-NINE: The bridge piers and bents shall be constructed parallel to the direction of streamflow.

FORTY: Drainage from the bridge shall not be discharged into the streambank.

FORTY-ONE: Plans showing all construction facilities such as temporary staging, coffer dams, and falsework which shall remain in a floodway during November 1 to July 15, must be submitted to the board for approval prior to installation of these facilities.

FORTY-TWO: All construction facilities such as temporary staging, coffer dams, and falsework must be designed to prevent bank erosion during normal streamflows and maintain maximum channel capacity during November 1 to July 15.

FORTY-THREE: The soffit of the bridge shall be no lower than that of the replaced bridge.

FORTY-FOUR: Bridge piers and bents placed within the floodway to support a widened portion of the existing bridge shall be constructed in line with the existing bents and piers.

FORTY-FIVE: The permittee shall comply with all conditions set forth in the letter from Department of the Army dated March 29, 2011, which is attached to this permit as Exhibit A and is incorporated by reference.

EXHIBIT A

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

REPLY TO ATTENTION OF

Flood Protection and Navigation Section (18579-1)

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

MAR 29 2011

Dear Mr. Punia:

We have reviewed a permit application by California Department of Transportation (application number 18579-1). This project includes widening an existing San Joaquin River Overflow Bridge by 6.42 feet on each side and adding one 18 inch diameter CISS pile on each side. The project is located north of the City of Los Banos along State Route 165, at 37.2971°N 120.8513°W NAD83, Merced 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 no work shall be performed and no stockpiles of material or equipment shall remain in the floodway during the flood season of November 1 to July 15.

b. That in the event trees and brush are cleared, they shall be properly disposed of outside the limits of the project right-of-way.

c. That the proposed work shall not reduce the channel flow capacity or change the channel flow in such a way that may cause damage to the existing embankment.

d. That the project section shall be restored to at least the same condition as existed prior to commencement of the proposed work.

e. That the proposed bridge widening shall allow for at least the same channel capacity, vertical clearance, and waterway area as existed prior to new construction.

f. That the proposed work shall not interfere with the integrity or hydraulic capacity of the flood damage reduction project; easement access; or maintenance, inspection, and flood fighting procedures.

g. That the bottom of the proposed bridge soffit shall be at least 3 feet above the designed water surface elevation or the elevation of the existing bridge soffit, whichever is higher.

A Section 10 and/or Section 404 permit (2007-00302) has been issued for this work.

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

Sincerely,

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

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., GOVERNOR

CENTRAL VALLEY FLOOD PROTECTION BOARD
3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-0685 FAX: (916) 574-0682

Permit No 18579-2 BD

California Department of Transportation
1976 E. Dr.Martin Luther King Jr. Blvd.
Stockton, California 95205

Enclosed is your approved Central Valley Flood Protection Board Encroachment Permit Conditions.

Under the Standard General Condition Four (4) of the permit, you are required to accomplish the work under direction and supervision of the Department of Water Resources; therefore, you must advise the Department at 3310 El Camino Avenue, Sacramento, California 95821, attention Lorraine Pendlebury, telephone (916) 574-0609, at least ten days prior to starting your project. An addressed postcard is enclosed for your convenience.

Please note that the permit grants the work proposed in your application. This permit, in addition to the twelve (12) standard conditions, includes special conditions, which may place limitations on or require modifications to your project. You are advised to read all conditions prior to starting the project. Commencing any work under this permit shall constitute an acceptance of the provisions of the permit and an agreement to perform accordingly. This permit does not relieve you from the responsibility for obtaining authorization from any State, local, or federal agencies for your proposed project.

Please refer to your permit number when communicating with this office. For further information, contact Jon Tice at (916) 574-2380.

Sincerely,

Mitra Emami

Mitra Emami, Senior Engineer, WR
Floodway Protection Section
Central Valley Flood Protection Board

Enclosure

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18579-2 BD

This Permit is issued to:

California Department of Transportation
1976 E. Dr.Martin Luther King Jr. Blvd.
Stockton, California 95205

To replace the existing San Joaquin River Bridge with a 43-foot-wide, 412-foot-long, 5-span bridge supported by 3-foot-diameter Cast-In-Steel Shell (CISS) piles, with 4 piles per bent across the channel of the San Joaquin River. The project is located north of Los Banos Along Highway 165 (Section 26&27, T7S, R10E, MDB&M, Lower San Joaquin Levee District, San Joaquin River, Merced 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: APR - 1 2011

Jay S. Punia
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.

DWR 3784 (Rev. 9/85)

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. 18579-2 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 and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), 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 State 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 and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), 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 State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SIXTEEN: The mitigation measures approved by the CEQA lead agency and the permittee are found in the Final Initial Study/Mitigated Negative Declaration adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

SEVENTEEN: The Central Valley Flood Protection Board and Department of Water Resources shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from

reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

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

NINETEEN: The permittee 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.

TWENTY: The permittee shall contact the Department of Water Resources by telephone, (916) 574-1206, 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.

TWENTY-ONE: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-TWO: Prior to start of any demolition and/or construction activities within the floodway, the applicant shall provide the Central Valley Flood Protection Board with two sets of layout plans for any and all temporary, in channel cofferdam(s), gravel work pad(s), work trestle(s), scaffolding, piles, and/or other appurtenances that are to remain in the floodway during the flood season from November 1 through July 15.

TWENTY-THREE: Debris that may accumulate on the permitted encroachment(s) and related facilities shall be cleared off and disposed of outside the floodway after each period of high water.

TWENTY-FOUR: All debris generated by this project shall be disposed of outside the floodway.

TWENTY-FIVE: Cleared trees and brush shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-SIX: Fill material shall be placed only within the area indicated on the approved plans.

TWENTY-SEVEN: 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-EIGHT: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the regulated channel.

TWENTY-NINE: Except with respect to activities expressly allowed under this permit, the work area shall be restored to the condition that existed prior to start of work.

THIRTY: The bottom member of the soffit of the bridge shall be at least three (3) feet above the designed flood plane.

THIRTY-ONE: The permittee shall provide supervision and inspection services acceptable to the Central Valley Flood Protection Board.

THIRTY-TWO: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

THIRTY-THREE: In the event that levee or bank erosion injurious to the adopted plan of flood control occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

THIRTY-FOUR: The permitted encroachment(s) shall not interfere with operation and maintenance of the present or future 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 or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

THIRTY-FIVE: 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 Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

THIRTY-SIX: The permittee shall be responsible for securing any necessary permits incidental to habitat manipulation and restoration work completed in the flood control project, and will provide any biological surveying, monitoring, and reporting needed to satisfy those permits.

THIRTY-SEVEN: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

THIRTY-EIGHT: The abandoned or dismantled bridge shall be completely removed and disposed of outside the limits of the levee section and floodway.

THIRTY-NINE: Piers, bents, and abutments being dismantled shall be removed to at least 1 foot below the natural ground line and at least 3 feet below the bottom of the low-water channel.

FORTY: The bridge piers and bents shall be constructed parallel to the direction of streamflow.

FORTY-ONE: Drainage from the bridge shall not be discharged into the streambank.

FORTY-TWO: Plans showing all construction facilities such as temporary staging, coffer dams, and falsework which shall remain in a floodway during November 1 to July 15, must be submitted to the board for approval prior to installation of these facilities.

FORTY-THREE: All construction facilities such as temporary staging, coffer dams, and falsework must be designed to prevent bank erosion during normal streamflows and maintain maximum channel capacity during November 1 to July 15.

FORTY-FOUR: The permittee shall comply with all conditions set forth in the letter from Department

of the Army dated March 29, 2011, which is attached to this permit as Exhibit A and is incorporated by reference.

EXHIBIT A

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

REPLY TO ATTENTION OF

Flood Protection and Navigation Section (18579-2)

MAR 29 2011

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

Dear Mr. Punia:

We have reviewed a permit application by California Department of Transportation (application number 18579-2). This project includes replacing an existing bridge with a 43 foot wide, 412 foot long, 4 span bridge supported by 3 foot diameter CISS piles, with 5 piles per bent across the channel of the San Joaquin River. The project is located north of Los Banos along Highway 165, at 37.2949°N 120.8512°W NAD83, Merced 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 no work shall be performed and no stockpiles of material or equipment shall remain in the floodway during the flood season of November 1 to July 15.

b. That in the event trees and brush are cleared, they shall be properly disposed of outside the limits of the project right-of-way.

c. That the proposed work shall not reduce the channel flow capacity or change the channel flow in such a way that may cause damage to the existing embankment.

d. That the bottom of the proposed bridge soffit shall be at least 3 feet above the designed water surface elevation or the elevation of the existing bridge soffit, whichever is higher.

e. That the existing bridge, piers and abutments that are not utilized for the proposed bridge shall be completely removed from the floodway and backfilled with suitable material compacted to at least the same density as the adjacent undisturbed embankment or underlying foundation.

f. That the proposed work shall not interfere with the integrity or hydraulic capacity of the flood damage reduction project; easement access; or maintenance, inspection, and flood fighting procedures.

A Section 10 and/or Section 404 permit (2007-00302) has been issued for this work.

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

Sincerely,

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

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

San Joaquin River
San Joaquin River Overflow

Wolfsen Rehabilitation Project
Bridge Nos. 39 0246 & 39-0212
10 - MER - 165
EA 10-279801

Prepared by:

Anthony Nedwick, PE
Structure Hydraulics and Hydrology
February 7, 2011

REGISTERED PROFESSIONAL ENGINEER
ANTHONY NEDWICK
No. C60368
Exp. 06/30/12
CIVIL
STATE OF CALIFORNIA

General:

It is proposed to widen the San Joaquin River Overflow (39-0212) bridge in kind with a CIP slab superstructure on pile extensions. The structure is to be widened symmetrically, adding 6.42 feet on both the right and left edge of the existing structure, to accommodate standard 8 foot shoulders. The widened portions will incorporate two additional 18" diameter CISS piles at each bent, one each for the left and right side widened portions.

It is also proposed to replace the San Joaquin River Bridge (old Br. No. 39-0211, new Br. No. 39-0246). There are two alternatives, both of which have an overall width of 42'-10" and a 2% cross-slope for drainage.

The proposed structure is a 5-span structure utilizing 42" deep PC/PS Bulb-T girders founded on 3'-0" diameter CISS piles, with 4 piles per bent. Bent caps will be 4'-6" wide and 4'-6" tall and the main span structural depth will be 4'-3". The abutments and bents will have a 20° right roadway skew to minimize the hydraulic skew and associated scour by aligning the bents with the flow. Span lengths vary to avoid the existing bent locations. Spans 1 through 5 will have lengths of 71, 87, 81, 85 and 88 feet center-to-center, respectively.

Datum:

The vertical datum used for this project is NGVD 1929. According to the Vertical Datum Transformation sheets provided by Preliminary Investigations-North, the elevations differed between the as-built plans and the NGVD 1929 datum for all of the existing structures. According to Marti Ikehara (National Geodetic Survey, NOAA, State Geodetic Advisor for California) the central valley has experienced significant subsidence, due primarily to ground water pumping.

For the San Joaquin River structure, the bridge datum (NGVD 1929) for the project is 0.79 feet lower than the elevations calculated from the as-built plans. For the San Joaquin River Overflow structure, the bridge datum (NGVD 1929) for the project is 0.89 feet lower than the elevations calculated from the as-built plans.

Survey data provided by the Department of Water Resources (DWR) uses the NAVD 1988 vertical datum.

Datum transformation information between NGVD 1929 and NAVD 1988 was determined using the National Geodetic Survey, National Oceanic and Atmospheric Administration (NGS, NOAA) website. According to the NGS information, values for the NAVD 1988 datum are 2.45 feet higher than for the NGVD 1929 datum at the project site. Where helpful, dual units will be noted in this report.

This report is based on the plans and information provided by Structure Design, as well as various other sources including previous Caltrans reports, USGS information and survey data from Preliminary Investigations and the Department of Water Resources. **All elevations indicated in this report are based on Vertical Datum NGVD 1929, except as noted.**

Basin:

The San Joaquin River Basin covers about 13,500 mi^2 at the southern boundary of the delta with a total watershed of 16,700 mi^2. The cities of Stockton, Modesto, Merced, and Fresno are major municipal and industrial centers in the basin. The basin is comprised of the western slope of the Sierra Nevada mountain range as well as a large portion of the fertile San Joaquin Valley. The San Joaquin River runs approximately 270 miles from Friant Dam to the river mouth about 4 miles below the town of Antioch. It originates in the Sierra Nevada Mountains with elevations of over 10,000 feet. The watershed experiences significant snowmelt runoff during the late spring and early summer, and as the flood flows reach the flat San Joaquin Valley floor they create numerous seasonally flooded wetlands, many of which are protected and encompass wildlife and waterfowl preserves. The basin also has numerous reservoirs and diversion canals for flood control as well as irrigation and drinking water supply. At the San Joaquin River and San Joaquin River Overflow bridges, the river has a watershed of approximately 7500 mi^2. The river is bounded by levees throughout much of the reach around the project site.

Discharge:

For the San Joaquin River, USGS Gage # 11261500 was used to estimate the 50-year and 100-year discharge rates. This gage is located at the Fremont Ford Bridge, approximately 7 miles downstream from the project site. This gage provides 44 years of peak stream flow data. The only significant tributary between the gage and the bridge site is that of Salt Slough. Based on USGS Stream Gage, #11261100, located at the Salt Slough Bridge, the 50-year flow rate for Salt Slough is 900 cfs, while the 100-year flow rate is 1000 cfs. To approximate the flow rates at the San Joaquin River site, the 50-year and 100-year discharge rates for Salt Slough were subtracted from the 50-year and 100-year rates determined from the Fremont Ford Bridge gage.

The 50-year and 100-year discharges for San Joaquin River at the project site were estimated to be 16,800 cfs and 21,700 cfs, respectively. In addition to the 50-year and 100-year flows, the CVFPB requires that their estimated channel capacity of 26,000 cfs be modeled. CVFPB requires that the new structure has 3 foot of freeboard over the 26,000 cfs flow. According to the State Plan of Flood Control (SPFC) Descriptive Document (Table 3-2, page 3-12, November 2010), the Design

Capacity from the Operating and Maintenance Manual is only 22,000 cfs in the reach from the Eastside bypass to the Merced River while the Design Capacity from Design Memo No. 1, 1955 (basis of State Operations) is only 20,000 in the same reach.

Hydraulic Analysis:

The channel hydraulics were modeled using the Army Corps of Engineers HEC-RAS modeling program, version 4.0, utilizing survey data provided by the Department of Water Resources. HEC-RAS was used to determine the water surface elevations and velocities throughout the project reach. Manning's roughness coefficients varied and were estimated using USGS guides as well as data and photos gathered during site investigations. Manning's coefficients ranged from 0.029 to 0.0345 in the main channel and 0.033 in the floodplain areas. For the San Joaquin River, the channel has a very flat average slope of approximately 0.02 % or less in the reach at the project site.

Two different scenarios were evaluated; the existing structure including the supplemental steel bents installed in 2008 and the pre-cast Bulb-T structure with an overall structural depth of 4'-3".

Based on the HEC-RAS models, the water surface elevation for the DWR design flood of 26,000 cfs will decrease for proposed structure, when compared with the existing configuration. The 5-span structure has a modeled "Water Surface Elevation" of 76.2 feet NAVD 88 (73.7 feet NGVD 29). However, the calculated "Lowest Soffit Elevation" for this structure is 80.0 feet NAVD 88 (77.5 feet NGVD 29), which provides about 3'-10" of freeboard over the CVFPB design flow of 26,000 cfs.

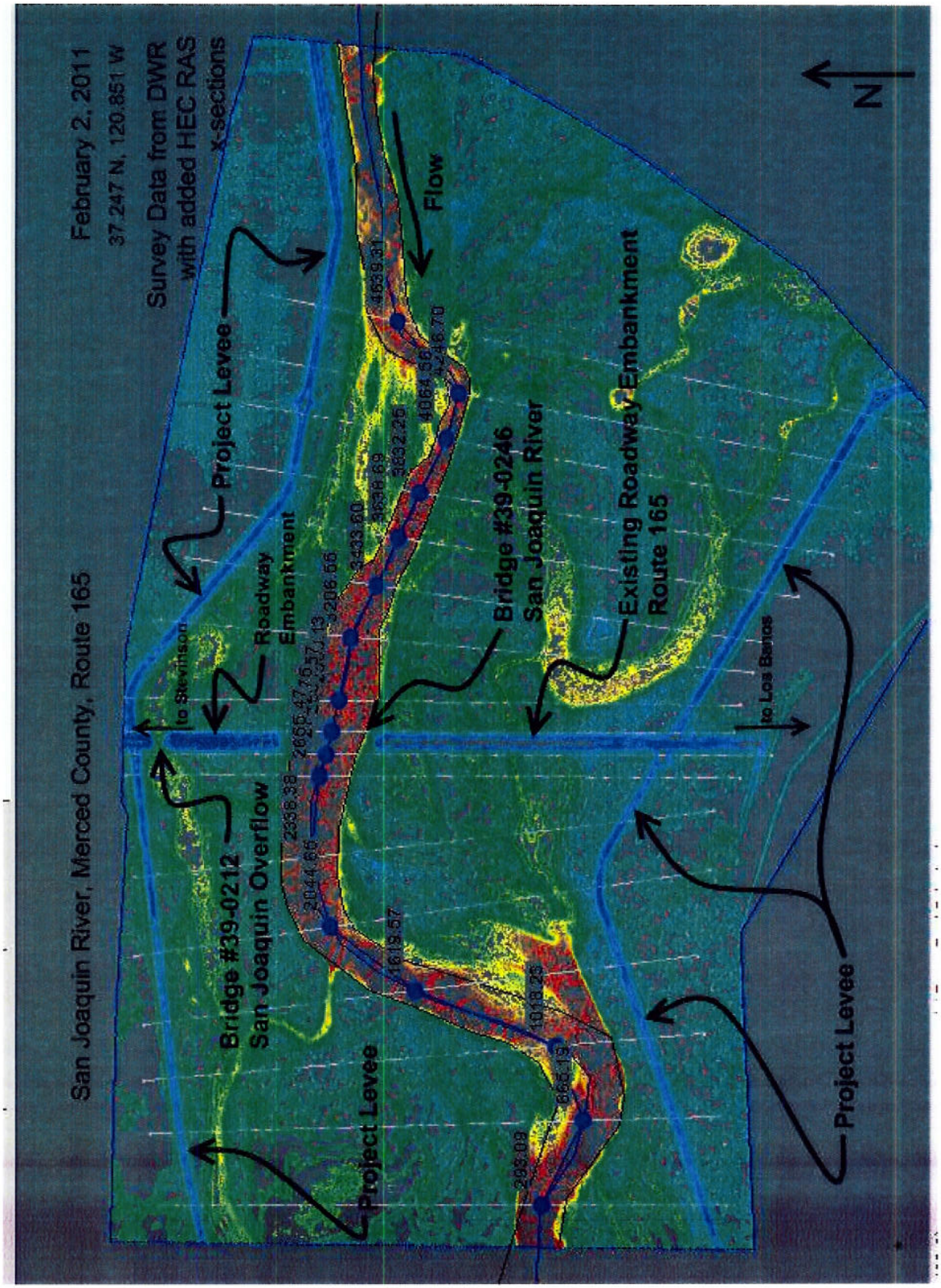
Streambed:

According to the draft Final Foundation and Seismic Report, the channel bed material consists of medium dense silty fine to medium grained, poorly graded sand, with silty sand and clayey sand also being found at the San Joaquin River Bridge site. This material is considered to be scourable.

Scour Analysis:

Scour was estimated utilizing the methods set forth in the FHWA HEC-18, "Evaluating Scour at Bridges." All scour elevations are based on the 100-year discharge.

For the San Joaquin River Bridge (39-0246), based on the HEC-RAS model using the 100-year discharge, there is no overbank flow returning to the main channel immediately upstream of the structure. Therefore, abutment and contraction scour


San Joaquin River, Merced County, Route 165
February 2, 2011
37.247 N, 120.851 W
Survey Data from DWR
with added HEC RAS
x-sections
Project Levee
Roadway
Embankment
to Stevinson
Bridge #39-0212
San Joaquin Overflow
Project Levee
Bridge #39-0246
San Joaquin River
Flow
Existing Roadway Embankment
Route 165
to Los Banos
Project Levee
N

are considered to be negligible for this site. Based on a comparison of historical records, no long term degradation anticipated but channel migration within the main channel beneath the structure is anticipated and has been included for local pier scour considerations. The San Joaquin River is considered to be an active, meandering channel. Since the abutments will be placed on the floodplain, inside the levees, they will also be subject to potential channel migration and scour. Therefore, all piles within this structure, including the abutment piles are potentially subject to the same scour depth and elevation.

Contraction scour, abutment scour and long term degradation were also considered negligible for the San Joaquin Overflow Bridge.

For the San Joaquin River Bridge (39-0246), Local Pier Scour for the 3-foot diameter columns is anticipated at 6.5 feet depth, to an elevation of 54.2 Feet NGVD 29. Channel migration is a consideration within the main channel and therefore all columns should be designed for the same scour elevations.

For the San Joaquin River Overflow Bridge (39-0212) with its 18" diameter piles, a total scour depth of 3.1 feet is anticipated, reaching an elevation of 66.7 feet NGVD 29. Migration of the main channel to the location of the overflow structure is not considered likely.

Summary & Recommendations:

Below is a summary of key design parameters based on the hydrology and hydraulic analysis performed for these structures.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations-North, using the NGVD 29 vertical datum unless otherwise noted.

Hydrologic Summary for San Joaquin River Bridge, 39-0246			
Drainage Area: 7500 mi^2			
Frequency	**Design Flood**	**Base Flood**	**CVFPB**
	50-year	100-year	N/A
Discharge	16,800 cfs	21,700 cfs	26,000 cfs
Water Surface Elevation at Bridge	72.2 ft NGVD 29 74.6 ft NAVD 88	73.1 ft NGVD 29 75.6 ft NAVD 88	73.8 ft NGVD 29 76.2 ft NAVD 88
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			
Minimum Soffit Elevation*	76.8 ft NGVD 29 (79.2 ft NAVD 88)		
Scour Depth	6.5 ft		
Scour Elevation	54.2 ft NGVD 29		

* The Central Valley Flood Protection Board requires 3 feet of Freeboard over their Design Flow for new structures.

Hydrologic Summary for San Joaquin River Overflow Bridge, 39-0212			
Drainage Area: 7500 mi^2			
Frequency	**Design Flood**	**Base Flood**	**CVFPB**
	50-year	100-year	N/A
Discharge	16,800 cfs	21,700 cfs	26,000 cfs
Water Surface Elevation at Bridge	72.2 ft NGVD 29 74.6 ft NAVD 88	73.1 ft NGVD 29 75.6 ft NAVD 88	73.8 ft NGVD 29 76.2 ft NAVD 88
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			
Minimum Soffit Elevation	Match Existing		
Scour Depth, All Piles	3.1 ft		
Scour Elevation, All Piles	64.3 ft NGVD 29		

All elevations given are referenced to the data provided by Structures Design using the NGVD 29 vertical datum, except as noted.

LongTerm Scour Depths, San Joaquin River, Br. No. 39-0246		
All Supports	Degradation Scour Depth (ft)	Contraction Scour Depth (ft)
	0	0

Scour Data (Elevation and Depth), San Joaquin River, Br. No. 39-0246		
All Supports	Long Term Scour Elevation (ft)	Short Term (Local) Scour Elevation (ft)
3-ft diameter	0	54.2 ft NGVD 29

LongTerm Scour Depths, San Joaquin River Overflow, Br. No. 39-0212		
All Supports	Degradation Scour Depth (ft)	Contraction Scour Depth (ft)
	0	0

Scour Data (Elevation and Depth), San Joaquin River Overflow, Br. No. 39-0212		
All Supports	Long Term Scour Elevation (ft)	Short Term (Local) Scour Elevation (ft)
18-in dia.	0	64.3 ft NGVD 29

All elevations given are referenced to the data provided by Structures Design using the NGVD 29 vertical datum, except as noted.

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.

Memorandum

Flex your power!
Be energy efficient!

To: GARY JOE
Chief, Senior Bridge Engineer
Division of Structure Design Central
Bridge Design Branch 17
Structure Design
Division of Engineering Services (MS 9-DES17)

Date: March 17, 2011

File: 10-MER-165-PM 41.2
EA 10-279801
San Joaquin River Bridge
(Replace)
Br. No. 39-0246

Attention: Rodney Simmons

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: Revised Foundation and Seismic Report (Revises Report dated November 18, 2009)

Per your request, the Office of Geotechnical Design North (OGD-N) has prepared this Revised Foundation and Seismic Report for the proposed bridge replacement. This report was amended to reflect the latest design changes to the replacement bridge. The report is based on review and evaluation of the existing bridge files, Log of Test Borings drilled in 1957 and field investigations in 2006 and 2008 and pile loads provided by Rod Simmons and Manode Kodsuntie and the General Plan dated February 4, 2011 and Foundation Plan dated February 4, 2011.

PROJECT DESCRIPTION

The project site is located on State Highway 165 south of the town of Stevenson in the Great Valley Grasslands State Park in Merced County. In general, the sites natural topography is relatively flat with an elevation of approximately 72 feet above sea level. The elevation variation of the river channel bottom at the proposed pier locations ranges from approximately 57 to 59 feet. At the abutments road grade (maximum height of the bridge embankment fill and pavement) the elevation is 82 feet.

The existing 15-span continuous reinforced concrete slab bridge that was built in 1959. The proposed new bridge will be a 5 span Precast, Pre-stressed Bulb-Tee Girder Bridge, supported on driven Cast-In Steel Shell (CISS) pile at the piers. The abutments will be a short-seated type supported on Class 200 Alternative "W" piles.

The elevations used in this report are based on the NGVD29.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

The subject site is situated within the approximate central portion of the Great Valley geomorphic province of California. Surficial Holocene alluvium (active stream and river deposits) and Pleistocene older alluvium of the Modesto Formation (river bank deposits) underlie the bridge site according to the Geologic Map of the San Francisco-San Jose Quadrangle, scale 1:250,000, compiled by D.L. Wagner, E.J. Bortugno, and R.D. McJunkin, 1990, second printing 2005, California Geological Survey.

Relatively recent subsurface investigations consisting of drilling mud rotary soil test borings were drilled in September and October 2006 and January 2008. The maximum depth of these borings was approximately 230 feet. The results of these drilling investigations and the original 1957 investigation indicated that the distribution of the alluvial and fill soils underlying the bridge site is relatively consistent. These soils are predominately fine to medium grained sand with some coarse sand and gravel, and lesser amounts of silts and mixtures of silt, clay and sand.

Specifically, the soils encountered in our investigation may be divided into three relatively distinct zones distributed by depth and are described below.

The upper zone confined to the abutment approaches from the ground surface to a depth of about 10 feet (Elevation 72 ft) consists of embankment Fill. These materials, encountered consisted of medium dense to loose silty sand and silt with clay.

The middle zone composed of alluvium, that also underlie the abutment approaches as well as the river channel (pier locations) ranges from approximately Elevation 72 ft to elevation 32 feet. These deposits consist predominately of loose to medium dense fine to medium grained, poorly graded sand, silty sand and scattered thin sandy silt layers.

The lower zone composed of alluvium extends from the bottom of the middle zone noted above to at least to the maximum depth explored (230 feet; Elev. -148 feet). These deposits are composed of predominately medium dense to dense sand, clayey and silty sand, silt, and include some very stiff clay layers. Very dense sand was encountered below elevation approximately –40 feet in the borings R-01-08 and R-02-002.

A detailed description of the subsurface soils is presented in the Log of Test Borings (LOTB).

GROUND WATER

Ground water depth was not measured during the 2006 and 2008 foundation investigations due to the use of the mud rotary drilling method and drilling at an active traffic lane. Ground water was measured at elevation 64.4 feet in boring B-1 and 65.3 feet at boring B-2 in 1957 field investigation. Running water was observed in the River during the fall of 2006 foundation investigation. We consider the ground water elevation as the running water elevation in the River. However, ground water elevations may fluctuate with seasonal precipitation.

SCOUR EVALUATION

The draft "Hydrology and Hydraulics Report" for San Joaquin River bridge (dated December 22, 2008) state "The scour noted in this report is the Total Scour anticipated at the structure, including thalweg migration, long-term degradation, pressure and local pier scour. The San Joaquin River is considered to be active, meandering channel. Since the abutments will be placed on the floodplain, inside the levees, they will also be subject to potential channel migration and scour. Therefore, all piles including the abutment piles are potentially subject to the same scour depth and elevation." A hydrology summary is presented in the following table.

Table 1- Scour Summary

Scour Summary for San Joaquin River Bridge, 39-0246	
Minimum Soffit Elevation	75.0 ft
Local Scour, All Piles	8.7 ft
Degradation / Contraction Scour Elevation, All piles	47.0 ft

CORROSIVITY EVALUATION

Representative samples taken during the foundation investigation were tested for corrosion potential. The results of the laboratory tests indicated this site is not corrosive. The following is a summary of the corrosion testing:

Table 2-Corrosive test Summary

Boring No.	Sample Depth (m/ft)	pH	Minimum Resistivity (ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
B-1-06	2.44-3.0/8-10	6.90	1900	--	--
B-1-06	10.7-12.2/35-40	8.02	900	100	160
B-2-06	3.5-4.6/10-15	7.20	2100	--	--
B-2-06	26.2-27.4/86-90	8.20	1300	--	--

Note: Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water sample taken at the site: Chloride concentration is greater than or equal 500 ppm, sulfate concentration is greater than or equal 2000 ppm, or the pH is 5.5 or less.

SEISMICITY

Based on the Caltrans 2009 seismic Design Procedure, the controlling fault for the site is the Great Valley Fault 8 (Fault ID No. 26) with Mmax of 6.56. The fault is located southwest of the site surface and the rupture distance to the fault plane from the bridge site is estimated to be 13 miles. The fault is referred to as a reverse fault with a dip angle of 15 degrees.

Based on the As-Built and more recent subsurface investigations, a VS30 of 790 feet per second was used to estimate the ground motion.

Using the above shear wave velocity, the spectral acceleration (SA) generated from the probabilistic method is higher than the SA generated by the Great Valley Fault 8. As a result, the attached ARS curve is based on the 5% probability of exceedance in 50 years (975 years return period). The design ARS curve with an estimated peak ground acceleration of 0.36g is attached.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the site.

The liquefaction potential is considered significant at the bridge site. The liquefaction data are presented in Table 3 below.

Table 3 - Liquefaction Data

Support Location	Estimated Original Ground Elevation (ft)	Estimated Elevations of Liquefiable Layers (ft)
Abutment 1	80	73 to 48 38 to 30
Pier 2	67	64 to 35 25 to 17
Pier 3	60	60 to 50
Pier 4	60	60 to 40
Pier 5	62	62 to 37
Abutment 6	82	75 to 55

Acceleration Response Spectrum is attached (See Attachment).

FOUNDATION RECOMMENDATIONS

Based on the available information, we are providing following foundation recommendations for the proposed new bridge.

36-inch diameter Cast-in-Steel-Shell (CISS) piles are selected as foundation support at the proposed bridge piers and 16-inch diameter Class 200 Alternative "W" Standard Open-ended driven steel pipe piles are recommend to support the abutments.

The use of Spread footings was not considered a suitable foundation type based on the subsurface liquefiable sandy soil conditions. Cast-in-Drilled-Hole (CIDH) piles were not specifically recommended for this project due to liquefiable soils, loose to medium dense sandy soils, and high ground water level. High ground water level, liquefiable soils, will result in serious soil caving and the high potential for development of pile anomalies. Driven steel "H" piles may not suitable pile type for this project due to "H" piles may not provide required lateral capacity. The pile design recommendations are presented in the following tables.

Table – 4. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support – Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	16" Class 200 Alt. W	67.8	920	470	200	400	-8 (a)	-8	620
Abut 6	16" Class 200 Alt. W	67.8	1090	600	200	400	-8 (a)	-8	600

Notes:

1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.

Table 5. Pier Foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit per Pile		Extreme Event per pile				
					Comp. (φ=0.7	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Pier 2	36" CISS	57.0	1420	1.0	890	N/A	450	N/A	-34 (a-I) -19 (a-II)	-34	1800
Pier 3	36" CISS	57.0	1480	1.0	940	N/A	480	N/A	-38 (a-I) +4 (a-II)	-38	1800
Pier 4	36" CISS	57.0	1470	1.0	930	N/A	475	N/A	-48 (a-I) 0 (a-II)	-48	2200
Pier 5	36" CISS	57.0	1510	1.0	960	N/A	490	N/A	-49 (a-I) -1 (a-II)	-49	2200

Notes:

1) Design tip elevations for bents are controlled by: (a-I) Compression (Strength Limit). (a-II) Compression (Extreme Event). There is no design tip elevation for Settlement.

2) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.) if any, which do not contribute to the design resistance.
3) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exist at all abutments and Piers.
4) Design tip elevations for Lateral Load are typically provided by SD.

Table 6- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	16" Class 200 Alt. "W"	400	N/A	-8 (a)	-8	620
Pier 2	36" CISS	1270	N/A	-34 (a)	-34	1800
Pier 3	36" CISS	1350	N/A	-38 (a)	-38	1800
Pier 4	36" CISS	1325	N/A	-48 (a)	-48	2200
Pier 5	36" CISS	1370	N/A	-49 (a)	-49	2200
Abut 6	16" Class 200 Alt. "W"	400	N/A	-8 (a)	-8	600

Notes:
1) Design tip elevations for abutments and piers are controlled by: (a) Compression.
2) The specified tip elevation shall not be raised without consulting with the Office of Geotechnical Design – North.
3) Structure Design Typically provides Design tip elevations for Lateral Load.

GENERAL NOTES TO DESIGNER

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Pile center-to-center spacing for piles should not be less than 3.0 times the pile diameter.

4. Support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memos to Designers" 4-2. The plotting of the support locations should be made prior to the foundation review.

5. To ensure sufficient geotechnical resistance to prevent soil plug blow out, a minimum of 16 feet of plug has to remain in the steel shell.

Notes to Special Provisions

1. Prior to installing driven piling, the contractor shall provide a driving system submittal.

2. Pile acceptance criteria at the piers (36-in. CISS piles) will be developed using a wave equation analysis in conjunction with Pile Dynamic analysis (PDA). Bearing acceptance criteria curves will be provided by the Foundation Testing Branch (FTB) of the Office of Geotechnical Support. Please coordinate with Brian Liebich from the FTB Branch for this information.

3. The contractor shall select one pile from each of the pier locations (2 through 5) to be dynamically monitored. These four piles shall be the first piles driven at each pier. No other piles shall be driven at that pier until the engineer has provided the wave equation acceptance criteria.

4. The Engineer shall be allowed 3 business days to revise pile tip elevations for a given control (pier) location. The Engineer shall be allowed 14 calendar days to complete dynamic monitoring and provide field acceptance criteria at each location. Day one in each case shall be the first day after the dynamically monitored pile has been installed.

5. One restrike shall be required for each of the piles to be tested. This restrike shall occur the next day.

Construction Considerations

1. Water is anticipated to be encountered during the construction in the river channel, and in the abutment areas below the elevation of the river water.

2. To ensure the geotechnical resistance, a minimum 16-foot soil plug has to remain in the steel shell.

3. Due to high ground water elevation and subsurface uncemented granular soils nature, the equipments and/or methods used to clean the steel shell should not cause quick soil conditions.

4. Pile acceptance criteria for all abutments (Class 200 Alt. "W" piles) will be based on the use of the Gates dynamic formula equation (Caltrans Standard Specifications 2006 in Section 49-1.08).

5. The piles should be driven to meet the estimated geotechnical resistances presented in Table 6 above.

6. In general, the driving of CISS piles for the project should be smooth and no difficulties, but the contractor should note that the very dense (high Standard Penetration Test (SPT) blow counts) soil layers were shown in the LOTB(s). The contractor should prepare to deal with the situation based on their experiences.

7. We recommend all CISS piles should have a cut-off allowance to compensate for material damaged at the top of the pile by the impact of the hammer during pile driving. A 1.5 to 5 feet pile section for cut-off allowance is normally recommended (API 1993).

8. To help insure that the 90 day construction schedule is met, the contract allows for an additional 200 feet of piling being available for use as required by the engineer.

PROJECT INFORMATION

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. *Log of Test Borings for San Joaquin River Bridge, Bridge Number 39-0246.*

Data and Information included in the Information Handout provided to the bidders and

Contractors are:

A. Addendum Foundation Report for San Joaquin River Bridge, Number 39-0246, dated March 17, 2011.

Data and Information available for inspection at the district Office:

A. None

Data and information available for inspection at the Transportation Laboratory:

A. Existing *San Joaquin River Bridge, Bridge Number 39-0211, file.*

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable. If there are any questions, please contact William Bertucci at (916)-203-7992 or John Huang at (916)-227-1037.

Report By:

for Bill Bertucci

William Bertucci
Associate Engineering Geologist
Geotechnical Design – North

Reviewed By:

REGISTERED PROFESSIONAL ENGINEER
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Reza Mahallati, P.E.
Senior Materials and Research Engineer
Geotechnical Design – North

Attachment – ARS Curve

c: District PM: Kerry Morgan;
GS Corporate: Mark Willian
RE Pending: RE_Pending_File@dot.ca.gov
DES OE: Rebecca Harnagel
District Materials Engineer: Dave Dhillon
OGDN/Branch E: John Huang

San Joaquin River Br. (Replace)

Bridge No. 39-0246

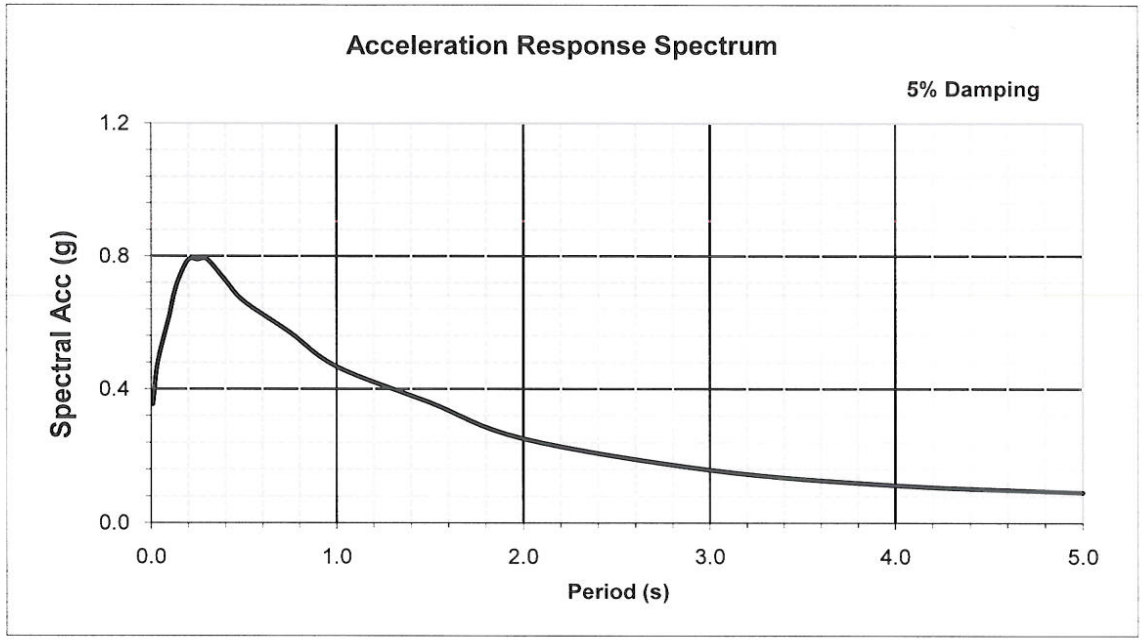
EFIS 1000000379

Latitude 37.2952

Longitude -120.8514

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.355
0.020	0.408
0.030	0.462
0.050	0.516
0.075	0.570
0.100	0.624
0.120	0.679
0.150	0.735
0.200	0.790
0.250	0.790
0.300	0.791
0.400	0.727
0.500	0.663
0.750	0.570
1.000	0.467
1.500	0.359
2.000	0.251
3.000	0.158
4.000	0.112
5.000	0.091



Deterministic Procedure Data

Fault	Great Valley fault 8	
Fault ID	26	
Style	R	
Mmax	6.6	
Dip	15	deg
Z_{TOR}	7	km

R_{rup}	21	km
R_{jb}	20	km
R_x	20	km
V_{S30}	240	m/s
$Z_{1.0}$	333	m
$Z_{2.5}$	2	km

Notes

Please note the Design ARS curve is based on the USGS 5% Probabilty of Exceedance in 50 years (975 years return period).

Final

Design Response Spectrum

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

Salt Slough

Wolfsen Rehabilitation Project
Bridge No. 39 0209
10 - MER - 165
EA 10-279801

Prepared by:

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General:

It is proposed to widen the Salt Slough Bridge (39-0209) bridge in kind with a CIP slab superstructure on pile extensions. The structure is to be widened symmetrically, adding 6.42 feet on both the right and left edge of the existing structure, to accommodate standard 8 foot shoulders. The widened portions will incorporate two additional 18" diameter CISS piles at each bent, one each for the left and right side widened portions.

Datum:

The vertical datum used for this project is NGVD 1929. According to the Vertical Datum Transformation sheets provided by Preliminary Investigations-North, the elevations differed between the as-built plans and the NGVD 1929 datum for all of the existing structures. According to Marti Ikehara (National Geodetic Survey, NOAA, State Geodetic Advisor for California) the central valley has experienced significant subsidence, due primarily to ground water pumping.

For the Salt Slough structure, the bridge datum (NGVD 1929) for the project is 1.15 feet lower than the elevations calculated from the as-built plans.

This report is based on the plans and information provided by Structure Design, as well as various other sources including previous Caltrans reports, USGS information and survey data from Preliminary Investigations. **All elevations indicated in this report are based on Vertical Datum NGVD 1929.**

Basin:

Salt Slough is a tributary to the San Joaquin River and drains a low-lying portion of the San Joaquin Valley, which includes large areas of wetlands and cotton fields; the slough does not have a significant upland area within its basin, and its streamflow is dominated by agricultural drainage much of the year. Most of the water in Salt Slough originates from either operational spills or from return flow from the Grassland Water District, San Luis Canal Company and the Central California Irrigation District. Salt Slough flows roughly 30 miles to the San Joaquin River and is formed by the confluence of Wood Slough and Santa Rita Slough which originate at the San Joaquin River south of State Route 152. It is likely that Salt Slough is an old natural branch of the San Joaquin River. In 1996, the Grasslands Bypass project reopened the San Luis Bypass to reduce the amount of contaminated agricultural runoff from flowing through the wildlife refuges and wetland areas around Salt Slough.

Discharge:

There is a USGS Stream Gage, #11261100, located at the Salt Slough Bridge. Historical records for this gage provided 21 years of peak flow rates were used to estimate statistical 50-year and 100-year discharge rates for Salt Slough. For Salt Slough (39-0209), the 50-year flow rate is 900 cfs, while the 100-year flow rate is 1000 cfs.

Hydraulic Analysis:

For Salt Slough, the channel has a very flat average slope of approximately 0.03 %. The 50-year and 100-year discharges were modeled along the reach using BrEase version 3.1 with an estimated Manning's roughness coefficient of 0.035. Average velocity for the 100-year flow at Salt Slough was approximately 2.2 ft/s, with a maximum velocity of approximately 2.7 ft/s.

Streambed:

The channel bed material consists of medium dense silty fine to medium grained, poorly graded sand. This material is considered to be scourable.

Scour Analysis:

BrEase 3.1 was used to model the channel and estimate scour depths utilizing the methods set forth in the FHWA HEC-18, "Evaluating Scour at Bridges." All scour elevations are based on the 100-year discharge. Contraction scour, abutment scour and long term degradation are considered negligible for the Salt Slough Bridge. Salt Slough is considered to be an active, meandering channel. Since the abutments will be placed on the floodplain, inside the levees, they will also be subject to potential channel migration and scour. Therefore, all piles, including the abutment piles, are potentially subject to the same scour depth and elevation.

For the Salt Slough Bridge, a total scour depth of 2.8 feet is anticipated, reaching an elevation of 58.3 feet.

Summary & Recommendations:

Below is a summary of key design parameters based on the hydrology and hydraulic analysis performed for these structures.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations-North, using the NGVD 29 vertical datum.

Hydrologic Summary for Salt Slough Bridge, 39-0209		
Drainage Area: N/A mi^2		
Frequency	**Design Flood**	**Base Flood**
	50-year	100-year
Discharge	900 cfs	1,000 cfs
Water Surface Elevation at Bridge	69.3 ft	69.7 ft

Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.

Minimum Soffit Elevation	Match Existing
Scour Depth	2.8 ft
Scour Elevation	58.3 ft

All elevations given are referenced to the data provided by Structures Design using the NGVD 29 vertical datum.

LongTerm Scour Depths, Salt Slough, Br. No. 39-0209		
All Supports	Degradation Scour Depth (ft)	Contraction Scour Depth (ft)
	0	0

Scour Data (Elevation and Depth), Salt Slough, Br. No. 39-0209		
All Supports	Long Term Scour Elevation (ft)	Short Term (Local) Scour Elevation (ft)
18-inch dia.	0	58.3 ft NGVD 29

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.