**THE BOARD OF SUPERVISORS OF THE COUNTY OF STANISLAUS**
**ACTION AGENDA SUMMARY**

DEPT: PUBLIC WORKS — BOARD AGENDA # *C-1

Urgent ____ Routine ✓ — AGENDA DATE June 19, 2001

CEO Concurs with Recommendation YES ____ NO ____ (Information Attached) — 4/5 Vote Required YES ____ NO ✓

SUBJECT: APPROVAL OF AN AGREEMENT FOR PROFESSIONAL SERVICES WITH DMJM+HARRIS FOR ENGINEERING DESIGN SERVICES FOR THE RIVER ROAD SEISMIC BRIDGE RETROFIT PROJECT

STAFF RECOMMENDATIONS:

1. APPROVE AN AGREEMENT FOR PROFESSIONAL SERVICES WITH DMJM+HARRIS FOR ENGINEERING DESIGN SERVICES FOR THE RIVER ROAD SEISMIC BRIDGE RETROFIT PROJECT FOR AN AMOUNT NOT TO EXCEED $725,000;

2. AUTHORIZE THE CHAIR TO EXECUTE THE PROFESSIONAL SERVICE AGREEMENT WITH DMJM+HARRIS FOR THE ENGINEERING DESIGN AND PREPARATION OF PLANS, SPECIFICATIONS, AND ESTIMATE OF THE RIVER ROAD SEISMIC BRIDGE RETROFIT PROJECT; AND,

**(CONTINUED ON PAGE 2)**

FISCAL IMPACT: None. This seismic bridge replacement project is mandated by the state legislature and is 100% funded by federal and state monies.

BOARD ACTION AS FOLLOWS:

**No.** 2001-474

**On motion of Supervisor** Blom , **Seconded by Supervisor** Mayfield
**and approved by the following vote,**
**Ayes: Supervisors:** Mayfield, Blom, Simon, Caruso, and Chair Paul
**Noes: Supervisors:** None
**Excused or Absent: Supervisors:** None
**Abstaining: Supervisor:** None
1) X **Approved as recommended**
2) ____ **Denied**
3) ____ **Approved as amended**
**MOTION:**

Christine Ferraro

**ATTEST: CHRISTINE FERRARO TALLMAN, Clerk** **By: Deputy** **File No.**

**STAFF RECOMMENDATIONS (Continued):**

3. AUTHORIZE THE AUDITOR TO INCREASE APPROPRIATIONS AND ESTIMATED REVENUE PER THE ATTACHED BUDGET JOURNAL SHEET.

**DISCUSSION:** The State conducted an engineering study that determined that the existing River/Hills Ferry Road Bridge over the San Joaquin River was subject to collapse if a significant seismic event occurred. The study resulted in the County being authorized to hire an engineering firm to determine the strategy for the retrofit or replacement if necessary and to prepare the plan, specifications, and estimate for the required work. This project will be 100% funded by state and federal funds. DMJM+HARRIS has been selected to provided professional services for the design, plans and specifications on a time and materials basis for an amount not to exceed $725.000.

**POLICY ISSUE:** This action is consistent with the Board's policy of providing a safe, healthy community.

**STAFFING IMPACT:** There is no additional staffing impact associated with this action.

JLG:

(L:\BRIDGES\32-042\Admin\042DMJM+HarrisProfServAgreeBOS.wpd)

**AUDITOR'S COPY**

# AUDITOR-CONTROLLER
# BUDGET JOURNAL

## BUDGET JOURNAL SCREEN

Stanislaus County — Striving to be the Best

Public Works — Stanislaus County

| | |
|---|---|
| Budget Organization | Stanislaus Budget Org |
| Budget | LEGAL BUDGET |
| Accounting Period From | Jul-00 |
| To | Jun-01 |

## BATCH SCREEN

| | |
|---|---|
| Journal Batch | PW DH |
| Category | Budget |

| Line | Coding Structure | | | | | | Period May-01 | Description |
|---|---|---|---|---|---|---|---|---|
| | Fund 4 | Org 7 | Account 5 | G/L Proj 7 | Loc 6 | Misc 6 | AMOUNT | |
| 1 | 1102 | 40310 | 63280 | 9203 | 0 | 0 | 725,000.00 | Increase Appropriations |
| 2 | 1102 | 40310 | 63280 | 0 | 0 | 0 | (725,000.00) | Decrease Appropriations |
| 3 | 1102 | 40310 | 27600 | 9203 | 0 | 0 | 725,000.00 | Increase Est. Revenue (Federal) |
| 4 | 1102 | 40310 | 27600 | 0 | 0 | 0 | (725,000.00) | Decrease Est. Revenue (Federal) |
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| | | | | | | Totals | 0.00 | |

Explanation: Establish appropriations and estimated revenue for River Rd Seismic Bridge Retrofit (Seismic Retro Phase 1)

| Requesting Department | CEO | Auditors Office Only |
|---|---|---|
| Diane Haugh | | |
| Signature | Signature | Approved By / Admin Approval ($75K+) |
| 13-Jun-01 | | 6-14-01 |
| Date | Date | Date / Date |

# AGREEMENT
# FOR
# PROFESSIONAL SERVICES

This Agreement For Professional Services is made and entered into by and between the County of Stanislaus ("County") and Frederic R. Harris, Inc., a New York corporation and a subsidiary of AECOM Technology Corporation doing business as DMJM Harris ("Consultant"), on June 19, 2001 (the "Agreement").

## Introduction

WHEREAS, the County has a need for services involving seismic studies to determine a strategy for the retrofit or replacement of the River Road Bridge over the San Joaquin River (Bridge No. 39C-01), and for services involving the preparation and plans, specifications and engineer's estimate for construction of the approved retrofit or replacement; and

WHEREAS, the Consultant is specially trained, experienced and competent to perform and has agreed to provide such services;

NOW, THEREFORE, in consideration of the mutual promises, covenants, terms and conditions hereinafter contained, the parties hereby agree as follows:

## Terms and Conditions

1. Scope of Work

1.1 The Consultant shall furnish to the County upon execution of this Agreement or receipt of the County's written authorization to proceed, those services and work set forth in **Exhibit A**, which is attached hereto and, by this reference, made a part hereof.

1.2 All documents, drawings and written work product prepared or produced by the Consultant under this Agreement, including without limitation electronic data files, are the property of the Consultant; provided, however, the County shall have the right to reproduce, publish and use all such work, or any part thereof, in any manner and for any purposes whatsoever and to authorize others to do so. If any such work is copyrightable, the Consultant may copyright the same, except that, as to any work which is copyrighted by the Consultant, the County reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, and use such work, or any part thereof, and to authorize others to do so.

1.3 Services and work provided by the Consultant under this Agreement will be performed in a timely manner in accordance with a schedule of work set forth in

Exhibit A. If there is no schedule, the hours and times for completion of said services and work are to be set by the Consultant; provided, however, that such schedule is subject to review by and concurrence of the County.

1.4 The Consultant shall provide services and work under this Agreement consistent with the requirements and standards established by applicable federal, state and County laws, ordinances, regulations and resolutions. The Consultant represents and warrants that it will perform its work in accordance with generally accepted industry standards and practices for the profession or professions that are used in performance of this Agreement and that are in effect at the time of performance of this Agreement. Except for that representation and any representations made or contained in any proposal submitted by the Consultant and any reports or opinions prepared or issued as part of the work performed by the Consultant under this Agreement, Consultant makes no other warranties, either express or implied, as part of this Agreement.

1.5 If the Consultant deems it appropriate to employ a consultant, expert or investigator in connection with the performance of the services under this Agreement, the Consultant will so advise the County and seek the County's prior approval of such employment. Any consultant, expert or investigator employed by the Consultant will be the agent of the Consultant not the County.

2. Consideration

2.1 The Consultant shall be compensated on a time and materials basis as provided in Exhibit A attached hereto.

2.2 Except as expressly provided in this Agreement, Consultant shall not be entitled to nor receive from County any additional consideration, compensation, salary, wages or other type of remuneration for services rendered under this Agreement, including, but not limited to, meals, lodging, transportation, drawings, renderings or mockups. Specifically, Consultant shall not be entitled by virtue of this Agreement to consideration in the form of overtime, health insurance benefits, retirement benefits, disability retirement benefits, sick leave, vacation time, paid holidays or other paid leaves of absence of any type or kind whatsoever.

2.3 The Consultant shall provide the County with a monthly or a quarterly statement, as services warrant, of fees earned and costs incurred for services provided during the billing period, which the County shall pay in full within 30 days of the date each invoice is approved by the County. The statement will generally describe the services performed, the applicable rate or rates, the basis for the calculation of fees, and a reasonable itemization of costs. All invoices for services provided shall be forwarded in the same manner and to the same person and address that is provided for service of notices herein.

2.4 County will not withhold any Federal or State income taxes or Social Security tax from any payments made by County to Consultant under the terms and conditions of this Agreement. Payment of all taxes and other assessments on such

sums is the sole responsibility of Consultant. County has no responsibility or liability for payment of Consultant's taxes or assessments.

3. Term

3.1 The term of this Agreement shall be from the date of this Agreement until completion of the agreed upon services unless sooner terminated as provided below or unless some other method or time of termination is listed in Exhibit A.

3.2 Should either party default in the performance of this Agreement or materially breach any of its provisions, the other party, at that party's option, may terminate this Agreement by giving written notification to the other party.

3.3 The County may terminate this agreement upon 30 days prior written notice. Termination of this Agreement shall not affect the County's obligation to pay for all fees earned and reasonable costs necessarily incurred by the Consultant as provided in Paragraph 2 herein, subject to any applicable setoffs.

3.4 This Agreement shall terminate automatically on the occurrence of (a) bankruptcy or insolvency of either party, or (b) sale of Consultant's business.

4. Required Licenses, Certificates and Permits

Any licenses, certificates or permits required by the federal, state, county or municipal governments for Consultant to provide the services and work described in Exhibit A must be procured by Consultant and be valid at the time Consultant enters into this Agreement. Further, during the term of this Agreement, Consultant must maintain such licenses, certificates and permits in full force and effect. Licenses, certificates and permits may include but are not limited to driver's licenses, professional licenses or certificates and business licenses. Such licenses, certificates and permits will be procured and maintained in force by Consultant at no expense to the County.

5. Office Space, Supplies, Equipment, Etc.

Unless otherwise provided in this Agreement, Consultant shall provide such office space, supplies, equipment, vehicles, reference materials and telephone service as is necessary for Consultant to provide the services under this Agreement. The Consultant--not the County--has the sole responsibility for payment of the costs and expenses incurred by Consultant in providing and maintaining such items.

6. Insurance

6.1 Consultant shall take out, and maintain during the life of this Agreement, insurance policies with coverage at least as broad as follows:

6.1.1 General Liability. Comprehensive general liability insurance covering bodily injury, personal injury, property damage, products and completed operations with limits of no less than One Million Dollars ($1,000,000) per incident or occurrence. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to any act or omission by Consultant under this Agreement or the general aggregate limit shall be twice the required occurrence limit.

6.1.2 Professional Liability Insurance. Professional errors and omissions (malpractice) liability insurance with limits of no less than One Million Dollars ($1,000,000) aggregate. Such professional liability insurance shall be continued for a period of no less than one year following completion of the Consultant's work under this Agreement.

6.1.3 Automobile Liability Insurance. If the Consultant or the Consultant's officers, employees, agents, representatives or subcontractors utilize a motor vehicle in performing any of the work or services under this Agreement, owned/non-owned automobile liability insurance providing combined single limits covering bodily injury, property damage and transportation related pollution liability with limits of no less than One Million Dollars ($1,000,000) per incident or occurrence.

6.1.4 Workers' Compensation Insurance. Workers' Compensation insurance as required by the California Labor Code. In signing this contract, the Consultant certifies under section 1861 of the Labor Code that the Consultant is aware of the provisions of section 3700 of the Labor Code which requires every employer to be insured against liability for workmen's compensation or to undertake self-insurance in accordance with the provisions of that code, and that the Consultant will comply with such provisions before commencing the performance of the work of this Agreement.

6.2 Any deductibles, self-insured retentions or named insureds, other than any subsidiary of AECOM Technology Corporation, must be declared in writing and approved by County. At the option of the County, either: (a) the insurer shall reduce or eliminate such deductibles, self-insured retentions or named insureds, or (b) the Consultant shall provide a bond, cash, letter of credit, guaranty or other security satisfactory to the County guaranteeing payment of the self-insured retention or deductible and payment of any and all costs, losses, related investigations, claim administration and defense expenses. The County, in its sole discretion, may waive the requirement to reduce or eliminate deductibles or self-insured retentions, in which case,

the Consultant agrees that it will be responsible for and pay any self-insured retention or deductible and will pay any and all costs, losses, related investigations, claim administration and defense expenses related to or arising out of the Consultant's defense and indemnification obligations as set forth in this Agreement.

6.3 The Consultant shall obtain a specific endorsement to all required insurance policies, except Workers' Compensation insurance and Professional Liability insurance, naming the County and its officers, officials and employees as additional insureds regarding: (a) liability arising from or in connection with the performance or omission to perform any term or condition of this Agreement by or on behalf of the Consultant, including the insured's general supervision of the Consultant; (b) services, products and completed operations of the Consultant; (c) premises owned, occupied or used by the Consultant; and (d) automobiles owned, leased, hired or borrowed by the Consultant. For Workers' Compensation insurance, the insurance carrier shall agree to waive all rights of subrogation against the County its officers, officials and employees for losses arising from the performance of or the omission to perform any term or condition of this Agreement by the Consultant.

6.4 The Consultant's insurance coverage shall be primary insurance regarding the County and County's officers, officials and employees. Any insurance or self-insurance maintained by the County or County's officers, officials and employees shall be excess of the Consultant's insurance and shall not contribute with Consultant's insurance.

6.5 Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the County or its officers, officials and employees.

6.6 The Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

6.7 Each insurance policy required by this section shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party except after thirty (30) days' prior written notice has been given to County. The Consultant shall promptly notify, or cause the insurance carrier to promptly notify, the County of any change in the insurance policy or policies required under this Agreement, including, without limitation, any reduction in coverage or in limits of the required policy or policies.

6.8 Insurance shall be placed with California admitted insurers (licensed to do business in California) with a current rating by Best's Key Rating Guide of no less than A-:VII; provided, however, that if no California admitted insurance company provides the required insurance, it is acceptable to provide the required insurance through a United States domiciled carrier that meets the required Best's rating and that is listed on the current List of Eligible Surplus Line Insurers maintained by the California Department of Insurance.

6.9 Consultant shall require that all of its subcontractors are subject to the

insurance and indemnity requirements stated herein, or shall include all subcontractors as additional insureds under its insurance policies.

6.10 At least ten (10) days prior to the date the Contractor begins performance of its obligations under this Agreement, Contractor shall furnish County with certificates of insurance, and with original endorsements, showing coverage required by this Agreement, including, without limitation, those that verify coverage for subcontractors of the Contractor. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements shall be received and, in County's sole and absolute discretion, approved by County. County reserves the right to require complete copies of all required insurance policies and endorsements, at any time.

6.11 The limits of insurance described herein shall not limit the liability of the Consultant and Consultant's officers, employees, agents, representatives or subcontractors.

7. Defense and Indemnification

7.1 To the fullest extent permitted by law, Consultant shall indemnify, hold harmless and defend the County and its agents, officers and employees from and against all claims, damages, losses, judgments, liabilities, expenses and other costs, including litigation costs and attorneys' fees, arising out of, resulting from, or in connection with the performance of this Agreement by the Consultant or Consultant's officers, employees, agents, representatives or subcontractors and resulting in or attributable to personal injury, death, or damage or destruction to tangible or intangible property, including the loss of use. Notwithstanding the foregoing, Consultant's obligation to indemnify the County and its agents, officers and employees for any judgment, decree or arbitration award shall extend only to the percentage of negligence or responsibility of the Consultant in contributing to such claim, damage, loss and expense.

7.2 Consultant's obligation to defend, indemnify and hold the County and its agents, officers and employees harmless under the provisions of this paragraph is not limited to or restricted by any requirement in this Agreement for Consultant to procure and maintain a policy of insurance.

7.3 To the fullest extent permitted by law, the County shall indemnify, hold harmless and defend the Consultant and its officers, employees, agents, representatives or subcontractors from and against all claims, damages, losses, judgments, liabilities, expenses and other costs, including litigation costs and attorney's fees, arising out of or resulting from the negligence or wrongful acts of County and its officers or employees.

7.4 Subject to the limitations in 42 United States Code section 9607 (e), and unless otherwise provided in a Scope of Services approved by the parties:

(a) Consultant shall not be responsible for liability caused by the presence or release of hazardous substances or contaminants at the site, unless the release results from the negligence of Consultant or its subcontractors;

(b) No provision of this Agreement shall be interpreted to permit or obligate Consultant to assume the status of "generator," "owner," "operator," "arranger," or "transporter" under state or federal law; and

(c) At no time, shall title to hazardous substances, solid wastes, petroleum contaminated soils or other regulated substances pass to Consultant.

7.5 Nothwithstanding anything in this Agreement, Consultant shall not have control or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety measures, precautions and programs, including enforcement of Federal and State safety requirements, in connections with construction work performed by the County's construction contractors. Nor shall Consultant be responsible for the supervision of County's construction contractors, subcontractors or any of their employees, agents and representatives of such contractors, or for inspecting machinery, construction equipment and tools used and employed by contractors and subcontractors on County's construction projects. In no event shall Consultant have the right to stop the work of any of County's construction contractors or subcontractors. In no event shall Consultant be liable for the acts or omissions of any construction contractors, their subcontractors, any of their agents or employees, or any other persons or entities performing any work related to this project, or for the failure of any of them to carry out construction work under contract with the County.

8. Status of Consultant

8.1 All acts of Consultant and its officers, employees, agents, representatives, subcontractors and all others acting on behalf of Consultant relating to the performance of this Agreement, shall be performed as independent contractors and not as agents, officers or employees of County. Consultant, by virtue of this Agreement, has no authority to bind or incur any obligation on behalf of County. Except as expressly provided in Exhibit A, Consultant has no authority or responsibility to exercise any rights or power vested in the County. No agent, officer or employee of the County is to be considered an employee of Consultant. It is understood by both Consultant and

County that this Agreement shall not be construed or considered under any circumstances to create an employer-employee relationship or a joint venture.

8.2 At all times during the term of this Agreement, the Consultant and its officers, employees, agents, representatives or subcontractors are, and shall represent and conduct themselves as, independent contractors and not employees of County.

8.3 Consultant shall determine the method, details and means of performing the work and services to be provided by Consultant under this Agreement. Consultant shall be responsible to County only for the requirements and results specified in this Agreement and, except as expressly provided in this Agreement, shall not be subjected to County's control with respect to the physical action or activities of Consultant in fulfillment of this Agreement. Consultant has control over the manner and means of performing the services under this Agreement. If necessary, Consultant has the responsibility for employing other persons or firms to assist Consultant in fulfilling the terms and obligations under this Agreement.

8.4 Consultant is permitted to provide services to others during the same period service is provided to County under this Agreement; provided, however, such services do not conflict directly or indirectly with the performance of the Consultant's obligations under this Agreement.

8.5 If in the performance of this Agreement any third persons are employed by Consultant, such persons shall be entirely and exclusively under the direction, supervision and control of Consultant. All terms of employment including hours, wages, working conditions, discipline, hiring and discharging or any other term of employment or requirements of law shall be determined by the Consultant.

8.6 It is understood and agreed that as an independent contractor and not an employee of County, the Consultant and the Consultant's officers, employees, agents, representatives or subcontractors do not have any entitlement as a County employee, and, except as expressly provided for in any Scope of Services made a part hereof, do not have the right to act on behalf of the County in any capacity whatsoever as an agent, or to bind the County to any obligation whatsoever.

8.7 It is further understood and agreed that Consultant must issue W-2 forms or other forms as required by law for income and employment tax purposes for all of Consultant's assigned personnel under the terms and conditions of this Agreement.

8.8 As an independent contractor, Consultant hereby indemnifies and holds County harmless from any and all claims that may be made against County based upon any contention by any third party that an employer-employee relationship exists by reason of this Agreement.

9. Records and Audit

9.1 Consultant shall prepare and maintain all writings, documents and records prepared or compiled in connection with the performance of this Agreement for a minimum of four (4) years from the termination or completion of this Agreement. This includes any handwriting, typewriting, printing, photostatic, photographing and every other means of recording upon any tangible thing, any form of communication or representation including letters, words, pictures, sounds or symbols or any combination thereof.

9.2 Any authorized representative of County shall have access to any writings as defined above for the purposes of making audit, evaluation, examination, excerpts and transcripts during the period such records are to be maintained by Consultant. Further, County has the right at all reasonable times to audit, inspect or otherwise evaluate the work performed or being performed under this Agreement.

10. Confidentiality

The Consultant agrees to keep confidential all information obtained or learned during the course of furnishing services under this Agreement and to not disclose or reveal such information for any purpose not directly connected with the matter for which services are provided.

11. Nondiscrimination

During the performance of this Agreement, Consultant and its officers, employees, agents, representatives or subcontractors shall not unlawfully discriminate in violation of any federal, state or local law, rule or regulation against any employee, applicant for employment or person receiving services under this Agreement because of race, religion, color, national origin, ancestry, physical or mental handicap, medical condition (including genetic characteristics), marital status, age, political affiliation or sex. Consultant and its officers, employees, agents, representatives or subcontractors shall comply with all applicable Federal, State and local laws and regulations related to non-discrimination and equal opportunity, including without limitation the County's nondiscrimination policy; the Fair Employment and Housing Act (Government Code sections 12900 et seq.); California Labor Code sections 1101, 1102 and 1102.1; the Federal Civil Rights Act of 1964 (P.L. 88-352), as amended; and all applicable regulations promulgated in the California Code of Regulations or the Code of Federal Regulations.

12. Assignment

This is an agreement for the services of Consultant. County has relied upon the skills, knowledge, experience and training of Consultant and the Consultant's firm, associates and employees as an inducement to enter into this Agreement. Consultant shall not assign or subcontract this Agreement without the express written consent of

County. Further, Consultant shall not assign any monies due or to become due under this Agreement without the prior written consent of County.

13. Waiver of Default

Waiver of any default by either party to this Agreement shall not be deemed to be waiver of any subsequent default. Waiver or breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach, and shall not be construed to be a modification of the terms of this Agreement unless this Agreement is modified as provided below.

14. Notice

Any notice, communication, amendment, addition or deletion to this Agreement, including change of address of either party during the term of this Agreement, which Consultant or County shall be required or may desire to make shall be in writing and may be personally served or, alternatively, sent by prepaid first class mail to the respective parties as follows:

To County:
County of Stanislaus
Department of Public Works
Attention: James Gregg
1010 Tenth Street, Suite 3500
Modesto, CA 95354

To Consultant:
DMJM Harris
Attention: Thomas R. Barnard, P.E.
601 University Avenue, Suite 274
Sacramento, CA 95825

15. Conflicts

Consultant agrees that it has no interest and shall not acquire any interest direct or indirect which would conflict in any manner or degree with the performance of the work and services under this Agreement.

16. Severability

If any portion of this Agreement or application thereof to any person or circumstance shall be declared invalid by a court of competent jurisdiction or if it is found in contravention of any federal, state or county statute, ordinance or regulation the remaining provisions of this Agreement or the application thereof shall not be invalidated thereby and shall remain in full force and effect to the extent that the provisions of this Agreement are severable.

17. Amendment

This Agreement may be modified, amended, changed, added to or subtracted from by the mutual consent of the parties hereto if such amendment or change is in written form and executed with the same formalities as this Agreement and attached to the original Agreement to maintain continuity.

18. Entire Agreement

This Agreement supersedes any and all other agreements, either oral or in writing, between any of the parties herein with respect to the subject matter hereof and contains all the agreements between the parties with respect to such matter. Each party acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or anyone acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Agreement shall be valid or binding.

19. Advice of Attorney

Each party warrants and represents that in executing this Agreement, it has received independent legal advice from its attorneys or the opportunity to seek such advice.

20. Construction

Headings or captions to the provisions of this Agreement are solely for the convenience of the parties, are not part of this Agreement, and shall not be used to interpret or determine the validity of this Agreement. Any ambiguity in this Agreement shall not be construed against the drafter, but rather the terms and provisions hereof shall be given a reasonable interpretation as if both parties had in fact drafted this Agreement.

21. Governing Law and Venue

This Agreement shall be deemed to be made under, and shall be governed by and construed in accordance with, the laws of the State of California. Any action brought to enforce the terms or provisions of this Agreement shall have venue in the County of Stanislaus, State of California.

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year first hereinabove written.

**COUNTY OF STANISLAUS**

By:_____
Pat Paul
Chair of the Board of Supervisors

"County"

**FREDRIC R. HARRIS, INC., dba DMJM HARRIS**

By:_____
Thomas R. Barnard, P.E.
Vice President

"Consultant

ATTEST: Christine Ferraro Tallman
Clerk of the Board of Supervisors of the
County of Stanislaus, State of California

By:_____
Deputy Clerk

Taxpayer Identification No. 13-5511947

APPROVED AS TO CONTENT:
Department of Public Works

By:_____
James L. Gregg
Supervising Civil Engineer

APPROVED AS TO FORM:
Michael H. Krausnick
County Counsel

By:_____
John P. Doering
Deputy County Counsel

L:\BRIDGES\32-042\Admin\042DMJM Harris AgmtC281.wpd

# EXHIBIT A

## A. SCOPE OF WORK

The Consultant shall provide engineering services under this Agreement related to and for the seismic retrofit or replacement of the River Road Bridge over the San Joaquin River (Bridge No. 39C-01), and for services involving the preparation and plans, specifications and engineer's estimate for construction of the approved retrofit or replacement, as set forth in the Consultant's Proposal dated November 22, 2000, as amended on January 17, 2001, which is incorporated herein by reference.

## B. COMPENSATION

1. The Consultant shall be compensated for the services provided under this Agreement on a time and materials basis, based on the hours worked by the Consultant's employees or subcontractors at the hourly rates specified in the Fee Estimate and Schedule of Rates included with the Consultant's Proposal. The specified hourly rates shall include direct salary costs, employee benefits, and overhead. These rates are not adjustable for the performance period set forth in this Agreement. In addition to the aforementioned fees, Consultant will be reimbursed for the following items, plus any expenses agreed by the parties as set forth in the Consultant's Proposal attached hereto, that are reasonable, necessary and actually incurred by the Consultant in connection with the services:

(a) Any filing fees, permit fees, or other fees paid or advanced by the Consultant.

(b) Expenses, fees or charges for printing, reproduction or binding of documents at actual costs.

2. The parties hereto acknowledge the maximum amount to be paid by the County for services provided shall not exceed $725,000.00, including, without limitation, the cost of any subcontractors, consultants, experts or investigators retained by the Consultant to perform or to assist in the performance of its work under this Agreement.

## C. FEDERAL OR STATE PROJECTS

The following provisions shall apply to projects funded entirely or in part by the State or federal government, and the Consultant agrees to perform services under this Agreement in accordance with such provisions, which shall take precedence over any different or inconsistent provisions of this Agreement.

1. Allowable cost items shall be determined in accordance with the Contract Cost Principals and Procedures (48 CFR Chapter 1, Part 31) and shall comply with the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments (49 CFR Part 18) (collectively referred to hereafter as the "Regulations").

2. The Consultant shall comply with all requirements and procedures set forth in the Regulations.

3. Any costs for which payments have been made to the Consultant, which are determined by subsequent audit to be unallowable under the Regulations, shall be promptly repaid to the County after demand.

4. Any subcontract entered into by the Consultant for performance of the Consultant's obligations under this Agreement, shall be subject to all of the provisions of this Agreement, and shall incorporate by reference all of the terms and conditions of this Agreement, and shall contain all of the provisions for State or federally funded projects set forth in Section "C" herein.

5. The Consultant shall perform the work under this Agreement with resources available within its own organization and no portion of the work pertinent to this Agreement shall be subcontracted without the prior written consent or approval by the State's or the County's Contract Manager, except that which is expressly identified in the Consultant's proposal. Any substitution of subcontractors must be approved in writing by the State's or the County's Contract Manager.

6. Representatives of the State and FHWA shall have access to review all project records and documents for the purposes of making audit, evaluation, examination, excerpts and transcripts during the period such records are maintained by the Consultant.

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**Public Works**
STANISLAUS COUNTY

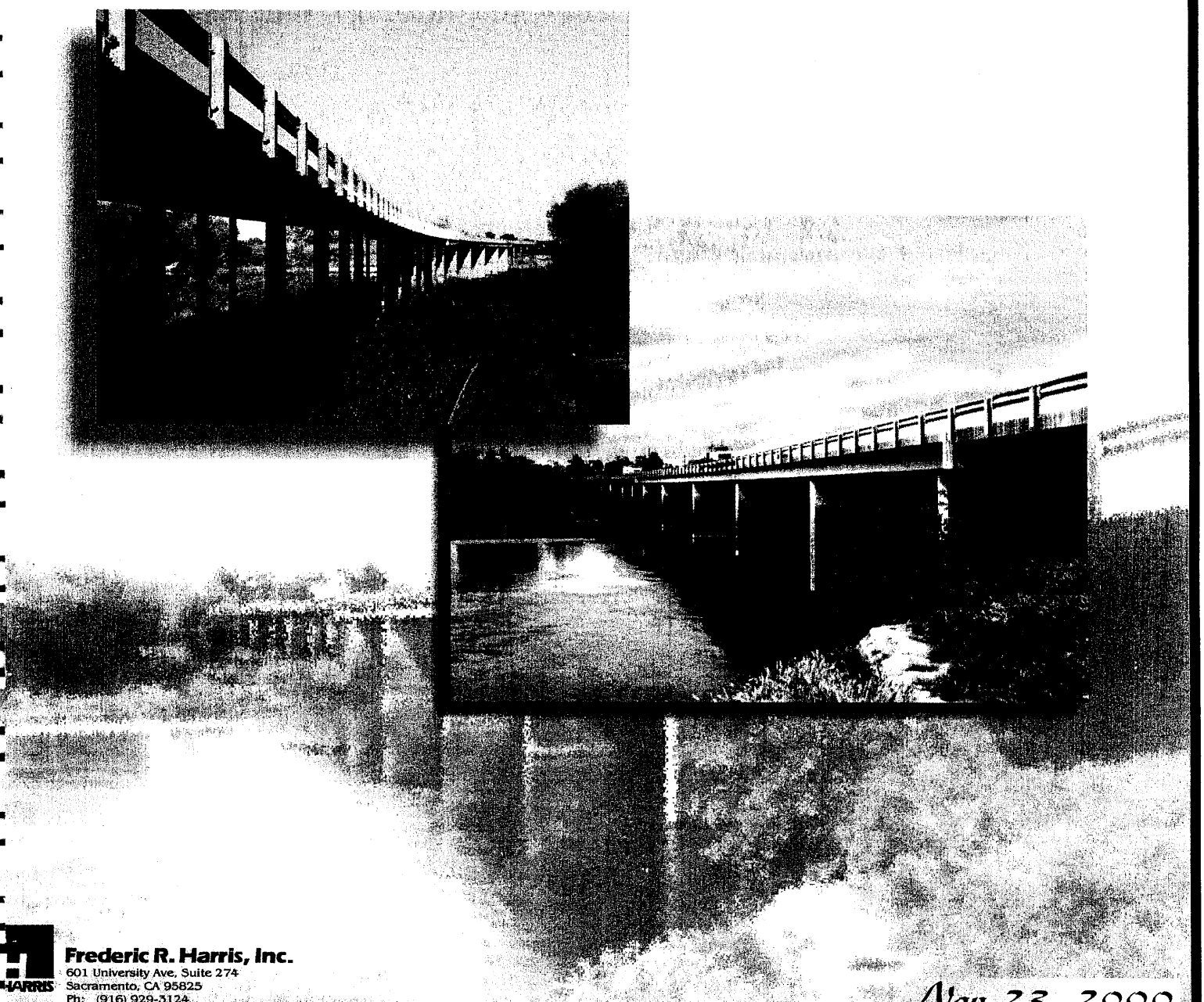
**PROPOSAL FOR**

Seismic Retrofit of

# River Road Bridge at San Joaquin River

Submitted by:

**Frederic R. Harris, Inc.**



**Frederic R. Harris, Inc.**
601 University Ave, Suite 274
Sacramento, CA 95825
Ph: (916) 929-3124

Nov 23, 2000

HARRIS

We are pleased to offer Stanislaus County an exceptional consultant team for this project:

- Frederic R. Harris, Inc. (Sacramento) will provide Project Management, Bridge Engineering and Civil Engineering.
- Earth Mechanics, Inc., (Fountain Valley), one of the premier firms in the nation with respect to evaluating the potential and impacts of liquefaction on structures, will provide Geotechnical Engineering services.
- Kjeldsen, Sinnock and Neudeck, Inc. (Stockton) will provide Surveying, Right-of-Way services and Utility Engineering.
- Norman S. Braithwaite, Inc. (Redding) will perform hydrologic, hydraulic and scour studies.
- Jones & Stokes (Sacramento) will provide environmental services necessary to complete certification of the project under CEQA/NEPA and obtain the necessary environmental permits.

Our proposed Project Manager for this project is Mr. Thomas R. Barnard, P.E. Tom's background includes serving as Project Manager or Project Engineer for seismic retrofit of over 50 bridges. He has also served in these capacities on more than 10 HBRR projects. Tom is currently serving as structures lead for the McHenry Avenue Corridor Study in San Joaquin/Stanislaus Counties.

We have reviewed the County's Master Agreement and can meet the stated requirements. However, there are several minor modifications we would like to discuss if selected for this work.

Our Proposal for Engineering Services for this work is enclosed. We look forward to working with Stanislaus County on this exciting project.

Sincerely,

**FREDERIC R. HARRIS, INC.**

Neil H. Harris, P.E.
Vice President

Enclosure

cc: Mr. Thomas R. Barnard, P.E.

# SECTION 1: PROJECT UNDERSTANDING

## INTRODUCTION

The subject bridge carries River Road across the San Joaquin River near Hills Ferry in Stanislaus County near the Merced County line. The bridge is located just downstream of the confluence of the San Joaquin River and the Merced River, which creates some interesting hydraulic conditions. George J. Hatfield State Recreation Area is located just to the north and east of the bridge site. The limits of the recreation area are not anticipated to extend into the area of the bridge project eliminating the need to address section 4(f) during the environmental documentation process.

Retrofit analyses were conducted for the subject bridge in 1993, and resulted in the production of retrofit strategy and PS&E. Since that time, changes in the Seismic Design Criteria, Seismic Hazard Map and the ARS curves prompted a re-evaluation of the issues and risks at the site by Stanislaus County. Anticipating that these changes would impact the original retrofit strategy, in 1999 the County requested Taber Consultants to perform geotechnical exploration and evaluation of foundation materials at the bridge site with regard to liquefaction potential and ground stability.

Stanislaus County has subsequently requested proposals from qualified consultants to study the bridge's response considering the new criteria and to suggest an appropriate course of action/strategy for mitigation of deficiencies. Two primary possibilities exist, retrofit or replacement:

- **Retrofit:** modify the existing structure to resist the increased demands, or
- **Replace:** should the cost and/or future consequences of modifying the existing structure prove to be uneconomical or inappropriate a replacement structure will be designed.

The selected consultant will prepare plans, specifications, and estimates for the strategy selected and provide design support during construction as requested by the County.

## PROJECT UNDERSTANDING

FRH is intimately familiar with the existing structure as a result of its involvement in developing the 1993 retrofit strategy and PS&E for this bridge. A recent site visit by FRH personnel indicates little change to the condition of the structure and channel since the original strategy in 1993. Also in preparation for this proposal, FRH thoroughly reviewed the previous strategy documents to determine changes to the 1993 seismic evaluation criteria and their potential impact on the strategy recommendation. Our findings are discussed in the following paragraphs.

### BRIDGE SITE GEOLOGY/SEISMICITY

The Taber report introduced the following two major changes to the criteria used in the original 1993 investigation:

a. *The Peak Rock Acceleration was revised from 0.15g to 0.4g:* The seismic design criteria at the time of the original study followed those published in the Caltrans BDS. The peak acceleration was 0.20 g. The ARS curve corresponding to a depth to rock-like materials of greater than 150 feet was used. The Caltrans Seismic Hazard Map showing the peak bedrock acceleration contours for the entire state was updated in 1996. Using this 1996 map, the peak bedrock acceleration at the bridge site is now 0.4g. In 1998, Caltrans also modified the ARS criteria to conform to those published in the ATC-32 report.

## SECTION 1: PROJECT UNDERSTANDING

According to the original strategy report, the fundamental longitudinal and transverse periods are 0.65 and 0.86 seconds, respectively. Using these same periods, the new spectral accelerations are found to be 50% higher than the original estimates.

b. *Liquefaction Potential and Lateral Spreading*: With this large increase in site seismicity, the Taber study finds that there is a significant potential for "large seismically induced ground movements at the east bank." According to Taber's report, the ground motion is produced by the liquefaction-susceptible upper native soil layer. The sudden drop in the shear strength of this layer upon liquefaction threatens the slope stability of the east embankment and could cause the embankment to slide several feet. The study further concludes that the resulting deflection and/or soil loads could fail the Class III piles at bents 2 through 5, and hence could result in a bridge collapse.

**Comparison of the Revised vs. Original ARS Coefficients:**

| Geotechnical Study | Longitudinal Dir. ($T_L$ = 0.65 sec.)* | Transverse Dir ($T_T$ = 0.86 sec.)* |
|---|---|---|
| ***Original Strategy*** | | |
| *ARS Curve: Caltrans S2GD51* | *0.67* | *0.58* |
| ***Taber Report*** | | |
| *Magnitude. = 6.75; Soil Type D* | *1.00* | *0.87* |
| ***% Increase*** | ***50%*** | ***50%*** |

** These periods, $T_L$ and $T_T$ are taken from the original strategy analysis performed by FRH in 1993*

*FRH concurs that the above two conclusions from the Taber report are significant enough to warrant a complete re-evaluation of the existing structure to determine its seismic vulnerabilities.*

### FURTHER DISCUSSION OF THE TABER REPORT:

Our Team's own assessment of the site seismicity produced an ARS curve that corresponds to Figure R3-7 of ATC-32 instead of Figure R3-8 as shown in the Taber's report. Figure R3-7 should be modified to account for near-fault effects, as suggested by Taber. However, the modification of the spectral-acceleration increase should start at a structural period of 0.4 second instead of 0.5 second used in the Taber report. Correction of the above discrepancies will result in a slightly lower spectral acceleration for the same structural period.

Using a peak acceleration of 0.34g, Taber concluded that the sandy soils above the silt have a high liquefaction potential. The sand below the silt layer at the approaches also has a high liquefaction potential but this deeper liquefiable sand only affects the abutment footings and stability of the

## SECTION 1: PROJECT UNDERSTANDING

approach. The Taber analysis was performed using a computer program referencing the NCEER 1996 method. This method was updated in 1997; we have applied the updated method on recent projects and do not anticipate a significant difference in conclusions using the updated 1997 method versus the 1996 method.

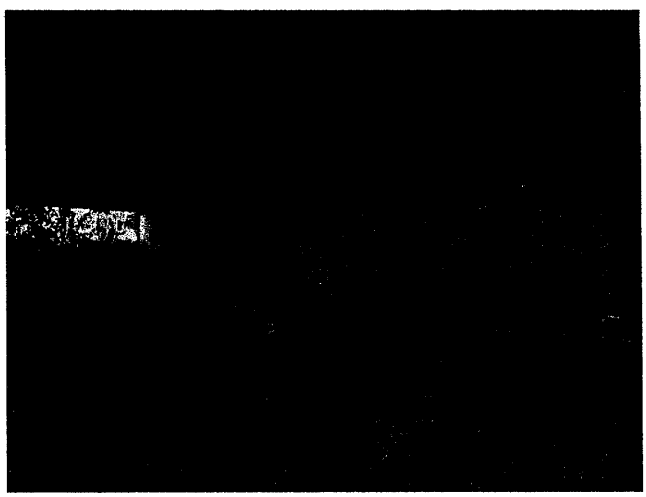
Due to soil liquefaction, ground movement is possible at the approaches as well as in the river. This ground movement, if significant, can impose soil loading on the substructure. Therefore, the magnitude of ground movement and soil loading must be studied in detail when evaluating the seismic performance of the entire bridge. Upon reviewing Taber's methodology and results, the proposing team has the following comments:

a) The subsurface soil strength parameters used by Taber are relatively conservative. Most geotechnical engineers have a tendency to be on the conservative sdie; however, for retrofit projects, it is critical for the geotechnical engineer to use realistic soil strength parameters because the cost associated with foundation retrofit could exceed 50 percent of the total retrofit cost. This is particularly true for river crossings. The use of realistic soil strength parameters will result in a reduction in the ground movement at the approaches.
b) Reinforcing effects of the existing piles must be considered. The piles supporting the abutments and the nearby piers, will reinforce the soil around the pile group. These pile "pinning" effects should be considered in lateral spreading analysis because the pile pinning will reduce the potential and amount of ground movement.
c) Based on the river bottom topography reported by Taber, there is significant ground relief near Station 13+00. Ground movement in this area should be included in a lateral spreading analysis.

The above refinements should be included in a more detailed lateral spreading analysis. This analysis must also include the effect of soil loading (if any) on the existing piles and embedded structural members.

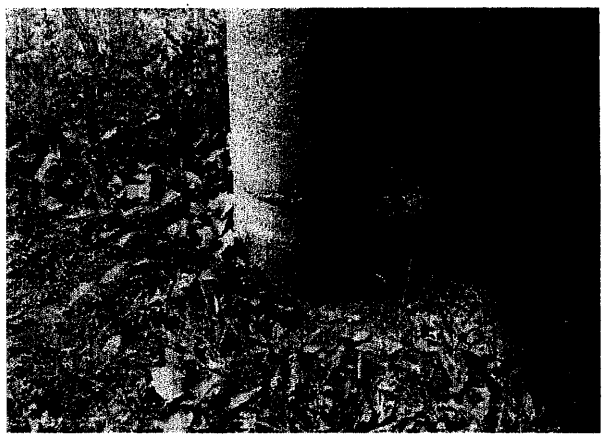
### EXISTING CONDITIONS:

As stated at the beginning of this section, no significant change in the general condition of the structure has occurred since the previous seismic evaluation. The diaphragm abutments and wingwalls appear to remain in satisfactory condition. Repairs were previously made at both abutments to mitigate undermining of the abutments due to embankment erosion and scour. As a result of this undermining, the bridge approaches have a history of undergoing settlements of up to 3 inches.



## SECTION 1: PROJECT UNDERSTANDING

Scour at the pile bents is an issue that should be considered in evaluating the bridge. An inspection report dated January 1, 1992 states "there is no evidence of scour noted at the structure." However, the latest inspection report dated February 29, 2000 indicates that there is indeed evidence of general long-term degradation of the streambed occurring. The NBIS SIA report does not indicate that the structure has been rated with respect to scour. Due to the evidence and future potential for scour, Caltrans design guidelines will require the inclusion of a "half-scour" depth in the assessment of foundation response under seismic loading and a "full-scour" depth under service loading condition.



***Bridge Data Summary:***

| | Framing Unit | | |
|---|---|---|---|
| | **East** | **Middle** | **West** |
| ***Superstructure:*** | | | |
| *Type:* | *CIP Slab* | *CIP T-Beam* | *CIP Slab* |
| *No. of Spans:* | *4* | *5* | *9* |
| ***Bents:*** | | | |
| *Column Type:* | *Pile Extension* | *Pier Wall* | *Pile Extension* |
| *Column / Bent:* | *4* | *1* | *4* |
| *Foundation Type:* | *3* | *2* | *1* |
| ***Abutments:*** | | | |
| *Type:* | *Diaphragm* | *N/A* | *Diaphragm* |
| *Foundation Type:* | *2* | *N/A* | *2* |

***Foundation Types:***

*1 = Four Class I piling w/ steel shell terminated at ground level*
*2 = Pile footing w/ Class I piles*
*3 = Four Class III piles w/ steel shell continued to the soffit*

### AS-BUILT ASSESSMENT:

The interaction between the three superstructure units will be captured through analysis to determine the final levels of forces and stiffness caused by earthquake loading. FRH's previous analysis models can be quickly updated with the revised seismic criteria and new runs obtained. This will allow more time to be devoted to finding an economical retrofit solution.

## SECTION 1: PROJECT UNDERSTANDING

In this structure, the stiffness characteristics of the bridge in the transverse direction are dependent upon the capacities of the existing connections between the three superstructure units. With the exception of friction forces, there are no effective lateral restraints or mechanisms to transfer shear across the joints. Without such mechanisms, the two end frames become immediately susceptible to large seismic movements and even collapse. If a mechanism for transferring transverse shear across the hinges is provided, the pier walls in the middle frame will lend significant rigidity to the entire bridge in the transverse direction. In the longitudinal direction, the seismic input to the various units depends largely on their individual stiffness since only a small longitudinal force could be effectively carried across the hinges.

The pier walls behave differently along their weak and strong axes and will be evaluated accordingly. In the weak direction, pier walls behave similar to regular columns, acting mainly in combined bending and axial compression. In the transverse or "strong" direction, the piers tend to act as deep beams or shear walls, resulting in a significant increase in the transverse stiffness of the bridge. If pier wall analysis were to be limited to linear response only, this increase in stiffness would normally result in high load demands on the pile foundation. These loads typically exceed the capacities of the existing piles. As a result, limited failure and inelastic action is likely to occur at the bottom of the pier. If certain conditions are met, this limited inelastic response at the bases of pier walls may be tolerated. Refinement techniques such as rocking analysis will be used to account for the effect of this localized foundation yielding. Rocking is considered to be a form of seismic isolation that could limit the seismic load input to the bridge.

The liquefaction potential described in Taber's report presents a serious threat to the safety of the structure. The slender, Class III pile extensions at the east bank are subject to failure under the soil loading resulting from "several feet" of lateral spreading. A retrofit strategy will be considered viable only if it provides for structural and/or soil mitigation measures to prevent structural collapse should liquefaction occur. It is anticipated that a strictly structural solution to the liquefaction problem will involve extensive retrofit. On the other hand, a geotechnical-only solution would be very expensive, and does not address other structural deficiencies. The Team believes that if retrofit is selected as the final strategy, a combination of structural and geotechnical mitigation measures would most likely be required.

In addition to liquefaction, the following as-built deficiencies are believed to be present:

- Insufficient hinge seat width
- Inadequate transverse shear capacity at hinges
- With the inclusion of scour, excessive displacements are anticipated.

### STRATEGY OPTIONS: RETROFIT *VS.* REPLACEMENT

Feasibility of proposed modifications to the existing structure necessary to bring it into conformance with current safety standards coupled with the economics of implementing them will be key to the decision to retrofit or replace. The retrofit requirements, and therefore cost, are expected to be significantly higher than proposed in the '93 strategy. In addition to the immediate impact of the retrofit cost, the remaining useful life of the bridge, estimated at 20 years, will be a factor in the decision.

## SECTION 1: PROJECT UNDERSTANDING

Review of the February 29, 2000 bridge inspection report indicates underwater investigation of the foundation elements within the river channel were not performed and are not programmed for the future. The as-built plans indicate that the original ground profile provided approximately 4 feet of cover over the pile footings supporting the pier walls. The current profile described in the inspection report states that top of deck to thalweg measures 10.5 meters +/- at Bents 12, 13 and 14. This would put the current streambed at the same elevation as the bottom of the pile footing or the top of the optional seal course. If no seal course was used during the original construction then the bottom of the footing may currently be exposed.

### *Environmental Considerations:*

The FRH team recognizes the importance of other factors such as location, environmental sensitivity, and site hydraulics and will make every effort to achieve a comprehensive understanding of these issues. The project team firmly believes that the success and timely completion of the project largely depends on a balanced view of these factors and the structural considerations.

Site environmental constraints are issues that need to be addressed at the onset of the seismic evaluation process. The increase in site seismicity combined with the liquefaction potential leads the Team to believe that foundation retrofit will likely be required for a retrofit solution and removal or modification of the existing structure necessary in a replacement scenario. As a result, river access and compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements will dictate constraints and mitigation measures to protect resources, both riparian and aquatic.

### *Bridge Replacement Considerations:*

Should replacement be the final strategy determination, the following factors will be considered during the type selection process of the replacement structure:

- Bridge Costs
- Bridge Aesthetics
- Roadway Geometry
- Site Hydraulics and Navigable Channel
- Environmental Documentation and Permitting
- Traffic Management During Construction
- Site Geology and Seismic Conditions
- Public Outreach Support
- Utility Coordination and/or Relocation
- Long-Term Costs/Benefits

### *Structure Alternatives:*

The replacement structure must meet the standard design requirements for functionality, while optimizing the economics related to both the construction and long-term maintenance costs. The presence of environmentally sensitive plant and animal species could significantly impact the available construction windows. As a result, consideration will be given to bridge solutions that minimize construction time and/or limit access requirements from the ground adjacent to the bridge.

***Substructure***

## SECTION 1: PROJECT UNDERSTANDING

To achieve the greatest economy among structurally viable systems, it is often necessary to evaluate the cost of increasing the span length against cost of increasing the number of supports. The type, and therefore cost, of the foundation selected for a replacement structure may be impacted by some or all of the following:

- Fill and soft/loose upper unit native soils at approaches
- Disturbed (bedload) soils in the channel
- Groundwater
- Saturated granular soils at depth
- Potential scour and degradation in the channel (as evaluated by others)
- Construction considerations
- Site seismicity and potential for liquefaction

The Final Geotechnical Report will discuss in detail the appropriate foundation elements for this site. However, our experience with similar structures favors the use of cast-in-drilled-hole (CIDH) piles, which minimize the impact to the environment by reducing the construction activity in the active channel. The use of other typical foundation types such as the standard piles listed in the Caltrans Standard Plans and spread footings will be investigated.

### *Superstructure*

Precast/Prestressed Box Girder: Precast box girder construction eliminates the need for falsework in the channel, minimizing environmental and hydraulic impacts during construction. The girder's box shape presents a smooth soffit to any drifting material that is forced under the leading edge of the bridge during peak flows, further reducing the impact of the low freeboard.

Precast/Prestressed Spliced Bulb Tee Girder: The benefit of eliminating falsework from the channel bottom is also realized with this structure type. The typical girder depth ranges from 54" to 81". For a given depth, the spanning capacity of this girder can be controlled through decreasing the girder spacing, introducing superstructure continuity, or increasing its concrete strength. This is an important advantage of the system, given the limitations placed on the structural depth as a result of the free board requirements. The long girders will be fabricated in shorter segments, which allows for relatively easy transportation and erection operations. Once in their final erected position, post-tensioning tendons will be threaded through ducts embedded into the girder segments during fabrication. Next, the ducts and adjacent girder ends will be spliced, and the P/T tendons will be stressed. The long, continuous girders are formed at the end of the stressing operations, and are ready for the application of the additional loads due to forming and casting the deck slab. A second stage of post-tensioning is typically applied after the deck hardens to impart compression into the newly–cast concrete and to enforce the post-tensioning applied during the first stage. FRH has been a pioneer in the use of this structure type in California, and has recently used post-tensioned spliced bulb-T girders on two HBRR projects.

Cast-In-Place Box Girder: This is the most common structure type built in California. Both reinforced and prestressed cast-in-place configurations were considered. To minimize the approach fill requirements, a variable depth (haunched) superstructure could be used. However, falsework construction for casting the boxes will likely aggravate environmental concerns regarding fish and wildlife habitat and may raise concern over control of sediment transport in the River channel during construction.

## SECTION 1: PROJECT UNDERSTANDING

### *Preliminary Roadway Design:*

The FRHTeam will review existing alignment and profile data along with the new topographic information collected to identify requirements for the ties between the new structure and the existing roadways. Roadway drainage in the approaches will be considered along with the maintenance and associated cost implications. Design considerations and requirements for existing and future utilities will be identified and incorporated in the preliminary designs. If the same alignment is used it is not anticipated that new ROW takes will be required. It is foreseeable that temporary construction easements will be required to accommodate construction activities. Alternative alignments and impacts on adjacent landowners along with related costs will be included in the consideration of various structure types.

# ORGANIZATIONAL CHART

**Public Works**
STANISLAUS COUNTY

**James Gregg, P.E.**
Roads and Bridges

**Officer-in-Charge**
**Neil Harris, P.E**
Frederic R. Harris, Inc.
Quality Assurance

**Project Manager**
**Thomas R. Barnard, P.E.**
Frederic R. Harris, Inc.

**Environmental Clearance & Permits**
**Kim Erickson**
Jones & Stokes

**Geotechnical Services**
**Lino Cheang, PhD., P.E., G.E.**
Earth Mechanics, Inc.

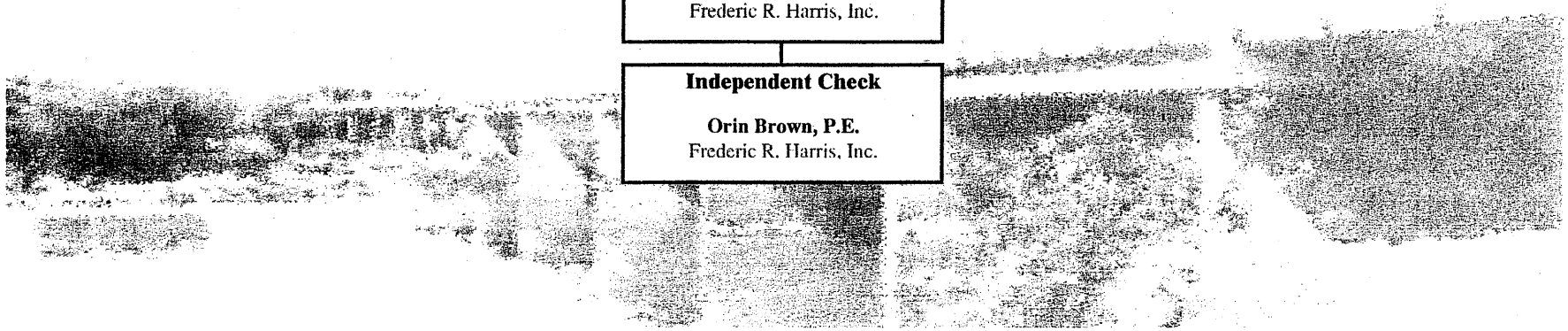
**Bridge Engineering**
Project Engineer
**Ahmad Abdel-Karim, PhD., P.E.**
Frederic R. Harris, Inc.

**Survey, Right of Way & Utilities**
**Kenneth Kjeldsen, P.E.**
Kjeldson, Sinnock & Nuedeck, Inc.

**Hydrology & Hydraulics**
**Norman S. Braithwaite, P.E.**
Norman S. Braithwaite, Inc.

**Civil & Roadway**
**Christopher Poli, P.E.**
Frederic R. Harris, Inc.

**Independent Check**
**Orin Brown, P.E.**
Frederic R. Harris, Inc.



Frederic R. Harris, Inc.

# River Road Bridge at San Joaquin River

## PROJECT TEAM QUALIFICATIONS AND EXPERIENCE

**Frederic R. Harris, Inc. (FRH)** has assembled a highly qualified team of professional firms to address all engineering disciplines required for the successful execution of this challenging retrofit project. **FRH** will serve as prime consultant, providing a single source of contact for Stanislaus County, and will perform all bridge engineering services. The firm has led seismic retrofit projects for Caltrans, the City of Los Angeles, the County of Los Angeles and the Southern California Regional Rail Authority (SCRRA), totaling over 100 bridges. Our bridge project experience includes many Bridge Replacement (HBRR), including River Crossing structures, and Grade Separation structures in California. To address the particular requirements of this project, we have formed an association with several consulting firms:

**ENGINEERING MECHANICS, INC.**
GEOTECHNICAL ENGINEERING

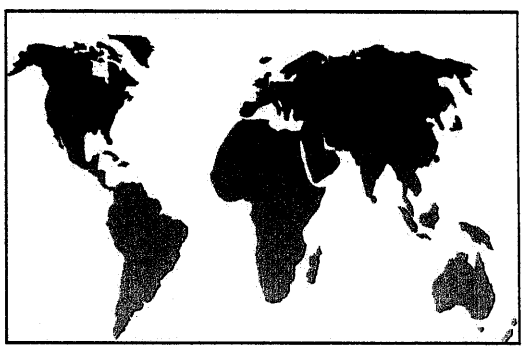
**NORMAN S. BRAITHWAITE, INC.**
HYDROLOGIC AND HYDRAULIC ENGINEERING

**JONES & STOKES**
ENVIRONMENTAL CLEARANCE AND PERMITS

**KJELDSEN, SINNOCK & NEUDECK, INC.**
SURVEY, RIGHT-OF-WAY, AND UTILITIES

## PROJECT MANAGEMENT, BRIDGE AND CIVIL ENGINEERING – *FREDERIC R. HARRIS, INC.*

**Frederic R. Harris, Inc. (FRH)**, nearing its 74th year of operation, is one of the nation's largest full service A/E firms. Consistently ranked within ENR's top ten survey of transportation engineering firms (ranked #6 in 2000), FRH has more than 600 professionals company-wide who specialize in transportation, and another 800 professionals and support personnel based in major cities and countries around the world. Our staff size has reached approximately 1,600 people.



**US Office Locations**
- California
- Puerto Rico
- Florida
- Louisiana
- Maryland
- Massachusetts
- New Jersey
- Virginia
- Rhode Island
- Washington
- New York

In Sacramento, FRH has been providing regional services under the name of our bridge engineering subsidiary, LoBuono, Armstrong & Associates. The 20 person Sacramento Office has recently diversified its range of services to include railroad/civil engineering and construction management, and has recently started marketing local services under the FRH name.

FRH was founded in 1927 by the late Admiral Frederic R. Harris, and quickly earned a reputation for creativity and innovation in solving complex engineering problems.

Over the years, the firm has continued to build on this reputation while steadily expanding in size and breadth of capabilities. Our staff includes some of the leading professional engineers, architects, planners, surveyors, construction specialists, environmental scientists, and traffic engineers in the industry. Their expertise has made FRH an award winning, recognized leader in

the design and construction of bridges, rail lines, highways and port facilities throughout the United States.

In the transportation field alone, FRH has been responsible for:

- 1,500 bridges and overpasses
- $2 billion of railroad and mass transit construction
- $2.5 billion of highway/bridge construction
- 20,000 miles of highways and expressways.

FRH offers a complete range of transportation engineering services, with special emphasis on structural engineering services (bridge design), highway design, passenger and freight rail design, ports and harbors design, and construction management. Its public sector clients include rail authorities, port authorities, state transportation departments and county and city public works departments throughout the United States, as well as many foreign government agencies.

Following the 1989 Loma Prieta earthquake, Frederic R. Harris, Inc (FRH). was selected by the California Department of Transportation (Caltrans) to perform emergency engineering services to protect the State's transportation infrastructure investment. Services included inspection, analysis, evaluation and development of seismic retrofit plans, specifications and estimates for critical highway, railroad and pedestrian bridges throughout California. Following the 1994 Northridge Earthquake, Caltrans determined there was a need to evaluate and strengthen a much larger number of structures, and again, FRH was called upon to provide emergency bridge expertise. In all, FRH has executed $8 million in engineering contracts with Caltrans for this work. In addition to Caltrans, Frederic R. Harris has provided seismic retrofit services to a number of California local agencies, including Contra Costa County, Los Angeles County, Imperial County and the City of Los Angeles.

FRH maintains a reputation for providing innovative, cost-effective solutions that meet the needs of the client. In order to maintain this reputation, cost commitment and schedule achievement are considered a priority. FRH has a proven record of success in delivering quality service and products, on time and within budget. In addition, the FRH Quality Assurance Program is a built-in component of every assignment. FRH is committed to providing high quality work products.

For detailed descriptions of relevant seismic retrofit and bridge replacement projects, please see Appendix B.

## OUR SUBCONSULTANTS

### GEOTECHNICAL ENGINEERING - ENGINEERING MECHANICS, INC. (EMI)

**EMI** was founded as a California corporation in February 1989. EMI is a geotechnical and earthquake engineering consulting company. The firm specializes in site investigation and foundation design of bridges. EMI provided consulting to federal (FHWA) and state highway departments (Arizona, California, Hawaii, Missouri, New York, Oregon, Tennessee and Washington DOT's) and other local county and city agencies and transportation commissions.

EMI has been engaged in the investigation, design and construction of numerous water crossing

**PROJECT TEAM QUALIFICATIONS AND EXPERIENCE**

projects. Recent significant water crossing projects in California include Carquinez Strait and Bencia-Martinez bridge replacements in the Bay area, Garey Bridge crossing Sisquoc River in Santa Maria, Hueneme Road crossing Calleguas Creek, River Road bridge crossing Santa Ana River, Marina Drive Bridge crossing San Gabriel River, Metrolink R/R bridge crossing Oso Creek Channel and Floradale Road Crossing Santa Ynez River. EMI also provided geotechnical design for the seismic retrofit of water crossings including five of the six toll bridges in Northern and Southern California. These contracts were funded by Caltrans. they are the Project Geotechnical consultant for the on-going design of the San Francisco-Oakland Bay East Span Replacement bridge project. They have also provided geotechnical design and construction support services for seismic analysis and retrofit of over 1000 bridges throughout California; some of these bridges are water crossings.

*__EMI__ is the prime geotechnical consultant on the __ATC-32__ project responsible for the review and modification of the foundation section of the widely used Caltrans Bridge Design Specifications.*

EMI's technical staff is familiar with Federal Codes and Specifications published by FHWA, AASHTO, AREA and ATC (Applied Technology Council) as well as design manuals, Standard Plans and Specifications and other design guidelines published by Caltrans.

Earth Mechanics' transportation team derives its strength from a group of experienced engineers and geologists. Each member has a different specialty, ranging from conventional site investigation to complex experimental and analytical modeling. Scope of their services includes:

- Field Exploration - Drilling and Soil Sampling
- Geologic Studies - Trenching, Down-Hole Logging and Fault Investigation
- Soil Laboratory Testing - ASTM and Caltrans Test Methods
- Engineering Design / Analysis - Foundation Design, Embankment Stability and Pavement Design
- Construction Support - Pile Driving Monitoring, Drilled Shaft Inspection and Compaction Testing
- Special Studies - Pile Load Test and Software Development.

HYDROLOGIC AND HYDRAULIC ENGINEERING - **NORMAN S. BRAITHWAITE, INC. (NSB)**

Norman S. Braithwaite Incorporated was organized in August 1987 in response to a growing regional demand for hydrologic and hydraulic engineering services. Prior to this time Mr. Braithwaite provided hydrologic and hydraulic engineering studies and design services as an employee of TKO Power (now CHI-West), Ott Water Engineers and CH2M-Hill. Presently, Mr. Braithwaite is the owner and principal of NSB. As such, he has complete control and full responsibility of all services. NSB has recently completed Location and Design Hydraulic Studies with FRH for two projects: Matanzas Creek in Santa Rosa and Alta Mesa Road over Dry Creek for Sacramento County.

*__NSB__ has prepared over 80 Design Hydraulic Studies for HBRR bridge projects.*

## PROJECT TEAM QUALIFICATIONS AND EXPERIENCE

### ENVIRONMENTAL CLEARANCE AND PERMITS - JONES & STOKES (J&S)

Jones & Stokes is a multidisciplinary firm providing clients with a wide range of services in environmental planning and natural resources management. The firm was formed in 1970 and is headquartered in Sacramento, California, with offices in Bakersfield, Irvine, and San Jose, California; Bellevue, Washington; Ashland, Oregon; and Phoenix, Arizona.

Jones & Stokes maintains a full-time staff of over 300 professionals that includes environmental specialists, biologists, planners, landscape architects, economists, attorneys, and engineers. Staff biologists are qualified in terrestrial and aquatic ecology, fisheries, wildlife management, wetland biology, habitat evaluation, forestry, vegetation management, and habitat restoration. Staff scientists and planners provide expertise in environmental planning, land use, transportation, air quality, noise, water quality, public services, and community and recreation planning. As cultural resource specialists, they provide services related to historical archaeology, historical architecture, and Native American resources. The firm's economic staff is skilled in natural resource economics, fiscal impact analyses, market studies, and socioeconomic analyses. The staff engineers are experienced in areas of environmental, water resources, waste disposal, and traffic engineering. Staff attorneys are knowledgeable in all aspects of environmental law and regulations.

> ***Jones & Stokes** has completed more than 3,500 environmental and natural resource reports and studies throughout the western United States.*

Jones & Stokes' diverse experience includes over 3,500 environmental and natural resource reports and studies throughout the western United States. In the past ten years alone, Jones & Stokes has conducted environmental studies for more than 250 transportation facility projects, including bridges, rural highways, urban freeways, local roadways, transit facilities, airports, and ports. They are experts on the Federal Highway Administration (FHWA) and Caltrans environmental compliance procedures for local roadway projects that receive federal funding.

Jones & Stokes is an employee-owned company in which each professional is personally committed to the highest quality client service. Their staff adheres to a problem-solving philosophy and believes that the keys to high-quality client service are scientific accuracy and decision-oriented work products. Their facilities include a full in-house technical library, a GIS and CAD facility, training facilities, and separate laboratories each for acoustical engineering, biology, and archaeology.

### SURVEY, RIGHT-OF-WAY, AND UTILITIES - KJELDSEN, SINNOCK & NEUDECK, INC. (KSN)

Kjeldsen, Sinnock & Neudeck, Inc. (KSN) is a full- service civil engineering and land surveying firm specializing in the surveying, mapping, planning, design and construction of municipal improvements, public works and water resources' related projects. KSN has the expertise and capability to handle all phases of project development, from initial planning and site surveying through design and construction, and on to maintenance and operation of the completed project. KSN and its predecessor firm, Darrhl I. Dentoni & Associates, have been providing civil engineering and surveying services to public and private clients throughout California's Central Valley for over 40 years. The firm currently serves as consultant to over 30 communities, special districts, and local

## PROJECT TEAM QUALIFICATIONS AND EXPERIENCE

public agencies in the San Joaquin County and foothill areas. KSN presently maintains a highly qualified staff of 25 which includes civil engineers, land surveyors, a landscape architect, engineering and CADD technicians, field inspectors and additional administrative support staff. KSN is committed to implementation of the rapidly changing technologies in its dynamic profession, including new construction products, construction procedures, computer hardware, design software, and surveying equipment. KSN's staff is proficient in the use of the most current versions of AutoCad and IntelliCAD drafting engines, Softdesk (DCA) and Eagle Point design software, HEC-2, TR-20, and Microsoft Office products including Word, Excel, Project, Powerpoint and Access.

***KSN** has been providing civil engineering and surveying services to public and private clients throughout California's Central Valley for over 40 years. The firm currently serves as consultant to over 30 communities, special districts, and local public agencies in the San Joaquin County and foothill areas.*

KSN, acting as the local sub-consultant to larger civil design firms, provided essential engineering for four railroad underpasses at the Union Pacific and the Southern Pacific crossings of Hammer and March Lanes in Stockton. The firm provided all surveying, right-of-way engineering, utility coordination, and drainage design services. These four grade separation projects will improve congestion on two of Stockton's major east-west thoroughfares. The Hammer Lane underpass was completed in late 1999, while the March Lane project is to be started in the fall of 1999. The total construction cost for the four grade separations was approximately $48,000,000.

Kjeldsen, Sinnock & Neudeck, Inc., acted as prime consultant and assembled multi-discipline design teams for the preparation of plans, specifications and estimates for the City of Stockton's Charter Way Beautification Project, the Center Street Rehabilitation Project and the El Dorado Street Rehabilitation Project. The total cost of construction of these three projects was approximately $3,000,000.

KSN served as the prime consultant on a multi-discipline team that prepared the plans, specifications and estimates for the City of Lodi's Kettleman Lane (State Route 12) Safety Improvement Project. The scope of the project improvements included a raised median with provisions for future landscaping and the conversion of an uncontrolled "T" intersection to a four way signalized intersection. The project was fast tracked to meet grant funding deadlines and required extensive coordination with utilities and Caltrans.

## PROJECT TEAM QUALIFICATIONS AND EXPERIENCE

### PROJECT STAFFING

The following is a summary of individual experience for key members of FRH's Team. Please see Appendix A for detailed resumes.

### PROJECT MANAGEMENT, BRIDGE ENGINEERING AND CIVIL ENGINEERING
### FREDERIC R. HARRIS, INC.

#### *Officer-in-Charge*

The Officer-in-Charge will ensure that the Project Manager has all the resources necessary for the successful execution of this project. He will be responsible for independently monitoring and assuring the County's satisfaction with FRH's work, and that the company's QA/QC program has been fully implemented.

**Neil H. Harris, P.E.**

**Project Assignment**
Officer-In-Charge

**Years of experience**
21

**Education**
*M.S., (Structures)*, 1981
University of Illinois at Urbana-Champaign
*B.S., Civil Engineering*, 1979
University of Cincinnati

Neil has managed over 20 task orders for a total construction value of $50 million. He was the project manager for the award-winning I-710/SR 60 Interchange seismic retrofit.

**Mr. Neil H. Harris, P.E.,** will serve in this capacity on this project. Neil has 21 years of bridge and civil engineering experience and manages FRH's Sacramento office and California operations. In addition to serving as Officer-in-Charge, he will lead the QA reviews. Mr. Harris has served as Officer-in-Charge or Project Manager on most of FRH's West Coast bridge and highway projects. He has played key technical roles as project manager for *Caltrans* on-call retrofit contracts. To date he has managed 20 task orders for a total construction value of $50 million. He was the project manager for the award-winning I-710/SR60 Interchange seismic retrofit project for Caltrans. His relevant project experience in California includes:

- Hills Ferry Bridge over San Joaquin River--Seismic Retrofit, Stanislaus County
- Caltrans Phase II Seismic Retrofit Contract 59X845, 22 Bridges throughout California
- I-710/SR60 Seismic Retrofit, Los Angeles County
- Retrofit of 23 City Bridges, Los Angeles
- Franklin Boulevard/Thornton Road Bridge Replacement, Sacramento / San Joaquin County
- Jackson Street Bridge Replacement Project, City of Red Bluff
- Alta Mesa Road Bridge over Dry Creek, Sacramento County
- Route 101 over Rock Creek Bridge Replacement, Mendocino County

#### *Project Manager*

The Project Manager will take ultimate corporate responsibility for successful completion of this project and will be the focal point for both internal management and communication with Stanislaus County. He will disseminate technical and management directives from the County to the production staff; monitor, evaluate and take necessary actions to ensure adherence to schedule and budget; review concepts, plans and specifications for conformance with accepted engineering practice; and initiate Quality Assurance activities. The Project Manager will prepare agendas and lead all team meetings and will take part in outside agency meetings.

## PROJECT TEAM QUALIFICATIONS AND EXPERIENCE

**Mr. Thomas Barnard, P.E.** has over 20 years of bridge experience in both design and construction of transportation structures and associated civil improvements. He spent more than nine years with a bridge design/build company, giving him strong insight into constructability and cost estimating issues. Mr. Barnard has substantial Federal Highway Bridge Replacement/Rehabilitation Program experience and in the last seven years Mr. Barnard has served as Project Manager or Project Engineer for over 100 seismic retrofit, 12 bridge replacement, and 5 rehabilitation projects. One of his recently completed assignments was Project Manager for the Jackson Street Bridge Replacement Project B, a two-bridge HBRR project for the City of Red Bluff with approximately 1,000 feet of roadway widening. Mr. Barnard is currently leading a study for the City of Sacramento evaluating repair and life-cycle maintenance and replacement costs for a series of 11 structures on State Route 160 to help the City negotiate route relinquishment costs with Caltrans. His other relevant California projects include:

**Thomas R. Barnard, P.E**

**Project Assignment**
Project Manager

**Years of experience**
20

**Education**
*B.S., Civil Engineering,* 1980
University of Oklahoma

Tom served as Project Manager or Project Engineer for seismic retrofit of over 100 bridges. He has extensive HBRR experience.

- Contract No. 59S573, Caltrans On-Call Seismic Retrofit
- Caltrans Phase II Seismic Retrofit Contract 59X845, 22 Bridges throughout California
- Seismic Retrofit of Four Bridges, Contra Costa County
- Brighton Underpass Rehabilitation, City of Sacramento
- Franklin Boulevard/Thornton Road Bridge Replacement, Sacramento/San Joaquin County
- Jackson Street Bridge Replacement Project, Red Bluff
- Alta Mesa Road Bridge over Dry Creek, Sacramento County
- Capay Bridge Replacement, Yolo County
- Laurelgrove Avenue Bridge Replacement Project, Studio City
- Route 101 over Rock Creek Bridge Replacement, Mendocino County

### *Bridge Project Engineer*

**Ahmad Abdel-Karim, Ph.D., P.E. --** will serve as the Bridge Project Engineer and lead bridge designer for this project. He has 14 years' experience in the design and research of bridge structures. Dr. Abdel-Karim has served as the project engineer, designer or independent checker for numerous seismic retrofit and bridge design projects in California and throughout the U.S. Under FRH's research contract with Caltrans, he has developed spliced precast girder design standards for use throughout the state and he has led seismic retrofit PS&E efforts for more than 20 bridges. He is also the author of several TRB reports on culvert design. Recent relevant California bridge PS&E experience includes:

- Caltrans Seismic Retrofit Program- Russian Gulch Bridge
- Freeman Road Bridge Seismic Retrofit, Contra Costa County
- Seismic Retrofit Program, City of Los Angeles
- I-710/SR60 Seismic Retrofit, Los Angeles
- Caltrans Design Standards for Spliced-Girder Bridges
- Franklin Boulevard / Thornton Road Bridge Replacement, Sacramento/San Joaquin Counties
- Jackson Street Bridge Replacement Project, Red Bluff

**PROJECT TEAM QUALIFICATIONS AND EXPERIENCE**

- Brown's Creek Bridge, Los Angeles County
- Mariposa Road Grade Separation, Stockton

***Bridge Independent Check Engineer***

**Orin A. Brown, P.E.** -- Will serve as the lead independent check engineer for this project. His Ten years of bridge engineering experience includes design or check assignments on numerous new bridge design, bridge rehabilitation and seismic retrofit projects. His California bridge design/check experience relevant to this project includes:

- San Juan Canyon Bridge Earthquake Retrofit, Orange County
- Smith River Bridge Earthquake Retrofit, Crescent City
- Samoa, Middle, and Eureka Channel Bridges Earthquake Retrofit, Eureka
- Franklin Boulevard / Thornton Road Bridge over Mokelumne River, Sacramento County
- Capay Bridge Replacement, Yolo County
- Mariposa Road Grade Separation, Stockton
- Alta Mesa Road over Dry Creek, Sacramento County

***Roadway Project Engineer***

**Christopher Poli, P.E.** – Will serve as project engineer for roadway and associated civil engineering work. Chris has 13 years of diverse civil engineering experience including highway, rail and facility design. He has held various positions including Design Engineer, Project Engineer and Project Manager. Relevant California experience for this project includes:

- Route 91 Widening Project, Orange County
- Route 86 Widening, Imperial County
- Needles Connector Feasibility Study, Needles, CA
- John Wayne Airport Access Road, Costa Mesa
- Jurupa Avenue Grade Separation Project, Riverside

**GEOTECHNICAL ENGINEERING**
**ENGINEERING MECHANICS, INC.**

**Mr. Lino Cheang, P.E.** will serve as the supervising geotechnical engineer for the project. Mr. Cheang has over 17 years of experience in foundation design and analysis of roadway widening, highway bridge widening and replacement projects. He has provided geotechnical design and analysis to determine the seismic performance of over 800 existing bridges. He is intimately familiar with the process of provided foundation parameters and design to support the development of retrofit strategies and preparation of final PS&E. The services he provided typically include an assessment for soil liquefaction potential and scour. Mr. Cheang is a registered Civil & Geotechnical Engineer.

**HYDROLOGIC AND HYDRAULIC ENGINEERING**
**NORMAN S. BRAITHWAITE, INC**

**Mr. Norman S. Braithwaite, P.E,** will lead all Hydrologic and Hydraulic Engineering. He has over 16 years of experience in all aspects of bridge hydraulic studies, sediment transport and erosion studies, and flood studies. Since 1987 as an independent consultant, Mr. Braithwaite

**PROJECT TEAM QUALIFICATIONS AND EXPERIENCE**

has prepared Location Hydraulic Studies (LHS) and Design Hydraulic Studies (DHS) for bridges using Highway Bridge Rehabilitation and Replacement (HBRR) funds and Emergency Restoration (FEMA-ER) funds for numerous Northern California county governments. Complex hydrologic and hydraulic issues have been addressed in these studies. He has also been responsible for writing, testing, and maintaining computer programs that emulate hydrology manuals for the *Counties of Sacramento, El Dorado, and Placer in California* and the Cities of Redding, California and Salt Lake City, Utah. These programs contain regional hydrologic data for each county or city and perform testing of parameters entered by the user.

**ENVIRONMENTAL CLEARANCE & PERMITS**
**JONES & STOKES**

**KIM ERICKSON, P.E.,** will lead the environmental clearance and permitting portion of this project. Kim has considerable experienced in project management; land use planning and analysis; impact assessment, including land use, public services, and growth inducement. She has served as Project Manager and directed preparation of natural environment study (NES) reports to address impacts on biological resources, archaeological survey reports, and historic properties survey reports for various bridge replacement projects.

**SURVEY, RIGHT-OF-WAY, AND UTILITIES**
**KJELDSEN, SINNOCK & NEUDECK, INC.**

**Mr. Kenneth Kjeldsen, P.E.**, will lead the surveying, right-of-way, and utility coordination efforts. He has over 30 years experience in the field of civil engineering with emphasis in the planning, design and construction of municipal, public works and water resource related projects. He has served as the Project Manager on numerous public works projects, ranging from sanitary, water supply, and transportation systems to reclamation engineering. Mr. Kjeldsen's extensive experience has included major treatment plant and collection system expansions in several Central Valley communities, including Escalon, San Andreas, Jamestown, Groveland, and Woodbridge.

## SECTION 3: WORK PLAN

This section describes the team's detailed approach to performing the various tasks of the project. The Project phase and task numbers described in this section correspond to those listed in the Project Schedule (Section 4). The actual work scope will be adjusted to fit the individual project prior to commencement. This section will become the basis of the Final Work Plan, which will guide the team members in every foreseeable aspect of the project from the Notice to proceed to public use.

### PROJECT MANAGEMENT

Project Management is a continuous, but not a full-time, activity throughout the duration of the project. Internal staff meetings will be held on an as-needed basis to keep the design team and project manager informed of issues that affect one another. The Project Manager will contact each of our subconsultant project engineers on a routine basis, when they are active on the project, to monitor their progress and exchange information. Communication with Stanislaus County's Contract/Project Manager will be conducted, as necessary, by telephone and other efficient means (fax, e-mail, etc.) to minimize travel expenses. Letter-type reports will be prepared monthly in conjunction with invoices to brief the County on progress within the period. **On-going communication between FRH and the County will be the key to successful completion of the project on time and within budget.**

It is anticipated that the environmental documentation process will involve a public outreach component. We assume that Stanislaus County will coordinate and perform this function. The RFP did not request this service and we have not proposed to provide it. We do propose, and have included a nominal amount of staff time to provide support for the County's efforts in the public outreach. We can also add a public outreach consultant to the team in order to provide the necessary services, should the County wish focus its own resources on other work.

### QUALITY ASSURANCE

**FRH**'s Quality Assurance Program has been developed to ensure that project work is carried out in a planned, controlled, and correct manner. It includes procedures for scheduling and assigning work; for recording, retention, and retrieval of records for both design and construction activities; for identifying and resolving deficiencies affecting the work; and for verifying compliance with the requirements of the QA Program.

Project checklists will be completed that document the following:

Review of the Seismic Retrofit Strategy,
Review of the Type Selection Report,
Independent Check of Design,
Review of the Contract Drawings, and
Review of the Specifications and Opinion of Construction Costs.

The Officer-in-Charge of the unit will serve as Quality Assurance Manager, tasked with monitoring and enforcing compliance with the program. He will also perform a review of the final contract documents package for conformance with the work scope.

# SECTION 3: WORK PLAN

## PROJECT APPROACH

## PHASE I – SEISMIC RETROFIT STRATEGY

### TASK I.1 REVIEW EXISTING DATA / FIELD REVIEW

Upon receiving a Notice to Proceed from the County, **FRH** will attend a meeting with County staff to set up administrative procedures and obtain all relevant data regarding the project. **FRH** will assemble and thoroughly review all available information about the bridge and its site and will distribute this information to team members. The list may include as-built bridge plans, planning documents, inspection/maintenance reports, foundation reports, etc. The available information will be studied in enough detail to familiarize the team with the project and to select critical bridge components and physical terrain features on which to concentrate during a site visit.

A field trip will be scheduled with County representatives. Checklists for inspection of the site will be prepared in advance to expedite the process.

Since the seismic retrofit strategy determination may be replacement of the existing bridge, information concerning constraints that will impact the design of a replacement will be gathered at the same time. It is anticipated that a representative from each discipline will attend (environmental, civil, survey, hydraulic, geotechnical, bridge, etc.) and participate in this critical site visit. In order to minimize travel expenses, the site visit will be scheduled to coincide with the kickoff meeting.

A letter report, summarizing the findings and documenting the critical features of the structure involved.

### TASK I.2 PERFORM INITIAL SURVEY

It is not anticipated that the strategy determination phase of the work will require the generation of full topographic survey information in order to commence. Verification of available benchmark information that will tie the hydraulic gauge datum to the structure and channel profiles will be performed. The effort may be as simple as a data search or may involve transfer of elevation to the site.

Cross-sections of the San Joaquin River will be acquired on each side of the bridge by sounding from the structure or via other means. The data will be of sufficient accuracy to permit preliminary hydraulic calculations to be performed (usually +/- 0.5 feet in elevation), and to identify changes in the Final Grade elevations indicated on the as-built plans.

Data will be gathered to determine property ownership. It is not anticipated that any right-of-way work will be performed at this stage, but it is useful to have the information when considering temporary and permanent easement /takes and the potential impacts, for estimating purposes.

In addition to the above, we will acquire existing aerial photos and topography maps for use in preparing the Advanced Planning Study of a replacement bridge.

## SECTION 3: WORK PLAN

### TASK I.3 PRELIMINARY ENVIRONMENTAL CONSULTING

In accordance with the FHWA Technical Advisory Paper and Caltrans' Guidance for Consultants, environmental resource technical studies must be completed before the environmental documents are prepared. In addition, FHWA and Caltrans typically require that the federal agencies have received environmental documentation (for example, the biological assessment has been submitted to NMFS) prior to release of the public draft environmental documents.

Based on our current knowledge of the project, we anticipate preparing an initial study/mitigated negative declaration to comply with CEQA and a categorical exclusion to comply with NEPA. It is not possible to determine at this time the appropriate environmental documents, as that would depend on the type and scale of construction work required.

Jones & Stokes staff will provide consultation on environmental issues during the strategy determination phase of the work. Review of available documentation for projects in the vicinity or of similar scope will be conducted and reported to the team in the form of email or letter reports. Consideration for listed and/or endangered species and other resources known or anticipated to exist at the site will be noted and discussed with the designer early in the process to reduce/eliminate strategy approaches which would generate conflicts. The net effect will focus efforts on feasible scenarios early and ensure higher probability of success and timely completion of the environmental documentation and permitting.

### TASK I.4 PRELIMINARY BRIDGE HYDRAULICS

***Initial Estimate of Potential Scour:*** An estimate of potential scour is needed to evaluate the existing structure with respect to the current seismic demands and determine the viability of possible seismic retrofit strategies.

Using available data from the preliminary survey task, USGS streamgage records for the San Joaquin River near Newman (USGS Streamgage Number 11274000), bridge as-built plans and any preliminary seismic retrofit design drawings, an estimate of potential pier, contraction and abutment scour (as appropriate) will be calculated.

The estimate of potential channel "degradation" or deepening from the seismic retrofit hydraulic analysis (required under the Seismic Retrofit program prior to the strategy meeting) will be relied upon for the estimates of total potential local scour. A preliminary design memorandum or brief letter report describing the analysis and conveying the results will be prepared.

### TASK I.5 PREPARE PRELIMINARY FOUNDATION REPORT

***Liquefaction Analysis:*** Using the latest Caltrans seismic design parameters and a realistic assessment of the soil properties, we will perform a liquefaction analysis using the latest NCEER method. This will be followed by a computation of the existing foundation capacity and stiffness. We propose providing capacity and stiffness values for two soil conditions: liquefied and non-liquefied. The non-liquefied results are needed because the foundation stiffness for this case is usually larger than the liquefied case; thus "attracting" larger structural demands to the foundation. Depending on the available foundation capacity for the non-liquefied condition, this case may control the retrofit strategy.

## SECTION 3: WORK PLAN

***Lateral Spreading:*** We will need to evaluate the magnitude of ground movement due to lateral spreading. These ground movements may impose significant loads on the existing foundation. There is a debate whether or not the full soil loading due to lateral spreading should be added to the full structural loading generated by the ARS. Sound engineering judgment supports the conclusion that the soil and structural loading will not be in-phase, thus the full values of each component should not be additive. In past projects, we have used either 50% of the soil loading and 100% of the structural loading, or 50% of the structural loading and 100% of the soil loading, whichever combination is more severe, to assess the foundation response.

***As-Built Analyses:*** Once the seismic design parameters (acceleration and ARS) are established, we will conduct a soil liquefaction assessment. Results of the liquefaction analyses will be incorporated in the development of idealized soil profiles and design strength parameters for liquefied and non-liquefied conditions. The profiles and soil strengths will be used to compute foundation capacity and stiffness. Lateral spreading analyses will also be performed to determine the amount of ground movement and subsequent soil loading on the foundation. All of the above work will be performed using existing soil data.

***Retrofit Strategy:*** Deficiencies identified by the structural designers will provide be the basis for our recommendations on foundation retrofit, if required. We will also participate in the Strategy Meeting to answer questions concerning the geotechnical findings and recommendations. It is important to point out that our recommendations for foundation retrofit are tailored for cost estimating purposes only; final design will be conducted in the PS&E phase (Task 2).

***Preliminary Geotechnical Report (PGR):*** A PGR will be prepared to document our findings and recommendations for the as-built and retrofit analyses. The PGR will be included as an appendix in the Strategy Report. We anticipate that the County and possibly Caltrans will review the PGR and a final PGR will need to be submitted to include those review comments and responses.

### TASK I.6 PERFORM AS-BUILT SEISMIC ANALYSIS

The original strategy was based on the latest criteria at the time it was prepared, which is largely contained in MTD 20-4. While the latest MTD 20-1 and SDC documents are both directed at new designs, they replace or update many of the provisions contained in MTD 20-4. Therefore the seismic re-evaluation of the bridge will be based on the latest SDC document.

Since the completion of the original strategy in 1993, Caltrans has made several revisions to its seismic evaluation / design criteria. The changes were largely in response to the 1994 Northridge Earthquake. The performance-based criteria is defined in Memo To Designers (MTD) 20-1 "Seismic Design Methodology." The specific provisions needed to implement this methodology are contained in the new Caltrans Seismic Design Criteria (SDC). The MTD 20-1 and SDC documents supersede the seismic design requirements contained in Chapters 3 and 8 of Caltrans Bridge Design Specifications.

Because of its role in developing the original (1993) strategy, FRH already has working as-built models for the structure. These models can easily be modified for the latest geotechnical findings and seismic parameters.

## SECTION 3: WORK PLAN

Findings of the initial estimate of potential scour will be used to set the unbraced length of piling and establish points of fixity for the elements for both the seismic and service load conditions. Should the estimated scour depth fall below the existing pile cap but within the limits of the existing piles the structure would be considered scour critical. Classification of the structure as "scour critical" will require a foundation structural analysis considering service loads.

The initial analysis will be a gravity analysis both to determine dead and live load forces in the substructure and to verify the model. Review of the foundation response in the full scour condition will be made at this stage.

Response spectrum dynamic analyses, by modal superposition, will be performed utilizing the spectra specified by EMI. The half scour condition prescribed in the CT-BDS will be considered in addition to liquefaction and the no-scour/non-liquefied cases.

A sufficient number of modes will be used to capture a minimum of 90 percent mass participation. Pseudo-static lateral analyses will be produced to verify the reasonableness of the dynamic analyses. In accordance with Caltrans procedures, a stand-alone analysis/evaluation of the hinge restrainers will be produced. FRH*'s in-house program, HINGERES, will be used to perform this analysis.*

Displacement ductility methods will be the basis for evaluating the vulnerability of the structure. Displacements from dynamic analyses, using cracked section properties, are taken as the seismic demand. Once the bents have been analyzed, foundation elements will be evaluated for the lesser of the elastic ARS demands or the plastic hinging moments at the bases of the columns. Again, pseudo non-linear approaches will be utilized, if necessary, to evaluate whether limited pile failure in pile foundations would shed load from the pier under consideration, and thereby eliminate the need for retrofitting.

### TASK I.7 DETERMINE RETROFIT ALTERNATIVES

The FRH team will review the analytical results and develop a set of possible retrofit measures to correct the defined deficiencies. The total possible options will be reduced to one or two schemes considered to be feasible. As-retrofit seismic analyses will be produced to evaluate the ability of each scheme to achieve the desired result. For each alternative, tables will be developed showing the demand versus capacity of all major components of the structures.

### TASK I.8 PERFORM ADVANCED PLANNING STUDY (APS)

The cost of retrofitting a structure, such as this one, is often significant, when compared to replacement. Giving due consideration to environmental constraints and the remaining useful life of the bridge, it is anticipated that replacement is an alternative strategy to be considered.

In order to compare the cost of bridge retrofit and replacement options, an advanced planning study will be prepared for the "bridge replacement" strategy. The purpose of this study is to explore the feasible structure types and produce an estimate of construction cost based on historical $/square foot for a few feasible structure types. The result is not a formal type selection but a planning document for comparison purposes. A general plan and elevation drawing and general plan estimate will be produced as a result of this effort.

## SECTION 3: WORK PLAN

It is anticipated that the County will provide input from it's "General Plan" for this area as it would relate to River Road and impact geometrics and functional configuration of a replacement structure and the approach roadway.

### TASK I.9 PREPARE COST ESTIMATES OF ALTERNATIVES

Cost estimates will be developed for the most promising of the strategies to determine which will be the most cost-effective. Current pricing data representative of the area in which the bridge is located will be used.

### TASK I.10 PREPARE DRAFT STRATEGY REPORT

The results of the analyses and proposed strategies for retrofit will be described in the Draft Strategy Report. This report will describe the structure, analysis methods and models used, analytical results, evaluation of structural components, and recommendations for retrofit. A cost estimate for the recommended strategy will be included in the report. The estimate will include associated costs for utilities, right-of-way and approach roadway works, which may be reasonably anticipated at the time. This draft report will be submitted to the County for review one week before the scheduled strategy meeting.

### TASK I.11 STRATEGY MEETING

The FRH Team will schedule and participate in a strategy meeting to present the evaluation procedures used, describe our findings and discuss proposed retrofit measures. Comments from the County will be discussed, meeting minutes recorded and distributed to all the attendees within 5 working days of the meeting date.

### TASK I.12 REVISE STRATEGY / UPDATE FINAL STRATEGY REPORT

After the strategy meeting, alternative retrofit strategies and/or supplemental analyses agreed upon by the attendees will be prepared and resubmitted for review. Upon final strategy determination, the Final Strategy Report will be produced. It will include Draft Strategy Report, Strategy Meeting Minutes, responses to the comments, a brief statement of the Final Strategy Determination and recommendations for action.

## SECTION 3: WORK PLAN

## OPTION A. PS&E (RETROFIT)

## PHASE II -- ENVIRONMENTAL AND UTILITY COORDINATION

### TASK II.1 FINAL ENVIRONMENTAL ASSESSMENT

If the Phase I environmental initial report indicates that construction activities may disturb hazardous materials. Jones & Stokes will conduct physical sampling (Phase II assessment) at the site, as necessary. After the subsurface investigation has taken place, the nature and extent of contamination, if any, is assessed. If significant contaminants are present in the subsurface in or along the construction corridor, a worker health and safety plan will address procedures for handling contaminated soil excavated during seismic retrofit and/or construction activities.

Jones & Stokes will prepare an administrative draft of the required technical studies for review by Stanislaus County, and Caltrans. After revising the studies based on written comments, the review reports will be forwarded to Stanislaus County to send to Caltrans for FHWA review. For purposes of cost estimating, it is assumed that only one review round of the technical studies will be prepared. The final reports would be based on FHWA review. All technical studies will be prepared in accordance with Caltrans Guidance for Consultants and the FHWA Technical Advisory Paper.

Jones & Stokes will also prepare NES, Wetlands Delineation, and Biological Assessment. The purpose of the NES and related documents is to provide certain biological studies and information necessary for environmental documents to satisfy legal requirements of the various state and federal statutes. Generally, the NES includes documentation of the biological resources in the project area and an assessment of the impacts of the project on those resources. It also includes a wetland delineation. A biological assessment is required when the project has the potential to take ("take" is defined by the federal KSN) a federally listed threatened or endangered species. For fisheries, any species that has a commercial value must be evaluated under a Essential Fish Habitat Assessment. This document can be folded into the biological assessment. The biological assessment is a stand-alone document that is typically included in the NES as an appendix.

Jones & Stokes biologists will prepare the NES to Caltrans requirements. We will follow requirements of the "Caltrans Guidance for Consultants, Procedures for Completing the Natural Environmental Study and Related Biological Reports." The biological resources that will be addressed in the NES will limited to those that are pertinent to the study area and can reasonably be expected to be affected by the project. The NES will include:

Relevant federal, state, and local policies and regulations related to biological resources in the project area will be summarized in the NES. We will discuss the roles and responsibilities of the federal agencies (Corps, NMFS, USFWS) and state agencies (California Department of Fish and Game [DFG] and Regional Water Quality Control Board (RWQCB). We also will review the requirements for a NEPA/404 memorandum of understanding (MOU) to determine if the project may require interagency coordination in accordance with the MOU.

The bridge project will require consultation with NMFS on Central Valley steelhead and with USFWS on Sacramento split tail. Jones & Stokes will coordinate informal consultation with NMFS and USFWS to discuss federally listed fish species that may be affected by the project and to determine the most efficient approach for achieving KSN Section 7 compliance. The bridge project would affect the migration corridor for adult steelhead returning to and juvenile steelhead leaving the Merced River. Sacramento split tail have the potential to occur year round at the project site,

however spawning and incubation occur in the spring, ending typically by May. The period of concern for the sensitive fish species would likely be October 1 through May 30. The removal of riparian vegetation for the temporary and permanent bridges would need to be avoided or minimized, as feasible. And, although Chinook salmon are not listed (currently considered a candidate species), KSN consultation would also need to include consultation on essential fish habitat for Chinook salmon.

Jones & Stokes will prepare Cultural Resources Technical Reports. Cultural resource studies for the project will be performed according to the guidelines and recommended procedures outlined in Caltrans' Guidance for Consultants in accordance with NHPA Section 106. All work required for this project will be supervised by professionals that meet the standards established by the U.S. Secretary of the Interior for work in archaeology, history, and architectural history. This will allow the work to comply with the FHWA guidelines and with the NHPA Section 106 requirements.

### TASK II.2 PRELIMINARY UTILITY COORDINATION & VERIFICATION AND TOPOGRAPHIC SURVEY

After the final strategy has been determined, the limits of proposed construction will then be identified. This will determine the scope of any additional utility verification/relocation required.

Utilities that are in the general proximity of the work area will be accurately located in the field. This field survey will be accomplished utilizing a two-person crew utilizing the latest state-of-the-art electronic data collection systems. Once collected, the data will be brought to the office and downloaded through the computer system so that it can be imported directly into the retrofit foundation plan.

A topographic survey to determine a more accurate profile of the channel will also be done in this task. The information obtained will be used in the scour report and the final strategy design.

## PHASE III -- PLANS, SPECIFICATIONS & ESTIMATES AND CONSTRUCTION SUPPORT

### TASK III.1 PERFORM FINAL STRATEGY DESIGN (65% SUBMITTAL)

Based on the conclusions stated in the final strategy report, FRH will proceed with final design calculations for retrofitting these structures. All procedures used will be in accordance with Caltrans' Bridge Design Specifications (BDS), Memos to Designers (MTD), Bridge Design Aids (BDA), and the new Seismic Design Criteria (SDC). FRH maintains a complete structural engineering software library (Appendix C) -- both commercial software and programs/spreadsheets developed in-house to specifically expedite bridge engineering work.

Calculation procedures will be reviewed by the Project Engineer, to determine their applicability to the situation at hand. Calculation sheets will be initialed by the designer, numbered and indexed for future reference.

If retrofit of some foundation elements is necessary, EMI will develop recommendations for pile types and tip elevations. These, along with any comments received on the Draft Geotechnical Report will be incorporated in the Final Geotechnical Report.

All drawings will be produced using AutoCAD Release 14. Detailing will be in accordance with Caltrans' Bridge Design Details (BDD) and Stanislaus County standards. Standard Plan references and standard retrofit details will be used wherever possible.

## SECTION 3: WORK PLAN

If temporary traffic control or roadway/civil reconstruction is required to construct the retrofit modifications, these plans will be produced and will conform to the requirements of Caltrans' Highway Design Manual.

### TASK III.2 PERFORM INDEPENDENT DESIGN CHECK

Once the 65% plans are complete, the package will be provided to the independent check engineers, who will independently develop calculations for the details provided and check their presentation in the plans. Simultaneously, the designer will conduct a thorough review of the plans. In accordance with Caltrans' policy, both the lead design engineer and lead check engineer will be California Registered Civil Engineers.

### TASK III.3 PREPARE FINAL HYDRAULICS / SCOUR REPORT

Should it be determined that retrofit measures will impact the current hydraulic capacity of the existing structure, a complete design hydraulic study will be performed. In an attempt to reduce the volume of paper used the scope for this activity is not repeated here. Please see "OPTION B. ps&e (REPLACEMENT): *TASK II.4 HYDROLOGY / HYDRAULIC ANALYSIS AND REPORT*" (for a detailed description of the scope of this work item.

### TASK III.4 PREPARE FINAL FOUNDATION DESIGN / REPORT

***Field Exploration:*** Unless there is no foundation retrofit planned, we recommend a supplemental field exploration program to collect additional subsurface soil data for final design. We recommend drilling two soil borings to a depth of about 100 feet below the river bottom near the existing Piers 8 and 16, and performing six cone penetrometer test (CPT) soundings. Locations of the CPT soundings will be spaced somewhat equally along the existing bridge alignment; CPTs are critical because liquefaction assessment using the CPT method will produce more accurate results than those using Standard Penetration Test (SPT) blowcounts collected in soil borings. We anticipate the CPT sounding will meet refusal at about 40 feet below the river bottom. Some of the soil boring and CPT soundings will be performed from the existing bridge deck, and if mandated from other requirements such as environmental and access, all borings and CPT soundings can be performed from the existing bridge deck. Traffic control and lane closure will be required.

For the soil borings/CPTs through the existing bridge deck, a 10-inch± diameter opening will be cored through the existing bridge. The drill string, sampling equipment and cone penetrometer device will be lowered into the borehole through this opening. At the end of the investigation, each of these openings will be covered by a steel plate welded to a pipe that fits inside the opening. Cold patch asphalt will be placed above the steel plate.

***Soil Laboratory Testing:*** Selected disturbed and relatively undisturbed soil samples will be tested to determine the engineering properties of the onsite soils.

***Foundation Design:*** EMI will recommend the foundation type. Design and specified pile tip elevations will be provided. Axial and lateral capacity and stiffness of the retrofit pile will be determined.

***Foundation Report:*** The field and laboratory findings will be documented in a foundation report together with the foundation design and construction recommendations. This report will include

## SECTION 3: WORK PLAN

LOTB sheets showing the supplemental soil borings and CPTs. This report will be reviewed and approved by the County and Caltrans. A final report will be issued to incorporate the review comments and our responses.

### TASK III.5 UTILITY RELOCATION / COORDINATION

Any utilities in conflict with the proposed retrofit measures will be identified and their owners notified. To that end, we will perform the following tasks:

- Identify conflicts between existing public utilities and proposed project.
- Determine requirements for existing utilities modifications or relocation as well as requirements for new utility accommodations to be included in the design of the new structure.
- Arrange coordination meetings with utility companies to resolve conflicts.

### TASK III.6 PREPARE CHECKED DETAILS (90% SUBMITTAL)

After the bridge independent check is complete, the structural designer and checker will meet and resolve any differences. The plans, calculations, estimates, and specifications will be updated accordingly. Any required traffic staging and roadway plans will also be prepared as part of this task.

Prior to the 90% Submittal, the Project Engineer will make a final review of the plans and specifications, and all calculation and drawing QA checklists will be completed.

### TASK III.7 RIGHT-OF-WAY PLANS & DESCRIPTIONS

We will identify and submit a rights-of-way report indicating status and needs for the project. Preparation of plat maps and legal descriptions and acquisition of title reports for rights-of-way will be done if requested, with the fees negotiated after the extent of the work is defined in the Phase I portion of the project.

### TASK III.8 PREPARE QUANTITIES (MAKE & CHECK) & ESTIMATE

Based on the final plans, two sets of quantity calculations will be developed. These make and check calculations will agree within the limits specified for individual items in the Caltrans Bridge Design Aids. An Engineer's Estimate will be produced utilizing the most recent Caltrans Cost Data book and available County cost data. An electronic copy of the Engineer's Estimate (in MS Excel format) will be furnished to the County.

### TASK III.9 PREPARE SPECIFICATIONS

Technical Special Provisions will be assembled and edited to modify the Caltrans Standard Specifications. FRH maintains access to the Caltrans Structures Bulletin Board through the Internet and will download the most recent versions of all relevant Standard Special Provisions. They will be edited in accordance with Caltrans procedures and will be assembled in printed format and on a CD (in MS Word format) for use by the County.

### TASK III.10 COMPILE PS&E PACKAGE / RESPOND TO 90%COMMENTS

FRH will respond to and address comments on the 90% submittal. The plans will be updated per comments from the 90% submittal. The final package will be assembled in the required format. This

## SECTION 3: WORK PLAN

task also includes a Quality Assurance interdisciplinary review of the plans, specifications, and estimate.

### TASK III.11 PREPARE DELIVERABLES AND RESPOND TO 100%COMMENTS

FRH will respond to and address any comments on the 100% submittal. The Project Deliverables consist of the following items:

- One (1) set of final Mylar reproducible plans, inset in the County standard detail sheet which can be reduced to half size and fit on 11"x17" paper.
- Electronic copies of plans in AutoCAD Version 14 format and survey data in SoftDesk.
- Contract specification and special provisions (printed and electronic MS Word 2000 format)
- Engineer's Estimate (printed and electronic in MS Excel format)
- Quantity Calculations - Make and Check (one set of each)
- One (1) set of Final Structure Design and Independent Check Calculations

### TASK III.12 PERMITTING

Preparation of the necessary applications and exhibit drawings for obtaining Grading and Erosion Control Permit in accordance with the requirements of Stanislaus County will be completed. Storm water pollution prevention and control plan will be prepared and permits for implementation obtained, if necessary.

In consultation with County staff, the team will establish recommended implementation of the requirements of the Grading and Erosion Control Permit. It is anticipated that the following permits/approvals will be required:

1. Section 404 permit (nationwide permit 14 for roads and bridges or nationwide permit 23 for approved categorical exclusions) from the Army Corps of Engineers,
2. Section 7 consultation with NMFS and USFWS on special-status fish species,
3. Section 401 water quality certification or waiver from the RWQCB,
4. Section 1601 streambed alteration agreement from DFG,
5. A land use lease from the State Lands Commission, and
6. A reclamation permit from the State Reclamation Board.

It is understood that the cost of permit fees will be paid for by the County directly or paid by the consultant and billed to the County as a direct cost as requested.

### TASK III.13 RIGHT-OF-WAY ACQUISITION (BY COUNTY)

The County will perform this task. FRH will respond in an expedient manner to questions or request for information by the County relevant to any portion of the work done by the team.

### TASK IV.1 PROVIDE DESIGN SUPPORT DURING CONSTRUCTION

No matter how carefully and accurately a set of retrofit construction documents is put together, there will be as-built conditions that are unanticipated. The **FRH Team** will have experienced engineers

## SECTION 3: WORK PLAN

available to respond to field questions in a timely manner. If changes in the contract documents are required, change order drawing preparation will have our highest priority. **FRH** has proven experience in resolving field issues quickly.

## SECTION 3: WORK PLAN

## OPTION B. PS&E (REPLACEMENT)

## PHASE II -- ENVIRONMENTAL AND UTILITY COORDINATION

### TASK II.1 FINAL ENVIRONMENTAL ASSESSMENT

If the Phase I environmental initial report indicates that construction activities may disturb hazardous materials. We will conduct physical sampling (Phase II assessment) at the site, as necessary. After the subsurface investigation has taken place, the nature and extent of contamination, if any, is assessed. If significant contaminants are present in the subsurface in or along the construction corridor, a worker health and safety plan will address procedures for handling contaminated soil excavated during construction activities.

We will prepare an administrative draft of the required technical studies for review by Stanislaus County and Caltrans. After revising the studies based on written comments, the review reports will be forwarded to Stanislaus County to send to Caltrans for FHWA review. For purposes of cost estimating, it is assumed that only one review round of the technical studies will be prepared. The final reports would be based on FHWA review. All technical studies will be prepared in accordance with Caltrans Guidance for Consultants and the FHWA Technical Advisory Paper.

We will also prepare NES, Wetlands Delineation, and Biological Assessments. The purpose of the NES and related documents is to provide certain biological studies and information necessary for environmental documents to satisfy legal requirements of the various state and federal statutes. Generally, the NES includes documentation of the biological resources in the project area and an assessment of the impacts of the project on those resources. It also includes wetland delineation. A biological assessment is required when the project has the potential to take ("take" is defined by the federal KSN) a federally listed threatened or endangered species. For fisheries, any species that has a commercial value must be evaluated under an Essential Fish Habitat Assessment. This document can be folded into the biological assessment. The biological assessment is a stand-alone document that is typically included in the NES as an appendix.

Our biologists will prepare the NES to Caltrans requirements. We will follow requirements of the "Caltrans Guidance for Consultants, Procedures for Completing the Natural Environmental Study and Related Biological Reports." The biological resources to be addressed in the NES will be limited to those considered pertinent to the study area that can be reasonably expected to be affected by the project. The NES will include:

- Relevant federal, state, and local policies and regulations related to biological resources in the project area will be summarized in the NES. We will discuss the roles and responsibilities of the federal agencies (Corps, NMFS, and USFWS) and state agencies (California Department of Fish and Game [DFG] and Regional Water Quality Control Board (RWQCB). We also will review the requirements for a NEPA/404 memorandum of understanding (MOU) to determine if the project may require interagency coordination in accordance with the MOU.

- The bridge project will require consultation with NMFS on Central Valley steelhead and with USFWS on Sacramento split-tail. We will coordinate informal consultation with NMFS and USFWS to discuss federally listed fish species that may be affected by the project and to determine the most efficient approach for achieving Section 7 compliance. The bridge project would affect the migration corridor for adult steelhead returning to and juvenile

## SECTION 3: WORK PLAN

steelhead leaving the Merced River. Sacramento splittail have the potential to occur year round at the project site, however spawning and incubation occur in the spring, ending typically by May. The period of concern for the sensitive fish species would likely be October 1 through May 30. The removal of riparian vegetation for the temporary and permanent bridges would need to be avoided or minimized, as feasible. And, although Chinook salmon are not listed (currently considered a candidate species), consultation would also need to include consultation on essential fish habitat for Chinook salmon.

We will prepare Cultural Resources Technical Reports. Cultural resource studies for the project will be performed according to the guidelines and recommended procedures outlined in Caltrans' Guidance for Consultants in accordance with NHPA Section 106. All work required for this project will be supervised by professionals that meet the standards established by the U.S. Secretary of the Interior for work in archaeology, history, and architectural history. This will allow the work to comply with the FHWA guidelines and with the NHPA Section 106 requirements.

### TASK II.2 ADDITIONAL TOPOGRAPHIC SURVEYING AND MAPPING

All surveying services for this project will be coordinated with existing data, which may be available from the County or other sources. The horizontal and vertical datum(s) will be verified to confirm they will be suitable for bridge design, road design, and hydrologic surveying purposes. If required, the datum(s) will be translated.

Sufficient control survey monuments will be established for aerial photogrammetry, design and construction purposes.

Additional topographic survey information will be gathered using the GPS system, total stations and data collectors. Sufficient cross-sections for the bridge design purposes will be taken across the San Joaquin River at the proposed bridge-crossing site.

All existing topographic data and newly acquired topographic data will be compiled for utilization by the design team. All mapping and other surveying related information will be available in both hardcopy and electronic format for the design team.

***Hydrographic Surveys:*** If required as a part of this project, we will provide hydrographic surveying required through the use of equipment speciufically designed for soundings of channel areas. Depending upon the extent of the hydrographic surveying required, photogrammetric mapping may also be utilized to determine the extent of the flood plain. All channels involved in the hydrographic survey will be physically cross-sectioned and sounded by a combination of ground survey teams and the hydrographic subconsultant. A control system for these surveys will be established utilizing the same datum(s) for the topographic design surveys. GPS will be utilized to establish this control network.

### TASK II.3 PRELIMINARY UTILITY COORDINATION

The limits of proposed construction for the replacement bridge will be identified. This will determine the scope of any additional utility verification/relocation required.

It is not anticipated that existing utilities will be a major constraint for this project but a proactive approach will eliminate surprises during design and construction. The following specific subtasks will be performed:

## SECTION 3: WORK PLAN

- Identify existing utilities affected by project. A proactive approach utilizing personal phone calls to the utility companies will be employed.
- Coordinate submittal to utility companies of progress plans
- Coordinate transmittal of the Utility Information Request Letter

### TASK II.4 HYDROLOGY / HYDRAULIC ANALYSIS AND REPORT

***Hydrologic Analysis:*** The FRH team will identify the appropriate design flood (usually the most probable 50-year flood), base flood (most probable 100-year flood), flood of record and the overtopping flood (as applicable). These floods will be determined using two or more hydrologic methods including regression from nearby representative gaged basins and application of regional equations if available and appropriate. Previously prepared hydrologic analysis will be reviewed and considered as appropriate. A flood frequency curve for the San Joaquin River channel at the project site will be prepared (appropriately excluding flows through the Merced River Slough).

***Existing Condition Hydraulic Analysis:*** An existing condition backwater model will be set up at the bridge site and calibrated to known high water marks if available. An existing condition stage discharge curve and flood profile at the bridge site will be prepared. The Corps of Engineer's HEC-RAS backwater model will be used for this analysis. The existing condition water surface profiles for the most probable 50- and 100-year floods, flood of record and identify the flow of the overtopping flood will be identified. If available and adequate for the purposes of the proposed project, a previously prepared backwater model may be used for evaluation of the project alternatives.

***Preliminary Project Hydraulic Analysis:*** Backwater models at the bridge site will be set up representing up to two preliminary bridge configurations on a single alignment. Approximate soffit elevations, conveyance capacities and effects, if any, of the preliminary bridge configurations on the water surface elevations of the most probable 100-year flood (FEMA Base Flood) will be determined. This information, along with other hydraulic information that may be of concern to bridge selection, will be provided to the bridge design consultant by memorandum (this memorandum, when supplemented with economic and other bridge considerations from other disciplines, can be used to complete a Location Hydraulic Study).

***Final Project Hydraulic Analysis:***

After identification of a preferred bridge alternative, a final backwater model will be prepared representing this bridge, including additional project details. Using this model, the water surface profiles of the Design Flood, Base Flood (most probable 100-year flood) and other floods of significance to design of the preferred bridge will be identified. The minimum appropriate soffit elevation to meet currently recommended design standards, the minimum required conveyance capacity and the effects of the preferred bridge on risk of flood damage to structures will be determined as well as the hydraulic characteristics necessary for estimating potential scour. Figures showing flood profiles and stage-discharge curves as appropriate will be prepared.

***Scour and Erosion Analysis:*** The potential abutment, contraction and pier scour for the preferred project configuration will be determined using methods presented in FHWA HEC-18. The potential for degradation and channel migration will be evaluated considering historic changes in channel geometry and land use using the Type 1 qualitative analysis described in FHWA HEC-20.

## SECTION 3: WORK PLAN

***Final Report:*** Two copies of a comprehensive draft and up to five copies of a final DHS report for the preferred bridge will be generated. The report will be prepared in a semi-tabular format with sections including: Executive Summary, Introduction, Description of basin, Description of stream and site, Hydrologic analysis, Hydraulic analysis, Scour and erosion, Other considerations, and Conclusions and Recommendations. The introduction will identify the purpose of the study, describe the existing and proposed bridges and identify the significance of the bridge. The description of the basin will include basin location, area, precipitation, elevation, land use and vegetation, aspect, etc. The site description will include a description of the stream, streambed materials, observed erosion or deposition, etc. The sections on hydrologic analysis, hydraulic analysis and scour and erosion will describe data, assumptions and methodologies of the respective analyses. The section on other considerations will identify other constraints to bridge configuration that may affect hydraulic conditions, properties at risk of flooding, significance of properties at risk of flooding, environmental considerations, etc. The section on conclusions and recommendations will present the results of the analyses, identify bridge hydraulic design requirements and recommend measures appropriate to minimize the risk of damage to the bridge and other structures (if impacted by the bridge project) during the most probable 100-year flood. Figures, photographs and tables will be included as appropriate. The DHS report will address appropriate concerns presented in the Caltrans Local Programs Manual.

### TASK II.5 PERFORM ADDITIONAL GEOTECHNICAL STUDIES

***Field Exploration:*** For the replacement option, we recommend a supplemental field exploration program to collect additional subsurface soil data for final design. We recommend drilling two soil borings to a depth of about 100 feet below the river bottom near the existing Piers 8 and 16, and performing six cone penetrometer test (CPT) soundings. Locations of the CPT soundings will be spaced somewhat equally along the existing bridge alignment; CPTs are critical because liquefaction assessment using the CPT method will produce more accurate results than those using Standard Penetration Test (SPT) blowcounts collected in soil borings. We anticipate the CPT sounding will meet refusal at about 40 feet below the river bottom. Some of the soil boring and CPT soundings will be performed from the existing bridge deck, and if mandated from other requirements such as environmental and access, all borings and CPT soundings can be performed from the existing bridge deck. Traffic control and lane closure will be required.

For the soil borings/CPTs through the existing bridge deck, a 10-inch± diameter opening will be cored through the existing bridge. The drill string, sampling equipment and cone penetrometer device will be lowered into the borehole through this opening. At the end of the investigation, a steel plate, welded to a pipe that fits within the opening, will cover each of these openings. Cold patch asphalt will be placed above the steel plate. Alternative methods for closing the core hole will be reviewed and costs estimated for approval by the County upon request.

***Soil Laboratory Testing:*** Selected disturbed and relatively undisturbed soil samples will be tested to determine the engineering properties of the onsite soils. In addition to the above, two shallow soil borings will be added to collect subgrade R-value for pavement design.

***Foundation Design:*** EMI will recommend the foundation type. Design and specified pile tip elevations will be provided. Axial and lateral capacity and stiffness of the new foundation will be determined. Depending on the stage construction, additional fill may need to be placed for temporary or permanent approaches. If so, we will estimate the settlement and settlement period. Analyses will be performed to determine the pavement structural sections and stability of the approach embankments (if modified from existing).

## SECTION 3: WORK PLAN

### TASK II.6 PRELIMINARY BRIDGE DESIGN AND TYPE SELECTION

FRH intends to take a very proactive approach to the Type Selection process, as it sets the direction of the project and defines the scope for the final design. The review of alternative alignments and their impacts on local property use; existing bridge foundations and their impact on span arrangements; the identification and understanding of utility, drainage and environmental issues that make up the criteria that the design will be based on.

The FRH Team will review existing alignment and profile data along with the new topographic information collected to identify requirements for the ties between the new structure and the existing roadways. Roadway drainage in the approaches will be considered along with the maintenance and associated cost implications. Design considerations and requirements for existing and future utilities will be identified and incorporated in the preliminary designs.

If the same alignment is used it is not anticipated that new ROW takes will be required. It is foreseeable that temporary construction easements will be required to accommodate construction activities. Alternative alignments and impacts on adjacent landowners along with related costs will be included in the consideration of the various structure types.

### TASK II.7 TYPE SELECTION MEETING

The **FRH Team** will attend a meeting with County staff to present its recommendations regarding structure type and configuration. This meeting should just be a pro forma exercise since FRH will keep the County's Project Engineer informed and will solicit comments throughout the preliminary design process.

Draft Plan and Profile (preliminary geometric approval drawing), and General Plan sheets with a preliminary opinion of construction cost (GP estimate) and other supporting information for the preferred alternative will be submitted with a Draft Caltrans type selection report five (5) working days prior to the meeting for review.

### TASK II.8 FINAL TYPE SELECTION

FRH will resolve any comments arising at the Type Selection Meeting and will revise the Type Selection Report accordingly. The General Plan and GP estimate will also be updated as required. Surveying, preliminary hydraulics, geotechnical, environmental, ROW and community based issues have been gathered and/or identified at this stage. The structure type selection is complete, which is consistent with 30-35% design. Our planned deliverable at this stage will be the five (5) copies of the Type Selection Report with General Plan and General Plan Estimate. The Type Selection Report will include a narrative "Preliminary Design Summary" which will be a brief historical background of the type selection process for this project.

Another important element of the Final Type Selection for this project will be acceptance of the Final Geometric Approval Drawing, which governs the roadway portion of the final design and the ties between the bridge and roadway sections.

### TASK II.9 UTILITY FIELD VERIFICATION

Utilities that are in the general proximity of the work area will be accurately located in the field. This field survey will be accomplished utilizing a two-person crew utilizing the latest state-of-the-art electronic data collection systems. Once collected, the data will be brought to the office and downloaded through the computer system so that it can be imported directly into the new foundation plan.

## SECTION 3: WORK PLAN

## PHASE III -- PLANS, SPECIFICATIONS & ESTIMATES AND COSTRUCTION SUPPORT

### TASK III.1 RIGHT-OF-WAY & SUPPLEMENTARY TOPOGRAPHIC SURVEY

***Right-of-Way Surveying, Platting and Description Services:*** If required by this project, we will perform field surveys to establish existing rights-of-way and new rights-of-way to be acquired for the project. We will coordinate the acquisition of title work and the preparation of legal descriptions and plats for the acquisition of the additional rights-of-way. This information will be provided to the appropriate County right-of-way agent(s) for their use in negotiating the acquisition of the rights-of-way. This information will also be coordinated with the design team for their insertion into design drawings as desired.

We will identify and submit a rights-of-way report indicating status and needs for the project. Preparation of plat maps and legal descriptions and acquisition of title reports for rights-of-way will be done if requested. The extent of the work will be defined and preformed under the terms of the contract.

### TASK III.2 PERFORM STRUCTURAL ANALYSIS & DESIGN

The design phase will commence following approval of the Type Selection Report and completion of the environmental process.

All structural analysis and component design will be completed in this task. All work will be conducted in accordance with Caltrans bridge design procedures; however, that will not stop FRH from following innovative approaches that lead to cost savings for the County. Design work will be supervised and coordinated by the Project Engineer. Structural design will be accomplished utilizing pre-validated computer programs and supplementary manual calculations. FRH maintains a complete library of personal computer software for design of bridge structures. Our extensive array of spreadsheet and custom programs allows rapid evaluation of different scenarios to determine the most cost-effective solution.

Manual calculations will be documented neatly, initialed and indexed. Each calculation package will contain a summary that states the purpose of the calculations, references and sources of input information, relevant codes and standards, and a concluding section that summarizes the design results, followed by the final design sketches and the calculations themselves. The calculations will be produced so that an engineer competent in bridge design can verify the approach used and results obtained.

### TASK III.3 PREPARE FINAL FOUNDATION DESIGN / REPORT

The field and laboratory findings will be documented in a foundation report together with the foundation design and construction recommendations. This report will include LOTB sheets showing any supplemental soil borings and CPTs. This report will be reviewed and approved by the County and Caltrans. A final report will be issued to incorporate the review comments and our responses.

## SECTION 3: WORK PLAN

### TASK III.4 PREPARE UNCHECKED DETAILS AND 60% ROADWAY PLANS

**Roadway Plans:** The FRH Team will carry forward the result from the alignment studies done in the type selection work to ensure the tie between the new structure and the existing roadways. Roadway drainage in the approaches will be considered along with the maintenance and associated cost implications. Design considerations and requirements for existing and future utilities will be identified and incorporated in the preliminary designs. Design of the approach sections of the project will be completed in accord with Stanislaus County's established practice and Caltrans Highway Design manuals.

If the same alignment is used it is not anticipated that new ROW takes will be required. It is foreseeable that temporary construction easements will be required to accommodate construction activities.

Roadway design will be done in SoftDesk Version 8.0 as is appropriate and detailed in AutoCad 14. Careful consideration will be given to the staging of construction and the delineation of the plans.

Drainage calculations will be produced for both the bridge (deck drains) and roadway approach. Construction staging plans will be developed. Signing and striping plans will be developed both for the construction period and final configuration.

**Bridge Plans:** Bridge plans will be developed in accordance with Caltrans Bridge Design Details. The designer will thoroughly review the plans to assure compliance with the design intent and current practice. At this stage (65% design) all design will be complete, and details will have been generated but not checked. Progress prints of plan sheets will be forwarded to the County. No formal review is anticipated at this time.

### TASK III.5 UTILITY RELOCATION / COORDINATION

Any utilities in conflict with the proposed replacement structure measures will be identified and their owners notified. To that end, KSN will perform the following tasks:

- Identify conflicts between existing public utilities and proposed project.
- Determine requirements for existing utilities modifications or relocation as well as requirements for new utility accommodations to be included in the design of the new structure.
- Arrange coordination meetings with utility companies to resolve conflicts.

### TASK III.6 PERFORM INDEPENDENT DESIGN CHECK

Once the 65% plans are complete, the package will be provided to the independent check engineers, who will independently develop calculations for the details provided and check their presentation in the plans. In accordance with Caltrans' policy, both the lead design engineer and lead check engineer will be California Registered Civil Engineers.

### TASK III.7 PREPARE CHECKED DETAILS AND 90% ROADWAY PLANS

After the bridge independent check is complete, the structural designer and checker will meet and resolve any differences. The plans, calculations, estimates, and specifications will be updated accordingly. Prior to the 90% Submittal, the Project Engineer will make a final review of the plans and specifications, and all calculation and drawing QA checklists will be completed.

## SECTION 3: WORK PLAN

### TASK III.8 PERFORM CONSTRUCTIBILITY REVIEW

Upon completion of the design work, incorporation of the agency comments and prior to the preparation of the final submittal package, a thorough review of the contract document set will be made by FRH. The review will consist of a comparison of the plans, specifications and estimates for consistency of nomenclature and delineation practice, clarity and buildablity of details and reasonableness of unit prices used. The County's Project Engineer and FRH's Project Engineer will discuss the comments generated by this review before they are incorporated into the package.

### TASK III.9 PREPARE QUANTITIES (MAKE / CHECK) & ESTIMATE

Based on the final plans, two sets of quantity calculations will be developed. These make and check calculations will agree within the limits specified for individual items in the Caltrans Bridge Design Aids. An Engineer's Estimate will be produced utilizing the most recent Caltrans Cost Data book and available County cost data. An electronic copy of the Engineer's Estimate (in MS Excel format) will be furnished to the County.

### TASK III.10 PREPARE SPECIFICATIONS

Technical Special Provisions will be assembled and edited to modify the Caltrans Standard Specifications. FRH maintains access to the Caltrans Structures Bulletin Board through the Internet and will download the most recent versions of all relevant Standard Special Provisions. They will be edited in accordance with Caltrans procedures and will be assembled in printed format and on a CD (in MS Word format) for use by the County.

### TASK III.11 COMPILE PS&E PACKAGE / ADDRESS 90% COMMENTS

FRH will respond to and address comments on the 90% submittal. The final package will be assembled in the required format. This task also includes a Quality Assurance interdisciplinary review of the plans, specifications, and estimate.

### TASK III.12 PRINT VELLUMS AND RESPOND TO 100%COMMENTS

FRH will respond to and address any comments on the 100% submittal. The Project Deliverables consist of the following items:

- One (1) set of final Mylar reproducible plans, inset in the County standard detail sheet which can be reduced to half size and fit on 11"x17" paper.
- Electronic copies of plans in AutoCAD Version 14 format and survey data in SoftDesk.
- Contract specification and special provisions (printed and electronic MS Word 2000 format)
- Engineer's Estimate (printed and electronic in MS Excel format)
- Quantity Calculations - Make and Check (one set of each)
- One (1) set of Final Structure Design and Independent Check Calculations

### TASK III.13 PERMITTING

The FRH Team will coordinate with involved agencies and prepare permit packages and all other necessary materials. Involved agencies will include U. S. Fish & Wildlife Service (USFWS), U.S. Army Corps of Engineers (COE), U.S. Coast Guard, California Department of Fish and Game

## SECTION 3: WORK PLAN

(CDFG), State Lands Commission, the Central Valley Regional Water Control Board (RWQCB), the California Department of Water Resources and the State Reclamation Board.

We will assist the County with permit acquisition and Section 7 consultation with the USFWS through the COE. We will prepare mitigation plans for State-listed species and Biological Assessments for federally-listed species, if necessary, however, these plans are not included in our cost estimate for permitting. It is anticipated that the following permits/approvals will be required:

1. Section 404 permit (nationwide permit 14 for roads and bridges or nationwide permit 23 for approved categorical exclusions) from the Army Corps of Engineers,
2. Section 7 consultation with NMFS and USFWS on special-status fish species,
3. Section 401 water quality certification or waiver from the RWQCB,
4. Section 1601 streambed alteration agreement from DFG,
5. A land use lease from the State Lands Commission, and
6. A reclamation permit from the State Reclamation Board

We do not anticipate need for a Coast Guard Bridge Permit as this is not a tidal waterway. It is understood that the cost of permit fees will be paid for by the County directly or paid by the consultant and billed to the County as a direct cost as requested.

### TASK III.14 RIGHT-OF-WAY ACQUISITION (BY COUNTY)

The County will perform this task. FRH will respond in an expedient manner to questions or request for information by the County relevant to any portion of the work done by the team.

### TASK IV.1 PROVIDE DESIGN SUPPORT DURING CONSTRUCTION

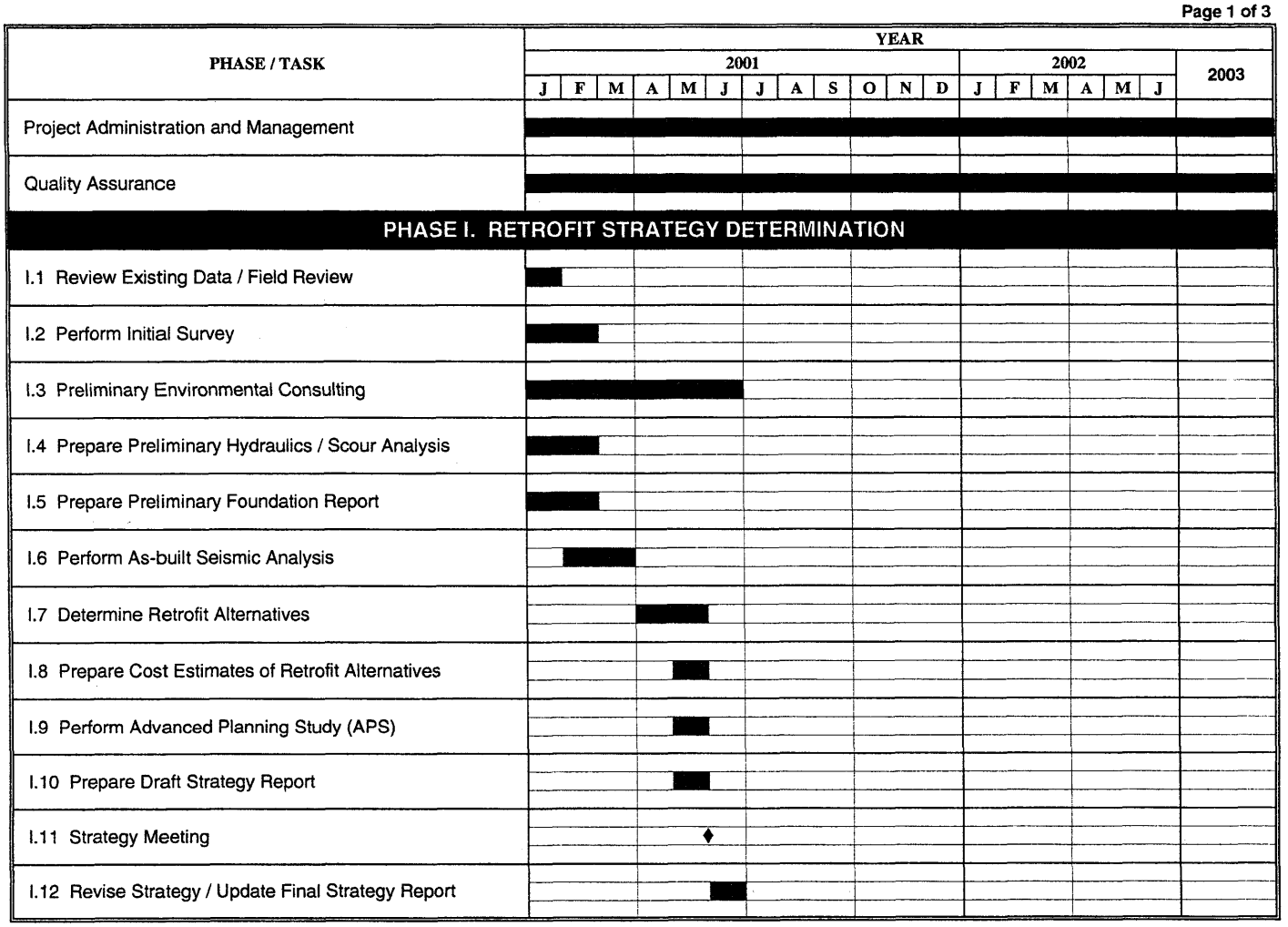
FRH will provide construction support services as requested by the County. These services will include attendance at the pre-construction meeting, review of demolition plans, false work /shop drawings, consultation, preparation of plan revisions as necessary to document change orders and transfer of the field notations to record as-built modifications which occurred.

If requested by the County, FRH will provide a qualified structure representative to act under the supervision of the County's designated engineer in responsible charge of the project (per HBRR Program Operating Procedures and Guidelines). We will work closely with the County's Engineer to effect a timely, claim-free completion of the work.

## Task Breakdown and Schedule

## SEISMIC RETROFIT STRATEGY





## Task Breakdown and Schedule

## OPTION A - PS&E (RETROFIT)



| PHASE / TASK | YEAR | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | | | | | | | | | | | | 2002 | | | | | | 2003 |
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | |
| Project Administration and Management | | | | | | | | | | | | | | | | | | | |
| Quality Assurance | | | | | | | | | | | | | | | | | | | |
| **PHASE II. ENVIRONMENTAL & UTILITY COORDINATION** | | | | | | | | | | | | | | | | | | | |
| II.1 Final Environmental Assessment | | | | | | | | | | | | | | | | | | | |
| II.2 Preliminary Utility Coordination & Verification and Topographic Survey | | | | | | | | | | | | | | | | | | | |
| **PHASE III. PS&E DESIGN** | | | | | | | | | | | | | | | | | | | |
| III.1 Perform Final Strategy Design (65% Submittal) | | | | | | | | | | | | | | | | | | | |
| III.2 Perform Independent Design Check | | | | | | | | | | | | | | | | | | | |
| III.3 Prepare Final Hydraulics / Scour Report | | | | | | | | | | | | | | | | | | | |
| III.4 Prepare Final Foundation Design / Report | | | | | | | | | | | | | | | | | | | |
| III.5 Utility Relocation / Coordination | | | | | | | | | | | | | | | | | | | |
| III.6 Prepare Checked Details (90% Submittal) | | | | | | | | | | | | | | | | | | | |
| III.7 Right-of-Way Plans & Descriptions | | | | | | | | | | | | | | | | | | | |
| III.8 Prepare Quantities (Make & Check) & Estimate | | | | | | | | | | | | | | | | | | | |
| III.9 Prepare Specifications | | | | | | | | | | | | | | | | | | | |
| III.10 Compile PS&E Package / Respond to 90%Comments | | | | | | | | | | | | | | | | | | | |
| III.11 Prepare Deliverables and Respond to 100%Comments | | | | | | | | | | | | | | | | | | | |
| III.12 Permitting | | | | | | | | | | | | | | | | | | | |
| III.13 Right-of-Way Acquisition (By County) | | | | | | | | | | | | | | | | | | | |
| **PHASE IV. CONSTRUCTION (DESIGN) SUPPORT** | | | | | | | | | | | | | | | | | | | |
| IV.1 Provide Design Support During Construction | | | | | | | | | | | | | | | | | | | |

## Task Breakdown and Schedule

## OPTION B - PS&E (REPLACEMENT)



| PHASE / TASK | YEAR | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | | | | | | | | 2002 | | | | | | | | | | | | | | | | 2003 |
| | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | | | | | |
| Project Administration and Management | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quality Assurance | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PHASE II.* ENVIRONMENTAL AND PRELIMINARY ENGINEERING** | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.1 Final Environmental Assessment | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.2 Additional Topographic Surveying and Mapping | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.3 Preliminary Utility Coordination | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.4 Hydrology / Hydraulic Analysis and Report | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.5 Perform Additional Geotechnical Studies | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.6 Preliminary Bridge Design and Type Selection | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.7 Type Selection Meeting | | | | | | | ♦ | | | | | | | | | | | | | | | | | | |
| II.8 Final Type Selection | | | | | | | | | | | | | | | | | | | | | | | | | |
| II.9 Utility Field Verification | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PHASE III. PS&E DESIGN AND PERMITTING** | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.1 Right-of-Way & Supplementary Topographic Survey | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.2 Perform Structural Analysis & Design | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.3 Prepare Final Foundation Design / Report | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.4 Prepare Unchecked Details & 60% Roadway Plans | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.5 Utility Relocation / Coordination | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.6 Perform Independent Design Check | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.7 Prepare Checked Details & 90% Rdwy Plans | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.8 Perform Constructibility Review | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.9 Prepare Quantities (Make / Check) & Estimate | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.10 Prepare Specifications | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.11 Compile PS&E Package / Address 90% Comments | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.12 Print Vellums and Respond to 100%Comments | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.13 Permitting | | | | | | | | | | | | | | | | | | | | | | | | | |
| III.14 Right-of-Way Acquisition (By County) | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PHASE IV. CONSTRUCTION (DESIGN) SUPPORT** | | | | | | | | | | | | | | | | | | | | | | | | | |
| IV.1 Provide Design Support During Construction | | | | | | | | | | | | | | | | | | | | | | | | | |

* For Phase I, see Task Breakdown for Option A - *Retrofit*

## RECENT PRE-AWARD AUDIT DATA

Frederic R. Harris, Inc. was last subjected to a Caltrans pre-award audit on March 28, 2000. That audit found that the firm maintains accounting systems which are capable of accumulating and segregating reasonable, allowable and allocable project costs. The auditors found that FRH's overhead rate should be 127.36% based on costs from the previous fiscal year. Our rate schedule for calendar year 2001 is based on a projected overhead rate of 130%.

We do not anticipate any of our subconsultants will have subcontract values near or above $250,000, and therefore, they should not need to be audited under Caltrans' procedures.

# APPENDIX A

Frederic R. Harris, Inc.

# THOMAS R. BARNARD, P.E.

Vice President / Principal Bridge Engineer

**Project Assignment**
Project Manager

**Years of experience**
20

**With this firm**
5

**Education**
*B.S., Civil Engineering,* 1980, University of Oklahoma

**Professional Registrations**
California/1990/P.E./46384
Oklahoma/1985/P.E./14429

**Professional Affiliations**
American Society of Civil Engineers, Structural Engineers Association of California, American Concrete Institute, National Society of Professional Engineers, California Society of Professional Engineers

Mr. Barnard has over 20 years of experience in the field of civil engineering. Specializing in the analysis and design of transportation structures, Mr. Barnard has over 18,000 hours experience in the design and evaluation of both new and existing transportation structures in the State of California. He has served in the capacity of Project Manager, Design Engineer, and Construction Support Engineer for large civil/structural engineering projects.

- **Relevant Projects**

**Jackson Street Bridge Replacement Project, Red Bluff, California.** As Project Manager for the referenced project, Mr. Barnard is responsible for the project from preliminary scoping through construction. Mr. Barnard directed the efforts of the team to successfully complete the preliminary studies (surveying/RW, hydraulic, geotechnical, environmental, etc.) in order assist the City of Red Bluff in the completion of the federal funding approval process. The project includes two bridge structures and the widening of about 1200 feet of associated city streets. The use of PC/PS decked bulb-T superstructures for the bridges allows the compression of construction timeline which is restricted by environmental constraints and proximity of the site to the local high school.

**Franklin Boulevard/Thornton Road Bridge over Mokelumne River, Sacramento/San Joaquin County, California**. Project Engineer responsible for technical direction and management of the preliminary and final design of a new 2100' long replacement structure bridging the Sacramento/San Joaquin County Line. The project crosses an environmentally sensitive area, which is home to a number of protected animal species. The new bridge will be composed of two structure types, a long-span precast concrete girder unit over the river, with a concrete trestle over the floodplain. The scope of work on the project includes environmental coordination, surveying, roadway design, geotechnical engineering, river hydraulics and bridge engineering.

**Seismic Retrofit of Four Bridges, Contra Costa County, California.** Project Manager responsible for team management and technical direction for retrofit strategy determination and PS&E production associated with 4 Contra Costa County owned bridges: Del Monte Overhead, Freeman Road Bridge, Pacific Avenue Overhead and Hawthorne Drive Bridge. Project scope included utility coordination and preparation of railroad agreements.

# THOMAS R. BARNARD, P.E.

Vice President / Principal Bridge Engineer

**Project Experience Continued** (Page 2)

**Contract No. 59S573, Caltrans On-Call Seismic Retrofit, California.** Mr. Barnard served as Project Manager and Project Engineer for this multi-task-order contract with Caltrans= Division of Structures.

- **Tasks 1, 5, and 6** to provide construction support for 13 bridges previously designed under earlier on-call contracts.
- **Task 2** consisted of a strategy determination of no work for one structure and PS&E for a composite steel/concrete multi-span bridge.
- **Task 3** involved five structures, two of which were eliminated at the strategy determination stage, two steel railroad underpasses on Route 5, and the Elysian Viaduct. The 2,500-foot-long, 21-span Elysian Viaduct carries Interstate 5 across two on-ramps, the Arroyo Seco Flood Control Channel, the Pasadena Freeway, two local streets, 500-plus feet of leased air space, the LAMTA/SCRRA rail yard, the L.A. River Channel, and Riverside Boulevard. Both left and right structures are composed of reinforced CIP concrete box girder spans up to Bent 6 at the Arroyo Seco Channel and then turn to composite steel/concrete welded plate girder superstructure for the remaining 15 spans. Analyses for this bridge included both linear and nonlinear techniques due to the complexity of the structure. The nonlinear analyses used were employed principally as design verification tools. The retrofit resulted in a 114-sheet Final PS&E produced in four months.

**Caltrans Phase II Seismic Retrofit Contract No. 59X845, Various Locations, California.** Technical leader for the analysis and design of seismic retrofit of several bridges for Caltrans under an on-call contract. Included in the structures analyzed are four reinforced-concrete arch bridges (Circa 1930: Russian Gulch, Jughandle Creek, Hare Creek, and San Juan Canyon) along with the Humboldt Bay Crossing bridges (Eureka, Middle, and Samoa Channel structures), the Ten Mile River Bridge, the Smith River Bridge, and others. Total estimated cost of the retrofit construction for the structures evaluated was $75 million.

**Contract No. 59N576, Caltrans On-Call Seismic Retrofit, California.** Mr. Barnard served as Project Engineer for this multi-task-order contract with Caltrans= Division of Structures.

- **Task 1** consisted of the completion of the PS&E package for the 5th Avenue Overhead structure on I-880 in Oakland and the University Avenue Bridge in Alameda County in the Caltrans ROW.
- **Task 2** is made up of four structures in L.A. County: Dolores Yard Overhead, 223rd Street Overhead, Torrance Lateral Bridge, and Dominguez Channel Overhead. All these structures are part of State Route 405 and are currently in the process of final design. Estimated construction costs are $7.91 million.
- **Task 3** is for the analysis and retrofit of the Ash Creek Bridge structure built in 1930 on State Route 101 in Mendocino County with estimated construction cost of $200,000.
- **Task 4** consists of construction support for two previous seismic retrofit contracts currently under construction. This involves coordination with Caltrans Resident Engineers and mitigation of site-

# THOMAS R. BARNARD, P.E.

Vice President / Principal Bridge Engineer

**Project Experience Continued** (Page 3)

specific problems encountered during the construction process. There is a total of 18 structures involved from two contracts.

- **Tasks 5 through 8** included several structural steel and reinforced concrete structures throughout California.

**Group IV Pedestrian Bridges, Various Locations, Los Angeles, California.** Construction support for six seismic retrofits and one bridge replacement project for the City of L.A. The bridge replacement was a single-span, post-tensioned concrete thru girder design with inset panels for architectural designs. The structure spans 130 feet over the Los Angeles River at Laurelgrove Avenue in Studio City. The project included design for the mitigation of erosion problems and visual screening, using landscaping and architectural concrete planters, with care taken to blend the structure into the land use on both sides of the river. The design of a temporary pedestrian access structure was also included in the project.

**San Diego-Coronado Bay Seismic Retrofit Project 618 (Contract No.59X478);** Mr. Barnard participated in a two day value engineering study of proposed retrofit of the San Diego-Coronado Bay Bridge. The formal VE process was followed with focus groups formed to evaluate and cost all alternative derived. Mr. Barnard was part of the focus group reviewing the massive substructure retrofits, requiring quantification and evaluation of the constructability and cost of large (12' and 16' diameter) caisson foundations to strengthen the existing precast/prestressed driven pile supported waterline foundations.

**Alta Mesa Road Bridge over Dry Creek, Sacramento County, California** Served as Project Engineer responsible for all technical activities on this 970-foot-long bridge replacement. Over the main channel, 90' long precast/prestressed concrete girders are used on pier wall bents. The longer span length was chosen to minimize debris accumulation. The remainder of the bridge is comprised of 44' long reinforced concrete slab spans founded on pile bents. Environmental mitigation measures are incorporated into the superstructure design--a portion of the space between precast girders will be left ungrouted to provide replacement bat habitat.

**Matanzas Creek Retaining Wall Replacement, Santa Rosa, California** Mr. Barnard served as Project Manager and Project Engineer for the replacement of three sections of existing redwood timber retaining wall along Matanzas Creek between the Hoen Avenue Frontage Road and State Highway 12 / Farmers Lane for the City of Santa Rosa. Portions of the existing walls had collapsed into the channel while the majority of the remaining sections were significantly deteriorated and near failure. Several issues had to be addressed in selection of the wall system to be used including: Minimize loss of mature trees and the disturbance of all vegetation due to temporary construction access and wall installation; maintain existing streambed; minimize impacts to City right of way; minimize impact on the riparian vegetation. The resulting design was a hybrid combination of a sheet pile cutoff wall below grade which will protect the roadway from the maximum anticipated degradation scour, and an exposed shotcrete tie-back wall which will blend into the natural environ over time with re-vegetation of the existing ground cover.

# Neil H. Harris, P.E.

Vice President

**Project Assignment**
Officer-in-Charge

**Years of experience**
21

**With this firm**
12

**Education**
*M.S., (Structures)*, 1981
University of Illinois at Urbana-Champaign,
*B.S., Civil Engineering*, 1979
University of Cincinnati

**Professional Registrations**
Professional Engineer:
California No. C045769 and 15 other states

**Professional Affiliations**
American Society of Civil Engineers, National Society of Professional Engineers, American Institute of Steel Construction, American Segmental Bridge Institute, Structural Engineers Association of California, American Public Works Association

**Awards**
*Young Engineer of the Year* (1989)--Big Bend Chapter of Florida Engineering Society, *Admiral Harris Award* (1993)--Frederic R. Harris, Inc. award for outstanding professional achievement

Mr. Harris has over 21 years of experience in design, technical management, and project management roles for a wide range of civil engineering projects, including bridges (concrete and steel), steel-plate structures (tanks, silos, water towers, and pressure vessels), and other unique civil engineering structures. His background includes multiple assignments as a third-party reviewer for public agencies overseeing the design/plans of other firms.

- **Relevant Projects**

**Hills Ferry Bridge over San Joaquin River--Seismic Retrofit, Stanislaus County, California.** Project Manager for the seismic retrofit of this 647-foot-long structure. This concrete T-beam and flat-slab structure is supported on two different types of pile bents and on rigid pier walls. Ductility displacement techniques, incorporating foundation rocking analyses, were utilized to verify minimum- cost retrofit solutions.

**Franklin Boulevard/Thornton Road Bridge over Mokelumne River, Sacramento/San Joaquin County, California.** Project Manager for the preliminary and final design of a new 2100' long replacement structure bridging the Sacramento/San Joaquin County Line. The project crosses an environmentally sensitive area, which is home to a number of protected animal species. The new bridge will be composed of two structure types, a long-span precast concrete girder unit over the river, with a concrete trestle over the floodplain. The scope of work on the project includes environmental coordination, surveying, roadway design, geotechnical engineering, river hydraulics and bridge engineering.

**I-710/S.R.60 Seismic Retrofit, Los Angeles County, California.** Project Manager for the seismic retrofit design of this five-bridge, four-level interchange. The retrofit strategy and modifications are based on a dynamic analysis model containing over 1,000 nodes. Four of the piers support three bridges each, forcing consideration of a global model that includes all five structures. Innovative retrofit concepts were developed to salvage outrigger bents and the major supporting columns.

**Retrofit of City Bridges, Los Angeles, California.** Principal-in-Charge for the seismic evaluation, analysis, strategy development, and retrofit design for 23 bridges in the city of Los Angeles. Eleven of the bridges are pedestrian structures connecting buildings. Special criteria were developed to evaluate differential movement between the bridges and buildings.

# Neil H. Harris, P.E.

Vice President

**Project Experience Continued** (Page 2)

**Jackson Street Bridge Replacement Project, Red Bluff, California.** Officer-in-charge for this project completed under the federal Highway Bridge Replacement and Rehabilitation (HBRR) program. The project includes two bridge structures and the widening of about 1200 feet of associated city streets. The use of PC/PS decked bulb-T superstructures for the bridges allows the compression of construction timeline which is restricted by environmental constraints and proximity of the site to the local high school. The firm is responsible for preliminary and final design, as well as construction engineering and inspection.

**Caltrans Phase II Seismic Retrofit Contract 59X845, Various Locations, California.** Project Manager for this $6 million (fee) on-call seismic retrofit contract. Representative assignments include:

**Russian Gulch, Jughandle Creek and Hare Creek Bridges, Mendicino County.** These three bridges are historic arch structures on Route 1 along the Pacific north coast. Displacement ductility methods were used to evaluate the seismic performance of these spandrel arch structures. LAA was able to confine most retrofit measures to non-visible portions of the structures to minimize aesthetic impacts. Retrofit measures include installation of large-diameter drilled shafts at the bridge abutments to reduce longitudinal movement, shear keys and restrainers at hinges and abutments, and minor retrofit to some spandrel columns.

**Ten Mile River Bridge, Mendocino County.** This 1,400-foot-long bridge crosses an environmentally sensitive estuary, which is subject to soil liquefaction and lateral spreading during a major seismic event. Dual seismic analyses were evaluated to consider both liquefied and non-liquefied cases. All foundations on this concrete box girder/T-beam structure will be retrofitted using 24-inch-diameter steel shell piles. These piles are designed to resist both the loads transmitted down from the superstructure, as well as soil movement loads due to lateral spreading. Other retrofit measures include column casings, bent cap retrofits, and abutment shear key retrofits.

**Samoa Channel, Middle Channel, and Eureka Channel Bridges, Humboldt County.** These three concrete I-girder/box girder bridges carry Route 255 over Humboldt Bay. The existing waterline foundations are supported on tall, plumb 54-inch- diameter prestressed piles and are founded in unstable, liquefiable soil. The retrofit solutions developed utilize four 10-foot-diameter drilled shafts at each pier to limit the movement of the structure to less than 2 feet. The retrofit solution will also withstand the large projected lateral spreading movements of the supporting soil mass.

**Alta Mesa Road Bridge over Dry Creek, Sacramento County, California**. Served as Project Manager on this 970-foot-long bridge replacement under the FHWA Highway Bridge Replacement/Rehabilitation Program (HBRR). Over the main channel, 90' long precast/prestressed concrete girders are used on pier wall bents. The longer span length was chosen to minimize debris accumulation. The remainder of the bridge is comprised of 44' long reinforced concrete slab spans founded on pile bents. Environmental mitigation measures are incorporated into the superstructure design -- a portion of the space between precast girders will be left ungrouted to provide replacement bat habitat.

# AHMAD M. ABDEL-KARIM, PH.D., P.E.

Senior Bridge Engineer

**Project Assignment**
Project Engineer

**Years of experience**
13

**With this firm**
9

**Education**
*Ph.D.Civil Engineering,* 1991, University of Nebraska-Lincoln

*M.S., Civil Engineering,* 1987, Ohio University

*B.S., Civil Engineering,* 1985, Ohio Northern University

**Professional Registrations**
Professional Engineer: California No.C051297

**Awards**
*PCI Certificate of Merit Award*

*Precast/Prestressed Concrete Institute Research Fellowship,* 1989

Dr. Abdel-Karim has over 13 years of experience in design and evaluation of bridge structures. He has participated in numerous research activities with special emphasis on highway structures. Dr. Abdel-Karim is the principal author of a state-of-the-art technology report on the design and construction of spliced-girder bridges, and has developed a computer program for the analysis of this type of bridge. Currently, he leads LAA's efforts to develop new design standards and examples for spliced precast girder bridges under a research contract with Caltrans.

- **Relevant Projects**

**Caltrans Seismic Retrofit Program- Russian Gulch Bridge, Northern CA.** Lead Bridge Engineer responsible for seismic evaluation/retrofit of this historic arch bridge constructed in 1939 and located on California's coastal Highway 1 in Russian Gulch State Park. The dual spandrel arch ribs have a theoretical span of 240 feet and a rise of 85 feet. The deck consists of 29 spans ranging in length from 16 to 35 feet, for a total length of 527 feet. The deck is supported on 13 two-column spandrel bents and 16 two-column approach bents. In selecting the final retrofit strategy, special attention was given to the preservation of the historic appearance of the structure. Retrofit measures were designed/detailed to enable the structure to withstand a maximum credible earthquake; yet, the appearance of the structure remains unchanged.

**Franklin-Thornton Bridge Replacement, Sacramento/San Joaquin Counties, CA.** Lead Bridge Engineer responsible for designing the superstructure of the main spans over the Mokelumne River. The 120'-140'-120' span unit consists of spliced-in-place precast/ prestressed girders made continuous with a composite slab and post-tensioning. The depth limitations placed on the deck resulted in a span-to-depth ratio of 32.5, making it an unusually shallow structure. In order to improve the seismic resistance of the bridge and reduce its substructure requirements, the superstructure was made integral with the substructure through a transversely post-tensioned bent cap.

**Seismic Retrofit Program, City of Los Angeles, California.** Strategy Analysis (Phase I): Prepared strategy analysis and retrofit recommendations for three pedestrian bridges and one roadway Two of the pedestrian bridges are part of a net of skyway passages connecting major buildings in the downtown area, featuring complex geometric and structural configurations. Due to strict architectural and construction restraints on what constituted an "acceptable" retrofit solution,

# AHMAD M. ABDEL-KARIM, PH.D., P.E.

Senior Bridge Engineer

**Project Experience Continued (Page 2)**

state-of-the-art analysis tools, combined with innovative modeling techniques, were used. Strategy Design (Phase II): Prepared design calculations of the retrofit recommendations made at the conclusion of Phase I for three pedestrian and one roadway bridge. Also performed an independent analysis and design checks on one pedestrian and one roadway bridge. Phase II responsibilities included overall coordination of the design and plan preparation efforts of the various design teams in two offices for eight pedestrian and four roadway bridges.

**Contra Costa County Seismic Retrofit--Freeman Road Bridge, Walnut Creek, California.** Project Engineer responsible for seismic evaluation, development and design of a retrofit strategy, and preparation of plan documents for this four-span bridge with composite steel-concrete superstructure and steel substructure.

**Jackson Street Bridge Replacement Project, Red Bluff, California.** Prepared the Type Selection Report and performed an independent design review for two precast/prestressed concrete bridge structures. The selection of PC/PS decked bulb-T superstructures for the bridges allowed the compression of construction timeline that is restricted by environmental constraints and proximity of the site to the local high school.

**I-710/SR60 Seismic Retrofit, Los Angeles, CA.** Lead Design Engineer responsible for the substructure seismic evaluation of this five-bridge, four-level interchange in Los Angeles County. The work consisted of capacity evaluation of the existing 78 bridge columns and the corresponding foundations, design, and detailing of the required retrofit measures. Work included development of eccentric pile footing retrofit for multi-story columns to avoid relocation of a major storm drainage structure.

**Route U.S. 9 (Edison Bridge), NJ.** Served as a Task Leader responsible for designing four superstructure units with an overall length exceeding 2500-ft. The two units comprising the south approach consist of single-span bulb tee segments erected over the piers and then made continuous through a post-tensioning and cast-in-place deck. The girders of the remaining two units comprising the north approach consist of pier- and span-segments that are erected and then field spliced away from the piers. A cast-in-place deck is then poured, which is preceded and followed by a two-phase post-tensioning operation. In both systems, an Integral Bent Cap was used to improve seismic resistance and reduce substructure requirements. Responsibilities also included full detailing and production of final plans.

**Ten Mile River Bridge, Mendocino County.** Performed independent seismic analysis and retrofit design reviews of this 1,400-foot-long bridge over an environmentally sensitive estuary, which is subject to soil liquefaction and lateral spreading during a major seismic event. Dual seismic analyses were evaluated to consider both liquefied and non-liquefied cases. All foundations on this concrete box girder/T-beam structure will be retrofitted using 24-inch-diameter steel shell piles. These piles are designed to resist both the loads transmitted down from the superstructure, as well as soil movement loads due to lateral spreading. Other retrofit measures include column casings, bent cap retrofits, and abutment shear key retrofits.

# ORIN A. BROWN, P.E.

Senior Bridge Engineer

**Project Assignment**
Bridge Independent Check

**Years of experience**
10

**With this firm**
5

**Education**
*M.S., Structural Engineering,* 1990, Purdue University, West Lafayette, IN

*B.S., Civil Engineering,* 1989, University of Massachusetts, Amherst, MA

**Professional Registrations**
Professional Engineer: California No. C048859

Mr. Brown has ten years of experience in bridge design, seismic retrofit, construction support, and post-design services. In addition, he has developed software applications to compute section properties for bridge members; to analyze prestress losses and equivalent loads for complex tendon paths; and to perform strain compatibility analyses of steel, reinforced, and prestressed concrete sections of any shape.

- **Relevant Projects**

**Samoa, Middle, and Eureka Channel Bridges Earthquake Retrofit Strategy, Eureka, California.** These three similar bridges cross Humboldt Bay to connect the city of Eureka with Samoa peninsula. The overall lengths of the Samoa, Middle, and Eureka Channel Bridges are 2,507; 1,082; and 1,817 feet, respectively. The superstructures consisted of precast prestressed I-girders with a composite reinforced concrete deck. The substructure consisted of reinforced concrete single-column bents. Performed the analysis and design of the substructure seismic retrofit strategy. A site-specific response was required in the design due to an alluvium depth of 1,000 to 2,000 feet, and strategy considered liquefaction and lateral spreading.

**San Juan Canyon Bridge Earthquake Retrofit, Orange County, California.** Performed the independent check and quantities for the retrofit design. The 1929 historic structure is a reinforced concrete, double arch, open-spandrel bridge over Sievers Creek with a total length of 180 feet. The retrofit design consisted of locking up four of the six expansion joints to limit column lateral displacements. This was accomplished by dowelling the deck into the abutments and into bolsters connected to bent caps.

**Smith River Bridge Earthquake Retrofit, Crescent City, California.** The bridge consists of two steel-plate girders, which are framed into concrete pier walls. The approach spans are reinforced concrete slab superstructures with three-column bents consisting of horizontal tie beams at mid-height. Analyzed the steel structure for combined bending and torsion caused by the plastic hinging of the pier wall columns. Designed details to tie the main steel structure to the aproach stuctures and anchor these structures to large-diameter,Cast-In-Drilled-Hole shafts behind the abutments. Designed details for shear connections across the expansion joints.

**Interstate 280 Southern Viaduct Earthquake Retrofit, San Francisco, California.** The project consisted of over 60 spans, many of which were double-deck structures. Involved in the independent design check.

# ORIN A. BROWN, P.E.

Senior Bridge Engineer

Checked finite element seismic models with complex geometry. Analyzed the bridge for site-specific acceleration response spectra; plastic hinging limit states; as well as dead, prestress, and moving live loads. Checked the design of all bridge members against all critical load conditions. Investigated the design of footing and bent cap joints.

**Torrance Lateral Bridge Earthquake Retrofit, Torrance, California.** The project consisted of constructing large wingwalls and abutment shear key walls to support the superstructure and engage enough soil to resist transverse and longitudinal seismic motion. Responsible for the entire seismic retrofit design.

**Elysian Viaduct Earthquake Retrofit, Los Angeles, California.** This was a complex 21-span steel and concrete bridge consisting of two independent 2,480-foot-long structures carrying Interstate 5 traffic. Performed an independent check for the bent cap and pier cap designs.

**Alta Mesa Road Bridge over Dry Creek, Sacramento County, California.** Served as designer on this 970-foot-long bridge replacement. Over the main channel, 90' long precast/prestressed concrete girders are used on pier wall bents. The longer span length was chosen to minimize debris accumulation. The remainder of the bridge is comprised of 44' long reinforced concrete slab spans founded on pile bents. Environmental mitigation measures are incorporated into the superstructure design--a portion of the space between precast girders will be left ungrouted to provide replacement bat habitat.

**Capay Bridge Replacement, Yolo County, California.** The bridge crosses Cache Creek on County Road 85. It is a three-span continuous box girder bridge on single-column bents and seat-type abutments with a total length of 444 feet. Performed the independent check of the bridge design and plans. Checked the structure for live load and seismic load combinations for compliance with current Caltrans criteria.

**Grove Street Underpass Railroad Bridge, San Diego County, California.** This is a two-span, cast-in-place, post-tensioned concrete thru-girder (U-shaped) bridge with a 54 degree skew. Damage occurred during the post-tensioning of the girders. Provided post-design services by performing analyses to determine an economical solution for the repair. Analyzed the effects of using various complex prestress paths. Checked the skew-induced torsion behavior of the bridge.

**San Juan Creek Railroad Bridge, San Juan Capistrano, California.** This will be a double-track, cast-in-place, post-tensioned concrete thru-girder (U-shaped) bridge. This unusual design consisted of a 675-foot-long, 15-foot-tall, multi-span superstructure with skews ranging from zero to over 52 degrees, supported by 8-foot-diameter columns on top of 10-foot-diameter CIDH=s. Responsible for the analysis and design of the entire bridge. Performed a response spectra analysis to model the behavior of the structure under the maximum credible earthquake. Designed the bridge to control the inelastic behavior to locations where it could be easily repaired. Specific attention was paid to allowing a minimum of one track of traffic during seismic repair. Before the concrete thru-girder design of the bridge was selected, Mr. Brown performed a planning study design of a 540-foot-long, 3-span, steel truss alternative.

# CHRISTOPHER POLI, P.E.

Senior Civil Engineer

**Project Assignment**
Lead Civil Engineer

**Years of experience**
13

**Years with FRH**
4

**Education**
BS Civil Engineering, Duke University, 1987

**Professional Registration**
Professional Engineer: California No. C50401, 1993

**Professional Affiliations**
National Society of Professional Engineers

Mr. Poli has 13 years of diverse civil engineering experience including highway, rail and facility design, and project management. He has held various positions including Design Engineer, Project Engineer and Project Manager.

**Route 91 Widening Project, Orange County, CA.** Project Design Engineer for the 8.5 mile widening of State Route 91 from Lakeview Avenue to the Riverside/Orange County Line. This project included the addition of four HOV lanes in the center median, and the widening of on-ramps of four interchanges. Mr. Poli was responsible for the design of 7,200 feet of masonry block sound wall on piles and for the design of six retaining walls located in the median. Retaining walls required special design considerations for the transition of the median barrier to a retaining wall, and for the incorporation of a cantilever roadway sign post.

**John Wayne International Airport, Orange County, CA.** Project Design Engineer for the SNA fuel farm access road at John Wayne Airport. This road included portland cement concrete, drainage systems, and electrical systems. The project required close coordination with the aviation consultants and the fire department.

**Eastern Transportation Corridor, Section 7, Orange County, CA.** Design Section Manager for Section 7 of the 22 mile toll road design/build project. Mr. Poli was responsible for coordinating the design of two overcrossing structures, a partial cloverleaf interchange with a single loop ramp and 1.5 miles of State Route 133 of the ETC. The initial project provides utilization of the median for future general-use and HOV lanes. The interchange includes toll collection facilities on the ramps that provide access to and from the south. Future ramp metering on all entrance ramps is incorporated into the design. Responsibilities also included preparation of design exception and traffic mitigation plan reports, grading plans and the QA/QC of roadway plans for various sections of the ETC.

**Route 86 Widening, Imperial County, CA.** Project Engineer for a 10 mile PS&E design for the widening of an existing two-lane highway to a four-lane expressway. Responsible for the horizontal and vertical alignments as well as coordination of preparing the layouts and CADD setup.

**U.S. 321 Widening Project, Caldwell County, NC.** Preliminary Roadway Design Engineer for 13.8 miles of proposed widening of U.S. 321.

**U.S. 61 Widening Project, Randolph County, NC.** Functional Roadway Design Engineer for 22 miles of proposed widening of U.S. 61.

# CHRISTOPHER POLI, P.E.

Senior Civil Engineer

**Route 234, Manassas Bypass, Manassas, VA.** Served as assistant Project Engineer for the 10-mile, CADD-designed rural minor arterial highway project. In this capacity, he aided in coordinating work schedules and distributing work assignments during the period from public hearing through R/W acquisition. Mr. Poli was also the design task leader from preliminary stages through 75 percent completion and the hearing. Responsibilities included: design of horizontal and vertical alignments for major and minor arterials, including cloverleaf and diamond interchanges; coordination of sheet layout preparation; and CADD setup. Mr. Poli also completed the initial drainage analysis and reviewed subsequent changes.

**South Holgate Street Improvement Project, Seattle, WA.** Project Engineer for the preliminary design, permitting, and final design for the complete reconstruction of S. Holgate Street between Occidental Ave. South and 4th Avenue South, in Seattle, WA. Project elements include: shifting of eastbound lanes to the south to create a median area for a future center supported grade separation; landscaping; coordination with proposed railroad grade crossings; maintenance of traffic; utility relocation, and acquiring the Private Street Use Permit. Required close coordination with the Department of Construction and Land Use, Seattle Street Use Division, Burlington-Northern-Santa-Fe Railway, Amtrak, and the Seattle City Arborist.

**Amtrak West, PNW Maintenance Facility, Seattle, WA.** Project manager in charge of the design for a regional maintenance facility in the Pacific Northwest. Responsibilities included the supervision of all track, drainage and civil design production and coordination of all design efforts with the railroad and the subconsultants.

**Amtrak West, Mitigation Engineering, 8$^{th}$ Street Yard, Los Angeles, CA.** Project manager in charge of the design for a mitigation of ACTA Redondo Junction, maintenance facility in the Pacific Northwest. Responsibilities included the supervision of all track, drainage and civil design production and coordination of all design efforts with the railroad and the subconsultants. Included parking lot design, lighting, electrical, utility relocation.

**Amtrak West, Reno Layover Conceptual Study, Reno, NV.** Project manager in charge for conceptual study and report for a layover facility in the Reno /Sparks area of Nevada. Report includes review of possible locations for a new facility and recommendations.

**Amtrak West Engineering Services On-Call Engineering, Los Angeles, CA.** Senior Engineer for Amtrak West On-Call Engineering contract.

**Burlington Northern Santa Fe Railway, Commerce, CA.** Senior engineer responsible for the development of bid package, including plans and specifications, for compaction grouting to improve soils conditions at BNSF's Commerce Yard, Maintenance Facility.

## Lino Cheang, P.E. — Supervising Engineer

*Registrations* 1987/Civil Engineer/California, No. C 41401
1997/Geotechnical Engineer/ No. 2345

*Years of Experience* 17 years

*Education* MS/1979/Civil Engineering/University of Texas at Austin
BS/1978/Civil Engineering/University of Texas at Austin

*Expertise* Performed foundation design and analysis of numerous roadway widening and highway bridge widening and replacement projects. He is familiar with Caltrans design criteria and is an expert in the area of deep foundation design. He is experienced in field and laboratory investigation to collect subsurface data for foundation design. He is currently a part-time faculty at California State University, Long Beach, teaching undergraduate courses on soil mechanics and soil laboratory testing.

*Societies* American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
American Society of Testing and Materials

*Key Projects* **Garey Bridge Replacement, Santa Barbara County.** Provided geotechnical services for replacement of a 4-span bridge over Sisquoc River. This site has severe scour concerns due to local mining operation. The foundation type at the pier locations consists of 7-foot diameter drilled shafts.

**Seismic Retrofit of over 800 Bridges in California.** Since 1990, provided geotechnical design and analysis to determine the seismic performance of over 800 existing bridges. Determined the seismic design parameters and foundation capacity and stiffness for each bridge. Provided foundation parameters and design to support the development of retrofit strategies and preparation of final PS&E.

**Rehabilitation of 7 Bridges Crossing Santa Ana River, Orange County**. This project is part of the Santa Ana River improvement project by U.S. Army Corps of Engineers. Provided foundation design parameters for foundation rehabilitation damaged by scour and upgraded capacity for earthquake loads.

**Replacement of Marina Drive Beach, Seal Beach.** This bridge will be replaced using HBRR funding. Provided all foundation design parameters including design for soil liquefaction and scour.

**Replacement of Hueneme Road Bridge Crossing Calleguas Creek, Ventura County.** This 4-span bridge is located on a liquefiable site. Designed deep foundation using liquefiable soil strengths to accommodate lateral earth loading generated by lateral spreading.

## Andrew Korkos, P.E. — Senior Engineer

***Registrations*** 1989/Civil Engineer/California, No. 44544
1997/Geotechnical Engineer/ No. 2357

***Years of Experience*** 12 years

***Education*** Certificate/1993/Waste Engineering and Management/California State University, Long Beach,
MS/1989/Civil Engineering/California State University, Long Beach
BS/1985/Civil Engineering/California State University, Long Beach

***Expertise*** Responsibilities include managing contracts and coordinating with clients; planning, managing, and directing field investigations and laboratory test programs; conducting geotechnical analyses and providing design parameters and recommendations; providing technical support during construction; and preparing reports. Planned, managed, and participated in field investigations and laboratory test programs. Performed geotechnical analyses for various types of structures and provided design parameters and recommendations. Evaluated and designed flexible and rigid pavements. Monitored and provided technical support during grading and construction. Prepared geotechnical reports.

***Key Projects*** **Railroad Bridge Crossing Oso Creek Channel, Orange County.** Planned and managed site investigation, laboratory test program, and engineering analyses, provided design and construction recommendations for steel pile foundation.

**Pedestrian Structure Spanning Foothill Transportation Corridor, Orange County.** Performed site reconnaissance for field investigation. Planned the geotechnical field investigation and determined preliminary soil parameters. Performed shallow foundation analysis and design, provide recommendations for construction, and perform slope stability analysis.

**Jamboree Road Grade Separation at Edinger Avenue, Orange County.** Planned and conducted geotechnical investigation, developed pile capacity curves for design of deep foundation, performed settlement analysis, provided design and construction recommendations for retaining walls. Designed flexible pavement structural sections.

**On-Call Geotechnical Reviewer, Orange County.** Performed site visit. Reviewed preliminary geotechnical investigation report and prepared written comments. Interacted with engineers preparing these geotechnical reports on slope stability, settlement, and foundation design issues.

**UPRR Crossing LA River and Rio Hondo Channel, South Gate.** This is a bridge rehabilitation project for the deepening of LA River channel. Performed site visit to compare with as-built plans. Developed soil stratigraphy and strength for estimating existing foundation capacity.

# KJELDSEN, SINNOCK & NEUDECK, INC.

CONSULTING ENGINEERS & LAND SURVEYORS

**RESUME**

KENNETH L. KJELDSEN, R.C.E. 20948
PRESIDENT / PRINCIPAL ENGINEER

Mr. Kjeldsen has over 30 years experience in the field of civil engineering with emphasis in the planning, design and construction of municipal, public works and water resource related projects. As a principal in the firm of Kjeldsen, Sinnock & Neudeck, Inc., Mr. Kjeldsen is responsible for managing the projects undertaken by the firm, coordinating with the client and consultants, and reviewing all technical calculations and design decisions. Mr. Kjeldsen's previous assignments have provided him with the background and experience to undertake all phases of project development from initial planning through operation and maintenance of the completed project. Mr. Kjeldsen currently serves as the District Engineer for the Woodbridge Sanitary District, and as District Engineer for numerous Reclamation Districts in the Sacramento-San Joaquin Delta. He has also served as City Engineer for the City of Escalon. Mr. Kjeldsen has served as the Project Manager on numerous public works projects, ranging from sanitary, water supply, and transportation systems to reclamation engineering. Mr. Kjeldsen's extensive experience has included major treatment plant and collection system expansions in several Central Valley communities, including Escalon, San Andreas, Jamestown, Groveland, and Woodbridge. Mr. Kjeldsen is an active member of numerous professional organizations, including the American Society of Civil Engineers (ASCE) and the Civil Engineers and Land Surveyors of California (CELSOC), and the Water Environmental Federation. Mr. Kjeldsen serves as a Director on the California Central Valley Flood Control Association. Mr. Kjeldsen's interest in the local community is reflected in his charitable work on behalf of the University of the Pacific and serving on the Industrial Advisory Council of the University's School of Engineering. Mr. Kjeldsen currently participates and supports the minority engineering program at the University of the Pacific, School of Engineering. Mr. Kjeldsen holds a BSCE degree from the University of the Pacific and is a Registered Civil Engineer in the State of California.

# KJELDSEN, SINNOCK & NEUDECK, INC.

CONSULTING ENGINEERS & LAND SURVEYORS

**RESUME**

DARREL G. RAMUS, P.L.S. 7192
PROFESSIONAL LAND SURVEYOR

Mr. Ramus has ten years of experience in the land surveying and civil engineering fields. Mr. Ramus has experience in all aspects of the surveying field including historic boundary research, boundary surveys, topography surveys, construction staking, aerial photogrammetry, bathymetric surveys, GPS geodetic control surveys, and real-time kinematic (RTK) GPS surveys.

Mr. Ramus has comprehensive experience implementing numerous types of field surveying equipment including the advanced Trimble 4700/4800 GPS system, Topcon Total Stations, Topcon Auto-levels, Laser Atlanta Advantage laser and the Innerspace Model 448 Sounder.

Mr. Ramus also has extensive Computer Aided Drafting and Design (CADD) experience utilizing AutoCAD and IntelliCAD drafting engines and Land Development Desktop (Softdesk) and Eagle Point Civil/Surveying design software. As a project manager, his duties include coordinating detailed research, field survey data and civil design in the preparation of topography maps, improvement plans, boundary maps and descriptions.

GIS authoring utilizing AutoCAD Map and ArcView platforms is a recent enhancement to Mr. Ramus' background. As a licensed land surveyor and his experience in detailed research he is uniquely suited for development of precise GIS base layers and incorporation of various data sources ranging from up-to-date orthometric digital photography to historic boundary descriptions and maps. His GPS experience allows both old and new data sources to be efficiently referenced to current NAD 1983 and NAVD 1988 global datums based on the most recent National Geodetic Survey (NGS) control networks.

Mr. Ramus has worked extensively with the City of Stockton, the San Joaquin, Sacramento, Contra Costa and Stanislaus county offices and various state and federal agencies including the State Lands Commission, Department of Water Resources, Reclamation Board, U.S. Geological Survey, National Geodetic Survey, Bureau of Land Management and the Army Corps of Engineers.

Mr. Ramus graduated from Oregon State University in Corvallis, Oregon, with a Bachelor of Science Degree in 1984. He attained the rank of Captain in the U.S. Air Force as a rated navigator and electronic warfare officer assigned to the F-4 Phantom II. He currently holds a license as a Professional Land Surveyor in the State of California.

NORMAN S. BRAITHWAITE, INCORPORATED
1050 West Street
Redding, CA 96001
Ph: 530.245.0864 Fax: 530.245.0867

# RESUME

Norman S. Braithwaite, P.E.
Hydrology and Hydraulic Engineering

## EXPERIENCE

August 1987 to Present: Independent consultant specializing in hydrology, hydraulics and computer modeling. Responsible for all phases of projects. Some specific experience gained during this period includes the following:

Bridge Hydraulic Studies:

Prepared Location Hydraulic Studies (LHS) and Design Hydraulic Studies (DHS) for bridges using Highway Bridge Rehabilitation and Replacement (HBRR) funds and Emergency Restoration (FEMA-ER) funds for numerous northern and central California county and city governments. Complex hydrologic and hydraulic issues have been addressed in these studies.

Reviewed Design Hydraulic Studies several bridges over channels at the I-580/I-680 interchange and for three replacement bridges on Highway 50 in the Tahoe Basin. Reviews were conducted to provide independent quality control of studies prepared by others.

Verified uncalibrated hydrology manual procedures for the City of Redding Drainage Manual. Flood flows were estimated at several bridges using HEC-2 and observed high water marks from the March 23, 1993 flood in Redding, California. The estimated flood flows were compared with flood flows computed using the proposed City of Redding Drainage Manual to verify the drainage manual methodology and assumptions.

Hydrology Manual Programming:

Responsible for writing, testing and maintaining computer programs which emulate hydrology manuals for the counties of Sacramento, El Dorado and Placer in California, and the cities of Redding, California and Salt Lake City, Utah. These programs contain regional hydrologic data for each county or city and perform testing of parameters entered by the user. The programs are menu driven and interactive for ease of use. Output from the

programs consist of an input file for the Corps of Engineers' HEC-1 Flood Hydrograph Program. Additional custom options prepared by request have included intermediate editing capabilities and summary output printing for review. The programs were written for ultimate users such as developers and development engineers but is also useful for development review and master planning. Clients include HDR Engineers, Incorporated, Psomas and Associates and CH2M-Hill through Hydmet, Incorporated.

Sediment Transport and Erosion Studies:

Estimated sediment transport potential of the Scott River for the Scott River Granitic Sediment Study prepared for the Siskiyou Resource and Conservation District. Conducted hydrologic, hydraulic and sediment transport analyses to estimate sediment transport potential of the Scott River using three sediment transport relationships.

Determined effects of various gravel mining alternatives on sediment transport in Cottonwood Creek near Cottonwood, California. Dr. Howard Chang's Fluvial 12 river hydraulics model was used to model several years of historic natural condition sediment transport and sediment transport for each of the gravel mining alternatives. Differences in sediment transport were then summarized by particle size. The study was conducted as part of the permitting process for the Xtra Power gravel mining operation.

Conducted a study of erosion potential on Thomes Creek near Red Bluff, California. The study was prepared to assist a gravel mine operator obtain permits to open a new pit near a Caltrans bridge (I-5) which is experiencing hydraulic problems.

Flood Studies:

Conducted numerous flood encroachment studies for developments in the City of Redding and Shasta County, California. These studies included surveys, backwater models of the existing condition and the encroached condition and letter reports.

February 1986 - July 1987: Engineer for TKO Power. Responsible for supervision of operation and maintenance at five hydroelectric powerplants. Also responsible for design of an intake structure for the Lacomb Hydroelectric Project (Lacomb, Oregon), review of design by other firms, construction review, permitting and permit maintenance and preparation of operation and maintenance manuals.

January 1980 - February 1986: Project Manager, Ott Water Engineers. Managed hydraulic and hydrologic projects. Responsible for civil design, structural design, construction review, computer programming, computer modeling and cost estimates. Specific experience gained while with Ott Water Engineers includes evaluation of erosion protection measures in the Tanana River near Nenana, Alaska using Dr. Howard Chang's Fluvial 12 program, investigation of erosion resulting from a slide into the Eel River near Redway, California using Fluvial 12, preparation of a probable maximum flood study for Magic Dam near Boise, Idaho using HEC-1 and preparation of a FEMA flood insurance study for Columbia County, Oregon and Wahkiakum County, Washington.

REGISTRATION:

Civil Engineer, California, 1984, C-37924

EDUCATION:

Bachelor of Science, Civil Engineering, 1980, California State University, Chico. Graduated Magna Cum Laude.

PUBLICATIONS:

"Bridge Design Considerations – Flood Risk", Journal of Floodplain Management, V2, N1, July 2000.

"Houston Answers Regulatory Questions with a Long-Term Simulation Model", Proceedings, WEFTEC 1998, Coauthor

RECENT CONTINUING EDUCATION:

HEC-RAS, HEC-HMS, FEMA FIS modifications, ASCE 1998
Arid West Conference including a short course in advanced HEC-2 modeling, ASFPM, 1995
Advanced Topics in Flood Hydrology, San Diego State Univ., 1992
Detention/Retention in Urban Surface Water Management, ASCE, 1991

PROFESSIONAL AND HONOR SOCIETIES:

Member, American Society of Civil Engineers
Member, Floodplain Management Association
Member, American Public Works Association, Director of local chapter
Phi Kappa Phi Honor Society

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# RESUME

David B. Braithwaite, P.E.
Hydrology and Hydraulic Engineering, Water Quality

## EXPERIENCE

February 1999 to Present, Associate Engineer and June 1994 to November 1996 (part time): Staff Engineer, Norman S. Braithwaite Inc. Responsible for data collection and reduction, technical analyses (hydrologic, hydraulic, tidal and water quality), computer programming, numerical modeling, conducting site review, hydraulic computer modeling and assisting in report writing associated with bridge construction, replacement or seismic retrofit projects. In addition to other tasks, responsible for the following projects:

Grizzly Island Road Bridge over Hill Slough, Combined Riverine and Tidal Hydraulic Analysis:

Conducted tidal frequency analysis and estuarine hydraulic analysis for a proposed replacement bridge on Grizzly Island Road over Hill Slough in Solano County. A combined riverine and tidal hydraulic analysis was required for design of a replacement bridge. Using tidal information from U.S. Army Corps of Engineers, flood frequency information from the Federal Emergency Management Agency and tide gage date from the State of California Department of Water Resources, determined tide levels of significance to bridge design and maximum rate of change in water surface elevation. Using estimates of storage capacity upstream of the bridge and the maximum rate of change in water surface elevation (due to tide) determined a maximum expected tidal flow through bridge. A backwater model was prepared using Corps of Engineers' HEC-2 backwater program to verify the maximum velocities for riverine conditions.

Pleasants Valley Road over Pleasants Creek:

Conducted hydrologic analyses for a replacement bridge on Pleasants Valley Road over Pleasants Creek in Solano County. Determined flood frequency curves and floods of significance for bridge design using methodologies including rainfall-runoff modeling (HEC-1), regression from nearby gaged basins and application of regional equations.

Alta Mesa Road over Dry Creek:

Conducted hydrologic, hydraulic and scour analysis for a replacement bridge on Alta Mesa Road over Dry Creek in Sacramento County. Hydrologic analysis was prepared by regression from nearby gaged basins. The Corps of Engineers HEC-2 backwater program was used to determine the water surface elevations of floods of concern to bridge design and to identify impacts of the replacement bridge on stream hydraulic conditions. The hydraulic analysis was complicated by split flow conditions for which a portion of streamflow during floods was not conveyed under the proposed replacement bridge. Potential pier scour was estimated using the CSU Equation presented in FHWA HEC-18.

January 1997 to January 1999: Water Resources Engineer, Surface Water Resources Incorporated. Responsible for conducting hydraulic and water quality analyses for environmental studies including:

Decker Island Tidal Wetland Enhancement Pilot Project, Port of Sacramento:

Conducted tidal frequency analysis and design for the tidal wetland restoration project on Decker Island. This project included extensive frequency analysis of tidal water surface elevations and the design of a river bank breach, in accordance with U. S. Army Corps of Engineers design methodology, to accommodate a tidal prism of adequate volume for restoration of intermittent flooding of the project area.

Flood control options for the Sacramento Area: Sacramento Area Flood Control Association:

Conducted computer modeling to analyze the potential system wide environmental impacts resulting from various proposed flood control strategy. Impacts analyzed included changes in water surface elevations, storage volumes, flows, water temperatures, contract deliveries, power generation and reservoir surface areas for all State Water Project (SWP) and Central Valley Project (CVP) facilities. Seventy years of monthly historic data were analyzed under current and future development conditions to provide statistical analysis of potential impacts from the project alone and combined with projected future development demands.

Draft Environmental Impact Report for the Water Forum Proposal: Sacramento City-County Office of Metropolitan Water Planning.

Conducted computer modeling to analyze the potential system wide environmental impacts resulting from the proposed water delivery strategy. Parameters and methodology were similar to those used in the previous project.

November 1996 to January 1997: Associate Engineer, McLaren Hart Environmental Engineering Corporation. Responsible for computer modeling of stormwater runoff and constituent fate and transport modeling in receiving waters.

Stormwater Runoff Management Plan, Port of Sacramento:

This project entailed computer modeling of stormwater runoff from municipal and industrial areas using the USEPA stormwater management model SWMM. Water quality parameters of concern were then modeled to determine potential contaminant impacts in the deep water shipping channel. Dispersion of the potential contaminant plumes was modeled using the USEPA water quality analysis simulation program WASP 3D. The project included design and planning of a dye study to determine the dispersion likely to be found due to tidal influence.

June 1996 to Fall 1997 (part time): Staff Engineer, The$^2$ Engineering Company. Responsible for performing structural analysis and design for commercial and residential structures. Projects included a branch of Tri-Counties Bank, Cascade School Theater, remodeling of a senior citizens housing facility, additions to multi-story residences and an awning on a top story elevator landing.

April 1995 to January 1996: Staff Engineer, Spencer Engineering and Construction Management, Incorporated. Responsible for preparing site development and improvement plans for minor subdivisions, performing calculations for grading and drainage plans, and foundation, timber and concrete building design. Developed a tax assessment database program for the City of McKinleyville and water quality standards for the Hoopa Reservation.

April 1993 to May 1994: Student Assistant, California Air Resources Board. Assisted air pollution specialists in completion of projects and audits.

November 1987 to September 1991: Environmental Chemist, CH2M-Hill Quality Analytical Laboratory. Developed procedures for and performed metals analysis by computerized automated graphite furnace, flame, gaseous hydride and cold vapor atomic absorption. Installed and maintained new instruments, computers and software. Prepared and analyzed data reports according to EPA Contract Laboratory Program specifications. Responsible for long term tracking of quality assurance analysis results.

REGISTRATION:

Civil Engineer, California, 2000, C-60531

EDUCATION:

Master of Science, Civil Engineering, 1996, California State University, Sacramento.

Specialization in environmental and water resources engineering.

Thesis, "A Finite Difference Computer Model For Chemical Spills in An Intertidal River"

A two-dimensional numerical model was developed to predict the extent and concentrations of a pollutant discharge into an intertidal river over time. The model was developed to take best possible advantage of current personal computer technology and for ease of operation. The model consists of hydrologic, hydrodynamic and turbulent mixing components. The model employs variable grid and time increment systems. The vertical component is averaged over the depth of each grid section. For each time increment an average tidal cycle function is used to determine the water surface elevation, at a downstream location, prior to performing backwater calculations. Velocities are determined using standard hydraulic formulae and volumetric accounting techniques. The model was tested for reasonable output using the Sacramento River between Rio Vista and Sacramento.

Bachelor of Science, Civil Engineering, 1994, California State University, Sacramento.
Bachelor of Science, Animal Physiology, 1984, University of California, Davis.

PUBLICATIONS:

Draft Environmental Impact Report for the Water Forum Proposal, EDAW, Inc. and Surface Water Resources, Inc., January 1999.

City of Folsom, Natoma Pipeline Replacement and Folsom Water Treatment Plant Expansion Project Draft Environmental Impact Report, Surface Water Resources, Inc., May 1998.

Placer County Water Agency and Northridge Water District Groundwater Stabilization Project Draft Environmental Impact Report, Surface Water Resources Inc., October 1998

Jones & Stokes

# KIM ERICKSON

## SPECIAL SKILLS AND EXPERTISE

Project management; land use planning and analysis; impact assessment, including land use, public services, and growth inducement; and extensive experience with California Department of Transportation (Caltrans) staff.

## EDUCATION

B.S., Environmental Planning and Management, University of California, Davis, 1980.

## EXPERIENCE

**Jones & Stokes.** Associate Principal.

- **West Sacramento Riverfront Improvements.** Project manager for the initial study/mitigated negative declaration on the proposed West Sacramento Riverfront Improvements project along the Sacramento River between Tower Bridge and Broderick Boat Ramp. Analyzed the impacts associated with constructing the river walk, riverfront park, bank access trail, river levee trail, interpretive displays, Broderick Boat Ramp improvements, and A Street/3rd Street pedestrian access. Prepared documentation for the following permits: land use lease authorization from the State Lands Commission, streambed alteration agreement from California Department of Fish and Game, encroachment permit from the Reclamation Board, Section 401 water quality certification or waiver from Central Valley Regional Water Quality Control Board, and Section 404 permit from the U.S. Army Corps of Engineers.

- **Lighthouse Marina and Riverbend Development Sacramento Riverbank Protection and Greenway Plan Project.** Prepared a detailed initial study that dismissed various issues that did not result in significant impacts; prepared a focused EIR that addressed the following issues: geomorphology, vegetation and wildlife issues, fisheries issues, water resources, cultural resources, land use, law enforcement and fire protection, and aesthetics. Prepared the draft EIR, final EIR, mitigation monitoring plan, and findings of fact and statement of overriding considerations.

- **State Route 70/Motorplex Parkway Interchange.** Project manager for the EIR/environmental assessment analyzing the proposed construction of a new interchange on Route 70. Key issues relate to land use and growth inducement, biological and

wetland resources, cultural resources, air quality, and noise. The project requires attendance at monthly project development team meetings. The project requires a National Environmental Policy Act (NEPA)/Section 404 memorandum of agreement individual permit and Section 7 consultation with U.S. Fish and Wildlife Service for potential impacts to giant garter snakes, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

- **South Honcut Creek Bridge Replacement.** Project manager for the proposed replacement of South Honcut Creek bridge on Loma Rica Road in Yuba County. Directed the preparation of a natural environment study (NES) report, positive archaeological survey report, positive historic properties survey report, finding of effect, and memorandum of agreement, as well as a Section 4(f) evaluation.

- **San Antonio and San Domingo Bridge Replacements.** Project manager for the proposed replacement of two bridges on Pool Station Road in Calaveras County. The project required working closely with the design engineers to develop a detailed project description to avoid impacts on an historic property located adjacent to the road. Prepared an NES to address impacts on biological resources, a water quality study to address water quality issues, and a positive archaeological survey report and historic properties survey report.

- **1997 and 1998 Caltrans On-Call Emergency Storm Damage Repair Projects.** Project manager for over 40 categorical exemption/categorical exclusion projects in Districts 1, 2, and 3. Key issues related to biological resources and cultural resources.

- **State Route 65 Widening Project.** Project manager for the widening of 4.5 miles of State Route 65 between Roseville and Lincoln. Key issues related to biological resources and cultural resources. Obtained a Section 404 permit and Section 7 biological opinion for the project as well as a Section 1601 streambed alteration agreement and Section 401 water quality certification or waiver.

- **Bass Lake Grade Truck Climbing Lane.** Project manager for the construction of a 1.2-mile-long truck climbing lane in the median of Route 50 between El Dorado Hills and Bass Lake Road in El Dorado County. The key issues addressed in the categorical exemption/programmatic categorical exclusion were biological resources, air quality, and cultural resources.

- **State Route 50/East Bidwell Street Interchange.** Project manager for the reconstruction of the existing East Bidwell Street/Scott Road interchange on Route 50 in Folsom. Key issues related to biological resources, land use and planning, growth inducement, and agricultural resources.

Jones & Stokes

# GINGER FODGE

## SPECIAL SKILLS AND EXPERTISE

Ecology of wetland systems and wetland restoration planning for cities, counties, and Air Force bases; permitting and regulatory compliance, including National Environmental Policy Act (NEPA); special-status species issues and related Section 7 and Section 10 consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under the federal Endangered Species Act.

## EDUCATION

B.S., Biological Conservation , California State University, Sacramento, 1990.

## EXPERIENCE

**Jones & Stokes.** Regulatory Compliance Specialist.

Serves as a regulatory compliance specialist on the Wetland Regulatory Team, focusing on projects that include wetland delineations and permit processing within the Sacramento, San Francisco, and Los Angeles Districts of the U.S. Army Corps of Engineers. Assists project managers in the development of strategies and implementation plans for wetland permitting requirements, including the Environmental Protection Agency's Section 404(b)(1) Guidelines. Works on projects that require compliance with Sections 401 and 402 (water quality certification) of the Clean Water Act, Section 106 of the National Historic Preservation Act (NHPA), Sections 7 and 10 of the Endangered Species Act, Section 1600 of the California Fish and Game Code, and the Coastal Zone Management Act.

**U.S. Army Corps of Engineers, Sacramento District.** Project Manager. Spent more than 7 years at the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch. Evaluated and processed Department of the Army permit applications under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Ensured compliance with Section 404(b)(1) Guidelines, NEPA, NHPA Section 106, and Endangered Species Act Section 7. Verified wetland delineations and participated in multi-agency teams and task forces and public outreach presentations.

Jones & Stokes

**STEVEN AVERY**

## SPECIAL SKILLS AND EXPERTISE

Extensive experience preparing natural environment studies for Caltrans projects; specialist in wetland ecology, wetland delineations and evaluations, and wetland-related environmental regulations and issues; knowledge of California botanical and wildlife resources, with special expertise in rare, threatened, and endangered species; experience in field biology techniques, including aerial photograph interpretation, special-status species surveys, plant and wildlife population censuses, and species identification.

## EDUCATION

M.A., Biology, University of Northern Colorado, Greeley, 1990.

B.S., Zoology/Wildlife Biology, Ohio University, Athens, 1985.

## EXPERIENCE

**Jones & Stokes.** Environmental Specialist IV.

Wildlife biologist with experience in wildlife surveys, impact assessment, and mitigation planning. Conducted biological assessments for threatened and endangered species on a variety of projects throughout northern California, including several U.S. Forest Service timber harvest plans. In the Central Valley, conducted special-status species surveys for the valley elderberry longhorn beetle, fairy and tadpole shrimp, California tiger salamander, California red-legged frog, bald eagle, Swainson's hawk, and burrowing owl. For federal Endangered Species Act compliance, prepared a biological assessment for the City of Redding for a bridge replacement project and prepared a biological assessment for Yuba County for a proposed new interchange. Also conducted surveys in several timber harvest areas for special-status species associated with mature forests, including Del Norte salamander, tailed frog, spotted owl, northern goshawk, marbled murrelet, and Pacific fisher. Trained and certified to conduct marbled murrelet surveys in California and successfully completed Denton Belke's course on identifying fairy shrimp. Relevant project experience includes:

- **Highway Bridge Rehabilitation and Replacement Local Bridge Projects.** Project manager or lead biologist for preparing natural environment study reports according to the Caltrans Guidance for Consultants for bridge replacement

projects in Colusa, Tuolomne, Calaveras, Yuba, and Sutter counties under the Highway Bridge Rehabilitation and Replacement program.

- **Roseville Interstate 80 to Royer Park Bike Path Project.** Conducted biological resource studies for preparation of environmental documents for a two-phased bicycle path construction project.

- **Caltrans Districts 1, 2, and 3 State Highway Emergency Storm Damage Repair Projects.** Conducted special-status plant and wildlife preconstruction surveys along Highways 20, 36, 96, 101, 169, and 299.

- **Willits Highway 101 Bypass Project.** Conducted special-status plant and wildlife surveys, wetland delineations, and habitat mapping.

- **Arden Garden EIS/EIR, Sacramento.** Coordinated and conducted biological resource surveys and natural environmental study reports.

- **Caltrans District 3 Natural Environment Study.** Conducted wildlife studies for a natural environment study relating to 40 sites on Highway 50 and Highway 267 that required storm damage repair. Assessed impacts on California spotted owl, California red-legged frog, foothill yellow-legged frog, and northwestern pond turtle.

- **Union Pacific Railroad Bridge Replacement Project.** Project manager for biological studies for a project to replace a railroad bridge in Butte County. Evaluated impacts on giant garter snakes and nesting raptors.

- **Merced County Streams Project.** Managed and conducted extensive special-status species surveys for the U.S. Army Corps of Engineers.

- **Tuscarora Natural Gas Pipeline Project.** Comanaged and conducted wetland delineations, habitat mapping, and special-status aquatic invertebrate surveys statewide.

Jones & Stokes

# SUSAN BUSHNELL

## SPECIAL SKILLS AND EXPERTISE

Project manager and lead botanist for a variety of transportation projects that involved NEPA and CEQA compliance; knowledgeable in agency coordination and permitting; extensive experience conducting biological surveys, impact assessments, and habitat mitigation and monitoring plans for large-scale projects; broad background in conducting botanical resource studies; experience in developing constraints analyses and coordinating with project engineers to design feasible development alternatives; demonstrated ability in developing and implementing construction monitoring programs.

## EDUCATION

B.S., Conservation and Resource Studies, University of California, Berkeley, 1990 (plant ecology emphasis).

## EXPERIENCE

**Jones & Stokes.** Plant Ecologist.

Wetland ecologist with extensive experience surveying and assessing botanical resources, delineating wetlands, assessing wetland functions and values, and developing conceptual wetland mitigation plans and monitoring methods for road and utility construction projects. Has worked on private and public projects as a project manager, lead botanist, or team member. Managed and participated in a variety of projects for public and private entities that required wetland and botanical resource impact assessments and conceptual mitigation plans, coordination with project engineers and construction contractors to develop feasible avoidance or protection measures for sensitive resources, and helping clients to acquire state and federal permits. Relevant project experience includes:

- **Roseville Transportation Facility Projects.** Lead botanist and wetland ecologist for conducting field surveys, environmental analysis, and permit assistance for the Miner's Ravine bicycle bridge repair project and the Interstate 80 (I-80) to Royer Park bicycle path project, the Orlando/Cirby intersection improvements projects, and the Sunrise/Douglas/I-80 interchange expansion project.

- **Federal Highway Administration Road Realignments Projects.** Project manager and lead botanist for two FHWA road realignment projects in California (Highway 105 in Yuba County and Quincy-La Porte Road in Plumas National

Jones & Stokes

**LESLIE FRYMAN**

## SPECIAL SKILLS AND EXPERTISE

Comprehensive planning for cultural resource management and historic preservation; documentation for Historic American Building Survey (HABS) and Historic American Engineering Record (HAER); development and implementation of public interpretation programs for archaeological sites and historic properties; meets Secretary of the Interior's standards for work in history and architectural history.

## EDUCATION

B. A., Art History, Edinboro State University, Edinboro, Pennsylvania, 1980.

## EXPERIENCE

**Jones & Stokes.** Cultural Resources Specialist.

More than 15 years of experience in archaeology and historical preservation. Has a wide range of research skills applicable to various areas of cultural resources management, as well as interdisciplinary fields such as public history, education, and museum studies. Currently assisting design engineers in completing cultural resources documentation for two bridge replacements along Pool Station Road in Calaveras County. Also serving as the cultural resources principal investigator for emergency storm damage repair work along State Route 96 in Humboldt and Siskiyou counties. Completed cultural resources inventories, National Register of Historic Places (NRHP) evaluations, and determination of effects documents for Caltrans projects in Alameda, Calaveras, El Dorado, Monterey, Placer, Solano, Humboldt, and Siskiyou Counties. Additional experience completing NRHP nominations, California Historical Landmark and Point of Historical Interest applications, Historic Architectural Building Surveys, Historic Architectural Evaluation Reports, and various NEPA and CEQA planning documents. Has served as historian or principal investigator on the following projects:

- **Old Arcata Road - Arcata-Eureka.** Assisting the design engineer, Humboldt County, and Caltrans with environmental studies for a road repair project along a historic rural road between Arcata and Eureka.

- **Pool Station Road - Calaveras Cement Company.** Assisted with cultural resources identification and evaluation in conjunction with Section 106 compliance for a Caltrans bridge replacement project.

- **Jamestown Road Bridge Replacement Project.** Assisted with cultural resources identification and evaluation in conjunction with Section 106 compliance for a Caltrans project.

- **Mormon Carson Emigrant Trail Project, Eldorado National Forest, California.** Performed archaeological, ethnographic, and historic studies along a 37-mile segment of the Carson River Route of the California Trail, known regionally as the Mormon-Carson Route, for the Eldorado National Forest. Portions of this trail have already been designated as a National Recreation and Historic Trail, and have been evaluated as potentially significant for listing in the NRHP. A final project report, NRHP nomination, and a ground position system mapping/video monitoring report are currently in preparation.

- **Red Cap Road - Orleans.** Assisted the design engineer, Humboldt County, Six Rivers National Forest, and the Federal Highway Administration with environmental studies for a major road repair project within a large district of traditional cultural properties associated with the Karuk Tribe of California.

- **Serrano Data Recovery Project - El Dorado Hills.** Implementing a mitigation program for a large residential development project along Highway 50, near the historic town of Clarksville. Data recovery of 21 sites on this property will result in documentation of the Clarksville Historic District.

- **Caltrans Districts 1, 2, and 3 State Highway Emergency Storm Damage Repair Projects.** Participated in preparing environmental and technical documentation for highway repair and debris disposal sites along Highways 36, 96, 101, 199, and 299 in Del Norte, Humboldt, and Siskiyou counties.

Jones & Stokes

# BILL MITCHELL

## SPECIAL SKILLS AND EXPERTISE

Freshwater fish biology, anadromous salmonid ecology, fisheries impact assessment and study design, fish population modeling, instream flow studies, fish passage evaluations, and fish population and habitat survey techniques

## EDUCATION

M.S., Fisheries Biology, Humboldt State University, Arcata, California, 1988.

B.S., Biology, San Diego State University, San Diego, California, 1980.

## EXPERIENCE

**Jones & Stokes.** Fisheries Biologist.

**Endangered Species Assessments.** Extensive experience addressing project impacts and developing mitigation plans for special status species, including winter-run chinook salmon, spring-run chinook salmon, steelhead trout, Delta smelt, Sacramento splittail, and tidewater goby. Served as regional coordinator for statewide program to review, analyze, and synthesize information on steelhead trout in California. Coauthored a comprehensive report submitted to the National Marine Fisheries Service (NMFS) to assist NMFS in their ruling on the status of steelhead under the Federal Endangered Species Act.

**Fisheries Impact Assessments.** Extensive experience preparing fisheries impact assessments and mitigation plans for numerous water resources, construction, and land use projects, including State Water Project and Central Valley Project operational changes; interagency water transfers; intra- and interbasin water diversions; fish screen and passage facilities; bridge, road, and pipeline construction; streambank and levee protection; and grazing and timber harvest plans. Analyzes hydrologic, hydraulic, water temperature, sediment transport, and physical habitat data to assess impacts to aquatic species and habitat. Experienced in the preparation of environmental impact statements, environmental impact reports, biological assessments, environmental assessments, and initial studies/negative declarations.

**Field Techniques.** Conducts fish population and habitat surveys using approved field techniques and sampling tools. Experience includes fish population estimation

using direct censusing, mark-recapture techniques, and multiple-pass removal methods; fish sampling techniques including direct observation, seining, and electrofishing; habitat mapping and classification; and field measurement and quantification of aquatic habitat using species or community habitat suitability models. Experienced in instream flow incremental methodology (IFIM) field techniques, including habitat mapping, study site selection, hydraulic data collection, and measurement of habitat suitability data.

**Field Investigations and Monitoring.** Designs and implements fish population and habitat assessment and monitoring programs to evaluate project effects on fisheries resources in streams, rivers, lakes, and estuaries. Directs annual chinook salmon carcass surveys on the lower Yuba River to monitor adult spawning escapement. Conducts annual snorkeling surveys of juvenile chinook salmon and steelhead populations to monitor abundance, growth, and habitat use. Investigated juvenile chinook salmon growth, condition, and migration timing in relation to streamflow and water temperatures. Conducted angler surveys and field investigations of American shad migration, spawning, and habitat use in the lower Yuba River. Assisted in the preparation of an implementation plan for the comprehensive assessment and monitoring program to evaluate the effectiveness of proposed anadromous fish restoration actions implemented pursuant to the Central Valley Project Improvement Act Section 3406(b). Recommended target species, races, watersheds, monitoring methods, and analytical tools for meeting program objectives.

**Instream Flow Studies and Habitat Evaluation Methods.** Received formal training in the U.S. Fish and Wildlife Service (USFWS) IFIM, and has extensive experience in other analytical habitat assessment techniques, including the USFWS habitat evaluation procedures (HEP). Designed and conducted an instream flow study on the Owens River to evaluate effects of modified flows on physical habitat for juvenile, adult, and spawning brown trout. Developed habitat suitability criteria for juvenile, adult, and spawning life stages, and used hydraulic and habitat simulation models to evaluate habitat availability for different operational alternatives. Applied HEP to measure baseline shaded riverine aquatic habitat and evaluate impacts and mitigation requirements for alternative streambank protection designs on the lower American and Sacramento Rivers.

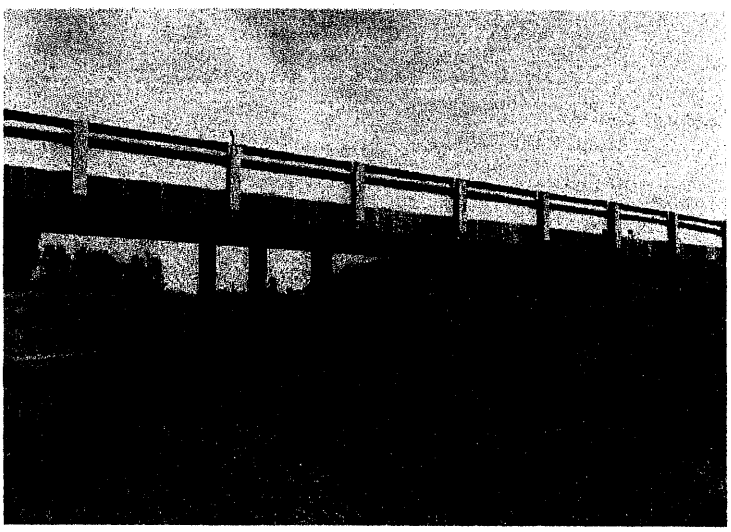
**Fish Passage and Screening Assessments.** Served as project manager and fisheries technical lead in designing and evaluating a proposed riverbed gradient facility and associated fish screen and bypass facilities at the Glenn-Colusa Irrigation District Hamilton City Pumping Plant on the mainstem Sacramento River. Designed fish passage routes and evaluated fish passage performance based on natural riffle and two-dimensional hydraulic modeling data. Currently directing preparation of the

final design and mitigation monitoring report addressing vegetation, wildlife, fisheries, state and federal threatened and endangered species, water quality, soils, recreation, and cultural resources. Evaluated potential fish screen and bypass impacts related to operation of Woodbridge Irrigation District's diversion facility on the Mokelumne River.

# APPENDIX B

Frederic R. Harris, Inc.

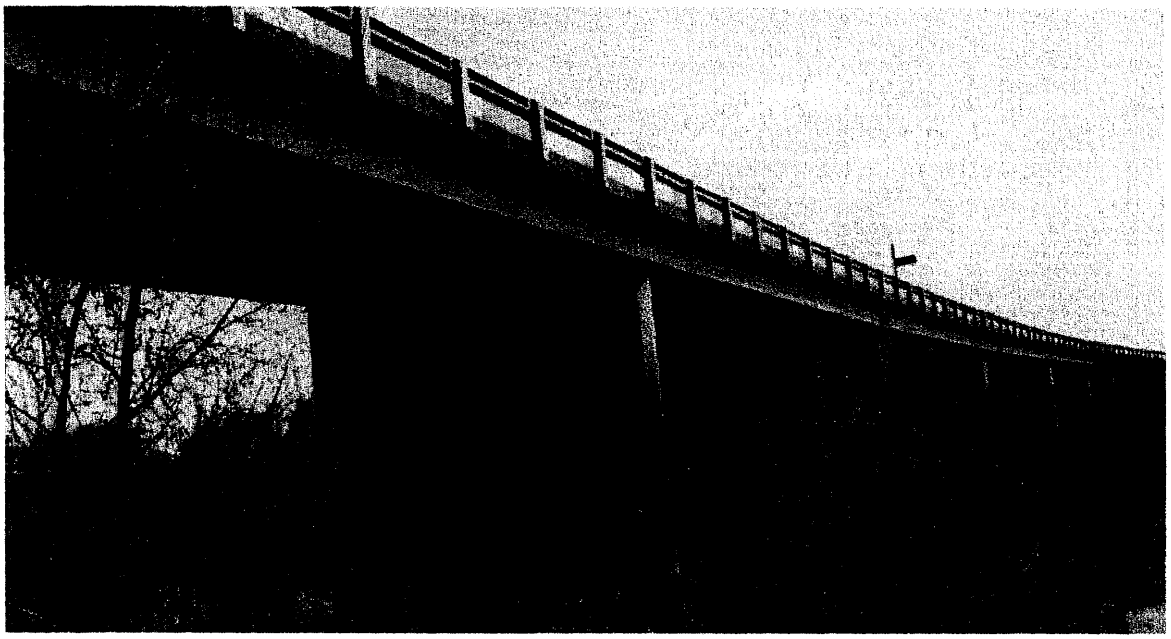
# RIVER ROAD OVER SAN JOAQUIN RIVER – SEISMIC RETROFIT



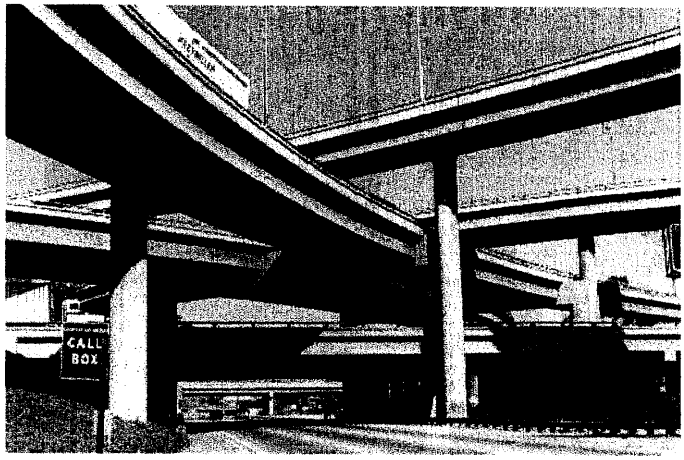
As part of Caltrans' Phase II Retrofit Program, Frederic R. Harris, Inc. (LoBuono, Armstrong & Associates' Division) was chosen to provide seismic analysis engineering of the Hills Ferry Bridge crossing the San Joaquin River at the Stanislaus and Merced County lines. The 647-foot-long bridge is curved and has 18 bents with skew angles that vary from 1 to 14 degrees. The middle third of the bridge consists of a T-beam superstructure supported on tall pier walls, while the two end portions are slab spans on plumb pile extensions.

In an effort to minimize retrofit costs, the evaluation included the most recent displacement-ductility and joint shear criteria. Analyses were modeled on GT Strudl and included soil-pile interaction and P-$\Delta$ amplification effects. Shear capacity criteria are based on the latest University of Berkeley research. FRH engineers also provided the client with a pseudo non-linear (rocking analysis) investigation of the foundations at the wall piers.

Backed by the strength of FRH's retrofit experience and established proprietary retrofit software, FRH was able to develop a very simple strategy which limited retrofit to addition of drop bent caps at four locations, and pipe shear keys/seat extenders at the in-span hinges. The plans, specifications, and engineer's estimate were completed on schedule and within budget.



# SR 60/I-710 INTERCHANGE – SEISMIC RETROFIT




As part of an "On-Call" Earthquake Retrofit Contract, Frederic R. Harris, Inc. (LoBuono, Armstrong & Associates' Division) analyzed and provided retrofit PS&E for this major four-level interchange between two Los Angeles-area freeways. In all, there would be seven different task orders for FRH, but this first assignment on the I-710/S.R.60 Interchange involved a geometrically complex interconnection of two roadways, their entrance and exit ramps, 12 abutments, and 75 bents, including 85 columns and foundations.

Due to the tight curvature and interconnection of the structures at common bents, FRH determined that a single global dynamic analysis model was necessary to adequately predict the response of the structures. This model contained approximately 1,000 nodes and 1,100 three-dimensional elements, resulting in one of the largest response spectrum analyses performed (at that time) using the M-STRUDL software. Based on this analysis and the subsequent strategy meeting, FRH developed plans for partial retrofit of 53 columns, full-column and foundation retrofit of 23 columns, isolation and torsional retrofit of outrigger bent beams, and three-pile-bent reconstruction.

The interchange was built around four supercolumns, each supporting three structures at three levels. The finite element analysis showed that additive loads from the structures would overstress the columns in the design earthquake. The FRH engineers' solution was to develop details to separate several of the structures from the supercolumns, thereby reducing the potential for seismic damage. Evaluation of the displacements from the global dynamic analysis was crucial to understanding how the interchange behaved. As for the outrigger beams connecting each pair of supercolumns, rigorous analysis of the combined moment, shear, and torsion in the beams was performed to identify possible failure modes.


AMERICAN CONSULTING
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*1996*

**ENGINEERING EXCELLENCE HONOR AWARD**

presented to

*Frederic R. Harris, Inc.*

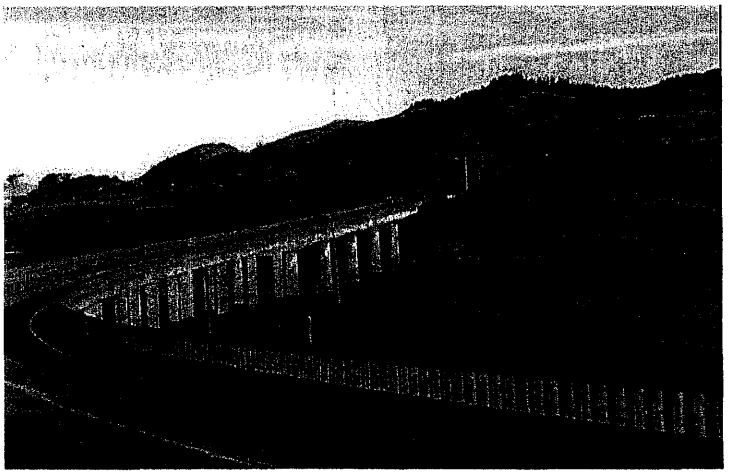
for high professional execution of engineering design on the project

*1710/SR.60 Interchange Seismic Retrofit*

*May 7, 1996*

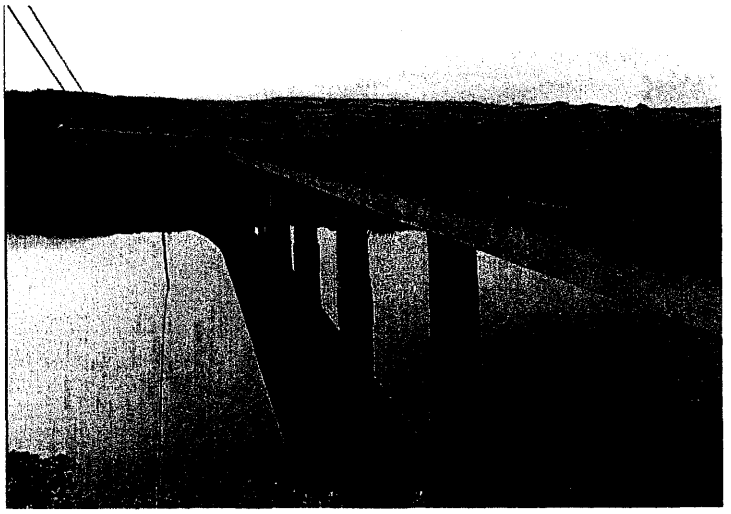
During dynamic analysis runs to measure bridge behavior, separate local models were extracted from the main model to verify localized behavior. In addition, an in-house basic program was created to manipulate the vast quantity of information produced from the analysis software output. This program, adaptable to future analyses, produced concise, clear result summaries. This efficient and flexible process enabled FRH engineers to investigate many different structural scenarios in rapid succession. Investigation of numerous retrofit scenarios was also possible, with quality control verification runs easily produced while repetitive calculation delays were minimized, thus allowing timely completion of a highly complex project.

# TEN MILE RIVER BRIDGE SEISMIC RETROFIT



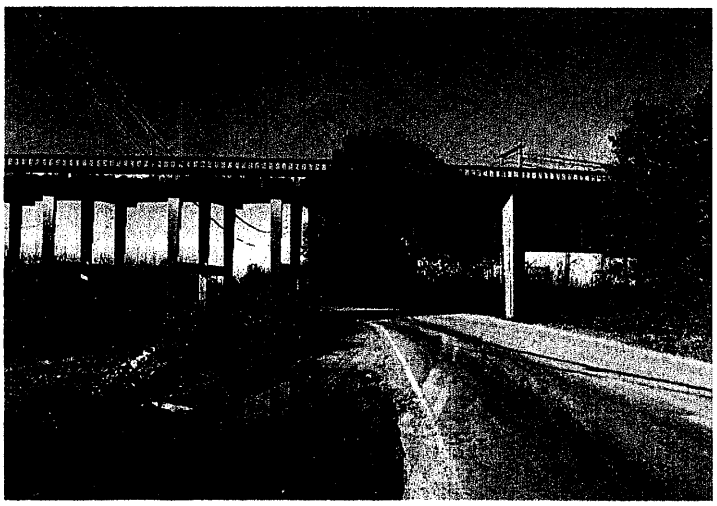
Frederic R. Harris (FRH) was retained by Caltrans to perform a seismic evaluation, develop and design retrofit measures, and produce the necessary plans, specifications, and estimates for this monumental, 1953-vintage bridge. The structure consists of 21 spans and carries California's most scenic highway (SR 1) over Ten Mile River, which **forms a habitat for an abundance of sensitive plant and animal species**. The superstructure is composed of three section types in two different heights: The south approach (Spans 1 through 16) consists of 3'-8" deep T- or box-girder superstructure supported on multi-column bents, while the remaining five northernmost main spans consist of 6'-6" concrete box girder supported on single circular piers. Most of the column footings are supported on timber piles, leaving only a few columns with steel H-pile or spread footing support. **The in-situ soil conditions were characterized as having a high potential for liquefaction.** The structure was retrofitted in 1985 by adding wire rope tie-downs at both abutments, a shear key at the south abutment, and cable restrainer units at all four interior hinge locations.

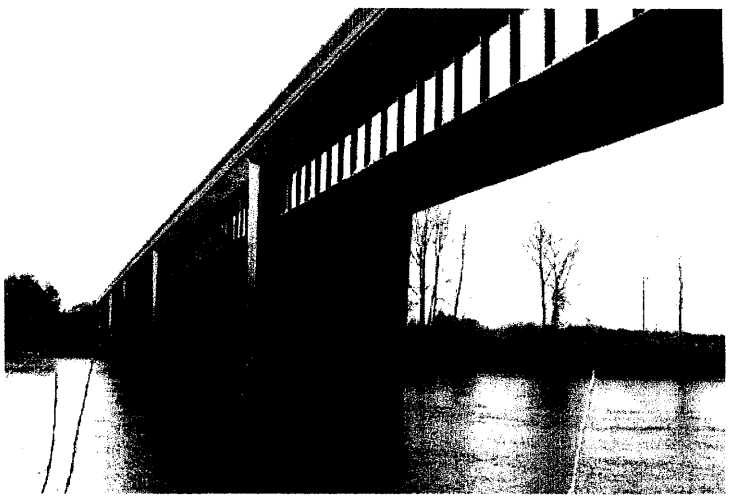
Analysis showed that the bridge does not have adequate capacity to resist the anticipated seismic loading. The predicted transverse seismic shear demands exceed the as-built capacity at both the north and south abutments, including the additional capacity provided by the shear keys installed during the 1985 retrofit. It was also determined that pile foundations do not have sufficient ultimate capacities to resist column probable plastic moment and potential liquefaction. Other major deficiencies are related to the flexural and shear capacities of the columns, bent caps, and in some cases, the superstructure itself.



FRH developed Plans, Specifications, and Estimates providing column casing and footing retrofit at all column support locations. At certain critical locations, bent caps and the superstructure are also strengthened. **The footing retrofits utilize 24-inch- diameter cast-in-steel shell piles so that the bridge can withstand the anticipated lateral spreading due to soil liquefaction.** The estimated construction cost is $4.6 million.

# SMITH RIVER BRIDGE -- SEISMIC RETROFIT





The Smith River Bridge (Dr. Fine Memorial), built in 1940, is a two-lane highway on State Route 101. The bridge is 1,050 feet long with a 20-degree skew. The approach spans are reinforced concrete continuous slabs on reinforced concrete three-column bents, with reinforced concrete spill through abutments. Channel Spans 10 through 15 are two welded steel-plate girders framed integrally into reinforced concrete two column piers with web walls. Abutment 1 through Bent 10 are on reinforced concrete piles; Pier 11 through Pier 14 are on steel piles; and Pier 15 through Abutment 19 are on spread footings. As part of an "on-call" contract for Caltrans, Frederic R. Harris, Inc.'s (LoBuono, Armstrong & Associates' Division) task was to evaluate as-built deficiencies through use of multi-modal response spectra analysis, develop retrofit strategies and then to finish the design by providing plans, specifications, and estimate for the seismic retrofit.

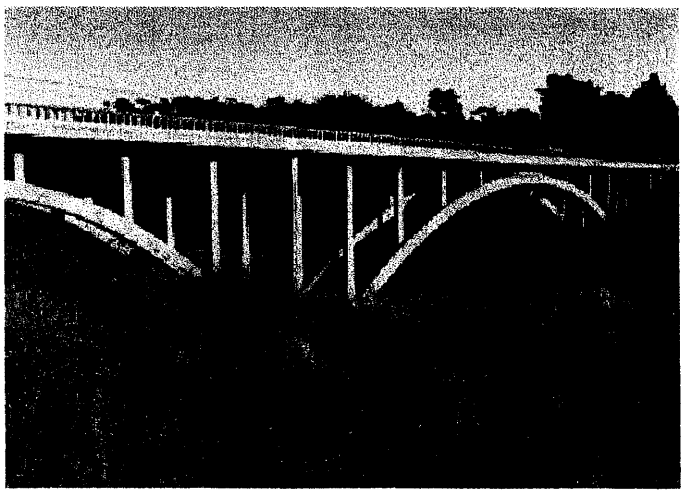
Upon FRH's evaluation of the as-built structure, several deficiencies were found. The hinge in Span 5 had no capacity to transfer transverse shear between Bents 5 and 6. Anticipated seismic transverse displacements exceeded capacities of approach span Bents 5 and 6. Approach span column to cap connections were unconfined. Lap splices in approach column to footing connections were unconfined. Inadequately confined lap splices were present in plastic hinge zone of channel pier columns. Anticipated seismic forces would cause excessive tension in steel piles from foundation overturning at Bents 11 through 14. Anticipated seismic displacements would cause shear failure of end bent type abutments and bent columns buried in approach fill.

The seismic retrofit PS&E produced by FRH included: 1) Hinge restrainers and shear key connections at hinges and expansion joints; 2) In-fill walls at Bents 5, 6, 9, 10, and 16; 3) Pier column confinement collars at bents 11 and 15; 4) Longitudinal restrainers from the abutments to Bents 11 and 15 to limit longitudinal movement of the steel girder spans; and 5) Four large 6' diameter cast-in-drilled-hole (CIDH) piles behind each abutment. The plans also included measures to mitigate and stabilize scour that had occurred at the river piers. Construction cost was approximately $1.9 million.

# ROUTE 1 ARCH BRIDGES - SEISMIC RETROFIT

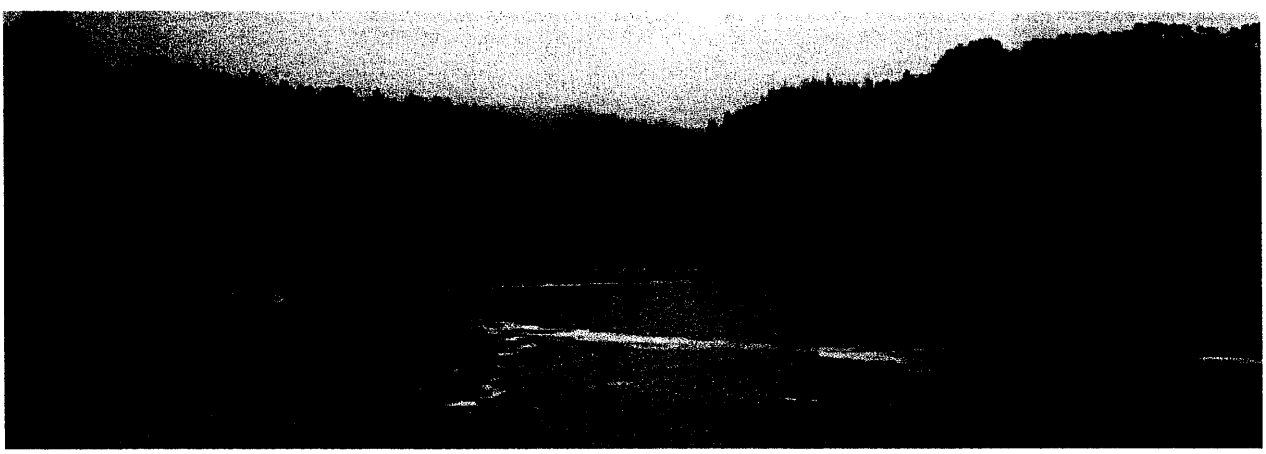
State Route 1 in Northern California is one of the country's most scenic highways. Along an exceptionally beautiful stretch of this road, south of Fort Bragg, are three major spandrel arch bridges. As part of an "on-call" contract for Caltrans, Frederic R. Harris, Inc. (LoBuono, Armstrong & Associates' Division) was assigned to analyze, evaluate, develop strategy, and produce plans, specifications, and estimates for seismic retrofit of these structures. Two of the bridges, Russian Gulch Bridge and Jughandle Creek Bridge, were built in the 1930's and are considered historic structures. The third bridge, Hare Creek Bridge, was one year short of historical status. All the bridges cross environmentally sensitive sites and are highly visible to the public.

Prior to this project, Caltrans did not have analysis procedures appropriate for this type of structure. FRH's first accomplishment was to develop an appropriate evaluation procedure which was acceptable to Caltrans. Having done this, seismic analyses were conducted which showed that all three structures were deficient if exposed to the current design level earthquake. In order to minimize historical, aesthetic, and environmental impacts, strategies were proposed and accepted which maintained the existing appearance of the structures.



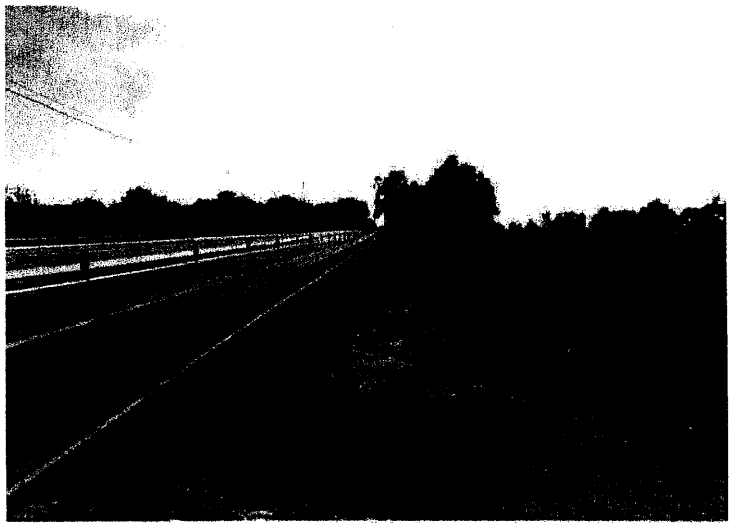
Hare Creek Bridge

Retrofit measures designed include: (1) large-diameter, cast-in-drilled-hole (CIDH) piles placed behind the abutments to prevent longitudinal movement, (2) provisions to "lock-up" or limit movement at the hinges and abutment joints, (3) pipe shear keys beneath the decks to provide transverse movement restraint, and (4) column connection modifications to minimize shear demands. The entire project from strategy through submittal of 100% plans was completed in just four months. Construction cost was approximately $2.5 million.



Russian Gulch Bridge

# ALTA MESA ROAD BRIDGE OVER DRY CREEK



As part of the Federal Highway Bridge Replacement Program (HBRR), Frederic R. Harris, Inc. (LoBuono, Armstrong and Associates Division) prepared the design and plans, specifications & estimate for a new structure crossing Dry Creek on Alta Mesa Road. The project site is located just north of the Sacramento -- San Joaquin County line. The existing structure was a timber trestle bridge, which had a severe debris accumulation problem in the winter months and had been undermined by scour.

The project was built with two different types of structure along the 970-foot-long bridge. Over the main channel, precast/prestressed concrete box girders were used, supported on 48" diameter cast-in-drilled-hole (CIDH) pile bents. The longer span length was chosen to minimize debris accumulation. The remainder of the bridge is comprised of 44' long reinforced concrete slab spans founded on driven pile bents. Environmental mitigation measures are incorporated into the superstructure design -- a portion of the space between precast girders will be left ungrouted to provide replacement bat habitat and fins were designed projecting from the bottom of the span 1 slab for bat night roosting.

FRH's design of this structure yielded a construction contract under $1.8 Million, considerably less than the $3.5 Million budgeted by Sacramento County's Public Works Department for this project.

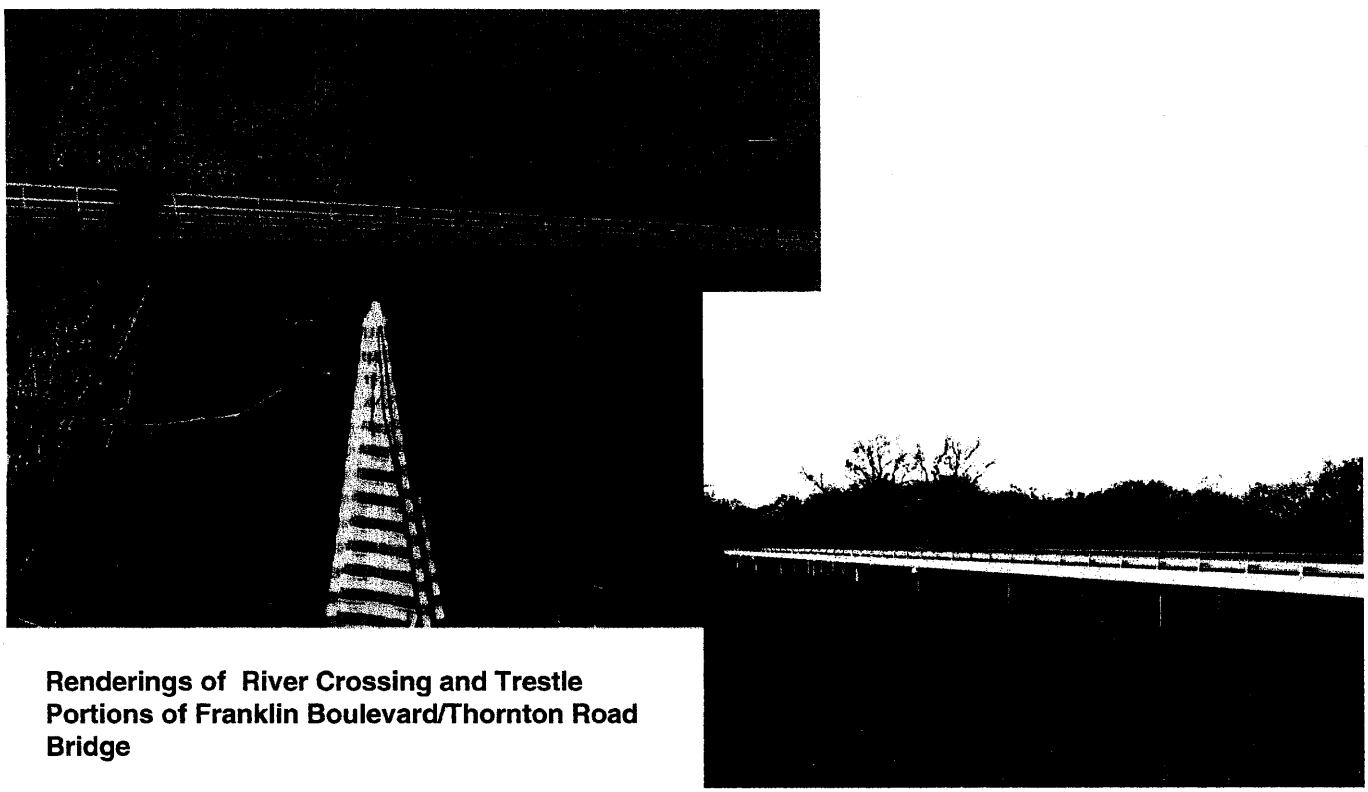
# FRANKLIN BLVD/THORNTON ROAD OVER MOKELUMNE RIVER

As part of the Federal Highway Bridge Replacement Program (HBRR), Frederic R. Harris, Inc. (LoBuono, Armstrong and Associates Division) is preparing the design and plans, specifications & estimate for a new structure carrying Franklin Boulevard (Sacramento Co.) and Thornton Road (San Joaquin Co.) across the Mokelumne River and flood plain. The site is one of great environmental sensitivity, as it is home to several threatened species of fish and fowl, and the existing bridge houses one of the largest maternal bat colonies in California.

A number of staging and schedule constraints have been designed into the project. The design concept allows access to Bean Ranch Road, an agricultural access road, at all times during the construction process. The window for contractor access to the river is only a couple of months per year. Temporary and permanent bat habitat have also been accommodated in the project.

Two different precast concrete bridge types are utilized for the 2,200-foot-long structure. The portion crossing the main river channel is spliced, precast concrete bulb-T girders supported on drilled pier-columns. This gives the necessary hydraulic opening and also minimizes the construction time in the river. The portion of structure over the flood plain is comprised of precast hollow-core slab units, made continuous with precast pile bents.

In addition to bridge design, Harris' scope of work includes surveying, geotechnical exploration, roadway geometrics and design, hydraulic studies of this designated floodway, environmental coordination and permitting, and public outreach.



**Renderings of River Crossing and Trestle Portions of Franklin Boulevard/Thornton Road Bridge**

**GUADALUPE RIVER FLOOD CONTROL PROJECT**
**SACRAMENTO, CALIFORNIA**

**Client:**
US Army Corps of Engineers

**Reference:**
Mr. Joe Sciandrone
1325 J Street
Sacramento, CA 95814
(916) 557-7184

**Responsibility:**

This is a very unusual and complicated project where a part of the USACOE's flood control channel comes within close proximity of existing Caltrans Highway bridge structures. The major issue involved in this project was to evaluate the performance of the bridge structure before and after the completion of USACOE's flood control project, and demonstrate to Caltrans that the bridge structures and foundations are not compromised by the proposed construction. For USACOE, the approval from Caltrans was critical for timely completion of the project. EMI was entrusted with the tasks of reviewing geotechnical data, evaluating seismic site response, performing liquefaction analysis, and evaluating slope stability under static and seismic conditions.

EMI performed detailed three and two-dimensional finite element analyses using state-of-the-art analytical tools and nonlinear soil models. Based on the analytical results provided by EMI in a comprehensive report, USACOE was able to demonstrate to the complete satisfaction of Caltrans that the bridge structures are not compromised by the proposed construction as long as the retaining walls are designed to accommodate additional loads generated by the seismic loading of the bridge structures. EMI worked closely with USACOE engineers to formulate a detailed design procedure for the retaining structures that would provide adequate resistance to support the bridge structures under a seismic event.

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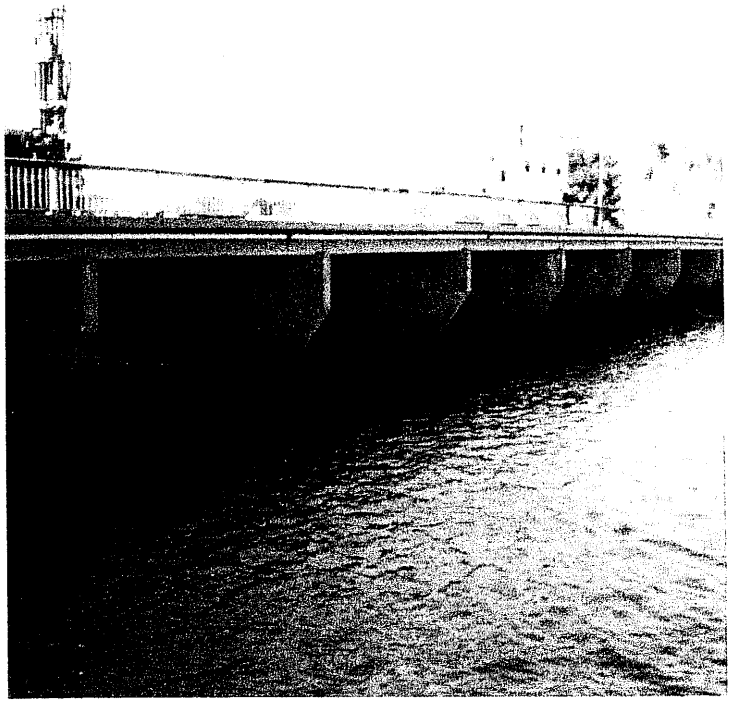
| **Project Manager:** | Kandiah Arulmoli, Principal Engineer |
| Other Key Staff: | Debanik Chaudhuri, Project Engineer |
| **Construction Cost:** | $1,500,000 |
| Geotechnical Fee: | $ 75,000 |

**MARINA DRIVE BRIDGE CROSSING SAN GABRIEL RIVER**
**SEAL BEACH, CALIFORNIA**



**Client:**
City of Seal Beach

**Reference:**
Mr. Dennis Haglan, JMI
655 University Avenue,
Suite 255
Sacramento, California 95825
(916) 929-4143

**Responsibility:**

The proposed water crossing is a four-span structure. EMI directed the drilling of 2 exploratory borings (one at each abutment) and performance of 3 cone penetrometer tests (CPT) inside the river. The CPTs were performed by coring a hole through the existing bridge deck. Soil laboratory test of selected soil samples were conducted to develop foundation design and construction recommendations.

Based on the CPT results, the near-surface soils below the river were determined to be susceptible to liquefaction. Foundations at the piers and abutments were designed to accommodate soil strength reduction and liquefaction induced ground subsidence. Approach embankments were evaluated for lateral spreading.

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| **Project Manager:** | Lino Cheang, Principal |
| Other Key Staff: | Andy Korkos, Senior Engineer |
| **Construction Cost:** | $ 4,500,000 |
| Geotechnical Fee: | $ 40,000 |

**REALIGNMENT OF HUENEME ROAD AT CALLEGUAS CREEK**
**VENTURA, CALIFORNIA**

**Client:**
County of Ventura

**Reference:**
Mr. Malcolm Mackinnon
800 S. Victoria Avenue
Ventura, California 93009
(805) 654-2065

**Responsibility:**

EMI is responsible for the overall geotechnical investigation including field exploration, laboratory testing, engineering analyses, and report preparation. A Structure/Foundation report was prepared with an accompanying Log of Test Borings Sheet for the bridge replacement.

New pavement sections were designed to accommodate the anticipated Traffic Indices and design subgrade strength (R-value). The design also considered the material type and thickness of the existing pavement. Pavement design was performed using Caltrans procedure.

Subsurface materials below the approaches were determined to be susceptible to soil liquefaction. As a result, steel HP-piles were selected to support the abutments in order to provide additional lateral resistance to reinforce the embankments and to minimize the ground movement associated with lateral spreading.

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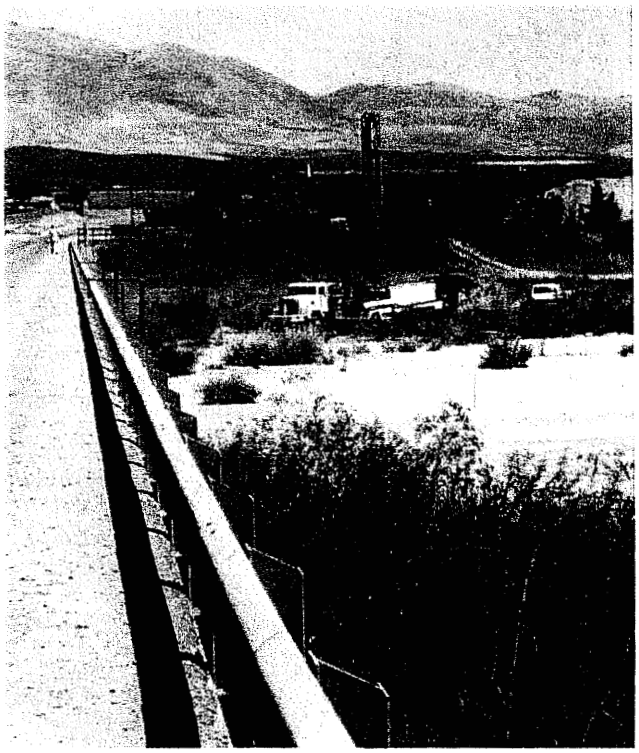
| **Project Manager:** | Lino Cheang, Principal |
| Other Key Staff: | Andy Korkos, Senior Engineer |
| **Construction Cost:** | $3,500,000 |
| Geotechnical Fee: | $25,000 |

**GAREY BRIDGE OVER SISQUOC RIVER**
**SANTA BARBARA COUNTY, CALIFORNIA**

**Client:**
County of Santa Barbara

**Reference:**
Mr. M.D. Wahiduzzaman
123 East Anapamu Street
Santa Barbara, California 93101
(805) 568-3019



**Responsibility:**

This is a bridge replacement project for a major river crossing (Sisquoc River). The replacement bridge is a 4-span structure about 600 feet long and 36 feet wide. The three single-column piers are supported on 7-foot diameter CIDH piles. This site is affected by local mining operation and scour was a key design issue for the bridge foundation. EMI is responsible for the overall geotechnical investigation including field exploration, laboratory testing, engineering analyses, and report preparation. New pavement sections were designed using TI values provided by the County of Santa Barbara and design subgrade strength (R-value). Large-diameter drilled shafts were proposed and designed for support of the bridge piers. The bridge abutments are founded on driven HP piles. The foundation design followed Caltrans criteria and procedures.

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| **Project Manager:** | Lino Cheang, Principal |
| Other Key Staff: | Bruce Schell, Senior Geologist |
| **Construction Cost:** | $ 6,000,000 |
| Geotechnical Fee: | $ 35,000 |

**SANTA YNEZ RIVER BRIDGE**
**LOMPOC, CALIFORNIA**

**Client:**
County of Santa Barbara

**Reference:**
Mr. M.D. Wahiduzzaman
123 East Anapamu Street
Santa Barbara, California 93101
(805) 568-3019

**Responsibility:**

Due to the relatively loose materials encountered below the approach and river bottom, soil liquefaction and lateral spreading were considered in foundation design. We supervised performance of Cone Penetrometer Test (CPT) soundings within the riverbed to collect supplemental subsurface soil data for soil liquefaction assessment. The CPT data was also used to delineate the subsurface soil profile as well as soil consistency.

Based on our liquefaction and slope stability analyses, the embankment has some potential to spread laterally into the channel. This form of soil movement will impose lateral loading on the pile foundations and embedded columns as the soil moves around these structural members. We recommended control of the imposed lateral movement by optimizing the pile layout at each support location including placement of additional soldier piles at strategic locations between bridge supports to reduce this soil movement. The foundation was also designed to resist liquefaction induced ground subsidence. These settlements resulted in downdrag loading on the piles.

At this stage of the design, we proposed providing foundation parameters for both Caltrans standard pipe piles (14-inch diameter, Alt. "W") and 42-inch diameter Cast-In-Drilled-Shell (CISS) piles. Steel piles were selected because they have higher ductility to withstand large deformations anticipated at this bridge site due to soil liquefaction and lateral spreading.

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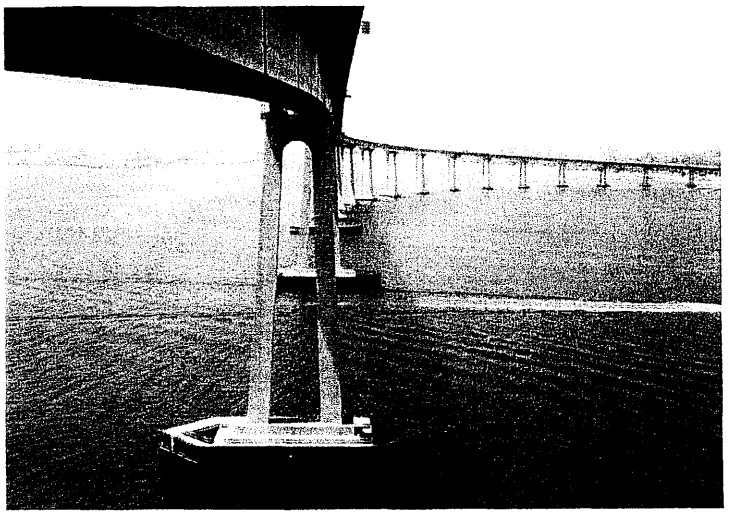
| **Project Manager:** | Lino Cheang, Principal |
| Other Key Staff: | Bruce Schell, Senior Geologist |
| **Construction Cost:** | $5,000,000 |
| Geotechnical Fee: | $ 27,000 |

**SEISMIC RETROFIT OF MAJOR TOLL BRIDGES**
**CALIFORNIA**



**Coronado Bay Bridge**

**Client:**
Caltrans, Division of Structures

**Reference:**
Mr. Tom Post
1801 30th Street
Sacramento, CA 94274-0001
(916) 227-8728

**Responsibility:**

Coronado Bay. EMI reviewed available data and concluded that the liquefaction issue for the bridge site would be low. The bridge response was also found to be highly sensitive to representation of the foundation in the global model. Formal independent check by a third party SSI expert was conducted on EMI's soil-structure interaction analyses and EMI's work was found to be accurate and our recommendations were sound.

Carquinez Strait. EMI applied nonlinear constitutive modeling and finite-element analysis techniques to evaluate the gravity caissons for both east and west structures which led to the conclusion that the existing caissons are not vulnerable to earthquake damage resulting in tremendous savings in the retrofit cost for the bridge.

Richmond-San Rafael. EMI assisted in constructibility issues involving the very large spud piles for retrofit of the main span foundations. We also assisted in retrofit design analyses and preparation of special provisions for all the foundation retrofit alternatives, including the CIDH and the CISS, the large diameter spud and the micro piles.

Vincent Thomas. The foundation for this bridge is large (almost 300 piles) and complex (unsymmetrical and highly battered piles). Our soil-structure interaction model explicitly accounted for each of the piles in the pile group in the analyses. The bridge crosses the Palos Verdes fault and the soil condition changed abruptly over very short distance along the bridge. In addition to liquefiable sands at the surface, there is a major soft clay (less than 1 blows per ft blow count) extending from 50-ft to 100-ft depth. EMI assisted Caltrans to obtain high quality in-situ soil shear strength data. The soil parameters were used in conducting state-of-the-art finite element analyses to determine the magnitude of slope deformation.

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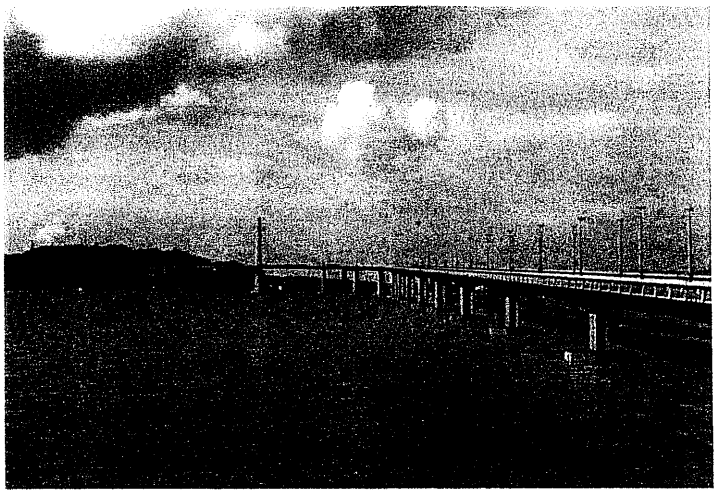
| **Project Manager:** | Ignatius Po Lam, Principal |
| Other Key Staff: | Hubert Law, Senior Engineer |
| **Construction Cost:** | Unknown |
| Geotechnical Fee: | $ 1,000,000 |

**SAN FRANCISO-OAKLAND BAY EAST SPAN REPLACMENT PROJECT**
**BAY AREA, CALIFORNIA**

**Client:**
Caltrans, Division of Structures

**Reference:**
Mr. Ade Akinsanya
1801 30th Street
Sacramento, CA 94274-0001
(916) 322-7911



**Responsibility:**

EMI formulated overall geotechnical and geophysical investigation program to capture the subsoil condition along the bridge from Yerba Buena Island to Oakland Mole. We developed seismic design criteria for the bridge structure using probabilistic analyses. In addition, pier-specific ground motions were also developed by taking into account scattering and coherency effects. These motions were used by structural engineers to perform multiple-support time-history analyses.

EMI developed foundation design parameters for the pile foundations supporting the bridge structure and provided recommendations to the structural engineers. We also performed soil-structure interaction analyses on a pier-to-pier basis.

The main signature span for the bridge is a self-anchored suspension bridge. The unique design of this structure requires extremely high capacity anchor piles. Another major challenge in designing is that a part of the structure is founded in rock and the other part is founded in soft bay mud. It also posed problems regarding rock slope stability. EMI used advanced analytical methods in conjunction with laboratory and field test data to address all these difficult issues and provided rational and practical solutions. EMI continues to work closely with structural engineering team, Caltrans, and the peer review committee to provide answers to myriad of geotechnical problems encountered during the design of this critical structure.

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| **Project Manager:** | Ignatius Po Lam, Principal |
| Other Key Staff: | Hubert Law, Senior Engineer |
| | Mike Kapuskar, Project Engineer |
| | Lino Cheang, Principal |
| **Construction Cost:** | $ 2,000,000,000 |
| Geotechnical Fee: | $ 1,500,000 |

KJELDSEN, SINNOCK & NEUDECK, INC.
CONSULTING ENGINEERS & LAND SURVEYORS

# RELEVANT PROJECT REFERENCES

## Kettleman Lane/Crescent Avenue Project, City of Lodi

Project Owner: City of Lodi, Public Works Department
Location: Kettleman Lane (Highway 12), Lodi, California

Reference Contact: Paula Fernandez, City of Lodi Public Works Department, (209) 333-6706

Project Description:
Restricted turning movements were the emphasis of this project. KSN and City staff reviewed traffic patterns and developed a controlled access along the Kettleman Lane corridor from Ham Lane to Hutchins Street. The design included raised medians with limited left turn bays. Medians were treated with architectural and landscape strips. The design also included the conversion of an uncontrolled "T" intersection at Crescent Avenue, to a signalized four way intersection. Engineers estimate for the project was $450,000. The fast track project required close coordination with Caltrans District 10, various utility companies, and the City of Lodi.

## Center Street Reconstruction Project

Project Owner: City of Stockton, Public Works Department
Location: Center Street, Stockton, California

Reference Contact: James Wong, City of Stockton Public Works Department, (209) 937-7630

Project Description:
Project consisted of asphalt overlay, and the reconstruction of numerous round corners and handicapped ramps along Center Street, from Charter Way to Oak Street (approximately 5,800 feet). In addition to the overlay, the project included curb reconstruction, concrete paver walk construction, street lights, utility coordination, traffic signal reconstruction, and pavement striping. The final engineering design was completed in early 1997 and construction was completed by the end of 1997.

## Taft Storm Drainage Improvements

Project Owner: City of Stockton, Public Works Department
Location: Stockton, California

Reference Contact: Ron Weldum, City of Stockton Public Works Department, (209) 937-8411

Project Description:
The project consists of a storm water pump station and force main. The detention basin was designed with a capacity of 9.11 Acre feet. The basin design also incorporated water quality best management practices. The pump station was designed for a capacity of 2,300 gallons per minute with a redundant pump and alternate power source. The discharge force main is approximately 1,700 feet long discharging into Walker Slough. The estimated cost for the project is $855,000. This project is to be constructed in the Summer of 2000.

**South San Joaquin Irrigation District Water Transmission Line Study and GIS Base Map**

Project Owner: South San Joaquin Irrigation District
Location: South San Joaquin County, California

Reference Contact: Mr. Richard Martin, South San Joaquin Irrigation District, (209) 823-3101

Project Description:
More than 400 square miles of south San Joaquin County form the background for the new South San Joaquin Irrigation District GIS database utilizing an array of ortho-rectified digital color photography. National Geodetic Survey control monuments were tied in a network more than 20 miles by 40 miles in size to control the GIS base layer. Lacking a suitable terrain model, a combination of real-time GPS transects and soft photogrammetry were utilized to develop a terrain surface for orthometric draping of the photography grid. This mapping will form the backbone for future planning, conceptual design and environmental impact reports. Utilizing as portion of the GIS Base Mapping, Kjeldsen, Sinnock & Neudeck, Inc. completed an aggressive pipeline interconnect feasibility study in less than three weeks. Design, environmental, and permitting special consultants were rapidly formed into a team that met the required deadline by incorporating available data sources into the primary GIS system.

**Toulumne River Restoration Project**

Project Owner: Turlock Irrigation District
Location: Stanislaus County, California

Reference Contact: Wilton B. Fryer, Turlock Irrigation District, (209) 883-8316

Project Description:
KSN implemented a full spectrum of surveying and mapping services along a 15-mile stretch of the Tuolumne River including static GPS control, aerial topography, digital orthophoto backgrounds, bathymetric surveys, and right-of-way mapping for an aggressive restoration project managed by the Turlock Irrigation District. Rough terrain, poor weather, and high river stages tested the KSN survey teams and equipment. A dozen primary survey control points spanning over 30 miles were established at centimeter level accuracy along with more than 60 secondary control points to constrain aerial photogrammetry with ground surveys and bathymetric data. Base mapping generated by KSN will be utilized for conceptual design, right-of-way negotiations, and final construction documents.

**March Lane Grade Separations at Union Pacific and Southern Pacific Railroads**

Project Owner: City of Stockton, Public Works Department
Location: Hammer Lane, Stockton, California

Reference Contact: Ray Deyto, City of Stockton, Department of Public Works, (209) 937-8869

Project Description:
Project consists of the design and construction of underpasses at the intersections of March Lane and the Union Pacific and Southern Pacific Railroads. Kjeldsen, Sinnock & Neudeck working as the civil subconsultant to HDR Engineering, is performing all surveying, right-of-way engineering and utility and drainage design associated with both grade separations. Total project cost is estimated at $17M, with the civil engineering totaling approximately $800,000. Construction on the underpasses commenced in the summer of 1999.

# Norman S. Braithwaite, Incorporated

## Recent Bridge Hydraulic Study Experience

(Definitions of abbreviations can be found on the last page)

| JOB | DESCRIPTION | FUNDING |
|---|---|---|
| **Alameda County:** | | |
| I-580/I-680 Interchange, Big Canyon Creek Canal, Dublin Ck., ACFC & WCD Line G-1-1 | Quality control review on DHS for major interchange over several channels | |
| **Amador County:** | | |
| Carbondale Road over Willow Creek | DHS for replacement bridge. | HBRR |
| Cook Road over Dry Creek | DHS for replacement bridge . | HBRR |
| Fiddletown Rd. over Dry Creek | DHS for replacement bridge | HBRR |
| Sutter Creek Rd. over Sutter Creek | Hydraulic & hydrologic analysis for replacement bridge | HBRR |
| **Butte County:** | | |
| Aguas Frias Road over Butte Ck. | DHS for 318-meter bridge | HBRR |
| Corona Avenue over Black Burn Moon Drain | Hydraulic Scoping study and DHS for bridge over urban drainage channel | HBRR |
| Bruce Road over Little Chico Ck.. | DHS for replacement bridge | HBRR |
| River Road over Big Chico Ck. | DHS for a 200-ft. long bridge at confluence | HBRR |
| State Rt. 162 over Feather River | Hydraulic Analysis for permitting work bridge | Private |
| **Colusa County:** | | |
| TCCA over Cortina Creek | DHS for private bridge retrofit | Private |
| **Contra Costa County:** | | |
| Delta Rd over Rock Slough | DHS for replacement bridge in tidal environment | HBRR |
| **Del Norte County:** | | |
| Parkway Dr. over Jordan Creek | DHS for "bottomless" culvert to facilitate fish passage | SB 271 |
| **El Dorado County:** | | |
| Placerville Drive over Hangtown Ck. | DHS for bridge widening | HBRR |
| **Fresno County:** | | |
| Powerhouse Road over San Joaquin River | DHS for 490-ft long bridge. | HBRR |
| **Glenn County:** | | |
| County Rd P. over Stony Ck. | DHS for replacement bridge | HBRR |

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|---|---|---|
| **Lassen County:** | | |
| Mapes Road over Susan River. | DHS for bridge spanning overflow in channel in wide floodplain. | HBRR |
| Lambert Lane over Hartson Slough. | DHS for bridge spanning Susan River overflow slough | HBRR |
| State Route 36 | Hydraulic Analysis for PSR | |
| Skyline Road over the Susan River | Hydraulic Analysis for PSR | |
| County Rd. A2 over Willow Creek | DHS for concrete arch culvert | HBRR |
| Punkin Center over Muddy Slough | Hydraulic Analysis for Seismic Retrofit | |
| Capezzoli over Whitehead Slough | Hydraulic Analysis for Seismic Retrofit | |
| Blickenstaff Rd. over Baxter Creek | DHS for replacement of bridge | HBRR |
| **Mendocino County:** | | |
| East Side Road over Morrison Ck. | DHS for replacement bridge at confluence | FHWA-SD |
| **Modoc County:** | | |
| County Road 90 over Pit River and overflow slough | DHS for bridges spanning river and overflow. overflow. | HBRR |
| Rattlesnake Butte Road over Pit River | DHS for bridge over a multiple channel river | HBRR |
| County Road 69 over Pit River | DHS for bridge in wide flood plain | HBRR |
| **Monterey County:** | | |
| Palo Colorado Rd Bridge over Mill Ck | | Field |
| Review & Channel Enlargement Analysis | | SR |
| Monte Rd. Bridge over Salinas River | " " " " " | SR |
| Nasson Rd Bridge over Chagua Ck | " " " " " | SR |
| Corral De Tierra Rd Bridge/ Calara Ck | | " " |
| " " " | SR | |
| Davis Rd Bridge over Salinas River | " " " " " | SR |
| Nasson Rd Bridge over Cachagua Ck | " " " " " | SR |
| Johnson Rd. Bridge over Carneros Ck | " " " " " | SR |
| Carmel Valley Rd. Bridge / Tularcitos Creek | " " " " " | SR |
| Moss Landing Bridge over Moss Landing Slough | DHS for replacement bridge | HBRR |
| Boranda Rd. over Carmel River | DHS for replacement bridge | HBRR |
| Lewis Creek Rd. Bridge/ Lewis Ck. | DHS for washed out bridge | FEMA ER |
| **Napa County:** | | |
| Oakville Cross-Rd. over Napa River | DHS for replacement bridge over estuary | HBRR |
| **Nevada County:** | | |
| Glenshire Drive over Truckee River | DHS for replacement bridge | HBRR |
| **Placer County:** | | |
| Wise Road over North Ravine | LHS & DHS for replacement bridge | HBRR |
| Barton Road over Miners Ravine | LHS & DHS for replacement bridge | HBRR |

**Plumas County:**

| | | |
|---|---|---|
| Johnsville Rd. over Jamison Ck. | DHS for replacement bridge in recreation - historic area | HBRR |
| Spanish Ck. Pedestrian Bridge over Spanish Creek | DHS for new bicycle and pedestrian bridge | ISTA/ HBRR |
| Taylorsville Bridge over Indian Ck | Field Review & Channel Enlargement Analysis | SR |
| Flournoy Bridge over Indian Ck | " " " " " | SR |
| Drum Bridge over Red Clover Ck. | " " " " " | SR |
| Twain Bridge / No. Fork Feather Rvr. | " " " " " | SR |
| Lights Creek Bridge over Lights Ck. | " " " " " | SR |
| Pole Bridge over Warner Ck. | " " " " " | SR |
| Clio Bridge / Middle Fork Feather Rvr | " " " " " | SR |
| Virgilia Bridge/Middle Fork Feather R | DHS for bridge improvement | HBRR |

**Sacramento County:**

| | | |
|---|---|---|
| Alta Mesa Rd. over Dry Creek | DHS for 1000-foot long replacement bridge over stream with a divided channel. | HBRR |
| E. Stockton Blvd. over Laguna Ck. and Overflow Bypass Structure | DHS for replacement bridge adjacent to the Hwy 99 freeway & W. Stockton Blvd bridges. | HBRR |
| Franklin Rd. over Mokelumne River and Consumnes River | DHS for 2,000-ft long bridge at confluence of two major rivers with wide flood plain, overtopping, tidal effects | HBRR |

**San Benito County:**

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|---|---|---|
| 43C-5 Panoche Rd./Tres Pinos Ck. Graves | DHS for repair of flood damaged bridge | FEMA-ER |
| 43C-13 Panoche Rd./Tres Pinos Ck. Callens | DHS for replacement of washed out bridge | FEMA-ER |
| 43C-14 Panoche Rd./Tres Pinos Ck. Appel | DHS for repair of flood damaged bridge | FEMA-ER |
| 43C-11 Panoche Rd./Tres Pinos Ck. Elkhorn | Hydraulic evaluation of flood damaged bridge | FEMA-ER |
| 43C-16 Panoche Rd./Tres Pinos Ck. Alvein | " " " " " | FEMA-ER |
| 43C-26 Panoche Rd./Tres Pinos Ck. Miller | " " " " " | FEMA-ER |
| 43C-27 Panoche Rd./Tres Pinos Ck. Wattis | " " " " " | FEMA-ER |
| 43C-22 Panoche Rd./Tres Pinos Ck Recalde | " " " " " | FEMA-ER |

**San Luis Obispo County:**

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|---|---|---|
| Santa Rosa St. over San Luis Creek | DHS for urban bridge in sensitive historic and environmental setting. | HBRR |
| Higuera St. "Undercity Tunnel" Over San Luis Creek | Hydraulic scoping study and bridge hydraulic alternatives for rehabilitation | HBRR |

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|---|---|---|
| **Santa Barbara County:** | | |
| University Dr. over Maria Ygnacio Ck | DHS for urban bridge | HBRR |
| **Shasta County:** | | |
| Lake Redding Bridge Over Sacramento River | DHS for new 600-ft bridge over a major river | HBRR |
| Turtle Bay Pedestrian Bridge over Sacramento River. | DHS and FEMA LOMR for new single span suspension bridge | |
| Vedder Road over Burney Creek | Hydraulic Feasibility & DHS for replacement bridge in a wide floodplain | HBRR |
| Pine Grove Ave. Extension over Churn Creek | DHS for new bridges | EDA; SB-45 & Local |
| Pine Grove Ave. Extension over Salt Creek | DHS for new bridges | EDA; SB-45 & Local |
| Main Street over Cottonwood Creek | DHS for replacement bridge | HBRR |
| Freeman Road over Clover Creek | Flood risk assessment | Local |
| Pedestrian Bridge over Sulphur Ck. | Brief hydraulic evaluation | Charity |
| **Sierra County:** | | |
| Goodyears Bar Bridge, Mountain House Road over Yuba River | Brief hydraulic scoping study and full DHS for replacement of bridge washed out during flood of January 1, 1997. | HBRR |
| **Siskiyou County:** | | |
| Eller Ln. over Scott River | DHS for replacement bridge | HBRR |
| Quartz Valley Rd. / Shackleford Ck. | DHS for replacement bridge | HBRR |
| Ager-Beswick Rd. over Bogus Ck. | DHS for replacement bridge | HBRR |
| Copco Rd. over Jenny Creek | DHS for replacement bridge | HBRR |
| **Solano County:** | | |
| Grizzly Island Rd. over Hill Slough | DHS for 58-meter replacement bridge over tidal estuary with a divided channel. | HBRR |
| Pleasants Valley Rd. over Pleasants Valley Ck. Bridge 23C-098 | DHS for replacement bridge | HBRR |
| Pleasants Valley Rd. over Pleasants Valley Ck. Bridge 23C-008 | DHS & channel stability evaluation for replacement bridge | HBRR |
| Pleasants Valley Rd. over Pleasants Valley Ck. Bridge 23C-010 | DHS & channel stability evaluation for replacement bridge | HBRR |
| **Sonoma County:** | | |
| Matanzas Ck. Retaining Wall | Hydraulic analysis for retaining wall | HBRR |
| **Stanislaus County:** | | |
| Modesto 9th St. over Tuolumne Rvr. | DHS for replacement bridge | HBRR |

**Tehama County:**

| | | |
|---|---|---|
| Cone Grove Rd. over New Creek | DHS for replacement bridge | HBRR |
| Jackson St Bridge over Reeds Creek | Brief hydraulic analysis and DHS | HBRR |
| Jackson St Bridge over Brickyard Ck. | Brief hydraulic analysis and DHS | HBRR |
| Toomes Rd. over Jewett Creek | DHS for bridge replacing low water crossing | HBRR |
| Corona Rd. over Blackburn Moon Drain | DHS for replacement bridge over urban drainage | HBRR |

**Trinity County:**

| | | |
|---|---|---|
| Ruth-Zenia Rd./ Little Van Duzen Rvr | DHS for replacement bridge | HBRR |
| Eagle Creek Loop over Trinity River | DHS for replacement bridge | HBRR |
| Bucktail bridge over Trinity River | Evaluation of bridge risk and requirements | TRRP |
| Salt Flat bridge over Trinity River | Evaluation of bridge risk and requirements | TRRP |
| Treadwell bridge over Trinity River | Evaluation of bridge risk and requirements | TRRP |
| Poker Bar bridge over Trinity River | Evaluation of bridge risk and requirements | TRRP |

**Yolo County:**

| | | |
|---|---|---|
| Co Rd 89 over S F Willow Slough | DHS for replacement bridge | HBRR |

**ABBREVIATIONS:**

HBRR - Highway Bridge Repair and Replacement
EDA - U.S. Department of Commerce Economic Development Administration
ER - Emergency Repair
FEMA - Federal Emergency Management Admin.
FHWA - Federal Highway Administration
SD - Storm Damage
SR - Seismic Retrofit
DHS - Design Hydraulic Study
PSR - Project Study Report
LHS - Location Hydraulic Study
LOMR - Letter of Map Revision
ISTA - Intermoda l Surface Transportation Act
TRRP - Trinity River Restoration Program, Department of the Interior

# JONES & STOKES

## RELEVANT PROJECT EXPERIENCE

### Honcut Creek Bridge Replacement, Yuba and Butte Counties

Jones & Stokes is preparing environmental documentation in the form of a natural environmental study (NES) report and archaeological survey report (ASR)/historic property survey report (HPSR) for a bridge replacement project located on a Loma Rica Road over Honcut Creek on the Yuba-Butte County line. We also prepared a determination of effect document and a memorandum of agreement and will perform required mitigation in compliance with Section 106 of the National Historic Preservation Act. A Section 4(f) of the U.S. Department of Transportation Act evaluation also was completed.

In consultation with the engineering firm, county staff, and the Caltrans, we are completing these studies to support bridge design, California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documentation requirements, and FHWA requirements under its Highway Bridge Rehabilitation and Replacement (HBRR) program. Jones & Stokes will also prepare an initial study and categorical exclusion document for the CEQA and NEPA processes. All environmental documentation was prepared according to the Caltrans' "Guidance for Consultants" and FHWA requirements.

### San Antonio and San Domingo Bridge Replacement, Calaveras County

Jones & Stokes prepared a NES report and an ASR for the proposed replacement of the San Antonio and San Domingo Bridges on Pool Station Road in Calaveras County. First, we worked closely with the design engineers, Calaveras County staff, and Caltrans staff in designing the project to avoid impacts on an historic property located on the east side of the project site. Once the approach to the project design was finalized, the design engineer prepared a project description that could be used as the basis for analysis of impacts. The NES addresses potential impacts on botanical resources, wildlife resources, and fish resources. A preliminary wetland delineation is included in the NES and was verified by the U.S. Army Corps of Engineers (Corps). The cultural resources documentation consists of a positive ASR and a positive HPSR. All environmental documentation was prepared according to the Caltrans's "Guidance for Consultants" and FHWA requirements.

### Old Davis Road Bridge Replacement, Solano County

Jones & Stokes prepared environmental documentation to support an initial study/negative declaration under CEQA and a categorical exclusion under NEPA for a bridge replacement project

on Old Davis Road in Solano County. Investigations included biological and cultural resource surveys, wetland and water quality evaluations, and preparation of a Section 404 nationwide permit and a Section 1601 streambed alteration agreement application. All environmental documentation was prepared according to the Caltrans's "Guidance for Consultants" and FHWA requirements.

## First Street Bridge Replacement, City of Napa

Jones & Stokes teamed with a consulting engineering firm to provide bridge design and environmental compliance and permitting assistance to the City of Napa for the replacement of the First Street Bridge over Napa Creek. The bridge replacement project is one element of the Corps' Napa River/Napa Creek Flood Control project, which requires removing and replacing a number of bridges in downtown Napa to accommodate flood flows. The First Street Bridge over Napa Creek also qualifies for federal funding under the FHWA's Highway Bridge Replacement and Rehabilitation (HBRR) program.

Jones & Stokes worked closely with the City of Napa, Caltrans District 4 local assistance, and FHWA to evaluate the impacts of the bridge replacement project on biological resources (including wetlands and riparian habitat), recreation resources (including City parklands and trails), visual quality, and historic and archaeological resources. Jones & Stokes used the results of these studies in conjunction with information collected for the overall Corps flood control project to assist the City of Napa, Caltrans, and FHWA in completing environmental permitting and consultation requirements for the bridge replacement project. Requirements include the Section 4(f) of the Department of Transportation Act, Section 106 of the National Historic Preservation Act, Section 1601-03 of the California Fish and Game Code (streambed alteration agreement), and Sections 401 and 404 of the Clean Water Act.

## White Road and Wilbur Springs Road Bridge Replacement, Colusa County

Jones & Stokes prepared environmental documentation in the form of a NES report and ASRs/HPSRs for two bridge projects located on rural roads in Colusa County. Working with the engineering firm and county staff, we completed these studies to support bridge design, CEQA and NEPA documentation requirements, and FHWA requirements under its HBRR program.

## Route 99 Improvement Project, San Joaquin County

Jones & Stokes is preparing NEPA and CEQA environmental documents for improvements to a 4-mile-long portion of State Route (SR) 99 in San Joaquin County. The County of San Joaquin, City of Stockton, San Joaquin County Council of Governments, and Caltrans jointly propose to improve the safety of travel and to increase the capacity of SR 99 between the SR 4 (Crosstown Freeway) and Hammer Lane interchanges in Stockton. Jones & Stokes is preparing the CEQA initial

study and NEPA environmental assessment for the project and is also preparing technical studies for biological resources, cultural resources, noise, air quality, socioeconomics, water quality, and visual resources.

## Lake Natoma Crossing Project Environmental Impact Statement/Environmental Impact Report, City of Folsom

Jones & Stokes prepared a joint environmental impact statement/environmental impact report and other related technical reports for the construction of a north/south crosstown connector and bridge across Lake Natoma just below Folsom Dam in Folsom, California. The environmental document was prepared in compliance with both FHWA and U.S. Bureau of Reclamation NEPA guidelines. The environmental studies for this complex and controversial project included analysis of four alternative bridge crossings. The environmental issues included urban issues (e.g., land use, parklands, and relocation concerns) and potential impacts on cultural and biological resources. Special attention was given to the air quality, water quality, and growth-inducement issues, which are a major public concern. Jones & Stokes prepared an alternatives analysis to satisfy Section 404(b)(1) of the Clean Water Act, a cultural resources report to comply with Section 106 of the National Historic Preservation Act, a biological assessment to comply with Section 7 of the Endangered Species Act, and a separate Section 4(f) evaluation in accordance with FHWA requirements to evaluate the impacts of the proposed project on the American River Parkway and the historic Rainbow Bridge. The project also included an extensive public involvement component, including three public hearings, 10 special interest group meetings, numerous public agency meetings, a newsletter, press releases, and a video.

## Interstate 5/Downing Avenue Project Study Report/Project Report, City of Stockton

SunCal Companies, the developer of the Weston Ranch subdivision, is proposing to improve the Interstate 5 (I-5)/Downing Avenue interchange in the City of Stockton to facilitate buildout of the 1,500-acre Weston Ranch residential development. Jones & Stokes is preparing the CEQA and NEPA environmental documentation for the project as part of the project study report/project report process. To comply with CEQA, Jones & Stokes is preparing an initial study/mitigated negative declaration for the project. Additionally, we are preparing technical studies required by Caltrans and the FHWA to support the NEPA process for this project.

# APPENDIX C

Frederic R. Harris, Inc.

The computer resources at FRH are an integral part of our commitment to advanced engineering analysis. Computer support and knowledge is widespread across every level of the organization, with every engineer and technician provided with his/her own Pentium-based PC workstation. All drafting work is produced on CAD, and FRH currently operates both PC-based AutoCAD and Microstation workstations. Each of our offices is served by a Windows NT Local Area Network (LAN), and the offices in turn are interconnected with a Wide Area Network (WAN). Every staff member has internal and internet e-mail capability.

For the static and dynamic structural analysis, a PC based version of GT-Strudl is our main software. Design of new continuous bridges is usually produced utilizing BDS or TANGO. FRH has developed an enhanced version of Caltrans' YIELD program for force capacity evaluation of columns, and uses the XSECTION and WFRAME programs developed by Caltrans for determining column/frame displacement capacity. Automated procedures have been developed to take results from all of these software packages and directly import them into MS Excel spreadsheets which calculate flexural and shear capacity-demand relationships. The following is a summary of FRH's major engineering computer software:

| | |
|---|---|
| BDS | General one-story bridge frame analysis and design. |
| BEAMX | Determination of moment-curvature relationship of beam cross-sections and their effective section properties. |
| CONSYS | Influence line generator and moving load analysis for continuous beams. |
| FLPIER | Analysis of pile group for vertical and lateral loads, in multi-layer non-linear soils |
| GT-Strudl | Finite element static and dynamic analysis software. Includes extensive element library, with ability to perform P-Delta and large deflection analyses. |
| HINGERES | In-house program for stand alone analysis and evaluation of bar and cable hinge restrainers. |
| LAAPIER | In-house version of YIELD program with enhanced convergence routines and alternative load combinations. |
| LARSA | Nonlinear/Linear Finite Element Analysis and Design. |
| LPILE | Analysis of single pile for vertical and lateral loads, in multi-layer non-linear soils. |
| PCBENT | General one-story plane bridge bent analysis and design. |
| RESPONSE | Flexural and shear evaluation of prestressed and reinforced concrete cross sections utilizing compression field theory. |
| SECTION | In-house program for determining properties of solid or hollow sections. |
| SEISAB | Seismic analysis of bridge structures. |
| SPAN | Simple span pre-tensioned concrete girder design. |
| SURETRAK | CPM Scheduling |
| TANGO | Time-dependent analysis of conventionally and segmentally constructed steel, concrete (including post-tensioned), cable-stayed or suspension bridges, and continuous composite precast/prestressed concrete spliced girder bridges. |
| WINABUT | Design and analysis of concrete seat- or high cantilever-type bridge abutments. |
| WINFOOT | Design and analysis of pile and spread footings. |
| WFRAME | Step-wise non-linear displacement capacity evaluation of bridge frames or bents. |
| XSECTION | Determination of yield displacements and effective properties of rectangular, circular and oblong columns with different levels of confinement. |

FRH also maintains a library of *validated* Excel spreadsheet templates for both engineering and project management applications.

DMJM HARRIS

601 University Avenue
Suite 274
Sacramento, California 95825

**Tel:** (916) 929-3124
**Fax:** (916) 921-9239

January 17, 2001

Mr. James L. Gregg, P.E.
Stanislaus County Department of Public Works
Administration Division
1010 10th Street, Suite 3500
Modesto, CA 95354

RE: River Road over the San Joaquin River (Bridge 39C-0001)
Seismic Study and PS&E Engineering Services
Comments on "Master Agreement for Professional Services (7.19.99)"

Dear James. Mr. Gregg:

Per our discussion, our company has recently begun reorganization. Included is a print of a recent announcement, which gives a brief description of what the changes are about.

We are in the process of merging the infrastructure practice groups from three companies, DMJM Infrastructure, Holmes & Narver Infrastructure and Frederic R. Harris. Each of these entities was a successful, independent operation within the AECOM family of companies, and we believe that the result of the merger, DMJM+HARRIS, will provide significant benefits to our clients.

During the process of completing the merger, we are focused on delivery of our commitments.

To that end, please find attached revised copies of Section 3: Work Plan, Fee Estimates and Fee Schedules. We have updated our previously submitted information to reflect the project timeline. The fee estimates and the workplan have been modified to provide consistent reference to task numbering.

We have reviewed the County's Master Agreement and the following minor modifications are submitted for your consideration. Our corporate contract coordinator, Mr. Robert K. Orlin, can be reached by phone at (212) 973-3070 or via email at rorlin@dmjmharris.com. I have spoken with him and he is prepared to go over the comments in detail and will work with your risk management and contract personnel to complete a document we can both accept.

DMJM HARRIS

**Article 6.2** - The article requires us to provide, among other things, a list of named insureds. The list is subject to the County's approval, with the potential for deletions or posting of other security such as bonds, cash, etc., upon request of the County.
Because our company is one operating entity within the overall AECOM organization, and our insurance is maintained on a practice basis, covering all the AECOM companies, we cannot do this. However, I am confident that the intent of the article can be addressed to the satisfaction of the County.
I would like to have our risk management and contract coordination personnel discuss the issues with your risk manager, County Council or other individual responsible for reviewing contract language.

**Article 6.3, Line 4** - Delete "*additional named insureds*" and replace with "*additional insureds*".

**Article 7.1, 4th to Last Line** - After the word "*indemnify*" insert the words "*hold harmless and defend*".

**Insert the following to the end of this article:**

*Notwithstanding anything in this Agreement, in no event shall either Consultant or Client be liable to the other for any indirect, special or consequential damages whether arising in contract, tort (including negligence), statute, or strict liability.*

**Construction Services** – It is anticipated that DMJM+HARRIS will provide design support services during construction. We request that the following disclaimer language be included in Article 7. "Defense and Indemnification".

*Notwithstanding anything in this Agreement, Consultant shall not have control or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety measures, precautions and programs including enforcement of Federal and State safety requirements, in connection with construction work performed by Client's construction contractors. Nor shall Consultant be responsible for the supervision of Client's construction contractors, subcontractors or any of their employees, agents and representatives of such contractors, or for inspecting machinery, construction equipment and tools used and employed by contractors and subcontractors on Client's construction projects. In no event shall Consultant have the right to stop the work of any of Client's construction contractors or subcontractors. In no event shall Consultant be liable for the acts or omissions of any construction contractors, their subcontractors, any of their agents or employees, or any other persons or entities performing any work related to this project, or for the failure of any of them to carry out construction work under contract with the Client.*

*In order that Consultant may be fully protected against such third party claims, Client agrees to obtain and maintain for the benefit of Consultant the same indemnities and insurance benefits obtained for the protection of Client from any contractor or subcontractor working on the project and shall obtain from that contractor or subcontractor insurance certificates evidencing Consultant as an additional named insured.*

DMJM HARRIS

We are eager to begin work on this project and are ready to respond to your questions promptly upon receipt. Feel free to call me to discuss any questions or to request additional information or clarification.

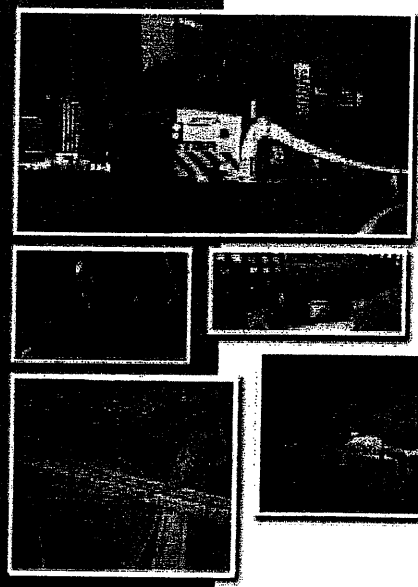
Sincerely,

DMJM+HARRIS

Thomas R. Barnard, P.E.
Vice President

# Millions of People Will Find What We Do Very Moving.

## Announcing The New Global Powerhouse in Transportation and Infrastructure. . . DMJM+HARRIS.



When you combine the talent and resources of three of the best companies in the field of transportation and infrastructure planning, engineering and architecture – DMJM Infrastructure, Holmes & Narver Infrastructure and Frederic R. Harris – you unleash new synergies of size, scope and technology into a dynamic and powerful new force. That powerful new force, with a deeper and more diverse pool of experienced professionals, and greater resources and financial strength to handle even the largest projects, is DMJM+HARRIS. Now a national and global powerhouse, our capabilities cover the full spectrum of market sectors and disciplines, including Transit, Highways and Bridges, Ports and Harbors, Energy, Water Resources, Marine and Aviation.

So from concept to completion, from project design and planning to project delivery, at DMJM+HARRIS we're ready to build a better world. And we think that a great many people who benefit from what we do will find that very moving.

DMJM HARRIS

*The People Who Get It Done™*

PROJECT DEVELOPMENT • PLANNING • DESIGN • PM/CM • OPERATIONS & MAINTENANCE

An AECOM Company

# FEE ESTIMATE
## Seismic Retrofit Strategy

| Firm/Classification | | PROJECT MANAGEMENT | | | | PHASE I -- SEISMIC RETROFIT STRATEGY | | | | | | | | | | | | Total Hours | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Project Management / Administration | Bi-Monthly Coordination / Status Meeting | Monthly Project Progress Report | Quality Assurance | Review Existing Data / Site Visit / Kickoff Meeting | Topographic Survey | Preliminary Environmental Consulting | Preliminary Hydaulic / Scour Analyses | Preliminary Geotechnical Study and Report | As-Built Seismic Analysis (Including Scour Critical ... | Develop Retrofit Alternatives | Advance Planning Study | Cost Estimate of Alternatives | Prepared Draft Strategy Report | Attend Strategy Meeting | Finalize Strategy Report | | |
| | | 0.1 | 0.2 | 0.3 | 0.4 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 1.10 | 1.11 | 1.12 | | |
| **Frederic R. Harris, Inc.** | | | | | | | | | | | | | | | | | | | |
| Project Manager/Principal | $ 160 | 66 | 16 | 20 | 12 | 12 | | | | | 4 | 4 | 8 | 2 | 8 | 16 | 12 | 180 | $ 28,800 |
| Principal Engineer | $ 135 | | | | | | | | | | | | | | | | | | |
| Senior Engineer | $ 106 | | | | | 8 | | | | | 30 | 24 | 48 | 12 | 40 | 8 | 40 | 210 | $ 22,260 |
| Engineer | $ 76 | | | | | | | | | | 120 | 48 | | | | | 24 | 192 | $ 14,592 |
| CAD Technician | $ 60 | | | | | | | | | | | | 30 | | 16 | | 4 | 50 | $ 3,000 |
| Clerical | $ 45 | 60 | | | | | | | | | | | | | 8 | | 4 | 72 | $ 3,240 |
| Other Direct Costs (Including 5% of Subs) | | | | | | | | | | | | | | | | | | | $ 20,000 |
| **Earth Mechanics, Inc.** | | | | | | | | | | | | | | | | | | | |
| Principal/Project Manager | $ 163 | | | | | 2 | | | | 13 | | | | | | 8 | | 23 | $ 3,749 |
| Project Engineer/Geologist | $ 87 | | | | | 10 | | | | 108 | | | | | | | | 118 | $ 10,266 |
| Staff Engineer/Geologist | $ 65 | | | | | | | | | 24 | | | | | | | | 24 | $ 1,560 |
| Clerical | $ 55 | | | | | | | | | 4 | | | | | | | | 4 | $ 220 |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | $ 400 |
| **Kjeldsen, Sinnock & Neudeck, Inc.** | | | | | | | | | | | | | | | | | | | |
| Principal Engineer | $ 125 | 4 | | | | 4 | 4 | | | | | | | | | | | 12 | $ 1,500 |
| Associate Engineer | $ 100 | | | | | | | | | | | | | | | | | | |
| Assistant Engineer | $ 90 | | | | | | | | | | | | | | | | | | |
| Junior Engineer | $ 80 | | | | | | 24 | | | | | | | | | | | 24 | $ 1,920 |
| Senior Technician/Draftsperson/CAD | $ 70 | | | | | | | | | | | | | | | | | | |
| Technician/Draftsperson/CAD | $ 60 | | | | | | | | | | | | | | | | | | |
| Three-Man Survey Crew + Vehicle | $ 195 | | | | | | | | | | | | | | | | | | |
| Two-Man Survey Crew + Vehicle | $ 150 | | | | | | 16 | | | | | | | | | | | 16 | $ 2,400 |
| Survey Party Chief | $ 75 | | | | | | 8 | | | | | | | | | | | 8 | $ 600 |
| Clerical | $ 44 | | | | | | 4 | | | | | | | | | | | 4 | $ 176 |
| Total Fee | | | | | | | 404 | | | | | | | | | | | | $ 4,696 |
| **Jones & Stokes** | | | | | | | | | | | | | | | | | | | |
| Associate Principal | $ 139 | | | | | 8 | | 16 | | | | | | | | | | 24 | $ 3,336 |
| Sr. Environmental Scientist | $ 130 | | | | | | | | | | | | | | | | | | |
| Environmental Scientist | $ 110 | | | | | | | | | | | | | | | | | | |
| Environmental Specialist IV | $ 106 | | | | | | | | | | | | | | | | | | |
| Environmental Specialist III | $ 80 | | | | | | | | | | | | | | | | | | |
| Environmental Specialist II | $ 70 | | | | | | | | | | | | | | | | | | |
| Graphic Artist/Tech Editor | $ 62 | | | | | | | | | | | | | | | | | | |
| Other Direct Costs | | | | | | 75 | | | | | | | | | | | | 75 | $ 75 |
| **Norman Braithwaite Inc.** | | | | | | | | | | | | | | | | | | | |
| Project Hydraulic Engineer | $ 91 | | | | | 8 | | | 8 | | | | | | | | | 16 | $ 1,456 |
| Staff Hydraulic Engineer | $ 79 | | | | | | | | | | | | | | | | | | |
| Technician/Clerical | $ 53 | | | | | | | | | | | | | | | | | | |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | $ 800 |
| Total Hours | | 130 | 16 | 20 | 12 | 52 | 56 | 16 | 8 | 149 | 154 | 76 | 86 | 14 | 72 | 32 | 84 | 977 | $ 109,484 |

# FEE ESTIMATE
## Option A PS&E Retrofit

| Firm/Classification | | | PROJECT MANAGEMENT | | | | PHASE II | | PHASE III | | | | | | | | | | | | PHASE IV | Estimated Total Hours | Estimated Fee |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Project Management / Administration | Bi-Monthly Coordination / Status Meeting | Monthly Project Progress Report | Quality Assurance | Final Environmental Assessment | Preliminary Utility Coordination/ Verification & Topo Survey | Final Strategy Design (65% Structure Plans) | Independent Design Check | Final Hydraulics / Scour Report | Final Foundation Design and Report | Utility Relocation /Coordination | Checked Details (90% Plans) | Right of Way Plans / Descriptions | Quantities and Estimate | Specifications | Compile PS&E Package | Final Submittal | Permitting | Design Construction Support | | |
| | | | 0.1 | 0.2 | 0.3 | 0.4 | II.1 | II.2 | III.1 | III.2 | III.3 | III.4 | III.5 | III.6 | III.7 | III.8 | III.9 | II.10 | II.11 | II.12 | IV.1 | | |
| **Frederic R. Harris, Inc.** | | | | | | | | | | | | | | | | | | | | | | | |
| Project Manager/Principal | $ | 163 | 164 | 48 | 112 | 40 | | | 20 | 8 | | | | 8 | | | 4 | 4 | 4 | 16 | 24 | 452 | $ 73,676 |
| Principal Engineer | $ | 142 | | | | | | | | | | | | | | | 80 | | | | | 80 | $ 11,360 |
| Senior Engineer | $ | 111 | | | | | 24 | 24 | 180 | 140 | 8 | 16 | | 80 | 8 | 8 | | 32 | 24 | 40 | 80 | 664 | $ 73,704 |
| Engineer | $ | 80 | | | | | | | 140 | | | | | | | | | | | | 40 | 180 | $ 14,400 |
| CAD Technician | $ | 63 | | | | | | | 200 | | | | | 80 | | 60 | | 24 | 16 | | 24 | 404 | $ 25,452 |
| Clerical | $ | 47 | 200 | | | | | | | | | | | | | | | | | | | 200 | $ 9,400 |
| Other Direct Costs (Including 5% of Subs) | | | | | | | | | | | | | | | | | | | | | | | $ 12,079,900 |
| **Earth Mechanics, Inc.** | | | | | | | | | | | | | | | | | | | | | | | |
| Principal/Project Manager | $ | 163 | | | | | | | | | | 32 | | | | | | | | | | 32 | $ 5,227 |
| Project Engineer/Geologist | $ | 87 | | | | | | | | | | 128 | | | | | | | | | | 128 | $ 11,136 |
| Staff Engineer/Geologist | $ | 65 | | | | | | | | | | 136 | | | | | | | | | | 136 | $ 8,840 |
| Clerical | $ | 55 | | | | | | | | | | 4 | | | | | | | | | | 4 | $ 220 |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | | | | | $ 2,800 |
| **Kjeldsen, Sinnock & Neudeck, Inc.** | | | | | | | | | | | | | | | | | | | | | | | |
| Principal Engineer | $ | 132 | 10 | | | | | 8 | | | | | 6 | | 6 | | | | | | | 30 | $ 3,960 |
| Associate Engineer | $ | 106 | 8 | | | | | | | | | | | | | | | | | | | 8 | $ 848 |
| Assistant Engineer | $ | 96 | | | | | | 8 | | | | | 24 | | 24 | | | | | | | 56 | $ 5,376 |
| Junior Engineer | $ | 84 | | | | | | 16 | | | | | | | | | | | | | | 16 | $ 1,344 |
| Senior Technician/Draftsperson/CAD | $ | 74 | | | | | | | | | | | | | | | | | | | | | |
| Technician/Draftsperson/CAD | $ | 64 | | | | | | | | | | | | | | | | | | | | | |
| Three-Man Survey Crew + Vehicle | $ | 204 | | | | | | 8 | | | | | | | | | | | | | | 8 | $ 1,632 |
| Two-Man Survey Crew + Vehicle | $ | 158 | | | | | | | | | | | | | | | | | | | | | |
| Survey Party Chief | $ | 80 | | | | | | 16 | | | | | | | | | | | | | | 16 | $ 1,280 |
| Clerical | $ | 46 | | | | | | | | | | | | | | | | | | | | | |
| Total Fee | | | | | | | | 1400 | | | | | 160 | | | | | | | | | | $ 1,560 |
| **Jones & Stokes** | | | | | | | | | | | | | | | | | | | | | | | |
| Associate Principal | $ | 139 | | | | | 52 | | | | | | | | | | | | | 44 | | 96 | $ 13,344 |
| Sr. Environmental Scientist | $ | 130 | | | | | 8 | | | | | | | | | | | | | 8 | | 16 | $ 2,080 |
| Environmental Scientist | $ | 110 | | | | | 24 | | | | | | | | | | | | | 140 | | 164 | $ 18,040 |
| Environmental Specialist IV | $ | 106 | | | | | 80 | | | | | | | | | | | | | | | 80 | $ 8,480 |
| Environmental Specialist III | $ | 80 | | | | | 120 | | | | | | | | | | | | | | | 120 | $ 9,600 |
| Environmental Specialist II | $ | 70 | | | | | 230 | | | | | | | | | | | | | | | 230 | $ 16,100 |
| Graphic Artist/Tech Editor | $ | 62 | | | | | 152 | | | | | | | | | | | | | | | 152 | $ 9,424 |
| Other Direct Costs | | | | | | | 2100 | | | | | | | | | | | | | 300 | | | $ 2,400 |
| **Norman Braithwaite Inc.** | | | | | | | | | | | | | | | | | | | | | | | |
| Project Hydraulic Engineer | $ | 96 | | | | | | | | | 40 | | | | | | | | | | | 40 | $ 3,840 |
| Staff Hydraulic Engineer | $ | 83 | | | | | | | | | 68 | | | | | | | | | | | 68 | $ 5,644 |
| Technician/Clerical | $ | 55 | | | | | | | | | 6 | | | | | | | | | | | 6 | $ 330 |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | | | | | $ 2,000 |
| Total Hours | | | 382 | 48 | 112 | 40 | 690 | 80 | 540 | 148 | 122 | 316 | 30 | 168 | 38 | 68 | 84 | 60 | 44 | 248 | 168 | 3386 | $ 521,... |

# FEE ESTIMATE
## Option B PS&E (Replacement)

| Firm/Classification | | PROJECT MANAGEMENT | | | | PHASE II | | | | | | | | PHASE III | | | | | | | | | | | | | PHASE IV | Estimated Total Hours | Estimated Fee |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Project Management / Administration | Bi-Monthly Coordination / Status Meeting | Monthly Project Progress Report | Quality Assurance | Final Environmental Assessment | Topographic Survey and Mapping | Utility Coordination (Preliminary and Field Verification) | Hydrology/Hydraulic Analysis and Report | Geotechnical Exploration / Analysis and Preliminary Report | Preliminary Bridge Design | Type Selection Meeting | Final Type Selection | Right of Way Survey and Desc. and Sup. Topo Survey | Structural Analysis and Design | Final Foundation Design and Report | Bridge Unchecked Details and 60% Roadway Plans | Utility Relocation /Coordination | Independent Design Check | Checked Details (90% Plans) | Constructability Review | Quantities and Estimate | Specifications | Compile PS&E Package | Final Submittal | Permitting | Design Construction Support | | |
| | | 0.1 | 0.2 | 0.3 | 0.4 | II.1 | II.2 | II.3 | II.4 | II.5 | II.6 | II.7 | II.8 | III.1 | III.2 | III.3 | III.4 | III.5 | III.6 | III.7 | III.8 | III.9 | III.10 | III.11 | III.12 | III.13 | IV.1 | | |
| **Frederic R. Harris, Inc.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Manager/Principal | $ 163 | 204 | 48 | 112 | 60 | | | | | | | 8 | | | 8 | | 34 | | 12 | 8 | | | 4 | 4 | 4 | 16 | 24 | 546 | $ 89,707 |
| Principal Engineer | $ 142 | | | | | | | | | | | | | | | | | | | | 24 | | 110 | | | | | 134 | $ 19,996 |
| Senior Engineer | $ 111 | | | | | 24 | 16 | 8 | 8 | 16 | 340 | 8 | 50 | 16 | 210 | | 120 | 6 | 460 | 80 | | | 8 | 64 | 24 | 40 | 120 | 1618 | $ 180,698 |
| Engineer | $ 80 | | | | | | | | | | 140 | | 16 | | 210 | | 40 | | | 40 | | | | 20 | | | 40 | 506 | $ 40,479 |
| CAD Technician | $ 63 | | | | | | | | | | 120 | | 8 | | | | 700 | | | 160 | | 200 | | 40 | 16 | | 24 | 1268 | $ 79,884 |
| Clerical | $ 47 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | 200 | $ 9,400 |
| Other Direct Costs (Including 5% of Subs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | $ 21,000 |
| **Earth Mechanics, Inc.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Principal/Project Manager | $ 163 | | | | | | | | | 28 | | 8 | | | | 10 | | | | | | | | | | | | 46 | $ 7,514 |
| Project Engineer/Geologist | $ 87 | | | | | | | | | 276 | | | | | | 30 | | | | | | | | | | | | 306 | $ 26,702 |
| Staff Engineer/Geologist | $ 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clerical | $ 55 | | | | | | | | | 2 | | | | | | 2 | | | | | | | | | | | | 4 | $ 220 |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | $ 2,000 |
| **Kjeldsen, Sinnock & Neudeck, Inc.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Principal Engineer | $ 132 | 24 | | | | | 16 | 8 | | | | | | 8 | | | | 8 | | | | | | | | | | 64 | $ 8,448 |
| Associate Engineer | $ 106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assistant Engineer | $ 96 | | | | | | 16 | 4 | | | | | | 8 | | | | 4 | | | | | | | | | | 32 | $ 3,072 |
| Junior Engineer | $ 84 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | $ 672 |
| Senior Technician/Draftsperson/CAD | $ 74 | | | | | | | | | | | | | 16 | | | | | | | | | | | | | | 16 | $ 1,184 |
| Technician/Draftsperson/CAD | $ 64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Three-Man Survey Crew + Vehicle | $ 204 | | | | | | 8 | | | | | | | 32 | | | | 16 | | | | | | | | | | 56 | $ 11,424 |
| Two-Man Survey Crew + Vehicle | $ 158 | | | | | | 16 | 16 | | | | | | 16 | | | | 8 | | | | | | | | | | 56 | $ 8,848 |
| Survey Party Chief | $ 80 | | | | | | 4 | 4 | | | | | | 8 | | | | 4 | | | | | | | | | | 20 | $ 1,600 |
| Clerical | $ 46 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | 16 | $ 736 |
| Other Direct Costs | | | | | | | 3500 | 56 | | | | | | 2960 | | | | | | | | | | | | | | | $ 6,516 |
| **Jones & Stokes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Associate Principal | $ 139 | | | | | 52 | | | | | | | | | | | | | | | | | | | | 44 | | 96 | $ 13,344 |
| Sr. Environmental Scientist | $ 130 | | | | | 8 | | | | | | | | | | | | | | | | | | | | 8 | | 16 | $ 2,080 |
| Environmental Scientist | $ 110 | | | | | 24 | | | | | | | | | | | | | | | | | | | | 140 | | 164 | $ 18,040 |
| Environmental Specialist IV | $ 106 | | | | | 80 | | | | | | | | | | | | | | | | | | | | | | 80 | $ 8,480 |
| Environmental Specialist III | $ 80 | | | | | 120 | | | | | | | | | | | | | | | | | | | | | | 120 | $ 9,600 |
| Environmental Specialist II | $ 70 | | | | | 230 | | | | | | | | | | | | | | | | | | | | | | 230 | $ 16,100 |
| Graphic Artist/Tech Editor | $ 62 | | | | | 152 | | | | | | | | | | | | | | | | | | | | | | 152 | $ 9,424 |
| Other Direct Costs | | | | | | 2100 | | | | | | | | | | | | | | | | | | | | 300 | | 2400 | $ 2,700 |
| **Norman Braithwaite Inc.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Hydraulic Engineer | $ 96 | | | | | | | | 40 | | | | | | | | | | | | | | | | | | | 40 | $ 3,822 |
| Staff Hydraulic Engineer | $ 83 | | | | | | | | 68 | | | | | | | | | | | | | | | | | | | 68 | $ 5,644 |
| Technician/Clerical | $ 55 | | | | | | | | 6 | | | | | | | | | | | | | | | | | | | 6 | $ 330 |
| Other Direct Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | $ 500 |
| Total Hours | | 248 | | | | 690 | 76 | 40 | 122 | 322 | 600 | 16 | 74 | 104 | 420 | 42 | 860 | 46 | 460 | 280 | 24 | 200 | 118 | 124 | 40 | 232 | 184 | 7722 | $ 661,561 |

DMJM HARRIS

# 2001 BILLING RATE SCHEDULE

| Classification | Normal Rate |
|---|---|
| Principal/Project Manager | $160 |
| Principal Engineer | $135 |
| Senior Engineer | $105 |
| Engineer | $75 |
| CAD Technician | $60 |
| Clerical/Administrative | $45 |

The above rates are valid through December 31, 2001. They will be increased 5% per year after that time.

Direct Costs

| | |
|---|---|
| In-House Reproduction | $0.15 / Copy |
| Mileage | $0.345 / Mile |

All other expenses, including subconsultants are billed at cost plus 5% administrative fee.

KJELDSEN, SINNOCK & NEUDECK, INC.
CONSULTING ENGINEERS & LAND SURVEYORS

KENNETH L. KJELDSEN
STEPHEN K. SINNOCK
CHRISTOPHER H. NEUDECK

711 NORTH PERSHING AVENUE
POST OFFICE BOX 844
STOCKTON, CALIFORNIA 95201-0844

TELEPHONE 946-0268
FAX NO. 946-0296
AREA CODE 209

# 2001 FEE SCHEDULE

| SERVICES | HOURLY RATES |
|---|---|
| **Engineering and Consulting:** | |
| Principal Engineer | $125.00 |
| Associate Engineer | $100.00 |
| Assistant Engineer | $ 90.00 |
| Junior Engineer | $ 80.00 |
| Inspector | $ 75.00 |
| Senior Technician/Draftsperson/CAD Operator | $ 70.00 |
| Junior Technician/Draftsperson/CAD Operator | $ 60.00 |
| Clerical | $ 44.00 |
| **Survey Crew:** | |
| Three Man Field Crew | $195.00 |
| Two Man Field Crew | $150.00 |
| Survey Party Chief | $ 75.00 |
| **Expenses:** | |
| Special Consultants | Cost Plus 10% |
| Mileage | $0.35 Per Mile |
| Special Printing, Photos, Copies, Telephone, Fax, Survey Materials, etc. | Cost Plus 10% |
| Trimble 4800 GPS (2 Receiver RTK system) | $55.00 Per Hour |
| Trimble 4800 GPS (3 Receiver Static system) | $85.00 Per Hour |
| Boat | $36.00 Per Hour |

**Note:** Fees are due and payable within 30 days from the date of billing. Fees past due may be subject to a finance charge computed on the basis of 1½ % of the unpaid balance per month.

Hourly rates are subject to review and adjustment January 1 of each calendar year.

# Earth Mechanics, Inc.

Geotechnical & Earthquake Engineering

## PROFESSIONAL FEE SCHEDULE

| Professionals (per hour) | Cost |
|---|---|
| Principals | $ 163.35 |
| Principal Engineers/Geologists | 140.96 |
| Senior Engineers/Geologists | 101.04 - 122.62 |
| Project Engineers/Geologists | 75.65 - 99.89 |
| Staff Engineers/Geologists | 64.83 |

| Support Staff (per hour) | |
|---|---|
| Senior Technicians | $ 85.15 |
| Technicians | 63.93 |
| Clerical | 44.22 - 60.25 |

Travel time will be billed at hourly rate above. 8-hour maximum charge per day for travel. Auto mileage is $0.45 per mile.

In-house personal computers will be charged at $ 10.00 per hour.

Overtime for support staff will be charged at 1.5 times the above rates. Overtime is the excess above 8 hours for Monday through Friday, and Saturdays, Sundays, and national holidays.

Reimbursable Expenses

Traveling expenses, shipping, reproduction, express mails, supplies and other reimbursable expenses will be invoiced at cost plus 10 percent.

Subcontractors

Consultants and other outside services will be invoiced at cost plus 10 percent.

Invoicing

Invoices are payable on receipt, unless otherwise agreed upon. On any amount not paid within 30 days, interest of 1-1/2 percent per month will be applied to the unpaid amount. Any legal fees and related costs incurred in collecting any delinquent amount shall be paid by the Client.

Insurance

Earth Mechanics, Inc. carries a full spectrum of insurance Comprehensive General Liability, Professional Liability, and Workers' Compensation, each with a policy limit acceptable to most clients. The cost for this insurance is covered by the fees listed in this schedule. Costs associated with increases in policy limits, adding other insured parties and waivers of subrogation, if required by Client, are charged at cost plus 10 percent.

17660 Newhope Street, Suite E, Fountain Valley, California 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

## River Road Bridge at the San Joaquin River

### JONES & STOKES : 2001 BILLING RATE SCHEDULE

**DIRECT LABOR**

| Classification | Hourly Rate |
|---|---|
| Associate Principal | $139 |
| Sr. Env. Scientist | $130 |
| Env. Scientist | $110 |
| Env Specialist IV | $106 |
| Env Specialist III | $80 |
| Env Specialist II | $70 |
| Technical Editor/Writer : Graphic Artist | $62 |

The above billing rates for each classification are valid through December 31, 2001. They will be increased 5% per year thereafter.

**OTHER COSTS**

| | |
|---|---|
| Travel, Meals, and Lodging | Cost |
| Reproductions | Cost |
| Mileage @ $0.345 per mile | Cost |
| Outside subconsultants | Cost |

General and administrative expense of 9.5% on non-labor costs and subcontractors.

## SECTION 3: WORK PLAN

This section describes the team's detailed approach to performing the various tasks of the project. The Project phase and task numbers described in this section correspond to those listed in the Project Schedule (Section 4). The actual work scope will be adjusted to fit the individual project prior to commencement. This section will become the basis of the Final Work Plan, which will guide the team members in every foreseeable aspect of the project from the Notice to proceed to public use.

### Task 0.1 – 0.3 PROJECT MANAGEMENT

Project Management is a continuous, but not a full-time, activity throughout the duration of the project. Internal staff meetings will be held on an as-needed basis to keep the design team and project manager informed of issues that affect one another. The Project Manager will contact each of our subconsultant project engineers on a routine basis, when they are active on the project, to monitor their progress and exchange information. Communication with Stanislaus County's Contract/Project Manager will be conducted, as necessary, by telephone and other efficient means (fax, e-mail, etc.) to minimize travel expenses. Letter-type reports will be prepared monthly in conjunction with invoices to brief the County on progress within the period. **On-going communication between FRH and the County will be the key to successful completion of the project on time and within budget.**

It is anticipated that the environmental documentation process will involve a public outreach component. We assume that Stanislaus County will coordinate and perform this function. The RFP did not request this service and we have not proposed to provide it. We do propose, and have included a nominal amount of staff time to provide support for the County's efforts in the public outreach. We can also add a public outreach consultant to the team in order to provide the necessary services, should the County wish focus its own resources on other work.

### Task 0.4 QUALITY ASSURANCE

**FRH**'s Quality Assurance Program has been developed to ensure that project work is carried out in a planned, controlled, and correct manner. It includes procedures for scheduling and assigning work; for recording, retention, and retrieval of records for both design and construction activities; for identifying and resolving deficiencies affecting the work; and for verifying compliance with the requirements of the QA Program.

Project checklists will be completed that document the following:

- Review of the Seismic Retrofit Strategy,
- Review of the Type Selection Report,
- Independent Check of Design,
- Review of the Contract Drawings, and
- Review of the Specifications and Opinion of Construction Costs.

The Officer-in-Charge of the unit will serve as Quality Assurance Manager, tasked with monitoring and enforcing compliance with the program. He will also perform a review of the final contract documents package for conformance with the work scope.

# SECTION 3: WORK PLAN

## PROJECT APPROACH

## PHASE I – SEISMIC RETROFIT STRATEGY

### TASK I.1 REVIEW EXISTING DATA / FIELD REVIEW

Upon receiving a Notice to Proceed from the County, **FRH** will attend a meeting with County staff to set up administrative procedures and obtain all relevant data regarding the project. **FRH** will assemble and thoroughly review all available information about the bridge and its site and will distribute this information to team members. The list may include as-built bridge plans, planning documents, inspection/maintenance reports, foundation reports, etc. The available information will be studied in enough detail to familiarize the team with the project and to select critical bridge components and physical terrain features on which to concentrate during a site visit.

A field trip will be scheduled with County representatives. Checklists for inspection of the site will be prepared in advance to expedite the process.

Since the seismic retrofit strategy determination may be replacement of the existing bridge, information concerning constraints that will impact the design of a replacement will be gathered at the same time. It is anticipated that a representative from each discipline will attend (environmental, civil, survey, hydraulic, geotechnical, bridge, etc.) and participate in this critical site visit. In order to minimize travel expenses, the site visit will be scheduled to coincide with the kickoff meeting.

A letter report, summarizing the findings and documenting the critical features of the structure involved.

### TASK I.2 PERFORM INITIAL SURVEY

It is not anticipated that the strategy determination phase of the work will require the generation of full topographic survey information in order to commence. Verification of available benchmark information that will tie the hydraulic gauge datum to the structure and channel profiles will be performed. The effort may be as simple as a data search or may involve transfer of elevation to the site.

Cross-sections of the San Joaquin River will be acquired on each side of the bridge by sounding from the structure or via other means. The data will be of sufficient accuracy to permit preliminary hydraulic calculations to be performed (usually +/- 0.5 feet in elevation), and to identify changes in the Final Grade elevations indicated on the as-built plans.

Data will be gathered to determine property ownership. It is not anticipated that any right-of-way work will be performed at this stage, but it is useful to have the information when considering temporary and permanent easement /takes and the potential impacts, for estimating purposes.

In addition to the above, we will acquire existing aerial photos and topography maps for use in preparing the Advanced Planning Study of a replacement bridge.

## SECTION 3: WORK PLAN

### TASK I.3 PRELIMINARY ENVIRONMENTAL CONSULTING

In accordance with the FHWA Technical Advisory Paper and Caltrans' Guidance for Consultants, environmental resource technical studies must be completed before the environmental documents are prepared. In addition, FHWA and Caltrans typically require that the federal agencies have received environmental documentation (for example, the biological assessment has been submitted to NMFS) prior to release of the public draft environmental documents.

Based on our current knowledge of the project, we anticipate preparing an initial study/mitigated negative declaration to comply with CEQA and a categorical exclusion to comply with NEPA. It is not possible to determine at this time the appropriate environmental documents, as that would depend on the type and scale of construction work required.

Jones & Stokes staff will provide consultation on environmental issues during the strategy determination phase of the work. Review of available documentation for projects in the vicinity or of similar scope will be conducted and reported to the team in the form of email or letter reports. Consideration for listed and/or endangered species and other resources known or anticipated to exist at the site will be noted and discussed with the designer early in the process to reduce/eliminate strategy approaches which would generate conflicts. The net effect will focus efforts on feasible scenarios early and ensure higher probability of success and timely completion of the environmental documentation and permitting.

### TASK I.4 PRELIMINARY BRIDGE HYDRAULICS

***Initial Estimate of Potential Scour:*** An estimate of potential scour is needed to evaluate the existing structure with respect to the current seismic demands and determine the viability of possible seismic retrofit strategies.

Using available data from the preliminary survey task, USGS streamgage records for the San Joaquin River near Newman (USGS Streamgage Number 11274000), bridge as-built plans and any preliminary seismic retrofit design drawings, an estimate of potential pier, contraction and abutment scour (as appropriate) will be calculated.

The estimate of potential channel "degradation" or deepening from the seismic retrofit hydraulic analysis (required under the Seismic Retrofit program prior to the strategy meeting) will be relied upon for the estimates of total potential local scour. A preliminary design memorandum or brief letter report describing the analysis and conveying the results will be prepared.

### TASK I.5 PREPARE PRELIMINARY FOUNDATION REPORT

***Liquefaction Analysis:*** Using the latest Caltrans seismic design parameters and a realistic assessment of the soil properties, we will perform a liquefaction analysis using the latest NCEER method. This will be followed by a computation of the existing foundation capacity and stiffness. We propose providing capacity and stiffness values for two soil conditions: liquefied and non-liquefied. The non-liquefied results are needed because the foundation stiffness for this case is usually larger than the liquefied case; thus "attracting" larger structural demands to the foundation. Depending on the available foundation capacity for the non-liquefied condition, this case may control the retrofit strategy.

***Lateral Spreading:*** We will need to evaluate the magnitude of ground movement due to lateral

spreading. These ground movements may impose significant loads on the existing foundation. There is a debate whether or not the full soil loading due to lateral spreading should be added to the full structural loading generated by the ARS. Sound engineering judgment supports the conclusion that the soil and structural loading will not be in-phase, thus the full values of each component should not be additive. In past projects, we have used either 50% of the soil loading and 100% of the structural loading, or 50% of the structural loading and 100% of the soil loading, whichever combination is more severe, to assess the foundation response.

***As-Built Analyses:*** Once the seismic design parameters (acceleration and ARS) are established, we will conduct a soil liquefaction assessment. Results of the liquefaction analyses will be incorporated in the development of idealized soil profiles and design strength parameters for liquefied and non-liquefied conditions. The profiles and soil strengths will be used to compute foundation capacity and stiffness. Lateral spreading analyses will also be performed to determine the amount of ground movement and subsequent soil loading on the foundation. All of the above work will be performed using existing soil data.

***Retrofit Strategy:*** Deficiencies identified by the structural designers will provide be the basis for our recommendations on foundation retrofit, if required. We will also participate in the Strategy Meeting to answer questions concerning the geotechnical findings and recommendations. It is important to point out that our recommendations for foundation retrofit are tailored for cost estimating purposes only; final design will be conducted in the PS&E phase (Task 2).

***Preliminary Geotechnical Report (PGR):*** A PGR will be prepared to document our findings and recommendations for the as-built and retrofit analyses. The PGR will be included as an appendix in the Strategy Report. We anticipate that the County and possibly Caltrans will review the PGR and a final PGR will need to be submitted to include those review comments and responses.

### TASK I.6 PERFORM AS-BUILT SEISMIC ANALYSIS

The original strategy was based on the latest criteria at the time it was prepared, which is largely contained in MTD 20-4. While the latest MTD 20-1 and SDC documents are both directed at new designs, they replace or update many of the provisions contained in MTD 20-4. Therefore the seismic re-evaluation of the bridge will be based on the latest SDC document.

Since the completion of the original strategy in 1993, Caltrans has made several revisions to its seismic evaluation / design criteria. The changes were largely in response to the 1994 Northridge Earthquake. The performance-based criteria is defined in Memo To Designers (MTD) 20–1 "Seismic Design Methodology." The specific provisions needed to implement this methodology are contained in the new Caltrans Seismic Design Criteria (SDC). The MTD 20-1 and SDC documents supersede the seismic design requirements contained in Chapters 3 and 8 of Caltrans Bridge Design Specifications.

Because of its role in developing the original (1993) strategy, FRH already has working as-built models for the structure. These models can easily be modified for the latest geotechnical findings and seismic parameters.

Findings of the initial estimate of potential scour will be used to set the unbraced length of piling and establish points of fixity for the elements for both the seismic and service load conditions. Should the estimated scour depth fall below the existing pile cap but within the limits of the existing piles the structure would be considered scour critical. Classification of the structure as "scour critical" will

require a foundation structural analysis considering service loads.

The initial analysis will be a gravity analysis both to determine dead and live load forces in the substructure and to verify the model. Review of the foundation response in the full scour condition will be made at this stage.

Response spectrum dynamic analyses, by modal superposition, will be performed utilizing the spectra specified by EMI. The half scour condition prescribed in the CT-BDS will be considered in addition to liquefaction and the no-scour/non-liquefied cases.

A sufficient number of modes will be used to capture a minimum of 90 percent mass participation. Pseudo-static lateral analyses will be produced to verify the reasonableness of the dynamic analyses. In accordance with Caltrans procedures, a stand-alone analysis/evaluation of the hinge restrainers will be produced. FRH's *in-house program, HINGERES, will be used to perform this analysis.*

Displacement ductility methods will be the basis for evaluating the vulnerability of the structure. Displacements from dynamic analyses, using cracked section properties, are taken as the seismic demand. Once the bents have been analyzed, foundation elements will be evaluated for the lesser of the elastic ARS demands or the plastic hinging moments at the bases of the columns. Again, pseudo non-linear approaches will be utilized, if necessary, to evaluate whether limited pile failure in pile foundations would shed load from the pier under consideration, and thereby eliminate the need for retrofitting.

### TASK I.7 DETERMINE RETROFIT ALTERNATIVES

The FRH team will review the analytical results and develop a set of possible retrofit measures to correct the defined deficiencies. The total possible options will be reduced to one or two schemes considered to be feasible. As-retrofit seismic analyses will be produced to evaluate the ability of each scheme to achieve the desired result. For each alternative, tables will be developed showing the demand versus capacity of all major components of the structures.

### TASK I.8 PERFORM ADVANCED PLANNING STUDY (APS)

The cost of retrofitting a structure, such as this one, is often significant, when compared to replacement. Giving due consideration to environmental constraints and the remaining useful life of the bridge, it is anticipated that replacement is an alternative strategy to be considered.

In order to compare the cost of bridge retrofit and replacement options, an advanced planning study will be prepared for the "bridge replacement" strategy. The purpose of this study is to explore the feasible structure types and produce an estimate of construction cost based on historical $/square foot for a few feasible structure types. The result is not a formal type selection but a planning document for comparison purposes. A general plan and elevation drawing and general plan estimate will be produced as a result of this effort.

It is anticipated that the County will provide input from it's "General Plan" for this area as it would relate to River Road and impact geometrics and functional configuration of a replacement structure and the approach roadway.

### TASK I.9 PREPARE COST ESTIMATES OF ALTERNATIVES

## SECTION 3: WORK PLAN

Cost estimates will be developed for the most promising of the strategies to determine which will be the most cost-effective. Current pricing data representative of the area in which the bridge is located will be used.

### TASK I.10 PREPARE DRAFT STRATEGY REPORT

The results of the analyses and proposed strategies for retrofit will be described in the Draft Strategy Report. This report will describe the structure, analysis methods and models used, analytical results, evaluation of structural components, and recommendations for retrofit. A cost estimate for the recommended strategy will be included in the report. The estimate will include associated costs for utilities, right-of-way and approach roadway works, which may be reasonably anticipated at the time. This draft report will be submitted to the County for review one week before the scheduled strategy meeting.

### TASK I.11 STRATEGY MEETING

The FRH Team will schedule and participate in a strategy meeting to present the evaluation procedures used, describe our findings and discuss proposed retrofit measures. Comments from the County will be discussed, meeting minutes recorded and distributed to all the attendees within 5 working days of the meeting date.

### TASK I.12 REVISE STRATEGY / UPDATE FINAL STRATEGY REPORT

After the strategy meeting, alternative retrofit strategies and/or supplemental analyses agreed upon by the attendees will be prepared and resubmitted for review. Upon final strategy determination, the Final Strategy Report will be produced. It will include Draft Strategy Report, Strategy Meeting Minutes, responses to the comments, a brief statement of the Final Strategy Determination and recommendations for action.

## SECTION 3: WORK PLAN

## OPTION A. PS&E (RETROFIT)

## PHASE II -- ENVIRONMENTAL AND UTILITY COORDINATION

### TASK II.1 FINAL ENVIRONMENTAL ASSESSMENT

If the Phase I environmental initial report indicates that construction activities may disturb hazardous materials. Jones & Stokes will conduct physical sampling (Phase II assessment) at the site, as necessary. After the subsurface investigation has taken place, the nature and extent of contamination, if any, is assessed. If significant contaminants are present in the subsurface in or along the construction corridor, a worker health and safety plan will address procedures for handling contaminated soil excavated during seismic retrofit and/or construction activities.

Jones & Stokes will prepare an administrative draft of the required technical studies for review by Stanislaus County, and Caltrans. After revising the studies based on written comments, the review reports will be forwarded to Stanislaus County to send to Caltrans for FHWA review. For purposes of cost estimating, it is assumed that only one review round of the technical studies will be prepared. The final reports would be based on FHWA review. All technical studies will be prepared in accordance with Caltrans Guidance for Consultants and the FHWA Technical Advisory Paper.

Jones & Stokes will also prepare NES, Wetlands Delineation, and Biological Assessment. The purpose of the NES and related documents is to provide certain biological studies and information necessary for environmental documents to satisfy legal requirements of the various state and federal statutes. Generally, the NES includes documentation of the biological resources in the project area and an assessment of the impacts of the project on those resources. It also includes a wetland delineation. A biological assessment is required when the project has the potential to take ("take" is defined by the federal KSN) a federally listed threatened or endangered species. For fisheries, any species that has a commercial value must be evaluated under a Essential Fish Habitat Assessment. This document can be folded into the biological assessment. The biological assessment is a stand-alone document that is typically included in the NES as an appendix.

Jones & Stokes biologists will prepare the NES to Caltrans requirements. We will follow requirements of the "Caltrans Guidance for Consultants, Procedures for Completing the Natural Environmental Study and Related Biological Reports." The biological resources that will be addressed in the NES will limited to those that are pertinent to the study area and can reasonably be expected to be affected by the project. The NES will include:

Relevant federal, state, and local policies and regulations related to biological resources in the project area will be summarized in the NES. We will discuss the roles and responsibilities of the federal agencies (Corps, NMFS, USFWS) and state agencies (California Department of Fish and Game [DFG] and Regional Water Quality Control Board (RWQCB). We also will review the requirements for a NEPA/404 memorandum of understanding (MOU) to determine if the project may require interagency coordination in accordance with the MOU.

The bridge project will require consultation with NMFS on Central Valley steelhead and with USFWS on Sacramento split tail. Jones & Stokes will coordinate informal consultation with NMFS and USFWS to discuss federally listed fish species that may be affected by the project and to determine the most efficient approach for achieving KSN Section 7 compliance. The bridge project would affect the migration corridor for adult steelhead returning to and juvenile steelhead leaving the Merced River. Sacramento split tail have the potential to occur year round at the project site,

however spawning and incubation occur in the spring, ending typically by May. The period of concern for the sensitive fish species would likely be October 1 through May 30. The removal of riparian vegetation for the temporary and permanent bridges would need to be avoided or minimized, as feasible. And, although Chinook salmon are not listed (currently considered a candidate species), KSN consultation would also need to include consultation on essential fish habitat for Chinook salmon.

Jones & Stokes will prepare Cultural Resources Technical Reports. Cultural resource studies for the project will be performed according to the guidelines and recommended procedures outlined in Caltrans' Guidance for Consultants in accordance with NHPA Section 106. All work required for this project will be supervised by professionals that meet the standards established by the U.S. Secretary of the Interior for work in archaeology, history, and architectural history. This will allow the work to comply with the FHWA guidelines and with the NHPA Section 106 requirements.

### TASK II.2 PRELIMINARY UTILITY COORDINATION & VERIFICATION AND TOPOGRAPHIC SURVEY

After the final strategy has been determined, the limits of proposed construction will then be identified. This will determine the scope of any additional utility verification/relocation required.

Utilities that are in the general proximity of the work area will be accurately located in the field. This field survey will be accomplished utilizing a two-person crew utilizing the latest state-of-the-art electronic data collection systems. Once collected, the data will be brought to the office and downloaded through the computer system so that it can be imported directly into the retrofit foundation plan.

A topographic survey to determine a more accurate profile of the channel will also be done in this task. The information obtained will be used in the scour report and the final strategy design.

## PHASE III -- PLANS, SPECIFICATIONS & ESTIMATES AND CONSTRUCTION SUPPORT

### TASK III.1 PERFORM FINAL STRATEGY DESIGN (65% SUBMITTAL)

Based on the conclusions stated in the final strategy report, FRH will proceed with final design calculations for retrofitting these structures. All procedures used will be in accordance with Caltrans' Bridge Design Specifications (BDS), Memos to Designers (MTD), Bridge Design Aids (BDA), and the new Seismic Design Criteria (SDC). FRH maintains a complete structural engineering software library (Appendix C) -- both commercial software and programs/spreadsheets developed in-house to specifically expedite bridge engineering work.

Calculation procedures will be reviewed by the Project Engineer, to determine their applicability to the situation at hand. Calculation sheets will be initialed by the designer, numbered and indexed for future reference.

If retrofit of some foundation elements is necessary, EMI will develop recommendations for pile types and tip elevations. These, along with any comments received on the Draft Geotechnical Report will be incorporated in the Final Geotechnical Report.

All drawings will be produced using AutoCAD Release 14. Detailing will be in accordance with Caltrans' Bridge Design Details (BDD) and Stanislaus County standards. Standard Plan references and standard retrofit details will be used wherever possible.

## SECTION 3: WORK PLAN

If temporary traffic control or roadway/civil reconstruction is required to construct the retrofit modifications, these plans will be produced and will conform to the requirements of Caltrans' Highway Design Manual.

### TASK III.2 PERFORM INDEPENDENT DESIGN CHECK

Once the 65% plans are complete, the package will be provided to the independent check engineers, who will independently develop calculations for the details provided and check their presentation in the plans. Simultaneously, the designer will conduct a thorough review of the plans. In accordance with Caltrans' policy, both the lead design engineer and lead check engineer will be California Registered Civil Engineers.

### TASK III.3 PREPARE FINAL HYDRAULICS / SCOUR REPORT

Should it be determined that retrofit measures will impact the current hydraulic capacity of the existing structure, a complete design hydraulic study will be performed. In an attempt to reduce the volume of paper used the scope for this activity is not repeated here. Please see "OPTION B. ps&e (REPLACEMENT): *TASK II.4 HYDROLOGY / HYDRAULIC ANALYSIS AND REPORT*" (for a detailed description of the scope of this work item.

### TASK III.4 PREPARE FINAL FOUNDATION DESIGN / REPORT

***Field Exploration:*** Unless there is no foundation retrofit planned, we recommend a supplemental field exploration program to collect additional subsurface soil data for final design. We recommend drilling two soil borings to a depth of about 100 feet below the river bottom near the existing Piers 8 and 16, and performing six cone penetrometer test (CPT) soundings. Locations of the CPT soundings will be spaced somewhat equally along the existing bridge alignment; CPTs are critical because liquefaction assessment using the CPT method will produce more accurate results than those using Standard Penetration Test (SPT) blowcounts collected in soil borings. We anticipate the CPT sounding will meet refusal at about 40 feet below the river bottom. Some of the soil boring and CPT soundings will be performed from the existing bridge deck, and if mandated from other requirements such as environmental and access, all borings and CPT soundings can be performed from the existing bridge deck. Traffic control and lane closure will be required.

For the soil borings/CPTs through the existing bridge deck, a 10-inch± diameter opening will be cored through the existing bridge. The drill string, sampling equipment and cone penetrometer device will be lowered into the borehole through this opening. At the end of the investigation, each of these openings will be covered by a steel plate welded to a pipe that fits inside the opening. Cold patch asphalt will be placed above the steel plate.

***Soil Laboratory Testing:*** Selected disturbed and relatively undisturbed soil samples will be tested to determine the engineering properties of the onsite soils.

***Foundation Design:*** EMI will recommend the foundation type. Design and specified pile tip elevations will be provided. Axial and lateral capacity and stiffness of the retrofit pile will be determined.

***Foundation Report:*** The field and laboratory findings will be documented in a foundation report together with the foundation design and construction recommendations. This report will include

## SECTION 3: WORK PLAN

LOTB sheets showing the supplemental soil borings and CPTs. This report will be reviewed and approved by the County and Caltrans. A final report will be issued to incorporate the review comments and our responses.

### TASK III.5 UTILITY RELOCATION / COORDINATION

Any utilities in conflict with the proposed retrofit measures will be identified and their owners notified. To that end, we will perform the following tasks:

- Identify conflicts between existing public utilities and proposed project.
- Determine requirements for existing utilities modifications or relocation as well as requirements for new utility accommodations to be included in the design of the new structure.
- Arrange coordination meetings with utility companies to resolve conflicts.

### TASK III.6 PREPARE CHECKED DETAILS (90% SUBMITTAL)

After the bridge independent check is complete, the structural designer and checker will meet and resolve any differences. The plans, calculations, estimates, and specifications will be updated accordingly. Any required traffic staging and roadway plans will also be prepared as part of this task.

Prior to the 90% Submittal, the Project Engineer will make a final review of the plans and specifications, and all calculation and drawing QA checklists will be completed.

### TASK III.7 RIGHT-OF-WAY PLANS & DESCRIPTIONS

We will identify and submit a rights-of-way report indicating status and needs for the project. Preparation of plat maps and legal descriptions and acquisition of title reports for rights-of-way will be done if requested, with the fees negotiated after the extent of the work is defined in the Phase I portion of the project.

### TASK III.8 PREPARE QUANTITIES (MAKE & CHECK) & ESTIMATE

Based on the final plans, two sets of quantity calculations will be developed. These make and check calculations will agree within the limits specified for individual items in the Caltrans Bridge Design Aids. An Engineer's Estimate will be produced utilizing the most recent Caltrans Cost Data book and available County cost data. An electronic copy of the Engineer's Estimate (in MS Excel format) will be furnished to the County.

### TASK III.9 PREPARE SPECIFICATIONS

Technical Special Provisions will be assembled and edited to modify the Caltrans Standard Specifications. FRH maintains access to the Caltrans Structures Bulletin Board through the Internet and will download the most recent versions of all relevant Standard Special Provisions. They will be edited in accordance with Caltrans procedures and will be assembled in printed format and on a CD (in MS Word format) for use by the County.

### TASK III.10 COMPILE PS&E PACKAGE / RESPOND TO 90%COMMENTS

FRH will respond to and address comments on the 90% submittal. The plans will be updated per comments from the 90% submittal. The final package will be assembled in the required format. This

## SECTION 3: WORK PLAN

task also includes a Quality Assurance interdisciplinary review of the plans, specifications, and estimate.

### TASK III.11 PREPARE DELIVERABLES AND RESPOND TO 100%COMMENTS

FRH will respond to and address any comments on the 100% submittal. The Project Deliverables consist of the following items:

- One (1) set of final Mylar reproducible plans, inset in the County standard detail sheet which can be reduced to half size and fit on 11"x17" paper.
- Electronic copies of plans in AutoCAD Version 14 format and survey data in SoftDesk.
- Contract specification and special provisions (printed and electronic MS Word 2000 format)
- Engineer's Estimate (printed and electronic in MS Excel format)
- Quantity Calculations - Make and Check (one set of each)
- One (1) set of Final Structure Design and Independent Check Calculations

### TASK III.12 PERMITTING

Preparation of the necessary applications and exhibit drawings for obtaining Grading and Erosion Control Permit in accordance with the requirements of Stanislaus County will be completed. Storm water pollution prevention and control plan will be prepared and permits for implementation obtained, if necessary.

In consultation with County staff, the team will establish recommended implementation of the requirements of the Grading and Erosion Control Permit. It is anticipated that the following permits/approvals will be required:

1. Section 404 permit (nationwide permit 14 for roads and bridges or nationwide permit 23 for approved categorical exclusions) from the Army Corps of Engineers,
2. Section 7 consultation with NMFS and USFWS on special-status fish species,
3. Section 401 water quality certification or waiver from the RWQCB,
4. Section 1601 streambed alteration agreement from DFG,
5. A land use lease from the State Lands Commission, and
6. A reclamation permit from the State Reclamation Board.

It is understood that the cost of permit fees will be paid for by the County directly or paid by the consultant and billed to the County as a direct cost as requested.

### TASK III.13 RIGHT-OF-WAY ACQUISITION (BY COUNTY)

The County will perform this task. FRH will respond in an expedient manner to questions or request for information by the County relevant to any portion of the work done by the team.

### TASK IV.1 PROVIDE DESIGN SUPPORT DURING CONSTRUCTION

No matter how carefully and accurately a set of retrofit construction documents is put together, there will be as-built conditions that are unanticipated. The **FRH Team** will have experienced engineers available to respond to field questions in a timely manner. If changes in the contract documents are

**SECTION 3: WORK PLAN**

required, change order drawing preparation will have our highest priority. **FRH** has proven experience in resolving field issues quickly.

## SECTION 3: WORK PLAN

## OPTION B. PS&E (REPLACEMENT)

## PHASE II -- ENVIRONMENTAL AND UTILITY COORDINATION

### TASK II.1 FINAL ENVIRONMENTAL ASSESSMENT

If the Phase I environmental initial report indicates that construction activities may disturb hazardous materials. We will conduct physical sampling (Phase II assessment) at the site, as necessary. After the subsurface investigation has taken place, the nature and extent of contamination, if any, is assessed. If significant contaminants are present in the subsurface in or along the construction corridor, a worker health and safety plan will address procedures for handling contaminated soil excavated during construction activities.

We will prepare an administrative draft of the required technical studies for review by Stanislaus County and Caltrans. After revising the studies based on written comments, the review reports will be forwarded to Stanislaus County to send to Caltrans for FHWA review. For purposes of cost estimating, it is assumed that only one review round of the technical studies will be prepared. The final reports would be based on FHWA review. All technical studies will be prepared in accordance with Caltrans Guidance for Consultants and the FHWA Technical Advisory Paper.

We will also prepare NES, Wetlands Delineation, and Biological Assessments. The purpose of the NES and related documents is to provide certain biological studies and information necessary for environmental documents to satisfy legal requirements of the various state and federal statutes. Generally, the NES includes documentation of the biological resources in the project area and an assessment of the impacts of the project on those resources. It also includes wetland delineation. A biological assessment is required when the project has the potential to take ("take" is defined by the federal KSN) a federally listed threatened or endangered species. For fisheries, any species that has a commercial value must be evaluated under an Essential Fish Habitat Assessment. This document can be folded into the biological assessment. The biological assessment is a stand-alone document that is typically included in the NES as an appendix.

Our biologists will prepare the NES to Caltrans requirements. We will follow requirements of the "Caltrans Guidance for Consultants, Procedures for Completing the Natural Environmental Study and Related Biological Reports." The biological resources to be addressed in the NES will be limited to those considered pertinent to the study area that can be reasonably expected to be affected by the project. The NES will include:

- Relevant federal, state, and local policies and regulations related to biological resources in the project area will be summarized in the NES. We will discuss the roles and responsibilities of the federal agencies (Corps, NMFS, and USFWS) and state agencies (California Department of Fish and Game [DFG] and Regional Water Quality Control Board (RWQCB). We also will review the requirements for a NEPA/404 memorandum of understanding (MOU) to determine if the project may require interagency coordination in accordance with the MOU.

- The bridge project will require consultation with NMFS on Central Valley steelhead and with USFWS on Sacramento split-tail. We will coordinate informal consultation with NMFS and USFWS to discuss federally listed fish species that may be affected by the project and to determine the most efficient approach for achieving Section 7 compliance. The bridge project would affect the migration corridor for adult steelhead returning to and juvenile

steelhead leaving the Merced River. Sacramento splittail have the potential to occur year round at the project site, however spawning and incubation occur in the spring, ending typically by May. The period of concern for the sensitive fish species would likely be October 1 through May 30. The removal of riparian vegetation for the temporary and permanent bridges would need to be avoided or minimized, as feasible. And, although Chinook salmon are not listed (currently considered a candidate species), consultation would also need to include consultation on essential fish habitat for Chinook salmon.

We will prepare Cultural Resources Technical Reports. Cultural resource studies for the project will be performed according to the guidelines and recommended procedures outlined in Caltrans' Guidance for Consultants in accordance with NHPA Section 106. All work required for this project will be supervised by professionals that meet the standards established by the U.S. Secretary of the Interior for work in archaeology, history, and architectural history. This will allow the work to comply with the FHWA guidelines and with the NHPA Section 106 requirements.

### TASK II.2 ADDITIONAL TOPOGRAPHIC SURVEYING AND MAPPING

All surveying services for this project will be coordinated with existing data, which may be available from the County or other sources. The horizontal and vertical datum(s) will be verified to confirm they will be suitable for bridge design, road design, and hydrologic surveying purposes. If required, the datum(s) will be translated.

Sufficient control survey monuments will be established for aerial photogrammetry, design and construction purposes.

Additional topographic survey information will be gathered using the GPS system, total stations and data collectors. Sufficient cross-sections for the bridge design purposes will be taken across the San Joaquin River at the proposed bridge-crossing site.

All existing topographic data and newly acquired topographic data will be compiled for utilization by the design team. All mapping and other surveying related information will be available in both hardcopy and electronic format for the design team.

***Hydrographic Surveys:*** If required as a part of this project, we will provide hydrographic surveying required through the use of equipment speciufically designed for soundings of channel areas. Depending upon the extent of the hydrographic surveying required, photogrammetric mapping may also be utilized to determine the extent of the flood plain. All channels involved in the hydrographic survey will be physically cross-sectioned and sounded by a combination of ground survey teams and the hydrographic subconsultant. A control system for these surveys will be established utilizing the same datum(s) for the topographic design surveys. GPS will be utilized to establish this control network.

### TASK II.3 PRELIMINARY UTILITY COORDINATION

The limits of proposed construction for the replacement bridge will be identified. This will determine the scope of any additional utility verification/relocation required.

It is not anticipated that existing utilities will be a major constraint for this project but a proactive approach will eliminate surprises during design and construction. The following specific subtasks will be performed:

**SECTION 3: WORK PLAN**

- Identify existing utilities affected by project. A proactive approach utilizing personal phone calls to the utility companies will be employed.
- Coordinate submittal to utility companies of progress plans
- Coordinate transmittal of the Utility Information Request Letter

### TASK II.4 HYDROLOGY / HYDRAULIC ANALYSIS AND REPORT

***Hydrologic Analysis:*** The FRH team will identify the appropriate design flood (usually the most probable 50-year flood), base flood (most probable 100-year flood), flood of record and the overtopping flood (as applicable). These floods will be determined using two or more hydrologic methods including regression from nearby representative gaged basins and application of regional equations if available and appropriate. Previously prepared hydrologic analysis will be reviewed and considered as appropriate. A flood frequency curve for the San Joaquin River channel at the project site will be prepared (appropriately excluding flows through the Merced River Slough).

***Existing Condition Hydraulic Analysis:*** An existing condition backwater model will be set up at the bridge site and calibrated to known high water marks if available. An existing condition stage discharge curve and flood profile at the bridge site will be prepared. The Corps of Engineer's HEC-RAS backwater model will be used for this analysis. The existing condition water surface profiles for the most probable 50- and 100-year floods, flood of record and identify the flow of the overtopping flood will be identified. If available and adequate for the purposes of the proposed project, a previously prepared backwater model may be used for evaluation of the project alternatives.

***Preliminary Project Hydraulic Analysis:*** Backwater models at the bridge site will be set up representing up to two preliminary bridge configurations on a single alignment. Approximate soffit elevations, conveyance capacities and effects, if any, of the preliminary bridge configurations on the water surface elevations of the most probable 100-year flood (FEMA Base Flood) will be determined. This information, along with other hydraulic information that may be of concern to bridge selection, will be provided to the bridge design consultant by memorandum (this memorandum, when supplemented with economic and other bridge considerations from other disciplines, can be used to complete a Location Hydraulic Study).

***Final Project Hydraulic Analysis:***

After identification of a preferred bridge alternative, a final backwater model will be prepared representing this bridge, including additional project details. Using this model, the water surface profiles of the Design Flood, Base Flood (most probable 100-year flood) and other floods of significance to design of the preferred bridge will be identified. The minimum appropriate soffit elevation to meet currently recommended design standards, the minimum required conveyance capacity and the effects of the preferred bridge on risk of flood damage to structures will be determined as well as the hydraulic characteristics necessary for estimating potential scour. Figures showing flood profiles and stage-discharge curves as appropriate will be prepared.

***Scour and Erosion Analysis:*** The potential abutment, contraction and pier scour for the preferred project configuration will be determined using methods presented in FHWA HEC-18. The potential for degradation and channel migration will be evaluated considering historic changes in channel geometry and land use using the Type 1 qualitative analysis described in FHWA HEC-20.

## SECTION 3: WORK PLAN

***Final Report:*** Two copies of a comprehensive draft and up to five copies of a final DHS report for the preferred bridge will be generated. The report will be prepared in a semi-tabular format with sections including: Executive Summary, Introduction, Description of basin, Description of stream and site, Hydrologic analysis, Hydraulic analysis, Scour and erosion, Other considerations, and Conclusions and Recommendations. The introduction will identify the purpose of the study, describe the existing and proposed bridges and identify the significance of the bridge. The description of the basin will include basin location, area, precipitation, elevation, land use and vegetation, aspect, etc. The site description will include a description of the stream, streambed materials, observed erosion or deposition, etc. The sections on hydrologic analysis, hydraulic analysis and scour and erosion will describe data, assumptions and methodologies of the respective analyses. The section on other considerations will identify other constraints to bridge configuration that may affect hydraulic conditions, properties at risk of flooding, significance of properties at risk of flooding, environmental considerations, etc. The section on conclusions and recommendations will present the results of the analyses, identify bridge hydraulic design requirements and recommend measures appropriate to minimize the risk of damage to the bridge and other structures (if impacted by the bridge project) during the most probable 100-year flood. Figures, photographs and tables will be included as appropriate. The DHS report will address appropriate concerns presented in the Caltrans Local Programs Manual.

### TASK II.5 PERFORM ADDITIONAL GEOTECHNICAL STUDIES

***Field Exploration:*** For the replacement option, we recommend a supplemental field exploration program to collect additional subsurface soil data for final design. We recommend drilling two soil borings to a depth of about 100 feet below the river bottom near the existing Piers 8 and 16, and performing six cone penetrometer test (CPT) soundings. Locations of the CPT soundings will be spaced somewhat equally along the existing bridge alignment; CPTs are critical because liquefaction assessment using the CPT method will produce more accurate results than those using Standard Penetration Test (SPT) blowcounts collected in soil borings. We anticipate the CPT sounding will meet refusal at about 40 feet below the river bottom. Some of the soil boring and CPT soundings will be performed from the existing bridge deck, and if mandated from other requirements such as environmental and access, all borings and CPT soundings can be performed from the existing bridge deck. Traffic control and lane closure will be required.

For the soil borings/CPTs through the existing bridge deck, a 10-inch± diameter opening will be cored through the existing bridge. The drill string, sampling equipment and cone penetrometer device will be lowered into the borehole through this opening. At the end of the investigation, a steel plate, welded to a pipe that fits within the opening, will cover each of these openings. Cold patch asphalt will be placed above the steel plate. Alternative methods for closing the core hole will be reviewed and costs estimated for approval by the County upon request.

***Soil Laboratory Testing:*** Selected disturbed and relatively undisturbed soil samples will be tested to determine the engineering properties of the onsite soils. In addition to the above, two shallow soil borings will be added to collect subgrade R-value for pavement design.

***Foundation Design:*** EMI will recommend the foundation type. Design and specified pile tip elevations will be provided. Axial and lateral capacity and stiffness of the new foundation will be determined. Depending on the stage construction, additional fill may need to be placed for temporary or permanent approaches. If so, we will estimate the settlement and settlement period. Analyses will be performed to determine the pavement structural sections and stability of the approach embankments (if modified from existing).

## SECTION 3: WORK PLAN

### TASK II.6 PRELIMINARY BRIDGE DESIGN AND TYPE SELECTION

FRH intends to take a very proactive approach to the Type Selection process, as it sets the direction of the project and defines the scope for the final design. The review of alternative alignments and their impacts on local property use; existing bridge foundations and their impact on span arrangements; the identification and understanding of utility, drainage and environmental issues that make up the criteria that the design will be based on.

The FRH Team will review existing alignment and profile data along with the new topographic information collected to identify requirements for the ties between the new structure and the existing roadways. Roadway drainage in the approaches will be considered along with the maintenance and associated cost implications. Design considerations and requirements for existing and future utilities will be identified and incorporated in the preliminary designs.

If the same alignment is used it is not anticipated that new ROW takes will be required. It is foreseeable that temporary construction easements will be required to accommodate construction activities. Alternative alignments and impacts on adjacent landowners along with related costs will be included in the consideration of the various structure types.

### TASK II.7 TYPE SELECTION MEETING

The **FRH Team** will attend a meeting with County staff to present its recommendations regarding structure type and configuration. This meeting should just be a pro forma exercise since FRH will keep the County's Project Engineer informed and will solicit comments throughout the preliminary design process.

Draft Plan and Profile (preliminary geometric approval drawing), and General Plan sheets with a preliminary opinion of construction cost (GP estimate) and other supporting information for the preferred alternative will be submitted with a Draft Caltrans type selection report five (5) working days prior to the meeting for review.

### TASK II.8 FINAL TYPE SELECTION

FRH will resolve any comments arising at the Type Selection Meeting and will revise the Type Selection Report accordingly. The General Plan and GP estimate will also be updated as required. Surveying, preliminary hydraulics, geotechnical, environmental, ROW and community based issues have been gathered and/or identified at this stage. The structure type selection is complete, which is consistent with 30-35% design. Our planned deliverable at this stage will be the five (5) copies of the Type Selection Report with General Plan and General Plan Estimate. The Type Selection Report will include a narrative "Preliminary Design Summary" which will be a brief historical background of the type selection process for this project.

Another important element of the Final Type Selection for this project will be acceptance of the Final Geometric Approval Drawing, which governs the roadway portion of the final design and the ties between the bridge and roadway sections.

### TASK II.9 UTILITY FIELD VERIFICATION

Utilities that are in the general proximity of the work area will be accurately located in the field. This field survey will be accomplished utilizing a two-person crew utilizing the latest state-of-the-art electronic data collection systems. Once collected, the data will be brought to the office and downloaded through the computer system so that it can be imported directly into the new foundation plan.

## SECTION 3: WORK PLAN

## PHASE III -- PLANS, SPECIFICATIONS & ESTIMATES AND COSTRUCTION SUPPORT

### TASK III.1 RIGHT-OF-WAY & SUPPLEMENTARY TOPOGRAPHIC SURVEY

***Right-of-Way Surveying, Platting and Description Services:*** If required by this project, we will perform field surveys to establish existing rights-of-way and new rights-of-way to be acquired for the project. We will coordinate the acquisition of title work and the preparation of legal descriptions and plats for the acquisition of the additional rights-of-way. This information will be provided to the appropriate County right-of-way agent(s) for their use in negotiating the acquisition of the rights-of-way. This information will also be coordinated with the design team for their insertion into design drawings as desired.

We will identify and submit a rights-of-way report indicating status and needs for the project. Preparation of plat maps and legal descriptions and acquisition of title reports for rights-of-way will be done if requested. The extent of the work will be defined and preformed under the terms of the contract.

### TASK III.2 PERFORM STRUCTURAL ANALYSIS & DESIGN

The design phase will commence following approval of the Type Selection Report and completion of the environmental process.

All structural analysis and component design will be completed in this task. All work will be conducted in accordance with Caltrans bridge design procedures; however, that will not stop FRH from following innovative approaches that lead to cost savings for the County. Design work will be supervised and coordinated by the Project Engineer. Structural design will be accomplished utilizing pre-validated computer programs and supplementary manual calculations. FRH maintains a complete library of personal computer software for design of bridge structures. Our extensive array of spreadsheet and custom programs allows rapid evaluation of different scenarios to determine the most cost-effective solution.

Manual calculations will be documented neatly, initialed and indexed. Each calculation package will contain a summary that states the purpose of the calculations, references and sources of input information, relevant codes and standards, and a concluding section that summarizes the design results, followed by the final design sketches and the calculations themselves. The calculations will be produced so that an engineer competent in bridge design can verify the approach used and results obtained.

### TASK III.3 PREPARE FINAL FOUNDATION DESIGN / REPORT

The field and laboratory findings will be documented in a foundation report together with the foundation design and construction recommendations. This report will include LOTB sheets showing any supplemental soil borings and CPTs. This report will be reviewed and approved by the County and Caltrans. A final report will be issued to incorporate the review comments and our responses.

## SECTION 3: WORK PLAN

### TASK III.4 PREPARE UNCHECKED DETAILS AND 60% ROADWAY PLANS

**Roadway Plans:** The FRH Team will carry forward the result from the alignment studies done in the type selection work to ensure the tie between the new structure and the existing roadways. Roadway drainage in the approaches will be considered along with the maintenance and associated cost implications. Design considerations and requirements for existing and future utilities will be identified and incorporated in the preliminary designs. Design of the approach sections of the project will be completed in accord with Stanislaus County's established practice and Caltrans Highway Design manuals.

If the same alignment is used it is not anticipated that new ROW takes will be required. It is foreseeable that temporary construction easements will be required to accommodate construction activities.

Roadway design will be done in SoftDesk Version 8.0 as is appropriate and detailed in AutoCad 14. Careful consideration will be given to the staging of construction and the delineation of the plans.

Drainage calculations will be produced for both the bridge (deck drains) and roadway approach. Construction staging plans will be developed. Signing and striping plans will be developed both for the construction period and final configuration.

**Bridge Plans:** Bridge plans will be developed in accordance with Caltrans Bridge Design Details. The designer will thoroughly review the plans to assure compliance with the design intent and current practice. At this stage (65% design) all design will be complete, and details will have been generated but not checked. Progress prints of plan sheets will be forwarded to the County. No formal review is anticipated at this time.

### TASK III.5 UTILITY RELOCATION / COORDINATION

Any utilities in conflict with the proposed replacement structure measures will be identified and their owners notified. To that end, KSN will perform the following tasks:

- Identify conflicts between existing public utilities and proposed project.
- Determine requirements for existing utilities modifications or relocation as well as requirements for new utility accommodations to be included in the design of the new structure.
- Arrange coordination meetings with utility companies to resolve conflicts.

### TASK III.6 PERFORM INDEPENDENT DESIGN CHECK

Once the 65% plans are complete, the package will be provided to the independent check engineers, who will independently develop calculations for the details provided and check their presentation in the plans. In accordance with Caltrans' policy, both the lead design engineer and lead check engineer will be California Registered Civil Engineers.

### TASK III.7 PREPARE CHECKED DETAILS AND 90% ROADWAY PLANS

After the bridge independent check is complete, the structural designer and checker will meet and resolve any differences. The plans, calculations, estimates, and specifications will be updated accordingly. Prior to the 90% Submittal, the Project Engineer will make a final review of the plans and specifications, and all calculation and drawing QA checklists will be completed.

## SECTION 3: WORK PLAN

### TASK III.8 PERFORM CONSTRUCTIBILITY REVIEW

Upon completion of the design work, incorporation of the agency comments and prior to the preparation of the final submittal package, a thorough review of the contract document set will be made by FRH. The review will consist of a comparison of the plans, specifications and estimates for consistency of nomenclature and delineation practice, clarity and buildablity of details and reasonableness of unit prices used. The County's Project Engineer and FRH's Project Engineer will discuss the comments generated by this review before they are incorporated into the package.

### TASK III.9 PREPARE QUANTITIES (MAKE / CHECK) & ESTIMATE

Based on the final plans, two sets of quantity calculations will be developed. These make and check calculations will agree within the limits specified for individual items in the Caltrans Bridge Design Aids. An Engineer's Estimate will be produced utilizing the most recent Caltrans Cost Data book and available County cost data. An electronic copy of the Engineer's Estimate (in MS Excel format) will be furnished to the County.

### TASK III.10 PREPARE SPECIFICATIONS

Technical Special Provisions will be assembled and edited to modify the Caltrans Standard Specifications. FRH maintains access to the Caltrans Structures Bulletin Board through the Internet and will download the most recent versions of all relevant Standard Special Provisions. They will be edited in accordance with Caltrans procedures and will be assembled in printed format and on a CD (in MS Word format) for use by the County.

### TASK III.11 COMPILE PS&E PACKAGE / ADDRESS 90% COMMENTS

FRH will respond to and address comments on the 90% submittal. The final package will be assembled in the required format. This task also includes a Quality Assurance interdisciplinary review of the plans, specifications, and estimate.

### TASK III.12 PRINT VELLUMS AND RESPOND TO 100%COMMENTS

FRH will respond to and address any comments on the 100% submittal. The Project Deliverables consist of the following items:

- One (1) set of final Mylar reproducible plans, inset in the County standard detail sheet which can be reduced to half size and fit on 11"x17" paper.
- Electronic copies of plans in AutoCAD Version 14 format and survey data in SoftDesk.
- Contract specification and special provisions (printed and electronic MS Word 2000 format)
- Engineer's Estimate (printed and electronic in MS Excel format)
- Quantity Calculations - Make and Check (one set of each)
- One (1) set of Final Structure Design and Independent Check Calculations

### TASK III.13 PERMITTING

The FRH Team will coordinate with involved agencies and prepare permit packages and all other necessary materials. Involved agencies will include U. S. Fish & Wildlife Service (USFWS), U.S. Army Corps of Engineers (COE), U.S. Coast Guard, California Department of Fish and Game

## SECTION 3: WORK PLAN

(CDFG), State Lands Commission, the Central Valley Regional Water Control Board (RWQCB), the California Department of Water Resources and the State Reclamation Board.

We will assist the County with permit acquisition and Section 7 consultation with the USFWS through the COE. We will prepare mitigation plans for State-listed species and Biological Assessments for federally-listed species, if necessary, however, these plans are not included in our cost estimate for permitting. It is anticipated that the following permits/approvals will be required:

1. Section 404 permit (nationwide permit 14 for roads and bridges or nationwide permit 23 for approved categorical exclusions) from the Army Corps of Engineers,
2. Section 7 consultation with NMFS and USFWS on special-status fish species,
3. Section 401 water quality certification or waiver from the RWQCB,
4. Section 1601 streambed alteration agreement from DFG,
5. A land use lease from the State Lands Commission, and
6. A reclamation permit from the State Reclamation Board

We do not anticipate need for a Coast Guard Bridge Permit as this is not a tidal waterway. It is understood that the cost of permit fees will be paid for by the County directly or paid by the consultant and billed to the County as a direct cost as requested.

### TASK III.14 RIGHT-OF-WAY ACQUISITION (BY COUNTY)

The County will perform this task. FRH will respond in an expedient manner to questions or request for information by the County relevant to any portion of the work done by the team.

### TASK IV.1 PROVIDE DESIGN SUPPORT DURING CONSTRUCTION

FRH will provide construction support services as requested by the County. These services will include attendance at the pre-construction meeting, review of demolition plans, false work /shop drawings, consultation, preparation of plan revisions as necessary to document change orders and transfer of the field notations to record as-built modifications which occurred.

If requested by the County, FRH will provide a qualified structure representative to act under the supervision of the County's designated engineer in responsible charge of the project (per HBRR Program Operating Procedures and Guidelines). We will work closely with the County's Engineer to effect a timely, claim-free completion of the work.

# Memorandum

cc:

HARRIS

**To:** **Distribution (see below)** **Subject:** **Oceanside-Escondido Loop**

**From:** **Alan Boone** **Date:** **Jan. 17, 2001**

Attached is a partial set of drawings for the Loop 90% inter discipline review. The following drawings are not included in this set, most of the these are related to the CSUSM station.

- CSUSM Structural Drawings
- CSUSM Plumbing, Mechanical and Electrical Drawings
- Loop Extension Bridge Drawings (re-design due to alignment revision)

We will send a package of supplemental drawings tomorrow to include in your set(s). If you have any questions, please call me at 916-929-3124 or e-mail me at alan.boone@dmjmharris.com.

**Distribution:**

Pat Caughey (Wimmer, Yamada & Caughey)

Joe Stoddard (Sanchez/Kamps Associates)

Helmut L. Schweitzer (Systra Consulting)

Howard Peer (Systra Consulting)

Shawn Masserat (William J. Yang & Associates)

Eli Choueiry (FRH Long Beach – 3 sets)