Regular Meeting
Governing Board of Sweetwater Authority
AGENDA

Wednesday, February 12, 2025
5:00 p.m.
Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91910

Notice: This meeting will be held at the above date, time, and location, and Sweetwater Authority Board members and members of the public may attend in person. Some Sweetwater Authority Board members may attend and participate in the meeting virtually pursuant to the Brown Act (Gov. Code § 54953). As a convenience to the public, the Sweetwater Authority provides a call-in option and internet-based option for members of the public to virtually observe and provide public comments at its meetings. Additional details on in-person and virtual public participation are below. Please note that, in the event of a disruption in the call-in option or internet-based option, the meeting will continue unless otherwise required by law, such as when a Director is attending the meeting virtually pursuant to certain provisions of the Brown Act.

To join via Zoom Webinar from a computer, tablet, or smartphone, click on the link below:
https://zoom.us/j/83420757494

To join this meeting via telephone, please dial:
1-669-900-6833 or 1-253-215-8782
Meeting ID: 834 2075 7494
The Zoom Webinar link and telephone number will be active approximately 15 minutes prior to the meeting start time.

If you are unable to access the meeting using this call-in information, please contact the Assistant Board Secretary at (619) 409-6704 for assistance.

INSTRUCTIONS FOR PUBLIC COMMENT

Members of the public may address the Board regarding items not appearing on the posted agenda, which are within the subject matter jurisdiction of the Governing Board, and on agenda items. Speakers are asked to state name, address, and topic, and to observe a time limit of three (3) minutes each. Public comment on a single topic is limited to twenty (20) minutes. (Note: Written comments will no longer be read aloud during the meeting.)

Making Public Comment for Those Attending In-Person:
Anyone desiring to address the Governing Board regarding non-agenda items or an item listed on the

agenda is asked to fill out a speaker's slip and present it to the Board Chair or the Secretary. Request to Speak forms are available at the Speaker's podium and at www.sweetwater.org/speakerform.

Making Public Comment for Those Not Attending In-Person:
The Chair will inquire if there are any comments from the public regarding non-agenda items and any items listed on the agenda prior to Board discussion. Members of the public may request to speak and make comments as follows:

- Via Zoom Webinar, click on "Raise Hand" button. This will notify the moderator that you wish to speak during Oral Communication or during a specific item on the agenda.
- Via phone, you can raise your hand by pressing *9 to notify the moderator that you wish to speak during the current item.

Any person with a disability who requires a modification or accommodation in order to participate in a meeting should direct such request to the Board Secretary at (619) 4096703 at least forty-eight (48) hours before the meeting, if possible.

UNDERSTANDING THE MEETING AGENDA

Opportunity for Public Comment Opportunity for members of the public to address the Board on items not appearing on the posted agenda, which are within the subject matter jurisdiction of the Governing Board (Government Code Section 54954.6)

Action Calendar Agenda Items on the Action Agenda call for discussion and action by the Board. All items are placed on the Agenda so that the Board may discuss and take action on the item if the Board is so inclined, including items listed for information.

Consent Calendar Items Items to be acted upon without discussion, unless a request is made by a member of the Board, the Staff, or the Public to discuss a particular item, including items listed for information. All consent calendar items are approved by a single motion.

Reports and Informational Items Items placed on the Agenda to allow the persons designated to provide information to the Board and the Public. There is no action called for in these items. The Board may engage in discussion on any report upon which specific subject matter is identified on the Agenda, but may not take any action other than to place the matter on a future Agenda.

Directors' Comments Directors' comments are comments by Directors concerning Authority business that may be of interest to the Board. Directors' comments are placed on the Agenda to enable individual Board members to convey information to the Board and the Public. There is no discussion or action taken on comments made by Board members.

Closed Session At any time during the regular session, the Governing Board may adjourn to closed session to consider litigation, personnel matters, or to discuss with legal counsel matters within the attorney-client privilege. (Government Code Section 54954.5.)

Pages

1. Call Meeting to Order and Roll Call

2. Pledge of Allegiance to the Flag

3. Opportunity for Public Comment

San Diego Unified Port District: 75 linear feet of 16-inch and 700 linear feet of 8-inch asbestos cement water mains, including one fire hydrant, located on Lagoon Drive in the City of Chula Vista.

Action and Discussion Items

8. New Business

8.1 Consideration to Approve Sponsorship for the Voice of San Diego's Off the Record: 20th Anniversary Celebration 298

9. Approval of Directors' Attendance at Meetings and Future Agenda Items

9.1 Per diem approval for Directors who wish to attend the CMUA Annual Conference, Anaheim – April 6-8, 2025 302

10. Delayed Revenue Balance Dashboard 303

11. Committee Minutes 304

12. Report of Legal Counsel

13. Report of Management

14. Reports by Directors on Events Attended

14.1 ACWA Foundation Retreat, Sacramento - January 27, 2025

14.2 San Diego Chapter CSDA Board Meeting - January 27, 2025

14.3 South County Economic Development Council Elected Officials Reception - January 28, 2025

14.4 South County Economic Development Council Meeting - February 4, 2025

14.5 CalDesal Annual Conference, Temecula - February 5-6, 2025

14.6 Other Events Attended

15. Directors' Comments

16. Closed Session

16.1 Conference with Legal Counsel – Existing Litigation pursuant to Government Code Section 54956.9 (d)(1):
In re: Aqueous Film-Forming Foams Products Liability Litigation, Settlement Agreement Between Public Water Agencies and 3M; U.S. Dist. Ct., D. S. Carolina, Case No. 2:18-mn-2873-RMG

16.2 Conference with Legal Counsel - Initiation of Litigation pursuant to Government Code Section 54956.9 (d)(4): One potential case

16.3 Conference with Legal Counsel - Anticipated Litigation – Significant Exposure to Litigation pursuant to Government Code Section 54956.9 (d)(2): One potential case

16.4 Public Employee Performance Evaluation pursuant to Government Code Section 54957:
Title: General Manager

16.5 Conference with Labor Negotiator pursuant to Government Code

Section 54957.6:
Agency Negotiators: Chair Manny Delgado and General Counsel Paula de Sousa

Unrepresented Employee: General Manager

16.6 Public Employee Performance Evaluation pursuant to Government Code Section 54957:
Title: Legal Counsel

16.7 Conference with Legal Counsel – Existing Litigation pursuant to Government Code Section 54956.9 (d)(1):
United States, et al. ex rel John Hendrix v. J-M Manufacturing Company Inc., and Formosa Plastics Corporation, U.S.A., Case No. ED CV06-00055-GW

17. Adjournment

This agenda was posted at least seventy-two (72) hours before the meeting in a location freely accessible to the Public on the exterior bulletin board at the main entrance to the Authority's office and it is also posted on the Authority's website at www.sweetwater.org. No action may be taken on any item not appearing on the posted agenda, except as provided by California Government Code Section 54954.2. Any writings or documents provided to a majority of the members of the Sweetwater Authority Governing Board regarding any item on this agenda will be made available for public inspection at the Authority Administration Office, located at 505 Garrett Avenue, Chula Vista, CA 91910, during normal business hours. Upon request, this agenda will be made available in appropriate alternative formats to persons with disabilities, as required by Section 202 of the Americans with Disabilities Act of 1990. Any person with a disability who requires a modification or accommodation in order to participate in a meeting should direct such request to the Board Secretary at (619) 409-6703 at least forty-eight (48) hours before the meeting, if possible.

To subscribe to meeting agendas and other pertinent information, please visit www.sweetwater.org

February 2025

February 2025

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March 2025

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Jan 26	27	28	29	30	31	Feb 1
2	3 4:00pm Finance and Administration Committee Meeting	4 8:00am SCEDC Meeting (SC)	5 CalDesal Annual Conference (DY, EC, RM) (Temecula) 4:00pm Engineering and Operations Committee	6	7	8
9	10	11	12 4:30pm SBW Board 5:00pm SWA Board	13	14	15
16	17 4:00pm Water Quality Committee	18	19	20	21	22
23	24	25 GMDA Winter Conference (DY) (Temecula)	26 UWI Spring Conference (DY) (Palm Springs) Expenses due to Secy 5:00pm SWA Board	27 1:00pm CWA Board	28	Mar 1

March 2025

March 2025						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April 2025						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Feb 23	24	25	26	27	28	Mar 1 9:00am Special Board Meeting
2	3 4:00pm Finance and Administration Committee Meeting	4	5 4:00pm Engineering and Operations Committee	6	7	8
9	10	11	12 4:30pm SBW Board 5:00pm SWA Board	13 CivicWell Policymakers Conference (SC, HM, MD, EC, RM, PMP) (Yosemite Valley Lodge, Yosemit	14	15
16 CivicWell Policymakers Conf	17 4:00pm Water Quality Committee	18	19	20	21	22
23	24	25	26 Expenses due to Secy 5:00pm SWA Board	27 1:00pm CWA Board	28	29
30	31 HOLIDAY	Apr 1	2	3	4	5

April 2025

April 2025

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May 2025

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Mar 30	31	Apr 1 4:00pm Finance and Administration Committee Meeting	2 4:00pm Engineering and Operations Committee	3	4	5
6 CMUA Annual Conference (Anaheim)	7	8	9 4:30pm SBW Board 5:00pm SWA Board	10	11	12
13	14 4:00pm Water Quality Committee	15	16	17	18	19
20	21	22	23 Expenses due to Secy 5:00pm SWA Board	24 1:00pm CWA Board	25	26
27	28	29	30	May 1	2	3

SWEETWATER AUTHORITY GOVERNING BOARD

MINUTES OF THE REGULAR MEETING

January 22, 2025, 5:00 p.m.
Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91910

Directors Present:	Steve Castaneda, Elizabeth Cox, Manny Delgado, Hector Martinez, Paulina Martinez-Perez, Ron Morrison, and Ditas Yamane
Staff Present:	General Manager Carlos Quintero, Assistant General Manager Roberto Yano, Legal Counsel Nick Norvell, Board Secretary Ligia Hoffman, Records Management Specialist Gloria Achutegui, Director of Water Quality Justin Brazil, Director of Engineering and Operations Erick Del Bosque, and Director of Finance Rich Stevenson
Others Present:	Yaily Gonzalez and Lauren Magnuson of The Water Conservation Garden, Jenny Windle of JPW, Emily Routman, and Ed Woodruff,

---

1. Call Meeting to Order and Roll Call

Chair Delgado called the meeting to order at 5:01 p.m.

2. Pledge of Allegiance to the Flag

3. Opportunity for Public Comment

There were none

4. Chair's Presentation

4.1 Comments from the Public Regarding Agency Staff

ACTION CALENDAR AGENDA

5. Items to be Added, Withdrawn, or Reordered on the Agenda

There were none.

6. Approval of Minutes - Regular Board Meeting of January 8, 2025

Motion by: Director Martinez
Seconded by: Director Castaneda

that the Governing Board approve the Minutes of the January 8, 2025 Regular Board meeting.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

7. Consent Calendar Items

Director Castaneda recused himself from consideration of Agenda Item 7 .1 due to his contract with Sempra Energy, parent company of SDG&E, which Director Castaneda disclosed on the record.

Director Cox pulled items 7.2, 7.4, 7.5, 7.6, and 7.9 for discussion.

Motion by: Director Yamane
Seconded by: Director Martinez

that the Governing Board approve Consent Calendar Items 7.1, 7.3, 7.7, and 7.8, with Director Castaneda's noted recusal on Item 7.1.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

7.1 Approval of San Diego Gas & Electric Demands and Warrants – November and December 2024

7.3 FY 2025-26 Budget Calendar (Information Item)

(Finance and Administration Committee Meeting of January 6, 2025)
Recommendation: No action was required by the Governing Board.

7.7 Consideration to Authorize the General Manager to Execute On-call Emergency and General Construction Services Contracts with Basile Construction, Inc. and Palm Engineering, Inc.

(Engineering and Communications Committee Meeting of January 13, 2025)
Recommendation: Authorize the General Manager to execute On-call Emergency and General Construction Services contracts with Basile Construction, Inc. and Palm Engineering, Inc., with each contract having a one-year duration and a not-to-exceed cost of $100,000.

7.8 **Development Services Update – August 15, 2024 through December 31, 2024 (Revised)** (Engineering and Communications Committee Meeting of January 13, 2025)
Recommendation: No action was required by the Governing Board.

Items Pulled from Consent Calendar

7.2 **Approval of Demands and Warrants (excludes the San Diego Gas & Electric Demands and Warrants) - November and December 2024**

Motion by: Director Castaneda
Seconded by: Director Martinez-Perez

that the Governing Board approve Item 7.2 - Approval of Demands and Warrants (excludes the San Diego Gas & Electric Demands and Warrants) – November and December 2024.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

7.4 **Review of Board Policies and Procedures (Policies 501 through 509)** (Finance and Administration Committee Meeting of January 6, 2025)
Recommendation: Approve Board Policies 501 through 509 as presented.

Motion by: Director Cox
Seconded by: Director Yamane

that the Governing Board approve Policies 501 through 509 as presented.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

7.5 **Consideration to Approve the FY 2024-25 ACWA/JPIA Auto and General Liability Program Insurance Premium**
(Finance and Administration Committee Meeting of January 6, 2025)
Recommendation: Approve the FY 2024-25 ACWA/JPIA Auto and General Liability Program Insurance Premium.

Motion by: Director Cox
Seconded by: Director Martinez

that the Governing Board approve the FY 2024-25 ACWA/JPIA Auto and General Liability Program Insurance Premium.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

7.6 Update on Capital Improvement Plan Program – First and Second Quarters of FY 2024-25 (Engineering and Communications Committee Meeting of January 13, 2025)
Recommendation: No action was required by the Governing Board.

Director Cox highlighted efficiencies listed on the memo.

7.9 Consideration to Amend JPW Communications Agreement for an Additional $183,000 Resulting in a Not-to-exceed Amount of $258,000 (Legislative Affairs and Communications Committee Meeting of January 16, 2025)
Recommendation: Approve an amendment to the JPW Communications agreement for an additional $183,000, resulting in a not-to-exceed amount of $258,000.

Motion by: Director Castaneda
Seconded by: Director Delgado

that the Governing Board approve an amendment to the JPW Communications agreement for an additional $183,000, resulting in a not-to-exceed amount of $258,000.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

Action and Discussion Items

8. Consideration to Approve Changes to the One-time Adjustments to Customer's Water Bills Policy
(Finance and Administration Committee Meeting of January 6, 2025)
Recommendation: Approve changes to the One-time Adjustments to Customer's Water Bills Policy as presented.

Motion by: Director Martinez
Seconded by: Director Cox

that the Governing Board approve changes to the One-time Adjustments to Customer's Water Bills Policy as presented.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

9. **Consideration to Award a Contract for the Construction of the Bonita Valley Reservoir Control Building Roof Replacement to JNH Construction, Inc.**
(Engineering and Communications Committee Meeting of January 13, 2025)
Recommendation: Reject all bids; direct staff to look at other options, including monitoring construction pricing; and bring back to the Board at a later date.

Motion by: Director Martinez
Seconded by: Director Castaneda

that the Governing Board reject all bids; direct staff to look at other options, including monitoring construction pricing; and bring back to the Board at a later date.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

10. **Update on Per- and Polyfluoroalkyl Substances (PFAS) Outreach (Information Item)**
(Legislative Affairs and Communications Committee Meeting of January 16, 2025)
Recommendation: No action was required by the Governing Board.

Jenny Windle from JPW provided a presentation.

11. **Old and Unfinished Business**

11.1 **"Update on the Water Conservation Garden," presented by Lauren Magnuson, Executive Director, The Water Conservation Garden (No Enclosure) (Information Item)**

Lauren Magnuson of The Water Conservation Garden provided a presentation.

11.2 **Consideration to Approve the FY 2024-25 Water Conservation Garden Authority Contribution Payment**

Emily Routman introduced herself, spoke about her career experience, is a current volunteer at The Water Conservation Garden for the last two years, and her support of the Water Conservation Garden.

Ed Woodruff stated he has been a volunteer at The Water Conservation Garden (Garden) for the last twelve years, spoke about the outreach efforts, the efforts Lauren has been making at the Garden, and expressed his love for the Garden.

Yaily Gonzalez introduced herself as The Water Conservation Garden Communities Programs Coordinator, spoke on her connection with the Chula Vista community, shared her educational and career journey, and the efforts currently being made to promote the Garden.

Motion by: Director Castaneda
Seconded by: Director Yamane

that the Governing Board approve the FY 2024-25 Water Conservation Garden Authority contribution payment.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

12. New Business

12.1 Consideration to Direct the General Manager to Perform a Fire System Infrastructure Assessment

Motion by: Director Castaneda
Seconded by: Director Yamane

that the Governing Board authorize the General Manager to execute a contract with HDR, Inc. to perform a Fire System Infrastructure Assessment for a not-to-exceed amount of $73,100, inclusive of an optional task for grant research and submittal assistance, in accordance with its proposal dated January 16, 2025; and approve the transfer of $73,100 from the FY 2024-25 Budget Capital Contingency Fund to the FY 2024-25 Budget Operating Expense line item Engineering General Consulting.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

13. Approval of Directors' Attendance at Meetings and Future Agenda Items

Motion by: Director Yamane
Seconded by: Director Martinez-Perez

that the Governing Board approve per diem for Directors for items 13.1 through 13.3.

Ayes (7): Director Castaneda, Director Cox, Director Delgado, Director Martinez, Director Martinez-Perez, Director Morrison, and Director Yamane

Motion Carried (7 to 0)

13.1 Per diem approval for Directors who wish to attend the SCEDC's Elected Officials Reception - January 28, 2025

13.2 Per diem approval for Directors who wish to attend the CalDesal 2025 Annual Conference, Temecula - February 5-6, 2025
(Note: Conflict with 2/5/25 Engineering and Operations Committee meeting)

13.3 Per diem approval for Directors who wish to attend the GMDA Winter Conference, Temecula - February 25-27, 2025
(Note: Conflicts with 2/26/25 Board meeting)

14. Delayed Revenue Balance Dashboard

15. Committee Minutes

16. Informational Reports

16.1 Financial Reports - November and December 2024

16.2 Quarterly Water Treatment Chemical Update

16.3 Quarterly Performance Measurement Report - Second Quarter FY 2024-25

16.5 Quarterly Report on Communications Plan Metrics - Second Quarter FY 2024-25

16.4 Quarterly Report of Directors' Expenses - Second Quarter FY 2024-25

17. Report of Management

There was none.

18. Report of Representatives to the San Diego County Water Authority

Director Yamane reported that the meeting is tomorrow, and mentioned the appointments to committees that were made.

Director Castaneda spoke about the importance of the County Water Authority's credit rating and its concern about the scheduled rate increases, concern regarding the impacts to districts the rate increases will cause, and the possibility to repeal AB 399.

19. Reports by Directors on Events Attended

19.1 Other Events Attended

There was none.

20. Directors' Comments

Director Cox stated it has been a month she has been on the Board and thanked everyone for allowing her to ask questions, and thanked the Director of Water Quality for the tours of Perdue Plant and Desal Facility, and requested a box be included on memos with the Committee's recommendation.

Director Martinez-Perez recognized Director of Water Quality Justin Brazil and Water Quality Superintendent Giovanni Outlaw for obtaining the Southwest Membrane Operator Association 2024 Distinguished Service Award.

21. Closed Session – There was none.

22. Adjournment

With no further business before the Board, Chair Delgado adjourned the meeting at 7:53 p.m.

____

Manny Delgado, Chair

____

Ligia Hoffman, Board Secretary

SWEETWATER AUTHORITY

Engineering and Operations Committee
February 5, 2025

Consideration to Authorize the General Manager to Execute a Contract with WSP USA, Inc. to Complete an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study

RECOMMENDATION

Staff recommends that the Governing Board authorize the General Manager to execute a contract with WSP USA, Inc. for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $286,378.

OVERVIEW

The original freestanding outlet tower at Sweetwater Reservoir was constructed in 1888, and was constructed out of the same masonry as the dam. It is located inside the reservoir, about 40 feet from the base of the Sweetwater Dam, and is adjacent to the lower portion of the right abutment slope. The tower is about 100 feet high, from its foundation base to the top of its circular operating platform.

The study was initiated as part of the Authority's Strategic Plan Detailed Work Plan this fiscal year. Tower failure could cause an interruption in water deliveries from Sweetwater Reservoir to the Perdue treatment plant and to Authority customers. If water could not be used from Sweetwater Reservoir, it could cost millions of dollars to purchase untreated water from the San Diego County Water Authority until the tower is replaced, or a temporary floating pump station could be constructed on the reservoir.

The objective of the Study is for the selected consultant to review the 2003 report from GEI Consultants, Inc., titled "Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit." After reviewing the report, the Consultant is tasked with detailing a comprehensive update to the original 2003 report, and completing a conceptual level design and budgetary cost for strengthening the tower to withstand an earthquake with a return period of approximately 144 years. The updated Study will evaluate the need to update the deterministic and probabilistic analysis using the latest available ground motion models and National Hazard Maps. The updated Study will also evaluate the assumptions used in the 2003 report for materials, boundary conditions, and load combinations, and will update them as necessary. The next steps after the Study is completed would be to evaluate the potential rehabilitation cost versus the return period of the earthquake that could cause outlet tower failure, and determine if strengthening the outlet tower is warranted based on acceptable risk. The potential for outlet tower failure is not a dam safety issue because the outlet tower is not used as a mechanism for potential emergency drawdowns of the reservoir and would not cause failure of Sweetwater Dam itself; therefore, this study is not under the jurisdiction of the Division of Safety of Dams (DSOD).

The standards governing the analysis will be the US Army Corps of Engineers Manual EM 1110-2-6053 titled "Earthquake Design and Evaluation of Concrete hydraulic Structures." Other standards and guidelines that will be used when needed are from the governing agencies of the Federal Energy Regulatory Commission and US Bureau of Reclamation, and design codes from the American Concrete Institute and the American Society of Civil Engineers. The selected consultant will also be able to use the information from the recently completed draft analysis titled "Stability Analyses of Sweetwater Dam Under Static and Seismic Loading Conditions," that is part of the Comprehensive Analysis for Sweetwater Dam that was requested by DSOD. The earthquake faults that will be considered in this study are: La Nacion, Rose Canyon, Agua Blanca-Coronado, San Miguel-Vallecitos, San Diego Trough and Elsinore.

To select a consultant to prepare an update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit, staff publicly advertised a Request for Proposals (RFP) on December 12, 2024. The RFP was publicly advertised on PlanetBids and the Authority's website. The advertised RFP is included as Attachment 1. The RFP included a statement encouraging participation by local, small and/or disadvantaged businesses.

Proposals in response to the RFP were due on January 16, 2025, and two proposals were received from the following consultants:

- WSP USA, Inc. (WSP)
- KPFF Consulting Engineers (KPFF)

Staff reviewed the proposals according to the evaluation criteria listed in the RFP. Based on the professional nature of the requested work and the proposed contract for professional services, a qualifications-based selection process was used, which included the following evaluation criteria:

Category	Maximum Points	Average Score for WSP	Average Score for KPFF
Approach to complete the report	60	58	55
Completeness of proposal in addressing requested information	10	10	10
Relevant qualifications and experience of the Respondent's personnel assigned	30	30	27

Upon review of the proposals submitted, WSP was ranked the highest by staff based on the criteria above. The proposal from WSP shows a better approach and they had more specific experience for the type of work being considered. Both proposals and costs are included as Attachments 2 and 3. Staff recommends selecting the consultant that was ranked the highest by staff.

FISCAL IMPACT

The FY 2024-25 Budget Operating Expense line item 10-40-400-5650 – General Engineering Consulting Services includes funding for the proposed project.

Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit	
Total project budget	$ 300,000
WSP's proposed project cost[1)]	$286,378
Project balance:	$13,622

1) *The RFP for this professional service was based on qualifications and not lowest bid; however, for informational purposes, the cost proposal from KPFF was $335,129 for Option 2. Option 1 of KPFF's proposal has a higher cost of $362,389; it's a higher cost than Option 2 because it does not include reusing available data.*

OPTIONS

1. Authorize the General Manager to execute a contract with WSP USA, Inc. for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $286,378.

2. Authorize the General Manager to execute a contract with KPFF Consulting Engineers for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $335,129.

3. Other direction as determined by the Governing Board.

Staff Contact:
Carlos Quintero, General Manager
Roberto Yano, Assistant General Manager
Erick Del Bosque, Director of Engineering and Operations

SUPPORTING INFORMATION

Attachments

1. RFP for an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit
2. Proposal and Cost from WSP USA, Inc.
3. Proposal and Cost from KPFF Consulting Engineers
4. Staff Presentation

Strategic Plan

Strategic Plan Goal 2: System and Water Supply Reliability (SR) – Achieve an uninterrupted, long-term water supply through investment, maintenance, innovation and developing local water resources.

- Objective SR5: Maintain Sweetwater Authority Dams in compliance with requirements of Division of Safety of Dams (DSOD) and other necessary improvements to ensure the maximum operational efficiency per regular dam surveillance inspections.

Task 4: Update Seismic Stability Analysis for Sweetwater Reservoir's Outlet Tower

Past Board Actions

June 12, 2024	The Board adopted Resolution 24-08, adopting the Fiscal year 2024-25 Budget
	The Board approved the FY 2024-25 Strategic Plan Detailed Work Plan

SWEETWATER AUTHORITY
505 GARRETT AVENUE
CHULA VISTA, CALIFORNIA 91910
(619) 420-1413
FAX (619) 425-7469
www.sweetwater.org

December 12, 2024

Subject: REQUEST FOR PROPOSALS TO UPDATE THE SEISMIC EVALUATION OF SWEETWATER DAM OUTLET TOWER AND CONDUIT STUDY

To Whom It May Concern:

Sweetwater Authority (Authority) is seeking a professional engineering services Consultant to update the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit study, attached as Exhibit A. The Authority invites respondents to provide a proposal, including proposed project approach and costs, project team qualifications, and experience with relevant past projects in response to this Request for Proposals (RFP).

The Authority encourages participation by local, small, and/or disadvantaged businesses. Persons or entities submitting a proposal in response to this RFP are referred to herein as "Respondent", whereas the successful Respondent to which the Authority would award a contract is referred to herein as "Consultant".

A. BACKGROUND INFORMATION

The Authority

The Authority was formed in 1977 as a Joint Powers Agency between the City of National City and South Bay Water. The Authority is a publicly-owned water agency that serves potable water to a population of approximately 200,000 in the City of National City, the western portion of the City of Chula Vista, and the unincorporated areas of Bonita and Lincoln Acres, in San Diego County, CA.

The Authority's service area covers approximately 36 square miles. The Authority owns, operates, and maintains a water distribution system with approximately 395 miles of transmission and distribution mains and 25 reservoirs, including 19 metallic water storage tanks. The Authority has several sources of water supply including surface water, fresh and brackish groundwater, and raw and treated imported supplies purchased from the San Diego County Water Authority (SDCWA).

The Authority's mission is *"to provide its current and future customers with a safe and reliable water supply through the use of the best available technology, sound management practices, public participation and a balanced approach to human and environmental needs"*.

Sweetwater Dam and Outlet Tower

The Sweetwater Dam is located on the Sweetwater River in the Southern part of San Diego County, about six miles northeast of Chula Vista. The dam was originally constructed between 1886 and 1888 as a masonry arch dam with a height of 90 feet. Significant modifications were made to the dam and appurtenances in 1911 and again after the 1916 flood, as follows:

1. The dam was structurally raised 20 feet in 1911, and converted to a curved gravity dam by placing mass cyclopean concrete against the downstream face of the dam.

2. The dam was overtopped in 1916 and experienced some damage at the abutments. No damage was reported to the composite masonry section of the dam or to the outlet tower. The dam was repaired and the parapet well raised, bringing the dam crest to the present maximum height of 127 feet.

The South dike was originally constructed in 1910 and was reconstructed to its current configuration in 1916 after the flood.

The original freestanding outlet tower was constructed in 1888, and was presumably constructed out of the same masonry as the dam. It is located inside the reservoir, about 40 feet from the base of the Sweetwater Dam, and is adjacent to the lower portion of the right abutment slope. The outlet tower was raised in 1911 by 20 feet when the main dam was raised. A 51-foot one-span steel footbridge provides access to the tower from the dam crest. The bridge is attached to the tower by four 5/8-inch x 12-inch carriage bolts and on the dam side, its lower and upper members are supported on two bearing pads indented into the spillway crest.

The present tower is about 100 feet high, from its foundation base to the top of its circular operating platform. The shaft cross-section is hexagonal, with a maximum outside width of 13.4 feet, a maximum inside width of 5.2 feet, and a wall thickness of about 3.55 feet, as scaled from the drawings. The upper platform has a radius of about 21 feet, and a thickness of about 8 inches.

B. PROJECT OBJECTIVE

The objective of the project is for the consultant to review the 2003 report form GEI Consultants, Inc., titled “Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit”. After reviewing the report, the Consultant will be tasked with detailing a comprehensive update to the original 2003 report, and completing a conceptual level design and budgetary cost for strengthening the tower to withstand an earthquake with a return period of approximately of 144 years.

The Consultant shall use the US Army Corps of Engineers Engineer Manual titled "Earthquake Design and Evaluation of Concrete Hydraulic Structures" for the basis of the update.

The evaluation criteria shall be developed as deterministic or probabilistic response spectra. The deterministic response spectra shall represent the mean (50^{th} percentile) levels of ground motion that could be induced at the site by a Maximum Credible Earthquake (MCE) centered along the La Nacion Fault or other upper-bound magnitude events centered along more distant faults, such as the Rose Canyon, Agua Blanca-Coronado, San Miguel-Vallecitos, San Diego Trough, and Elsinore faults. The La Nacion and Rose Canyon faults have low rates of slip. The probabilistic criteria are representative of ground motion levels with 10 or 50 percent probabilities of occurrence during a 50-year period, corresponding to return periods of 144 and 72 years.

Once the update is conducted, the Consultant shall complete a conceptual level design and budgetary cost that would strengthen the tower to a level that it would be capable of safely withstanding ground motion with a horizontal peak ground acceleration equal to a seismic event with a return period of 144 years.

C. SCOPE OF WORK

The Consultant's scope of work shall be broadly based on the following tasks. Respondents are encouraged to add tasks as needed based on their understanding of the Project and proposed approach to performing the work.

TASK 1: KICK-OFF MEETING

Consultant shall schedule an in-person kick-off meeting at the Authority's office at 505 Garrett Avenue, Chula Vista, CA. The consultant will produce an agenda with all the items to be discussed and follow-up with minutes of the meeting.

The meeting should include, but not limited to the following items:

- Review the scope of work
- Review the budget
- Determine the team member's roles and responsibility in the application process
- Determine the schedule so the application will be submitted on time
- Discuss data and documents needed by the consultant from the Authority
- Determine any potential issues that may delay the application

TASK 2: DOCUMENTS TO BE PROVIDED BY THE AUTHORITY

The Authority will provide the following documents:

- Seismic Evaluation of Sweetwater Main Dam Outlet Tower and Conduit
- Other information and data as requested from the Consultant

Consultant shall create a list of additional documents needed from the Authority.

TASK 3: SCHEDULE DEVELOPMENT

Consultant shall create a schedule that will result in the update being submitted to the Authority on time and on budget. Consultant will be responsible to monitor the schedule to make sure that the progress of the project is on schedule.

The schedule should include, but not limited to the following:

- Milestones of importance
- Deadline submissions to the Authority
- Time dedicated to review by the Authority
- Time for a presentation to the Authority Board or committee.

TASK 4: COMPLETION OF THE UPDATE TO THE AUTHORITY

Consultant, in conjunction with the Authority as detailed above, shall submit the update to the 2003 Seismic Evaluation of Sweetwater Main Dam Outlet Tower and Conduit. Consultant will be responsible for developing the narrative, exhibits, budget, schedules, workplans and other necessary components for the report. Consultant shall have an internal quality assurance/quality control process, and conduct interactive internal reviews of the report before issuing a draft and final package to the Authority.

TASK 5: PROJECT MANAGEMENT

Consultant shall assume the following meetings:

- Project kick-off
- Progress check meetings at key milestones and more frequently as needed during the project process
- One presentation to the Governing Board and/or Engineering and Operations Committee

Respondents shall provide with their proposal a proposed schedule starting on as assumed notice to proceed date.

D. PROPOSAL REQUIREMENTS

Proposals submitted by Respondents shall be concise, well organized, and demonstrate the Respondent's experience applicable to the requirements of this RFP. A proposal submitted in response to this RFP shall be in the following order and shall include:

1. *Introductory Letter:* Describe Respondent's basic understanding of the Project objective and the proposed approach. The letter should also contain a statement regarding the qualifications of the firm and any summary information that may be useful or informative to the Authority.

2. *Identification of Respondent:*
   a. Provide legal name and address of company.
   b. Provide legal form of company (partnership, corporation, joint venture, etc.) and state of incorporation.
   c. Identify any parent companies.
   d. Provide addresses of office(s) and number of employees.
   e. Addresses of office(s) containing key proposed Project personnel.
   f. Provide name, title, address, phone number(s), and email of a person to contact concerning the proposal.

3. *Financial Relationships Disclosure(s):*
   a. Identify all existing and past financial relationships between the Respondent's firm and current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.
   b. Identify all existing and past financial relationships between the Respondent's proposed subconsultants and current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.
   c. For a list of the Authority's Governing Board members, see the following link: http://www.sweetwater.org/35/Governing-Board.

4. *Approach for Completing the Work:* Based on review of this RFP and any publicly available data or resources pertaining to the outlet tower, describe the approach for completing the report. Include detailed tasks for completing the work, which may expand upon the above Scope of Work, deliverables to the Authority for each task identified in the proposal, and a timeframe for completing each task.

5. *Required Qualifications:* The following are the minimum required qualifications for Respondents. Interested parties should not submit a proposal if they do not meet these required qualifications:

   a. The Respondent's primary business or the primary business of a department within the Respondent's firm shall be engineering consulting services for large-scale dam evaluations, and shall have been in the business of providing such services for at least five (5) years.

   b. The Respondent shall provide a single project manager as the primary point of contact with the Authority. This project manager must have at least five (5) years total experience with current firm or other employers in projects related to large-scale dam evaluations, and shall be registered as a professional engineer in the state of California.

   c. Provide a list of past and ongoing qualifying projects for which the Respondent's services were or are similar to those described in this RFP. Limit the list to no more than ten projects the Respondent believes are most relevant to the RFP. For each project, include the following:

      - A brief description of the project, date initiated, date completed (if applicable).
      - Name of owner and owner's project manager with contact information (email and/or phone number).
      - Identify role of the key personnel proposed for the grant funding application.

   d. Present the experience of any proposed subconsultants in the same manner.

   e. Provide evidence of the experience and competence of the Respondent's team proposed to work on the Project, with specific emphasis on experience in working on large-scale dam evaluation.

6. *Respondent's Firm and Key Personnel:* Provide an organizational chart showing the relationship and titles of key personnel. Describe Respondent's firm, including identification and responsibilities of key personnel and subconsultants. For each of the key personnel, identify their main work location. Identify the project manager who will be responsible for the direct supervision and coordination of all work activities.

7. *Costs:* Provide costs for every task identified in the proposal, in Portable Document Format (PDF). Costs shall be provided in a separate document from the proposal submittal.

8. *Exceptions to the RFP and/or Professional Services Agreement:* The Respondent shall certify that it takes no exceptions to this RFP, including but not limited to, the Authority's Agreement for Services (Agreement), as attached in Exhibit B. If the

Respondent does take exception(s) to any portion of the RFP or Agreement, the specific portion of the RFP or Agreement to which exception(s) is taken shall be identified and proposed alternative language shall be provided and explained in the proposal.

9. *Proposal Authorization:* The proposal shall be signed by an individual authorized to bind the consultant and shall contain a statement to the effect that the submittal is in effect for ninety (90) days.

10. *Proposal Submittal:* Provide one (1) electronic copy of the proposal document and one (1) electronic copy of the proposed costs in separate PDF files. The proposal document file and separate cost proposal file shall be uploaded to PlanetBids at the link below.

    https://vendors.planetbids.com/portal/69501/bo/bo-detail/124636

Proposals in response to this RFP are due to PlanetBids <u>no later than 4:00 p.m. on Thursday, January 16, 2025.</u>

Proposals submitted after this deadline will not be accepted.

E. CONSULTANT SELECTION PROCESS

1. The Authority will evaluate all proposals based on the evaluation criteria presented in this section, as well as other information obtained through background information and references.

2. The Authority will convene a selection committee to review the submitted proposals. Using the established evaluation criteria and associated scores in this section, the selection committee will evaluate and rank the proposals.

3. The evaluation criteria that will be used by the Selection Committee are as follows:

Category	Maximum Points
Approach to complete the report	60
Completeness of proposal in addressing requested information	10
Relevant qualifications and experience of the Respondent’s personnel assigned	30

4. The selection committee may choose to interview the top-ranked Respondents. The selection committee may re-evaluate the interviewed Respondents and rank them considering both the proposal and interview. The Authority reserves the right to eliminate the interview step of the selection process.

5. The Authority will notify the top-ranked Respondent and will proceed with negotiations regarding cost or any exceptions the Respondent took to this RFP or the Standard Agreement for Services. Should the Authority and top-ranked Respondent not reach agreement, the Authority will proceed with negotiations with the next-ranked Respondent until agreement is reached. The Authority reserves the right to cancel the RFP process at any time.

6. A Services Agreement between the Authority and the selected Respondent would be executed upon approval and award by the Authority's Governing Board.

F. AGREEMENT EXECUTION AND RENEWALS

Following award, the selected Consultant will be required to provide insurance documentation before an agreement is executed. The Consultant will be expected to execute the Authority's standard agreement without modification. A copy of the Agreement is provided in Exhibit B. If the Consultant takes exception(s) to any portion of the agreement, the specific portion of the agreement to which exception(s) is taken shall have been identified and proposed alternative language shall have been provided and explained in the proposal.

All services shall be performed on a time and materials basis in accordance with the standard hourly rates as submitted by the Consultant and the terms of the agreement. Once the agreement is executed by both parties, the Consultant's work will be authorized via a Notice to Proceed (NTP) letter.

E. DISCLAIMER

This RFP does not commit the Authority to enter into an agreement for services, to pay any costs incurred in the preparation of a proposal, or to procure or contract for services or supplies. The Authority reserves the right to accept or reject any or all proposals received as a result of this RFP, to negotiate with any qualified source, or to cancel in part or in its entirety this RFP, if it is in the best interest of the Authority to do so. The Authority shall not be obligated to contract any or all of the requested services to the selected Consultant. Further, even upon execution of the Agreement, the selected Consultant will not be guaranteed any work under the Agreement until an NTP letter is issued by the Authority.

If you have any questions regarding this RFP or the described scope of work, please contact me at edelbosque@sweetwater.org, or 619-409-6750.

Sincerely,

SWEETWATER AUTHORITY

Erick Del Bosque

Erick Del Bosque, P.E.
Director of Engineering and Operations

enclosures: Exhibit A: Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit
Exhibit B: Standard Agreement for Services Template

EXHIBIT A

SEISMIC EVALUATION OF SWEETWATER DAM OUTLET TOWER AND CONDUIT REPORT
2003

Seismic Evaluation of Sweetwater Main Dam Outlet Tower and Conduit B.P. 01-20E

GEI Consultants, Inc.

2141 Palomar Airport Road, Suite 160
Carlsbad, CA 92009
(760) 929-9136

SUBMITTED TO

Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91912-2328

IN ASSOCIATION WITH

Gilles Bureau
Consulting Engineer
140 Wildwood Avenue
Piedmont, CA 94610

Thomas O. Keller, P.E., G.E.
Project Manager

February 2003
022560

February 14, 2003
Project 022560

Mr. T. Kevin Kasner, P.E.
Sweetwater Authority
P.O. Box 2328
Chula Vista, California 91912-2328

Re: Sweetwater Main Dam – Outlet Tower and Conduit Evaluation
B.P. 01-20E

Dear Mr. Kasner:

Attached are three copies of our February 14, 2003 report on an evaluation of the response of Sweetwater Main Dam's outlet tower and conduit to various earthquake loading scenarios. Analyses presented in the report were performed by Gilles Bureau as a subconsultant to GEI Consultants, Inc. The key results of the evaluation were conveyed to Sweetwater Authority at a meeting on December 5, 2002.

Sincerely,

GEI CONSULTANTS, INC.

Thomas O. Keller, P.E., G.E.
Principal

c: Gilles Bureau

Table of Contents

List of Tables

List of Figures

Executive Summary

The Sweetwater Main Dam and Reservoir contains a 100-foot tall outlet tower in the reservoir that is used to control flow of reservoir water to the Robert A. Perdue Water Treatment Plant. The tower is very slender, and consists of stone and mortar with no steel reinforcement. The tower was constructed in 1888, and raised by 20 feet in 1911. Even though the tower is over 100 years old, it appears to be in good condition. However, the slenderness of the tower, combined with the fact that it contains no steel reinforcement, makes it vulnerable to cracking, and possibly toppling, during an earthquake.

GEI Consultants, Inc. was engaged to estimate the level of earthquake loading that could cause the tower to fail, and the probability of that earthquake to occur. A conclusion of the study was that an earthquake causing a peak ground acceleration at the site of about 0.11g (g is the acceleration due to gravity) could cause failure of the tower. The chance of this occurring is about 50 percent in the next 100 years. Hence, within the next century, the Sweetwater Dam outlet tower has a 50 percent chance of remaining stable during an earthquake event. An example of an earthquake that could produce a ground acceleration of 0.11g at the dam site is a Magnitude 5.5 earthquake on the Rose Canyon fault, located about eight miles west of the site.

A stone and mortar conduit is located between the base of the outlet tower and the base of the dam. This conduit is used to convey water from the tower to a pipeline that passes through the dam, which in turn conveys water to a pipeline that leads to the water treatment plant. In general, the conduit between the outlet tower and dam is capable of surviving a much larger earthquake than the tower.

Failure of the outlet tower would not cause failure of Sweetwater Dam itself, which is a massive concrete structure. Therefore, the potential for tower failure is not a dam safety issue. However, tower failure could cause an interruption in water deliveries from Sweetwater Reservoir to the customers of Sweetwater Authority. The findings of this study will be used by the Authority to decide whether the calculated risk of failure of the outlet tower is acceptable for such an essential, but not safety-related, facility and to perform cost-benefit analysis for any major upgrades that might be considered.

Technical Summary

This report presents the results of a seismic evaluation of the Sweetwater Main Dam outlet tower and conduit, owned and operated by Sweetwater Authority (Authority). The primary purpose of this investigation was to evaluate the structural performance of the tower under seismic loads and estimate the characteristics of the most severe ground motion that the tower could withstand without collapse or major failure.

Seismic evaluation criteria were developed as deterministic or probabilistic response spectra. The deterministic response spectra represent mean (50^{th} percentile) levels of ground motion that could be induced at the site by a Maximum Credible Earthquake (MCE) centered along the La Nacion Fault or other upper-bound magnitude events centered along more distant faults, such as the Rose Canyon, Agua Blanca-Coronado, San Miguel-Vallecitos, San Diego Trough, and Elsinore faults. The La Nacion and Rose Canyon faults have low rates of slip. The probabilistic criteria are representative of ground motion levels with 10 or 50 percent probabilities of occurrence during a 50-year period, corresponding to return periods of 144 and 72 years, respectively.

We performed a visual inspection of the tower on August 29, 2002 and found it to be in good condition. Schmidt hammer testing was performed during the inspection to assess the quality of the concrete portion of the tower. The stone masonry was tested near the dam left abutment, which was assumed representative of the tower masonry, most of which was constructed at the same time as the dam. No particular structural deficiencies were observed in the visible portions of the tower.

We performed parametric finite element response analyses of the tower for the specified earthquake loading, and for a range of strength and elastic properties for the stone masonry. The mathematical model was composed of three-dimensional structural beam elements (stick model).

For some of the specified ground motions, our response analyses indicated that the moment-resisting capacity of the Sweetwater outlet tower would be largely exceeded in its lower half. The structure did not meet performance evaluation criteria for the MCE or Rose Canyon events, or for the seismic criteria with 10 percent probability of occurrence in 50 years. Hence, significant earthquake-induced cracking of the masonry and possible collapse of the tower could occur under ground motion similar or more severe than these earthquake scenarios. The tower was also shown to be potentially unstable for global overturning for the La Nacion and Rose Canyon maximum earthquake events.

Based on analyses reported herein, we believe that the tower is not likely to be significantly damaged by ground motions induced by recognized active faults in the greater project vicinity other than the La Nacion and Rose Canyon faults. After estimating earthquake loads and capacities by eliminating some of the necessary conservatism applied in the numerical analysis (this was done by using root-mean-square loads and unfactored capacities), the tower appears capable of safely withstanding ground motion with a horizontal peak ground acceleration (PGA) up to about 0.11g. For the local tectonic environment, this corresponds to a seismic event with a return period of about 144 years, or a probability of occurrence of 29 percent in 50 years or 50 percent in 100 years. Hence, within the next century, the Sweetwater outlet tower has a 50 percent chance of remaining stable during a seismic event.

The outlet conduit was evaluated for global stability and for overstressing potentially caused by seismic waves traveling laterally or longitudinally with respect to its alignment. Masonry cracking is probable under the MCE. The MCE was the only one of four seismic scenarios considered where conduit instability was computed to occur by toppling, ignoring any passive resistance that could be provided by the loose reservoir sediments. Overall, the seismic stability of the outlet conduit is of little concern, compared with that of the tower.

The above findings could be used by the Authority to decide whether such risk is acceptable for this essential, but not safety-related facility, and to perform cost-benefit analysis for structural upgrades that might be considered.

This technical summary presents selected elements of our findings, and interpretations. It does not present crucial details needed for application of our findings and interpretations. These details are provided in the main body of this report.

1. Introduction

1.1 General

This report presents the results of a seismic stability evaluation of Sweetwater Main Dam's outlet tower, as well as a conduit that connects the tower to the dam. The potential behavior of the tower was evaluated for various earthquake scenarios, and considered a range of potential tower properties. Sweetwater Main Dam (referred to as Sweetwater Dam in this report) and Reservoir are owned and operated by the Sweetwater Authority (Authority).

1.2 Purpose

The Sweetwater outlet tower is used to control releases of raw water stored in Sweetwater Reservoir. The raw water is directed through an outlet conduit to the nearby Robert A. Perdue Water Treatment Plant prior to delivery to Authority customers. Therefore, the tower is essential to the management of the Authority's water distribution function, and its failure would represent a major inconvenience to the Authority.

The primary objective of this evaluation was to assess the behavior of the tower and conduit under seismic loading, and to estimate the levels of ground motion they could withstand without collapse or major structural failure. The seismic behavior of the tower is partly dependent on the properties of materials used to construct the tower. Seismic analysis were performed for a range of these material properties to judge their influence on tower behavior. Results of these parametric analyses can be used to judge the need for more detailed investigations of material properties. Knowing the level of risk associated with possible major seismic damage, the Authority will be able to assess if such risk is acceptable for these structures. Such knowledge can be used in the decision-making process before considering any structural upgrades.

1.3 Limitations

The data, information, interpretations and recommendations contained in this report are presented solely as a basis for a preliminary assessment of the seismic performance of the Sweetwater outlet tower and conduit. The conclusions and interpretations contained herein were primarily developed by Gilles Bureau, P.E., G.E. as a subconsultant to GEI Consultants, Inc. (GEI). They are in accordance with generally accepted standards in the geotechnical and structural engineering professions, but rely on old drawings and background data developed by others.

This report was prepared based on a review of full-size or reduced original construction drawings, design data, and previous construction or inspection reports made available to the project team. We performed a brief field inspection and structural audit. Data collected and dimensional checks performed during that inspection, as well as published information found to be applicable, were used to supplement the data retrieved from Authority files.

Unanticipated geologic or foundation conditions, or concealed structural features of the outlet tower, if different from those shown on the drawings or described in previous reports, could affect some of our conclusions. Our field inspection was limited to the visible portion of the outside perimeter of the tower on the day of the inspection. The true existing conditions of concealed elements of the tower may differ from those assumed in this evaluation. Our evaluation relied upon stone masonry elastic parameters and mortar strength properties estimated from the original design data and limited non-destructive in-situ testing performed during our field inspection. Such testing was less complete than would be obtained from a core sampling and testing program. However, more detailed field and laboratory studies were concluded not to be required for the purpose of this initial investigation.

Our conclusions and recommendations only relate to the Sweetwater Dam outlet tower and conduit. This report has been prepared for the sole and exclusive use of the Authority and for possible submission to the State Division of Safety of Dams (DSOD). It may contain information insufficient for the purpose of other parties or other uses.

2. Project Description

2.1 Construction History

Sweetwater Dam is a 127-foot high curved gravity dam located near Chula Vista, California composed of an upstream cyclopean stone masonry thick arch and a downstream concrete gravity section. The lower 50 feet of the masonry portion was designed by F.E. Brown and constructed in 1886. The dam was intended to be a thin-arch. James Schuyler, a renowned dam engineer, revised the design in 1887, and thickened and extended the masonry arch to a height of 60 feet in 1887, and to 90 feet in 1888.

All elevations in this report are in units of feet and are referenced to Sweetwater Authority datum. Sweetwater Authority datum is about four feet lower than National Geodetic Vertical Datum (also referred to as Mean Sea Level Datum). Elevations are commonly referred to by the abbreviation "El."

The original freestanding outlet tower was constructed in 1888 to about El 220 (top platform elevation), and was presumably built of the same masonry as the dam. It is located inside the reservoir, about 40 feet from the base of Sweetwater Dam, and is adjacent to the lower portion of the right abutment slope. A general plan of the dam and tower is shown in Figure 1, and a cross-section through these facilities is shown in Figure 2.

In an 1897 Annual Report of the United States Geological Survey (USGS) and a technical article titled "*Reservoirs for Irrigation,*" Schuyler described the care taken during the original construction of the Sweetwater facilities. Original construction consisted of the best class uncoursed, rough rubble masonry laid in rich mortar of Portland cement and sand. The masonry was carefully set in-place by skilled stone masons, and was mixed one part cement to two parts clean sand (1:2) for the portion of masonry within 4 feet of the reservoir. The stones came from a quarry 800 feet downstream of the dam, had no well-defined joints, and were reported to have a specific gravity between 175 pounds per cubic foot (pcf) and 200 pcf. Based on such records, the quality of the masonry would be expected to be high.

The original tower was equipped with eight inlet elbows with a saucer valve and basket screen, and three outlet pipes near the bottom. Two of the valves, valves 1 and 2, are actually located on the outlet conduit, on either side of the tower, with inlets at El 145.3 and El 155, respectively. The other valves are located along the tower shaft as follows: valve 3 (El 165), valve 4 (El 175), valve 5 (El 185), valve 6 (El 195), valve 7 (El 205) and valve 8 (El 215).

Following floods and overtopping of the dam in 1895 and 1909, Sweetwater Dam was structurally raised 20 feet in 1911, and converted to a curved gravity dam by placing mass cyclopean concrete against the downstream face. The outlet tower was also raised at that time and the top of the shaft extended by about 20 feet (top of platform at El 240) with a masonry sleeve. An October 3, 1911 construction report described the concrete mixture in the stone masonry as follows: One part cement, three parts sand and five parts aggregate. Five to ten percent of the cement in the mixture were replaced by hydrated lime. The sand came from a local quarry, half-a-mile south of the dam. A new saucer valve, valve 9 (El 220), was added. According to the construction drawings, the outside of the new portion of the tower was covered with one coat of 1:2 cement mortar with 10 percent of hydrated lime. It is possible that the entire tower surface was covered with cement mortar at that time. An October 3, 1911 Construction Report by John Covert, Resident Engineer, indicated that 77.2 cubic yards of cement were used for the tower. The old tower platform and roof were raised to the new elevation, as well as the access footbridge.

Sweetwater Dam was again overtopped in 1916 and experienced some damage at the abutments. No damage was reported to the composite masonry section of the dam or to the outlet tower. The dam was repaired and the parapet wall raised, bringing the dam crest to near present maximum height (127 feet). In 1939-1940, the spillway crest wall was replaced with a rounded spillway overflow sill, and the access bridge to the outlet tower was relocated to its lower present elevation (bridge deck at El 237). The old bridge was replaced with a 50.8 foot-long one-span steel footbridge providing access to the tower from the dam crest. The bridge is attached to the tower by four 5/8-inch x 12-inch carriage bolts and, on the dam side, its lower and upper members are supported on two bearing pads indented into the spillway crest.

The present tower is about 100 feet high, from its foundation base to the top of its circular operating platform. The shaft cross-section is hexagonal, with a maximum outside width of 13.4 feet, a maximum inside width of 5.2 feet, and a wall thickness of about 3.55 feet, as scaled from the drawings. The upper platform has a radius of about 21 feet, and a thickness of about 8 inches. Photographs of the tower are contained in Appendix A.

2.2 Geology

Available information regarding the geology of the site was reviewed, as developed in earlier foundation investigations and safety review studies (Dames & Moore, 1994; URS, 2001).

Foundation conditions at Sweetwater Dam and outlet tower consist of competent metavolcanic bedrock of the Jurassic Santiago Peak volcanics. That formation consists of a very hard metamorphosed dacite, with either aphanitic or porphyric texture. Bedrock is typically sound, with only a few feet of surface deterioration. Woodward-Clyde Consultants (1975) reported unconfined compressive strength data for foundation bedrock and masonry stones ranging from 12,000 to 18,000 pounds per square inch (psi), and a unit weight of 168 pcf, hence lower than the 175 to 200 pcf reported in 1897. The spacing between joints in the foundation rock was estimated at three to six feet or more, based on construction photographs and records (USCOLD, 1988). However, erosion of the rock resulting from spillway overflow and observations of exposed rock downstream of the dam indicate that a more closely spaced micro-fracture system appears to exist (URS, 2001). Because of the overall excellent quality of the local bedrock, the bond between the tower base and bedrock, although not described on drill logs, is likely to be good (USCOLD, 1988).

2.3 Field Inspection

2.3.1 General

The project team inspected the Sweetwater outlet tower on August 29, 2002. Kevin Kasner and James Smith, from the Authority, were present. During the inspection, Gilles Bureau performed non-destructive Schmidt hammer testing of the concrete mortar facing along the outside facing of the outlet tower wall, slightly above the reservoir surface, and of the concrete at the top of the tower platform. No masonry was visible at the tower, but Schmidt hammer rebound measurements were also taken near the dam left abutment, where the original dam masonry is exposed. The approximate location of the masonry tested on August 29, 2002 is shown in Photograph 5 in Appendix A. Such measurements may be indicative of the strength of the tower masonry stones and mortar, which are believed to be of the same composition as the dam masonry.

2.3.2 Structural Inspection and Existing Data Review

The August 29, 2002 inspection was limited to observations of the visible portion of the outside faces of the tower walls. The water level was at El 198.9 on the day of the visit. Observation of the concrete mortar facing suggests that the upper part of the tower is in good condition. Neither significant deterioration nor efflorescence was observed. No significant cracks were visible. Thin horizontal cracks were observed where the bolts that anchor the footbridge deck to the tower penetrate the tower wall. These cracks are not structurally significant.

At the top of the upper platform of the tower, there are five two-foot wide, 14-inch tall square concrete pedestals with a one-foot wide central square opening. These pedestals support the winches used to open and close the five upper saucer valves. Authority personnel indicated that reservoir silt has reached a level between valves 3 and 4, or approximately El 170.

The widths of the contact areas of the bridge structure with the dam crest were measured at 14 inches at the lower support pad, and 12 inches at the upper pad. Bridge side horizontal clearance with the vertical concrete surfaces at the support pads is about six inches. Hence, for out-of-phase seismic movements between the top of the tower and the dam spillway crest, the maximum relative displacements that the bridge could experience toward the dam without being compressed between the two structures is about six inches. About 12 inches of relative movements of the bridge could be accommodated by the support pads, if the tower and the dam were moving away from each other, assuming that the four anchor bolts that tie the bridge to the tower side have sufficient capacity. Rupture or pullout of the bolts as a result of excessive oscillations of the tower structure would cause the bridge to fall into the reservoir.

During the field inspection, Gilles Bureau performed Schmidt hammer testing of the concrete mortar facing along the tower outside surface, about four feet above the reservoir level, and of the concrete at the top and side of the operating platform. Schmidt hammer measurements can be correlated to compressive strength. The stone masonry was not visible along the tower shaft. However, stone masonry of the dam structure is exposed at its left abutment. Schmidt hammer testing of the dam masonry mortar and stones was also performed. The dam stones and mortar may be similar to those at the tower, having been built at similar times and presumably with similar materials and techniques.

The results of these tests, which were taken at random locations, are shown in Table 1. Schmidt hammer readings are proportional to the height of instantaneous rebound, after impact on the material tested, of a steel ram and plunger released through the sudden expansion of a loaded spring. Hence, these measurements should be indicative of a "dynamic" strength (rapid loading condition). A Type-N Schmidt hammer was used. The tests were performed on clean flat surfaces, prepared with a grinding stone.

Compressive strengths for the tower concrete facing and mortar were obtained from a correlation between measured rebound and unconfined compressive strength provided by the instrument manufacturer. The estimated compressive strength for the masonry stones was obtained after converting measured rebound values to equivalent rebound values for a Type-L Schmidt hammer. The L-equivalent values were then converted into a compressive strength, based on an assumed unit weight of 168 pcf for the masonry stones and a correlation developed by Deere and Miller (1966) for rock testing with a Schmidt hammer.

Interpretation of the Schmidt hammer testing indicated an average dynamic compressive strength of 3,900 psi for the dam masonry mortar. Twelve tests were performed on that material, with a standard deviation of about 980 psi. Although not very precise (the instrument error, or dispersion, can be significant), these measurements indicate good quality masonry mortar. Eleven tests were performed on the top concrete platform and along the concrete facing of the outlet tower. These tests indicated a higher dynamic compressive strength, averaging about 7,200 psi, with a standard deviation of about 710 psi. Lastly, ten tests were performed on selected dam masonry stones. These tests indicated high rebound values, typically between 60 and 70, which correspond to dynamic compressive strengths ranging from 31,000 psi to 59,000 psi, with an average of about 47,400 psi and a standard deviation of about 10,600 psi.

The Schmidt hammer tests were performed on selected small, clean, hand-ground, uncracked areas of the concrete, mortar or stone surfaces. For two other towers, Bureau and Scawthorn (1986) indicated reasonable consistency between compressive strengths derived from Schmidt hammer tests and laboratory tests on cores of concrete and brick masonry mortar. The same may not be true in the case of the masonry stones, where Schmidt hammer testing could yield higher estimated strengths than large core or block testing. Micro-fissures, joints, foliation, and any sheared or weathered areas would control failure of masonry blocks or stones. Hence, the field tests performed on masonry stones only confirm the hard nature of the local rock and cannot be used to reliably estimate the strength of large specimens. A limited amount of laboratory testing to obtain information on compressive strength of bedrock cores and masonry stones from the dam site was performed in 1975 (WCC). These tests indicated compressive strengths ranging from about 12,000 to 18,000 psi. These compressive strengths are significantly lower than those based on Schmidt hammer testing performed for this evaluation. The differences are due in part to the test method ("static" testing of laboratory samples versus "dynamic" testing in the field using a Schmidt hammer), but may also be due to potential discontinuities in the larger samples used for laboratory testing.

According to construction records (1939), the unconfined compressive strength of the cement mortar facing and concrete of the top platform was specified as 3,000 psi at 28 days, with maximum 2-inch aggregate. The static compressive strength presently estimated from the Schmidt hammer tests is about 6,000 psi. This indicates that such concrete has gained strength with age, and/or that the original specifications were met or exceeded.

In summary, based on the field observation of the visible parts of the tower and limited non-destructive testing, the Sweetwater outlet tower appears to be in good condition.

3. Seismic Analysis Criteria

3.1 General

Failure of the Sweetwater outlet tower would be extremely unlikely to endanger the safety of the dam and its capacity to impound the reservoir. Hence, seismic requirements less demanding than previously used for Sweetwater Dam have been used for evaluation of the tower.

For tower evaluation purposes, it was assumed that the foundation bedrock at the tower site is sufficiently competent to be considered as rigid, compared with the more flexible tower structure. Therefore, seismic criteria applicable to an outcropping bedrock condition were developed. As the tower is a slender structure of relatively light mass, tower-foundation interaction effects were neglected. Ignoring tower-foundation interaction effects is reasonable.

The use of free-field seismic input criteria at the base of the tower is conservative, as no radiation damping is accounted for in such numerical analyses. Overall, we believe that local subsurface conditions should have little or no significance for the dynamic structural evaluation of the tower, and that fixed-base response analysis is appropriate.

Previous geologic and seismicity studies have been performed for Sweetwater Dam and other Authority facilities (Dames & Moore, 1994, 1995; URS, 2001). Most of the following section, which describes the tectonic environment of the site, is based on information contained in these previous studies, and updated as needed.

3.1.1 Tectonic Environment

The greater site area lies within a broad zone of faulting related to interaction between the Pacific and North American tectonic plates. Sweetwater Dam is located within that tectonically active region. Chula Vista and its vicinity have only experienced moderate, rare historic seismicity, compared with other areas of near-coastal California. Major regional and local faults include, from east to west: the San Andreas, San Jacinto, Elsinore, La Nacion, Rose Canyon, Coronado Bank, San Diego Trough and San Clemente fault zones.

Ongoing tectonic activity within the area is reflected by Holocene age (11,000 years old or younger) displacements on major northwest-trending faults and youthful geomorphic features of tectonic origin. Historically, The San Jacinto Fault zone has proved to be the most active system in the region. However, because of its distance from Sweetwater Dam (about 94 km), ground shaking resulting from earthquakes on this fault is not considered to be a significant threat. Earthquakes generated along the San Clemente Fault (about 87 km from the dam) and The San Andreas Fault (about 140 km from the dam) are also considered too distant to have a major impact on this site. The La Nacion and Rose Canyon fault zones are the two closest, most prominent, local fault systems with evidence of Quaternary activity. The six fault zones of greatest potential concern to the dam are described below, in order of increasing distance from the site.

La Nacion Fault Zone

Because of the short distance (4 km) from the La Nacion Fault Zone to the site, this fault system controls the Maximum Credible Earthquake (MCE) for the Sweetwater Dam site. The fault zone is a north-northwesterly trending series of discontinuous, moderate to high angle dip-slip faults, traceable from the U.S.-Mexico border northward through the eastern San Diego Metropolitan area, up to about the latitude of Mission Valley. Because the La Nacion Fault Zone is poorly defined, estimates of its length range from approximately 12 to 17 miles (19 to 28 km). Offset along the La Nacion Fault Zone is primarily dip-slip movement. The fault has displaced Pleistocene deposits (Lindavista Formation) by about 365 feet (Artim and Pinckney, 1973), but evidence for Holocene displacements is lacking. Geologically recent tectonic displacements, reported by Artim and Pinckney (1973) were subsequently concluded not to displace Holocene sediments (Elliot and Hart, 1977). However, the La Nacion Fault Zone must be considered to be potentially active with very long recurrence intervals (Artim and Elder, 1979). MCE magnitude estimates range from 6.5 to 6.7. Previous studies of Sweetwater Dam (Woodward-Clyde Consultants, 1975; and URS, 2001) assigned an upper bound magnitude of 6.7 to the La Nacion Fault Zone. This value represents a conservative estimate and was used in this evaluation.

Rose Canyon Fault

The Rose Canyon Fault Zone is located between 7 to 15 km west of the La Nacion Fault Zone and is composed of numerous subparallel, en échelon and branching sub-faults that generally trend north to northwest. This Fault zone extends south, paralleling the coast offshore from the latitude of Carlsbad, crosses inland along the northeast flanks of Mount Soledad, and continues south along the eastern margins of Mission Bay. Between Mission Bay and downtown San Diego the zone appears to widen and diverge as it continues south across San Diego Bay and Coronado before returning offshore. Offshore traces of the Fault zone extend to the latitude of the International border for an estimated total system length of about approximately 72 km. The closest approach of this fault to the site is about 13 km. The Rose Canyon Fault has been characterized by many authors as having a predominantly right-lateral strike-slip type of movement, but significant dip-slip has occurred on at least two segments: toward the southern end of the fault zone in the shallow continental shelf area (Kennedy and others, 1979), and north of Mount Soledad (Kennedy and others, 1975). Historically, the Rose Canyon Fault has typically been micro-seismically active. However, in 1985 and 1986 a series of earthquakes in the vicinity of San Diego Bay with magnitudes up to 4.7 were attributed to activity along the Rose Canyon Fault Zone. Trenching studies by Anderson and others (1989) within Rose Canyon concluded that Holocene alluvium and modern topsoil (“A” horizon) have been offset by the fault. Rockwell and others (1989) suggested the potential for earthquakes with magnitudes up to 7.0 for the Rose Canyon Fault Zone.

Agua Blanca-Coronado Bank Fault

The Agua Blanca-Coronado Bank fault zone consists of a northwest-trending series of en échelon faults that extend from onshore Baja (Agua Blanca portion) into the offshore Mexico and California inner borderland (Coronado Bank portion). The closest approach of this system to the site is along its offshore segment, about 28 km toward the west. The Agua Blanca-Coronado Bank Fault Zone is characterized as having both right- and left-stepping segments (Kennedy et al, 1980). Offshore, it is shown to cut Quaternary-age sediments in reflection profile records. Its predominant type of displacement is right-lateral (Clark, et al., 1984). An upper bound magnitude of 7.2 for the Agua Blanca-Coronado Bank Fault Zone was used for this evaluation.

San Miguel-Vallecitos Fault

The San Miguel-Vallecitos Fault, located in northern Baja California, is approximately 154 km in total length. The fault is a right-stepping system consisting of three segments (northern, central and southern). The northern segment is approximately 43 km southeast of the site. The San Miguel-Vallecitos Fault Zone has been the most active in Northern Baja California. Six earthquakes of about magnitude 6.8 occurred in 1954 and 1956 along its southern segment. Local studies (Anderson, et al., 1989) estimate the magnitude at 7.0 for this fault system.

San Diego Trough Fault

The San Diego Trough Fault is located offshore approximately 50 km west-southwest of the site and displays concentrated, low-level, seismic activity. The San Diego Trough Fault appears to strain in response to movement along a minor southern strand of the Agua Blanca Fault (Legg, 1985), which slips no more than 1 millimeter/year (Rockwell et al, 1987). Seismic reflection profiles suggest that the San Diego Trough Fault is continuous for approximately 15 km. However, it is presumed to be associated with the Bahia Soledad Fault, onshore Baja California (Legg, 1985). If so, this would yield a total fault length of over 155 miles (250 km). A combined rupture along this fault zone could generate earthquakes of magnitude 7.2, or perhaps greater.

Elsinore-Laguna Salada Fault

The Elsinore Fault is about 60 km away from the site. The Elsinore Fault Zone is considered to be part of the northwest-southeast trending Whittier-Elsinore Fault Zone, and extends nearly continuously for approximately 185 to 255 km from the vicinity of Corona, in the Los Angeles Basin, to southeast of the International Border into Mexico, where it continues southward as a series of subparallel right-stepping segments designated as the Laguna Salada Fault. The Elsinore Fault has been characterized as having both dip-slip (Clark, 1982) and right-lateral displacements (Yerkes, 1972; Lamar et al, 1975). Holocene-age displacements have been revealed in exploratory trenches across the fault, south of Lake Elsinore (Lamar and Swanson, 1981). The Elsinore Fault has been recognized to be composed of five individual active segments, each with a separate history of movement and characteristic type of deformation. The Elsinore-Laguna Salada fault system has experienced several relatively recent earthquakes with magnitudes between 5.0 and 5.9, and has had historic earthquakes of larger magnitude (1812, M 6.75; 1842, M 7.0 to 7.5; and 1910, M 6.0). Numerous paleoseismic events of magnitudes between 6.5 and 7.1 have also been identified (Rockwell, 1989). Magnitude estimates range from 7.0 to 7.3, depending on what length is assumed for the active segments. Simultaneous rupture of two or more segments could yield an earthquake with a magnitude of 7.5. Such large magnitude is now conservatively considered the most representative of the fault, and was used for this evaluation.

3.1.2 Deterministic Seismic Criteria

For Sweetwater Dam, the La Nacion Fault is the controlling geologic feature for the MCE. According to USCOLD (1999), "*the MCE is the largest reasonably conceivable earthquake that appears possible along a recognized fault or within a geographically defined tectonic province, under the presently known or presumed tectonic framework. The MCE is generally defined as an upper bound of expected magnitude, or in less frequent cases, as an upper bound of Modified Mercalli Intensity. Little regard is given to its probability of occurrence, which may vary from less than a hundred to over ten thousand years, depending on the geologic environment considered.*" California dams such as Sweetwater Dam must be evaluated for the MCE, which was also considered for the analysis of the outlet tower reported herein. For many sites near coastal California and dams whose failure could potentially cause extensive loss of life and property, it has been customary and a State Division of Safety of Dams (DSOD) requirement, to define the MCE by response spectra that comply with mean-plus-one-standard-deviation (84th percentile) estimates in the range of periods of interest. On a case-by-case basis, DSOD has sometimes accepted less demanding ground motion criteria for low risk dams and moderately active tectonic environments.

The La Nacion Fault has a very low rate of activity, which reduces its significance to the outlet tower. However, events other than the MCE, occurring along more distant faults and/or with a higher probability of occurrence, are of direct interest to the evaluation of the tower. We have, therefore, estimated the maximum ground motions that could be generated by the MCE and by maximum earthquakes centered along five other well-known faults affecting the project area.

Considerable insight has been gained in recent years regarding the characteristics of ground motion and, especially, its attenuation as a function of distance from fault rupture. For this project, we developed response spectra for the MCE and five other deterministic earthquake scenarios, using several well-accepted sets of attenuation equations for peak ground acceleration (PGA) and spectral accelerations. Significant considerations for these response spectra are the associated margin of error and their probability of being exceeded, as discussed below. Such considerations were not used in the previous dam studies, which relied only on the concept of the MCE.

As flood and earthquake loadings represent extreme conditions, typically assumed not to be concurrent, reservoir spilling was considered not to be occurring at the time of the earthquake. Tower failure would impair reservoir drawdown capacity and water deliveries to the Authority's customers after the earthquake or in case of a subsequent flood, but would not cause sudden, uncontrolled release of the reservoir water. Major structural failure of the tower is unlikely to affect Sweetwater Dam other than by inducing cosmetic impact damage in the upper part of the dam, should the tower collapse toward downstream. Hence, tower failure would primarily represent a severe operational inconvenience and an economic loss to the Authority, rather than an immediate danger to the downstream area and population.

For the above reasons, in our deterministic approach based on largest magnitude and shortest distance assumptions for the MCE and other earthquake scenarios, we believe that mean response spectra (50^{th} percentile) are appropriate to assess the seismic performance of the tower. Therefore, we used such response spectra in our dynamic analyses and performance evaluation.

3.1.3 Probabilistic Seismic Criteria

The two closest faults that could generate the most severe ground motion at the site in case of rupture have experienced very low rates of activity in historic times. The La Nacion Fault is probably more a "capable" than an "active" fault, considering its apparent lack of Holocene activity. The Rose Canyon Fault, although definitively active, has also exhibited low rates of slip. For such reasons, probabilistic seismic hazard analysis (PSHA) is appropriate to consider for an essential but non-safety-related facility such as the Sweetwater outlet tower. Probabilistic ground motion estimates allow additional perspective on the conclusions derived for the MCE and other deterministic scenarios.

PSHA combines the contribution of all recognized faults or seismic zones around the site, including random seismicity, to assess the probability of experiencing various specified levels of local ground motion. The results are expressed as return periods or probabilities of exceedance during a given length of time, for seismic parameters such as the PGA or spectral accelerations. A numerical model of the greater area surrounding the site is normally required to develop probabilistic response spectra at various periods of vibration.

An alternative approach was used for this evaluation consisting of the use of results from the *National Seismic Hazard Mapping Project* of the USGS. That project has been ongoing for many years and includes a public database, accessible from the Internet, for nationwide probabilistic ground motion estimates computed at the nodes of a grid with 0.1 degree latitude/longitude intervals overlaying the entire United States. Gridpoint data are internally interpolated when querying the database to obtain estimates directly applicable to the geographic coordinates of the site. The web site provides PGA, and 0.2 second (s), 0.3s and 1.0s spectral accelerations with 10 percent, 5 percent or 2 percent probability of exceedance in 50 years. Assuming a Poisson's distribution of earthquake events and spectral shapes consistent with the local tectonic environment, these values can then be used to estimate seismic parameters for any return period and to develop approximate probabilistic response spectra. This simplified methodology was used herein. Spectral coefficients in-between the four periods provided were obtained by geometric (logarithmic) interpolation for an "average" magnitude level applicable to the region. Spectral coefficients for periods longer than 1.0s were assumed to be inversely proportional to the period considered.

3.2 Response Spectra

3.2.1 Deterministic Response Spectra

The 50th percentile mean horizontal PGA for the La Nacion MCE (M 6.7, distance 4 km) is 0.49g. The corresponding estimated 84th percentile PGA is 0.77g. These values were obtained by averaging predictions from four well-accepted and well-documented attenuation equations by Abrahamson and Silva, Boore and Joyner, Campbell, and Sadigh (see Seismological Research Letters, BSSA, January 1989). Attenuation equation parameters applicable to hard rock site conditions and strike-slip or normal faulting were used. The results obtained are consistent with ground motion estimates for the Sweetwater Dam site by previous consultants. Two of the aforementioned references also provide equations applicable to vertical ground motion. Deterministic horizontal and vertical PGA estimates for the six fault zones of interest to this evaluation are presented in Table 2.

It should be noted that both mean (50th percentile) and mean-plus-sigma (84th percentile) estimates are listed for completeness of the information provided. However, as previously discussed, we have recommended and used mean criteria for evaluating the tower seismic performance.

We obtained complete five percent damping bedrock response spectra through averaging estimates obtained from the same sets of attenuation relationships as used for the PGA. Both horizontal and vertical spectra were developed. Vertical response spectra at various damping values were based on the same reduction or amplification factors used for horizontal motion.

The magnitude dependent and distance dependent 50th percentile response spectra obtained for the six fault zones considered are presented in Tables 3 and 4. Horizontal and vertical response spectra are shown in Figures 3 and 4, respectively. These spectra represent a uniform level of reliability in the estimated ground motion over the entire range of periods considered. The probability of actual maximum ground motion along these six fault zones either exceeding or being less than these response spectra is exactly 50 percent.

3.2.2 Probabilistic Response Spectra

The web search of the USGS Seismic Hazard Mapping Project database provided probabilistic PGA estimates for the Sweetwater Dam site (latitude: 32.461 degrees, longitude: 117.000 degrees). The PGA with 10 percent probability of exceedance in 50 years is 0.21g. Such a value represents the potential contributions of all of the faults identified in the deterministic approach to the local seismic hazard. It also includes the possibility of random earthquakes (centered outside of well-recognized fault zones) occurring anywhere in the vicinity of the site. Ground motion parameters obtained from the USGS are presented in Table 5.

As mentioned in Section 3.1.3, Table 5 was used to obtain more complete response spectra for these probability levels, based on yearly rates of experiencing any specified acceleration at a given period. An earthquake representing an event with a 50 percent probability of occurring during a 50-year period was also used in analyses. The corresponding PGA is 0.06g and has a 72-year return period. The approximate horizontal response spectra developed for the three USGS probability levels and for the 72-year return period earthquake are shown in Figure 5.

The USGS database does not provide probabilistic vertical ground motion estimates. However, recognizing that the faults that are closest to the site (La Nacion and Rose Canyon) have relatively low rates of activity and are associated with the most demanding deterministic estimates, it can be reasonably concluded that probabilistic horizontal response spectra with long returns periods should be associated with more severe vertical motion, comparatively, than those with short return periods. This line of reasoning was followed to develop approximate probabilistic vertical response spectra for analysis purposes.

3.3 Damping Ratio

Response spectra for damping values other than 5 percent were developed by direct scaling of the 5 percent damping response spectra, using empirical equations (Newmark and Hall, 1982) for horizontal spectrum amplification factors at various damping coefficients. An example of application of this procedure is shown in Figure 6 for the 50th percentile La Nacion MCE. Similar spectral scaling factors were used for all other spectra to obtain spectral coefficients at damping values other than 5 percent.

Stone masonry is not a modern construction material, and little information is available regarding what damping levels should be expected under dynamic excitation. Limited information was found in a recent technical paper (Noret, Da Rin, Modaressi and Carrère, 1998). The authors describe full-size testing of stone masonry at Dardennes Dam, in southern France, using large size vibrating equipment of adjustable amplitude and gradually varying frequency from 1 to 20 Hertz (Hz). The first four modes of vibrations of Dardennes Dam were identified and ranged from 10.4 Hz to 18.4 Hz. The corresponding damping ratios were 13 percent of critical (mode 1), 12 percent (mode 2), 10 percent (mode 3), and 8 percent (mode 4). The authors concluded that the stone masonry infilling material actually resulted in a particularly high level of structural damping, even at a low level of deformation.

Severe earthquake shaking would likely be associated with damping levels higher than measured during forced vibration testing. Based on this consideration, for gross response analysis and "uncracked" initial condition of the Sweetwater outlet tower, we have considered a damping factor of 10 percent for the seismic input. It should be noted that because linear elastic response was considered, responses for damping levels other than 10 percent can be easily estimated through spectral response scaling based on the corresponding spectral ratios. The 10 percent estimate represents, in our opinion, a reasonable, moderately conservative value suitable for estimating the response of a non-safety related structure.

3.4 Response Modification Factor

A response modification factor, $R_{w,}$ is typically used to adjust spectral coefficients to be used for linear response analysis of reinforced concrete structures. This factor normally accounts for possible inelastic action, and is used to scale the elastic spectral amplitudes defining the seismic input to compute the earthquake demand (loads) more realistically than through linear-elastic response analysis.

Based on the classification of the Uniform Building Code (UBC), the intake tower cannot be described as a specific lateral-force-resisting structural system, but could be considered to be a distributed mass cantilever structure. The applicable R_w coefficient, per the UBC, would be 4.0. The use of such a value has been suggested for reinforced concrete intake/outlet towers in the USCOLD *Guidelines for Earthquake Design and Evaluation of Structures Appurtenant to Dams* (1995), but current U.S. Army Corps of Engineers (COE) criteria recommend a more conservative value of 2.0 for R_w in the case of the Maximum Design Earthquake (MDE), which is essentially equivalent to a MCE (Erikson, 1996). For lower levels of motion, such as the 72-year return period earthquake, Erikson used an R_w of 1.0. Because the Sweetwater tower is not steel-reinforced, and since stone masonry would exhibit little or no ductility, we did not use a response modification factor in this study. This is a conservative approach ($R_w = 1.0$).

3.5 Load Combination Factors

Three components of motion were applied simultaneously in the analyses. The same spectral shape was used for the primary and secondary horizontal components of ground motion, as no distinction was made between these two components in the development of the attenuation equations. However, peak loading in one horizontal direction is unlikely to occur simultaneously with peak loading in the other horizontal direction. To take this into account and as recommended by Goyal and Chopra (1989) for the evaluation of intake/outlet towers, we used load combination factors of 100 percent and 50 percent, respectively, for the primary and secondary components of ground motion. As the peak vertical response also occurs at a frequency different than the peak horizontal response, we used a load combination factor of 75 percent for the vertical component of motion, as assumed to occur concurrently with the peak horizontal excitation. The responses to the three components of motion were separately computed, and then combined by the Square-Root-of-the-Sum-of-the-Squares (SRSS) procedure.

The response analysis was used to assess what portion(s) of the tower would be expected to remain intact after occurrence of the specified seismic loads, and to estimate the overall stability of the structure against global overturning and base sliding. As the tower is not reinforced, post-cracking (cracked) response analysis is not applicable, and the tower must be assumed to fail if substantial overstressing of the materials comprising the tower occurs.

4. Parametric Response Analysis

4.1 General

This section describes the numerical analyses performed to evaluate the response of Sweetwater outlet tower to various earthquake ground motions. Two basic types of analyses were performed. The first is referred to as a "stress evaluation" in which the applied loads were compared to the estimated capacity of the tower structure. Capacity is based, in part, on the strength of the tower material. In this type of analysis, the applied loads were based on the assumption that the tower remained "uncracked," even though computed stresses exceeded material strengths. The second was a "gross stability evaluation" in which the potential for overturning or sliding of the tower as a whole was considered.

Seismic evaluation criteria were discussed in Section 3.0. Masonry strength parameters were developed from a review of previous safety reports for Sweetwater Dam and non-destructive (Schmidt Hammer) testing performed as part of this evaluation.

We performed a parametric response analysis of the tower to account for uncertainties in the estimated strength and elasticity parameters of the tower material. The gross response evaluation was based on intact section properties, assumed to exist prior to the occurrence of any earthquake-induced cracking. The cracking capacity of the tower was developed for ranges of mortar strength and stone masonry stiffness, with average estimates based on the results of the Schmidt hammer testing.

We developed a structural engineering model for the Sweetwater outlet tower. The response of the model to the specified seismic loading was computed. The basic structural analyses involved the following steps:

- Select an appropriate analysis and results interpretation methodology, commensurate with the degree of refinement required,
- Specify analysis and strength parameters,
- Develop a numerical (finite element) model of the tower,
- Perform the analyses, and
- Interpret the results obtained and compare earthquake demand (induced loading) with capacity (ability of tower to withstand loading).

The above steps are discussed in the following sections.

4.2 Analysis Parameters

4.2.1 General

The tower response (uncracked condition) is governed by the stiffness and modulus of elasticity (E) of the stone masonry. The E-modulus of such composite material should be intermediate between those estimated for the cement mortar and the masonry stones.

Without full-size field-testing, it is difficult to assess the global stiffness of the masonry, which directly influences the tower dynamic response. For example, in earlier studies of Sweetwater Dam, Woodward-Clyde Consultants (1975) simply assumed the modulus of elasticity of the masonry portion of the dam to be between one-tenth and ten times that of the concrete gravity portion (3.5 million psi). Dames & Moore (1994) used 2.0 million psi for the static or dynamic modulus of the masonry. As a basis for comparison, Noret, et al. (1998) reported static moduli of elasticity for stone masonry used in dam construction ranging from about 0.3 to 3.9 million psi, with a mean value of about 2.9 million psi. Dynamic E-moduli reported by these same authors ranged from about 1.7 to 4.5 million psi. A best estimate for the E-modulus of the tower material was developed on the basis of our literature review, and considering the apparent good quality of the Sweetwater outlet tower masonry. Analyses were performed using the best estimate of E-modulus, as well as a lower and higher value to assess the sensitivity of results to E-modulus.

The seismic capacity (stress analysis or stability analysis) of the Sweetwater outlet tower will be governed by the shear and tensile strengths of the masonry mortar, and its bond strength with the masonry stones and tower foundation. Therefore, we have focused on developing strength properties for the mortar, as discussed in the following section. As with the E-modulus, analyses were performed using best estimates of strength parameters, as well as lower and higher values to assess the sensitivity of results to strength parameters.

4.2.2 Masonry Mortar

The Schmidt hammer manufacturer lists an instrument error of plus or minus 15 percent for tests performed in accordance with ASTM C-805 guidelines. However, in similar studies of intake/outlet towers, Bureau and Scawthorn (1986) and Bureau (1985, 1993) found less than ten percent difference in estimated average compressive strengths (f'_c) between laboratory and Schmidt hammer tests on concrete. Based on that experience, the strength properties derived from the Schmidt hammer testing of the dam mortar for this investigation (assumed similar to the tower mortar) are judged to be reasonable for this analysis.

Schmidt hammer measurements provide a rapid loading (dynamic) compressive strength for the mortar. From the measured rebound values, the average estimated dynamic compressive strength is about 3,914 psi, with a standard deviation of about 975 psi. Based on the common assumption that the rapid loading compressive strength is about 20 percent higher than the sustained loading compressive strength, this corresponds to an average static compressive strength of about 3,260 psi for long-term, sustained loading.

We successively assumed dynamic compressive strengths of 2,900 psi, 3,900 psi or 4,900 psi in our parametric evaluation of the tower structural capacity. Such dynamic strengths approximately correspond to average-minus-one standard deviation (sigma), average, and average-plus-sigma static compressive strengths of about 2,415 psi, 3,250 psi or 4,085 psi, respectively. The above values likely bound the in-situ compressive strengths of the Sweetwater cement mortar.

Other properties necessary for the analysis, such as Poisson's ratio and modulus of elasticity, were estimated from empirical formulas and values provided in American Concrete Institute (ACI) Standard 318, *Building Code Requirements for Structural Concrete.* An average Poisson's ratio of 0.15 was used, with high and low estimates of 0.12 and 0.18. A unit weight of 150 pcf for the mortar was used. Knowing the compressive strength, ACI-318 and other empirical formulas were used to obtain estimates of the static shear and direct tensile strengths and the modulus of rupture (bending) of the cement mortar. Although established for the design of conventional reinforced concrete buildings, these formulas apply reasonably well to assessment of the outlet tower.

As discussed above, it is well known that concrete cores tested in either tension or compression exhibit higher strength under rapid than slow loading condition. Hence, it is common practice (USCOLD, 1985; 1999) that both concrete strength and modulus of elasticity be increased for earthquake (rapid) loading condition. Such increase factors were assumed applicable to the mortar of the Sweetwater tower. The following dynamic increase factors were selected, based on precedents and a history of approval for similar projects by regulatory authorities, such as the Federal Energy Regulatory Commission (FERC) and the DSOD:

- Compressive Strength: 20 percent increase
- Modulus of Elasticity: 25 percent increase
- Tensile Strength: 40 percent increase
- Shear Strength: 30 percent increase

The mortar dynamic shear strength (v_c) and direct tensile strength, based on ACI and other well-accepted formulas, were used to establish the cracking (gross) capacity of the tower for shear and moment loading, respectively. For reinforced concrete towers, the modulus of rupture is normally used to establish the bending capacity. However, because of the irregular failure surfaces likely to occur in stone masonry, the use of the direct tensile strength was considered more prudent. Our tensile strength estimate is lower than the "apparent" seismic tensile strength and is, therefore, believed to be sufficiently conservative. The concept of "apparent" strength, first introduced by Dungar (1981), was generalized by Raphael (1984) to define what strength value should be used to interpret the results of linear-elastic analysis of structures built with concrete, a material known to behave nonlinearly. The masonry mortar properties developed for the seismic analysis of the Sweetwater tower are listed in Table 6. Detailed information on how these properties were selected are provided in the following paragraphs.

For comparison, three masonry outlet towers of the same vintage (1873 to 1894) as the Sweetwater tower and located in California, (Lower Crystal Springs, Lake Frey and Pilarcitos towers), also exhibited high quality mortar when tested in the field or the laboratory, with shear and tensile strengths greater than 400 psi and 300 psi, respectively. Our estimated mortar strengths, based on the Schmidt hammer data, are consistent with that other experience.

Essential to the evaluation of the Sweetwater tower is the bond strength that can develop at the stone-mortar interface. Failure in response to induced dynamic tensile stresses is likely to occur at the interface between the stones and mortar, rather than through the mortar itself. The quality of the bond between these two materials depends on the care that was given during construction to clean and wet the contact surfaces. Proper preparation will normally achieve most of the strength of intact mortar at the interface. While the quality of construction was reported to be excellent, details of mortar and stone surface preparation are unknown. Hence, it is prudent to assume that the tensile strength at stone-mortar joints is less than that of intact mortar. Based on data available from the literature, concrete lift joints with no prior surface treatment achieve between 31 and 83 percent of the tensile strength of intact concrete. Joints formed by placing new concrete on a dry or wet prepared surface achieve higher strengths. Using data reported by Waters (1954) and Tynes (1959, 1963) at the U.S. Army Corps of Engineers, strength reduction factors for clean-brushed and hand-compacted lifts on hard surfaces with no other prior surface treatment range from 0.55 to 0.74. We took the mean value of these reduction factors for unprepared surfaces, or 0.58, as being applicable to the Sweetwater masonry, in the absence of other information. Therefore, the estimated dynamic tensile strengths of masonry mortar joints, after reduction at stone contact level, are 196 psi, 264 psi and 332 psi, at the average-minus-sigma, average, and average-plus-sigma levels, respectively. These values represent the dynamic direct tensile strength of the mortar, multiplied by the joint strength reduction factor of 0.58.

The above reduction factor corresponds to a perfectly plane horizontal failure surface in direct tension. Two other factors were considered. First, the estimated modulus of rupture, as defined by the ACI, could be a better parameter than the estimated direct tensile strength for defining the capacity to resist moment loading. However, its applicability to masonry mortar is unknown. Secondly, because masonry stones have various shapes and sizes, actual failure along stone-mortar contact surfaces could be irregular and involve an area larger than defined by a horizontal plane. Taking the above factors into account, we have increased by 25 percent the reduced stone-mortar bond strength defined above. Hence, in our analyses, we have taken the dynamic strength of the stone-mortar joints as being 0.725 times (0.58 x 1.25) the dynamic strength of intact mortar. Dynamic tensile strength values for equivalent horizontal joints were successively taken as 245, 330 and 415 psi for average-minus-sigma, average, and average-plus-sigma levels, respectively.

4.2.3 Stone Masonry

Stone masonry can be difficult and potentially very costly to core and test in the laboratory. Therefore, a qualitative assessment of the stone and mortar condition, where visible, and non-destructive testing of these materials were performed for this investigation. The compressive strength of the mortar and stones, where exposed near the dam abutment, could be measured using a Schmidt Hammer, and the quality of the bond between stone and mortar visually assessed. The local stone is dense and very hard based on our field testing. A unit weight of 168 pcf was assumed for the stone masonry. In the absence of specific data, the same estimates of Poisson's ratio used for the mortar were also used for the masonry.

Estimates of the E-modulus of the stone masonry (mortar plus stones) were used in analyses to estimate tower response to dynamic loading. The E-modulus of the masonry is expected to be greater than the E-modulus of the mortar alone because of the influence of very hard stones in the masonry. Based on empirical relationships between E-modulus and compressive strength, and using compressive strength measurements of mortar at the dam site, we estimated a static E-modulus for the mortar alone at about 3.5 million psi. This corresponds to a dynamic E-modulus for the mortar of about 4.4 million psi. For analysis purposes, we assumed a "best estimate" dynamic E-modulus for the masonry (mortar plus stones) of 5.0 million psi. Parametric analyses were performed for dynamic E-moduli ranging from 1.25 to 8.75 million psi. This range is broader than the range of dynamic moduli for stone masonry reported by Noret (1998).

4.2.4 Foundation Bedrock

As the tower is free-standing on a competent, hard foundation, no significant interaction between the bedrock and tower structure would be expected. The shaft is flexible compared with the underlying half-space and the slender tower is a relatively low mass structure. For analysis purposes, we considered the foundation materials as infinitely stiff, compared with the more flexible free-standing tower shaft. Hence, we assumed the tower to be rigidly connected to bedrock at El 139, a conservative assumption as it ignores radiation damping and interaction effects.

To evaluate the gross stability of the tower for overturning and sliding, we assumed a dynamic bond strength of 50 percent of the stone-mortar joints in the tower and a friction angle of 35 degrees at the masonry-bedrock interface. The reduced bond strength accounts for possible weaker contact, in the event the foundation surface was prepared with less care than used for the tower walls. This friction angle is believed to be conservative because the hard foundation substratum should be capable of developing significant dilatancy resulting from uneven contact surfaces and rock asperities at the masonry-bedrock interface.

4.3 Methodology and Analysis

4.3.1 Methodology

Dynamic, three-dimensional (3-D), finite element response spectrum analysis was used to calculate the structural demand (imposed loading) on the tower under the specified input motion. Analyses were performed using the computer program SAP2000 (1999). Facilities such as the Sweetwater outlet tower primarily behave as vertical cantilever beams in resisting earthquake motion. However, as the Sweetwater tower appears not to be anchored to the substratum, bottom uplift or overturning may represent a potential concern for this structure under severe earthquake loading. The analysis steps followed the basic approach described in *Section 5 - Intake/Outlet Towers* of the *Guidelines for Earthquake Design and Evaluation of Structures Appurtenant to Dams* (USCOLD, 1995), and included:

- Develop a numerical model for the structure,
- Define the significant modes and frequencies of vibration,
- Calculate induced loads (moment and shear) as a result of the specified earthquake shaking,
- Combine static and dynamic loads, and
- Compare these loads with gross (uncracked) shear and moment capacities of the tower shaft (stress evaluation).

The modal characteristics of the tower and its response were computed using a finite element numerical model. A three-dimensional system of flexural beam elements and lump masses was used to represent the tower, as shown in Figure 7. The tower shaft was assumed cantilevered at El 139, which represents a point of fixity (Node 1) when the tower vibrates.

A limited number of beam elements (20 or less) is amply sufficient to model this type of structure (USCOLD, 1995; Bureau, 1993), due to its relatively simple vibration characteristics. The tower does not contain equipment other than the saucer valves and their winches at the top platform. The masses of the walls and external appendages (top platform, valve operators and saucer valves) were lumped to the appropriate nodal points of the mathematical model.

In the calculations, areas and moments of inertia were adjusted to account for the encroachment of valves 7, 8 and 9 into the tower hexagonal section. Key nodes of the model were placed at the center of the valve inlets. Nodal point mass assignments were adjusted to account for the valve inlet wall openings and the weight of the steel valves. A small portion of the outlet conduit, between the tower and valve 2, was assumed to form an integral part (no joint) of the tower base. The top node of the numerical model was placed at the center of gravity of the roof concrete platform. The masses of the platform, winches, winch pedestals and roof assembly were lumped to that node.

A steel footbridge connects the operating platform of the tower and the crest of the dam. The footbridge has no intermediate supports and is a very light structure (1,788 lbs), compared with the tower itself. Based on other experience and comparative studies performed with or without including the bridge for other similar towers, structural interaction between the bridge and the tower should be negligible. This is because the mass of the bridge (steel structure) is very low, compared with that of the tower (concrete and masonry structure). For the above reason, the entire mass of the footbridge was simply lumped to the applicable nodal point near the top of the tower (Node 20). This corresponds to the assumption that the bridge would move in phase with the tower by sliding on the dam crest support pads.

4.3.2 Basis for Modal Analysis

For seismic analysis purposes, it is customary not to combine flood with earthquake loading. A high water level is the most critical in the case of outlet towers. Because the reservoir water elevation normally fluctuates, we have assumed for analysis purposes that the reservoir elevation would be at its maximum normal operating level, defined by the south spillway crest level at El 237. The modal characteristics of the tower under empty reservoir condition were not defined, because in the case of a slender tower such as this one, the full reservoir case is the most critical.

Authority personnel indicated that the water level inside the tower shaft is frequently at a high level. Therefore, for analyses we assumed the inside water level as the same level as the reservoir. We verified that assuming the tower full of water resulted in larger response than if the inside shaft was empty. Based on our calculations, the filled tower has a fundamental period 1.8 percent longer, and computed moments for the case of the 475-year earthquake were about 3 percent higher, than when dewatered. Hence all the results discussed in this report assume the inside and outside water levels to be at El 237.

Loose, compressible sediments (reservoir siltation) surround the lower part of the tower up to a level between valves 3 and 4. Reservoir sediments are typically denser (e.g., 81 to 83 pcf, measured at Searsville Dam, CA) and have lower compressive wave velocities (about 1,000 feet/second, also measured at Searsville Dam) than water (4,800 feet/second). Hence, the reservoir silt slightly restrains the lower part of the tower and perhaps dampens traveling compressive waves near the tower, thereby reducing potential hydrodynamic pressures on the tower wall. However, such effects are difficult to quantify, and we ignored the presence of the silt in our hydrodynamic equivalent masses calculations. We simply assumed the tower to be submerged in water from its base to the assumed reservoir elevation.

The following tables summarize the analysis model properties developed for the uncracked tower (assumed existing condition):

- Table 7: Nodal Points Coordinates
- Table 8: Cross Section Areas
- Table 9: Sections Moment of Inertias
- Table 10: Nodal Point Masses

4.3.3 Parametric Gross Response Analysis Methodology

The parametric gross (uncracked) response analysis is intended to determine the factors of most significance to the tower response. Following identification of such factors, the tower model can be fine-tuned, as needed, or conclusions derived based on other assumptions. The deterministic and probabilistic seismic criteria were successively applied.

Typical parametric analyses include the influence on response, and/or gross capacity, of the concrete or masonry strength, reservoir water level, and factors such as the structure and foundation flexibility or the presence of appurtenances, such as access bridges or heavy equipment. The Sweetwater tower contains no equipment other than the external saucer valves, and was assumed surrounded by water at spillway crest level. Therefore, the principal factors of significance to its gross response are the seismic criteria and modulus of elasticity of the stone masonry. As previously stated, the light footbridge was not separately considered in the analyses, but its influence on the computed tower response was accounted for.

4.4 Influence of Masonry Stiffness and Strength

4.4.1 Frequencies of Vibration

The frequencies of the significant modes of vibration of the Sweetwater outlet tower were calculated for the average stiffness estimated for the tower masonry, as well as for the low or high estimates. The tower was assumed cantilevered at foundation level (El 139). For the "best estimate" of the dynamic modulus of elasticity (5 million psi), the following frequencies were calculated:

Bonding Mode	Frequency, Hz		Period, Seconds	
	X Direction	Y Direction	X Direction	Y Direction
Fundamental	2.20	1.95	0.45	0.51
Second	11.5	10.6	0.09	0.09
Third	28.9	27.4	0.03	0.04

Notes: X-Direction is upstream/downstream
Y-Direction is cross-valley

The first vertical mode frequency was calculated to be 25.3 Hz. Modal frequencies are summarized in Table 11 for the range of masonry stiffnesses considered. Except for its first few modes of vibration, the dewatered tower behaves as a rigid structure (frequencies higher than 33 Hz). However, the first bending modes in the upstream/downstream (X) and cross-valley (Y) directions, which have the largest mass participation factors, occur at frequencies lower than the frequency at which the peak acceleration of the specified response spectrum occurs (about 5 Hz, see Figure 5). Hence, when the strength (and stiffness) estimates of the mortar increase, the response of the tower also increases, which makes the computed demand-to-capacity (D/C) ratios less sensitive to the uncertainty regarding the masonry parameters.

4.4.2 Uncracked Tower Capacities

The two critical modes of response of typical intake/outlet towers are for shear and bending loads, bending being generally the most critical by a substantial margin. Hoop (horizontal) tensile loading is of no concern for towers. Hence, only bending and shear loads were considered in this study.

Intact Masonry Mortar

For the average compressive strength estimated for intact mortar from the Schmidt Hammer measurements, we estimated a static direct tensile strength of 325 psi and a dynamic tensile strength of 455 psi (40 percent increase). This value is less than the ACI modulus of rupture or the apparent dynamic tensile strength (746 psi) suggested by Raphael (1984) for linear-elastic analysis of mass concrete structures. In this study, we also used lower and upper bounds of 338 psi and 572 psi for the dynamic tensile strength of intact mortar, based on the range (plus or minus one standard deviation) of compressive strengths estimated from the field measurements. The average tensile strength and this range of values were used to calculate “best” and upper- and lower-bound estimates for the gross moment capacity (cracking moment) at various elevations along the tower shaft.

Normal compressive loads, such as dead load (gravity), increase the moment-resisting capacity of individual tower cross-sections, based on their elevation within the shaft. Upward or downward earthquake accelerations can increase or reduce the initial vertical loads acting across tower sections, and affect their moment-resisting capacity. Instead of successively combining the (+) or (-) vertical earthquake loading with the two horizontal components of loading, it is equivalent in the simple model considered to reduce the effective section capacity by subtracting the most critical (upward) computed vertical dynamic loads from the static gravity loads in the cracking moment capacity calculations. This simplified procedure is appropriate, as there is essentially no contribution of the vertical accelerations to the overturning moment in this near-axisymmetric structure. Hence, instead of combining vertical with horizontal loads in the demand calculations, we simply adjusted the gross section bending capacities, taking into account the calculated maximum dynamic upward loads. We combined the two components of horizontal loading to compare earthquake demand with the available gross capacity of individual sections, adjusted for axial loading.

We computed the factored capacity of the tower wall (cracking of intact mortar) using a strength reduction factor in bending of 0.90, as recommended in the American Concrete Institute (ACI-318) requirements. This strength reduction factor provides a factor of safety in the calculation of the gross capacity of the structure. Table 12 shows the calculated factored gross moment capacities (cracking moment M_{cr}) of the Sweetwater outlet tower, based on the assumed range of strengths for intact mortar.

Stone-Mortar Joints

As previously discussed, a potential concern is how the presence of cracks and irregular mortar joints affects the tensile strength. We assumed that potentially weak and irregular joints in the tower would develop a bond strength of 72.5 percent of the strength of intact mortar. Hence, the mean dynamic tensile strength of "equivalent horizontal" stone-mortar joints was assumed to range from 245 psi to 415 psi, with an "average" estimate of 330 psi. Moment capacities based on the bond strength of mortar-stone joints are shown in Table 13.

The factored gross shear capacity of the uncracked tower was also calculated for a range of values assumed for the masonry mortar compressive strength. We also followed the principles described in ACI-318 to compute shear capacities, and used a shear strength reduction factor of 0.85. As assumed for moment loading, joints would potentially affect the shear capacity of the Sweetwater outlet tower. A stress increase factor of 1.855 (approximately circular section) was used to account for the fact that the tower walls are not uniformly stressed. The calculated uncracked shear capacities of the Sweetwater outlet tower, through intact mortar or along stone-mortar joints, are presented in Tables 14 and 15, respectively.

4.4.3 Response Spectrum Analysis

The first 40 modes of vibration of the tower were included in the analysis, which corresponds to a combined mass participation greater than 98 percent and, therefore, sufficient accuracy. For the analysis of the tower in an uncracked condition, we used response spectra, including those shown on Figures 3 to 6, as a basis to define the peak horizontal and the vertical components of ground motion. We used 10 percent damping for the structural response, as previously discussed.

The vertical static stresses are well below the allowable compressive strength of the tower wall. Hoop stresses in the tower wall cannot be calculated in a stick (3-D beams) model, but have been shown to be essentially negligible in detailed studies of other intake/outlet towers. Static and dynamic hoop stresses would also be very small. Therefore, under an earthquake loading condition, the most critical dynamic loads for the tower are bending (overturning) moments and shear forces. Based on other experience (Bureau, 1986, 1993), earthquake-induced compressive and torsion loads do not represent a potential problem for this type of structure. Therefore, our dynamic response analyses and interpretation was focused on induced bending moments and shear forces at various elevations along the shaft.

We used the principles described in ACI-318 as guidelines to evaluate the performance of the Sweetwater outlet tower. ACI-318 criteria are based on the strength design method, and normally use load factors (greater than 1.0) and strength reduction factors (smaller than 1.0) to compare induced stresses with the available structural capacity of concrete (or cement mortar). Several combinations of static and dynamic loads and a l33 percent dynamic overstress allowance are normally used.

In the absence of live loads, as is the case for outlet towers, conventional application of ACI-318 requirements would define combined loads for earthquake loading as the most critical of the following:

$$\textit{Total Load} = 1.05 \textit{ Static Load} + 1.40 \textit{ Dynamic Load} \qquad [4\text{-}1]$$

or

$$\textit{Total Load} = 0.90 \textit{ Static Load} + 1.43 \textit{ Dynamic Load} \qquad [4\text{-}2]$$

where *Load* represents either bending, axial or shear loads.

Instead of using the above equations, we selected static and dynamic load factors equal to 1.0. The reason for this modification of the code formulas is that, in ACI-318, the earthquake load factors provide an additional margin of safety when pseudo-static earthquake forces are computed through code formulas (seismic zoning of the Uniform Building Code and applicable source factors N_A and N_V). The load factors defined by equations [4-1] and [4-2] would be required if a new structure were to be designed. For response spectrum analysis and the evaluation of an existing, older structure, load factors equal to 1.0 are appropriate. This is because a rigorous definition of the earthquake demand (response spectra) has been used and an estimate of the true seismic vulnerability is desired. We also used the dynamic overstress allowance factors described previously, rather than ACI's 133 percent.

Since the orientations of the specified directions of earthquake loading are unknown, we vectorially combined peak shear forces and bending moments calculated in the X and Y directions of shaking to obtain upper bound estimates of the peak forces and overturning moments at various elevations along the shaft, a conservative approach. As discussed earlier in this report, the assumed spectral shape of the secondary horizontal component was the same as that representing the primary component, but was used with a vectorial combination factor of 0.50. The vertical response spectrum was assigned a combination factor of 0.75.

4.5 Results of Analyses

4.5.1 Stress Analysis

Gross Moment Response

- For the La Nacion MCE, the largest D/C (demand/capacity) ratio for moment loading at stone-mortar joints was 6.61 for the average ("best estimate") stiffness and strength properties (dynamic modulus of elasticity of 5.0 million psi). D/C ratios higher than 1.0 indicate non-compliance with the specified performance criteria. Lower D/C ratios than for the average condition were computed for the lower-bound assumptions (D/C = 4.70) and upper bound assumptions (D/C = 6.26). Hence, the "best estimates" represent the most critical combination of analysis parameters and strength properties for the three combinations considered. D/C ratios for moment loading for the La Nacion MCE are presented in Table 16 for intact mortar or stone mortar joints. These D/C ratios indicate unacceptable performance, based on the performance evaluation criteria discussed in this report.

- For the Rose Canyon maximum earthquake, the most critical D/C ratio was 3.72, again for the "best estimate" conditions at joint level. Computed D/C ratios are presented in Table 17.

- Complete results are presented for the 475-year probabilistic seismic criteria. Table 18 shows the computed moment response of the Sweetwater tower for the three assumptions regarding the E-modulus of the masonry. As previously discussed, overturning moments induced by the two horizontal components of motion (X and Y directions) were combined by the SRSS procedure. Induced moments and factored gross capacities (at mortar joints level) are graphically compared in Figure 8. D/C ratios are listed in Table 19. Two conclusions can be drawn from Figure 8 and Table 19. First, and for this postulated earthquake loading, the gross capacity of the shaft is exceeded for a significant extent (from about El 139 to about El 198), for the average conditions considered. The most critical location is located immediately above the outlet conduit (D/C = 2.95). Secondly, masonry strength and stiffness have limited influence on the available capacity and moment response. The most critical condition corresponds to the "best estimates" of stiffness and strength properties.

- Moment response was also calculated for the 72-year earthquake. Depending on the assumed properties, D/C ratios at the most critical location ranged from 0.59 to 0.83, indicated that the tower should be capable of withstanding moments resulting from such an event, based on the specified performance criteria.

The Sweetwater outlet tower is not capable of withstanding an MCE (La Nacion Fault) or a maximum earthquake along the Rose Canyon fault. It appears not capable of withstanding the probabilistic event with 10 percent probability in 50 years, which may better represent the seismic hazard at this site than the two deterministic events, because of the low slip rates of the La Nacion and Rose Canyon faults.

Gross Shear Response

- For the La Nacion MCE, the maximum D/C ratio was 1.63 for the average analysis conditions. Although this is unacceptable performance (D/C greater than 1.0), it is considerably less critical than the moment loading case. D/C ratios for “low” and “high” mortar property estimates are 1.28 and 1.66, also indicating potential overstressing, but less critical than for moment loading. Therefore, moment loading controls the seismic performance of the Sweetwater outlet tower.

- For the Rose Canyon maximum earthquake, the highest computed D/C ratio for shear loading was 1.05, indicating questionable performance, but a probably stable tower for this mode of failure, because a strength reduction factor of 0.85 for shear was used.

- For the 475-year probabilistic earthquake, the highest D/C ratio for shear loading was 0.85, indicating compliance with our performance criteria for the three assumptions regarding the strength of the stone-mortar joints. Average induced shear forces are shown in Table 20, and D/C ratios in Table 21. A graphical comparison between shear forces induced by this probabilistic earthquake and the shear capacity is shown in Figure 9, at stone-mortar joint level. Compared with the bending capacity, the shear capacity of the tower is considerably less critical.

- The maximum D/C ratio computed for the 72-year earthquake was 0.21, indicating satisfactory performance.

Overall, shear response is considerably less critical than the moment response for the Sweetwater outlet tower.

4.5.2 Gross Stability Analysis

In addition to possible overstressing, we evaluated the stability of the tower against global overturning (toppling) and sliding along its base. This was done by comparing the moment at the bottom of the tower with the overturning capacity, and the base shear with the frictional resistance along the tower bottom. Tower toppling was assumed possible around a rotation point along the tower bottom perimeter, perpendicularly to the outlet conduit. Resistance to overturning is provided by the resultant of the moments of the buoyant weight of the tower masonry and inside water and the total bond force available at the masonry-foundation interface. Resistance to sliding is provided by frictional and bond forces along the tower-foundation contact.

The highest computed instantaneous D/C ratio for global overturning, based on the computed peak moment at the bottom of the tower, was 2.12 (La Nacion MCE). For this earthquake scenario, D/C ratios for global overturning ranged from 1.43 to 2.12, for the three assumptions regarding the masonry dynamic stiffness and assumed dynamic bond strength at the foundation contact (122.5 psi, 165 psi or 207.5 psi). As in the stress evaluation, the worst condition was for the assumed "best estimate" properties.

The highest D/C ratios computed for the other earthquake loading assumptions were 1.25 (Rose Canyon MCE), 1.00 (475-year earthquake) and 0.28 (72-year earthquake). Hence, the tower could become unstable for global overturning for the two most demanding deterministic events (La Nacion and Rose Canyon), and is marginally stable for global overturning under probabilistic criteria with a return period of 475 years.

It is conservative to use a peak dynamic moment to compute a factor of safety against overturning using equivalent static moment equilibrium considerations. The peak dynamic loading would be applied only for a short instant of time, and the direction of loading application would constantly change during the duration of the earthquake shaking. Conceivably, the tower might uplift or oscillate from one side to the other under load reversals, without being out of plumb, if the bending capacity of the shaft were not exceeded. However, failure of the masonry through overstressing is likely to occur before failure by overturning and would control the seismic performance of the tower.

For the maximum applied base shear (V_{max}), and assuming a masonry to bedrock friction angle of 35 degrees and bond strength of 50 percent of that used for mortar joints, the factors of safety against sliding are considerably higher than for overturning. Therefore, sliding at the base of the tower was not considered further.

4.6 Interpretation of Results

Based on the results presented in Tables 16 through 20 and depicted in Figures 8 and 9, the earthquake-induced moment demand substantially exceeds the available cracking capacity of the Sweetwater outlet tower for the La Nacion MCE, Rose Canyon maximum earthquake, and the probabilistic 475-year earthquake. Induced shear forces, as well as global overturning and sliding stability are considerably less critical. While the lower or upper bounds of estimated masonry strength influenced capacity, as expected, the loads induced on the tower were affected by corresponding changes in stiffness, and the average (best estimate) assumptions regarding the masonry properties turned out to be the most critical. Overall, computed D/C ratios exhibited moderate sensitivity to the wide range of postulated strength and stiffness of the stone masonry.

Stresses were calculated assuming a stable tower, cantilevered at foundation level. Under severe seismic moment loading, the tower could become unstable. Hence, the assumption of the base being fixed would no longer apply. Base uplift and masonry mortar cracking above the outlet conduit would make the response highly nonlinear and significantly affect the actual loads. Loads, but also the capacity, should decrease considerably if the response became non-linear. However, as the gross moment capacity of the shaft was largely exceeded, we concluded that, as a minimum, the masonry mortar would crack extensively.

Partial or complete collapse of the Sweetwater outlet tower as a result of extensive cracking and possible instability against overturning are probable, under the postulated MCE, Rose Canyon or 475-year earthquake events. The structure response to any of these three scenarios would be inelastic and the tower, in its assumed existing condition, would experience major cracking of the masonry mortar, likely resulting in partial to complete collapse due to excessive earthquake-induced bending moments.

Out-of-phase movements between the tower and the crest of Sweetwater Dam appear to be of limited concern under elastic response, as long as the four bolts that tie the access bridge to the tower are not pulled out. Maximum tower platform elastic displacements (Node 21) under the most demanding MCE earthquake loading condition ranged from 1.3 to 4.2 inches for the three assumptions regarding the E-modulus of the masonry. Out-of-phase elastic displacements of the dam crest would be less than the displacements noted above. However, extensive cracking (inelastic response) is likely for the MCE, resulting in partial or complete collapse of the tower, rendering the footbridge performance a moot point.

5. Maximum Sustainable Earthquake Loads

We believe the analyses reported herein are conservative, although not excessively. Such conservatism was required to compensate for the uncertainties regarding the seismic exposure of the site and the masonry properties. In this section, we provide an opinion on the maximum earthquake loading that the tower could withstand without experiencing unacceptable cracking or major structural failure. We assessed more realistically what the expected performance of the tower might be, essentially without using any implied "factors of safety" in the performance evaluation.

First, we recomputed the D/C ratios for moment loading, using an assumed root-mean-square moment (M_{rms}) equal to 0.7 times the peak moment (M_{max}). We then eliminated the strength reduction factor (0.9) required by the code in the moment capacity calculations. This reduced the previously calculated D/C ratios by 37 percent, but still indicated insufficient overturning capacity for the MCE, Rose Canyon and 475-year probabilistic events.

Based on the recomputed "realistic" D/C ratios, the tower appears capable of safely withstanding ground motion with a peak ground acceleration of about 0.11g. For the local tectonic environment, this corresponds to a seismic event with a probability of occurrence of approximately 29 percent in 50 years, or 50 percent in 100 years. Hence, within the next century, the Sweetwater outlet tower has a 50 percent chance of either experiencing major failure or remaining stable during a seismic event.

6. Evaluation of Outlet Conduit

6.1 General

The outlet conduit consists of a masonry structure of rectangular section (17.3 feet x 6.5 feet) with a short wall (2.3 feet high by 1.5 feet wide) at its top on the right-abutment side. It contains three unlined water lines, 40-inches, 14-inches and 18-inches in diameter, respectively. The top of the conduit is at about El 155.

According to drawings provided to us, clay filling was placed on the right-abutment side of the conduit (see Figure 2). No details are available regarding the clay filling properties and extent. The Authority indicated that the surface of loose reservoir sediments is between valves 3 and 4, or about El 170. Hence, the outlet conduit should be buried in about 15 feet of loose sediments above the top of the conduit.

6.2 Gross Stability of Outlet Conduit

The presence of the reservoir sediments should help to stabilize the outlet tunnel for global overturning or sliding along its base. However, the extent of these sediments and their physical properties are unknown. A worst-case assumption would be if there are no sediments or if they are so loose that they behave essentially like a fluid. In that case, the conduit would be exposed to horizontal and vertical earthquake forces, plus hydrodynamic pressures under full reservoir head (El 237). This scenario was used to assess the gross stability of the conduit, assuming sliding along its base or toppling around the edge of its base would become possible.

Horizontal and vertical upward earthquake loads contribute to the overturning moment, as well as hydrodynamic pressures. Because the outlet conduit is a short, massive structure, it should respond as a rigid body (fundamental frequency of 33 Hz or greater to earthquake motion). However, for the purpose of taking a conservative approach, we assumed that the peak horizontal and vertical ground accelerations would be amplified by a factor of 2.0 at the top of the approximate center of gravity of the conduit (taken as the center of its rectangular section). Hydrodynamic pressures were assumed to be exerted along the conduit structure side, and along the side of its small crest wall. Resisting forces consist of the buoyant weight of the conduit and bond forces at foundation-conduit level. As previously discussed, the bond strength at foundation level was assumed to be half of that of the stones and mortar in the masonry. An additional analysis was also performed, using an assumed lower-bound bond strength of 50 psi. The D/C ratios for moment loading under the various assumptions regarding the bond strength are summarized in Table 22 for the four earthquake loading conditions considered.

Based on the above results, the outlet conduit should be stable for overturning for any earthquake event other than the postulated MCE along the La Nacion Fault, and with a lower bound estimate of foundation-conduit bond strength. In any case, the outlet tower would fail well before the conduit, whose overturning capacity should be of limited concern. As in the case of the tower, the sliding stability of the outlet conduit is less critical than its overturning stability and was not considered further.

6.3 Seismic Wave Passage Considerations

6.3.1 General

The outlet conduit structure and opening could be sensitive to seismic wave passage through the foundation and reservoir water or sediments. The conduit structure was built of stone masonry, and the diameter of its largest pipe is 40 inches. The influence of the two smaller pipes is negligible. Outlet conduit response to wave passage can be estimated based on two simplified bounding assumptions: (1) taking the largest pipe as an unlined 40-inch diameter circular opening in a hard medium (stone masonry) or, (2) assuming a lined opening (the lining being the conduit masonry itself) in very soft ground consisting of the reservoir sediments. The smallest side thickness of the conduit wall (15 inches) defines the most critical lining thickness, in the case of the second assumption. The reservoir hydrostatic pressure and gravity loads define the initial state of stress of the masonry for both of these assumptions.

For practical purposes, the 40-inch diameter conduit opening can be considered as near-rigid and, therefore, will not experience significant induced seismic stresses as a result of earthquake-induced “racking.” It should not significantly amplify ground motions, and the only requirement is that it does not experience excessive strains as a result of seismic wave passage, which would cause potential cracking in both the transverse and longitudinal directions. Depending on their directions of travel, seismic waves could induce axial, bending or hoop strains that might affect the conduit opening perimeter. As the conduit structure is built of unreinforced masonry, under assumption (2), it will act as a “rigid inclusion” and will tend to resist surrounding reservoir sediment movements.

For assumption (2), the properties and, especially, the elastic and bulk moduli of the reservoir sediments are unknown. Such materials are expected to be extremely loose and transmit compressive waves at velocities close to, or substantially lower than that of water (4,720 feet/second). For this study, we considered two extreme compressive wave velocities through the Sweetwater Reservoir sediments, 500 feet/second (fps) or 4,800 fps, recognizing that somewhere between 1,000 fps and 2,000 fps is the most likely value.

Among other factors, induced seismic strains will depend on the velocity of the traveling waves (V_s or V_c), on the particle velocity (V) of the earthquake-induced ground motion, and on the ratios of the shear and compression moduli of the masonry and surrounding sediments. Seismic performance can be estimated by computing stresses and strains induced by wave passage using simplified mathematical solutions, and by comparing such stresses and the corresponding strains with threshold values representative of typical concrete seismic performance, such as "cracking" or "crushing" strain limits. For concrete, the "cracking limit" is typically taken as 0.04 percent strain, and the "crushing limit" is typically taken as 0.4 percent strain. The same limits were used to assess the masonry mortar, even though stone masonry may behave differently and experience locally larger strains than mass concrete. However, taking the masonry as a homogeneous material was considered sufficient for preliminary estimates of its behavior under seismic wave passage.

Another way to assess conduit performance is to compare the specified ground motion parameters (such as peak ground acceleration and velocity) with damage limits established from empirical correlations between these parameters and the observed performance of soil and rock tunnels and underground openings. The application of the above two methods, while extremely simplified, provided a useful basis to assess the performance of the outlet conduit.

6.3.2 Analysis Methodology

Various simplified solutions are available to simulate the effects of seismic waves on buried conduits. These simplified solutions assimilate dynamic transient stresses induced by the seismic wave passage to an equivalent-static stress field, superimposed on the pre-existing confining stresses. Analytical procedures rely on numerical formulations derived from the work of various researchers (Mow and Mente, 1963; Newmark, 1968; Pao and Mo, 1973; and others) and decouple several types of wave loading, such as induced by transversely- or longitudinally-propagating compressive, shear or Rayleigh waves. While earthquake effects result from the combination of all wave types, we reduced the uncertainty resulting from the decoupling of wave effects by taking an upper-bound approach in our calculations. In the estimation of induced stresses and strains, peak static stresses were combined with peak induced seismic stresses obtained using the most unfavorable combination of stress concentration factors and wave travel orientation, thereby resulting in a conservative assessment. These simplified analysis procedures are briefly summarized below:

Simplifying Assumptions Related to Ground Motion

- Particle velocity is the same in shear or compression (conservative),
- Peak loads occur simultaneously in the horizontal and vertical directions,
- Linear elastic medium was assumed,
- The most critical direction of propagation of wave fronts was taken, and
- Detailed calculations were only performed for the case of the 475-year probabilistic earthquake.

As induced seismic stresses in an elastic medium are proportional to the specified peak ground acceleration, conclusions can be derived for other scenarios.

Longitudinal Waves

The simplified solutions assume that the axial and shear modes of deformation of the conduit wall, hence the stresses, are the same as would exist in the absence of the conduit opening. This implies that displacements of the conduit structure and surrounding medium are assumed to be the same, a conservative assumption as it leads to possibly overestimating actual movements of the conduit walls.

Transverse Waves

The dynamic problem is reduced to an equivalent static solution by assuming that a planar wave front imposes a transient uniform stress field on the materials surrounding the conduit opening. If one further assumes a state of plane-strain, elastic solutions provide the seismic stresses around the opening. The induced seismic stresses modify the initial elastic stresses, which depend on the depth of overburden and on the shape of the opening and its wall thickness. Under assumption (2), stresses around the perimeter of the conduit were estimated through the use of stress concentration factors applicable to buried structures, as developed by Chen, Deng and Birkmyer (1979). These factors approximately take into account the influence of the assumed different rigidities of the conduit wall and surrounding sediments and clay fill.

There is a fundamental difference in the case of transverse waves, compared with the case of longitudinal waves. While no relative movements between the conduit and the surrounding materials are assumed to occur, the conduit pipe perimeter can deform in shape as a result of transverse wave passage. Newmark (1968) provided expressions to estimate strains induced by a planar front traveling at a certain angle with respect to the centerline of a long buried structure. These expressions were used to provide upper bound estimates of dynamic strains and curvatures imposed on the outlet conduit.

6.3.3 Results

Longitudinal Wave Passage

Under assumption (1), maximum induced tensile strains in the conduit were estimated to range from 0.002 percent to 0.006 percent for shear waves, and 0.03 to 0.007 percent for compression waves. These values are less than the assumed cracking limit of 0.04 percent strain, indicating satisfactory performance. Under assumption (2), shear wave tensile strains were computed to range from 0.07 to 0.35 percent, and compressive wave tensile strains ranged from 0.009 to 0.04 percent. These values indicate possible cracking, but are below the assumed crushing limit of 0.4 percent strain.

Transverse Wave Passage

Under assumption (1), computed strains remained below the cracking limit. Maximum tensile strains ranged from 0.009 to 0.03 percent and maximum compressive strains ranged from 0.01 to 0.03 percent. Under assumption (2), these ranges become 0.008 to 0.002, and 0.003 to 0.009 percent, respectively. Overall, these calculated values do not represent a concern, as they remain below the postulated cracking limit.

Empirical Considerations

As a supplement to the above analyses, the ground motion specified for the 475-year earthquake was compared with ground motions known to have caused damage in tunnels and underground facilities. Such a comparison would apply to a conduit buried in somewhat consolidated sediments or if the clay fill was well compacted, which may or may not be the case. Historically, below-ground facilities such as tunnels, pipelines and conduits have performed satisfactorily during earthquakes, if they were not directly intersected by a fault rupture or surrounded with liquefied soils. Most of the applicable literature is related to tunnels (Dowding and Rozen, 1978; Sharma and Judd, 1991; Geomatrix Consultants; 1998). Most of this information is applicable to bored tunnels, however, and does not readily apply to the Sweetwater outlet conduit. However, pipelines and buried conduits have generally performed well if they were not surrounded by soft soils and potentially liquefiable materials. For PGA's of 0.20g or less, shaking causes very little or no damage in tunnels. For PGA's between 0.20 and 0.50g, there has been limited occurrences of slight to moderate damage. However, at that level of ground motion, the most extensive damage has been related to cases of landsliding at tunnel portals (e.g. 1923 Kanto Earthquake, Japan), and therefore would be irrelevant to the outlet conduit. Relatively few instances, but some cases of severe damage in tunnels, have been reported for PGA's greater than 0.50g, which is about the PGA of the MCE (0.49g). Overall, for PGA's between 0.20g and 0.50g, no or minor damage would be expected in buried pipes or conduit structures not intersected by fault movement.

7. Conclusions

Based on analyses of the Sweetwater outlet tower reported herein, we believe that significant cracking (major structural damage) of the tower would probably occur under several of the postulated earthquake loads. In addition, the stability of the tower against global overturning could not be demonstrated. The tower would likely collapse under moment loading from an earthquake with a 475-year return period, or under maximum earthquakes occurring along the La Nacion or Rose Canyon faults, due to masonry overstressing resulting from large overturning moments. However, the La Nacion or Rose Canyon events have a very low probability of occurrence, due to the low slip rates of these two faults. Based on a parametric analysis, we concluded that the tower is likely to survive a ground motion at the site having a peak ground acceleration (PGA) up to 0.11g. The return period of an earthquake that can cause a PGA of 0.11 at the site was estimated to be 144 years. For ground motions with return periods between 144 and 475 years, various degrees of cracking, or partial or total failure, could conceivably occur. The tower appears to be capable of resisting maximum earthquakes generated by more distant faults such as the San Miguel-Vallecitos, San Diego Trough and Elsinore faults, and perhaps the Agua Blanca-Coronado fault. Such faults are the most active in the greater San Diego area.

It is possible that the tower could sustain significant cracking, and still maintain its stability. However, uncertainties in the way loads would be redistributed after the onset of cracking make assessment of post-cracking behavior of the masonry tower virtually impossible to predict, especially since the tower contains no reinforcing steel.

The response of the outlet conduit to seismic wave passage was evaluated based on simplified analyses and empirical considerations. No significant damage other than some cracking of the conduit wall would be expected under the 475-year earthquake or lesser ground motions. The parameters used in the analyses were conservative, meaning that the actual performance of the conduit would probably be better than that obtained from the analyses. Overall, the conduit is considerably less vulnerable to earthquake motion than the tower itself.

8. References

American Concrete Institute (1995). **Building Code Requirements for Structural Concrete**, Standard ACI 318-95 and Commentary (ACI 318R-95).

Artim, E.R.; Elder, D.L. (1979). **Late Quaternary Deformation along the La Nacion Fault System, San Diego, California**, Geological Society of America, Abstracts with Prog., Vol. 11, p. 381.

Anderson, J.G., Rockwell, T.K., and Agnew, D.C. (1989). **Past and Possible Future Earthquakes of Significance to the San Diego Region**, Earthquake Spectra, Vol. 5, No. 2. pp 299-335.

Artim, E.R.; Pinckney, C.J. (1973). **La Nacion Fault System, San Diego**, Geological Society of America Bulletin, Vol. 84, pp. 1075-1080.

Bureau, G. (1985). **Seismic Safety Analysis and Rehabilitation of Dam Inlet/Outlet Structures**, XVth International Congress on Large Dams, Lausanne, Switzerland, Proceedings, Q.59, R.17, pp. 297-319.

Bureau G. (1993). **Seismic Safety of Intake/Outlet Towers**, International Workshop on Dam Safety Evaluation, Grindelwald, Switzerland, 26-28 April, Proceedings, Vol. 2, pp. 229-240.

Bureau, G. (1995). **Intake/Outlet Towers**, Section 5 in USCOLD *Guidelines for Earthquake Design and Evaluation of Structures Appurtenant to Dams,* USCOLD Committee on Earthquakes, pp. 41-62.

Bureau, G.; Scawthorn, C. (1986). **Seismic Reevaluation of Lower Crystal Springs Outlet System** in Seismic Evaluation of Lifeline Systems - Case Studies, ASCE Publisher, October, pp. 16-27.

Chen, P.C.; Deng, D.Z.F.; Birkmyer, A.J. (1970). **Considerations of Dynamic Stress Concentrations in the Seismic Analysis of Buried Structures,** 2nd U.S. National Conference on Earthquake Engineering, Stanford, CA, Proceedings.

Clark, M.M. (1982). **Map Showing Recently Active Breaks Along the Elsinore and Associated Faults between Lake Henshaw and Mexico**, USGS Map I-1329, 1:24,000

Clark, M.M.; Harms, K.K.; Lienkaemper, J.J.; Harwood, D.S.; Lajoie, K.R.; Matti, J.C.; Perkins, J.A.; Rymer, N.J.; Sarna- Wojcicki, A.M.; Sharp, R.V.; Sims, J.D.; Tinsley, J.C., III; and Ziony, J.I.; (1984). **Preliminary Slip-Rate Table and Map of Late-Quaternary Faults of California**, U.S. Geological Survey Open-File Report 84-106, p. 12, pl. 1-5.

Construction Specifications (1939). **Constructing Unit No. 1 of the Enlargement of Sweetwater Dam and Spillways**, November, in Sweetwater Authority files.

Dames & Moore (1994). **Final Report, Control of Water Surface at Sweetwater Dam, Spring Valley, CA**, Sweetwater Authority File B.P. 93-41E, Report to Sweetwater Authority, September.

Dames & Moore (1995). **Seismic Analysis of Various Steel Tanks**, Report to Sweetwater Authority, Chula Vista, CA, April.

Deere, D.U.; Miller, R.P. (1966). **Engineering Classification and Index Properties for Intact Rock**, Figure 6-20.

Dowding, C.; Rozen, A. (1978). **Damage to Rock Tunnels from Earthquake Shaking**, ASCE Journal of the GT Division, Vol. 104, No. GT2, February.

Dungar, R. (1981). **El Cajon Hydroelectric Power Plan, Arch Dam Final Design, Static and Dynamic Stress Analysis**, Report by Motor Columbus Consulting Engineers, Baden, May, p. 25.

Elliot, W.J. and Hart, M.W. (1977). **New Evidence Concerning Age of Movement of the La Nacion Fault, Southwestern San Diego County**, in *Geology of Southwestern San Diego County, California and Northwestern Baja California*, San Diego Association of Geologists Guidebook, Farrand G.T. Editor, pp. 53-60.

Erikson, D.L. (1996). **Seismic Evaluation of the Blue River Reservoir Intake Tower**, Proceedings, USCOLD Annual Meeting, Los Angeles, CA, July, pp. 155-173

Geomatrix Consultants (1998). **Summary and Evaluation of Procedures for the Seismic Design of Tunnels**, By Power, M.S., et al., Technical Report to MCEER, FHWA Contract No. DTFH61-92-C-00112, September 9, Rev. 1.

Goyal, A.; Chopra, A.K. (1989). **Earthquake Analysis and Response of Intake-Outlet Towers**, University of California, Earthquake Engineering Research Center, Report UBC/EERC-89/04, 427 pp.

International Conference of Buildings Officials (1997). **Uniform Building Code** [UBC], Volumes 1 to 3.

Kennedy, M.P.; Clarke, S.H., Greene, H.G.; Legg, M.R. (1980). **Recency and Character of Faulting, Offshore Metropolitan San Diego, California**, California Division of Mines and Geology, Map Sheet No. 42.

Kennedy, M.P.; and others (1975). **Recency and Character of Faulting, San Diego Metropolitan Area, California**, CDMG Special report No. 123, 33 pp.

Kennedy, M.P.; and others (1979). **Recency and Character of Faulting Offshore from Metropolitan San Diego, California**, USGS, Menlo Park, CA.

Lamar, D.L.; et al (1975). **Application of Skylab and ERTS Imagery to Fault Tectonics and Earthquake Hazards of Peninsular Ranges, Southwestern California**, Earth Sciences Corporation, Technical Report 75-2, Santa Monica, California

Lamar, D.L.; Swanson, S.C. (1981). **Study of Seismic Activity by Selective Trenching along the Elsinore Fault Zone, Southern California**, USGS Open File Report 81-0882

Legg, M.R. (1985). **Geological Structure and Tectonics of the Inner Continental Borderland Offshore Northern Baja California Mexico**, Ph.D. Thesis, University of California, Santa Barbara.

Mow, C.C.; Mente, L.J. (1963). **Dynamic Stresses and Displacements Around Cylindrical Discontinuities Due to Planar Harmonic Shear Waves**, Journal of Applied Mechanics, Transactions ASME, 30(4):598, December, pp. 598-604.

Newmark, N. M.; Hall, W. J. (1982). in **Earthquake Spectra and Design**, Earthquake Engineering Research Institute (EERI), Monograph Series, Vol. 3, 103 pp.

Newmark (1968). **Problems in Wave Propagation in Soil and Rock**, International Symposium on Wave Propagation and Dynamic Properties of Earth Materials, August 23035, U. of New Mexico, Albuquerque, Proceedings, pp. 7-26.

Noret, C.; Da Rin, E.M.; Modaressi, A.; Carrère, A. (1998). **Seismic Vulnerability Assessment of Masonry Gravity Dams**, DG12 Workshop on *Reducing Earthquake Risks to Structures and Monuments in the European Union*, Cambridge, Great Britain, Nov. 26-27, 13 pp.

Pao, Y.H.; Mow, C.C. (1973). **Diffraction of Elastic Waves and Dynamic Stress Concentrations**, Rand Corporation research Study, Crane-Russak, Publisher, 694 pp.

Raphael, J.M. (1984). **Tensile Strength of Concrete**, ACI Journal, Technical Paper, March-April Issue, pp. 158-165.

Rockwell, T.K. (1989). **Behavior of Individual Fault Segments along the Elsinore-Laguna Salada Fault Zone and Northern Baja California: Implications for the Characteristic Earthquake Model in Fault Segmentation and Control of Rupture Initiation and Termination**, USGS Open File Report 89-315.

Rockwell, T.K., Lindvall, S.C., Haraden, C.C., Hibayashi, C.K., and Baker, E., (1989). **Minimum Holocene Slip Rate for the Rose Canyon Fault in San Diego, California** in Abbott, P.L. and Elliot, W.J., Eds., "Environmental Perils, San Diego Region," published for the Geological Society of American Annual Meeting by the San Diego Association of Geologists.

Rockwell, T.K.; Hatch, M.E.; Schug, D.L. (1987). **Late Quaternary Rates: Agua Blanca and Borderland Faults**, Final Technical Report, U.S. Geol. Survey, 122 pp.

Rockwell, T.K.; Loughman, C.; Merrifield, T. (1989). **Late Quaternary rate of Slip Along the San Jacinto Fault Zone, Southern California**, Journal Geophys. Research.

Sadigh, K.R. (1989). **Attenuation Relationships for Horizontal Peak Ground Acceleration and Response Spectral Accelerations for Rock Sites**, Seismological Research Letters, Vol. 60, No. 1, January- March, p. 19

SAP2000 (1999). Version 7.10, computers and Structures, Inc., Berkeley, California.

Seismological Research Letters, Seismological Society of America [SSA] (1989). Vol. 60, No. 1, January-March, papers by Abrahamson and Silva; Boore, et al.; Sadigh and Campbell.

Sharma, S.; Judd, W.R. (1991). **Underground Opening Damage from Earthquakes**, Engineering Geology, Volume 30.

Tynes, W.O. (1963). **Investigation of Methods of Preparing Horizontal Construction Joints in Concrete**, Technical Report No. 6-518, Report 2, *Test of Joints in Large Blocks*, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Miss., August.

Tynes, W.O. (1959). **Investigation of Methods of Preparing Horizontal Construction Joints in Concrete**, Technical Report No. 6-518, Report 1, US Army Engineer Waterways Experimental Station, Vicksburg, Miss., July.

United States Committee on Large Dams (1985). **Guidelines for Selecting Seismic Parameters for Dam Projects**, USCOLD Publication, Committee on Earthquakes, October, 39 pp.

United States Committee on Large Dams [USCOLD] (1999). **Updated Guidelines for Selecting Seismic Parameters for Dam Projects**, USCOLD Publication, Committee on Earthquakes, April, 63 pp.

United States Committee on Large Dams [USCOLD] (1995). **Guidelines for Earthquake Design and Evaluation of Structures Appurtenant to Dams**, USCOLD Publication, Committee on Earthquakes, May, 75 pp.

United States Committee on Large Dams [USCOLD] (1988). **Development of Dam Engineering in the United States**, Published for XVIth ICOLD Congress, San Francisco, USA, *"No. 3-1 Sweetwater Dam,"* Kollgaard, Chadwick, Editors, Pergamon Press, pp. 319-330.

URS (2001). **Safety Inspection Report, Sweetwater Dam**, Report to Sweetwater Authority, Sweetwater Authority File B.P. 99-36E, February.

Waters, T. (1954). **A Study of the Tensile Strength of Concrete Across Construction Joints**, Magazine of Concrete Research, Cement and Concrete Association, London, England, Vol. 6, No. 18, Dec., pp. 151-153.

Woodward-Clyde Consultants (1975). **Study of the Behavior and Stability of the Sweetwater Arch Dam, San Diego County, CA**.

Yerkes, R.F. (1972). **Geology and Oil Resources of the Western Puente Hills Area, Southern California**, USGS Professional Paper 420-C, p. 63

Tables

Table 1

Schmidt Hammer Rebound Measurements

SWEETWATER MAIN DAM OUTLET TOWER, CA

MEASUREMENTS AT VARIOUS TOWER AND DAM ABUTMENT LOCATIONS

(Random locations)

Test Number	Material Tested	Hammer Position	Rebound Value (R)	Compressive Strength (psi)	Comments
1	Concrete	Horizontal	50	7,416	Side of top platform
2	Concrete	Vertical	49	7,889	Top of operating platform
3	Concrete	Vertical	48	7,667	Top of operating platform
4	Concrete	Vertical	46	7,222	Top of operating platform
5	Concrete	Vertical	52	8,556	Top of operating platform
6	Concrete	Vertical	45	7,000	Top of operating platform
7	Concrete	Vertical	44	6,778	Top of operating platform
8	Concrete	Horizontal	42	5,683	Side of tower, from boat
9	Concrete	Horizontal	48	6,983	Side of tower, from boat
10	Concrete	Horizontal	50	7,416	Side of tower, from boat
11	Concrete	Horizontal	46	6,550	Side of tower, from boat
12	Mortar	Horizontal	30	3,083	At dam left abutment
13	Mortar	Horizontal	32	3,516	At dam left abutment
14	Mortar	Horizontal	33	3,733	At dam left abutment
15	Mortar	Horizontal	44	6,116	At dam left abutment
16	Mortar	Horizontal	30	3,083	At dam left abutment
17	Mortar	Horizontal	29	2,866	At dam left abutment
18	Mortar	Horizontal	30	3,083	At dam left abutment
19	Mortar	Horizontal	36	4,383	At dam left abutment
20	Mortar	Horizontal	38	4,816	At dam left abutment
21	Mortar	Horizontal	40	5,250	At dam left abutment
22	Mortar	Horizontal	31	3,300	At dam left abutment
23	Mortar	Horizontal	33	3,733	At dam left abutment
24 [4]	Stone	Horizontal	62	35,000 *	At dam left abutment
25 [4]	Stone	Horizontal	62	35,000 *	At dam left abutment
26 [4]	Stone	Horizontal	60	31,000 *	At dam left abutment
27 [4]	Stone	Horizontal	65	45,000 *	At dam left abutment
28 [4]	Stone	Horizontal	70	59,000 *	At dam left abutment
29 [4]	Stone	Horizontal	70	59,000 *	At dam left abutment
30 [4]	Stone	Horizontal	65	45,000 *	At dam left abutment
31 [4]	Stone	Horizontal	67	47,000 *	At dam left abutment
32 [4]	Stone	Horizontal	70	59,000 *	At dam left abutment
33 [4]	Stone	Horizontal	70	59,000 *	At dam left abutment

NOTES

[1] All surfaces were grounded smooth prior to measurements. Uncorrected N-type rebounds are listed.

[2] Masonry stone and mortar were tested at dam left abutment, as masonry is not visible at tower.

[3] Dynamic strength is measured, as it is based on instantaneous hammer rebound.

[4] Different correlations between rebound and compressive strength are used for stone or concrete.

f'c CONCRETE:	**7,196**	**psi**	**STD. DEV.**	**714**	**psi**
f'c MASONRY MORTA	**3,914**	**psi**	**STD. DEV.**	**976**	**psi**
f'c MASONRY STONE:	**47,400**	**psi ***	**STD. DEV.**	**10,613**	**psi**

* Corrected from N- to L-type hammer and use of Deere and Miller (1966) rock R-f'c (L-type) correlation.

SCHMIDT.wq!

Table 2

Deterministic Peak Ground Acceleration Estimates

SWEETWATER MAIN DAM OUTLET TOWER, CA

Fault Name	M_{max}	Distance (km)	Peak Ground Acceleration, (g)			
			50th Percentile		84th Percentile	
			Horizontal	Vertical	Horizontal	Vertical
La Nacion	6.7	4	0.49	0.51	0.77	0.90
Rose Canyon	7.0	13	0.28	0.24	0.43	0.41
Agua Blanca-Coronado	7.2	28	0.15	0.11	0.24	0.20
San Miguel-Vallecitos	7.0	43	0.09	0.06	0.14	0.10
San Diego Trough	7.2	50	0.08	0.05	0.13	0.10
Elsinore-Laguna Salada	7.5	60	0.08	0.05	0.13	0.10

Mmax = Earthquake magnitude
50th Percentile = mean value
84th Percentile = mean-plus-one standard deviation

Table 3
Deterministic Horizontal Response Spectra

FAULTS NAME:

[1] LA NACION	**M = 6.7 [Mw]**	**d = 4 km**
[2] ROSE CANYON	**M = 7.0 [Mw]**	**d = 13 km**
[3] AGUA BLANCA - CORONADO BANK	**M = 7.2 [Mw]**	**d = 28 km**
[4] SAN MIGUEL - VALLECITOS	**M = 7.0 [Mw]**	**d = 43 km**
[5] SAN DIEGO TROUGH	**M = 7.2 [Mw]**	**d = 50 km**
[6] ELSINORE - LAGUNA SALADA	**M = 7.5 [Mw]**	**d = 60 km**

COMPONENT: **HORIZONTAL (Rock)** PERCENTILE: **50th** **Average of 4**

T (sec)	[1] La Nacion	[2] Rose Canyon	[3] Coronado	[4] San Miguel	[5] San Diego	[6] Elsinore
0.010	0.49	0.28	0.15	0.09	0.08	0.08
0.020	0.49	0.28	0.15	0.09	0.08	0.08
0.030	0.55	0.31	0.17	0.09	0.09	0.09
0.040	0.62	0.35	0.19	0.10	0.10	0.09
0.050	0.69	0.38	0.20	0.11	0.10	0.10
0.060	0.75	0.41	0.22	0.12	0.11	0.11
0.075	0.83	0.45	0.23	0.13	0.12	0.11
0.090	0.91	0.49	0.26	0.14	0.13	0.12
0.100	0.96	0.52	0.27	0.15	0.14	0.13
0.120	1.02	0.56	0.29	0.16	0.15	0.14
0.150	1.08	0.60	0.31	0.17	0.16	0.15
0.170	1.09	0.61	0.32	0.18	0.17	0.16
0.200	1.09	0.61	0.33	0.18	0.17	0.16
0.240	1.04	0.59	0.32	0.18	0.17	0.16
0.300	0.96	0.55	0.30	0.17	0.16	0.16
0.360	0.86	0.50	0.28	0.16	0.15	0.15
0.400	0.81	0.47	0.27	0.15	0.15	0.15
0.460	0.73	0.43	0.25	0.14	0.14	0.14
0.500	0.68	0.40	0.23	0.13	0.13	0.13
0.600	0.58	0.35	0.21	0.11	0.11	0.12
0.750	0.47	0.28	0.17	0.10	0.10	0.10
0.850	0.41	0.25	0.15	0.09	0.09	0.09
1.000	0.34	0.21	0.13	0.07	0.08	0.08
1.500	0.21	0.14	0.09	0.05	0.05	0.06
2.000	0.14	0.10	0.07	0.04	0.04	0.04
3.000	0.08	0.06	0.04	0.02	0.02	0.03
4.000	0.05	0.03	0.02	0.01	0.01	0.02
5.000	0.03	0.02	0.02	0.01	0.01	0.01

Note: geometric average is used

Table 4
Deterministic Vertical Response Spectra

FAULTS NAME:

[1] LA NACION	**M = 6.7 [Mw]**	**d = 4 km**
[2] ROSE CANYON	**M = 7.0 [Mw]**	**d = 13 km**
[3] AGUA BLANCA - CORONADO BANK	**M = 7.2 [Mw]**	**d = 28 km**
[4] SAN MIGUEL - VALLECITOS	**M = 7.0 [Mw]**	**d = 43 km**
[5] SAN DIEGO TROUGH	**M = 7.2 [Mw]**	**d = 50 km**
[6] ELSINORE - LAGUNA SALADA	**M = 7.5 [Mw]**	**d = 60 km**

COMPONENT: **VERTICAL (Rock)** PERCENTILE: **50th** **Average of 4**

T (sec)	[1] La Nacion	[2] Rose Canyon	[3] Coronado	[4] San Miguel	[5] San Diego	[6] Elsinore
0.010	0.51	0.24	0.11	0.06	0.05	0.05
0.020	0.51	0.24	0.11	0.06	0.05	0.05
0.030	0.60	0.27	0.12	0.06	0.06	0.06
0.040	0.80	0.35	0.15	0.08	0.07	0.07
0.050	1.00	0.43	0.19	0.09	0.09	0.08
0.060	1.13	0.49	0.22	0.10	0.10	0.09
0.075	1.27	0.55	0.24	0.12	0.11	0.10
0.090	1.28	0.55	0.24	0.12	0.11	0.10
0.100	1.28	0.55	0.24	0.11	0.11	0.10
0.120	1.18	0.51	0.23	0.11	0.10	0.10
0.150	1.05	0.47	0.21	0.11	0.10	0.10
0.170	0.94	0.43	0.20	0.10	0.09	0.09
0.200	0.80	0.37	0.18	0.09	0.08	0.08
0.240	0.65	0.31	0.15	0.08	0.07	0.07
0.300	0.50	0.24	0.12	0.07	0.06	0.06
0.360	0.41	0.20	0.10	0.05	0.05	0.05
0.400	0.36	0.18	0.09	0.05	0.05	0.05
0.460	0.30	0.15	0.08	0.04	0.04	0.04
0.500	0.28	0.14	0.07	0.04	0.04	0.04
0.600	0.23	0.12	0.07	0.04	0.04	0.04
0.750	0.19	0.10	0.06	0.03	0.03	0.03
0.850	0.17	0.09	0.05	0.03	0.03	0.03
1.000	0.15	0.08	0.04	0.02	0.02	0.03
1.500	0.11	0.06	0.03	0.02	0.02	0.02
2.000	0.07	0.04	0.02	0.01	0.01	0.01
3.000	0.05	0.03	0.02	0.01	0.01	0.01
4.000	0.03	0.02	0.01	0.01	0.01	0.01
5.000	0.02	0.01	0.01	0.00	0.00	0.01

Note: geometric average is used

Table 5

USGS Probabilistic Ground Motion Estimates

SWEETWATER MAIN DAM OUTLET TOWER, CA

Probability of occurrence in 50 years	Return Period (years)	Peak Ground Acceleration (g)	0.2 Second Spectral Acceleration (g)	0.3 Second Spectral Acceleration (g)	1.0 Second Spectral Acceleration (g)
10%	475	0.21	0.49	0.44	0.18
5%	975	0.28	0.64	0.61	0.25
2%	2,475	0.38	1.06	0.99	0.36

Table 6

Analysis Properties for Masonry Mortar and Stone Masonry

SWEETWATER MAIN DAM OUTLET TOWER, CA

Analysis Parameter	Average - sigma	Average	Average + sigma
Masonry Mortar Only			
Sustained Static Compressive Strength (psi)	2,417	3,250	4,083
Dynamic Compressive Strength (psi)	2,900	3,900	4,900
Dynamic Tensile Strength (psi)	338	455	572
Dynamic Shear Strength (psi)	128	148	166
Equivalent Horizontal Joint Between Stone and Masonry			
Dynamic Tensile Strength (psi)	245	330	415
Dynamic Shear Strength (psi)	93	107	120
Stone Masonry			
Dynamic Modulus of Elasticity (million psi)	1.25	5.0	8.75
Poisson's ratio	0.12	0.15	0.18

Table 7
Nodal Point Coordinates

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

Node	X (ft)	Y (ft)	Z (ft)	Z (in)	DZ (in)
21	0.000	0.000	239.30	2,871.6	
					42.6
20	0.000	0.000	235.75	2,829.0	
					108.0
19	0.000	0.000	226.75	2,721.0	
					108.0
18	0.000	0.000	217.75	2,613.0	
					30.0
17	0.000	0.000	215.25	2,583.0	
					30.0
16	0.000	0.000	212.75	2,553.0	
					60.0
15	0.000	0.000	207.75	2,493.0	
					60.0
14	0.000	0.000	202.75	2,433.0	
					60.0
13	0.000	0.000	197.75	2,373.0	
					60.0
12	0.000	0.000	192.75	2,313.0	
					60.0
11	0.000	0.000	187.75	2,253.0	
					60.0
10	0.000	0.000	182.75	2,193.0	
					60.0
9	0.000	0.000	177.75	2,133.0	
					60.0
8	0.000	0.000	172.75	2,073.0	
					60.0
7	0.000	0.000	167.75	2,013.0	
					60.0
6	0.000	0.000	162.75	1,953.0	
					46.5
5	0.000	0.000	158.88	1,906.5	
					46.5
4	0.000	0.000	155.00	1,860.0	
					58.2
3	0.000	0.000	150.15	1,801.8	
					58.2
2	0.000	0.000	145.30	1,743.6	
					75.6
1	0.000	0.000	139.00	1,668.0	

Table 8

Cross-Section Areas

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

NODE / SECTION NUMBER	NODE Z (ft)	NODE Z (in)	SECTION Z (in)	SECTION Ri (in) [Note 1]	SECTION Ro (in) [Note 1]	A-GROSS (Ag) (in**2)	A-SHEAR (As) (in**2)
21	239.30	2,871.6					
20			2,850.3	31.2	80.4	13,575	11,810
20	235.75	2,829.0					
19			2,775.0	31.2	80.4	13,575	11,810
19	226.75	2,721.0					
18			2,667.0	31.2	80.4	13,575	11,810
18	217.75	2,613.0					
17			2,598.0	31.2	80.4	13,723	11,939
17	215.25	2,583.0					
16			2,568.0	31.2	80.4	13,723	11,939
16	212.75	2,553.0					
15			2,523.0	31.2	80.4	13,954	12,140
15	207.75	2,493.0					
14			2,463.0	31.2	80.4	13,954	12,140
14	202.75	2,433.0					
13			2,403.0	31.2	80.4	14,265	12,411
13	197.75	2,373.0					
12			2,343.0	31.2	80.4	14,265	12,411
12	192.75	2,313.0					
11			2,283.0	31.2	80.4	14,265	12,411
11	187.75	2,253.0					
10			2,223.0	31.2	80.4	14,265	12,411
10	182.75	2,193.0					
9			2,163.0	31.2	80.4	14,265	12,411
9	177.75	2,133.0					
8			2,103.0	31.2	80.4	14,265	12,411
8	172.75	2,073.0					
7			2,043.0	31.2	80.4	14,265	12,411
7	167.75	2,013.0					
6			1,983.0	31.2	80.4	14,265	12,411
6	162.75	1,953.0					
5			1,929.8	31.2	80.4	14,265	12,411
5	158.88	1,906.5					
4			1,883.3	31.2	80.4	14,265	12,411
4	155.00	1,860.0					
3			1,830.9	31.2	80.4	18,945	16,482
3	150.15	1,801.8					
2			1,772.7	31.2	80.4	13,185	11,471
2	145.30	1,743.6					
1			1,705.8	31.2	80.4	21,474	18,682
1 [fixed]	139.00	1,668.0					

Note 1: Ri and Ro designate maximum hexagonal radii.
Note 2: For tower bottom, Ro is minimum distance from hexagon center to side of equivalent section.
Note 3: For sections 14 to 20, areas were reduced for encroachment of valves 7, 8 and 9.

Table 9

Sections Moments of Inertia

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

NODE / SECTION NUMBER	Z (ft)	Z (in)	Z (ft)	Ri (in)	Ro (in)	Ixx (in**4)	Iyy (in**4)	J (in**4)
21	239.30	2871.6						
20			237.53	31.2	80.4	2.136E+07	2.137E+07	4.273E+07
20	235.75	2829.0						
19			231.25	31.2	80.4	2.136E+07	2.137E+07	4.273E+07
19	226.75	2721.0						
18			222.25	31.2	80.4	2.136E+07	2.137E+07	4.273E+07
18	217.75	2613.0						
17			216.50	31.2	80.4	2.136E+07	2.137E+07	4.274E+07
17	215.25	2583.0						
16			214.00	31.2	80.4	2.136E+07	2.137E+07	4.274E+07
16	212.75	2553.0						
15			210.25	31.2	80.4	2.168E+07	2.169E+07	4.337E+07
15	207.75	2493.0						
14			205.25	31.2	80.4	2.168E+07	2.169E+07	4.337E+07
14	202.75	2433.0						
13			200.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
13	197.75	2373.0						
12			195.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
12	192.75	2313.0						
11			190.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
11	187.75	2253.0						
10			185.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
10	182.75	2193.0						
9			180.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
9	177.75	2133.0						
8			175.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
8	172.75	2073.0						
7			170.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
7	167.75	2013.0						
6			165.25	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
6	162.75	1953.0						
5			160.81	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
5	158.88	1906.5						
4			156.94	31.2	80.4	2.208E+07	2.209E+07	4.416E+07
4	155.00	1860.0						
3			152.58	31.2	80.4	3.157E+07	7.413E+07	1.057E+08
3	150.15	1801.8						
2			147.73	31.2	80.4	2.557E+07	3.778E+07	6.335E+07
2	145.30	1743.6						
1			142.15	0.0	80.4	3.208E+07	7.466E+07	1.062E+08
1 [fixed]	139.00	1668.0						

Note 1: Ri and Ro designate maximum hexagonal radii.
Note 2: For all elements, averaged properties are being used and include adjustment for openings.
Note 3: Inertias adiusted for valve encroachment of valves 7. 8. 9.

Table 10
Nodal Point Masses

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

NODE NUMBER	SECTION NUMBER	NP MASS [dry] (lbs.s2/in)	OUTSIDE WATER MASS	INSIDE WATER MASS	NP MASS [w/water] (lbs.s2/in)
21		179.91	0.00	0.00	179.91
	20				
20		266.67	20.51	15.45	302.62
	19				
19		369.18	83.08	15.45	467.71
	18				
18		243.65	26.50	4.29	274.44
	17				
17		103.67	26.64	4.29	134.60
	16				
16		164.47	53.56	8.58	226.62
	15				
15		210.82	92.57	14.67	318.07
	14				
14		220.40	109.41	17.16	346.97
	13				
13		215.53	110.54	17.16	343.23
	12				
12		222.75	111.00	17.16	350.91
	11				
11		215.53	111.23	17.16	343.92
	10				
10		222.75	111.46	17.16	351.37
	9				
9		215.53	111.68	17.16	344.37
	8				
8		222.75	112.03	17.16	351.94
	7				
7		215.53	112.25	17.16	344.94
	6				
6		198.50	99.83	15.23	313.56
	5				
5		167.03	87.44	13.30	267.77
	4				
4		222.34	98.74	14.97	336.05
	3				
3		235.44	109.88	16.65	361.97
	2				
2		301.02	126.43	19.14	446.59
	1				
1		fixed	fixed	fixed	0.00

Note 1: Tower inside is assumed to be dewatered during postulated occurrence of earthquake.
Note 2: Node masses have been adjusted to account for presence of valve openings, saucer valves, footbridge, operating platform and equipment.

Table 11
Principal Modes of Vibration

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

with inside of tower full of water

RESERVOIR ELEVATION: 237.00 feet

CASE Number	MASONRY f'c (psi)	Mode 1 (Hz) Y, X	Mode 2 (Hz) Y, X	Mode 3 (Hz)	Mode 4 (Hz) Y, X

===> *VALUES BELOW ARE FOR UNCRACKED TOWER SHAFT*
[Gross section properties were used]

1	2,417	0.96, 1.08	5.22, 5.67	12.40	13.54, 14.27
2	3,250	1.95, 2.20	10.62, 11.53	25.32	27.45, 28.91
3	4,083	2.59, 2.92	14.07, 15.27	33.59	36.33,38.24

Note :
Mode 1 = First Bending Mode of Vibration (Y and X)
Mode 2 = Second Bending Mode of Vibration (Y and X)
Mode 3 = First Vertical Mode of Vibration (Z)
Mode 4 = Third Bending Mode of Vibration (Y and X)

Table 12
Gross Section Moment Capacity
Intact Masonry Mortar

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA
475-year earthquake

PGA (H)	0.21	g
PGA (V) =	0.15	g

Rw = 1.0

Strength reduction factor for bending: **0.90**
The dynamic tensile strength is considered
Calculations include vertical [static - dynamic] loads
% of peak axial dynamic load used **75**

					INTACT MASONRY MORTAR FACTORED GROSS MOMENT CAPACITY [in Kips.in x 1,000]		
NODE NUMBER	SECTION NUMBER	Ro (in)	Igross (in**4)	f'c >>	2,417	3,250	4,083
				ft >>	338	455	572
21							
	20	80.4	2.14E+07		81.7	109.7	137.7
20							
	19	80.4	2.14E+07		83.7	111.9	140.0
19							
	18	80.4	2.14E+07		85.8	114.1	142.2
18							
	17	80.4	2.14E+07		86.3	114.7	142.8
17							
	16	80.4	2.14E+07		86.9	115.3	143.4
16							
	15	80.4	2.17E+07		89.2	118.1	146.7
15							
	14	80.4	2.17E+07		90.3	119.3	148.0
14							
	13	80.4	2.21E+07		93.0	122.6	151.8
13							
	12	80.4	2.21E+07		94.2	123.9	153.1
12							
	11	80.4	2.21E+07		95.3	125.1	154.4
11							
	10	80.4	2.21E+07		96.5	126.4	155.6
10							
	9	80.4	2.21E+07		97.7	127.6	156.9
9							
	8	80.4	2.21E+07		98.9	128.9	158.2
8							
	7	80.4	2.21E+07		100.0	130.2	159.5
7							
	6	80.4	2.21E+07		101.2	131.4	160.8
6							
	5	80.4	2.21E+07		102.1	132.4	161.8
5							
	4	80.4	2.21E+07		103.0	133.4	162.8
4							
	3	80.4	7.41E+07		333.5	434.4	532.9
3							
	2	80.4	3.78E+07		183.7	236.2	286.7
2							
	1	80.4	7.47E+07		336.9	438.7	537.9
1							

Note: Ro designate distance to extreme fiber for hexagonal section

Table 13
Gross Section Moment Capacity
Stone-Mortar Joints

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA
475-year earthquake

PGA (H)	0.21	g
PGA (V) =	0.15	g

Rw = 1.0

Strength reduction factor for bending: **0.90**
The dynamic modulus of rupture is being considered
Calculations include vertical [static - dynamic] loads
% of peak axial dynamic load used 75
Lift joint strength reduction factor: 0.725

NODE NUMBER	SECTION NUMBER	Ro (in)	Igross (in**4)	MORTAR-STONE JOINTS FACTORED GROSS MOMENT CAPACITY [in Kips.in x 1,000] f'c >> / ftj >>	2,417 / 245	3,250 / 330	4,083 / 415
21							
	20	80.4	2.14E+07		59.4	79.8	100.1
20							
	19	80.4	2.14E+07		61.5	82.0	102.3
19							
	18	80.4	2.14E+07		63.5	84.2	104.6
18							
	17	80.4	2.14E+07		64.0	84.7	105.2
17							
	16	80.4	2.14E+07		64.6	85.3	105.8
16							
	15	80.4	2.17E+07		66.6	87.7	108.5
15							
	14	80.4	2.17E+07		67.8	89.0	109.8
14							
	13	80.4	2.21E+07		70.0	91.7	112.9
13							
	12	80.4	2.21E+07		71.2	92.9	114.2
12							
	11	80.4	2.21E+07		72.4	94.2	115.5
11							
	10	80.4	2.21E+07		73.5	95.4	116.8
10							
	9	80.4	2.21E+07		74.7	96.7	118.0
9							
	8	80.4	2.21E+07		75.9	98.0	119.3
8							
	7	80.4	2.21E+07		77.0	99.2	120.6
7							
	6	80.4	2.21E+07		78.2	100.5	121.9
6							
	5	80.4	2.21E+07		79.1	101.5	122.9
5							
	4	80.4	2.21E+07		80.0	102.4	123.9
4							
	3	80.4	7.41E+07		256.3	330.6	402.4
3							
	2	80.4	3.78E+07		144.4	183.2	220.2
2							
	1	80.4	7.47E+07		259.2	334.1	406.4
1							

Note: Ro designate distance to extreme fiber for hexagonal section

Table 14
Gross Section - Shear Capacity
Intact Masonry Mortar

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA
475-year earthquake

PGA (H)	0.21	g
PGA (V) =	0.15	g

Strength reduction factor for shear = **0.85**
Small capacity increase from vertical load is ignored
Stress increase factor for shape = 1.855

Rw = 1.0

				INTACT MASONRY MORTAR FACTORED GROSS CAPACITY [in Kips]			
NODE NUMBER	ELEV. (ft)	SECTION NUMBER	Shear Area (in**2)	f'c >>	2,417	3,250	4,083
				vc >>	128	148	166
21	239.30						
		20	11810		692	802	899
20	235.75						
		19	11810		692	802	899
19	226.75						
		18	11810		692	802	899
18	217.75						
		17	11939		699	811	909
17	215.25						
		16	11939		699	811	909
16	212.75						
		15	12140		711	825	924
15	207.75						
		14	12140		711	825	924
14	202.75						
		13	12411		727	843	945
13	197.75						
		12	12411		727	843	945
12	192.75						
		11	12411		727	843	945
11	187.75						
		10	12411		727	843	945
10	182.75						
		9	12411		727	843	945
9	177.75						
		8	12411		727	843	945
8	172.75						
		7	12411		727	843	945
7	167.75						
		6	12411		727	843	945
6	162.75						
		5	12411		727	843	945
5	158.88						
		4	12411		727	843	945
4	155.00						
		3	16482		965	1119	1255
3	150.15						
		2	11471		672	779	873
2	145.30						
		1	18682		1094	1269	1422
1	139.00						

Table 15
Gross Section - Shear Capacity
Stone-Mortar Joints

Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA
475-year earthquake

PGA (H)	0.21	g
PGA (V) =	0.15	g

Rw = 1.0

Strength reduction factor for shear = **0.85**
Small capacity increase from vertical load is ignored
Stress increase factor for shape = 1.855
Mortar joint strength reduction factor: 0.73

NODE NUMBER	ELEV. (ft)	SECTION NUMBER	Shear Area (in**2)		MORTAR-STONE JOINTS FACTORED GROSS CAPACITY [in Kips]		
				f'c >>	2,417	3,250	4,083
				vcj >>	93	107	120
21	239.30						
		20	11810		501	582	652
20	235.75						
		19	11810		501	582	652
19	226.75						
		18	11810		501	582	652
18	217.75						
		17	11939		507	588	659
17	215.25						
		16	11939		507	588	659
16	212.75						
		15	12140		515	598	670
15	207.75						
		14	12140		515	598	670
14	202.75						
		13	12411		527	611	685
13	197.75						
		12	12411		527	611	685
12	192.75						
		11	12411		527	611	685
11	187.75						
		10	12411		527	611	685
10	182.75						
		9	12411		527	611	685
9	177.75						
		8	12411		527	611	685
8	172.75						
		7	12411		527	611	685
7	167.75						
		6	12411		527	611	685
6	162.75						
		5	12411		527	611	685
5	158.88						
		4	12411		527	611	685
4	155.00						
		3	16482		700	812	910
3	150.15						
		2	11471		487	565	633
2	145.30						
		1	18682		793	920	1031
1	139.00						

Table 16
Gross Response - Demand/Capacity (D/C) Ratios
SWEETWATER MAIN DAM OUTLET TOWER
SWEETWATER AUTHORITY, Chula Vista, CA

Reservoir water level: 237
Eqk load condition: La Nacion MCE

MOMENT LOADING

NODAL POINT	SECTION NUMBER	Elevation (ft)	INTACT MORTAR MORTAR STRENGTH (psi)			STONE-MORTAR JOINTS BOND STRENGTH (psi)		
			338	455	572	245	330	415
21		239.30	0.00	0.00	0.00	0.00	0.00	0.00
	20	237.53	0.02	0.02	0.02	0.03	0.03	0.02
20		235.75	0.04	0.04	0.03	0.06	0.05	0.04
	19	231.25	0.16	0.15	0.13	0.23	0.21	0.18
19		226.75	0.29	0.26	0.23	0.40	0.36	0.32
	18	222.25	0.47	0.45	0.40	0.64	0.62	0.55
18		217.75	0.65	0.64	0.57	0.89	0.88	0.78
	17	216.50	0.70	0.70	0.62	0.97	0.96	0.86
17		215.25	0.75	0.76	0.68	1.04	1.05	0.94
	16	214.00	0.81	0.82	0.74	1.11	1.13	1.02
16		212.75	0.85	0.88	0.79	1.18	1.21	1.09
	15	210.25	0.95	1.01	0.91	1.31	1.39	1.25
15		207.75	1.06	1.14	1.03	1.46	1.57	1.43
	14	205.25	1.16	1.29	1.17	1.61	1.78	1.62
14		202.75	1.26	1.42	1.30	1.74	1.96	1.79
	13	200.25	1.35	1.56	1.44	1.86	2.16	1.99
13		197.75	1.45	1.72	1.59	2.00	2.37	2.19
	12	195.25	1.55	1.88	1.75	2.13	2.60	2.41
12		192.75	1.64	2.05	1.90	2.27	2.82	2.63
	11	190.25	1.74	2.22	2.07	2.40	3.06	2.86
11		187.75	1.84	2.39	2.24	2.54	3.30	3.09
	10	185.25	1.94	2.57	2.41	2.68	3.55	3.33
10		182.75	2.04	2.75	2.59	2.82	3.79	3.57
	9	180.25	2.15	2.94	2.77	2.97	4.05	3.82
9		177.75	2.26	3.12	2.95	3.11	4.31	4.07
	8	175.25	2.37	3.32	3.14	3.28	4.57	4.33
8		172.75	2.49	3.51	3.32	3.44	4.84	4.58
	7	170.25	2.62	3.71	3.51	3.62	5.11	4.84
7		167.75	2.75	3.90	3.70	3.79	5.38	5.10
	6	165.25	2.89	4.11	3.89	3.99	5.66	5.37
6		162.75	3.04	4.31	4.09	4.19	5.95	5.64
	5	160.81	3.16	4.47	4.24	4.36	6.17	5.85
5		158.88	3.28	4.63	4.39	4.52	6.39	6.05
	4	156.94	3.41	4.79	4.54	4.70	6.61	6.26
4		155.00	1.65	2.31	2.19	2.27	3.19	3.02
	3	152.58	1.13	1.58	1.49	1.55	2.17	2.05
3		150.15	1.55	2.14	2.03	2.13	2.96	2.80
	2	147.73	2.34	3.21	3.04	3.23	4.43	4.20
2		145.30	1.69	2.31	2.18	2.33	3.18	3.01
	1	142.15	1.36	1.85	1.75	1.88	2.55	2.41
1		139.00	1.44	1.94	1.83	1.99	2.67	2.52

Table 17
Gross Response - Demand/Capacity (D/C) Ratios
SWEETWATER MAIN DAM OUTLET TOWER
SWEETWATER AUTHORITY, Chula Vista, CA

Reservoir water level: 237
Eqk load condition: Rose Canyon Earthquake

MOMENT LOADING

NODAL POINT	SECTION NUMBER	Elevation (ft)	INTACT MORTAR MORTAR STRENGTH (psi)			STONE-MORTAR JOINTS BOND STRENGTH (psi)		
			338	455	572	245	330	415
21		239.30	0.00	0.00	0.00	0.00	0.00	0.00
	20	237.53	0.01	0.01	0.01			0.01
20								0.02
	19							0.10
19								0.18
	18							0.31
18								0.45
	17							0.49
17								0.53
	16							0.58
16								0.62
	15							0.71
15								0.81
	14							0.92
14								1.02
	13							1.13
13								1.24
	12							1.37
12								1.49
	11							1.62
11		187.75	1.06	1.36	1.27			1.75
	10	185.25	1.12	1.46	1.37			1.89
10		182.75	1.18	1.56	1.47			2.02
	9	180.25	1.24	1.67	1.57			2.16
9		177.75	1.30	1.77	1.67			2.30
	8	175.25	1.37	1.88	1.78			2.45
8								2.59
	7							2.74
7								2.88
	6							3.03
6								3.18
	5							3.30
5		158.88	1.87	2.61	2.47	2.57		3.41
	4	156.94	1.93	2.69	2.56	2.67		3.53
4		155.00	0.94	1.31	1.24	1.30		1.71
	3							1.16
3		150.15	0.88	1.21	1.14	1.21	1.67	1.58
	2	147.73	1.30	1.79	1.70	1.79	2.47	2.35
2		145.30	0.95	1.30	1.23	1.32	1.79	1.69
	1							1.36
1								1.42

Table 18
Gross (uncracked) Moment Response
475-year earthquake
Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

Reservoir water level: 237 ft

BENDING MOMENT [Kips.in x 1000]

NODAL POINT	Elevation (ft)	SECTION NUMBER	Elevation (ft)	DYN. ELASTICITY MODULUS (psi)		
				1.25 E6	5.0 E6	8.75 E6
21	239.30			0	0	0
		20	237.53			
20	235.75			2	2	2
		19	231.25			
19	226.75			11	14	15
		18	222.25			
18	217.75			26	33	37
		17	216.50			
17	215.25			30	40	44
		16	214.00			
16	212.75			34	46	52
		15	210.25			
15	207.75			44	61	69
		14	205.25			
14	202.75			53	78	88
		13	200.25			
13	197.75			63	96	109
		12	195.25			
12	192.75			73	116	132
		11	190.25			
11	187.75			83	136	157
		10	185.25			
10	182.75			94	158	182
		9	180.25			
9	177.75			105	181	209
		8	175.25			
8	172.75			117	205	237
		7	170.25			
7	167.75			130	230	266
		6	165.25			
6	162.75			145	255	295
		5	160.81			
5	158.88			157	275	318
		4	156.94			
4	155.00			169	296	342
		3	152.58			
3	150.15			185	322	371
		2	147.73			
2	145.30			203	348	401
		1	142.15			
1	139.00			226	383	441

Table 19
Gross Response - Demand/Capacity (D/C) Ratios
Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

Reservoir water level: 237
Eqk load condition: 475-year earthquake

MOMENT LOADING

NODAL POINT	SECTION NUMBER	Elevation (ft)	INTACT MORTAR MORTAR STRENGTH (psi)			STONE-MORTAR JOINTS BOND STRENGTH (psi)		
			338	455	572	245	330	415
21		239.30	0.00	0.00	0.00	0.00	0.00	0.00
	20	237.53	0.01	0.01	0.01	0.01	0.01	0.01
20		235.75	0.02	0.02	0.01	0.03	0.02	0.02
	19	231.25	0.08	0.07	0.06	0.10	0.09	0.08
19		226.75	0.13	0.12	0.10	0.18	0.17	0.14
	18	222.25	0.21	0.21	0.18	0.29	0.28	0.25
18		217.75	0.30	0.29	0.26	0.41	0.40	0.36
	17	216.50	0.32	0.32	0.28	0.44	0.44	0.39
17		215.25	0.35	0.34	0.31	0.48	0.48	0.42
	16	214.00	0.37	0.37	0.33	0.51	0.52	0.46
16		212.75	0.39	0.40	0.36	0.54	0.55	0.49
	15	210.25	0.44	0.46	0.41	0.60	0.63	0.57
15		207.75	0.49	0.52	0.47	0.67	0.71	0.65
	14	205.25	0.54	0.58	0.53	0.74	0.81	0.73
14		202.75	0.58	0.65	0.59	0.80	0.89	0.81
	13	200.25	0.62	0.71	0.65	0.86	0.98	0.90
13		197.75	0.67	0.78	0.72	0.93	1.08	0.99
	12	195.25	0.72	0.86	0.79	0.99	1.18	1.09
12		192.75	0.77	0.93	0.86	1.06	1.28	1.19
	11	190.25	0.82	1.01	0.94	1.13	1.39	1.29
11		187.75	0.86	1.08	1.01	1.19	1.50	1.39
	10	185.25	0.91	1.17	1.09	1.26	1.61	1.50
10		182.75	0.96	1.25	1.17	1.33	1.72	1.61
	9	180.25	1.02	1.33	1.25	1.40	1.83	1.72
9		177.75	1.07	1.41	1.33	1.47	1.95	1.83
	8	175.25	1.12	1.50	1.41	1.55	2.07	1.94
8		172.75	1.18	1.58	1.49	1.62	2.18	2.06
	7	170.25	1.24	1.67	1.58	1.70	2.30	2.17
7		167.75	1.29	1.76	1.66	1.79	2.42	2.29
	6	165.25	1.36	1.84	1.74	1.87	2.54	2.40
6		162.75	1.42	1.93	1.83	1.96	2.67	2.52
	5	160.81	1.47	2.00	1.90	2.03	2.76	2.61
5		158.88	1.53	2.07	1.96	2.10	2.86	2.70
	4	156.94	1.58	2.14	2.03	2.18	2.95	2.80
4		155.00	0.77	1.04	0.98	1.07	1.44	1.35
	3	152.58	0.53	0.71	0.67	0.73	0.98	0.92
3		150.15	0.72	0.96	0.91	0.99	1.32	1.25
	2	147.73	1.06	1.42	1.35	1.46	1.95	1.86
2		145.30	0.78	1.03	0.97	1.07	1.42	1.34
	1	142.15	0.64	0.83	0.78	0.88	1.15	1.08
1		139.00	0.67	0.87	0.82	0.92	1.20	1.13

Table 20
Gross (Uncracked) Shear Response
475-year earthquake
Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

Reservoir water level: **237 ft**

SHEAR FORCE [Kips]

NODAL POINT	Elevation (ft)	SECTION NUMBER	Elevation (ft)	DYN. ELASTICITY MODULUS (psi)		
				1.25 E6	5.0 E6	8.75 E6
21	239.30			0	0	0
		20	237.53			
20	235.75			37	43	47
		19	231.25			
19	226.75			88	108	118
		18	222.25			
18	217.75			135	183	204
		17	216.50			
17	215.25			149	216	243
		16	214.00			
16	212.75			154	231	262
		15	210.25			
15	207.75			163	255	291
		14	205.25			
14	202.75			173	284	327
		13	200.25			
13	197.75			183	313	361
		12	195.25			
12	192.75			196	339	392
		11	190.25			
11	187.75			212	364	420
		10	185.25			
10	182.75			230	386	444
		9	180.25			
9	177.75			250	407	466
		8	175.25			
8	172.75			270	425	485
		7	170.25			
7	167.75			291	441	500
		6	165.25			
6	162.75			308	454	512
		5	160.81			
5	158.88			322	463	521
		4	156.94			
4	155.00			332	469	526
		3	152.58			
3	150.15			341	475	532
		2	147.73			
2	145.30			348	479	535
		1	142.15			
1	139.00			352	482	538

Table 21
Gross Response - Demand/Capacity (D/C) Ratios
Sweetwater Main Dam Outlet Tower
Sweetwater Authority, Chula Vista, CA

Reservoir water level: 237
Eqk load condition: 475-year earthquake

SHEAR LOADING

NODAL POINT	SECTION NUMBER	Elevation (ft)	INTACT MORTAR MORTAR STRENGTH (psi)			STONE-MORTAR JOINTS BOND STRENGTH (psi)		
			128	148	166	93	197	120
21		239.30	0.00	0.00	0.00	0.00	0.00	0.00
	20	237.53	0.03	0.03	0.03	0.04	0.04	0.04
20		235.75	0.05	0.05	0.05	0.07	0.07	0.07
	19	231.25	0.09	0.09	0.09	0.12	0.13	0.13
19		226.75	0.13	0.14	0.13	0.18	0.19	0.18
	18	222.25	0.16	0.18	0.18	0.22	0.25	0.25
18		217.75	0.19	0.23	0.23	0.27	0.31	0.31
	17	216.50	0.20	0.25	0.25	0.28	0.34	0.34
17		215.25	0.21	0.27	0.27	0.29	0.37	0.37
	16	214.00	0.22	0.28	0.28	0.30	0.38	0.38
16		212.75	0.22	0.28	0.29	0.30	0.39	0.39
	15	210.25	0.22	0.29	0.30	0.31	0.41	0.41
15		207.75	0.23	0.31	0.31	0.32	0.43	0.43
	14	205.25	0.24	0.33	0.33	0.33	0.45	0.46
14		202.75	0.24	0.34	0.35	0.33	0.47	0.48
	13	200.25	0.25	0.35	0.36	0.34	0.49	0.50
13		197.75	0.25	0.37	0.38	0.35	0.51	0.53
	12	195.25	0.26	0.39	0.40	0.36	0.53	0.55
12		192.75	0.27	0.40	0.41	0.37	0.56	0.57
	11	190.25	0.28	0.42	0.43	0.39	0.58	0.59
11		187.75	0.29	0.43	0.44	0.40	0.60	0.61
	10	185.25	0.30	0.44	0.46	0.42	0.61	0.63
10		182.75	0.32	0.46	0.47	0.44	0.63	0.65
	9	180.25	0.33	0.47	0.48	0.46	0.65	0.66
9		177.75	0.34	0.48	0.49	0.47	0.67	0.68
	8	175.25	0.36	0.49	0.50	0.49	0.68	0.69
8		172.75	0.37	0.50	0.51	0.51	0.70	0.71
	7	170.25	0.39	0.51	0.52	0.53	0.71	0.72
7		167.75	0.40	0.52	0.53	0.55	0.72	0.73
	6	165.25	0.41	0.53	0.54	0.57	0.73	0.74
6		162.75	0.42	0.54	0.54	0.59	0.74	0.75
	5	160.81	0.43	0.54	0.55	0.60	0.75	0.75
5		158.88	0.44	0.55	0.55	0.61	0.76	0.76
	4	156.94	0.45	0.55	0.55	0.62	0.76	0.76
4		155.00	0.39	0.48	0.48	0.54	0.66	0.66
	3	152.58	0.35	0.42	0.42	0.48	0.58	0.58
3		150.15	0.42	0.50	0.50	0.57	0.69	0.69
	2	147.73	0.51	0.61	0.61	0.71	0.85	0.84
2		145.30	0.39	0.47	0.47	0.54	0.65	0.64
	1	142.15	0.32	0.38	0.38	0.44	0.52	0.52
1		139.00	0.32	0.38	0.38	0.44	0.52	0.52

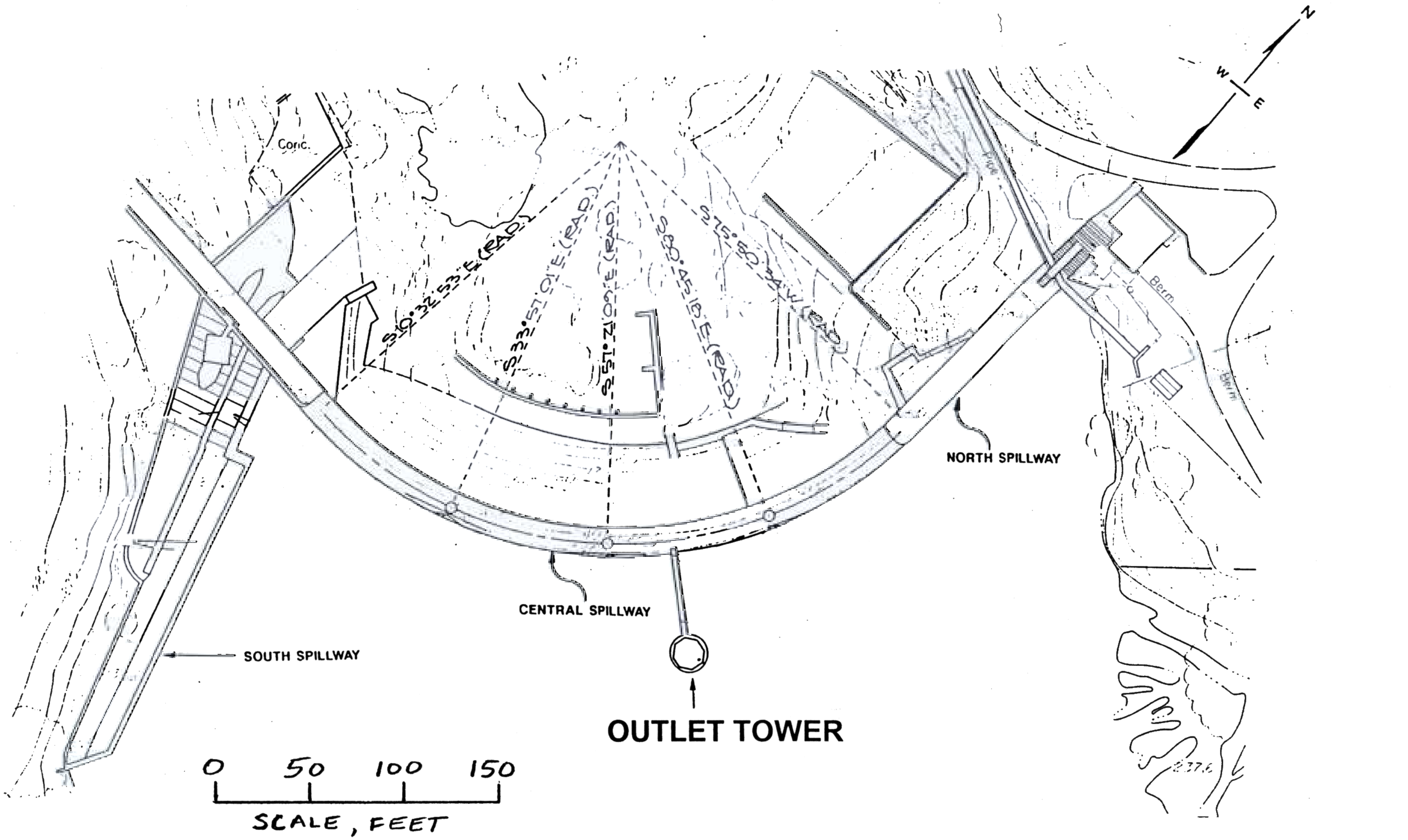
Table 22

Outlet Conduit – Moment Loading D/C ratios

SWEETWATER MAIN DAM OUTLET TOWER, CA

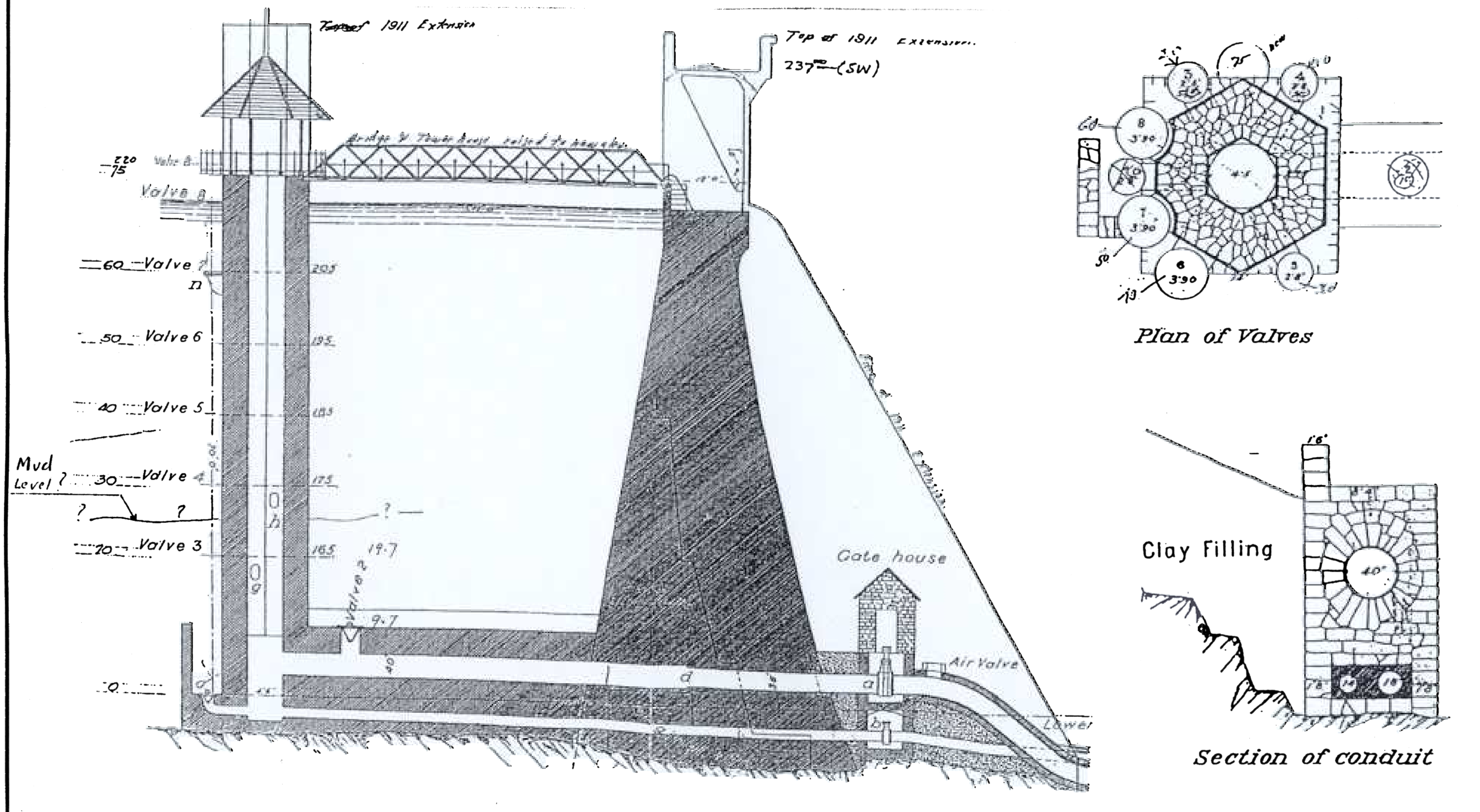
Bond Strength at Foundation Level (psi)	Demand/Capacity Ratio			
	La Nacion Earthquake [MCE]	Rose Canyon Earthquake	475-year Earthquake	72-year Earthquake
50.0	1.73	0.97	0.72	0.20
122.5	0.79	0.44	0.33	0.09
165.0	0.59	0.33	0.25	0.07
207.5	0.48	0.27	0.20	0.06

Figures

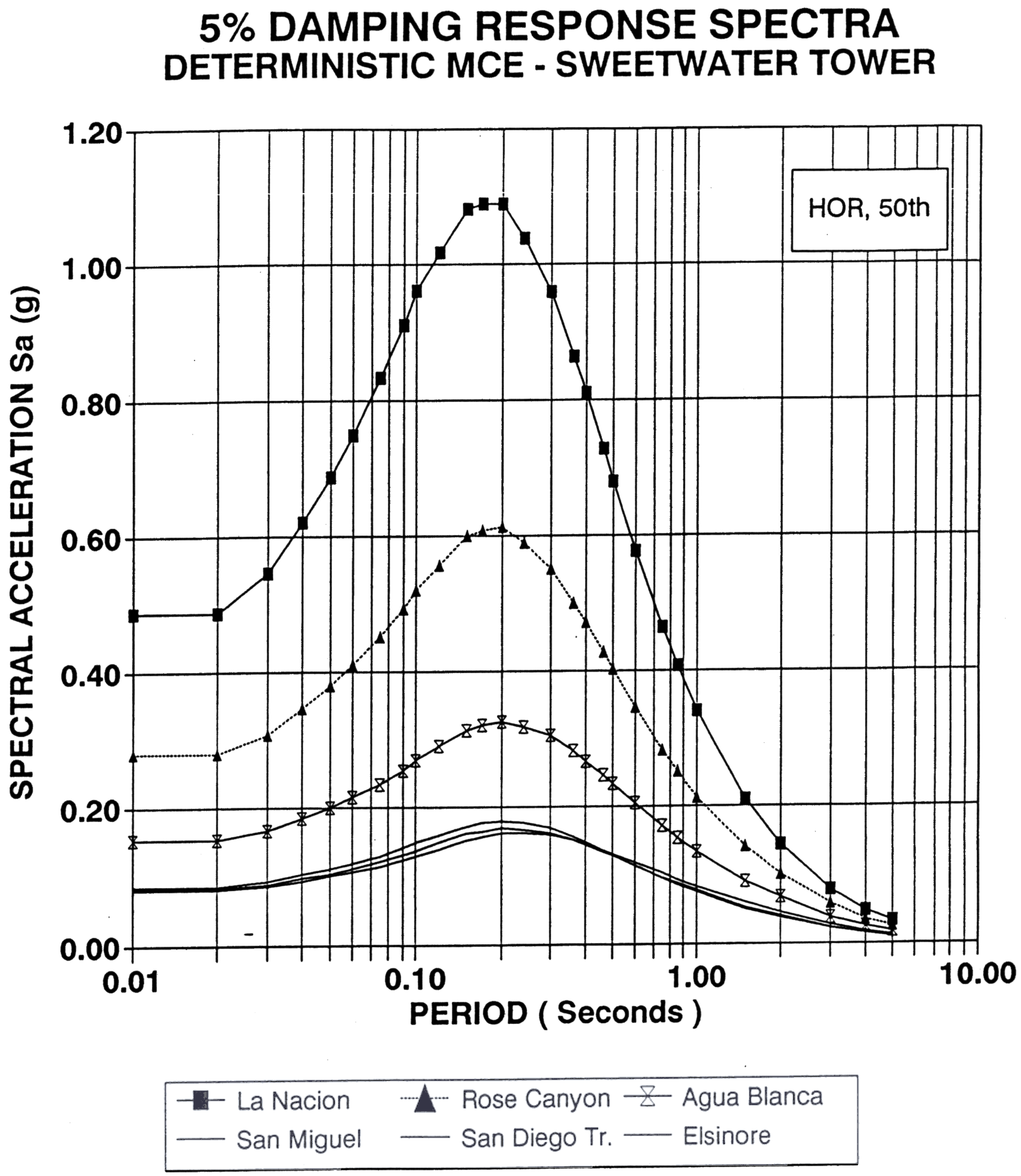


REFERENCE:
REVISED BASED ON THE ORIGINAL PLAN FROM
PHILLIPS - REYNOLDS ENGINEERING, INC.
OCTOBER 16, 1984

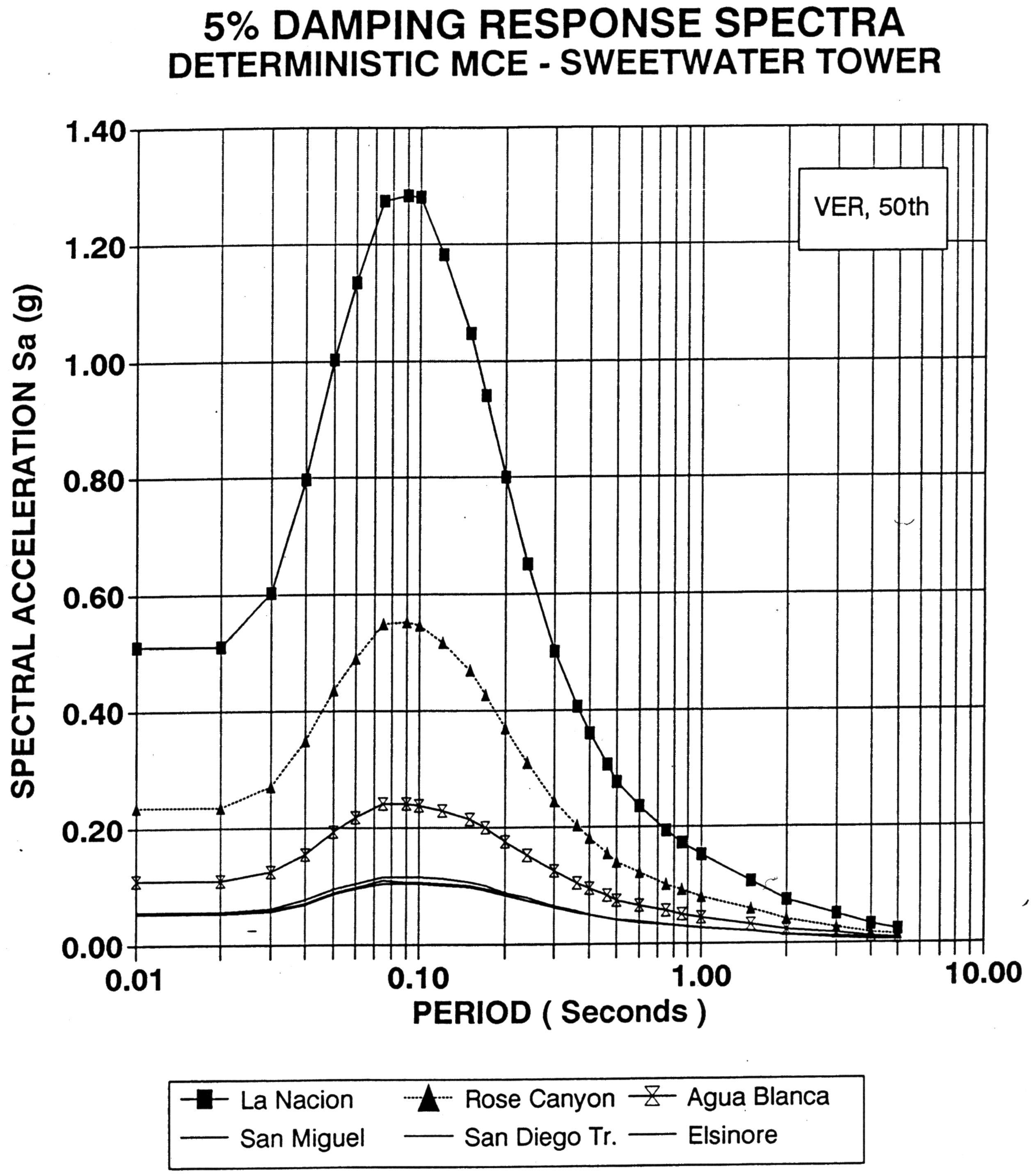
Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	**PLAN VIEW OF SWEETWATER DAM AND OUTLET TOWER**
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 Figure 1



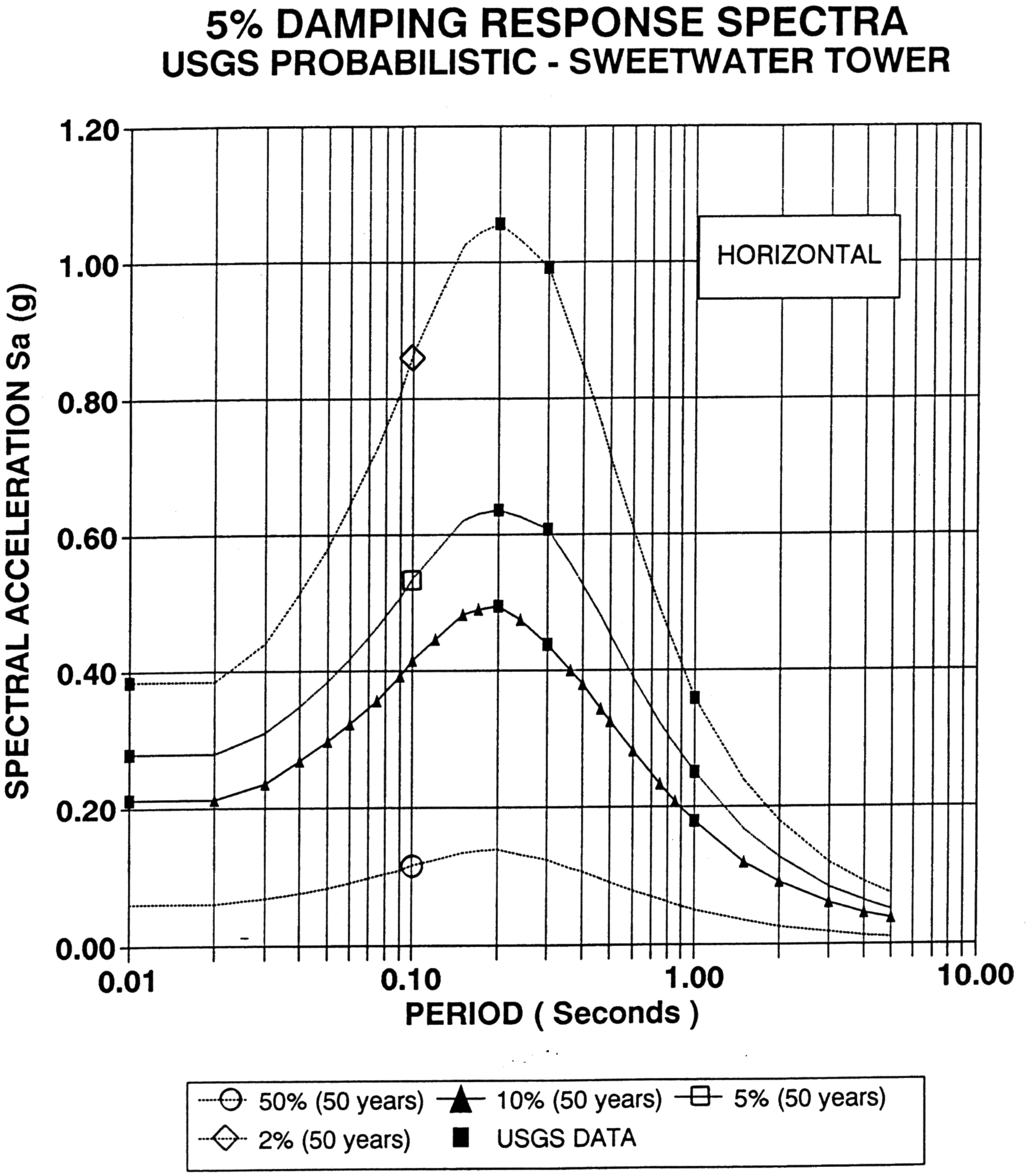
Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	**OUTLET TOWER & CONDUIT DRAWINGS**
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 Figure 2



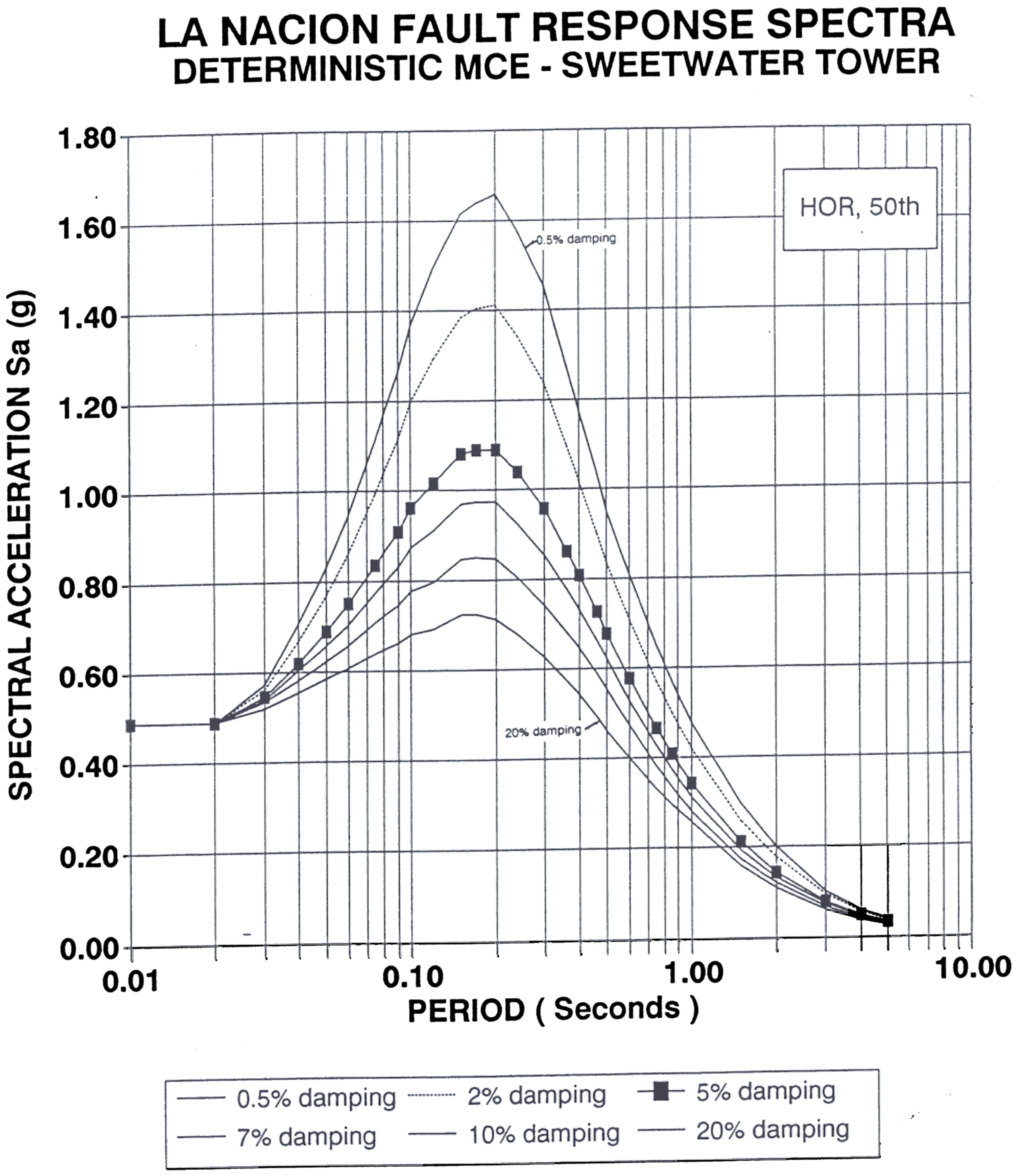
Sweetwater Authority Chula Vista, CA GEI Consultants, Inc. Gilles Bureau	Sweetwater Dam Outlet Tower California	**HORIZONTAL RESPONSE SPECTRA - DETERMINISTIC EARTHQUAKE SCENARIOS**
	Project 022560	December 2002 — Figure 3



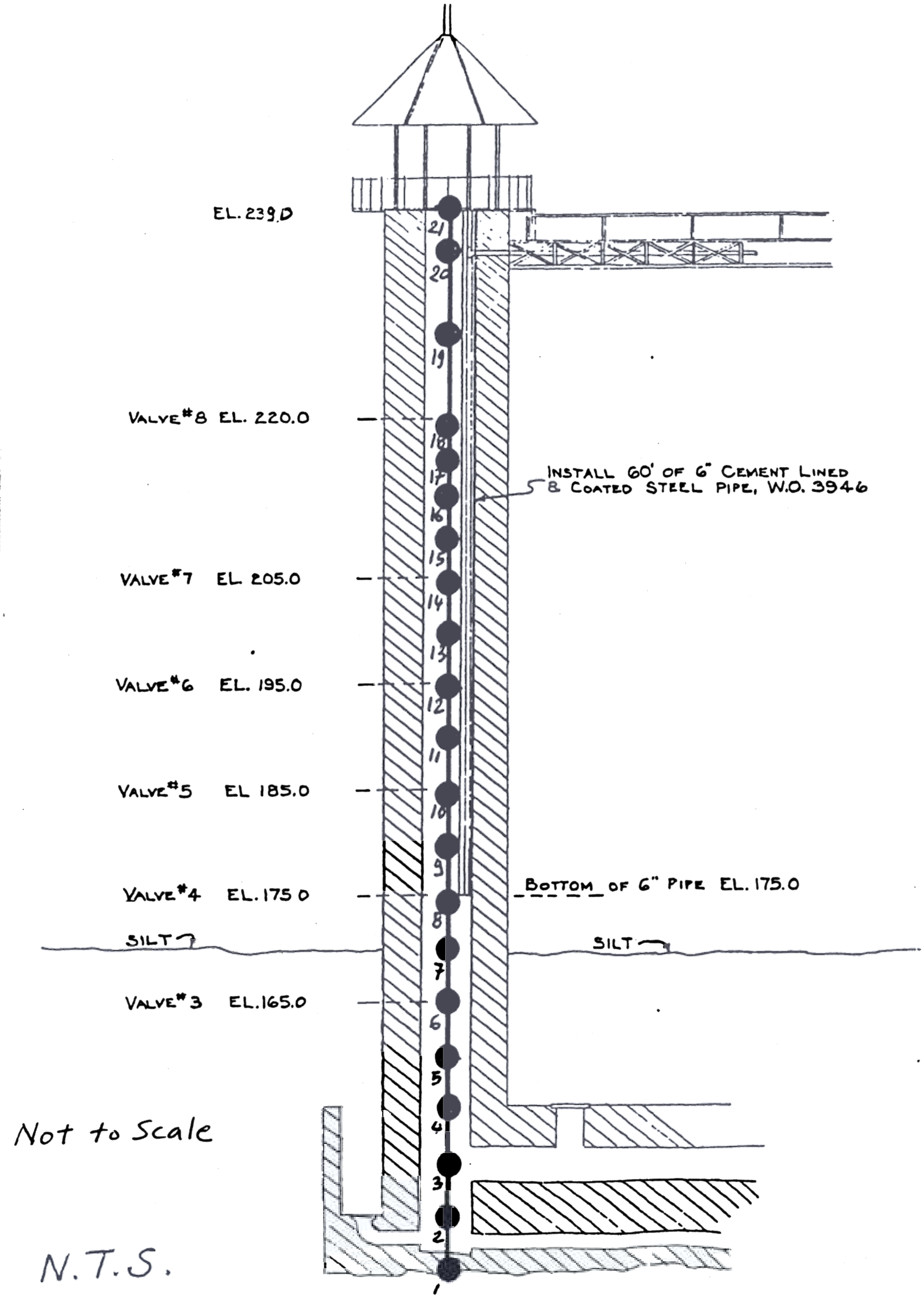
Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	**VERTICAL RESPONSE SPECTRA - DETERMINISTIC EARTHQUAKE SCENARIOS**
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 — Figure 4



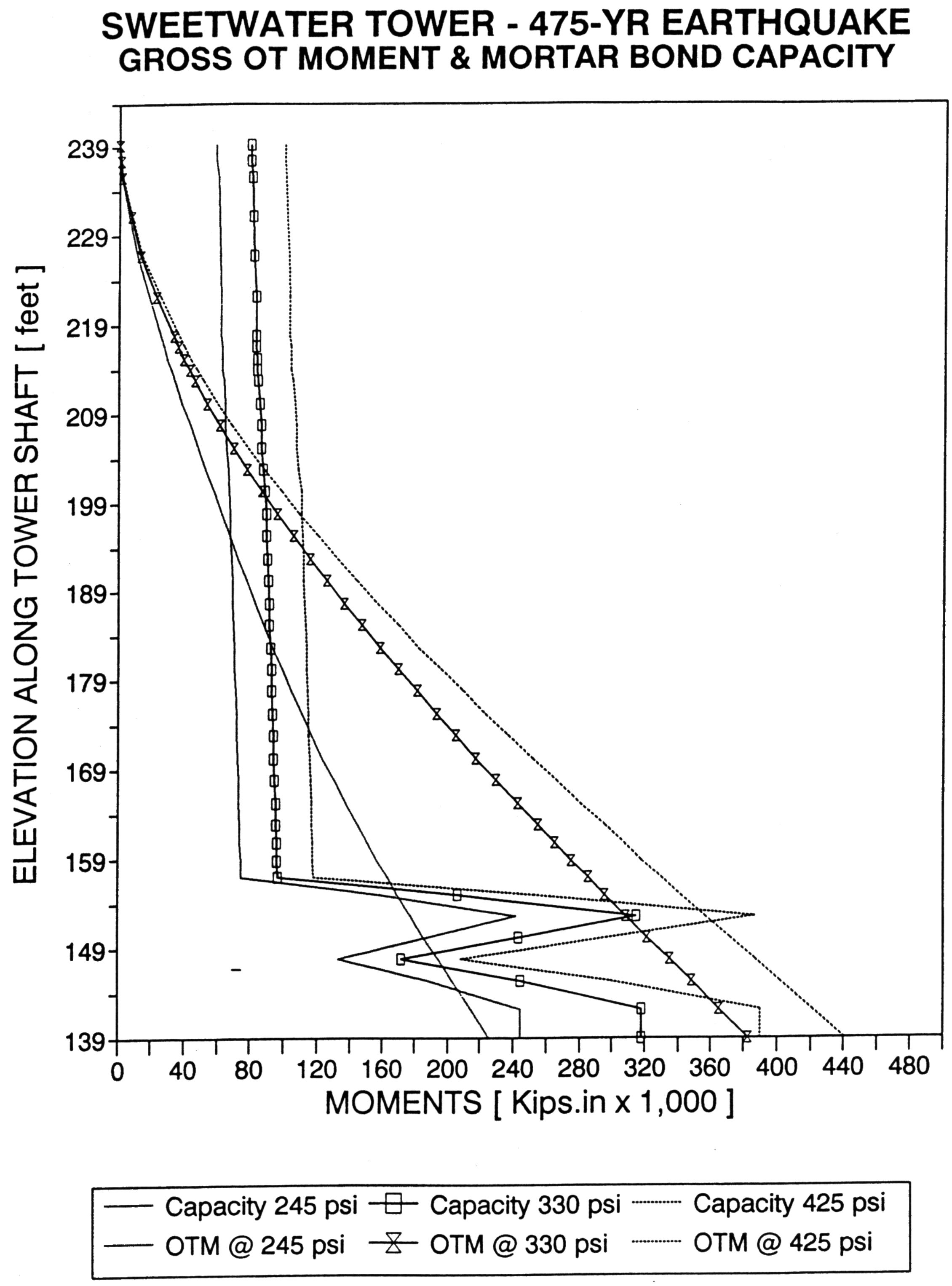
Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	HORIZONTAL RESPONSE SPECTRA - PROBABILISTIC EARTHQUAKE SCENARIOS
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 — Figure 5



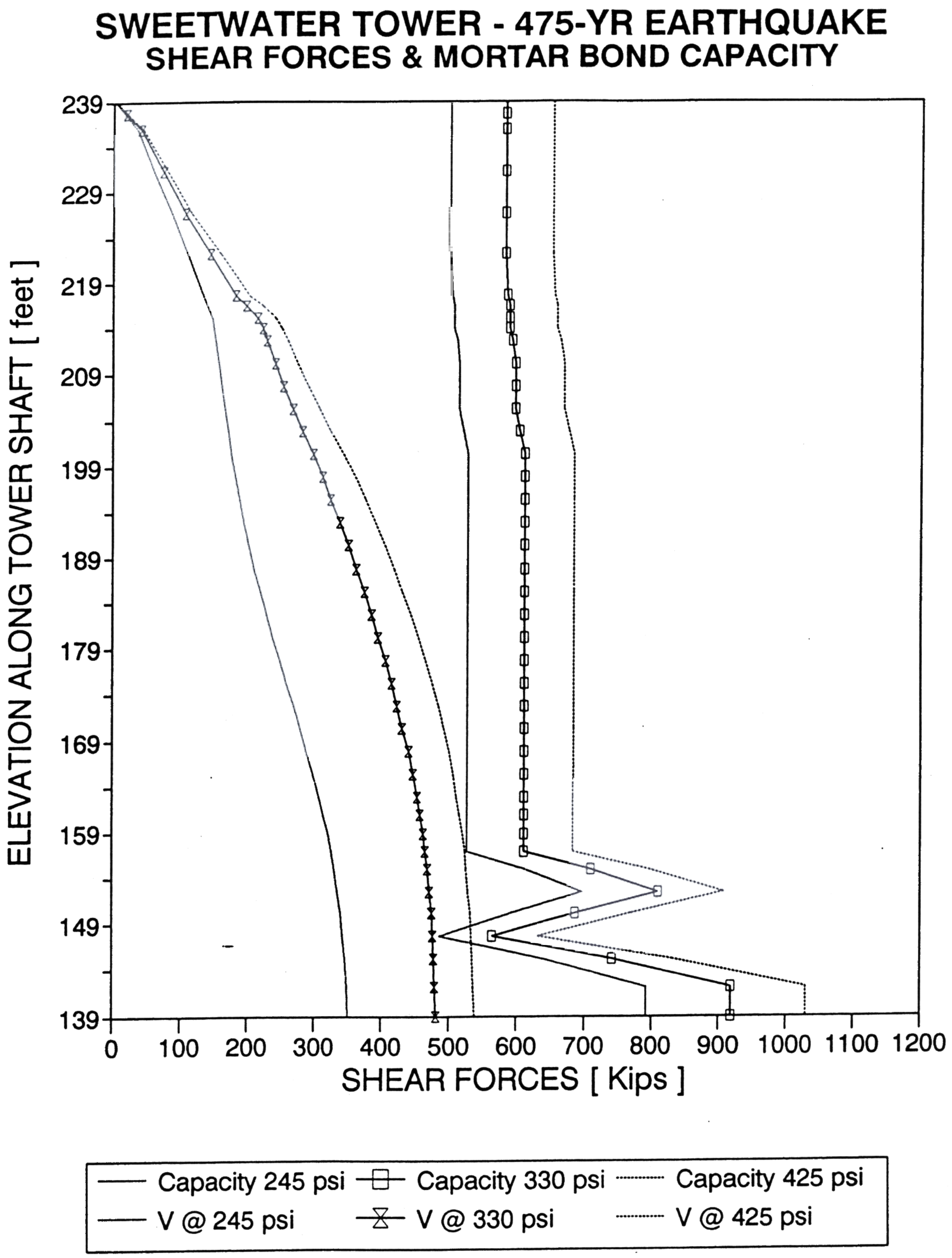
Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	**HORIZONTAL RESPONSE SPECTRA - DETERMINISTIC MCE ON LA NACION FAULT**
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 / Figure 6



Sweetwater Authority Chula Vista, CA GEI Consultants, Inc. Gilles Bureau	Sweetwater Dam Outlet Tower California	ONE-DIMENSIONAL MODEL OF TOWER WITH NODE LOCATIONS	
	Project 022560	December 2002	Figure 7



Sweetwater Authority Chula Vista, CA	Sweetwater Dam Outlet Tower California	**OVERTURNING MOMENT AND CAPACITY VS. ELEVATION - 475 YEAR EARTHQUAKE**
GEI Consultants, Inc. Gilles Bureau	Project 022560	December 2002 / Figure 8



Sweetwater Authority Chula Vista, CA GEI Consultants, Inc. Gilles Bureau	Sweetwater Dam Outlet Tower California	SHEAR FORCE & MORTAR BOND CAPACITY VS. ELEVATION - 475 YEAR EARTHQUAKE	
	Project 022560	December 2002	Figure 9

Appendix A - Photographs

Photographs of Sweetwater Main Dam and Outlet Tower

Photo 1 – Upstream face of dam, and outlet tower, as viewed from left rim of reservoir (taken June 3, 2002).

Photo 2 – Outlet tower and bridge as viewed from left abutment (taken June 3, 2002).

Photo 3 – Outlet tower as viewed from left abutment (taken June 3, 2002).

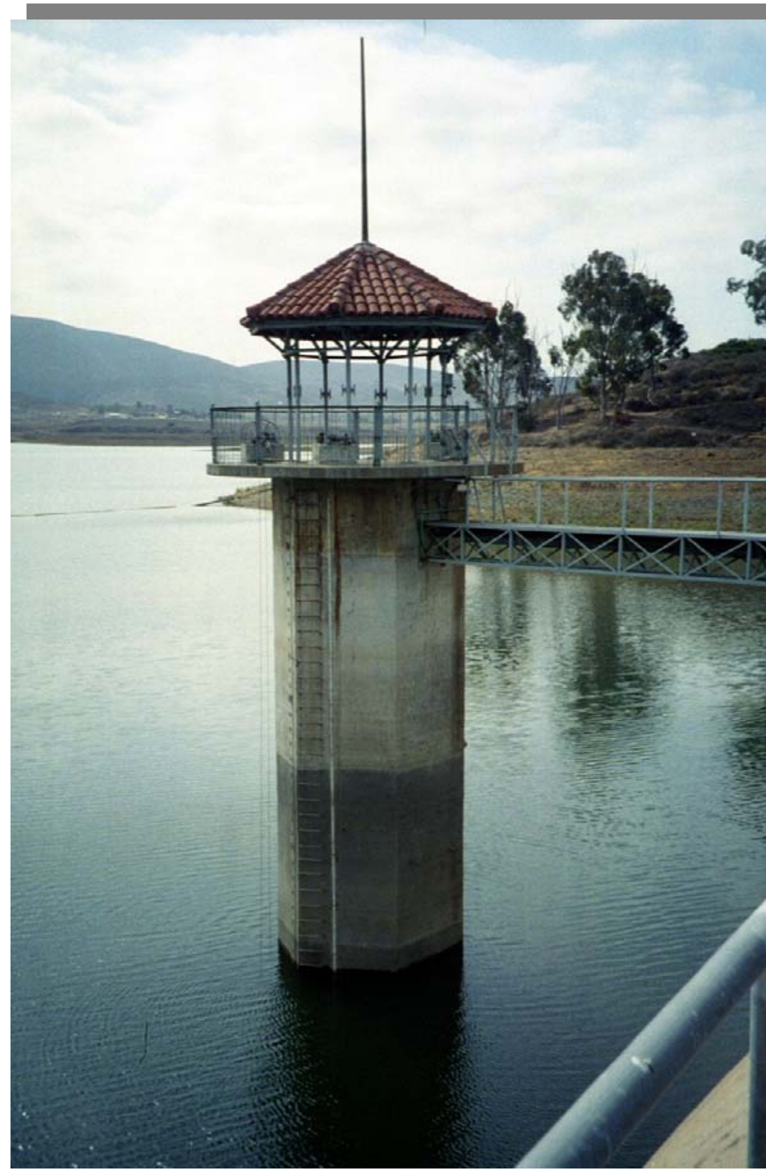


Photo 4 – Oulet tower as viewed from right side of dam crest (taken June 3, 2002).

Photo 5 – Stone masonry on downstream side of dam, on right side of south spillway discharge channel (taken June 3, 2002).

Photo 6 – Close-up of stone masonry shown in Photo 5, showing stones and mortar between stones (taken June 3, 2002).

EXHIBIT B

STANDARD AGREEMENT FOR SERVICES TEMPLATE

AGREEMENT FOR SERVICES
BETWEEN SWEETWATER AUTHORITY
AND
[*CONSULTANT NAME*]

This Agreement is made and entered into this __ day of ______________ 20__ by and between SWEETWATER AUTHORITY (hereinafter referred to as the "Authority"), a joint powers agency operating under the Irrigation District Law, Water Code § 20500 et seq., and **[*CONSULTANT NAME*]** (hereinafter referred to as "Consultant").

RECITALS

A. The Authority is a public agency of the State of California and is in need of professional services for the following project: **[*PROJECT NAME*]** (hereinafter referred to as "the Project").

B. Consultant is duly licensed and has the necessary qualifications to provide such services.

C. The parties desire by this Agreement to establish the terms for the Authority to retain Consultant to provide the services described herein.

AGREEMENT

NOW, THEREFORE, IT IS AGREED AS FOLLOWS:

1. Services

1.1 Consultant shall provide the Authority with the services described in the Scope of Services attached hereto as Exhibit "A" and by this reference incorporated herein ("Services"). Consultant warrants that it will perform the Services as set forth herein in a competent, professional and satisfactory manner.

1.2 At any time during the term of this Agreement, the Authority may request changes in the Scope of Services, and any such change shall be processed by the Authority in the following manner: a letter outlining the changes shall be forwarded to the Authority by Consultant with a statement of estimated changes in fee or time schedule. An amendment to the Agreement shall be prepared by the Authority and executed by both parties before performance of such services or the Authority will not be required to pay for the changes in the scope of work. Such amendment shall not render ineffective or invalidate unaffected portions of this Agreement.

2. Compensation

2.1 Subject to paragraph 2.2 below, the Authority shall pay for such Services in accordance with the Schedule of Charges set forth in Exhibit "B" and by this reference incorporated herein.

2.2 Unless otherwise provide herein, Consultant will perform services on a time and material basis. In no event shall the total amount paid for services rendered by Consultant pursuant to Exhibit "A" exceed the sum of $ **[*AMOUNT*]**. Periodic payments shall be made within thirty (30) days of receipt of an undisputed statement for services rendered. Payments to Consultant for work performed will be made on a monthly billing basis.

2.3 Payment shall not constitute acceptance of any work completed by Consultant.

3. Time of Performance

3.1 Consultant shall perform its services hereunder in a prompt and timely manner, in accordance with the Activity Schedule shown in Exhibit “C,” and shall commence performance upon receipt of the written Notice to Proceed from the Authority. The Notice to Proceed shall set forth the date of commencement of work. Consultant shall confer as requested with Authority representatives to review progress of work elements, adherence to work schedule, coordination of work, scheduling of review and resolution of problems which may develop.

3.2 Neither the Authority nor Consultant shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the non-performing party. For purposes of this Agreement, such circumstances include, but are not limited to, abnormal weather conditions, floods, earthquakes, fire, epidemics, war, riots, and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances, sabotage, or judicial restraint.

3.3 Should such circumstances occur, the non-performing party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement.

4. California Labor Code Requirements

4.1 Consultant is aware of the requirements of California Labor Code Sections 1720 et seq and 1770 et seq., which require the payment of prevailing wage rates and the performance of other requirements on certain “public works” and “maintenance” projects. If the services are being performed as part of an applicable “public works” or “maintenance” project, as defined by the Prevailing Wage Laws, and if the total compensation is $1,000 or more, Consultant agrees to fully comply with such Prevailing Wage Laws, if applicable. Consultant shall defend, indemnify and hold the Authority, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. It shall be mandatory upon Consultant and all subconsultants to comply with all California Labor Code provisions, which include but are not limited to prevailing wages, employment of apprentices, hours of labor and debarment of contractors and subcontractors.

4.2 If the services are being performed as part of an applicable “public works” or “maintenance” project, in addition to the foregoing, then pursuant to Labor Code sections 1725.5 and 1771.1, Consultant and all subconsultants must be registered with the Department of Industrial Relations (“DIR”). Consultant shall maintain registration for the duration of the Project and require the same of any subconsultants. This Project may also be subject to compliance monitoring and enforcement by the DIR. It shall be Consultant’s sole responsibility to comply with all applicable registration and labor compliance requirements, including the submission of payroll records directly to the DIR.

5. Standard of Care

Consultant's services will be performed in accordance with generally accepted professional practices and principles and in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions.

6. Insurance

6.1 Minimum Insurance Requirements: Consultant shall procure and maintain for the duration of the contract and for a minimum of twenty-four (24) months following the date of the Project completion and acceptance by the Authority, insurance against claims for injuries or death to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Consultant, his agents, representatives, employees or sub-contractors.

6.2 Coverage: Coverage shall be at least as broad as the following:

6.2.1 Commercial General Liability (CGL): Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 00 01) including products and completed operations, property damage, bodily injury, personal and advertising injury with limit of at least two million dollars ($2,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (coverage as broad as the ISO CG 25 03, or ISO CG 25 04 endorsement provided to the Authority) or the general aggregate limit shall be at least twice the required occurrence limit or four million dollars ($4,000,000).

(a) **Required Provisions:** The General Liability policy must contain, or be endorsed to contain, the following provisions:

(i) **Additional Insured Status:** Authority, its directors, officers, employees, and authorized volunteers are to be given insured status (at least as broad as ISO Form CG 20 10 10 01), with respect to liability arising out of work or operations performed by or on behalf of the Consultant including materials, parts, or equipment furnished in connection with such work or operations.

(ii) **Primary Coverage:** For any claims related to this project, the Consultant's insurance coverage shall be primary at least as broad as ISO CG 20 01 04 13 as respects to the Authority, its directors, officers, employees and authorized volunteers. Any insurance or self-insurance maintained by the Authority its directors, officers, employees and authorized volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

6.2.2 Automobile Liability: Insurance Services Office (ISO) Business Auto Coverage (Form CA 00 01), covering Symbol 1 (any auto) or if Consultant has no owned autos, Symbol 8 (hired) and 9 (non-owned) with limit of one million dollars ($1,000,000) for bodily injury and property damage each accident.

6.2.3 Workers' Compensation Insurance: As required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease. By his/her signature hereunder, Consultant certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and he/she will comply with such provisions before commencing the performance of the work of this agreement.

(a) **Waiver of Subrogation:** The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in the favor of the Authority for all work performed by Consultant, its employees, agents and sub-consultants. The Insurer(s) agree to waive all rights of subrogation against the Authority, its elected or appointed officers, officials, agents, authorized volunteers and employees for losses paid under the terms of the policy which arise from work performed by the Consultant; but this provision applies regardless of whether or not the Authority has received a Waiver of Subrogation from the insurer.

6.2.4 <u>Professional Liability (also known as Errors and Omissions)</u>: Insurance appropriate to the Consultant profession, with limits no less than $1,000,000 per occurrence or claim, and $2,000,000 policy aggregate.

(a) **If Claims Made Policies:**

(i) The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.

(ii) Insurance must be maintained and evidence of insurance must be provided **for at least five (5) years after completion of the contract of work.**

(iii) If coverage is canceled or non-renewed, and not **replaced with another claims-made policy form with a Retroactive Date** prior to the contract effective date, the Consultant must purchase "extended reporting" coverage for a minimum of **five (5)** years after completion of contract work.

6.2.5 <u>Cyber Liability Insurance (Technology Professional Liability – Errors and Omissions)</u>: Limits not less than $2,000,000 per occurrence or claim, and $2,000,000 aggregate or the full per occurrence limits of the policies available, whichever is greater. Coverage shall be sufficiently broad to respond to the duties and obligations as is undertaken by Consultant in this Agreement and shall include, but not be limited to, claims involving infringement of intellectual property, including but not limited to infringement of copyright, trademark, trade dress, invasion of privacy violations, information theft, damage to or destruction of electronic information, release of private information, alteration of electronic information, extortion and network security. The policy shall provide coverage for breach response costs as well as regulatory fines and penalties as well as credit monitoring expenses with limits sufficient to respond to these obligations.

6.3 <u>Other Required Provisions:</u>

6.3.1 If the Consultant maintains broader coverage and/or higher limits than the minimums shown above, the Authority requires and shall be entitled to the broader coverage and/or higher limits maintained by the Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Authority.

6.3.2 Policy limits shall not be less than the minimum limits described above. The limits of insurance required by this Agreement may be satisfied by a combination of primary, and umbrella or excess insurance. Each umbrella or excess policy shall follow the same provisions as the primary policy.

6.3.3 Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the Authority its Board and each member of the Board, its officers, employees, agents, and the Authority's designated volunteers.

6.3.4 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.

6.3.5 Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the Authority.

6.4 Deductibles and Self-Insured Retentions: Insurance deductibles or self-insured retentions must be declared to and approved by the Authority. The Authority may require the Consultant to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention.

6.4.1 At the election of the Authority, Consultant shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.

6.4.2 Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or Authority.

6.5 Acceptability of Insurers: Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California and maintain an agent for process within the state, unless waived, in writing, by the Authority Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A: VII or better, or as otherwise approved by the Authority Risk Manager.

6.6 Verification of Coverage: Consultant shall furnish the Authority with certificates (Acord Form 25 or equivalent) and amendatory endorsements, declarations page(s) listing all policy endorsements or copies of the applicable policy language effecting coverage required by this Agreement. Blanket endorsements are accepted with language that states "as required by contract". All certificates and endorsements are to be received and approved by the Authority before work commences.

6.6.1 Such evidence shall include the following:

(a) Additional insured endorsements with primary & non-contributory wording for each policy providing General Liability coverage

(b) Workers' Compensation waiver of subrogation

6.6.2 All of the insurance shall be provided on policy forms and through companies satisfactory to the Authority. However, failure to obtain the required documents prior to the work beginning shall not waive the Consultant's obligation to provide them. The Authority reserves the right to obtain complete, certified copies of all required insurance policies, at any time.

6.7 Continuation of Coverage: Consultant shall, upon demand of the Authority deliver evidence of coverage showing continuation of coverage for not less than 24 months for all policies, and not less than (5) years for claims made policies, following the termination or completion of this Agreement. Consultant further waives all rights of subrogation under this agreement. When any of the required coverages expire during the term of this agreement, Consultant shall deliver the renewal certificate(s) including the general liability additional insured endorsement and evidence of waiver of rights of subrogation against the Authority to the Authority at least ten (10) days prior to the expiration date. Failure to continually satisfy the Insurance requirements is a material breach of contract.

6.8 Sub-Consultants: In the event that Consultant employs other consultants (sub-consultants) as part of the work covered by this agreement, it shall be Consultant's responsibility to require, verify and confirm that each sub-consultant meets the minimum insurance requirements specified above. Consultant shall, upon demand of the Authority, deliver to the Authority copies such policy or policies of insurance and the receipts for payment of premiums thereon.

6.9 The Authority reserves the right to modify these insurance requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage or other circumstances.

7. Indemnification

7.1 To the fullest extent permitted by law, Consultant shall defend (with counsel of the Authority's choosing), indemnify and hold the Authority, its officials, officers, employees, volunteers, and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, or incident to any acts, errors or omissions, or willful misconduct of Consultant, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of Consultant's Services, the Project or this Agreement, including without limitation the payment of all damages, expert witness fees and attorneys' fees and other related costs and expenses. Consultant's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by Consultant, the Authority, its officials, officers, employees, agents, or volunteers.

7.2 To the extent required by Civil Code section 2782.8, which is fully incorporated herein, Consultant's obligations under the above indemnity shall be limited to claims that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of Consultant, but shall not otherwise be reduced. If Consultant's obligations to defend, indemnify, and/or hold harmless arise out of Consultant's performance as a "design professional" (as that term is defined under Civil Code section 2782.8), then upon Consultant obtaining a final adjudication that liability under a claim is caused by the comparative active negligence or willful misconduct of the Authority, Consultant's obligations shall be reduced in proportion to the established comparative liability of the Authority and shall not exceed Consultant's proportionate percentage of fault.

8. Termination or Abandonment

8.1 The Authority has the right to terminate or abandon any portion or all of the work under this Agreement by giving ten (10) calendar days written notice to Consultant. In such event, the Authority shall be immediately given title and possession to all original field notes, drawings and specifications, written reports, and other documents produced or developed for that portion of the work completed, and/or being abandoned. The Authority shall pay Consultant the reasonable value of services rendered for any portion of the work completed prior to termination. If said termination occurs prior to completion of any task for the Project for which a payment request has not been received, the charge for services performed during such task shall be the reasonable value of such services, based on an amount mutually agreed to by the Authority and Consultant of the portion of such task completed but not paid prior to said termination. The Authority shall not be liable for any costs other than the charges or portions thereof, which are specified herein. Consultant shall not be entitled to payment for unperformed services, and shall not be entitled to damages or compensation for termination of work.

8.2 Consultant may terminate its obligation to provide further services under this Agreement upon thirty (30) calendar days' written notice to the Authority only in the event of substantial failure by Authority to perform in accordance with the terms of this Agreement through no fault of Consultant.

9. Compliance with All Laws

9.1 Consultant shall comply with all applicable laws, ordinances, codes, and regulations of the federal, state, and local government.

9.2 Consultant will use its best professional efforts to interpret all applicable federal, state and local laws, rules and regulations with respect to access, including those of the Americans with Disabilities Act ("ADA"). All documents (including but not limited to plans, specifications, and other technical documents, if applicable) prepared by Consultant pursuant to this Agreement shall be compliant with all applicable requirements of the ADA.

9.3 Consultant shall assist the Authority in obtaining and maintaining all permits required by federal, state, and local regulatory agencies.

9.4 Consultant is responsible for all costs of clean up and/or removal of hazardous and toxic substances spilled as a result of its services or operations performed under this Agreement.

10. Organization

Consultant shall assign **"[*PM NAME*]"** as the Project Manager. The Project Manager shall not be removed from the Project or reassigned without the prior written consent of the Authority.

11. Maintenance of Records

Books, documents, papers, accounting records, and other evidence pertaining to costs incurred shall be maintained by Consultant and made available at all reasonable times during the

Agreement period and for four (4) years from the date of final payment under the Agreement for inspection by the Authority.

12. Job Site Responsibility

If the services covered by this Agreement involve a construction phase of the Project, the Authority agrees that in accordance with generally accepted construction practices, the construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the Project, including safety of all persons and property, and that this requirement shall be made to apply continuously and not be limited to normal working hours. Consultant shall not have control over or charge of, and shall not be responsible for, construction means, methods, techniques, sequences, or procedures, as these are solely the responsibility of the construction contractor.

13. Assignment and Subconsultants

Consultant shall not assign, sublet, or transfer this Agreement or any rights under or interest in this Agreement without the written consent of the Authority, which may be withheld for any reason. Nothing contained herein shall prevent Consultant from employing independent associates, and subconsultants as Consultant may deem appropriate to assist in the performance of services hereunder.

14. Conflicts of Interest

Identify all existing and past financial relationships (including consulting agreements) between **[*CONSULTANT NAME*]** and members of the Authority's Governing Board, and entities for which said members are employed, or have an interest, both past and present.

15. General Provisions

15.1 Independent Consultant. Consultant is retained as an independent consultant and is not an employee of Authority. No employee or agent of Consultant shall become an employee of the Authority. The work to be performed shall be in accordance with the work described in Exhibit "A," subject to such directions and amendments from the Authority as herein provided.

15.2 Notice. All notices permitted or required under this Contract shall be given at the following address, or at such other address as the parties may provide in writing for this purpose:

Authority:	Consultant:
SWEETWATER AUTHORITY	**[*COMPANY*]**
505 Garrett Ave	[*ADDRESS*]
Chula Vista, CA 91910	
Attn: **[*MANAGER*]**	Attn: **[*CONTACT*]**
[*POSITION*]	[*POSITION*]

The parties may designate, in writing, other individuals to whom notice is to be given. Notices shall be deemed to be received upon personal delivery to the addresses above; if sent by overnight delivery, upon delivery as shown by delivery service records; if sent by facsimile, upon receipt as confirmed by the sending facsimile equipment; if by United States Postal Service, five days after deposit in the mail.

15.3 Severability. The unenforceability, invalidity or illegality of any provision(s) of this Agreement shall not render other provisions of this Agreement unenforceable, invalid or illegal.

15.4 Integration. This Agreement represents the entire understanding of the Authority and the Consultant as to those matters contained herein, and supersedes and cancels any prior oral or written understanding, promises, or representations with respect to those matters covered hereunder. This Agreement may not be modified or altered except in writing, signed by both parties hereto. This is an integrated Agreement.

15.5 Survival. All rights and obligations hereunder that by their nature are to continue after any expiration or termination of this Agreement, including, but not limited to, the indemnification obligations, shall survive any such expiration or termination.

15.6 Time is of the Essence. Time shall be of the essence as to all dates and times of performance contained in this Agreement.

15.7 Third Party Rights. Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than the Authority and Consultant.

15.8 Disputes. If any disputes should arise between the Parties concerning the work to be done under this Agreement, the payments to be made, or the manner of accomplishment of the work, Consultant shall nevertheless proceed to perform the work as directed by the Authority pending settlement of the dispute.

15.9 Laws, Venue, and Attorneys' Fees. This Agreement shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this Agreement, the action shall be brought in a state or federal court situated in the County of San Diego, State of California. In the event of any such litigation between the parties, the prevailing party shall be entitled to recover all reasonable costs incurred, including reasonable attorney's fees, as determined by the court.

AGREEMENT FOR SERVICES
BETWEEN SWEETWATER AUTHORITY
AND
[*CONSULTANT NAME*]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

SWEETWATER AUTHORITY		**[*CONSULTANT NAME*]**	
By:	____________________	By:	____________________ (Authorized Representative of Consultant)
Name:	Carlos Quintero	Name:	**[*NAME*]**
Title:	General Manager	Title:	**[*TITLE*]**
Dated:	____________________	Dated:	____________________

Approved as to form: (only required when contract template is modified)

____
Paula C. P. de Sousa
Legal Counsel
SWEETWATER AUTHORITY

AGREEMENT FOR SERVICES
BETWEEN SWEETWATER AUTHORITY
AND
[*CONSULTANT NAME*]

EXHIBIT "A"
SCOPE OF WORK

[*INSERT PROPOSED SCOPE OF WORK*]

AGREEMENT FOR SERVICES
BETWEEN SWEETWATER AUTHORITY
AND
[*CONSULTANT NAME*]

EXHIBIT "B"
SCHEDULE OF CHARGES

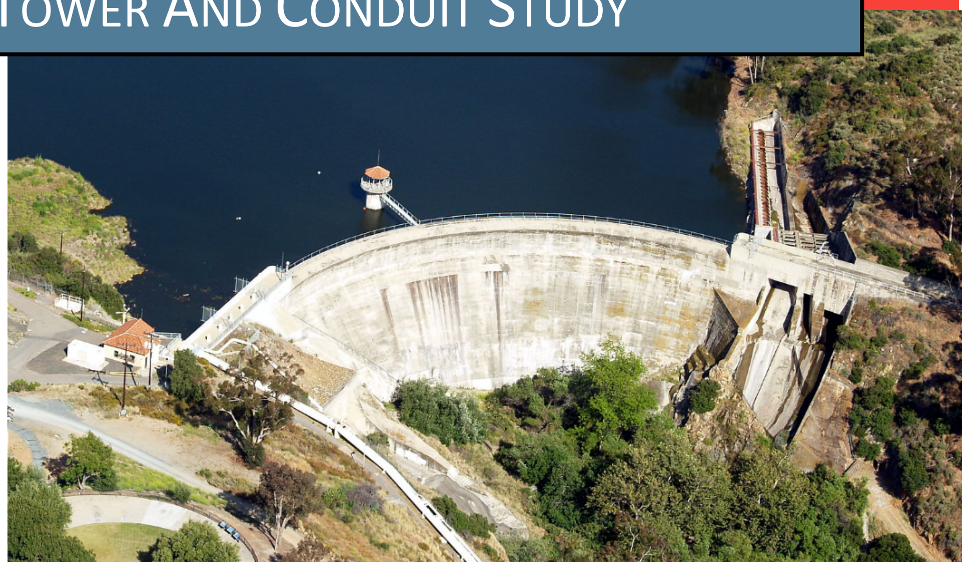
AGREEMENT FOR SERVICES
BETWEEN SWEETWATER AUTHORITY
AND
[*CONSULTANT NAME*]

EXHIBIT "C"
ACTIVITY SCHEDULE

Prepared by:
WSP USA Inc.
401 B Street
San Diego, CA 92101

Phone: 619-338-9376

Proposal For Update To The Seismic Evaluation Of Sweetwater Dam Outlet Tower And Conduit Study



Proposal to the Sweetwater Authority

Erick Del Bosque, P.E.

Director of Engineering and Operations

Chula Vista, CA

January 16, 2025

Table of Contents

1 | Introductory Letter

January 16, 2025

CONFIDENTIAL

Erick Del Bosque
Director of Engineering and Operations
Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91910

Subject: WSP Proposal to Update the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study

Dear Mr. Del Bosque:

WSP USA Inc. (WSP) is pleased to submit our proposal to the Sweetwater Authority (Authority) to update the seismic evaluation of Sweetwater Dam outlet tower and conduit study per your RFP received on December 12, 2024.

WSP is one of the world's leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, project managers, planners, surveyors and environmental specialists, as well as other design and program management professionals. We design and deliver lasting solutions in Infrastructure, Buildings, Transportation, Oil & Gas, Environment, Geomatics, Mining, Power and Industrial sectors as well as project delivery and strategic consulting services. With 19,000 talented people across the United States and 73,900 globally, we engineer projects that will help societies grow for generations to come.

WSP proposes a team with extensive experience in seismic evaluations and design of dams and infrastructures. Our project manager, Reza Farahani, brings 20 years of experience working on seismic evaluations, analysis and design of various structures including dams and hydraulic structures. Reza is a California registered PE and holds a PhD in Civil (Structural) Engineering. He has served as project manager and Engineer of Record (EOR) for several dams and hydraulic structures projects in California. Our seismologist, Dr. Valentina, has more than 20 years of experience in seismic hazard analysis (probabilistic and deterministic) and has worked on several dams and infrastructures projects. Our structural engineer, Praneeth Lingireddy, is PE and SE of California and has over 10 yrs of structural evaluations, analysis and design experience including working on dam safety projects.

Introduction and Understanding of the Project Objectives

The Sweetwater Dam is located on the Sweetwater River in the Southern part of San Diego County near Chula Vista. The dam was originally constructed between 1886 and 1888 as a masonry arch dam with a height of 90 feet. The dam height was raised 20 feet in 1911 and converted to a curved gravity dam by placing mass cyclopean concrete against the downstream face of the dam. The dam was overtopped in 1916 and experienced some damage at the abutments but no damage was reported to the composite masonry section of the dam or to the outlet tower. The dam was repaired and the parapet wall raised, bringing the dam crest to the present maximum height of 127 feet.

The original outlet tower was constructed in 1888 inside the reservoir, about 40 feet from the base of the Sweetwater Dam, and adjacent to the lower portion of the right abutment slope and was presumably constructed out of the same masonry as the dam. The outlet tower was raised in 1911 by 20 feet when the main dam was raised. The present tower is about 100 feet high, from its foundation base to the top of its circular operating platform and has a hexagonal cross-section with a maximum outside width of 13.4 feet and a wall thickness of about 3.55 feet. A 51-foot one-span steel footbridge provides access to the tower from the dam crest.

The outlet conduit is located between the base of the outlet tower and the base of the dam. The conduit consists of a masonry structure with a rectangular cross section and a short wall at its top on the right-abutment side. The conduit contains three unlined water lines and conveys water from the tower to a pipeline that passes through the dam, which in turn conveys water to a pipeline that leads to the water treatment plant.

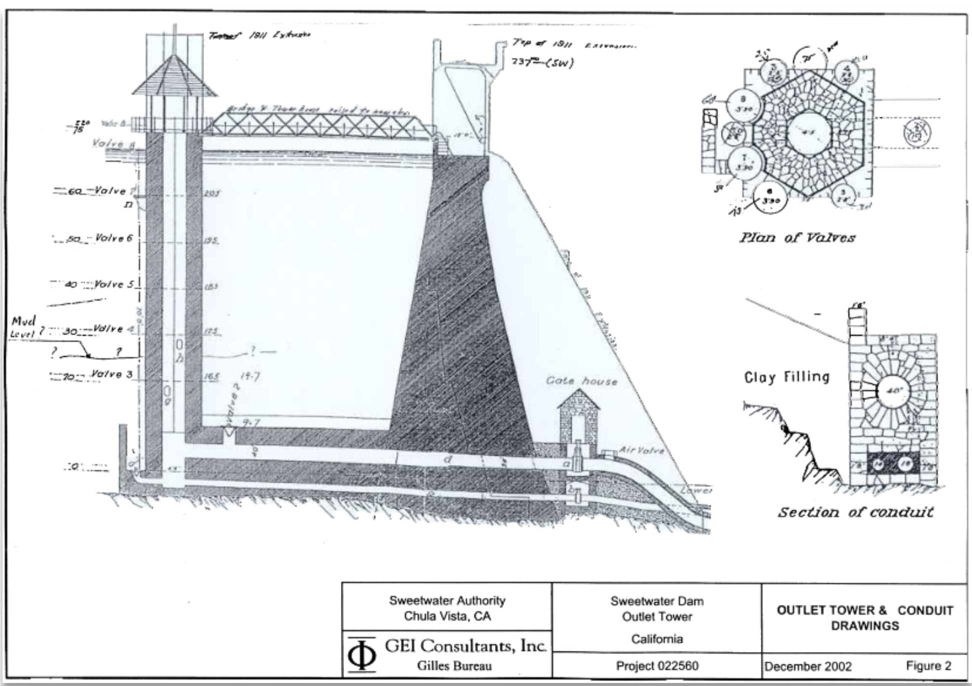


Figure 1. Sweetwater Dam Outlet Tower and Outlet Conduit

GEI Consultants, Inc performed seismic evaluation of the Sweetwater Dam outlet tower and conduit in 2003. They estimated the level of earthquake loading that could cause the tower to fail, and the probability of that earthquake to occur. They indicated that an earthquake causing a peak ground acceleration at the site of about 0.11g (g is gravitational acceleration) could cause the tower to fail. They determined the chance of this failure to be about 50 percent in the next 100 years.

The objective of this project is to conduct a comprehensive update to the 2003 report from GEI Consultants, Inc., titled "Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit" and to complete a conceptual level design and budgetary cost for strengthening the outlet tower to withstand an earthquake with a return period of approximately of 144 years. Seismic evaluation of the dam is out of scope of this proposal and will not be considered.

Proposed Scope of Work

The proposed SOW in this memorandum has been divided into tasks with the following work breakdown structure:

- Kick-off Meeting
- Documents to be Provided by the Authority
- Developing Evaluation Criteria
- Seismic Evaluations
- Report Updates
- Conceptual Level Design and Budgetary Cost Estimates
- Project Management and Meetings

Details for each task are provided below.

- **TASK 1: Kick-off Meeting**
  WSP will schedule an in-person kick-off meeting at the Authority's office at 505 Garrett Avenue, Chula Vista, CA. WSP will produce an agenda with all the items to be discussed and follow-up with minutes of the meeting. The meeting will include the following items:

  - Review the scope of work
  - Review the budget
  - Determine the team member's roles and responsibility
  - Determine the detailed schedule
  - Discuss data and documents needed by WSP from the Authority
  - Determine any potential issues that may delay the application

  <u>Deliverable:</u>

  Meeting agenda and minutes

- **TASK 2: Documents to be Provided by the Authority**

  WSP will create a list of documents needed from the Authority. The Authority will provide the following documents:

  - GEI Consultants, Inc. (2003), "Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit".
  - Other information and data as requested by WSP

- **TASK 3: Schedule Development**

  WSP will create a schedule that will result in the seismic updates and conceptual level design being submitted to the Authority on time and on Budget. WSP will work with the client to develop a successful schedule and will monitor the schedule to make sure that progress of the project is on schedule. WSP team proposes the following activity schedule for this project.

Task #	Task Name	Duration (Days)
0	Notice to Proceed (NTP)	0
1	Kick-off Meeting	1
2	Documents to be Provided by the Authority	5
3	Schedule Development	5
4	Developing Evaluation Criteria	19
5	Seismic Evaluations	70
6	Report Updates	30
	Submit Draft to Authority	0
	Authority Review Period	10
	Submit Final to Authority	30
7	Conceptual Level Design and Budgetary Cost Estimates	50
	Submit Draft to Authority	0
	Authority Review Period	10
	Submit Final to Authority	35
8	Project Management and Meetings	362

- **TASK 4: Developing Evaluation Criteria**

  WSP will review the 2003 report from GEI Consultants, Inc., titled "Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit" and will evaluate the need to update the deterministic and probabilistic analysis using the latest available ground motion models and National Hazard Maps. WSP will develop the evaluation criteria as deterministic or probabilistic response spectra. The deterministic response spectra shall represent the mean (50th percentile) levels of ground motion that could be induced at the site by a Maximum Credible Earthquake (MCE) centered along the La Nacion Fault or other upper-bound magnitude events centered along more distant faults, such as the Rose Canyon, Agua Blanca- Coronado, San Miguel-Vallecitos, San Diego Trough, and Elsinore faults. The La Nacion and Rose Canyon faults have low rates of slip. The probabilistic criteria shall represent ground motion levels with 10 or 50 percent probabilities of occurrence during a 50-year period, corresponding to return periods of 144 and 72 years.

- **TASK 5: Seismic Evaluations**

  The seismic evaluations will be mainly based on the US Army Corps of Engineers (USACE) Manual EM 1110-2-6053, "Earthquake Design and Evaluation of Concrete Hydraulic Structures". Other standards and guidelines from the governing agencies (USACE, FERC, and USBR) and design codes (ACI and ASCE) will be used when needed. The assumptions used in the 2003 report from GEI Consultants, Inc. for materials, boundary conditions, loadings and load combinations will be reviewed and updated as needed. Seismic evaluations of the outlet tower and conduit will be performed in SAP2000 finite element program, similar to the 2003 report from GEI Consultants, Inc. Seismic evaluations will include stability checks and strength design checks. Structural stability of the structures under seismic loading will be evaluated in Mathcad. For strength evaluations, three-dimensional (3D) finite element models of structures will be created in SAP2000 and response spectrum analysis will be performed to calculate critical seismic demands. Multi-directional seismic effect will be considered for both stability evaluations and strength design checks.

  Modal analysis will be performed for the outlet tower to determine dynamic characteristics of the structure. A parametric study will be performed for the outlet tower for a range of strength and elastic properties for the stone masonry in order to account for uncertainties in the estimated strength and elastic parameters of the tower material, similar to the 2003 report from GEI Consultants, Inc.

- **TASK 6: Report Updates**

  WSP will update the original 2003 report based on the new developed evaluation criteria and seismic analysis performed. WSP will have an internal quality assurance/quality control process and will conduct interactive internal reviews of the report before issuing a draft and final package to the Authority.

  Deliverable:

  - Draft updated report in PDF
  - Final updated report in PDF

- **TASK 7: Conceptual Level Design and Budgetary Cost Estimates**

  WSP will complete a conceptual level design based on the results of the seismic evaluations (Task 4) and will estimate a budgetary cost for strengthening the tower to withstand an earthquake with a return period of approximately of 144 years. WSP will perform internal quality assurance/quality control of the conceptual level design plans before issuing a draft and final package to the Authority.

  Deliverable:

  - Draft Conceptual Level Plans in PDF and Budgetary Cost Estimates
  - Final Conceptual Level Plans in PDF and Budgetary Cost Estimates

- **TASK 8: Project Management and Meetings**

  Project management activities include preparation of work plan and schedule, coordination, preparation of status reports and invoicing. The task is continuous throughout the duration of the project.

  Deliverable:

  - Meeting agendas and minutes, status reports

  Key Assumptions:

  - Seismic evaluation of the Sweetwater Dam is out of scope for this proposal. No analysis for the dam will be included.
  - Seismic Evaluation of the steel footbridge and circular operating platform located on top of outlet tower is out of scope for this proposal.
  - All deliverable components will be submitted for a single round of review and comment by Authority and will be compiled into a final deliverable.
  - No review by or presentation to DSOD or FERC is assumed for this proposal.

- All data will be provided by Authority or obtained in the public domain; no field data collection is proposed.
- WSP has assumed that a kick-off site visit is included with task 1 and up to five (5) staff from WSP will attend the site-visit.
- WSP has assumed a virtual meeting and presentation to the Authority Governing Board and/or Engineering and Operations Committee.
- A monthly 2-hour meeting has been assumed with the Authority through the duration of the project to discuss the progress of the project. The overall project duration is assumed to be 12 months for cost estimates.
- One hours bi-weekly internal meetings have been assumed for the duration of the project.
- A four-hour meeting has been assumed following each deliverable.

PROPOSED PERSONNEL & QUALIFICATIONS

WSP is proposing a multi-disciplinary team with specialized experience to deliver the proposed work. Our key team members proposed for this project are as follows:

Staff	Role	Years of Experience	Location
Reza Farahani, PhD, PE	Project Manager, Engineer of Record (EOR)	20	CA
Jeffrey Keaton, PhD, PE	Quality Controller	50	AZ
Praneeth Lingireddy, PE, SE	Seismic/Structural Engineer	10	Vancouver, CA
Ali Wahidi, PE, SE	Structural Engineer	40	WA
Stefan Schadinger, PE	Structural Engineer	28	MI
Valentina Montaldo Falero, PhD	Geologist/Seismologist	24	CA
Eric Vanhemert	Cost Estimator	17	WA

WSP recognizes that results from the simplified finite element analysis of the outlet tower and conduit in SAP2000 may not be very precise and advanced finite modeling and analysis may be needed for more detailed and comprehensive seismic evaluation updates. Advanced finite element modeling and analysis will take more time and effort than the simplified finite element modeling and analysis conducted in SAP2000 program and considered for this proposal, and it will cost more. WSP has the capability of conducting such advanced finite element modeling and analysis of the outlet tower and conduit and will be pleased to offer that as a change order. Upon request for the advanced finite element modeling and analysis of the outlet tower, WSP team will work with the Authority to determine scope of work and estimated costs.

The WSP Team provides the Sweetwater Authority with an expert qualified team of experienced dam engineering professionals that have recent and relevant experience in the analysis and development of seismic solutions for dams. Our California based experts in seismic hazards, seismic structural modeling, and dam safety value the opportunity to support the Authority with the development of improvements to the Sweetwater Dam to increase the longevity and function of this critical asset.

As requested by the RFP, this proposal is in effect for ninety (90) days. We trust that this aligns closely with your expectations, but should you have any questions or require any further clarifications, please do not hesitate to reach out to Reza Farahani by email at Reza.Farahani@wsp.com or by phone at 916-675-3318 with any questions or comments.

Thank you for your consideration.

Sincerely,

Debby Reece

R.V. Farahani

Debby Reece, PE
California Water Business Line Leader
Senior Vice President

Reza Farahani, PhD, PE
Project Manager

WSP USA
401B Street, San Diego, CA 92101
Tel.: +1 619 338-9376, Fax: +1 916 338-8123
Wsp.com

2 | Identification of Respondent

WSP is a nationally recognized firm and a global leader in engineering and water infrastructure. We are ranked No. 2 globally in Pure Engineering Design and No. 8 in Water by Engineering News Record, and offer a breadth and depth of water infrastructure design services. We have more than 73,900 engineers, technicians, scientists and environmental experts, planners, modeling specialists, and program and construction management professionals in towns and cities across 40 countries.

Legal Name/Company Address	WSP USA Inc., One Penn Plaza, New York, NY 10119
Legal Form of Company	Corporation
Parent Company	WSP Global Inc
San Diego County Office Information	401 B Street, Suite 1650, San Diego, CA 92101
Number of Employees in San Diego County	341
Sacramento County office Information	10940 White Rock Road, Suite 190, Rancho Cordova, CA 95670
Number of Employees in Sacramento County	128
Contact Person	Reza Farahani, Vice President, California Dams and Hydraulic Structures Lead 10940 White Rock Road, Suite 190, Rancho Cordova, CA 95670 916-576-3318, Reza.Farahani@wsp.com

3 | Financial Relationships Disclosure

a. Identify all existing and past financial relationships between Consultant's firm and current members of the Authority's Governing Board and staff and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.

WSP has no known existing nor past financial relationships between Consultant's firm and current members of the Authority's Governing Board and staff and entities for which said members are employed or have an interest, both past and present.

b. Identify all existing and past financial relationships between Consultant's proposed sub-consultants and current members of the Authority's Governing Board and staff and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.

WSP is not currently proposing any sub-consultants for this project.

4 | Approach for Completing the Work

WSP team will conduction seismic evaluations of the Sweetwater Dam outlet tower and conduit mainly based on the US Army Corps of Engineers (USACE) Manual EM 1110-2-6053, "Earthquake Design and Evaluation of Concrete Hydraulic Structures". Other standards and guidelines from the governing agencies (USACE, FERC, and USBR) and design codes (ACI and ASCE) will be used when needed.

WSP team will review the 2003 report from GEI Consultants, Inc., titled "Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit" and will evaluate the need to update the deterministic and probabilistic analysis using the latest available ground motion models and National Hazard Maps. WSP will develop the evaluation criteria as deterministic or probabilistic response spectra. The deterministic response spectra shall represent the mean (50th percentile) levels of ground motion that could be induced at the site by a Maximum Credible Earthquake (MCE) centered along the La Nacion Fault or other upper-bound magnitude events centered along more distant faults, such as the Rose Canyon, Agua Blanca- Coronado, San Miguel-Vallecitos, San Diego Trough, and Elsinore faults. The La Nacion and Rose Canyon faults have low rates of slip. The probabilistic criteria shall represent ground motion levels with 10 or 50 percent probabilities of occurrence during a 50-year period, corresponding to return periods of 144 and 72 years.

WSA team will review and update the assumptions used in the 2003 report from GEI Consultants, Inc. for materials, boundary conditions, loadings and load combinations as needed. Seismic evaluations of the outlet tower and conduit will be performed in SAP2000 finite element program, similar to the 2003 report from GEI Consultants, Inc. Seismic evaluations will include stability checks and strength design checks. Structural stability of the structures under seismic loading will be evaluated in Mathcad. For strength evaluations, three-dimensional (3D) finite element models of structures will be created in SAP2000 and response spectrum analysis will be performed to calculate critical seismic demands. Multi-directional seismic effect will be considered for both stability evaluations and strength design checks.

Modal analysis will be performed for the outlet tower to determine dynamic characteristics of the structure. A parametric study will be performed for the outlet tower for a range of strength and elastic properties for the stone masonry in order to account for uncertainties in the estimated strength and elastic parameters of the tower material, similar to the 2003 report from GEI Consultants, Inc.

WSP team will update the original 2003 report based on the new developed evaluation criteria and seismic analysis performed. WSP will have an internal quality assurance/quality control process and will conduct interactive internal reviews of the report before issuing a draft and final package to the Authority.

WSP team will complete a conceptual level design based on the results of the seismic evaluations and will estimate a budgetary cost for strengthening the tower to withstand an earthquake with a return period of approximately of 144 years. WSP will perform internal quality assurance/quality control of the conceptual level design plans before issuing a draft and final package to the Authority.

5 | Required Qualifications

a. The Respondent's primary business or the primary business of a department within the Respondent's firm shall be engineering consulting services for large-scale dam evaluations, and shall have been in the business of providing such services for at least five (5) years. ✓

b. The Respondent shall provide a single project manager as the primary point of contact with the Authority. This project manager must have at least five (5) years total experience with current firm or other employers in projects related to large-scale dam evaluations, and shall be registered as a professional engineer in the state of California. ✓

c. Provide a list of past and ongoing qualifying projects for which the Respondent's services were or are similar to those described in this RFP. Limit the list to no more than ten projects the Respondent believes are most relevant to the RFP.
List of past and ongoing qualifying projects and requested details are presented in Section 5.1. ✓

d. Present the experience of any proposed subconsultants in the same manner.
No subconsultants is considered for our proposal. ✓

e. Provide evidence of the experience and competence of the Respondent's team proposed to work on the Project, with specific emphasis on experience in working on large-scale dam evaluation.
The requested information is presented in Section 5.1. ✓

5.1 | List of Qualifying Projects and Evidence of experience

Valenciano Dam

Juncos, PR, United States

Project Description

WSP is the lead design firm for the new Valenciano Dam, the center piece of the East Central Puerto Rico Water Supply Project. The dam is a new 120-foot tall roller compacted concrete structure with four tainter gates, a piano key weir, and an Obermeyer weir. Other features of the site include a access bridge over the dam, a water intake tower, a sediment transport tower, a new raw water pump station, an outlet energy dissipation basin training walls, retaining walls, and operations building, and various piping, valved and civil site design features throughout the site. Design of the new dam includes a full seismic study of the maximum design earthquake associated with the Muertos Trough subduction zone. WSP performed the seismic hazard analysis, the dam seismic stability analysis, and has prepared a finite element structural analysis seismic model. The team has performed long-term water yield studies on the reservoir, reservoir sedimentation studies and optimization to protect the long-term water yield, and CFD studies of the PMF to size the dam, gates, and energy dissipation basins. Currently geotechnical and geophysical field investigations are underway to document the properties and extent of high-quality native rock for use in the on site RCC plant for construction of the dam.

WSP Services

Geotechnical, structural, hydraulics, hydraulic physical modeling, seismic hazard analysis, seismic structural analysis, seismic structural FEM, civil site design, sedimentation analysis, long-term water supply yield analysis, cost estimation, construction plan development, geotechnical filed oversite, geophysical field exploration, and other services as required for the design.

Client/Owner:
Puerto Rico Aqueduct and Sewer Authority (PRASA)

Project Dates:
09/2024 – 09/2026

Key Elements:
- ✓ New RCC Dam Design
- ✓ Full seismic design study

Key Personnel:
Gregory Hebeler
Reza Farahani
Peter Bouchie
Stefan Schadinger
Ali Wahidi
Valentina Montaldo Falero
Maria Arcos
Josh Myers
Jeff Keaton

References:
Jeff Beriswell, PE
Black & Veatch Program Manager for PRASA
BeriswillJ@bv.com

Chilhowee Dam Seismic Hazard Study & Embankment Repair

Tallassee, TN, United States

Project Description

WSP developed and oversaw an extensive subsurface investigation program to determine the extent of deficient embankment materials. In parallel, WSP performed a site-specific seismic evaluation, to address recent changes to the USGS hazard maps for the area of the dam. Based on the results of the subsurface program, WSP prepared the contract documents, design drawings, technical specifications, the QCIP for a significant rehabilitation program at the site and provided on-site engineering oversight for the repair program. The repairs were successfully completed, and the reservoir restored, in the summer of 2017. The sloping clay core configuration of the embankment complicated the options for repairing the embankment. In addition, due to the depth at which repairs were needed, the reservoir was partially lowered, and a significant portion of the repair work was completed below the reservoir level.

WSP Services

Owner's Engineer, Seismic Analysis, Dam Safety Inspection, Dam Rehabilitation Design, Partial Embankment reconstruction design, during construction

Client/Owner:
Brookfield Renewable

Project Dates:
2014-2017

Key Elements:

- ✓ Geotech
- ✓ Hydraulics
- ✓ CFD Modeling
- ✓ FERC Support

Key Personnel:
Derek Olson
Stefan Schadinger
Peter Bouchie

References:
Mr. Ashley Thomas
Senior Compliance Manager
Ashley.thomas@
brookfieldrenewable.com

Cushman Dam #1 Rockfall Mitigation

Tacoma, WA

Project Description

WSP was contacted by Tacoma Public Utilities to perform an emergency site visit to the Lake Cushman Dam No. 1 Powerhouse to assess the stability of a rock slope immediately adjacent to the powerhouse, a portion of which had failed the previous night, severely damaging a tramway and associated infrastructure. WSP was to assess the condition of the remaining slope and determine remedial actions to provide temporary stabilization of the rock slope to allow worker access for repairs to the damaged infrastructure. Using the information gained from the reconnaissance, WSP designed a rockfall stabilization system that comprised rock dowels and rope anchors providing support for a high-tensile wire mesh draped over the slope area. WSP also provided construction observations and testing services during installation of the rockfall stabilization system.

WSP Services

Geohazard Analysis, Geological Investigations, Remediation Design

Client/Owner:
Tacoma Power

Project Dates:
Month, Year – Month, 2023

Key Elements:
- ✓ Geohazard
- ✓ Preliminary Design
- ✓ Detailed Design
- ✓ Construction Support

Key Personnel:
Vinod Pillai, PE PM
Jason Cox, PE

References:
Seth Frazier Doull, PE
Sr. Project Manager
Tacoma Public Utilities - Generation Civil Engineering
sdoull@cityoftacoma.org

Diablo Powerhouse Emergency Rockfall Repair

Skagit County, WA

Project Description

WSP provided preliminary engineering, design, and construction support for emergency rockfall repair at the Diablo Powerhouse in Skagit county, Washington. After multiple rockfall events at the rockface adjacent to the Diablo powerhouse, WSP designed and provided preliminary engineering for rockfall mitigation methods including an anchor-supported wire mesh wall on the North side and rockfall attenuation fencing on the south side of the rock face. WSP also acted as the owner's engineer providing construction oversite, on-site quality control support, testing support, and RFI support throughout the construction.

WSP Services

Geohazard Analysis, Remediation Design, Construction Support

Client/Owner:
Tacoma Power

Project Dates:
Month, Year – Month, 2023

Key Elements:

- ✓ Geohazard
- ✓ Preliminary Design
- ✓ Detailed Design
- ✓ Construction Support

Cost/Budget:
<$200,000.00

Key Personnel:
Vinod Pillai, PE PM
Jason Cox, PE

References:
Lisa Williams, DBIA
Sr. Project Manager
Seattle City Light- Project Delivery
Lisa.Williams@seattle.gov

Calderwood Station Seismic Analysis

Tennessee, US

Project Description

WSP prepared a three-dimensional finite element model of the Calderwood Station concrete arch dam to evaluate seismic stability and stresses. The finite element model incorporated loads that represent gravity, reservoir water levels, and thermal and seismic loads. The model was used to address thermal affects and the potentially weakened foundation at an abutment fault zone, as well as to ensure that the displacements and the stresses were acceptable. This was especially important since the material properties of the concrete and rock elements local to the fault had to be significantly reduced to account for the weakened zone beneath the abutment.

WSP Services

Seismic hazard analysis, Finite Element Modeling

Client/Owner:
Brookfield Renewable

Project Dates:
2017

Key Elements:

- ✓ Geotech
- ✓ Geophysical Services
- ✓ Seismic Modeling
- ✓ Structural FEM
- ✓ Civil Engineering

Key Personnel:
Derek Olson
Stefan Schadinger
Peter Bouchie

References:
Mr. Ashley Thomas
Senior Compliance Manager
Ashley.thomas@
brookfieldrenewable.com

Ross Arch Dam And L2RA Finite Element Foundation Modeling

North Cascades National Park, US

Project Description

WSP was responsible for finite element analysis of the rock foundations for the 165m high Ross dam for inclusion into the dam safety report for the Federal Energy Regulatory Commission. Attended a weeklong dam safety review and provided input on the rock foundations for Part 12 probable failure mode analysis and L2 risk assessment. The FEM helped identify potential wedges but also provided FOS's on the wedges that were adequate given the degree of rock bridging on release joints.

WSP Services

Finite Element Modeling

Client/Owner:

Seattle City Light

Project Dates:

2021

Key Elements:

- ✓ Geotech
- ✓ Geophysical Services
- ✓ Seismic Modeling
- ✓ Civil Engineering

Key Personnel:

Stefan Schadinger

Peter Bouchie

Vinod Pillai

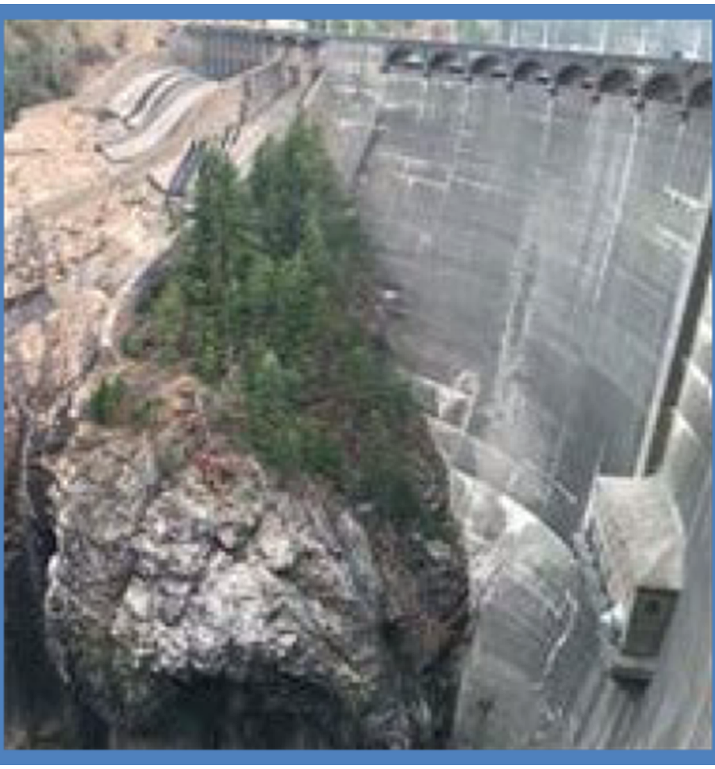
Reference:

Kim Pate

Kim.Pate@seattle.gov

Sr. Project Manager

Seattle City Light- Project



Diablo Arch Dam PFMA and L2RA Foundation Finite Element Modeling

Whatcom County, WA, US

Project Description

WSP was responsible for finite element analysis of the rock foundations of the 119 m high Diablo arch dam for inclusion into the dam safety report for the Federal Energy Regulatory Commission. WSP also attended weeklong 2023 FERC dam safety review and provided input on the rock foundations for Part 12 probable failure mode analysis and risk assessment. Work also included detailed mapping of the rock mass on the right bank and spillway apron downstream of the arch dam.

WSP Services

Finite Element Modeling

Client/Owner:
Seattle City Light

Project Dates:
2021

Key Elements:
- ✓ Geotech
- ✓ Geophysical Services
- ✓ Seismic Modeling
- ✓ Civil Engineering

Key Personnel:
Stefan Schadinger
Peter Bouchie
Vinod Pillai

Reference:
Kim Pate
Kim.Pate@seattle.gov
Sr. Project Manager
Seattle City Light- Project

Spillway Rockfall Assessment

Northern California, US

Project Description

The penstock slope anchors are aging, and it was noted that some of the anchors are failing. Site geological mapping undated the geological model and strength and deformability for the penstock slope and the delivery tunnels from the dam. These data were built into a 3-D model in an RS3 equivalent program to understand the impact of seismic events on the penstock slope. The final model output was put on hold given the PGA for the dam was under review

WSP Services

Geotechnical, LiDAR, seismic analysis

Client/Owner:
Confidential Hydropower Client

Project Dates:
2022

Key Elements:
- ✓ Geotech
- ✓ Hydraulics
- ✓ CFD Modeling
- ✓ FERC Support

Key Personnel:
Vinod Pillai, Project Engineer

Power Deck Seismic Anchoring

Washington State, United States

Project Description

Seismic Upgrades at three powerhouses along a run-of-river hydroelectric project. Included ground penetrating radar (GPR) to confirm/correct owner's as-builts, Geotech and seismic analysis, structural design, and construction support.

WSP Services

Seismic, structural, project management.

Client/Owner:
Confidential Client

Project Dates:
2020-2024

Key Elements:

- ✓ Seismic Assessment
- ✓ Geotechnical
- ✓ Structural Design
- ✓ GPR Investigations
- ✓ Construction Support

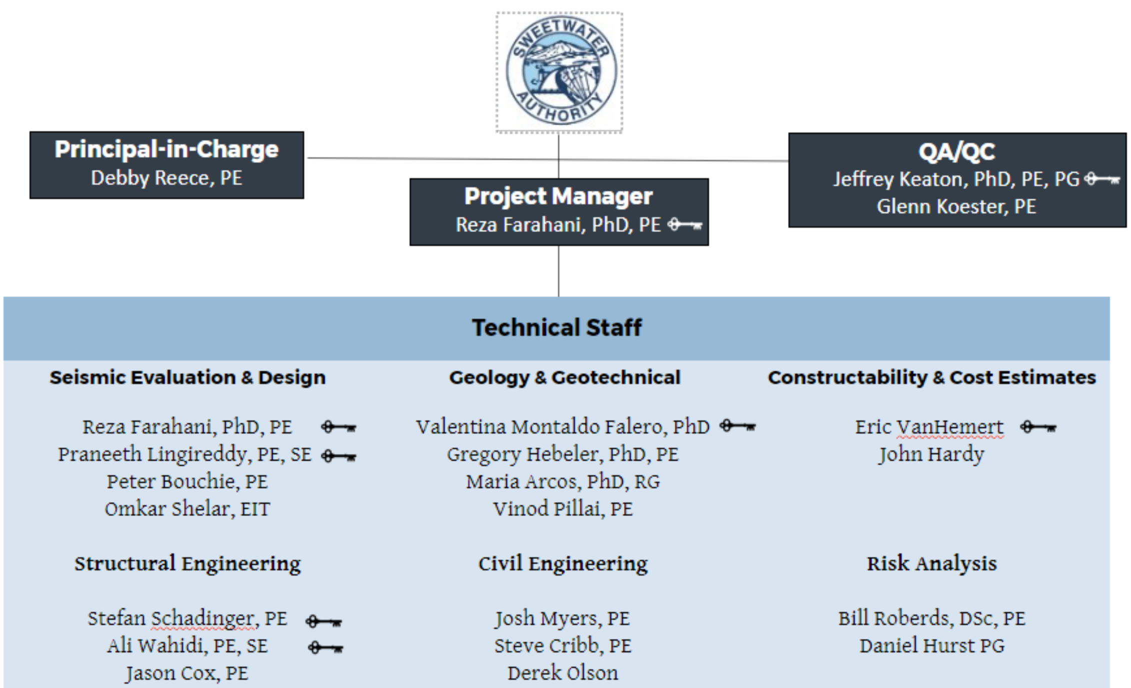
Key Personnel:
Ali Wahidi, Principal Engineer

6 | Respondent's Firm and Key Personnel

WSP is one of the world's leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, project managers, planners, surveyors and environmental specialists, as well as other design and program management professionals. We design and deliver lasting solutions in Infrastructure, Buildings, Transportation, Oil & Gas, Environment, Geomatics, Mining, Power and Industrial sectors as well as project delivery and strategic consulting services. With 19,000 talented people across the United States and 73,900 globally, we engineer projects that will help societies grow for generations to come.

WSP proposes a team with extensive experience in seismic evaluations and design of dams and infrastructures. Our project manager, Reza Farahani, brings 20 years of experience working on seismic evaluations, analysis and design of various structures including dams and hydraulic structures. He is PE of California and holds a PhD in Civil (Structural) Engineering. He has served as project manager and Engineer of Record (EOR) for several dams and hydraulic structures projects in California. Our seismologist, Dr. Valentina, has 24 years of experience in seismic hazard analysis (probabilistic and deterministic) and has worked on several dams and infrastructures projects. Our structural engineer, Praneeth Lingireddy, is PE and SE of California and has over 10 yrs of structural evaluations, analysis and design experience including working on dam safety projects. The key personnels are shown in the below organization chart.

6.1 Organizational Chart



6.2 Key Personnel Resumes

The resumes of key personnels are presented in next page.

REZA FARAHANI, PhD, PE

Vice President, California Dams and Hydraulic Structures Lead

Years with the firm

<1

Years total

20

Professional Registration

California Professional Engineer, Civil, License No.: CA 83722

Washington Professional Engineer, Civil, License No.: 22027230

Iowa Professional Engineer, License No.: P25810 (inactive)

Areas of practice

Civil Engineering

Structural Engineering

Earthquake Engineering

Soil-Structure Interaction

Finite Element Analysis

Office location

Sacramento

CAREER SUMMARY

Reza Farahani has more than 20 years of diverse structural engineering experience in analysis, evaluation, design, and project management. He is expert in seismic analysis of structures considering soil-structure interaction, and evaluation of existing concrete structures under extreme events. He has been involved from the early planning and proposal development stages through detailed design and has significant experience in preparing scope of work, staffing, budget estimate, scheduling, project coordination with multi-disciplinary teams, developing design criteria and specs, leading analysis and design tasks, preparing calculations and technical reports, implementing QA/QC procedures, and tracking financial aspects of projects.

EDUCATION

Ph.D., Civil Engineering (Structures), Univ. of Tennessee, Knoxville	2013
M.S., Civil Engineering (Structures), Univ. of Tennessee, Knoxville	2010
M.S., Civil Structural Engineering, Amirkabir Univ. of Technology, Iran	2004
B.S., Civil Water Engineering, KN Toosi Univ. of Technology, Iran	2001

PROFESSIONAL EXPERIENCE

— Central East Region Water Supply Improvements, Valenciano Dam and Raw Water Intake Project, Juncos, Puerto Rico: Reza is currently serving as a structural QC for stability analysis of Valenciano dam gated spillway. He is reviewing project information, drawings, and structural analysis calculations.

— NRCS Ross Dam Rehabilitation Design Project, Massachusetts, United States: Reza is currently serving as structural QC (detailed checker) for Lester Ross dam spillway design. He is reviewing project drawings, structural design calculations, and specifications.

— East Kellogg - Phase C 30902699C Project, Kansas, United States: Reza is currently serving as structural engineer for Brookhaven dam and spillway design and is designing concrete spillway and preparing structural plans, calculations and technical specifications.

— Bishop Intake No. 2 Service Spillway Coring and Repairs, Bishop, CA: Reza served as the project manager (PM) and engineer of record (EOR), and structural lead for the Bishop Intake No. 2 Service Spillway Coring and Repairs project. He led structural evaluations and resurfacing design of the existing cyclopean concrete spillway and attended site visits to observe coring progress. He was responsible for project management activities, structural analysis and design, and production of drawings and technical specifications.

— Antelope Dam Spillway Project, Plumas County, CA: Reza served as the PM and structural lead for the Antelope Dam Spillway project. He was previously structural lead and EOR for this project where he led stability analysis and strength design checks of spillway structures and prepared structural analysis technical report. He was responsible for project management activities in addition to the structural lead role.

— Sabrina Dam Spillway Retrofit Project, On-site Engineering Support, Bishop, CA: As the project manager, Reza negotiated the contract terms and personnel rates with client and was responsible for project management and coordination with client and HDR engineers attending the site to provide required on-site engineering support.

- Big Creek Dam #7 Gate Analysis, Madera County, CA: Reza served as the PM, EOR, and structural lead for the Big Creek Dam #7 Radial Gate Analysis project. He was responsible for project management activities, structural analysis efforts and production of technical report. As the project manager, Reza was responsible for overseeing the project, schedule, and costs and coordination with client and HDR engineers to accomplish the project.
- North Shore Levee West (NSLW) Project, Aberdeen, WA: Reza served as the structural lead of Hoquiam NSLW project. He led structural analysis and design efforts of sheet pile walls (I-walls), T-walls and closure structures (stoplogs, swing gates, sliding gates, and passive tilt up gates). He was also coordinating structural designs with multi-disciplinary teams.
- Moccasin Lower Dam Long Term Improvements Project, Tuolumne County, CA: Reza served as the structural lead of the Moccasin project. He was coordinating structural designs with multi-disciplinary teams. He was responsible for structural analysis and design, production of structural drawings and technical specifications.
- Calero Dam Seismic Retrofit Project, San Jose, CA: Reza served as the structural lead in 30% design. His scope efforts included coordinating structural design with multi-disciplinary teams, preparing basis of design report and design criteria memorandum (structural), finite element modeling, analysis and design of relevant structures, production of structural drawings, and mentoring junior engineers.
- NID Scotts Flat Spillway Design, Nevada City, CA: Reza served as the structural lead for flip bucket design of NID Scotts Flat Spillway Design project in 30% design. He was responsible for structural analysis and design of flip bucket and production of structural drawings and technical specifications.
- Clarke County Iowa Reservoir Commission Project, Clarke County, IA: Reza served as the lead structural engineer and EOR in 30% design. He mentored and supervised junior structural engineers in design of spillway intake, conduit, and stilling basin. His scope efforts included coordinating structural design, finite element modeling, structural analysis and design, and production of structural drawings.
- Pyramid Dam Service Spillway Project, Los Angeles, CA: Reza served as a structural engineer and EOR for the Pyramid Dam Service Spillway Project and performed stability analysis and strength design checks of spillway structure and prepared structural analysis report.
- PCWA Interbay Dam Project, Placer County, CA: Reza served as a structural engineer and EOR for the PCWA Interbay outlet pipe support rehabilitation design. His responsibilities included analysis and design of outlet pipe and pipe supports and production of structural drawings.
- Oroville Dam FCO Non-Linear Stress Analysis, Oroville, CA: Reza served as a detail checker for Oroville Dam FCO advanced finite element modeling and analyses performed in LS-DYNA program. He investigated the FCO in SAP2000 program for new seismic ground motions.

JEFFREY KEATON, PHD, PE, PG, CEG, TF.WSP F.ASCE, F.GSA, HM.AEG, F.ABET

Senior Vice President | Engineering Geologist

Years with the firm

36

Years total

50+

Professional registrations

Registered Civil Engineer, Arizona, No. 78538 (Exp. 6/30/26); California, No. 30561 (Exp. 3/31/26), 1979

Registered Geologist, Arizona 78537 (Exp. 6/30/26); California, No. 3379 (Exp. 9/30/25), 1977

Certified Engineering Geologist, California, No. 979 (Exp. 9/30/25), 1977

Languages

English

Office location

Phoenix

CAREER SUMMARY

Extensive experience in managing, conducting, and supervising geologic, seismologic, and geotechnical projects on five continents for five decades has given Dr. Keaton understanding of a wide variety of projects, including metal, uranium, coal, potash, phosphate, and building material mines, quarries, and milling facilities; dams for water supply, power generation, flood control, tailings storage, and sediment control; energy development and transmission; fossil-fuel and nuclear power plants; gas, liquid, water, and sewer pipelines; underground gas storage facilities; refineries and tank farms; bridges, roads, and highways.

Geologic and Seismic Evaluations

Applying the principles of geology, Dr. Keaton has characterized sites and alignments of proposed and existing facilities of all types. These engineering geology evaluations focused on quantifying natural conditions and processes for siting, design, and operation. He is involved in conducting and supervising regional and detailed mapping of bedrock and surficial geology, aerial image interpretation, utilizing lidar data, logging of surface and subsurface exposures, analyzing rock structure for stability, collecting rock and sediment samples, analyzing laboratory test data, utilizing geographic information system technology for analysis and visualization, formulating recommendations, preparing reports, and providing expert witness testimony. He has written papers on engineering geology mapping symbols, mapping of slopes and landslides, liquefaction hazards, faults, debris flows, earth fissures, and engineering geology input for probabilistic flood hazard assessments.

Dr. Keaton was the Principal Investigator of three research projects involving neotectonic evaluations of seismically active faults funded by the U.S. Geological Survey under the National Earthquake Hazards Reduction Program (NEHRP), two regional earthquake-induced slope stability research projects (NEHRP), and one project to develop guidelines for evaluating scour at bridge foundations on rock funded by the National Cooperative Highway Research Program (NCHRP). He was Co-Principal Investigator of several regional liquefaction hazard mapping projects (NEHRP). He was the geotechnical and foundations team leader on an Applied Technology Council (ATC) project for a Federal Emergency Management Agency (FEMA) program to develop guidelines for seismic rehabilitation of buildings. He was selected by the Earthquake Engineering Research Institute for the 1999 Professional Fellowship award to work with two professors of seismology at University of Nevada-Reno to develop synthetic normal fault seismograms using their Composite Source Model.

Dr. Keaton has directed and conducted many projects to develop earthquake ground motions for design; stability of surficial and bedrock geologic materials under both static and earthquake loading; design parameters that incorporate ground motion; and engineering geologic characterization of sites exposed to soil liquefaction and fault rupture hazards. Dr. Keaton directed and conducted many projects involving geoseismic evaluations of fault zones for determination of degree of fault activity and earthquake design parameters. Among the fault zones he has evaluated are the San Andreas, Garlock, Sierra Madre, and Calico in California; the Stafford fault zone in Virginia; the Wasatch in Utah; the Eglington fault zone in Nevada; the Southern Whidbey Island fault zone in Washington; the East Franklin Mountains fault in West Texas; the Amargosa fault in Chihuahua, Mexico; faults associated with the East Africa rift in Ethiopia; and a number of unnamed faults in the United States, Canada, Mexico, Iran, and Great Britain. He has also performed seismic hazard studies for design of new and closure of existing mine tailings storage facilities sites in Mexico, Peru, Bolivia, Chile, Argentina, Brazil, Spain, Russia (Far East), Liberia, Botswana, Indonesia, Malaysia, the Philippines, and Angola.

JEFFREY KEATON, PHD, PE, PG, CEG, TF.WSP F.ASCE, F.GSA, HM.AEG, F.ABET

Senior Vice President | Engineering Geologist

EDUCATION

- PhD, Geology, Texas A&M University, College Station — 1988
- MS, Engineering (Geotechnical), University of California, Los Angeles — 1972
- BS, Geological Engineering, University of Arizona, Tucson — 1971

PROFESSIONAL EXPERIENCE

- Principal Engineering Geologist: Probabilistic Earthquake Ground Motion for Stability Evaluation for Closure of Existing Tailings Storage Facilities, Newmont Canada, Golden Giant Mine, South Central Ontario, Canada, 2023. Desktop geohazard evaluation for closure of an existing gold mine tailings storage facility. Tectonic setting and seismic sources, active faults screening, and historical seismicity, and ground motion for return periods of 2,500, 5,000, and 10,000 years. Three sets of results were developed for different values of average shear-wave velocity in the upper 30m of the site to represent the range of seismic hazard. Scaled acceleration-time series were developed for the lowest shear wave velocity which corresponds to the softest ground condition and highest seismic response.
- Principal Engineering Geologist: Desktop Capable Fault Assessment, Confidential Client, Northwest England, United Kingdom, 2020-2023. Desktop assessment of geological faults within a 40km radius of a specific but confidential site with special emphasis on faults within 8km of the site. Assessment included tectonic setting, historical seismicity, potential seismic sources, geological maps of bedrock formations and surficial deposits, published geologic hazard reports for hazardous facility siting and waste disposal, publicly available onshore and offshore geophysical surveys (seismic reflection, aeromagnetic anomalies, gravity anomalies), government-produced 1m pixel bare earth lidar data, and ground investigation reports. Faults were classified with a three-tier system developed for faults in the United Kingdom consisting of active, extinct, or unproven.
- Principal Engineering Geologist: Probabilistic Earthquake Ground Motion for Design of Tailings Storage Facilities, Kirkland Minerals Tailings Storage Facility, Kirkland Lake, Ontario, Canada, 2023. Desktop geoseismic evaluation for design of mine tailings storage facilities. Tectonic setting and seismic sources, active faults screening, and historical seismicity, and ground motion for return periods of 2,500, 5,000, and 10,000 years. An assumed value of average shear-wave velocity in the upper 30m of the site was used to calculate seismic hazard in terms of acceleration response spectra. Eight sets of scaled acceleration-time series were developed for the 10,000-year return period.
- Principal Engineering Geologist: Site Specific Seismic Hazard Assessment for Expansion of Curuglú Tailings Storage Facility, West of Santa Rosalia, Baja California Sur, México for Minera y Metalúrgica del Boleo, 2023. Desktop geoseismic evaluation for design of mine tailings storage facilities. Tectonic setting and seismic sources, active faults screening, and historical seismicity, and ground motion for return periods of 2,500, 5,000, and 10,000 years. This site is located within 100km of the boundary between the North American Plate and the Pacific Plate, which is a transform fault in the middle of the Gulf of California. An historically active volcano is within 50km. A deterministic M7.8 earthquake was estimated to occur 25km from the site and a deterministic M7.15 was estimated to occur within 17.8km from the site. The site stiffness was estimated based on assumed shear-wave velocities of the two uppermost layers of the geotechnical profile

VALENTINA MONTALDO FALERO

VICE PRESIDENT, GEOLOGIST

Years with the firm

17

Years total

24

Professional associations

Member, Earthquake Engineering Research Institute

Member, Seismological Society of America

Languages

English – Fluent

Italian – Fluent

Office location

Oakland, California

CAREER SUMMARY

Dr. Montaldo Falero has more than 20 years of experience in engineering seismology, including probabilistic seismic hazard analyses (PSHA) and deterministic seismic hazard analyses (DSHA). Her experience in PSHA includes regional studies (Italy, US, Canada, Papua New Guinea), site-specific studies for proposed new reactors (US, UK, Canada) including the siting of two small modular reactors (Carbon Free Power Project and Darlington), long-term hazard analyses for nuclear waste repositories (Canada), re-evaluation of the seismic hazard for existing nuclear facilities and systems of dams (US, Spain, and Canada), site-specific seismic hazard studies for oil and gas infrastructure and US diplomatic compounds in multiple locations worldwide. She has participated in six SSHAC Level 3 and one SSHAC Level 1 projects.

Dr. Montaldo Falero has compiled earthquake catalogs from a variety of instrumental and historical sources for many regions in the world and has developed empirical magnitude conversion relationships for parts of western North America for use in PSHA. She has extensive experience in working under NQA-1 and ISO Quality Assurance Programs.

EDUCATION

Doctor of Philosophy (PhD), Geology (Seismology), Università degli Study di Milano-Bicocca, Italy	2006
Master of Science (Laurea), Geology, Università degli Study di Milano, Italy	2000

PROFESSIONAL EXPERIENCE

— Comprehensive Probabilistic Seismic Hazard Assessment, Brookfield Dams. 2022-present. The objective of this project is to perform a site-specific seismic hazard evaluation for three dams following Chapter 13 of FERC's Engineering Guidelines for the Evaluation of Hydropower Projects (Idriss et al., 2018). Dr. Montaldo Falero is responsible for updating the earthquake catalog to verify the applicability of the existing recurrence model for the Central Eastern U.S. and to perform seismic hazard calculations.

— Review of PG&E Background Seismicity Model, Pacific Gas & Electric (PG&E), 2021. Conducted third-party review of the background seismicity model that PG&E plans to use for the Deterministic Seismic Hazard Report of all PG&E dams. Dr. Montaldo Falero was responsible for evaluating the compilation and processing of the earthquake catalog, and its use in determining seismicity rates.

— Update of Valley-Wide and Site-Specific Seismic Hazard Analyses for the Tennessee Valley Region, Tennessee Valley Authority (TVA), 2028-2020. The scope of the project was to conduct a region-wide assessment of the seismic hazard and individual site-specific probabilistic seismic hazard analyses for 92 projects, including earth or concrete dams and appurtenant structures. Dr. Montaldo Falero was responsible for checking the applicability of existing models, verify the effect of induced seismicity sources on the hazard, perform seismic hazard calculations.

— U.S. Army Corps of Engineers (USACE), USACE/Willamette Valley/Seismic, Willamette, OR, 2018 – 2019. Dr. Montaldo Falero developed the earthquake catalog for use in probabilistic seismic hazard analyses and conducted probabilistic seismic hazard analyses at 13 dams located in the western Cascades Mountains in central

Oregon. The results of this seismic hazard study provide input to risk evaluations of the dams.

- Probabilistic Seismic Hazard Analysis for Mactaquac Generating Station, New Brunswick, New Brunswick Power, 2017-2018. Dr. Montaldo Falero evaluated the need to update the seismic hazard model prepared in a previous study (2012) considering new seismic data. She was also responsible for conducting the probabilistic seismic hazard analyses to obtain the design ground motion prescribed by the Canadian Dam Association guidelines.

- U.S. Army Corps of Engineers (USACE), USACE/Willamette Valley/Seismic, Willamette, OR, 2016-2017. Dr. Montaldo Falero developed the earthquake catalog for use in probabilistic seismic hazard analyses and conducted probabilistic seismic hazard analyses at 13 dams located in the western Cascades Mountains in central Oregon. The results of this seismic hazard study provide input to risk evaluations of the dams.

- Probabilistic Seismic Hazard Analysis, BCHydro and Power Authority, BC, Canada (multiple locations). 2008-2013. This SSHAC Level 3 study developed a comprehensive probabilistic seismic hazard analysis (PSHA) model for the region encompassing the dams and appurtenant structures owned and operated by BC Hydro. Dr. Montaldo Falero assisted in preparing and analyzing a uniform earthquake catalog for crustal earthquake and one for subduction earthquakes and performed the preliminary and final seismic hazard calculations at 42 sites.

- Frontier Observatory for Research in Geothermal Energy (FORGE), UT, University of Utah. 2017-2022.
- Comprehensive Probabilistic Seismic Hazard Assessment, Offshore Guyana, ExxonMobil. 2021.
- P'nyang Project PSHA, Papua New Guinea, ExxonMobil PNG Limited. 2018-2019.
- Seismic Hazard Analyses for the Landslide Footprint Mapping Project, Golder Associates. 2017.
- Comprehensive Probabilistic Seismic Hazard Assessment, Offshore Guyana, ExxonMobil. 2016.
- Santa Elena Mine Seismic Hazard Assessment, Mexico, Majestic Silver Company. 2020.
- San Dimas Mine Seismic Hazard Assessment, Mexico, Majestic Silver Company. 2020.
- Limited Seismicity Update for U.S. Diplomatic Compounds (2014-2020):

RECENT PUBLICATIONS & PRESENTATIONS

- "Modeling time dependent earthquake occurrences on faults: examples from recent PSHA studies", Montaldo Falero, V. and Youngs, R.R., Proceedings of the 18th World Conference on Earthquake Engineering, Milan, June 30-July 5, 2024.
- "Virtual fault ruptures in area-source zones for PSHA: Are they always needed?", J.J. Bommer and V. Montaldo Falero. Seismological Research Letters, doi: 10.1785/0220190345. 2020.
- "Assessing the Need for an Update of a Probabilistic Seismic Hazard Analysis Using a SSHAC Level 1 study and the Seismic Hazard Periodic Reevaluation Methodology", S.J. Payne, K. J. Coppersmith, R. Coppersmith, V. Montaldo Falero, R. R. Youngs, A. Rodriguez-Marek, and W. Silva. Nuclear Engineering and Design, Vol. 323, pp. 103-119.

ERIC VANHEMERT

Assistant Vice President/ Senior Lead Estimator, Project Controls

YEARS WITH THE FIRM

3

Years total

17+ Years

Areas of practice

Preconstruction Management
Estimating Management
Project Controls
Project Management

Office location

Seattle

CAREER SUMMARY

Construction management professional with extensive experience in a broad range of responsibilities in the Heavy Civil industry. Specialist in team management, project planning and constructability analysis, construction cost estimating, and support for design-build construction processes. Experienced in multiple project delivery types including design-build, progressive design build, GCCM, design-bid-build and P3 on a variety of project values up to $1.5 billion. Primary clients in the Heavy Civil industry include Transit Authorities, Federal Transportation Administration, multiple DOT's as well as local municipalities.

EDUCATION

B.S. Civil Engineering 2006

Montana Tech of the University of Montana, Butte Montana

PROFESSIONAL EXPERIENCE

- Valley Link Light Rail System, Tri-Valley San Joaquin Valley Regional Rail Authority, Alameda and San Joaquin Counties, CA. Senior lead estimator.
- Sweetheart Lake Hydroelectric Project, Juneau Hydropower Inc., Juneau, AK. Senior lead estimator.
- Alondra Park Multi-Benefit Stormwater Capture Project, County of Los Angeles Dept of Public Works, Lawndale, CA. Senior lead estimator.
- VIA ART East/ West Corridor, Bus Rapid Transit, VIA Metropolitan Transit, San Antonio TX. Senior lead estimator.
- BART Silicon Valley Phase II Extension, Santa Clara VTA, Santa Clara County, CA. Senior lead estimator.
- Multiple Hydroelectric Pumped Storage, Site Planning, Private Client, Western United States. Senior lead estimator.
- VIA ART North/ South Corridor, Bus Rapid Transit, VIA Metropolitan Transit, San Antonio TX. Senior lead estimator.
- I-405 Bus Rapid Transit and Bus Operations & Maintenance Facility, Sound Transit, King County, WA. Senior lead estimator.
- Hydroelectric Pumped Storage Facility Upgrades - 2 Sites, Private Client, Western United States. Senior lead estimator.
- Atlanta Network Distribution Center Facility Upgrades, United States Postal Service, Atlanta, GA. Senior lead estimator.
- Frontrunner Forward Commuter Rail System Expansion, Utah Transportation Authority, Salt Lake and Utah Counties, UT. Senior lead estimator.
- Hydroelectric Pumped Storage, Facility Upgrades, Private Client, Western United States. Senior lead estimator.

PREVIOUS EXPERIENCE

GRAHAM CONTRACTING, LTD.-- BELLEVUE, WA
CHIEF ESTIMATOR

- Supervision of the Heavy Civil estimating and preconstruction department
- Focus on estimate accuracy, quality and estimating team communication to provide a solid product for submission.
- Setup, organization and delegation of estimate tasks and responsibilities
- Lead and direct Joint Venture pursuits on complex civil projects
- Collaboration with design firms throughout the design build process providing direction and guidance and structured expectations to maximize efficiency and minimizing risk.
- Development of the district business plan for upcoming years and provided input and direction for strategic project selection.
- Training of new employees in estimating practices, technical/software utilization, quantity take offs and vendor communications.

WALSH GROUP-- SEATTLE, WA
CHIEF ESTIMATOR

- Provide and coordinate full estimating and preconstruction services to procure work through directing the Estimating/Pre-construction department.
- Setup, organization and delegation of estimate tasks and responsibilities.
- Assemble bid teams, develop bid strategies, and provide direction to team members throughout all pursuits.
- Lead and direct Joint Venture pursuits, draft JV documents, and organize and reconcile quantity and cost reviews.
- Interface with design firms throughout the design build process providing guidance and direction for maximum efficiency while minimizing risk.

PCL CIVIL CONSTRUCTORS-- BELLEVUE, WA
CHIEF ESTIMATOR

- Management of the estimating and preconstruction services group.
- Assemble bid teams, develop bid strategies, and provide direction to team members throughout our pursuits.
- Lead and direct Joint Venture pursuits, draft JV documents, and organize and reconcile quantity and cost reviews.
- Interface with design firms throughout the design build process providing guidance and direction for maximum efficiency while minimizing risk.
- Provide training for new employees and reinforcement training for existing employees.
- Estimate close out, subcontractor selections, risk management, fee recommendations and effective/efficient project staffing.

STEFAN SCHADINGER, PMP, PE

Senior Structural Engineer

Years with the firm

24

Years total

28

Professional qualifications

Professional Engineer:
AL - DE - IN - MA - MD
ME - MI - NC - NH - NJ
NY - PA - TN - TX - VA
VT - WI - WV

Project Management Professional (PMP)

Areas of practice

Dam Safety

Independent Consultant

Dam Rehabilitation and Remediation

Analysis and Design – Civil/Structural

Structural Inspection

Instrumentation and Monitoring

Office location

Boston

CAREER SUMMARY

Stefan Schadinger is the national business line structural lead within the Energy Group. A principal engineer with extensive experience in hydropower and thermal power projects, Stefan has performed steel and concrete detailed structural designs and stability analyses of hydropower and thermal projects. Stefan is approved as a Federal Energy Regulatory Commission (FERC) Independent Consultant to perform Part 12D dam inspections and has experience directing Potential Failure Mode Analyses (PFMA) sessions. He has over 25 years' experience, with a majority of this time, working on FERC and State Dam Safety and related concerns.

Stefan has been a FERC Independent Consultant on 9 projects, and has participated/assisted on several other Part 12D dam safety inspections and been a core member of the PFMA review sessions.

Stefan has experience inspecting, performing site condition assessments and working on various structural and stability aspects of arch dams, concrete gravity dams, earthen embankments, spillways, Tainter and Stoney gates, penstocks and tunnels, high capacity post-tensioned anchor designs and installation. As part of the analyses and evaluations performed, he also has extensive experience interpreting dam instrumentation.

Stefa has also been involved with Headwater Benefits determinations which involve the calculation of additional energy production possible at a downstream hydropower project resulting from the regulation of river flows by an upstream storage reservoir.

EDUCATION

M.S., Structural Engineering, Northeastern University	2005
B.S., Civil Engineering, University of Vermont	1995

PROFESSIONAL EXPERIENCE

- Vischer Ferry Dam (New York Power Authority (NYPA)) (2021-Present). Senior structural engineer supporting structural, mechanical and operational modifications considerations to mitigate effects of winter ice jams and flooding impacts on surrounding properties. As a lead structural engineer his responsibilities included evaluating dam stability, assessing various gate alternative impacts and identifying modifications to meet the project's stability requirements.
- Mio Dam Project (Consumers Energy, MI) FERC Part 12D Periodic Inspection (PI) (Ongoing). As Independent Consultant, specific duties included the following: Performed the field inspections for the 5 MW project structures that includes a 195 ft. long right earth embankment, 529 ft. long auxiliary spillway, 476 ft. long middle earthen embankment, 20 ft. Tainter gate spillway structure, 65 ft concrete and masonry powerhouse and a 725 ft. long left earth embankment. Preparation of the FERC Tenth Periodic Safety Inspection Report for the Mio Dam Project (On going). Responsible for the review and evaluation of existing stability, seismic and hydraulic analyses. Responsible for the review and evaluation of the instrumentation records.
- Valenciano Dam (Puerto Rico Aqueduct and Sewer Authority). Senior Structural Engineer responsible for leading the design of structural elements of this new RCC dam, including: tainter gate support piers, training walls, water intake tower, stilling basin, and the overall structural stability analysis of the RCC Dam. Leading the

preparation of structural engineering basis of design report, coordinating on structural seismic analysis and design.

- Foote Dam Project (Consumers Energy, MI) FERC Part 12D Periodic Inspection (PI) (Ongoing). As Independent Consultant, specific duties included the following: Performed the field inspections for the 9 MW project structures that includes a 3,400 ft. long right earth embankment with emergency spillway near its termination, 103 ft concrete and masonry powerhouse, 93 ft. Tainter gate spillway structure and a 700 ft. long left earth embankment. Preparation of the FERC Tenth Periodic Safety Inspection Report for the Mio Dam Project (On going). Responsible for the review and evaluation of existing stability, seismic and hydraulic analyses. Responsible for the review and evaluation of the instrumentation records.
- Pensacola Project (Grand River Dam Authority, OK). FERC Comprehensive Assessment (CA) (Ongoing). As the IC, specific duties included the following: Performed the field inspections for the 120 MW project structures that includes a 28 ft non-overflow section, 4,284 ft 51 multi-arches concrete dam with 52 buttresses, a 851 ft spillway, a 451 ft left non-overflow section, a middle spillway and an East spillway along with a non-water retaining powerhouse. Review and evaluation of existing project documentation, including stability. Review and evaluation of the instrumentation records. Review and partial preparation of the PIPR. Participated in the PFMA and risk workshop as the IC and as the structural subject matter expert.
- Turners Falls Hydroelectric Project (FirstLight, MA). As PFMA facilitator led the Design and Construction PFMA for the rehabilitation of the Power Canal Left Dike. 3,900 ft earthen embankment with a 1,000 ft section to undergo addition of a 2.5-ft thick earthen berm with an underlying sand filter blanket. 1,000 ft 5-ft by 8-ft deep sand diaphragm filter at the toe of the slope with 10" dia. HDPE perforated pipe surrounded by free-draining gravel.
- Northfield Mountain Pumped Storage Project (FirstLight, MA). FERC Comprehensive Assessment (CA) (2023-2024). As the structural subject matter expert, specific duties included the following: Performing field inspections of the project structures. Participated in the PFMA and risk workshop as the structural subject matter expert. Review and partial preparation of the FERC CA Report for the project. Review of the L2RA Report for the project. Review and evaluation of existing project documentation, including stability. Review and evaluation of the instrumentation records.
- Hodenpyl Dam Project (Consumers Energy, MI) FERC Part 12D Periodic Inspection (PI) (2023). As Independent Consultant, specific duties included the following: Performed the field inspections for the 13.9 MW project structures that includes a 500 ft. long uncontrolled emergency spillway, a 3,853 ft. long right earth embankment with steel sheet pile wall capped with reinforced concrete, a 105 ft. long powerhouse, and 322 ft. long left earth embankment with steel sheet pile wall capped with reinforced concrete. Preparation of the FERC Tenth Periodic Safety Inspection Report for the Hodenpyl Dam Project (On going). Responsible for the review and evaluation of existing stability, seismic and hydraulic analyses. Responsible for the review and evaluation of the instrumentation records.
- Tippy Dam Project (Consumers Energy, MI) FERC Part 12D Periodic Inspection (PI) (2023). As Independent Consultant, specific duties included the following: Performed the field inspections for the 20 MW project structures that includes a 460 ft. long right earth embankment, a 118 ft. long spillway with tumble bay and four Tainter Gates, 147 ft. long powerhouse, and 100 ft. long left earth embankment. Preparation of the FERC Tenth Periodic Safety Inspection Report for the Tippy Dam Project (On going).

7 | Cost

The estimated cost for every task identified in the proposal and total project cost are presented in a separate document.

8 | Exceptions to the RFP and/or Professional Service Agreement

WSP certifies that it takes no exceptions to this RFP, including but not limited to, the Authority's Agreement for Services (Agreement), as attached in Exhibit B of RFP.

The RFP does not outline services for Geotechnical or geophysical data collection. Based on the available data for the project, these services may be required to complete the scope of services herein. WSP's proposed cost does not include these extra services but may be included in a later data via contract modification.

The RFP notes an application process at various points. The overall proposed scope of work does not seemingly require a particular project application to any named agencies. WSP's proposed costs do not include efforts for grant, environmental, or dam safety applications. These extra services may be included at a later date via contract modification.

9 | Proposal Authorization

The proposal is signed by Debby Reece, Senior Vice President, California Water Business Line Leader at WSP.

10 | Proposal Submittal

One (1) electronic copy of the proposal document and one (1) electronic copy of the proposed costs in separate PDF files are submitted to PlanetBids.

Client Cost Estimate Breakdown
Project Name: Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit
Date Prepared: 1/16/2025

Task	Hours	Cost
1 - Kick-off Meeting	60	$16,477
2 - Documents to be Provided by the Authority	32	$7,776
3 - Schedule Development	10	$2,621
4 - Developing Evaluation Criteria	72	$17,959
5 - Seismic Evaluation	400	$76,521
6 - Report Updates	248	$50,092
7 - Conceptual Level Design & Budgetary Cost Estimates	312	$57,765
8 - Project Management and Meetings	216	$53,811
9 - Expenses		$3,356
Total Not-to-Exceed Cost Estimate	**1,350**	**$286,378**

WSP provides this cost breakdown for informational purposes only. WSP quotes only the estimated Not-to Exceed cost for this proposal. Quote is valid for 90 days.

SWEETWATER DAM OUTLET TOWER & CONDUIT SEISMIC EVALUATION

KPFF Consulting Engineers | Sweetwater Authority | 2025

TABLE OF CONTENTS

INTRODUCTORY LETTER

Describe Respondent's basic understanding of the Project objective and the proposed approach. The letter should also contain a statement regarding the qualifications of the firm and any summary information that may be useful or informative to the Authority.

DIABLO DAM -POWERHOUSE INTAKE TRASH RACKS

KPFF provided Structural Evaluation & Mechanical Engineering

January 15, 2025

kpff

Attention
Erick Del Bosque, PE

Director of Engineering & Operations

Sweetwater Authority

505 Garrett Avenue
Chula Vista, CA 91910

Subject
Seismic Evaluation for Sweetwater Dam Outlet Tower & Conduit Study

Qualifications for Structural Engineering Services

Contacts
Project Manager
Bob Riley, PE, SE

Principal-in-Charge
Geoff Warcholik, PE, SE

KPFF Consulting Engineers

3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

619.521.8500

Sweetwater Authority Selection Committee

In this package you will find the KPFF Team qualifications demonstrating our unique abilities to assist the Authority with this project. This is a unique and challenging project, and we believe we have assembled a team of specialists who are in the best position to help the Authority come up with cost effective solutions to preserve the Sweetwater Dam Outlet Tower and Conduit.

Our team will be led by Principal in Charge **Geoff Warcholik, PE, SE** and Project Manager **Bob Riley, PE, SE.** Being located in San Diego for his entire 20+ year career, Geoff brings his seismic evaluation of existing structures expertise to this project. Having spent over 20 years in the design of marine and waterfront structures, Bob brings a deep understanding of evaluating, analyzing and retrofitting underwater and near shore structures.

To accomplish the first task of updating the 2003 Seismic Evaluation of the Tower and Conduit, we have a panel of seismic specialists to assist with this effort. With the support of Geoff and Bob, **Maikol Del Carpio, PE, SE, PhD**, will be leading the seismic evaluation for KPFF. He will also be supported by our geotechnical engineering consultants, **GeoEngineers**, and **Lettis ConsultantsInternational, Inc**. GeoEngineers has years of experience related to dam safety and evaluation of hydraulic structures, as can be seen by their qualifications listed in this package. Lettis Consultants also has years of experience helping to evaluate the seismic stability of dam facilities. In fact, last summer they assisted in a seismic evaluation of the Sweetwater Dam.

To accomplish the next task of completing a conceptual level design for a seismic retrofit of the Tower and Conduit, we have included on our team unreinforced masonry specialists and underwater construction specialists. **Farid Mohseni, PE, SE** and **Jospeh Carpenter, PE**, both from KPFF, will assist in evaluating and developing solutions to preserve the unreinforced masonry tower and conduit. Also on the team is **Steve Spencer, PE** from GeoEngineers, who has over 20 years of construction experience in waterfront and underwater construction. Steve will be supporting Bob in helping the team to develop constructable retrofit solutions. Bob recently helped Seattle City Light replace a steel underwater intake trash rack at the Lake Diablo Dam that extends underwater to a depth of 140 feet. KPFF completed this project with the support of GeoEngineers, who was on the team for geotechnical engineering and constructability support. This was a very unique and challenging project, as the original trash rack was almost 100 years old and was damaged due to debris build up. Careful planning and collaboration with the Owner and the Contractor led to successful replacement of the trash rack in the Fall of 2024.

In summary, we believe we have an experienced and innovative team that is ready to help the Sweetwater Authority accomplish this unique and challenging project.

We look forward to working with you.

Sincerely,

Robert H Riley

Bob Riley, PE, SE
Project Manager
bob.riley@kpff.com

Geoff Warcholik

Geoff Warcholik, PE, SE
Principal-in-Charge
geoff.warcholik@kpff.com

IDENTIFICATION OF RESPONDENT

a. Provide legal name and address of company.
b. Provide legal form of company (partnership, corporation, joint venture, etc.) and state of incorporation.
c. Identify any parent companies.
d. Provide addresses of office(s) and number of employees.
e. Addresses of office(s) containing key proposed Project personnel.
f. Provide name, title, address, phone number(s), and email of a person to contact concerning the proposal.

Identification of Respondent

A. LEGAL NAME & COMPANY ADDRESS

KPFF, Inc.
dba KPFF Consulting Engineers

Legal Address
1601 Fifth Avenue, Suite 1600
Seattle, WA 98101

B. LEGAL FORM OF COMPANY & STATE OF INCORPORATION

KPFF Consulting Engineers is a corporation based in Washington.

C. PARENT COMPANIES

none

D. ADDRESSES OF OFFICES & NUMBER OF EMPLOYEES

1,400 (approximately) employees nationwide.

27 locations nationwide.

San Diego, CA – 85 Employees
3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

Long Beach, CA – 22 Employees
444 West Ocean Boulevard, Suite 1530
Long Beach, CA 90802

Seattle, WA – 86 Employees
1601 Fifth Avenue, Suite 1300
Seattle, WA 98101

Tacoma, WA – 35 Employees
2407 North 31st Street, Suite 100
Tacoma, WA 98407

St. Louis, MO – 35 Employees
1630 Des Peres Road, Suite 100
St. Louis, MO 63131

E. KEY PROPOSED PROJECT PERSONNEL OFFICE ADDRESSES

San Diego
3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

Seattle, WA
1601 Fifth Avenue, Suite 1300
Seattle, WA 98101

St. Louis, MO
1630 Des Peres Road, Suite 100
St. Louis, MO 63131

F. CONTACT

Geoff Warcholik, S.E.
Principal, Structural Engineer

3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

Office: 619.521.8500x225
Mobile: 619.920.6485
Direct: 858.742.8005

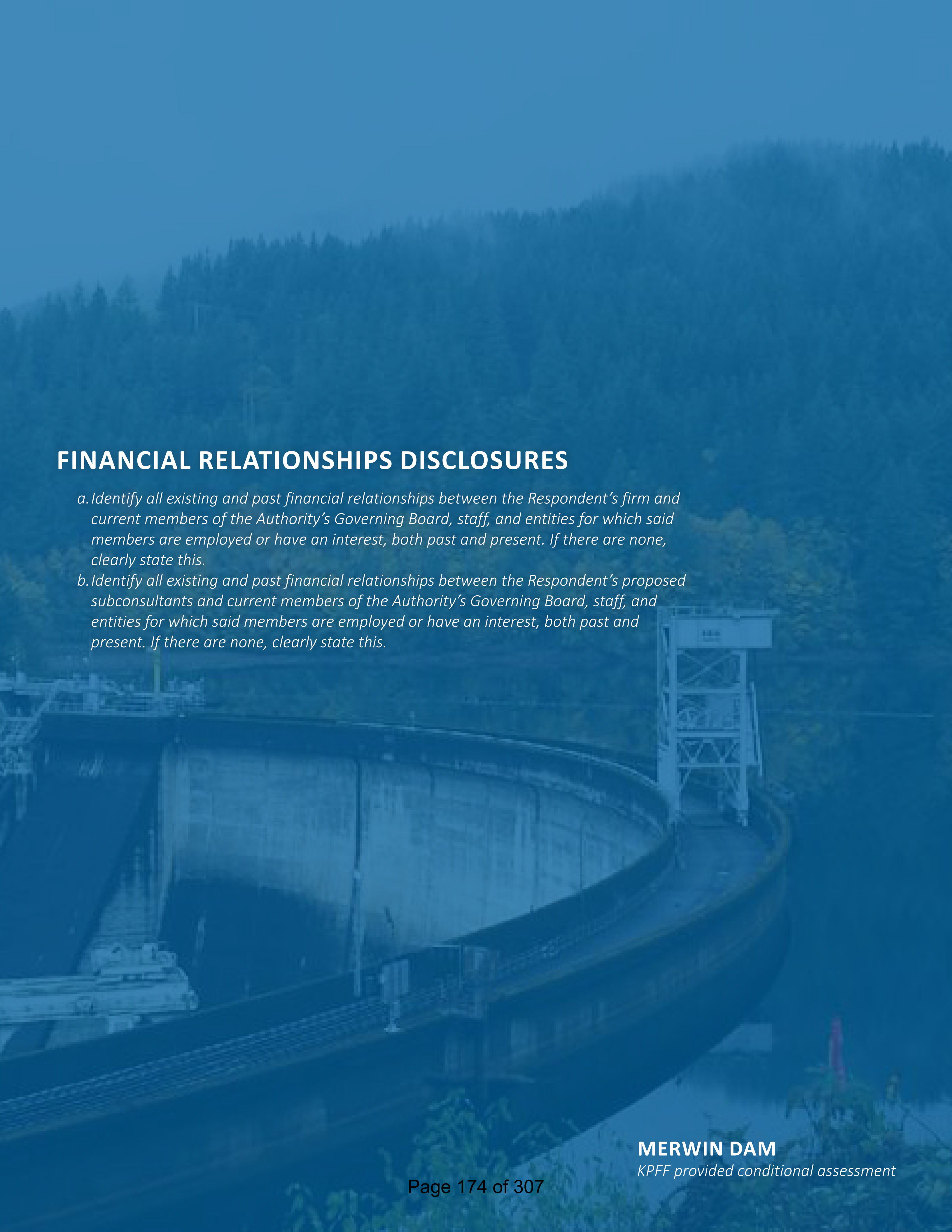
geoff.warcholik@kpff.com

Bob Riley, PE, SE
Principal, Structural Engineer

1601 Fifth Avenue, Suite 1300
Seattle, WA 98101

Office: 206.382.0600
Mobile: 206.330.6946
Direct: 206.388.1577

bob.riley@kpff.com



FINANCIAL RELATIONSHIPS DISCLOSURES

a. Identify all existing and past financial relationships between the Respondent's firm and current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.

b. Identify all existing and past financial relationships between the Respondent's proposed subconsultants and current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest, both past and present. If there are none, clearly state this.

MERWIN DAM
KPFF provided conditional assessment

Financial Relationships Disclosures

A. OUR FIRM & CURRENT MEMBERS OF THE AUTHORITY

KPFF does not have existing or past financial relationships between with current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest, both past and present.

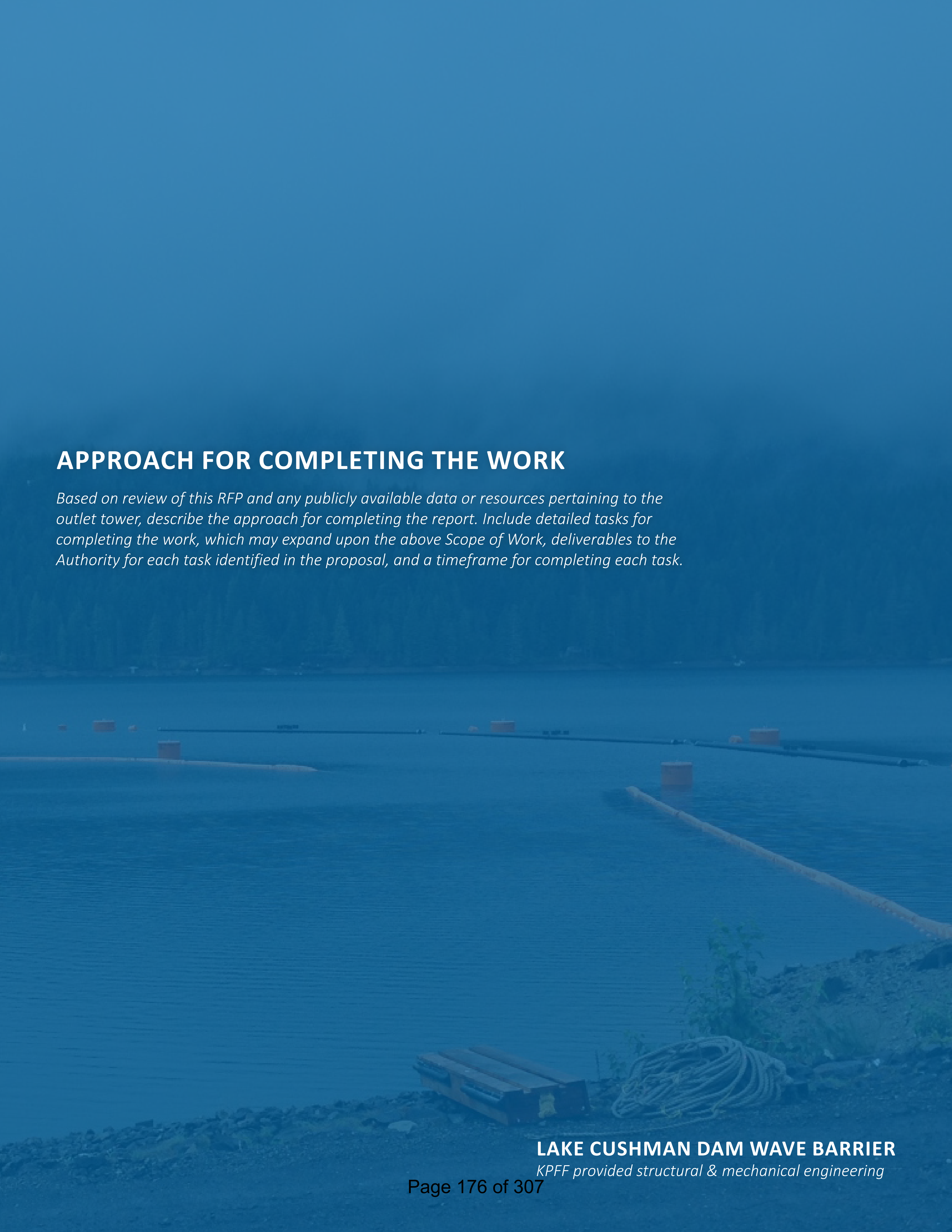
B. SUB CONSULTANTS & CURRENT MEMBERS OF THE AUTHORITY

With regards to item 3.b,Lettis has no existing or past financial relationships with any of the identified entities

Based on information available at this time, GeoEngineers, Inc. currently has no existing or past financial relationships with any current members of the Authority's Governing Board, staff, and entities for which said members are employed or have an interest.

APPROACH FOR COMPLETING THE WORK

Based on review of this RFP and any publicly available data or resources pertaining to the outlet tower, describe the approach for completing the report. Include detailed tasks for completing the work, which may expand upon the above Scope of Work, deliverables to the Authority for each task identified in the proposal, and a timeframe for completing each task.



LAKE CUSHMAN DAM WAVE BARRIER
KPFF provided structural & mechanical engineering

Approach for Completing the Work

PROJECT UNDERSTANDING

The Sweetwater Authority operates the Sweetwater Dam and Reservoir that provides water supply to the Robert A. Perdue Water Treatment Plant in Chula Vista, California. The water intake structure is a 100 foot tall unreinforced masonry tower with 8 inlet valves, spaced at roughly 10 foot intervals along the vertical length of the structure. The tower feeds a masonry conduit that extends through the base of the Dam to feed the water treatment plant downstream. The original tower and conduit were built around 1888, with a 20 foot tall extension placed onto the top of the tower in 1911. The roughly 13' diameter tower is topped with a round concrete platform cantilevered off the edge of the tower. The tower is connected back to the crest of the Dam by a 51 foot long steel trussed footbridge that is supported below the concrete platform.

In 2003, the Authority completed a Seismic Evaluation of the Outlet Tower and Conduit. The outcome of this study found that an earthquake with a ground acceleration of 0.11g could cause failure of the Tower, leaving the Authority vulnerable to disruption in service to its customers. At the time the report was written, this magnitude of earthquake represented a 50% probability of occurrence within a 100 year period, which is equivalent to a 29% probability within a 50 year period.

We understand that the Authority would like to update this Seismic Evaluation, with the goal of understanding how much it would cost to retrofit the Tower and Conduit to withstand an earthquake with a return period of 144 years, which equates to a 10% probability of occurrence within a 50 year period.

The specific tasks that will be undertaken will be to update the Seismic Hazard Risk evaluation, analyze the Tower and Conduit for these updated seismic input parameters, and update the 2003 report with this current information. The outcome of this analysis will inform the next task, which will be to produce a Conceptual Design and associated Rough Order of Magnitude Construction Cost for seismically retrofitting the Tower and Conduit.

SCOPE OF WORK

In order to complete the goals of this project, the KPFF Team will undertake the following tasks.

Task 1: Kick Off Meeting

Shortly after getting under contract, the KPFF Team will meet with the Authority in person at the Authority's office for a Project Kick Off meeting. We anticipate the following KPFF Team Members to be at this meeting:

- Geoff Warcholik – Principal in Charge (KPFF)
- Bob Riley – Project Manager (KPFF)
- Maikol Del Carpio – Lead Structural Engineer (KPFF)
- Arash Pirouzi – Lead Geotechnical Engineer (GeoEngineers)
- Lyle Stone- Sr. Geotechnical Engineer (GeoEngineers)
- Ivan Wong – Lead Seismologist (Lettis Consultants)

The purpose of the meeting will be to discuss the following:

- Review the Project Goals and Desired Outcomes
- Review the Scope of Work
- Review the Design Budget
- Review Team Member Roles and Responsibilities
- Review the Project Schedule
- Review Available Data and determine Data Needs
- Discuss Project Risks

Task 2: Background Document Review & Basis of Design

The KPFF Team will prepare a list of data needs and present this to the Authority. KPFF will work with the Authority to identify any data needs that are not readily available from the Authority, and come up with a plan for either procuring this data or finding ways to complete the scope of work without this data, should this situation arise.

Once KPFF has the data in hand from the Authority, our team will spend time reviewing this information and preparing a Basis of Design document that will lay the foundation for our approach to the seismic evaluation and analysis.

The seismic evaluation will be based on the methodologies outlined in the US Army Corps of Engineers Engineering Manual EM 1110-2-6053, Earthquake Design and Evaluation of Concrete Hydraulic Structures, dated May 1, 2007. It will also be based on evaluating two seismic scenarios – deterministic response spectra ground motions representing the mean level of ground motion produced by nearby credible faults, generated by our team's seismologist specialists from Lettis Consultants; and probabilistic response spectra ground motions representing ground motions with 10% or

Approach for Completing the Work

50% probabilities of occurrence in a 50 year period, corresponding to return periods of 144 and 72 years, as available from USGS.

Task 3: Develop Schedule Development

KPFF's Project Manager will create a project schedule that is intended to be a living document for the life of the project. KPFF will create an initial baseline schedule and review this schedule with the Authority. The schedule will identify key tasks, milestones and deliverable dates. The schedule will be updated regularly as the project continues and will be reviewed in monthly check in meetings with the Authority.

Task 4: Completion of the Update to the Authority

Task 4 is being divided into two components:

Task 4A – Update to 2003 Seismic Evaluation Report

Task 4B – Develop Conceptual Tower & Conduit Retrofit Design

Task 4A: Comprehensive Update to 2003 Seismic Evaluation Report

The first step to accomplishing this task is for our geotechnical partners, GeoEngineers and Lettis Consultants, to complete a Seismic Hazard evaluation study. This study will account for the two seismic scenarios described under Task 2 and produce a set of deterministic and probabilistic ground motions for KPFF's engineers to use in their modeling and analysis. GeoEngineers will be the lead author of a Seismic Hazard study that will provide the necessary seismic input data to the team for evaluation of the Tower and Conduit.

While the Seismic Hazard Study is underway, we will be developing a Finite Element Model of the Tower and Conduit using SAP 2000 (a powerful 3D FEM modeling and analysis tool). Our lead seismic analysis specialist will be working with our Unreinforced Masonry specialists to determine the appropriate material properties for the existing structures that are being modeled. Our team has the good fortune of having access to the 2003 report, as that report has a lot of good data that can be used for this analysis. Much of the legwork that is typically required for structures of this era has already been done and that information is contained in this report. This includes basic geometric layout, material properties and foundation geologic assumptions.

Once the Seismic Hazard Study is complete, the various ground motions to be evaluated can be added to the SAP 2000 FEM model. The program can then be used to analyze the existing structure and determine the level of ground motion that will start to cause failure of the structures. The structure will be evaluated both globally for overturning stability as well as locally for material stress failures and cracking.

Once the analysis results are compiled and fully understood, our team will prepare a Draft Seismic Evaluation Report. The report will include an executive summary and will document our assumptions, input parameters, output of the analysis, as well as an interpretation of controlling components of the structure and level of earthquake that is likely to cause structural failure. This report will be reviewed by both the Principal in Charge and the Project Manager prior to delivery to the Authority.

The team will then review this Draft report with the Authority and document any comments or concerns.

The team will then prepare and review a Final report and deliver the report to the Authority.

Task 4B: Develop Conceptual Tower & Conduit Retrofit Design

The goal of Task 4B is to produce a constructable conceptual design for retrofitting the Tower and Conduit (if needed), with associated Rough Order of Magnitude Construction Costing.

Since our team is comprised of several very experienced and innovative specialists, we are proposing to hold a one-half day design charette to kick off this task. Getting several experienced people in a room to brainstorm ideas is a great way to come up lots of creative ways to solving a problem. We would propose to have all of our key staff attend this meeting in person at the Authority's office. This meeting would take place shortly after delivery of the Final Seismic Evaluation Report. The advantage of waiting until this report is complete is that our team would know the vulnerabilities of the structure and be able to target those vulnerabilities as part of this design charette.

Ideally, several credible ideas would be developed as a result of this meeting. We would propose to develop up to 3 of those ideas to a 5% level of design. The team would perform very high level analysis for each concept and develop 5% level drawings for each. We would then work

Approach for Completing the Work

collaboratively with the Authority to narrow down the ideas to one preferred option.

The team would then develop the Preferred Option to a 10% level of design. The team would also then develop a Rough Order of Magnitude Construction Cost estimate for this design. We typically perform these cost estimates in house. Bob and his team regularly develop cost estimates for their projects and have a good database for marine construction costs. The last few years have been challenging to estimate construction costs as labor and material prices have been very unpredictable. However, the last year has shown more predictability in pricing and we have had good success in recent months in our Engineer's Estimates aligning well with Contractor bid pricing.

The process of getting to the preferred option will be documented in a Draft Conceptual Seismic Retrofit Design Report, along with the key components of the concept and estimated costs. Key risks will be identified and a constructability analysis will be included in the report.

The report will be reviewed by both the Principal in Charge and the Project manager prior to delivery to the Authority.

The team will then review this Draft report with the Authority and document any comments or concerns.

The team will then prepare and review a Final Conceptual Seismic Retrofit Design Report and deliver the report to the Authority.

Task 5: Project Management

In addition to the Kick Off meeting, identified in Task 1, we are assuming there will be monthly virtual meetings with the Authority. We are assuming that these will be attended by the Principal in Charge, the Project Manager, our Lead Structural Engineer and Lead Geotechnical Engineer, and a Project Coordinator to assist with note taking and updating project documents.

This task will also involve regular coordination with the Authority and our internal team. We will also produce monthly invoices and budget reporting.

We understand that this task may also include a final presentation to the Authority, summarizing the findings of our work for this project.

We are assuming this project will last approximately 14 months. A high level schedule of activities is included on the next page for reference:

Fee Schedule

Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study

Proposed Design Schedule

Task	Duration	Dates	2025										2026	
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Kick Off Meeting	0	3/5/25												
Gather & Review Documents	14	3/6/25-3/19/25												
Prepare Basis of Design	14	3/20/25-4/2/25												
Prepare Geotechnical Seismic Hazard Study	28	3/6/25-4/30/25												
Task 4A - Conduct Structural Evaluation and Analysis	90	5/1/25-7/31/25												
Task 4A - Prepare Draft Report	28	8/1/2025-8/28/25												
Task 4A - Meeting to present Draft Report	0	9/3/25												
Task 4A - Prepare Final Report	21	9/4/25-9/25/25												
Task 4B - Design Charette for Seismic Retrofit	0	10/1/25												
Task 4B - Develop up to 3 Retrofit Alternatives	28	10/2/25-10/30/25												
Task 4B - Meeting to present 3 Retrofit Alternatives	0	11/4/25												
Task 4B - Devleop Preferred Option to 10% Design	49	11/5/25-12/24/25												
Task 4B - Prepare ROM Cost Estimate	14	12/26/25-1/8/26												
Task 4B - Prepare Draft Concept Design Report	28	1/9/26-2/6/26												
Task 4B - Meeting to present Draft Concept Design Report	0	2/6/26												
Task 4B - Prepare & Deliver Final Concept Design Report	21	2/27/26												

Task 4A Activities

Task 4B Activities

REQUIRED QUALIFICATIONS

a. The Respondent's primary business or the primary business of a department within the Respondent's firm shall be engineering consulting services for largescale dam evaluations, and shall have been in the business of providing such services for at least five (5) years.

b. The Respondent shall provide a single project manager as the primary point of contact with the Authority. This project manager must have at least five (5) years total experience with current firm or other employers in projects related to large scale dam evaluations, and shall be registered as a professional engineer in the state of California.

c. Provide a list of past and ongoing qualifying projects for which the Respondent's services were or are similar to those described in this RFP. Limit the list to no more than ten projects the Respondent believes are most relevant to the RFP. For each project, include the following:

- *A brief description of the project, date initiated, date completed (if applicable).*
- *Name of owner and owner's project manager with contact information (email and/ or phone number).*

d. Present the experience of any proposed subconsultants in the same manner.

e. Provide evidence of the experience and competence of the Respondent's team proposed to work on the Project, with specific emphasis on experience in working on large-scale dam evaluation.

GRAND COULEE DAM SEISMIC EVALUATION

KPFF provided structural evaluation.

Required Qualifications

A. YEARS OF EXPERIENCE

KPFF has been providing engineering services for large scale dams for over 5 years, including:

- *Grand Coulee Dam, Coulee City, WA – Bureau of Reclamation (2017)*
- *Lake Diablo Dam, Whatcom County, WA – Seattle City Light (2022 - 2024)*
- *Oakdale Dam, Monticello, IN – Thompson Metal Fab (2022)*
- *Mud Mountain Dam, Enumclaw, WA – USACE (2022 - 2023)*
- *Zosel Dam, Oroville, WA – WA State Department of Enterprise Services (2023 - Current)*
- *Lake Cushman Dam, Shelton, WA – Tacoma Power (2014)*
- *PacificCorp Dam Surveys – Various location, Western US*

B. PROJECT MANAGER

Bob Riley, PE, SE

Structural Engineer: WA(#33839), CA (#5335), TX (#135805)

Endorsed for Civil & Structural, AK (AELC11844), CA (#74386), OR (#88442), MA (#50615), FL (#83709)

Structural Qualifications, PEng, BC (#194168)

Bob Riley's position as leader of the heavy civil structural group within KPFF's Special Projects Division reflects his breadth of engineering experience. During his 32-year career (27 at KPFF), he has served as a civil engineer, structural engineer, and project manager on a wide range of projects small and large, for public and private clients as well as contractors. Bob has worked on many projects that require daily out-of-the-box thinking, and he is especially skilled at developing creative solutions to obstacles. These strengths have served him well in his extensive work designing heavy civil structures including marine and mooring structures; piers; floating structures; bulkheads and fendering systems; RORO Bridges; work on hydraulic structures, including locks and dams; Intake Trash Racks; and Gates.

Relevant Projects:

- *Grand Coulee Dam (2017)*
- *Lake Diablo Dam (2022 - 2024)*
- *Lake Cushman Dam (2014)*
- *Willamette Falls Locks (2018 - 2020)*
- *Pontoon Construction Facility (2010 - 2015)*
- *Zosel Dam (2023 - Current)*

C. PAST & ONGOING PROJECTS

KPFF's past and ongoing qualifying projects will be highlighted on the following pages.

D. SUBCONSULTANTS

The qualifications of our two subconsultants, GeoEngineers and Lettis, will be highlighted on the following pages..

E. KEY PERSONNEL

The KPFF Team's key personnel will be highlighted on the following pages.

Required Qualifications: Past & Ongoing Projects

C. PAST & ONGOING PROJECTS - KPFF

LAKE DIABLO DAM INTAKE SCREEN REPLACEMENT

WHATCOM COUNTY, WA

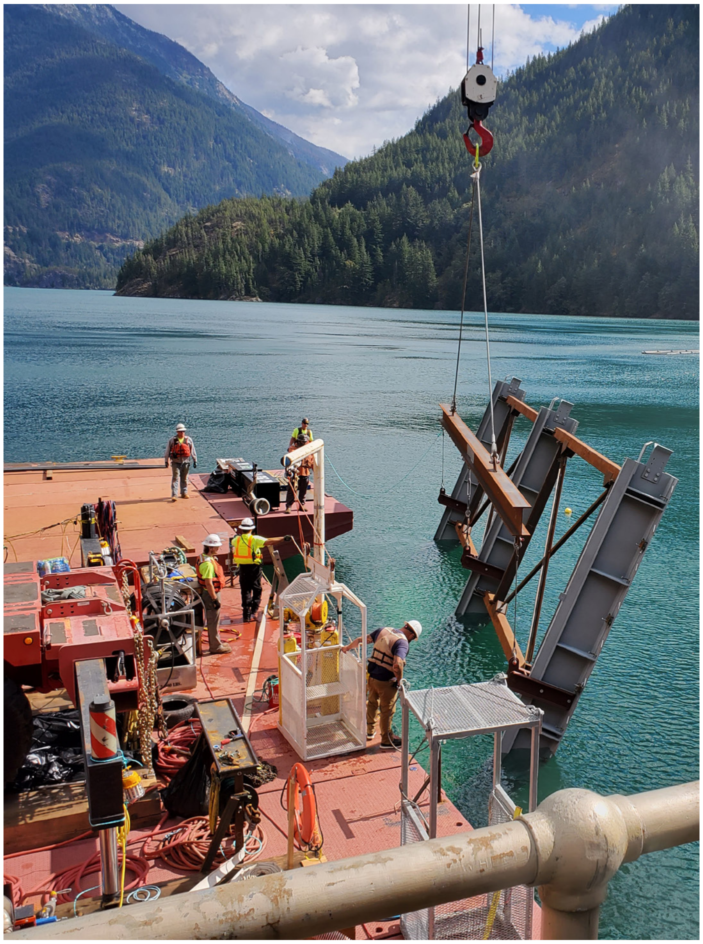
Early in 2022 Seattle City Light (SCL) discovered significant structural damage to the original powerhouse intake trashracks on Diablo Lake. Subsequent investigations determined the cause of the failure to be adverse flow conditions caused by accumulation of debris on the lower portion of the trashrack. KPFF was tasked with designing a new trashrack system with provisions for automatic raking to remove debris, and with adequate vertical flow area to prevent future failures should the rack become clogged. KPFF was able to develop a design that could be installed cost effectively by divers in 140 feet of water depth.

Date Initiated: 2022
Date Completed: 2024

Owner: Seattle City Light
Joshua Jackson, Project Manager
P: 206.684.3828
E: joshua.jackson@seattle.gov

Key Personnel: Bob Riley, PE, SE | Structural Engineer of Record; Lyle Stone, PE, GE | GeoEngineers

Relevance: Challenging retrofit of large scale dam components located below water at an operating dam



Required Qualifications: Past & Ongoing Projects

C. PAST & ONGOING PROJECTS - KPFF

WILLAMETTE FALLS CANAL & LOCKS CONDITION ASSESSMENT

CLACKAMAS, OR

Willamette Falls Locks is owned and operated by the United States Army Corps of Engineers (USACE). The lock is not currently available for use to the public due to safety concerns. Willamette Falls Locks Commission (WFLC) was charged with determining the feasibility for acquiring ownership of the historic lock and envisions reopening the site to the public to support industrial, tourism and recreational users. KPFF completed an independent condition assessment of facility in support of the WFLC. This assessment looked at all aspects of the lock system including the seven miter gates, miter gate gudgeon anchors, and the gate operating machinery.

Date Initiated: 2018
Date Completed: 2020

Owner: Willamette Falls Locks Commission (WFLC)
Michelle Giguere – Summit Strategies (Rep for WFLC)
(503) 341.1435

Key Personnel: Bob Riley, PE, SE | Structural Engineer

Relevance: Conditions assessment and engineering evaluation of historic system of locks and dams constructed with unreinforced masonry walls

Required Qualifications

C. PAST & ONGOING PROJECTS - KPFF

SEISMIC EVALUATION AND RETROFIT - HARBOR DRIVE FACILITIES, SOLAR TURBINES

SAN DIEGO, CA

KPFF provided structural engineering services for a seismic evaluation and retrofit study of 16 buildings on this Harbor Drive campus. Many of these buildings are Unreinforced Masonry (URM) shear wall structures. As Prime, KPFF engaged an architect to evaluate historic aspects of the buildings and to assist with aesthetic impacts of retrofit options. KPFF also assisted in developing a post-earthquake response plan to assess seismic distress of critical structural members. Retrofit designs were developed for four of the buildings. Retrofit designs were developed for four of the buildings and to date the retrofit was implemented on one of the more vulnerable structures.

Date Initiated: 2011
Date Completed: 2012

Owner: Solar Turbines
Jim Garegnani/Manager, Industrial/Facility Engineering & Maintenance Operations
P: 619-520-3856
E: Garegnani_Jim_X@solarturbines.com

Key Personnel: Geoff Warcholik, SE | Structural Engineer and Farid Mohseni SE | Structural Engineer

Relevance: Seismic evaluation of several Unreinforced Masonry structures in San Diego area


New Steel Frame To Brace Existing Masonry Wall

GRAND COULEE DAM SEISMIC EVALUATION OF POWER PLANT 3

COULEE CITY, WA

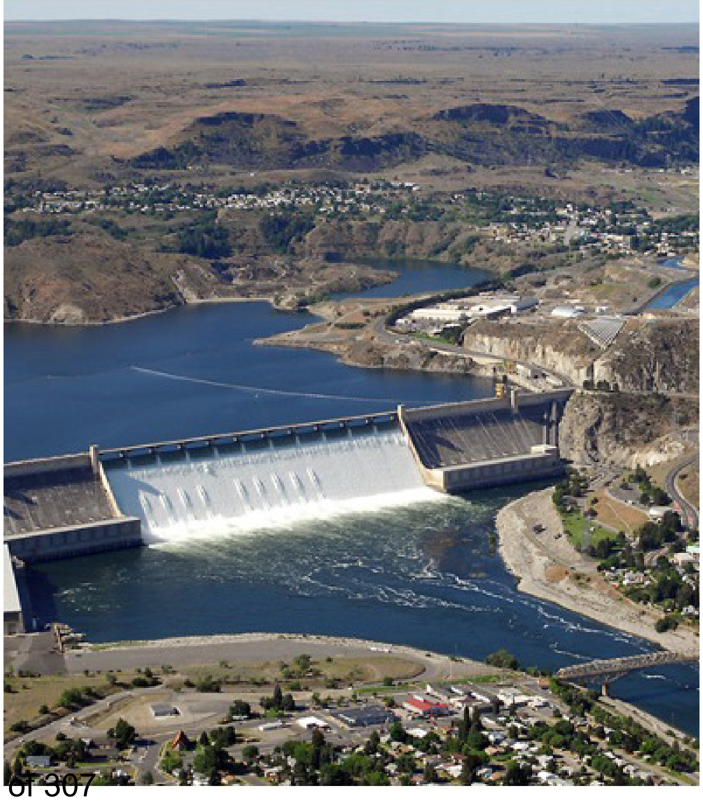
KPFF Consulting Engineers provided Title I seismic evaluation services for the four operating powerplants at Grand Coulee Dam; designed a seismic retrofit for the third powerplant; and completed a concept study of alternatives for enlarging the primary service door on the north end of the third powerplant. The seismic evaluations and retrofit designs included both structural and non-structural components.

Date Initiated: 2017
Date Completed: 2017

Owner: US Department of the Interior, Bureau of Reclamation
Tim Brown/Project Manager
P: (303) 445-3709

Key Personnel: Bob Riley, PE, SE | Sr. Structural Engineer, Joseph Carpenter, PE | Sr. Structural Engineer

Relevance: Seismic evaluation at large dam facility



Required Qualifications

C. PAST & ONGOING PROJECTS - KPFF

UCSD SEISMIC SAFETY REVIEWS OF EXISTING BUILDINGS

LA JOLLA, CA

KPFF provided structural engineering services to conduct Seismic Safety Reviews and Summary Reports for UCSD owned or occupied existing University Facilities in accordance with the University of California Office of the President (UCOP) Seismic Safety Policy Guidelines. The scope of work consists of Tier 1 Seismic Evaluations of approximately 220 existing buildings in accordance with ASCE 41-17 protocol, approximately 12 Tier 2 and/or Tier 3 Seismic Evaluations, and a peer review of the York Hall and Mayer Hall seismic retrofits.

Date Initiated: 2018
Date Completed: 2023

Owner: UCSD
Eric Wolff/Director of Engineering Services
P:619-757-8304
E: ewolff@ucsd.edu

Key Personnel: Geoff Warcholik, SE | Structural Engineer and Farid Mohseni SE | Structural Engineer

Relevance: Seismic evaluation of over 200 structures in the San Diego area

ZOSEL DAM

OROVILLE, WA

Zosel dam is in need of upgrades to various systems within the control structure, all while needing to remain operational throughout construction to uphold the obligations of the IJC order. KPFF is designing upgrades to support replacement of the vertical lift gates, replacement of operating machinery with modernized equipment and controls systems, and replacement of heating systems within the gate structure and gate embeds. Refurbishment of the stoplog systems as well as refurbishment of gate and stoplog embeds will be performed. Improvements to lighting systems and replacement of the standby generator are also needed.

Date Initiated: 2023
Date Completed: Ongoing

Owner: Washington State Department of Ecology
Craig Jordan
360-688-8743
craig.jordan@ecy.wa.gov

Key Personnel: Bob Riley, PE, SE | Structural QA/QC Manager

Relevance: Retrofit of large scale dam components at an operating dam

Required Qualifications

C. PAST & ONGOING PROJECTS - KPFF

CANDY FACTORY RENOVATIONS

SAN DIEGO, CA

The historic Showley Brothers Candy Factory in downtown San Diego was built in 1924 and produced candy until 1951. The 3-story, 30,000-sf un-reinforced brick building was relocated 280 feet, and it is now situated beyond right field of Petco Park. KPFF provided structural engineering services to renovate the building including the addition of skylights, a roof deck, a new elevator, two new stairs, a second floor opening, new interior stud walls, and relocating existing shear walls. The construction cost was $15 million.

Date Initiated: 2005
Date Completed: 2008

Owner: JMI Realty
James Chatfield/Senior VP Construction
P: 858- 945-4835
E: jchatfield@jmirealty.com

Key Personnel: Farid Mohseni SE | Structural Engineer

Relevance: Seismic evaluation and retrofit of an existing unreinforced masonry structure in San Diego

SR 520 PONTOON CONSTRUCTION FACILITY

GRAYS HARBOR, WA

KPFF provided structural, mechanical and dredging design for the 55-acre casting facility used to construct the pontoons for the new SR 520 Floating Bridge. This work included grading and drainage for the entire 55-acre facility, mass excavation in excess of 250,000 CY, dredge excavation and development of a 600' long launch channel, shoreline embankments, hydraulic control structures, bulkhead walls, a 110' removable gate, more than 2,000 lineal feet of crane support trestles and access bridges, and the pile supported structural floor of the casting basin.

Date Initiated: 2010
Date Completed: 2015

Owner: Washington State Department of Transportation
Dave Ziegler, Pontoon Casting Basin Manager
(360) 500-4421
ziegled@wsdot.wa.gov

Key Personnel: Bob Riley, PE, SE | Structural Engineer

Relevance: Seismic design of water retaining structure; construction of below water components

Required Qualifications

C. PAST & ONGOING PROJECTS - KPFF

CITY HALL SEISMIC EVALUATION AND CITY BUILDING ASSESSMENTS

NATIONAL CITY, CA

KPFF provided structural engineering services for the seismic evaluation of the City Hall building, built in 1965. Due to growing knowledge of seismicity in the area and updates to the building code, the building was evaluated again by KPFF. The scope of work included ASCE-41 Tier 1 and Tier 2 seismic analyses with conceptual retrofit sketches for cost estimating. The project also included a brief review of the existing drawings of 18 City of National City buildings to determine the building size, building type, and lateral system for an initial assessment based on ASCE-41.

Date Initiated: 2021
Date Completed: 2023

Owner: City of National City
Roberto Yano/Assistant General Manager at Sweetwater Authority (formerly with the City of National City)
P:619-420-1413
E: ryano@sweetwater.org

Key Personnel: Geoff Warcholik, SE | Structural Engineer

Relevance: Seismic evaluation of structure of importance in San Diego area

SCHIEFER AND SONS BUILDING RENOVATIONS

SAN DIEGO, CA

KPFF provided structural engineering services to renovate the Schiefer and Sons building, a historic 3-story structure in downtown San Diego. Services included the addition of two new stairs, a new elevator, a roof deck, new interior stud walls; a lateral analysis; and a retrofit consisting of wall and roof ties and parapet bracing. The construction cost was $13 million.

Date Initiated: 2005
Date Completed: 2008

Owner: JMI Realty
James Chatfield/Senior VP Construction
P: 858- 945-4835
E: jchatfield@jmirealty.com

Key Personnel: Farid Mohseni SE | Structural Engineer

Relevance: Seismic retrofit of unreinforced masonry structure in San Diego

Required Qualifications

C. PAST & ONGOING PROJECTS - GEOENGINEERS

SKAGIT PROJECT SEISMIC HAZARD ASSESSMENT REPORTING,
DIABLO, WA

GeoEngineers, Inc., (GeoEngineers) conducted a site-specific seismic hazard analysis for the Seattle City Light Skagit River Hydroelectric Project, which includes the Ross, Diablo, and Gorge Dams and associated facilities. The study involved performing both probabilistic seismic hazard analysis (PSHA) and deterministic seismic hazard analysis (DSHA) to evaluate ground motions for the dams and powerhouses. GeoEngineers developed an updated seismic source characterization model, incorporating recent seismic data and advancements in ground motion models. The analysis was designed to meet the Federal Energy Regulatory Commission (FERC) guidelines and American Society of Civil Engineers (ASCE) 7-16 standards. The final report was submitted to FERC in 2020. The findings will inform engineering design and safety evaluations for the Skagit Dams, ensuring the project's resilience to seismic events.

Date Completed: 2019

Owner: Seattle City Light
Kim Pate, Chief Dam Safety Engineer, Generation
(206) 684-3705
kim.pate@seattle.gov

Key Personnel: GeoEngineers


Ross Lake Dam, WA

NBSD B-3291 SEISMIC EVALUATION
SAN DIEGO, CA

GeoEngineers performed a geotechnical seismic evaluation for Building 3291 at Naval Base San Diego. The work involved assessing subsurface conditions and identifying potential geologic and seismic hazards that could affect the site. Based on this assessment, GeoEngineers provided recommendations in accordance with ASCE/Structural Engineering Institute (SEI) 41-17 and Unified Facilities Criteria (UFC) 1-200-01 standards to guide retrofitting efforts. The evaluation results will support the design-build process and help ensure the site's seismic resilience.

Date Initiated: 2023
Date Completed: 2024

Owner: U.S. Navy
Michael Fraser, NAVFAC SW
(619) 705-4758
michael.s.fraser.civ@us.navy.mil

Key Personnel: Arash Pirouzi, Geotechnical Project Manager; Lyle Stone, Geotechnical Associate-in-Charge; GeoEngineers

Required Qualifications

C. PAST & ONGOING PROJECTS - GEOENGINEERS

FLOW CONTROL FACILITY SEISMIC UPGRADES

SAN DIEGO, CA

GeoEngineers provided geotechnical engineering services in support of the proposed seismic upgrades for eight flow control facilities located in San Diego County, California. The project sites are spread across San Diego County from Otay Ranch area in the south to Hidden Meadows in the north. Services included the evaluation of existing structures and design of structural improvements to mitigate seismic risk complying with California Building Code (CBC) 2019 and ASCE 41-17, Evaluation and Retrofit of Existing Buildings. Due to familiarity with site conditions, GeoEngineers utilized non-invasive geophysical survey techniques to investigate site conditions which are faster and more cost-effective than conventional geotechnical investigation methods. Our team provided site-specific geotechnical seismic design parameters to inform a more realistic design of structural improvements for each building.

Date Initiated: 2022
Date Completed: Present

Owner: San Diego County Water Authority
Darin Aveyard
(858) 668-0707

Key Personnel: Arash Pirouzi, Geotechnical Project Manager, GeoEngineers

IDAHO WATER RESOURCES BOARD (IDWR), PRIEST LAKE DAM

PRIEST LAKE, ID

The IDWR is implementing a project to increase the water levels in Priest Lake. This project includes both upgrading the existing outlet dam to accommodate the increased water levels and making additional safety improvements to the dam and spillway. GeoEngineers is providing geotechnical engineering analysis and environmental permitting services. The project is currently in construction. The project has a limited design and construction budget. As with many retrofit projects, it was not feasible to achieve current seismic design standards for all components of the structure. GeoEngineers began the project by evaluating the seismic vulnerability of different components at different design levels and by performing a detailed parametric analysis. By analyzing a wide range of probable soil parameters, we determined what data and components were critical to design. This allowed the design team, IDWR and Idaho Dam Safety to establish and agree on reasonable seismic design levels, overall risk levels and performance expectations.

Date Initiated: 2019
Date Completed: 2020

Owner: Idaho Water Resources Board
Shane Phillips
(206) 838-2886

Key Personnel: Lyle Stone, Geotechnical Associate-in-Charge, GeoEngineers

Required Qualifications

C. PAST & ONGOING PROJECTS - LETTIS

SWEETWATER DAM
SAN DIEGO COUNTY, CA

A site-specific seismic hazard analysis was performed for the dam. Probabilistic and deterministic seismic hazard analyses, and site response analysis were performed and time histories were developed.

Date Initiated/Completed: 2024

Owner: Sweetwater Authority

Lettis Key Personnel: Ivan Wong, Reviewer, LCI

OROVILLE DAM
OROVILLE, CA

Site-specific seismic hazard analysis of the dam including probabilistic and deterministic seismic hazard analyses. Evaluation of reservoir triggered seismicity.

Date Initiated: 2019
Date Completed: 2023

Owner: California Department of Water Resources
Don Hoirup
916.882.2739
Don.Hoirup@water.ca

Lettis Key Personnel: Ivan Wong, Seismicity Analyst and Reviewer, LCI

WHITTIER NARROWS DAM
MONTEBELLO, CA

Peer review of seismic hazards and deformation analysis

Date Initiated/Completed: 2021

Owner: U.S. Army Corps of Engineers
Khaled Chowdhury
916.557.5309
Khaled.Chowdhury@usace.army.mil

Lettis Key Personnel: Ivan Wong, Reviewer, LCI

RESPONDENT'S FIRM AND KEY PERSONNEL

Provide an organizational chart showing the relationship and titles of key personnel. Describe Respondent's firm, including identification and responsibilities of key personnel and subconsultants. For each of the key personnel, identify their main work location. Identify the project manager who will be responsible for the direct supervision and coordination of all work activities.

SR 520 PONTOON CONSTRUCTION FACILITY

KPFF provided civil, structural, and mechanical design.

Organizational Chart for Key Personnel

ERICK DEL BOSQUE, PE
Director of Engineering & Operations
SWEETWATER AUTHORITY

GEOFF WARCHOLIK, PE, SE
Principal-in-Charge
KPFF
San Diego

BOB RILEY, PE, SE
Project Manager
KPFF
Seattle

SEISMIC SPECIALISTS

MAIKOL DEL CARPIO, PHD, PE, SE
Senior Seismic Engineer
KPFF
Los Angeles

ARASH PIROUZI, PHD, PE
Lead Geotechnical Engineer
GEOENGINEERS
San Diego

LYLE STONE, PE, GE
Senior Geotechnical Engineer
GEOENGINEERS
Seattle

IVAN WONG, PG
Senior Seismologist
LETTIS
Concord

SCOTT LINDVALL, PG, MS, CEG
Senior Seismologist
LETTIS
Valencia

UNREINFORCED MASONRY SPECIALISTS

FARID MOHSENI, PE, SE
Senior Technical Specialist
KPFF
San Diego

JOSEPH CARPENTER, PE
Senior Engineer
KPFF
St. Louis

UNDERWATER CONSTRUCTION SPECIALISTS

BOB RILEY, PE, SE
Waterfront Structural Engineer
KPFF
Seattle

STEVE SPENCER, PE
Constructability Expert
GEOENGINEERS
Seattle

Responsibilities of key personnel will be provided on the following pages.

Key Personnel

San Diego

FIRM
KPFF Consulting Engineers

EDUCATION
B.S. Structural Engineering
University of California, San Diego

REGISTRATION
Structural Engineer in CA (#S4951)

Civil Engineer in CA (#C63301)

LEED Accredited Professional

PROFESSIONAL AFFILIATIONS
Structural Engineering Association of California

International Code Council

Cold Formed Steel Engineers Institute

American Institute of Steel Construction

GEOFF WARCHOLIK, SE, LEED AP
PRINCIPAL-IN-CHARGE

As a Principal with KPFF, Geoff leads the conceptual design. He provides technical and managerial guidance to the Project Manager and follows the progress and direction of the work. He provides an internal peer review of the documents at critical milestones and checks and seals the final documents. Geoff has 25 years of structural engineering experience and has managed several large, complex projects, including many existing structure evaluations, upgrades, and retrofits.

UCSD Seismic Safety Reviews of Existing Buildings, La Jolla, CA
Seismic Safety Reviews and Summary Reports for approximately 220 UCSD owned or occupied existing facilities in accordance with the University of California Office of the President Seismic Safety Policy Guidelines. The scope of work consisted of 220 Tier 1 Seismic Evaluations, 12 Tier 2 and/or Tier 3 Seismic Evaluations, and a peer review of two seismic retrofits.

Solar Turbines – Seismic Evaluation and Retrofit – Harbor Drive Facilities, San Diego, CA
Seismic evaluation and retrofit study of 16 buildings. Many of these buildings are Unreinforced Masonry (URM) shear wall structures. As Prime, KPFF engaged an architect to evaluate historic aspects of the buildings and to assist with aesthetic impacts of retrofit options. KPFF also assisted in developing a post-earthquake response plan to assess seismic distress of critical structural members. Retrofit designs were developed for four of the buildings.

City Hall Seismic Evaluation and City Building Assessments, City of National City, National City, CA
Seismic evaluation of a building built in 1965, previously evaluated in 1999. The scope of work included ASCE-41 Tier 1 and Tier 2 seismic analyses with conceptual retrofit sketches for cost estimating. The project also included a brief review of the existing drawings of 18 City of National City buildings to determine the building size, type, and lateral system for an initial assessment.

Balboa Elementary School Modernization, San Diego, CA
Structural engineering services for the modernization of Balboa Elementary School, including student health, safety, and security improvements; school accessibility and code compliance upgrades; and major building system repairs. Prior to the renovation work, we provided a Pre-Schematic Assessment Report which included seismic evaluations of two buildings.

Additional Relevant Projects
- Born and Raised Restaurant Tenant Improvement and Seismic Retrofit, San Diego, CA
- Mission Valley Mall – Building Conversion Feasibility Study, San Diego, CA
- Sharp Memorial Hospital, SB1953 Seismic Evaluation, San Diego, CA
- Tizon Apartments (Radisson Rancho Bernardo Seismic Retrofit/Conversion), San Diego, CA

Key Personnel

FIRM
KPFF Consulting Engineers

EDUCATION
BS, Architectural Engineering, University of Colorado at Boulder

REGISTRATION
Structural CA (#5335), TX (#135805), WA (#33839)

Endorsed for Civil & Structural, AK - (AELC11844), CA- (#74386), OR- (#88442), MA “(#50615), FL- (#83709)

Structural Qualifications, PEng, BC- (#194168)

PROFESSIONAL AFFILIATIONS
American Institute of Steel Construction (AISC) American Society of Civil Engineers (ASCE)

Coasts, Oceans, Ports, and Rivers Institute (COPRI)

Association of Professional Engineers and Geoscientists of BC (APEGBC)

BOB RILEY, PE, SE
PROJECT MANAGER

Bob Riley’s position as leader of the heavy civil structural group within KPFF’s Special Projects Division reflects his breadth of engineering experience. During his 32-year career, he has served as a civil engineer, structural engineer, and project manager on a wide range of projects small and large, for public and private clients as well as contractors. Bob has worked on many projects that require daily out-of-the-box thinking, and he is especially skilled at developing creative solutions to obstacles.

Lake Diablo Dam Intake Screen Replacement, Whatcom County, WA
Structural Engineer of Record for the design of a new trashrack system with provisions for automatic raking to remove debris, and with adequate vertical flow area to prevent future failures should the rack become clogged. KPFF was able to develop a design that could be installed cost effectively by divers in 140 feet deepwater . Design was completed late in 2023 and construction wrapped up late in 2024.

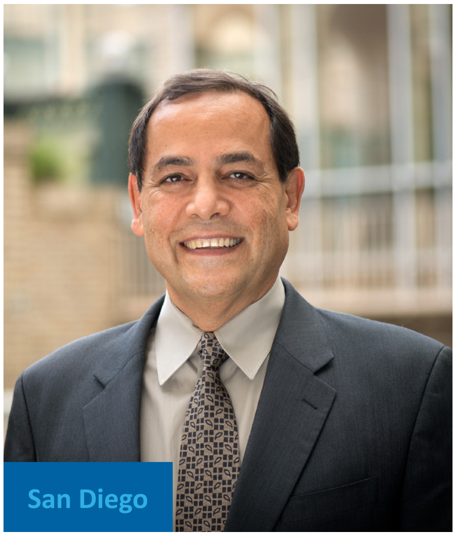
SR 520 Pontoon Construction Casting Basin, Grays Harbor, WA
Structural Engineer of Record for the four-acre pile supported casting basin concrete slab structure, retaining walls and elevated mobile crane supported trestle structures that provide support for the tracked mobile cranes used to construct the 33 pontoons ranging in size to 360’ long by 75’ wide by 28’ tall. Specific elements of work include development of a 55-acre casting facility and 20-acre basin; a moveable gate structure; structural walls along the shoreline; elevated mobile crane structures; additional crane access piers; hydraulic control structures to flood and drain the basin; channel excavation and structures to support pontoon launching. The pontoons were used to build the new SR 520 floating bridge.

Lower Baker Dam Peer Review of Temporary Structure, Concrete, WA
Structural Engineer of Record and Principal-in-Charge for the peer review of a temporary scaffolding structure that was mounted to the upstream side of the Lower Baker Dam in Concrete, WA. This temporary structure provides access for the Contractor to install a below grade grout curtain below the dam that is required in order to mitigate the amount of seepage currently occurring below the dam structure.

Third Power Plant Grand Coulee Dam, Grand Coulee, WA
Structural Engineer supporting KPFF’s study to investigate the feasibility of modifying the historic third powerplant building by increasing the door size to accomodate a large generator unit uprate program.

Additional Relevant Projects
- Willamette Falls Locks, Clackamas, OR
- Lake Cushman Dam Floating Wave Barrier, Shelton, WA
- UCSD Seawall Evaluation & Repair, La Jolla, CA
- Alta Sea Concrete Wharf Renovations, Port of Los Angeles, CA

Key Personnel



FARID MOHSENI, SE
SENIOR TECHNICAL SPECIALIST

As a Principal with KPFF, Farid provides technical and managerial guidance to the Project Manager and follows the progress and direction of the work. He provides internal peer review of the documents at critical milestones. Farid has over 45 years of structural engineering experience and has worked on large, complex projects as well as performed many seismic evaluations and upgrades.

EDUCATION
M.S. Civil Engineering
University of Kentucky

B.S. Civil Engineering
Tehran Polytechnic

REGISTRATION
Structural Engineer in CA (#S4775) and NV

Civil Engineer in CA (#C60508) and NV

Professional Engineer in FL, MD, PA, TX, and WA

PROFESSIONAL AFFILIATIONS
American Institute of Architecture

Structural Engineers Association of California

Lean Construction Institute

American Institute of Steel Construction

San Diego Architectural Foundation

** Designed while employed at previous firm*

Candy Factory Renovations, San Diego, CA
$15M renovation and relocation of the historic Showley Brothers Candy Factory built in 1924. The 3-story, 30,000-sf un-reinforced brick building was relocated beyond right field of Petco Park. The renovation included the addition of skylights, a roof deck, a new elevator, two new stairs, a second floor opening, new interior stud walls, and relocating existing shear walls.

Schiefer and Sons Building Renovations, San Diego, CA
$13M renovation of historic 3-story building. The project included the addition of two new stairs, a new elevator, a roof deck, new interior stud walls; a lateral analysis; and a retrofit consisting of wall and roof ties and parapet bracing.

Pack Lofts Historic Building Renovation, San Diego, CA
Renovation of historic structure to serve as a 20,000-sf, 4-story mixed use building. The existing building had exterior concrete frames and infill clay tiles. The project included a voluntary seismic retrofit in addition to the renovations associated with a warm shell office space on the upper three floors and retail space on the first floor.

Seismic Evaluation and Retrofit – Harbor Drive Facilities, San Diego, CA
Seismic evaluation and retrofit study of 16 buildings as Prime on the project. Many of these buildings are Unreinforced Masonry (URM) shear wall structures. An architect was engaged to evaluate historic aspects of the buildings and assist with access and aesthetic impacts of retrofit options.

Patton U.S. Army Reserve Center Seismic Evaluations, Bell, CA
Seismic evaluations for four buildings with steel, masonry, and concrete, constructed from 1970 to 1989, including office, classroom, warehouse, and maintenance facilities.

Previous Dam Experience
- Franklin Dam Upgrade Study, Louisville, KY*
- Guist Creek Dam Upgrade, spillway, sheet piles, pile structures, and concrete retaining structures, Shelbyville, KY*
- Pipeline Installation, including sheet piling, retaining walls, and excavation shoring, Dry Run Levee, OH*
- Winchester Raw Water Intake, Winchester, KY*

Key Personnel

FIRM
KPFF Consulting Engineers

EDUCATION
M.S. Civil Engineering /Structural Emphasis
Southern Illinois University Edwardsville

B.S. Civil Engineering /Structural Emphasis
Southern Illinois University Carbondale

REGISTRATION
Professional Engineer in MO, OH, and TX

LEED Accredited Professional

PROFESSIONAL AFFILIATIONS
ASCE Member

ACE Mentorship – St. Louis Affiliate Board Member

JOSEPH CARPENTER, PE, LEED AP
SENIOR ENGINEER

Joe, who joined KPFF in 2014, has more than 20 years of experience in structural design for a wide range of project types, including historic renovation, residential, public amenities, healthcare, laboratories, commercial facilities, and parking garages. He is skilled at managing projects, and is responsible for client contact, development of structural framing systems, management of a project's budget and schedule, supervision of the overall structural design, and production of construction documents.

Grand Coulee, Bureau of Reclamation, Columbia River Basin, WA
Seismic evaluation and retrofit of Power Plant 3 included development of SAP computer models of the building structures and a Tier 3 analysis in accordance with ASCE 31-03. The seismic evaluation of non-structural items included discrete equipment components, and distributed systems. Discrete components are evaluated in ASCE 31-03 Tier 1 mode using Reclamation's Equipment Database.

St. Louis Post-Dispatch Building Renovation, St. Louis, MO
$70M renovation of historic newspaper building including a seismic evaluation and upgrading, new rooftop amenity structure, various new monumental stairs, alterations of existing floor/roof structures for new interior atrium/skylights, and various MEP support work.

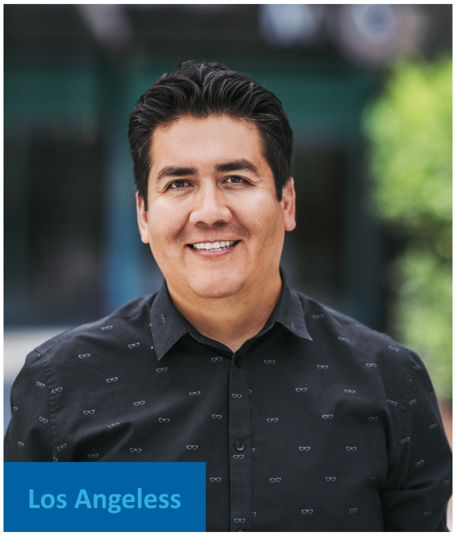
Armory Renovation, St. Louis, MO
Renovation of historic 250,000-sf, 3-story armory building built in 1938 with a large drill hall that is topped by a clear-span roof. Building alteration measures include new interior egress, elevator tower, monumental stairs, and MEP system support evaluation/strengthening.

Kings Hill Renovation, St. Louis, MO
Renovation and adaptive reuse of historic factory warehouse that suffered heavy deterioration into a Law Firm Headquarters. The project included new monumental stair, new elevator, and localized shear walls. Structural documentation, raising, and preservation of the existing structural roof framing while maintaining the original historic truss elements was required.

St. Louis CITY SC Union Square Headquarters, St. Louis, MO
Renovation of historic 5-story brick, steel, and concrete building to provide a world-class headquarters with kitchen and banquet facilities, exhibit space, broadcast studios, and office space.

Additional Relevant Projects
- 4565 McRee, St. Louis, MO
- Last Hotel in the International Shoe Building, St. Louis, MO
- Angad Arts Hotel/Missouri Theatre Building Renovation, St. Louis, MO
- Alton Downtown Redevelopment Renovations, Alton, IL
- Tower Grove Park Historic Pavilion Assessments and Renovations, St. Louis, MO

Key Personnel



FIRM
KPFF Consulting Engineers

EDUCATION
Ph.D. Structural and Earthquake Engineering, State University of New York at Buffalo, 2014

M.S. Structural and Earthquake Engineering, State University of New York at Buffalo, 2009

B.E. Civil Engineering, National University of San Agustin, Peru, 2006

REGISTRATION
Professional Engineer in CA (#C85381)

PROFESSIONAL AFFILIATIONS
American Society of Civil Engineers

ASCE 41 Committee on Seismic Evaluation and Retrofit of Existing Buildings, Technical Committee Associate Member

MAIKOL DEL CARPIO, PE, PhD
SENIOR SEISMIC ENGINEER

Dr. Del Carpio is currently an Associate focusing on award winning work in complex seismic retrofit and renovation projects. He leads projects under several jurisdictions including HCAI/OSHPD and DSA and various municipalities. He has published several technical papers in peer-reviewed journals and conferences on the topic of seismic performance and advanced analysis methodologies. Dr. Del Carpio also participated as an analysis consultant in the development of guidelines for the Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings with Weak First Stories (FEMA P-807 Report). Dr. Del Carpio is currently an associate member of the ASCE 41 committee on Seismic Evaluation and Retrofit of Existing Buildings.

City of Inglewood Civic Center Seismic Review, Inglewood, CA
Seismic upgrades were performed on three buildings at the City of Inglewood Civic Center, using advanced analysis procedures in accordance with ASCE 41. The upgrades included installing fluid viscous dampers, wrapping concrete beams and columns with FRP, adding new concrete walls, and thickening existing walls.

Department of Veterans Affairs, VA Medical Center Bldg 1 Tier 3 Seismic Evaluation, Fresno, CA
Seismic evaluation of Building 1, a 250,000 GSF acute care hospital configured as 7 stories above grade plus a 2-story mechanical penthouse and 2 stories below grade (basement and sub-basement levels). The scope of work included Material Testing/ Condition Assessment Program (MTCAP), ASCE 41 Tier 3 Seismic Evaluation, and Conceptual Retrofit Drawings.

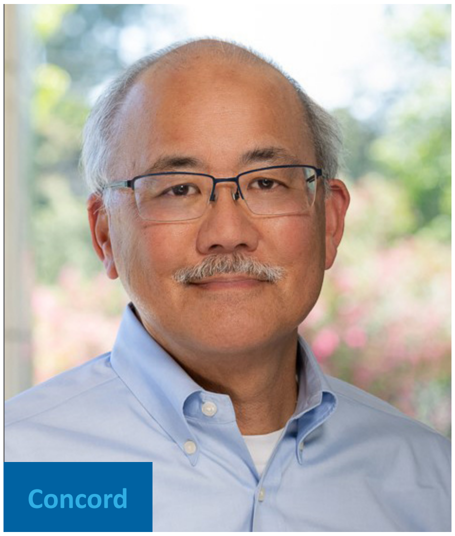
UCLA Pritzker Hall Seismic Renovation, Los Angeles, CA
KPFF used advanced nonlinear dynamic analysis techniques per ASCE 41, combined with physical specimen testing, to confirm a UCOP SSP Level III rating. This was achieved by strategically installing viscous dampers in select locations of the building. KPFF's approach preserved the architectural integrity of this historic campus landmark.

Community Hospital of the Monterey Peninsula SPC-4D Retrofit, Monterey, CA
Seismic retrofit of the 1960 and 1968 buildings using advanced analysis procedures per ASCE 41.

MSJCCD Mt. San Jacinto College Temecula Valley Campus Seismic Evaluation, Retrofit & Renovation, Temecula, CA
Seismic evaluation, retrofit, rehabilitation, and adaptive reuse of an existing office building to transform it into a new satellite community college campus.

Additional Relevant Projects
- Children's Hospital Los Angeles SPC-4D Reclassification of Duque and McAllister Buildings, Los Angeles, CA
- UCLA Rosenfeld Renovation and Expansion, Los Angeles, CA
- UCLA Wooden Center Complex Seismic Improvements, Los Angeles, CA
- UCLA Kerchkhoff Hall Tier 3 Seismic Evaluation, Los Angeles, CA

Key Personnel



FIRM
Lettis Consultants International, INC. I

EDUCATION
BS, Physics, 1970; BS, Geology, 1972 MS, Geophysics, 1976

Graduate Studies, Geophysics, 1975-1976; Earthquake Engineering, 2002-2003; Geophysics 2002-2007

REGISTRATION
Professional Geologist, UT and ID

IVAN WONG, PG
SENIOR SEISMOLOGIST

Ivan Wong is a Senior Principal Seismologist with Lettis Consultants International. He is an internationally recognized expert in seismic hazard evaluations with nearly 50 years of experience in the fields of seismology, earthquake engineering, and seismic geology. Ivan has directed the seismic hazard evaluations of more than 700 critical and important facilities worldwide including more than 300 dams. These dams include more than 120 dams owned by the U.S. Bureau of Reclamation and others owned by the California Department of Water Resources (DWR), U.S. Army Corps of Engineers, Fish & Wildlife Service, Bureau of Indian Affairs, Tennessee Valley Authority, and numerous state, regional and local water agencies.

Altus and Fort Cobb Dams and Lugert and East Dikes, OK – U.S. Bureau of Reclamation
Principal Seismologist. Responsible for the site-specific seismic hazard analyses. Seismic hazard analyses includes development of probabilistic and deterministic response spectra and time histories for use in the dynamic analyses of the dams.

Sweetwater Dam, San Diego County, CA
Principal Seismologist. A site-specific seismic hazard analysis was performed for the dam. Probabilistic and deterministic seismic hazard analyses, and site response analysis were performed and time histories were developed.

Oroville Dam, Oroville, CA
Principal Seismologist. Site-specific seismic hazard analysis of the dam including probabilistic and deterministic seismic hazard analyses. Evaluation of reservoir triggered seismicity.

Whittier Narrows Dam, Montebello, CA
Peer review of seismic hazards and deformation analysis

Trail Bridge, Smith, and Carmen Diversion Dams, OR – Eugene Water and Electricity Board
Principal Seismologist. Responsible for the site-specific seismic hazard analyses. Seismic hazard analyses includes development of probabilistic and deterministic response spectra and time histories for use in dynamic analyses of the dams.

The Dalles, Bonneville, and John Day Dams, OR/WA – U.S. Army Corps of
Principal Seismologist. Responsible for the site-specific seismic hazard analyses. Seismic hazard analyses included development of probabilistic and deterministic response spectra and time histories for use in the dynamic analyses of the dams.

Additional Relevant Projects
- Soda Springs, Toketee, Fish Creek, Lemolo, and Clearwater Dams, OR
- Clear Branch Dam, OR – Middle Fork Irrigation District
- Cushman Dams 1 and 2 and Wynochee Dam, WA – Tacoma Power
- Long Lake Dam, Washington, Post Falls and Cabinet Gorge Dams, Idaho, and, Noxon Rapids Dam, Montana
- Wells Dam, WA – Douglas County Public Utilities District

Key Personnel

FIRM
Lettis Consultants International, INC. I

EDUCATION
San Diego State University, M.S., Geology 1988

Stanford University, B.S., Geology 1984

REGISTRATION
Certified Engineering Geologist

California, No. 1711

Professional Geologist, California, No. 5486

PROFESSIONAL AFFILIATIONS
American Geophysical Union

Association of Engineering Geologists

Earthquake Engineering Research Institute

Geological Society of America

Seismological Society of America

SCOTT LINDVALL, MS, PG, CEG
SENIOR SEISMOLOGIST

Mr. Lindvall is a Certified Engineering Geologist in California with over 31 years of experience performing seismic and geologic hazard analyses, fault investigations, ground motion studies, and engineering geology investigations for both existing and proposed critical facilities. Mr. Lindvall is experienced in a variety of investigative techniques, such as detailed geologic mapping, geomorphic analyses of aerial photography and LiDAR, and subsurface exploration (trenches, borings, CPTs, and geophysical surveys), as well as the interpretation and integration of these data to develop detailed geologic models. He has performed numerous seismic source characterizations, ground motion studies, probabilistic and deterministic seismic hazard analyses (PSHA and DSHA), and probabilistic and deterministic fault displacement hazard analyses (PFDHA and DFDHA).

Pyramid and Castaic Dam PSHA projects, Southern CA
Mr. Lindvall helped recently develop the seismic source characterizations used to develop the probabilistic seismic hazard analyses (PSHA) and deterministic seismic hazard analyses (DSHA) for these two Department of Water Resources (DWR) dams located in the Transverse Ranges. The ground motion hazard results of these studies were used in the Level 2 Risk Assessments (L2RA) for both dams.

Fault Mapping and Evaluations for DWR, Southern CA
Mr. Lindvall is currently leading mapping and fault characterization projects on the northern San Gabriel fault near Pyramid Dam and the Waterman Canyon and Santa Ana faults located in the San Bernardino Mountains near the Devil Canyon Penstocks. The purpose of these studies is to evaluate the recency of movement (activity) and assess their potential impact to State Water Project facilities. The evaluations include analysis of lidar data, helicopter reconnaissance, field mapping, acquisition of drone imagery, age dating, and documentation of scarps and displaced Quaternary deposits.

Seismic Hazard Evaluation of San Gabriel Dam, Los Angeles County, CA
Mr. Lindvall directed the seismic hazard evaluation of the earthen and rock-fill dam constructed in 1937 and owned by the Los Angeles County Department of Public Works (LACDPW). San Gabriel Dam falls under the jurisdiction of both the California Division of Safety of Dams (DSOD) and the Federal Energy Regulatory Commission (FERC). The study included deterministic and probabilistic seismic hazard analyses (DSHA and PSHA) for the dam, which is located within 5 km of the San Gabriel, Clamshell-Sawpit, and Sierra Madre faults and within 25 km of the San Andreas fault. Mr. Lindvall also provided support to the FERC Part 12D workshop on the subject of seismic hazard and faults mapped in the crystalline foundation rock.

Seismic Hazard Evaluations of El Capitan and Lake Hodges Dams, San Diego County CA
Mr. Lindvall managed the seismic hazard studies of both dams owned by the City of San Diego. El Capitan Dam is a hydraulic fill dam with rockfill buttresses completed in 1935 and Lake Hodges Dam is a concrete, multiple-arch structure completed in 1919. These studies included seismic source characterization, development of ground motion model input parameters, performing deterministic and probabilistic seismic hazard analyses (DSHA and PSHA), deagreggation of hazard and developing uniform hazard spectra, and selection of seed time histories and spectrally matching to the controlling earthquake spectra.

Key Personnel

San Diego

FIRM
GeoEngineers

EDUCATION
Ph.D., Civil and Environmental Engineering

M.S., Civil and Environmental Engineering

B.S., Civil Engineering

REGISTRATION
Professional Engineer: CA (#C95580)

ARASH PIROUZI, PhD, PE
LEAD GEOTECHNICAL ENGINEER

Arash heads GeoEngineers' San Diego office and manages a wide range of geotechnical engineering projects along the West Coast including seismic retrofit of existing structures and design of waterfront structures. His expertise includes complex geotechnical and geo-structural engineering analysis, subsurface investigation, site characterization, ground improvement design, temporary support of excavation design, and deep foundation analysis.

Ocean Beach Pier Replacement, San Diego, CA
Arash is providing ongoing geotechnical engineering services in support of development of a 30% preliminary design plan set to be included in the design-build RFP solicitation package. The project involves coordinating a geophysical/ geotechnical field investigation, including explorations to be advanced from the pier deck and upon the coastal bluff adjacent to the pier; environmental permit acquisition associated with project explorations; geologic/seismic hazard analysis; and geotechnical report preparation.

B Street Pier Interior Improvements, San Diego, CA
The Port of San Diego is embarking on a $5 million upgrade of the B Street Terminal to repair curtain walls and pavement. GeoEngineers is providing construction phase support to the Port in regard to installation of Deep Soil Mixing (DSM) columns and sheet pile walls. GeoEngineers also completed a geotechnical investigation program to facilitate DSM column installation at the site. Arash is responsible for managing the project, including client interactions, preparing technical documents, and responding to RFIs.

Flow Control Facility Seismic Upgrades, San Diego, CA
GeoEngineers provided geotechnical engineering services in support of the proposed seismic upgrades for eight flow control facilities located in San Diego County, California. The project sites are spread across San Diego County from Otay Ranch area in the south to Hidden Meadows in the north. Services included the evaluation of existing structures and design of structural improvements to mitigate seismic risk complying with California Building Code (CBC) 2019 and American Society of Civil Engineers (ASCE) 41-17, Evaluation and Retrofit of Existing Buildings. Due to familiarity with site conditions, GeoEngineers utilized non-invasive geophysical survey techniques to investigate site conditions which are faster and more cost effective than the conventional geotechnical investigation methods. As geotechnical project manager, Arash provided site-specific geotechnical seismic design parameters to inform a more realistic design of structural improvements for each building.

Additional Relevant Projects
- NBSD B-3291 Seismic Evaluation, San Diego, CA
- San Joaquin Area Flood Control Agency Smith Canal Gate Project, Stockton, CA
- Seismic Evaluation for ACU-5 Control Tower 31930, Oceanside, CA
- NBC 1457 Seismic Retrofit, Coronado, CA

Key Personnel

LYLE STONE, PE, GE
SENIOR GEOTECHNICAL ENGINEER

Lyle has 19 years of geotechnical engineering experience, including seismic work for dams and waterfront projects. He is skilled in design of retrofits and construction feasibility assessments. Lyle's expertise includes seismic evaluation for large structures, foundations, and slope stabilization. With extensive knowledge of both waterfront and dam projects, he has successfully collaborated on numerous projects, ensuring the stability and safety of dams and critical infrastructure.

FIRM
GeoEngineers

EDUCATION
M.S., Civil Engineering, Michigan Technological University

B.S., Civil Engineering, California Polytechnic State University

REGISTRATION
Professional Civil Engineer: CA (#C72065), WA (#45765), ID (#19197), OR (#100288PE), CO (#0062677); Geotechnical Engineer: CA (#GE3066), OR (#100288PE); 40-hour OSHA Hazardous Waste Site Operations & Safety Training

Ocean Beach Pier Replacement, San Diego, CA
GeoEngineers is providing ongoing geotechnical investigation and engineering services in support of development of a 30% preliminary design plan set. As part of the owner's representative team, the 30% design set will be included in a design-build RFP solicitation package. The project includes coordination of a geophysical/geotechnical field investigation, including explorations to be advanced from the pier deck and upon the coastal bluff adjacent to the pier; environmental permit acquisition associated with project explorations; geologic/seismic hazard analysis; and preliminary geotechnical design.

Diablo Dam Trash Rack Footing, Diablo, WA
The intake trash rack at the Diablo Dam Intake Structure, originally constructed in 1929, was deteriorating and required replacement. The repair conceived by KPFF Consulting Engineers included expanding the existing footing to support the new larger structure. The new footing, which was about 100 feet below water in the reservoir would be constructed entirely in the wet and would be designed without direct observation of the ground and rock conditions.

City of Spokane Part 12D Comprehensive Assessment & Report Upriver Dam Hydroelectric Project, Spokane, WA
Lyle is the Associate-in-charge for the Comprehensive Assessment (CA) and is serving as an Independent Consultant team member. Lyle prepared portions of the CA-PIPR (Pre-Inspection Preparation Report) and participated in the Part 12 site inspection and Potential Failure Mode Analysis (PFMA) and Risk Workshops.

City of Port Townsend Lords Lake East Dam, Jefferson County, WA
Lords Lake reservoir, located in the foothills of the Olympic Mountains, provides water to the City of Port Townsend. In 2020 the Washington Dam Safety Office identified the East Dam as a seismic risk due to potentially liquefiable soils in the embankment. GeoEngineers is working with the City to identify and delineate areas of seismic risk, develop alternatives for repair, and prepare concept level designs to include permitting implications. Lyle is Associate-in-charge of this ongoing project.

Additional Relevant Projects
- NBSD B-3291 Seismic Evaluation, San Diego, CA
- Camp Pendleton Repair BEQ 53450, Oceanside, CA

Key Personnel

Seattle

FIRM

GeoEngineers

EDUCATION

B.S., Civil Engineering, Ohio University

M.S., Civil Engineering, University of Washington

REGISTRATION

Professional Engineer: WA (#33016), HI (#11834), ID (#13482)

STEVE SPENCER, PE
CONSTRUCTABILITY EXPERT

Over the past three decades, Steve has served as the lead engineer for more than 200 marine, underground, and deep foundation projects, including seismic dam infrastructure. He has managed numerous heavy civil and marine projects across the Pacific Northwest, Alaska, and British Columbia. Steve brings expertise in construction execution via bid-build, design-build, and CM/GC project delivery methods. Currently, he leads the Construction Design Group where he applies his knowledge of design and foundation system construction for large-scale infrastructure projects.

Box Canyon Dam Upstream Fish Passage, Ione, WA
Engineer of Record and Construction Team Project Manager. This Design-build project included installation of a 300-foot-long sheet pile cofferdam to enable fish ladder construction in the challenging river environment at the Box Canyon Dam. The cofferdam diverted the Pend Oreille River for construction of the concrete fish ladder. The cofferdam and diversion and care of water submittals were approved by FERC.

Nelson Dam Removal Project, Yakima, WA
The Nelson Dam removal project is providing a new start on the Naches River. It features better fish passage, a sluiceway for irrigation, and changes to reduce flood risk. GeoEngineers provided stream diversion plans, river flow estimates, and diversion cofferdam designs.

San Joaquin Area Flood Control Agency Smith Canal Gate Project, Stockton, CA
Steve provided geo-structural engineering for a temporary trestle design for the San Joaquin Area Flood Control Agency Smith Canal Gate project. The temporary trestle was planned for use along the alignment of the proposed cellular cofferdam from Station 6+00 to Station. The purpose of the temporary trestle was to provide equipment access to the completed cellular cofferdam northwest of Station 6+00. The scope of work included reviewing existing Geotech Data, bridge drawings, and preliminary Geotechnical and structural design of a temporary work trestle structure.

Anderson Dam Tunnel, Morgan Hill, CA
Steve provided geo-structural engineering associated with dam stability during TBM breakout of earthen dam face and into the reservoir and safe retrieval of the TBM from the reservoir.

Skagit County Dike District #12, No Name Tide Gate and Bypass Replacement Project, Skagit County, WA
GeoEngineers provided geotechnical and geo-structural engineering services for the design of a temporary cofferdam to facilitate the construction of a new concrete tide gate though an existing dike. The use of a cofferdam was required to maintain the integrity of the dike to withstand 12’ tidal fluctuations and assure seawater separation from the irrigation canals.

Additional Relevant Projects

- Boeing Perimeter Retaining Wall, Everett, WA
- Port of Alaska Petroleum and Cement Terminal Season I, Anchorage, AK

EXCEPTIONS TO THE RFP AND/OR PROFESSIONAL SERVICES AGREEMENT

The Respondent shall certify that it takes no exceptions to this RFP, including but not limited to, the Authority's Agreement for Services (Agreement), as attached in Exhibit B. If the Respondent does take exception(s) to any portion of the RFP or Agreement, the specific portion of the RFP or Agreement to which exception(s) is taken shall be identified and proposed alternative language shall be provided and explained in the proposal.

WILLAMETTE FALLS LOCKS
KPFF provided structural and mechanical evaluation

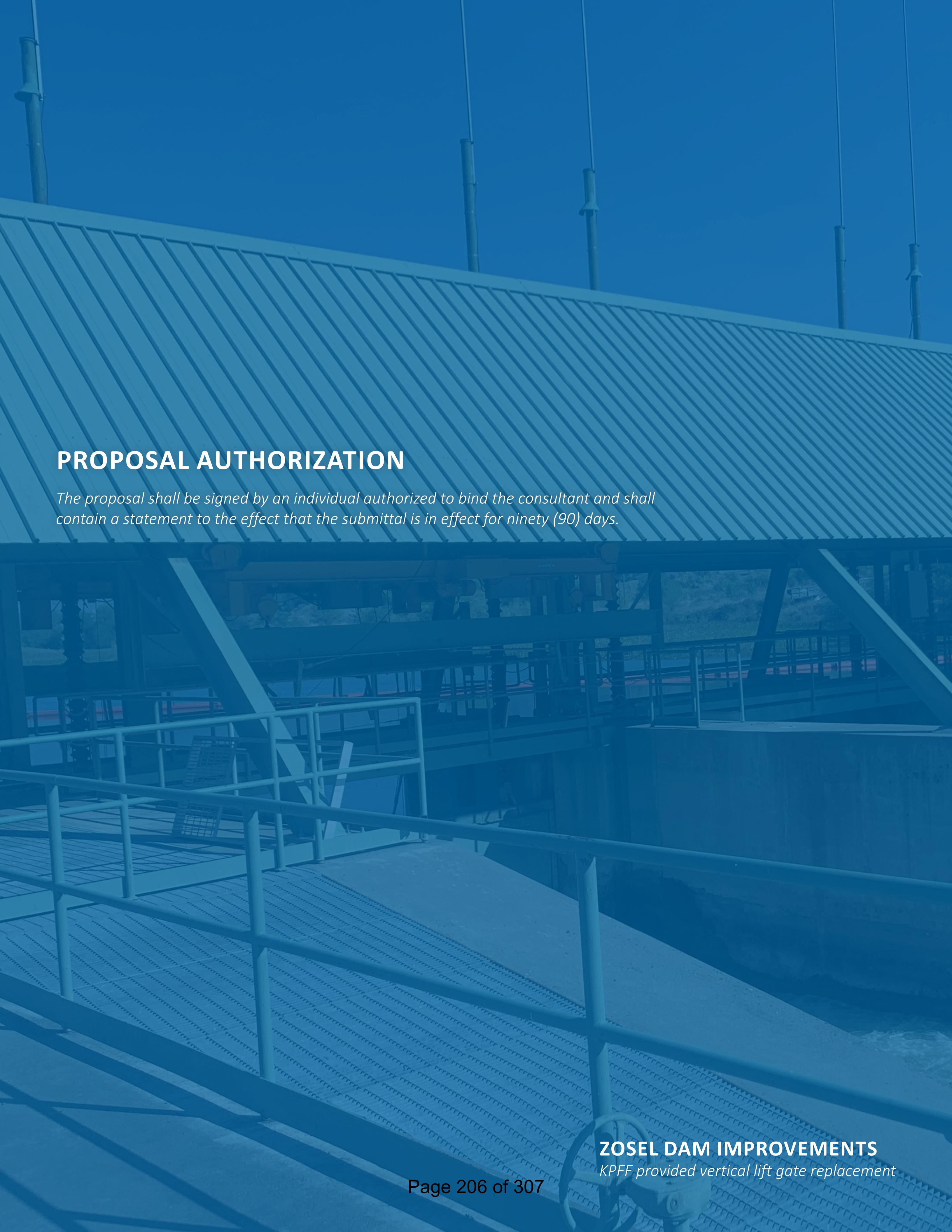
Exceptions to the RFP

KPFF would like to note the following exception to the RFP. On page 6, section 7.1 Indemnification: Line 5 we would like to add "***negligent***" to the following statement.

To the fullest extent permitted by law, Consultant shall defend (with counsel of the Authority's choosing), indemnify and hold the Authority, its officials, officers, employees, volunteers, and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, or incident to any ***negligent*** acts, errors or omissions, or willful misconduct of Consultant, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of Consultant's Services, the Project or this Agreement, including without limitation the payment of all damages, expert witness fees and attorneys' fees and other related costs and expenses.

PROPOSAL AUTHORIZATION

The proposal shall be signed by an individual authorized to bind the consultant and shall contain a statement to the effect that the submittal is in effect for ninety (90) days.



ZOSEL DAM IMPROVEMENTS

KPFF provided vertical lift gate replacement

Proposal Authorization

This proposal has been signed by an individual authorized to bind KPFF Consulting Engineers and the submittal is in effect for ninety (90) days."

Sincerely,

Bob Riley, PE, SE
Principal | Project Manager

Geoff Warcholik, PE, SE
Principal-in-Charge

kpff

SAN DIEGO | STRUCTURAL ENGINEERING

3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

619-521-8500

www.kpff.com @kpff_sd @kpffsd

San Diego, Long Beach, Newport Beach, Irvine, Los Angeles, San Francisco, Sacramento, Eugene, Portland, Tacoma, Lacey, Seattle, Spokane, Boise, Salt Lake City, Austin, Des Moines, Chicago, St. Louis, Birmingham, Nashville, Louisville, Cincinnati, Washington DC, New York City

SWEETWATER DAM OUTLET TOWER & CONDUIT SEISMIC EVALUATION FEE PROPOSAL

KPFF Consulting Engineers | Sweetwater Authority | 2025

Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study
Sweetwater Authority
Chula Vista, CA
Engineering Fee Estimate Schedule

Project #2400260

January 16, 2025

Option 1 Approach

Task	KPFF Fee	GeoEngineers Fee	Lettis Fee	Total Task Fee
Task 1 - Kick Off Meeting	$8,200	$2,740	$5,440	$16,380
Task 2 - Background Document Review & Basis of Design	$7,660	$7,044	$0	$14,704
Task 3 - Develop Project Schedule	$5,010	$0	$0	$5,010
Task 4A - Comprehensive Update to 2003 Seismic Evaluation Report	$105,210	$20,036	$51,200	$176,446
Task 4B - Develop Conceptual Tower & Conduit Seismic Retrofit Design	$79,145	$14,380	$0	$93,525
Task 5 - Project Management (assume 12 month duration)	$34,225	$7,552	$5,440	$47,217
Subtotal	*$239,450*	*$51,752*	*$62,080*	*$353,282*
Markup on Subconsultants (8%)		$4,140	$4,966	$9,107
Total Estimated Fee - Option 1				***$362,389***

Option 2 Approach

Task	KPFF Fee	GeoEngineers Fee	Lettis Fee	Total Task Fee
Task 1 - Kick Off Meeting	$8,200	$2,740	$5,440	$16,380
Task 2 - Background Document Review & Basis of Design	$7,660	$7,044	$0	$14,704
Task 3 - Develop Project Schedule	$5,010	$0	$0	$5,010
Task 4A - Comprehensive Update to 2003 Seismic Evaluation Report	$105,210	$20,036	$25,960	$151,206
Task 4B - Develop Conceptual Tower & Conduit Seismic Retrofit Design	$79,145	$14,380	$0	$93,525
Task 5 - Project Management (assume 12 month duration)	$34,225	$7,552	$5,440	$47,217
Subtotal	*$239,450*	*$51,752*	*$36,840*	*$328,042*
Markup on Subconsultants (8%)		$4,140	$2,947	$7,087
Total Estimated Fee - Option 2				***$335,129***

The difference in approaches has to do with the starting point for Lettis' Seismic Hazard Analysis work.

In 2024, Lettis did a seismic hazard assessment for the Sweetwater Dam.

Option 1 assumes that they do not reuse any of their previous work to develop the hazard assessment data for the tower and conduit, and are effectively starting over from scratch.

Option 2 assumes that the Authority allows Lettis to reuse their previous study work as a baseline starting point to generate the data necessary for the tower and conduit assessment.

See attached for a detailed breakdown of KPFF's fee

Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study
Sweetwater Authority
Chula Vista, CA
Engineering Fee Estimate Schedule

Project #2400260

January 16, 2025

Work Item	*Principal*	*Sr Project Manager*	*Senior Technical Specialist*	*Senior Engineer*	*Professional Engineer*	*Design Engineer*	*Dive Technician*	*CAD Technician*	*Project Coordinator*	*Total Cost by Task*
Task 1 - Kick Off Meeting										
Meeting Preparation	1	4							4	$1,670
In Person Meeting	4	4	4						4	$3,480
Meeting Notes & Follow Up	1	8							8	$3,050
Task 2 - Background Document Review & Basis of Design										
Prepare a list of Background Documents needed		2	2							$940
Review available documentation	1	4	8							$3,110
Prepare Basis of Design Document	1	4	4		8					$3,610
Task 3 - Develop Project Schedule										
Prepare baseline project schedule	1	6							6	$2,360
Review schedule with Authority	2	2							2	$1,270
Update schedule as needed		4							4	$1,380
Task 4A - Comprehensive Update to 2003 Seismic Evaluation Report										
Coordination with GEO Engineers & Lettis to update Sesimic Hazard Study		4	8							$2,820
Prepare 3D FEM of Tower & Conduit	4	4	20		60					$17,600
Conduct Structural Evaluation of Tower & Conduit, based on updated Seismic Hazard Study	4	12	40		80					$27,780
Evaluate results of Structural Analysis & Capacity of existing structures	4	12	40		80					$27,780
QA/QC Review of Draft Report	4	4								$2,100
Prepare Draft Seismic Evaluation Report	2	4	20		40			12	8	$16,280
QA/QC Review of Final Report	2	4								$1,520
Prepare Final Seismic Evaluation Report	1	2	12		24			6	4	$9,330
Task 4B - Develop Conceptual Tower & Conduit Seismic Retrofit Design										
Design charette for Seismic Retrofit Options	4	8	8		4				4	$6,080
Develop up to 3 concepts for retrofit (to a 5% level of design)	4	16	24		40			15		$20,235
Work with the Authority to select a preferred option	1	2	2							$1,230
Develop Preferred Option to a 10% level of design	4	16	24		60			40		$27,960
Prepare ROM Cost estimate for Preferred Retrofit Option		4	4		8					$3,320
QA/QC Review of Draft Report	1	4								$1,230
Prepare Draft Conceptual Seismic Retrofit Design Report		4	20		24			4	4	$11,060
QA/QC Review of Final Report	1	4								$1,230
Prepare Final Conceptual Seismic Retrofit Design Report		4	8		16			4	4	$6,800
Task 5 - Project Management (assume 12 month duration)										
Regular Project Meetings & Meeting Notes (assume 12 meetings)	12	24	12						24	$14,580
Coordination with Subs & Authority	8	20								$7,020
Monthly Reporting/Invoicing		15							30	$6,825
Presentation to the Board or Engineering & Operations Committee	4	16							8	$5,800
Total Hours	71	221	260		444			81	114	
Fee Schedule	$290	$235	$235	$215	$180	$165	$135	$165	$110	
Sub Totals	$20,590	$51,935	$61,100		$79,920			$13,365	$12,540	$239,450

KPFF Subtotal Design Fees **$239,450**

SAN DIEGO | STRUCTURAL ENGINEERING

3131 Camino Del Rio North, Suite 1080
San Diego, CA 92108

619-521-8500

www.kpff.com @kpff_sd @kpffsd

San Diego, Long Beach, Newport Beach, Irvine, Los Angeles, San Francisco, Sacramento, Eugene, Portland, Tacoma, Lacey, Seattle, Spokane, Boise, Salt Lake City, Austin, Des Moines, Chicago, St. Louis, Birmingham, Nashville, Louisville, Cincinnati, Washington DC, New York City

2/5/2025

Authorize the General Manger to Execute a Contract with WSP USA, Inc. for an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit

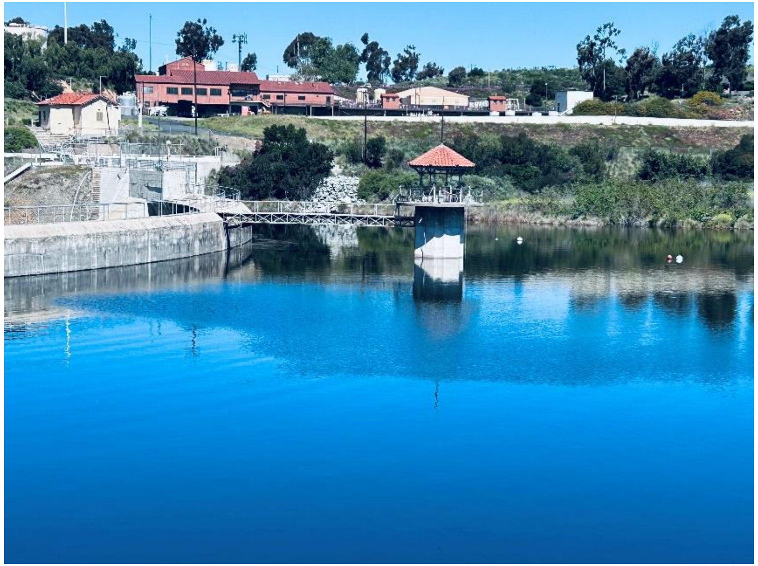
Erick Del Bosque, P.E.
Director of Engineering and Operations

Background

- The outlet tower at Sweetwater Reservoir was constructed in 1888, and was constructed out of the same masonry as the dam. It is located inside the reservoir, about 40 feet from the base of the Sweetwater Dam, and is adjacent to the lower portion of the right abutment slope. The tower is about 100 feet high, from its foundation base to the top of its circular operating platform.

- This study is part of the Sweetwater Authority's Strategic Plan Detailed Work Plan.

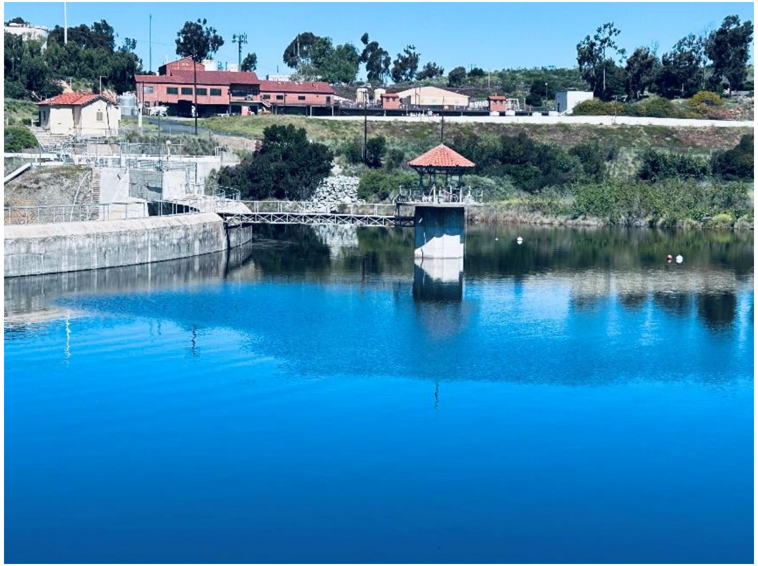
- Failure of outlet tower could cause inability to use local surface water for treatment.



Background

The objective of the study:

- Review and update the 2003 report titled “Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit”.
- Complete a conceptual level design and budgetary cost for strengthening the tower to the current governing standards (US Army Corps of Engineers, US Bureau of Reclamation, American Society of Civil Engineers).
- Compare rehabilitation cost versus the return period of the earthquake that could cause outlet tower failure
- Recommend Options - if strengthening the outlet tower is warranted based on acceptable risk. This study is not under the jurisdiction of the Division of Safety of Dams



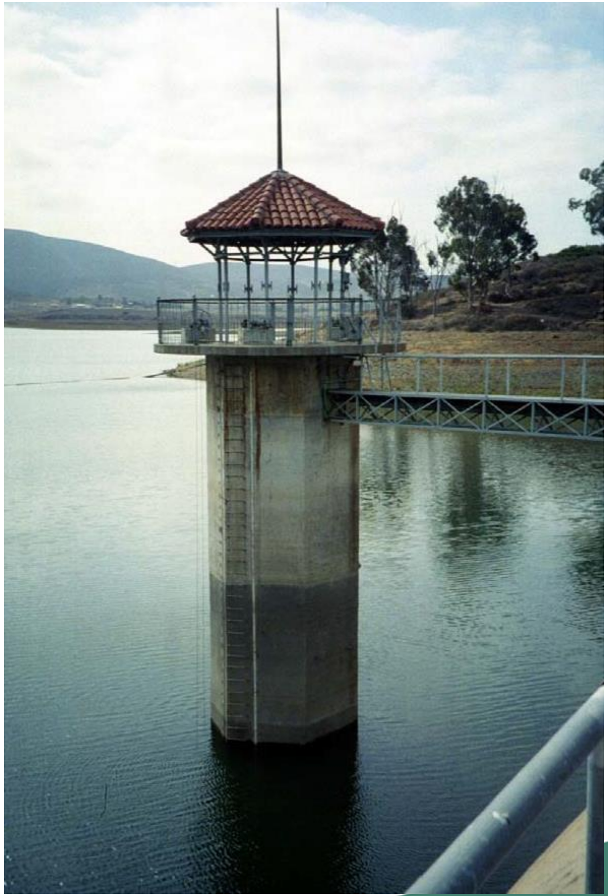
Request for Proposals

To select consultant to prepare an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower, an RFP was advertised on 12/12/24 through Planet Bids and Authority's website. Proposals were due on 1/16/2025.

Bidder	Bid Amount
WSP USA, Inc.	$286,378
KPFF Consulting Engineers	$335,129

Scope of Work:

1. Professional Engineering Services for an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit
2. Project Management and Presentations to the Governing Board



Request for Proposals

Scoring Criteria:

Category	Maximum Points	Average Score for WSP	Average Score for KPFF
Approach to complete the report	60	58	55
Completeness of proposal in addressing requested information	10	10	10
Relevant qualifications and experience of the Respondent's personnel assigned	30	30	27

Proposal from WSP was ranked highest by staff. Their proposal shows a better approach and firm's experience for the type of project being considered.

Fiscal Impact

The FY 2024-25 Budget allocated $300,000 for the Project. Funds available under account no. 10-40-400-5650.

Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit	
Total project budget	$ 300,000
WSP's proposed project cost[1)]	$286,378
Project balance:	$13,622

1) The RFP for this professional service was based on qualifications and not lowest bid; however, for informational purposes, the cost proposal from KPFF was $335,129 for Option 2. Option 1 of KPFF's proposal has a higher cost of $362,389 and it has a higher cost than Option 2 because it does not include reusing available data.

Options and Staff's Recommendation

1. Authorize the General Manager to execute a contract with WSP USA, Inc. for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $286,378.

2. Authorize the General Manager to execute a contract with KPFF Consulting Engineers for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $335,129.

3. Other direction as determined by the Governing Board.

Staff recommends Option 1

Questions?

SWEETWATER AUTHORITY

Engineering and Operations Committee
February 5, 2025

Consideration to Award a Contract for the Central Wheeler Tank Construction and System Improvements Project and Authorize Construction Related Services

RECOMMENDATION

Staff recommends that the Governing Board authorize the General Manager to do the following:

a) Award and execute a contract for the Central Wheeler Tank Construction and System Improvements Project with Canyon Springs Enterprises of Temecula, CA, for an amount of $3,866,615;
b) Allocate a five percent contingency fund in the amount of $193,331 for the Canyon Springs Enterprises construction contract;
c) Execute amendment no. 1 to the on-call construction management and inspection services contract with TKE Engineering, Inc. for an additional $340,000, for an overall not-to-exceed amount of $540,000;
d) Approve a task order for TKE for construction management services for a not-to-exceed amount of $375,360;
e) Execute amendment no. 2 to the on-call civil engineering services contract with Ardurra for an additional $50,000, for an overall not-to-exceed amount of $450,000;
f) Approve a task order for Ardurra for construction support services for a not-to-exceed amount of $99,898;
g) Approve a task order to Enterprise Automation for SCADA programming and configuration, for a not-to-exceed amount of $50,000;
h) Approve a task order to Rockwell Construction Services, LLC for SCADA construction management, for a not-to exceed amount of $44,000;
i) Execute amendment no. 1 to the on-call environmental consulting services contract with Dudek for an additional $150,000, for an overall not-to-exceed amount of $300,000; and
j) Approve a task order to Dudek for Mitigation Monitoring and Reporting Program compliance for a not-to-exceed amount of $183,183.

OVERVIEW

The Authority's previous master planning efforts identified deficiencies in water supply within the Wheeler Pressure Zone of its water distribution system. The only tank in this zone, the existing Wheeler Tank located in Bonita, is smaller than the recommended storage volume for the area to meet both maximum day demand plus fire flow demand. Additionally, the tank does not meet the structural stability requirements for seismic activity, leading to its operation at a reduced capacity. Consequently, the 2020 Water Distribution System Master Plan recommended the construction of a new 0.8 million gallon (MG) Central-Wheeler Tank (CWT) and proposed expanding the Wheeler Pressure Zone to include 187 parcels currently supplied by gravity near San Miguel Road in the communities of Bonita and Sunnyside. These areas occasionally experience water pressure issues, with pressures ranging from 30 to 50 pounds per square inch.

The selected site for the new Central-Wheeler tank is on Sweetwater Reservoir lands adjacent to Summit Meadow Road. The pipeline connecting the future tank site to the existing distribution system on San Miguel Road has been constructed in several phases:

- 2006: Installation of a 16-inch PVC pipe from San Miguel Road, beneath State Route 125, to Summit Meadow Road, covering approximately 1,460 feet.
- 2022: Installation of a 16-inch PVC pipe on Summit Meadow Road, approximately 290 feet, linking to the pipeline constructed in 2006.
- 2024: Installation of a 16-inch PVC pipe in San Miguel Road, approximately 1,000 feet, connecting the end of the existing distribution system to the segment installed in 2006.

See Attachment 1 for detailed locations of the pipeline and tank site.

The design for the tank pad, the drainage pipeline to Sweetwater Reservoir, the remaining 100 linear feet of pipeline, and a chlorine residual control system have been developed. Once the Central Wheeler Tank construction is complete, the pressure zone conversion will be implemented for the 187 parcels on San Miguel Road currently served by the gravity system. This conversion will enhance water pressure levels, ranging from 55 to 75 psi, and will require the installation of a pressure reducing valve for each connection, to be owned and operated by the property owner. Pressure reducing valves are not part of the design package prepared for bids and those would be installed by one of the Authority's on-call contractors.

Mitigation Monitoring and Reporting Program

At its April 14, 2021 meeting, the Board adopted a Mitigated Negative Declaration and a Mitigation Monitoring and Reporting Program (MMRP) for the project, ensuring compliance with the California Environmental Quality Act (CEQA). The MMRP for the project is included as Attachment 2. Compliance with the MMRP is mandatory during the construction phase.

Advertisement and Bids

Upon completion of the Contract Documents, the Project was advertised for bids on November 22, 2024, through PlanetBids, Star News, and the Authority's website. A mandatory pre-bid site walk was held on December 16, 2024, with six prospective prime contractors in attendance. Bids were accepted electronically through PlanetBids to increase accessibility and interest among prospective bidders who might not be able to submit a paper bid in person. The deadline for bid submissions was January 17, 2025. Four bids were received and are outlined below, compared to Ardurra's Opinion of Probable Construction Cost (OPCC) which is estimated at $3,967,661.

BIDDING CONTRACTOR	BID AMOUNT
Canyon Springs Enterprises	$ 3,866,615
Covenant Technical Solutions	$ 4,649,140
Pacific tank & Construction, Inc.	$ 5,253,474
Innovative Construction Solutions	$ 5,820,000

Canyon Springs Enterprises submitted the lowest bid that was both responsive and responsible. They hold a Class A general contractor's license in good standing and have successfully completed similar water system construction projects for other public entities. Based on these qualifications, staff recommends that the Board award the contract to Canyon Springs Enterprises. A bid tabulation of all submissions is provided as Attachment 3. The contract documents require the selected contractor to complete the project within 486 calendar days of receiving a Notice to Proceed (NTP), inclusive of materials' lead time estimated at 150 calendar days, placing the project completion in fourth quarter of FY 2025-26. Once a NTP is issued, the contractor is required to submit a project schedule, which will indicate the construction period duration.

Additional Services needed during Construction

Additional professional services including construction management, inspection, and SCADA services are required for the Project. Consequently, staff sought proposals from our on-call construction management consultants. TKE Engineering, Inc. (TKE) and Project Professionals Corporation (PPC). PPC did not submit a proposal due to their current workload. TKE, who is familiar with the Project, after conducting a constructability review initially submitted a proposal for construction management services of $474,585. After staff negotiated with TKE and clarified the anticipated lead times for materials and construction duration the proposal was reduced to a not to exceed amount of $375,360 (Attachment 4). Staff is also proposing amending the on-call agreement amount with TKE to accommodate this effort. The increase amount for TKE's agreement is detailed in the Fiscal Impact Section.

Proposals were also requested from on-call SCADA consultants, Enterprise Automation (EA) and Rockwell Construction Services, LLC, to handle SCADA programming/configuration and construction management oversight for SCADA, respectively. EA implemented the Authority's SCADA system and prepared the SCADA standards that need to be implemented, and currently maintain the SCADA system. The Authority does not have any other on-call consultants to provide SCADA programming/configuration and SCADA construction management services, respectively. Enterprise Automation had submitted a budgetary estimate for SCADA programming and configuration costing $50,000 (previously approved by the Board on June 26, 2024), and Rockwell has proposed $44,000 for SCADA construction management (Attachment 5).

Additionally, to ensure ongoing support from the Engineer of Record, a proposal was requested from Ardurra. Ardurra's proposed amount for construction support services was $121,756. After staff negotiated with Ardurra and clarified the anticipated lead times for materials and construction duration, the proposal was reduced to a not to exceed amount of $99,898 (Attachment 6). The proposed changes to the not-to-exceed amounts for Ardurra's agreement are also detailed in the Fiscal Impact Section.

In compliance with CEQA requirements for the Project, staff requested proposals from three on-call environmental consultants. The proposals covered the scope of preliminary site work monitoring and overall environmental compliance with the MMRP during tank construction.

The proposals received are summarized in Table 1.

Table 1: Proposals Received from the On-call Environmental Consulting Vendors for Compliance with the CWT MMRP

Consultant	Total
Dudek	$183,182.30
AECOM Technical Services, Inc.	$260,606.60
Tetra Tech, Inc.	$266,993.00

Based on review of proposals, Dudek has provided the lowest quote, $183,182.30, with a satisfactory proposal that understands the required tasks and subtasks as presented below:

- Information Gathering and Pre-Construction Surveys
- Construction Monitoring MMRP including worker sensitivity training, weekly nest surveys, archeological/paleontological/Native American monitoring

Dudek's proposal also includes two optional tasks for a revegetation plan and post-construction site revegetation, for a total of $41,445. However, staff does not recommend including these tasks because they would be handled by the construction contractor as part of their required Stormwater Pollution Prevention Plan to address temporary impacts to vegetation. The proposed changes to the not-to-exceed amounts for Dudek's agreement are also detailed in the Fiscal Impact Section. The submitted proposal from Dudek is included as Attachment 7.

Staff recommends authorizing the General Manager to approve task orders for all five consultants.

FISCAL IMPACT

The FY 2024-25 Budget for the Capital Investment Project Central-Wheeler Tank Construction and System Improvements is $6,416,000. Canyon Springs Enterprises provided the lowest, responsive, and responsible construction bid of $ 3,866,615. Additional costs required to complete the Project will cover construction contingency, internal labor, as well as fees for pressure zone conversion for 187 parcel locations, construction management and support, and compliance with the MMRP. The fiscal impact of these expenses is detailed in the table below:

Central Wheeler Tank Construction and System Improvements (20014016)	
FY 2023-2024 carried over for the Project	$2,416,000
Budget transfer from Sweetwater Dam Improvements (20114012)	$4,000,000

Central Wheeler Tank Construction and System Improvements (20014016)	
Total project budget	$6,416,000
Less design and expense to date	<812,303>
Available Project balance:	$5,603,697
Less project costs:	
Construction contract amount	<3,866,615>
Construction contingency, 5%	<193,331>
Construction Management and Inspection (TKE)	<375,360>
Construction Support-Engineer of Record (Ardurra)	<99,898>
SCADA Programming/Configuration (Enterprise Automation)	<50,000>
SCADA Construction Management (Rockwell)	<44,000>
MMRP Compliance (Dudek)	<183,183>
Pressure Zone Conversion, 187 Locations*	<252,450>
Project budget balance	$538,860

* Estimated cost for each pressure conversion is $1,350 including labor and materials.

The proposed amendment of the existing on-call contract with TKE is as follows

TKE's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$200,000
Proposed Increase	340,000
Proposed not-to-exceed amount	$540,000
Less Cost:	
Central Wheeler Tank-Constructability Review	<9,725>
Tank Rehabilitation 2025-Constructibility Review	<11,365>
Deep Anode Well Replacement-CM/Inspection	<38,400>
General as-needed engineering costs expended	<59,490)

TKE's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Proposed CM Services for Central Wheeler Tank	**<375,360>**
Balance of contract available for other as-needed projects outlined in original agreement	$105,450*

* TKE's 2025 Tank Rehabilitation Program CM proposal with the estimated fee of $98,000 is currently under review.

The proposed amendment of the existing on-all contract with Ardurra is as follows.

Ardurra's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$400,000
Proposed Increase	50,000
Proposed not-to-exceed amount	$450,000
Less Cost:	
Central Wheeler Tank-Design Services	<149,853>
Evaluate the Perdue Water Treatment Plant Clearwell	<190,623>
General as-needed engineering costs expended	<340,476>
Proposed Construction Support for Central Wheeler Tank	**<$99,898>**
Balance of contract available for other as-needed projects outlined in original agreement	$9,626

The proposed amendment of the existing on-call environmental services contract with Dudek is as follows.

Dudek's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$150,000
Proposed Increase	150,000
Proposed not-to-exceed amount	$300,000
Less Cost:	

Dudek's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Proposed Construction Support for Central Wheeler Tank	**<$183,183>**
Balance of contract available for other as-needed projects outlined in original agreement	$116,817

Options

1. Authorize the General Manager to do the following:
    a) Award and execute a contract for the Central Wheeler Tank Construction and System Improvements Project with Canyon Springs Enterprises of Temecula, CA, for an amount of $3,866,615;

    b) Allocate a five percent contingency fund in the amount of $193,331 for the Canyon Springs Enterprises construction contract;
    c) Execute amendment no.1 to the on-call construction management and inspection services contract with TKE Engineering, Inc. for an additional $340,000, for an overall not-to-exceed amount of $540,000;
    d) Approve a task order for TKE for construction management services for a not-to-exceed amount of $375,360;
    e) Execute amendment no. 2 to the on-call civil engineering services contract with Ardurra for an additional $50,000, for an overall not-to-exceed amount of $450,000;
    f) Approve a task order for Ardurra for construction support services for a not-to-exceed amount of $99,898;
    g) Approve a task order to Enterprise Automation for SCADA programming and configuration, for a not-to-exceed amount of $50,000;
    h) Approve a task order to Rockwell Construction Services, LLC for SCADA construction management, for a not-to exceed amount of $44,000;
    i) Execute amendment no.1 to the on-call environmental consulting services contract with Dudek for an additional $150,000, for an overall not-to-exceed amount of $300,000; and
    j) Approve a task order to Dudek for Mitigation Monitoring Reporting Program compliance for a not-to-exceed amount of $183,183.

2. Other direction as determined by the Governing Board.

Staff Contact:
Carlos Quintero, General Manager
Roberto Yano, Assistant General Manager

Erick Del Bosque, Director of Engineering and Operations
Kay Kim, Engineering Manager

SUPPORTING INFORMATION

Attachments

1. Project Location Map
2. Mitigation Monitoring and Reporting Program
3. Bid Summary
4. TKE-CM and Inspection Proposal
5. Rockwell- SCADA CM Proposal
6. Ardurra-Construction Support Proposal
7. Dudek-Environmental Monitoring Proposal
8. Staff Presentation

Strategic Plan

Strategic Plan Goal 2: System and Water Supply Reliability (SR) – Achieve an uninterrupted, long-term water supply through investment, maintenance, innovation and developing local water resources.

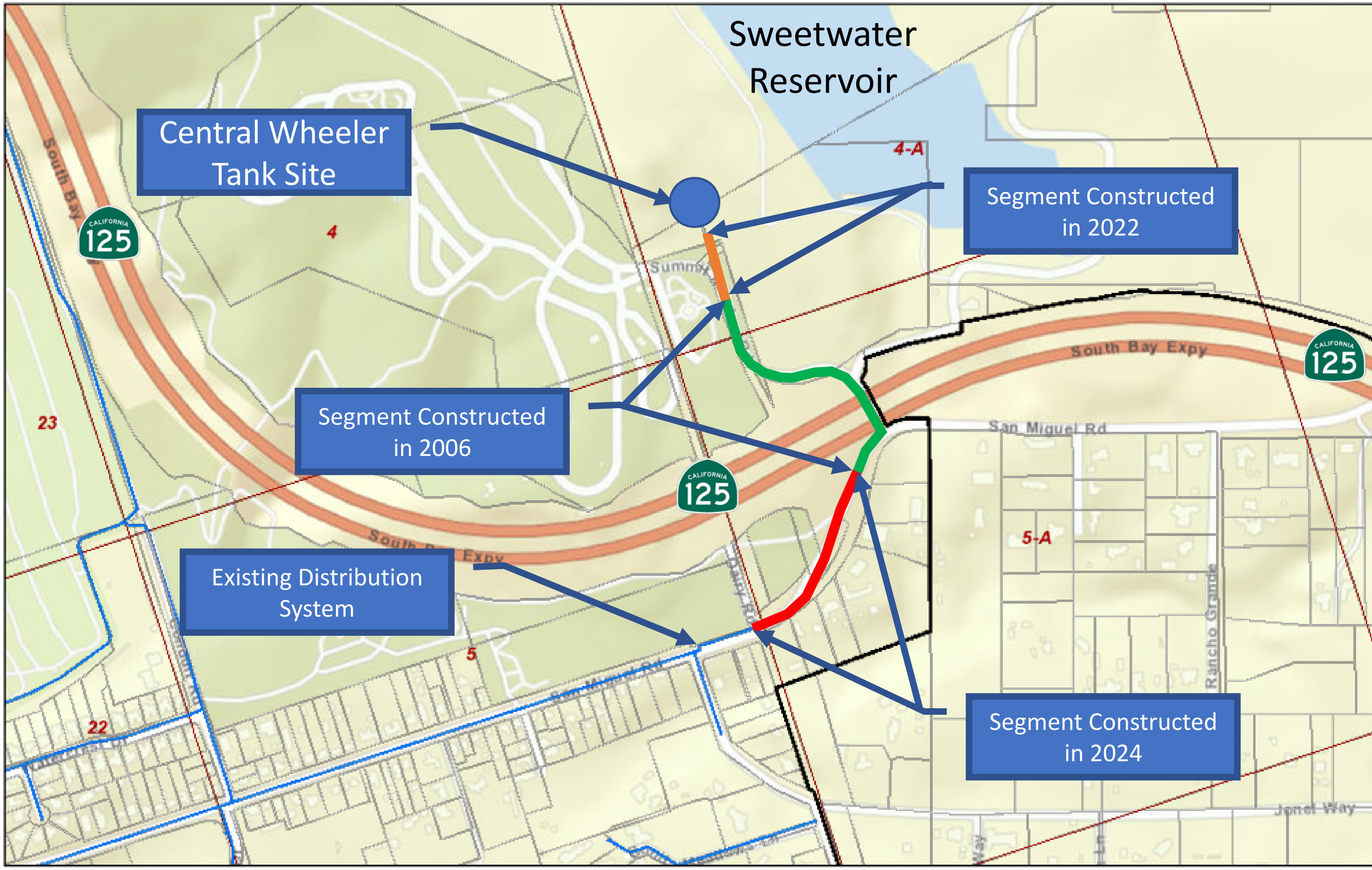
- Objective SR1: Implement the following recommendations of the current Water Distribution Master Plan: FY 2024-25 pipeline replacements and new pipelines for capacity, reliability and redundancy; additional water storage capacity in deficient zones; and develop Standard Operating Procedure for the AC Pipe Testing Program, per approved Fiscal Year Budget.
  - Task 001.00: Complete design, advertise for bids, and construct new Central-Wheeler Tank (carryover budget).

Past Board Actions

November 13, 2024	The Board authorized the General Manager to execute an amendment to the on-call agreement for engineering services with Ardurra for an additional $200,000 resulting in a total not-to-exceed amount of $400,000.
November 13, 2024	The Board authorized e the General Manager to execute On-call Environmental Consulting Services contracts with Aecom Technical Services, Dudek, and Tetra Tech Inc., with each contact having a one-year duration with options for the General Manager to execute four additional annual renewals based on satisfactory performance, and with each contract having a not-to-exceed limit of $150,000 for the contract duration.
June 26, 2024	The Board awarded the following contracts: $316,500 for SCADA Design Consulting to Rockwell Construction Services, Vista, CA; and $656,400 for SCADA Integration to Enterprise Automation, Irvine, CA, for the FY 2024-25 SCADA Expense and Capital Projects.
May 22, 2024	The Board authorized the General Manager to execute on-call construction management and inspection consulting services contracts with TKE Engineering, Inc. of San Diego, CA, for a not-to-exceed amount of $200,000, for a twelve-month

	period from the date of the agreement execution, with four one-year possible extensions subject to future board approval.
January 29, 2024	The Board authorized the General Manager to approve a task order for Ardurra Group, Inc. to perform engineering design services for the New Central Wheeler Tank for a not-to-exceed amount of $149,853.
June 28, 2023	The Board adopted Resolution 23-13, adopting a Budget for FY 2023-24.
April 14, 2021	The Board adopted Resolution 21-07, adopting a Mitigated Negative Declaration and a Mitigation Monitoring and Reporting Program under the California Environmental Quality Act for the Central-Wheeler Tank and Systems Improvements Project, and Approved the Project.

Location Map: Central Wheeler Tank and System Improvements



Service Area Boundary
WaterMain
Main
Raw Water Main
Initial Design
Quarter Section Grid
Parcels with Pressure
ServiceAreaParcels

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

Web AppBuilder for ArcGIS

Attachment: Central Wheeler Tank Mitigation Monitoring and Reporting Program

SECTION 5
Mitigation Monitoring and Reporting Program

The Mitigation Monitoring and Reporting Program (MMRP) for the proposed Project has been prepared in accordance with Public Resources Code Section 21081.6 and State CEQA Guidelines Section 15091(d). Sweetwater Authority (Authority) will use this MMRP to track compliance with the Project mitigation measures. Authority will consider the MMRP during the certification hearing for the Mitigated Negative Declaration (MND). The MMRP will incorporate all mitigation measures adopted for the proposed Project.

This MMRP summarizes potentially significant impacts and mitigation commitments identified in the Central Wheeler Tank and System Improvements Project MND. **Table 5-1** provides the MMRP which includes all mitigation measures, monitoring/reporting action, monitoring timing, and responsible person(s) for implementation. Impacts and mitigation measures are presented in the same order as in the MND. The columns in the table provide the following information:

- **Mitigation Measures:** The action(s) that will be taken to reduce the impact to a less-than-significant level.
- **Monitoring/ Reporting Action:** This column outlines the appropriate steps to implement and verify compliance with the mitigation measures.
- **Monitoring Timing:** This column indicates the general schedule for conducting each monitoring task, either prior to construction, during construction, and/or after construction.
- **Responsible Person(s):** This column lists the agency responsible for ensuring implementation of the mitigation measure.

TABLE 5-1
MITIGATION MONITORING AND REPORTING PROGRAM – CENTRAL-WHEELER TANK AND SYSTEM IMPROVEMENT PROJECT

Mitigation Measure	Monitoring / Reporting Action	Monitoring Timing	Responsible Person(s)
Biological Resources			
BIO-1: If construction initiation occurs between February 1 and September 15, a pre-construction nesting bird and raptor survey of the proposed Project area shall be completed by a qualified biologist. If any active nests are detected, the area will be flagged and mapped on construction plans along with a buffer as recommended by the qualified biologist. The buffer area(s) established by the qualified biologist will be avoided until the nesting cycle is complete or it is determined that the nest is no longer active. The qualified biologist shall be a person familiar with bird breeding behavior and capable of identifying the bird species of San Diego County by sight and sound and determining alterations of behavior as a result of human interaction. Buffers will be based on local topography and line of sight, species behavior and tolerance to disturbance, and existing disturbance levels.	Site Survey	Prior to Construction	Authority
BIO-2: Prior to initiation of project clearing, grading, grubbing, or other construction activities, a pre-construction survey for the presence of California gnatcatcher to verify species absence shall be conducted. If present in the project construction footprint or immediate surrounding area (up to 300 feet), coordination with USFWS and CDFW shall occur to establish measures to reduce potential impacts to California gnatcatcher. Such measures may include but are not limited to: delay of construction until the species is no longer present after the breeding season, implementation of noise reduction techniques, or monitoring to ensure the species is not harmed during project implementation.	Site Survey Site Monitoring	Prior to Construction During Construction	Authority Construction Contractor
BIO-3: Prior to initiation of project clearing, grading, grubbing, or other construction activities, pre-construction surveys for the presence of burrowing owl to verify species absence shall be conducted. The pre-construction surveys shall follow the take avoidance survey methods outlined in the *2012 CDFW Staff Report on Burrowing Owl Mitigation*. The first survey shall be conducted prior to 30 days of initial site disturbance, and the second survey shall occur within 24 hours of initial site disturbance. Subsequent pre-construction surveys will be required if lapses in the project occur exceeding 72 hours. If present in the project construction footprint or immediate surrounding area, coordination with CDFW shall occur to establish measures to avoid potential impacts to burrowing owl. Such measures may include but are not limited to: construction avoidance until the species is no longer present after the breeding season, installation of one-way burrow exclusion devices, construction of alternate burrow sites in the nearby vicinity prior construction, or monitoring to ensure the species is not harmed during project implementation. Loss of foraging habitat would be compensated as described in BIO-4.	Site Survey	Prior to Construction During Construction	Authority Construction Contractor
BIO-4: Permanent impacts to 0.52 acre of non-native grassland shall be mitigated at a 1:1 ratio. Mitigation for permanent impacts shall be accomplished through preservation at the Authority's existing Skelton Habitat Mitigation Area or similar site on Authority property. Temporary impacts to 0.14 acre of non-native grassland shall be mitigated at a 1:1 ratio. Mitigation for temporary impacts shall be accomplished through on-site revegetation. Prior to initiating project impacts, a habitat revegetation plan will be developed to lay forth methods for re-seeding and re-vegetating temporarily disturbed areas with suitable native species. In this, temporary impacts to disturbed habitat would be revegetated with a grassland or coastal sage scrub plant pallet, as appropriate and based on the finished site conditions and adjacent habitat types. Re-vegetation shall occur at the conclusion of construction activities, per the methodologies set forth in the revegetation plan. Additionally, an inspection for Otay tarplant during the appropriate blooming season (i.e. May – June) is recommended to verify absence in the proposed Project footprint areas only in the same year as construction. If present, contact the USFWS and CDFW to secure permitting as necessary. Unavoidable impacts should be mitigated in the form of permanent conservation and management of	Plan Preparation Site Survey	Prior to Construction Post-Construction	Authority

MITIGATION MONITORING AND REPORTING PROGRAM (CONTINUED)

Mitigation Measure	Monitoring / Reporting Action	Monitoring Timing	Responsible Person(s)
similar occupied or potential Otay tarplant habitat on the Reservoir property at a ratio to be agreed on with USFWS and/or CDFW. The conserved mitigation area may require restoration if Otay tarplant is lacking and can also co-occur with any mitigation for permanent habitat loss from the proposed Project.			
Cultural Resources			
CR-1: Worker Sensitivity Training. Prior to the start of ground-disturbing activities, the Applicant shall retain a Qualified Archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (U.S. Department of the Interior 2008) to carry out all mitigation related to cultural resources. Prior to the start of ground disturbing activities, all construction personnel shall be trained to identify the types of cultural resources that may be encountered during Project implementation. These include both prehistoric and historic period archaeological resources. In addition to cultural resources recognition, the training shall convey procedures to follow in the event of a potential cultural resources discovery, including notification procedures. The training shall be provided by the Qualified Archaeologist or an archaeologist working under their supervision.	Personnel Training	Prior to Construction During Construction	Authority Construction Contractor
CR-2: Construction Monitoring. An archaeological monitor (working under the direct supervision of the Qualified Archaeologist) and a Native American monitor shall observe all project-related ground-disturbing activities including but not limited to brush clearance, vegetation removal, grubbing, and grading. The Qualified Archaeologist, in coordination with the Authority and the Native American monitor(s), may reduce or discontinue monitoring if it is determined that the possibility of encountering buried archaeological deposits is low based on observations of soil stratigraphy or other factors. This may be particularly true for the portion of the project being constructed within San Miguel Rd. Archaeological monitoring shall be conducted by an archaeologist familiar with the types of archaeological resources that could be encountered within the Project. The Native American monitor shall be from a tribe that is culturally and geographically affiliated with the Kumeyaay tribe. The archaeological and Native American monitors shall be empowered to halt or redirect ground-disturbing activities away from the vicinity of a discovery until the Qualified Archaeologist has evaluated the discovery, consulted with the Authority, and determined appropriate treatment (as prescribed in CR-3). The archaeological monitor shall keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the archaeologist shall prepare a monitoring report that details the results of monitoring. The report shall be submitted to the Authority and any Native American groups who request a copy. The Qualified Archaeologist shall also submit a copy of the final report to the California Historic Resources Information System South Coastal Information Center.	Site Monitoring	During Construction	Authority Construction Contractor
CR-3: Protocols for Unanticipated Discoveries. If cultural resources are encountered during Project implementation, all activity within 50 feet of the find should cease until the find can be evaluated by the Qualified Archaeologist. If the Qualified Archaeologist determines that the resource may be significant, he or she will notify the Authority and develop an appropriate treatment plan for the resource. The Authority shall consult with the Native American monitor or other appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources if the resources are prehistoric and Native American in nature. In considering any suggested measures proposed by the archaeologist to mitigate impacts to archaeological resources, the Authority will determine whether avoidance is feasible in light of factors such as the nature of the find, Project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures will be instituted, which could	Site Monitoring	During Construction	Authority Construction Contractor

MITIGATION MONITORING AND REPORTING PROGRAM (CONTINUED)

Mitigation Measure	Monitoring / Reporting Action	Monitoring Timing	Responsible Person(s)
include, among other options, detailed documentation, or data recovery excavation. Work may proceed on other parts of the Project area while mitigation for cultural resources is being carried out.			
Geology and Soils			
GEO-1: Implement SWPPP. A Storm Water Pollution Prevention Plan (SWPPP), in compliance with the Statewide Construction General Permit, shall be prepared and implemented during construction activities to help prevent and minimize, to the maximum extent practicable, stormwater and non-stormwater pollution resulting from the construction activities. The SWPPP shall be prepared by a Qualified SWPPP Developer, and include erosion and sediment controls, and stormwater and non-stormwater Best Management Practices (BMPs).	Plan Preparation Site Monitoring	During Construction	Authority Construction Contractor
GEO-2: Worker Sensitivity Training. Prior to the start of ground disturbing activities, all construction personnel shall be trained to identify the types of paleontological resources that may be encountered during Project implementation. The training may be provided during the archaeological sensitivity training conducted pursuant to Mitigation Measure CR-1. Documentation shall be retained demonstrating that all construction personnel attended the training.	Personnel Training Site Monitoring	Prior to Construction During Construction	Authority Construction Contractor
GEO-3: Paleontological Monitoring. Paleontological resources monitoring shall be conducted for excavation activities occurring in previously undisturbed sediments within the Project site (i.e. CWT site). Monitors shall have the authority to temporarily halt or divert work away from exposed fossils of significance in order to recover the fossil specimens. Monitors shall prepare daily logs detailing the types of activities and soils observed, and any discoveries.	Site Monitoring	During Construction	Authority Construction Contractor
GEO-4: Fossil Discovery. If personnel or workers discover any potential fossils during Project implementation, regardless of the depth of work or location, work at the discovery location shall cease in a 50-foot radius of the discovery until the Qualified Paleontologist has assessed the discovery, consulted with the Authority, and made recommendations as to the appropriate treatment.	Site Monitoring	During Construction	Authority Construction Contractor
Hydrology and Water Quality			
HYD-1: Compliance with Drinking Water System Discharges Statewide General Permit. Discharges of treated drinking water from the Central Wheeler Tank into the Sweetwater Reservoir shall comply with Statewide General Permit for Drinking Water System Discharges to Waters of the U.S. The Authority shall be responsible for ensuring that the appropriate BMPs and monitoring and reporting requirements are followed. Each individual discharge must be logged and the BMPs shall be recorded and verified. Mandatory Permit BMPs include de-chlorination of the discharge water, and implementing sediment, erosion, and turbidity control as necessary.	Site Monitoring	During Construction	Authority
Noise			
NOISE-1: To reduce noise impacts due to construction, construction contractors shall implement the following measures: • Construction activities shall be limited to between 7 a.m. and 7 p.m. Monday through Friday to avoid noise-sensitive hours of the day, unless special circumstances require work outside these hours. Construction activities shall be prohibited on weekends and holidays. • The contractor shall ensure that all construction equipment, fixed or mobile, are equipped with properly operating and maintained noise shielding and muffling devices, consistent with manufacturers' standards. The contractor shall use muffler systems (e.g. absorptive mufflers) that	Noise Reduction Measures Notification Site Monitoring	Prior to Construction During Construction	Authority Construction Contractor

MITIGATION MONITORING AND REPORTING PROGRAM (CONTINUED)

Mitigation Measure	Monitoring / Reporting Action	Monitoring Timing	Responsible Person(s)
provide a minimum reduction of 5 dBA compared to the same equipment without an installed muffler system, reducing maximum construction noise levels. The contractor shall keep documentation on-site demonstrating that the equipment has been maintained in accordance with the manufacturers' specifications. The contractor shall also keep documentation on-site verifying compliance with this measure. • The contractor shall limit engine idling of construction equipment not actively in use (e.g. haul trucks, loaders, etc.) to a minimum of 95 feet from any boundary of the nearest sensitive receptors. • Prior to commencement of construction activities, the Authority shall notify in writing adjacent residents and businesses near the various project sites, of proposed construction activities and the tentative schedule.			
Recreation			
REC-1: Prior to construction, Sweetwater Authority shall install fencing and signage to secure the construction sites and to provide detours to temporary closed trials and fishing areas. The following actions shall be implemented: - Install construction fencing and signs to keep trail users and anglers out of all construction areas; - Establish and maintain temporary trail detours during construction activities, as necessary, in coordination with COSD Parks and Recreation staff; - Restrict construction vehicle speeds to 10 miles per hour when driving on the trail or trail crossings, and require that construction vehicles come to a complete stop when trail users are encountered; - Maintain access to the Fishing Program to the greatest extent possible while maintaining construction site safety.	Fence/Sign Installation Traffic Control	Prior to Construction During Construction	Authority Construction Contractor

SWEETWATER AUTHORITY
BID OPENING SUMMARY
PROJECT: CENTRAL WHEELER TANK CONSTRUCTION AND SYSTEM IMPROVEMENTS (20014016)
1/17/2025

				Engineer's Estimate for Construction Cost		Bid-1: Lowest Responsive Bidder Canyon Springs Enterprises		Bid-2 Covenant Technical Solutions		Bid-3 Innovative Construction Solutions		Bid-4 Pacific Tank & Construction, Inc.	
No.	**Item**	**Quantity**	**Unit**	**Unit Cost**	**Line Total**	**Unit Cost**	**Total**	**Unit Cost**	**Total**	**Unit Cost**	**Total**	**Unit Cost**	**Total**
General Cost					**$ 497,328.00**		**$ 535,000.00**		$ 688,000.00		$ 880,610.00		$ 705,137.00
1	Mobilization and Demobilization	1	LS	$ 191,328.00	$ 191,328.00	$ 150,000.00	$ 150,000.00	$ 260,000.00	$ 260,000.00	$ 350,000.00	$ 350,000.00	$ 311,333.00	$ 311,333.00
2	Electrical and I&C Costs	1	LS	$ 270,000.00	$ 270,000.00	$ 355,000.00	$ 355,000.00	$ 400,000.00	$ 400,000.00	$ 500,610.00	$ 500,610.00	$ 365,860.00	$ 365,860.00
3	Corrosion Protection Cost	1	LS	$ 36,000.00	$ 36,000.00	$ 30,000.00	$ 30,000.00	$ 28,000.00	$ 28,000.00	$ 30,000.00	$ 30,000.00	$ 27,944.00	$ 27,944.00
New Water Tank Pipelines					**$ 566,585.45**		**$ 550,665.00**		$ 759,650.00		$ 746,125.00		$ 927,723.00
4	Trench Excavation	234	CY	$ 48.00	$ 11,232.00	$ 50.00	$ 11,700.00	$ 400.00	$ 93,600.00	$ 390.00	$ 91,260.00	$ 580.00	$ 135,720.00
5	Trench Zone-Subgrade (t=6")	24	CY	$ 104.40	$ 2,505.60	$ 250.00	$ 6,000.00	$ 300.00	$ 7,200.00	$ 760.00	$ 18,240.00	$ 339.00	$ 8,136.00
6	Trench Zone-Backfill Material	43	CY	$ 67.96	$ 2,922.11	$ 60.00	$ 2,580.00	$ 350.00	$ 15,050.00	$ 1,250.00	$ 53,750.00	$ 581.00	$ 24,983.00
7	Pipe Zone-Sand Backfill	140	CY	$ 59.80	$ 8,371.44	$ 40.00	$ 5,600.00	$ 430.00	$ 60,200.00	$ 360.00	$ 50,400.00	$ 757.00	$ 105,980.00
8	Warning Tape	4	EA	$ 380.40	$ 1,521.60	$ 65.00	$ 260.00	$ 100.00	$ 400.00	$ 1,200.00	$ 4,800.00	$ 813.00	$ 3,252.00
9	Shoring	1	LS	$ 24,000.00	$ 24,000.00	$ 9,000.00	$ 9,000.00	$ 15,000.00	$ 15,000.00	$ 20,000.00	$ 20,000.00	$ 6,160.00	$ 6,160.00
10	Hydrostatic Testing of Pressure Pipeline	1	LS	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 12,430.00	$ 12,430.00
11	16-inch C900 PVC Pipe (DR 18)	100	LF	$ 411.84	$ 41,184.00	$ 340.00	$ 34,000.00	$ 150.00	$ 15,000.00	$ 400.00	$ 40,000.00	$ 542.00	$ 54,200.00
12	16-inch SDR 35 Overflow Pipe	650	LF	$ 193.06	$ 125,486.40	$ 100.00	$ 65,000.00	$ 125.00	$ 81,250.00	$ 110.00	$ 71,500.00	$ 145.00	$ 94,250.00
13	12-inch Sch 80 PVC Interior Tank Pipe & Fitting	110	LF	$ 444.60	$ 48,906.00	$ 500.00	$ 55,000.00	$ 445.00	$ 48,950.00	$ 400.00	$ 44,000.00	$ 266.00	$ 29,260.00
14	12-inch Flex Tend Fittings	2	EA	$ 25,326.00	$ 50,652.00	$ 19,000.00	$ 38,000.00	$ 20,000.00	$ 40,000.00	$ 15,000.00	$ 30,000.00	$ 27,610.00	$ 55,220.00
15	12-inch Check Valve	2	EA	$ 15,390.00	$ 30,780.00	$ 11,000.00	$ 22,000.00	$ 11,000.00	$ 22,000.00	$ 9,500.00	$ 19,000.00	$ 9,020.00	$ 18,040.00
16	12-inch Custom Steel Bend	2	EA	$ 2,407.50	$ 4,815.00	$ 7,500.00	$ 15,000.00	$ 5,000.00	$ 10,000.00	$ 4,400.00	$ 8,800.00	$ 10,560.00	$ 21,120.00
17	12-inch Steel Fittings	18	EA	$ 1,398.60	$ 25,174.80	$ 6,500.00	$ 117,000.00	$ 4,400.00	$ 79,200.00	$ 5,000.00	$ 90,000.00	$ 8,800.00	$ 158,400.00
18	12-inch Butterfly Valve	3	EA	$ 6,237.00	$ 18,711.00	$ 5,500.00	$ 16,500.00	$ 7,000.00	$ 21,000.00	$ 7,400.00	$ 22,200.00	$ 8,250.00	$ 24,750.00
19	12-inch Gate vavle	1	EA	$ 8,019.00	$ 8,019.00	$ 6,500.00	$ 6,500.00	$ 21,000.00	$ 21,000.00	$ 6,000.00	$ 6,000.00	$ 12,650.00	$ 12,650.00
20	12-inch Victaulic Couplings	2	EA	$ 1,598.40	$ 3,196.80	$ 1,500.00	$ 3,000.00	$ 400.00	$ 800.00	$ 1,850.00	$ 3,700.00	$ 990.00	$ 1,980.00
21	2-inch CARV Assembly	2	EA	$ 3,708.00	$ 7,416.00	$ 6,700.00	$ 13,400.00	$ 3,500.00	$ 7,000.00	$ 3,000.00	$ 6,000.00	$ 10,010.00	$ 20,020.00
22	4-inch BO Valve Assembly	1	EA	$ 8,406.00	$ 8,406.00	$ 7,000.00	$ 7,000.00	$ 15,000.00	$ 15,000.00	$ 5,000.00	$ 5,000.00	$ 10,450.00	$ 10,450.00
23	16-inch Wafer in-Line Check Valves	2	EA	$ 11,988.00	$ 23,976.00	$ 12,000.00	$ 24,000.00	$ 9,500.00	$ 19,000.00	$ 13,000.00	$ 26,000.00	$ 12,532.00	$ 25,064.00
24	12-inch duckbill Check Valve	4	EA	$ 9,144.00	$ 36,576.00	$ 4,500.00	$ 18,000.00	$ 4,500.00	$ 18,000.00	$ 7,800.00	$ 31,200.00	$ 3,687.00	$ 14,748.00
25	Pipe Supports	16	EA	$ 3,607.20	$ 57,715.20	$ 1,500.00	$ 24,000.00	$ 5,500.00	$ 88,000.00	$ 1,600.00	$ 25,600.00	$ 890.00	$ 14,240.00
26	Irrigation Pump and Appurtenances	1	EA	$ 12,339.00	$ 12,339.00	$ 45,000.00	$ 45,000.00	$ 56,000.00	$ 56,000.00	$ 50,000.00	$ 50,000.00	$ 75,570.00	$ 75,570.00
27	#12 UF Locator Wire (100LF Section)	5	LS	$ 135.90	$ 679.50	$ 25.00	$ 125.00	$ 200.00	$ 1,000.00	$ 735.00	$ 3,675.00	$ 220.00	$ 1,100.00
Construct Asphalt Pavement					**$ 124,257.96**		**$ 213,240.00**		$ 138,000.00		$ 445,710.00		$ 298,120.00
28	4-inch Asphalt Concrete	270	SY	$ 96.30	$ 26,001.00	$ 290.00	$ 78,300.00	$ 200.00	$ 54,000.00	$ 190.00	$ 51,300.00	$ 169.00	$ 45,630.00
29	6-inch Class 2 Aggregate Base	140	CY	$ 67.42	$ 9,438.24	$ 220.00	$ 30,800.00	$ 600.00	$ 84,000.00	$ 250.00	$ 35,000.00	$ 216.00	$ 30,240.00
30	60-inch Engineering Fill	1270	CY	$ 69.94	$ 88,818.72	$ 82.00	$ 104,140.00	$ -	$ -	$ 283.00	$ 359,410.00	$ 175.00	$ 222,250.00
Construct PCC Pavement					**$ 27,339.36**		**$ 64,485.00**		$ 116,500.00		$ 93,550.00		$ 103,045.00
31	6-inch Portland Cement Concrete	30	SY	$ 442.02	$ 13,260.60	$ 866.00	$ 25,980.00	$ 1,800.00	$ 54,000.00	$ 400.00	$ 12,000.00	$ 1,289.00	$ 38,670.00
32	9-inch Class 2 Aggregate Base	25	CY	$ 115.56	$ 2,889.00	$ 465.00	$ 11,625.00	$ 2,500.00	$ 62,500.00	$ 190.00	$ 4,750.00	$ 591.00	$ 14,775.00
33	60-inch Engineering Fill	160	CY	$ 69.94	$ 11,189.76	$ 168.00	$ 26,880.00	$ -	$ -	$ 480.00	$ 76,800.00	$ 310.00	$ 49,600.00
Concrete Work				$ -	**$ 132,669.00**		**$ 175,810.00**		$ 294,675.00		$ 165,375.00		$ 269,445.00
34	Tank Drainage Basin	1	EA	$ 6,825.60	$ 6,825.60	$ 30,000.00	$ 30,000.00	$ 29,000.00	$ 29,000.00	$ 35,000.00	$ 35,000.00	$ 24,363.00	$ 24,363.00
35	Ring Road Catch Basin	1	EA	$ 6,827.04	$ 6,827.04	$ 21,000.00	$ 21,000.00	$ 11,000.00	$ 11,000.00	$ 25,000.00	$ 25,000.00	$ 21,027.00	$ 21,027.00
36	8-inch Curb	665	FT	$ 84.24	$ 56,019.60	$ 70.00	$ 46,550.00	$ 105.00	$ 69,825.00	$ 45.00	$ 29,925.00	$ 75.00	$ 49,875.00
37	6-inch Curb	62	FT	$ 68.58	$ 4,251.96	$ 80.00	$ 4,960.00	$ 150.00	$ 9,300.00	$ 50.00	$ 3,100.00	$ 75.00	$ 4,650.00
38	Headwalls (Drain, Overflow, Culvert)	4	EA	$ 5,562.00	$ 22,248.00	$ 10,000.00	$ 40,000.00	$ 24,000.00	$ 96,000.00	$ 13,000.00	$ 52,000.00	$ 28,600.00	$ 114,400.00
39	Gutter Along Access Road	370	FT	$ 98.64	$ 36,496.80	$ 90.00	$ 33,300.00	$ 215.00	$ 79,550.00	$ 55.00	$ 20,350.00	$ 149.00	$ 55,130.00
Tank and RCS				$ -	**$ 2,273,495.82**		**$ 1,972,400.00**		$ 2,109,315.00		$ 2,592,150.00		$ 2,403,250.00
40	Tank	1	EA	$ 1,560,000.00	$ 1,560,000.00	$ 1,327,000.00	$ 1,327,000.00	$ 1,647,000.00	$ 1,647,000.00	$ 1,640,000.00	$ 1,640,000.00	$ 1,711,570.00	$ 1,711,570.00
41	60-inch Engineering Fill	750	CY	$ 69.94	$ 52,452.00	$ 82.00	$ 61,500.00	$ -	$ -	$ 300.00	$ 225,000.00	$ 209.00	$ 156,750.00
42	RCS Equipment	1	LS	$ 626,406.00	$ 626,406.00	$ 480,000.00	$ 480,000.00	$ 400,000.00	$ 400,000.00	$ 575,000.00	$ 575,000.00	$ 448,065.00	$ 448,065.00
43	RCS Piping	440	FT	$ 22.24	$ 9,783.84	$ 55.00	$ 24,200.00	$ 100.00	$ 44,000.00	$ 100.00	$ 44,000.00	$ 14.00	$ 6,160.00
44	RCS Tubing	440	FT	$ 10.33	$ 4,546.08	$ 55.00	$ 24,200.00	$ 26.00	$ 11,440.00	$ 35.00	$ 15,400.00	$ 22.00	$ 9,680.00
45	4-inch of 3/4" Crushed Rock	25	SY	$ 87.76	$ 2,193.90	$ 720.00	$ 18,000.00	$ 275.00	$ 6,875.00	$ 210.00	$ 5,250.00	$ 581.00	$ 14,525.00
46	68-inch Engineering Fill	250	CY	$ 72.46	$ 18,114.00	$ 150.00	$ 37,500.00	$ -	$ -	$ 350.00	$ 87,500.00	$ 226.00	$ 56,500.00
Site Improvements					**$ 345,985.33**		**$ 355,015.00**		$ 543,000.00		$ 896,480.00		$ 546,754.00
47	Grading	1928	CY	$ 64.80	$ 124,934.40	$ 80.00	$ 154,240.00	$ 100.00	$ 192,800.00	$ 310.00	$ 597,680.00	$ 141.00	$ 271,848.00
48	Access Road Aggregate	165	CY	$ 67.42	$ 11,123.64	$ 245.00	$ 40,425.00	$ 350.00	$ 57,750.00	$ 350.00	$ 57,750.00	$ 325.00	$ 53,625.00
49	Riprap 1/4 Ton (T=2.7')	4	CY	$ 384.13	$ 1,536.53	$ 1,800.00	$ 7,200.00	$ 1,200.00	$ 4,800.00	$ 2,200.00	$ 8,800.00	$ 990.00	$ 3,960.00
50	Riprap 1/2 Ton (T=3.5')	5	CY	$ 423.16	$ 2,115.78	$ 1,600.00	$ 8,000.00	$ 1,000.00	$ 5,000.00	$ 2,200.00	$ 11,000.00	$ 1,430.00	$ 7,150.00
51	Riprap 2 Ton (T=5.4')	28	CY	$ 462.17	$ 12,940.70	$ 500.00	$ 14,000.00	$ 375.00	$ 10,500.00	$ 1,000.00	$ 28,000.00	$ 653.00	$ 18,284.00
52	Fencing	650	LF	$ 189.05	$ 122,881.20	$ 100.00	$ 65,000.00	$ 91.00	$ 59,150.00	$ 160.00	$ 104,000.00	$ 128.00	$ 83,200.00
53	Gate	1	EA	$ 6,001.34	$ 6,001.34	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 7,000.00	$ 7,000.00	$ 4,180.00	$ 4,180.00
54	Bollards	9	EA	$ 1,200.26	$ 10,802.38	$ 1,200.00	$ 10,800.00	$ 2,500.00	$ 22,500.00	$ 3,000.00	$ 27,000.00	$ 923.00	$ 8,307.00
55	Slope Protection: 1-3" Crushed Rock (T=4")	130	SY	$ 228.07	$ 29,649.36	$ 295.00	$ 38,350.00	$ 250.00	$ 32,500.00	$ 175.00	$ 22,750.00	$ 300.00	$ 39,000.00
56	Erosion Protection	1	LS	$ 24,000.00	$ 24,000.00	$ 9,000.00	$ 9,000.00	$ 150,000.00	$ 150,000.00	$ 32,500.00	$ 32,500.00	$ 57,200.00	$ 57,200.00
				TOTAL	$ 3,967,660.92		$ 3,866,615.00		$ 4,649,140.00		$ 5,820,000.00		$ 5,253,474.00

January 27, 2025

Mr. Eric Del Bosque, P.E.
Director of Engineering and Operations
Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91910

SUBJECT: WHEELER RESERVOIR CONSTRUCTION MANAGEMENT AND INSPECTION SERVICES

Dear Mr. Oberbauer:

Thank you for the opportunity to provide professional constructability review, construction management and inspection services for the Wheeler Reservoir Project. The project includes constructability review for a new 0.8 MG welded steel reservoir, construction of roadway, waterline and storm drain. The new reservoir is located northeast of the intersection of Proctor Valley Road and San Miguel Road in Bonita.

The project is scheduled for a contract time period of 1.5 year; 469 Calendar days. TKE will be covering the project for 12 months, 365 calendar days per the Authority's request.

SCOPE OF WORK

TKE's scope of services is presented in the following paragraphs:

Task No. 1 - Preconstruction Services

A preconstruction conference will be held for the project. The conference will be attended by Authority staff, TKE's Construction Manager and Construction Inspector, the Contractor, representatives of potentially affected utilities and representatives of any other affected agencies. Prior to the conference, we will prepare a conference agenda. At the meeting, we will discuss communication protocol requirements, safety and health procedures, schedule requirements, procedures for contract submittals, contract administration, job-site access and delivery, and coordination with others. After the meeting, it will be documented with minutes.

Deliverables: *Agenda, Minutes, and distribution to all entities*

Task No. 2 – Construction Management Services During Construction

TKE will provide the following subtasks related to construction management services:

Task No. 2a – Records Management

TKE utilizes an electronic records management system. Files include:

- Contract Documents, Addenda, and Reports
- All required local, other agencies and state records throughout the project duration and submit copies to the Authority's project manager, including labor compliance.
- Environmental Compliance Documents/Agency Permits
- Material Submittals

- Contractor Correspondence (RFI's and RFC's)
- Authority Correspondence (Responses to RFI's and RFC's and other correspondence)
- Certified Payroll Records
- Employee Interviews
- Change Orders
- Progress Payments
- Materials Testing Reports/Correspondence
- Inspection Field Reports/Accident Reports
- Photo Logs
- Utility/Agency Correspondence
- Operations and Maintenance Manuals
- Project Closeout Records

Deliverables: E-File of All of the Above.

Task No. 2b – Material Submittal Review

TKE will develop a list of all required material submittals and compare the list to the Contractors submittals. TKE will review all project submittals including welding certifications. Each submittal shall be reviewed with Authority staff and design engineer as required to verify compliance. We will maintain a project log for each project and it will include descriptions of submittals, submittal status, date received, and date returned. Once the submittals have been reviewed and accepted, they will be signed, dated, and sent to the Construction Inspector, Authority staff, project Contractor and the file. Submittals will be returned within the time frame specified by the Contract Documents.

In addition to submittals, TKE will review all vendor and lab reports and certifications and material test inspections and correlate all reports with respect to the plans and specifications. TKE will provide a log for reports and certifications and notify the Authority upon any irregularities.

Deliverables: Submittals, Transmittals, and Logs

Task No. 2c – Construction Meetings

TKE will be in constant communication with Authority staff during the projects entirety to ensure that the project is running smoothly and in accordance with the Authority's expectations. TKE will hold meetings with Authority staff, Contractor and Inspector, meetings with utilities/agencies, community members, and affected agencies. Each is discussed below:

Authority Meetings-TKE will meet with Authority staff as required to keep staff fully apprised as to construction progress and potential project issues. We will prepare agendas and minutes for each meeting.

Contractor Meeting-our Construction Manager will meet with the project contractor biweekly. We will prepare agendas and minutes for each meeting. Meeting agenda will typically include background, old business, new business, scope, objectives, traffic control, construction phasing, project schedule, potential issues discussion, payment quantities discussion, and any safety deficiencies observed.

Utilities/Agency Meetings-as mentioned above, TKE will invite utilities and agencies to the preconstruction conference. During that meeting, all potential project impacts will be discussed with each. During construction, should issues develop needing further discussions with utilities/agencies, TKE will meet with each and develop remediation strategies. Again, all meetings will be documented with minutes.

Community Meetings-TKE will meet with members of the community to discuss current project schedule, issues during construction or coordination of private property improvement reconstruction.

In addition, the Authority will receive RFI's and RFC's (including written clarification requests and change-in-plan drawings) regarding the contract documents. TKE will provide any drawings, sketches and written responses in a timely manner to each with direction and will verify compliance with the Contract Documents. All RFI's and RFC's will be logged, including content of inquiry, date relayed and date of response. TKE will review all RFC's for any potential change in scope and notify the Authority if potential change orders may arise from the RFC.

Deliverables: Agendas, Minutes, RFI and RFC Responses

Task No. 2d – Construction Management

TKE is uniquely suited to respond to challenges that may occur during construction. Our manager's consistent communications with the construction inspector will also provide immediate remediation alternative development.

TKE will review the project schedule and construction progress prior to each Contractor meeting to verify compliance with the Contract Documents. In addition, we will prepare weekly statement of working days to be provided to the contractor at each weekly meeting. If the Contractor is failing to meet approved schedule contract obligations, TKE will request a remediation effort to return the project progress to comply with requirements. If the remediation plan requires adjustment to the completion date, TKE will advise the Authority and will not execute any approval of such change without Authority authorization.

Change conditions and time extensions that may warrant a change order will require a complete understanding of the impacts of the change of which TKE will need to consider in determining its resolution. TKE will seek appropriate comments from anyone impacted by the changed conditions and will closely consult with the Authority to develop the most cost-effective remediation alternative. Cost and scheduling impacts will be noted and presented to the Authority in accordance with the cities change order procedures prior to direction being given to the Contractor, including the preparation of Change Order drawings and specifications, if required.

To maintain cost controls, TKE will review project budgets on a weekly basis, or as warranted, by review of change orders, RFC's, and progress payments. In particular, quantities used on the project will be tracked to verify that they will not exceed contract budgeted amounts. Each month, TKE will provide a budget report to the Authority. Should an increase in budget be required, TKE will assist Staff with staff report preparation.

Regarding RFC's, we will review any change order request received to determine if said request is warranted. If the change order request is not warranted, we will reject it in writing; prior to sending rejection letters to the Contractor, we will review it with Authority staff. If the change order request appears justified, we will review it with the Construction Inspector and compare it with field reports for confirmation of materials, equipment and/or labor involved; we will review same with Authority staff and receive Authority staff's approval prior to preparing and processing the contract change order. Change orders will be prepared on standard forms.

Should rejected RFC's require additional consideration, we will negotiate with contractors to establish the impact of change conditions and we will attempt to complete negotiations prior to beginning work. If we fail to reach an agreement and the work must continue, we will direct the Contractor to complete the work. For all disputed work and force account work, the Construction Inspector will document the labor, materials and equipment used for the extra work for use in future negotiations.

Upon direction from the Authority, TKE will continue negotiating with Contractors to settle all disputes. However, Authority staff will ultimately determine the extent the Authority will go to achieve resolution. TKE will meet with both parties, either independently or together, as warranted until resolution is reached. TKE will complete all necessary calculations to support the Authority's position. TKE utilizes a proactive dispute avoidance program. Once an issue is identified, TKE works diligently to resolve it as timely as possible. The weekly meetings will also be used to avoid or resolve these disputes.

Deliverables: Change Orders, Budget Reports, Staff Report

Task No. 2e – Pay Requests

Each month, TKE will review the construction payment requests submitted by the contractors for work completed and the construction schedule. We will review the work completed and payment requests to ensure that the quantities and amounts requested reflect the actual work completed. After each request has been reviewed (and revised if necessary), we will approve it and forward it to staff for approval and payment along with a written statement of completed review. We will also submit a monthly status report with each payment request that will advise the Authority of compliance with the project schedule.

TKE will track and log any Preliminary and Stop Notices prior to each month's progress payment. If any stop notices have been issued, we will direct the Contractor to rectify the notice and provide proof of the rectification prior to release of payment.

TKE will perform verification of labor compliance for the project with each payment request submitted and will also perform labor compliance interviews. Should deficiencies be noted, corrective action will be requested from the contractors prior to payment release.

TKE will also provide monthly reports highlighting project progress, change orders, cost issues, and schedule.

Deliverables: Payment Requests, Certified Payroll Reporting, Labor Compliance Interviews and Budget Reports

Task No. 2f – Agency Coordination

TKE's Construction Manager will review permitting and coordinate with appropriate County, Authority, and utility agencies affected by the work. We will coordinate project schedules and work progress affecting the project with each appropriate agency. If appropriate, the Construction Manager will invite affected agencies to attend the weekly progress meetings to review the project schedule, summarize project requirements and discuss them at these weekly meetings.

Deliverables: Agency Coordination

Task 3h – Billing and Project Reports

TKE will provide monthly project reporting identifying current activities, future activities, potential change items, concerns, problems, any possible delays, percentage of completion and budget status for construction contractor and consultants. TKE will provide monthly billing to the Authority for consultant work performed during the previous month. All invoices will follow Authority format and include a break down by task and fee.

Deliverables: Monthly Invoices and Summary Reports

Task No. 3 - Construction Inspection Services

TKE will provide daily construction inspection and reporting, to verify that the project is progressing in compliance with the contract documents. We will require strict compliance with the contract documents for all construction activities and for any equipment or materials to be furnished and installed. We already possess the measuring devices and testing equipment normally required for inspecting public works construction projects. Our construction inspection personnel are experienced and knowledgeable in the operation of said devices and equipment, as well as the associated safety equipment.

Quality Assurance: TKE's inspector will continually review plans and specifications throughout construction of features in the project. Verifications of the contractor's compliance with the specifications and manufacturer's technical data sheets will be accomplished by performing the following task as necessary, with the appropriate calibrated instruments for each:

a. Structural Inspection: Perform visual inspection of welds, including reinspection after repair of defective joints. Review and evaluation of welder's credentials and welding procedures. Check appurtenances are installed in accordance with AWWA, Cal/OSHA, and SWRCB regulations.

b. Inspector will be on site during all x-ray testing of welds, dye penetrant testing of chime weld and vacuum testing of all bottom welds accomplished by the Contractor.

c. Conditions of Surfaces Prior to Preparation: The inspector will examine surfaces prior to begin surface preparation to assure that grease and oil have been removed and no sharp edges are present or are removed as specified.

d. Compressed Air Cleanliness: The inspector will check the air quality when production includes abrasive blast cleaning or substrate blow-down procedures in accordance with ASTM D4285.

e. Ambient Conditions: The inspector will monitor ambient conditions in accordance with ASTM E337 to assure that final blast cleaning and coating application operations are not completed outside the specified requirements.

f. Surface Preparation: The inspector will examine the abrasive and equipment used for surface preparation for adequacy to do the work, as specified. Equipment pressures will be monitored. The inspector will verify proper storage and size of abrasives, and that the proper degree of cleaning and surface profile or scarification is obtained.

g. Coating Preparation and Mixing: The inspector will verify materials used are approved and the pot or shelf lives has not been exceeded. The inspector will observe all components are proportioned correctly, added, and thoroughly mixed and any inductions times are maintained. All batch numbers will be recorded.

h. Coating Application: The inspector will examine the application equipment for cleanliness and adequacy to work. The inspector will observe application techniques to assure proper coverage without detrimental runs, pinholes, or other visually evident deficiencies. The inspector will make spot checks of the wet film thickness in accordance with ASTM D4414 so that adjustments to the amount of material being applied can be made at the time of application to minimize the amount of rework after the coating has dried.

i. Dry Film Thickness: The inspector will measure the dry film thickness of each coat to assure that it complies with the specification requirements and manufacturers' instructions. Film thickness will be monitored using a Type II film gage in accordance with ASTM D1186, SSPC-PA2, or as required (i.e. every 100SqFt).

j. Cure Evaluation: The inspector will evaluate the final cure of the applied lining in accordance with the Manufacturer's recommended procedures, and or ASTM D5402, as required.

k. Holiday Detection: Inspector will provide holiday detection equipment and perform 100 percent holiday detection in accordance with NACE International's "Recommended Practice for Discontinuity (Holiday) Testing of Protective Coatings," (RP 0188-99), AWWA D102, and the specified requirements.

l. SHOP INSPECTION: Inspection of the surface preparation and application of the prime coat will be accomplished per the above noted scope Items C. through J. above. except at the Contractor's selected shop location. Daily inspection reports will be prepared for the days of inspection at the shop. The fees are based on two weeks of shop inspection including travel time and subsistence.

Throughout the project, TKE's inspector will maintain a set of record drawings which reflect conditions encountered and constructed in the field. Upon substantial project completion, these drawings will be submitted to the construction manager.

As a part of the project, TKE's inspector will assist the construction manager with monthly pay estimates. TKE's inspector will utilized load tickets, testing results, and inspection reports to reconcile pay requests. The inspector will keep records of extra work performed, minor changes, revisions to the plans and specifications, and develop estimates for changer orders if determined necessary. All extra work invoices will be reviewed by the inspector for accuracy.

All materials will be reviewed against approved material submittals as they arrive on-site. Batch tickets or weigh certificates will be collected upon material arrival.

Our Construction Inspector will verify SWPPP and safety provisions have been implemented at the start of each work day, at the construction site. Any deviations will be documented. All system service interruptions, connections and abandonments will be coordinated with staff. In addition, he will coordinate and schedule materials testing and survey requirements with appropriate Agency's parties to ensure there is no delay to the project construction and to minimize costly down periods for anyone onsite.

We will digitally photograph the activities and maintain copies in the project files and our Construction Inspector will prepare daily field reports, which will document all observed project activity, including location of the activity, number of workers present, construction equipment used, quantities constructed, inspector present, weather conditions, and construction progress. All project documentation will be completed on standard forms. All documents will be submitted in hard copy and electronic copy formats.

Our inspector will provide emergency contact information to allow for 24-hour accessibility. He will verify site safety conditions on a daily basis and, should conditions be unsafe, advise the contractor of corrective actions. If the contractor fails to remediate such conditions, he will advise the Authority and request direction. Should an accident occur, we will notify the Authority and note all site conditions and photo document the accident location.

Deliverables: Daily Field Reports, Site Deficiency Reports, Batch Tickets, Photographs, Accident Reports, Testing Reports, and Summary Reports

Task No. 4 – Post Construction Management Services

TKE will provide the following subtasks related to post construction management services:

Task 4a - Project Close-Out

After project construction is essentially complete, we together with Authority staff, if desired, will field review the project and prepare a construction deficiencies list (punch list) of items requiring remedial work. After all deficiencies are corrected, our Construction Manager will prepare a letter, recommending acceptance of the project. Once the remedial work is completed, TKE will review and process the final project invoice.

TKE will assist the Authority to identify, track and monitor the completion of warranty work prior to the construction completion date. We will obtain lien waivers, bonds, guarantees, warranties, if required, and other documents required by the Contract Documents for final Contract Closeout.

In addition, we will prepare the Notice of Substantial Completion to establish the date for the commencement of contract warranty periods and acceptance of maintenance responsibility by Authority. We will provide the Contractor with a list of any remaining incomplete work requirements to be completed prior to Final Completion.

After all project requirements have been completed, we will prepare a "Notice of Completion" report documenting the final completion of the project and acceptance of the project improvements by the Authority.

Once the project has been completed, we will provide the Authority with a complete set of redlined record drawings which will reflect the improvements as constructed; any changes made during project construction will be shown on the record drawings based on contractor's and our records.

We will forward copies of all records in digital and hard copy format (CD ROM and mylar) and we will prepare a summary of construction changes, final cost, and schedule revisions.

Deliverables: Record Drawings, Punch List, Final Payment, Project Records, and Notice of Completion

Task No. 4b – Record Drawings

Each month, our Construction Inspector will review the contractor's records to ensure that a diligent effort is being made to keep current and accurate records of work in place. If deficiencies are observed, we will withhold the contractor's progress payment until the contractor demonstrates compliance.

Once the project has been completed, we will provide the Authority with a complete set of redlined record drawings which will reflect the improvements as constructed; any changes made during project construction will be shown on the record drawings based on contractor's and our records. Drawings will be forwarded to the design engineer to prepare final as-built drawings to be provided to the Authority.

Deliverables: Redlined Record Drawings

FEE

TKE's fee to provide the scope of service described above is shown on the attached fee table breakdown. Our fee is a "time and material basis" fee amount and we will not provide added services without prior written approval from the Authority. Fees for construction administration services will be provided in accordance with our attached rate schedule and are assumed on a 12-month (365 Calendar Days) project schedule, inspection does not include the electrical or control work phase at the end of the project. TKE will invoice monthly in accordance with our rate schedule and will not exceed our fee without prior approval from the Authority.

Thank you for the opportunity to submit our proposal to provide professional engineering and inspection services. If you have any questions, please contact me at (951) 680-0440 or email me at Trenner@tkeengineering.com.

Sincerely,

Terry Renner, P.E., Q.S.D.
Senior Vice President
TKE ENGINEERING, INC.

Attachments: Fee Breakdown Table

Sweetwater Authority

Construction Management and Inspection Services for
Wheeler Reservoir Constructability Review, Construction Management & Inspection Services
Consulting Engineering Fee Breakdown

		Construction Manager		Assistant Construction		Clerical		Senior Construction		Survey Crew		Total
Task No.	Task	Hours	$	Hours	$	Hours	$	Hours	$	Hours	$	$
1	Preconstruction Services	16	$ 2,720	16	$ 2,400	8	$ 720	4	$ 520		$ -	$ 6,360
2	Construction Management Services[2.)]	150	$ 25,500	330	$ 49,500	24	$ 2,160		$ -		$ -	$ 77,160
3	Construction Inspection Services[3.)]	16	$ 2,720	24	$ 3,600	40	$ 3,600	2080	$ 270,400		$ -	$ 280,320
4	Postconstruction Services	24	$ 4,080	40	$ 6,000	16	$ 1,440		$ -		$ -	$ 11,520
	Subtotal:	206	$ 35,020	410	$ 61,500	88	$ 7,920	2,084	$ 270,920	0	$ -	$ 375,360
											Total:	**$ 375,360**

Rates:

Construction Manager	$ 170	/HR
Assistant Construction Manager	$ 150	/HR
Clerical	$ 90	/HR
Senior Construction Inspector	$ 130	/HR
2-Man Survey Crew	$ 250	/HR

Notes:

1.) Reimbursables Include Cost for Prints, Copies, Mileage, Etc.

2.) Assumes 260 Working Days with Part Time Construction Management (i.e. 6 - 8 hours per week)

3.) Assumes Full Time Inspection (i.e. 40 hours per week) for 365 Calendar Days; Includes Specialty Inspection for Coatings. A 4-hour minimum will be charged for an inspector arriving to the site. The overall inspection hours will be adjusted according to the hours required by the Contractor.

Janaary 27, 2025

TKE Engineering, Inc.

January 20, 2025

Sweetwater Authority

Subject: Proposal to Provide Professional SCADA Services for the Sweetwater Authority (SWA) Central Wheeler Tank Construction Project

Rockwell Construction Services (RCS) is pleased to offer this proposal to provide professional services for construction oversight as well as testing and startup assistance related to the SCADA portion of the referenced project.

We propose to provide SCADA consulting services during the construction and commissioning phases of the project, including coordination and communication with the SWA and EA. We will review the control system documents, including control narratives, test plans and commissioning plans; we will provide on-site support to assure that issues are addressed promptly; we will witness field testing; and provide guidance during operational testing to ensure the successful operation of the facility.

A. Scope of Work

Following is a summary of proposed tasks with their anticipated budgets.

Task 1 Attend client coordination meetings to assist in addressing pending design considerations with SWA and EOR that were not addressed during the construction bid process.

Anticipated Budget = 8 Hours @ $190 per hour $1,520.00

Task 2 Review Submittals, RFIs, and Change Orders related to Electrical and I&C Design. (Tetra Tech)

Anticipated Budget = $13,545.00

Task 3 Assist with SDG&E coordination. SWA is the primary SDG&E contact.

Anticipated Budget = 16 Hours @ 190 per hour $3,040.00

Task 4 Assist in the development of Control Narratives.

Anticipated Budget = 8 Hours @ $190 per hour $1,520.00

Task 5 Provide review and comments on Test Plans including Loop Test, Functional Test and Operation Tests, Spare Parts and Training coordination, as well as O&M Manuals.

Anticipated Budget = 24 Hours @ $190 per hour $4,560.00

Task 6 Participate in Meetings and Workshops to assist with control system coordination.

Anticipated Budget = 8 Hours @ $190 per hour $1,520.00

Task 7 Provide SCADA consultant on-site testing support related to Loop Testing, Functional Testing, and Operational Testing.

Anticipated Budget = 40 Hours @ $190 per hour $7,600.00

Task 8 Provide periodic SCADA consultant on-site inspection to ensure compliance with plans and specifications. This is a secondary inspection and is not meant to relieve the CM team from their daily inspections.

Anticipated Budget = 32 Hours @ $190 per hour $6,080.00

Task 9 Project Management and Administrative Tasks.

Anticipated Budget = 24 Hours @ $190 per hour $4,560.00

B. Total Proposed Estimated Costs

The estimated cost to provide professional services as enumerated in the Scope of Work above is as follows.

Rockwell Construction Services – Construction Estimated Costs

Rockwell Construction Services (160 hours @ $190 per hour) = $30,400
Tetra Tech = $13,545
Construction Total = $43,945.00

Please contact us if you have any questions or would like to discuss this proposal.

Regards,

Thomas M. Klein
ROCKWELL Construction Services, LLC
(760) 470-1576
thomas.klein@rockwell-cs.com

ARDURRA

January 23, 2025

Ms. Kyehee Kim, PE
Engineering Manager – Infrastructure and Inspection
Sweetwater Authority (SWA)
505 Garrett Avenue, Chula Vista, CA 91910

RE: Engineering Services for Bid and Construction Phase Services Proposal: Central-Wheeler Tank

Dear Ms. Kim,

We are pleased to submit this proposal for Engineering Services for Bid Phase and Construction Phase Services for the Central-Wheeler Tank. Please note that our design task order included a small budget for bid and construction phase services and due to the extended design services required, this budget was utilized to finish the design, at the direction of SWA.

SCOPE OF WORK

TASK 1 – Project Management

Task 1.1 – Project Management

- Coordination of submittals, RFIs, change orders, record drawings and meeting documentation associated with engineering services during construction with PSE
- Provide invoicing as project progresses for Ardurra and associated disciplines (PSE)
- We assume SWA will coordinate submittal reviews, response to RFI's, and other construction services with the consultants who performed design services directly for SWA for electrical and instrumentations and cathodic protection disciplines.

TASK 2 – Engineering Services During Bid Phase

Task 2.1 – Bid Addenda

- Prepare and issue three (3) bid addenda based on the updated geotechnical engineering report and bidder questions.

Task 2.2 – Pre-Bid Meeting

- One (1) In person per-bid meeting. An agenda will be provided by the Authority's Construction Manager or other party prior to the meeting with input from SWA. Meeting minutes will be provided at the conclusion of the meeting by the Authority's Construction Manager or other party.

Task 2.3 – Bid RFI's

- Gather and respond to tabulated contractor pre-bid questions as they pertain to the civil, mechanical, general, and structural drawings. Package input from other disciplines as provided by

SWA into final response to be provided to contractors prior to bid.

Task 2.4 – Conformed Drawings

- Provide updated general, civil, mechanical, and structural drawing set based addressing bid RFI's. Package input from other disciplines as provided by SWA into final Conformed drawings set for construction purposes.

TASK 3 – Engineering Services During Construction

Task 3.1 – Meetings

- Attend the in-person construction Kick-Off meeting. An agenda will be provided by the Authority's Construction Manager or other party prior to the meeting with input from SWA. Meeting minutes will be provided at the conclusion of the meeting by the Authority's Construction Manager or other party.
- Site visits, up to three (3) as needed.
- Virtual Bi-Weekly progress meetings fifteen (15). An agenda will be provided by the Authority's Construction Manager or other party prior to the meeting with input from SWA. Meeting minutes will be provided at the conclusion of the meeting by the Authority's Construction Manager or other party.

Task 3.2 – Submittal Review

- Review of thirty (30) submittals with twenty (20) resubmittals for a total of fifty (50) submittals.

Task 3.3 – RFI Review

- Review of twenty (10) RFIs.

Task 3.4 – Change Orders

- Time for addressing two (2) change orders.

Task 3.5 – Record Drawings

- Inclusion of contractor redlines from general, civil, mechanical, and structural plans into overall record drawings. Packaging of other engineering discipline's drawings sets into final record set as provided by SWA.

Assumptions

- Inspection services are not included; these can be provided (including selected specialty inspections) if requested by SWA
- We assume SWA will coordinate submittal reviews, response to RFI's, and other construction services with the consultants who performed design services directly for SWA for the electrical, instrumentation and cathodic protection disciplines.
- This proposal comprises the level of effort shown for each task according to the anticipated number of Submittals, RFI's, meetings, design changes etc. If the actual number of these items exceeds the estimated one, additional fee may be required.

ARDURRA

PROJECT FEE

We propose to complete this work on a time and materials basis at a total cost not to exceed as shown in the attached fee table. Please note the billing rates shown include annual escalation of 3.5% as allowed in the on-call agreement with SWA.

We appreciate the opportunity to provide our proposed scope and fee to the Authority for this work and would be happy to discuss the scope, fee, and schedule further with the Authority. If you have any questions, please do not hesitate to contact me at 858-842-6993.

We sincerely appreciate the opportunity to provide this proposal. Please contact me at 619-358-3904 should you have any questions or need further information.

Sincerely,

Aric Gnesa

Aric Gnesa
Group Leader

Attachments: Fee Breakdown Table

FEE ESTIMATE
Bid and Construction Services for Sweetwater Authority Central Wheeler Tank Project

		Ardurra Personnel							Subconsultants		
Task/ Subtask	Task/Subtask Description	*Project Manager IV*	*Project Engineer IV*	*CADD Drafter III*	*Word Processor*	**Subtask Labor-Hours**	**Subtask Labor Cost**	**Direct Cost**	*Structural*	**Subcontract incl 10% MU**	**Total Cost**
		A. Gnesa	*C. Minerman/ D. Payne*	*T. Sweitzer*	*Staff*				*Peterson Structural Engineers*		
		$289.00	$227.00	$150.00	$124.00						
Task 1	**Project Management & Meetings**										**$15,906**
1.1	Project Management & Invoicing	20	30		9	59	$13,706		$2,000	$2,200	$15,906
Task 2	**Support Services During Bid Phase**										**$13,722**
2.1	Bid Addenda (3)	2	16	8		26	$5,410		$1,000	$1,100	$6,510
2.2	Pre-Bid Meeting (1)	2				2	$578	$50		$0	$628
2.3	Bid RFIs	2	8			10	$2,394		$1,500	$1,650	$4,044
2.4	Conformed Drawings & Specifications	2	6	4		12	$2,540			$0	$2,540
Task 3	**Support Services During Construction Phase**										**$70,270**
3.1	Virtual Meetings (15), KO Meeting & Site Visits (3)	24	24			48	$12,384	$150	$4,000	$4,400	$16,934
3.2	Submittal Review (50)	18	70		10	98	$22,332		$8,000	$8,800	$31,132
3.3	RFI Response (10)	4	16	4		24	$5,388		$4,000	$4,400	$9,788
3.4	Design Changes	4	8	12		24	$4,772			$0	$4,772
3.5	Record Drawings	2	8	24		34	$5,994		$1,500	$1,650	$7,644
		80	186	52	19	337					
		$23,120	$42,222	$7,800	$2,356		$75,498	$200	$22,000	$24,200	**$99,898**

TOTAL NOT-TO-EXCEED FEE: $99,898

January 27, 2025

Julia Varnergardner, Principal Environmental Specialist – Biology
Sweetwater Authority
505 Garrett Avenue
Chula Vista, California 91910

Subject: Proposal to Provide Environmental Compliance Services for the Central Wheeler Tank and System Improvements Project

Dear Julia Varnergardner:

Dudek appreciates this opportunity to submit this proposal to Sweetwater Authority for environmental compliance services for the Central Wheeler Tank and System Improvements Project (Project). Dudek understands the Project entails the construction of an 0.8 million gallon (MG) welded-steel water tank and associated water drainage and conveyance pipelines.

The scope of work presented in this proposal is based on the requirements of the Mitigation Monitoring and Reporting Program (MMRP) of the Project Mitigated Negative Declaration (MND).

Scope of Services

TASK 1 INFORMATION GATHERING AND PRE-CONSTRUCTION SURVEYS

Task 1.1 Information Gathering and Kickoff Meeting

The Dudek Project Manager will review the Project's environmental documents and construction plans to understand the Project's environmental constraints and commitments and develop a survey and monitoring plan. The Dudek Project Manager will also attend a one-hour kickoff meeting with Sweetwater Authority staff prior to the start of the Project, assumed to be in-person.

Task 1.2 Pre-Construction Nesting Bird and Raptor Survey

Dudek understands that construction is scheduled to begin on February 8, 2025. In accordance with BIO-1, if construction initiation occurs between February 1 and September 15, a pre-construction nesting bird and raptor survey is required. Dudek will provide a qualified biologist to conduct the nesting bird and raptor survey. In the event that active nests are detected, the biologist will establish an avoidance buffer to ensure the protection of the nest. Upon completion of the survey, a survey methods and results memorandum will be provided to Sweetwater Authority.

Task 1.3 Pre-Construction California Gnatcatcher Survey

In accordance with BIO-2, Dudek will provide a qualified biologist to conduct a pre-construction survey to determine presence/absence of California gnatcatcher prior to initiation of Project clearing, grading, grubbing, or other construction activities. Given that a 9-pass protocol survey was conducted in 2019 and was negative, Dudek proposes conducting a 3-pass protocol survey to re-confirm absence. The survey will be conducted within the Project footprint and 300-foot buffer where legal access is allowed. A 15-day notification will be submitted to the U.S. Fish and Wildlife Service (USFWS) prior to the survey and the survey will be conducted by a biologist holding a valid Section 10(a)(1)(A) permit. If California gnatcatchers are detected in the survey area, coordination with the USFWS and California Department of Fish and Wildlife (CDFW) will be required to establish measures to reduce potential impacts. Upon completion of the survey, a survey methods and results memorandum will be provided to Sweetwater Authority and to USFWS following Sweetwater Authority review.

This task includes up to 2 hours of agency coordination time in the event that California gnatcatchers are detected.

Task 1.4 Pre-Construction Burrowing Owl Surveys

In accordance with BIO-3, pre-construction surveys for the presence of burrowing owl are required prior to initiation of clearing, grading, grubbing, or other construction activities. Dudek will provide a qualified biologist to conduct pre-construction take avoidance surveys as outlined in the 2012 CDFW Staff Report on Burrowing Owl Mitigation. The first survey will be conducted 30 days prior to initial site disturbance and the second survey will be conducted within 24 hours of initial site disturbance. Upon completion of the survey, a survey methods and results memorandum will be provided to Sweetwater Authority.

If burrowing owls are present within the survey area, coordination with CDFW will be required to establish measures to avoid potential impacts. This task includes up to 2 hours of agency coordination time.

Task 1 Assumptions

- If any resources are located that require avoidance buffers, Dudek assumes that materials and installation will be conducted by others, but Dudek will support by overseeing the process.
- Mileage for all pre-construction surveys is estimated between the Dudek Encinitas office and the Project site at the 2025 federal mileage rate of 70 cents per mile.

Task 1 Deliverables

- Pre-construction nesting bird survey memorandum in PDF format
- Pre-construction California gnatcatcher survey memorandum in PDF format
- Pre-construction burrowing owl survey memorandum in PDF format

TASK 2 CONSTRUCTION MONITORING PER MMRP

Task 2.1 Worker Sensitivity Training

Preparation of a worker sensitivity training was scoped under a previous proposal for vegetation clearing at the Project site. This scope includes attendance at one in-person training session. The training will be administered by a qualified biologist and the Qualified Archaeologist or an archaeologist working under their supervision. This task also includes attendance by the Native American monitor.

Task 2.2 Weekly Nest Surveys

Dudek will conduct once or twice weekly nest surveys of the construction area during the migratory bird breeding season, depending on the avian activity observed. Frequency of the nest surveys will be determined by the Project biologist in coordination with the Sweetwater Authority biologist. Dudek biologists can also assess avoidance buffers and noise restrictions, if applicable, to ensure avoidance of adjacent California gnatcatcher or burrowing owl occurrences. For the purposes of this scope, although work is planned for 31 weeks of the breeding season, up to two nest surveys per week for 20 weeks have been included in this task, based on our experience of typical nesting bird activity.

Task 2.3 Archaeological/Paleontological/Native American Monitoring

In accordance with CR-2 and GEO-3, Dudek will provide a qualified monitor that is dual trained for archaeology and paleontology to be present on-site each day during brush clearances, vegetation removal, grubbing, and grading activities. Dudek will subcontract with Red Tail Environmental to provide Kumeyaay Native American monitoring. Daily logs will be prepared by Dudek monitors detailing daily activities. Logs will be submitted digitally to Sweetwater Authority as part of the final reports, or as otherwise requested. Dudek assumes that no more than 65 days of monitoring by an archaeological monitor and Native American monitor (8-hour days without overtime, plus drive time [which is estimated to be 1 hour]) will be required. If workdays are shorter than 8 hours, Dudek will bill the actual hours worked (RedTail Environmental has a 4-hour minimum charge). The scope also includes site visits (up to 2 days) by the Project Archaeologist and Project Paleontologist to inspect potential discoveries.

Based on observations of the exposed sediments, the monitor will consult with Dudek's Project Archaeologist/Paleontologist, Native American monitor (if applicable), and Sweetwater Authority to determine when archaeological/paleontological and Native American monitoring efforts should be reduced or suspended.

Per CR-2, upon completion of archaeological and paleontological monitoring, Dudek will prepare a combined monitoring report documenting all activities and discoveries. Dudek assumes that no archaeological or paleontological resources will be discovered that require formal documentation or evaluation and that a combined letter report will be sufficient. Should any discoveries be made that require formal documentation, evaluation, and/or data recovery, Dudek will work with Sweetwater Authority to develop an appropriate scope of work and cost based on the mitigation measures for the Project. The report will be submitted within 60 days of completion of grading and be submitted to Sweetwater Authority, South Coastal Information Center, and any Native American groups who request a copy.

Task 2 Assumptions

- Dudek assumes that monitoring staff will be informed at least 48 hours before the start of each week (Monday) and at the end of each workday whether ground disturbing activities requiring construction monitoring, pursuant to the Project mitigation measures, will be occurring the next business day.
- No more than 65 days of monitoring by a dual-qualified archaeological/paleontological monitor will be required. Should the monitoring schedule need to be adjusted, additional staff time will need to be authorized through a contract amendment to provide additional monitoring and coordination.

- No more than 65 days of monitoring by a RedTail Environmental Native American monitor will be required to observe ground disturbance within sediments containing possible cultural resources. Should the monitoring schedule need to be adjusted, additional staff time will need to be authorized through a contract amendment to provide additional monitoring and coordination.
- If workdays are shorter than 8 hours, or fewer monitoring days are required, Dudek will bill the actual hours worked. Note: RedTail Environmental has a 4-hour minimum charge.
- The scope also includes site visits (up to 2 days) by the Project Archaeologist and Project Paleontologist.
- Mileage is estimated from the Dudek Encinitas office to the Project site at the 2025 federal mileage rate.
- No weekend or night work will be required.
- Dudek assumes a workday consists of 8 hours and work will occur Monday through Friday, with no overtime or night work.
- No discoveries will be made that require formal recordation or treatment beyond what can be accomplished by the monitors during the normal course of monitoring (i.e., no work diversions, formal test excavations, or large-scale salvage) or that require curation.

Task 2.4 Construction Monitoring for Initial Site Preparation

This task is limited to initial site preparation activities that involve mowing and work limit fence installation and which requires cultural resources monitoring compliance services. This task is scoped and budgeted separately from Task 2.1 and ask 2.3, above.

In accordance with CR-1, Dudek will prepare and administer a worker sensitivity training to ensure that all construction personnel are trained to identify cultural resources that may be encountered during construction. The training will also outline procedures to follow in the event of a cultural resources discovery, including notification procedures. The training will be administered by the Qualified Archaeologist or an archaeologist working under their supervision and will be reiterated as necessary during morning tailboards. One formal in-person environmental training session is included in this scope of work, in addition to the 40-hours of monitoring described below. It is expected that the formal training session will be conducted during the Project's first day of work.

In accordance with CR-2, Dudek will provide a qualified archaeological monitor to be present on-site each day during brush clearances, vegetation removal, grubbing, and work limit fence installation. Dudek will subcontract with Red Tail Environmental to provide Kumeyaay Native American monitoring. Daily logs will be prepared by Dudek monitors detailing daily activities. Logs will be submitted digitally to Sweetwater Authority as part of the final report, or as otherwise requested. Dudek assumes that no more than 40 hours of monitoring by an archaeological monitor and Native American monitor (up to 8-hour days without overtime, plus drive time [which is estimated to be 1 hour]) will be required. If workdays are shorter than 8 hours, Dudek will bill the actual hours worked (RedTail Environmental has a 4-hour minimum charge). This scope also includes project management and scheduling coordination.

Per CR-2, upon completion of cultural resources monitoring, Dudek will prepare a monitoring report documenting all activities. This task is not included in this scope and instead, the initial site preparation activities will be included in the monitoring report that is being scoped in a separate monitoring proposal providing environmental compliance services for the Central Wheeler Tank and System Improvements Project involving the construction of the water tank and associated water drainage and conveyance pipelines. However, this scope includes one weekly summary report of monitoring observations and data that will be provided upon the completion of the monitoring outlined herein.

Dudek assumes that no archaeological resources will be discovered that require formal documentation or evaluation during the initial site preparation activities. Should any discoveries be made that require formal documentation, evaluation, and/or data recovery, Dudek will work with Sweetwater Authority to develop an appropriate scope of work and cost based on the mitigation measures for the Project.

Task 1 Assumptions

- Dudek assumes that monitoring staff will be informed at least 48 hours before the start of each week (Monday) and at the end of each workday whether ground disturbing activities requiring construction monitoring, pursuant to the Project mitigation measures, will be occurring the next business day.
- No more than 40 hours of monitoring by a qualified archaeological monitor will be required. Should the monitoring schedule need to be adjusted, additional staff time will need to be authorized through a contract amendment to provide additional monitoring and coordination.
- No more than 40 hours of monitoring by a RedTail Environmental Native American monitor will be required to observe ground disturbance within sediments containing possible cultural resources. Should the monitoring schedule need to be adjusted, additional staff time will need to be authorized through a contract amendment to provide additional monitoring and coordination.
- If workdays are shorter than 8 hours, or fewer monitoring days are required, Dudek will bill the actual hours worked. Note: RedTail Environmental has a 4-hour minimum charge.
- Mileage is estimated from the Dudek Encinitas office to the Project site and will be billed at the 2025 federal mileage rate.
- No weekend or night work will be required.
- Dudek assumes a workday consists of up to 8 hours and work will occur Monday through Friday, with no overtime or night work.
- No discoveries will be made that require formal recordation or treatment beyond what can be accomplished by the monitors during the normal course of monitoring (i.e., no work diversions, formal test excavations, or large-scale salvage) or that require curation.

TASK 3 POST-CONSTRUCTION ACTIVITIES

A Dudek biologist will conduct a site visit upon the completion of construction to verify that all Project materials have been removed from the site and that temporary impact revegetation activities have been completed per the Project's Revegetation Plan. A brief memorandum will be provided for Sweetwater Authority's records.

Task 3 Deliverables

- Post-construction site visit memorandum in PDF format

TASK 4 PROJECT MANAGEMENT

The Dudek project team will perform staff coordination, Project setup and closure, budget and schedule maintenance, invoicing, task administration, and provide weekly survey and monitoring summary reports to Sweetwater Authority environmental staff.

TASK 5 REVEGETATION PLAN (OPTIONAL)

Dudek will prepare a brief 2-3-page memorandum that will serve as a Revegetation Plan that describes post-construction treatment for onsite mitigation of 0.14 acre of temporary impacts to non-native grasslands. The plan will include a description of Project impacts, the mitigation as outlined in the Project MND/MMRP, and the revegetation methodology and procedures. The plan will include a brief description of site preparation and hydroseed application including a seed mix, post-installation maintenance and qualitative monitoring. Performance standards that satisfy the Notice of Completion standards for the Stormwater Pollution Prevention Plan will be adopted in the revegetation plan. A Dudek habitat restoration specialist will conduct one site visit to review post-construction site conditions prior to plan preparation.

Task 5 Assumptions

- The plan will be reviewed and approved solely by SWA.
- The mitigation site will not be irrigated; however, we may recommend the use of a water truck to provide temporary irrigation water to the mitigation areas.
- All erosion control measures will be described in the SWPPP and implemented by the general contractor.
- No container planting is proposed for the revegetation Project.
- A draft plan will be submitted for review and comment by SWA. Following revisions, the plan will be finalized.

TASK 6 POST-CONSTRUCTION SITE REVEGETATION (OPTIONAL)

The Dudek project team will provide all labor, material, supplies and incidental items to implement the Revegetation Plan, as approved by SWA. We anticipate the work to include site preparation (performed by others), hydroseed installation, site maintenance (weed and erosion control) and monitoring for a period of 2-years post-construction. Maintenance visits will occur monthly for the first 6 months and then quarterly thereafter for the remainder of the 2-year period (6 additional visits). A total of 12 maintenance visits will be performed. Separately, Dudek will manually water the Project site on a weekly basis for the first two months following the completion of seed application. A total of 8 watering visits will be performed. Qualitative site visits will be conducted to monitor vegetation cover establishment, erosion, weeds growth, and other conditions that may impede reaching performance criteria. Site visits will occur on the same schedule as maintenance visits. A site observation report will be prepared after each site visit to describe and document site conditions and make recommendations if remedial actions are deemed necessary to reach performance standards.

Task 6 Assumptions

- The site will be manually watered with a water truck on a weekly basis for a period of two months.

- The seed mix will be a basic mix of commercially available native seeds not exceeding 30#/acre and composed of common annuals, grasses, and a limited number of coastal sage scrub species.
- There will be no local genetic seed requirements.
- Site preparation will be conducted by the general contractor including soil decompaction, weed removal, and stabilized slopes with temporary erosion control features such as fiber rolls.
- Standard soil amendments will be applied as part of the hydroseed slurry.
- The hydroseed slurry will include 2,500#/acre of wood fiber mulch and a guar gum tackifier (no bonded fiber matrix).
- Client will provide a point of connection (POC) for the water truck that is within a 10-minute commute from the Project site.
- Client will pay all water meter permit and usage fees.
- Client will conduct all regulatory agency coordination without support from Dudek.
- The final site observation report will serve as the final monitoring report for the Project.

Cost Summary

As summarized in the table below, a not-to-exceed cost of **$183,182.30** is estimated to complete the outlined scope of work in Tasks 1 through 4. With Optional Tasks 5 and 6, a not-to-exceed cost of **$224,627.30** is estimated to complete the outlined scope of work in Tasks 1 through 6. All work will be billed on a time and materials basis in accordance with the Agreement between Dudek and Sweetwater Authority for Professional On-Call Environmental Consulting Services.

Task Description	Cost
Task 1 – Information Gathering and Pre-Construction Surveys	
Task 1.1 – Information Gathering and Kickoff Meeting	$1,773.60
Task 1.2 – Pre-Construction Nesting Bird and Raptor Survey	$2,003.60
Task 1.3 – Pre-Construction California Gnatcatcher Survey	$7,170.80
Task 1.4 – Pre-Construction Burrowing Owl Surveys	$3,072.20
Task 2 – Construction Monitoring per MMRP	
Task 2.1 – Worker Sensitivity Training	$2,240.65
Task 2.2 – Weekly Nest Surveys	$21,792.00
Task 2.3 – Archaeological/Paleontological/Native American Monitoring	$125,490.70
Task 2.4 – Construction Monitoring Per MMRP	$11,225.15
Task 3 – Post-Construction Activities	$1,523.60
Task 4 – Project Management	$6,890.00
Total Excluding Optional Tasks 5 and 6	**$183,182.30**
Optional Task 5 – Revegetation Plan	$3,570.00
Optional Task 6 – Post-Construction Site Revegetation	$37,875.00
Total Including Optional Tasks 5 and 6	**$224,627.30**

Sincerely,

Abby Bergsma
Environmental Compliance Manager

cc: Vipul Joshi and Emily Seklecki, Dudek
att: Detailed Budget Spreadsheet

Sweetwater Authority
17035 (As Needed) - Central Wheeler Tank - Copy
DUDEK FEE ESTIMATE
1/27/2025

DUDEK

	Dudek Labor Hours and Rates																						Subconsultant Fees			
	Project Team Role:	Specialist IV	Specialist V	Specialist I	Specialist I	Assistant Biologist	Specialist III	Specialist I	Technician III	Analyst IV	Senior Specialist III	Analyst III	Specialist III	Analyst III	816 Foreman	Technician II	816 Foreman	GIS Analyst III	Publications Specialist II		TOTAL DUDEK HOURS	DUDEK LABOR COSTS	WEAP/Precon Attendance and Mileage - Red Tail Environmental		OTHER DIRECT COSTS	TOTAL FEE
	Billable Rate:	$200.00	$210.00	$165.00	$155.00	$110.00	$195.00	$150.00	$95.00	$120.00	$265.00	$110.00	$195.00	$195.00	$195.00	$95.00	$95.00	$130.00	$120.00				Hours	Fee		
Task 1	**Information Gathering and Pre-Construction Surveys**																									
1.1	Information Gathering and Kickoff Meeting	2		8																	10	$1,720.00			$53.60	$1,773.60
1.2	Pre-Construction Nesting Bird and Raptor Survey			2	8					1								2			13	$1,950.00			$53.60	$2,003.60
1.3	Pre-Construction California Gnatcatcher Survey		30	2														2	1		35	$7,010.00			$160.80	$7,170.80
1.4	Pre-Construction Burrowing Owl Survey			2	9	9				1								1			22	$2,965.00			$107.20	$3,072.20
	Subtotal Task 1	**2**	**30**	**14**	**17**	**9**				**2**								**5**	**1**		**80**	**$13,645.00**			**$375.20**	**$14,020.20**
Task 2	**Construction Monitoring Per MMRP**																									
2.1	Worker Sensitivity Training			1	4			4	4												13	$1,765.00	4	$422.05	$53.60	$2,240.65
2.2	Weekly Nest Surveys				48	112				8											168	$20,720.00			$1,072.00	$21,792.00
2.3	Archaeological/Paleontological/Native American Monitoring						24	28	593	8								2			655	$66,435.00	858	$55,464.50	$3,591.20	$125,490.70
2.4	Construction Monitoring Per MMRP			6			2	6	45												59	$6,555.00	45	$4,283.75	$386.40	$11,225.15
	Subtotal Task 2			**7**	**52**	**112**	**26**	**38**	**642**	**16**								**2**			**895**	**$95,475.00**			**$5,038.40**	**$160,748.50**
Task 3	**Post-Construction Tasks**			**4**		**4**				**1**								**1**	**1**		**11**	**$1,470.00**			**$53.60**	**$1,523.60**
Task 4	**Project Management**	**10**		**20**			**2**	**8**													**40**	**$6,890.00**				**$6,890.00**
	Total Hours	**12**	**30**	**45**	**69**	**125**	**28**	**46**	**642**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**2**	**0**	**1026**		**907**			
	Total	**$2,400.00**	**$6,300.00**	**$7,425.00**	**$10,695.00**	**$13,750.00**	**$5,460.00**	**$6,900.00**	**$60,990.00**	**$2,280.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$1,040.00**	**$240.00**	**$0.00**		**$117,480.00**		**$60,812.86**	**$5,467.20**	**$183,182.30**
	Percent of Hours (Base)	*1%*	*3%*	*4%*	*7%*	*12%*	*3%*	*4%*	*63%*	*2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*						
Optional Services																										
Task 5	**Revegetation Plan**	**2**									**2**	**24**									**28**	**$3,570.00**				**$3,570.00**
Task 6	**Post-Construction Site Revegetation**	**8**									**6**	**40**	**8**	**8**	**72**	**60**	**60**				**262**	**$36,150.00**			**$1,725.00**	**$37,875.00**
	Total Optional + Base Hours and Fee	**22**	**30**	**45**	**69**	**125**	**28**	**46**	**642**	**19**	**8**	**64**	**8**	**8**	**72**	**60**	**60**	**8**	**2**	**0**	**1316**	**$157,200.00**	**907**	**$60,812.86**	**$7,192.20**	**$224,627.30**
	Percent of Hours (Optional + Base)	*2%*	*2%*	*3%*	*5%*	*9%*	*2%*	*3%*	*49%*	*1%*	*1%*	*5%*	*1%*	*1%*	*5%*	*5%*	*5%*	*1%*	*0%*	*0%*						

2/5/2025

Consideration to Award a Contract for the Central Wheeler Tank Construction and System Improvements Project and Authorize Construction Related Services

Erick Del Bosque, P.E.
Director of Engineering and Operations

Background

- Previous master planning efforts identified deficiencies in water supply within the Wheeler Pressure Zone of the Authority's water distribution system.
- The 2020 Water Distribution System Master Plan recommended the construction of a new 0.8 million gallon (MG) Central-Wheeler Tank.
- Proposed expanding the Wheeler Pressure Zone to include 187 parcels currently supplied by gravity near San Miguel Road in the communities of Bonita and Sunnyside.
- Several distribution system improvements have been made to connect between future tank site and existing distribution system.

Proposed View

Project Location

Project Development Timeline

April 24, 2021 Board Meeting → **Design Development** → **Construction Bid Advertised** → **January 17, 2025 Bid Opening**

Board Adopted a MND/MMRP for Environmental Compliance

Need for Design Development including
- ✓ Welded Steel Tank Design
- ✓ Incorporating RCS System
- ✓ Electrical/Control Design

Design Consultant: Ardurra

Plans/Technical Spec/OPCC Prepared

<u>OPCC: $3,967,661</u>

11/22/24: Bid Advertised
12/16/24: Mandatory Pre-Bid Meeting (6 Prime Contractors Attended)

Total 42 RFIs and 1 Addendum

Total 4 Bids Received

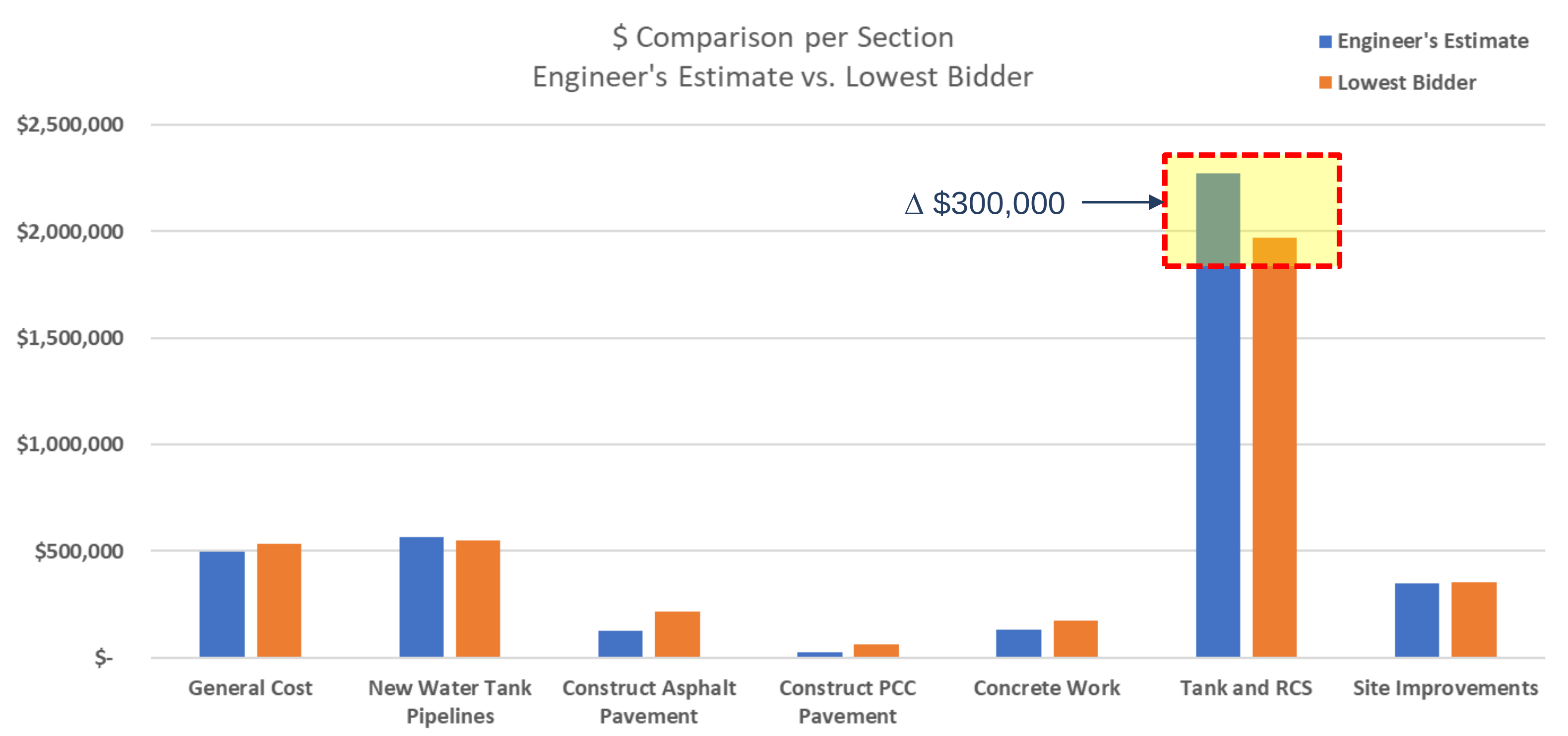
Received Bids

Bidder	Bid Amount
Canyon Springs Enterprises	$ 3,866,615
Covenant Technical Solutions	$ 4,649,140
Pacific tank & Construction, Inc.	$ 5,253,474
Innovative Construction Solutions	$ 5,820,000

- Canyon Springs Enterprises Submitted the Lowest & Responsive Bid
- Class A General Contractor’s License
- Successfully Completed Similar Water System Construction Projects

- Contract documents require project to be completed within 486 calendar days after providing Noticed to Proceed.

Lowest Bid Comparison with OPCC



Tank Sub-Contractor: Paso Robles Tank (Tank & Coating)

Additional Services Needed During Construction

- Construction Management and Inspection
  - (Civil/Mechanical/Structural/Specialties-Welding/Coating etc.)
- Construction Technical Support by Engineer of Record
- SCADA Programming/Configuration
- Construction Management for Electrical & SCADA
- CEQA Compliance
  - Preliminary Site Work Monitoring/MMRP Compliance

Fiscal Impact - Expenses

Central Wheeler Tank Construction and System Improvements (20014016)	
FY 2023-2024 carried over for the Project	$2,416,000
Budget transfer from Sweetwater Dam Improvements (20114012)	$4,000,000
Total project budget	$6,416,000
Less design and expense to date	<812,303>
Available Project balance:	$5,603,697
Less project costs:	
Construction contract amount	<3,866,615>
Construction contingency, 5%	<193,331>
Construction Management and Inspection (TKE)	<375,360>
Construction Support-Engineer of Record (Ardurra)	<99,898>
SCADA Programming/Configuration (Enterprise Automation)	<50,000>
SCADA Construction Management (Rockwell)	<44,000>
MMRP Compliance (Dudek)	<183,183>
Pressure Zone Conversion, 187 Locations*	<252,450>
Project budget balance	$538,860

Fiscal Impact – Proposed Amendment of TKE Contract

TKE's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$200,000
Proposed Increase	<u>340,000</u>
Proposed not-to-exceed amount	$540,000
Less Cost:	
Central Wheeler Tank-Constructability Review	<9,725>
Tank Rehabilitation 2025-Constructibility Review	<11,365>
Deep Anode Well Replacement-CM/Inspection	<38,400>
General as-needed engineering costs expended	<59,490)
Proposed CM Services for Central Wheeler Tank	**<u><375,360></u>**
Balance of contract available for other as-needed projects outlined in original agreement	$105,150*

Fiscal Impact – Proposed Amendment of Ardurra Contract

Ardurra's not-to-exceed contract increase for the	
Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$400,000
Proposed Increase	50,000
Proposed not-to-exceed amount	$450,000
Less Cost:	
Central Wheeler Tank-Design Services	<149,853>
Evaluate the Perdue Water Treatment Plant Clearwell	<190,623>
General as-needed engineering costs expended	<340,476>
Proposed Construction Support for Central Wheeler Tank	**<$99,898>**
Balance of contract available for other as-needed projects outlined in original agreement	$9,626

Fiscal Impact – Proposed Amendment of Dudek Contract

Dudek's not-to-exceed contract increase for the Central Wheeler Tank Construction and System Improvements Project	
Current approved not-to-exceed amount	$150,000
Proposed Increase	150,000
Proposed not-to-exceed amount	$300,000
Less Cost:	
Proposed Construction Support for Central Wheeler Tank	**<$183,183>**
Balance of contract available for other as-needed projects outlined in original agreement	$116,817

Options and Staff's Recommendation

1. Authorize the General Manager to do the following:

a) Award and execute a contract for the Central Wheeler Tank Construction and System Improvements Project with Canyon Springs Enterprises of Temecula, CA, for an amount of $3,866,615;

b) Allocate a five percent contingency fund in the amount of $193,331 for the Canyon Springs Enterprises construction contract;

c) Execute amendment no.1 to the on-call construction management and inspection services contract with TKE Engineering, Inc. for an additional $340,000, for an overall not-to-exceed amount of $540,000;

d) Approve a task order for TKE for construction management services for a not-to-exceed amount of $375,360;

e) Execute amendment no. 2 to the on-call civil engineering services contract with Ardurra for an additional $50,000, for an overall not-to-exceed amount of $450,000;

f) Approve a task order for Ardurra for construction support services for a not-to-exceed amount of $99,898;

g) Approve a task order to Enterprise Automation for SCADA programming and configuration, for a not-to-exceed amount of $50,000;

h) Approve a task order to Rockwell Construction Services, LLC for SCADA construction management, for a not-to exceed amount of $44,000;

i) Execute amendment no.1 to the on-call environmental consulting services contract with Dudek for an additional $150,000, for an overall not-to-exceed amount of $300,000; and

j) Approve a task order to Dudek for Mitigation Monitoring Reporting Program compliance for a not-to-exceed amount of $183,183.

2. Other direction as determined by the Board.

Staff recommends Option 1

Questions?

SWEETWATER AUTHORITY

Engineering and Operations Committee
February 5, 2025

Consideration to Authorize the General Manager to Relinquish Water Facilities to the San Diego Unified Port District

RECOMMENDATION
Staff recommends that the Governing Board authorize the General Manager to relinquish to the San Diego Unified Port District: 75 linear feet of 16-inch and 700 linear feet of 8-inch asbestos cement water mains, including one fire hydrant, located on Lagoon Drive in the City of Chula Vista.

OVERVIEW

As part of the Chula Vista Bayfront Master Plan approved by the California Coastal Commission in August 2012, the San Diego Unified Port District (Port of San Diego) is developing its land to include habitat protection, commercial and recreational spaces, and improved access to the San Diego Bayfront. Sweetwater Park, to be located in Chula Vista within the jurisdictional boundaries of the Port of San Diego, is designed to be a recreational open space that emphasizes natural habitats, including: meadows, specialty gardens, and mounded grasslands. The park will feature nature playgrounds, various seating and picnic areas, pedestrian and bicycle paths, sand dunes, and overlooks for bayfront viewing. Additionally, it will incorporate Kumeyaay signage, public art, restroom facilities, and will provide 216 parking spaces. The project is aimed to be completed in 2025. See Attachment 1 for proposed location.

As depicted on Attachment 1, Sweetwater Park construction requires vacating certain rights-of-way and partially abandoning the Authority's existing water facilities. In addition, in February 2020, the Board approved a Remote Service to supply water to the Sweetwater Bicycle Path and Corridor, which crosses several Port of San Diego parcels and rights-of-way. See Attachment 1 for remote service location and Attachment 2 for more detailed information.

Following a formal request from the Port of San Diego in August 2021, for single water services at multiple parcels of Sweetwater Park, which were conditionally approved with modification by Authority Management in September 2021 (Attachment 3), significant improvements of water services for Sweetwater Park were initiated. These improvements include relinquishing a portion of the existing water main and fire hydrant, in accordance with the 2012 Chula Vista Bayfront Master Plan, to establish a private fire system for the park. After the submission of the Park Water Facilities Improvements Plans, the Authority approved these plans showing the relinquishment of water facilities and provided a Fee and Deposit Letter on October 1, 2024. By December 12, 2024, the Authority received $805,573, covering installations, capacity fees, and engineering fees.

The Authority's water facilities proposed to be relinquished are located at the westerly end of Lagoon Drive and include approximately 700 linear feet of 8-inch water main, 75 linear feet of 16-inch water main, and a single fire hydrant (Attachment 1). To privatize the water facilities, an 8-foot segment of the existing 16-inch AC pipe will be cut, and replaced with a new 8-inch fire service and backflow preventer assembly as a branch piping connection, isolating the relinquished system from the Authority's distribution system. The City of Chula Vista will be vacating the public Right-of-Way where the section of main will be isolated and the new 8-inch fire service will be installed where public Right-of-Way on Lagoon Drive will remain. A backflow preventer will be positioned on private property, to ensure continued fire protection for the Port of San Diego's Sweetwater Park – Bayfront. See Attachment 4 for details.

Originally acquired in 1972 by the Authority's predecessor, Cal-American Water, these facilities have not generated revenue since service accounts on the western portion of Lagoon Drive were discontinued in the mid-1980s. The water system, including 8-inch and 16-inch pipes, were improved as part of a development project in 1992 and subsequently dedicated to the Authority in 1993 at no cost to the Authority. However, the dead-end water main, which has not seen an increase in usage, requires routine flushing to eliminate stagnated water in the water mains, thereby incurring ongoing maintenance costs for the Authority. Relinquishing these facilities supports the development of Sweetwater Park by adapting the infrastructure to current and future needs, eliminating continuous costs, and resolving issues with underused water mains. This move aligns with broader community and environmental benefits, ensuring that both fire safety and recreational enhancements proceed without delay.

If the Board approves staff's recommendation, staff would draft an agreement for the Port of San Diego to accept the water facilities "as-is", without any warranty of its condition, and requiring the installation of the aforementioned 8-inch fire service with backflow preventer.

FISCAL IMPACT

All costs associated with the Request will be the responsibility of the Port of San Diego, including the process of the relinquishment of Authority facilities and installation of an 8-inch fire service that would be owned and maintained by the Authority.

The 8-inch fire service would generate revenue to the Authority, estimated at $1,631.76 per year ($135.98 per month for separate private fire protection lateral in accordance with the Authority's Supplement to the Rates and Rules). In addition, the avoidance of future maintenance costs for the relinquished 775 linear feet of water main and one fire hydrant outweighs any future maintenance costs for the approximate 11 linear feet of 8-inch fire service and associated appurtenances that would be owned by the Authority.

OPTIONS

1. Authorize the General Manager to relinquish to the San Diego Unified Port District: 75 linear feet of 16-inch and 700 linear feet of 8-inch asbestos cement water mains, including one fire hydrant, located on Lagoon Drive in the City of Chula Vista.

2. Reject the San Diego Unified Port District's request to relinquish water facilities and continue to own and maintain the existing water facilities located on Lagoon Drive in Chula Vista.

3. Other direction as determined by the Governing Board.

Staff Contact:
Carlos Quintero, General Manager
Roberto Yano, Assistant General Manager
Erick Del Bosque, Director of Engineering and Operations
Kay Kim, Engineering Manager

SUPPORTING INFORMATION

Attachments

1. Port of San Diego Relinquishment Map
2. Board Action Request for Remote Service_02212020
3. Port District Request for Single Service and SWA Response
4. Staff's Presentation

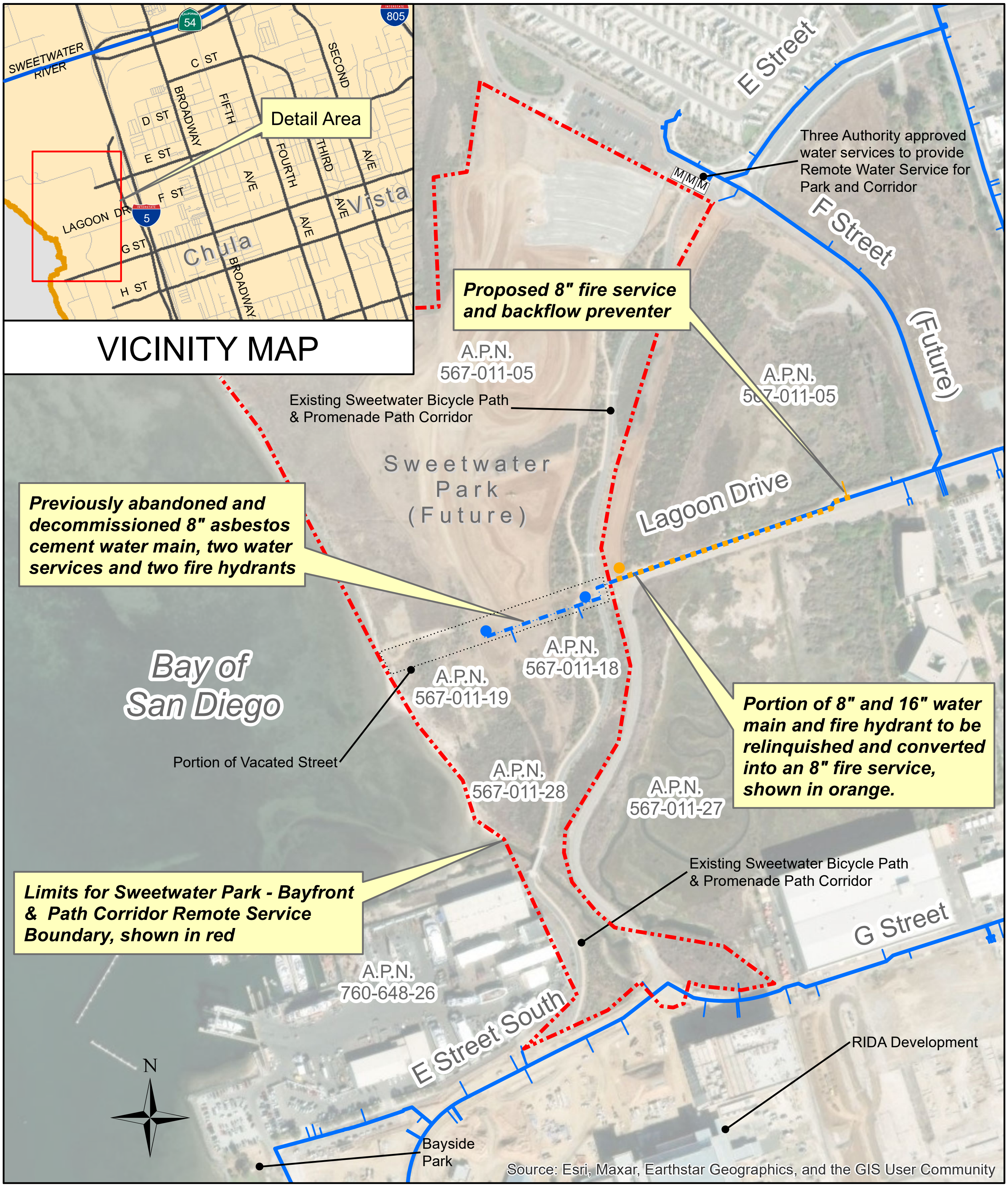
Strategic Plan

Strategic Plan Goal 2: System and Water Supply Reliability (SR) – Achieve an uninterrupted, long-term water supply through investment, maintenance, innovation and developing local water resources.

- Objective SR7: Proactively engage and coordinate with the land use agencies, development community, residents, and businesses on public water infrastructure requirements to ensure proposed public facilities meet Authority standards, and to expedite review process.

Past Board Action

February 14, 2020	The Board approved the Port of San Diego's request for remote service to serve the Sweetwater Bicycle Path and Promenade corridor.



Request for Water Facilty Relinquishment - Sweetwater Park - Bayfront

Chula Vista, City right-of-way & A.P.N. 567-011-05, -18, & -19

400 200 0 400 Feet

I:\engr\Dev\Sweetwater Park - Bayfront\Committee Meeting Docs\Port Relinquishment Request.pdf

BOARD ACTION

TO: Governing Board

FROM: Management

DATE: February 21, 2020

SUBJECT: Request for Remote Service – Sweetwater Bicycle Path & Promenade, Chula Vista, A.P.N. 567-011-05, 18, 28 and 760-648-26

SUMMARY

As part of the Chula Vista Bayfront Master Plan, the San Diego Unified Port District (Port District) has requested water service for the proposed Sweetwater Bicycle Path and Promenade along a corridor described in draft easement and consent agreements on file at the Authority (Path Corridor) which spans Port District property, three adjacent parcels, and designated right-of-way areas within the Port District and the City of Chula Vista. The Path Corridor is planned to extend along the Chula Vista Bayfront between Gunpowder Point Drive and G Street, near the existing Bayside Park as illustrated on the attached sketch. The requested service is to provide irrigation water for 3.8 acres of irrigated landscaping along the Path Corridor.

The Port District desires to irrigate landscaping within the entire length of the Path Corridor through a single meter fronting right-of-way at the future intersection of E Street and F Street, on the north end of the Path Corridor. The meter would supply an irrigation system spanning multiple parcels and right-of-way beyond the Port District's property, creating a remote service condition. Based on staff's review of the water system in this area, the Bayfront Master Plan, and the Water Distribution System Master Plan, it has been determined that providing a water service to the Path Corridor from a combination of multiple meters and water main extensions is neither required nor feasible and would be inconsistent with the water system planned as part of the Bayfront Master Plan. In accordance with the Authority's Rates and Rules, a remote service subject to Governing Board approval will be required to serve the Path Corridor. As further outlined in the Rates and Rules, final easements and consent agreements will be recorded to define the Path Corridor and provide for access and water service through the subject parcels and right-of-way areas.

The proposed water service and meter for the Path Corridor are to be installed as part of the construction of water facilities for the Costa Vista RV Resort by that project's developer. However, the construction of that project is not expected to be completed until the summer of 2021 and the timing for the availability of water facilities is uncertain. In order to meet its more immediate need for an irrigation supply, the Port District is requesting water to be temporarily served from two existing water meters fronting Port District property on F Street, west of Bay

Boulevard. With the approval of the subject remote service request, the temporary service would be granted. Following activation of the new water facilities for the Costa Vista RV Resort, the temporary service would be discontinued and the irrigation system for the Path Corridor would be transferred to the permanent water meter at the future intersection of E Street and F Street. The parcels, meter locations, and proposed Path Corridor are illustrated on the attached sketch.

PAST BOARD ACTION

The Board considers requests for remote services on a case-by-case basis.

FISCAL IMPACT

There will be no cost to the Authority associated with the remote service. The Port District will pay for all costs associated with the installation of temporary and permanent water services.

POLICY

It is the Authority's policy for the Board to consider approval of a remote service to serve an area where it is determined that a water main extension is not required.

Strategic Plan Goal 2: System and Water Supply Reliability: Achieve an uninterrupted, long-term water supply through investment, maintenance, and innovation.

- Objective SR 7: Review proposed development plans and install necessary infrastructure to ensure the facilities meet the required demand, achieve code compliance, avoid cross-connections, and have minimal-to-zero financial impacts to the Authority's ratepayers.

ALTERNATIVES

1. Approve the remote service request.

2. Reject the remote service request.

STAFF RECOMMENDATION

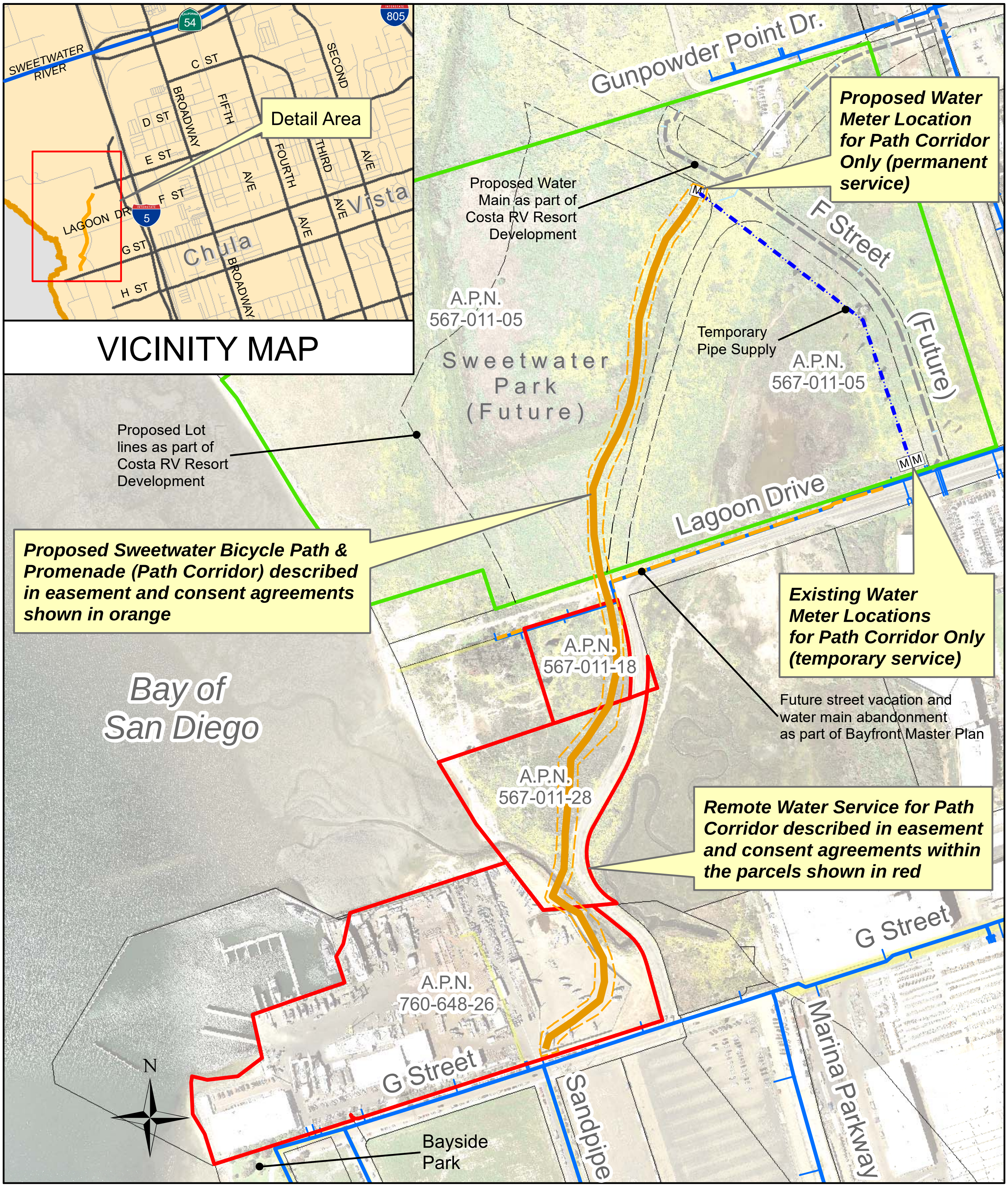
Staff recommends the Governing Board approve the Port District's request for remote service to serve the Sweetwater Bicycle Path and Promenade corridor.

COMMITTEE RECOMMENDATION

The Operations Committee concurred with the Staff Recommendation.

ATTACHMENT

Sketch – Sweetwater Bicycle Path & Promenade



Request for Remote Service - Sweetwater Bicycle Path & Promenade

Chula Vista, A.P.N. 567-011-05, 18, 28 and 760-648-26

400 200 0 400 Feet

I:\engr\Dev\Sweetwater Bicycle Path & Promenade\Sketches\Port Remote Service Request.pdf

PORT of SAN DIEGO

August 26, 2021

Jason Mettler (via email)
Engineering Technician Supervisor
Sweetwater Authority
P.O. Box 2328
Chula Vista, CA 91912-2328
jmettler@sweetwater.org

Subject: Request for Single Water Service at Multiple Parcels for Sweetwater Park at Chula Vista Bayfront

Hi Jason,

This letter serves as formal request for Sweetwater Authority's (SWA) concurrence that single water services (1 each meter and backflow for potable water and 2 each meters and backflows for irrigation water) be allowed for the water services needed for the proposed Sweetwater Park project. The irrigated areas of Sweetwater Park occur on multiple parcels. Per the recent meeting between KTUA (park design firm), City of Chula Vista, Port of San Diego, and SWA you advised that Sweetwater Authority typically will not allow single services for multiple parcels because of the concern that the parcels may be owned and developed by different entities and thus conflicting water services may be required for each of the separate parcels. That is not the case at the Sweetwater Park project.

The attached exhibit represents the landscape irrigated areas of Sweetwater Park and it's adjacent greenbelt areas. The exhibit also shows the current parcel designations for those areas. All of those areas are part of the public realm of the Chula Vista Bayfront Master Plan. The Port of San Diego, in association with the City of Chula Vista, administers the land use of the public realm. Because all of the areas associated with Sweetwater Park will be operated and maintained as one facility it makes sense that the water service for these areas should be combined into single services serving multiple parcels.

Therefore, we request Sweetwater Authority approve single water services for the areas as shown on the exhibit herein. Sweetwater's response is requested by end of day Tuesday Sept. 7, 2021 as necessary to continue of the design of Sweetwater Park. With your approval, the Port district will proceed to make formal application with SWA for the services as designated exhibit.

This exhibit also shows the landscape acreage at each of the locations making up Sweetwater Park. Can this information be used to verify the capacity and meter fees?

Please advise on the Port's request for approval of the single water services for the areas shown on exhibit. Please also advise if this information is sufficient to determine capacity and meter fees for the Sweetwater Park development.

Sincerely,

Mark McIntire
Capital Project Manager II,
Engineering-Construction
3165 Pacific Highway, San Diego, CA 92101
(o) (619) 686.8064 • (c) 619.665.9679
mmcintir@portofsandiego.org

Enclosures: Sweetwater Park Proposed Water Service.

cc: Abraham Pineda Port of San Diego
Michele Chan Port of San Diego
Stephanie Shook Port of San Diego
Christopher Brooke Port of San Diego
Mark Caro City of Chula Vista
William Valle City of Chula Vista
Rick Ryals City of Chula Vista

Mettler, Jason

From: Mettler, Jason
Sent: Monday, September 13, 2021 9:19 AM
To: 'Mark Mcintire'
Cc: Chris Langdon (chris@ktua.com); Stephanie Shook; Stephen Nunez; Abraham Pineda; Christopher Brooke; Matthew Ostlund; Mark Caro; William Valle; Boushra Salem; Rick Ryals; Michelle Chan
Subject: Sweetwater Park - Bayfront: Request to Sweetwater Authority for Single Water Services
Attachments: Exhibit 3.pdf; Exhibit 2.pdf

Good morning Mark,

Sweetwater Authority (Authority) received your email on September 1, 2021 with a letter, dated August 26, 2021, formally requesting concurrence for a single water service to serve multiple parcels for Port of San Diego's (Port's) proposed Sweetwater Bayfront Park (Park). The email also included an exhibit showing the Park's expanded limits, along with existing and proposed irrigation areas for the Park and surrounding areas.

The Authority reviewed the Port's exhibit and researched its existing water facilities serving the area. Please see a copy of the modified exhibit (Exhibit 2) showing parcels and right-of-way areas that are either capable of being served or are currently served by the Authority. Exhibit 2 also includes the irrigation area for the Bicycle Path and Promenade Corridor (Corridor) that was previously authorized for service by the Authority's Governing Board.

The Port's letter and exhibit was presented to the Authority's Management. Management recognized the existing Corridor limits, see Exhibit 3 attached, and has agreed to allow the expanded Park and existing Corridor areas be served by the bank of three water meters located at the north westerly side of the E and F Street Round-about, with a service area limit boundary shown in light blue. The Park area can be served water for irrigation by combining the two 2-inch meters, by manifold, and the existing 5/8-inch meter could be upsized to a 1-1/2-inch meter serve the Park's domestic needs (e.g. bathroom, concessions). As a condition of service, no other water service lateral/account will be allowed in the future to enter the Authority's Management-approved Park area (e.g., from F Street or G Street), except a private fire system for a Port-owned fire hydrant by means of water main/facility relinquishment on F Street, in accordance with the Bayfront's Master Plan.

Also note, all other parcels and right-of-way areas as shown on Exhibit 2 shall continue to be served by their previously assigned active water meters and a water meter will be required to be set at Service No. 39635, a 2-inch lateral, to irrigate Parcel SP-2. The Authority will ultimately require record drawings and perform a visual inspection of the irrigated service areas to ensure their service area limits.

The Authority looks forward to the Parks plan submittals.

Thank you,

Jason Mettler
Engineering Technician Supervisor
Sweetwater Authority
(619) 409-6755 Direct
(619) 861-8551 Cell
jmettler@sweetwater.org
www.sweetwater.org

From: Mark Mcintire <mmcintir@portofsandiego.org>
Sent: Tuesday, August 31, 2021 3:30 PM
To: Mettler, Jason <jmettler@sweetwater.org>

Cc: Chris Langdon (chris@ktua.com) <chris@ktua.com>; Stephanie Shook <sshook@portofsandiego.org>; Stephen Nunez <stephen@ktua.com>; Abraham Pineda <apineda@portofsandiego.org>; Christopher Brooke <cbrooke@portofsandiego.org>; Matthew Ostlund <mostlund@portofsandiego.org>; Mark Caro <mcaro@chulavistaca.gov>; William Valle <wvalle@chulavistaca.gov>; Boushra Salem <bsalem@chulavistaca.gov>; Rick Ryals <rryals@chulavistaca.gov>; Michelle Chan <mchan@portofsandiego.org>
Subject: Sweetwater Park Development at Chula Vista Bayfront - Request to Sweetwater Authority for Single Water Services

Hi Jason,

Pursuant to the meeting you participated in on July 30th regarding Irrigation water service for the Sweetwater Park development I am submitting to you the attached letter and exhibit.

The letter documents the Port's request for Sweetwater Authority to allow the irrigation water service (two meters and two backflow preventers) to serve irrigated landscape at multiple parcels that make up the Sweetwater Park development in the Chula Vista Bayfront. Please review and advise if Sweetwater Authority can approve the Ports request as identified in the letter and exhibit.

Regards,
Mark

CHULA VISTA BAYFRONT SWEETWATER WATER METER NARRATIVE:

THREE WATER METERS ARE PROPOSED TO SERVICE BOTH THE IRRIGATION AND POTABLE WATER NEEDS FOR THE PORT DISTRICT'S SWEETWATER PARK, BIKE PATH, RESTROOM, AND OFF-SITE LANDSCAPE AND ENVIRONMENTAL MITIGATION AREAS. ONE OF THESE METERS, A 2" IRRIGATION METER, IS INSTALLED AND CURRENTLY SERVICING THE IRRIGATION ON THE COMPLETED SWEETWATER BIKE PATH PROJECT. TWO ADDITIONAL WATER METERS ARE PROPOSED TO SERVICE THE BALANCE OF SWEETWATER PARK AND PORT JURISDICTION LANDSCAPE AREAS. THE FOLLOWING DESCRIPTIONS SUMMARIZE THE DESIGN INTENT FOR THE THREE METERS:

METER #1 (IRRIGATION): THIS IS A 2" METER INSTALLED WITH THE SWEETWATER BIKE PATH IMPROVEMENTS AND CURRENTLY SERVICES IRRIGATION ON THE BIKE PATH IN PARCEL S-2, AS WELL AS AREAS IN SP-1, SP-2, HP-1(N), AND AREAS WITHIN THE E STREET RIGHT OF WAY.

METER #2 (IRRIGATION): THIS IS A PROPOSED 2" METER INTENDED TO SERVICE THE BALANCE OF IRRIGATION NEEDS FOR SWEETWATER PARK AND ASSOCIATED LANDSCAPE IMPROVEMENT AREAS. BECAUSE THE SWEETWATER BIKE PATH WAS AN EARLY ACTION PHASE OF SWEETWATER PARK, THE DESIGN AND LONG TERM OPERATIONAL INTENT IS TO MANIFOLD EXISTING METER #1 AND PROPOSED METER #2 TOGETHER TO CREATE A 4" IRRIGATION SERVICE THAT WILL SUPPLY WATER JOINTLY TO THE SWEETWATER BIKE PATH AND SWEETWATER PARK LANDSCAPE AREAS. SEPARATE, SWEETWATER AUTHORITY APPROVED BACKFLOW PREVENTION DEVICES WILL BE INSTALLED IMMEDIATELY DOWNSTREAM OF EACH METER AND THE MANIFOLD WILL OCCUR DOWNSTREAM OF THE BACKFLOW PREVENTERS. THIS NEW COMBINED IRRIGATION AREA WILL BE SOLELY UNDER THE JURISDICTION AND MANAGEMENT OF THE PORT OF SAN DIEGO AND INCLUDE IRRIGATED AREAS WITHIN THE FOLLOWING PARCELS: S-2, SP-1, SP-2, SP-3, HP-1(N), HP-11, AND WITHIN THE E STREET RIGHT OF WAY.

METER #3 (POTABLE): THIS IS A PROPOSED 1-1/2" METER INTENDED TO SERVICE THE POTABLE WATER NEEDS FOR THE SWEETWATER PARK RESTROOM AND DRINKING FOUNTAIN. THIS METER WILL SERVICE POTABLE WATER NEEDS ONLY WITHIN PARCEL S-2.

LEGEND

(green)	SWEETWATER BIKE PATH AND PROMENADE (EXISTING)
(blue)	SWEETWATER PARK IMPROVEMENTS (PROPOSED)
M-1	EXISTING 2" WATER METER SERVICING SWEETWATER BIKE PATH AND PROMENADE
M-2	PROPOSED 2" WATER METER TO BE MANIFOLDED WITH EXISTING 2" WATER METER TO CREATE ONE COMMON 4" IRRIGATION SERVICE FOR BOTH PATH AND PARK
M-3	PROPOSED 1-1/2" WATER METER POTABLE SERVICE FOR THE RESTROOM BUILDING

IRRIGATION ACREAGE BY PARCEL

	METER #1	METER #2 (MANIFOLDED WITH METER # 1
PARCEL	PATH	PARK
E STREET R.O.W.	0.15	0.74
S-2	3.38	9.38
SP-1	0.17	9.15
SP-2	3.80	0.00
SP-3	0.00	0.29
HP-1 (N)	0.93	0.53
(TOTAL)	8.43	20.09

0 50 100 200

SCALE: 1"=100' (IF PRINTED AT 24"X36" SHEET SIZE)

ktua
3916 Normal Street
San Diego, CA 92103
619.294.4477
www.ktua.com

CITY OF CHULA VISTA DRAWING NO. - CV XXXXX

100% DESIGN DEVELOPMENT SUBMITTAL

RECORD DRAWING
REVIEWED BY:
PROJECT MANAGER/ENGINEER
DATE:

NOTE:
THIS DRAWING MAY BE A REDUCED SCALE PRINT OF THE ORIGINAL DRAWING. UTILIZE GRAPHIC SCALES TO VERIFY IF DRAWING IS A REDUCTION, AND ADJUST SCALES ACCORDINGLY TO THE GRAPHIC SCALES SHOWN.

SPEC NO. 2021-12 WBS NO. CP-0025
REFERENCES -
PROJECT ENGINEER ABRAHAM PINEDA
CONTRACTOR -
CONSTRUCTION STARTED -
CONSTRUCTION COMPLETED -
COST - INSPECTOR -

REVISIONS | DATE / APPROVED

PORT of SAN DIEGO
Waterfront of Opportunity

DESIGNED CL, BE, SN
DRAWN SN, HH, GS
CHECKED CL, BE
APPROVAL RECOMMENDED
MANAGER
APPROVED
MANAGER

CHULA VISTA, CALIFORNIA

SWEETWATER PARK

DATE 08/31/2021
A/E NO.
SHEET OF
DRAWING NO. CV-2020-02
REV. -

CHULA VISTA BAYFRONT SWEETWATER WATER METER NARRATIVE:

THREE WATER METERS ARE PROPOSED TO SERVICE BOTH THE IRRIGATION AND POTABLE WATER NEEDS FOR THE PORT DISTRICT'S SWEETWATER PARK, BIKE PATH, RESTROOM, AND OFF-SITE LANDSCAPE AND ENVIRONMENTAL MITIGATION AREAS. ONE OF THESE METERS, A 2" IRRIGATION METER, IS INSTALLED AND CURRENTLY SERVICING THE IRRIGATION ON THE COMPLETED SWEETWATER BIKE PATH PROJECT. TWO ADDITIONAL WATER METERS ARE PROPOSED TO SERVICE THE BALANCE OF SWEETWATER PARK AND PORT JURISDICTION LANDSCAPE AREAS. THE FOLLOWING DESCRIPTIONS SUMMARIZE THE DESIGN INTENT FOR THE THREE METERS:

METER #1 (IRRIGATION): THIS IS A 2" METER INSTALLED WITH THE SWEETWATER BIKE PATH IMPROVEMENTS AND CURRENTLY SERVICES IRRIGATION ON THE BIKE PATH IN PARCEL S-2, AS WELL AS AREAS IN SP-1, SP-2, HP-1(N), AND AREAS WITHIN THE E STREET RIGHT OF WAY.

METER #2 (IRRIGATION): THIS IS A PROPOSED 2" METER INTENDED TO SERVICE THE BALANCE OF IRRIGATION NEEDS FOR SWEETWATER PARK AND ASSOCIATED LANDSCAPE IMPROVEMENT AREAS. BECAUSE THE SWEETWATER BIKE PATH WAS AN EARLY ACTION PHASE OF SWEETWATER PARK, THE DESIGN AND LONG TERM OPERATIONAL INTENT IS TO MANIFOLD EXISTING METER #1 AND PROPOSED METER #2 TOGETHER TO CREATE A 4" IRRIGATION SERVICE THAT WILL SUPPLY WATER JOINTLY TO THE SWEETWATER BIKE PATH AND SWEETWATER PARK LANDSCAPE AREAS. SEPARATE, SWEETWATER AUTHORITY APPROVED BACKFLOW PREVENTION DEVICES WILL BE INSTALLED IMMEDIATELY DOWNSTREAM OF EACH METER AND THE MANIFOLD WILL OCCUR DOWNSTREAM OF THE BACKFLOW PREVENTERS. THIS NEW COMBINED IRRIGATION AREA WILL BE SOLELY UNDER THE JURISDICTION AND MANAGEMENT OF THE PORT OF SAN DIEGO AND INCLUDE IRRIGATED AREAS WITHIN THE FOLLOWING PARCELS: S-2, SP-1, SP-2, SP-3, HP-1(N), HP-11, AND WITHIN THE E STREET RIGHT OF WAY.

METER #3 (POTABLE): THIS IS A PROPOSED 1-1/2" METER INTENDED TO SERVICE THE POTABLE WATER NEEDS FOR THE SWEETWATER PARK RESTROOM AND DRINKING FOUNTAIN. THIS METER WILL SERVICE POTABLE WATER NEEDS ONLY WITHIN PARCEL S-2.

LEGEND

(green)	SWEETWATER BIKE PATH AND PROMENADE (EXISTING)
(blue)	SWEETWATER PARK IMPROVEMENTS (PROPOSED)
M-1	EXISTING 2" WATER METER SERVICING SWEETWATER BIKE PATH AND PROMENADE
M-2	PROPOSED 2" WATER METER TO BE MANIFOLDED WITH EXISTING 2" WATER METER TO CREATE ONE COMMON 4" IRRIGATION SERVICE FOR BOTH PATH AND PARK
M-3	PROPOSED 1-1/2" WATER METER POTABLE SERVICE FOR THE RESTROOM BUILDING

IRRIGATION ACREAGE BY PARCEL

	METER #1	METER #2 (MANIFOLDED WITH METER # 1
PARCEL	PATH	PARK
E STREET R.O.W.	0.15	0.74
S-2	3.38	9.38
SP-1	0.17	9.15
SP-2	3.80	0.00
SP-3	0.00	0.29
HP-1 (N)	0.93	0.53
(TOTAL)	8.43	20.09

0 50 100 200
SCALE: 1"=100' (IF PRINTED AT 24"X36" SHEET SIZE)

ktua
3916 Normal Street
San Diego, CA 92103
619.294.4477
www.ktua.com

DD - NOT FOR CONSTRUCTION

CITY OF CHULA VISTA DRAWING NO. - CV XXXXX

100% DESIGN DEVELOPMENT SUBMITTAL

RECORD DRAWING
REVIEWED BY:
PROJECT MANAGER/ENGINEER
DATE:

NOTE:
THIS DRAWING MAY BE A REDUCED SCALE PRINT OF THE ORIGINAL DRAWING. UTILIZE GRAPHIC SCALES TO VERIFY IF DRAWING IS A REDUCTION, AND ADJUST SCALES ACCORDINGLY TO THE GRAPHIC SCALES SHOWN.

SPEC NO. 2021-12 WBS NO. CP-0025
REFERENCES -
PROJECT ENGINEER ABRAHAM PINEDA
CONTRACTOR -
CONSTRUCTION STARTED -
CONSTRUCTION COMPLETED -
COST - INSPECTOR -

REVISIONS | DATE / APPROVED

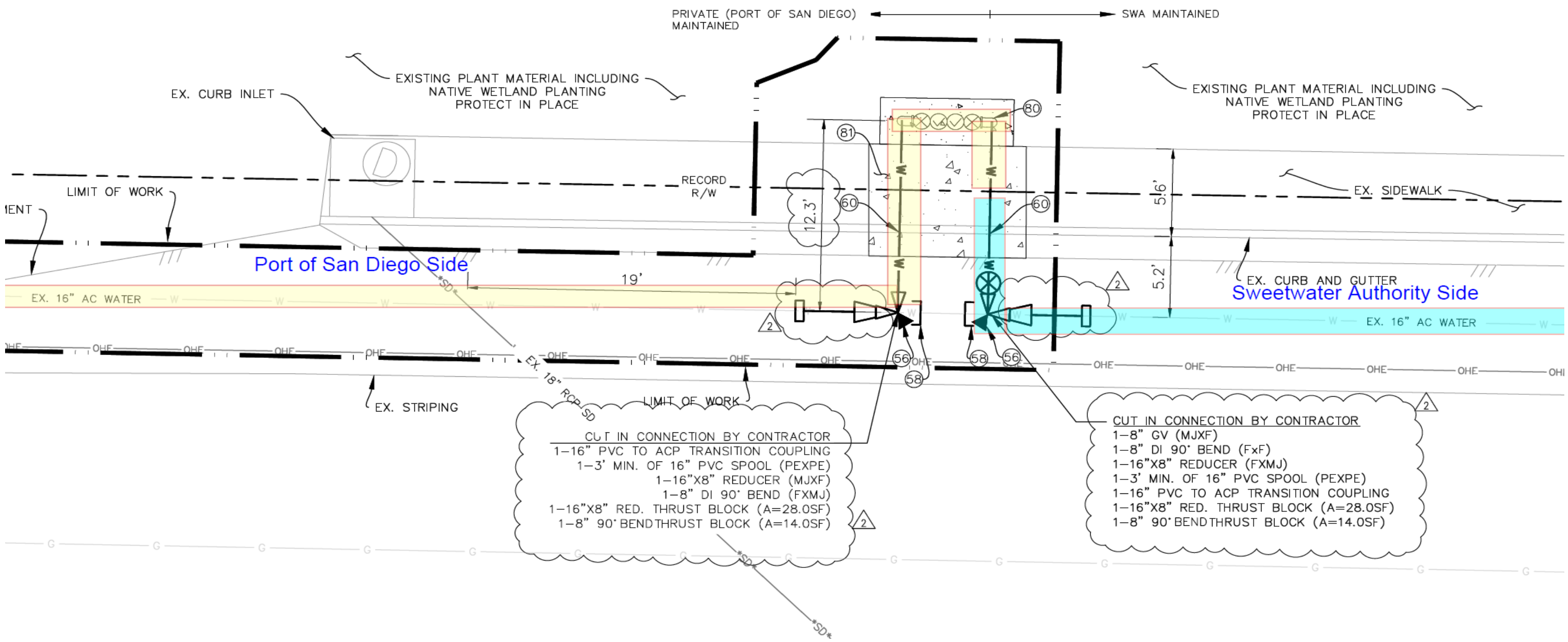
PORT of SAN DIEGO
Waterfront of Opportunity

DESIGNED CL, BE, SN
DRAWN SN, HH, GS
CHECKED CL, BE
APPROVAL RECOMMENDED ____ MANAGER
APPROVED ____ MANAGER

CHULA VISTA, CALIFORNIA

SWEETWATER PARK

DATE 08/31/2021
A/E NO.
SHEET OF
DRAWING NO. CV-2020-02
REV. -


PRIVATE (PORT OF SAN DIEGO) MAINTAINED
SWA MAINTAINED
EXISTING PLANT MATERIAL INCLUDING NATIVE WETLAND PLANTING PROTECT IN PLACE
EX. CURB INLET
EXISTING PLANT MATERIAL INCLUDING NATIVE WETLAND PLANTING PROTECT IN PLACE
RECORD R/W
LIMIT OF WORK
EX. SIDEWALK
12.3'
5.6'
5.2'
Port of San Diego Side
19'
EX. CURB AND GUTTER
Sweetwater Authority Side
EX. 16" AC WATER
EX. 16" AC WATER
EX. 18" RCP SD
EX. STRIPING
LIMIT OF WORK
CUT IN CONNECTION BY CONTRACTOR
1-16" PVC TO ACP TRANSITION COUPLING
1-3' MIN. OF 16" PVC SPOOL (PEXPE)
1-16"X8" REDUCER (MJXF)
1-8" DI 90° BEND (FXMJ)
1-16"X8" RED. THRUST BLOCK (A=28.0SF)
1-8" 90° BEND THRUST BLOCK (A=14.0SF)
CUT IN CONNECTION BY CONTRACTOR
1-8" GV (MJXF)
1-8" DI 90° BEND (FxF)
1-16"X8" REDUCER (FXMJ)
1-3' MIN. OF 16" PVC SPOOL (PEXPE)
1-16" PVC TO ACP TRANSITION COUPLING
1-16"X8" RED. THRUST BLOCK (A=28.0SF)
1-8" 90° BEND THRUST BLOCK (A=14.0SF)

2/5/2025

Consideration to Authorize the General Manager to Relinquish Water Facilities to the San Diego Unified Port District

Erick Del Bosque, P.E.
Director of Engineering and Operations

Chula Vista Bayfront Master Plan

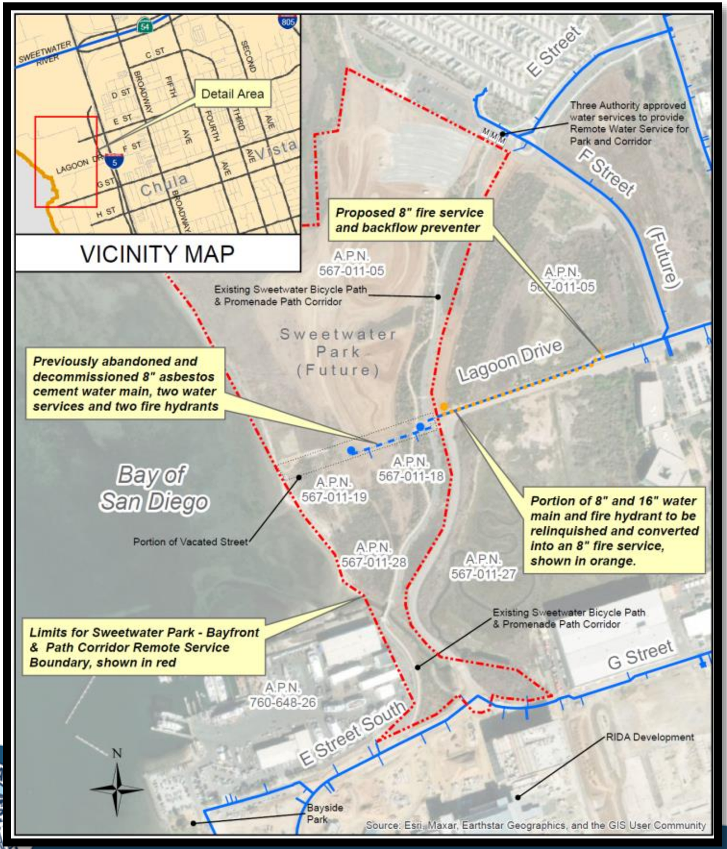
Background

1. In February 2020, the Authority's Board approved a Remote Service to supply water to the Sweetwater Bicycle Path and Corridor Requested by the San Diego Unified Port District (Port of San Diego).

2. Sweetwater Park Construction requires the vacation of certain rights-of-way and the partial abandonment of the Authority's existing water facilities.

3. Authority's Management conditionally approved the Port of San Diego's request in September 2021, subject to plan approval of proposed improvements and Board approval of relinquishment of facilities.

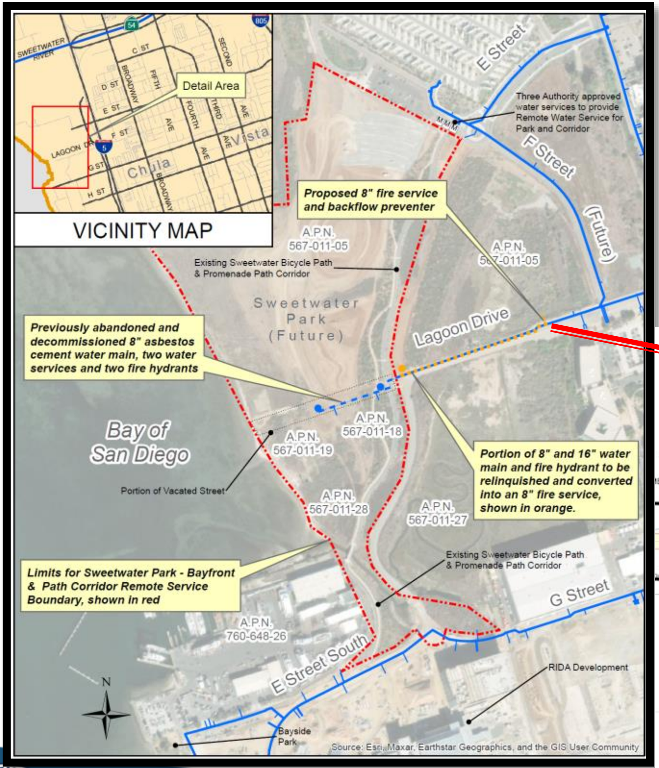
Location of Relinquishment & Conversion to a Private system



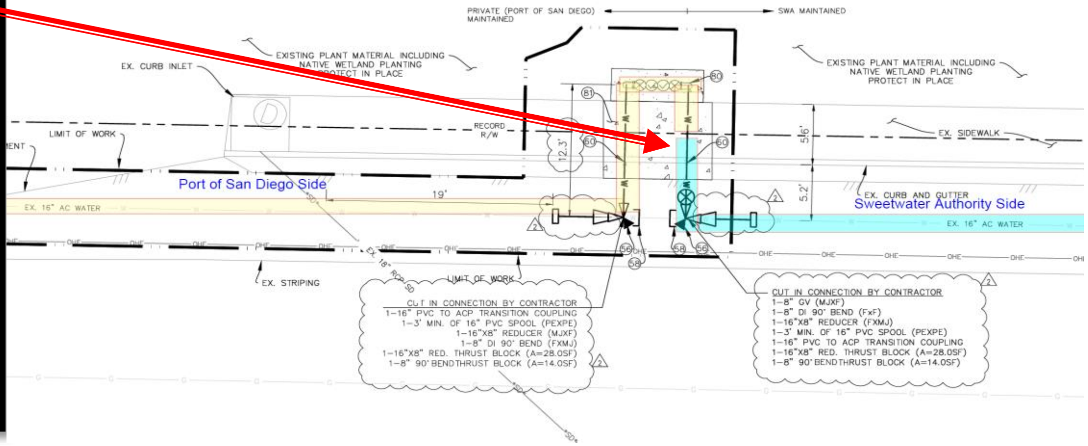
Request of Relinquishment of Water System on Lagoon Drive includes:

- 75 LF of 16-inch AC water main
- 700 LF of 8-inch AC water main
- one fire hydrant

Location of Relinquishment & Conversion to a Private system



Port of San Diego would accept facilities "as-is" and would install 8-inch fire service (approx. 11 LF long) with backflow preventer



SWEETWATER AUTHORITY

Rationales of Relinquishing and Privatizing the System

- These assets originally acquired by Cal-American Water, in 1972.
- Water service accounts on the westerly portion of Lagoon Drive discontinued in the mid-1980s, and since then, no revenue has been generated by the Authority.
- Developer driven improvements were made in 1992 to the subject pipelines and were dedicated to the Authority in 1993 at no cost to the Authority.
- Illegal water use has remained an ongoing issue.
- The dead-end water main with no water usage requires flushing to prevent stagnated water in pipes —resulting in ongoing maintenance costs to the Authority.

Fiscal Impact

- The Authority will convert its maintenance costs into revenue by transforming the unutilized water main into a fire service.
- The expected annual revenue estimated at $1,631.76 ($135.98/Month for fire service in accordance with Supplement to Rates and Rules)
- All costs associated with the Request will be the responsibility of the Port of San Diego

Options and Staff's Recommendation

1. Approve the General Manager to relinquish to the San Diego Unified Port District: 75 linear feet of 16-inch and 700 linear feet of 8-inch asbestos cement water mains, including one fire hydrant, located on Lagoon Drive in Chula Vista.

2. Reject the San Diego Unified Port District's request to relinquish water facilities and continue to own and maintain the existing water facilities located on Lagoon Drive in Chula Vista.

Staff recommends Option 1

Questions?

Off the Record: 20th Anniversary Celebration

Sponsorship Packages

Align your organization with Voice as a sponsor for our first ever “Off the Record” - an exclusive evening celebrating the freedom of press through comedy. Join elected officials, community leaders and Voice’s major supporters in a roast of our CEO and Editor-in-Chief Scott Lewis and watch never before seen footage of San Diego’s political leaders. Your generous sponsorship not only supports the production of this event, but also demonstrates your dedication to our mission of investigative journalism for a better San Diego.

Sponsorship Opportunities

TITLE $25,000 EXCLUSIVE

SOLD OUT

- **Exclusive recognition** as the only title sponsor during the program
- Two (2) tables with **premium seating, premium wine selection and two optional VIP guests** for a total of twenty (20) event tickets
- Top billing on all event promotional materials across Voice’s podcast, newsletters, website and social media
- Opportunity to feature a 30-second sponsor-produced video during program
- Four (4) days of Morning Report (19k+ subscribers) newsletter advertising
- One (1) month of advertising on Voice podcast
- One (1) month of advertising on Voice website
- Recognition during event program and **premier** logo placement on event materials

PRESENTING $20,000 EXCLUSIVE

- **Exclusive recognition** as the only presenting sponsor
- Two (2) tables with **preferred seating, premium wine selection, and two optional VIP guests** for a total of twenty (20) event tickets
- Opportunity to feature a 30-second sponsor-produced video during program
- Opportunity to place promotional materials at the event
- Two (2) Morning Report (19k+ subscribers) newsletter advertising
- One (1) month of advertising on Voice podcast
- One (1) month of advertising on Voice website
- Recognition during event program and **prominent** logo placement on event materials

VOICE of SAN DIEGO
INVESTIGATIVE JOURNALISM FOR A BETTER SAN DIEGO
20 YEARS

RECEPTION | $15,000 | EXCLUSIVE

- **Exclusive recognition** as the only reception sponsor
- ·One (1) table with **preferred seating, premium wine selection, and an optional VIP guest** for a total of ten (10) event tickets
- Opportunity to feature a 30-second sponsor produced video during the program
- One (1) month of advertising on Voice podcast
- One (1) month of advertising on Voice website
- Recognition during event program and **prominent** logo placement on event materials

DIAMOND | $10,000

AUDIOVISUAL OR EVENT PRODUCTION SPONSOR (ONE PER ITEM)

- Recognition as a sponsor for event production OR audiovisual
- ·One (1) table with **preferred seating, premium wine selection, and an optional VIP guest** for a total of ten (10) event tickets
- One (1) month of advertising on Voice website
- Recognition during event program and **prominent** logo placement on event presentation/materials

PLATINUM | $7,500

TECHNOLOGY/INNOVATION OR POST-PARTY SPONSOR (ONE PER ITEM)

- Recognition as a platinum sponsor for technology/innovation or post-party
- One (1) table with **preferred seating and premium wine selection** for a total of ten (10) tickets
- Recognition during event program and logo on event materials

GOLD | $6,000

COCKTAIL OR WINE SPONSOR (ONE PER ITEM)

COCKTAIL SOLD

- Recognition as a gold sponsor for event cocktails or wine
- Total of four (4) event tickets with **preferred seating**
- Recognition during event program and logo on event materials

SILVER | $5,000

COMMUNITY SPONSOR (LIMIT OF 6)

- Recognition as a community sponsor
- One (1) table for a total of ten (10) event tickets
- Recognition during event program and logo on event presentation/materials

BRONZE | $3,500

PHOTOBOOTH, DESSERT OR BEER (ONE PER ITEM)

PHOTOBOOTH AND BEER SOLD

- Recognition as a sponsor for either the photobooth, dessert or beer
- Two (2) event tickets
- Recognition during event program and logo on event presentation/materials

20 YEARS

VOICE of SAN DIEGO

INVESTIGATIVE JOURNALISM FOR A BETTER SAN DIEGO

BENEFITS	TITLE	PRESENTING	RECEPTION	DIAMOND
	$25,000	$20,000	$15,000	$10,000
Top billing in all promotional materials across Voice platforms	✓	✓		
Opportunity to feature a 30-second sponsor produced video during program	✓	✓	✓	
Exclusive Recognition	✓	✓	✓	
Days of Morning Report ads	4	2	N/A	N/A
One month of podcast advertising	✓	✓	✓	
One month of website advertising	✓	✓	✓	✓
Event tickets	20	20	10	10
Recognition during event and logo on all materials	✓	✓	✓	✓

VOICE of SAN DIEGO
INVESTIGATIVE JOURNALISM FOR A BETTER SAN DIEGO
20 YEARS

BENEFITS	PLATINUM	GOLD	SILVER	BRONZE
	$7,500	$6,000	$5,000	$3,500
Top billing in all promotional materials across Voice platforms				
Opportunity to feature a 30-second sponsor produced video during program				
Exclusive Recognition				
Days of Morning Report ads	N/A	N/A	N/A	N/A
One month of podcast advertising				
One month of website advertising				
Event tickets	10	04	10	02
Recognition during event and logo on all materials	✓	✓	✓	✓

CMUA 2025 Annual Conference

Start Date: 4/6/2025 7:00 AM PDT
End Date: 4/8/2025 3:00 PM PDT

Venue Name: JW Marriott Anaheim Resort

Location:
1775 South Clementine Street
Anaheim, CA United States 92802

Organization Name: CMUA

Contact:
Christine Chapman
Email: cchapman@cmua.org
Phone: (916) 326-5804

Join us in Anaheim at the JW Marriott

Join CMUA and its member April 6-8, 2025 in Anaheim, CA, at the stunning JW Marriott Anaheim Resort located within walking distance of Disneyland, California Adventure, and a short drive to Corona Del Mar State Beach, Knott's Berry Farm, and more!

Bring your family and extend your stay through the weekend. The conference rate will be extended for three days before and after the conference dates (based on availability) so mark your calendar now.

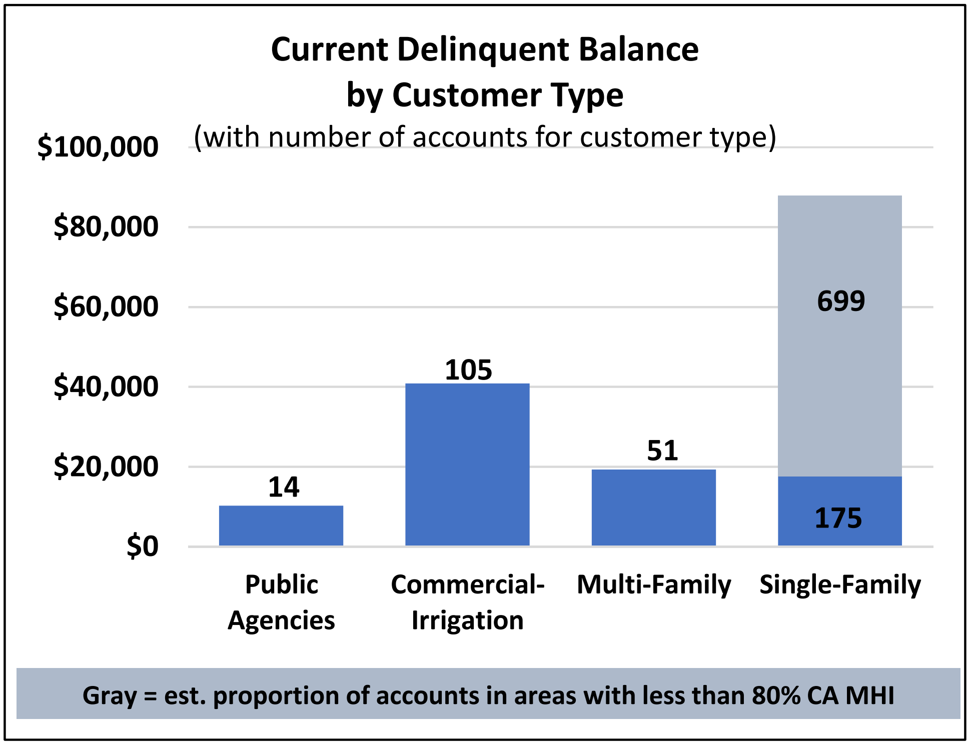
Conference registration will open on February 7, 2025, (registration rates coming soon).

Reserve your hotel room at the JW Marriott. Guest room rates are $269 per night single/double plus tax and fees.

More info coming soon - Put your Mickey ears on and we will see you in Anaheim!

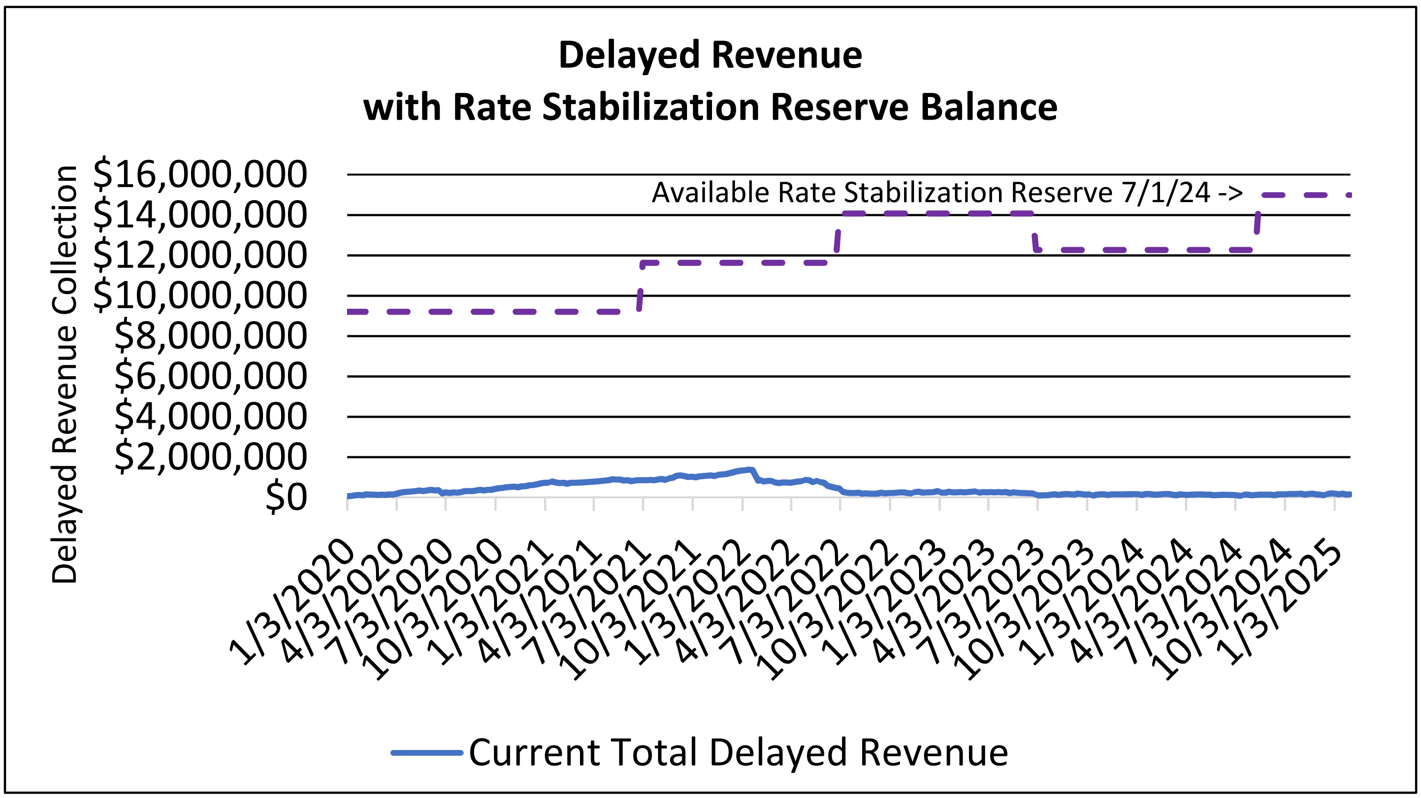
Delayed Revenue Dashboard

Total Delinquent Water Bill Balances over 60 Days Past Due, as of : 1/31/2025



As of Date	Delinquent Balance
11/8/2024	$132,472
11/15/2024	$163,002
11/22/2024	$182,625
11/29/2024	$158,092
12/6/2024	$139,795
12/13/2024	$107,473
12/20/2024	$164,959
12/27/2024	$197,397
1/3/2025	$186,903
1/10/2025	$159,099
1/17/2025	$183,130
1/24/2025	$143,609
1/31/2025	**$158,296** *

*Balance as a percent of annual revenue = 0.32%



Sweetwater Authority Low-income Customer Assistance Program (LCAP):

- 237 customers have signed up for the LCAP program as of January 31, 2025
- These customers are either already receiving a bill credit or will start receiving a credit on their next water bill.
- Customers that apply and are approved will receive a $20 bill credit for six consecutive bi-monthly water bills.
- More information can be found at https://www.sweetwater.org/Customers/Low-Income-Customer-Assistance-Program

ENGINEERING AND OPERATIONS COMMITTEE

MINUTES OF THE REGULAR MEETING

February 5, 2025, 4:00 p.m.
Sweetwater Authority
505 Garrett Avenue
Chula Vista, CA 91910

Directors Present:	Steve Castaneda, *Elizabeth Cox, and Hector Martinez
	**Director Cox provided a brief statement regarding her participation in the meeting remotely via videoconference in compliance with the provisions of Government Code section 54953, stating that her remote participation was for "just cause" for travel on official business representing the Authority that prevents her from participating in person. Directors Cox participated through audio and visual technology.*
Staff Present:	General Manager Carlos Quintero, Assistant General Manager Roberto Yano, Board Secretary Ligia Hoffman, Director of Engineering and Operations Erick Bosque, Engineering Manager Kyehee Kim, and Director of Finance Rich Stevenson
Others Present:	Tonda Johnson

Pursuant to the Brown Act Government Code Section 54953, this meeting was held in person and via teleconference.

---

1. Call Meeting to Order and Roll Call

Director Martinez called the meeting to order at 4:11 p.m.

ACTION CALENDAR AGENDA

2. Items to be Added, Withdrawn, or Reordered on the Agenda

There were none.

3. Opportunity for Public Comment

There were none.

4. Action Agenda

4.1 Consideration to Authorize the General Manager to Execute a Contract with WSP USA, Inc. to Complete an Update to the Seismic Evaluation of Sweetwater Dam Outlet Tower and Conduit Study

Director of Engineering and Operations Del Bosque provided a presentation.

Motion by: Director Castaneda
Seconded by: Director Cox

that the Governing Board authorize the General Manager to execute a contract with WSP USA, Inc. for an update to the seismic evaluation of Sweetwater Dam Outlet Tower and Conduit for a not-to-exceed amount of $286,378.

Ayes (3): Director Castaneda, Director Cox, and Director Martinez

Motion Carried Unanimously (3 to 0)

4.2 Consideration to Award a Contract for the Central Wheeler Tank Construction and System Improvements Project and Authorize Construction Related Services

Tonda Johnson of Bonita spoke to the reasons the Central Wheeler Tank needs to be replaced, and issues regarding her neighborhood's low water pressure.

Motion by: Director Cox
Seconded by: Director Castaneda

that the Governing Board authorize the General Manager to do the following:

a. Award and execute a contract for the Central Wheeler Tank Construction and System Improvements Project with Canyon Springs Enterprises of Temecula, CA, for an amount of $3,866,615;

b. Allocate a five percent contingency fund in the amount of $193,331 for the Canyon Springs Enterprises construction contract;

c. Execute amendment no. 1 to the on-call construction management and inspection services contract with TKE Engineering, Inc. for an additional $340,000, for an overall not-to-exceed amount of $540,000;

d. Approve a task order for TKE for construction management services for a not-to-exceed amount of $375,360;

e. Execute amendment no. 2 to the on-call civil engineering services contract with Ardurra for an additional $50,000, for an overall not-to-exceed amount of $450,000;

f. Approve a task order for Ardurra for construction support services for a not-to-exceed amount of $99,898;

g. Approve a task order to Enterprise Automation for SCADA programming and configuration, for a not-to-exceed amount of $50,000;

h. Approve a task order to Rockwell Construction Services, LLC for SCADA construction management, for a not-to exceed amount of $44,000;

i. Execute amendment no. 1 to the on-call environmental consulting services contract with Dudek for an additional $150,000, for an overall not-to-exceed amount of $300,000; and j) Approve a task order to Dudek for Mitigation Monitoring and Reporting Program compliance for a not-to-exceed amount of $183,183.

Ayes (3): Director Castaneda, Director Cox, and Director Martinez

Motion Carried Unanimously (3 to 0)

4.3 Consideration to Authorize the General Manager to Relinquish Water Facilities to the San Diego Unified Port District

Motion by: Director Cox
Seconded by: Director Martinez

that the Governing Board authorize the General Manager to relinquish to the San Diego Unified Port District: 75 linear feet of 16-inch and 700 linear feet of 8-inch asbestos cement water mains, including one fire hydrant, located on Lagoon Drive in the City of Chula Vista.

Ayes (2): Director Cox, and Director Martinez

Abstain (1): Director Castaneda

Motion Carried (2 to 0)

5. Directors' Comments

There were none.

6. Next Meeting Date: March 5, 2025

7. Adjournment

With no further business before the Committee, Director Martinez adjourned the meeting at 5:36 p.m.