July 16, 2018

Agenda for the Regular Meeting of the Commissioners of the Antelope Valley State Water Contractors Association to be held at the Palmdale Water District office at 2029 East Avenue Q, Palmdale

Thursday, July 19, 2018

6:00 p.m.

NOTE: To comply with the Americans with Disabilities Act, to participate in any Association meeting please contact Dawn Deans at 661-947-4111 x1003 at least 48 hours prior to an Association meeting to inform us of your needs and to determine if accommodation is feasible.

Agenda item materials, as well as materials related to agenda items submitted after distribution of the agenda packets, are available for public review at the Palmdale Water District's office located at 2029 E. Ave. Q, Palmdale. Please call Danielle Henry at 661-947-4111 x1059 for public review of materials.

PUBLIC COMMENT GUIDELINES: The prescribed time limit per speaker is three-minutes. Please refrain from public displays or outbursts such as unsolicited applause, comments, or cheering. Any disruptive activities that substantially interfere with the ability of the Association to carry out its meeting will not be permitted and offenders will be requested to leave the meeting.

Each item on the agenda shall be deemed to include any appropriate motion, resolution, or ordinance to take action on any item.

1) Pledge of Allegiance.
2) Roll call.
3) Adoption of agenda.
4) Public comments for items not on the agenda.
5) Consideration and possible action on minutes of regular meeting held April 12, 2018.
6) Payment of bills.

7) Presentation on the status of the Upper Amargosa Creek Recharge Project. (Chuck Heffernan, City of Palmdale, Director of Public Works)

8) Consideration and possible action on acceptance and filing of audit for year ended June 30, 2017. (Controller Hoffmeyer)

9) Consideration and possible action on ratification of U.S.G.S. Agreement for Cooperative Water Resources Investigations for 2017/2018. (General Manager Knudson)

10) Consideration and possible action on approval of professional services agreement with Kennedy/Jenks Consultants for the preparation of the Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project in the not-to-exceed amount of $236,951.00. (General Manager Knudson/Assistant General Manager Thompson II)

11) Consideration and possible action on approval of professional services agreement with Raftelis Financial Consultants, Inc. for the preparation of a financial analysis associated with the cost of providing replacement water to the Antelope Valley in the not-to-exceed amount of $27,377.00. (General Manager Knudson/Assistant General Manager Thompson II)

12) Consideration and possible action on budget for fiscal year 2018/2019. (General Manager Knudson/Assistant General Manager Thompson II/Controller Hoffmeyer)

13) Discussion on concepts of maximizing the use of available recycled water in the Antelope Valley. (Chair Parris/General Manager Knudson)

14) Report of General Manager.

    a) Update on Antelope Valley Watermaster meetings.

    b) Update on Antelope Valley IRWMP Stakeholder meetings.

    c) Update on Fremont Basin IRWMP Stakeholder meetings.

15) Report of Controller.

    a) Update on Revenue, Expenses and Change in Net Position.

16) Reports of Commissioners.

    a) Status update on AVSWCA Strategic Water Plan Ad Hoc Committee meetings. (Chair Parris)

17) Report of Attorney.

18) Commission members' requests for future agenda items.

19) Consideration and possible action on scheduling the next Association meeting August 9, 2018.

20) Adjournment.

ANTELOPE VALLEY
STATE WATER CONTRACTORS ASSOCIATION

COMMISSION MEMORANDUM

DATE:	July 16, 2018	**July 19, 2018**
TO:	AVSWCA Commissioners	**Commission Meeting**
FROM:	Matthew Knudson, General Manager Peter Thompson II, Assistant General Manager	
RE:	***AGENDA ITEM NO. 7 - PRESENTATION ON THE STATUS OF THE UPPER AMARGOSA CREEK RECHARGE PROJECT***	

Mr. Chuck Heffernan, Director of Public Works for the City of Palmdale (City) will be at the AVSWCA meeting to give a presentation on the status of the Upper Amargosa Creek Recharge Project.

Association and City staff will be available to answer questions from the Commissioners.

ANTELOPE VALLEY
STATE WATER CONTRACTORS ASSOCIATION

COMMISSION MEMORANDUM

DATE:	July 16, 2018	**July 19, 2018**
TO:	AVSWCA Commissioners	**Commission Meeting**
FROM:	Matthew Knudson, General Manager Dennis Hoffmeyer, Controller	
RE:	***AGENDA ITEM NO. 8 – CONSIDERATION AND POSSIBLE ACTION ON ACCEPTANCE AND FILING OF AUDIT FOR YEARS ENDED JUNE 30, 2017 AND 2016.***	

Recommendation:

Staff recommends acceptance and filing of the audit for years ended June 30, 2017 and 2016. The Independent Auditors' Report and Financial Statements are attached. This information will be reviewed in detail at the meeting.

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

AUDIT REPORT

For the Fiscal Years Ended June 30, 2017 and 2016

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION
For the Fiscal Years Ended June 30, 2017 and 2016
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FINANCIAL SECTION

Page

Financial Section

INDEPENDENT AUDITORS' REPORT

Governing Board
Antelope Valley State Water Contractors Association
Palmdale, California

Report on the Financial Statements
We have audited the accompanying financial statements of the Antelope Valley State Water Contractors Association (Association), which comprise of the balance sheet as of June 30, 2017, and the related statements of revenues, expenses, and change in net position, and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility
Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinion
In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of Antelope Valley State Water Contractors Association, as of June 30, 2017, and the respective changes in financial position and cash flows thereof for the fiscal years then ended in accordance with accounting principles generally accepted in the United States of America.

Prior Period Financial Statements
The financial statements of the Antelope Valley State Water Contractors Association as of June 30, 2016, were audited by other auditors whose report dated June 30, 2017, expressed an unmodified opinion on those statements.

Other Matters
Required Supplementary Information
Management has not presented the Management's Discussion and Analysis that accounting principles generally accepted in the United States of America requires to be presented to supplement the basic financial statements. Such missing information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. Our opinion on the basic financial statements is not affected by this missing information.

Murrieta, California
_____, 2018

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION
Balance Sheets
June 30, 2017 and 2016

	2017	2016
ASSETS		
Cash and cash equivalents (Note 2)	$ 17,562	$ 23,409
Prepaid items	546	546
Total assets	$ 18,108	$ 23,955
LIABILITIES		
Accounts payable	$ 57,153	$ 43,555
Total liabilities	57,153	43,555
NET POSITION		
Unrestricted (Deficit) (Note 3)	(39,045)	(19,600)
Total net position	(39,045)	(19,600)
Total liabilities and net position	$ 18,108	$ 23,955

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION
Statements of Revenues, Expenses, and Changes in Net Position
For the Fiscal Year Ended June 30, 2017

	2017	2016
Operating Revenues		
Member agency contributions	$ 64,000	$ 24,000
Contributions - other	31,000	90,050
Total operating revenues	95,000	114,050
Operating Expenses		
Contracted services	79,511	176,640
General and administrative expenses	34,951	22,588
Total operating expenses	114,462	199,228
Net operating loss	(19,462)	(85,178)
Nonoperating Revenues		
Miscellaneous	5	-
Investment earnings	12	37
Total nonoperating revenues	17	37
Changes in net position	(19,445)	(85,141)
Net Position		
Beginning of year	(19,600)	65,541
End of year	$ (39,045)	$ (19,600)

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Statements of Cash Flows
June 30, 2017 and 2016

	2017	2016
Cash flows from operating activities:		
Cash received from member agencies	$ 64,000	$ 24,000
Cash received from contributions	31,000	90,050
Cash payments for operating expenses	(100,864)	(217,004)
Net cash (used in) operating activities	(5,864)	(102,954)
Cash flows from investing activities:		
Investment income	17	37
Net Cash provided by investing activities	17	37
Net (decrease) in cash and cash equivalents	(5,847)	(102,917)
Cash and cash equivalents:		
Beginning of year	23,409	126,326
End of year	$ 17,562	$ 23,409
Reconciliation of net operating loss to net cash (used in) operating activities:		
Net operating loss	$ (19,462)	$ (85,178)
Adjustments to reconcile operating loss to net cash (used in) operating activities:		
Increase (decrease) in accounts payable	13,598	(17,776)
Net cash (used in) operating activities	$ (5,864)	$ (102,954)

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Organization and Operations of the Reporting Entity

The Antelope Valley State Water Contractors Association (Association) was consolidated on May 26, 1999 as a joint powers authority in an effort to optimize the use of state water resources and protect surface water and groundwater storage within the Antelope Valley. Three public agencies combined to form the Association in serving the Antelope Valley: Antelope Valley – East Kern Water Agency, Littlerock Creek Irrigation Association, and Palmdale Water Association, which constitutes the member agencies. Each member agency appoints two members to the Governing Board.

Any member of the Association shall have the right to withdraw its membership upon serving prior written notice of intention to do so on the other members at least one hundred twenty (120) days before the close of any fiscal year. Unless sooner revoked, such withdrawal shall become effective upon the expiration of the fiscal year during which such notice was given; provided, however, that no such withdrawal shall release the withdrawing member from any financial obligation theretofore incurred by it hereunder.

Each member of the Association shall be obligated to pay its pro-rata share of the funds required to be appropriated by any approved budget. Approval of any budget by a member shall constitute an agreement of such member to pay said allocation, conditioned only on the approval thereof by each of the other members.

Basis of Accounting and Measurement Focus

The Association reports its activities as an enterprise fund, which is used to account for operations that are financed and operated in a manner similar to a private business enterprise, where the intent of the Association is that the costs of providing services be financed or recovered primarily through user (member) charges, capital grants and similar funding. Revenues and expenses are recognized on the full accrual basis of accounting. Revenues are recognized in the accounting period in which they are earned and expenses are recognized in the period incurred, regardless of when the related cash flows take place.

Financial Reporting

The Association's basic financial statements have been prepared in conformity with accounting principles generally accepted in the United States Board (GAAP), as applied to enterprise funds, The Governmental Accounting Standards Board (GASB) is the accepted standard-setting body for establishing governmental accounting and financial reporting principles. The Association solely operates as a special-purpose government which means it is only engaged in business-type activities; accordingly, activities are reported in the Association's proprietary fund.

Operating revenues and expenses result from exchange transactions associated with the principal activity of the Association Exchange transactions are those in which each party receives and gives up essentially equal values. Management administration and depreciation expenses are also considered operating expenses. Other revenues and expenses not included in the above categories are reported as non-operating revenues and expenses.

Cash and Cash Equivalents

The Association's cash and cash equivalents are considered to be cash on hand and short-term investments with original maturities of three months or less from the date of acquisition

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Prepaid Items
Certain payments to vendors reflect costs applicable to future accounting periods and are recorded as prepaid items.

Net Position
The financial statements utilize a net position presentation. Net position is categorized as follows:

> **Unrestricted** – This component of net position is the net amount of the assets, deferred outflows of resources, liabilities, and deferred inflows of resources that are not included in the determination of the net investment in capital assets or restricted component of net position.

Use of Estimates
The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("U.S. GAAP") requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from these estimates.

Member Contributions
Contribution revenue consists of payments from members that are planned to match operating expenses. The activities of the Association consist solely of development and protection of the water supply for the Antelope Valley groundwater basin.

Grants
Grant revenues are recorded when earned on grants that have been approved and funded by the grantor. The grant source is the Safe Drinking Water Grant Fund from the State of California Department of Water Resources.

Member's Equity
In the event of a member withdrawal, member termination, or dissolution of the Association, any property interest remaining in the Association, following a discharge of all obligations shall be disposed of pursuant to the Joint Powers Agreements as adopted by the Governing Board.

NOTE 2 – CASH AND CASH EQUIVALENTS

Cash and cash equivalents consisted of the following:

Description	2017	2016
Demand deposits with financial institutions	$ 17,562	$ 23,409

Demand Deposits
At June 30, 2017 and 2016, the carrying amount of the Association's demand deposits was $17,562 and $23,409, respectively, and the financial institution's balance was $17,562 and $23,409, respectively. There was no net difference and/or other reconciling items between the financial institution's balance and the Association's balance.

NOTE 2 – CASH AND CASH EQUIVALENTS (continued)

Custodial Credit Risk – Deposits
Custodial credit risk is the risk that in the event of a bank failure, the Association's deposits may not be returned to it. The ROP does not have a policy for custodial credit risk for deposits. Cash balances held in banks are insured up to $250,000 by the Federal Depository Insurance Corporation (FDIC) and are collateralized by the respective financial institutions. In addition, the California Government Code requires that a financial institution secure deposits made by State or local governmental units by pledging securities in an undivided collateral pool held by a depository regulated under State law (unless so waived by the governmental unit). The market value of the pledged securities in the collateral pool must equal at least 110 percent of the total amount deposited by the public agencies. California law also allows financial institutions to secure public deposits by pledging first trust deed mortgage notes having a value of 150 percent of the secured public deposits and letters of credit issued by the Federal Home Loan Bank of San Francisco having a value of 105 percent of the secured deposits.

NOTE 3 – UNRESTRICTED NET POSITION (DEFICIT)

The Association's member agency contributions and reserves were not enough to cover the Associations expenses for the year ended June 30, 2017. The Association will reevaluate its member agency contributions for future periods so that a deficit net position does not occur in future years.

NOTE 4 – RISK MANAGEMENT

The Association has purchased commercial general liability insurance coverage to cover claim contingencies against the Association.

NOTE 5 – COMMITMENTS AND CONTINGENCIES

In the ordinary course of operations, the Association is subject to claims and litigation from outside parties. Nevertheless, after consultation with legal counsel, the Association believes that these actions, when finally, concluded and determined are not likely to have a material adverse effect on the Association's financial position, results of operations, or cash flows.

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

AUDIT REPORT

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Auditors' Responsibility
Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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United States Department of the Interior

U.S. GEOLOGICAL SURVEY

California Water Science Center
6000 J Street, Placer Hall
California State University
Sacramento, California 95819-6129
Phone: (916) 278-3000 Fax: (916) 278-3070
http://water.wr.usgs.gov

March 5, 2018

Mr. Robert Parris, Chair and
Mr. Matthew Knudson, General Manager
Antelope Valley State Water Contractors Association
c/o Palmdale Water District
2029 East Avenue Q
Palmdale, California 93550

Dear Mr. Parris and Mr. Knudson:

This letter confirms discussions between our respective staffs, concerning the continuation of the cooperative water resources program, between the Antelope Valley State Water Contractors Association (AVSWCA) and the U.S. Geological Survey (USGS) during the period November 1, 2017 to October 31, 2018.

The proposed program for the subject period and associated costs are as follows:

1. **Ground Water-Level monitoring**

   Annual Water levels will be measured in March of 2018 in approximately 175 wells (see List A). Semi-Annual Water levels will be measured in August 2018 in approximately 25 index wells that are indicative of each of the ground-water subunits.

2. **Ground Water-Quality monitoring**

   Three well groups are sampled on a three year rotational basis for complete chemical analysis (see List C). Each group consists of approximately nine wells, of which eight wells will be selected and sampled. The ninth well in each group (not specified) is considered as an alternate in the event that one of the selected eight wells cannot be sampled. Water quality samples will be collected for complete chemical analysis from Group 2 for the 2018 agreement (see List B). The remaining wells in Groups 1 and 3 will be sampled for specific conductance and temperature only (see List B).

Data collected in Elements 1 and 2 above will be transmitted annually in electronic form and are also available online at the USGS National Water Information System website as well as the USGS Antelope Valley State Water Contractors Association website.

FUNDING SUMMARY

Element	AVSWCA Funds	USGS Funds	Total Funds
1. **Ground Water-Level monitoring**	$29,300	$14,700	$44,000
2. **Ground Water-Quality monitoring**	34,300	17,250	51,550
TOTAL	**$63,600**	**$31,950**	**$95,550**

Total cost of the proposed program is $95,550. AVSWCA is responsible for $63,600, and subject to the availability of Federal matching funds, the USGS will provide $31,950.

Enclosed are two originals of Joint Funding Agreement (JFA) 18WSCA43000, signed by our agency, for your approval. If you are in agreement with this proposed program, please return one fully executed JFA to our office. Work performed with funds from this agreement will be conducted on a fixed-price basis. Billing for this agreement will be rendered quarterly.

The USGS is required to have an agreement in place prior to any work being performed on a project. We request that a fully executed JFA be returned prior to March 31, 2018. If it is not received by March 31, we will be required to suspend operations until an agreement is received.

If you have any questions concerning this program, please contact Dianna Crilley, Associate Director for Data, at (619) 225-6150, or Scott Patterson, Acting Redlands Field Office Chief, at (858) 679-4015. If you have any administrative questions, please contact Tammy Seubert, in our Sacramento Office, at (916) 278-3040.

Sincerely,

(Acting)

Eric G. Reichard
Director, USGS California Water Science Center

Enclosure

cc: Dianna Crilley, USGS CAWSC
Al Caldwell, USGS CAWSC
Scott Patterson, USGS CAWSC

ec: Robert Parris, rparris@avek.org
Matt Knudson, mknudson@avek.org

List A

Antelope Valley State Water Contractors Association (AVSWCA)
Water-level monitoring wells - measured annually (March), semi-annual (August)

Well Number	Frequency
4N/ 8W- 7C1	Annual
4N/ 8W- 7R1	Annual
4N/13W-12C3	Annual
4N/13W-15A1	Annual
5N/ 9W- 4C1	Annual
5N/ 9W- 5R2	Annual
5N/ 9W- 8J1	Annual
5N/10W- 6N1	Annual
5N/10W-12M2	Annual
5N/10W-17R1	Annual
6N/ 8W-28A2	Annual
6N/ 8W-34D1	Annual
6N/ 9W- 4H2	Annual
6N/ 9W- 7J1	Semi-Annual
6N/ 9W-21R1	Annual
6N/ 9W-28F1	Annual
6N/ 9W-30F1	Annual
6N/9W-33G1	Annual
6N/ 9W-33P1	Semi-Annual
6N/10W- 4F2	Annual
6N/10W- 4M1	Annual
6N/10W- 5H1	Annual
6N/10W-20N1	Annual
6N/10W-22D1	Annual
6N/10W-30A2	Annual
6N/10W-35A1	Annual
6N/11W- 6F1	Annual
6N/11W-31A1	Annual
6N/11W-36G1	Semi-Annual
6N/12W- 9H3	Annual
6N/12W-20J1	Annual
6N/12W-29B1	Annual
7N/ 9W-17N2	Annual
7N/10W-2H2	Annual
7N/10W- 5E3	Annual
7N/10W- 5N5	Annual

Well Number	Frequency
7N/10W-19Q1	Annual
7N/10W-22P1	Annual
7N/10W-29B1	Annual
7N/10W-29Q1	Annual
7N/10W-33J1	Annual
7N/11W- 1Q1	Annual
7N/11W- 3E3	Annual
7N/11W-12M1	Annual
7N/11W-14N1	Annual
7N/11W-16H3	Annual
7N/11W-27Q1	Annual
7N/11W-28Q1	Annual
7N/11W-29G1	Annual
7N/11W-31M1	Annual
7N/12W-19R1	Annual
7N/12W-24A1	Semi-Annual
7N/12W-26K3	Annual
7N/12W-27F5	Annual
7N/12W-27F6	Annual
7N/12W-27F7	Annual
7N/12W-27F8	Annual
7N/12W-27H5	Annual
7N/12W-27H6	Annual
7N/12W-27H7	Annual
7N/12W-27H8	Annual
7N/12W-27J5	Semi-Annual
7N/13W- 3D1	Annual
7N/13W-9N2	Semi-Annual
7N/13W-13N1	Annual
7N/13W-26J2	Semi-Annual
7N/13W-34B1	Semi-Annual
7N/14W-13A1	Semi-Annual
8N/ 9W- 6D1	Annual
8N/10W-18P3	Annual
8N/10W-22H4	Annual
8N/10W-22P3	Semi-Annual

Well Number	Frequency
8N/10W-23F3	Annual
8N/11W-14R1	Annual
8N/11W-15Q1	Annual
8N/11W-24R2	Annual
8N/11W-34D2	Annual
8N/12W- 2Q1	Annual
8N/12W- 5D1	Annual
8N/12W-10J1	Semi-Annual
8N/12W-21R1	Annual
8N/12W-28D1	Semi-Annual
8N/12W-30K1	Annual
8N/12W-31Q2	Annual
8N/12W-34K1	Annual
8N/13W- 5E1	Annual
8N/13W- 7B1	Semi-Annual
8N/13W- 9K1	Annual
8N/13W-14B2	Annual
8N/13W-15M1	Annual
8N/13W-18Q2	Semi-Annual
8N/13W-20B1	Semi-Annual
8N/13W-23E1	Annual
8N/13W-31Q1	Annual
8N/13W-35M1	Annual
8N/14W- 1C1	Annual
8N/14W-10L1	Annual
8N/14W-17M1	Semi-Annual
8N/14W-18N1	Semi-Annual
8N/14W-24C1	Annual
8N/15W- 2A1	Annual
8N/15W- 7P1	Annual
8N/15W- 9D1	Annual
8N/15W-10P2	Annual
8N/15W-19H1	Annual
8N/16W- 2R1	Annual
8N/16W- 3F1	Annual
8N/16W- 6M1	Annual

Well Number	Frequency
8N/16W- 9G1	Annual
8N/16W-13N1	Annual
8N/16W-16A1	Annual
8N/16W-17R2	Annual
8N/16W-18H2	Annual
8N/16W-22Q4	Annual
8N/17W- 4D1	Annual
8N/18W-23F1	Annual
9N/ 9W- 6E1	Semi-Annual
9N/ 9W-27H2	Semi-Annual
9N/10W- 8P1	Annual
9N/10W-24C1	Semi-Annual
9N/10W-24C2	Annual
9N/10W-28F2	Annual
9N/11W-36L1	Annual
9N/12W-16E4	Annual
9N/12W-23N1	Annual
9N/13W- 4A1	Annual
9N/13W-14Q1	Annual
9N/13W-21N1	Annual
9N/13W-28R1	Annual
9N/13W-29M1	Annual
9N/13W-30N1	Annual
9N/13W-32C1	Annual
9N/13W-32D1	Annual
9N/13W-34Q1	Semi-Annual
9N/14W- 1H1	Annual
9N/14W-19L1	Annual
9N/14W-20B1	Annual
9N/14W-21G1	Annual
9N/14W-22D1	Annual
9N/15W-26N1	Semi-Annual
9N/15W-30Q1	Annual
9N/15W-34B2	Annual
9N/17W-36K1	Annual
10N/ 9W- 4D1	Semi-Annual

Well Number	Frequency
10N/ 9W-24A2	Annual
10N/12W-13H1	Annual
10N/12W-20C6	Annual
10N/12W-22J1	Annual
11N/ 8W-29K1	Annual
11N/ 9W-13D1	Annual
11N/ 9W-24A1	Annual
11N/ 9W-36R1	Annual
11N/10W-19D1	Annual
11N/10W-27R1	Annual
11N/11W- 7A1	Annual
11N/11W- 9A1	Annual
11N/13W-19C1	Annual
11N/13W-29M1	Annual
12N/12W-35R1	Annual
29S/39E-33K1	Annual
30S/37E-13C1	Annual
30S/37E-27H2	Annual
30S/37E-36G1	Annual
30S/37E-36N1	Annual
30S/38E- 3K2	Annual
30S/38E-24F1	Annual
30S/38E-30P1	Annual
30S/38E-31C1	Annual
31S/37E-33H1	Annual
31S/37E-35N1	Annual
31S/38E-18P1	Annual
31S/39E-24P1	Annual
32S/36E-35D1	Annual
32S/37E-11N1	Annual
32S/37E-12M1	Annual
32S/37E-26N1	Annual
32S/39E-33L1	Annual

Semi-Annual wells are measured in the Fall and Spring.

List B

Antelope Valley State Water Contractors Association (AVSWCA)
Water-quality monitoring wells

GROUP 1	GROUP 2	GROUP 3
5N/10W- 8H1	7N/14W-13A1	9N/13W-28R1
5N/11W- 1C1	8N/10W-22H4	9N/13W-30N1
6N/11W- 6F1	8N/10W-22P3	29S/39E-23J2
6N/11W-11D1	8N/12W-16M1	30S/37E-24J3*
6N/11W-36G1	8N/12W-21Q1*	30S/37E-34H2
6N/12W- 9H3	8N/16W-13N1	31S/37E-1R2
7N/11W- 3E3	9N/13W-25N1	32S/37E-16R1*
7N/11W-19E1	9N/13W-35C1	32S/37E-27G1
7N/13W-14E1	10N/13W-32D1*	

* Site has been discontinued. Placeholder until a replacement can be found.

Mr. Robert Parris, Chair and Mr. Matthew Knudson, General Manager – Antelope Valley State Water Contractors Association

LIST C

Chemical Constituents
(mg/L or as indicated)

Boron, dissolved(µg/L)

Calcium, dissolved

Chloride, dissolved

Flouride, dissolved

Iron, dissolved (µg/L)

Manganese, dissolved (µg/L)

Magnesium, dissolved

Ammonia, dissolved

Nitrogen (nitrate + nitrite), dissolved

Nitrogen (nitrite), dissolved

Orthophosphate (PO_4), dissolved

Orthophosphorus (P), dissolved

Potassium, dissolved

Silica, dissolved

Sodium, dissolved

Sulfate, dissolved

Dissolved solids at 180°C
(Labcode 27)

Sodium adsorption ratio

Percent sodium

Total alkalinity ($CaCO_3$)

Total Hardness ($CaCO_3$)

Noncarbonate hardness

Temperature °C

pH

Carbonate (CO_3)

Bicarbonate (HCO_3)

Specific conductance
(µS/cm @25 °C)

Arsenic (Labcode 3122)

Chromium, dissolved

Dissolved Oxygen

Note: Samples for Chromium-VI will be collected at all designated water-quality groundwater sites. Analyses will be performed by a contract lab (TestAmerica), via a national contract between the contract lab and the USGS National Water-Quality Lab (NWQL).

Schedules used: 101, 117
and Labcodes: 27, 3122, and 1369.

Form 9-1366
(April 2015)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement
FOR
Water Resource Investigations

Agreement#: 18WSCA43000
Customer#: 6000001010
Project #: ZG00GZV
TIN #: 95-4753654
USGS DUNS #: 1761-38857

Fixed Cost Agreement YES[X] NO[ ]

THIS AGREEMENT is entered into as of the 1st day of November, 2017, by the U.S. GEOLOGICAL SURVEY, California Water Science Center, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION, party of the second part.

1. The parties hereto agree that subject to the availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation for cooperative water resources investigations in the Antelope Valley State Water Contractors Association area, herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50, and 43 USC 50b.

2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) include In-Kind-Services in the amount of $0.00.

(a) $31,950.00 by the party of the first part during the period November 1, 2017 to October 31, 2018

(b) $63,600.00 by the party of the second part during the period November 1, 2017 to October 31, 2018

(c) Contributions are provided by the party of the first part through other USGS regional or national programs, in the amount of : $0.00

Description of the USGS regional/national program:
Not Applicable

(d) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(e) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.

4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.

5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.

6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.

7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

8. The maps, records or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request; be furnished by the party of the first part; at cost, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records or reports published by either party shall contain a statement of the cooperative relations between the parties.

9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered **quarterly**. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983.).

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement
FOR
Water Resource Investigations

Agreement#: 18WSCA43000
Customer#: 6000001010
Project #: ZG00GZV
TIN #: 95-4753654
USGS DUNS #: 1761-38857

USGS Technical Point of Contact

Name:	Scott Patterson Supervisory Hydrologic Technician
Address:	12110 Tech Center Drive Poway, CA 92064
Telephone:	(858) 679-4015
Fax:	(858) 679-4019
Email:	rspatter@usgs.gov

Customer Technical Point of Contact

Name:	Matthew Knudson c/o Palmdale Water District
Address:	2029 East Avenue Q Palmdale, CA 93550
Telephone:	(661) 947-4111
Fax:	
Email:	mknudson@palmdalewater.org

USGS Billing Point of Contact

Name:	Tamara Seubert Budget Analyst
Address:	6000 J Street - Placer Hall Sacramento, CA 95819
Telephone:	(916) 278-3040
Fax:	(916) 278-3070
Email:	tseubert@usgs.gov

Customer Billing Point of Contact

Name:	
Address:	SAME
Telephone:	
Fax:	
Email:	

U.S. Geological Survey
United States
Department of Interior

Signature

By (acting) **Date:** 3/5/2018
Name: Eric G. Reichard
Title: Director, USGS California Water Science Center

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Signatures

By _____ **Date:** 3/28/18
Name:
Title:

By_____ **Date:** _____
Name:
Title:

By_____ **Date:** _____
Name:
Title:

ANTELOPE VALLEY
STATE WATER CONTRACTORS ASSOCIATION

COMMISSION MEMORANDUM

DATE:	July 16, 2018	**July 19, 2018**
TO:	AVSWCA Commissioners	**Commission Meeting**
FROM:	Matthew Knudson, General Manager Peter Thompson II, Assistant General Manager	
RE:	***AGENDA ITEM NO. 10 - CONSIDERATION AND POSSIBLE ACTION ON APPROVAL OF PROFESSIONAL SERVICES AGREEMENT WITH KENNEDY/JENKS CONSULTANTS FOR THE PREPARATION OF THE FEASIBILITY STUDY AND ENVIRONMENTAL DOCUMENTATION FOR THE IMPLEMENTATION OF THE BIG ROCK CREEK GROUNDWATER RECHARGE PROJECT IN THE NOT-TO-EXCEED AMOUNT OF $236,951.00.***	

Recommendation:

Association staff and the member agency General Managers recommend the Commissioners:

1. Approve a professional services agreement in the not-to-exceed amount of $236,951.00 for Kennedy/Jenks Consultants to prepare a Feasibility Study and Environmental Documentation for the implementation of the Big Rock Creek Groundwater Recharge Project; and

2. Authorize the General Manager to execute the professional services agreement upon acceptance by legal counsel for same.

Background:

Association staff distributed a Request for Proposal (RFP) on May 12, 2018 to a total of six qualified engineering firms. Two of the six firms provided proposals (Carollo Engineers and Kennedy/Jenks Consultants). The following is a summary of the two proposals received:

	Project Fee	*Alternative Scope*	*Monitoring Well*	*Schedule*
Carollo	$193,703	N/A	N/A	6-Months
Kennedy/Jenks	$236,951	$413,941	$49,215	9-Months

Staff is recommending to award a contract to Kennedy/Jenks to perform the scope associated with the "Run-of-the-River" concept. Kennedy/Jenks provided an alternative scope/fee associated with evaluating off-stream recharge using new infrastructure such as pipelines and recharge basins and engineering associated with a monitoring well. The Association would discuss these alternatives and seek Commissioner approval, only if the Run-of-the-River concept does not prove feasible or if the construction of a monitoring well is necessary. Kennedy/Jenks is being recommended based on their extensive knowledge and understanding of the Antelope Valley groundwater basin, groundwater modeling experience, proven project delivery track record, and their proposal included a "Demonstration Project" component.

COMMISSIONERS
ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION
VIA: Matthew Knudson, General Manager
Peter Thompson II July 16, 2018

Pursuant to Section 3 of the JPA, the Association shall have the power to exercise joint and common powers of its members in studying, planning, and implementing programs for coordinated utilization of the groundwater and groundwater storage capacity of the Antelope Valley.

The Association staff will be responsible for Project Administration, including project management, communication, and coordination between the member agencies and Kennedy/Jenks Consultants.

Financial Impact:

Per the approved MOU for this project, the total project feasibility and CEQA phase costs shall be borne by the agencies according to the following percentages:

a. Antelope Valley-East Kern Water Agency: 47.5%
b. Littlerock Creek Irrigation District: 5.0%
c. Palmdale Water District: 47.5%

Based on these percentages, the following is a breakdown of the financial commitment necessary from the member agencies:

d. Antelope Valley-East Kern Water Agency: $112,552
e. Littlerock Creek Irrigation District: $ 11,847
f. Palmdale Water District: $112,552

June 19, 2018

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Proposal for a Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

Direct Recharge of the Pearland Subbasin within Big Rock Creek

Kennedy/Jenks Consultants

Kennedy/Jenks Consultants

Engineers & Scientists

300 North Lake Avenue, Suite 1020
Pasadena, CA 91101
626-568-4300
FAX: 626-683-8938

June 19, 2018

Mr. Matthew Knudson, General Manager
Mr. Peter Thompson II, Assistant General Manager
Antelope Valley State Water Contractors Association
c/o Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

SUBJECT: PROPOSAL FOR PREPARATION OF FEASIBILITY STUDY AND ENVIRONMENTAL DOCUMENTATION FOR THE IMPLEMENTATION OF THE BIG ROCK CREEK GROUNDWATER RECHARGE PROJECT

Dear Mr. Knudson and Mr. Thompson,

With the investments the member agencies of the Antelope Valley State Water Contractors Association (AVSWCA) have made in the State Water Project (SWP) supply and implementation of the Adjudication, the Big Rock Creek Groundwater Recharge Project (Project) represents a great opportunity to maximize utility of the SWP supply, when available, and recharge the groundwater basin. The Project will serve as a great complement to the other groundwater banking programs in the Antelope Valley and will help secure the Valley's water supplies for the foreseeable future.

Under the leadership of our proposed Project Manager, David Ferguson, Kennedy/Jenks Consultants has worked with the Antelope Valley-East Kern Water Agency (AVEK) and the Palmdale Water District (PWD) to plan and implement several of the groundwater banking projects in the Antelope Valley over the past decade, including the AVEK Westside and Eastside Water Banks, and the Palmdale Regional Groundwater Recharge and Recovery Project. We intend to bring forth our experience and lessons learned from these projects for the benefit of the Project, including our extensive groundwater modeling experience that will provide accurate and efficient planning.

In addition, **our proposed project approach will maximize cost effectiveness and fast track implementation** by utilizing a **demonstration project** to evaluate the feasibility and effectiveness of utilizing Big Rock Creek for conveyance and recharge, which requires no significant new facilities and represents one of the best alternatives for the Project. If the demonstration project is proven successful, the AVSWCA can proceed to full-scale implementation by mid-2019.

We are ready to begin immediately and look forward to working with you on this important project and are committed to its success. Please contact me at (626) 568-4302 or email at DavidFerguson@kennedyjenks.com should you have any questions regarding our proposal.

Sincerely,

KENNEDY/JENKS CONSULTANTS

David Ferguson, Ph.D., P.E.
Project Manager, Vice President

Harold Glaser, P.E.
Principal-in-Charge, Vice President

Table of Contents

Kennedy/Jenks Consultants

A. BASIC QUALIFICATIONS

Nearly 20 Years of Trusted Groundwater Planning and Design Services in the Antelope Valley

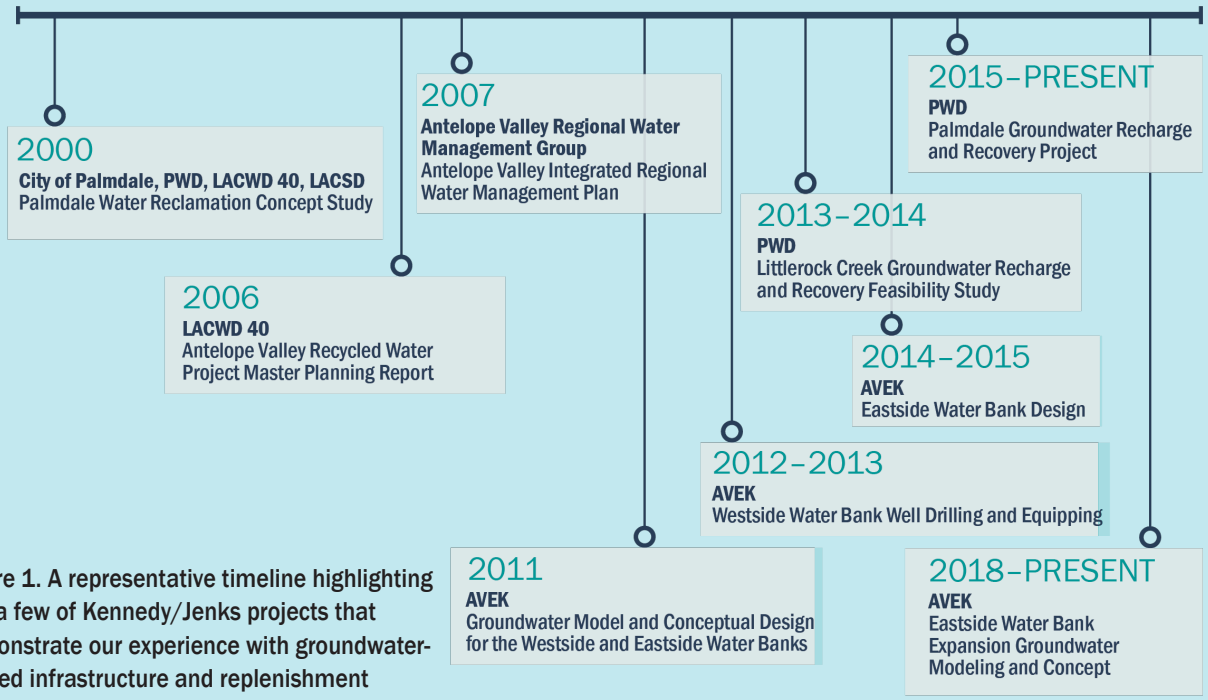


Figure 1. A representative timeline highlighting just a few of Kennedy/Jenks projects that demonstrate our experience with groundwater-related infrastructure and replenishment programs.

ABOUT KENNEDY/JENKS

Kennedy/Jenks Consultants (Kennedy/Jenks) is a leader among the nation's water consulting firms, providing planning, design, and construction management.

Our more than 380 professionals and support staff in 30 offices across the United States provide services including master planning; recycled water programs; systems evaluation; hydraulic modeling and geographic information systems (GIS); capacity studies; asset management; financial planning; preliminary design; pilot and plant-scale studies; design standards; design and analysis for water treatment, distribution, and storage; conveyance systems planning and design; design/build; operational assistance; and facilities monitoring. We have been involved in water resource planning in the Antelope Valley, California for 20 years, and are familiar with important water resource issues.

99 Years of California Groundwater Experience

Kennedy/Jenks also has significant experience in the planning, design, and construction of groundwater banking and recharge projects. These projects have included analysis and design of infrastructure such as canals, pipelines, lift stations and wells, and construction management. **Kennedy/Jenks has been providing water resource engineering and groundwater development services to California clients since 1919.** Specifically, we have provided groundwater services for clients including Calleguas Municipal Water District (Calleguas), Antelope Valley-East Kern Water Agency (AVEK), Los Angeles Department of Water and Power, and the Palmdale Water District (PWD). **David Ferguson, Ph.D., P.E., will serve as Project Manager for this project and brings 38 years of experience with water supply projects.** Detailed resumes highlighting relevant experience for David and the rest of the team members are located in Appendix 2.

From left to right: David Ferguson, Mike Flood, AVEK Assistant General Manager, and James Stahl , AAEES Board of Trustees President

Kennedy/Jenks Wins 2015 Grand Prize for Groundwater Banking Excellence

Kennedy/Jenks was awarded the 2015 Grand Prize for environmental sustainability from the American Academy of Environmental Engineers and Scientists (AAEES) in recognition of our excellence in engineering provided for the **AVEK Westside Water Bank project.**

Kennedy/Jenks, **lead by our proposed Project Manager, David Ferguson,** provided engineering services to create a water bank to achieve both water supply stabilization and water quality compliance using a secondary water supply for AVEK. The completed project consists of the development of a 1,500-acre groundwater recharge and extraction well field and delivered 15,000 ac-ft in 2014.

B. SPECIFIC QUALIFICATIONS

A TEAM WITH PROVEN EXPERIENCE AND LOCAL KNOWLEDGE

We have assembled an outstanding team with in-house specialists to maintain continuity with the past bringing an unmatched understanding of local and statewide water issues. Our specialists have focused their careers on evaluating and implementing projects that develop reliable water supplies. **Our team will provide AVSWCA with the right balance of in-depth local knowledge of your stakeholders and your groundwater recharge project in addition to a comprehensive understanding of local, regional, and statewide water resource issues.**

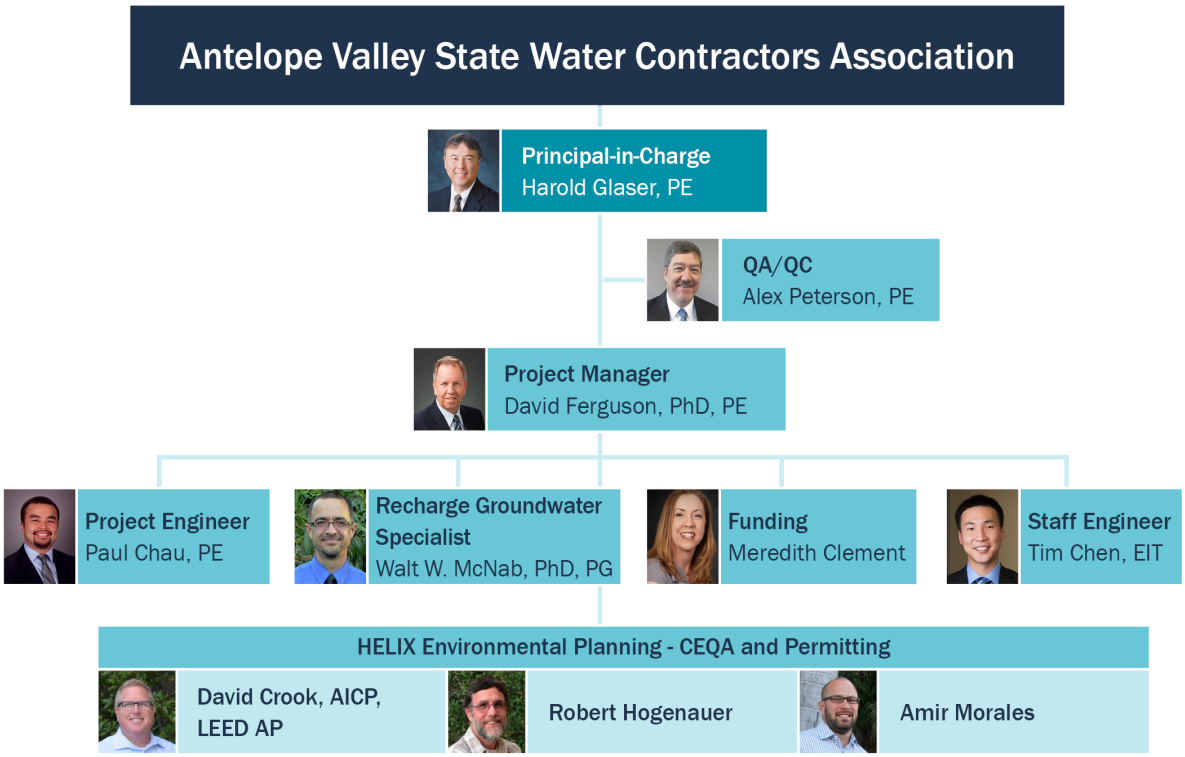
As Project Manager, David Ferguson will be leading this effort. David is a seasoned Project Manager with experience in the planning, design, construction, and operation of water supply, infrastructure, and treatment projects. He has served as Project Manager for the AVEK Westside and Eastside Water Banks and the PWD Palmdale Regional Groundwater Recharge and Recovery Project.

Harold Glaser will serve as Principal-in-Charge, has directed a wide range of projects, and has extensive experience in civil and environmental engineering and management consulting. His project experience includes water, wastewater, stormwater, and flood control facilities, so he is well versed on the mechanisms of a wide range of water projects. Alex Peterson, our proposed Quality Assurance/Quality Control (QA/QC) leader will work along side Harold to assist David in providing team oversight. Alex supported David on the AVEK water banks and the PWD Palmdale Groundwater Recharge and Recovery Project.

Organization Chart

The organization chart below in **Figure 2** identifies the roles and reporting structure of the staff assigned to our team. Together, we bring you a tremendous breadth and depth of expertise on the latest and most innovative conveyance infrastructure, groundwater recharge, and reuse projects to enhance local water supplies. Brief bios for key team members can be found on page 3 followed by a firm bio describing the qualifications of our team member subconsultant HELIX Environmental Planning who will provide CEQA services and permitting.

Figure 2. Organization Chart

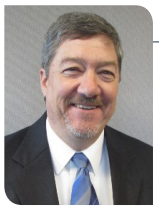


David Ferguson, Ph.D., P.E. | Project Manager | *Percentage of Involvement - 20%*

As Project Manager, David Ferguson will proactively manage the project and provide scope, schedule and budget monitoring and will be responsible for staffing the project. He will provide the day-to-day management and will be in regular contact with AVSCWA. David has 38 years of experience in the planning, design, construction, and operation of water supply, infrastructure, and treatment projects. His background includes project and program management, as well as management of engineering and operations for three large water utilities in Southern California. His recent experience includes serving as Project Manager for multiple conjunctive-use projects including the Westside Water Bank (Phases 1 and 2) and Eastside Water Bank for AVEK (Phases 1 and 2), and the Palmdale Regional Groundwater Recharge and Recovery Project for PWD. David's work with PWD to develop a viable strategy to recharge the groundwater basin of the Littlerock Creek using tertiary treated wastewater, demonstrated his ingenuity in combining technology, the natural environment, and an available resource to meet a client's needs.

Harold Glaser, P.E. | Principal-in-Charge | *Percentage of Involvement - 5%*

As Principal-In-Charge, Harold Glaser has the authority to adjust execution of the work being performed by Kennedy/Jenks to ensure AVSWCA's needs are met through each milestone. Harold has extensive experience in civil and environmental engineering, information technology, and management consulting. His emphasis is on projects related to planning; design; construction management; and evaluation of water, wastewater, storm water, and flood control facilities. He has served on the quality management team simultaneously for consultant projects performed for the Los Angeles Department of Water and Power, and the Metropolitan Water District of Southern California. He recently served as Principal-in-Charge for the recent water banking projects with AVEK and PWD, working in conjunction with David Ferguson. In those roles, he has had oversight responsibility for client service, project management, delivery, and performance of all technical assignments for these agencies. Harold's comprehensive water system design and management experience will benefit project quality and execution.



Alex Peterson, P.E. | Quality Assurance/Quality Control | *Percentage of Involvement - 10%*

Alex Peterson will provide creative and innovative perspective as part of the QA/QC process to deliver high-value additional benefits through collaboration and broad spectrum-based technical review. Alex is a registered civil engineer with 33 of years experience as an engineering consultant. He has extensive expertise in planning, design, bidding, and construction of water resources related to infrastructure projects. Alex has managed water system projects including well siting and drilling, well equipping, groundwater treatment, surface water treatment, booster pumping, steel reservoirs and transmission/distribution system improvements. Some of his experience includes the Westside and Eastside Water Banks for AVEK.

Paul Chau, P.E. | Project Engineer | *Percentage of Involvement - 30%*

As Project Engineer, Paul Chau will be responsible for the day-to-day technical execution and implementation. He will work directly with David Ferguson to assure that the project milestones are met and that efforts are within the negotiated budget. Paul is a licensed civil engineer with extensive experience in conjunctive use, reuse, and water banking projects in Southern California. He served as Project Engineer for the PWD Palmdale Regional Groundwater Recharge and Recovery Project and the San Bernardino Valley Municipal Water District Bunker Hill Conjunctive Use Project.In addition, he has extensive water infrastructure planning and design experience, including pipelines, pump stations, and reservoirs.

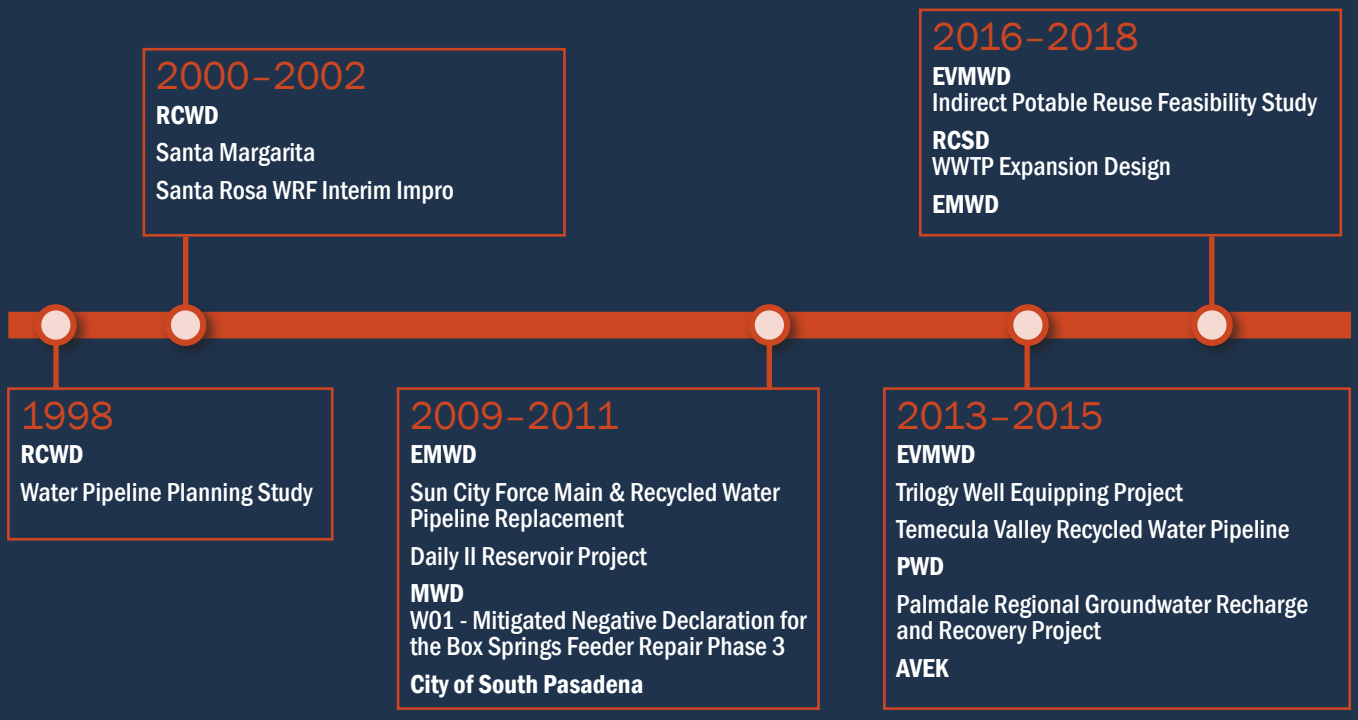
Walt W. McNab, Ph.D., P.G. | Recharge Groundwater Specialist | *Percentage of Involvement - 35%*

As Recharge Groundwater Specialist, Walt McNab will be responsible for groundwater modeling to evaluate hydrogeological feasibility of the project alternatives. Walt is an environmental geoscientist with over 22 years of experience as a Project Manager, Researcher, and Consultant. His interests and experience span a wide range of issues in physical and chemical hydrogeology and soil science, particularly those involving coupled process phenomena. He has developed and applied numerical, analytical, and semi-analytical methods for simulating flow and transport processes in porous media to problems entailing variably-saturated fluid flow and reactive transport in a variety of environmental settings. He has also worked extensively with geochemical process models, addressing issues such as oxidation-reduction phenomena, mineral and gas phase equilibria, cation exchange, the effects of surface complexation on trace element mobility, and reconciliation of multiple environmental data sets (e.g., groundwater age data, artificial tracer data, stable isotope data) with major geochemical parameters. Walt served as our groundwater modeling specialist for all three recent water banking projects with AVEK and PWD.

WORKING TOGETHER FOR OVER 25 YEARS

Successful projects are delivered by collaborating with the right team member firms with the necessary experience. We have teamed with HELIX Environmental Planning, Inc. (HELIX) to provide CEQA and permitting services for this project. With a highly experienced group of professionals and over 25 years of experience working with Kennedy/Jenks, HELIX brings a vast amount of knowledge and expertise in addition to a strong working relationship. The timeline in Figure 3 below illustrates previous, similar projects on which we have worked with HELIX.

Figure 3.



HELIX Environmental Planning

HELIX Environmental Planning

HELIX is a full-service environmental consulting firm with over 25 years of experience providing high-quality services throughout southern California. HELIX's technical staff includes environmental planners, biologists, permitting specialists, archaeologists, and specialists for habitat restoration, acoustics, and air quality. Primary disciplines provided by HELIX include California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) compliance; permitting; biological, cultural, acoustical, visual, and air quality/greenhouse gas (GHG) emissions studies; compliance monitoring; and native habitat restoration design, construction, and maintenance. The firm has provided environmental compliance services on over 200 water and wastewater projects to include groundwater extraction/replenishment, treatment plants, water storage/reservoirs, pump stations, and pipelines. HELIX has a long, successful working history with Kennedy/Jenks. Relevant projects include the AVEK Banking and Blending project and the PWD Groundwater Recharge and Recovery project.

PROVEN EXPERIENCE DELIVERING SUCCESSFUL PROJECTS TO OUR CLIENTS

The following section highlights just a few of Kennedy/Jenks' projects that address the scope described in your RFP. We feel these projects demonstrate our firm's experience of groundwater related infrastructure and replenishment programs to efficiently identify the most feasible groundwater recharge options for the Big Rock Creek.

GROUNDWATER BANKING PROGRAM, ANTELOPE VALLEY-EAST KERN WATER AGENCY (AVEK), PALMDALE, CA

AVEK is implementing an $80 million water banking program with a twofold objective: (1) water supply stabilization, and (2) regulatory compliance with the Stage 2 Disinfectants/ Disinfection ByProducts (D/DBP) Rule; specifically trihalomethane (THM) control with free chlorine as the distribution system secondary disinfectant. The program includes multiple phases for a large Westside Water Bank and a smaller Eastside Water Bank.

The Westside Water Bank was constructed on a 1,475-acre agricultural property in west Lancaster, California. The water bank includes 500 acres of agricultural field flooding (low berm recharge basins) with a capacity to spread up to 50,000 ac-ft/ year, and 11 potable recovery wells with a capacity of 20 to 30 mgd depending on aquifer water levels. AVEK completed construction of the Phase 1 wells in early 2014, with Phase 2 (the newest two wells) in 2017. Kennedy/Jenks performed the Conceptual Design Report, blending water quality evaluation, groundwater modeling, and the well drilling design and field observation. AECOM designed the pipelines with Kennedy/ Jenks as a subconsultant for the design of well equipping and the treatment site facilities (including two 4.0 mg steel tanks).

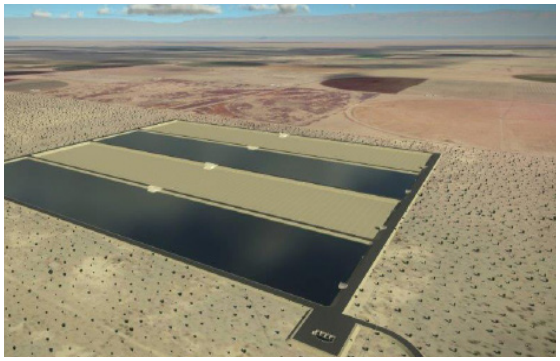
The Eastside Water Bank was constructed on an 80-acre site in Littlerock, California with 6 acres of recharge basins designed to recharge 4,000 ac-ft/year and 3 potable recovery wells with a capacity of 5 mgd. In addition to supplying AVEK's Eastside water treatment service area, the project has the capability to pump back to the East Branch of the State Water Project. Currently, Kennedy/Jenks is working on the groundwater modeling and concept design for a substantial expansion.

Over the past seven years, Kennedy/Jenks has prepared design reports for both the Westside and Eastside water banks and served as the designer engineer for eight bid packages including well drilling, well equipping, pump station and chlorination facilities, storage tanks, and pipelines with a construction value of $40 million. Kennedy/Jenks provided construction management for four of the projects and office engineering for all eight projects.

Project Highlights

- Large-scale groundwater recharge and recovery program.
- Hydraulics, geotechnical, and hydrogeology evaluations and analyses.
- DDW permitting.
- Conveyance, recharge basins, recovery wells, and disinfection design.
- Control strategy and operations plan.

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT, PALMDALE WATER DISTRICT, PALMDALE, CA



The Palmdale Water District (PWD) is developing a water banking program with new spreading grounds to recharge imported water and recycled water, and recovery facilities to meet future water demands. The Antelope Valley Groundwater Basin has been in continuous overdraft since about 1930 with an estimated 5.8 million acre-foot decrease in groundwater storage in the three sub-basins underlying PWD's service area. The Littlerock Creek is one of three creeks that provide the majority of recharge to the Antelope Valley and runs through much of the service area, as well as across the East Branch of the State Water Project aqueduct.

The proposed Palmdale Regional Groundwater Recharge and Recovery Project (PRGRRP) will deliver raw water from the East Branch to new spreading basins in or adjacent to the Creek. Off-stream recharge basins may be used to supplement or replace in-stream recharge and will be required should recycled water be included. **The Kennedy/Jenks team has developed 10 alternatives for further evaluation. Two of the alternatives utilized "Run-of-the-River" concept, with Littlerock Creek as the conveyance and recharge medium.** The remaining eight alternatives utilize pipeline conveyance to eliminate losses in the creek, potential high groundwater in adjacent quarries, and the need for a diversion structure in the active channel to cross a major surface street that floods when the creek is active. Four refined alternatives were shortlisted for additional evaluation including capital and O&M costs.

Valley-wide water demand and supply update for an integrated banking plan. The project included an update by Kennedy/Jenks of valley-wide water demands presented as a Technical Memorandum. PWD will work closely with several partners, including Antelope Valley-East Kern Water Agency (AVEK), Littlerock Creek Irrigation District, and others, on the availability and timing of recharge supplies in the East Branch. The development and evaluation of recharge and recovery alternatives included an in-depth evaluation of the hydrogeology, geology, and infrastructure requirements to convey raw water, recharge in areas that support PWD's existing groundwater wells and new recovery wells.

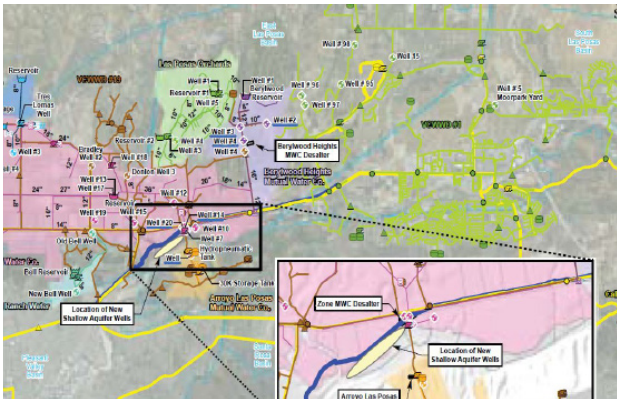
Modeling effort confirming viability of water banking. The development and evaluation of recharge and recovery alternatives included an in-depth evaluation of the hydrogeology, geology, and infrastructure requirements to convey raw water, recharge in areas that support PWD's existing groundwater wells as well as new recovery wells. Water quality and subsidence were additional challenges that were included in a sub-regional groundwater modeling effort. This in-house modeling effort used the existing USGS MODFLOW flow and subsistence model to develop a sub-regional model to calibrate the active channel with accurate water level measurements and define recharge capacity and demonstrate the benefits of water banking. USGS's PHREEQC model code was used to estimate reactive mixing of the water quality groundwater modeling to identify and quantify the groundwater quality impacts stemming from the introduction of recharge water to the aquifer system.

Evaluated financially viable alternatives addressing project challenges to ensure stakeholder buy-in. Kennedy/Jenks used biological and cultural surveys as a "Constraints Study" and a weighted factor in alternative development and evaluation. The feasible and financially viable alternatives were refined and optimized with updated cost estimates. An implementation plan for the preferred alternative addressed the technical, regulatory, institutional, and operational challenges. Public outreach with stakeholder and community meetings are underway to ensure stakeholder buy-in.

Project Highlights

- Large-scale groundwater recharge and recovery
- Hydraulics, geotechnical, and hydrogeology evaluations/analyses
- Collaboration with external stakeholders.
- Preliminary design of pipelines, recharge basins, recovery and wells.
- Eliminated alternatives, refined final four alternatives for further evaluation, and recommended a preferred project.

LAS POSAS REPLACEMENT WATER STUDY, CALLEGUAS MUNICIPAL WATER DISTRICT AND FOX CANYON GROUNDWATER MANGEMENT AGENCY, THOUSAND OAKS, CA



A material decrease in groundwater recharge within the Las Posas Basin (Basin) is projected over the next twenty years resulting from various water resource activities in adjacent basins and effects of climate change. The majority of current groundwater use in the Basin is agricultural, and nearly a third of total water demand is met by importing water from other sources. Sustainable future water supply in the Basin is dependent on groundwater replenishment, pumping restrictions, and supplemental water sources.

The purpose of the Las Posas Replacement Water Study (Study) was to identify and evaluate potential water supply projects that could be implemented to replenish the Basin and evaluate water conveyance options to facilitate direct delivery of supplemental supplies. **Kennedy/Jenks provided CMWD and Fox Canyon Groundwater Management Agency engineering services to perform the Study, which comprised fourteen individual studies each evaluating a water supply alternative, including several alternatives that utilized Santa Clara River for conveyance and recharge of supplemental water supply.** Kennedy/Jenks developed key criteria to assess each project alternative. Results of this Study found that opportunities to diversify the Basin's water supply are regionally accessible within supply types including stormwater, treated brackish water, imported water, and recycled water, as well as invasive vegetation removal. Factors impacting the overall feasibility of an evaluated alternative include capacity and capital costs per project, and potential limitations on supply availability such as water rights, agency terms, hydrological availability, drought, and other limitations. The results also found advantages and disadvantages for each project, which are similar within a specific supply type.

Stormwater Supply – Kennedy/Jenks performed three studies to evaluate stormwater as a supplemental water source: Beardsley, Washington; Gabbert Canyon Channel Improvements; and Moorpark Wastewater Treatment Plant Percolation Basins. **These alternatives include using the Santa Clara River to convey stormwater for recharge.**

Imported Water Supply – Kennedy/Jenks performed four studies to evaluate opportunities for imported water sources. The studies included limited term supplies (transfers and leases), long term supplies (SWP Table A Purchase), various central and northern California water rights holders, and City of Oxnard Advanced Water Purification Facility water (via United Water Conservation District. **One of the alternatives includes using Piru Creek to convey recharge water from Piru Lake to the groundwater basin.**

Recycled Water Supply – Kennedy/Jenks performed two studies to evaluate Simi Valley recycled water as a supplemental water source. **One alternative included using the Santa Clara River for conveyance and recharge of recycled water.**

Treated Brackish Water Supply – Kennedy/Jenks performed four studies to evaluate treated brackish water from mutual water companies as a supplemental water source: Arroyo Las Posas, Berylwood Heights, Zone, and East Las Posas (conveying from Moorpark Desalter).

Arundo Removal – Kennedy/Jenks performed a study to evaluate removal of an invasive plant species from Arroyo Las Posas and Arroyo Simi and its estimated effect on groundwater recharge.

Project Highlights

- Evaluation of "Run-of-the-River" alternatives for groundwater recharge.
- Basin characterization for safe yield, recharge, and groundwater pumping.
- Water quality evaluations of TDS and chloride levels.
- Development of new water supply alternatives.
- Hydraulic analysis of conveyance options.
- Capital, O&M, and unit cost estimates.
- Economic analysis over 25 years preliminary design of pipelines, recharge basins, recovery and wells.

UPPER VDC CONJUNCTIVE USE OPTIMIZATION STUDY, RANCHO CALIFORNIA WATER DISTRICT, TEMECULA, CA

Rancho California Water District's (RCWD) Recharge and Recovery Program at the Upper VDC was implemented in 1998 when imported water from Metropolitan Water District was first available on a regular basis and pumping began in local recovery wells.

Kennedy/Jenks was retained by RCWD to develop an optimized recharge and recovery strategy to allow for increased production and improved operations at the Upper VDC. Kennedy/Jenks performed the following:

- Reviewed existing operational data and permit requirements for possible permit amendment to optimize recharge and recovery operations
- Evaluated alternative conveyance facility plan scenarios to convey this increased production of potable water supply from the Upper VDC to the distribution system
- Developed a disinfection improvement plan to accommodate increased production
- Evaluated economics of project alternatives to confirm feasibility of increased improvements required to increase production
- Recommended a capital improvement program with phasing

With years of operational information and sampling data available on the performance of the recharge and recovery operations, a permit amendment from DDW was granted eliminating the 40-foot depth-to-groundwater requirement for the well operations at the Upper VDC and eliminating the groundwater under the direct influence of surface water requirements. This now allows RCWD to recharge and recover larger volumes of water to significantly reduce water supply cost compared to purchasing treated water and meanwhile reduce operational and production costs on existing operations.

Following the study, Kennedy/Jenks designed the Phase 1 improvements which included a new 5-foot high berm, re-grading of pond bottoms to direct recharge to the recovery wells, three new pond discharge outlets, 1,900 LF of 36-inch diameter raw water pipeline, and 1,000 LF of 24-inch diameter treated water pipeline.

Project Highlights

- Optimization of imported water recharge with built recharge basins
- Water quality study and permitting support
- Performed alternatives analysis, including economic evaluation

BUNKER HILL BASIN CONJUNCTIVE USE PROJECT, SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, SAN BERNARDINO, CA

San Bernardino Valley Municipal Water District (SBVMWD), in cooperation with water agencies throughout the Santa Ana River Watershed and in cooperation with agencies in its service area has been developing the Bunker Hill Conjunctive Use Program, as a component of the Santa Ana River Conservation and Conjunctive Use Program. The program will benefit the retail water agencies within SBVMWD's service area by recharging and storing wet year water for later extraction in dry years.

Kennedy/Jenks performed the preliminary design of the Bunker Hill Basin Conjunctive Use Project (CUP) to determine the physical systems necessary to enhance water supply reliability for the region, and performed a cost allocation study to determine the equitable cost allocation of the CUP based on potential benefits received by the stakeholders which consisted of the following:

- Evaluating various pipelines alignment to convey up to 80,000 AFY of extracted groundwater from the Bunker Hill Basin to the Texas Grove reservoir site.
- Determination of the project facilities and capital and operating costs of the CUP in accordance with the results of the hydrogeological analysis.
- Developing a phasing plan for an initial production of 40,000 AFY and an ultimate production of 80,000 AFY and consisting of up to 12 production wells.
- Evaluating alternative cost allocation methodologies and providing the framework for how the proposed CUP project costs will be allocated amongst the participants.
- Providing coordination and support in the development of an operations and governance plan including stakeholder facilitation.

Project Highlights

- Water banking/conjunctive use
- Operations and governance plans
- Stakeholder facilitation
- Planning and preliminary design
- Division of Drinking Water coordination

C. APPROACH TO PROJECT

Project Understanding

The Antelope Valley Groundwater Basin has been in continuous overdraft since about 1930. With adjudication now in place and groundwater production being curtailed in the future, the Antelope Valley State Water Contractors Association (AVSWCA) is interested in evaluating the feasibility of implementing a groundwater recharge project within Big Rock Creek. The recharge water supply would be State Water Project (SWP) water from the East Branch of the California Aqueduct, with allocations provided by the member agencies of the AVSWCA. The recharged (banked) water would then be available as additional groundwater pumping rights for the respective AVSWCA agencies to pump using their existing wells in the Pearland Subbasin, or elsewhere with the approval of the Watermaster.

Project Approach

KENNEDY/JENKS' APPROACH TO THIS PROJECT IS TO UTILIZE A STEP-WISE FEASIBILITY ANALYSIS THAT MAXIMIZES COST-EFFECTIVENESS, STREAMLINE IMPLEMENTATION AND EASE PERMITTING COMPLIANCE FOR AVSWCA.

Recharge within the Big Rock Creek area can be generally categorized into two categories: in-stream ("Run-of-the-River") and off-stream (infrastructure) recharge. Based on the limited information available at this point of the project, it appears that a "Run-of-the-River" concept, which utilizes Big Rock Creek for both conveyance and recharge, will provide AVSWCA with the most benefits. In comparison to an infrastructure project for off-stream recharge, the "Run-of-the-River" concept has several advantages and benefits as illustrated in **Table 1** below.

With two existing SWP metered blow-offs, utilization of Big Rock Creek for recharge, and assuming the member agencies use their existing extraction wells for recovery of the recharge water; no significant new facilities will be required for the "Run-of-the-River" concept. This will not only save AVSWCA money, but will minimize disturbance to the environment, which will make CEQA environmental compliance and permitting much simpler and allow the project to be implemented on a shorter timeframe.

Table 1. Comparison of benefits and CEQA/permitting compliance requirements for the Run-of-the-River concept versus an infrastructure concept.

Run–of–the–River Concept		Built Infrastructure Project	
APPROACH	**BENEFITS**	**APPROACH**	**BENEFITS**
Utilize Big Rock Creek for conveyance and recharge	No new infrastructure required Fewer environmental impacts Simpler permitting compliance	Construct new infrastructure for conveyance and recharge	More control of conveyance and recharge
PERMITTING/ CEQA REQUIRED		**PERMITTING/ CEQA REQUIRED**	
• Biological Constraints Study • Cultural Resources Study • CDFW Section 1602 Permit • SWRCB Section 401 Permit		• Biological Constraints Study • Cultural Resources Study • Air Quality Analysis • Greenhouse Gas Analysis • Noise and Vibration Analysis • CDFW Section 1602 Permit • SWRCB Section 401 Permit • USACE Section 404 Permit	

If it can be proven that a "Run-of-the-River" concept is feasible and meets all of the AVSWCA's objectives, then evaluating other alternatives will not be necessary, saving AVSWCA time and money. Therefore, in the first step of this project, we propose using a limited **Demonstration Project** to evaluate the feasibility of the "Run-of-the-River" concept. The demonstration project would consist of recharging 40 AF/day (20.2 cfs) of SWP water through the two existing blow-offs on the east edge of Big Rock Creek over a period of 90 days for a total of 3,600 AF. Our team will assist the AVSWCA with obtaining any required permits for the Demonstration Project. Our preliminary analysis indicates that an environmental compliance review is not required for the temporary Demonstration Project. The 90-day Demonstration Project would look to evaluate the following objectives:

Demonstration Project Objectives

Evaluate Effective Recharge Rate

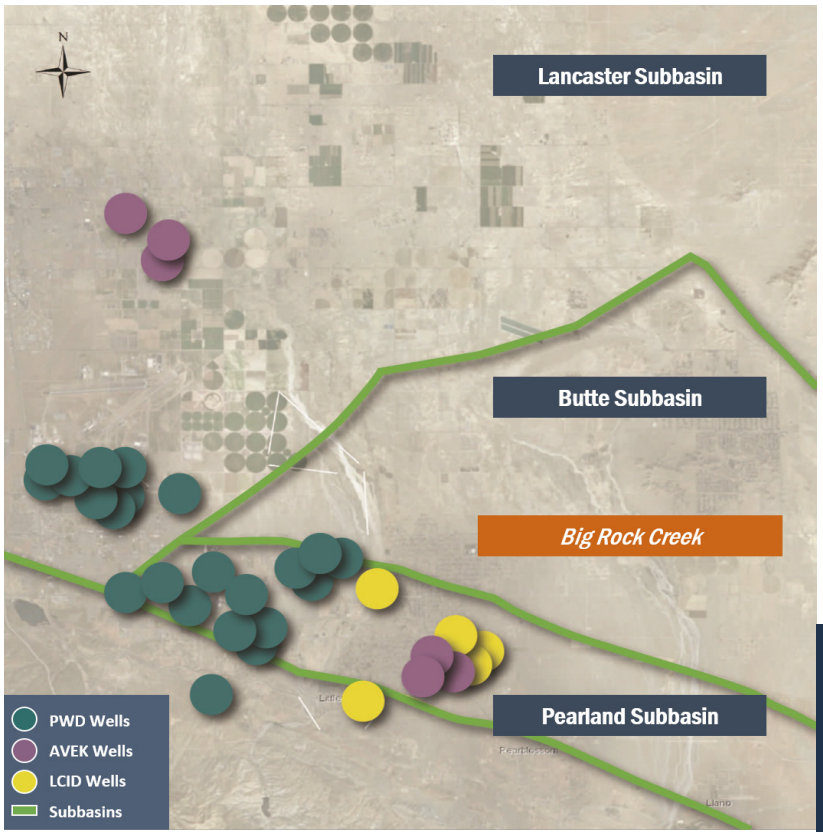
By utilizing existing local monitoring wells or constructing a new monitoring well, the impact of recharging water on local groundwater level will be evaluated. Using a water balance approach, the amount of recharge water that recharges the aquifer will be approximated. This will provide meaningful data for the Watermaster to determine the recharge credit percentage for the project.

Evaluate Impact to Local Quarry

Using field data and the hydrogeological model, the horizontal rate of percolation will be determined. Additionally, it will be determined whether or not the Vulcan Materials Company quarry located west of Big Rock Creek and south of the railroad tracks will be impacted by the project.

Determine Reach of Groundwater Recharge and Surface Water Discharge

It will be most advantageous to the AVSWCA member agencies if the recharge water is localized at the Pearland Subbasin, where the member agencies have existing extraction wells, as shown on Figure 5 below. This will also avoid impacts to Avenue T, which is located approximately one mile downstream of the Pearland/Butte Subbasin and does not have a grade separation from Big Rock Creek. Any surface water at this location will flood the street.



A figure summarizing the considerations for the Demonstration Project is provided in **Figure 6** on the next page. Following the Demonstration Project, we will evaluate data collected from the demonstration to determine if the "Run-of-the-River" concept will meet AVSWCA's objectives for the project. If the objectives are met and AVSWCA agrees to move forward with this concept, our team will provide the environmental compliance and permitting support to bring the project towards full scale operation. Our **base scope of work** is based on testing and implementation of the "Run-of-the-River"concept.

Figure 5. *AVSWCA member agencies own extraction wells in the Pearland Subbasin, but not the Butte Subbasin. The focus will be on project recharge water in the Pearland Subbasin to receive recharge credit for the member agencies' existing wells.*

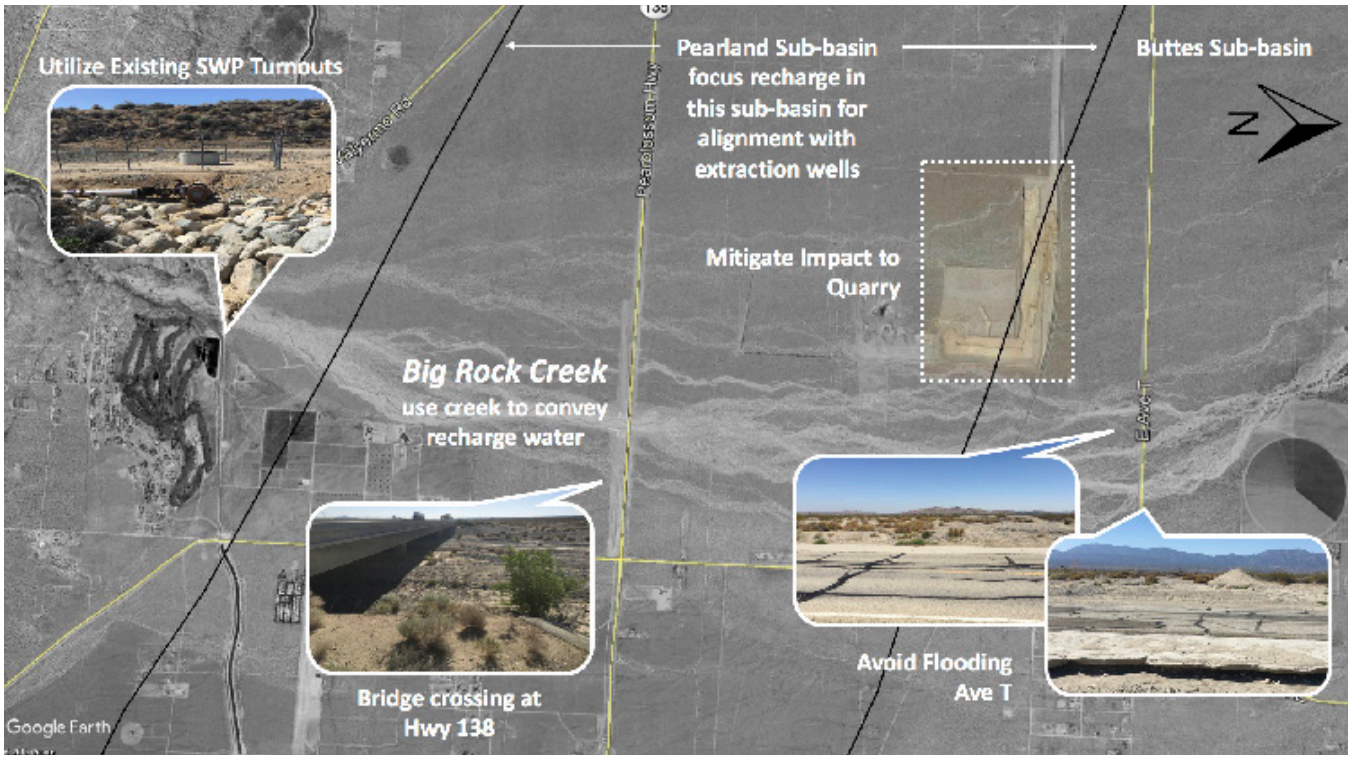


Figure 6: *Considerations for the "Run-of-the-River" concept that will help determine feasibility of the alternative.*

If the "Run-of-the-River" concept is proven to be not desirable for AVSWCA, then we will execute our **alternative scope of work**, which will focus on evaluating alternatives for off-stream recharge using new infrastructure such as pipelines and recharge basins. A facility comparison of our base and alternative scopes of work are shown in **Figure 7**.

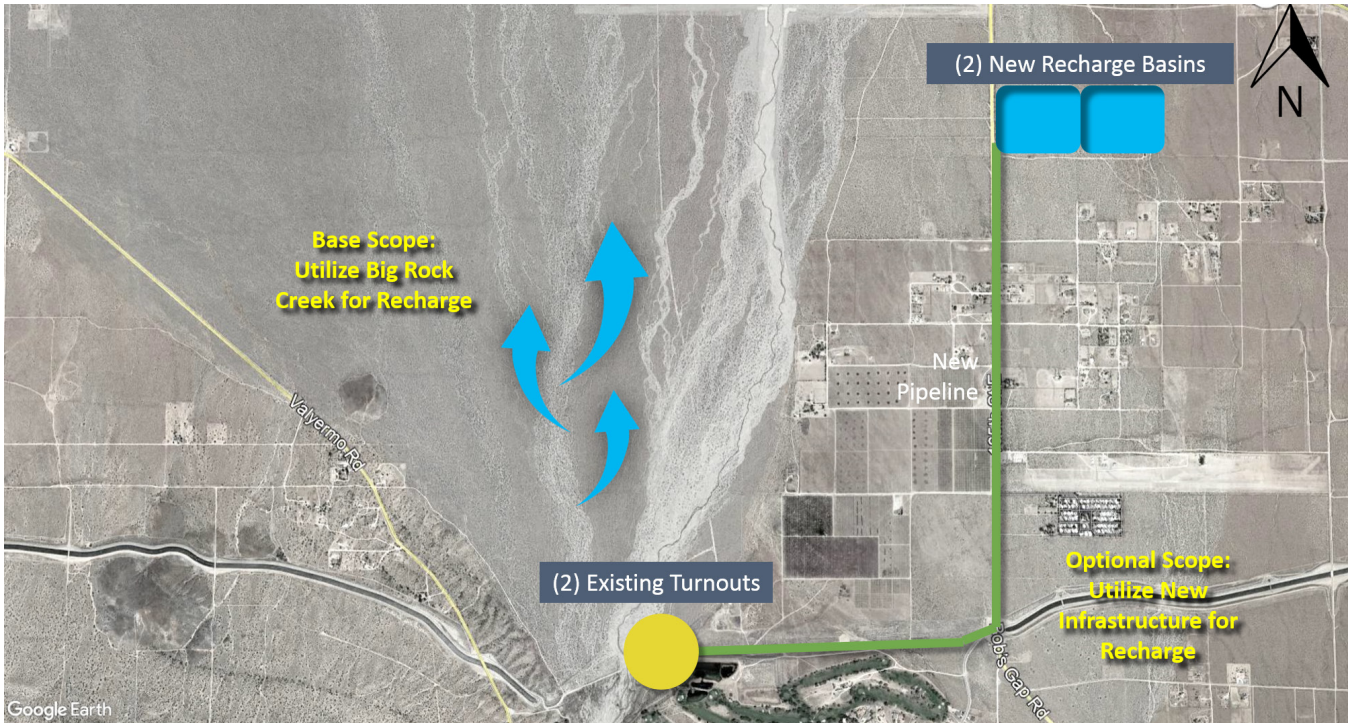


Figure 7: *Facility Comparison of Base Scope of Work ("Run-of-the-River" concept) and Alternative Scope of Work (Infrastructure project)*

Extensive Local Hydrogeological Modeling Experience Provides Confidence in Project Planning

Kennedy/Jenks has extensive experience using the U.S. Geological Survey (USGS) MODFLOW model of the Antelope Valley to assess the recharge capacity during the Westside and Eastside water banking projects for AVEK and the Palmdale Regional Groundwater Recharge and Recovery Project for PWD.

Utilizing lessons learned, our hydrogeological approach for the project will follow a similar process to develop a subregional and local groundwater model derived from the basin-wide USGS model. This benefits AVSWCA as a time- and cost-effective process allowing for rigorous analysis of the project site without having to simulating the entire basin.

For the proposed "Run-of-the-River" concept, the USGS's recent MODFLOW groundwater model encompassing much of the Antelope Valley provides a useful framework to simulate groundwater banking and extraction. This model, employing a 1-km grid resolution, includes representations of important hydrogeological features such as mountain-front recharge from the San Gabriel Mountains to the south, spatial variability in hydraulic conductivity, major horizontal flow barriers (faults), pumping, and evapotranspiration. While parameterization has been calibrated to various data sets (e.g., historic groundwater elevation data), the model is focused over a broad area, so local-scale heterogeneities may not always be represented. This particular issue is currently being explored in the context of the proposed PRGRRP recharge basin in the Lancaster Basin for the Palmdale Water District.

This limited characterization includes a very coarse vertical discretization in the model, in some areas consisting of a single layer. Consequently, while employing a modified version of the MODFLOW model to predict the performance of the "Run-of-the-River" concept (as described below), sensitivity of model results to parameter assumptions will comprise a key focus of the assessment.

Special Modifications to Accurately Model the "Run-of-the-River" concept

In the existing USGS MODFLOW model, recharge from Big Rock Creek is simplified as broad-scale, mountain-front recharge. To provide process fidelity for the "Run-of-the-River" concept, the Surface Water (SWR) Process module will be added to the model to directly simulate transient recharge events. The resultant model will be based on discharge fluxes in the creek, streambed morphology, and coupling with the existing Unsaturated-Zone Flow (UZF) package for MODFLOW (as currently employed in the model).

We will use one of Kennedy/Jenks' two drones, nicknamed Osprey and Condor, to provide periodic aerial surveys of Big Rock Creek during the Demonstration Project to analyze the extent of the wetted front for calibration of the hydrogeological model. The drone aerial surveys will provide a modern and cost-effective tool for gathering project data.

Additional modifications will include delineating a submodel from the Antelope Valley-wide MODFLOW model, employing appropriate boundary conditions, to reduce computational burden, as well as the addition of additional layers to improve vertical discretization. MODFLOW-NWT (i.e., the Newton-Raphson solver version of MODFLOW) will continue to be used to facilitate numerical solution of model scenarios.

Streambed morphology will be incorporated into the new submodel based on digital elevation data and aerial images. Hydraulic characteristics, such as the hydraulic conductivity of the streambed, will be calibrated to the extent practicable using multiple sources as available data permit, including:

- Soil infiltration measurements
- Past historical discharges on Big Rock Creek and downgradient extent of flooding

Once the MODFLOW submodel with SWR is in place, the efficacy of different discharge scenarios (e.g., timing and release volume) will be assessed in terms of: (1) propagation distance of resultant flood event, (2) percolation rate as a function of location, (3) travel time of the wetting front to underlying groundwater, (4) time-dependent morphology of the corresponding groundwater mound, and (5) groundwater pore velocities and travel times associated with mounding. Each scenario will entail different parameter realizations (e.g., streambed conductivity, underlying topmost layer aquifer hydraulic conductivity and specific yield) to assess sensitivity of model results.

SCOPE OF WORK

This section presents our proposed scope of work for the Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project. The scope of work is organized into a Base Scope of Work, Alternatives 1 and 2 Scopes of Work, and Optional Scope of Work. The **Base Scope of Work (Tasks 1-4)** describes the tasks associated with evaluating the "Run-of-the-River" concept. If the Demonstration Project is successful, the **Alternative 1 Scope of Work (Tasks 5 and 6)** will be executed to support environmental and permitting compliance for the "Run-of-the-River" concept. If the Demonstration Project shows that this project is not desirable, the **Alternative 2 Scope of Work (Tasks 7-11)** will be executed, which consists of tasks to evaluate infrastructure alternatives and preliminary implementation. An **Optional Scope of Work (Task 12)** item is provided for monitoring well design and implementation if a new monitoring well is required for the project.

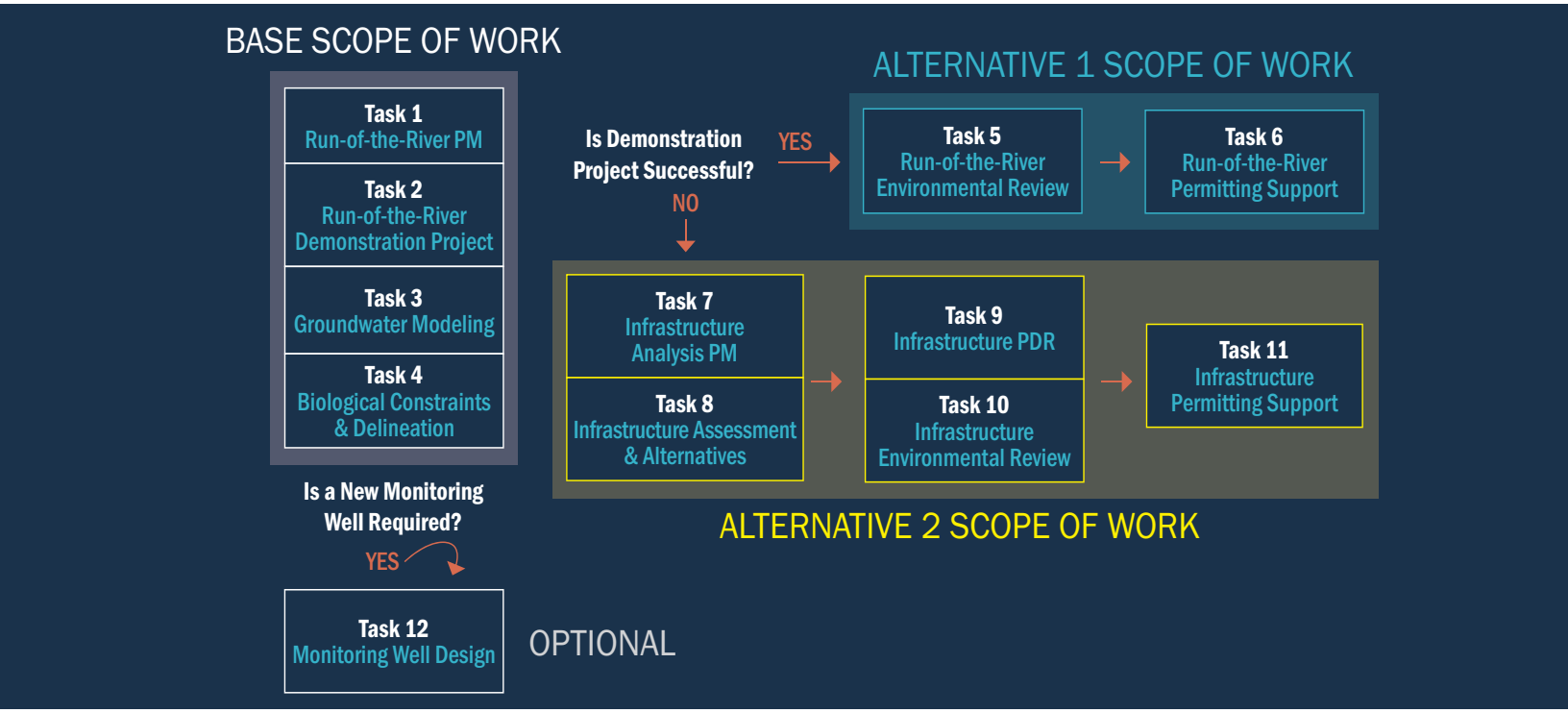


Figure 8. The flowchart describes the decision framework for executing the scope of work for the project.

BASE SCOPE OF WORK

Task 1. Run-of-the-River Concept Project Management, Communication, and Data Collection

1.1 Management and Administration

- Our proposed Project Manager, David Ferguson, will be the point of contact and will coordinate all communication with AVSWCA staff.
- Project coordination and administration will be provided, consisting of invoicing, schedule and budget monitoring, subconsultant coordination, and contract administration. The project duration is assumed to be 10 months.

1.2 Kickoff Meeting

- A kickoff meeting with AVSWCA staff to discuss study parameters, site-specific conditions, project goals, and objectives; and to obtain information such as regional planning documents and studies that may be helpful in studying this project.

1.3 Project Schedule and Monthly Progress Meetings

- Kennedy/Jenks will submit an initial schedule with milestones. The schedule will be updated monthly and will be provided at monthly progress meetings attended by our Project Manager. An agenda will be provided prior to each meeting. It is assumed that up to ten monthly progress meetings will be attended.
- Meeting miinutes will be prepared and submitted within five working days after the meeting(s).

1.4 On-Site Evaluation

- Conduct a site visit to survey and perform general evaluation of Big Rock Creek including on-site facilities, existing utilities, drainage areas, key drainage areas, and general physical and topographical characteristics.

1.5 Quality Assurance/Quality Control

- Provide quality reviews for project deliverables. Provide an internal project initiation review meeting to review project goals and objectives with Kennedy/Jenks' Chief Engineer. Provide an internal concept and criteria review meeting at 10% project completion to review methodologies and early work products.

Task 2. Demonstration Project

The purpose of this task is to develop and implement a demonstration project to determine if the "Run-of-the-River" concept, utilizing Big Rock Creek for conveyance and recharge, is feasible and meets AVSWCA's objectives for the project.

2.1 Develop Demonstration Project Test Plan

- A test plan will be provided to describe the parameters, objectives, facilities, and data gathering requirements for the Demonstration Project. Any required permits will be identified. A draft test plan will be submitted to AVSWCA and a final test plan will be provided based on AVSWCA's comments on the draft test plan.

2.2 Review Monitoring Well Data

- During and after the Demonstration Project, local monitoring well data will be reviewed to evaluate impact of recharge water on groundwater level. If a new monitoring well is required, an optional task is provided for siting and design of the monitoring well.

2.3 Drone Aerial Surveys

- Kennedy/Jenks will utilize a drone to provide aerial surveys of Big Rock Creek during a 100-day period, which consists of the 90-day Demonstration Project and 10 days afterwards. An aerial survey will be conducted every 5 days, for a total of 20 aerial surveys. The aerial surveys will be utilized to analyze the wetted front in the creek for calibration of the hydrogeological model.

2.4 Hydrogeological Analysis

- Provide hydrogeological analysis using data collected from the Demonstration Project and the hydrogeological model (Task 3.1) to evaluate performance of the "Run-of-the-River" concept relative to project objectives, consisting of:
    - Effective recharge rate
    - Impact to local quarry
    - Reach of surface water discharge
    - Travel time and direction of recharge water

2.4 Technical Memorandum

- Provide a detailed Technical Memorandum (TM) that will address the following topics:
    - Existing conditions

  - Desired project objectives
  - Demonstration Project analysis
  - Recomendations and next steps
  - SWP water availability
  - Full-scale implementation plan

- A draft TM will be provided, and a final TM will be prepared based on AVSWCA's comments on the draft TM. An electronic PDF of each TM will be provided.
- One meeting with AVSWCA staff to discuss and review comments from the TM.

Task 3. Groundwater Modeling

3.1 Hydrogeological Modeling Development

- In the existing USGS MODFLOW model, recharge from Big Rock Creek is simplified as broad-scale, mountain-front recharge. To provide process fidelity for the Run-of-the-River scenario, the Surface Water (SWR) Process module will be added to the model to directly simulate transient recharge events. The resultant model will be based on discharge fluxes in the creek, streambed morphology, and coupling with existing the Unsaturated-Zone Flow (UZF) package for MODFLOW (as currently employed in the model)
- Additional modifications will consist of delineating a submodel from the Antelope Valley-wide MODFLOW model, employing appropriate boundary conditions, to reduce computational burden, as well as the addition of additional layers to improve vertical discretization. MODFLOW-NWT (i.e., the Newton-Raphson solver version of MODFLOW) will continue to be used to facilitate numerical solution of model scenarios.
- Streambed morphology will be incorporated into the new submodel based on digital elevation data and aerial images. Hydraulic characteristics, such as the hydraulic conductivity of the streambed, will be calibrated to the extent practicable using multiple sources as available data permit, consisting of:
  - Soil infiltration measurements
  - Past historical discharges on Big Rock Creek and downgradient extent of flooding
- Once the MODFLOW submodel with SWR is in place, the efficacy of different discharge scenarios (e.g., timing and release volume) will be assessed in terms of: (1) propagation distance of resultant flood event, (2) percolation rate as a function of location, (3) travel time of the wetting front to underlying groundwater, (4) time-dependent morphology of the corresponding groundwater mound, and (5) groundwater pore velocities and travel times associated with mounding. Each scenario will entail different parameter realizations (e.g., streambed conductivity, underlying topmost layer aquifer hydraulic conductivity and specific yield) to assess sensitivity of model results.

3.2 Water Quality Modeling

- The MT3D-USGS solute transport package will be used to simulate the conservative migration of a tracer in the Big Rock Creek discharge into the aquifer as an add-on feature to the MODFLOW groundwater flow simulation. MT3D-USGS is an appropriate tool for this calculation, given its compatibility with the Unsaturated-Zone Flow (UZF) and streamflow packages. The solute transport model will be used to assess the proportion of artificially-recharged water in and around the resultant groundwater mound as a function of location and time under different discharge duration and intensity scenarios.
- Separately, the USGS's PHREEQC geochemical speciation model will be used to directly model potential water chemistry changes in response to different mixing scenarios. This will entail positing end-member water compositions for the water discharged into Big Rock Creek as well as for the underlying aquifer. Mixing proportions will reflect the results of the solute tracer simulation subtask. The model will also consider equilibrium between major ion and trace element concentrations and reactive mineral phases and surfaces in the aquifer, including carbonate minerals (pH buffers), an ion exchanger phase, and a reactive surface capable of complexing trace elements through pH-dependent competitive adsorption. All calculations will entail un-altered complexation constant databases supplied with PHREEQC.altered complexation constant databases supplied with PHREEQC.

3.3 Technical Memorandum

- A draft TM will be prepared that summarizes the groundwater modeling work completed in this task. A final TM will be prepared based on AVSWCA's comments on the draft TM. An electronic of each TM will be provided.

Task 4. Biological Constraints Analysis and Jurisdictional Delineation

- For evaluation of the "Run-of-the-River" concept, preparation of a biological constraints map and a corresponding constraints memorandum will be provided. The biological constraints memorandum will be useful in avoiding or minimizing biological/jurisdictional constraints associated with the project. To prepare the Biological Constraints Memorandum, HELIX will conduct a general biological survey that will support preparation of detailed vegetation mapping within the project area of the "Run-of-the-River" concept. The vegetation mapping will serve to assess the suitability of habitat for sensitive plant and/or wildlife species.

- To assist with developing a project design that avoids/minimizes impacts to jurisdictional resources, HELIX will conduct a jurisdictional delineation within the project study area to determine the associated limits of Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) jurisdictional waters. The locations of sensitive species incidentally observed or otherwise detected during the general biological survey will be mapped in the field. The results of this site visit and mapping will determine future wildlife and/or plant survey needs, if any, while forming the basis for preparation of the Biological Constraints Memorandum and the subsequent Biological Technical Report (described in detail below). This scope of services does not include protocol surveys for sensitive plant and/or wildlife.

- HELIX will prepare a Biological Technical Report based on the results of the Demonstration Project and the corresponding project disturbance limits or "footprint" chosen by the AVSWCA. The report will provide a formal biological technical study that will support the CEQA document for the project and will describe the survey methods employed, present the results of the fieldwork, assess the potential for additional sensitive resources to occur on the site, identify regulatory issues related to the resources on the site, calculate limits of project disturbance to vegetation and/or jurisdictional waters, and recommend mitigation measures (as applicable) – including regulatory permitting, if impacts to jurisdictional resources are deemed unavoidable by the project. This scope of services assumes analysis of only one version of the final disturbance footprint for the project.

ALTERNATIVE SCOPE OF WORK

Task 5. Environmental Review for "Run-of-the-River" Concept

If the Demonstration Project is proven successful and the "Run-of-the-River" concept is recommended for full-scale implementation, this task describes the required environmental review services required for the project.

The technical studies prepared as part of Task 4 will be submitted to the AVSWCA for review and comment prior to proceeding with CEQA documentation. Based on one set of AVSWCA comments, HELIX will revise the technical studies/analyses as necessary prior to finalizing them for use in the CEQA document.

5.1 Cultural Resources/AB 52 Consultation Assistance/Section 106

- HELIX will conduct a cultural resources survey addressing CEQA guidelines, as well as Section 106 of the National Historic Preservation Act in order to meet the requirements of federal permitting agencies (e.g., USACE) or the State Water Resources Control Board (SWRCB), as applicable. This scope includes the following: obtain a records search from the South Central Coastal Information Center (SCCIC); contact the Native American Heritage Commission (NAHC) for a Sacred Lands File (SLF) search and list of Native American contacts; contact the local Native American community, as identified by the NAHC; review historic maps and aerial photographs of the project area; conduct a field survey of the proposed pipeline alignment and the two potential recharge basins; include a Native American monitor during the fieldwork (the Native American monitor would be subcontracted to HELIX); and prepare a cultural resources survey report detailing the methods and results of the survey, as well as recommendations.

- The scope assumes that no cultural resources will be identified within the project area as a result of the records search or during the survey. If cultural resources are identified, they would need to be evaluated to

assess their significance, which would require a contract augment. The scope and cost of testing would depend on the extent and nature of cultural material encountered.

- The Army Corps of Engineers will perform formal consultation with Tribal individuals or organizations under Section 106, and the AVSWCA or the County of Los Angeles, as appropriate, will conduct formal government-to-government consultation with Tribal entities per Assembly Bill 52.

5.2 Noise and Vibration Analysis

- In order to evaluate the potential noise effects of the "Run-of-the-River" concept, HELIX will prepare a brief qualitative technical memorandum that provides the construction noise control rules and regulations applicable to the site and proposed activities, a list of probable construction equipment with notation of distances to closest sensitive noise receptors in the area (as visible from aerial map displays), and assessment of potential noise impacts at those locations. The scope does not include conducting a site visit or documenting existing site noise conditions.

5.2 Draft Initial Study/Mitigated Negative Declaration Preparation

- HELIX anticipates preparation of an Initial Study (IS) and Draft Mitigated Negative Declaration (MND), in accordance with CEQA and the State CEQA Guidelines. Irrespective of the approach selected by the AVSWCA, the Draft IS/MND will follow the AVSWCA's standard format and will include a description of the project, an IS checklist, and supporting figures. The IS checklist will include detailed discussions of environmental resource or issue areas that may be significantly affected by the project. Specifically, each environmental resource discussion will include an overview of the environmental setting, appropriate significance thresholds, and an evaluation of potentially significant impacts. If potentially significant impacts are identified, HELIX will identify appropriate mitigation measures to reduce impacts to a less-than-significant level. In addition, brief explanations of why the project would not result in significant effects on other issues would be provided. Impacts related to cultural and biological resources, as well as noise/vibration, will be evaluated based on technical analyses, as applicable. Other topics, such as temporary construction traffic and public services will be evaluated qualitatively, based on readily available information and our experience with similar projects. It should be noted that this scope of work assumes project-specific analysis of only one project approach; while HELIX would provide general qualitative input to the project team regarding additional conceptual project approaches, this scope of work does not include detailed quantitative analysis for any options beyond the proposed or "preferred" project.

- HELIX will produce one electronic copy (.pdf) and five hard copies of the screencheck Draft IS/MND for the AVSWCA's review. Upon AVSWCA review of the screencheck Draft IS/MND, HELIX will organize and attend a meeting with the AVSWCA to discuss comments to be incorporated into a Public Review IS/ Draft MND. Based on the input received at the meeting, HELIX will make revisions to the Draft IS/MND and will provide an electronic revised Draft IS/MND for AVSWCA review and approval prior to preparing the public review Draft IS/MND and commencing a 30-day public review period.

- Upon incorporation of appropriate revisions, HELIX will prepare hard and electronic copies of the Draft IS/MND for public review and will fulfill CEQA noticing requirements. Specifically, HELIX will produce up to 20 hard copies of a public review version of the Draft IS/MND, with appendices (excluding confidential cultural resources information) on a CD for distribution by the AVSWCA. HELIX will also transmit 15 electronic CD copies to the State Clearinghouse, along with a summary sheet, Notice of Completion form, and a Notice of Intent to Adopt an MND. The Notice of Intent to Adopt an MND will be prepared concurrently with the preparation of the public review Draft IS/MND, and will be filed with the Los Angeles County Clerk, along with a filing fee of $75. Lastly, if requested by the County, HELIX will assist in the preparation of a public notice for publication the local newspaper of general circulation by preparing a draft notice for the County review and paying required publishing fees, which is budgeted at up to $600.

5.4 Final IS/MND Preparation and Response to Comments

- Following public review, and in consultation with the project team and the AVSWCA, HELIX will respond to substantive comments received on the content of the Draft IS/MND and prepare a screencheck Final IS/

MND. It is assumed that responding to comments would not require more than 24 hours of professional staff time. An introduction, the responses, revisions to the Draft IS/MND (if needed), and a Mitigation Monitoring and Reporting Program (MMRP) will be incorporated into the screencheck Final IS/MND. HELIX will produce one electronic copy and five printed copies of a screencheck Final IS/MND and MMRP, including 20 hard copies and one electronic copy. One set of revisions, based on the AVSWCA's comments, will be completed by HELIX prior to completing the Final IS/MND. Following completion of the Final IS/MND, HELIX will present the results to the AVSWCA Commissioners and will answer questions related to the project, such as the anticipated environmental impacts, mitigation measures, and/or public concerns about the project. Following AVSWCA Commissioner adoption of the Final IS/MND and MMRP and project approval, HELIX will e mail the AVSWCA a Notice of Determination to be signed by AVSWCA staff and filed with the Los Angeles County Clerk within five business days of project approval. The NOD filing fee of $75 and the CDFW filing fee of $2,181.25 are assumed in the costs within this scope of work.

5.5 Project Management for HELIX

- HELIX's project manager will guide the preparation and completion of the appropriate CEQA document throughout the environmental review period. Specifically, HELIX will coordinate and attend four meetings, including a kick-off meeting, two strategy meetings with AVSWCA staff during preparation of the Draft and Final CEQA documents, respectively, and a meeting with AVSWCA staff to review comments on the Draft Initial Study/Mitigated Negative Declaration (IS/MND). This scope of work also includes attendance by HELIX staff at one public hearing for approval of the project and adoption of the CEQA document (if applicable). This scope of work does not include meetings with DWR regarding the potential options being explored in the Feasibility Study.

Task 6. Permitting Support for "Run of the River" Concept

- In support of permit acquisition for the project, HELIX will coordinate with the various stakeholders including the County of Los Angeles, DWR, CalTrans, USACE, CDFW, and RWQCB. This scope of services includes up to four meetings or teleconferences with stakeholders to occur as part of the project design process.

- This scope of services includes preparation and acquisition support services needed to obtain regulatory authorizations pursuant to Section 404 of the Clean Water Act, Section 1602 of the California Fish & Game Code, and Section 401 of the Clean Water Act, respectively. This scope of services presumes that under the "Run-of-the-River" concept, a Section 404 Permit from the USACE would not be required, but that other regulatory permits would. If regulatory permits for implementation of geotechnical activities are required, this scope of services assumes that said activities will be addressed in the regulatory permits for the final project. The project areas are not located within designated critical habitat for federally-listed plant and/or wildlife species, though the Big Rock Wash channel is designated as being part of the Antelope Valley Significant Ecological Area (SEA #3) in the Los Angeles County General Plan. Consequently, this scope of services does not include assistance with preparation and processing of a Section 7 Consultation of the Federal Endangered Species Act or Section 2080.1 of the California Fish & Game Code should they be required to obtain regulatory permits for the project.

- The cultural resources survey conducted for Task 4.2 will address both CEQA and Section 106 of the National Historic Preservation Act and will be adequate to meet the requirements of the USACE in order to receive concurrence from the State Historic Preservation Officer (SHPO). HELIX will be available to assist USACE staff with tribal outreach and will draft a letter for use by the USACE in their coordination with SHPO.

ALTERNATIVE 2 SCOPE OF WORK

If the Demonstration Project is proven successful, then the "Run-of-the-River" concept can be developed further and implemented on a full scale. If it is not successful, Kennedy/Jenks will execute Tasks 7 through 11 to evaluate other alternatives that utilize infrastructure for conveyance and recharge of SWP water.

Task 7. Infrastructure Concept Project Management, Communication, and QA/QC

7.1 Management and Administration

- Our proposed Project Manager, David Ferguson, will be the point of contact and coordinate all communication with AVSWCA staff.
- Project coordination and administration will be provided, consisting of invoicing, schedule and budget monitoring, subconsultant coordination, and contract administration. The project duration for the alternative scope of work is assumed to be 8 months.

7.2 Project Schedule and Monthly Progress Meetings

- Kennedy/Jenks will submit an initial schedule with milestones. The schedule will be updated monthly and be provided at monthly Progress Meetings attended by our Project Manager. An agenda will be provided prior to each meeting. It is assumed that up to 8 monthly progress meetings will be attended.
- Meeting minutes will be prepared and submitted within five working days after the meeting(s).

7.3 QA/QC

- Provide quality reviews for project deliverables under the alternative scope of work.

Task 8. Feasibility Assessment and Alternatives Analysis

8.1 Develop Recharge Alternatives

- Develop up to three off-stream recharge location alternatives that utilize built infrastructure for conveyance and recharge from the existing blowoffs to locations adjacent to Big Rock Creek.
- Develop various alternatives for pipelines, turnouts, and location for infiltration, including locations for water quality testing and flow monitoring methodologies to quantify the performance of the project's effectiveness.
- Assess the footprint required to construct facilities required for each of three alternatives, including monitoring equipment and requirements necessary to implement a groundwater recharge project.

8.2 Groundwater Recharge Assessment

- Assess the feasibility of constructing groundwater recharge on the project site. Perform desktop geotechnical evaluation using existing USGS and other reports. Estimate percolation rates and recommend potential infiltration tests for the next phase of work not performed under this scope of work.
- Utilize hydrogeological model to determine recharge capacity, underground flow and direction of recharge water for each of three alternatives

8.3 Alternatives Analysis

- Conduct an alternatives analysis that utilized weighted criteria, such as capital cost, recharge capacity, construction impact on community, and regulatory compliance, to develop a recommended recharge alternative for further development.

8.4 Technical Memorandum

- A draft TM will be prepared that summarizes the alternatives development and analysis. A final TM will be prepared based on AVSWCA's comments on the draft TM. An electronic PDF of each TM will be provided.

Task 9. Develop Preliminary Design Report

- For the recommended alternative, provide conceptual layout depicting all proposed facilities, such as retention/infiltration facilities, groundwater recharge facilities, piping connections, distribution pipeline and related appurtenances.
- For the recommended alternative, regulatory, environmental and permitting requirements will be defined. Strategies for procuring funding, such as grants and low interest loans, financing considerations, and construction recommendations will be provided.
- A preliminary design report will be provided that describes the new facilities for the recommended alternatives. The report will consist of design criteria, facility sizing, preliminary layouts, facility types and materials to represent a 10-30% level of design. Conceptual figures will be provided to depict proposed facilities. A preliminary design-level construction cost estimate and implementation schedule will be provided. The TM developed from Task 7.5 will also be incorporated to the report. It is assumed that aerial survey and geotechnical investigations will not be provided.
- A draft report will be submitted to AVSWCA and a final report will be prepared based on AVSWCA's comments on the draft report. An electronic PDF of each report will be provided.
- Four meetings will be conducted, consisting of one meeting to review the draft submittal, one meeting to review the final submittal, and two additional meetings to provide support at the AVSWCA Commissioner meetings.

Task 10. Environmental Review for Recommended Built Infrastructure Alternative

For the recommended built infrastructure alternative, this task describes the required environmental review services required for the project.

The technical studies prepared as part of Task 4 will be submitted to the AVSWCA for review and comment prior to proceeding with CEQA documentation. Based on one set of AVSWCA comments, HELIX will revise the technical studies/analyses as necessary prior to finalizing them for use in the CEQA document.

10.1 Air Quality Analysis

- HELIX will prepare the air quality analysis for the proposed project in accordance with the Antelope Valley Air Quality Management District (AVAQMD) guidelines by obtaining information from project planning/design documents and a questionnaire for the planning team to provide data related to structures or paving to be demolished, pipeline installation methods, construction start and completion dates, phasing, construction equipment to be used, truck trips, anticipated soil export and import, and related project data. HELIX will calculate proposed project construction phase criteria pollutant emissions using the California Emissions Estimator Model (CalEEMod) or equivalent methods. Results will be compared to the AVAQMD emissions thresholds to determine significance. Exposure to toxic air contaminants, odors, and consistency with regional air quality plans will be addressed qualitatively. If potential significant impacts are identified, HELIX will recommend appropriate mitigation measures. The results of the air quality analysis will be described in the IS/MND; supporting calculations will be included as an appendix.

10.1 Air Quality Analysis Biological Constraints Analysis/Jurisdictional Delineation

- To support the Alternatives Analysis described in Task 7.3, HELIX will prepare a biological constraints map and a corresponding constraints memorandum that can be utilized in analyzing project design alternatives. The biological constraints memorandum will be useful in avoiding or minimizing biological/jurisdictional constraints associated with the project, as well as for preparation of the Draft Preliminary Design Report. In order to prepare the Biological Constraints Memorandum, HELIX will conduct a general biological survey that will support preparation of detailed vegetation mapping within a study area. The biological study area will

be sized sufficiently to ensure that any potential areas of disturbance associated with pipeline installation locations (including associated potholing, staging, access, valve replacement, and drilling location areas) can be adequately evaluated for biological and/or jurisdictional constraints. The vegetation mapping will serve to assess the suitability of habitat for sensitive plant and/or wildlife species.

- To assist with developing a project design that avoids/minimizes impacts to jurisdictional resources, HELIX will conduct a jurisdictional delineation within the project study area to determine the associated limits of Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) jurisdictional waters. The locations of sensitive species incidentally observed or otherwise detected during the general biological survey will be mapped in the field. The results of this site visit and mapping will determine future wildlife and/or plant survey needs, if any, while forming the basis for preparation of the Biological Constraints Memorandum and the subsequent Biological Technical Report. This scope of services does not include protocol surveys for sensitive plant and/or wildlife.

- Upon completion of the preliminary design phase for the project described above, HELIX will prepare a Biological Technical Report based on the Preliminary Design Report and the corresponding project disturbance limits or "footprint" chosen by the AVSWCA. The report will provide a formal biological technical study that will support the CEQA document for the project and will describe the survey methods employed, present the results of the fieldwork, assess the potential for additional sensitive resources to occur on the site, identify regulatory issues related to the resources on the site, calculate limits of project disturbance to vegetation and/or jurisdictional waters, and recommend mitigation measures (as applicable) – including regulatory permitting, if impacts to jurisdictional resources are deemed unavoidable by the project. This scope of services assumes analysis of only one version of the final disturbance footprint for the project.

10.3 Cultural Resources/AB 52 Consultation Assistance/Section 106

- HELIX will conduct a cultural resources survey addressing CEQA guidelines, as well as Section 106 of the National Historic Preservation Act in order to meet the requirements of federal permitting agencies (e.g., USACE) or the State Water Resources Control Board (SWRCB), as applicable. This scope includes the following: obtain a records search from the South Central Coastal Information Center (SCCIC); contact the Native American Heritage Commission (NAHC) for a Sacred Lands File (SLF) search and list of Native American contacts; contact the local Native American community, as identified by the NAHC; review historic maps and aerial photographs of the project area; conduct a field survey of the proposed pipeline alignment and the two potential recharge basins; include a Native American monitor during the fieldwork (the Native American monitor would be subcontracted to HELIX); and prepare a cultural resources survey report detailing the methods and results of the survey, as well as recommendations. The scope of work assumes the recharge basin is a total of approximately 70 acres, and the pipeline alignment is approximately three miles long.

- The scope assumes that no cultural resources will be identified within the project area as a result of the records search or during the survey. If cultural resources are identified, they would need to be evaluated to assess their significance, which would require a contract augment. The scope and cost of testing would depend on the extent and nature of cultural material encountered.

- The Army Corps of Engineers will perform formal consultation with Tribal individuals or organizations under Section 106, and the AVSWCA or the County of Los Angeles, as appropriate, will conduct formal government-to-government consultation with Tribal entities per Assembly Bill 52.

10.4 Greenhouse Gas Analysis

- HELIX will estimate the GHG emissions for the project using CalEEMod or equivalent methods. Results will be compared to the AVAQMD emissions thresholds to determine significance. HELIX will determine whether implementation of the project would conflict with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The results of the GHG emissions analysis will be described in the IS/MND; supporting calculations will be included as an appendix.

10.5 Noise and Vibration Analysis

- HELIX will conduct a site visit to the proposed basin area and will gather ambient noise measurements and will also collect ambient noise measurements at select residential locations along proposed pipeline route. Using these data, HELIX will model anticipated construction as needed for basins and proposed pipeline route for daytime construction work, and also prepare a brief analysis of potential construction vibration impacts. Based on the results of these analyses, HELIX will then prepare a draft noise and vibration technical report for the project that includes the site information, necessary graphics, supporting noise level source and impact information, noise contours, and applicable noise-related codes and ordinances.

10.6 Draft Initial Study/Mitigated Negative Declaration Preparation

- HELIX anticipates preparation of an Initial Study (IS) and Draft Mitigated Negative Declaration (MND), in accordance with CEQA and the State CEQA Guidelines. The Draft IS/MND will follow the AVSWCA's standard format and will include a description of the project, an IS checklist, and supporting figures. The IS checklist will include detailed discussions of environmental resource or issue areas that may be significantly affected by the project. Specifically, each environmental resource discussion will include an overview of the environmental setting, appropriate significance thresholds, and an evaluation of potentially significant impacts. If potentially significant impacts are identified, HELIX will identify appropriate mitigation measures to reduce impacts to a less-than-significant level. In addition, brief explanations of why the project would not result in significant effects on other issues would be provided. Impacts related to cultural and biological resources, as well as air quality, GHGs, and noise/vibration will be evaluated based on technical analyses prepared, as applicable. Other topics, such as temporary construction traffic and public services will be evaluated qualitatively, based on readily available information and our experience with similar projects. It should be noted that this scope of work assumes project-specific analysis of only one project approach; while HELIX would provide general qualitative input to the project team regarding additional conceptual project approaches, this scope of work does not include detailed quantitative analysis for any options beyond the proposed or "preferred" project.

- HELIX will produce one electronic copy (.pdf) and five hard copies of the screencheck Draft IS/MND for the AVSWCA's review. Upon AVSWCA review of the screencheck Draft IS/MND, HELIX will organize and attend a meeting with the AVSWCA to discuss comments to be incorporated into a Public Review IS/ Draft MND. Based on the input received at the meeting, HELIX will make revisions to the Draft IS/MND and will provide an electronic revised Draft IS/MND for AVSWCA review and approval prior to preparing the public review Draft IS/MND and commencing a 30-day public review period.

- Upon incorporation of appropriate revisions, HELIX will prepare hard and electronic copies of the Draft IS/MND for public review and will fulfill CEQA noticing requirements. Specifically, HELIX will produce up to 20 hard copies of a public review version of the Draft IS/MND, with appendices (excluding confidential cultural resources information) on a CD for distribution by the AVSWCA. HELIX will also transmit 15 electronic CD copies to the State Clearinghouse, along with a summary sheet, Notice of Completion form, and a Notice of Intent to Adopt an MND. The Notice of Intent to Adopt an MND will be prepared concurrently with the preparation of the public review Draft IS/MND, and will be filed with the Los Angeles County Clerk, along with a filing fee of $75. Lastly, if requested by the County, HELIX will assist in the preparation of a public notice for publication the local newspaper of general circulation by preparing a draft notice for the County review and paying required publishing fees, which is budgeted at up to $600.

10.7 Final IS/MND Preparation and Response to Comments

- Following public review, and in consultation with the project team and the AVSWCA, HELIX will respond to substantive comments received on the content of the Draft IS/MND and prepare a screencheck Final IS/MND. It is assumed that responding to comments would not require more than 24 hours of professional staff time. An introduction, the responses, revisions to the Draft IS/MND (if needed), and a Mitigation Monitoring and Reporting Program (MMRP) will be incorporated into the screencheck Final IS/MND. HELIX will produce one electronic copy and five printed copies of a screencheck Final IS/MND and MMRP, including 20 hard copies and one electronic copy. One set of revisions, based on the AVSWCA's comments, will be completed by HELIX prior to completing the Final IS/MND. Following completion of the Final IS/MND, HELIX will present the results to the AVSWCA Commissioners and will answer questions related to the project, such as the anticipated

environmental impacts, mitigation measures, and/or public concerns about the project. Following AVSWCA Commissioner adoption of the Final IS/MND and MMRP and project approval, HELIX will e mail the AVSWCA a Notice of Determination to be signed by AVSWCA staff and filed with the Los Angeles County Clerk within five business days of project approval. The NOD filing fee of $75 and the CDFW filing fee of $2,181.25 are assumed in the costs within this scope of work.

10.8 Project Management for HELIX

- HELIX's project manager will guide the preparation and completion of the appropriate CEQA document throughout the environmental review period. Specifically, HELIX will coordinate and attend four meetings, including a kick-off meeting, two strategy meetings with AVSWCA staff during preparation of the Draft and Final CEQA documents, respectively, and a meeting with AVSWCA staff to review comments on the Draft Initial Study/Mitigated Negative Declaration (IS/MND). This scope of work also includes attendance by HELIX staff at one public hearing for approval of the project and adoption of the CEQA document (if applicable). This scope of work does not include meetings with DWR regarding the potential options being explored in the Feasibility Study.

Task 11. Permitting Support for Built Infrastructure Recommended Project

- In support of permit acquisition for the recommended project, HELIX will coordinate with the various stakeholders including the County of Los Angeles, DWR, CalTrans, USACE, CDFW, and RWQCB. This scope of services includes up to four meetings or teleconferences with stakeholders to occur as part of the project design process.

- This scope of services includes preparation and acquisition support services needed to obtain regulatory authorizations pursuant to Section 404 of the Clean Water Act, Section 1602 of the California Fish & Game Code, and Section 401 of the Clean Water Act, respectively. If regulatory permits for implementation of geotechnical activities are required, this scope of services assumes that said activities will be addressed in the regulatory permits for the final project. The project areas are not located within designated critical habitat for federally-listed plant and/or wildlife species, though the Big Rock Wash channel is designated as being part of the Antelope Valley Significant Ecological Area (SEA #3) in the Los Angeles County General Plan. Consequently, this scope of services does not include assistance with preparation and processing of a Section 7 Consultation of the Federal Endangered Species Act or Section 2080.1 of the California Fish & Game Code should they be required to obtain regulatory permits for the project.

- The cultural resources survey conducted for Task 9.3 will address both CEQA and Section 106 of the National Historic Preservation Act and will be adequate to meet the requirements of the USACE in order to receive concurrence from the State Historic Preservation Officer (SHPO). HELIX will be available to assist USACE staff with tribal outreach and will draft a letter for use by the USACE in their coordination with SHPO.

OPTIONAL SCOPE OF WORK

Task 12. Monitoring Well Design

If a new monitoring well is required to collect water level and water quality data for the project, Kennedy/Jenks will prepare the design drawings and specifications for the construction of one monitoring well. 4-inch PVC well screen and blank casing will be utilized. Soil samples will be collected at 5-foot intervals or change in lithology. Geophysical logging will complete in the borehole to provide additional hydrologic and geologic information.

Work phases will consist of a Basis of Design Memorandum, Design, Bid Assistance, Construction Management, and Operations Support.

12.1 Basis of Design Memorandum

- Kennedy/Jenks will prepare Basis of Design Memorandum to succinctly document the assumptions, prior findings, and recommendations to be incorporated into the final design. An electronic PDF of the memorandum will be provided. AVSWCA's comments on the memorandum will be incorporated in the 90% contract document described in Task 12.2. The preliminary design work for well drilling and well level monitoring and sampling

equipping will primarily involve:

- Well site plan
- Document allowable work area, water source and any special considerations
- Well drilling diameter, casing diameter, and materials
- Anticipated well screen materials
- Well borehole depth and completed monitoring well depths
- Target sample collection pumping rate
- Anticipated groundwater table operating ranges and projected drawdown under design pumping conditions
- Proposed well screen placement and completion
- Proposed well profile for each proposed well
- Well pad and well head lockable access configuration
- Submersible sample pump selection with system curve for range of aquifer storage assumptions
- Portable electric generator requirements for sample pump operation
- Direct read level monitoring equipment and datalogger configuration
- Construction cost estimates for the two monitoring well alternatives
- Equipment recommendations for sample pumps, portable generator, level sensors and dataloggers

11.2 Design

- This task provides for the development of construction Contract Documents for the bidding of one monitoring well. The specifications will include prior investigative work (local well logs) to provide the driller of nearby physical criteria. Final well screen selection will occur during construction following the completion of the well drilling, geophysical logging and formation sample analysis.

- Kennedy/Jenks will design the well equipment components of the project for the monitoring well consisting of sampling pumps, portable generator, level sensors and dataloggers. Kennedy/Jenks will prepare the Well Drilling Contract Documents consisting of a well profile, an overall site plan, and specifications for the project at 90% and Bid Set completion stages. The work also includes the preparation of an opinion of probable cost and project schedule.

12.3 Bid Assistance

- Kennedy/Jenks will provide bid assistance for a single bid for the combined Well Drilling and Infiltration Pilot Test project. Work tasks will consist of:
  - Conduct Pre-Bid Meeting and attend bid opening
  - Respond to technical questions from prospective bidders.
  - Prepare up to two addenda.
  - Evaluate bid results and prepare a Recommendation for Award.

- AVSWCA Responsibility:
  - Cordinate and host Pre-Bid Meeting and Bid Opening
  - Award contract.

12.4 Construction Management

- This task is subdivided into three subtasks as follows:
  - Pre-Construction Meeting
  - Construction Management
  - Field Observation
- Pre-Construction Meeting

- Kennedy/Jenks will conduct a Pre-Construction Meeting with the selected contractor and AVSWCA staff. Kennedy/Jenks will prepare the Pre-Construction Meeting agenda and prepare and circulate meeting minutes.

- Construction Management
  - This task includes the assignment and coordination of our technical resources, scheduling, and tracking construction progress. We will provide periodic progress updates to AVSWCA by phone, e-mail, or in person. All deliverables will be reviewed in our in-house Quality Assurance/Quality Control (QA/QC) process prior to submittal to AVSWCA.
- Kennedy/Jenks will lead the construction management effort during construction consisting of:
  - Serve as AVSWCA's point of contact with the Contractor.
  - Perform office engineering, including review of submittals, shop drawings, product data sheets, and request for information (RFIs) for conformance with the design drawings and specifications.
  - Review change order requests
  - Make recommendations for the well operating design point based on the aquifer testing.
  - Review contractor's schedule and monitor project progress.
  - Review contractor's monthly pay requests and provide a recommendation to AVSWCA.
- Field Observation
  - Kennedy/Jenks will provide field observation during construction to include the following:
    - Daily observation during active borehole drilling and initial water quality testing. This will include well drill formation logging and observation each day drilling is proceeding.
    - Daily observation during well reaming and casing installation.
    - Daily observation during well development, step testing, and constant rate pump testing.
    - Weekly field meeting and conference call.
  - Although it is anticipated that the borehole drilling, well reaming, and well development (swabbing, airlifting, surge pumping and bailing) will require continuous 24-hour operation by the Contractor, observation by Kennedy/Jenks is proposed for the day shift either 5 or 7 days per week during these phases of construction at the Contractor's discretion. The contract specifications will require the Contractor to collect, label, and store samples for every 10 feet of drilling, for logging by the Engineer/Geologist on a daily basis. A total of 12 field days are included in the budget.
  - A Well Completion Report will document the well drilling work at each location, the Well Drillers Report, geophysical logs, as-built drawings, and related information.
- Deliverables
  - An electronic PDF of Pre-Construction Meeting Minutes
  - An electronic PDF copy of reviewed Contractor Submittals and RFIs
  - An electronic PDF of the Well Completion Report

12.5 Operations Support

- wKennedy/Jenks will provide operations staff support and training for periodic water level measurement and sample collection. Kennedy/Jenks will perform the initial sample collection in coordination with the drilling contractor using sample bottles provided by AVSWCA with sample delivery to AVSWCA or directly to its contract lab. A second round of sample collection will be performed by Kennedy/Jenks in coordination with AVSWCA operations staff as a training exercise on water level measurement, sample pump operation, and sample collection procedures. On-going periodic water level measurement and/or sample collection will be performed by AVSWCA operations staff.

Kennedy/Jenks Consultants

D. PAST PERFORMANCE

The best judges of our performance are the clients with whom we have worked. The contacts in the references below are from our past similar and relevant projects from Section B. Specific Qualifications of this proposal. Please contact each reference for a summary of our performance.

Groundwater Banking Program, Antelope Valley-East Kern Water Agency (AVEK), Palmdale, CA

Client Reference
Matthew Knudson, Assistant General Manager
AVEK
6450 West Avenue N
Palmdale, CA 93551
661.49.7310

Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District,
Palmdale, CA

Client Reference
Dennis LaMoreaux, General Manager
Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550
661.947.1017

Las Posas Replacement Water Study, Calleguas Municipal Water District and Fox Canyon Groundwater Management Agency
Thousand Oaks, CA

Client Reference
Susan B. Mulligan, General Manager
Calleguas Municipal Water District
2100 Olsen Road
Thousand Oaks, CA 91360
805.526.9323

Upper VDC Conjunctive Use Optimization Study, Rancho California Water District
Temecula, CA

Client Reference

Andy Webster, Chief Engineer
Rancho California Water District
42135 Winchester Road
Temecula, CA 92590
951.296.6900

Bunker Hill Basin Conjunctive Use San Bernardino Valley Municipal Water District, Palmdale, CA

Client Reference

Wen Huang, Manager of Engineering
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408
909.387.9223

APPENDIX 1. E. PROJECT
FEE AND SCHEDULE

Kennedy/Jenks Consultants

E. PROJECT FEE AND SCHEDULE

This section provides Kennedy/Jenks' proposed project fee and schedule. The project fee is organized in the same manner as the scope of work with separate subtotals for the Base, Alternative 1, Alternative 2, and Optional scopes of work. Summary tables are shown below that provide total fee estimates for the "Run-of-the-River" and infrastructure concepts. Kennedy/Jenks welcomes the opportunity to discuss our fee estimate with AVSWCA to ensure that we are meeting your expectations.

RUN-OF-THE-RIVER CONCEPT FEE SUMMARY	
TASK	**FEE ESTIMATE**
Task 1 - Base Project Management	$34,975
Task 2 - Demonstration Project	$55,105
Task 3 - Groundwater Modeling	$43,790
Task 4 - Biological Constraints & Delineation	$24,885
Task 5 - CEQA for "Run-of-the-River" Concept	$53,592
Task 6 - Permits for "Run-of-the-River" Concept	$24,604
Total	$236,951
INFRASTRUCTURE CONCEPT FEE SUMMARY	
TASK	**FEE ESTIMATE**
Task 1 - Base Project Management	$34,975
Task 2 - Demonstration Project	$55,105
Task 3 - Groundwater Modeling	$43,790
Task 4 - Biological Constraints & Delineation	$24,885
Task 7 - Infrastructure Project Management	$26,480
Task 8 - Feasibility & Alternatives Analysis	$48,610
Task 9 - Develop Infrastructure PDR	$29,060
Task 10 - CEQA for Infrastructure Concept	$115,900
Task 11 - Permits for Infrastructure Concept	$35,135
Total	$413,941
OPTIONAL TASK	
Task 12 - Monitoring Well Implementation	$49,215

Proposal Fee Estimate

Kennedy/Jenks Consultants

CLIENT Name: Antelope Valley State Water Contractors Association

PROJECT Description: Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

Proposal/Job Number: B10450045 **Date:** 6/15/2018

Classification:	Eng-Sci-9	Eng-Sci-8	Eng-Sci-7	Eng-Sci-6	Eng-Sci-5	Eng-Sci-4	Eng-Sci-3	Eng-Sci-2	Eng-Sci-1	Sr. CAD-Design	Project Administrator	Admin. Assist.	Aide	Total	KJ Labor	Sub Helix Environmental Planning	KJ ODCs	Total Labor	Total Subs	Total Expenses	Total Labor + Subs + Expenses
Hourly Rate:	$275	$250	$235	$215	$195	$175	$160	$140	$130	$155	$110	$90	$75	Hours	Fees	Fees	Fees				Fees
Task 1 - Base Project Management																					
1.1 Management & Administration	20				20						10			50	$10,500			$10,500	$0	$0	$10,500
1.2 Kickoff Meeting	2				4									6	$1,330		$100	$1,330	$0	$105	$1,435
1.3 Schedule, Status Report, and Progress Meetings	20				40									60	$13,300		$1,000	$13,300	$0	$1,050	$14,350
1.4 On-Site Evaluation	4				4		4							12	$2,520		$200	$2,520	$0	$210	$2,730
1.5 QA/QC	16				8									24	$5,960			$5,960	$0	$0	$5,960
														0	$0			$0	$0	$0	$0
Task 1 - Subtotal	62	0	0	0	76	0	4	0	0	0	10	0	0	152	$33,610	$0	$1,300	$33,610	$0	$1,365	$34,975
Task 2 - Demonstration Project																					
2.1 Develop Test Plan	4		4		24		24							56	$10,560			$10,560	$0	$0	$10,560
2.2 Review Monitoring Well Data			8		4									12	$2,660			$2,660	$0	$0	$2,660
2.3 Drone Aerial Surveys					20					108				128	$20,640		$2,000	$20,640	$0	$2,100	$22,740
2.4 Hydrogeological Analysis	4		16											20	$4,860			$4,860	$0	$0	$4,860
2.5 Technical Memorandum	4	8			24		40							76	$14,180		$100	$14,180	$0	$105	$14,285
														0	$0			$0	$0	$0	$0
Task 2 - Subtotal	12	8	28	0	72	0	64	0	0	108	0	0	0	292	$52,900	$0	$2,100	$52,900	$0	$2,205	$55,105
Task 3 - Groundwater Modeling																					
3.1 Hydrogeological Modeling Development	4		120		4									128	$30,080			$30,080	$0	$0	$30,080
3.2 Water Quality Modeling	4		24		4									32	$7,520			$7,520	$0	$0	$7,520
3.3 Technical Memorandum	2		24											26	$6,190			$6,190	$0	$0	$6,190
														0	$0			$0	$0	$0	$0
Task 3 - Subtotal	10	0	168	0	8	0	0	0	0	0	0	0	0	186	$43,790	$0	$0	$43,790	$0	$0	$43,790
Task 4 - Biological Constraints & Delineation																					
4.1 Biological Constraints & Jurisdictional Analyses	1				1									2	$470	$23,253		$470	$24,415	$0	$24,885
BASE SCOPE OF WORK TOTAL	**85**	**8**	**196**	**0**	**157**	**0**	**68**	**0**	**0**	**108**	**10**	**0**	**0**	**632**	**$130,770**	**$23,253**	**$3,400**	**$130,770**	**$24,415**	**$3,570**	**$158,755**
ALTERNATIVE 1 SCOPE OF WORK																					
Task 5 - CEQA for "Run-of-the-River" Concept																					
5.1 Cultural Resources	1				1									2	$470	$15,268		$470	$16,031	$0	$16,501
5.2 Noise and Vibration Analysis	1				1									2	$470	$2,515		$470	$2,641	$0	$3,111
5.3 Draft IS/MND	4				4									8	$1,880	$13,430		$1,880	$14,102	$0	$15,982
5.4 Final IS/MND	4				4									8	$1,880	$9,750		$1,880	$10,238	$0	$12,118
5.5 PM for HELIX														0	$0	$5,600		$0	$5,880	$0	$5,880

Proposal Fee Estimate **Kennedy/Jenks Consultants**

CLIENT Name: Antelope Valley State Water Contractors Association

PROJECT Description: Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

Proposal/Job Number: B10450045 **Date:** 6/15/2018

Classification:	Eng-Sci-9	Eng-Sci-8	Eng-Sci-7	Eng-Sci-6	Eng-Sci-5	Eng-Sci-4	Eng-Sci-3	Eng-Sci-2	Eng-Sci-1	Sr. CAD-Design	Project Administrator	Admin. Assist.	Aide	Total	KJ Labor	Sub Environmental Planning	KJ ODCs	Total Labor	Total Subs	Total Expenses	Total Labor + Subs + Expenses
Hourly Rate:	$275	$250	$235	$215	$195	$175	$160	$140	$130	$155	$110	$90	$75	Hours	Fees	Fees	Fees				Fees
														0	$0			$0	$0	$0	$0
Task 5 - Subtotal	10	0	0	0	10	0	0	0	0	0	0	0	0	20	$4,700	$46,563	$0	$4,700	$48,892	$0	$53,592
Task 6 - Permits for "Run-of-the-River" Concept																					
Permitting Support	4				8									12	$2,660	$20,899		$2,660	$21,944	$0	$24,604
														0	$0			$0	$0	$0	$0
Task 6 - Subtotal	4	0	0	0	8	0	0	0	0	0	0	0	0	12	$2,660	$20,899	$0	$2,660	$21,944	$0	$24,604
ALTERNATIVE 1 SCOPE OF WORK TOTAL	**14**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**	**$7,360**	**$67,462**	**$0**	**$7,360**	**$70,836**	**$0**	**$78,196**
ALTERNATIVE 2 SCOPE OF WORK																					
Task 7 - Infrastructure Project Management																					
7.1 Management & Administration	16				16						8			40	$8,400			$8,400	$0	$0	$8,400
7.2 Schedule, Status Report, and Progress Meetings	16				32									48	$10,640		$800	$10,640	$0	$840	$11,480
7.3 QA/QC	24													24	$6,600			$6,600	$0	$0	$6,600
														0	$0			$0	$0	$0	$0
Task 7 - Subtotal	56	0	0	0	48	0	0	0	0	0	8	0	0	112	$25,640	$0	$800	$25,640	$0	$840	$26,480
Task 8 - Feasibility & Alternatives Analysis																					
8.1 Develop Recharge Alternatives	8				40		40							88	$16,400			$16,400	$0	$0	$16,400
8.2 Groundwater Recharge Assessment	4		24											28	$6,740			$6,740	$0	$0	$6,740
8.3 Alternatives Analysis	8				40		40							88	$16,400			$16,400	$0	$0	$16,400
8.4 Technical Memorandum	2				24		24							50	$9,070			$9,070	$0	$0	$9,070
														0	$0			$0	$0	$0	$0
Task 8 - Subtotal	22	0	24	0	104	0	104	0	0	0	0	0	0	254	$48,610	$0	$0	$48,610	$0	$0	$48,610
Task 9 - Develop Infrastructure PDR																					
PDR	8				40		60			24				132	$23,320			$23,320	$0	$0	$23,320
Meetings (4)	8				16									24	$5,320		$400	$5,320	$0	$420	$5,740
Task 9 - Subtotal	16	0	0	0	56	0	60	0	0	24	0	0	0	156	$28,640	$0	$400	$28,640	$0	$420	$29,060
Task 10 - CEQA for Infrastructure Concept																					
10.1 Air Quality Analysis	2				4									6	$1,330	$6,010		$1,330	$6,311	$0	$7,641
10.2 Biological Constraints & Jurisdictional Analyses	2				4									6	$1,330	$27,141		$1,330	$28,498	$0	$29,828
10.3 Cultural Resources	2				4									6	$1,330	$15,268		$1,330	$16,031	$0	$17,361
10.4 Greenhouse Gas Analysis	2				8									10	$2,110	$5,045		$2,110	$5,297	$0	$7,407
10.5 Noise and Vibration Analysis	2				8									10	$2,110	$7,000		$2,110	$7,350	$0	$9,460
10.6 Draft IS/MND	4				6									10	$2,270	$16,970		$2,270	$17,819	$0	$20,089

Proposal Fee Estimate **Kennedy/Jenks Consultants**

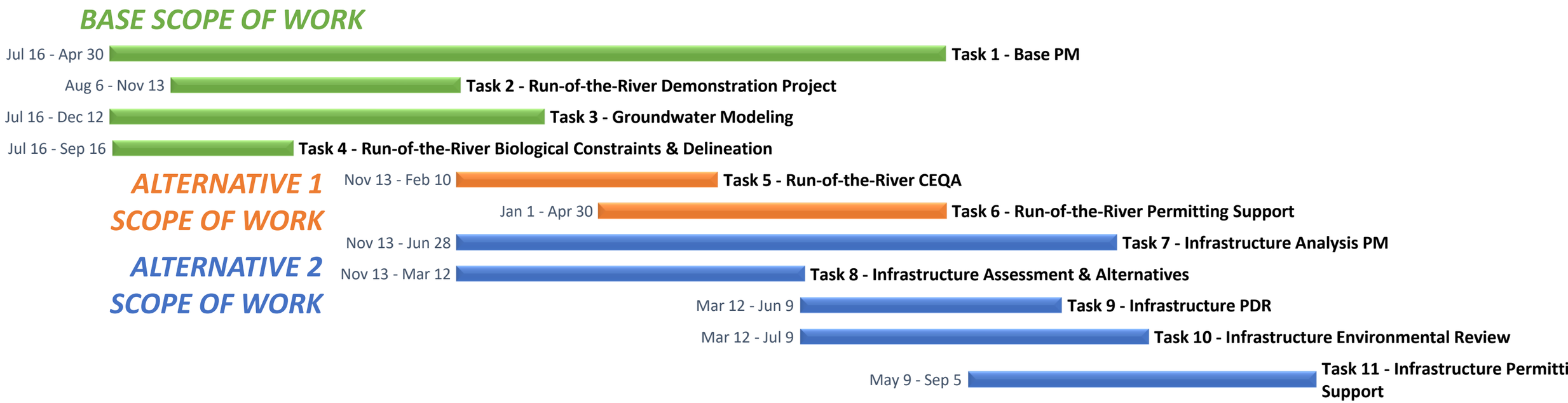
CLIENT Name: Antelope Valley State Water Contractors Association

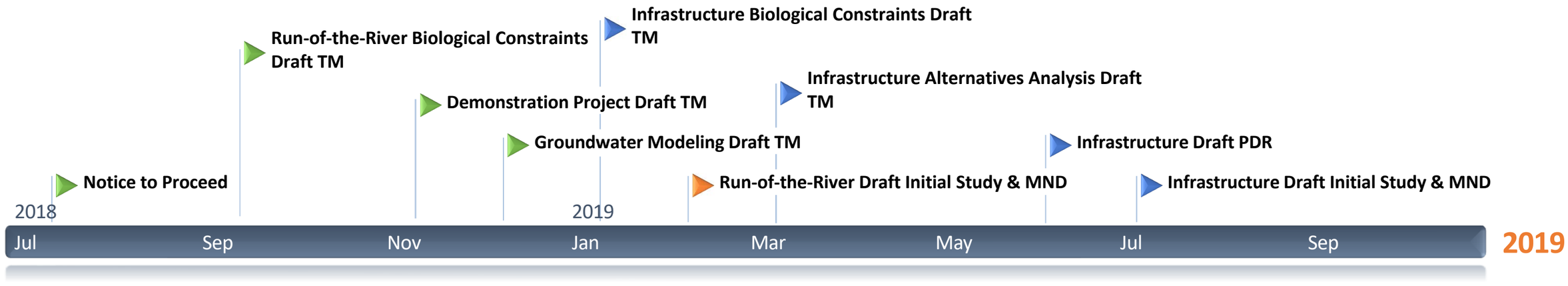
PROJECT Description: Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

Proposal/Job Number: B10450045 **Date:** 6/15/2018

Classification:	Eng-Sci-9	Eng-Sci-8	Eng-Sci-7	Eng-Sci-6	Eng-Sci-5	Eng-Sci-4	Eng-Sci-3	Eng-Sci-2	Eng-Sci-1	Sr. CAD-Design	Project Administrator	Admin. Assist.	Aide	Total	KJ Labor	Sub Helix Environmental Planning	KJ ODCs	Total Labor	Total Subs	Total Expenses	Total Labor + Subs + Expenses
Hourly Rate:	$275	$250	$235	$215	$195	$175	$160	$140	$130	$155	$110	$90	$75	Hours	Fees	Fees	Fees				Fees
10.7 Final IS/MND	4				6									10	$2,270	$9,750		$2,270	$10,238	$0	$12,508
10.8 PM for HELIX														0	$0	$11,054		$0	$11,607	$0	$11,607
														0	$0			$0	$0	$0	$0
Task 10 - Subtotal	18	0	0	0	40	0	0	0	0	0	0	0	0	58	$12,750	$98,238	$0	$12,750	$103,150	$0	$115,900
Task 11 - Permits for Infrastructure Concept																					
Permitting Support	4				8									12	$2,660	$30,929		$2,660	$32,475	$0	$35,135
														0	$0			$0	$0	$0	$0
Task 11 - Subtotal	4	0	0	0	8	0	0	0	0	0	0	0	0	12	$2,660	$30,929	$0	$2,660	$32,475	$0	$35,135
ALTERNATIVE 2 SCOPE OF WORK TASKS TOTAL	**116**	**0**	**24**	**0**	**256**	**0**	**164**	**0**	**0**	**24**	**8**	**0**	**0**	**592**	**$118,300**	**$129,167**	**$1,200**	**$118,300**	**$206,461**	**$1,260**	**$255,185**
OPTIONAL SCOPE OF WORK																					
Task 12 - Monitoring Well Implementation																					
12.1 Basis of Design	2	4			2		16						2	38	$6,390			$6,390	$0	$0	$6,390
12.2 Design	2	4			2		30						2	48	$8,050			$8,050	$0	$0	$8,050
12.3 Bid Assistance	8	2			4		16							30	$6,040		$100	$6,040	$0	$105	$6,145
12.4 Construction Management	2	8			2		20		96					164	$23,840		$2,400	$23,840	$0	$2,520	$26,360
12.5 Operations Support		2							12					14	$2,060		$200	$2,060	$0	$210	$2,270
														0	$0			$0	$0	$0	$0
OPTIONAL SCOPE OF WORK TOTAL	14	20	0	0	10	0	82	0	108	0	0	0	4	294	**$46,380**	**$0**	**$2,700**	**$46,380**	**$0**	**$2,835**	**$49,215**

Project Schedule





Notes:

- If a new monitoring well is required and Optional Task 12 is initiated, the schedule for the base scope of work will likely be extended by four months.
- Meetings are not shown for clarity, but are described in the Scope of Work.

APPENDIX 2.
PERSONNEL RESUMES

Kennedy/Jenks Consultants

Harold T. Glaser, P.E.

Principal-in-Charge

Education
BS, Civil and Environmental Engineering, Clarkson University, 1976
MS, Civil and Environmental Engineering, Clarkson University, 1978

Registrations
Professional Civil Engineer, California (30437)

Memberships/Affiliations
American Society of Civil Engineers
American Water Works Association
Association of Metropolitan Water Agencies
Colorado River Water Users Association
Association of California Water Agencies
Tau Beta Pi, Engineering Honor Society
Chi Epsilon, Civil Engineering Honor Society

Years of Experience
11 Years with Kennedy/Jenks
29 Total

Professional Summary
Harold has extensive experience in civil and environmental engineering, information technology, and management consulting. Emphasis is on projects related to planning; design; construction management; and evaluation of water, wastewater, storm water, and flood control facilities; computer aided design; automated mapping and facilities management; geographic information systems; and analysis, design, and development of engineering and scientific computing systems. He recently served as Client Service Manager simultaneously for the Metropolitan Water District of Southern California, and the Los Angeles Department of Water and Power, and was responsible for client service, project management, delivery, and performance of all technical assignments for these clients. Harold is currently serving as the firm's Business Development Director.

Relevant Project Experience
Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District, Palmdale, CA - *Technical Advisor* - Palmdale Water District (PWD) is implementing the first phase of the Palmdale Regional Groundwater Recharge and Recover Project, a $55 million surface spreading indirect potable reuse (IPR) water bank in Antelope Valley, CA. The project will provide up to 50,000 ac-ft/year of recharge capacity and initially 7,500 ac-ft/year of extraction capacity. State Water Project (SWP) raw water will be conveyed 9.5 miles via a 36- and 48-inch diameter pipeline with disinfected tertiary recycled water adding at a 20% ratio and recharged in two initial 20-acre recharge basins (four ultimate). After undergoing soil aquifer treatment and meeting residence time requirements, the groundwater will be extracted through 4 initial (and up to 16 ultimate) recovery wells, chlorinated and conveyed to PWD's distribution system.

Feasibility of Developing the Santa Monica and Hollywood Basins as Sources of Groundwater Supply, City of Los Angeles, Department of Water and Power, Los Angeles, CA - *Technical Advisor* - For the feasibility of developing the Santa Monica and Hollywood groundwater basins as potable groundwater supply sources for the City of Los Angeles. For each groundwater basin, the study included: hydrogeologic characterization, basin governance, groundwater quality, treatment evaluations, and siting studies. Seven alternative sites and a total of 14 alternatives were identified. Kennedy/Jenks recommended a treatment process of green sand pressure filters followed by granular activated carbon (GAC) for the Hollywood Basin, and reverse osmosis (RO) for the Santa Monica Coastal Subbasin.

Lake Bottom Modification Feasibility Study, Big Bear Municipal Water District, Big Bear, CA - *Project Manager* - The purpose of this project was two-fold: (1) Evaluate the technical feasibility of recontouring the bottom of Big Bear Lake to remove phosphorous-laden sediment, improve navigation and recreation, control aquatic plants, enhance the fishery and wildlife habitat and improve water quality. Material handling options will be evaluated, and a reconnaissance level estimate of costs will be prepared along with a schedule and proposed program of future activities. (2) Identify compliance requirements and concerns of selected stakeholders, including regulatory, environmental, fisheries, and recreation interests. The scope of work included a bathymetric survey of the lake bottom performed by a subconsultant.

Proposed Facility Management System Evaluation, East Bay Municipal Utilities District, East Bay, CA - *Civil Engineer* - Prepared a feasibility study for automated archival of engineering drawings related to a major wastewater treatment plant expansion.

Laboratory Automation Systems Feasibility Study Update/Water Quality Database, City of Los Angeles, Los Angeles, CA - *Project Manager* - Conducted a feasibility study for implementation of a Laboratory Information Management System for the District's Water Quality Laboratory. An in-depth analysis was conducted of the lab's wet chemistry, microbiology, and organic chemistry sections, as well as their pilot treatment plant testing department. A detailed listing of requirements was prepared, and prioritized to serve as the basis for software selection. Several commercial vendors were evaluated for compliance with the District's needs. Alternative configurations were prepared for hardware, software, and equipment to interface with laboratory scientific instrumentation. Additional applications specified included word processing, graphics, data analysis, and data management. In a follow-on study, the lab's needs for specialized equipment to evaluate gas chromatographs of volatile organic compounds was evaluated.

As-Needed Services Contract, Metropolitan Water District of Southern California, Los Angeles, CA - *Principal-In-Charge* - Providing consulting services to Metropolitan in the areas of business process facilitation associated with reorganization of the Engineering Services Section, and internal partnering associated with the Control System Expansion and Automation Master Plan (CSEAMP). For the ESS, Mr. Glaser led a series of workshops designed to identify and address major issues and concerns associated with the reorganization process. Workshops consisted of a highly participative resolution of key issues and concerns. For the CSEAMP, Mr. Glaser provided partnering services to five organizations within Metropolitan to increase the level of awareness, understanding, and cooperation among the groups. The overall focus of the partnering/team building efforts was to coordinate the activities included as part of the CSEAMP with the activities required as a part of on-going, new, and anticipated programs and projects to improve efficiency and avoid duplication of effort. Examples of key issues addressed included training, documentation standards for hardware and software, and documentation standards, and organizational issues which arise on projects involving several different groups.

Valencia Water Reclamation Plant Automated Record Drawing Conversion, County Sanitation Districts of Los Angeles County, Los Angeles County, CA - *Project Manager* - Responsible for development of a 2-D model, and archival via scanning of 1,600 record drawings for civil, mechanical, structural, electrical components of the treatment plant. The 2-D model included a complete Microsoft Access database for storage and retrieval of plant design and operating data associated with graphic elements, and was delivered on CD in Microstation Design File format. A pilot test was performed of the plant Title 22 pressure filter area in order to confirm final delivery specifications for the graphic and non-graphic plant features. The scanned drawings were delivered in PDF format on the same CD, accompanied by a web browser for simplified user access.

Alexander R. Peterson, P.E.

Quality Assurance/Quality Control

Education
BS, Civil Engineering, California State University, Sacramento, 1985

Registrations
Professional Civil Engineer, California (46095)
Professional Civil Engineer, Oregon (16795)

Years of Experience
21 Years with Kennedy/Jenks
33 Total

Professional Summary
Alex is a registered civil engineer and has provided more than three decades of consulting advice for water system owners with a focus on groundwater development, treatment, and storage/banking. In his role as Kennedy/Jenks' groundwater practice leader, Alex provides innovative ideas and technical review for projects throughout the firm. He has lead evaluations of groundwater treatment strategies for iron, manganese, arsenic, hexavalent chromium, N-Nitrosodimethylamine (NDMA), perchlorate, volatile organic compounds (VOCs), and strategy development for downhole isolation of sources to improve water quality, well head treatment, centralized treatment, and operation practices to achieve treatment avoidance, if possible. This work includes bench scale and pilot-scale treatment testing as part of developing design and operations and maintenance (O&M) criteria/costs.

Relevant Project Experience
Water Supply Stabilization Program, Antelope Valley-East Kern Water Agency, AECOM Technology Corporation, Palmdale, CA - *Project Director* - Team Leader for siting and design of seven extraction wells for groundwater banking recovery of water recharged through spreading basins. Recovery wells provide direct potable use supply to the AVEK distribution system with blending for THM reduction.

Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District, Palmdale, CA - *Experience Discipline Name* - Palmdale Water District (PWD) is implementing the first phase of the Palmdale Regional Groundwater Recharge and Recover Project, a $55 million surface spreading indirect potable reuse (IPR) water bank in Antelope Valley, CA. The project will provide up to 50,000 ac-ft/year of recharge capacity and initially 7,500 ac-ft/year of extraction capacity. State Water Project (SWP) raw water will be conveyed 9.5 miles via a 36- and 48-inch diameter pipeline with disinfected tertiary recycled water adding at a 20% ratio and recharged in two initial 20-acre recharge basins (four ultimate). After undergoing soil aquifer treatment and meeting residence time requirements, the groundwater will be extracted through 4 initial (and up to 16 ultimate) recovery wells, chlorinated and conveyed to PWD's distribution system.

Surface/Ground Water Blending Study, City of Lathrop, Lathrop, CA - *Project Engineer* - Evaluation of surface and groundwater blending alternatives as a treatment approach to the reduction of manganese and arsenic in groundwater supplies generated by the interim well field (Well 21,22, & 23) projects. Work included development of process alternatives, conceptual site plans and process diagrams, and preparation of cost estimates. Results indicated that no surplus surface capacity for blending of groundwater supplies for arsenic compliance existed. This determination was based on the assumption that all existing City wells would use blending as the treatment approach before proceeding to a removal type process.

Interim Well Field Treatment Investigation, City of Lathrop, Lathrop, CA - *Project Engineer* - Responsible for the evaluation of groundwater quality information and development of treatment alternatives for the removal of manganese and arsenic from new water supplies being developed south of the City. The recommendations included aquifer zone isolation to reduce nitrate and gross alpha radioactivity issues as well as three primary treatment approaches. Effort included meeting with a consortium of project proponents and support of project funding efforts with cost estimates, cash flow projections and alternative schedules corresponding to possible development scenarios.

Well No. 21 Groundwater Treatment Plant, City of Lathrop, Lathrop, CA - *Project Engineer* - Evaluation of surface and groundwater blending alternatives as a treatment approach to the reduction of manganese and arsenic in groundwater supplies generated by the interim well field (Well 21,22, & 23) projects. Work included development of process alternatives, conceptual site plans and process diagrams, and preparation of cost estimates. Results indicated that no surplus surface capacity for blending of groundwater supplies for arsenic compliance existed. This determination was based on the assumption that all existing City wells would use blending as the treatment approach before proceeding to a removal type process.

NDMA Groundwater Extraction Treatment Design, Carmichael Water District, Carmichael, CA - *Project Manager* - Provided preliminary design, design, and construction phase services for the completion of two groundwater remediation facilities treating contamination from an Aerospace manufacturing facility in Rancho Cordova, California. Treatment included Ultraviolet light for destruction of NDMA, Hydrogen Peroxide with Ion Exchange for VOC destruction, and Granular Activated Carbon for reduction of Perchlorate. Project Management included development of collaborative relationships between the Potential Responsible Party, Sacramento County, and the regulators. Work is proceeding under PRP funding by agreement to expedite cleanup by cooperating versus litigating. Estimated flow rates are 1,200 gpm in Phase 1 and over 4,000 gpm in future phases.

Bajamont Groundwater Extraction and Treatment Plant Design, Carmichael Water District, Carmichael, CA - *Task Leader* - Professional Services for implementation of Aerojet groundwater remediation facilities at the Bajamont Way treatment plant site. Tasks included project management, QA/QC, technical evaluations, schematic design, opinion of probable construction costs, permit assistance, regulatory coordination, public outreach including workshops and public meetings, and pilot study and design.

Ancil Hoffman NDMA Groundwater Treatment Plant, Carmichael Water District, Carmichael, CA - *Project Manager* - Planning, design, and construction phase services for approximately 7,200 feet of 12-inch water main to improve fire suppression supply to the Ancil Hoffman Park and support a GenCorp Aerojet Groundwater Extraction and Treatment Project.

Bajamont Groundwater Remediation Project, Carmichael Water District, Carmichael, CA - *Project Manager* - Provided preliminary design, design, and construction phase services for the completion of two groundwater remediation facilities treating contamination from an Aerospace manufacturing facility in Rancho Cordova, California. Treatment included Ultraviolet light for destruction of NDMA, Hydrogen Peroxide with Ion Exchange for VOC destruction, and Granular Activated Carbon for reduction of Perchlorate. Project Management included development of collaborative relationships between the Potential Responsible Party, Sacramento County, and the regulators. Work is proceeding under PRP funding by agreement to expedite cleanup by cooperating versus litigating. Estimated flow rates are 1,200 gpm in Phase 1 and over 4,000 gpm in future phases.

David W. Ferguson, Ph.D., P.E.

Project Manager

Education

BS, Civil Engineering, University of Massachusetts, 1980
BS, Environmental Science, University of Massachusetts, 1977
MBA, Business Management, California State University, San Bernardino, 1985
MS, Civil Engineering, University of Massachusetts, 1980
PHD, Executive Management, Claremont Graduate University, 1993

Registrations

Professional Civil Engineer, California (34626)

Certifications

Board Certified Environmental Engineer, American Academy of Environmental Engineers & Scientists (AAEES)

Years of Experience

8 Years with Kennedy/Jenks
32 Total

Professional Summary

David Ferguson, PhD has extensive experience in the planning, design, construction, and operation of water supply, infrastructure, and treatment projects. His background includes project and program management, as well as management of engineering and/or operations for three large water utilities in Southern California. He has served as manager for an $80 million water banking program for the Antelope Valley-East Kern Water Agency (AVEK), and a $55 million indirect potable reuse (IPR) recharge and recovery project for the Palmdale Water District. David has been responsible for the evaluation and/or design of upgrades, rehabilitation, retrofit, and/or replacement for over 40 water treatment plants, 30 reservoirs, and 20 pumping stations for 15 different water utilities.

Project Experience

Upper VDC Optimized Conjunctive Use Program, Rancho California Water District, Temecula, CA - *Civil Engineer* - Kennedy/Jenks was retained by RCWD to develop an optimized recharge recovery strategy to allow for increased production and improved operations at the Upper VDC. Kennedy/Jenks performed the following; reviewed existing operational data and permit requirements for possible permit amendment to optimize recharge and recovery operations, evaluated alternative conveyance facility plan scenarios to convey this increased production of potable water supply from the Upper VDC to the distribution system, Developed a disinfection improvement plan to accommodate increased production, evaluated economics of project alternatives to confirm feasibility of increased improvements required to increase production, recommended a capital improvement program with phasing. With years of operational information and sampling data available on the performance of the recharge and recovery operations, a permit amendment from DDW was granted eliminating the 40-foot depth-to-groundwater requirement for the well operations at the Upper VDC, and eliminating the groundwater under the direct influence of surface water requirements. Following the study, Kennedy/Jenks designed the Phase 1 improvements which included a new 5-foot high berm, re-grading of pond bottoms to direct recharge to the recovery wells, three new pond discharge outlets, 1,900 LF of 36-inch diameter raw water pipeline, and 1,000 LF of 24-inch diameter treated water pipeline.

Groundwater Banking - Water Supply Stabilization Program, Antelope Valley-East Kern Water Agency, Palmdale, CA - *Civil Engineer* - AVEK is implementing an $80 million water banking program with two separate water banks, the 1,475-acre Westside Water Bank and the 80-acre Eastside Water Bank. The Westside site can recharge up to 50,000 ac-ft/year over 500 acres of agricultural land and currently can

extract 25 mgd with 11 potable recovery wells. The Eastside site can recharge up to 5,000 ac-ft/year in three 2-acre recharge ponds and extract up to 6 mgd with 3 potable recovery wells. Over the course of 5 years, Kennedy/Jenks managed seven subconsultants with 15 sub agreements, and prepared eight design packages for $34 million in construction.

Water Supply Stabilization Program, Antelope Valley-East Kern Water Agency, AECOM Technology Corporation, Palmdale, CA - *Project Manager* - For the design of 4 of 7 bid packages for the $30 million Phase 1 groundwater banking and blending program that will provide both water supply stabilization through banking and compliance with the Stage 2 Disinfectants/Disinfection ByProducts Rule (D/DBP) for TTHM Control by providing potable groundwater as an alternative water supply source. The development of a sub-regional groundwater model in combination with water quality testing of various groundwater and treated surface water blends provided operational strategies for THM compliance. The design packages for well drilling, treatment/chlorination facilities, and storage tank construction have been successfully bid, with the well equipping design currently at 90% completion. The well drilling construction contract (seven 20-inch diameter wells with depths up to 600 feet) is currently 50% complete.

Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District, Palmdale, CA - *Project Manager* - Serving as Project Manager over the last three years and has provided planning and design services to support the regulatory strategy and facilities design of this innovative project. The first phase, completed in early 2014, consisted of a feasibility study to evaluate alternatives and define the project parameters, evaluate recharge and recovery alternatives, and evaluate the hydrogeology, geology, and infrastructure requirements for conveyance, recharge, and recovery. The second phase of the project, Kennedy/Jenks prepared the preliminary design completed an Environmental Impact Report (EIR), managing the permitting process, and coordinating public outreach activities. Work also included preparation of a Bureau of Reclamation grant funding application submitted August 17, 2107. Currently, Kennedy/Jenks is managing field and laboratory testing including an infiltration pilot test and soil column testing. The project is anticipated to begin operation in 2020.

Bunker Hill Conjunctive Use Project, San Bernardino Valley Municipal Water District, Redlands, CA - *Technical Advisor* - Kennedy/Jenks performed the preliminary design of the Bunker Hill Basin Conjunctive Use Project (CUP) to determine the physical systems necessary to enhance water supply reliability for the region, and performed a cost allocation study to determine the equitable cost allocation of the CUP based on potential benefits received by the stakeholders and consisting of the following; evaluating various pipeline alignment alternatives to convey up to 80,000 AFY of extracted groundwater from the Bunker Hill Basin to the Texas Grove reservoir site, determining the project facilities and capital and operating costs of the CUP in accordance with the results of the hydrogeological analysis, developing a phasing plan for an initial production of 40,000 AFY and an ultimate production of 80,000 AFY, and consisting of up to 12 production wells, evaluating alternative cost allocation methodologies, and providing the framework for how the proposed CUP project costs will be allocated amongst the participants.

Feasibility of Developing the Santa Monica and Hollywood Basins as Sources of Groundwater Supply, City of Los Angeles, Department of Water and Power, Los Angeles, CA - *Project Manager* - For the feasibility of developing the Santa Monica and Hollywood groundwater basins as potable groundwater supply sources for the City of Los Angeles. For each groundwater basin, the study included: hydrogeologic characterization, basin governance, groundwater quality, treatment evaluations, and siting studies. Seven alternative sites and a total of 14 alternatives were identified. Kennedy/Jenks recommended a treatment process of green sand pressure filters followed by granular activated carbon (GAC) for the Hollywood Basin, and reverse osmosis (RO) for the Santa Monica Coastal Subbasin.

Paul H. Chau, P.E.

Project Engineer

Education
BS, Environmental Engineering and Science, University of California, Los Angeles, 2006
MS, Civil and Environmental Engineering, Stanford University, 2007

Registrations
Professional Civil Engineer, California (C75784)

Certifications
Certified Energy Manager, Certification Issuer

Years of Experience
4 Years with Kennedy/Jenks
10 Years Total

Professional Summary
Paul Chau is a civil engineer with a diverse background in master planning, hydraulic water modeling, and infrastructure design. He has built, developed, calibrated, and analyzed hydraulic water models using both Innovyze and Bentley software. He has also provided engineering analyses such as demand development, pipe & pump station sizing, and CIP development. In addition, Paul has extensive experience in water, recycled water, and sewer pipeline design.

Project Experience
Water Supply Stabilization Program, Antelope Valley-East Kern Water Agency, AECOM Technology Corporation, Palmdale, CA - *Project Team Member* - AVEK implemented an $80 million water-banking program with two separate water banks, the 1,475-acre Westside Water Bank and the 80-acre Eastside Water Bank. The Westside site can recharge up to 50,000 ac-ft/year over 500 acres of agricultural land and currently can extract 25 mgd with 11 potable recovery wells. The Eastside site can recharge up to 5,000 ac-ft/year in three 2-acre recharge ponds and extract up to 6 MGD with three potable recovery wells. Over the course of two years, Kennedy/Jenks managed seven subconsultants with 15 subconsultant agreements, and prepared eight design packages for $34 million in construction.

Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District, Palmdale, CA - *Civil Engineer* - Served as the lead engineer for this large-scale indirect potable water reuse water banking project, which will blend raw water from the State Water Project with recycled water produced at the Palmdale Water Reclamation Plant and bank them in the Lancaster groundwater sub-basin with recharge basins. Responsible for overall technical execution of the projection, including evaluation and screening of 14 project alternatives, which included various facility sites for treatment, conveyance and recharge facilities, as well as infrastructure design, hydraulic analysis, and cost estimating. Extracted water will be conveyed directly to Palmdale Water District's distribution system where it will eventually become the largest source of water supply for the District. It is anticipated this project will save the District roughly $300 million over the life of project when compared to alternative water supply strategies, in addition to increasing the overall reliability of their water supply portfolio.

Bunker Hill Conjunctive Use Project, San Bernardino Valley Municipal Water District, Redlands, CA - *Project Engineer* - Kennedy/Jenks performed the preliminary design of the Bunker Hill Basin Conjunctive Use Project (CUP) to determine the physical systems necessary to enhance water supply reliability for the region, and performed a cost allocation study to determine the equitable cost allocation of the CUP based on potential benefits received by the stakeholders and consisting of the following; evaluating various pipeline alignment alternatives to convey up to 80,000 AFY of extracted groundwater from the

Bunker Hill Basin to the Texas Grove reservoir site, determining the project facilities and capital and operating costs of the CUP in accordance with the results of the hydrogeological analysis, developing a phasing plan for an initial production of 40,000 AFY and an ultimate production of 80,000 AFY, and consisting of up to 12 production wells, evaluating alternative cost allocation methodologies, and providing the framework for how the proposed CUP project costs will be allocated amongst the participants.

Los Posas Replacement Water Study, Calleguas Municipal Water District, Moorpark, CA - *Experience Discipline Name* - (PLEASE PROVIDE ROLE) Kennedy/Jenks provided CMWD and Fox Canyon Groundwater Management Agency engineering services to perform the Study, which comprised fourteen individual studies each evaluating a water supply alternative. Kennedy/Jenks developed key criteria to assess each project alternative. Results of this Study found that opportunities to diversify the Basin's water supply are regionally accessible within supply types including stormwater, treated brackish water, imported water, and recycled water, as well as invasive vegetation removal. Factors impacting the overall feasibility of an evaluated alternative include capacity and capital costs per project, and potential limitations on supply availability such as water rights, agency terms, hydrological availability, drought, and other limitations. The results also found advantages and disadvantages for each project, which are similar within a specific supply type.

Well No. 41 Wellhead Treatment Design and Bid Services, Ontario Municipal Utilities Company, Ontario, CA - *Project Engineer* - Design engineering and engineering services during construction for the Well No. 41 Wellhead Treatment Project. The project includes a 2,350 gpm ion exchange perchlorate treatment facility, new chlorine building for on-site generation of sodium hypochlorite (relocation of existing OSG system from Well No. 41 building), associated site improvements, approximately 1,300 LF of 16-inch diameter CML&C groundwater supply pipeline, 200 LF of 16-inch diameter CML&C treated water pipeline, and 300 LF of 18-inch diameter RCP storm drain.

Moreno Valley Groundwater Development Program Facilities Project, Eastern Municipal Water District, Moreno Valley, CA - *Project Team Member* - Project consisted of equipping two new wells, designing a centralized treatment facility consisting of a water and wastewater treatment plant, and designing transmission pipelines to connect to current water distribution system. Calculated hydraulic grade lines and chemical storage requirements, compiled design criteria and equipment lists for water treatment technologies, and assisted in the write-up for the Preliminary Design Report.

Pure Water Monterey, Groundwater Recharge (GWR) Injection Well Facilities (Phase 1), Monterey Regional WPC, Monterey, CA - *Deputy Project Manager* - Responsible for leading the design team for the injection well facilities, which include two deep injection wells, one vadose zone well, and four monitoring well clusters. Monterey One Water (formerly Monterey Regional Water Pollution Control Agency) and Monterey Peninsula Water Management District have partnered to create Pure Water Monterey, a $115M groundwater replenishment project. The program entails collecting six different sources of wastewater, providing conventional tertiary wastewater treatment, advanced water treatment, and injection well facilities. The injection wells will store highly purified recycled water produced from the advanced water treatment facility in the local groundwater basins.

Walt W. McNab, Jr., Ph.D., P.G.

Recharge Groundwater Specialist

Education
BA, Geology, University of California, Berkeley, 1988
MS, Mineral Engineering - Hydrogeology, University of California, Berkeley, 1990
PhD, Mineral Engineering - Hydrogeology, University of California, Berkeley, 1995

Registrations
Professional Geologist, California (7312)

Memberships/Affiliations
American Geophysical Union
American Society of Ground Water Scientists and Engineers
Geological Society of America
Sigma Xi
Peer reviewer for Bioremediation Journal, Chemosphere, Environmental Science & Technology, Ground Water Monitoring & Remediation, Journal of Contaminant Hydrology, Transport in Porous Media, Vadose Zone Journal, and Water Resources Research

Years of Experience
23 years

Professional Summary
Dr. Walt McNab is an environmental geoscientist with over 23 years of experience as a project manager, researcher, and consultant. His interests and experience span a wide range of issues in physical and chemical hydrogeology and soil science. He has directed or played leadership roles in projects that have entailed groundwater data analyses and modeling for a variety of applications (e.g., contaminant migration, impacts of agricultural practices, geochemical impacts of artificial recharge), design of novel treatment technologies, geologic storage of CO_2, vadose zone processes, reactive transport, and multiphase flow through porous media. In addition to his current role as a senior geoscientist with Kennedy/Jenks, he worked previously as an environmental scientist at Lawrence Livermore National Laboratory where he published numerous peer-reviewed scientific papers addressing groundwater transport processes, plume migration, applied geochemical modeling, and other related topics. Dr. McNab is a Professional geologist in California.

Selected Project Experience
Eastside Water Bank, Antelope Valley-East Kern Water Agency, LIttlerock, CA – *Groundwater Modeler* - AVEK is implementing an $80M water banking program with a twofold objective: (1) water supply stabilization, and (2) regulatory compliance with the Stage 2 Disinfectants/Disinfection ByProducts (D/DBP) Rule; specifically, trihalomethane (THM) control with free chlorine as the distribution system secondary disinfectant. The Eastside Water Bank was constructed on an 80-ac site in Littlerock, CA with 6 acres of recharge basins designed to recharge 4,000 ac-ft/year and 3 potable recovery wells with a capacity of 5 mgd. In addition to supplying AVEK's Eastside water treatment service area, the project has the capability to pump back to the East Branch of the State Water Project. To support planning efforts for the water bank, Walt provided groundwater modeling support, utilizing a subregional model of the Antelope Valley-wide MODFLOW model.

Palmdale Regional Groundwater Recharge and Recovery Project, Palmdale Water District, Palmdale, CA - *GW Quality Solute Transport* - Palmdale Water District (PWD) is implementing the first phase of the Palmdale Regional Groundwater Recharge and Recover Project, a $55 million surface spreading indirect potable reuse (IPR) water bank in Antelope Valley, CA. The project will provide up to 50,000 ac-ft/year of recharge capacity and initially 7,500 ac-ft/year of extraction capacity. State Water Project (SWP) raw water will be conveyed 9.5 miles via a 36- and 48-inch diameter pipeline with disinfected tertiary recycled water adding at a 20% ratio and recharged in two initial 20-acre recharge basins (four ultimate).

After undergoing soil aquifer treatment and meeting residence time requirements, the groundwater will be extracted through 4 initial (and up to 16 ultimate) recovery wells, chlorinated and conveyed to PWD's distribution system.

Project Hydrogeologist, Transportation Sector Client. Responsible for evaluating behavior of fuel hydrocarbons in soil and groundwater at fueling facilities in several states. Tasks include quantifying the mobility of free product as well as evaluating the migration of dissolved fuel hydrocarbons through the vadose zone to groundwater using the U.S. Geological Survey's VS2DT unsaturated flow model, as well as quantifying rates of natural bioattenution.

Project Hydrogeologist, Food and Beverage Industry Clients. Provides technical input for regulatory compliance purposes on a series of projects involving land application of process wastes associated with the wine industry in California. Technical issues include flow and transport modeling, as well as geochemical modeling, to support planning decisions and to characterize legacy impacts stemming from past operating practices.

Project Manager and Hydrogeologist, Underground Test Area, Nevada Test Site (Lawrence Livermore National Laboratory). Managed budget and scope and participated in task planning and coordination with the U.S. Department of Energy and other contractors for the Nevada Test Site environmental characterization program. Conducted unsaturated zone modeling studies to assess radionuclide mobility through the vadose zone and test tunnels.

Project Manager and Hydrogeologist, CO_2 Injection and Storage Study at the In Salah Gas Field, Algeria (Lawrence Livermore National Laboratory). Managed budget and scope for an industry- and U.S. Department of Energy-funded modeling assessment an industrial-scale CO_2 storage pilot study at a natural gas field in North Africa. Technical responsibilities included performing reactive transport modeling to support characterizing reservoir and wellbore cement responses to CO_2 injection and dissolution.

Task Leader, Source Area Remediation Technology Assessment (Lawrence Livermore National Laboratory). Conducted a comparative analysis of the suitability for alternative remediation strategies for chlorinated hydrocarbon plume source areas at the LLNL Livermore Site, a CERLA site in Northern California. Designed a compartmentalizeds model of plume source areas which was used to analyze multiple source area data sets. Presented the source area remediation evaluation approach to U.S. Department of Energy management, regulatory agency representatives, a community work group, and subject matter experts from the U.S. EPA's Office of Research & Development.

Project Hydrogeologist, California State Water Resources Control Board-funded Study Addressing Key Groundwater Quality Issues in California's San Joaquin Valley (Lawrence Livermore National Laboratory). Tasks included (1) identifying the geochemical footprint of animal waste lagoon seepage in an aquifer underlying an instrumented dairy facility, and (2) identifying ion exchange and trace element surface complexation reactions, specifically including arsenic mobilization, associated with an artificial recharge project. Project work entailed geochemical modeling components and led to two peer-reviewed journal articles, both as first author.

Meredith E. Clement

Funding

Education

BS, Environmental Policy, Analysis and Planning, University of California at Davis, 1996
MS, City and Regional Planning, California Polytechnic State University, 2000
MS, Transportation Engineering, California Polytechnic State University, 2000

Membership Affiliations

American Public Works Association
American Water Works Association
Association of Environmental Professionals

Years of Experience

11 Years with Kennedy/Jenks
21 Total

Professional Summary

Meredith Clement has nearly 20 years of environmental consulting experience on projects throughout California. Meredith has special expertise with water planning projects, urban planning, and environmental compliance documentation, including the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Project Experience

Santa Ana River Water Rights Application and Environmental Impact Report (EIR), SAIC-Science App International, San Diego, CA - *Project Manager* - For the Santa Ana River Water Rights Application and Environmental Impact Report (EIR). Managed water right application materials and an EIR to support a project involving dam re-operation, raw water delivery infrastructure and associated new water right petition to the State Water Resources Control Board. Responsible for preparation of technical documentation for surface and groundwater models, preparation of a water availability analysis, in-stream flow feasibility analyses, the overall EIR, as well as project team coordination and client liaison.

Groundwater Contamination Elimination, City of Oxnard, Planning and Environmental Services, Oxnard, CA - *Project Manager* - This project involves the installation of sewer line and abandonment of septic systems for over 225 residences in the City of Oxnard's College Park neighborhood. CEQA documentation involved updating information prepared for the City's Wastewater Collection System Master Plan and preparing new analyses for air quality and potential green house gas emissions. Because the project was eligible for funding from the State Water Resources Control Board, environmental documentation was prepared to meet the requirements of both the City of Oxnard and the State Water Resources Control Board.

Grant Administration Support, County of Ventura, Ventura, CA - *Grant Administrator* - Acting as grant administrator for 11 project proponents that successfully competed for Proposition 50 Integrated Regional Water Management Plan funding. Assist project proponents with contract negotiations, coordination of deliverables, regulatory compliance for projects, preparation of invoices, and progress reports. Act as contact for the 11 projects with the State Water Resources Control Board. As part of grant administration, assisted with the design and development of a web platform, electronic input forms, and database.

Recycled Water Master Plan, City of Oxnard, Planning and Environmental Services, Oxnard, CA - *Environmental Scientist* - City of Oxnard, Recycled Water Master Plan, Oxnard, CA. Evaluating potential uses for recycled water within and adjacent to the City of Oxnard. Uses under evaluation include M&I, agricultural, seawater barrier, and groundwater barrier.

Proposition 50 Grant Administration Tool and Integrated Regional Water Management Plan, Contra Costa Water District, Concord, CA - *Technical Advisor* - Assisted Contra Costa Water Agency with development of a customized database for use with the Kennedy/Jenks Grant Administration Tool. This website tool and database is assisting these two agencies with management of Proposition 50 Implementation grants.

Conjunctive Use and Enhanced Aquifer Recharge in the Santa Margarita Groundwater Basin, County of Santa Cruz, Santa Cruz, CA - *Technical Advisor* - Assisted the Community Foundation of Santa Cruz with development of a customized database for use with the Kennedy/Jenks Grant Administration Tool. This website tool and database is assisting these two agencies with management of Proposition 50 Implementation grants.

Santa Barbara Countywide Integrated Regional Water Management Plan-Prop 50, Implementation Grant Administration, County of Santa Barbara, DPW, Santa Barbara, CA - *Project Manager* - Assisted with grant administration for the agreement between the County of Santa Barbara and the State Water Resources Control Board (SWRCB). Tasks include assisting with submittal of materials necessary for grant execution and maintenance, completion of a web platform and electronic database for invoice preparation.

Grant Assistance, City of Corona Department of Water & Power, Corona, CA - *Grant Writer* - Assisted in the preparation of state and federal grant applications related to recycled water, water and water reclamation projects including energy efficiency.

Grant Funding Assistance for Recycled Water Storage and Demineralization, San Elijo Joint Powers Authority, San Elijo, CA - *Grant Writer* - Assisted in the monitoring and preparation of state and federal funding opportunities, as well as providing as needed services in refining materials needed for grant and loan applications specific to SEJPA's Recycled Water Storage and Demineralization Project.

Grant Support Services, City of Camarillo, Camarillo, CA - *Grant Writer* - Responsible for the preparation of grant application for the Clean Water State Revolving Fund (CWSRF) Project Priority List for several of the City's projects including Stormwater Trash TMDL implementation, Pleasant Valley Road Reclaimed Water Main Phase II, Wastewater Treatment Plant Diversion Discharge to Camrosa, and the Sewer Main Replacements per the Sewer System Upgrade Plan.

Application for U.S. Bureau of Reclamation Grant Program, Calleguas Municipal Water District, Thousand Oaks, CA - *Grant Writer* - Responsible for the preparation of a grant application for the U.S. Bureau of Reclamation (USBR) Challenge Grant Program: Recovery Act of 2009 Water Marketing and Efficiency Grants for the Turnout Automation and Vault Improvements Project.

Conservation Block Grant Application, City of Camarillo, Camarillo, CA - *Grant Writer* - Responsible for the preparation of a grant application for the U.S. Department of Energy (DOE) National Energy Technology Laboratory Recovery Act Energy Efficiency and Conservation Block Grants Funding Opportunity DE-FOA-000013 for the Corporation Yard Solar Improvements Project.

Tim Chen, E.I.T.

Staff Engineer

Education
BS, Environmental Engineering, Shanghai University, 2011
MS, Environmental Engineering, University of Southern California, 2013

Registrations
Engineer-In-Training, California (157109)

Years of Experience
1.5 Years with Kennedy/Jenks
1.5 Total

Professional Summary
Tim is and environmental engineer with more than four years of experience in water resources and environmental investigations performed for numerous municipalities, state agencies, and private clients throughout the Southern California region. His areas of expertise include: watershed modeling and management, ground water basin and water quality studies, artificial recharge, ground water flow and solute transport modeling, and experience in the fields of GIS applications, database development and management, and well design. His software experience includes MODFLOW, MT3D, ArcGIS, HSPF, and Surfer.

Project Experience
Wastewater Treatment Plant Rehabilitation Concept Design, **Rosamond Community Service District**, **Rosamond, CA** - *Project Engineer* - Expansion of a wastewater treatment plant from 0.5 MGD to 1.3 MGD to treat inflows from raw wastewater and septage trucks. The project concept also included the retrofit of existing evaporation ponds to achieve groundwater recharge through percolation.

Hydrogeological Support, **Rosamond Community Service District, Rosamond, CA** - *Project Engineer* - Evaluation of the groundwater storage and well siting options based on groundwater modeling results. Expansion of existing potable water distribution system to include a new groundwater supply well.

Groundwater Bank Expansion, **Antelope Valley East Kern Water Agency, Palmdale, CA** - *Project Engineer* - Expansion of the AVEK Eastside groundwater bank. The project included an increase of the total groundwater recharging area form 6 acres to over 70 acres, and installations of four new groundwater pumping wells to recover the additional artificial recharge.

Wellhead Treatment Design, **Eastern Municipal Water District, Perris, CA** - *Project Engineer* - Design of a 1,000 gpm GAC treatment facility for perfluorinated compounds contamination in a potable water supply well. The project included detail engineering evaluation of remedy alternatives and cost analysis.

City of Los Angeles, Bureau of Sanitation, City of Los Angeles, Bureau of Sanitation, Los Angeles, CA - *Environmental Engineer* - Currently working as an in-house consultant to provide support for the One Water LA 2040 Plan. Scope of work includes reviewing technical reports (i.e., wastewater facilities plan, stormwater and urban runoff facilities plan and environmental impact report), public and stakeholder outreach, and workshop preparations.

Geoscience Support Services, Inc., Geoscience Support Services, Inc., Various Cities, CA - *Hydrogeologist* - Evaluated water supply options for watersheds with land subsidence and groundwater shortage problems. Determined annual change in groundwater storage and safe yield for various groundwater basins. Conducted model prediction of groundwater contaminants migration and

evaluated remediation options. Estimated local surface runoff and explored storm water capture options. Assessed environmental impacts of coastal desalination and sea water intrusion projects. Performed numerous drinking water pumping well siting assessments for various water districts. Prepared proposals, technical reports, project progress reports and meeting minutes to clients. Provided oral presentations to clients and the public on project status and findings. Project:

- Monterey Bay Desalination Project
- Paso Robles Basin Groundwater Model Refinement and Water Supply Options Study
- Antelopoe Valley Groundwater Rights Adjudication
- Doheny Ocean Desalination Project
- Rancho California Water District Groundwater Management Program
- Riverside North Aquifer Storage and Recovery Project
- Yucaipa Groundwater Basin Safe Yield Study
- Stormwater Flow and Capture Analysis - Active Recharge Project for the Tributaries of the Santa Ana River
- Rialto-Colton Basin Groundwater Model Update
- Rialto-Colton Basin Groundwater Rights Settlement Negotiations

Los Angeles Regional Water Quality Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles, CA - *Administrative* - Reviewed public reports and permits for wastewater discharge and remediation projects. Maintained and updated water quality information in CIWQS and Geo-Tracker database.

Shanghai Guchen M&E Co., Ltd., Shanghai Guchen M&E Co., Ltd., Shanghai, Proj State Code - *Project Engineer* - Designed and installed flow meters monitoring surface flow conditions using AutoCAD and ArcGis. Collaborated with contractors and clients as the on-site engineer for municipal water supply projects.

Veolia Water Co., Ltd., Veolia Water Co., Ltd., Shanghai, Proj State Code - *Civil Engineer* - Aided supervisor in development of plans and cost estimates on water supply and drainage projects.

David Crook, AICP, LEED AP

Principal Planner

Summary of Qualifications

David Crook is an environmental planner with 18 years of professional experience in environmental science, impact assessment, planning, and geographic information system (GIS) applications. He joined HELIX in 2018 and has prepared all levels of California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) studies, as well as other planning documents, including General Plans and Specific Plans. He has worked on a variety of projects for public and private entities that require a diversity of skills and disciplines, such as written and oral communication, analytical, and managerial. In addition to his CEQA and NEPA expertise, Mr. Crook has experience with field inspections, including soil, groundwater, and surface water sampling and analysis, and preparation of associated analytical reports.

Selected Project Experience

Palos Verdes Peninsula Water Reliability Project MND (2016 - 2018). Project Manager for the preparation of an Initial Study/Mitigated Negative Declaration (IS/MND) for new 36- and 24-inch potable water transmission mains and a new booster pump station in the Cities of Rolling Hills Estates, Rancho Palos Verdes, and unincorporated Los Angeles County. The project, which was proposed by California Water Service Company (Cal Water) was intended to replace the single steel transmission main serving 90% of the Palos Verdes Peninsula, which is over 60 years old and has experienced several leaks and failures. The IS/MND, for which the City of Rolling Hills Estates served as Lead Agency for CEQA, addressed impacts associated with the construction and operation of the two new pipelines and pump station throughout the approximately 7-mile project alignment. Given the relatively rural nature of the project area, topographic conditions, and limited public right-of-way available, key issues facing the project included traffic and circulation (including pedestrian, bicycle, and horse access), noise and vibration (particularly nighttime construction noise and pump station operational noise and vibration), biological resources/jurisdictional features (California gnatcatcher/Palos Verdes Blue Butterfly and multiple drainages cross the alignment), cultural resources (high sensitivity and consultation with Gabrieleno Tribal representatives), geotechnical stability (steep slopes and landslide areas on-site), and hazardous materials (alignment crossed through former landfill properties). The project was approved, and the MND adopted, by the Rolling Hills Estates City Council in April 2018.

Burbank Water and Wastewater Infrastructure Projects (2000 - 2018). Project Manager for oversite of the preparation of Mitigated Negative Declaration (MND) projects, which included the Burbank Recycled Water System Expansion project (addressing 79,000 linear feet of pipeline extensions); Reservoir No. 1 Replacement Project (a 6.9-million-gallon potable water reservoir constructed in 1928); Sustainable

Education

Master of Science, City and Regional Planning, California Polytechnic State University, San Luis Obispo, 2000

Bachelor of Science, Environmental Studies, University of California, Santa Barbara, 1997

Registrations/ Certifications

American Institute of Certified Planners (AICP) #018136, 2002

U.S. Green Building Council, LEED Accredited Professional (BD+C), 2007

Professional Affiliations

American Institute of Certified Planners

U. S. Green Building Council

Board Member, Orange County Association of Environmental Professionals

Board Member, Orange County American Planning Association

Water Use Ordinance for Burbank Water & Power, as well as an Negative Declaration (ND) to support the City's 2017 Wastewater Change Petition that was submitted to the State Water Resources Control Board. Work was performed for the City of Burbank.

Back Bay Landing Project EIR (2012 - 2014). Project Manager for the preparation of an EIR for the proposed Back Bay Landing project located on a waterfront property in upper Newport Bay. The EIR addressed the various discretionary land use approvals to accommodate the future redevelopment of the approximately seven-acre project site with a mixed-use waterfront development. The applicant requested approval of General Plan, Coastal Land Use Plan (CLUP) and Planned Community legislative approvals to allow for consideration of a future project with specific project- level design details to be evaluated during the Site Development Plan and Coastal Development Permit (CDP) application process. Among key issues addressed in the EIR are aesthetics/views, biological (marine) and jurisdictional resources, historic resources, hydrology and water quality, land use (including Airport Land Use Plan and Coastal Act consistency), and traffic/circulation. In 2016, at the request of the City, also prepared an Addendum to the Certified Back Bay Landing Project EIR in order to address changes to the proposed amendments and legislative approvals due to input from the California Coastal Commission.

LADWP On-Call Contract (2000 - 2004). Lead Environmental Analyst and Assistant Project Manager for preparation of CEQA documentation supporting various water and wastewater infrastructure projects throughout the Los Angeles Department of Water and Power (LADWP) service area. Infrastructure projects included linear pipelines that required evaluation of short-term construction impacts along the project alignment. Construction activities occurred within public street rights-of-way and therefore traffic and access impacts were essential to address. Specific projects included the Santa Ynez Reservoir Covering Project MND; Magnolia Trunk Line MND; Hansen Area Water Recycling Project MND; Sepulveda Basin Water Recycling Project; Woodley/Burbank MND; City Trunk Line South MND; and West Valley Water Recycling Project MND.

Village at Playa Vista EIR (2000 - 2004). Lead Analyst for an EIR prepared to address the environmental impacts of Phase 2 of the Playa Vista Project in the City of Los Angeles. Prepared a number of EIR technical sections for the EIR, including Earth (geology and soils), Mineral Resources, Hydrology, Water Quality, Safety/Risk of Upset, Energy, Water Consumption, Wastewater, and Solid Waste. Work was performed for PCR Services Corporation with the City of Los Angeles as lead agency.

Canyon Sewers Rehabilitation Project Program EIR (2001 - 2002). Environmental Planner prepared technical sections of the Program Environmental Impact Report (EIR) for the City of San Diego Metropolitan Wastewater Department for the Canyon Sewer Rehabilitation project, which entailed construction, replacement, and repair of sewers in environmentally sensitive canyon areas within the city of San Diego.

Marina del Rey Marriott EIR Addendum (2013 - 2015). Project Manager for the addendum of an EIR on the Marina del Rey Marriot project located in Los Angeles County. Environmental Issues: Addendum to Certified EIR; Air Quality, Biological Resources, Education, Fire Protection, Geotechnical and Soil Resources, Hydrology and Drainage, Land Use and Planning, Libraries, Noise, Parks and Recreation, Police Protection, Population and Housing, Sewer Service, Solid Waste, Traffic/Access, Visual Resources, and Water Service Project Description: The Reduced-Scale Project includes development of the northerly approximately 2.2 acres of Parcel 9U and is referred to as the "The Marina del Rey Marriott Courtyard and Residence Inn Hotel." Proposed development under the Reduced-Scale Project consists of one structure containing a five-story hotel "wing" (tower height of approximately 61 feet) and a six-story

hotel wing (tower height of approximately 72 feet) with 288 hotel studios, suites, and standard guest rooms, which would include two meeting rooms, a hotel-oriented restaurant and bar/lounge, fitness center (including an outdoor pool and spa), and associated hotel operations space, such as the lobby, hallways, elevator shafts, mechanical rooms, offices, and laundry, maintenance and custodial facilities. The building would also feature an outdoor patio/terrace, a large second floor deck with a pool, both of which would overlook the waters of the Marina and a 28-foot-wide pedestrian promenade (approximately 386 feet in length).

Hidden Oaks Country Club Specific Plan EIR (2015 - 2018). Project Manager for the preparation of an EIR for the Hidden Oaks Country Club Specific Plan in the City of Chino Hills. The project involves the development of up to 107 custom single-family estate homes on the approximately 500-acre project site, as well as related amenities including a private clubhouse, and on- and off-site infrastructure improvements. The comprehensive EIR addresses the following issues: aesthetics, air quality/health risk, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population and housing, public services, transportation/traffic, tribal cultural resources, and utilities and service systems. Key constraints on the site include steep topography, numerous designated Prominent Ridgelines and Exceptionally Prominent Ridgelines, biological resources including thousands of oak trees, limited vehicular access to the area, existing on- and off-site natural drainages including Carbon Canyon Creek and Soquel Canyon Creek, as well as the presence of the Chino Hills State Park to the south of the project site.

Burbank Town Center EIR (2017 - 2018). Project Manager for the Burbank Town Center project in downtown Burbank. The project involves revisions to the existing Planned Development (PD) that regulates land use on the approximately 36-acre site, as well as the redevelopment of all or portions of five of the eight planning areas subject to the PD. Proposed improvements include redevelopment of the former IKEA store and other existing uses on the property. The project would maintain much of the existing land uses on-site but would also introduce new uses and features. The project would demolish approximately 285,000 square feet of existing structures and construct new buildings that would include apartments, condominium residences, a hotel, offices, retail shopping, restaurants, and community events. New construction would include a gross floor area of up to approximately 311,496 sf that includes options for new office, retail, restaurants, and a 200-room hotel. The project also includes new construction of up to approximately 1,173 new housing units at the project site. The EIR issues include aesthetics, air quality/health risk, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, population and housing, public services, transportation/traffic, tribal cultural resources, and utilities and service systems.

Camp Emerald Bay Master Plan MND, Santa Catalina Island, Los Angeles, County, CA (2011 - 2017). Project Manager to prepare CEQA documentation in support of the Boy Scouts of America Western Los Angeles County Council's Camp Emerald Bay 2016 Master Plan project on Santa Catalina Island. The 2016 Master Plan provides a mechanism for the long- term expansion and improvement of the existing camp facility over an approximate 20-year period, and given the site's unique location on Santa Catalina Island, the project involves a number of key environmental challenges. These challenges include the site's location directly on the coast with direct beach/ocean interface, sensitive biological resources including native habitat, a known archaeological site on the property, wildland fire hazards, views/scenic resources, and several on-site natural drainages. Performed project-specific technical analyses for air quality, greenhouse gas emissions/global climate change, archaeological and historic resources, and biological resources/jurisdictional features in support of the environmental document.

Robert Hogenauer

Senior Scientist

Summary of Qualifications

Mr. Hogenauer has 14 years of experience and is actively involved in focused surveys for endangered species, including the least Bell's vireo, coastal California gnatcatcher, Quino checkerspot butterfly, fairy shrimp, desert tortoise, and arroyo toad, all of which are listed at the federal level. He joined HELIX in 2004 and has extensive experience surveying for burrowing owls, and has performed biological field studies at various locales in Imperial, Riverside, San Bernardino, Los Angeles, and San Diego counties. Mr. Hogenauer has conducted studies and written many documents for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), and California Environmental Quality Act (CEQA) compliance for a variety of projects.

Selected Project Experience

Recharge Banking and Blending Study (2012 - 2015). Lead Biologist for two 3-acre parcels proposed for use in a water recharge project in the Antelope Valley region of unincorporated Los Angeles County, between the communities of Pearblossom and Little Rock, south of the City of Palmdale. Conducted biological studies, including surveys for the desert tortoise, rare plants, Mojave ground squirrel (conducted by permitted subcontractor), and burrowing owl. Assisted in the writing of biological letter report for both parcels. In addition to the two recharge basins, the project included construction and operation of up to five extraction wells, associated pipelines and other facilities. Work performed for Kennedy/Jenks Consultants, with Antelope Valley East Kern Water District as the lead agency.

Hemet/San Jacinto Integrated Recharge and Recovery Program (IIRP) (2010). Biologist for a project that included 38 acres of groundwater recharge basins in the San Jacinto River channel, an approximately eight-mile-long water supply pipeline, and several groundwater monitoring and extraction wells. Monitored the construction site and San Bernardino kangaroo rat exclusionary fencing. Assisted with USFWS-requested, multiple-grid San Bernardino kangaroo rat study. Work performed for EMWD.

Hemet/San Jacinto IIRP (2004, 2011 - 2014). Lead Biologist for a pre-construction nesting bird survey and habitat restoration for a project that included 38 acres of groundwater recharge basins in the San Jacinto River channel, an approximately eight-mile-long water supply pipeline, and several groundwater monitoring and extraction wells. Work performed for EMWD.

Education

Bachelor of Science, Biology, Minor in Zoology, California State Polytechnic University, 2004

Registrations/ Certifications

CDFW, Scientific Collecting Permit (SCP-8832), 2005

CDFW, Authorized Flat-tailed horned Lizard biological monitor, 2007

USFW, Authorized individual for coastal California gnatcatcher, 2007

USFW, Permit to conduct quino checkerspot butterfly presence/absence surveys, 2008

Professional Affiliations

Desert Tortoise Council Member

San Diego County Sensitive Butterfly Workshop

Hemet/San Jacinto IRRP Well 37 Drilling and Testing (2017). Project manager for Well 37 and monitoring well 4 portion of groundwater recharge and recovery project. This portion of work involves a burrowing owl pre-construction survey, San Bernardino Kanagroo Rat monitoring and the preparation of the well sites with base and an exclusionary fence.

Hemet/San Jacinto Mitigation Planning & Monitoring for Phase 1 IRRP (2007 - 2009). Lead Biologist conducting biological construction monitoring on a one-acre project site for the Hemet/San Jacinto Integrated Recharge and Recovery Program (IRRP) in the City of San Jacinto, Riverside County. Monitored the San Bernardino kangaroo rat exclusionary fence and GPS trap locations for the San Bernardino kangaroo rat study. Work performed for EMWD.

San Jacinto Seasonal Storage & Recovery (2005). Biologist conducting biological monitoring for the San Bernardino kangaroo rat for a project that proposed to recharge up to 3,000 acre-feet per year of seasonal storage water purchased from MWD for later extraction and use. Work performed for EMWD.

Palmdale Water District - Littlerock Creek GW Recharge & Recovery Feasibility Study (2015). Conducted burrowing owl and assisted with rare plant survey for water line, ground water recharge project in Littlerock, Los Angeles County, CA.

Palmdale Water District - Palmdale Regional Groundwater Recharge and Recovery Preliminary Design EIR, EA, FONSI (2015). Conducted burrowing owl, desert tortoise and rare plant surveys. coordinated with subconsultant for mojave ground squirrel surveys.

Operations and Maintenance Support (2013 - 2014). Biologist conducting nesting bird clearance surveys for several plant expansion projects in Los Angeles County. Work performed for MWD.

Upper San Gabriel Valley Municipal Water District Direct Reuse System Support (2015 - 2016, 2018). Biologist who conducted vegetation mapping and field habitat assessment for sensitive species. Also wrote biological document for water pipeline project in multiple Cities in Los Angeles County, California.

Amir Morales

Principal Regulatory Specialist

Summary of Qualifications

Mr. Morales has over 17 years of experience consulting on issues pertaining to regulatory permitting, environmental science, and hydrology throughout southern California. He joined HELIX in 2017 and specializes in arid/wetland delineations, jurisdictional resource assessments, Clean Water Act Section 404 permitting for the U.S. Army Corps of Engineers (USACE), Clean Water Section 401 permitting for the Regional Water Quality Control Board (RWQCB), and California Fish and Game Code Section 1602 permitting for California Department of Fish and Wildlife (CDFW); regulatory permitting and compliance; and compensatory mitigation development. Mr. Morales also leads Helix's biology group based in Irvine, California. He has completed over 400 jurisdictional delineations (JDs) during his tenure as a consultant and has extensive experience with a range of services including due diligence, regulatory strategy/planning, habitat conservation plan compliance, storm water quality assistance, streambed mitigation development/ implementation, biological planning and management, conservation easement negotiations/support, and California Environmental Quality Act (CEQA) peer review. Mr. Morales has also trained several staff members in field methods; delineations; Geographic Information Systems (GIS); compliance with USACE and CDFW regulatory guidelines; and coordination of the regulatory permitting process.

Selected Project Experience

Los Angeles County Delineations & Regulatory Permits. Conducted over 100 jurisdictional delineations, managed biological surveys/reports, and processed many regulatory permits for projects in unincorporated areas as well as within the Cities of Castaic Lake, Santa Clarita, Calabasas, Simi Valley, Palmdale, Pasadena, Los Angeles, Beverly Hills, Baldwin Heights, and Diamond Bar. Notable clients include the City of Pasadena, the City of Los Angeles, D.R. Horton, G.H. Palmer, and Beazer Homes.

Pasadena Water & Power, Arroyo Seco Water Recycling Project (2014 - 2016). Conducted a wetland delineation within the upper Arroyo Seco in the City of Pasadena including. Worked with resource agencies and the City of Pasadena to develop a functional assessment-based approach to watershed monitoring to address resource agency concerns with the periodic diversion of upstream water proposed by the project. Managed biological surveys and preparation of revised biological technical reports for both project-specific and programmatic project components under CEQA. Assisted with regulatory strategy and documentation.

City of Malibu, Civic Center Wastewater Treatment Facility (2015 - 2016). Led general biological assessment, sensitive plant survey, and a jurisdictional delineation on the proposed project area for a wastewater treatment facility in the City of Malibu

Education

Bachelor of Science, Hydrological Sciences, Minor Geographic Information Systems, University of California, Santa Barbara, 2001

Registrations/ Certifications

Qualified California Rapid Assessment Method (CRAM), Practitioner, Wetlands, 2013

Qualified California Rapid Assessment Method (CRAM) Practitioner, Estuarine, 2014

Professional Affiliations

Association of State Wetland Managers

Association of Environmental Professionals

within Los Angeles County. Prepared a jurisdictional delineation report per the request of USACE. Prepared a preliminary jurisdictional delineation approved by USACE and used by the project engineer to design full project avoidance of all jurisdictional resources.

City of Los Angeles, Peck Park (2010 - 2013). Performed a jurisdictional delineation, managed biological services, and worked with the City of Los Angeles and the project engineer to develop a mitigation approach and support preparation of emergency permits to address streambed erosion designed to protect trails within Peck Park located within the City of San Pedro.

Cucamonga Valley Water District, Lytle Creek Diversion Pond (2012 - 2015). Conducted a jurisdictional delineation and prepared/processed emergency repair permits for a damaged water diversion facility associated with Lytle Creek located within the San Bernardino Mountain foothills. Managed biological efforts including sensitive plant/wildlife surveys and preparation of a biological technological study in seeking a long-term maintenance permit from California Department of Fish & Wildlife.

Trabuco Canyon Water District, Alternate Raw Water Transmission Line (2014). Conducted a wetland delineation within Serrano Creek and provided strategic regulatory support for installation of a water transmission line and abandonment of an existing line on behalf of Trabuco Canyon Water District.

Orange County Public Works, Santa Ana River Interceptor Abandonment (2016). Conducted a jurisdictional delineation and led strategic regulatory permitting efforts on behalf of Orange County Public Works over five locations within the Santa Ana River and its floodplain proposed to sever and leave in place several segments of the abandoned Santa Ana River Interceptor (SARI) sewer line working in conjunction with USACE and USFWS.

City of Irvine, Macarthur Channel Improvements (2016). Conducted a jurisdictional delineation over Macarthur Channel in the City of Irvine from Main Street to Reach 3 of the San Diego River to assist with planning of design and regulatory constraints associated with channel improvements proposed by the Orange County Flood Control District.

Orange County Public Works, Trabuco Creek Road Emergency Permits (2011). Conducted a jurisdictional delineation over several crossings and road segments within Trabuco Creek Road on behalf of Orange County Public Works that were heavily damaged by flows within Trabuco Creek during the 2010/2011 rain events. Required jurisdictional forensics to determine the prior extent of Arizona crossings and road limits no longer discernible following the high flow events and working with OCPW regulatory staff to assist with preparation of emergency regulatory permits as well as managing construction monitoring staff to oversee road improvements.

Wilson Creek Streambed Mitigation. Due to the absence of viable off-site streambed mitigation areas in the Santa Margarita Watershed in Riverside County, worked with a private land owner to develop and implement a streambed mitigation plan in Wilson Creek working with the USACE, CDFW, and San Diego RWQCB that is currently providing over 20-acre of riparian streambed restoration. It is anticipated to provide 50-100 acres of needed riparian streambed creation opportunities for projects within the Watershed.

CONTACT:
David Ferguson, Ph.D., P.E.
Project Manager

ADDRESS:
300 North Lake Avenue
Suite 1020
Pasadena, CA 91101
626-568-4302

Kennedy/Jenks Consultants

AVSWCA
Antelope Valley State Water Contractors Association

Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

PROPOSAL | JUNE 2018

carollo
Engineers...Working Wonders With Water®

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707 Wilshire Boulevard, Suite 3920, Los Angeles, California 90017
P. 213.489.1587 F. 213.572.0361

June 19, 2018

Mr. Matthew Knudson, General Manager
Mr. Peter Thompson II, Assistant General Manager
Antelope Valley State Water Contractors Association
c/o Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

Subject: Proposal to Provide Professional Engineering Services for the Preparation of Feasibility Study and Environmental Documentation for the Implementation of the Big Rock Creek Groundwater Recharge Project

Dear Mr. Knudson and Mr. Thompson:

We are excited to present this proposal and project team to assist the Antelope Valley State Water Contractors Association (AVSWCA) with the planning for the Big Rock Creek Groundwater Recharge Project. We understand the importance of managing imported water sources under the Antelope Valley Groundwater Adjudication Judgment, and we have assembled a team that brings a depth and breadth of experience that is a direct match with your project needs. Some of the key benefits that our team brings are:

- **A Dedicated Recharge Planning Team.** Carollo offers a team that has a proven track record for delivering recharge projects across the arid southwest. Planning recharge projects requires close coordination among multiple disciplines, and our team collectively covers all disciplines to achieve successful results.
- **Familiarity with Water in the Antelope Valley.** Our team members have worked together on multiple recharge projects for other agencies in the Antelope Valley, and have worked regularly for the member agencies of AVSWCA. Our familiarity with the specific water management challenges in the Antelope Valley, the groundwater adjudication, and your member agencies translates into a quick project start, efficient work process, and cost savings.
- **Comprehensive Approach to Planning for Recharge Facilities.** The Carollo team members have experience working together in the planning, designing, and permitting of recharge and recovery facilities. Our previous experience working together has given our team the familiarity and ability to prepare a project-specific approach that will quickly and efficiently deliver the recommendations needed to plan for a recharge project at Big Rock Creek.

Our project understanding, extensive experience with recharge projects, and tailored approach will result in a sound plan ready for the implementation of permitting and design. We want to thank you for the opportunity to submit our proposal and look forward to working with you on this important project.

Sincerely,

CAROLLO ENGINEERS, INC.

Jim Meyerhofer, PE
Principal

Inge Wiersema, PE
Project Manager

Contents

A. BASIC QUALIFICATIONS

To meet the challenges of the Antelope Valley State Water Contractor's Association (AVSWCA) Feasibility Study and Environmental Documentation for Implementation of the Big Rock Creek Groundwater Recharge Project, Carollo Engineers, Inc. has assembled an exceptionally qualified and diverse team of professionals covering engineering, hydrogeological, environmental, and financial disciplines.

THE RIGHT TEAM FOR AVSWCA

The Carollo team includes Montgomery & Associates, Inc. for hydrogeological evaluations, Jericho Systems, Inc. for environmental and permitting evaluations, and WestWater Research, LLC for financial and water banking consulting. Each firm was chosen for its record in providing critical support services in their respective disciplines to water providers in the Antelope Valley for advancing recharge and recovery projects.

Leadership You Can Trust

Our team is led by the same Carollo leadership and professionals that have served water providers in the Antelope Valley on numerous, previous projects and programs. Our California-based professionals are backed by the full range and depth of Carollo's industry leading water professionals. Resumes of our experienced and uniquely qualified team members are included in the Appendix.

Our team combines the following characteristics that will be applied to the benefit of AVSWCA in planning and permitting the Big Rock Creek Recharge Project.

- Nationally recognized leaders in the water industry with a core technical team experienced in every aspect of planning and engineering of recharge facilities.
- A team of firms with a successful history of collaboration and an understanding of each member's strengths based on previous projects for the Antelope Valley/East Kern Water Authority (AVEK), Palmdale Water District (PWD), and across arid areas of Southern California and Arizona.
- A team approach to the project that hits the ground running and is aligned to develop the most cost-effective means to deliver State Water Project (SWP) for storage in the Antelope Valley.

CAROLLO ENGINEERS, INC.

Firm Background

Carollo Engineers is the largest engineering consulting firm in the United States that is focused 100 percent on water. This laser-focus on water is embedded in our staff of more than 1,050 professionals that continuously work on a wide variety of innovative strategic plans, integrated water master plans and feasibility studies, designs, construction-phase services, O&M technical support, and financial consulting services for aquifer recharge facilities, production and recharge wells, water storage and distribution systems, water treatment facilities, and water reuse programs. This range of expertise will allow us to support you in planning and designing the Big Rock Creek Groundwater Recharge Project providing you with the optimal balance between capital investments, operating costs, and permitting requirements.

Carollo's reputation is based upon client service and a continual commitment to quality. We currently maintain 42 offices in 17 states. During our 85-year history, Carollo has successfully completed more than 25,000 projects for public sector clients. Carollo is currently ranked within *Engineering News Record's* (*ENR*) top 100 design firms. More importantly, *ENR's* annual Source Book ranks Carollo among the top 15 firms for water and sewer/wastewater design and selected as 2016 California Design Firm of the Year.


ENR
THE TOP 500
NUMBERS 29
Worry Despite Strong Markets
The markets continue to grow, but design firms are concerned about infrastructure funding, tariffs and staff shortages. By Gary J. Tulacz

We are currently ranked within *ENR's* top 100 design firms. More importantly, the *ENR* annual Source Book ranks Carollo among the top 15 firms for water and wastewater/sewer design and selected as 2016 California Design Firm of the Year.

We recruit nationwide and hire technical staff with extensive background and training specific to this field. For that reason, the quality and professional standing of our core group of water and wastewater professionals equals or exceeds that provided by some of the largest engineering firms in the country.

Our Focus is Water

Carollo has been a leader in the development of award-winning, comprehensive master plans for water agencies facing a variety of complex issues. Within the past 15 years, Carollo has prepared integrated master plans or facility plans for more than 100 agencies. We have demonstrated our ability to successfully simplify complex technical, legal, regulatory, and institutional issues to produce clear, concise, cost-effective, and implementable recommendations.

Water Resources/Recharge Expertise

Water resource planning includes a wide range of recharge projects from small planning studies to comprehensive regional master plans. These plans have addressed process and collection system reliability, flexibility, and operational issues. We have designed recharge facilities with basins ranging from 2 and 207 acres in size, with recharge capacities between 2,240 to 150,000 acre-feet per year (AFY).

SUBCONSULTANTS

Montgomery & Associates, Inc.

Montgomery & Associates specializes in hydrogeology and water resource planning. Their professionals are technical leaders in fields integral to sustainable groundwater management, including managed aquifer recharge, groundwater resource evaluation, groundwater modeling, groundwater basin characterization, water supply and demand projection, and hydrogeologic data management.

For more than 30 years, they have provided effective water resource solutions to clients and diverse stakeholder groups in the municipal, industrial, agricultural, tribal, and environmental sectors. They routinely partner with engineering firms to offer comprehensive water planning and design services. Their offices are located in the western U.S., including Tucson, Phoenix, Sacramento, Salt Lake City, Denver, and in South America.

Their expertise in areas directly relevant to the Big Rock Creek Recharge Project is briefly summarized below:

- **Managed Aquifer Recharge (MAR).** Montgomery & Associates professionals are demonstrated experts in MAR in Arizona. They have provided hydrogeologic services for recharge feasibility investigations and siting studies, conceptual design, regulatory permitting, and recharge monitoring for more than 35 recharge projects over the past 30 years. The recharge projects Montgomery & Associates has participated in account for more than two-thirds of the Colorado River water stored in Arizona. Over the past year, they have applied decades of experience to assist several clients on recharge projects in California.

M&A led a hydrogeologic investigation that was part of a conjunctive water use study to help an irrigation district comply with California's 2016 Sustainable Groundwater Management Act.

- **Groundwater Modeling.** Montgomery & Associates maintains one of the largest and most experienced teams of modeling professionals in the western U.S. Nearly all of their modelers possess a master's or doctoral degree, and most have decades of experience. Their modeling professionals are at the forefront of today's modeling methods, routinely engaging with model code developers to improve and customize software to meet client's needs. They maintain a modern library of modeling support tools such as three-dimensional geologic visualization and decision support software, and they have extensive programming capability to adapt all of their modeling software to better achieve client goals.

Jericho Systems, Inc.

Jericho Systems is a full-service environmental consulting firm providing services from project conception to construction since 2012. They have been a trusted leader with multiple public agencies and private parties for their ability to balance progress and resources protection by finding creative solutions.

Jericho specializes biological surveys for large-acreage recharge projects per CEQA Mitigation.

Jericho has worked in the Antelope Valley since 2014, assisting our water and wastewater utility clients to execute environmental compliance and regulatory processes that clear the way for their projects to get built. Jericho has specifically been a trusted partner with AVEK, working with them on a variety of projects from conception to final design, including preparing all California Environmental Quality Act (CEQA) compliance for AVEK's Avenue H wellfield, AVEK's High Desert Water Bank, and most recently exploratory surveys for a potential 175-acre parcel near Avenue T.

WestWater Research, LLC

WestWater Research was established in 2001 and specializes in water resource economics, planning and policy analysis. With offices in Boise (Idaho), Phoenix (Arizona), Fort Collins (Colorado), and Vancouver (Washington), WestWater has assisted clients in the public, private, and non-profit sectors throughout the western United States.

Their broad experience in water resource economics, regulatory policy analysis, and water markets allows them to effectively participate in water resource projects involving communication and coordination with multi-disciplinary teams. Their staff of economists, MBAs, and GIS analysts have conducted numerous in-depth economic analyses requiring use and development of water demand forecasts, valuation of water resources, and economic and financial feasibility studies of proposed water supply development and management projects.

WestWater's technical areas of expertise include:

- Water resource and agricultural economics.
- Financial analysis.
- Economic feasibility and benefit-cost analysis.
- Water asset valuation.
- Water resource planning and management.
- Water transactions and investments.

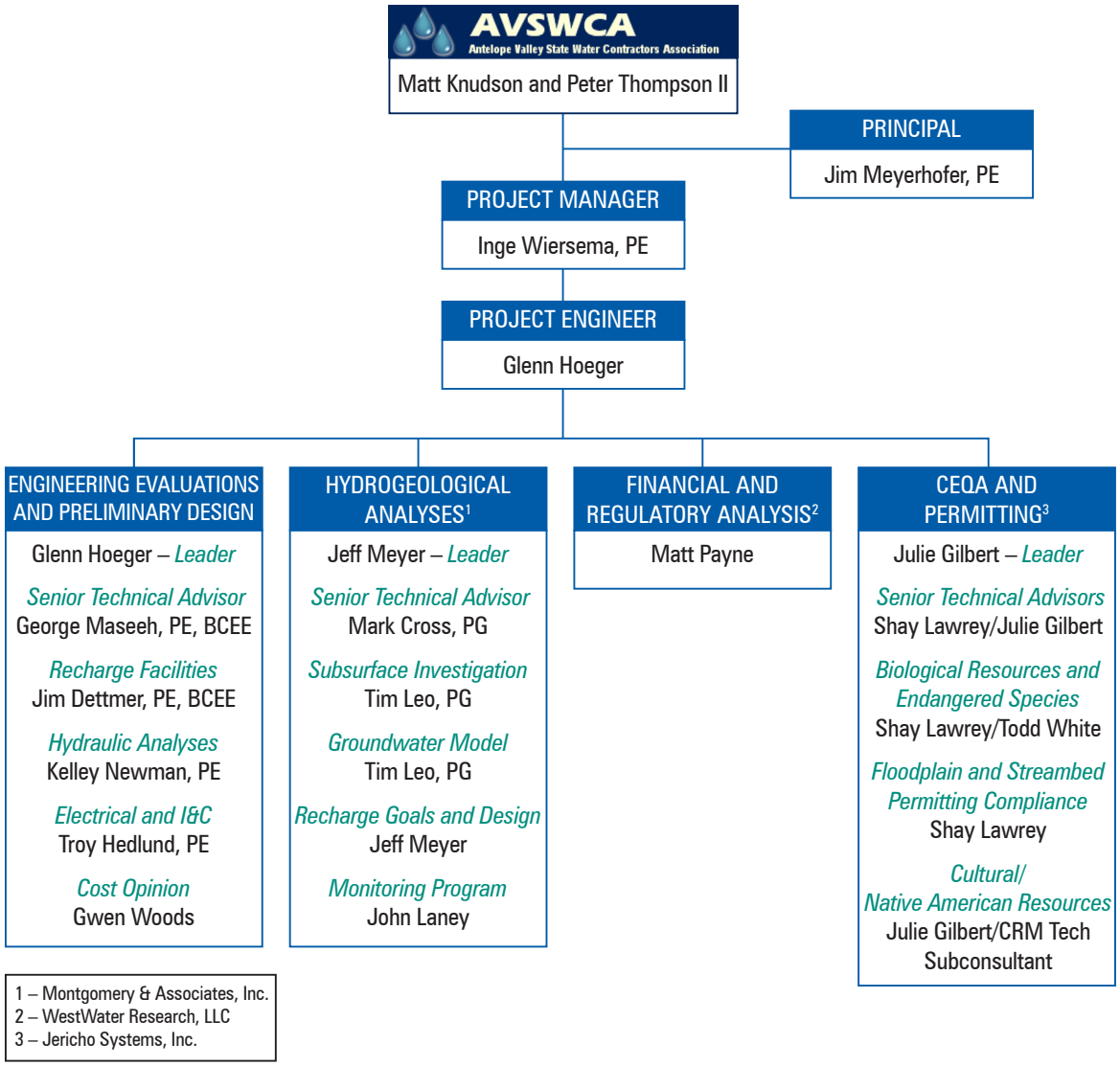
To support economic and financial analyses, WestWater maintains a proprietary database of information on water rights transactions throughout the western United States. The database is the largest of its kind and most current in existence, and details more than 15,000 water right transactions completed in the past ten years.

B. SPECIFIC QUALIFICATIONS

Carollo has established itself as a leader in water resource planning for cities and agencies facing a variety of complex water management challenges.

Carollo is offering to AVSWCA a dedicated water planning team that has demonstrated the ability to successfully deliver projects with complex technical, regulatory, and institutional issues to produce clear, cost- effective, and practical recommendations with a wide variety of stakeholders. As shown in the organization chart below, we are proposing a comprehensive and experienced team for this project.

Our team is supported by an organization with deep resources in all aspects of the water industry that allows us to quickly mobilize industry experts for specialty topics that may arise during the project, ranging from regulatory and groundwater recharge to financial experts.



KEY DELIVERY TEAM – PROJECT MANAGEMENT AND ENGINEERING

Inge Wiersema, PE – Project Manager

Years of Experience: 23

Inge brings to AVSWCA a proactive project manager with a strong understanding of the larger context of water resource planning. She is an environmental engineer experienced in more than 100 master plans and modeling projects including project management for the current AVEK Water System Master Plan.

Inge has also led various water resources projects including groundwater, watershed, and urban water management plans. Inge will be your prime contact throughout the project. She will direct and support the activities of the team and implement project management strategies to keep the project on track and resolve any questions in a timely manner.

Relevant Experience:

- Project manager for the Antelope Valley East Kern Water System Master Plan, Palmdale, CA.
- Project manager for the One Water LA 2040 Plan, Los Angeles, CA.
- Project manager for the 2016 water system master plan for Cucamonga Valley Water District, CA.
- Project manager for the 2016 Water Master Plan for the City of Colton, CA.

Glenn Hoeger – Project Engineer

Years of Experience: 27

Glenn has more than 27 years of experience. He has achieved a successful record of performance for delivering technical, high quality services through a proactive approach with regulators and clients. His areas of specialty include groundwater recharge and water resources studies, engineering and feasibility studies, pilot tests, master planning studies, utility route studies, regulatory compliance and permitting. He has extensive experience in managing large, multi-firm teams on a wide range of projects and contracts for private, federal, and municipal clients.

Relevant Experience:

- Project manager for the independent cost opinion and evaluation of the AVEK High Desert Water Bank Independent Cost Opinion and Evaluation, Palmdale, CA.
- Project manager for conceptual design of recharge and public use facilities at the San Antonio Spreading Grounds, Three Valleys Municipal Water District, Los Angeles, CA.
- Deputy project manager and recharge feasibility study task leader for the Southern Avra Valley Storage and Recovery Project (SAVSARP), Tucson, AZ.
- Task Leader for recharge pilot testing and preliminary design of recharge facilities for the Central Avra Valley Storage and Recovery Project (CAVSARP), Tucson AZ.

Jim Meyerhofer, PE – Principal

Years of Experience: 28

Jim's years of experience has focused exclusively on water treatment, including: pilot plant design and operation, water quality studies, treatment plant evaluation, treatment plant design, plant startup, and construction management.

Additionally, he brings proven experience as principal for a wide variety of projects, including water master plans from his work throughout CA since 1989.

Relevant Experience:

- Principal for AVEK Water System Master Plan, Palmdale CA.
- Principal for the City of Pomona, CA, Water and Recycled Water Master Plans. The project included creation and calibration of water, recycled water, and sewer models using the City's geographic information system (GIS).
- Principal for the Water Supply Planning Study for the City of Santa Barbara, CA. The study evaluated the City's water supply mix and assessed opportunities to improve water supply reliability.
- Principal for the Potable Water Distribution System Master Plan for the Coachella Valley Water District, CA.

George Maseeh, PE, BCEE – Senior Technical Advisor

Years of Experience: 31

George has more than 30 years of experience in the municipal water/wastewater and environmental engineering field. His experience includes all phases of planning, design, construction administration, and startup/operations assistance for a wide range of water resource projects, including facilities for groundwater and surface water treatment and supply; groundwater recharge; and wastewater collection, treatment, and reuse.

George integrates technical, communication, presentation, and negotiation skills, resulting in motivated project teams, continuous stakeholder engagement, and consistently positive project outcomes.

Relevant Experience:

- Principal-in-charge for Independent Cost Opinion and Evaluation of the AVEK High Desert Water Bank, Palmdale, CA.
- Principal-in-charge for Tucson Water, AZ, Southern Avra Valley Storage & Recovery Project involving design of Tucson Water's second major CAP water recharge facility.
- Project manager for Tucson Water, AZ, Central Avra Valley Storage & Recovery Project.

Jim Dettmer, PE, BCEE – Recharge Engineering Leader

Years of Experience: 37

Jim has more than 37 years of experience relating to water infrastructure, including water storage and delivery and mechanical system design. He has managed and contributed to several water planning projects throughout Arizona. Jim's experience also includes mechanical system design of pump stations; reservoirs; odor control facilities; and HVAC, plumbing, and fire protection systems documents for water and wastewater facilities.

He has a successful history of providing quality management for infrastructure projects, knowing the unique challenges these types of projects can pose including site limitations and impacts to neighboring facilities.

Relevant Experience:

- Project manager for Tucson Water, AZ, Southern Avra Valley Storage and Recovery Project. The project included the design of Tucson Water's second major CAP water recharge facility that became operational in 2008.
- Deputy project manager for Tucson Water, AZ, Central Avra Valley Storage and Recovery Project including recharge and recovery facilities.
- Project manager for Tucson Water, Arizona, Plant 9 Chemical Systems Evaluation and Design project, including evaluation and design of chemical feed and storage facilities to support recovery of recharged Central Arizona Project water from the City's SAVSARP facility.

KEY DELIVERY TEAM – HYDROGEOLOGY

Jeffrey Meyer – Recharge Hydrogeology Leader

Years of Experience: 31

Jeff is a Principal Hydrologist/Soil Scientist at Montgomery & Associates in Tucson, Arizona, specializing in vadose zone characterization programs and recharge project implementation. His 31 years of experience includes a broad array of recharge feasibility and siting studies, vadose zone and groundwater contamination assessments, and mine tailings studies. Jeff has extensive experience in developing and permitting managed aquifer recharge projects for both surface water supplies and treated wastewater.

His experience on more than 35 recharge projects includes design and utilization of effective hydrogeologic investigation methods for site-specific characterization, multi-faceted analysis of recharge feasibility and capacity, development of recharge mitigation strategies, conceptual design of recharge facilities, and installation of recharge monitoring facilities.

He has worked with Carollo's Tucson staff on the SAVSARP recharge project. He recently completed a recharge capacity assessment for maximizing storage of surface water supplies for Tulare Irrigation District in the Central Valley as part of a conjunctive use study that will support preparation of the Groundwater Sustainability Plan.

Relevant Experience:

- Groundwater Recharge Capacity Evaluation for the Tulare Irrigation District, CA, Central Valley Conjunctive Water Use Study. Led an assessment of lithologic conditions in percolation basins to maximize the use and storage of seasonal surface water deliveries.
- Feasibility Investigations for the Liberty Utilities, AZ, Permitting and Monitoring project for the Liberty Aquifer Replenishment Facility. Led reconnaissance investigations to site a recharge facility.
- Feasibility Investigations & Permitting for the Town of Marana, AZ, Water Reclamation Facility Recharge Project. Designed and led hydrogeologic investigations to assess recharge feasibility.

Mark Cross, PE – Senior Technical Advisor

Years of Experience: 37

Mark has 37 years of water quality experience. He has managed aquifer recharge (MAR) investigations, where he uses not only his technical skills but also his extensive experience in regulatory permitting and planning. He has led dozens of recharge feasibility assessments, successfully supervising, siting, designing, and implementing comprehensive programs. In addition, he has overseen the development of numerous groundwater flow models.

Relevant Experience:

- Provided technical oversight for the West Salt River Valley Recharge Planning project for the City of Surprise, AZ.
- Provided technical oversight for Antelope Valley East Kern Water Agency, CA, Recharge Capacity Assessment project. Included an assessment of storage capacity for a potential enterprise water bank under a range of recharge and recovery scenarios.
- Led feasibility studies, including investigations and groundwater flow modeling for the Tucson Water Department, AZ, Recycled Water Program.

Timothy Leo, PG – Groundwater Model

Years of Experience: 30

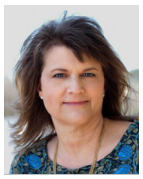
Tim, a California Professional Geologist and Certified Hydrogeologist, is a Principal and Director of California Operations at Montgomery & Associates. Tim splits his time between Montgomery & Associates' Sacramento, CA and Tucson, AZ offices. For nearly 30 years, Tim has managed and participated in a variety of multidiscipline water resources and groundwater modeling projects. He specializes in analytical hydrogeology, including groundwater modeling, developing conceptual models and water budgets, and groundwater system characterization and testing.

He is currently working on groundwater recharge studies in Tulare County, Santa Cruz County, and the Antelope Valley. He is also is managing the modeling work for the Groundwater Sustainability Plan for the Paso Robles Basin. On several of these projects, he has provided technical support on grant funding applications.

Relevant Experience:

- Groundwater modeling for the Paso Robles Groundwater Basin, CA, Groundwater Sustainability Plan.
- Managed Aquifer Recharge Capacity Study for the Tulare Irrigation District, CA, including managing an assessment of recharge capacity in over 1,000 acres of infiltration basins.
- Managed Aquifer Recharge Capacity Study for the Antelope Valley-East Kern Water Agency, CA. Managed a modeling study to assess the recharge capacity at two proposed enterprise groundwater banks.

KEY DELIVERY TEAM – ENVIRONMENTAL



Julie Gilbert – Environmental Leader

Years of Experience: 27

Since 1991, Julie has been an environmental planner and project manager, with special expertise in CEQA, NEPA, regulatory compliance, communication/facilitation for resolution of environmental issues, and public image management. She has authored environmental documentation for a broad variety of projects and acts as a resource person in working with clients, governmental agencies, the community, and decision-makers in finding solutions to complex problems. She also negotiates with regulators at the federal, state and local level.

Relevant Experience:

- Lead author who prepared a thorough Initial Study/Mitigated Negative Declaration in accordance with CEQA for the Antelope Valley – East Kern Water Agency, CA, West Avenue H Wellfield Project: Initial Study/Mitigated Negative Declaration.
- Lead author on the Initial Study/Mitigated Negative Declaration for the Three Valleys Municipal Water District, CA, to construct a new groundwater production well.
- Reviewed the R3 PEIR and the CEQA Guidelines, and authored EIR Addendum for the Mojave Water Agency, CA, Groundwater Replenishment Program – Off Channel Environmental Impact Report Addendum project.

Todd White – Biological Resources/ Endangered Species

Years of Experience: 26

Todd serves Jericho in two capacities - as a wildlife biologist and as the Director of Flight Operations for RoboHawk LLC, which is an unmanned aircraft corporation in which

Jericho owns. He is an expert in both ecology and real estate since 1992, specializing in environmental project coordination and management, real estate brokerage and development, environmental biology and geotechnology, agricultural, ranch land and open space management, GIS/GPS mapping and information systems, along with financing and developing compensatory mitigation projects. He is a proven strong project manager for biological/ecological/geotechnical site assessments, principal environmental compliance monitoring for large construction projects, site investigation and restoration, agricultural, rural and ranch land real estate acquisition, sales and management, mitigation banking, and oversight and compliance with the CEQA and NEPA.

Relevant Experience:

- Coordinating all protocols and survey efforts for the Antelope Valley – East Kern Water Agency, CA, High Desert Water Bank Mitigation Monitoring Biological Resource Studies.
- Lead field biologist/restoration ecologist, field logistics manager, and lead CEQA compliance monitor for the Moorpark-Newbury Subtransmission Line project.
- Partner, principal and biologist for mitigation bank development of 500+ acres for the Santa Clara River Mitigation Bank Development project.

Shay Lawrey – Floodplain/Streambed Compliance

Years of Experience: 20

Shay has 20 years of experience in environmental planning, natural resource management, impact analysis, special status species survey, regulatory permitting, project risk analysis, and construction monitoring. She is well known for her ability to work well with her clients and the regulatory agencies to achieve a balance between budgets, timeframes, regulations, and preservation-mitigation. Shay is known as someone who can deliver on projects – small or large. She specializes in working with clients from conception to construction to ensure the project runs smoothly.

Relevant Experience:

- Assisted on the Antelope Valley – East Kern Water Agency, CA, West Avenue H Wellfield Project: Initial Study/Mitigated Negative Declaration.
- Assisted on the Initial Study/Mitigated Negative Declaration for the Three Valleys Municipal Water District, CA, to construct a new groundwater production well.
- CEQA Documentation and Jurisdictional Master Waters Permitting for the Arrowhead Lake Association – Lake Arrowhead Maintenance Dredging project.

KEY DELIVERY TEAM – FINANCIAL

Matthew Payne – Financial Evaluation Leader

Years of Experience: 10

Matt leads the Southwest office of WestWater Research in Phoenix, Arizona. He is dedicated to helping public, private, and non-profit sector clients address economic, financial, and strategic challenges relating to water resources and infrastructure. Matt's areas of expertise are water resource economics, water asset valuation, water supply planning and implementation, and water asset transactions.

In recent years, Matt has been engaged by a Southern California wholesale water agency to support development of a new water banking enterprise. In addition, he leads water rights acquisition programs for California's largest investor-owned utility, and Arizona's largest wholesale water agency.

Relevant Experience:

- Frequently contributes economic and financial analytical capabilities to water resource and integrated utility planning projects.
- Recent analyses have included cost-benefit assessments of proposed infrastructure projects and water management strategies, as well as valuation of water rights and infrastructure assets.
- Specializes in estimating the value of water using econometric techniques.

RELEVANT EXPERIENCE

The table below provides a select listing of Carollo's recharge projects. We have also provided summaries of relevant projects on the following pages. References are provided in the Past Performance section.

Carollo's Select Recharge Projects

Carollo Has Completed Multiple Projects Addressing Elements of the Rock Creek Recharge Feasibility Study.

	Project Elements												
Client/Project	Groundwater Recharge	Hydrogeological Evaluations	Land Access/Acquisition Issues	State Water Project Supplies	Turnout/Diversion Structures	Groundwater Modeling	Alternatives Evaluation	Recycled Water Replenishment	Stormwater Replenishment	Environmental Evaluations	Water Banking/Institutional Planning	Constituents of Emerging Concern	Stakeholder Outreach
Palmdale Water District, CA Strategic Water Resources Plan	•			•		•	•	•	•	•		•	•
City of Riverside, CA Integrated Water Management Plan	•					•	•	•	•				•
Pasadena Department of Water and Power, Pasadena, CA Arroyo Seco Canyon Project	•	•	•		•		•		•				•
Mojave Water Agency, CA Oro Grande Wash Recharge Project	•		•	•	•					•			
Town of Gilbert, AZ Riparian Preserve at Water Ranch	•	•			•		•	•					
City of Chandler, AZ Chandler Heights Recharge Project Master Plan, Design, and Construction	•	•			•		•						
Central Arizona Project, AZ Tonopah Desert Recharge Project	•	•			•						•		
Orange County Water District, CA Imperial Headgates Rehabilitation Project	•				•								
Three Valleys Municipal Water District, CA San Antonio Spreading Grounds Pipeline Extension	•		•		•		•		•		•		
Santa Clara Valley Water District, CA Indirect Potable Reuse Feasibility Study	•						•	•				•	•
City of Ventura, CA Santa Clara River Estuary Special Studies	•						•	•				•	•

HIGH DESERT WATER BANK

ANTELOPE VALLEY-EAST KERN WATER AGENCY, CA

Antelope Valley-East Kern Water Agency (AVEK) is developing The High Desert Water Bank to provide a 70,000 acre-foot per year (AFY) recharge and recovery facility to store California State Water Project (SWP) water during wet years and supplement supplies in the aqueduct during dry years. The facility will support a business enterprise that provides water banking services for partner agencies, and generates revenue for AVEK. All of the member firms of the Carollo team have worked on the High Desert Water Bank project.

WestWater Research and Montgomery & Associates were engaged to perform a financial feasibility analysis of the High Desert Water Bank. The purpose of the study was to support and inform the decision of AVEK's Board of Directors to invest further capital into the project. Montgomery & Associates conducted a groundwater modeling study for AVEK to evaluate the feasibility of operating the High Desert Water Bank. The existing USGS groundwater model was adapted for the study. Results of the study informed AVEK on project feasibility and led to recommendations for further studies to improve project performance.

Carollo was retained as a subconsultant to WestWater Research to review the conceptual design and planning-phase cost estimate for the High Desert Water Bank and provide recommendations to advance the project to preliminary design. Recommended revisions to the conceptual design included re-locating and resizing turnouts on the SWP canal and the delivery pipeline maximizing gravity delivery of water to recharge basins and removing a large pump station reducing capital and operations costs.

AVEK adopted a Mitigated Negative Declaration (MND) and Mitigation Monitoring and Reporting Program (MMRP) in December 2017 for a 1,500-acre water banking site that included approximately 1,138 acres of recharge basins and approximately 322 acres of habitat mitigation. Jericho Systems performed a CEQA Peer Review and MMRP compliance for the project. Jericho provided quality assurance/quality control and peer review of all reports and of the Initial Study/MND.

Jericho provided review and guidance on the procedure for editing after comments, potential pitfalls in language, and potential agency issues. Jericho worked with the engineering team to develop a mitigation strategy that would be acceptable to the jurisdictional waters agencies to ensure permitting the project could proceed smoothly.

RELEVANCE TO AVSWCA

- Recharge design and cost opinion.
- Financial analysis.
- Permitting support.
- Groundwater model.
- Hydrologic evaluations.

TEAM MEMBER INVOLVEMENT

Glenn Hoeger, George Maseeh, Gwen Woods, Troy Hedlund, Matt Payne, Tim Leo, Mark Cross, Julie Gilbert, Todd White, Shay Lawrey

SOUTHERN AVRA VALLEY STORAGE AND RECOVERY PROJECT (SAVSARP)

TUCSON WATER, AZ

The SAVSARP facility was developed to meet the City's requirements for additional renewable water supplies. Original permitting and design efforts for SAVSARP, completed by Tucson Water and Carollo's Tucson Office staff (formerly with another firm), included recharge of up to 60,000 acre-feet per year of CAP water in constructed infiltration basins and recovery of the water using an extensive network of existing and new wells spread over several square miles. Working closely with staff from Tucson Water, we prepared a master plan for constructing a facility capable of conveying and recharging 60,000 acre-feet per year initially and up to 140,000 acre-feet per year of CAP water at buildout.

The project team developed an innovative design for recharge basins accounting for variations in surface and subsurface infiltration characteristics while minimizing off-site impacts to flood water elevations in the 100-year floodplain without the need for expensive constructed floodwater conveyance features. Montgomery & Associates conducted exploratory drilling and trenching to further characterize hydrogeologic conditions and identify the most favorable recharge areas and/or potential recharge-limiting strata. The recharge facility master planning/design and permitting of recharge basins were completed in a smooth, timely process based on close coordination between our team with Tucson Water staff, the Pima County Flood Control District, and the cultural/biological survey contractor.

Detailed design and construction of the facility included a total of nine recharge basins with a combined area of over 220 acres. This collaborative design includes PLC control and collection of basin information over spread spectrum radio and interface to CAP SCADA at the Shuk Toak CAP Aqueduct turnout. Data collected via the radio system is transmitted over microwave radio to the City's fiber optic network and integrated into the city-wide SCADA system. The project also included an alignment study, conceptual design, and cost evaluation of approximately nine miles of 78-inch diameter transmission piping to convey recovered water from the SAVSARP site to the Hayden-Udall WTP.

RELEVANCE TO AVSWCA

- Recharge design and cost opinion.
- Instrumentation and communications.
- Financial analysis.
- Permitting support.
- Hydrologic evaluation.

TEAM MEMBER INVOLVEMENT

Glenn Hoeger, George Maseeh, Jim Dettmer, Kelley Newman, Mark Cross, and Jeff Meyer

WILLOW SPRINGS WATER BANK DUE DILIGENCE

ANTELOPE VALLEY-EAST KERN WATER AGENCY (AVEK), CA

AVEK engaged the consulting team of WestWater Research and Montgomery & Associates to perform a due diligence review of the Willow Springs Water Bank. Key issues included a project financial analysis, review of proposed agreement terms, and hydrogeologic modeling of available recharge and recovery capacity.

Montgomery & Associates applied the existing USGS Antelope Valley groundwater model to estimate the available capacity at the Willow Springs Water Bank, and review for interactions with AVEK's existing Westside Water Bank. WestWater provided recommendations to AVEK staff and directors regarding the financial aspects of the project.

RELEVANCE TO AVSWCA

- Financial analysis.
- Groundwater model.

TEAM MEMBER INVOLVEMENT

Matt Payne, Tim Leo, and Mark Cross

In addition, WestWater completed a professional review of Willow Springs' application to the California Water Commission for Water Storage Investment Program (WSIP) funding.

WEST AVENUE H WELLFIELD PROJECT

ANTELOPE VALLEY-EAST KERN WATER AGENCY (AVEK), CA

The Antelope Valley-East Kern Water Agency (AVEK) proposed to construct three potable groundwater wells, associated delivery and transmission pipelines and modifications to existing chlorination facilities on two sites. The new potable water infrastructure was proposed to connect to the existing Los Angeles County Waterworks District (LACWWD) turnout located at the northeast corner of West Avenue H and 80th Street West in LA County near Lancaster. The purpose of the project was to allow AVEK to provide an additional supply of groundwater to meet demands during periods of below average allocation of imported water from the State Water Project as well as use as an emergency supply. The proposed well sites contained approximately 20,000 square feet of structures formerly used as houses, barns and storage facilities.

The project contained several key complex issues including that one of the sites had been a farming ranch since the 1950s, and was later converted to a horse boarding operation. A small landfill of unknown origin was also found on site. Additionally, the proposal included the potential to demolish the old structures, which were determined to possibly contain asbestos due to their age. The reduced water supply in the region due to the drought was also a significant issue, resulting in the need to demonstrate that the project would not result in overdraft significant enough to cause subsidence. Other complex issues included but were not limited to aesthetics, agricultural, air quality, biological resources, floodplain, and land use.

Jericho prepared an Initial Study / Mitigated Negative Declaration (IS/MND) in accordance with the California Environmental Quality Act (CEQA). Jericho worked with the clients to develop solutions and mitigation measures to ensure that the project would have a less than significant effect on the environment with the mitigation incorporated. The Initial Study received few and minor comments, and the AVEK Board publicly adopted the Mitigated Negative Declaration.

RELEVANCE TO AVSWCA

- CEQA Evaluation.
- Permitting.

TEAM MEMBER INVOLVEMENT

Julie Gilbert and Shay Lawrey

CENTRAL AVRA VALLEY STORAGE AND RECOVERY PROJECT (CAVSARP)

TUCSON WATER, AZ

The CAVSARP concept was developed to meet the requirements of an initiative passed by City voters in 1995 limiting direct delivery of treated CAP water, while also achieving compliance with State laws that require use of renewable water resources to reduce reliance on limited groundwater supplies.

Carollo's Tucson Office staff worked closely with Tucson Water staff in the planning, pilot testing, design, startup, and operation of the CAVSARP facilities beginning in 1996 with the goal of recharging 60,000 ac-ft of Colorado River water per year (54 MGD) in constructed infiltration basins and recovering a blend of recharged Colorado River water and Avra Valley groundwater for distribution to Tucson Water customers. CAVSARP tasks included:

- Field investigations to determine recharge site characteristics and facility design parameters.
- Regulatory compliance for Endangered Species Act, floodplain use, Clean Water Act Section 404 permitting, and technical support for underground storage facility and recovery well permits.
- Design, construction, and operation of a 60-acre Expanded Pilot Recharge facility in use from October 1997 through May 2003.
- Multiple full-scale projects, including a CAP aqueduct turnout, over 14 miles of large-diameter pipelines, more than 300 acres of infiltration basins, a 54-MGD pump station and 8.5-MG recovered water reservoir, and modifications to specific Hayden Udall WTP systems.
- Construction-related services and startup planning for phased implementation of the full scale facilities to 60,000 acre-ft per year.
- Public participation/outreach working with Avra Valley interests to mitigate issues such as noise, mosquitoes, and off-site hydraulic impacts to wells surrounding CAVSARP.
- An extensive community-wide public information program to support Clearwater.

The CAVSARP team was honored with the inaugural AZ Water Association's Water Project of the Year award in 2003 with for the full-scale CAVSARP Recharge Facilities.

RELEVANCE TO AVSWCA

- Permitting support.
- Hydrologic evaluations.
- Floodplain analyses.

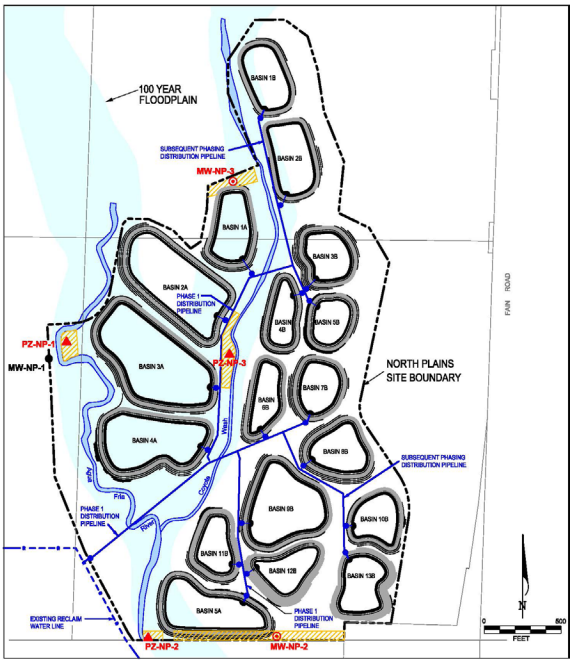
TEAM MEMBER INVOLVEMENT

Glenn Hoeger, George Maseeh, Jim Dettmer, and Mark Cross

GROUNDWATER RECHARGE CAPACITY ASSESSMENT FOR TULARE IRRIGATION DISTRICT CONJUNCTIVE WATER USE STUDY

TOWN OF PRESCOTT VALLEY, AZ

The Town of Prescott Valley operates a wastewater treatment facility that discharges to an in-channel recharge facility in the Agua Fria River. Over the past 17 years, Montgomery & Associates has provided a range of services to support recharge siting and feasibility investigations, conceptual design, and permit applications to meet this client's growing goals for storing effluent, including development of an off-channel surface basin facility. These services have also included acquiring Aquifer Protection Permits and Underground Storage Facility permits (short-term Managed and long-term Constructed). In 2007, the Town engaged WestWater Research to market the rights to the effluent that is discharged to the Upper Agua Fria Recharge Facility. Through an auction process, WestWater monetized the water rights on behalf of the Town, generating up to $67 million in proceeds for the Town.

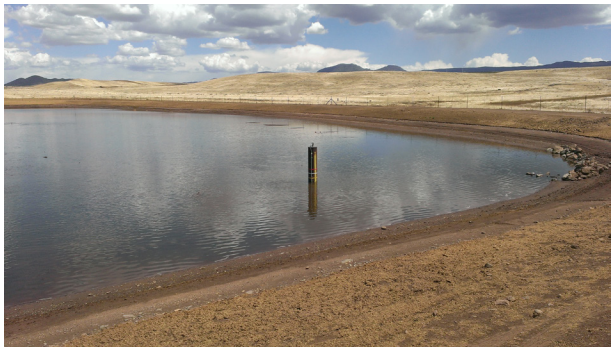


RELEVANCE TO AVSWCA

- Financial analysis.
- Recharge design.
- Hydrologic evaluations.

TEAM MEMBER INVOLVEMENT

Matt Payne, Jeff Meyer, and Mark Cross



C. APPROACH TO PROJECT

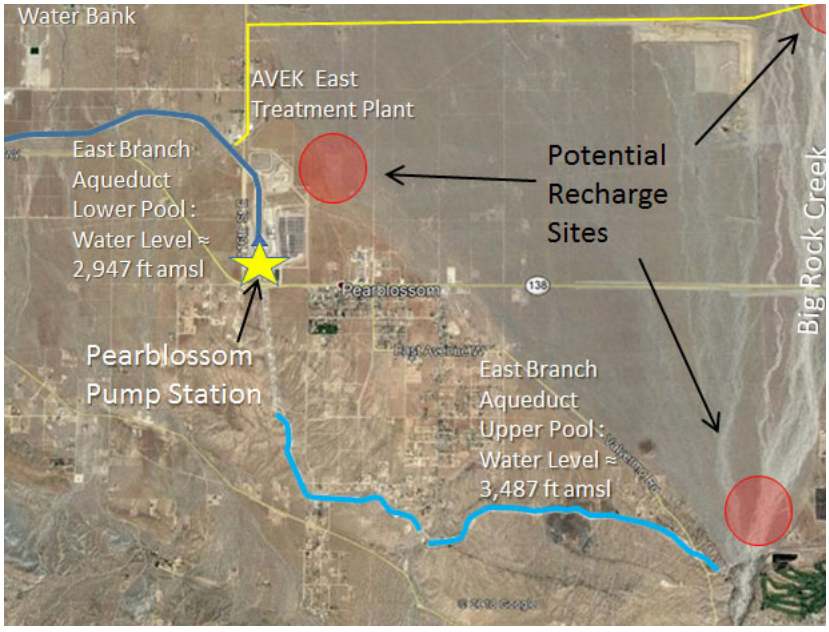
PROJECT UNDERSTANDING

As a result of the Antelope Valley Groundwater Adjudication Judgment, water suppliers in Antelope Valley are developing aquifer recharge capacity to address variability of imported water deliveries, and to satisfy replacement water obligations associated with the judgment. Currently, suppliers are recharging unused portions of their SWP allocations into water banking facilities for use as additional imported water sources. Based on the groundwater adjudication, imported water supplies can be recharged into banking facilities and used as either replacement water under the adjudication or as a new imported water sources with recovery occurring elsewhere within the adjudicated basin.

AVSWCA, a Joint Powers Authority created to collectively manage imported water supplies and groundwater storage within the Antelope Valley, has initiated a regional planning effort to evaluate the feasibility of implementing a groundwater recharge project within Big Rock Creek. The recharge project is planned to bank excess SWP water including Table A water, carryover water, and article 21 water that is surplus to customer demands and typically available in normal or wet years.

Our team understands that the intermittent availability of excess SWP water requires the water bank to be designed with a large recharge capacity; however, the cost for recharging water at this large-capacity facility may be spread over a relatively small volume of water due to the limited availability of excess SWP water. The water bank facilities, therefore, must be designed by minimizing cost of SWP water, as well as minimizing capital and operation costs of the recharge facilities themselves. As illustrated below, the Pearblossom Pump Station is located on the aqueduct upgradient of Big Rock Creek. SWP water from the lower pool of the aqueduct, therefore, does not have the lift charge associated with pumping SWP water to the upper pool, which crosses the Big Rock Creek channel. Placing a turnout on the lower canal will reduce the cost of SWP water being delivered to the water bank facility.

Our approach will include evaluation of recharge facilities located at turnouts on both the upper and lower pools of the aqueduct on either side of the Pearblossom Pump Station. Up to three locations will be evaluated with two locations associated with the lower pool near the AVEK East Water Treatment Plant and one location associated with the upper pool at the siphon crossing Big Rock Creek. Once the most cost-effective location is selected, up to three alternative conceptual designs will be developed to evaluate the most cost-effective and implementable approach to recharge of excess SWP water at the selected location. The final work product of this Feasibility Study will provide the basis for proceeding forward with design, required CEQA compliance, and permitting necessary to implement the project.



Location of the Pearblossom Pump Station on the aqueduct upgradient of Big Rock Creek.

SCOPE OF WORK

Task 1 – Project Management, Site Visit, and Data Collection

Subtask 1.1 – Kick-off Meeting and Site Visit

Our team will schedule a kick-off meeting with the AVSWCA project team. Representatives from the entire consulting team will be present at the kick-off meeting. We propose that the kick-off meeting be held concurrently with the initial site visit to reduce meeting costs. The purpose of the kick-off is to accomplish the following:

- Introduce team members.
- Review the project scope of work, schedule, and budget.
- Review project goals and objectives.
- Discuss background information and data.

Because we are proposing to conduct the site visit during the same time as the kick-off meeting, we are also proposing to delay the kick-off meeting until the initial data collection and review can be performed so the initial site visit can be maximized. Upon selection, we will submit a letter to AVSWCA requesting data, record drawings, and other applicable information relating to the existing canal system, nearby water banking facilities, and water flow and quality data. Any additional data sources collected prior to the project kick-off meeting will be provided to AVSWCA prior to the meeting. The kick-off meeting will be scheduled one week following receipt of available data allowing our team to become familiar with the site before the kick-off meeting and site visit.

We will identify up to three candidate recharge sites and, following the kick-off meeting, perform on-site investigations to evaluate and confirm field conditions at each site. The investigations will include identification of:

- Existing canal turnouts.
- Existing utilities.
- Drainage areas
- Visible geologic conditions.
- Topography.
- Debris or illicit dumping.
- Surrounding land uses.
- Potential pipeline routes.
- Other features affecting construction or operation of the recharge facility.

It is assumed that the kick-off meeting and site visit will occur on the same day.

Subtask 1.2 – Project Status Meetings

We anticipate this scope of work to be completed over a six-month period. As a result, we will prepare for and attend up to five project monthly status meetings to be held in Palmdale, CA. The Carollo project manager will attend the meetings in person. Other team members will attend by teleconference, as needed. The monthly meetings will include schedule and budget updates and discussion of project progress, challenges, and decisions. Where possible, monthly meetings will be combined with review meetings for the Task 2 technical memorandum and the preliminary design report (PDR) to minimize meeting costs.

Subtask 1.3 – Data Collection and Review

Our team will collect and review available water flow and quality data for the SWP, the Big Rock Creek, and the Eastside Water Bank from the Los Angeles County Department of Public Works, the Los Angeles County Flood Control District, the United States Geologic Survey, and AVSWCA member organizations. Data collected will be used to evaluate in channel recharge feasibility, potential surface infiltration rates, and impacts of natural stream flow on potential facility design, sizing, and recharge operations. The data collection task will also support each of the disciplines. We will address hydrogeologic data including:

1. Current and historic groundwater levels and trends:
   - General vicinity of targeted recharge sites to evaluate aquifer storage capacity.
   - Eastern part of Antelope Valley to identify areas of potentially significant groundwater level changes.
2. Soil survey maps.
3. Subsurface lithologic conditions.
4. Groundwater quality.

In addition, our team will review various Federal and State databases for biological and jurisdictional waters for each of the proposed sites, and provide a letter report of findings. Based on the location maps, we will create an Area of Potential Effect map on the appropriate current and historic- period USGS quadrangle maps and General Land Office land survey plat maps of the area for use during the records search, background research, Native American scoping, geoarchaeological assessment, paleontological desktop survey, field survey, and for inclusion in the report, as appropriate.

Task 2 – Feasibility Study

Subtask 2.1 – Conduct Recharge Site Evaluations

Our team will evaluate the feasibility of three candidate recharge locations, which include:

- Adjacent to the siphon crossing Big Rock Creek.
- At a location in Big Rock Creek north of the siphon crossing at an elevation that would accommodate gravity flow from the lower pool upstream of the Pearblossum Pumping Plant.
- Near the AVEK East Water Treatment Plant.

The feasibility will include an evaluation of excess water available for recharge and a comparison of recharge characteristics, constructability, and operability.

The recharge site evaluations will include groundwater flow modeling to evaluate aquifer storage capacity and changes in groundwater levels due to recharge operations. Although the groundwater system is unlikely to be a limitation and groundwater mounding is unlikely to be a concern, our team will use the existing USGS groundwater model for Antelope Valley to evaluate recharge and groundwater flow for the three different recharge sites. Each site will have projected groundwater elevations compared to a baseline condition (without the proposed recharge project) to assess whether storage capacity in the groundwater system is a limiting factor on project feasibility.

Subtask 2.2 – Conduct Recharge Capacity Evaluation

Based on the data review conducted in Subtask 1.3 and input from AVSWCA, our team will conduct hydrogeologic investigations at each of the candidate sites. The investigation will include exploration trenching and infiltration testing.

The exploration trenching will be conducted to characterize lithologic and stratigraphic conditions in the shallow subsurface to depths of approximately twelve feet, the most critical zone for evaluating recharge feasibility. Up to ten trenches total will be excavated at the three sites. The general methodology for exploration trenching consists of the following elements:

- Lithologic and stratigraphic conditions encountered in the trenches will be evaluated and described by a geologist to provide a continuous characterization of sediment strata, and representative samples will be obtained from all strata of differing lithology.
- Detailed lithologic descriptions will be prepared for the samples by evaluating and estimating particle size distribution, plasticity, and degree of lithification, chiefly using manual methods.
- Selected samples may be submitted to a geotechnical laboratory for analysis of particle size distribution and plasticity limits.
- Based on field observations and detailed lithologic descriptions, sediment strata will be classified into five categories based on lithologic properties and estimated permeability.

Graphic logs will be prepared for the trench profiles based on the five lithologic/permeability categories to allow comparison of vertical and spatial occurrence of notable strata and overall near-surface conditions.

Infiltration testing will be conducted using the constant-head permeameter method. This method is a useful technique for evaluating the field saturated hydraulic conductivity of soils and consists of a small-scale test conducted in hand-augered holes. The results will be combined with the information obtained from the exploration trenching to correlate hydraulic conductivity with targeted sediment strata and used as a basis for evaluating potential infiltration capacity of the near-surface profile. Key aspects of the infiltration testing include:

- The infiltration tests will be conducted concurrently with the exploration trenching so that tests can be conducted in identified strata at various depths (maximum depth of approximately 4 feet for safety considerations).
- For cost estimation purposes, it is assumed that a minimum of 10 (total) constant-head permeameter tests would be conducted at the three targeted recharge sites.
- In addition to the permeameter measurements, our team will estimate approximate infiltration rates based on the lithologic and stratigraphic conditions observed in the exploration trenches and through comparison and correlation of these conditions to lithologic data, hydraulic characterization, and operational recharge rates for many other recharge projects that we have conducted.
- It is understood that AVSWCA may conduct a simple in-channel infiltration test by releasing water from the California Aqueduct into Big Rock Creek; this test would provide the most useful and representative data for evaluating potential in-channel infiltration rates and, if conducted, may preclude the need for small-scale infiltration tests at this site.

Our biologists will perform biological clearance surveys for areas where geotechnical trenching will occur. For scoping purposes, it is assumed that six locations will be selected by the geotechnical consultant, that the geotechnical consultant will accompany the biologist to the area of the trenching, and that all six trenching sites can be surveyed in one day. If trenching will occur during nesting bird season (generally March 15 to August 15) and depending on the site conditions and if nests are discovered near the trenching locations, our biologists will provide guidance as to appropriate buffers. A third survey day may be necessary, if there are nesting birds discovered, but is not assumed to be needed at this time.

Subtask 2.3 – Develop Facility Schematics and Cost Opinions

Using the results of information gathered in Subtasks 2.1 and 2.2, we will develop conceptual facility schematics and layouts of proposed facilities at each of the three candidate recharge sites. The layouts will include approximate sizes, configuration, and depths of the proposed facilities and will identify the approximate locations and sizes of canal/siphon turnouts and piping to transport raw water to each of the potential facilities. Conceptual instrumentation and flow control valving will identified and included in the process schematics.

Conceptual level cost opinions will be prepared for construction and operation and maintenance (O&M), conforming to Class 4, as defined by the Association for the Advancement of Cost Engineering (AACE) International. A life-cycle cost analysis will be prepared for comparison of the three sites.

We will estimate the annual quantity of SWP water available for recharge at the Big Rock Creek project. Assumptions regarding SWP water deliveries during various year types (e.g., critically dry, dry, wet) will be consistent with the results of the most recent SWP Delivery Capability Report published by the California Department of Water Resources (DWR). Key considerations will be:

- Current and forecasted water demands of the three AVSWCA agencies.
- Current and forecasted water supplies available to the three AVSWCA agencies.
- Existing water banking projects in the Antelope Valley and their available recharge capacity.
- Prioritization of the use of available Antelope Valley recharge capacity.

We will develop and document informed assumptions regarding each of the above considerations. Deliverables will include an Excel model presenting the forecast and estimates, along with a supporting memorandum summarizing the analysis approach, assumptions, and results.

Subtask 2.4 – Prepare Recharge Facility Technical Memorandum

A technical memorandum summarizing the findings, conclusions, and recommendations of Tasks 1 and 2 will be prepared and submitted to AVSWCA for review and comment. Upon receipt of comments from AVSWCA, the technical memorandum will be finalized. The draft and final technical memorandum are assumed to be submitted electronically in pdf format.

Task 3 – Engineering Alternatives

Subtask 3.1 – Develop and Evaluate Alternatives

Our team will develop up to three feasible alternatives for designing and constructing a recharge facility at the site recommended in the Task 2 technical memorandum. Alternatives will be developed to evaluate the following design issues:

- Recharge facility location to evaluate in-channel versus off-channel facilities and effects each may have on stormwater drainage and natural flow patterns of the Big Rock Creek.
- In-channel constructed features for erosion control, sedimentation control, and minimizing impacts to natural flow and floodplain.
- For constructed basin alternatives, shallow basins constructed with push-up berms will be compared with excavated basins based on requirements for infiltration rates and size of constructed facilities within the sensitive habitats and floodplain.
- Turnout locations and designs to minimize the length of the raw water delivery pipelines.
- Pipeline routes taking maximum advantage of existing rights-of-way and easements and minimizing permitting requirements.
- Water quality monitoring locations to effectively monitor incoming water quality and aquifer quality impacts caused by recharge.
- Flow monitoring methods to accurately measure water delivery and downstream flow in the case of in-channel recharge facilities.

Each of the alternatives will be evaluated and ranked using a scoring system that factors in effects from both cost-based factors and non-cost-based

factors. The factors and scoring methodology will be developed collaboratively with AVSWCA. Cost-based factors will include capital costs, land acquisition, O&M costs, and other items that can be quantified monetarily. Non-cost factors will include items that may affect facility construction or operation that are not easily quantifiable, such as impacts to surrounding properties, complexity of permitting, security, floodplain impacts, disturbance of archaeological sites, or other items identified during the data collection and site visit. The scoring will include relative importance of each of the factors and will be developed to provide a quantifiable ranking of each alternative.

Draft alternatives will be reviewed by Jericho Systems to identify potential environmental concerns, such as promoting wetland growth or significantly reducing or increasing important species habitat and/or forage areas. Jericho will also review the alternative for the potential to introduce design measures that could potentially reduce impacts to the environmental receptors or permitting challenges.

Subtask 3.2 – Prepare Recommendations

Based on the alternatives evaluation described in Subtask 3.1, our team will develop an implementation plan that identifies the steps to be followed to efficiently plan, design, construct, permit, and operate the recommended recharge facility. The implementation plan will include a schedule, a planning level budget, and potential funding sources.

We will identify a set of potential funding sources, including but not limited to:

1. State grants.
2. Federal grants.
3. Watermaster assessments.
4. Public-private partnership.
5. Municipal bonds.
6. Green bonds.
7. Low-interest loan.
8. Partner cost-share.

Task 4 – Preliminary Design Report

Our team will prepare a Preliminary Design Report (PDR) of the recharge facility recommended in Task 3. The preliminary design report will present a summary of the information developed in Tasks 1 through 3 and will include site layouts with sufficient detail to illustrate the major components and surrounding features of the recharge facility. Technical memoranda and reports developed in Tasks 1 through 3 will be appended to the PDR. A draft of the PDR will be submitted to AVSWCA, and any comments developed by AVSWCA will be discussed in a review meeting. AVSWCA's comments will be incorporated into a final PDR and presented to AVSWCA in a second meeting. Our team will support AVSWCA in up to two Commissioner meetings.

The benefits and challenges of each funding source will be assessed as they pertain to the Big Rock Creek Recharge Project. Based on this preliminary research, 1 to 3 of the identified funding sources will be recommended as high priorities for further investigation and potential pursuit. The funding sources identification, description, and recommendations will be documented in an attachment to the PDR.

Task 5 – Environmental Services Pursuant to CEQA

Based on the design developed in the PDR, we will conduct biological and jurisdictional waters surveys, and cultural surveys. For scoping purposes, it is assumed that the survey area will not exceed 64 acres.

Subtask 5a – Biological Resources Assessment and Jurisdictional Delineation

The biological field surveys for the biological and jurisdictional resources will be conducted concurrently to reduce time for field mobilization. We assumed that the survey area is 64 acres. Our team assumed that the 64 acre site will be surveyed by three biologists for two days.

Biological Resources Assessment: Our biologists will conduct the field surveys of the survey area to determine the habitat suitability for sensitive species, with focus on species known to be in the area, such as the Mohave Ground Squirrel, burrowing owl, and potentially desert tortoise. The potential for sensitive avian species, such as Swainson's Hawk and Tri-Colored blackbird, to nest and/or forage in the area will also be addressed. Jericho will only conduct a habitat assessment for species as appropriate and is not proposing to conduct presence/absence surveys at this stage.

Jurisdictional Waters/Wetlands Delineation: We will also conduct a jurisdictional waters delineation and a general wetlands delineation of the proposed alternative to determine which State and Federal permits may be required, as well as attempting to

delineate the approximate acreage of impact of the waters. Due to the large area and very braided nature of Big Creek Wash, our team will utilize an unmanned aerial vehicle (UAV/drone), coupled with field surveys to ground-truth the data. The drone imagery can also assist the engineering team in determining elevational differences in the alluvial fan that can assist with other studies.

Subtask 5b – Prepare Environmental Constraints Analysis Report

At the conclusion of the field surveys, we will conduct an Environmental Constraints Analysis that will identify the following topics including but not limited to:

- Environmental Setting that identifies the surrounding land uses other basic information as appropriate.
- Screening level analysis for geology, hydrogeology and water.
- Resources using the results of the Engineering Design Constraints Analysis.
- Results of the findings of the literature reviews and field surveys.
- Results of the findings of the jurisdictional waters assessment, including potential impacts to State and federal waters.
- Summary of results of the Cultural Resources field survey by Jericho's subconsultant. His full report will be an appendix to the Jericho's report.
- Other Constraints – we will perform a literature review screening level analysis for other resource issues as required by CEQA, including land use, traffic, noise, and minerals through literature review of City and County general plans and other available technical literature.
- Conclusions as to the environmental constraints, the need for follow-on species and botanical focused surveys, subsequent species and jurisdictional waters permitting as necessary, and any other pertinent information that will determine the level of effort for the follow-on work.

Task 6 – Permits

We assume that this task will result in a combined engineering and environmental Implementation Technical Memorandum. The memorandum will identify the CEQA/NEPA compliance requirements and the surveys and consultations recommended to support permitting. The memorandum will provide the path forward to complete design and obtain permits.

D. PAST PERFORMANCE

JUST ASK OUR CLIENTS. The Carollo team is dedicated to responsive client service. We have demonstrated our quality of service on numerous recharge projects like yours. We invite you to contact the following references. These individuals will attest to the quality and responsiveness of our team's services on similar projects.

References

Client/Project	Client Contact Information	Team Member Involvement
Antelope Valley-East Kern Water Agency, CA High Desert Water Bank	Dwayne Chisam, General Manager 661-943-3201	Glenn Hoeger, George Maseeh, Gwen Woods, Troy Hedlund, Matt Payne, Tim Leo, Mark Cross, Julie Gilbert, Todd White, Shay Lawrey
Tucson Water, AZ Southern Avra Valley Storage and Recovery Project	Timothy Thomure, Director 520-837-2116	Glenn Hoeger, George Maseeh, Jim Dettmer, Kelley Newman, Mark Cross, and Jeff Meyer
Antelope Valley-East Kern Water Agency, CA Willow Springs Water Bank Due Diligence	Dwayne Chisam, General Manager 661-943-3201	Matt Payne, Tim Leo, and Mark Cross
Antelope Valley-East Kern Water Agency, CA West Avenue H Wellfield Project	David Ferguson, Kennedy/Jenks Consultants 626-568-4302	Julie Gilbert and Shay Lawrey
Tucson Water, AZ Central Avra Valley Storage and Recovery Project	Jeff Biggs, Administrator Strategic Initiatives Division 520-837-2111	Glenn Hoeger, George Maseeh, Jim Dettmer, and Mark Cross
Town of Prescott Valley, AZ Groundwater Recharge Capacity Assessment for Tulare Irrigation District Conjunctive Water Use Study	John Munderloh, Water Resources Manager 928-759-3105	Matt Payne, Jeff Meyer, and Mark Cross

E. PROJECT FEE AND SCHEDULE

Our project management and quality control program will define a game plan and set the course for integrating all project components.

PROJECT MANAGEMENT APPROACH

Project management activities will be primarily directed by Inge Wiersema with support from Glenn Hoeger. Our project management approach is structured to emphasize five key areas:

- Collaboration and coordination.
- Consensus-based decision making.
- Risk management.
- Scope, schedule, and budget control.
- Quality management.

It All Starts with a Good Plan

Managing a project is a lot easier when everyone works as a team, and the team works best when everyone understands the "game plan." Our project manager, Inge Wiersema and project engineer, Glenn Hoeger, will work with you at the onset to develop a Project Management Plan (PMP) tailored specifically to this project. The PMP sets goals and expectations for the project, as well as defines assignments and responsibilities to AVSWCA and Carollo's team members. The PMP also establishes the control measures to manage cost, schedule, and scope. The benefit to you is that everyone knows who, what, when, and the level of effort anticipated.

Our management approach is structured to emphasize five key areas.

Collaboration and Coordination

Timely, effective communication is critical to confirm expectations and encourage stakeholder input. Without an ongoing commitment to communication at all levels, the project will not be successful. Our team understands the importance of collaboration for project success, and we fully support the concept of a collaborative team including the AVSWCA management, your O&M team, and the design team. Our project scope includes monthly project and work product review meetings; however, our approach also uses regular communications with AVSWCA's project manager to keep the project on track.

Timely and Effective Decision Making

The success of your Feasibility Study project will depend on effective and timely consensus building and decision making. We will be proactive with the AVSWCA team in identifying areas of decision-making input and responsibility. To promote this, we will employ the following:

- Effective use of project status meetings.
- Technical memoranda/drat reports.
- Action, issue, and decision logs.

Effective Use of Project Status. Our approach will seek to obtain consensus by project stakeholders on critical decisions at the earliest possible date. We moved up the data request to be submitted at the beginning of the project, so we can use the project kick-off meeting to hit the ground running. Key elements to this approach include:

- Planning. We will establish a well-documented "game plan" for project meetings and workshops. This plan will identify the ground rules, information required, objectives, attendees, and schedule for meetings.
- Execution. Information will be distributed to attendees for review and input prior to the meeting. We will present the proposed agenda prior to

agenda package distribution in order to confirm meeting intent, objectives, attendees, and desired outcomes.

- Follow-Up. In addition to distributing meeting notes, we will sustain communication after the meeting through email, phone correspondence, or in-person discussion to follow through on action items and project coordination issues or to clarify details.
- Technical Memoranda/Reports. Draft and final TMs and reports, including supporting information, will document major design decisions and findings. This process will allow timely consensus-driven decisions and prevent backtracking or rework.
- Action, Issue, and Decision Logs. We will effectively use action, issue, and decision logs to track those elements that affect the progress of the design. We will identify and update these elements in Procore meeting notes and discuss them at progress meetings.

Scope, Schedule, and Budget Control

Throughout the project, the Carollo team will identify and evaluate project risks associated with cost, schedule, quality, and/or safety.

Carollo bears the responsibility and accountability to AVSWCA to ensure that our team's scope, budget, and schedule are effectively managed. We will accomplish this through timely and accurate monthly progress monitoring and reporting, use of progressed schedule management techniques, and effective maintenance of logs to track scope changes. Our team has prepared an aggressive six-month schedule (shown on the next page) to meet budget needs and to move the project at a sufficient pace to get the biological survey team in the field by October. Biological surveys should not be conducted in winter months beginning in November.

Monthly Progress Monitoring and Reporting.

Carollo utilizes earned value management analytical methods to accurately assess project budget and schedule status, as well as monitor progress and take appropriate corrective action if required. Based on the budget, scope, schedule, and work breakdown structure (WBS), we develop and monitor a planned percent complete curve ("S" curve) on a monthly basis over the duration of the project. Any deviations (and trends) between planned and actual progress provides us with clear indication that corrective action is necessary.

You expect quality deliverables. Our work plans, schedule, and quality control program define the game plan and set the course for collaboration during the entire project.

Scope Logs. We will provide potential scope changes (plus or minus) to be discussed at the scheduled project meetings. Proactively discussing scope maintenance on a regular basis assists our management team with timely change identification, developing alternatives for dealing with the change, maintaining the schedule, and potentially eliminating design scope changes.

Quality Management

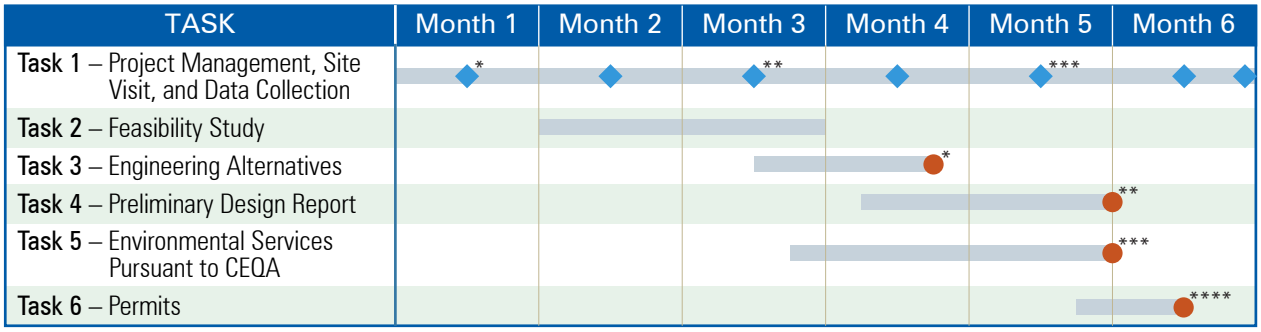
Our approach to quality is based on defining our Quality Management (QM) expectations up front and applying the right reviews at the right time to ensure that the project starts off correctly and ends successfully. Inge bears ultimate responsibility for quality assurance/quality control for this project. We have defined our quality management goals as:

- Minimizing errors and omissions in all work products.
- Controlling design and construction costs by "doing it right the first time."
- Maintaining schedule and permit compliance through efficient delivery.

To achieve these goals and to meet our own quality expectations, we will prepare a project-specific QM plan that identifies the specific deliverables from each phase, a log of review comments, changes made, and supporting documentation.

Carollo has used this proven process to develop a track record for high-quality documents, which translates to design-related change orders averaging less that 2 percent over the last 10 years, a benchmark significantly lower than industry average of 4 to 5 percent.

Project Schedule



- **Project meetings:** * Kick-off meeting, ** Draft Feasibility Study Report Review, *** Draft Preliminary Design Report Review
- **Final Task Deliverable Milestone:** * Feasibility Study Report, ** Preliminary Design Report, *** Environmental Constraints Analysis Report, **** Implementation Technical Memorandum

Detailed Work Effort and Fee Estimate

Task Description		CAROLLO COSTS									MONTGOMERY & ASSOCIATES COSTS			JERICHO SYSTEMS COSTS			WESTWATER COSTS	
		Project Manager	Project Engineer	Project Reviewers	Lead Engineer	Staff Engineer	Senior GIS Analyst	Document Processing/ Clerical	Total Hours	Carollo Labor Cost	Montgomery & Associates Labor Costs	Subcontractor Costs	Montgomery & Associates Total Costs	Jericho Systems Labor Costs	Subcontractor Costs	Jericho Total Costs	WestWater Research Total Costs	Total Costs
Hourly Rate		**$265**	**$220**	**$220**	**$170**	**$150**	**$180**	**$110**										
Task 1 - Project Management, Site Visit, and Data Collection																		
1.1	Kick-off Meeting and Site Visit	2	8		8	8		2	28	$5,070	$4,600		$4,600	$2,670		$2,670	$1,400	
1.2	Monthly Status Meetings	12	8					6	26	$5,600	$500		$500	$278		$278	$600	
1.3	Data Collection and Review	1	2		12	16	6		37	$6,225	$6,680		$6,680	$1,118			$2,000	
	Subtotal								**91**	**$16,895**	**$11,780**		**$11,780**	**$4,066**		**$4,066**	**$4,000**	$36,741
Task 2 - Feasibility Study																		
2.1	Conduct Recharge Site Evaluations		4	2	6	8	2		22	$3,900	$6,000		$6,000				$8,500	
2.2	Conduct Recharge Capacity Evaluation		2			4			6	$1,040	$25,800	$5,620	$31,420	$800		$800		
2.3	Develop Facility Schematics/Cost Opinions		4	2	6	12	8		32	$5,580			$0					
2.4	Prepare Recharge Facility Technical Memo		2	2	4	24	6	8	46	$7,120	$13,000		$13,000	$2,358		$2,358	$4,300	
	Subtotal								**106**	**$17,640**	**$44,800**	**$5,620**	**$50,420**	**$3,158**		**$3,158**	**$12,800**	$84,018
Task 3 - Engineering Alternatives																		
3.1	Develop and Evaluate Alternatives	1	4	2	10	32	16		65	$10,965				$2,406		$2,406		
3.2	Prepare Recommendations	1	4	2	8	24			39	$6,545								
	Subtotal								**104**	**$17,510**				**$2,406**		**$2,406**		$19,916
Task 4 - Preliminary Design Report		2	8	4	18	40	16	8	**96**	**$15,990**							**$5,000**	$20,990
Task 5 - Environmental Services Pursuant to CEQA		2			8				**10**	**$1,890**				$14,796	$10,746	**$25,542**		$27,432
Task 6 - Permits		2			8				**10**	**$1,890**				$2,716		**$2,716**		$4,606
TOTAL		**23**	**46**	**14**	**88**	**168**	**54**	**24**	**417**	**$71,815**	**$56,580**	**$5,620**	**$62,200**	**$27,142**	**$10,746**	**$37,888**	**$21,800**	**$193,703**

Appendix

Resumes

Education

MSc Environmental Engineering, Agricultural University, Wageningen, Netherlands, 1997

BS Environmental Engineering, Hogeschool Van Utrecht, Netherlands, 1995

Licenses

Civil Engineer, California

Professional Affiliations

American Water Works Association

Association of Women in Water, Energy, and Environment

Water Environment Federation

WateReuse Association (Technical Chair of Los Angeles Chapter)

Inge Wiersema, P.E.

Inge Wiersema is an environmental engineer with 22 years of experience and is specialized in water system planning and water resources projects. She has been involved in more than 100 master planning and hydraulic modeling projects for water, recycled water, wastewater, and stormwater systems in Southern California.

She has also worked on various groundwater management plans, watershed management plans, urban water management plans, sewer system management plans, and water supply studies. Her technical experience also includes conceptual and preliminary design of pipelines, pump stations, and water treatment plants. A selection of her experience includes:

Relevant Experience

→ Project manager for the Antelope Valley East Kern Water System Master Plan, Palmdale, California.

→ Project manager for the One Water LA 2040 Plan for the City of Los Angeles, California. The Plan is a collaborative effort of the LA Sanitation (LASAN) and LA Department of Water and Power (LADWP) that takes a holistic approach to consider all types of water as "One Water." The Plan is developed through a stakeholder driven process and will guide the City with strategic and multi-billion dollar decisions for water infrastructure projects to make LA a more water resilient and sustainable City. In addition to the One Water LA 2040 Plan, this project includes the preparation of a wastewater facilities plan, stormwater facility master plan), development of long-term policies, various special studies (e.g. LA River Flow Study, Satellite Wastewater Treatment Feasibility Study, Rate Study), and a programmatic environmental impact report (EIR). As Project Manager, Inge is responsible for the coordination of the work effort with City staff from multiple departments and more than 20 subconsultants

→ Project manager for the 2016 water system master plan for Cucamonga Valley Water District, California. This ongoing project includes potable water demand forecasting, InfoWater hydraulic modeling updates, hydraulic model calibration using SCADA and pressure logger data, and the development of customer specific diurnal curves. As part of the model calibration process and condition assessment activities, coordination with operations and engineering staff has been conducted. In addition, the infrastructure upgrades for the existing and future systems will be evaluated and the findings will be combined in a capital improvement program (CIP) and water master plan report.

→ Project engineer for Integrated Water Management Plan for the City of Riverside, California. The ongoing project will identify a supply strategy to meet the City's potable and non-potable water demands, which will consider new wells, recycled water, groundwater recharge, salinity management, water conservation, stormwater, water treatment, and groundwater banking projects. The water supply evaluation identified 15 new water supply project opportunities. Detailed project descriptions, conceptual layouts, facility sizing, and cost estimates were developed for each project. The projects were ranked and prioritized to identify the best mix of projects to serve the City's projected demands through 2035.

→ Project manager for the Arroyo Seco Project for the City of Pasadena, California. The project consists of the conceptual and final design of a new intake structure to divert more local stream flows to spreading basins for groundwater recharge. Siting and design of new spreading basins, restrooms, recreational facilities, and educational displays, as well as river restoration plans, are also part of the project. Environmental documents and final design package were prepared for this first Los Angeles Integrated Regional Water Management Plan (IRWMP) project.

→ Project manager for the Recycled Water Master Plan for the Indio Water Authority, California. The project included a recycled water market assessment including cus-

tomer surveys, demand projections, and development of a hydraulic model to size future distribution system components. In addition, opportunities for groundwater recharge at a City park using direct injection wells were evaluated. The findings of the project were presented in a master plan report and projects were phased in a $75 million capital improvement program (CIP).

→ Task manager for the Recycled Water Implementation Plan for the Inland Empire Utilities Agency (IEUA), California. The project defined the layout and sizing of the regional recycled water system that consists of 92 miles of pipelines, 110 million gallons of storage reservoirs, and 12 booster stations. Under build-out conditions, the proposed system serves 95,000 acre-feet per year of recycled water to 17 groundwater-recharge basins and will provide the backbone recycled water system for the cities of Chino Hills, Chino, Ontario, Upland, Rancho Cucamonga, Montclair, and Fontana and some unincorporated areas of San Bernardino County. Potential recycled water users were identified, a 24-hour hydraulic model was created in InfoWater®, pressure zone boundaries were defined, and all system pipelines and facilities were sized. Multiple pipeline alignments and facility locations were evaluated to minimize utility conflicts during construction. She was the lead on all technical tasks and the preparation of the recycled water implementation plan report, including a $320 million capital improvement program (CIP) and operational strategy.

→ Project manager for the 2016 Water Master Plan for the City of Colton, California. This project included water demand forecasting, hydraulic model development and EPS calibration using field fire flow testing. Existing and future system analysis was conducted to develop a capital improvement program (CIP) including a rehabilitation and replacement program. The findings were presented in a comprehensive water master plan report that was developed in conjunction with the 2016 Sewer Master Plan.

→ Project manager for the 2015 Integrated Water Resources Plan for Otay Water District, California. This project involved the identification and evaluation of a wide range of water supply options to diversify the District's supply portfolio and reduce reliance on imported water.

→ Project manager for the Nitrification Study for Mesa Water District, California. This project involved the analysis of extensive field data gathering and laboratory testing to identify trends and solutions for nitrification events. In addition, hydraulic modeling analysis was conducted to identify potential hydraulic contributing factors, such as water age. Findings were presented in a comprehensive report, including a nitrification mitigation and prevention plan.

→ Project manager for the 2015 Recycled Water Feasibility Study to increase the region's water supply with the sustainable and reliable use of recycled water. Interconnection between the City of Pomona, Monte Vista Water District, and Inland Empire Utilities Agency were evaluated to develop water supply alternatives that would provide IEUA with regional water supply benefits. As part of this evaluation, seasonal flow data from multiple supply sources with variable water quality was analyzed, regulatory permit impacts were reviewed, groundwater impacts were evaluated, and advanced treatment alternatives were assessed. The final selected alternatives were analyzed utilizing InfoWater models from the City of Pomona and IEUA.

→ Project manager for the Six Basins Groundwater Recovery Project for Three Valleys Municipal Water District, California. The project included a detailed evaluation of alternatives to treat contaminated groundwater and reduce reliance on imported water supplies while improving basin water quality. The study included review of various treatment locations and project capacities, sizing of infrastructure, treatment process evaluation, treatment plant sizing, and preparation of cost estimates. A conceptual design and implementation plan for the preferred alternative was prepared and used to prepare a Title XVI grant application.

Education

MS Toxicology, University of Arizona, 1992

BS Biology, University of Arizona, 1984

Professional Affiliations

SETAC Chairman, Bioavailability Sessions 2013, 2014, 2015

TRRP Update Training ITRC Team Member, Bioavailability Guidance

Storm Water Inspector Training

Landfill Gas Extension System Design

40-Hour HAZWOPER

Texas Risk Reduction Program

Glenn C. Hoeger

Glenn Hoeger has more than 27 years of experience. He has achieved a successful record of performance for delivering technical, high quality services through a proactive approach with regulators and clients. Mr. Hoeger's areas of specialty include groundwater recharge and water resources studies, engineering and feasibility studies, pilot tests, master planning studies; regulatory compliance and permitting; groundwater remedial investigations; and risk assessments. Mr. Hoeger has extensive experience in managing a wide range of projects, contracts, and consulting teams for private, federal, and municipal clients.

Relevant Experience

→ Project manager for the Antelope Valley East Kern (AVEK) High Desert Water Bank Independent Cost Opinion and Evaluation. Technical lead and manager for the review of conceptual level design for recharge and recovery facilities at a spreading basin facility receiving up to 70,000 acre-feet/year (AFY) State Water Project (SWP) water and recovery of up to 63,000 AFY. Evaluated basin configurations allowing reduction or elimination of pump station previously designed into the project. Worked closely with Montgomery and Associates to determine recovery well layout in line with predictions of groundwater mounding based on model results. Managed development of independent cost opinion identifying data gaps in including power delivery and distribution on the site.

→ Deputy Project Manager for Tucson Water, Arizona - Southern Avra Valley Storage and Recovery Project. Southern Avra Valley Storage and Recovery Project (SAVSARP) investigations and design of recharge facilities for a potential 140,000 AFY recharge and recovery facility in Avra Valley outside Tucson. Provided management and senior technical oversight for mapping, Phase I Environmental Site Assessment, Herbicide/Pesticide Investigation and documentation, hydrogeological investigations, floodplain analysis, master planning, and preliminary design. Managed team of sub-consultants to provide work product providing data for master plan development. Prepared site-specific earthwork specifications for bid documents to support design efforts for large-scale recharge basins. Prepared subcontracts, managed sub-consultants, and managed budget and schedule for $2.4M investigation, planning, and design project.

→ Deputy Project Manager and Task Leader for Tucson Water, Arizona - Clearwater Renewable Resource Facility, Start-up Plan for Recharge and Recovery Facilities. Prepared a startup plan to initiate phased operations of the Clearwater Renewable Resource Facility. Startup included coordinating efforts for recharge facilities and recovery well field, 72-inch pipeline, 54-MGD pump station, and 8.5 MG reservoir. Maintained schedules for multiple subcontractors and identified critical path items to ensure facility startup on demanding schedule.

→ Task Leader for Tucson Water, Arizona - Central Avra Valley Storage and Recovery Project, Full-scale Recharge Facility Design. Preliminary design of recharge facilities to recharge 60,000 AF-yr of Central Arizona Project (CAP) water at CAVSARP. Responsible for development of recharge facilities layout, basin design, berm protection, control and monitoring devices, and the operational plan for the recharge facilities. Coordinated design of recharge facilities with utility providers.

→ Project Manager and Technical Leader for Three Valleys Municipal Water District, California - San Antonio Spreading Grounds Multiple Benefit Recharge Project. Conceptual feasibility study for multiple benefits recharge project in Los Angeles County. Developed conceptual design for water delivery and recharge facilities, storm water controls and enhancements for natural recharge, public hiking trails, and education center. Prepared conceptual design as basis for preliminary cost opinion.

→ Project Manager for Tucson Water, Arizona - Southern Avra Valley Storage and Recovery Project, Recovered Water Transmission Pipeline Alignment Study. Study of a large-diameter (84-inch) pipeline through

an area of congested wild-cat development and sensitive habitat/floodplain issues. Used ArcGIS to develop automated scoring of evaluation criteria such as utility conflicts, width of right-of-way, residential conflicts, and traffic/access issues. Provided alternative alignment outside original scope, which provide to be the most cost-effective alternative.

→ Task Leader and Project Engineer for Arizona Department of Water Resources - Sahuarita-Green Valley, Arizona - Sahuarita-Green Valley Area Central Arizona Project Water Use Feasibility Analysis and Delivery System Optimization Study. Developed database and mapping using ArcView GIS software to summarize, categorize, and visually display major water use in the study area for the Arizona Department of Water Resources, Tucson Active Management Area. Developed conceptual pipeline routes for delivery of CAP water to major water users in the Sahuarita-Green Valley area. Performed pipeline route study using cost-based and non-cost-based evaluations of pipeline alignments to recommend the optimal delivery route for CAP water.

→ Project Manager for Tucson Water, Arizona – Tucson International Airport Groundwater Remediation Project (TARP) Annual Profession Services: Compliance, Capture, and Engineering Services. Project manager for engineering and consulting services maintaining compliance of the TARP remediation system with Consent Decree requirements for groundwater remediation of a 6-mile TCE plume with treated water being delivered to the City of Tucson potable water distribution system. Provide regulatory compliance under CERCLA consulting and reporting for all investigation, operation, and planning activities. Responsible for scopes, budgets, technical project delivery, schedule, and regulatory compliance.

→ Deputy Project Manager for Tucson Water, Arizona - Blended Water Demonstration Program. Small-scale recharged/recovered CAP water delivery project to several neighborhoods in the Tucson Water Department service area. Coordinated design, Approval-to-Construct by ADEQ, construction, Approval-of-Construction by ADEQ, and start-up of water delivery systems. Acted as contact between contractor, regulator, and client. Provided technical support for maintenance of the source for recharged CAP water, development of operational procedures, and obtaining regulatory compliance providing timey regulatory approval.

→ Project Manager for Tucson Water, Arizona - Southern Avra Valley Storage and Recovery Project, Earthwork Model and Design. Managed development of earthwork model using LDD demonstrating that compaction of 2-foot thick footer beneath berms of recharge facility would use an additional 200,000 cubic yards of excavated material compared to berm compaction at land surface. Cut-and-fill model demonstrated sufficient space available to place and compact excess fill without adversely impacting adjacent property owners in the 100-year floodplain. Model used as basis for establishing earthwork specifications that refuted $385K change order request.

→ Deputy Project Manager for Tucson Water, Arizona - Central Avra Valley Storage and Recovery Project, Blended Water Demonstration Program. Small-scale recharged/recovered CAP water delivery project to several neighborhoods in the Tucson Water Department service area. Assisted in design, construction, and start-up of water delivery systems. Acted as contact between contractor and client. Provided technical support for maintenance of the source for recharged CAP water, development of operational procedures, and obtaining regulatory compliance.

→ Project Leader for Tucson Water, Arizona - Central Avra Valley Storage and Recovery Project, Expanded Pilot Recharge Project. Operation and monitoring activities for three 20-acre pilot recharge basins to recharge CAP water in Avra Valley. Coordinated water delivery schedules with Central Arizona Water Conservation District. Developed monitoring protocols and data base to determine optimal water delivery schedules to each basin. Developed operation plan to respond to seasonal and infiltration variability.

Education

MS Civil Engineering, University of California, Davis, 1989

BS Civil Engineering, Loyola Marymount University, California, 1987

Licenses

Civil Engineer, California

Professional Engineer, Montana, Washington

Water Treatment Plant Operator, Grade T4, California

Professional Affiliations

American Water Works Association

James A. Meyerhofer, P.E.

James Meyerhofer, a senior vice president with Carollo Engineers, has 28 years of experience focused on water treatment, including pilot plant design and operation, water quality studies, treatment plant evaluation and design, and construction management.

Relevant Experience

→ Principal for AVEK Water System Master Plan.

→ Principal-in-charge for the City of Pomona, California, Water and Recycled Water Master Plans. The project included creation and calibration of water, recycled water, and sewer models using the City's geographic information system (GIS). A recycled water market survey and an economic feasibility analysis were conducted to develop the recycled water distribution system. Potable water demand projections were closely coordinated with the sewer flow projections. System analyses were conducted to identify improvements needed and capital improvement program (CIPs) were prepared to phase the recommended projects.

→ Principal-in-charge for the Water Supply Planning Study for the City of Santa Barbara, California. The study evaluated the City's water supply mix and assessed opportunities to improve water supply reliability. The study also included assessments for State Water Project supply reliability, climate change impact localization, recycled water system expansion opportunities, and water conservation.

→ Principal-in-charge/project manager for the Potable Water Distribution System Master Plan for the Coachella Valley Water District, California. The project focused on the assembly and calibration of a hydraulic model of the District's potable water distribution system. It also included evaluation of the distribution system, storage facilities, and future supply options. A capital improvement budget assigned costs to the proposed improvements.

→ Principal-in-charge for the Oro Grande Groundwater Recharge Project for the Mojave Water Agency, California. The project included the design and construction services for infrastructure to convey up to 45 cfs of water from the California Aqueduct to the Oro Grande Wash. Detailed design included the modification to an existing turnout in the aqueduct, connecting to the turnout, design of metering, screening, process control, and pressure reduction facilities and the design of approximately 3 miles of 30- and 36-inch cement mortar lined and coated steel pipeline. Construction services included bidding and construction management for all phases of construction.

→ Project manager for the 4-mgd Pedley Filter Plant Feasibility Study for the City of Pomona, California. The study evaluated the expansion of capacity and the optimization of production of treated surface water at the Pedley Filter Plant for the next 20 years. Three different viable, defensible, and cost-effective prioritized recommendations were provided.

→ Project manager for the Process Residuals Management Study at the 60-mgd Lloyd W. Michael Water Treatment Plant for the Cucamonga Valley Water District, California. The study assessed the long-term feasibility of the existing residuals management practices based on local, regional, and federal regulations. The fiscal and regulatory impacts of alternative treatment strategies were identified.

→ Technical advisor for a feasibility study for the City of Redlands, California. The project involved an evaluation of water sources and water demands for the City, as well as evaluation of the regulatory issues facing the operation of the Horace Hinckley Surface Water Treatment Plant and approaches to expanding the plant to meet the City's needs.

→ Principal-in-charge for the Water Supply Feasibility Evaluation for Improvement District No. 11 and Area 23 for the Coachella Valley Water District, California. The project determined the most cost-effective and fea-

sible way to meet current and projected water demands for the Improvement District No. 11 and Area 23 service areas.

→ Project manager for the Joint Facilities Master Plan Project J-501 for the Santa Fe Irrigation Water District, California. The project included protective device coordination, and fault current and arc-flash studies for the Cielo Pump Station, the San Dieguito Pump Station, and the R.E. Badger Water Filtration Plant. The electrical facilities included in the arc-flash analysis were comprised of medium-voltage and low-voltage power distribution systems, and various on-site generation sources including natural-gas engine and hydroelectric generation.

→ Principal-in-charge for the 2006 Water System Master Plan Update for the Palmdale Water District, California. The project involved development of a new water system computer model using the City's newly developed Geographical Information System.

→ Project engineer for the 20-Year Comprehensive Water Master Plan for the City of Victorville, California. The project included preparation of an Urban Water Management Plan, evaluation of the District's 16 storage tanks for seismic vulnerabilities, and development of a financial analysis to analyze revenues and establish a new rate structure.

→ Principal-in-charge for the City of Hesperia, California, Water and Wastewater Master Plans. Carollo prepared four interrelated planning documents, including three hydraulic models to assist the City with addressing increasing water demands, declining groundwater levels, constraints on groundwater over-use, and collection system capacity constraints. The Water Master Plan incorporated the City's increasing development patterns, updated development projections, updated the existing hydraulic model, and updated the existing CIP.

→ Project engineer responsible for assessing water demand and supply requirements for the 2005 Water Master Plan Update for the City of Azusa, California. The main goals of the project were to identify the capital improvements needed to provide reliable service, update the hydraulic model, and establish realistic cost estimates for the recommended improvements.

→ Project engineer for the water quality elements of the Domestic Water System Master Plan for the Yorba Linda Water District, California. The project included an update of current and pending water quality regulations, analysis of nitrification monitoring results, analysis of the District's existing and future storage requirements, and analysis of the potential use of untreated water for irrigation purposes. The project also included an update of the District's H2ONET® hydraulic model to represent the existing water distribution system. The project resulted in preparation of a capital improvement program and a Master Plan Report.

→ Principal-in-charge for a six-month Water Research Foundation pilot study for the Palmdale Water District, California. The project evaluated disinfection by-product (DBP) control strategies, including ion-exchange, magnetic ion exchange (MIEX®), and adsorption with granular activated carbon (GAC).

→ Project manager for the evaluation of a downtown well field and the subsequent preliminary and final design of a centralized water treatment plant for the City of Santa Barbara, California. The work included field and pilot-scale testing to evaluate treatment alternatives for removal of iron, manganese, hydrogen sulfide, radon, tetrachloroethene (PCE), and trichloroethylene (TCE) from five City wells.

→ Project engineer on the three-year Blue Water Project for the East Bay Municipal Utility District (EBMUD), California. He was the key individual on EBMUD's corrosion control optimization study for the Lead and Copper Rule. The pilot study evaluated pH adjustment, alkalinity adjustment, and orthophosphate addition for corrosion control optimization, and included linear polarization resistance, coupon weight loss, and pipe loop leaching for corrosion-rate measurement.

Education

BS Civil Engineering, University of Arizona, 1985

Licenses

Civil Engineer, Arizona

Professional Affiliations

WateReuse Association, AZ Water Association

American Water Works Association

Water Environment Federation

WateReuse Association

American Academy of Environmental Engineers and Scientists

University of Arizona Civil Engineering and Engineering Mechanics Department

- Alumni and Industry Council

George P. Maseeh, P.E., BCEE

George Maseeh has more than 30 years of experience in the municipal water / wastewater and environmental engineering field. His experience includes all phases of planning, design, construction administration, and startup/operations assistance for a wide range of water resource projects, including facilities for groundwater and surface water treatment and supply; groundwater recharge; and wastewater collection, treatment, and reuse. Mr. Maseeh integrates technical, communication, presentation, and negotiation skills, resulting in motivated project teams, continuous stakeholder engagement, and consistently positive project outcomes.

Relevant Experience

→ Project principal for the Antelope Valley East Kern (AVEK) High Desert Water Bank Independent Cost Opinion and Evaluation. Principal and technical director/quality assurance for conceptual design, cost opinion development, and memorandum preparation. Project included review of conceptual level design for recharge and recovery facilities for spreading basins receiving up to 70,000 acre-feet/year (AFY) State Water Project water and recovery of up to 63,000 AFY. Provided recommendation for basin configurations to reduce or eliminate pumping requirements and recovery well in line with predictions of groundwater mounding based on model results. The independent cost opinion identified gaps in initial estimate including power delivery and distribution on the site.

→ Project principal for Tucson Water, Arizona - Southern Avra Valley Storage & Recovery Project. This project involved design of Tucson Water's second major CAP water recharge facility, which became operational in 2008. The initial phase of the recharge facility includes a new CAP Aqueduct turnout, a 60-inch diameter raw CAP water delivery pipeline, and nine recharge basins with a total area of approximately 220 acres. The master site plan developed for the facility includes provisions for future expansion with a parallel raw water pipeline and up to 14 additional recharge basins for a total of 470 acres. The project also included an alignment study, conceptual design, and cost evaluation of approximately nine miles of 78-inch diameter transmission piping to convey recovered water from the SAVSARP site to the Hayden-Udall WTP, and design of improvements to chemical storage and feed facilities and modeling and design of a reservoir baffle at the Plant 9 reservoir/booster site.

→ Project manager for Tucson Water, Arizona - Central Avra Valley Storage & Recovery Project. Project manager for the CAVSARP facilities, which include a new Tucson Aqueduct interconnection, a raw CAP water delivery pipeline (54- to 60-inch diameter), more than 300 acres of infiltration basins to recharge 60,000 acre-feet per year of CAP Water into the Avra Valley aquifer, 25 deep recovery wells, wellfield collector pipelines, an 8.5-MG recovered water reservoir and 54-MGD booster station, 12.5 miles of 60-inch and 72-inch-diameter recovered water transmission main from the CAVSARP booster station to the Hayden-Udall Water Treatment Facility, and modifications to chemical feed systems and water quality monitoring facilities at the Hayden-Udall Water Treatment Plant.

→ Principal and technical director/Quality assurance for Tucson Water, Arizona - TARP WTP Improvements / AOP Treatment Facility. Principal and technical director/quality assurance for conceptual design, pilot testing, preliminary design report, plans/specifications, construction-phase field and office services, and startup/commissioning/O&M support for a facility to remove 1,4-dioxane from groundwater supplies at the Tucson International Airport Area Groundwater Remediation Project WTP. Project included pilot testing of multiple AOP technologies, including UV-hydrogen peroxide and ozone-hydrogen peroxide systems, and peroxide quenching testing using GAC and a range of chemical quenching agents. The full-scale project includes an 8.4-MGD UV-peroxide AOP facility, innovative application

of GAC for peroxide quenching, and improvements to process control, SCADA, and security systems.

→ Program manager and principal for Tucson Water, Arizona - Recycled Water Master Plan and Implementation Program. Developed a plan for full utilization of City of Tucson-owned effluent entitlements from Pima County's metropolitan Tucson area wastewater reclamation facilities. The master plan charts a long-term course for reaching the full-utilization goal, including phased improvements to the Reclaimed Water System's production, storage, and distribution infrastructure and a phased implementation plan for developing a potable reuse program, potentially including effluent conveyance, recharge and recovery, advanced purification of recovered water, and introduction of purified water into the utility's potable water distribution system. The master plan includes innovative efforts to increase local storage and utilization of recycled water to support economic development.

→ Project manager for Tucson Water, Arizona - Application for Designation of Assured Water Supply. Prepared the City of Tucson's original AWS application in accordance with the Arizona Groundwater Code and Assured and Adequate Water Supply Rules. The document demonstrated the physical, continuous, and legal availability of water supplies for a 100-year period. The application was submitted early, enabling Tucson Water three years of "free" groundwater pumping that was not debited from the City's Assured Water Supply account balance.

→ Technical director for El Paso Water Utilities, Texas - Rio Bosque Area Reuse Concept Development and Feasibility Study. This project consisted of concept development and a feasibility study for an indirect or direct potable reuse project in the Rio Bosque Wetlands Park area of El Paso. Study included evaluation of seasonal effluent supply availability, water quality profile/treatment requirements, aquifer recharge/recovery approaches, infrastructure requirements, conceptual cost opinions, and regulatory/permitting considerations. This study set the groundwork for El Paso's Advanced Water Purification Facility direct potable reuse project.

→ Technical director for El Paso Water Utilities, Texas - Advanced Water Purification Facility. Project involved program development, conceptual design, pilot testing, and regulatory permitting to utilize purified water as a locally-controlled renewable water supply by EPWU's customers through advanced treatment technologies and direct potable reuse. This program, for which the pilot phase has been completed, is unique in the United States and is a subject of interest by the water industry globally.

→ Project manager for City of Glendale, Arizona - Cholla Water Treatment Plant Water Quality Improvements. Project involved pilot testing, preliminary design, detailed design, and construction for conversion of the 30-MGD Cholla WTP's granular media filtration facilities into granular activated carbon filter-adsorber facilities. Project included retrofit of four existing filters, construction of two additional GAC filter-adsorbers and a new backwash supply pump station. The project also included installation of sludge collection equipment in existing sedimentation basins, a carbon dioxide storage and feed system for pH optimized coagulation, chlorination system modifications, repair of leaking concrete basins, and other miscellaneous plant improvements. Assessed regulatory compliance issues for two concrete finished water reservoirs at the plant, including baffling, disinfection CT, overflow, and vent requirements.

→ Project manager for the Arizona Department of Water Resources - CAP Water Use Feasibility Analysis and Delivery System Optimization Study. This study identified potential, existing, and planned demand for CAP water in the Green Valley-Sahuarita area. Potential demand was balanced against available supplies and three potential conveyance system alignments were identified and evaluated. A preliminary design was developed based on the most favorable alignment.

Education

MS Civil Engineering, University of Arizona, 1991

BS Mechanical Engineering, Purdue University, 1980

Licenses

Sanitary Engineer, Arizona

Mechanical Engineer, Arizona

Board Certified Environmental Engineer

Professional Affiliations

Arizona Water Association

American Water Works Association

Water Environment Federation

James W. Dettmer, P.E., BCEE

Jim Dettmer has more than 37 years of project management, planning, design, construction, and startup experience relating to water infrastructure projects, including water recharge and recovery, water storage and delivery, and mechanical systems. He has also managed and contributed to several projects for recharging surface water and wastewater effluent. Mr. Dettmer's experience also includes canal turnouts, recharge basins, basin bank protection, recharged water recovery facilities, pump stations, reservoirs, pipelines, and pressure regulating stations.

Relevant Experience

→ Project Manager for Tucson Water, Arizona - Southern Avra Valley Storage and Recovery Project. The project included the design of Tucson Water's second major CAP water recharge facility that became operational in 2008. The initial phase of the recharge facility includes a new CAP Aqueduct turnout, a 60-inch diameter raw CAP water delivery pipeline, and nine recharge basins with a total area of approximately 220 acres. The master site plan developed for the facility includes provisions for future expansion with a parallel raw water pipeline and up to 14 additional recharge basins, for a total of approximately 470 acres. The project also included an alignment study, conceptual design, and cost evaluation of approximately 9 miles of 84-inch diameter transmission piping to convey recovered water from the SAVSARP site to the Hayden-Udall WTP.

→ Deputy project manager for Tucson Water, Arizona - Clearwater Renewable Resource Facility. The Central Avra Valley Storage and Recovery Project recharge and recovery facilities included a new Tucson Aqueduct interconnection, a raw CAP water delivery pipeline (54- to 60-in diameter), infiltration basins to recharge 60,000 ac-ft per year of CAP water in the Avra Valley aquifer, 25 deep recovery wells, wellfield collector pipelines, an 8.5-mg recovered-water reservoir, a 54-mgd booster station, and approximately 12.5 miles of 60- and 72-in-diameter recovered-water transmission main from the CAVSARP booster station to the Hayden-Udall Water Treatment Facility and modifications to chemical feed systems and water quality monitoring facilities at the Hayden-Udall Water Treatment Plant. Hayden-Udall Water Treatment Facility.

→ Project manager for Tucson Water, Arizona - Plant 9 Chemical Systems Evaluation and Design. Project Manager for evaluation and design of chemical feed and storage facilities to support recovery of recharged Central Arizona Project water from the City's SAVSARP facility. The study phase included evaluation of sodium hydroxide, sodium hypochlorite, polyphosphate, aqua ammonia, and sodium chlorite under alternative water quality and demand scenarios. The evaluation also included CFD modeling of a 1.5-million-gallon storage tank to determine the optimal installation of a baffle curtain for the purpose of achieving 4-log virus inactivation credit from the Arizona Department of Environmental Quality. The design included new chemical storage and feed facilities for sodium hydroxide and sodium hypochlorite, installation of the baffle curtain within the storage tank, and fire protection sprinklers. It also included master planning for potential future installation of polyphosphate, ammonia, and sodium chlorite facilities.

→ Project manager for Tucson Water, Arizona - Santa Cruz Water Production Facility. The project involves designing a new Santa Cruz Water Production Facility to disinfect, store, and distribute potable water produced by the Santa Cruz Well field. The facility includes a 2-MG reservoir and 2-mgd booster station and a sodium hypochlorite storage and feed facility sized to treat up to 20 mgd. This facility will provide potable water storage and pumping to the Sonoran Corridor, as well as consolidate sodium hypochlorite storage and feed into a single central location.

→ Project manager for Tucson Water, Arizona – Tucson International Airport Area Groundwater Remediation Project Desanders. Managed the design of installation of three cyclone desanders to remove solids

from groundwater produced by the TARP remediation wellfield.

→ Program manager for Tucson Water, Arizona - Recycled Water Master Implementation Program. The master plan implementation developed and evaluated alternative technologies for developing a potable effluent reuse program, potentially including effluent conveyance, recharge and recovery, advanced purification of recovered water, and introduction of purified water into the utility's potable water distribution system.

→ Project Manager for Tucson Water, Arizona - Santa Cruz Wellfield Disinfection Facility. The detailed design of the 20-mgd sodium hypochlorite disinfection facility included: a containment area for two 7,000-gallon sodium hypochlorite storage tanks, underground piping, sodium hypochlorite feed, paving and grading, and site security. The project also included master planning the site for future arsenic and chromium treatment facilities, and future chemical storage and feed facilities.

→ TARP Trustee, Arizona - Tucson International Airport Area Groundwater Remediation Project. Assisted in development of a design analysis report and design of construction plans and specifications for removal of trichloroethylene from groundwater. Packed-column aeration and vapor-phase carbon adsorption were used for removal and capture of TCE before incorporating the water stream into the city water supply. Specific assignments included design of well site equipment and layouts and design of plant site process equipment.

→ Project manager for Tucson Water, Arizona - Tucson International Airport Area Groundwater Remediation Project, AOP Improvements. Project Manager for design and construction of improvements to existing 8.4 mgd TARP facility to add UV/Peroxide Advanced Oxidation Process for removal of 1,4-dioxane from the TARP contaminated groundwater source. The design also includes granular activated carbon for catalytic quenching of residual hydrogen peroxide from treated water, influent booster pump station, and process/electrical/control building.

→ Project Coordinator and Engineer for Hughes Missile Systems Company, Arizona - This project for a 7.2-mgd groundwater treatment plant and control building/laboratory included removing TCE and hexavalent chromium from contaminated groundwater supply. Packed-tower air stripping and vapor-phase carbon adsorption were used for TCE removal, and ion exchange for chromium removal. Responsibilities included the supervision and technical check of consultant's design and contract documents, shop drawing review, and coordination among owner, general contractor, and design consultant.

→ Project Manager for Pima County Regional Wastewater Reclamation Department, Arizona - Green Valley Water Reclamation Facility Influent Improvements. This project included a new influent lift station and the conversion of lagoon treatment system impoundments to demonstrate recharge effectiveness of plant effluent.

→ Project Manager for Pima County Regional Wastewater Reclamation Department, Arizona - Avra Valley Water Reclamation Facility Expansion. The project, the expansion of the Avra Valley Wastewater Treatment Facility from 1.1-mgd to 4.0-mgd, included the design of a new low pressure, high output UV disinfection system, new influent pump station, two biological nutrient removal oxidation ditches, sludge pumping station, secondary clarifiers, moving bed sand filters, and solids handling facilities. The project also included the expansion of effluent percolation basin facilities for the recharge of effluent. The design and construction was completed using the CMAR capital delivery method.

Jeffrey Meyer, Hydrologist / Principal

Office: TUCSON

Years of Experience

Total: 31 | M&A: 30

Education

M.S., Soil Science/Land Reclamation, University of Illinois (1983)

B.S., Agronomy / Soil Science, University of Illinois (1980)

Key Areas of Expertise

Recharge siting, feasibility, and impact assessments

Vadose zone and hydrogeologic characterization

Installation of monitoring wells and vadose zone piezometers

Jeff's background in vadose zone hydrology and soil science has been indispensable to a wide array of managed aquifer recharge investigations since he joined M&A in 1988. He has managed or led technical investigations more than 35 recharge projects to site facilities, assess hydrologic feasibility, and support regulatory permitting and facility design. His expertise includes evaluating the physical and hydraulic properties of soils using a range of field instrumentation and testing techniques.

Representative Projects

Groundwater Recharge Capacity Evaluation • Central Valley Conjunctive Water Use Study • Tulare Irrigation District

Led an assessment of lithologic conditions in percolation basins to maximize the use and storage of seasonal surface water deliveries; designed and oversaw exploration trenching, drilling, and infiltration testing to identify limitations to recharge rates and develop mitigation strategies [TULARE COUNTY, CA]

Feasibility Investigations, Permitting, & Monitoring • Liberty Aquifer Replenishment Facility • Liberty Utilities

Led reconnaissance investigations to site a recharge facility; conducted drilling, trenching, and infiltration testing to assess recharge feasibility; provided permitting support (groundwater modeling, an unreasonable harm assessment, and monitoring plans), which involved coordinating extensively with regulatory agencies because the site is located near sensitive land and water uses; designed and installed a monitoring / telemetry system [MARICOPA COUNTY, AZ]

Feasibility Investigations & Permitting • Water Reclamation Facility Recharge Project • Town of Marana

Designed and led hydrogeologic investigations (drilling, trenching, infiltration testing, and a geophysical survey) to assess recharge feasibility; prepared USF permit and APP applications, a hydrologic report, and monitoring and contingency plans; conducted groundwater modeling and an unreasonable harm assessment [PIMA COUNTY, AZ]

Site Selection, Feasibility Assessments, & Permitting • Upper Agua Fria Recharge Project • Town of Prescott Valley

Conducted reconnaissance investigations to site and design effluent recharge alternatives; characterized hydrogeologic conditions and the infiltration capacity of near-surface soils; oversaw groundwater flow modeling; coordinated floodplain hydraulic analyses and recharge facility design activities; prepared permit applications and negotiated with regulatory agencies; conducted a follow-up study that emphasized vadose zone and deep injection facilities and conceptual designs for recovery [YAVAPAI COUNTY, AZ]

Feasibility Assessments • Tonopah Desert Recharge Project • CAWCD

Led recharge feasibility investigations, which included drilling, trenching, and infiltration testing; prepared a conceptual design of the recharge facility and

Additional Education

Ph.D. coursework, Soil Physics / Hydrology, University of Arizona

Awards & Distinctions

1996–1997: ADEQ Cleanup Standards / Policy Task Force

oversaw the engineering design; designed / installed wells and vadose zone piezometers to monitor long-term operations; provided technical oversight for the preliminary design of a recovery wellfield and optimized the design based on capital and O&M costs [MARICOPA COUNTY, AZ]

Feasibility Assessments & Permit Support • Clearwater Recharge Facility (Central Avra Valley Storage & Recovery Project) • City of Tucson

Designed and conducted drilling programs to characterize vadose zone sediments and evaluate the feasibility of recharge via surface basins; implemented a monitoring program for pilot recharge operations; prepared reports and applications for USF permitting [PIMA COUNTY, AZ]

USF Permitting • Black Wash Recharge Project • Pima County Regional Wastewater Reclamation Department

Analyzed hydrogeologic and operational data for the Avra Valley Water Reclamation Facility (WRF) to assess feasible recharge volumes; prepared a USF permit application, a hydrologic report, and monitoring and contingency plans; conducted groundwater modeling and an unreasonable harm assessment; coordinated closely with the client and regulators [PIMA COUNTY, AZ]

Basin Performance & Mitigation Assessment • Green Valley WRF • Pima County Regional Wastewater Reclamation Department

Led a study to assess limitations to sustainable recharge rates, which entailed analyzing lithologic and operational data for existing percolation basins; monitored infiltration cycles and perched water conditions; developed possible mitigation strategies in coordination with engineering design modifications for the effluent discharge system [PIMA COUNTY, AZ]

Feasibility Investigations • Butler Drive Water Reclamation Facility • City of Peoria

Designed and implemented recharge feasibility investigations, including large-scale reconnaissance, drilling, and vadose zone injection testing; evaluated sites and effluent recharge alternatives using groundwater modeling, hydrogeologic, and economic analyses [MARICOPA COUNTY, AZ]

Site Selection & Feasibility Assessments • Western Arizona Recharge Project • CAWCD

Led reconnaissance investigations for six groundwater basins; characterized hydrogeologic conditions, land ownership, and land and water uses to identify and prioritize potential recharge sites; assessed recharge feasibility for large-scale facilities at the most favorable sites [WESTERN AZ]

Infiltration Studies & Permit Support • Beardsley Water Reclamation Facility • City of Peoria

Conducted field investigations to characterize effluent infiltration rates and near-surface lithologic conditions; evaluated infiltration rates for two recharge basins and assessed the seepage of recharged water on an adjacent property; developed and evaluated mitigation strategies [MARICOPA COUNTY, AZ]

Characterization & Permit Support • Pima Mine Road Recharge Project • CAWCD

Conducted field investigations to characterize hydrogeologic conditions; prepared a report and monitoring plan; installed monitoring wells and piezometers; designed and conducted investigations to evaluate low infiltration rates at selected recharge basins; developed a mitigation plan [PIMA COUNTY, AZ]

Mark Cross, P.G., Hydrogeologist / Principal

Office: TUCSON

Years of Experience

Total: 37 | M&A: 28

Education

M.S., Hydrology, University of Arizona (1983)

B.S., Geology, Northern Arizona University (1979)

Key Areas of Expertise

Design / implementation of studies for recharge feasibility assessments

Technical support for recharge permit applications

Design of technical evaluations for water supply projects

Development of groundwater flow and transport models

Design / testing of production, injection, monitoring, and dewatering wells

As M&A's President and Tucson Operations Manager, Mark Cross brings a wealth of expertise to his projects — particularly managed aquifer recharge (MAR) investigations, where he uses not only his technical skills but also his extensive experience in regulatory permitting and planning. He has led dozens of recharge feasibility assessments, successfully supervising, siting, designing, and implementing comprehensive programs. In addition, he has overseen the development of numerous groundwater flow models.

Representative Projects

Recharge Capacity Assessment • Antelope Valley • Antelope Valley East Kern Water Agency
Provided technical oversight for an assessment of storage capacity for a potential enterprise water bank under a range of recharge and recovery scenarios [LOS ANGELES COUNTY, CA]

Recharge Planning • West Salt River Valley • City of Surprise
Provided technical oversight for characterizing hydrogeologic conditions, identifying favorable locations for effluent recharge facilities, and preparing estimates of facility capital and O&M costs to support an update of the City's Reclaimed Water Master Plan [MARICOPA COUNTY, AZ]

Feasibility Studies • Recycled Water Program • Tucson Water Department
Led feasibility investigations and groundwater flow modeling to develop a conceptual design for recharge and recovery facilities that will facilitate the indirect potable reuse of recycled water [PIMA COUNTY, AZ]

Alternative Infrastructure Assessment • Tucson Area • Tucson Water Department
Managed technical analyses of feasibility and costs for increasing production capacity to meet demands for potable water during temporary disruptions of supply from the Clearwater Renewable Resource Facility [PIMA COUNTY, AZ]

Facility Design & Permit Support • Tonopah Desert Recharge Project • Central Arizona Water Conservation District (CAWCD)
Planned, managed, and provided technical oversight for hydrogeologic characterization studies, groundwater flow modeling, and reporting required for the design and permitting of large-scale recharge and recovery facilities [MARICOPA COUNTY, AZ]

Phase 1 & 2 Effluent Recharge Design & Permitting • Liberty Aquifer Recharge Facility • Liberty Utilities
Provided technical oversight and support for the identification, screening, and ranking of candidate sites for recharging treated effluent by surface infiltration and injection; oversaw the design of effluent recharge facilities and the acquisition of regulatory permits [MARICOPA COUNTY, AZ]

Professional Registrations

Registered Professional Geologist #19193, AZ

Registered Professional Geologist #4471, CA

Certified Professional Hydrogeologist #249, CA

Awards & Distinctions

2007–present: External Advisory Committee for the University of Arizona Water Resources Research Center

1999: Honorary plaque from Tucson Regional Water Council for contributions to Advisory Council

1999: Certificate of appreciation from ADWR for outstanding community service on the Tucson AMA Regional Recharge Committee

Feasibility Assessment • Butler Drive Water Reclamation Facility • City of Peoria
Managed / oversaw feasibility investigations, groundwater flow modeling, pilot injection testing, and evaluation of alternatives for recharging treated effluent by surface infiltration and injection [MARICOPA COUNTY, AZ]

Phase 1 Activities • Recovery Wellfield Siting Study • CAWCD
Managed and provided technical oversight for a hydrogeologic assessment, an inventory and ranking of existing potential recovery wells, and the conceptual design of a new wellfield for recovering stored CAP water [PINAL COUNTY, AZ]

Feasibility Assessments • Western Arizona Recharge Project • CAWCD
Managed and provided technical oversight for reconnaissance investigations for six groundwater basins, prioritized sites for further investigation, and conducted feasibility studies for large-scale recharge and recovery facilities [WESTERN AZ]

Feasibility Assessment & Permitting • Central Avra Valley Storage & Recovery Project • City of Tucson
Planned, managed, and provided technical oversight for hydrogeologic characterization studies, groundwater flow and solute transport modeling, and technical reporting to support the design and permitting of recharge and recovery facilities [PIMA COUNTY, AZ]

Analysis of Recharge Alternatives • Tres Rios del Norte Project • City of Tucson
Managed and provided technical oversight for groundwater flow modeling to evaluate alternatives for recharging treated effluent and restoring riparian habitat along the Santa Cruz River [PIMA COUNTY, AZ]

Feasibility Assessment & Permit Support • Northwest Tucson AMA Replenishment Program • Pima County Flood Control District
Planned, managed, and provided technical oversight for hydrogeologic investigations and groundwater flow modeling to assess recharge feasibility and support regulatory permitting [PIMA COUNTY, AZ]

Feasibility/Impact Assessment • Sahuarita/Green Valley Recharge Project • ADWR
Characterized hydrogeologic conditions, assessed recharge feasibility, and evaluated the potential impacts to groundwater for ADWR's CAP Water Use Feasibility Analysis and Delivery System Optimization Study [PIMA COUNTY, AZ]

Design & Permit Support • West Area Aquifer Recharge Facility • City of Glendale
Evaluated hydrogeologic conditions, modeled groundwater flow, prepared technical reports to support facility design and permitting, and participated in administrative hearings on the potential effects of recharge operations on water quality in nearby potable water supply wells [MARICOPA COUNTY, AZ]

Design & Permit Support • Pima Mine Road Recharge Project • CAWCD
Characterized hydrogeologic conditions, prepared a monitoring plan, installed a monitoring network, modeled groundwater flow to support facility design and permitting, and provided litigation support regarding the potential effects of recharge on a nearby gravel mining operation [PIMA COUNTY, AZ]

Timothy P. Leo, P.G., Hydrogeologist / Principal

Office:
TUCSON/SACRAMENTO

Years Experience

Total: 30 | M&A: 10

Education

M.S., Hydrology, University of Arizona (1988)

B.S., Geology, Bradley University (1983)

Key Areas of Expertise

Water resource evaluations

Groundwater modeling

Analytical hydrogeology

Groundwater system characterization, testing and analysis

Managed aquifer recharge

Tim Leo manages large, multidisciplinary water resources projects. For nearly three decades, he has worked on a variety of groundwater resource projects throughout the western United States for private-sector and municipal clients. As a principal hydrogeologist, he routinely provides senior guidance to staff on a variety of technical hydrogeologic analyses. In his technical work, he specializes in analytical hydrogeology, groundwater modeling, groundwater system characterization and testing, hydrogeologic conceptual models and water budgets, and groundwater remediation. His current focus is on water resources projects in CA, with a particular focus on groundwater sustainability plans, groundwater modeling and managed aquifer recharge studies. He is Director of California operations and splits his time between Tucson and California.

Representative Projects

Groundwater Sustainability Plan • Paso Robles Groundwater Basin
Project includes working with a multidisciplinary team to update the groundwater model for use in developing the groundwater sustainability plan, including evaluating sustainability projects and management actions [SAN LUIS OBISPO COUNTY, CA]

Managed Aquifer Recharge Capacity Study • Tulare Irrigation District
Managed an assessment of recharge capacity in over 1,000 acres of infiltration basins; work included field studies to assess lithologic conditions, including testing to determine infiltration rates; results of the study will support development of the Groundwater Sustainability Plan [TULARE COUNTY, CA]

Managed Aquifer Recharge Capacity Study • Antelope Valley-East Kern Water Agency
Under subcontract to WestWater Research, LLC, managed a modeling study to assess the recharge capacity at two proposed enterprise groundwater banks; an existing USGS groundwater model was adapted for the study; model results provided critical hydrogeologic information on the potential future performance and of the groundwater bank and supported detailed financial analyses to market the bank as a business venture; developed recommendations for additional investigations to prove-out the recharge capacity; supported an evaluation to determine if one of the water banks could be partially funded under WSIP [LOS ANGELES COUNTY, CA]

Managed Aquifer Recharge Modeling • Santa Margarita Basin
Under subcontract to HydroMetrics Water Resources Inc., managing a modeling study to assess the aquifer storage and recovery projects under current and future hydrologic and climate conditions; model results will be an important component of conjunctive use evaluations for future sustainable basin management [SANTA CRUZ COUNTY, CA]

MONTGOMERY & ASSOCIATES

Professional Registrations

Registered Professional Geologist #6163, CA

Certified Professional Hydrogeologist #344, CA

Registered Professional Geologist #33257, AZ

Registered Professional Geologist #8272244, UT

Impact Analysis • Effluent Recharge APP • City of Avondale
Conducted a groundwater modeling study to project the impact of discharge from a proposed recycled water recharge basin in the Phoenix area; model results supported a successful application for a permit to operate the facility [MARICOPA COUNTY, AZ]

Groundwater Resource Protection • Sacramento, CA
Providing strategic direction to The Boeing Company for a regional groundwater remedy in the Sacramento area; directed a comprehensive hydrogeologic characterization and conceptual model development to support development of the restoration remedy; recently developed a new comprehensive regional groundwater flow model to manage restoration effectiveness and improve coordination with private water companies and municipal groundwater users; project requires frequent stakeholder communications, risk analysis, and cost containment measures; initiating evaluation of conveying treated groundwater to the Cosumnes Subbasin for agricultural uses [SACRAMENTO COUNTY, CA]

Conceptual Site Model • Las Vegas, NV
Developed a comprehensive hydrogeologic conceptual model for a groundwater basin in the Las Vegas area; evaluated groundwater flow conditions, groundwater quality conditions, geologic conditions, and impacted groundwater discharge potential to Las Vegas Wash, an important tributary to the Colorado River watershed [CLARK COUNTY, NV]

Conceptual and Numerical Model • Southeastern Utah
Managed comprehensive hydrogeologic investigation, conceptual model development, numerical groundwater flow and transport model development; the modeling program included advanced evaluation of model uncertainty using a multi-conceptual model probabilistic method; model results were robust and enabled detailed understanding of the impact of impaired groundwater on the groundwater basin [SAN JUAN COUNTY, UT]

Groundwater Restoration Models • Various Sites • Various Clients
Developed or directed the development of groundwater flow and contaminant transport models to design, optimize, or evaluate groundwater restoration wellfields at numerous sites in CA and AZ; models included development of detailed hydrogeologic conceptual models, advance calibration methods, rigorous evaluation by regulatory agencies and project stakeholders; most of the models included evaluation of potential impacts of impaired groundwater on local groundwater users; some models evaluated potential impacts to ecological resources [AZ/CA]

JULIE GILBERT

Environmental Project Manager

Expertise

Environmental planning
CEQA/NEPA
Regulatory compliance
Public policy
Public engagement
Documentation QA/QC

Education

B.A., Journalism, Louisiana State University, 1987

Certificates

Certificate, Environmental Leadership. Cal State San Marcos, 2014

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SUMMARY

Since 1991, Mrs. Gilbert has been an environmental planner and project manager, with special expertise in CEQA, NEPA, regulatory compliance, communication/ facilitation for resolution of environmental issues, and public image management. She has authored environmental documentation for a broad variety of projects and acts as a resource person in working with clients, governmental agencies, the community, and decision-makers in finding solutions to complex problems. She also negotiates with regulators at the federal, state and local level.

She has processed numerous permits through State and federal regulatory agencies such as U.S. Forest Service (USFS), Bureau of Land Management (BLM), Federal Highways Administration (FHWA), Federal Emergency Management Agency (FEMA), Federal Airport Authority (FAA), U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (USFWS), State Water Board (SWB), California Public Utilities Commission (CPUC), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW) etc. She is skilled in both the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) and has authored numerous Initial Studies, Negative Declarations, Mitigated Negative Declarations and Environmental Assessments (EAs).

Prior to joining Jericho Systems, Inc. in August 2016, she had managed community affairs for the Department of Public Works for the City of Houston, managed community affairs in the High Desert area of Southern California for Southern California Edison (SCE), had been a lead senior planner for SCE for four years, and a senior planner for the County of San Bernardino Department of Public Works for the Flood Control District, Transportation Department and Solid Waste Management Division for 10 years. Prior to that, she worked for several leading environmental consulting firms preparing CEQA and NEPA compliance documents, regulatory permit acquisition, environmental project management, preparing constraints analyses, preparing impact analyses, preparing mitigation plans, negotiating mitigation compliance with various agencies, and managing public comments and public image.

KEY EXPERIENCE - GENERAL

Ms. Gilbert has prepared nearly one hundred environmental and regulatory permitting documents that comply with CEQA, NEPA and other regulatory statutes. Ms. Gilbert's depth of expertise includes the following key areas:

- CEQA/NEPA Preparation
- Jurisdictional Waters Permitting
- Mitigation Plan Development
- Public Engagement
- Regulatory Program Development

KEY PROJECT EXPERIENCE

Antelope Valley – East Kern Water Agency (AVEK), West Avenue H Wellfield Project: Initial Study/Mitigated Negative Declaration. AVEK proposed to construct three potable groundwater wells, associated delivery and transmission pipelines and modifications to existing chlorination facilities on two sites in order to provide an additional supply of groundwater to meet demands during periods of below average allocation of imported water from the State Water Project as well as use as an emergency supply. Ms. Gilbert was the lead author, working as the CEQA subconsultant to the prime engineering firm, and prepared a thorough Initial Study / Mitigated Negative Declaration (IS/MND) in accordance with CEQA. The Initial Study received few and minor comments, and the Mitigated Negative Declaration was adopted.

Initial Study/Mitigated Negative Declaration – New Groundwater Production Well No. 3, Three Valleys Municipal Water District (TVMWD). Ms. Gilbert was the lead author on the Initial Study/Mitigated Negative Declaration for the TVMWD to construct a new groundwater production well. The project contained several key complex issues including that the site was on a large lot in a residential area, several groundwater production wells in the vicinity, and a groundwater table that had been impacted by the drought and high nitrate levels. Ms. Gilbert and Jericho president Shay Lawrey worked with the TVMWD and their consulting engineering firm to develop a project that would meet the client's needs and still have a less than significant effect on the environment.

Mojave Water Agency - Groundwater Replenishment Program – Off Channel Environmental Impact Report Addendum. The Mojave Water Agency (MWA) certified in January 2006 the Water Supply Reliability and Groundwater Replenishment Program Final Project Environmental Impact Report (referred to as the R3 PEIR), which identified 22 extraction wells, conveyance pipelines, and a new disinfection facility. Since the adoption of the R3 PEIR, the MWA purchased two properties that were immediately adjacent,to areas analyzed in the PEIR, to develop the off-channel recharge areas envisioned in the R3 PEIR. Ms. Gilbert thoroughly reviewed the R3 PEIR and the CEQA Guidelines and statutes determined that although the new parcels were not directly identified in the R3 PEIR, the adjacent areas were similar enough in character that MWA could prepare an Addendum to the EIR to comply with CEQA and allow the projects to move forward. Ms. Gilbert authored a thorough EIR Addendum that assessed the two new sites consistent with the R3 PEIR, and the Addendum was adopted.

New Program and Public Policy Development, Various. Throughout her career, Ms. Gilbert has utilized her organizational, public engagement and public policy knowledge to help develop programs, projects and public policy for public benefit, including but not limited to:

Preliminary Jurisdictional Determination Development with Corps of Engineers. After several key court decisions in 2006 significantly affected the Corps of Engineers wetland permitting regulations, Ms. Gilbert worked directly with the Los Angeles Region of the Corps of Engineers and developed the "Preliminary Jurisdictional Determination" rules and forms, significantly reducing permitting complexities where there was no dispute as to the presence of Corps jurisdictional waters. This process is now standard, utilized for any applicant the Los Angeles Region of the Corps of Engineers.

TODD WHITE

Senior Ecologist and Mitigation Lands Planning
Director of Flight Operations – RoboHawk LLC/Jericho Systems

Expertise

Wildlife and Fisheries Biology/Ecology

Construction Environmental Compliance Monitoring

Mitigation Banking Feasibility and Development

Land Assessment and Remediation

FAA Certified Drone Pilot and Pilot-In-Command

Education

B.S., Environmental and Systematic Biology with Concentrations in Ecology, Wildlife & Fisheries, California Polytechnic State University, San Luis Obispo, 2002.

Certifications and Professional Licenses

CA Real Estate License #01481756

FAA 107 Licensed UAV Pilot #3922055

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SUMMARY

Mr. White serves Jericho in two capacities - as a wildlife biologist and as the Director of Flight Operations for RoboHawk LLC, which is an unmanned aircraft corporation in which Jericho owns. Mr. White is an expert in both ecology and real estate since 1992, specializing in environmental project coordination and management, real estate brokerage and development, environmental biology and geotechnology, agricultural, ranch land and open space management, GIS/GPS mapping and information systems, along with financing and developing compensatory mitigation projects.

He is a proven strong project manager for biological / ecological / geotechnical site assessments, principal environmental compliance monitoring for large construction projects, site investigation and restoration, agricultural, rural and ranch land real estate acquisition, sales and management, mitigation banking, and oversight and compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Prior to joining Jericho in August 2016, Mr. White's primary responsibility over the past decade was to ensure environmental sensitivity while serving as a principal for a developer in agricultural, rural, and ranchland acquisition and sales, residential and commercial development and redevelopment, including the largest master planned and award-winning community in Ventura County history (RiverPark). He has also served key roles in mitigation banking development as the principal research associate, financial consultant and principal biologist during the development of a large mitigation banking opportunity in the West Mojave Desert (San Bernardino County) and one within the Santa Clara River Watershed (Ventura County).

He has consulted on jurisdictional wetlands, Endangered Species Act compliance, and other land use issues facing farmers, ranchers, and rural landowners. In all roles, he focuses on risk management, communications, regulatory compliance, and financial responsibility. He has provided regulatory oversight and compliance monitoring for project design (residential) and construction (utility, residential/commercial development, and military operations). He is experienced in project development and management, as well as communicating complex environmental issues to a wide range of audiences.

For Jericho's subsidiary, RoboHawk LLC, Mr. White is the Director of Flight Operations. He obtained his FAA 107 remote pilot certificate in September of 2016 shortly after its inception by the FAA in August of 2016. He has over 100 hours of flight time utilizing both manual and autonomous flight systems, and has safely and successfully mapped many projects in the past year.

EXPERIENCE

Antelope Valley – East Kern Water Agency (AVEK), High Desert Water Bank Mitigation Monitoring Biological Resource Studies. The Antelope Valley-East Kern Water Agency (AVEK) adopted a Mitigated Negative Declaration (MND) and Mitigation Monitoring and Reporting Program (MMRP) in December 2017 for a 1,500-acre water banking site that included approximately 1,138 acres of percolation basins and approximately 322 acres of habitat mitigation. The MMRP contained multiple provisions for surveys prior to design and construction to ensure that the Project would have a less than significant impact on the environment. Mr. White has been coordinating all protocols and survey efforts including:

- Special-Status Plants – survey all project areas.
- Swainson's Hawk – survey site and within 5-mile radius
- Tri-colored Blackbirds – survey site and within 3 mile radius
- Jurisdictional Drainages and Wetlands – survey, documentation, prepare draft permits
- Prepare Habitat Management Plan

Construction Management – Moorpark-Newbury Subtransmission Line, December 2016 to Present. Mr. White has been the lead field biologist/restoration ecologist, field logistics manager, and lead CEQA compliance monitor for the project that involved the reconstruction of a 66 kV subtransmission line. Work included:

- Oversight of all environmental obligations, CEQA compliance, mitigation and applicant proposed measures, sensitive resource surveys and avoidance.
- Coordinate, schedule and supervise all biological and archaeological staffing and monitoring personnel.
- Represented client before state and local regulatory agencies.
- GPS and GIS data collection and mapping
- Utilized aerial photography and mapping to document project compliance, non-project related off road vehicle damage after storm events, mapping and measuring of final disturbance limits using photogrammetric tools.

Santa Clara River Mitigation Bank Development Partner, Biologist. Partner, principal and biologist for mitigation bank development of 500+ acres in the Santa Clara River valley. Using a drone, Mr. White has fully mapped all 500 acres allowing real-time orthographic vegetation data and stream data. Other duties include managing teams of biologists and all regulatory documentation for mitigation bank development including but not limited to:

- Jurisdiction drainage delineations
- Least Bell's vireo surveys
- Habitat Assessment
- Negotiations for land entitlement
- Abdication of mineral rights from controlling interests
- Prospectus
- Agency coordination

SHAY LAWREY, M.A., PRESIDENT

Regulatory Specialist, Ecologist

Expertise

Sensitive Species and Habitat Subject Matter Expert since 1997

Regulatory Specialist

Education

M.A., Biology, Occidental College, Los Angeles, 1997

B.A., Environmental Studies, University of California Santa Cruz, 1993

Biological Permits / Licenses

US Fish and Wildlife Service Federal 10(a) Recovery Permit (TE-094308-3) - San Bernardino kangaroo rat (*Dipodomys merriami parvus*)

US Fish and Wildlife Service Federal 10(a) Recovery Permit (TE-094308-3) - Southwestern willow flycatcher (*Empidonax traillii extimus*)

California Department of Fish and Game Scientific Collecting Permit (SC-007256)

Certificates:

2017 Advanced Airport Wildlife Training -Tulsa International Airport -March 14th-16th 2017

2016 Yellow-billed Cuckoo survey training workshop held at the Southern Sierra Research Station's Kern River Preserve.

SUMMARY

Ms. Lawrey has 20 years of experience in environmental planning, natural resource management, impact analysis, special status species survey, regulatory permitting, project risk analysis, and construction monitoring. She is well known for her ability to work well with her clients and the regulatory agencies to achieve a balance between budgets, timeframes, regulations, and preservation-mitigation.

She has processed a variety of permits through State and federal regulatory agencies such as U.S. Forest Service (USFS), Bureau of Land Management (BLM), Federal Highways Administration (FHWA), Federal Emergency Management Agency (FEMA), Department of Homeland Security (DHS), Federal Airport Authority (FAA), U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (USFWS), State Water Board (SWB), State Revolving Fund (SRF), California Public Utilities Commission (CPUC), Regional Water Quality Control Board, California Department of Fish and Wildlife (CDFW) etc. She is well versed in various regulations including the Migratory Bird Treaty Act (MBTA), the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Prior to forming Jericho Systems, Inc, in 2012, she had been the Lead Biologist at a leading environmental consulting firm in San Bernardino County, an Ecologist and Senior Planner for the County of San Bernardino Department of Public Works - Flood Control District, a Biologist at the County of San Bernardino Museum of Natural History, a Lead Condor Biologist at the Ventana Wilderness Society in Big Sur, and the Assistant Curator of the Moore Laboratory of Zoology in Los Angeles.

Her duties over the years have included preparing various levels of documents in compliance with CEQA and NEPA, regulatory permit acquisition, preparing constraints analyses, biological surveys, jurisdictional delineations, habitat suitability evaluations for endangered species, biological resources damage assessments, impact analyses, mitigation plans, implementation plans and conducting protocol-level surveys for dozens of special status species.

Her biological expertise with desert and riverine/riparian ecosystems, and their sensitive species include the following species:

- least Bell's vireo (LBVI);
- southwestern willow flycatcher (SWWF);
- southwestern arroyo toad (ARTO);
- San Bernardino kangaroo rat (SBKR),
- desert tortoise;
- Mohave ground squirrel;
- burrowing owl

2013 Willow Flycatcher survey training workshop held at the Southern Sierra Research Station's Kern River Preserve.

2003 and 2013 Desert Tortoise Council Workshops: covered topics in desert tortoise handling, egg handling, and artificial burrow construction, construction monitoring and regulatory requirements.

Business Certifications

Founder and President of Jericho Systems, since 2012

Publications

Feather Lead Concentrations and 207Pb/206Pb Ratios Reveal Lead Exposure History of California Condors (*Gymnogyps californianus*) Environ. Sci. Technol., 2010, 44 (7), pp 2639–2647 (March 3, 2010)

KEY MAJOR PROJECT EXPERIENCE

Ms. Lawrey is known as someone who can deliver on projects – small or large. She specializes in working with clients from conception to construction to ensure the project runs smoothly. A sampling of her leadership role on complex projects includes but is not limited to the following:

Antelope Valley – East Kern Water Agency (AVEK), West Avenue H Wellfield Project: Initial Study/Mitigated Negative Declaration. AVEK proposed to construct three potable groundwater wells, associated delivery and transmission pipelines and modifications to existing chlorination facilities on two sites in order to provide an additional supply of groundwater to meet demands during periods of below average allocation of imported water from the State Water Project as well as use as an emergency supply. Ms. Lawrey coordinated the effort, working as the CEQA subconsultant to the prime engineering firm, prepared a thorough Initial Study / Mitigated Negative Declaration (IS/MND) in accordance with CEQA, working with AVEK to develop solutions and mitigation measures to ensure that the project would have a less than significant effect on the environment with the mitigation incorporated. The Initial Study received few and minor comments, and Mitigated Negative Declaration was adopted.

Three Valleys Municipal Water District (TVMWD), New Groundwater Production Well No. 3: Initial Study/Mitigated Negative Declaration. TVMWD proposed to construct one new groundwater well, associated delivery and transmission pipelines, and new chlorination facilities housed within an approximate 600 square foot building located in the City of Claremont, on West Baseline Road. The project contained several key complex issues including that the site was on a large lot in a residential area, several groundwater production wells in the vicinity, and a groundwater table that had been impacted by the drought and high nitrate levels. Ms. Lawrey, working as the CEQA subconsultant to the engineering firm, was the lead manager in overseeing an Initial Study / Mitigated Negative Declaration (IS/MND), and worked with the engineering firm, TVMWD, and the surrounding neighbors to develop a project that would meet the client's needs and still have a less than significant effect on the environment.

CEQA Documentation and Jurisdictional Master Waters Permitting – Lake Arrowhead Maintenance Dredging. The Arrowhead Lake Association (ALA), a private corporation, is charged with maintaining the navigational safety and water supply integrity in the nearly 700-acre Lake Arrowhead located in the San Bernardino Mountains. All dredging and maintenance of inlets and bays requires obtaining complex permits and environmental analyses. ALA agreed with Ms. Lawrey's recommendation to streamline their future permitting by obtaining master, long-term permits (20 years) from the various State and Federal regulatory agencies. Ms. Lawrey led a project team to prepare a thorough Initial Study/Mitigated Negative Declaration (IS/MND), worked with ALA to prepare various operations and maintenance plans for the dredging, prepared the Jurisdictional Determinations (JD) for the Corps and the CDFW, prepared the master Streambed Alteration Agreement permit for the CDFW, prepared the Individual Permit application to the Corps, prepared a draft Environmental Assessment (EA) for the National Environmental Policy Act (NEPA) compliance to support the Individual Permit, and prepared the Clean Water Act (CWA) Section 401 permit for the RWQCB. The CEQA MND was adopted, and the permits have been issued by the agencies.

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(602) 595-7009

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418 S. Howes Street, #220
Fort Collins, CO 80521
(970) 672-1811

Matthew T. Payne

Principal

AREAS OF EXPERTISE:

Water Resource Economics

Water Asset Valuation

Financial Analysis

Water Asset Transactions

Strategic Planning

Project Management

EDUCATION:

M.B.A., Arizona State University, 2014

B.A., Economics, Colorado College, 2009

EXPERIENCE:

Principal, WestWater Research
2015 - present

Senior Associate, WestWater Research
2014 - 2015

Associate, WestWater Research
2011-2014

Research Associate, WestWater Research
2009-2011

Intern, WestWater Research
2008-2009

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payne@waterexchange.com

Statement of Qualifications:

Matt Payne leads the Southwest office of WestWater Research in Phoenix, Arizona. He is dedicated to helping public, private, and non-profit sector clients address economic, financial, and strategic challenges relating to water resources and infrastructure. His areas of expertise are water resource economics, water asset valuation, water supply planning and implementation, and water asset transactions. In recent years, Matt has been engaged by a Southern California wholesale water agency to support development of a new water banking enterprise. In addition, Matt leads water rights acquisition programs for California's largest investor-owned utility, and Arizona's largest wholesale water agency.

Matt serves non-profit clients by estimating the value of water in complex instream flow transactions. He frequently works as a part of multidisciplinary teams, contributing economic and financial analytical capabilities to water resource and integrated utility planning projects. Recent analyses have included cost-benefit assessments of proposed infrastructure projects and water management strategies, as well as valuation of water rights and infrastructure assets.

Matt holds an M.B.A. from the W.P. Carey School of Business at Arizona State University, and is a certified Project Management Professional (P.M.P.). He also earned a degree in economics from Colorado College, where he focused on environmental and natural resource economics, and conducted research in the water resources field. He specializes in estimating the value of water using econometric techniques. Matt has published extensively in peer-reviewed and industry journals, and is developing the first-ever price index for water rights in the American West.

Selected Recent Consulting Projects:

"High Desert Water Bank Partner Outreach and Agreement Development" for Antelope Valley-East Kern Water Agency. Palmdale, California. Ongoing.

"Financial Feasibility Analysis of the High Desert Water Bank" for Antelope Valley-East Kern Water Agency. Palmdale, California. 2017.

"Assessment of Willow Springs Water Bank Partnership Proposal" for Antelope Valley-East Kern Water Agency. Willow Springs, California. 2017.

"Water Resources Impact Fee Analysis: Nickel Water" for Antelope Valley-East Kern Water Agency. Palmdale, California. 2017.

"Groundwater Sustainability Plan Preparation" for Paso Robles Basin Groundwater Sustainability Agency (subconsultant to Hydrometrics WRI). Paso Robles, CA. Ongoing.

"Groundwater Sustainability Plan Preparation" for Salinas Valley Basin Groundwater Sustainability Agency (subconsultant to Hydrometrics WRI). Salinas, CA. Ongoing.

"Water Acquisition Planning and Implementation" for California American Water Company. Los Angeles, California. 2016-2018.

"Valuation Analysis of Fox Canyon GMA Groundwater Allocation and CPUC Expert Testimony" for California American Water Company. Ventura, California. 2017-2018.

"Acquisition of Mojave Basin Groundwater Rights" for Confidential Client. Apple Valley, California. 2017.

"Water Supply Acquisition Program Planning, Analysis and Transaction Support" for Central Arizona Groundwater Replenishment District, a division of the Central Arizona Project. Ongoing.

"Energy Storage Project Water Rights Due Diligence and Mitigation Planning" for Confidential Client. Prescott, Arizona. Ongoing.

"Valuation Analysis of Water Assets Held by Homer, LLC" for Confidential Private Equity Firm, Central Valley, California. 2014.

"Integrated Utility Master Plan Task 1.5 – Economic Value of Water" for City of Peoria, Arizona. Subconsultant to Carollo Engineers. 2014.

"Valuation Analysis of the Granite Reef Underground Storage Project" for City of Phoenix, Arizona. 2012.

Publications:

Payne, M.T., M.G. Smith., C.J. Landry. 2014. "Price Determination and Efficiency in the Market for South Platte Basin Ditch Company Shares." *Journal of the American Water Resources Association*, JAWRA-12-0107-P.

Payne, M.T., M.G. Smith. 2013. "Price Determination and Efficiency in the Market for Water Rights in New Mexico's Middle Rio Grande Basin." *International Journal of Water Resources Development*, Vol. 20, Issue 4.

Payne, M.T. 2012. "Recycled Water: Changing Values and Views." *Watermark*, PERC Water, April.

Payne, M.T., S. Root. 2011. "Water Rights Markets in the Western US." *Water Resources Impact*, Vol. 13, No. 5.

Payne, M.T., *Promoting Efficient Allocation of Water Resources: The Price Determinants for Ditch Company Shares in Colorado's South Platte Basin*, B.A. Thesis, Colorado College, May 2009.

Recent Presentations:

"Water Trading & Banking: Economic Tools for Successful SGMA Implementation." Madera County, California. 2017.

"Virtual Water Trade? Lessons from the Commodities Market." Pacific Council, Los Angeles, California. 2017.

"The Role of Water Markets in Arizona Water Management." University of Arizona, Tucson, Arizona. 2016.

"Pricing the Way through a Water Shortage: An Economist's View." Dealing in Drought. Los Angeles, CA 2014.

Education

MS Environmental and Water Resources Engineering, University of Texas, Austin, 2003

BS Civil Engineering, Purdue University, 2001

Licenses

Civil Engineer, Arizona

Professional Engineer, Texas, Oregon

Professional Affiliations

American Water Works Association

Kelley E. Newman, P.E.

Kelley Newman has 15 years of experience in planning, design, and engineering services during construction for water infrastructure projects. Ms. Newman is thoroughly versed in hydraulic modeling and understands that hydraulic conditions are critical to distribution systems. She has a successful history of designing local water infrastructure projects, and she is a hands-on project manager who is able to provide a unified and focused team, promote excellent communication, and facilitate stakeholder buy-in.

Relevant Experience

→ Hydraulic Modeler for Pima County Wastewater Department, Arizona - Avra Valley Wastewater Treatment Plant 4-mgd Expansion Project. Created a model and evaluated the hydraulic design of a 4-mgd expansion of an existing wastewater treatment plant. Provided recommendations to design engineers on hydraulic considerations for their process areas.

→ Hydraulic Modeler for Freeport McMoRan, Arizona - Morenci Mine Broken Arrow Wastewater Treatment Plant. Developed hydraulic model and provided input to design team on hydraulics of new packaged wastewater treatment plant. Completed portions of yard piping design.

→ Hydraulic Modeler for Homestake Mining Company, Grants, New Mexico - Reverse Osmosis Water Treatment Plant Design. Developed hydraulic model and assisted design of new membrane filtration plant and clarifier at existing treatment plant.

→ Hydraulic Modeler for the City of Rifle, Colorado - Rifle Regional Water Purification Facility. Hydraulic modeling of residuals streams from new membrane treatment plant.

→ Hydraulic Modeler for the City of San Diego, California - Miramar Clearwell Improvements Design. Updated hydraulic model per design changes for new clearwell configuration for 215 MGD treatment plant. Evaluated model results for various operating scenarios.

→ Hydraulic Modeler for Capital District Regulatory Planning Committee, New York - Albany Combined Sewer Overflow Evaluation. Developed a calibrated hydraulic model and evaluated the hydraulic capacity of a 35-mgd wastewater treatment plant as part of a city-wide combined sewer overflow management plan.

→ Hydraulic Modeler for Wards Island (New York) - WWTP Grit Chamber Hydraulic Evaluation. Completed hydraulic evaluations of the Manhattan and Bronx grit chambers for performance during construction of upgrades to the channels. Evaluated flow distribution between upgraded and existing channels as well as baffle height for grit removal and equipment submergence. Wrote a technical memorandum for the client summarizing results.

→ Project engineer for Tucson Water, Arizona - TARP Annual Professional Services 2017. Provided professional services for operation assistance, organization of preventative maintenance, preparation of semi-annual status reports, as-needed design services for Tucson International Airport Remediation Project (TARP) CERCLA treatment facility for removal of TCE and 1,4-dioxane from a groundwater aquifer.

→ Process/mechanical design for Tucson Water, Arizona - Santa Cruz Well Field Treatment Facility Design. This project included design of a chemical feed facility for groundwater treatment, preliminary design of arsenic treatment, planning for future chemicals and chromium treatment, blending evaluation for arsenic and chromium, and hydraulic evaluation using SewerGEMS for a 10-mile section of wells, pipes, and reservoir.

→ Design engineer for Tucson Water, Arizona - Advanced Oxidation Process for Tucson International Airport Remediation Project (TARP). Assisted with design, startup and commissioning, and operation of improvements to the existing 8.4 mgd TARP facility to add UV peroxide AOP for the re-

moval of 1,4-dioxane from the TARP contaminated groundwater source. The project also includes an innovative application of GAC for peroxide quenching and improvements to process control, SCADA, and security systems:

- Pilot Plant. Performed engineering design of a pilot plant using UV/peroxide and ozone/peroxide processes for groundwater treatment of 1,4-dioxane and TCE.

→ Project engineer for Tucson Water, Arizona - Santa Cruz Water Production Facility. The project involves designing a new Santa Cruz Water Production Facility to disinfect, store, and distribute potable water produced by the Santa Cruz Well field. The facility includes a 2-MG reservoir and 2-mgd booster station and a sodium hypochlorite storage and feed facility sized to treat up to 20 mgd. This facility will provide potable water storage and pumping to the Sonoran Corridor, as well as consolidate sodium hypochlorite storage and feed into a single central location.

→ Project engineer for Tucson Water, Arizona - Tucson International Airport Remediation Project (TARP) Regulatory Compliance and Engineering Support Services. Assisted with development of Semi-Annual Status Reports, including compilation and analysis of water level, water quality, and operating data; development of tables, figures, and appendices; and report text revisions. Also assisted with development of documents supporting the request to USEPA to retire the existing packed column aeration treatment system, including Engineering Evaluation / Cost Analysis (EE/CA).

→ Process/mechanical design engineer for Walsh Construction, San Francisco, California - San Francisco Airport Mel Leong Industrial Wastewater Treatment Plant and Recycled Water Upgrades. Design lead for detailed design of upgrades to existing Industrial Wastewater Treatment Plant, including rehabilitation of existing equalization tank; new equalization tank pump station; new grit removal system; new dissolved air flotation system; process drain sump; and recycled water tank and pump station.

→ Project Engineer for Town of Marana, Arizona - Marana Water Reclamation Facility Expansion. Provided office engineering services during construction of Water Reclamation Facility expansion. Coordinated shop drawing review and development of design clarifications. Coordinated with the Town and contractor to resolve issues that arose during construction.

→ Project engineer for Tucson Water, Arizona - Recycled Water Program. For this potable reuse planning project, assisted with development of cost opinion for several treatment train options for treatment of recycled wastewater, including recharge, recovery, membrane treatment, and advanced oxidation processes. Developed conceptual design parameters, site layouts, facility layouts, and cost estimates for alternatives evaluation. Responsible for membrane treatment processes and finished water booster pumps.

→ Process/mechanical design for Tucson Water, Arizona - Plant 9 Pump and Chemical Upgrades. This project included the design of new sodium hypochlorite and sodium hydroxide storage and feed systems for an existing 30-mgd booster station:

- Operation Phase. Helped coordinate design of a new sediment removal system to remove gravel from the source water entering the treatment facility. Hydraulic modeling of the TARP well field in support of sediment removal system design. Coordinated subcontractors to provide regular preventative maintenance and other repairs as needed. Developed maintenance contractor procurement documents. Communicated with Tucson Water's Computerized Maintenance Management System (CMMS) manager and provided field service reports for all maintenance and repair work done at the facility.

Education

MBA Business Administration, University of Colorado, 2008

BS Electrical Engineering, Colorado School of Mines, 2002

Licenses

Professional Engineer, Colorado

Electrical Engineer, California

Professional Affiliations

Institute of Electrical and Electronics Engineers

International Society of Automation

Troy Hedlund, P.E.

Troy Hedlund joined Carollo Engineers in 2002 and has experience as a project manager and as an electrical and instrumentation engineer in the design of water and wastewater treatment plants, large-scale solar photovoltaic systems, and cogeneration facilities.

Relevant Experience

→ Electrical and instrumentation design engineer for the Groundwater Demineralization Project for the Zone 7 Water Agency, California. The project included modifications to groundwater pump stations, packaged reverse osmosis membrane water treatment systems, a membrane clean-in-place system, finished water pumping, and chemical feed systems including aqua ammonia, sodium hypochlorite, caustic soda, and scale inhibitor.

→ Lead electrical and instrumentation design engineer for the Ortega Groundwater Treatment Plant Project for the City of Santa Barbara, California. The project included design of new electrical, instrumentation, and control systems to accommodate the new equipment installed with the project.

→ Electrical design engineer for the Groundwater Collection System Project for the Colorado Springs Utilities, Colorado. This design-build project included a new 350-hp transmission pump on a variable frequency drive, a new ATEC water filter, expansion of the existing finished water pump building, as well as the construction of new metering and well vaults.

→ Project manager and lead electrical engineer for the Electrical Distribution and Substation Improvements project for the Santa Fe Irrigation District, California. Troy provided design services to replace the existing 12-kV service entrance and electrical power distribution system at the R.E. Badger Water Filtration Plant. The design included new 12-kV and 4.16-kV switchgears, a 480-V switchgear, 480-V motor control centers, and a new standby diesel engine generator. The design also included a new 5,000-square-foot main electrical building.

→ Lead electrical, instrumentation and controls design engineer for the Irvine Ranch Water District, California, Rattlesnake Reservoir Chlorine Gas System Replacement. Carollo is providing engineering services to replace the existing chlorine gas system with a bulk sodium hypochlorite system. His responsibilities included design of the electrical, instrumentation, and controls associated with the new sodium hypochlorite storage and feed equipment.

→ Lead instrumentation and controls design engineer for the Baker Water Treatment Plant for the Irvine Ranch Water District, Irvine, California. The project included the design of a complete SCADA and process control system and instrumentation associated with a new 28-mgd surface water membrane filtration plant. Unit processes comprising the plant include a 1,350-hp remote raw water pump station, an 1,800-hp membrane feed pump station and forebay complex, a pressurized membrane filtration system consisting of 14 individual membrane racks and associated membrane clean-in-place chemical systems, ultraviolet disinfection, and a 1,500-hp product water pump station. The project also included the design of membrane system waste/solids handling consisting of chemically enhanced flocculation and sedimentation. The plant SCADA and process control system consists of distributed Modicon Quantum and M340 PLCs connected to dual fiber-optic communication networks which isolate PLC-to-SCADA and PLC-to-PLC messaging, as well as network interfaces with vendor-provided control systems for the membrane and ultraviolet disinfection systems.

→ Lead electrical and instrumentation design engineer for the Cater Water Treatment Plant Chain and Flight Replacement Project for the City of Santa Barbara, California. The project included replacement of the existing chain and flight system and design of the modifications to existing plant power and control systems required to accommodate the new chain and flight equipment.

Troy Hedlund, P.E.

→ Lead electrical and instrumentation design engineer for the Cater Water Treatment Plant Advanced Treatment Project for the City of Santa Barbara, California. The project included installation of ozone, dewatering, and various new chemical storage and feed facilities and design of a new electrical service and the integration of the new facilities into the existing plant SCADA/PLC network.

→ Lead instrumentation and controls engineer for the development of design/build contract documents for the Irvine Ranch Water District, California, Wells 21 and 22 Reverse Osmosis Treatment Plant. The project included development of 30-percent design documents in accordance with the Irvine Ranch Water District, including technical instrumentation specifications and the facility control system architecture.

→ Project manager for the Henry C. Garnett Water Purification Plant Service Entrance Upgrade Project for the Kern County Water Agency Improvement District No. 4, Bakersfield, California. The project included the design of a 115-kV substation consisting of two 14-MVA substation transformers, and a 4.16-kV power distribution system consisting of remote controlled 4.16-kV switchgear, two 2.0-MW standby diesel engine generators, connection of a 1.0-MW solar PV system, and extensive coordination with PG&E for interconnection of the onsite generation sources.

→ Lead electrical, instrumentation, and control design engineer for the 52-mgd Henry C. Garnett Water Purification Plant Expansion for the Kern County Water Agency Improvement District No. 4, Bakersfield, California. The project included the design of new electrical distribution, controls, and fiber-optic SCADA/PLC systems for the plant expansion. The design of the plant expansion consisted of new facilities such as a raw water pump station, flocculation and sedimentation processes, mixed-media filtration with automatic backwash, and extensive chemical storage and feed.

→ Electrical, instrumentation, and control design engineer for the Palmdale Water Treatment Plant Improvements Project for the Palmdale Water District, California. The project included the design of a new sludge removal system, a 480-V switchgear, a 1,000-kW standby engine generator, extensive modifications to the existing plant 480-V electrical distribution system, site electrical, a new rotating screen on the plant influent water line, site lighting design, and a complete replacement of the existing instrumentation and control system and fiber-optic SCADA/PLC communication networks.

→ Electrical design engineer for the reverse osmosis water treatment plant expansion for the South Island Public Service District, Hilton Head, South Carolina. The project included the construction of an additional reverse osmosis process train, replacement of cooling tower pumps, and modifications to the existing plant electrical system, as well as lighting design. The project will expand plant capacity from 1.5 to 3 mgd, maximizing the District's use of deep, geothermal, and brackish Cretaceous well supply.

→ Electrical and instrumentation design engineer for the Weiser Water Treatment Plant Phase II Improvements Project for the City of Weiser, Idaho. The project included the replacement of existing packaged filters with two conventional sand-bed filters, a new backwash pump station, treated water UV disinfection, and a 500-kW standby diesel engine generator.

→ Project engineer for a solar photovoltaic (PV) system design project for the Kern County Water Agency Improvement District No. 4, Bakersfield, California. Project included a 1-MW, single-axis tracking solar photovoltaic system for the Henry C. Garnett Water Purification Plant, where it was connected to the facility power distribution system. Once a series of plant expansion projects were completed, the PV system, at maximum output, provided approximately 12 percent of the plant's peak power demands.

Education

MS Environmental Engineering, University of Arizona, 2012

BS Civil and Environmental Engineering, Colorado School of Mines, 2006

BS Mathematics and Computer Science, Colorado School of Mines, 2006

Gwendolyn J. Woods

Gwen Woods has experience spanning many areas of water monitoring and water resources planning, including physical, chemical, and biological testing of water, hydraulic modeling, cost estimation, scenario planning, and design optimization.

Relevant Experience

→ Project engineer for Antelope Valley – East Kern Water Agency, California - High Desert Water Bank. Project includes review of previous cost estimate and development of independent cost estimate for aquifer storage and recovery facility receiving up to 70,000 acre-feet per year of State Water Project water from the California Aqueduct.

→ Graduate researcher for Houghton Area (Tucson, AZ) reclamation study. Expanded and modified decision support system to assess alternatives for water reclamation and reuse in the study area in southeast Tucson. The project created cost estimates for several reuse configurations and examined the effect of existing infrastructure capacities on the cost effectiveness and environmental impact of these configurations.

→ Project engineer for Metropolitan Domestic Water Improvement District, Arizona - Water System Improvements for Mitigating 1,4-dioxane in the Delivery System - Alternatives Evaluation and Implementation Plan. Carollo provided a technical evaluation for water system improvements for mitigating 1,4-dioxane in the delivery system. The alternatives evaluation for improvements included (1) evaluating projected effectiveness, costs, and water quality risks of blending water from multiple wells within the utility's distribution system and (2) comparing the blending-only approaches to implementing a treatment facility in combination with in-system blending. The evaluation included simulation of blending utilizing Metro Water's distribution system hydraulic model and development of conceptual engineering information necessary for comparison of the blending and treatment/blending alternatives. An implementation plan was developed, which included continued water quality monitoring and the potential for design and construction of treatment facilities in the future.

→ Hydraulic modeler for Tucson Water, Arizona - Santa Cruz Water Production Facility. Assisted with design of new 20-mgd disinfection facility for the Santa Cruz Well Field. Project also includes a 2-MG reservoir and booster station.

→ Engineering support for Tucson Water, Arizona, TARP WTP Improvements/AOP Treatment Facility, an 8.4 mgd facility using UV peroxide AOP for the removal of 1,4-dioxane and TCE from the TARP contaminated groundwater source. Hydraulic modeling of the TARP well field in support of adding a new sediment removal system to remove gravel from the source water entering the treatment facility.

→ Water elevation and water quality monitoring lead for Tucson Airport Authority Remediation Project (TARP) Capture Evaluation (CERCLA). Completed quarterly groundwater level measurement in production and monitoring wells in an around project site. Conducted review and update of Field Operations Plan, including supplement for PFOS/PFOA sampling.

→ Graduate researcher for scenario planning for integrated water management in southeast Tucson, Arizona. Worked with stakeholders at Tucson Water and Pima County Regional Wastewater Reclamation District to outline key uncertainties for planning of water and wastewater infrastructure. Used genetic algorithms to find infrastructure solutions for various scenarios, including variations in Central Arizona Project supply and local rates of water use. The project identified potential locations for water reclamation and reuse in and around the study area and recommended infrastructure (pipes, pumps, reclamation facilities) for robust systems that should perform well under a wide range of future conditions.

→ Water quality technician for Mines Park Water Reclamation Test Site at Colorado School of Mines, Golden, CO. Collected weekly samples of wastewater from septic

tank, holding tank, textile filtration unit, membrane bioreactor, and irrigation system. Tested samples for biological and chemical parameters (COD, nitrate, total nitrogen, total phosphorus, BOD_5, TS, TSS, coliforms) and monitored data for unexpected values.

→ Graduate researcher for scenario planning for integrated water management in southeast Tucson, AZ. Worked with stakeholders at Tucson Water and Pima County Regional Wastewater Reclamation District to outline key uncertainties for planning of water and wastewater infrastructures. Used genetic algorithms to find infrastructure solutions for various scenarios, including variations in Central Arizona Project supply and local rates of water use. The project identified potential locations for water reclamation and reuse in and around the study area and recommended infrastructure (pipes, pumps, reclamation facilities) for robust systems that should perform well under a wide range of future conditions.

→ Summer undergraduate research supervisor for study of water reclamation and reuse in Green Valley and Sahuarita, Arizona. Coordinated with Pima County Regional Wastewater Reclamation District and Tucson Water to evaluate several integrated water resource management alternatives.

→ Vadose zone research intern at Savannah River Site, SC. Monitored subsurface pressures and added optimization routine to program predicting subsurface pressures. Sampled soil vapor and performed sieve analysis on soil samples.

John Laney, L.G., Hydrogeologist

Office: SACRAMENTO

Years of Experience

Total: 21 | M&A: 10

Education

B.S., Geology, University of North Carolina at Wilmington (1995)

B.A., Environmental Science, University of North Carolina at Wilmington (1995)

Key Areas of Expertise

Hydrogeologic and environmental field investigations

Well design and construction oversight

Aquifer test design and analysis

Water supply and recharge investigations

Soil, water, and air quality assessment

John manages day-to-day operations at our Sacramento office. He has provided support and oversight for hydrogeologic and environmental investigations at M&A since 2008. His diverse environmental experience includes leading remediation efforts at mine and industrial sites. John has coordinated the design, installation, and testing of production, injection, extraction, and monitoring wells for a variety of water resource and environmental projects. Other project experience includes designing and implementing monitoring programs in accordance with regulatory protocols and installing remediation and product-recovery systems. He also specializes in optimizing wellfields and assessing the impacts of mining operations on groundwater and surface water resources.

Representative Projects

Feasibility Studies

Well Construction & Testing • Resolution Mine • Resolution Copper Mining
Supported large-scale hydrogeologic investigations to assess the potential impacts of mining operations on groundwater; participated in well drilling and hydraulic testing programs to evaluate conditions in the deep ore zone; oversaw deep well construction and installed piezometers with grouted-in pressure transducers [PINAL COUNTY, AZ]

Environmental Impact Studies

Well Construction & Testing • Mt. Hope Mine • General Moly
Supported hydrogeologic investigations to assess the potential impacts of proposed mining operations; oversaw well drilling and construction; directed hydraulic testing programs [EUREKA COUNTY, NV]

Well Construction & Testing • Dairy Syncline Mine • J.R. Simplot Company
Supported EIS investigations to assess the potential impacts of proposed mining activities on the environment and regional water supply; oversaw and directed deep well drilling and testing programs [CARIBOU COUNTY, ID]

Tailings Water Management

Tailings Seepage Analysis • Bagdad Mine • Gallagher & Kennedy, PA
Conducted a comprehensive hydrogeologic investigation that entailed inventorying seeps and springs, measuring seep flow rates, characterizing water quality (for seepage, surface water, and groundwater), characterizing groundwater flow, developing a conceptual hydrogeologic model, and evaluating potential NPDES / APP compliance issues [WESTERN AZ]

Professional Registrations

Licensed Geologist
#2317, WA

Professional Certifications

Soil Matrix Cleanup Supervisor, OR

UST Decommissioning Supervisor, OR

ICC Certified Environmental Site Assessor, WA

Groundwater Resource Development

Aquifer Testing & Analysis • Various Sites • Various Clients
Conducted aquifer tests and analyzed data to estimate hydraulic parameters [AZ/UT/ID/NV]

Groundwater Remediation

Groundwater Remediation Investigation • Inactive Rancho Cordova Test Site • The Boeing Company
Provided strategic direction for the regional groundwater remedy; directed feasibility studies, remedial action planning, extraction and monitoring well installation, pilot testing for source-area treatment, and the conceptual design and operation of in situ bioremediation systems [SACRAMENTO COUNTY, CA]

Conceptual Model Development • Various Sites • Various Clients
Developed conceptual models for sites impacted by petroleum hydrocarbons to complete risk-based corrective action closures [OR/WA/CA/MT/CO/AZ]

Environmental Compliance

Environmental Site Assessment • Former Lisbon Mine & Mill • Rio Algom Mining LLC
Managed and conducted hydrogeologic investigations to assess environmental impacts to groundwater from former mining activities; directed and oversaw drilling and monitoring well installation; developed, coordinated, and implemented hydraulic testing and groundwater sampling and analysis programs for site characterization [SAN JUAN COUNTY, UT]

Contaminant Investigation | Groundwater Remediation

Environmental Site Assessments • Industrial, Manufacturing, Wood Treatment, & Solid-Waste Disposal Sites • Various Clients
Managed and conducted hydrogeologic and remedial investigations; oversaw soil boring and monitoring well installation; developed, coordinated, and implemented sampling and analysis plans for site characterization [OR/WA/CA/WY/NY/AZ]

Managed Aquifer Recharge

Field Characterization • Central Valley Conjunctive Water Use Study • Tulare Irrigation District
Conducted investigations that entailed drilling, trenching, and infiltration testing; characterized near-surface lithologic conditions to evaluate recharge via surface infiltration [TULARE COUNTY, CA]

Reconnaissance Recharge Investigations • Various Sites • Various Clients
Conducted investigations that entailed drilling, trenching, and infiltration testing; characterized near-surface lithologic conditions to evaluate recharge via surface infiltration [AZ]

ANTELOPE VALLEY
STATE WATER CONTRACTORS ASSOCIATION

COMMISSION MEMORANDUM

DATE:	July 16, 2018	**July 19, 2018**
TO:	AVSWCA Commissioners	**Commission Meeting**
FROM:	Matthew Knudson, General Manager Peter Thompson II, Assistant General Manager	
RE:	***AGENDA ITEM NO. 11 - CONSIDERATION AND POSSIBLE ACTION ON APPROVAL OF PROFESSIONAL SERVICES AGREEMENT WITH RAFTELIS FINANCIAL CONSULTANTS, INC. FOR THE PREPARATION OF A FINANCIAL ANALYSIS ASSOCIATED WITH THE COST OF PROVIDING REPLACEMENT WATER TO THE ANTELOPE VALLEY IN THE NOT-TO-EXCEED AMOUNT OF $27,377.00.***	

Recommendation:

Association staff and the member agency General Managers recommend the Commissioners:

1. Approve a professional services agreement in the not-to-exceed amount of $27,377.00 for Raftelis Financial Consultants, Inc. to prepare a financial analysis associated with the cost of providing replacement water to the Antelope Valley; and

2. Authorize the General Manager to execute the professional services agreement upon acceptance by legal counsel for same.

Background:

Association staff distributed a Request for Proposal (RFP) on May 25, 2018 to a total of three qualified financial firms to perform an analysis and determine the cost of importing State Water Project water to the Antelope Valley for recharge into the groundwater basin. The final report prepared under this agreement will be used to establish a Replacement Water Assessment associated with the Antelope Valley Watermaster. Two of the three firms provided proposals (NHA Advisors and Raftelis Financial Consultants). The following is a summary of the two proposals received:

	Project Fee	*Schedule*
NHA Advisors	$100,500.00	6-Months
Raftelis	$ 27,377.00	4-Months

Raftelis is being recommended based on their experience, straight forward approach to the project, familiarity with other adjudicated groundwater basins (watermasters), and having worked with AVEK, PWD, and our neighboring State Water Project contractor (Mojave Water Agency).

COMMISSIONERS
ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION
VIA: Matt Knudson, General Manager
Peter Thompson II, Assistant General Manager July 16, 2018

The Association staff will be responsible for Project Administration, including project management, communication, and coordination between the member agencies and Raftelis Financial Consultants.

Financial Impact:

The AVSWCA's current policy for funding various programs, is to use State Water Project Table A amounts to determine the split among the member agencies. Based on this policy, the $27,377.00 would be split among the member agencies as follows:

a. Antelope Valley-East Kern Water Agency: $23,462.00 (85.7%)
b. Littlerock Creek Irrigation District: $ 383.00 (1.4%)
c. Palmdale Water District: $ 3,532.00 (12.9%)

RAFTELIS

June 4, 2018

Antelope Valley State Water Contractors Association
c/o Matthew Knudson
Assistant General Manager, Antelope Valley – East Kern Water Agency
2029 East Ave. Q
Palmdale, CA 93550

Subject: 2018 Financial Analysis Study for Replacement Water Assessment

Dear Mr. Knudson:

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to submit this proposal to conduct a financial analysis study (Study) of State Water Project costs and establish a Replacement Water Assessment Fee for the Antelope Valley State Water Contractors Association (Association). We are excited to provide our unique combination of industry expertise, depth of resources, and unparalleled qualifications to assist the Association on this important project.

We are familiar with the methodologies used by the Chino Basin Watermaster and Upper San Gabriel Watermaster to establish Replacement Water Assessment Fees. Our experience in this area will help inform the study. We have assisted numerous agencies in California with successfully examining water supply costs, including Antelope Valley East Kern Water Agency, Mojave Water District, and Valley County Water District. Raftelis is confident in our ability to conduct a financial analysis that establishes the cost of importing water for groundwater basin recharge as part of the Association's establishment of a Replacement Water Assessment for the recently formed Antelope Valley Watermaster.

We have the largest practice in California and the country, with more than 70 financial and management consultants. We are locally situated and our local staff will assist the Authority with this study to provide efficient service and minimize costs. I will serve as Project Manager for this study. I bring 40 years of experience in financial studies and engineering. I have extensive expertise in water utility finance and revenue planning, having conducted over 400 studies for agencies across the State. I will be responsible for overall project accountability and will be actively involved, providing insight and direction in all aspects of the project. I will also will manage the day-to-day aspects of the project, guiding staff consultant work, and will ensure the project stays on schedule and effectively meets the Association's objectives.

Raftelis is an industry leader and our staff have helped develop many of the leading industry guidebooks about utility financial planning and rate setting. Additionally, we have cutting edge knowledge because of our active involvement in the industry, having co-authored the *AWWA M1 Manual* and our own book on water and wastewater pricing titled, *Water and Wastewater Finance and Pricing: The Changing Landscape*.

We are confident that our industry expertise and wide range of experience will result in a successful project and we look forward to assisting you. Please call me at (626) 583-1894 if you have any questions.

Sincerely,

Sudhir Pardiwala, PE
Executive Vice President

150 N. Santa Anita Avenue, Suite 470
Arcadia, CA 91006
www.raftelis.com

Project Understanding

The Antelope Valley Groundwater Adjudication Judgement was entered in December 2016 and provides for a five-member Watermaster Board and an Advisory Committee. The Watermaster hired an engineer to provide hydrogeological and technical analyses and to guide administrative functions to fulfill the Judgment and prepare annual reports.

The native safe yield of the Antelope Valley Groundwater Basin (Basin) is 82,300 acre-feet per year (AFY). However, the groundwater pumping typically exceeds the safe yield. The three State Water Project (SWP) Contractors import water, a portion of which can then be used to replenish the Basin. The general operating cost of the Watermaster will be recovered through and administrative fee on all water pumped from the Basin. The operating costs of replenishment including the cost of imported water must be recovered from users through a replenishment assessment fee.

Scope of Service

Task 1 – Project Management, Communication, and Data Collection

Project Management

For this study, Mr. Sudhir Pardiwala will serve as Project Manager and the point of contact and will coordinate all efforts with Association staff. Our management approach stresses transparency, communication, teamwork, objectivity, and accountability to meeting project objectives. Management responsibilities extend to general administrative duties such as client correspondence, billing, project documentation, and administration of the Study work plan.

In every project, we implement a systematic program of quality assurance and quality control (QA/QC) to ensure consistency, accuracy, and validity. As Project Manager, Sudhir Pardiwala will ensure that the financial analysis model developed is functioning properly and is based on sound principles and standard industry practice. This ensures that all of our work products will be of the highest quality and meet or exceed the standards that our clients have come to expect from Raftelis.

We believe a productive kick-off meeting is the most effective way to begin a study of this nature. Prior to the meeting, we will provide the Association with a meeting agenda and data request list. In advance of the meeting, we will also review any data provided beforehand in response to the list so that we may discuss any questions with staff at the kick-off meeting. The purpose of this in-person meeting is to provide a forum to discuss parameters, goals and objectives, policies, and methodologies. During the meeting, we will also examine agency-specific conditions with representatives from the three-member agencies, Antelope Valley-East Kern Water Agency, Littlerock Creek Irrigation District, and Palmdale Water District.

Finally, we will review and finalize the work schedule during the kick-off meeting. This project schedule will include important milestones and preliminary estimations of completion for each. An updated schedule will be provided after the meeting.

Throughout the Study, the Raftelis Team will schedule biweekly status update webinars. Status meetings will be conducted via telephone or webinar utilizing GoToMeeting, a web conferencing tool that enables clients and consultants to simultaneously view any application on a computer in real time over the Internet. This tool will help us conduct efficient webinars to discuss issues and review results, and it makes the project more efficient and minimizes costs. The Project Team will also conduct face-to-face meetings as outlined in the scope.

Prior to each meeting, we will provide staff an agenda at least five working days in advance of each webinar and an updated project schedule. This scope assumes a maximum three-month project duration commencing at the Kick-Off meeting, with the total biweekly webinars listed below as reflective of this duration. However, we

would be happy to discuss additional webinars should the need arise. After each biweekly meeting, Raftelis will provide staff meeting minutes within five working days.

Meetings: One in-person Kick-Off Meeting; Six biweekly status update webinars
Deliverables: Data request list; Kick-off meeting agenda, presentation materials, and meeting minutes; Biweekly meeting agenda, presentation materials (as needed), and meeting minutes; Initial and updated work schedule

Task 2 – Perform Analysis of Costs

As part of its objectives, the Association manages and encourages the conservation of the local groundwater in Antelope Valley. Integral to the conservation plan is recharging the basin with imported water from the State Water Project, also managed by the Association within its service area. Raftelis will perform a financial analysis of the imported water costs for the Association's groundwater basin recharge. This analysis will include an examination of the roles of each of the three member agencies and will assist in defining which agencies will recharge the basin and the distribution of costs with consideration of agencies' extraction points and quantities as well as recharge point locations.

Analysis will commence with a review of the items provided in response to the data request list. We will discuss with staff any questions or additional data needs that may arise after the kick-off meeting. In conducting the financial analysis, we will define costs as fixed or variable depending on the nature of each expense, and allocate them to each member agency fairly and equitably based on shared responsibility. Raftelis will utilize input from the member agencies and Association staff provided during the kick-off and biweekly update meetings to inform the cost analysis. Additionally, Raftelis will distribute the imported water fixed and variable costs across the agencies, identifying those shared across each agency and to what degree. This blended cost analysis of the three member agencies includes identifying costs solely born by individual agencies and the reasoning behind these allocations.

Finally, Raftelis will distribute costs across property owners with consideration for those who have paid their share of State Water Project costs through their property taxes in comparison to properties that have not yet contributed to these costs through property taxes. Using these allocations, we will develop the Replacement Water Assessment Fees. Working with representatives from all member agencies will ensure both the equitable and fair allocation of costs as well as a shared understanding among stakeholders of the goals, objectives, and decisions involved in the rate design process.

After conducting the financial analysis, Raftelis will prepare a technical memorandum providing preliminary results of the financial analysis. The memorandum will include background data, project objectives as defined in the kick-off meeting, and relevant factors such as policies and agency-specific considerations that factored into the analysis. Next, the memorandum will detail the identification of the fixed and variable costs for importing water and recharging the groundwater basin through the existing recharge facilities. It will then discuss the allocation of these costs across member agencies. The memorandum will also discuss the rationale behind the allocations across property owners based on property tax contributions to the State Water Project, and leading to the proposed Replacement Water Assessment Fees.

Raftelis will provide staff a draft memorandum for review and comment. We will discuss staff comments in a webinar during which we will discuss the preliminary results of the analysis and address any additional questions or comments. After incorporating staff revisions to the draft memorandum, we will provide a final draft memorandum as well as the draft financial analysis model.

Meetings: One webinar with staff to discuss preliminary results and draft technical memorandum; One in-person meeting to discuss results
Deliverables: Preliminary Results Draft and Final Technical Memoranda; Draft financial analysis model

Task 3 – Prepare Draft and Final Reports

The draft report will summarize the results of the study. It will include an executive summary highlighting the major issues and decisions reached during development of the financial analysis and proposed Replacement Water Assessment Fees. The main body of the report will include a brief physical description of the Association and the groundwater recharge program as well as an overview of the financial analysis and the rationale behind the proposed Replacement Water Assessment Fees. The report will also contain discussion of the analysis' assumptions and methodologies employed in preparing it. The report will guide the reader through the study and explain how we derived the imported water costs for the groundwater basin recharge, including the reasoning behind any allocations of cost between the member agencies.

Association staff members, member agency representatives, and the Association's Attorney will provide comments for summarization and incorporation into the draft report. Raftelis will conduct a webinar with Association staff to discuss and review the draft comments. After incorporating any final edits, Raftelis will conduct a second webinar to discuss the preliminary final report. Raftelis will then provide the complete final report. The final report will serve as the administrative record for the establishment of a Replacement Water Assessment for the Antelope Valley Watermaster.

Finally, Raftelis will attend one Association Commissioner Meeting to provide support to Association staff in the presentation of results.

Meetings: One webinar with staff to discuss draft report and review report comments; One webinar with staff to review the preliminary final report; One Association Commissioner Meeting
Deliverables: Draft, Preliminary Final, and Final Results Report; Final financial analysis model

Fee Schedule

Raftelis will provide the services shown in the Scope on a time and materials basis as shown below. Expenses include a $10 per hour technology charge that covers network, computer, software, printing, postage, telephones, etc.

Antelope Valley State Water Contractors Association
2018 Financial Analysis Study for Replacement Water Assessment

Tasks	Web Meetings	Number of Meetings	SP	SC	Admin	Total	Total Fees & Expenses
1. Project Management, Communication, and Data Collection	1	1	12	16	4	32	$7,059
2. Perform Analysis of Costs	1	1	12	40	-	52	$10,559
3. Prepare Draft and Final Reports	2	1	12	35	-	47	$9,759
Total Estimated Meetings / Hours	4	3	36	91	4	131	
Hourly Billing Rate			$325	$150	$75		
Total Professional Fees			$11,700	$13,650	$300	$25,650	

Total Fees	$25,650
Total Expenses	$1,727
Total Fees & Expenses	$27,377

SP - Sudhir Pardiwala, Project Manager
SC - Staff Consultants
Admin - Administrative Staff

Qualifications

Raftelis has focused on financial consulting for water, wastewater, and recycled water utilities since the firm's founding in 1993, and our staff consists of some of the most experienced consultants in the industry. Below please find detailed descriptions of previous studies for districts similar to the Association. We have included references at the end of this section for each of these clients and urge you to contact them to better understand our capabilities and the quality of service that we provide.

Antelope Valley – East Kern Water Agency

Client Reference
Dwayne Chisam,
Assistant General Manager
6500 West Avenue N
Palmdale, CA 93551-2855
P: 661.943.3201
E: dchisam@avek.org

As a State Water Project contractor, Antelope Valley-East Kern Water Agency (AVEK) is entitled to receive an annual allotment of up to 141,400 acre feet of water from the State Water Project via the California Aqueduct to replenish local aquifers that serve residents living in an area that encompasses nearly 2,400 square miles of the Mojave Desert area, northeast of Los Angeles including eastern Kern County and a small portion of Ventura County. AVEK has the third largest water entitlement of all SWP agencies in California. The mission of AVEK is to seek sources of water and develop the infrastructure to deliver water in the most effective manner to ensure the quality of life within its boundaries.

In 2013, AVEK engaged Raftelis to develop a Wholesale Water Rate Model as a tool to develop a revised rate structure that recovers anticipated increases in electrical and operational expenditures without overburdening taxpayers or customers. The engagement has been split into two phases, the first was to create a financial plan and update the current rate structure for 2014. The financial plan was designed to sufficiently fund annual operating, capital, and reserves needs while meeting other financial performance goals and policies of AVEK, such as revenue and rate stability and debt service coverage requirements. The second phase involves developing the full wholesale water rate model which includes the implementation of AVEK's reserve policies and reviewing alternate rate structures to provide revenue stability and incentives for conservation. One of the structures investigated was a two-tier postage stamp rate structure similar to the structure employed by Metropolitan Water District of Southern California. Raftelis has met with AVEK's Board of Directors and member agencies and presented the financial plan along with 2014 wholesale rates to show the financial health under various scenarios related to water supply and growth rates. The second phase of developing the wholesale water rate model has commenced. Upon completion of the study, the user-friendly wholesale rate model was delivered to AVEK staff along with a training session to demonstrate all key aspects of the model. Raftelis has updated the financial plan for AVEK every year since the first study.

Mojave Water District

Client Reference
Kathy Cortner, Chief Financial Officer
13846 Conference Center Drive
Apple Valley, CA 92307
P: 760.946.7054
E: KCortner@MojaveWater.org
F: 760.240.2642

As a State Water Project contractor, Mojave Water Agency (MWA) is entitled to receive an annual allotment of up to 82,800 acre feet of water from the State Water Project via the California Aqueduct to replenish local aquifers that serve residents living in 4,900 square miles of the High Desert in San Bernardino County. The essential mission of MWA is to seek sources of water, including supplemental water, and to deliver that water in the most effective fashion to ensure the quality of life within its boundaries.

In 2012, MWA engaged Raftelis to develop the financial plan model as a tool assess risk in water supply variance, capital spending plans including estimated Delta repair costs, property tax growth rates, and evaluate associated potential financial impacts and ensure financial sufficiency for MWA's operational and capital expenditures. Raftelis presented the model to the Board of Directors to show the financial health under various scenarios related to water supply and growth rates. The model was delivered to MWA staff along with a training session to demonstrate all key aspects of the model and a user manual was provided for MWA's future use.

In 2013, MWA retained Raftelis to upgrade its financial plan model to include a water leasing module to evaluate the potential water supply risk under different growth and hydrological conditions and the associated risks and financial impacts of selling their multi-year pool water to defer the Delta repair costs. Upon the completion of the model upgrade, Raftelis conducted financial sensitivity workshops with MWA staff and the Board and presented the results of the study and delivered the model to MWA along with a manual for its future use and reference.

In 2015, MWA again retained Raftelis to provide ongoing financial plan support to examine the financial effects of the historic drought. Because of the then ongoing drought, Department of Water Resources (DWR) costs had been rapidly increasing. Raftelis was retained to evaluate the feasibility, magnitude, and efficacy of potential financial tools that would help the Agency generate additional revenue. As part of this project, Raftelis met with the MWA Board and the Personnel, Finance & Security working group several times, on an ongoing basis as the Agency's financial outlook changed. At the conclusion of the study, Raftelis provided the Agency with an update to its Strategic Financial Plan.

Valley County Water District

Client Reference
Jose Martinez
General Manager
Valley County Water District
14521 East Ramona Blvd.
Baldwin Park, CA 91706
P: 626.338.7301 x:201
E: martinez@vcwd.org

Raftelis was engaged to conduct a water rate study for Valley County Water District. This study involved updating the District's rate structures and calculating new rates based on cost of service principles. It also involved planning for significant revenue adjustments, due to rapidly increasing water supply costs and drought-related conservation. The District's groundwater assessment charges were projected to rapidly increase far beyond a level satisfied by their previously-adopted rate increases. The current water rate structure had the same tiered rates for residential and commercial customers. Raftelis proposed uniform rates for multi-family customers and retained the tiers for the remaining customers. The cost of various water supply sources was considered in developing tiered rates. Raftelis incorporated the District's data and supply cost projections to calculate rates for various customer classes. The rates were accepted by the District's Board in late 2017.

JUNE 5, 2018

STATEMENT OF QUALIFICATIONS TO PROVIDE FINANCIAL ADVISORY SERVICES

TO THE

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Project Team Led By

NHA | ADVISORS
Financial & Policy Strategies.
Delivered.

4040 Civic Center Drive, Suite 200
San Rafael, CA 94903
Phone: (415) 785-2025
www.NHAadvisors.com

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NHA | ADVISORS
Strategy. Innovation. Solutions.

4040 Civic Center Drive, Suite 200
San Rafael, CA 94903

Office: 415.785.2025
www.NHAadvisors.com

June 5, 2018
Antelope Valley State Water Contractors Association
Attn: Matt Knudsen (mknudson@avek.org)

RE: Statement of Qualifications to Provide Advisory Services – NHA Advisors, LLC

Dear Matt,

Thank you for the opportunity to introduce NHA Advisors, LLC ("NHA") and our proposed project team to the Antelope Valley State Water Contractors Association ("AVSWCA"). This proposal outlines our proposed project team and our approach to serving as AVSWA's financial advisor to provide financial analysis establishing the cost of importing State Water Project water to the Antelope Valley.

We are bidding jointly with a rate-making and a civil engineering firm: HF&H Consultants and Provost & Pritchard. HF&H has been an advisor to both groundwater pumpers and wholesale water providers on water supply contracts, as well as on litigation related to both groundwater and wholesale water sales. Dan Flory of Provost & Pritchard managed at one time the section at DWR that prepares Bulletin 132. Mr. Flory will serve as our team's expert on SWP contract pricing.

NHA has raised funds for California water wholesalers and knows the unique credit aspects of that side of the business. At the same time, we represent 20 retail water utilities and we know the State Water Project (SWP), serving as financial advisor to five different SWP contractors. In addition, we have experience with non-SWP DWR water supply contracts through two of our clients and can advise our clients throughout the process.

We provide "holistic funding" solutions for our clients, including SRF loans, grants and other alternative funding sources. Section I of this proposal highlights our approach to the scope of services requested in AVSWCA's RFP. We have successfully problem solved for our clients through the "four seasons of California" – fire, flood, earthquake and drought.

NHA would love to work with the AVSWCA on its upcoming projects. We encourage you to reach out to our references in Section II to get a sense of our team's availability, hands-on project management style, and attention to detail.

Thank you for your consideration!

Mark Northcross, Principal
Mark@NHAadvisors.com
Ph: 415.785.2025 x 2002 Cell: 415.309.4171
www.NHAadvisors.com

I. APPROACH TO PROVIDING REQUESTED SERVICES

We have reviewed the proposed scope of services identified by AVSWCA in their request for proposals, and agree with its terms and schedule. We do want to present a more specific view of potential work items in this section on General Approach.

ANALYSIS PARAMETERS

We believe that this is the most crucial part of the assignment. We see this analysis as being the core of the Technical Memorandum. Our goal is to prepare a comprehensive review of every viable pricing mechanism for wholesale replacement water now in use by California utilities. With that in mind, we recommend that The following factors should be considered in developing a pricing model for AVSWCA:

- Provisions of Section 9.2 of the adjudication
- Current case law that bears on the pricing of wholesale water sales related to groundwater.
- Sales of SWP water by the Mojave Water Agency to the Phelan Pinon Pines Community Services District.
- Current wholesale water sale pricing mechanism used by AVEK.
- Other sales of replacement water to groundwater management agencies for adjudicated basins in southern California.
- Timing and quantity of replacement water sales with respect to the determination of variable costs under SWP contracts.
- Allowance for benefit of prior and/or future payment of assessments and ad valorem taxes by over pumpers within the taxing jurisdiction of AVEK, PWD or Littlerock Creek Irrigation District.
- Determining whether or not to charge over pumpers outside the taxing jurisdiction of the three JPA members for an appropriate share of fixed SWP charges paid through assessments in the past.
- Any pricing differential for the use of carryover or banked water from the SWP.

BLENDED COST ANALYSIS

We will develop a comparative analysis of the SWP contracts and pricing mechanisms through DWR Bulletin 132-2017 for each of the three members of the JPA. We will present options for how to blend any differences in fixed and variable rate SWP costs between the three JPA members. We also see the blended cost analysis as being core to the Technical Memorandum. Blending factors to be considered include the following:

- Relative share of replacement water obtained for each SWP contractor.
- Timing of delivery of replacement water.
- Any secondary effects of use of SWP contract water for this purpose on other business activities of the utility.
- Relative share of assessments and ad valorem taxes for each SWP contractor.

NEGOTIATIONS BETWEEN AVSWCA MEMBERS REGARDING FINAL BLENDED COST FORMULA

We believe that it is possible that there may be more than one reasonable approach to blending the costs for SWP water for the three AVSWCA members. Consequently, there may be a need to negotiate a final blended cost formula. The consultant team, if desired, can take a facilitator role in such negotiations.

FINAL REPORT PREPARATION AND DELIVERY

We see the final report as the long-term policy document for pricing replacement water. This report will take the analysis in the technical memorandum and make clear recommendations on how the pricing of replacement water should be set. The final report will also need to take into consideration the possibility of future changes in

SWP costs, or other pricing factors. We recommend that the final report address the recommended pricing changes resulting from most likely "what if" scenarios.

PRESENTATION TO STAFF AND ELECTEDS

Our cost proposal includes time spent preparing a PowerPoint presentation on the final report for both staff and electeds. While both the technical memorandum and the final report need to be very robust documents to withstand the scrutiny possible from other stakeholders in the adjudication, the conclusions in these documents need to be communicated to the public in a clear and comprehensible way. Consequently, our team assumes we will be presenting the findings of our work in one or more public forums.

SPECIFIC COST PARAMETERS OF FOCUS

Given the potential attention the sale of replacement water may receive from stakeholders in the Antelope Valley adjudication, we feel that certain potential cost parameters deserve special focus in the technical memorandum. Even more important, we believe that the final pricing recommendations stated in the final report need to be responsive to these potential cost parameters:

- **Legal parameters -** Recent court cases (*Pajaro, San Buenaventura*, *Great Oaks*) must be considered, which is challenging given their conflicting court decisions. Whereas groundwater charges in *Pajaro*, which are subject to Proposition 218, must meet the proportionality standard, groundwater charges in *San Buenventura* are viewed as regulatory fees that are subject to the fair and reasonable standard under Proposition 26. Understanding the significance of these court decisions will help in establishing the boundaries for the quantitative analysis. Applying industry standard rate-making techniques within these boundaries will provide alternatives for the parties to consider and around which a consensus can be built.

- **Judgment stipulations** - Section 9.2 in the adjudication establishes the foundation for determining the Replacement Water Assessment. The amount of the Assessment shall be the product of excess production multiplied times the cost to the Watermaster of replacement water, including spreading costs for recharge, which is similar to HF&H's expert witness work that resulted in a favorable award in the Water Replenishment District (described in Section II of this proposal).

  We assume that the Watermaster will determine any excess production for each party as well as other adjustments related to the Rampdown period and the accounting for Replacement Water obligations when insufficient imported water is available. The Watermaster's cost would include the cost imported water from AVEK, Littlerock Creek ID, Palmdale Water District, or any other entity. The cost will presumably vary by source depending on the particular source's SWP charges. Other non-SWP sources could further affect the cost.

  Spreading costs could include both capital and O&M costs associated with aqueducts, diversion facilities, and spreading basin maintenance. The spreading costs presumably could vary depending on the relative location of the facilities and the pumpers. The cost allocations associated with spreading are similar to HF&H's analysis of M&I and Ag rates at United Water Conservation District, which takes into account the classes of pumpers (described in Section II of this proposal).

- **Industry practices** - Refining rate-making analyses to achieve a result that is acceptable to all parties may be facilitated by drawing on the practices in other adjudicated basins. Other basins can be surveyed on specific points of interest if needed. For example, there may be areas in the Judgment that are open to interpretation or alternative approaches, which may have been addressed in other basins and that could serve to make further refinements in the in the Replacement Water Assessment.

II. PROPOSED ADVISORY TEAM

The proposed team for this assignment will consist of NHA Advisors, HF&H Consultants, and Provost & Pritchard Consulting Group.

NHA will serve as the team manager, led by Mark Northcross. HF&H Consultants, led by John Farnkopf, will take the lead on defining good cost parameters with the exception of SWP contracts. Provost & Pritchard, led by Dan Flory, will take the lead on interpreting SWP contract pricing provisions.

By combining the expertise of all three firms, we believe that we can deliver the most robust and accurate pricing mechanism for replacement water sales by AVSWCA to the watermaster.

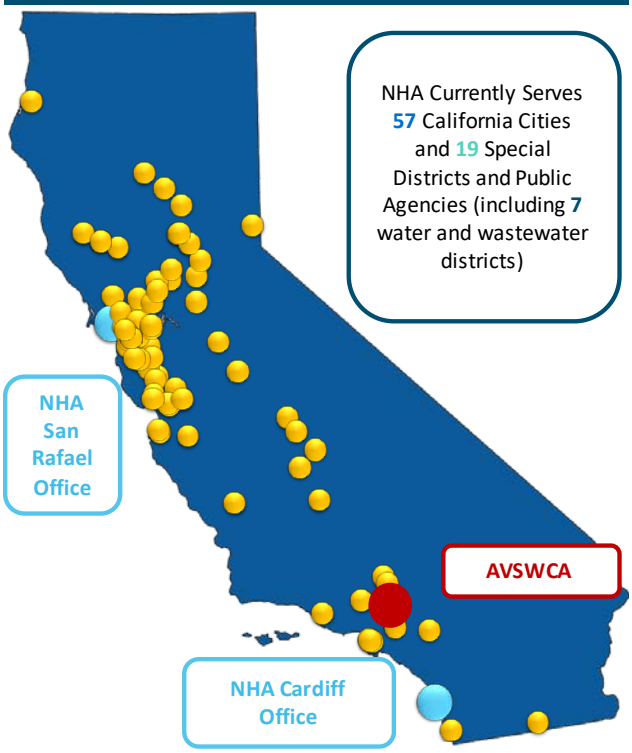
The diagram below outlines the proposed roles for each firm and the expertise of each team member. The remainder of this Section II further demonstrates the relevant expertise of each firm. A Statement of Qualifications (SOQ) with resumes for each team member is included in the appendices to this proposal.

QUALIFICATIONS OF NHA

NHA Advisors, LLC is a privately-owned Independent Registered Municipal Advisor headquartered in San Rafael and specializes in providing hands-on municipal advisory and consulting services to local government agencies ***only in California***, with a primary focus on utility districts, community services districts, cities, and successor agencies to redevelopment. NHA Advisors has an unmatched presence in Northern California and our client relationships, many of which exceed 10 (even 20!) years, are the result of "doing what it takes" and often begin through a referral from a neighboring public agency.

NHA is led by three Principals: Mark Northcross, Craig Hill and Eric Scriven. Each of these Principals have more than 26 years of public finance experience in California. They are supported by two Vice Presidents, Rob Schmidt and Mike Meyer, each of whom have more than 14 years of public financing experience. Christian Sprunger, Associate, supports this team in an analytical capacity. All of our registered municipal advisors have passed their Series 50 exam and are fully licensed with the SEC and MSRB.

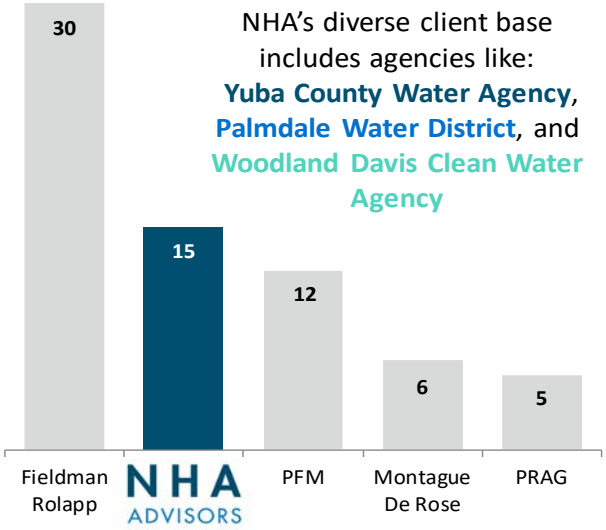
NHA's Current Clients



NHA's Water Financing and Project Management Experience

NHA has served as municipal advisor for 35 water-related projects in 23 California utility districts and cities statewide since 2013. Of those projects, 23 were bond financing transactions ($559 million total par value) and 12 were special consulting assignments. The ranking chart shows municipal advisor rankings in in terms of numbers of clients statewide.[1] **Since January 2013, we have completed financings for 15 different utility districts, cities, and financing authorities.** True expertise in water finance is not measured by the dollar amount of financings a firm has done, but by the breadth and diversity of the firm's clients. We have included a detailed list of our diverse water project management and consulting experience throughout the State of California since 2013 in our SOQ in Appendix A. As detailed on that list, Mark Northcross has extensive experience with water financing transactions.

MOST ACTIVE ADVISORS TO CALIFORNIA PUBLIC AGENCIES
Number of Special District and City Water Financing Clients (January 2013 - Present[1])



NHA's diverse client base includes agencies like: **Yuba County Water Agency**, **Palmdale Water District**, and **Woodland Davis Clean Water Agency**

There are a wide variety of water utility credit types in California and NHA has a broad client base that includes the following types of water utilities:

1) Major water retailers
2) Major water wholesalers
3) Major water suppliers

[1] Source: State of California; all water financings for cities and special districts statewide, as of March 2018

4) State Water Project contractors
5) State Water Project suppliers
6) Urban water utilities
7) Agricultural water utilities

This diversity of experience enables us to truly serve our water industry clients. We know the business from the customer management challenges of a retail utility to the high-level complexities of State Water Project contracts and supply contracts with DWR. Based on experience, we know when SRF funding and grants are a realistic funding option and can advise staff accordingly. We have dealt with the "four seasons of California (fire, flood, earthquake and drought) for our water clients. Equally as important, we have developed financial solutions for utilities facing major Prop 218 challenges. **NHA's diversity of experience makes it uniquely qualified to provide insight and financial management expertise to California's water utilities.**

NHA Personnel

NHA maximizes value to our clients by leveraging the key strengths of all six of our municipal advisors depending on the project scope. We dedicate at least two senior level advisors for every engagement to ensure the highest level of client service, maximize availability to attend meetings, and leverage each member's unique expertise. Mark Northcross heads NHA's water utility practice. Mark has been structuring bond issues for public agencies since 1981. He did his first water utility financing in 1983 for San Bernardino Municipal Water District. He knows the capital markets and has seen a great deal of change in how public projects are financed over the last 37 years. Mark has also delivered financing solutions for water utilities stressed by drought, earthquakes, and Prop 218 challenges. He is dedicated to a "holistic" approach to funding water projects that looks beyond market rate bonds to include SRF loans, grants, and P3 structures.

Mark is supported by Rob Schmidt, Vice President, and Christian Sprunger, Associate. Mr. Schmidt will serve as a project manager on NHA's team, assisting Mark to ensure that the consulting team meets project deadlines set by AVSWCA. Mr. Sprunger will assist both Mark and Rob in an analytical and project support role. Complete team resumes are included in NHA's SOQ in Appendix B.

References for NHA

Name *Title*	Public Entity	Term of Service	Main Services Provided	Contact Information
Dennis Diemer *Fmr. General Manager*	Woodland Davis Clean Water Agency	2012 - Present	Financial advisor for approximately $200 million DBO for a new water treatment plant	dennis@diemerengineering.com (925)-876-0111
Teri Daly *Administrative Manager*	Yuba County Water Agency	2016 - Present	Financial advisor for a $72 million refinancing of a wholesale water utility debt for levee construction	tdaly@ycwa.com (530)-741-5000
Brian Lockwood *General Manager*	Pajaro Valley Water Management Agency	2015 - Present	Financial advisor for a restructuring of debt securities based on water wholesale agreement	lockwood@pvwater.org (831)-772-9292 x26
Mike Williams *Finance Manager*	Palmdale Water District	2009 - Present	Financial advisor for a financing in the midst of Prop 218 litigation	mawilliams@palmdalewater.org (661)-947-4111 x1047

QUALIFICATIONS OF HF&H

For the past thirty years HF&H has provided financial and economic consulting services to water and wastewater agencies. A copy of our Statement of Qualifications is included in Appendix B of this proposal. Our SOQ describes our services and lists our clients, which includes experience related to the proposed project. Our experience demonstrates our ability to develop innovative quantitative frameworks that reflect the unique circumstances in each project. The following projects are related to deriving charges for pumping groundwater. Each project contains a unique analytical approach that we developed. Each approach reflects our experience with industry practices for setting rates that are legally defensible.

United Water Conservation District – Groundwater Extraction Charges (2011 - present)

The District was sued by the City of Ventura over the District's groundwater extraction charges, which are higher for municipal and industrial pumpers (M&I) than for agricultural pumpers. The City prevailed at the trial court level, which found that the groundwater extraction charges were subject to Proposition 218 and required the District to refund the difference.

As a precaution in subsequent years, HF&H was hired by the District to confirm the rate differential between M&I and Ag pumpers. HF&H has conducted annual cost-of-service studies since 2011 that have confirmed the rate differential.

An appellate court decision reversed the trial court decision in the District's favor. Upon appeal, the California Supreme Court ruled in *City of San Buenaventura v. United Water Conservation District,* Supreme Court Case No. S226036, that the District's groundwater extraction charges are not subject to Proposition 218. The case was remanded to the appellate court for further review of the cost basis for the charges, at which point our cost-of-service analyses can be added to the administrative record.

Our cost-of-service analysis classifies the District's charges into three service categories: replenishment, reliability, and regulatory compliance. Replenishment costs are allocated between M&I and Ag pumpers based on their respective consumptive uses (i.e., total pumpage minus return flows and natural recharge). Reliability costs are allocated between M&I and Ag pumpers based on their respective uses of the basin safe yield, where M&I pumping is given priority because of its higher beneficial use. Regulatory compliance costs are allocated between M&I and Ag pumpers based on their respective contributions to overdraft.

Santa Ynez River Water Conservation District – Groundwater Charges (2014)

The District retained HF&H to evaluate its groundwater charges per reach along the Santa Ynez River between Lake Cachuma and the City of Lompoc. We allocated costs to the six subbasins and aggregated them by alluvial and upland zones to derive blended groundwater charges. The resulting charges by basin and by type of pumper within each basin were compared with the existing District-wide charges. The District elected to continue the practice of charging the same District-wide charge. Our approach to allocating costs by reach was patterned after the State Water Project. Fixed and variable costs were allocated either across all reaches or by reach in proportion to the benefits received.

Water Replenishment District of Southern California – Replenishment Assessments (2011)

The District was sued by three cities (*Cities of Cerritos, Downey, and Signa l Hill v. Water Replenishment District of Southern California,* Los Angeles Superior Court Case No. BS128136) in the eastern portion (Central Basin) of its basin because they were charged the same rate as the western portion (West Coast basin) despite the fact that the cost of replenishment in the Central Basin is

lower. Whereas Central Basin replenishment water comes from natural recharge and recycled water in addition to the more expensive imported water, replenishment water for the West Coast basin is mostly imported water. HF&H was retained by the plaintiffs as expert witnesses to calculate the respective replenishment assessments for each basin. The court ruled in favor of the plaintiffs, granting a $10 million award.

HF&H conducted cost-of-service analyses for six prior years, which indicated that the cost of replenishing the Central Basin was one-third of the West Coast Basin. District-wide costs were allocated to both basins and the cost of replenishment water was allocated based on which source of water was used in each basin.

Santa Clara Valley Water District – Cost-of-Service Study (2000 – 2009)

Santa Clara Valley Water District

HF&H performed the first cost-of-service study for the District, which provides surface water and groundwater to M&I and Ag customers. The analysis comprised two different approaches to allocating costs, one of which pooled costs among classes of customers and another that apportioned costs to surface and groundwater functions. The latter approach yielded a greater difference in the charges for each type of water than were found in the District's existing approach to setting its charges.

HF&H later provided litigation support to the District over groundwater charges (*Great Oaks Water Co. v. Santa Clara Valley Water District,* Santa Clara Superior Court Case No. 1-05-CV053142). Plaintiffs alleged that the District's groundwater charges violated Proposition 218. Contrary to decisions mentioned above in United Water Conservation District, an appellate court found that the District's groundwater charges are subject to Proposition 218. This case is currently pending in the California Supreme Court.

HF&H Personnel

Resumes for Jon Farnkopf, Rick Simonson, and Geoff Michalczyk are included in our SOQ in Appendix B. We work as a team on HF&H's water, sewer, stormwater, and related studies; additional assistance from junior staff is sometimes required. We are located in HF&H's Walnut Creek office.

John Farnkopf brings unique experience to the proposed project. After graduating from Cal (where David K. Todd was his faculty advisor and from whom he studied groundwater hydrology), he pursued a career in water resources engineering at Stetson Engineers. There he assisted in preparing watermaster reports (Santa Ynez River basin). During that time he also provided litigation support regarding wholesale water rates. Since then he worked for other engineering and management consulting firms conducting water and wastewater rate and development fee studies for wholesale water and wastewater agencies before co-founding HF&H in 1989.

Rick Simonson and Geoff Michalczyk have accounting and economics backgrounds that forms an invaluable complement to John's water resources background. As a team, we are able to develop rate-making solutions tailored to the case at hand. Evaluating groundwater charges is challenging, particularly in adjudicated basins with court judgments that establish watermaster requirements, pumping rights, storage and transfer conditions, and accounting for carryover water and replacement obligations. Our expertise with groundwater resources, rate-making techniques, and the law governing wholesale and retail rate making in California allows us to translate the requirements in judgments into cost allocations based on pumpage and storage data that yield legally defensible rates and charges.

References for HF&H

HF&H has been involved in highly consequential litigation over groundwater charges and through this experience has demonstrated innovative capabilities of blending our expertise in groundwater resources with our expertise in wholesale and retail water rate making. The following references can attest to our capabilities as expert witnesses and rate analysts.

Name *Title*	Public Entity	Term of Service	Main Services Provided	Contact Information
Mauricio Guardado *General Manager*	United Water Conservation District	2011 - Present	Annual Cost of Service Studies	805-525-4431
Bruce Wales *General Manager*	Santa Ynez River Conservation District	2014	Evaluate Groundwater Charges and Allocat Costs to Multiple Subbasins	805-688-8065
Patty Quilizapa, Esq. *Plaintiff's Counsel* *Aleshire &Wynder*	Water Replenishment District (Now with MWD)	2011	Replenishment Assessment Calculations and Cost of Service Assessments	213-217-6834
Tom Berliner, Esq. *District's Counsel* *Duane Morris*	Santa Clara Valley Water District	2000 - 2009	Initial Cost of Service Study and Litigation Support	415-957-3333

We note that Dwayne Chisam should be familiar with our rate-making expertise from when we set retail water, wastewater, and solid waste rates for the City of Los Banos when he was Public Works Director there in 2010.

QUALIFICATIONS OF PROVOST & PRITCHARD CONSULTING GROUP

In 1968, Provost & Pritchard Consulting Group began a tradition of engineering excellence in the San Joaquin Valley. Over the course of 50 years, Provost & Pritchard has grown in size, services offered, and geography with eight office locations California. With over 170 employees, our staff is diverse in their specialties, including civil and agricultural engineers, hydrogeologists, environmental specialists, planners, land surveyors, construction managers and field representatives, and support personnel.

Provost & Pritchard continues to be a leader in water resources engineering, providing a variety of services to help clients maximize the benefits from their water supplies. Those services include:

- Water quality studies and solution development
- Water Resources master planning
- Water supply wells design and construction management
- Water and wastewater treatment studies and design
- Conveyance, distribution and drainage design
- Groundwater management planning
- Water transfers and exchanges program development
- Geographic Information Systems (GIS)

Key Personnel

Dan Flory is a principal engineer specializing in water resources with Provost & Pritchard. Mr. Flory has more than 35 years of experience in water resources engineering including six years as the general manager of the Antelope Valley-East Kern Water Agency. He served in 28 progressively more responsible roles for the California Department of Water Resources, culminating in his position as the department's executive manager. He worked an additional four years in engineering with the California Department of Water Resources. He is an experienced advisor to legislative staffs, appointed officials and board members as well as serving as an expert witness providing testimony in litigation involving water rights.

References for Provost & Pritchard

Name *Title*	Public Entity	Term of Service	Main Services Provided	Contact Information
Dwayne Chisam *General Manager*	Antelope Valley East Kern Water Agency	2015-ongoing	Consulting Services	(661) 943-3201
Tom McCarthy *General Manager*	Mojave Water Agency	2017-on-going	Consulting Services	(760) 946-7000
Jeff Davis *General Manager*	San Gorgonio Pass Water Agency	2016-ongoing	Consulting Services	(951) 845-2577
Dale Melville *General Manager*	Dudley Ridge Water District	1972-ongoing	Consulting Services	(559) 449-2700

III. PROPOSED COMPENSATION

Our fee estimate for the scope of services requested in AVSWCA's RFP is shown in the table below which provides a breakdown by task and by team member performing the task. The estimate reflects our current understanding of AVSWCA's requirements. We would expect to review the budget with the Authority during the preparation of the contract to ensure that it accurately reflects AVSWCA's needs. AVSWCA will be billed monthly on a time-and-expenses, not-to-exceed basis. Direct expenses are billed at cost with no markup. No out-of-scope work will be undertaken without prior written approval from AVSWCA. We will notify the AVSWCA as soon as we determine that out-of-scope work is requested and will request additional funding prior to proceeding. Out-of-scope work is work in addition to the estimated hours that are not due to inefficiency on our part, or work on additional tasks not identified in our fee estimate.

We need to make one important clarification in our proposal regarding the scope of work. The scope assumes 12 bi-weekly status/progress *meetings.* Our scope and compensation assumes that the first and last of these 12 meetings will be face-to-face meetings. We assume that the other 10 meetings will be via conference call or an internet meeting website such as GoTo Meeting. Mark Northcross is available to make three separate presentations to AVSWCA members boards. Our fee estimate assumes the following with regard to meetings, as noted in the AVSWCA RFP:

Task 1 – Projection Management, Communication, and Data Collection: The project executive and project manager shall attend an onsite kick-off meeting in Early July 2018 and participate in bi-weekly status/progress conference calls throughout the project via telephone conference. The RFP does not include a target completion date; therefore, based on an estimated project length of approximately six months, our fee estimate assumes twelve bi-weekly status/progress meetings.

Task 2 – Perform Analysis of Costs: The project executive and project manager shall organize a conference call meeting to review the preliminary results and draft technical memorandum with staff.

Task 3 – Prepare Report: We will facilitate two conference calls with Authority staff to review and discuss the draft report and incorporate staff's comments into a final draft report to be presented at the AVSWCA Commissioner meeting. The project executive and project managers shall attend and provide support at the AVSWCA Commissioner final report briefing meeting to present the results of the analysis.

	NHA Team			HF&H Team					Provost & Pritchard		Totals
Name	Northcross	Schmidt	Sprunger	Farnkopf	Simonson	Michalczyk			Flory		
Role	*Project Leader*	*Project Manager*	*Project Analyst*	*Project Director*	*Project Manager*	*Project Analyst*	*Admin*	*Travel Expenses*	*Project Manager*	*Travel Expenses*	
Hourly Rates	$325	$275	$150	$280	$250	$150	$115		$215		
Task 1 - Project Management, Communication and Data Collection											
Task hours	20	4	8	22	24	12	0	1 Meeting	30	1 Meeting	120
Task fees	$6,500	$1,100	$1,200	$6,160	$6,000	$1,800	$0	$1,500	$6,450	$1,200	$31,910
Task 2 - Perform Analysis of Costs											
Task hours	12	6	16	24	28	48	4		30		168
Task fees	$3,900	$1,650	$2,400	$6,720	$7,000	$7,200	$460		$6,450		$35,780
Task 3 -Prepare and Present Report											
Task hours	32	4	20	24	12	6	6	1 Meeting	20	1 Meeting	124
Task fees	$10,400	$1,100	$3,000	$6,720	$3,000	$900	$690	$1,500	$4,300	$1,200	$32,810
Total hours	64	14	44	70	64	66	10		80		412
Total fees	**$20,800**	**$3,850**	**$6,600**	**$19,600**	**$16,000**	**$9,900**	**$1,150**	**$3,000**	**$17,200**	**$2,400**	**$100,500**
								Total Not To Exceed			**$100,500**

Note: NHA Advisors will not charge for California travel expenses

JUNE
2018

STATEMENT OF QUALIFICATIONS TO PROVIDE FINANCIAL ADVISORY SERVICES

FOR

CALIFORNIA WATER UTILITY CLIENTS

By

NHA | ADVISORS
Financial & Policy Strategies. Delivered.
4040 Civic Center Drive, Suite 200
San Rafael, CA 94903
Phone: (415) 785-2025
www.NHAadvisors.com

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I. FIRM PROFILE AND QUALIFICATIONS

FIRM OVERVIEW

NHA Advisors, LLC is a privately-owned Independent Registered Municipal Advisor headquartered in San Rafael and specializes in providing hands-on municipal advisory and consulting services to local government agencies ***only in California***, with a primary focus on utility districts, community services districts, cities, and successor agencies to redevelopment. NHA Advisors has an unmatched presence in Northern California and our client relationships, many of which exceed 10 (even 20!) years, are the result of "doing what it takes" and often begin through a referral from a neighboring public agency.

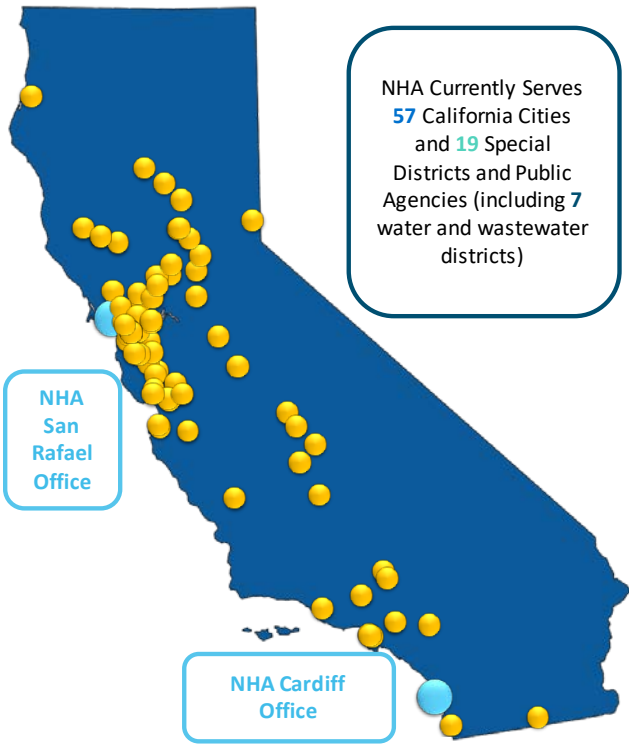
NHA is led by three Principals: Mark Northcross, Craig Hill and Eric Scriven. Each of these Principals have more than 26 years of public finance experience in California. They are supported by two Vice Presidents, Rob Schmidt and Mike Meyer, each of whom have more than 14 years of public financing experience. Christian Sprunger, Associate, supports this team in an analytical capacity. All of our registered municipal advisors have passed their Series 50 exam and are fully licensed with the SEC and MSRB.

Bond Financing – The principals of NHA has been advising California public agencies for more than three decades. **Since 2013 NHA has served as financial advisor for 139 bond financing transactions.** Our transactions have included all types of district-related needs, including a large number (34) utility revenue bonds.

Project Consulting – Although NHA is one of the most experienced advisors with respect to executing municipal finance transactions, we are more than just a "bond shop." **Since the beginning of 2013, NHA staff has completed more than 184 unique consulting assignments for its clients.** While this level of service is not commonly provided by municipal advisors, our "*extension of staff*" services have become a critical benefit to many of our clients given the financial and staffing pressures that have lingered past the recent economic downturn.

Our consulting services cover a wide range of areas, from capital planning and fiscal sustainability to reserves consulting. A growing element of our consulting practice has been CalPERS and pension consulting. These services

NHA's Current Clients



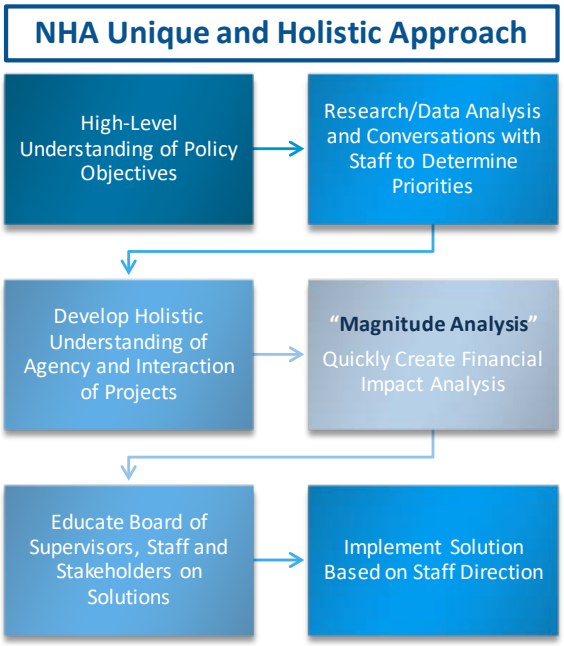
NHA Advisors LLC - Key Information	
Organization Type	Limited Liability Company (LLC)
Principals	Craig Hill, Mark Northcross, and Eric Scriven
Lead Office Location	4040 Civic Center Drive, Suite 200 San Rafael, CA 94903
Website	www.NHAadvisors.com

NHA's Statewide Financing Experience 2013-Present

Type of Project	Deals
Utility Revenue Bonds	34
Lease Revenue Bond/COP	27
Tax Allocation Bond	24
Special Tax/Assessment District Bonds	20
Tax and Revenue Anticipation Notes	15
General Obligation Bonds	13
Sales Tax Revenue Bonds	4
Side Fund/ CalPERS Refinancing	2
Total Bond Financing Projects	**139**
Total Other Consulting Projects	184

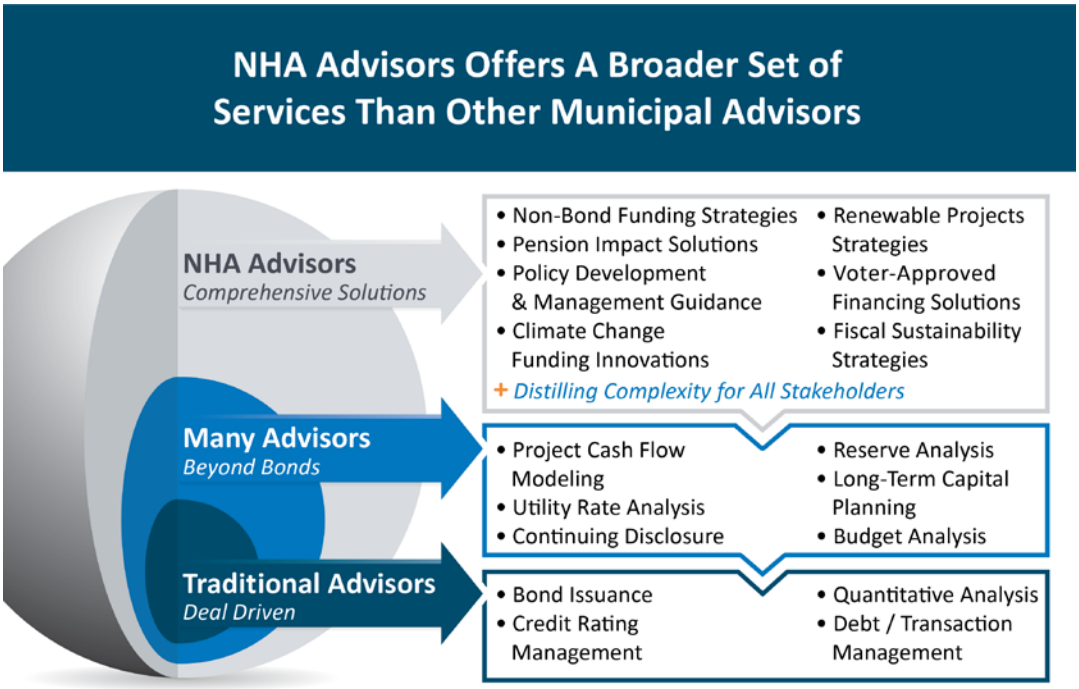
range from analyzing and projecting future contribution requirements to providing presentations to staff and elected officials on strategies for managing and mitigating the unfunded portion of the liability.

NHA has also been actively consulting California agencies on green and renewable energy projects, as well as on climate change infrastructure. In Fall 2017, NHA was selected as the financial advisor for the Resilient by Design Bay Area Challenge, a year-long collaborative design challenge bringing together local residents, public officials, and local, national, and international experts to develop ten innovative community-based solutions to strengthen the region's resilience to climate change. A key element of NHA's role is to prepare educational materials and presentations for design teams and stakeholders to translate complex ideas and financing plans for climate change infrastructure and make those concepts understandable for non-finance professionals.



UNIQUE APPROACH TO ADVISORY SERVICES

NHA is a holistic, client-oriented, and hands-on municipal advisor. This means that the first step in our process is listening to our client to understand your needs. We are a team player and pride ourselves in being accessible to our client's staff. We will assign at least two senior level advisors to each project to ensure open communication with our clients, utilizing email, telephone, and in-person meetings according to our client's preferred method of communication. NHA will attend all Board meetings and any special meetings with staff, bond counsel, disclosure counsel, credit enhancement firms, and rating agencies as our client deems necessary. All projects are unique and NHA commits to "***doing what it takes***" to manage the process to achieve a successful result for our client and other stakeholders.



DIVERSE PROBLEM-SOLVING EXPERIENCE

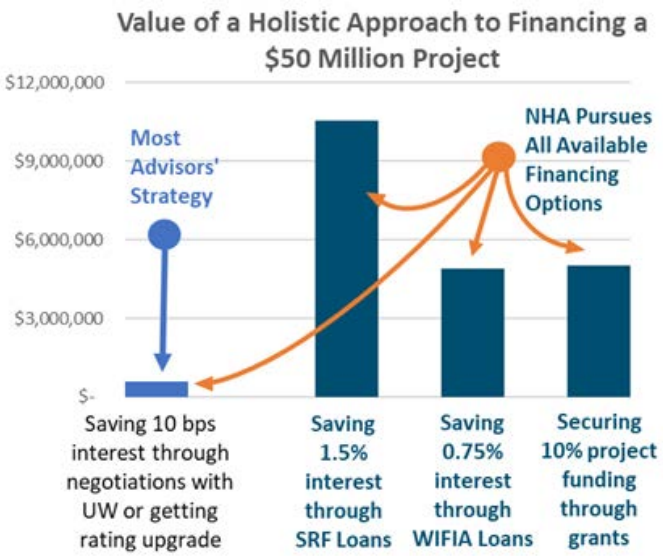
The focus of our principals for over three decades has been on problem solving for public entities in California – and not just the problems that can arise with debt financing. Consider the table below, summarizing our problem-solving experience over the years. Our problem-solving experience addresses a litany of municipal disasters: bankruptcy, bond defaults, earthquakes, droughts, floods, and climate change. **NHA has met each of those challenges for our clients by coming up with cutting edge solutions, by rethinking the way things are normally done, and above all, by finding the "win-win" solution.**

NHA's Problem Solving Experience

Experience	Examples
Dealing with Litigation Against a Rate Increase Under Prop 218	City of Davis, Palmdale Water District
Dealing with Voter Initiative Challenging a Rate Increase Under Prop 218	City of Davis
Management and Finance Solutions for Rate Covenant Violations	City of Corning, City of Davis, City of Napa, City of Oxnard, Palmdale Water District,
Earthquake Recovery Funding	City of Santa Cruz (1989 Loma Prieta Earthquake), City of Napa (2014 South Napa Earthquake)
Fire Prevention Funding	City of Hermosa Beach
Municipal bankruptcy	Richmond Unified School District, Town of Mammoth Lakes
Work-Out of Defaulted Bond Issues	City of Alameda (1 bond issue), City of Cotati (1 bond issue), City of Gilroy (1 bond issue), City of Palmdale (3 bond issues), City of Scotts Valley (7 bond issues), West Contra Costa Unified School District (1 bond issue), City of Yuba City (1 bond issue)
Flood Prevention Funding	City of Palmdale, City of Santa Cruz, Yuba County Water Agency
Water Utility Financing During Drought-Related Use Cutbacks	Cambria CSD, City of Corcoran, City of Corning, City of Davis, City of Napa, Pajaro Valley Water Management Agency, City of Lakeport, Palmdale Water District, City of Yuba City
Management Solutions for CalPERS/OPEB Obligations	Pension analysis and consulting for over 30 public entities
Leveraging Public Finance with Grants	Cambria CSD, City of Davis, City of Rocklin, City of Scotts Valley, Woodland Davis Clean Water Agency
SRF Loans	City of Davis, Pajaro Valley Water Management Agency, Palmdale Water District, City of Santa Cruz, City of Yuba City
Public Private Partnerships	10 different public entities, 13 different developers
Funding Liability Insurance Pools	CSAC Excess Insurance Authority, Independent Cities Risk Management Auth.
Funding Climate Change Adaptation	San Francisco Bay Conservation and Development Commission, Resilient by Design Bay Area Challenge

We have found solutions to enable our utility clients to debt finance critical projects not only in the middle of Prop 218 litigation, but also during a voter initiative challenging a Prop 218 process. We have delivered funding to clients in the aftermath of major earthquakes and funding to water utility clients facing severe financial challenges from drought. **There is an expression that the "four seasons of California are fire, flood, earthquake and drought." NHA has successfully delivered financial solutions for all four of them for our clients over the years, as shown by the table above.**

VALUE OF A HOLISTIC APPROACH TO FINANCING PROJECTS



The graphic to the right shows the relative value of a holistic approach to a client's funding needs. If a municipal advisor can save a client 10 basis points on a financing through a rating upgrade or negotiation with bond underwriters, it is worth approximately $600,000 on a present value basis for $50 million bond issue. That is much more than the cost of the typical municipal advisor fee. But if our client is served by an advisor that helps them obtain a below market rate SRF or WIFIA loan for the utility, the present value savings of the below market interest rate on an SRF or WIFIA loan is between $5 and $10 million on a present value basis for a $50 million financing. If the municipal advisor can direct their client to a grant funding source that can fund just 10% of the project costs, that also saves $5 million in present value. **NHA pursues all available financing options as part of our holistic approach for delivering the lowest cost project funding for our clients. We go beyond simply negotiating with the underwriter over discount or presenting a case to the rating agencies for a rating upgrade and we find the lowest cost money for the project.**

ALTERNATIVE FUNDING SOURCES FOR WATER UTILITIES – OUR HOLISTIC APPROACH

As the graphic above demonstrates, we do more than lead a response to the financial challenges - we find new ways of funding projects, and new ways of structuring public finance through our holistic funding approach. NHA believes that the role of a municipal advisor should be more than structuring and negotiating bond issues, and that it should include finding the least costly and most suitable way to fund a project. This means that incorporating below market rate financing programs like SRF into the financing plan and finding grant money to cover a portion of the project cost is as important as negotiating a bond issue. **This approach to securing below-market rate loans or grant money for projects sets us apart**. We are not grant writers per se, but we are very familiar with the most reliable grant funding sources and can direct our clients to them.

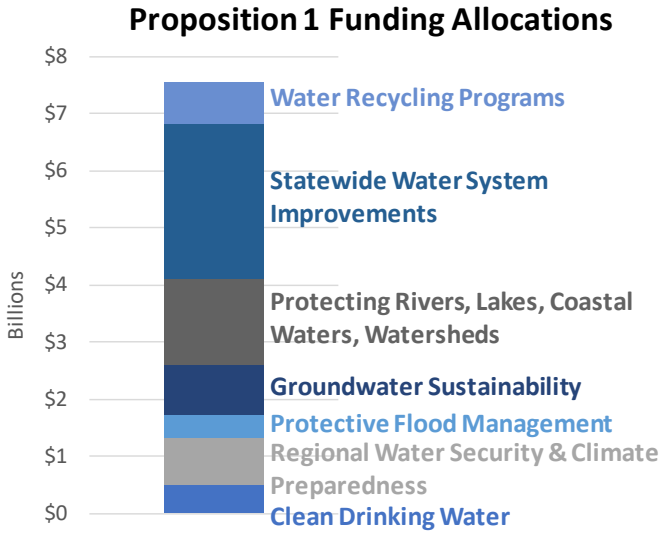
SRF Funding: NHA Advisors is experienced in obtaining SRF funding for major utility projects. It is very important for California water districts to consider this option because SRF now provides 30-year amortization, at an interest rate roughly half of the interest rate on the State's last general obligation bond. **Market rate financing cannot compete with SRF loan rates, even for a "AAA"-rated credit.**

We believe that one of the biggest issues for California water districts is long term rate management. **If and when ratepayer push back develops, a water utility must be able to demonstrate that it has been proactive in applying for eligible SRF funding to lower borrowing costs, even if that means that the District only gets $5 million in SRF funding on a $50 million CIP.** In our opinion, the political benefit of being able to make that representation to ratepayers outweighs the challenges of working with the SRF staff on the application.

State Grants: Many federal and state agencies offer grants or loan support for water and wastewater projects. Priority is typically given to "green" projects, including projects that provide climate resilience and climate adaptation. We recommend that our clients focus on four major state and local grant programs, summarized in the table below. These major programs have the most money and typically allocate funds through several agencies. Following the table, is a description of the four programs and reference specific allocations under the applicable agency in the sections that follow. Note that this table also evaluates these major grant funding sources for their applicability to both predevelopment cost funding and project finance funding.

	Approximate Annual Funding Volume	One Tine Funding Amount	Availability	Key Project Eligibility Criteria	Regions and Communities of Competition	Funding Pre-Development Costs	Project finance funding
SB 1	$5 billion per year	N/A	Starts in 2018	Must be part of repair, improvements of roadways	Statewide. Cities, counties, public transit agencies and Caltrans	Yes	Yes, but one time grant
Cap and Trade	$2 billion per year	N/A	Now	Climate change mitigation or adaptation	Statewide	Yes	Yes, but one time grant
Proposition 1	N/A	$7.545 billion, of which $2.7 billion may be applicable to projects	Now	Watershed protection and restoration, integrated water management, flood management	Statewide	Yes	Yes, but one time grant
SB 5	N/A	$3.5 billion, of which at least $440 million is applicable to projects	If adopted by voters, funds available in 2019	Climate preparedness, habitat restoration and innovation	Statewide	Yes, if adopted	Yes, if adopted

1. ***Proposition 1 Funding**:* California Proposition 1, the Water Bond (Assembly Bill 1471), was approved by the voters on the November 4, 2014 ballot in California as a legislatively-referred bond act. The measure enacted the Water Quality, Supply, and Infrastructure Improvement Act of 2014. Proposition 1 authorized $7.55 billion in general obligation bonds for state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration. It was designed to appropriate money from the General Fund to pay off bonds and require certain projects to provide matching funds from non-state sources to receive bond funds.



Specific spending allocations in the proposition included:

- $520 million to improve water quality for beneficial use, for reducing and preventing drinking water contaminants, disadvantaged communities, and the State Water Pollution Control Revolving Fund Small Community Grant Fund.
- $1.495 billion for competitive grants for multi-benefit ecosystem and watershed protection and restoration projects.
- $810 million for expenditures on, and competitive grants and loans to, integrated regional water management plan projects.
- $2.7 billion for water storage projects, dams, and reservoirs.
- $725 million for water recycling and advanced water treatment technology projects.
- $900 million for competitive grants and loans for projects to prevent or clean up the contamination of groundwater that serves as a source of drinking water.
- $395 million for statewide flood management projects and activities.

2. ***SB 1 – Gas Tax Increase:*** The State adopted legislation this calendar year that increases statewide gas taxes by over $5 billion per year. While this money is primarily intended to address the accumulated deferred maintenance on the State's roadways, we believe that some of it can be directed to resilient infrastructure where that infrastructure directly benefits an existing State roadway.

3. ***Cap and Trade Revenues:*** California climate expenditures are among the most significant in the world and this is reflected in the availability of grant dollars, including those from Cap and Trade auction revenues. Consequently, before getting into the details of all the various State grant programs that may apply to resilient infrastructure, it is worth a deeper consideration of cap and trade revenues.

   There is an increasing recognition that climate adaptation and resilience projects need funding and much of this funding is coming from the cap and trade program. The recently enacted AB 398 extended the Cap and Trade program to 2030. The legislation identifies climate adaptation and resiliency as one of the seven priorities for investment of cap and trade revenues.[1] Passage of AB 398 helped stabilize the cap and trade marketplace and most observers expect available revenues to continue to be significant. Allocations approved in September 2017 of cap and trade auction revenues accumulated in the Greenhouse Gas Revenue Fund topped $1.5 billion. The Governor's budget for FY 2017-18 assumes $2 billion per year in Cap and Trade revenues.

   Most of the cap and trade spending is fixed per statutory formulas, but much is left to negotiation in the annual budget cycle. There is some discretion as the budget gets negotiated, but cap and trade spending generally adheres to spending priorities outlined in the State Cap and Trade Investment Plan. Given the sums involved, the negotiations can be quite robust. Some agencies, such as the Strategic Growth Council, are now receiving reasonably predictable funding from Cap and Trade revenues.

   Besides the Investment Plan, there are other documents to consider as part of the grant application process. The current draft of the Funding Guidelines document serves as a detailed primer on the inter-relationship between various climate spending priorities, including assuring co-benefits for residents of disadvantaged communities, low-income communities, and low-income households. Updated information on cap and trade expenditure programs and plans can be found on the ARB California Climate Investments website.

4. ***Potential SB 5 Funding***: The legislature and governor recently approved SB5, a $7.5 billion resources and climate bond measure to be placed on the June 2018 ballot. If approved by the voters, the measure would allocate over $440 million to climate adaptation and resiliency. The measure says eligible projects shall improve a community's ability to adapt to the unavoidable impacts of climate change, improve and protect coastal and rural economies, agricultural viability, wildlife corridors, or habitat, develop future recreational opportunities, or enhance drought tolerance, landscape resilience, and water retention.

WIFIA Loans: The EPA's new Water Infrastructure Finance and Innovation Act ("WIFIA") program provides long-term fixed-rate loans to public utilities for both water and wastewater projects of "regional significance." WIFIA loans are below market rate: the interest rate is the same as for a US Treasury obligation of comparable maturity. While determining if a water program falls within the EPA's categorization of a project of "regional significance" can be a time-consuming process, we believe that given the potential savings from these loans, WIFIA needs to

[1] The full list of priorities in AB398 includes: (1) air toxic and criteria air pollutants from stationary and mobile sources, (2) low- and zero-carbon transportation alternatives, (3) sustainable agricultural practices that promote the transitions to clean technology, water efficiency, and improved air quality, (4) healthy forests and urban greening, (5) short-lived climate pollutants, (6) climate adaptation and resiliency, and (7) climate and clean energy research.

be considered since the debt service reduction (and the rate impact) for our client's debt through a WIFIA funding program could be significant. Also noteworthy is the possibility of using a WIFIA loan in conjunction with SRF loan programs to minimize the issued bond size.

Pay for Performance Loans: Foundations and impact investors are now funding pay-for-performance loans. In the case of pay for performance loans, the actual payment amount is tied to metrics of project success. The potential application of this for a public utility is with respect to technology risk. While utility managers like to have their systems be state of the art, it is often very hard for a public utility to take the performance risk on relatively new and untested technology. Pay for performance offers a way to mitigate this risk for a public agency.

Distributed Utility Systems Financing: Distributed systems for power, water and sewer are being seriously considered in throughout the nation, and particularly in California. With respect to water supply, not only is centralized storm water recapture an important potential new supply source, but utilities are also considering distributed storm water recapture. Distributed lower level sewage treatment is also being considered for new commercial developments as a source of grey water for applicable uses.

One of the biggest challenges to the implementation of distributed utility systems is how to finance them. One of the most successful responses to date has been the PACE financing mechanism for distributed solar retrofits. However, in view of increasing pushback from mortgage lenders, it is not clear how sustainable the application of PACE financing to distributed utility systems is. Another potential option is on-bill repayment, an option that has been used by investor owned utilities in limited applications. The challenge with IOU's has been that the California Public Utilities Commission (CPUC) to date has not allowed the on-bill financing "lien" to stay with the meter, regardless of changes in the named ratepayer. Muni utilities are not subject to CPUC regulation and may have some power to do this.

Starting with PACE programs for residential solar, the notion of structuring utilities as distributed, as opposed to centralized, systems is getting traction. With respect to wastewater systems, the key question is on-site water reuse. There are a number of projects in California where large commercial ratepayers are partially treating their own wastewater to enable on-site non-potable reuse. While NHA Advisors has no opinion as to the advisability of this approach, we do have ideas on how to finance it. We made a presentation at a recent ACWA conference on how to finance distributed systems, including onsite water reuse. Our preliminary thinking is that on bill financing may be the best way of financing onsite water reuse for major institutional water customers.

Clean Renewable Energy Bonds (CREBs): The Clean and Renewable Energy Bond program offers financing alternatives to public agencies for financing renewable energy projects, based on a federal list of technologies qualifying for the energy production tax credit. This program began in 2005 and has evolved since then, but essentially the issuer sell bonds (through public offering or private placement) and is obligated to repay the principal on the bond and a portion of the interest. Although interest received from a public agency's CREBs is subject to federal and state income taxes, the bondholder also receives federal tax credits in lieu of a portion of the interest, lessening the tax burden for the bond holder. The tax credit rate is set by the U.S. Treasury Department, based on the CREBs allocation by Congress.

NHA has significant experience working with California public agencies to issue CREBs to finance energy efficiency projects. In 2017, NHA worked with the City of Yuba City to finance a solar and battery system for their water and wastewater utility plants, enabling the City to significantly lower its ongoing operating costs of those facilities. We also worked with the City of National City to issue a CREB to finance energy improvements to administrative and police facilities. NHA will work with our clients to determine which portions of the capital improvement program can be financed through CREBs as an alternative to traditional financing sources.

Centralized Storm Water Recapture

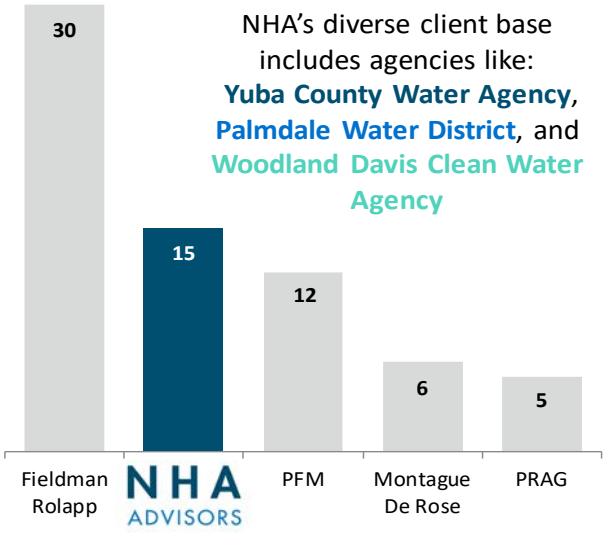
Another issue facing some water utilities is the need for enhanced centralized storm water recapture. In particular, where SGMA or adjudication may mandate a significant increase in groundwater recharge, groundwater dependent utilities may become involved in the storm water recapture business. NHA is experienced in financing options for these programs, from both a Clean Water SRF loan perspective, and from the perspective of a potential SB 231 storm water utility rate.

WATER FINANCING EXPERIENCE

NHA has served as municipal advisor for 35 water-related projects in 23 California utility districts and cities statewide since 2013. Of those projects, 23 were bond financing transactions ($559 million total par value) and 12 were special consulting assignments. The ranking chart shows municipal advisor rankings in in terms of numbers of clients statewide.[2] **Since January 2013, we have completed financings for 15 different utility districts, cities, and financing authorities. True expertise in water finance is not measured by the dollar amount of financings a firm has done, but by the breadth and diversity of the firm's clients.** We have included a detailed list of our diverse water experience throughout the State of California since 2013 in **Appendix C.** As detailed on that list, Mark Northcross has extensive experience with water financing transactions. In order to demonstrate the value NHA added to various transactions and in order to give our clients a better understanding of NHA's approach to water financing projects, we also have included several **case studies** in Section III.

Statewide Water Experience 2013 - Present	
Total Projects	35
Total Bond Financings	23
Total Par Value of Bonds	$559 Million
Total Consulting Contracts	12
Total Public Agencies Served	23

MOST ACTIVE ADVISORS TO CALIFORNIA PUBLIC AGENCIES
Number of Special District and City Water Financing Clients (January 2013 - Present[1])



NHA's diverse client base includes agencies like: **Yuba County Water Agency**, **Palmdale Water District**, and **Woodland Davis Clean Water Agency**

There are a wide variety of water utility credit types in California and NHA has a broad client base that includes the following types of water utilities:

1) Major water retailers
2) Major water wholesalers
3) Major water suppliers
4) State Water Project contractors
5) State Water Project suppliers
6) Urban water utilities
7) Agricultural water utilities

This diversity of experience enables us to truly serve our water industry clients. We know the business from the customer management challenges of a retail utility to the high-level complexities of State Water Project contracts and supply contracts with DWR. Based on experience, we know when SRF funding and grants are a realistic funding option and can advise staff accordingly. We have dealt with the "four seasons of California (fire, flood, earthquake and drought) for our water clients. Equally as important, we have developed financial solutions for utilities facing major Prop 218 challenges. **NHA's diversity of experience makes it uniquely qualified to provide insight and financial management expertise to California's water utilities.**

[2] Source: State of California; all water financings for cities and special districts statewide, as of March 2018

CLIMATE CHANGE ADAPTATION EXPERIENCE

NHA is uniquely qualified amongst financial advisors in providing expertise on funding solutions for climate change adaptation projects. NHA serves as financial advisor for the Resilient by Design Bay Area Challenge. In this role, he is working with a team to develop financing plans for 10 design team different designs for adapting the Bay Area to rising sea levels. A key element of NHA's role is to develop grant funding options for climate change infrastructure projects. In that role, NHA prepared educational materials and presentations for design teams and stakeholders to translate complex ideas and financing plans for climate change infrastructure and make those concepts understandable for non-finance professionals.

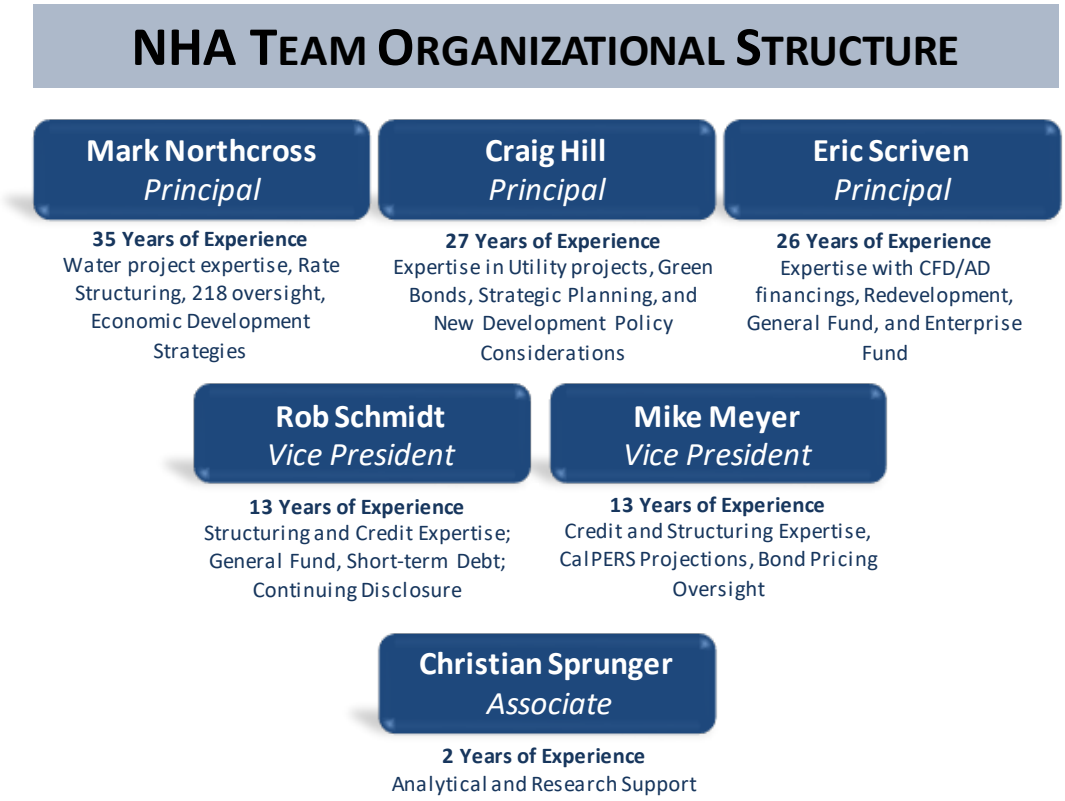
In addition to this demanding role, Mark Northcross also serves on the Bay Conservation and Development Commission's Finance the Future committee, which is focused on finding ways to fund protection against rising sea levels. Our work with these programs has shown us that climate change adaptation programs are some of the best sources of pre-development funding (interim finance) for climate change infrastructure projects. We believe that we can find grant funding through climate change infrastructure channels for a significant portion of the interim finance needs.

NHA has made presentations on funding for climate change adaptation for the Bay Area Council, the Bay Planning Coalition, the California Climate Action Planning Conference and the Floodplain Management Association. NHA also serves as the public finance expert for the Joint Quebec-California-Ontario Clean Climate Transport Research Partnership.

II. STAFF QUALIFICATIONS

NHA maximizes value to our clients by leveraging the key strengths of all six of our municipal advisors depending on the project scope. We dedicate at least two senior level advisors for every engagement to ensure the highest level of client service, maximize availability to attend meetings, and leverage each member's unique expertise. Mark Northcross heads NHA's water utility practice. Mark is supported by the entire NHA team, as the organizational chart below demonstrates. Complete team resumes are included in Appendix B.

Mark has been structuring bond issues for public agencies since 1981. He did his first water utility financing in 1983. He knows the capital markets and has seen a great deal of change in how public projects are financed over the last 37 years.



III. RELEVANT CASE STUDIES

We believe the best way of demonstrating our approach to water financing is to do a "deep dive" into 4 water utility projects through the following case studies. References for our water-related financing experience and references demonstrating long-term relationships with several public agencies are provided in **Section IV.**

Woodland Davis Clean Water Agency - Financing a DBO for a Major Water Project

WOODLAND-DAVIS Clean Water Agency
A partnership for a sustainable future.

The Cities of Woodland and Davis formed the Woodland Davis Clean Water Agency (WDCWA) joint powers authority 10 years ago and embarked on a program to obtain water rights to the Sacramento River and replace their existing groundwater systems with a surface water system. NHA serves as financial advisor to both WDCWA and the City of Davis. After years of planning and executing, the $279 million project went into operation in 2016. Both cities decided that the best approach to undertaking the creation of a new surface water treatment plant for two ground water utilities was to utilize a

design/build/operate ("DBO") approach. The winning bidder was CH2M Hill and the water treatment plant was completed on schedule and under budget.

NHA served as municipal advisor for WDCWA to finance the entire construction costs with a combination of SRF loans and water revenue bonds. The two cities each financed their share of the project costs separately. NHA reviewed and validated the financing plan for the SRF loan submittal and processing, and at the same time educated both elected officials and the community about the project. In the end, 80%+ of the cost of the water treatment plant was funded through SRF loans. We are proud to have been part of this very successful process.

Yuba County Water Agency - Project Financing Based on Wholesale Water Sales

Yuba County Water Agency (YCWA) is co-obligor with Yuba County on $72 million in bonds used to fund levee improvements for the Yuba River, Feather River, and Bear River. However, at present, YCWA pays all of the debt service. NHA served as municipal advisor to YCWA in refinancing and restructuring of the original 2008 bonds in late 2016.

YCWA generates the bulk of the revenues pledged to the bonds through the sale of water from its New Bullard's Bar reservoir to DWR, under the authority of the Yuba River Accord. Revenue from these water sales comes from four different components. The primary component is an advance payment from DWR to YCWA for a set amount of water. Consequently, this cash comes in to YCWA as a lump sum but is only recognized as revenue under GASB accounting rules as the water is actually delivered to DWR. This large potential difference between actual cash received and cash showing in YCWA's CAFR as pledged revenue had resulted in problems with disclosure to bond investors. NHA worked with YCWA staff and legal counsel to redress these issues, restructure the legal documents, and correct past continuing disclosure issues.

City of Paso Robles – Advising on Water Sale Agreements for the Nacimiento Water Project

NHA served as the advisor to the City of Paso robles in a 2015 refinancing of the San Luis Obispo County Financing Authority's obligations for the construction of the Nacimiento Reservoir. The project is a water delivery pipeline project that was built by a consortium of public agencies, including the City of Paso Robles. NHA advised the City of Paso Robles regarding the impact that their negotiated water sale agreement would have on their enterprise and general funds. NHA worked with rate consultants and City staff to explore rate increase options and eventually implement a strategy to enable the City to pay their portion of the debt service on the project. As part of the structuring of this deal, City pays their portion of the debt service on the 2015 bonds directly to SLO County Financing Authority and treats those payments as an operating and maintenance cost rather than a debt service cost. This strengthens the coverage on the Financing Authority's bonds since the debt service at the local is treated as senior to all other debt service.

Pajaro Valley WMA – Restructuring Debt Security based on Water Wholesale Agreement

In 2014 and early 2015, NHA Advisors worked with Pajaro Valley Water Management Agency to implement new reserve policies and start the process for a Prop. 218 water rate increase. In 2015, NHA began working with Pajaro Valley Water Management Agency to structure the refinancing and consolidation of three existing debts (a COP and two SRF loans). Originally, the debt was used to fund the Agency's water treatment plant but was issued by the City of Watsonville, one of Pajaro Valley Water Management Agency's clients. Watsonville is the Pajaro Valley WMA's largest wholesale water customer. The debt service payments, however, were covered by the Agency through annual payments to the City to cover the obligation. During the 2016 refinancing, NHA worked to transfer the obligation of the debt service from the local level (City of Watsonville) to the Agency. This effectively moved the debt off the books of the City of Watsonville and onto Pajaro Valley WMA and saved the Agency the sizeable annual administration fee paid to Watsonville.

Concurrent with the 2016 refunding, NHA helped PVWMA gain approval for a 30-year, 1% State Water Resources Control Board (SRF) loan. In NHA's presentation to S&P, we demonstrated that PVWMA would maintain ample coverage and reserves to absorb the additional $1,000,000/year of "new" debt from the 2016 refunding and SWRCB loan, resulting in **a second rating upgrade from "A-" to "A**

City of Napa - Water Bond Refinancing Financing in the Aftermath of an Earthquake

The City of Napa issued $47.3 million in water revenue bonds in 2007 to fund improvements to a water treatment plant. Acting in its role as municipal advisor to the City of Napa, NHA informed the City in 2015 that the bonds were refundable with significant savings to the City, but that there were some challenges. First, the bond insurer had gone bankrupt during the 2008-09 financial meltdown. Second, the 2014 South Napa earthquake had done significant damage to the City's water pipeline network. While FEMA was reimbursing these projects, the enterprise was providing initial funding for the repair work put serious cash flow pressures on the water fund.

The biggest hurdle early on was the treatment of repair expenses for the South Napa Earthquake. Normally, replacement of water pipeline is treated as a capital expense and does not count as an operating expense when determining debt service coverage. However, since these improvements were being made in response to an earthquake, so they were classified as repairs under GASB and bond document definitions, not as capital improvements. This increased repair expense drove up operating expenses, adversely impacting debt coverage. Further, the FEMA reimbursements did not always show up in the same fiscal year as the repair expenses. This resulted in a timing mismatch between repair expenses and reimbursement revenues, further distorting the debt coverage ratio. The ultimate concern was that even if the utility enterprise had ample cash reserves to fund the repair projects, operating expenses increased so dramatically after the earthquake the enterprise could be forced to choose between a huge rate increase and defaulting on its rate covenant.

NHA Advisors worked with staff and came up with innovative solutions that enabled the refunding to move forward. We began by showing separate line items in operating expenses and revenues for all earthquake related repairs and FEMA reimbursements. Consequently, the investor could see clearly the unique impact of the South Napa Earthquake on the water utility cash flows. The next issue was how to address the earthquake repairs expenses in the rate covenant. Our solution was to work with bond counsel to design a rate covenant that provides an "out" in the event of a natural disaster. The City of Napa received a "AA-" rating from S&P on the refunding bonds despite the innovative rate covenant and a surety bond replacing the debt service reserve requirement. Consequently, the $43.5 million in refunding bonds were sold successfully at competitive bid, locking in significant cash flow savings.

CASE STUDIES FOR UTILITY FINANCINGS WITH MAJOR CREDIT CHALLENGES

Palmdale Water District - Water Financing in the Midst of Prop 218 Litigation

NHA Advisors structured a refinancing of approximately $12 million in water revenue secured debt for the Palmdale Water District in the midst of litigation challenging the District's existing rate structure. The refinancing was done through a private placement with a bank, with substantial cash flow savings to the District. The principals at NHA were serving as financial advisors to the District in 2009 when the District began a Prop 218 process to establish new water rates. The District retained a major, internationally-known rate consultant to develop a state-of-the-art new rate structure for the District. This structure was based on a complex formula that set individual water budgets for each ratepayer. A significant increase in rates was also proposed as the same time in order to facilitate the acquisition of new surface water supplies in anticipation of the final adjudication of the over drafted Antelope Valley groundwater basin. However, as the mortgage meltdown was reaching its peak, District's ratepayers noticed the complex and more expensive rate structure. During a time when the foreclosure rate in the District was around 10%, ratepayers could not

understand the water budget concept and did not want to pay more for water when they were struggling to pay their home mortgages. The City of Palmdale sued the District, challenging the entire rate structure.

In 2012, NHA Advisors determined that a prior debt obligation could be refinanced with significant savings. The challenge was how to find an investor for this refinancing with the risk of 218 litigation. NHA addressed this problem by (1) arranging for a private placement with a bank and (2) demonstrating that the District had the revenues and fund balances to pay debt service on the obligation even if the City of Palmdale was successful in the litigation. Consequently, the District received a very good bid from a regional bank. Prior to closing the refinancing, the District also reached a settlement with the City of Palmdale.

City of Corning - Issuing Insured Water Bonds without an Underlying Rating

In June 2016, NHA began working on a refunding of all utility debt for the City of Corning. As a small issuer, the City had issued its utility debt on a combined (water + sewer) basis over the last decade to fund critical infrastructure, with 75% of its debt issued using USDA loans, and only one issue marketed to bond investors (non-rated). Facing decreasing net water revenues due to State-mandated cutbacks, the City was forced to dip into reserves to make debt service payments over the previous two fiscal years, violating its rate covenant, and posing difficult decisions for the new City Manager and political risks for the city council since the constituency was wary of any rate increases. NHA was able to develop a multipronged solution to refunding all of the City's debt, ultimately generating $1.3 million in cash flow savings. NHA utilized creative water credit structuring with rate stabilization fund and deferred debt service to avoid the need for an immediate, drought-related rate increase. Finally, NHA negotiated a unique agreement with the bond insurance company to purchase an insurance policy for the water revenue bonds, even though the underlying bonds were not rated.

City of Yuba City - Successful Refunding of Water Revenue Bonds Through Local Distribution

In 2013, NHA Advisors structured a $21.7 million water revenue refunding bond for the City of Yuba City. The refunding bonds were sold through a negotiated sale with an underwriting firm that had many retail sales offices in the greater Sacramento Valley region. Ultimately, a significant portion of the bonds were purchased by residents of the Sacramento Valley who were willing to purchase the bonds at a lower interest rates because they were familiar with the "story" of the bonds.

NHA worked with the underwriter to schedule the bond sale process to accommodate a longer pre-marketing time and recommended to the City that the underwriter be given a higher discount than normal to provide adequate compensation for their sales staff to market the bonds to retail investors. The overall combined effective interest rate resulting from this strategy was significantly lower than it would have been through a conventional sale to institutional purchasers, saving the City money.

City of Corcoran - Restructure Utility Debt Given Debt Service Coverage Violation

Between 2015 and the summer of 2016, NHA worked with the City of Corcoran to develop a multipronged solution to a water system facing financial pressure similar to the City. In 2008, Corcoran issued variable rate debt with a Union Bank/MUFG LOC, and a synthetic fixed rate swap. The structure saved money over 7 years (compared to traditional fixed rate bond), however, with the LOC market changing, the City faced renewal challenges. Financial pressure on the water fund from (1) rate covenant pressure from drought-induced revenue decreases, (2) expiring LOC with no renewal option, (3) ballooning swap termination payment, and (4) the necessity for a new rate structure that would ensure fiscal sustainability and equitability amongst all types of rate payers.

Ultimately, through a patient process by NHA, the City began a restructuring process in 2015 and executed a multi-faceted financial solution mid-year 2016. Highlights included use of a Rate Stabilization Fund to meet debt

service coverage target and rate covenant. We negotiated an extension of the LOC through June of 2016 to give the City a "short-term window" to conduct a thorough rate study and extended the maturity of the restructuring bonds in order to lower annual debt requirements, improve coverage, and raise additional new money for a couple key projects. This restructuring involved terminating the swap and reducing future LOC renewal and swap related risks to the City. NHA worked with the rate consultant to ensure a fiscally sustainable and equitable water rate structure that ultimately was adopted. In the end, the financing achieved "A" rating with stable outlook and was sold into the market to enable the City to meet its covenants.

IV. REFERENCES

Name *Title*	Public Entity	Term of Service	Main Services Provided	Contact Information
Dennis Diemer *Fmr. General Manager*	Woodland Davis Clean Water Agency	2012 - Present	Financial advisor for approximately $200 million DBO for a new water treatment plant **(See Case Study)**	dennis@diemerengineering.com (925)-876-0111 855 Country Road 102 Woodland, CA 95776 https://www.wdcwa.com/
Teri Daly *Administrative Manager*	Yuba County Water Agency	2016 - Present	Financial advisor for a $72 million refinancing of a water utility debt for levee construction **(See Case Study)**	tdaly@ycwa.com (530)-741-5000 1220 F Street Marysville, CA 95901 http://www.ycwa.com/
Brian Lockwood *General Manager*	Pajaro Valley Water Management Agency	2015 - Present	Financial advisor for a restructuring of debt securities based on water wholesale agreement **(See Case Study)**	lockwood@pvwater.org (831)-772-9292 x26 36 Brennan St. Watsonville, CA 95076 http://www.pvwma.dst.ca.us/index.php
Mike William *Finance Manager*	Palmdale Water District	2009 - Present	Financial advisor for a financing in the midst of Prop 218 litigation **(See Case Study)**	mawilliams@palmdalewater.org (661)-947-4111 x1047 2029 East Avenue Q Palmdale, CA 93550 https://www.palmdalewater.org/
Steve Kroeger *City Manager (over 10 years)*	City of Yuba City	2000 - Present	Financial advisor for many wastewater, water, and redevelopment financings	skroeger@yubacity.net (530)-822-4620 1201 Civic Center Blvd. Yuba City, CA 95993 http://www.yubacity.net/

G-42 DISCLOSURES

NHA Advisors, LLC is registered as a Municipal Advisor with the SEC and Municipal Securities Rulemaking Board ("MSRB"). Pursuant to MSRB Rule G-42, on Duties of Non-Solicitor Municipal Advisors, Municipal Advisors are required to make certain written disclosures to clients, which include, among other things, Duty of Care, Duty of Loyalty, Conflicts of Interest and any Legal or Disciplinary events of NHA Advisors, LLC and its associated persons. As such, NHA Advisors, LLC has a Fiduciary duty to each public agency and must provide both a Duty of Care and a Duty of Loyalty that entails the following:

DUTY OF CARE

- NHA will exercise due care in performing its municipal advisory activities;
- NHA will possess the degree of knowledge and expertise needed to provide public agency with informed advice;
- NHA will make a reasonable inquiry as to the facts that are relevant to public agency's determination as to whether to proceed with a course of action or that form the basis for any advice provided to public agency; and
- NHA will undertake a reasonable investigation to determine that NHA Advisors, LLC is not forming any recommendation on materially inaccurate or incomplete information; NHA Advisors, LLC must have a reasonable basis for:
  - any advice provided to or on behalf of the public agency;
  - any representations made in a certificate that it signs that will be reasonably foreseeably relied upon by the public agency, any other party involved in the municipal securities transaction or municipal financial product, or investors in public agency's securities; and
    any information provided to public agency or other parties involved in the municipal securities transaction in connection with the preparation of an official statement.

NO BROKER-DEALER AFFILIATION

NHA has no affiliation, ownership or relationship with any broker-dealer. NHA abides by all the new rules for Independent Registered Municipal Advisors, which includes not allowing for finder's fees, fee splitting, payments to consultants, or other contractual arrangements that present either a real or perceived conflict of interest.

NO PAST OR PENDING DISCIPLINARY ACTIONS

NHA certifies that neither the firm nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal, State or local department or agency. In addition, NHA has no record of unsatisfactory performance as evidenced by complaints filed with the SEC, or any other Federal or State agencies with jurisdiction over the services provided by the firm.

NHA has no pending litigation or investigations from the Justice Department, SEC, FINRA, NASD, MSRB, or other regulatory agencies and is not aware of any pending potential projects subject to litigation or investigations. NHA has no known current potential conflicts of interest with the Agency and has never been disqualified from a selection process. In addition, NHA has not declared bankruptcy since it was founded and no member of NHA's leadership has been involved in bankruptcy proceedings at a previous firm.

Proof of NHA's good standing with the MSRB can be found on the MSRB website (http://msrb.org/MARegistrants.aspx). Additionally, copies of NHA's most recent form MA and each most recent form MA-I filed with the SEC may be accessed electronically at the following location: https://www.sec.gov/edgar/searchedgar/companysearch.html

NHA STAFF RESUMES

Public Finance Professional Since:

1981

Expertise

- Public Policy
- Utility Financing
- Climate Change Infrastructure
- Development/Land-Secured Financing
- Economic Development
- Developer Negotiations
- Pension Financing

Education

- B.A. Social Sciences

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

Mark Northcross, *Principal*

During a California public finance career that spans back to 1981, Mark Northcross has structured debt for nearly every kind of issuer and nearly every kind of revenue source legally available in the State.

Mr. Northcross is also a specialist in utility revenue financings, particularly for water and sewer utilities. He has structured about 80 sewer and water revenue bond issues for over 30 water districts, sewer districts and cities since 1983, including private placements with commercial banks. Most recently he secured funding for severely drought impacted water utility on the central coast for a desalination plant and for the City of Napa's water utility in the immediate aftermath of the South Napa Earthquake. He has also arranged financing for two major public utilities in the midst of major litigation regarding Proposition 218, and the legality of their water rates. Projects financed include the acquisition of new water supply, water treatment plants and upgrades to newly acquired service area infrastructure.

Mr. Northcross has been a leading innovator in financing climate change infrastructure. In 2017, he was selected as the financial advisor for the Resilient by Design Bay Area Challenge, a year-long collaborative design challenge bringing together local residents, public officials, and local, national, and international experts to develop ten innovative community-based solutions to strengthen the region's resilience to climate change.

Mr. Northcross's career has also been focused on the interface between public finance and land development. He is a leader in California in negotiating both public-private partnerships for both land secured debt and redevelopment. He has negotiated public-private partnerships for the successful development of major mixed-use projects throughout the State. Since the early-1990s, Mr. Northcross has negotiated the restructuring and workout of nearly $200 million in either defaulted or highly stressed municipal bond issues. He is also a leader in negotiating joint ventures between different public agencies – with notable success in putting together bond funded risk sharing programs for cities, counties, and school districts in California.

When not working on solutions to tough problems for his clients, Mr. Northcross serves on a variety of non-profit corporation boards. He is also a proud recipient of the Norman Bright trophy in the annual Dipsea Race, the oldest cross-country foot race in the nation. Mr. Northcross is also the Treasurer of the West Point Inn Association, a non-profit that runs a 114-year-old hike-in hotel in the parklands of Mt. Tamalpais. He graduated from the University of California at Irvine in 1973.

Public Finance Professional Since:

1989

Expertise

- Cities and Special Districts
- Renewable & Energy Efficiency Financing
- Utility Expert – Water, Wastewater, Refuse
- Educational Presentations, Public Speaking
- Public Finance and Policy Leadership
- Voter-Approved Financing

Education

UC DAVIS
UNIVERSITY OF CALIFORNIA

- B.S. Managerial Economics
- B.S. Agricultural Economics

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

G. Craig Hill, *Principal*

Mr. Hill has been a public finance professional since 1989 and is a founding partner of NHA Advisors. His clients include California cities, redevelopment agencies, special districts, and school districts throughout the State. In addition to providing traditional financial advisory expertise on public finance, Mr. Hill's expertise includes developing public policies for financial systems, appropriate reserve levels and capital finance requirements. His understanding of local government and the operational components (public safety, water, sewer, marinas, airports, golf courses and other enterprise funds) provides a professional basis to assist public agencies in developing sound financial planning practices.

Mr. Hill has extensive experience in the issuance of water and sewer revenue bonds, general obligation bonds, tax allocation bonds, certificates of participation, tax and revenue anticipation notes, land-secured improvement bonds, and bond anticipation notes. In addition to traditional projects, Mr. Hill is also active in energy efficiency and renewable energy project financing.

Mr. Hill speaks to many professional associations including the Milken Institute, Carbon War Room, California Debt and Investment Advisory Commission, Municipal Management Association of Northern California (MMANC), and participates on speaking panels for public finance and solar financing.

Prior to founding NHA Advisors, Mr. Hill began his public finance career as a financial analyst for SMUD to evaluate the financial and economic feasibility of the Rancho Seco Nuclear Power Plant Plan. In addition to working for the Sacramento Municipal Utility District, Mr. Hill worked for the State of California to develop financing programs for the State's facility upgrades. While in private practice, he managed the financial services group of Jones Hall, a premier bond counsel firm in San Francisco. Mr. Hill began his own municipal advisory practice with Mark Northcross in 1992 after working for Kelling, Northcross & Nobriga.

In addition to working as a municipal advisor, Mr. Hill has served as a member of the Novato Park & Recreation Commission, Novato Investment Committee, and Novato Budget Committee. He has also served on the board of directors for the Novato Youth Soccer Association and as President of the Novato Lacrosse Club.

Public Finance Professional Since:

1990

Expertise

- Cities and Special Districts
- Utility Expert - Water, Wastewater, Refuse, Land-Secured
- Expert on Educational Presentations, Public Speaking

Education

Berkeley
UNIVERSITY OF CALIFORNIA

- B.S. Urban Land Economics and Finance
- MBA, Hass School of Business

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

Eric Scriven, *Principal*

Since 1990, Mr. Scriven has provided municipal advisory and implementation services for public agencies throughout California. He has served as an investment banker or municipal advisor to dozens of municipal and special district clients and has personally managed more than 100 successful financings for a par value of more than $2 billion during the past 10 years.

Mr. Scriven's assignments have ranged from large, strong credit cities to non-rated land-secured transactions. He takes special care to conduct the most thorough due diligence to fully understand a client's goals, as well as all opportunities and constraints inherent in a project. This approach enables him to provide critical advice to clients and to maximize opportunities to best "fit" (or sometimes rule out) a solution and then, importantly, effectively implement that solution. Additionally, Eric provides invaluable support to his clients by helping them optimally position their finances to meet their goals, with an emphasis upon best-practices forecasting methods for capital planning, budgeting and investment.

Eric recently served the City of Napa on its Renewable Resources Project ("NRRP") – a comprehensive, multi-staged project designed to make Napa a leader in the State of California in solid waste diversion in compliance with AB 939, AB 341, and other State regulations. He also works with NHA's Mike Meyer as Municipal Advisor to the City of Industry, where NHA has served as advisor on over $1 billion of TAB, GO, and Sales Tax financings over the past few years.

While working at his prior firm, Eric also led the credit and structuring efforts for the City of Riverside's Bond Anticipation Notes in 2009, 2010 and 2011.

Between visits to city halls and time spent in the office, Eric actively seeks out outdoor adventures wherever and whenever he can. Half Dome, Glacier NP, Mt. Shasta and the Grand Canyon—and always the Pacific Ocean—are recent memorable destinations!

Public Finance Professional Since:

2003

Expertise

- General Fund Financing
- Pension Obligations
- Utility Financing
- Redevelopment Financing and Tax Increment Modeling
- Project Management
- Financial Modeling
- Credit Analysis and Presentations

Education

UC San Diego

- B.S. Management Science

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

Mike Meyer, *Vice President*

Since 2003, Mr. Meyer has been providing the highest level of support to California municipalities as an advisor, consultant, and an investment banker. He has worked with a wide spectrum of municipalities, including cities like Healdsburg, Beverly Hills, Burlingame, Napa, San Ramon, Suisun City, Gonzales, Corcoran, Lakeport, Arcata and Selma; as well as larger cities and enterprises such as San Francisco, Oakland, Long Beach, San Francisco Airport and the East Municipal Utility District.

Mr. Meyer has executed all types of financings available to California municipalities, including utility revenue (water/wastewater/storm drain), general fund backed leases, tax increment, general obligation, transportation, land secured, pension, and housing deals. He is experienced supporting and leading projects from origination to closing, including conducting due diligence, bond cash flow modeling, and credit analysis.

In 2015, Mr. Meyer has served as an advisor on $575 million of TABs for the Successor Agency to the Industry Urban Development Agency. This transaction secured more than $100 million of savings for taxing agencies who receive property taxes from the City's taxable parcels. NHA served as municipal advisor to the Successor Agency for over three years to design and implement this financing plan and was instrumental in helping the Agency garner "A" category underlying ratings, bond insurance, and reserve fund sureties for the majority of the deeply complex issuance, which ultimately was composed of six series of bonds, including taxable and tax-exempt and senior and subordinate lien bonds.

As the firm's resident pension expert, Mr. Meyer is also working on creative restructuring solutions for several Northern California cities in order to enhance budget predictability of their CalPERS pension payments and create near-term budgetary savings.

In the summer of 2016, Mr. Meyer served as primary credit and structuring advisor for the City of Berkeley Parking Revenue Bond issuance as well as the City of Napa's Solid Waste "Green Bond" transaction.

Prior to joining NHA Advisors, Mr. Meyer served as a Vice-President for De La Rosa and Co. Investment Bankers, where he worked on over 50 senior managed transactions totaling $1.5 billion in par from 2003 to 2011. Most recently, he served as a Principal at p2 Capital Advisors (p2CA) from 2011 to 2014, providing independent consulting and advisory work to numerous California public agencies. He joined NHA in the summer of 2014, along with fellow p2CA Principal, Eric Scriven, in order to further bolster NHA's prominence as the premiere advisor and consultant to California municipalities.

In his spare time, Mike serves as the Assistant Coach for the UC Davis Men's Tennis team and also enjoys traveling, hiking, surfing and practicing/teaching yoga.

Public Finance Professional Since:

2003

Expertise

- Cities & Special Districts
- General Fund Financing
- Utility Financing
- Land-Secured Debt
- Project Management
- Financial Modeling
- Continuing Disclosure

Education

UCLA

- B.A. Economics
- Specialization in Computing

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

Rob Schmidt, *Vice President*

As municipal advisor, Mr. Schmidt's goal is to provide strategic, objective, financially sound solutions that meet a public agency's long-term objectives. He accomplishes this by exploring and providing a wide spectrum of financing options to ensure the integrity and accountability of the financing process.

Mr. Schmidt has served as a municipal advisor and consultant to municipalities of all shapes and sizes, including dozens of cities, counties, redevelopment agencies, special districts, and school districts, as well as private companies doing business with the public sector.

His work has covered a variety of assignments, including: strategic planning, structuring municipal bond debt, cash flow analyses, tax projections, fiscal impact analyses, development impact fee studies, budget analyses, and a multitude of consulting assignments. These assignments have required Mr. Schmidt to develop hundreds of tailor-made financial models to meet the unique needs of his diverse client base.

In addition to his advisory and analytical work, Mr. Schmidt leads NHA's continuing disclosure services division, for which he manages and/or prepares annual continuing disclosure filings for public agencies throughout California.

Before founding NHA Advisors with Craig Hill and Mark Northcross and before joining Northcross, Hill & Ach, Mr. Schmidt served as a Senior Associate and Northern California division manager for David Taussig & Associates, a public finance consulting firm, for which he formed and administered public financing districts throughout California. Prior to returning home to Northern California, Mr. Schmidt served as a consultant to numerous cities and counties in Southern California.

In his spare time, Mr. Schmidt enjoys spending time with his growing family and maintaining his status as a weekend warrior, participating in an array of competitive and recreational sports.

Public Finance Professional Since:

2016

Expertise

- Budgeting and Cashflow Analysis
- Demographic Research and Credit Presentations
- Pension Analysis
- Market Research and Refinancing Analysis

Education

KELLEY SCHOOL OF BUSINESS
INDIANA UNIVERSITY

- M.S. Finance

BIOLA UNIVERSITY

- B.S. Biological Sciences

Licenses & Registrations

- Registered with the SEC and MSRB
- Series 50 License

Christian Sprunger, *Associate*

Christian's role in NHA Advisors' analytical and research department is to provide support to California cities and special districts in a variety of ways. His work has covered a variety of assignments, including: cashflow and market analysis for refinancing projects, demographic research and credit presentation preparation, CalPERS and pension analysis, and proposal writing. In 2017, he assisted several California cities, including the City of Corning, the City of National City, the City of Winters, and the City of Scotts Valley with their financing projects.

Christian is a licensed municipal advisor and has passed the Series 50 examination.

Prior to making a career switch into public finance, Christian was an R&D microbiologist at a veterinary pharmaceutical company and taught microbiology laboratory technique as adjunct faculty at Biola University for several years.

Christian transitioned into public finance in 2016 when he started as an analyst at NHA Advisors and enrolled in a master's program at Indiana University. In early 2018, he graduated from the Kelly School of Business with a MS in Finance.

Christian was born in Kijabe, Kenya, and lived in Swaziland for several years while his father was working as a bush pilot, flying food and medicine into Mozambique during the civil war in early 1990's. Christian also lived in Guatemala City, Guatemala in the late 1990's. After moving back to the US in 2000, Christian lived in Arizona for several years before moving to California in 2007.

Christian and his wife currently live in Santa Rosa, California, and recently welcomed their first child (daughter) in March 2018. In spare moments, Christian enjoys reading various fiction and non-fiction books and practicing guitar.

LIST OF WATER FINANCING AND CONSULTING EXPERIENCE 2013 – 2018

Project Date	Issuer Name	Par Amount	Sale Method	Description / Unique Financing Features	NHA Staff Involved
2/26/18	Palmdale Water District	N/A	Consulting Only	2018 SRF Loan Consulting ($55 million project)	Northcross, Sprunger
10/25/17	City of Torrance	$0.5 Million	Private Placement	2017 Installment Sale Agreement (Water Well Project)	Hill, Schmidt
3/23/17	City of Yuba city	$2.134 Million	Private Placement	2017 Water Revenue Taxable CREBs (Battery Project for the Water Treatment Plant)	Northcross, Hill, Schmidt
3/2/17	City of Corning	$3.460 Million	Negotiated Sale	2017 Water Revenue Refunding, (Insured with Unrated Underlying)	Northcross, Meyer
12/5/16	Buckingham Park Water District	$1.163 Million	Private Placement	2016 Certificates of Participation (USDA Loan Financing)	Hill, Schmidt
11/28/16	Yuba County Water Agency	$72.88 Million	Negotiated Sale	2016 Revenue Bonds (Refunding 2008 Rev. Bonds, Series A, B)	Northcross, Schmidt
10/18/16	Palmdale Water District	N/A	Consulting Only	Continuing Disclosure Compliance Consulting	Northcross, Schmidt
10/4/16	Suisun-Solano Water Authority	N/A	Consulting Only	Consulting on Capital Project Financing and Rate Study	Hill, Schmidt
10/4/16	Suisun-Solano Water Authority	$8.24 Million	Negotiated Sale	2016 Water Revenue Bonds (Refunded 1993 Water Rev. Bonds)	Hill, Schmidt, Meyer
8/11/16	Corcoran, City of	$19.79 Million	Negotiated Sale	2016 Water Refunding Bonds (Refunded 2008 COPs)	Scriven, Meyer
6/30/16	Pajaro Vly Water Mgmt. Agency	N/A	Consulting Only	Rebate Analysis Consulting	Hill, Schmidt
6/30/16	Pajaro Vly Water Mgmt. Agency	$7.50 Million	Consulting Only	Consultant to the Agency for securing SRF funds	Hill, Schmidt
6/29/16	Pajaro Vly Water Mgmt. Agency	$11.435 Million	Negotiated Sale	2016 Water Revenue Refunding - Treatment Plant (from City of Watsonville)	Hill, Schmidt
6/24/16	Lakeport, City of	$2.587 Million	Private Placement	2016 Water Revenue Refunding Bonds (2000 USDA Bonds)	Scriven, Meyer
4/27/16	Pajaro Valley Water Mgmt. Agency	N/A	Consulting Only	Continuing Disclosure Compliance Consulting	Hill, Schmidt
2/4/16	Napa, City of	$43.505 Million	Competitive Sale	2016 Refunding Water Revenue Bonds (Post-earthquake rate covenant adjustment)	Northcross, Scriven, Schmidt
1/8/16	Woodlake, City of	$4.10 Million	Private Placement	2015-2016 Water Meter Financing	Hill, Schmidt
12/17/15	Woodland Davis Clean Wtr Agency	$19.495 Million	Negotiated Sale	2015 Subordinate Refunding Water Revenue Bonds	Northcross, Schmidt
12/7/15	Gilroy, City of	N/A	Consulting Only	Water/Sewer Rate Study Project	Hill, Schmidt

Project Date	Issuer Name	Par Amount	Sale Method	Description / Unique Financing Features	NHA Staff Involved
2/26/18	Palmdale Water District	N/A	Consulting Only	2018 SRF Loan Consulting ($55 million project)	Northcross, Sprunger
8/5/15	SLO County Financing Authority	$107.115 Million	Consulting Only	NHA was MA to the City of Paso Robles, a major party to the transaction	Hill, Schmidt
6/1/15	Corcoran, City of	N/A	Consulting Only	Water Enterprise LOC Renewal / Capital Planning & Consulting	Scriven, Meyer
4/30/15	Pajaro Vlyy Water Mgmt. Agency	$19.97 Million	Negotiated Sale	2015 Water Revenue Ref. Bonds (Ref. of 1999 COPs, 1999 SWRCB Loan, & 2002 SWRCB Loan)	Hill, Schmidt
4/30/15	Pajaro Vly Water Mgmt. Agency	N/A	Consulting Only	Continuing Disclosure Compliance Consulting	Hill, Schmidt
4/6/15	Pajaro Vly Water Mgmt. Agency	N/A	Consulting Only	Agency Debt Plan and Loan Process	Hill, Schmidt
9/3/14	Aromas Water District	$2.724 million	Private Placement	2014 Special Tax Bonds (Water Facility Expansion – USDA Loan)	Hill, Schmidt
8/7/14	Cambria Comm. Services District	$8.939 Million	Private Placement	2014 Installment Sale Agreement (Emergency Water Supply Project)	Northcross, Schmidt
7/22/14	Santa Cruz, City of	$11.26 Million	Negotiated Sale	2014 Water Revenue Refunding Bonds	Northcross, Schmidt
3/1/14	Woodland Davis Clean Wtr Agency	$95.461 Million	Private Placement	SWRCB CWSRF Loan for Construction of Public treatment works (ISA)	Northcross, Schmidt
12/19/13	Mission Springs Water District	$1.215 Million	Private Placement	2013 Installment Sale Agreement	Northcross, Schmidt
10/10/13	Davis, City of	$30.0 Million	Private Placement	Wells Fargo Loan, Water Revenue Bonds	Northcross, Schmidt
8/13/13	Hayward, City of	$7.245 Million	Private Placement	Refunding of 1996 Refunding LRBs, 2001 COPs, & 2004 COPs, Water Revenue Refi	Hill, Schmidt
7/30/13	Folsom Public Finance Authority	$12.78 Million	Private Placement	Refunding of Series 2005A Water Revenue Bonds	Northcross, Schmidt
5/30/13	Palmdale Water District	$44.35 Million	Negotiated Sale	Refunding 2004 Water Revenue COPs/New Money	Northcross, Schmidt
5/21/13	Yuba City, City of	$21.71 Million	Negotiated Sale	Refunding of 2005 Water Revenue COPs	Northcross, Schmidt

STATEMENT OF QUALIFICATIONS

WATER, WASTEWATER, AND STORMWATER CONSULTING SERVICES

2018

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Walnut Creek, CA 94596
Phone: **925/977-6950**
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STATEMENT OF QUALIFICATIONS

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RESUMES

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INTRODUCTION

This Statement of Qualifications describes the consulting services HF&H Consultants, LLC, provides to water, wastewater, and stormwater municipalities. Our core services include:

- *Financial Planning* – Preparation of multi-year financial projections to determine funding requirements from available sources.
- *Rates* – Developing rate designs that meet rate-making objectives.
- *Development Impact Fees* – Deriving charges for connecting to facilities in compliance with legal requirements.
- *Management Studies* – Analyzing organizational efficiency, institutional relationships, and growth strategies.
- *Resource Management and Economics* – Evaluating the impacts of resource constraints on operational capabilities and contractual commitments.
- *Litigation and Regulatory Support* – Assisting with contractual compliance audits, inter-agency negotiations, rate and fee analysis.

These services are delivered with a distinctive approach:

- *More than analysts* – Attention to the details that matter to clients.
- *No cookie cutters* – Unique analytical approaches that result in practical solutions.
- *Decision managers* – Skilled techniques for evaluating alternatives.
- *Consensus builders* – Strong presentation skills in public hearings.

These services are described in greater detail in this Statement, which includes a list of clients for whom we have performed these services. All of the projects listed have involved the key staff members whose résumés are included in this Statement. Please contact John Farnkopf, Senior Vice President (925-977-6953), if you require additional information.

Our Statement of Qualifications concludes with a summary of our most recent client satisfaction survey.

In addition to its water, wastewater, and stormwater services, the firm provides a wide range of solid waste consulting services including rate reviews and studies, contract audits and negotiations, feasibility studies, operational studies, and capital improvement planning.

Mission Statement

Our mission is to be the first choice and recognized leader among municipal agencies for high quality consulting services in selected geographic and service markets.

FIRM DESCRIPTION

Organization

Founded in 1989, HF&H Consultants, LLC, provides consulting services to water, wastewater, and solid waste agencies. Prior to forming the company, the firm's executives worked together for six years at a "Big Five" accounting firm. The synergy resulting from our staff's engineering, accounting, economics, and public policy backgrounds provides substantial added value to clients, which can rarely be achieved by individual engineering, accounting, or management consulting firms.

Today, HF&H Consultants has grown to a firm of nineteen professionals, which makes us one of the largest ratemaking firms on the West Coast. With offices located in northern and southern California, HF&H Consultants directs its practice to cities, counties, and special districts in the western United States. As such, HF&H Consultants provides clients with the breadth of experience of a national firm, and the responsiveness, accountability, and personal commitment of a local firm. Our consultants are seldom far away and, as a result, our clients always receive a quick, personal response to their needs.

HF&H Consultants provides financial, economic and general consulting services to public officials in the following areas: rate-setting, cost-of-service studies, financial planning and budgeting, resource management, public policy development, litigation, and negotiations. By comparison with engineering consultants, our style of consulting is influenced by our prior exposure to private sector consulting: we like to help our municipal clients function as healthy businesses within the regulatory and political framework of the public sector.

HF&H Consultants has a low staff-to-executive ratio in order to allow the firm's most experienced members to participate actively in client projects, rather than only in practice development and project administration. Unlike firms that delegate critical tasks to junior staff, our senior employees are involved throughout our clients' projects. The close working relationship between our management and staff ensures effective supervision and quality control. The executives' national certifications and licenses assure our clients of compliance with the highest professional standards.

Profile of Services

The services we provide may be classified as follows:

- Seventy-five percent of our work is performed for long-term, continuing clients for whom the members of HF&H Consultants have worked for as long as 20 years.
- Seventy-five percent of our work is directly related to rate regulation, which typically involves revenue requirement analyses, cost-of-service studies, and rate design.
- Our principal clients are state and local governmental bodies such as cities, counties, and special districts. Several of our clients are joint organizations of municipalities sharing a common concern such as water management or solid waste rate regulation. In addition, we provide litigation support to the legal counsel of these and other clients.

CONSULTING SERVICES

HF&H Consultant's consulting services are listed below. A listing of HF&H Consultant's current and historical clients is also included in the following pages.

Financial Planning

- Revenue requirement analysis
- Multi-year financial plans
- Revenue programs
- General Fund reimbursement studies
- Reserve fund management
- Interfund transfer policies

Capital Funding

- Capital financing alternatives
- Engineer's certificates
- Economic feasibility analysis
- Stormwater program funding strategies

Cost Allocation Studies

- Cost-of-service studies
- Multi-purpose project allocations
- Inter-agency allocations
- Recycled water regional allocations
- Cash and utility rate making

Rates, Charges, and Fees

- Rate structure diagnostic evaluations
- Rate structure designs
- Customer bill impacts
- Affordability analysis
- Outside-city rate increases
- Price elasticity impacts
- Indexed pass-through costs
- Customer class audits
- Administrative and field service fees

Development Impact Fees and Valuations

- Full cost recovery models
- Utility asset valuations
- Depreciation studies
- Renewal/replacement funding

Stakeholder Facilitation

- Council and Board presentations
- Community workshops
- Citizens advisory groups
- Industrial customer focus groups
- Decision management techniques
- Customer surveys
- Mediations

Management Studies

- Benchmarking
- Strategic planning
- Organization structures reviews
- Management/institutional reviews
- Performance audits
- Incorporation/consolidation studies

Litigation Support

- Rate and fee litigation
- Environmental remediation
- Water supply contracts
- Contract compliance
- Expert witness testimony

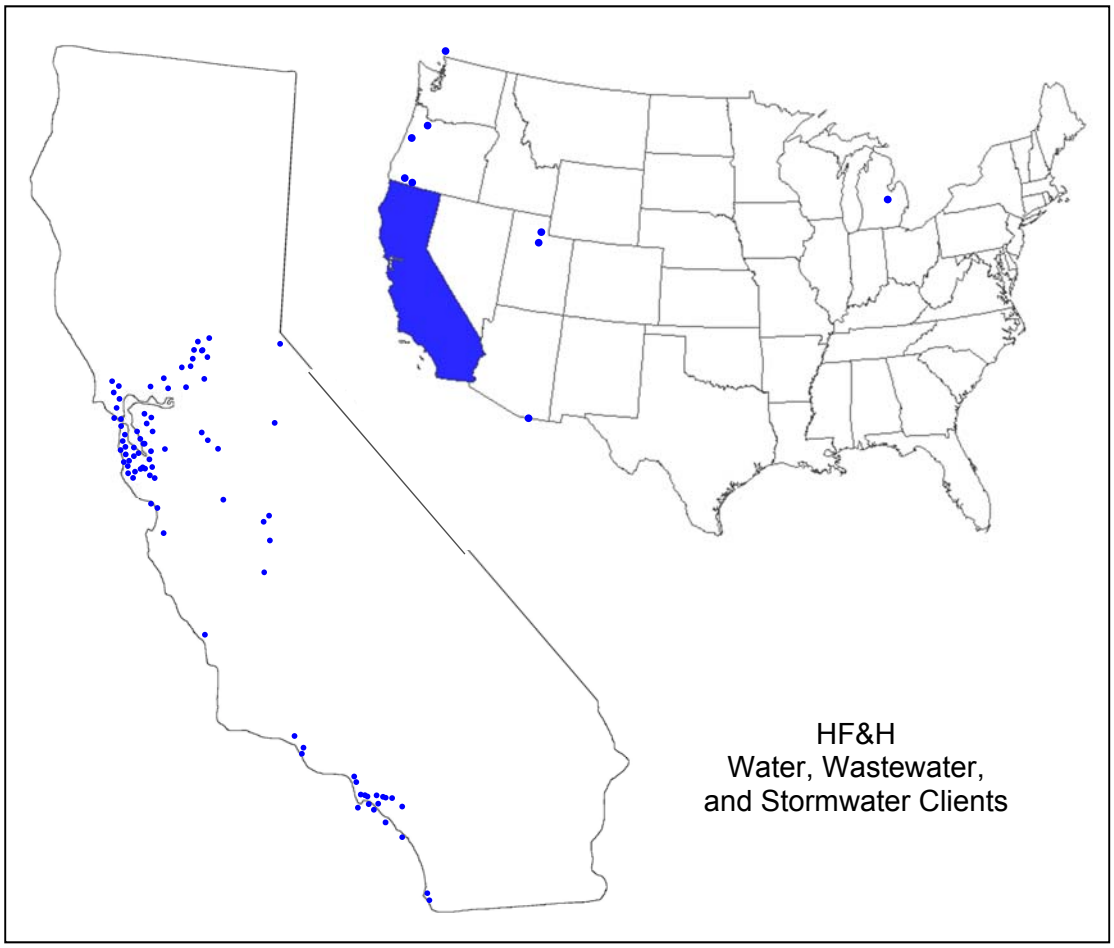
Contract Negotiations

- Wholesale/retail water supply
- Regional wastewater treatment
- Recycled water supply and pricing
- Water/Wastewater privatizations
- Metering and billing services
- JPA formation

Legal/Regulatory Compliance

- Proposition 218
- Public Utility Commission practices
- Ordinance/resolution preparation

WATER, WASTEWATER & STORMWATER CLIENTS



Client	Type of Study	Year	Project Emphasis
City of Alameda	Stormwater Financial Plan	2001	Sewer and Solid Waste Funding in Compliance with Proposition 218
Alameda County Water District	Financial Planning	1991	Project Financing, Debt Issuance
	Urban Water Management - Plan Best Management Practices	1993	Cost/Benefit Analyses, Water Conservation
	Capacity Charges	1998	Critique of Methodology
	Engineer's Certificate	2003	Debt Coverage
	Engineer's Certificate	2012	Debt Coverage
	Engineer's Certificate	2015	Debt Coverage

Client	Type of Study	Year	Project Emphasis
Alameda Countywide Clean Water Program	Stormwater Funding	2003	Proposition 218 Compliance
Aleshire & Wynder, LLP	Litigation Support	2011 to 2015	Groundwater Replenishment Cost Allocations
Amador Water Agency	Litigation Support	1996	Dept. of Corrections Water Rates
	Water Rate Review	1998	Rate Update
City of Anaheim	Sewer Rates	2012	Confirm Revenue Sufficiency
	Litigation Support	2013	Enterprise Overhead Reimbursements
City of Antioch	Public Safety Cost Recovery	2016	Water, Sewer Enterprise Reimbursements
City of Ashland, OR	Water and Wastewater Rates	1994	Demand Management, Debt Issuance
Bay Area Stormwater Management Agencies Association	Stormwater Funding Strategies	2008	Permit Renewal
Bay Area Water Supply and Conservation Agency	Review Administration of Wholesale Water Supply Contract	2004	Compliance with Rate-making Provisions
	Overhead Cost Allocation	2005	Benchmark Comparisons
	Review Flow-Based Allocation Formulas	2007	Simplification of Water Accounting
	Review Impact of Organizational Changes on Cost Accounting	2007	Water/Power Allocations
	Rate of Return	2008	National Survey of Industry Practices
	Wholesale Water Supply Contract Negotiations	2009	Rate-Making Methodology
	Shortage Allocations	2009	Dry-Year Conditions
	Supply Allocations	2010	Long-Term Conditions
	Wholesale Rates	2011	Restructuring
	Hydroelectric Cost Allocations	2012 to present	Water/Power Split
	Water supply allocations	2016	Water Transfers
Bear Creek Valley Auth., OR	Capital Replacement Strategy	1996	Depreciation, Rate Analysis

Client	Type of Study	Year	Project Emphasis
City of Belmont	Sewer/Stormwater Rates	1999	Proposition 218 Compliance
	Regional Wastewater Treatment Plant Capacity	2000	Capacity Expansion Options
	Sewer/Stormwater Rates	2001	Update
	Sewer/Stormwater Rates	2002	Update
	Sewer/Stormwater Rates	2003	Update
	Sewer/Stormwater Rates	2004	Update
	Sewer/Stormwater Rates	2005	Update
	Stormwater Funding	2005	Capital Improvement Financing
	Sewer/Stormwater Rates	2006	Update
	Sewer/Stormwater Rates	2007	Treatment Plant Financing
	Sewer Connection Fees	2008	Update
	Sewer Rates	2008	Restructuring Fixed Charge
	Sewer Treatment Charge	2009	Create New Charge
	Sewer Rates	2009	Update Collection System Charge
	Sewer Rates	2010	Update
	Sewer Rates	2011	Update
City of Beverly Hills	Water System Leasing	1999	Proposition 218 Compliance
	Regional Wastewater Charges	2000	Revenue Program
	Water Rates and Penalty Surcharge	2015 to present	Tiered Water Rate Structure, *San Juan Capistrano* compliance
	Sewer Rates	2017	Financial Plan Update
Bold, Polisner, Maddow, Nelson & Judson	Litigation Support (Contra Costa Water District)	1996	Water Capacity Fees
City of Brentwood	Water, Sewer, and Non-Potable Water Rates	2013	Enterprise Overhead Reimbursements
	Overhead Cost and Interfund Services Allocations	2017	Review of Methodology
City of Burbank	Public Safety, Right-of-Way Maintenance Cost Recovery	2014	Water Enterprise Reimbursements
City of Burlingame	Sewer Rate Structure	1997	Alternatives to Minimize Climatic Influences
	Water and Sewer Rates	2002	Revenue Stability
	Water and Sewer Rates	2005	Model Development
	Water and Sewer Rates	2007	$25 Million Debt Issuance
	Water and Sewer Rates	2008	Update
	Water and Sewer Rates	2010	Update
	Water and Sewer Rates	2011	Debt Refinancing
	Water and Sewer Rates	2012	Tiered Water Rate Structure
	Water and Sewer Rates	2013	Debt refinancing
	Water and Sewer Rates	2015	Drought Pricing

Client	Type of Study	Year	Project Emphasis
California State University – Monterey Bay	Water and Sewer Rates and Capacity Charges	2017	Contract Negotiations With Local Agency
California Water Service Co.	Cost Allocation (Salinas)	1997	Historic Benefits Analysis
	Water Supply Development (Tassajara Valley)	1998	Organizational, Institutional, and Financial Aspects
	Water Supply Feasibility (Visalia)	2005	System Expansion
City of Camarillo	Water Rates	1997	Conservation Oriented Rates
Carmichael Water District	Water Rates	1998	Metering Residential Customers
	Water Rates	1999	Proposition 218 Compliance
Central Contra Costa Sanitary District	Wastewater Capacity Fees	2003	Diagnostic Evaluation
City of Ceres	Water Rates	2008	Financial Stabilization, $3,000,000 Financing
	Water Rate Update	2010	Metered Water Rates
	Regional Wastewater Planning	2010	JPA Formation
	Water Rates	2012	Tiered Water Rates
	Water Connection Fees	2013	Competitiveness
	Water Rates and Connection Fees Update	2017	Post-drought demand rebound
City of Cerritos	Street and Stormwater Program Funding	2006	Proposition 218 Compliance
	Litigation Support	2011	Groundwater Replenishment Assessment
City of Chino	Public Safety, Governmental Assets and Right-of-Way Maintenance Cost Recovery	2015	Water, Sewer, Solid Waste, Stormwater Enterprise Reimbursements
Clear Creek Community Services District	Water Financial Security Package	2017	Proposition 1 Grant Funding
City of Clovis	Wastewater Rates	1996	Capital Cost Allocation
	Commercial Wastewater Rates	2002	Fixed and Variable Charges
	Water and Wastewater Rates and Capacity Fees	2003	Growth Allocations
	Water and Wastewater Rates	2004	Restructure Fixed Charges
Coastside County Water District	Water System Operations	1989	Fire Protection Charges
	Drought Water Rate Structure Study	2014	Drought Rate Adjustments
	Water Rate Update	2016	Adequacy of Reserves, *San Juan Capistrano* compliance
	Water Rates and Connection Fee Update	2017	Post-drought demand rebound
Cobb Area County Water District	Water Financial Security Package	2017	Proposition 1 Grant Funding
	LAFCo Plan For Services	2017	Consolidation of Nine Service Areas

Client	Type of Study	Year	Project Emphasis
Contra Costa Water District	Water Rates	1990	Debt Coverage, Water Conservation
	Water Rates	1991	Debt Coverage, Water Conservation
	Engineer's Certificate	1992	Debt Coverage
	Expert Witness Testimony	1997	Capacity Fees
	Capacity Fees	1998	Industrial Customers
Cooley, Godward, Castro, Huddleson & Tatum	Expert Witness Testimony (Palo Alto Park Mutual Water Co.)	1994	Capacity Fees, Conservation Penalties
	Expert Witness Testimony (Citizens Utilities Company)	1995	Groundwater Contamination (Arbitration)
Costa Mesa Sanitary District	Sewer Rates	2012	Cost of Service Analysis and Rate Restructuring
City of Crescent City	Wastewater Financial Plan	2018	Application for State Grant
City of Daly City	Water Supply Contract	1990	Conjunctive Use
	Wholesale Water Rates	2009	Supply Allocation
	Water Rates	2017	Capital Improvement Program funding
City of Davis	Public Works Department Audit	1999	Water, Wastewater, Stormwater, and Solid Waste Divisions
Delta Diablo Sanitation District	Sewer Connection Fees	2001	Improved Documentation
	Street Sweeping Fees	2001	Methodology Review
	Recycled Water Sales	2003	Inter-Agency Agreement
Dublin San Ramon Services District	Wastewater Capacity Fees	2018	Consistency With Facilities Master Plan
Dublin San Ramon Services District/East Bay Municipal Utilities District	Wholesale Recycled Water Rates	2012	Contract Negotiations
		2017	Consistency With Facilities Master Plan
East Bay Municipal Utility District	Litigation Support	1992	Rate Equity, Water Conservation
	Wet Weather Facilities Regulatory Strategies	2006	Benefit-Cost Analysis
City of East Palo Alto	Consolidation Study	1996	Water, Wastewater, Stormwater, Lighting Services
	Sanitary District Consolidation	2002	LAFCo Process, Public Outreach
East Palo Alto Sanitary District	Management Study	1999	Organizational Restructuring
City of El Monte	Sewer Rates	2008	Sewer Enterprise Formation
City of Fairfield	Water Rates	1989	Debt Coverage, Rate Equity
	Engineer's Certificate	1993	Debt Coverage
	Engineer's Certificate	1996	Debt Coverage
	Engineer's Certificate	2003	Debt Coverage

Client	Type of Study	Year	Project Emphasis
Fairfield-Suisun Sewer District	Wastewater Rates	1994	Industrial Water Reclamation, Rate Equity
	Wastewater Rates and Connection Fees	2002	Rate update and Comparison of Non-residential Connection Fees
Fair Oaks Water District	Water Rates	1998	Metering Residential Customers
City of Fillmore	Wastewater JPA Formation	2002	Treatment Plant Financing, Cost Allocations, JPA Agreement
City of Folsom	Stormwater Utility Formation	2005	Feasibility Analysis
City of Foster City	Water and Sewer Connection Fees	2016	Periodic Update
City of Fremont	Stormwater Funding	2011	Financial Study
City of Galt	Sewer Rates	2014	SRF Loan
	Sewer Rates	2015	Debt Financing
City of Glendale	Public Safety Cost Recovery	2012	Enterprise Reimbursements
	Public Safety Cost Recovery	2017	Update Prior Study
Greater Vancouver Water District	Wholesale Seasonal Rates	1998	Price Elasticity
	Wholesale Seasonal Rates	2002	Cost of Service Allocations
	Wholesale Rate Structures	2003	Fixed/Variable Options
Groveland Community Services District	Water Rates and Capacity Fees	1995	Debt Issuance, Debt Coverage
Hanson, Bridgett, Marcus, Vlahos & Rudy, LLP	Litigation Support (San Francisco Bay Area Water Users Association)	1978-84	Wholesale Water Rates
	Wholesale Water Rates	2007	Contract Negotiations
City of Hayward	Water and Sewer Capacity Charges	1999	Develop Model
Town of Hillsborough	Storm Drain Funding	2013	Funding Strategies
	Storm Drain, Wastewater, and Water Rates	2014 to present	Stormwater Program Funding *San Juan Capistrano* compliance
City of Imperial Beach	Sewer/Stormwater Rates	2004	Consolidate Funds in Compliance with Proposition 218
Irish Beach Water District	Litigation Support	2016	Engineer's Report
City of La Puente	Sewer Rates and Capacity Fees	2006	Sewer Enterprise Formation
	Sewer Rate Update	2008	$10,000,000 Financing
Las Deltas Mutual Water Company	Water Rate Review	2017	Compliance With Industry Standards and Legal Requirements
City of La Verne	Overhead Cost and Interfund Services Allocations	2017	Review of Methodology

Client	Type of Study	Year	Project Emphasis
City of Lincoln	Water and Wastewater Rates	2003-05	Rate Payer Sensitivity
	Water Rate Update	2005	Purchased Water Cost Increase
	Water Rate Update	2007	Rate Structure
	Water, Sewer, and Solid Waste Rates	2012	Rate Update
City of Live Oak	Storm Drain Impact Fee	2010	Charges for Development Zones
City of Livermore	Water and Sewer Capacity Charges	2017	Review of Methodology
City of Lodi	Sewer Rates	2003	Low-Interest Loan Application
	Sewer Rate Update	2004	$25,000,000 Financing
	Sewer Rate Update	2004	Restructure Rates & Capacity Fees
	Sewer Rate Update	2007	$20,000,000 Financing
	Sewer Rates	2009	Update
Loma Prieta Joint Unified School District	Alternative Water Supply Costs	2017	Economic Analysis
City of Lompoc	Public Safety, Governmental Assets, Right-of-Way Maintenance Cost Recovery	2015	Water, Sewer, Solid Waste, Broadband, Electric, Airport Enterprises
City of Long Beach	Street Sweeping	2005	Funding Sources
	Right-of-Way Maintenance Cost Recovery	2017	Water Enterprise
City of Los Altos	Sewer Rates	2000	Charges for Colleges
Town of Los Altos Hills	Sewer Rates and Connection Fees	2007	Convert Septic Users to Sewer Facilities
Los Angeles Department of Water and Power	Financial Evaluation	2005	Rate-Making Process
	Strategic Planning	2010	Supply Reliability
	Water Rates	2010 to 216	Evaluation of Tiers
City of Los Banos	Wastewater Rates and Connection Fees	2006	Evaluating Alternative Capital Projects
	Water and Sewer Rates	2010	Treatment Plant Expansion
Los Trancos County Water District	Future Water Demand	2002	Conversion from Septic to Sewer System
Lukins Brothers Water Company	Water System Valuation and Sale	2004	California PUC Rate-Making Practices
		2006	Negotiations of Sale
Malaga County Water District	Management Study	1998	Incorporation Feasibility
City of Manteca	Stormwater Fees	2003	Funding Options
Marin Municipal Water District	Water Rates	2013	Restructuring
	Watershed Vegetation Management	2013	Program Economics

Client	Type of Study	Year	Project Emphasis
McCutchen, Doyle, Brown & Enersen	Expert Witness Testimony (Arbitration)	1995	Groundwater Contamination (Citizens Utilities Company)
	Litigation Support (Groundwater Basin Remediation)	2001	California PUC Rate-Making Practices (San Gabriel Valley Water Company)
City of Menlo Park	Water Rates	1995	Customer Billing, Rate Structure
Metropolitan Water District of Southern California	Capacity (Growth) Charges, Tier I Water Supply Contract	1997 - 2002	Impacts on Member Agencies and Developers
City of Mill Valley	Sewer Rates	2010-11	Regulatory Compliance
	Sewer Rates	2011	Flow-Based Residential Rates
City of Modesto	Wastewater Capacity Fees	1996	Cost Allocation, Project Financing
	Peer Review	2006	Water Rate Revenue
	Peer Review	2007	Sewer Capacity Charge
	Peer Review	2007	Sewer Rate Revenue
	Peer Review	2007	Water Capacity Charge
	Regional Wastewater Planning	2010	JPA Formation
City of Morgan Hill	Water/Wastewater Rates and Capacity Fees	2002	Rate Structure Review
City of Mountain View	Water and Sewer Rate Review	1998	Qualitative Assessment of Rate Structures
Natural Resources Defense Council	Water and Wastewater Rates	2010-13	Tiered Rate Standards, Flow-Based Sewer Rates, Marginal Cost Pricing
	Water Rate Structures	2014	Proportionality standards
City of Newport, OR	Sewer Rates	1998	Debt Issuance
City of Newport Beach	Water Rates	1998	Impact of Annexation
	Sewer, Stormwater, and Recycled Water Rates	2013 to 2017	*San Juan Capistrano* compliance
City of Nogales, AZ	Water and Wastewater Rates	1999	Capital Project Revenue Requirement, Cost Allocation, Ability to Pay
North Coast County Water District	Water Rates	2001	Financial Planning Model
	Water Rates	2002	CIP Financing
	Water Rates	2004	Update
	Water Capacity Fees	2005	Update
	Water Rates	2006	Update
	Water Rates	2007	Update
	Water Rates	2010	CIP Financing
	Water Rates	2011	Water Budget Rate Structures
	Water Rates	2013	Update
	Water Rates	2015	*San Juan Capistrano* compliance

Client	Type of Study	Year	Project Emphasis
Northridge Water District	Water Rates and Capacity Fees	1996	CIP Financing, Rate/Fee Design
Nossaman, Guthner, Knox & Elliott, LLP	Litigation Support (Industries)	2003	California PUC Rate-Making Practices (Southern California Water Company)
Oakwood Lakes Water District	Water and Sewer Rates	2017	Allocation to Development
City of Ogden, UT	Water/Wastewater Rates	1996	Water Conservation, Rate Structure
Olivenhain Municipal Water District	Water Rates	1996	Tier Structure, Equity
	Operations Review	1996	High Level Diagnostic Review
City of Orange	Water Rates	1997	Financial Plan Model
	Water Rate Update	2000	Rate Restructuring, Fire Service Charges
	Water Rate Update	2001	Policies for Reserves
	Water Rate Update	2002	Revised CIP
	Water Rate Update	2003	Pass-Through Costs
Orange County Sanitation District	Operational Audit	1999	Office Support Staff Organization
City of Oxnard	Public Safety, Governmental Asset, and Right-of-Way Maintenance Cost Recovery	2013	Cost Allocations to Enterprises
City of Pacifica	Sewer Rate Evaluation	2014	Single-family vs. Multi-family Flow Differential
City of Palo Alto	Water, Wastewater and Reclaimed Water Rates	1993	Reclaimed Water, Cost Allocation
	Water Utility Benchmarking	2010	Rate Differences
City of Paso Robles	Water/Wastewater Rates and Capacity Fees	2001	Rate Structure Design
	Water Capacity Fees	2005	Methodology Review
	Water/Wastewater Capacity Fees	2006	Update
	Water Capacity Fees	2008	Developer Negotiations
City of Petaluma	Wastewater Privatization Agreement	1997	Rate Payer Safeguards
	Water and Sewer Rates and Capacity Fees	2002	Infrastructure Financing, Stormwater Funding
	Litigation Support	2013	Stormwater Funding
	Water, Sewer Connection Fees	2014	Industrial Customers
	Grant Application	2014	Digester CNG Facility
City of Pittsburg	Water Treatment Plant Operations	2009	Privatized Operations
Placer County Water Agency	Treated and Untreated Water Rates	2005	Consolidation of Geographic Zones
	Treated Water Rates	2007	Fixed/Variable Revenue

Client	Type of Study	Year	Project Emphasis
City of Pleasanton	Water Rates	1993	Increasing Block Residential Rates
	Water Rates	1994	Seasonal Irrigation Rates
	Water Rates	1995	Lifeline Rates
	Water Rates, Water Resources	1996	Water Supply Evaluation
	Water Rates	1997	Update
	Water Rates	1999	Update
	Water Rates	2000	Update
	Water Rates	2002	Update
	Water Rates	2003	Update
	Water Rates	2007	Increasing Block Rates
	Water Rates	2008	Update
	Water Rates	2009	Rate Restructuring
City of Portland, OR	Pretreatment Program Review	1999	Regulatory Program Evaluation
City of Redondo Beach	Water Rate Review	1999	Private Water Company Rate Application
City of Redwood City	Sewer/Stormwater Rates	1999	Proposition 218 Compliance
	In-Lieu Transfer	2006	Proposition 218 Compliance
City of Rio Vista	Water/Wastewater Contract Operations	2001	Cost-Plus Contract Negotiations
City of Rohnert Park	Water and Sewer Rates	1999	Unmetered Residential Water Customers
	Water and Sewer Connection Fees	2001	Connection Fees
	Water and Sewer Rate Update	2002	Usage-Based Rates
City of Roseville	Sewer Rates	1999	Financial Plan
		2001	Financial Plan Update
Ross Valley Sanitary District	Sewer Rates	2011	Equity Adjustments Between Zones
	Sewer Rates	2011	Flow-Based Residential Rates
	Sewer Connection Fees	2013	Update
	Sewer Rates	2014	Single-family vs. Multi-family Flow Differential
Saginaw Area Intermunicipality Water Committee (MI)	Litigation Support (Suburban Water Agencies)	2004	Review Wholesale Rate-Making Methodology
San Bernardino Municipal Water District	Public Safety and Right-of-Way Maintenance Cost Recovery	2017	Cost Allocations to Water and Sewer Enterprises
City of San Bruno	Water/Wastewater Rates and Capacity Fees	1992	Water Conservation, Project Financing
San Francisco Bay Area Water Users Association	Litigation Support (Suburban Water Agencies)	1978 to 1984	Wholesale Water Supply Contract
	Contract Compliance	1984 to 2000	Annual Rate Reviews, Water Shortage Allocations, Regulatory Analysis

Client	Type of Study	Year	Project Emphasis
San Francisco Presidio Trust	Recycled Water Development	2009	Financial Feasibility
San Francisquito Creek JPA	Cost Allocation Study	2000	Regional Flood Control Costs
City of Sanger	Wastewater Rates	1995	Industrial Water Reclamation, Debt Coverage
Sanitary District No. 5 of Marin County (Tiburon/Belvedere)	Sewer Rate and Capacity Fee Study	2005	Separate User Charges by Zone
	Capital Improvement Funding	2006	Financing Plan
	Sewer Rates	2007	Update
	Sewer Rates	2010	Update
	Sewer Rates	2011	Flow-Based Residential Rates, Debt Financing
	Sewer Connection Fees	2014	Update
City of San José	Wastewater Pretreatment Program Evaluation	2005	Source Control Inspector Staffing
	Urban Runoff NPDES Program	2007	Economic Evaluation of Alternatives
San Juan Water District	Water Rates	1998	Wholesale and Retail Cost Allocations
City of San Leandro	Management Study	1997	Environmental Services Program Audit
City of San Luis Obispo	Public Safety, Right-of-Way Maintenance Cost Recovery	2014	Water, Sewer Enterprises
San Mateo County	Sewer Rate Study	2017	Rate Model
San Mateo Countywide Water Pollution Prevention Program	Stormwater Funding Strategies	2008	Permit Renewal
City of Santa Ana	Public Safety, Governmental Asset, and Right-of-Way Maintenance Cost Recovery	2012	Water Enterprise
		2014	Update
City of Santa Clara	Urban Water Management Plan	1992	Water Shortage Contingency Plan
Santa Clara Valley Urban Runoff Pollution Prevention Program	Cost Allocation/Program Management	2005	Cost Allocation Formula; Program Cost, Scope, Term; Benchmark Comparison
	Cost Allocation/Program Management	2016	Update
Santa Clara Valley Water District	Cost of Service Analysis	2000	Cost Allocation Approaches
	Expert Witness Testimony	2008	Rate Analysis
	Litigation Support	2009	Cost of Service
Santa Margarita Water District	Water Rates	1998	Irrigation Rates
City of Santa Monica	Environmental Program Cost Allocations to Enterprise Funds	2007	Proposition 218 Compliance

Client	Type of Study	Year	Project Emphasis
City of Santa Paula	Wastewater JPA Formation	2002	Treatment Plant Financing, Cost Allocations, JPA Agreement
City of Santa Rosa	Water and Sewer Rates	1998	Public Participation Process
	Net Benefits Analysis	2003	Regional Recycled Water Alternatives
Sausalito-Marin City Sanitary District	Sewer Financial Plan	2002	Capital Funding Options, Public Participation Process
	Contract Negotiations	2002	Regional Wastewater Treatment
	Sewer Rates and Capacity Fees	2004	Update
	Financing Plan	2007	Update
	Sewer Rates	2010	Debt Financing
	State Revolving Fund Application	2011	Credit Review Checklist
	Customer Billing Process	2011	Billing on Tax Rolls
	Sewer Rates	2013	Single-family vs. Multi-family Flow Differential
	Sewer Rates	2014	Update, Tax Roll Billing
	Customer Billing Process	2015 to present	Billing on Tax Rolls
	Contract Negotiations	2017	Service Outside District
Scotts Valley Water District	Water Rates	2004	Restructure Increasing Block Quantity Charges
	Water Rates	2005	Update
	Water Rates	2006	Update
	Water Rates	2007	Update Financial Projections
	Water Rates	2008	Update Financial Plan
	Water Rates	2009	Update Rate Projections
	Water Rates	2010	Update Rate Projections
	Water Rates	2011	Update Rate Projections
	Water Rates	2012	Update Rate Projections
	Water Rates	2013	Update Rate Projections
Sharon Heights Golf & Country Club	Water Supply Reliability	2000	Shortage Allocations, Water Supply Alternatives
	Water Supply Reliability	2009	Update Action Plan
Six Acres Water Company	Water Supply Alternatives	2017	Economic Analysis
Snell & Wilmer	Expert Witness Testimony (Arbitration)	1995	Groundwater Contamination Damages (Citizens Utilities Company)
Solano Irrigation District	Agricultural and M&I Water Rates	2014 to present	Cost Allocations
Sonoma County Water Agency	Wholesale Water Rates	2013 to present	Rate Restructuring and Contract Modifications
	Wastewater Annexation	2013	Financing Alternatives

Client	Type of Study	Year	Project Emphasis
South Bayside System Authority	Flow Equalization Basin Study	2003	Economic Evaluation of Lease Options
Southeast Water Coalition	Cost Allocation Analysis of Replenishment Assessment	2006	Interbasin Subsidy
	Cost Allocation Analysis	2009	Update
South El Monte Joint Defense Group	Groundwater Remediation Damages	2004	Evaluation of Damage Claims
Stanford University	Water Supply Assessment	2008	Shortage Allocations
Straw & Gilmartin	Expert Witness Testimony (Arbitration)	1995	Groundwater Contamination Damages (Citizens Utilities Company)
Tamalpais Community Services District	Wastewater Financial Plan	2004	Capital Improvement Program Funding Alternatives
City of Tracy	General Fund Reimbursement	2016	Water, Sewer, Solid Waste Enterprises
City of Ukiah	Water Rates, Sewer Rates, and Capacity Charges	2009	Financial Stability During Water Supply Shortage
	On-Going Services	2010-11	Sanitary District Detachment
	Water Connection Fees	2011	Update
Union Sanitary District	Connection Fees	1990	Project Financing, Cost Allocation
	Internal Financial Controls	1998	Management Practices
	Joint Powers Financing Authority Review	1999	Debt Retirement
	Reserve Fund Review	2000	Adequacy of Reserves
	Sewer Rates	2015	Rate Modeling
	Sewer Rates	2016 to present	Capital Planning Modeling
United Water Conservation District	Wholesale Water Rates	2011 to present	Proportionality Between Agriculture and M&I Groundwater Charges
Veterans Home of California, Yountville	Water Rates	2001	Surplus Water Charges
	Wastewater Rates	2001	Contract Compliance
West Bay Sanitary District	Flow Equalization Basin Study	2003	Economic Evaluation of Lease Options
	Sewer Rates and Connection Fees	2011	Financial Plan
	Sewer Rates	2012	Update
	Sewer Rates	2013	Update
	Sewer Rates	2014	Update
	Sewer Rates	2015	Update
	Stormwater Rates and Connection Fees	2016	Updates
	Sewer Rates	2017	Cost of Service Allocations
City of West Sacramento	Water and Sewer Rates	2014 to present	Capital Funding
	Refuse Rates	2016	Proposition 218 implementation

Client	Type of Study	Year	Project Emphasis
Westborough County Water District	Water Connection Fees	2015	Redevelopment
Western Hills Water District	Water Rates	2015	Proposition 218 Compliance
Western Municipal Water District	Retail Water Rates	2003	Alignment with Wholesale (MWDSC) Rate Structure
	Retail Water Rates	2004	Elevation Surcharges
City of Willits	Litigation Support	2011	Cost Allocation
Town of Windsor	Water, Wastewater, Recycled Water Rates and Capacity Fees	1993	Water Conservation, Cost Allocation
City of Winters	Water and Wastewater Rates	2005	Debt Financing; Conversion to Metered Rates
City of Woodland	Wastewater Buy-In Charge	2010	Sale of Treatment Plant Capacity

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CLIENT SATISFACTION SURVEY

Johnston, Gremaux & Rossi, LLP
CERTIFIED PUBLIC ACCOUNTANTS

January 2, 2013

HF&H Consultants, LLC
201 N. Civic Drive, Suite 230
Walnut Creek, CA 94596

To the Partners of HF&H Consultants, LLC:

In November 2012, Johnston, Gremaux & Rossi, LLP was retained by HF&H Consultants, LLC to conduct and compile the results of a client satisfaction survey, in accordance with the procedures described below. This letter documents the procedures we followed in compiling the survey results and reports our findings for the Company as a whole.

Procedures:

Johnston, Gremaux & Rossi, LLP used the following procedures to conduct and compile the results of the client satisfaction survey:

- HF&H Consultants, LLC provided Johnston, Gremaux & Rossi, LLP with an Excel client list of the clients from the years 2008 and 2012 that included names and e-mail addresses of recipients who should receive the survey.
- Johnston, Gremaux & Rossi, LLP set-up an online survey with Survey Monkey, an online survey vendor, on November 7, 2012 to be used exclusively for HF&H's client satisfaction survey in which the results would be reported directly to Johnston, Gremaux & Rossi, LLP. The online survey was kept open for about 3 1/2 weeks (November 7, 2012 through November 30, 2012).
- Two e-mail reminders were sent on November 14th and November 26th to those who had not responded to the online survey.
- A total of 160 survey requests were sent out to recipients and as of November 30th we had received 59 responses. On December 5, 2012, Johnston, Gremaux & Rossi, LLP compiled the responses. Our findings are presented below.

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HF&H Consultants, LLC
January 2, 2013
Page 2

Findings:

- 100% of the respondents either strongly agreed or agreed with the statement that "HF&H staff was professional, experienced, and well-qualified."
- 98% of the respondents either strongly agreed or agreed with the statement that "HF&H staff understood my unique requirements."
- 95% of the respondents either strongly agreed or agreed with the statement that "HF&H staff was responsive to my needs and inquiries."
- 91% of the respondents either strongly agreed or agreed with the statement that "HF&H presentations were effective and well organized."
- 91% of the respondents either strongly agreed or agreed with the statement that "HF&H provided good value for my consulting dollar, relative to other consultants."
- 93% of the respondents either strongly agreed or agreed with the statement that "they would hire HF&H again."
- 95% of the respondents either strongly agreed or agreed with the statement that "they would recommend HF&H's services to another jurisdiction with similar needs."

Should you have any questions concerning these findings, please do not hesitate to call.

Sincerely,

JOHNSTON, GREMAUX & ROSSI, LLP

Christopher M. Haley, CPA
Partner

RÉSUMÉS

JOHN W. FARNKOPF, P.E.

Senior Vice President

Industry Experience

- Water, wastewater, reclaimed water, and stormwater utilities
- Municipal and investor-owned rate making
- Water resources engineering

Education and License

- B.S., Civil Engineering, University of California, Berkeley
- B.A., Philosophy, University of California, Berkeley
- Civil Engineering C31652, California

Professional History

- HF&H Consultants, LLC: 1989 to present
- Price Waterhouse: 1986 to 1989
- Leedshill-Herkenhoff, Inc.: 1984 to 1986
- Stetson Engineers, Inc.: 1977 to 1984
- Novato Sanitary District No. 6: 1975 to 1976

Professional Memberships

- American Water Works Association, Financial Management Committee (CA-NV Section)
- California Association of Sanitation Agencies
- Water Environment Federation

Range of Experience

Over 43 years of utility industry experience including water resources engineering and management consulting before co-founding HF&H, where he directs the firm's water, wastewater, and stormwater consulting services.

Expertise

- *Rates and Charges* – multi-year revenue requirement models, cost-of-service analysis, rate structure design
- *Financial Planning* – stormwater funding strategies, reserve fund management
- *Development impact fees* – water and wastewater capacity charges; stormwater impact fees
- *General Fund Reimbursements* – public safety, governmental facilities, right-of-way maintenance
- *Management Studies* – benchmarking, organizational audits, contract compliance

Publications

- *California Water Rate Setting Under Proposition 218: A Practical Guidebook*, contributing editor for the American Water Works Association California-Nevada Financial Management Committee, 2018.
- *Private Property Infiltration and Inflow Control*, review editor for the Water Environment Federation, 2016.
- *Building Better Water Rates for an Uncertain World*, contributing author, Alliance For Water Efficiency, 2014.
- *User Fee Funded Stormwater Utilities*, review editor for the Water Environment Federation, 2013.
- *Financing and Charges for Wastewater Systems*, authored Chapter XI "Implementing Rate Studies," Water Environment Federation Manual of Practice, 2004.

Articles, Speeches, and Testimony

- "Rate Making and Cloud Computing," invited panelist at the National Association of Regulatory Commissioners Summer Policy Summit, July 2017.
- "Tiers or Tears: Designing Cost-Based Increasing Block Rates," presented at the American Water Works Association CA-NV Section Fall Conference, October 2015.
- "Interpreting the San Juan Capistrano Decision in Setting Drought Rates," invited speaker at the California Society of Municipal Finance Officers Sacramento Valley Chapter meeting, September 2015.
- "Conservation Pricing: Cal American Water Company's Experience" presented at the California Urban Water Conservation Council's Water Rates Best Management Practices 1.4 Workshop, June 2013.
- "Volumetric Wastewater Rates: Current and Future Industry Practices" presented at the Volumetric Wastewater Pricing Stakeholder Group, Center for Collaborative Policy Office, October 2012.
- "Conservation Water Rates: Balancing Fixed and Volumetric Charges" presented at the Association of California Water Agencies' Regulatory Summit, August 2012.
- "Volumetric Pricing for Sanitary Sewer Service in California," testimony presented before the California State Water Resources Control Board, May 2012.
- "Cost of Service Analysis: Meeting the Burden of Proof" presented at the Association of California Water Agencies' Spring Conference, May 2012.
- "Recent Trends in Funding Enterprise Infrastructure" presented at the California Society of Municipal Finance Officers Annual Conference, March 2007.
- "Proposition 218: Are Your Rates In Compliance?" presented at the California/Nevada Annual Fall Conference of the American Water Works Association, October 2004.
- "Funding Stormwater NPDES Requirements: Potential Sources" presented at the League of California Cities Annual Conference, September 2003.
- "Funding Water, Sewer, and Stormwater Programs under Proposition 218" presented at the League of California Cities Public Works Officers Institute Conference, March 2000.
- "Guidelines for Setting Rates in Compliance with Proposition 218" presented at the League of California Cities Annual Conference, October 1999.
- "Getting Rate Approval" presented at the Water Environment Federation Conference, 1998.
- "Privatization as a Means of Managing Municipal Budget Constraints" presented at the Orange County Workshop "Managing Municipal Budget for the New Millennium," 1997.
- "The Use of Mediation Techniques to Evaluate Rate Alternatives," presented at the California/Nevada Annual Spring Conference of the American Water Works Association, 1996.
- "Dissecting Rate Structures: Identifying Where Further Refinements are Warranted," Proceedings of CONSERV96, American Water Works Association Conference, 1996.

- "The Palo Alto Reclamation Project: Economic Justifiability versus Financial Feasibility," presented to the San Francisco Bay Area Water Recycling Task Force, 1993.
- "Allocating Reclamation Costs to Water and Waste Water Rates," invited speaker at the 68th Annual Conference of the Western Economic Association International, 1993.
- "Pricing Reclaimed Water," presented at the American Water Works Association/Water Environment Federation Joint Management Conference, 1993.
- "Developing Reclaimed Water Pricing Policies," presented to the San Francisco Bay Area Water Recycling Task Force, 1992.
- "Drought Impacts on San Francisco's Wholesale Water Purchases," testimony presented to the State Water Resources Control Board, Bay Delta Hearings, Water Rights Phase, 1992.
- "The Ability of Manufacturing Industries to Cope with Permanent Water Supply Reductions," testimony on behalf of the Santa Clara County Manufacturing Group presented to the State Water Resources Control Board, Bay Delta Hearings, Water Rights Phase, 1992.
- "Characteristics of Conservation-Oriented Rates," Proceedings, American Water Works Association National Conference, 1992.
- "Impacts of Water Supply on Bay Area Industrial Water Users," presented at the California Water Planning Conference sponsored by the Association of Bay Area Governments, 1991.
- "Allocating Water Supplies during Droughts," Proceedings, American Society of Civil Engineers National Conference on Environmental Engineering, 1991.
- "Setting Wholesale and Retail Rates in Times of Drought," presented at the Drought Response Water Rate Structure Workshop sponsored by the San Diego County Water Authority, 1991.
- "Capacity Charges: Theory, Practice, and the Law," presented at the California Nevada Spring Conference of the American Water Works Association, 1990.
- "Fixed Asset Valuation Procedures," presented at Fixed Asset Valuation and Management for Local Governments and Utilities, a Price Waterhouse seminar, 1988.
- "Bay Area Water Supplies: Imported, Reclaimed, and Local Sources," testimony presented to the State Water Resources Control Board, Bay Delta Hearings, Phase I, 1987.
- "Elements of River Meanders," California Engineer, University of California, Berkeley, 1978.

RICK SIMONSON, CMC

Vice President

Education and Certifications

- B.S., Business Administration, Accountancy, California State University - Sacramento
- B.A., Communication Studies, Media Production, California State University - Sacramento
- Certified Management Consultant

Professional History

- HF&H Consultants, LLC: 2000 to present
- Contra Costa County Assessor's Office: Auditor/Appraiser, 1996 to 2000
- Laidlaw Transit: Staff Accountant, 1995-1997

Professional Memberships

- Institute of Manangement Consultants
- American Water Works Association
- Water Environment Federation

Range of Experience

Over 17 years of utility rate setting experience with HF&H and has performed over 80 financial planning/rate studies for water, wastewater, and solid waste clients. He brings a depth of knowledge and expertise in Propositions 218 and 26 compliance, rate structure design, and a strong financial modeling background.

Expertise

- *Rates and Charges* – Multi-year financial modeling, cost-of-service analysis, rate structure design
- *Development impact fees* – Water and wastewater capacity/connection charges; stormwater impact fees
- *General Fund Reimbursements* – Public safety, governmental facilities, right-of-way maintenance

Recent Projects as Project Manager

- **West Bay Sanitary District -** Sewer service charge and connection fee update (2017)
- **City of West Sacramento –** Water, wastewater, and solid waste rate studies. Water and wastewater connection fee studies. (2017)
- **City of Ceres –** Water rate and connection fee study (2017)
- **City of Hillsborough –** Tiered water rate study and water shortage rates (2016)

Speaking Engagements

- Moderator and Presenter, *HF&H/CalRecycle High Diversion Rates & Compensation Workshops*, October 2013 (Oakland), November 2013 (Lakewood), and December 2013 (Sacramento)
- SWANA – Western Regional Symposium – May 2005 – *"Accurate Solid Waste Rate Comparisons"*
- SWANA – Western Regional Symposium – May 2004 – "Annual Solid Waste Rate Adjustments – Index Method or Cost-of-Service Method?"

GEOFFREY MICHALCZYK

Associate Analyst

Industry Experience

- Water, wastewater, stormwater, and solid waste utilities
- Rate making for municipal-owned utilities
- City-wide overhead cost allocations

Education

- B.S., Economics & Political Science, University of Utah
- M.S., Financial Analysis, Saint Mary's College of California
- M.B.A., Saint Mary's College of California

Professional History

- HF&H Consultants, LLC: 2016 to present
- Bartle Wells Associates: 2015 to 2016
- Peterson Holding Company: 2014 to 2015

Range of Experience

Municipal finance and accounting analyst specializing in the financial management of water and wastewater utilities. Joined HF&H in 2016 and focuses on rate studies and long-term financial planning.

Expertise

- *Rates and Charges* – multi-year revenue requirement models, cost-of-service analysis, rate structure design
- *Financial Planning* – stormwater funding strategies, reserve fund management
- *Development Impact Fees* – water and wastewater capacity charges; stormwater impact fees
- *General Fund Reimbursements* – public safety, governmental facilities, right-of-way maintenance
- *Cost Allocations* – overhead allocations, analytical review, Prop 218 compliance

Recent Projects

- *City of Daly City:* Water Rates
- *West Bay Sanitary District:* Sewer Rates
- *City of La Verne:* Cost Allocations
- *City of Brentwood:* Administrative Cost Reimbursement Study
- *San Mateo County:* Sewer Rates
- *Cobb Area Water District:* LAFCO Consolidation
- *Oakwood Lake Water District:* Water and Sewer Rates
- *City of Newport Beach:* Sewer Rates
- *City of Ceres:* Water Rates
- *City of Long Beach:* Right-of-Way Cost Allocations
- *City of Tracy:* Enterprise Reimbursement
- *City of Glendale:* Enterprise Reimbursement

Dan Flory, PE

Principal Engineer

Education

- ✓ B.S., Civil Engineering, California State University, Chico
- ✓ Executive Management Program, University of California, Davis

Registration/Certifications

- ✓ Civil Engineer, California #33004

Areas of Expertise

- ✓ Water Resources Engineering
- ✓ Water Banking
- ✓ Water Transfers
- ✓ Bid Documents
- ✓ Data Analysis

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Professional Summary

Dan Flory is a principal engineer specializing in water resources with Provost & Pritchard. Mr. Flory has more than 35 years of experience in water resources engineering including six years as a water agency general manager. He served in 28 progressively more responsible roles for the California Department of Water Resources, culminating in his position as the department's executive manager. He worked an additional four years in engineering with the California Department of Water Resources. He is an experienced advisor to legislative staffs, appointed officials and board members as well as serving as an expert witness providing testimony in litigation involving water rights.

Relevant Experience

Previous Experience

Antelope Valley-East Kern Water Agency, Palmdale, California, General Manager – Reporting to the Board of Directors, Mr. Flory was responsible to oversee all operations of the Agency. He managed a $45 million budget and 40 operations and administrative staff. His position also included supplying water through four water treatment plants to a population of about 400,000 and 2,400 square miles in the Mojave Desert and Antelope Valley. He led the development of three local water banks recharging SWP water in 2011 allowing the Agency to meet all water quality and water supply needs during a four-year drought. He also negotiated water delivery and exchange agreements to net $13 million in additional revenue for the Agency.

California Department of Water Resources, Sacramento, California, Executive Manager – Reporting to the SWP Deputy Director and leading the Department's efforts to renegotiate and extend the long-term water supply contracts, Mr. Flory developed new and revised contract terms to fund major capital improvements including the through Delta facilities and address SWP bonding and cash flow issues. He provided expert testimony and technical support to defend the Department's long-standing practices in the allocation of water and power costs among the water contractors. As Executive Manager for FloodSAFE California he provided oversight and executive direction to the FloodSAFE program with an annual budget over $700 million per year. He also directed the work of a large multi-disciplinary matrix management team of Department staff and consultants; developed the bond expenditure plan and managed over one hundred programs and projects and reported to the legislature and Department management all expenses and progress of the work.

California Department of Water Resources, Sacramento, California, Division Chief – For six years, Mr. Flory supervised and directed the work of 100 engineers and analysts in the administration of power purchase and water supply contracts. The operating budget, including power purchases was about $300 million a year. Work included the allocation of water supplies to water users and the distribution of water and power costs to 29 SWP contracting agencies. He also developed the 400 page annual report documenting the costs to contractors.

California Department of Water Resources, Sacramento, California, Principal Engineer – Mr. Flory supervised and directed the work of the Water Supply Reliability Branch, water resource planning related to the SWP, including the Bay Delta Water Rights Hearing Group, the Arroyo Pasajero Flood Study Team and the Future Water Supply Studies Group.

California Department of Water Resources, Sacramento, California, Section Chief – For 11 years Mr. Flory supervised the Water Contracts Administration and Negotiation Section. He directed the work of 20 engineers and technicians, approving water delivery schedules, documenting deliveries and facilitating water transfers. He also developed contracts for the use of the SWP facilities.

California State Water Resources Control Board, Sacramento, California, Water Rights Engineer – Mr. Flory was responsible to investigate, document and to present findings to the State Water Resources Control Board on water right applications and disputes. He gave presentations at public hearings and in one-on-one staff briefings of Board members; organized staff reports; facilitated public testimony and developed the hearing record on water right hearings and adjudicatory processes for surface and groundwater resources.

California Department of Water Resources, Sacramento, California, Civil Design Engineer – Mr. Flory developed civil design drawings and specifications for major SWP projects including the Bottlerock Geothermal Power Plant and the Suisun Marsh Water Quality Control Structures.

California State Water Resources Control Board, Sacramento, California, Associate Engineer – As an Associate Engineer, Mr. Flory performed a special study to determine the water available for appropriation in the Sacramento-San Joaquin watershed. He analyzed all water rights held in the Central Valley including all appropriative and riparian rights; determined the applicability of standard water right restrictions on diversions; took field measurements and documented water diversions for a court ordered adjudication.

Syblon-Reid, Engineering Contractors, Folsom, California, Project Engineer – Mr. Flory served as a Field Engineer and surveyor on several water resources construction projects including the Atwater wastewater treatment plant expansion, Roaring River Slough levee repair and road construction and the Friant-Kern Canal maintenance and lining repair. He developed bid documents and progress payment estimates.

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

AGENDA ITEM NO. 12

Proposed Budget - FY 2018/19

General Program Funds

	FY 2007/08 ACTUAL	FY 2008/09 ACTUAL	FY 2009/10 ACTUAL	FY 2010/11 ACTUAL	FY 2011/12 ACTUAL	FY 2012/13 ACTUAL	FY 2013/14 ACTUAL	FY 2014/15 ACTUAL	FY 2015/16 ACTUAL	FY 2016/17 ACTUAL	FY 2017/18 ADOPTED BUDGET	FY 2017/18 PROJECTED YTD	FY 2018/19 PROPOSED BUDGET
Revenues:													
Member Contributions	$ 30,000.00	$ -	$ 21,000.00	$ 18,000.00	$ 18,000.00	$ -	$ 18,000.00	$ 24,000.00	$ 24,000.00	$ 64,000.00	$ 30,000.00	$ 30,000.00	$ 30,000.00
Interest Earnings	23.87	39.17	74.25	752.09	264.40	81.61	49.81	112.14	50.00	11.66	25.00	26.34	30.00
Revenue - Refund/Misc							3,550.80	-		5.00		-	
Total Revenue	$ 80,327.27	$ 39.17	$ 21,074.25	$ 18,752.09	$ 18,264.40	$ 81.61	$ 21,600.61	$ 24,112.14	$ 24,050.00	$ 64,016.66	$ 30,025.00	$ 30,026.34	$ 30,030.00
Expenditures:													
Insurance (ACWA/JPIA)	$ 2,183.00	$ 1,655.00	$ 1,887.00	$ 1,815.00	$ 2,183.00	$ 2,133.02	$ 2,183.00	$ 1,637.27	$ 2,182.92	$ 2,183.10	$ 2,350.00	$ 2,182.98	$ 2,350.00
Memberships (ACWA)	785.00	910.00	1,520.00	1,435.00	1,560.00	1,625.00	1,755.00	2,225.00	2,385.22	2,510.00	2,650.00	2,635.00	2,825.00
Outreach (Web Site, Community Activities)	540.00	2,040.00	540.00	1,145.00	2,603.00	648.00	788.00	1,168.00	4,231.63	30,257.79	5,000.00	5,187.40	5,000.00
Miscellaneous (Bank Fees, Refreshments, Etc.)	23.46	-	50.34	-	98.95	88.50	369.07	-	75.00	-	500.00	-	500.00
Contract Services - Administration	22,174.77	16,936.08	14,228.28	13,079.60	17,933.21	7,254.90	11,984.73	12,476.53	13,712.77	17,046.49	15,000.00	10,394.08	15,000.00
Contract Services - Financial Audit	1,500.00	-	2,000.00	-	-	-	6,000.00	4,000.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
Total Expenditures	$ 72,935.83	$ 21,541.08	$ 20,225.62	$ 17,474.60	$ 24,378.16	$ 11,749.42	$ 23,079.80	$ 21,506.80	$ 24,587.54	$ 53,997.38	$ 27,500.00	$ 22,399.46	$ 27,675.00
Net Income (Loss)	$ 7,391.44	$ (21,501.91)	$ 848.63	$ 1,277.49	$ (6,113.76)	$ (11,667.81)	$ (1,479.19)	$ 2,605.34	$ (537.54)	$ 10,019.28	$ 2,525.00	$ 7,626.88	$ 2,355.00
												Member Contribution:	10,000.00

Prepared 7/11/2018

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Proposed Budget - FY 2017/18

Restricted Funds - AVIRWMP Program

	FY 2007/08 ACTUAL	FY 2008/09 ACTUAL	FY 2009/10 ACTUAL	FY 2010/11 ACTUAL	FY 2011/12 ACTUAL	FY 2012/13 ACTUAL	FY 2013/14 ACTUAL	FY 2014/15 ACTUAL	FY 2015/16 ACTUAL	FY 2016/17 ADOPTED BUDGET	FY 2016/17 ACTUAL	FY 2017/18 PROPOSED BUDGET
Revenues:												
AV Regional Water Management Group	$ 55,000.00	$ -	$ 131,278.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
AV IRWMP 2013 Update (Prop. 84 Grant)	-	-	-	-	28,729.56	63,948.84	54,714.84	278,209.52	-	46,790.00	-	-
Total Revenue	$ 55,000.00	$ -	$ 131,278.33	$ -	$ 28,729.56	$ 63,948.84	$ 54,714.84	$ 278,209.52	$ -	$ 46,790.00	$ -	$ -
Expenditures:												
Contract Services - AVRWMG	$ 11,707.30	$ 9,833.93	$ 6,959.12	$ 47,269.00	$ -	$ -	$ 48,656.77	$ -	$ -	$ -	$ -	$ -
Contract Services - AVRWMG (Contract Commitments)	-	-	-	-	-	-	-	23,666.50	-	-	-	-
Contract Services - IRWMP 2013 Update	-	-	-	-	25,736.78	72,197.27	-	278,209.52	105,157.11	-	-	-
Portion Due Back to AVSWCA (Pass-thru)										22,000.00	-	22,000.00
Total Expenditures	$ 11,707.30	$ 9,833.93	$ 6,959.12	$ 47,269.00	$ 25,736.78	$ 72,197.27	$ 48,656.77	$ 301,876.02	$ 105,157.11	$ 22,000.00	$ -	$ 22,000.00
Net Income (Loss)	$ 43,292.70	$ (9,833.93)	$ 124,319.21	$ (47,269.00)	$ 2,992.78	$ (8,248.43)	$ 6,058.07	$ (23,666.50)	$ (105,157.11)	$ 24,790.00	$ -	$ (22,000.00)

	Revenue	Expenditures	Income(Loss)	
AVRWMG	$ 186,278.33	$ 148,092.62	$ 38,185.71	
Grant Funds	425,602.76	481,300.68	(55,697.92)	
	$ 611,881.09	$ 629,393.30	**$ (17,512.21)**	**Projected AVIRWMG Portion in Bank (Remaining Group & Grant Funds)**

Prepared 7/11/2018

ANTELOPE VALLEY STATE WATER CONTRACTORS ASSOCIATION

Proposed Budget - FY 2018/19

Restricted Funds - USGS/CASGEM Program

	FY 2007/08 ACTUAL	FY 2008/09 ACTUAL	FY 2009/10 ACTUAL	FY 2010/11 ACTUAL	FY 2011/12 ACTUAL	FY 2012/13 ACTUAL	FY 2013/14 ACTUAL	FY 2014/15 ACTUAL	FY 2015/16 ACTUAL	FY 2016/17 ACTUAL	FY 2017/18 ADOPTED BUDGET	FY 2017/18 YTD	FY 2018/19 PROPOSED BUDGET
Revenues:													
Member Contributions - USGS	$ -	$ 55,200.00	$ 56,750.00	$ 60,000.00	$ -	$ 54,500.00	$ 89,400.00	$ 76,725.00	$ 90,050.00	$ 31,000.00	$ 61,100.00	$ 61,100.00	$ 31,800.00
Contributions - Others (AVIRWMG/AV Watermaster)	-	-	-	-	-	-	-	-	-	-	-	-	31,800.00
Member Contributions - CASGEM	-	-	-	-	-	7,750.00	-	-	-	-	-	-	-
Total Revenue	$ -	$ 55,200.00	$ 56,750.00	$ 60,000.00	$ -	$ 62,250.00	$ 89,400.00	$ 76,725.00	$ 90,050.00	$ 31,000.00	$ 61,100.00	$ 61,100.00	$ 63,600.00
Expenditures:													
Contract Services - USGS	$ -	$ 27,600.00	$ 55,975.00	$ 56,900.00	$ 55,775.00	$ 27,250.00	$ 90,075.00	$ 115,308.34	$ 69,483.33	$ 50,283.33	$ -	$ 30,550.00	$ 31,800.00
Contract Services - USGS (Prior Year)									-	-	75,900.00	-	-
Contract Services - USGS (New Year)												31,800.00	
Contract Services - CASGEM	-	-	-	-	-	2,104.50	-	-	-	-	-	-	-
Total Expenditures	$ -	$ 27,600.00	$ 55,975.00	$ 56,900.00	$ 55,775.00	$ 29,354.50	$ 90,075.00	$ 115,308.34	$ 69,483.33	$ 50,283.33	$ 75,900.00	$ 62,350.00	$ 31,800.00
Net Income (Loss)	$ -	$ 27,600.00	$ 775.00	$ 3,100.00	$ (55,775.00)	$ 32,895.50	$ (675.00)	$ (38,583.34)	$ 20,566.67	$ (19,283.33)	$ (14,800.00)	$ (1,250.00)	$ 31,800.00

AVEK Contribution =	$ 27,253.00
PWD Contribution =	4,102.00
LCID Contribution =	445.00
	$ 31,800.00

Prepared 7/16/2018

ANTELOPE VALLEY STATE WATER CONTRACTORS
Statement of Revenues, Expenses and Change in Net Position
For the Twelve Months Ending 6/30/2018

	June	YTD
Revenues:		
Contributions - Member Agency		$30,000.00
Contributions - Member Programs (USGS & CASGEM)		61,100.00
Contributions - Others (AVRWMG)		
Grant Re-imbursement - IRWMP 2013 Update		
Water Sales - Pilot In-Lieu Banking		
Miscellaneous Refund		
Interest Earnings	0.70	27.04
Total Revenue		**$91,127.04**
Expenditures:		
General Government		
Bank Fees		
Insurance	181.91	2,182.98
Memberships		2,635.00
Outreach	199.95	5,187.40
Purchased Water		
Miscellaneous		
		10,005.38
Public Resource		
Contract Services - Administration	2,084.49	13,413.28
Contract Services - USGS & CASGEM		62,350.00
Contract Services - AVRWMG		
Contract Services - IRWMP 2013 Update		
Contract Services - Other		
		75,763.28
Total Expenditures		**$85,768.66**
Change in Net Position		**$5,358.38**
Net Position - Beginning of Year		**(39,046.56)**
Net Position - End of Year		**($33,688.18)**

ANTELOPE VALLEY STATE WATER CONTRACTORS
Balance Sheet
For the Twelve Months Ending 6/30/2018

	YTD
ASSETS	
Cash - General Fund	$7,256.63
Restricted - AVRWMG	5,070.59
Accounts Receivable	15,900.00
Prepaid Insurance (Premium Period 10/1 - 9/30)	545.73
Total Assets	**$28,772.95**
LIABILITIES AND FUND BALANCE	
LIABILITIES	
Accounts Payable	$46,561.13
Total Liabilities	**46,561.13**
FUND BALANCE	
Unassigned	(17,788.18)
Total Fund Balance	**(17,788.18)**
Total Liabilities and Fund Balance	**$28,772.95**

ANTELOPE VALLEY STATE WATER CONTRACTORS
Budget vs Actual FY2017-18
For the Twelve Months Ending 6/30/2018

	June Actual	YTD Actual	Budget	Variance
General Revenues:				
Contributions - Member Agency		$30,000	$30,000	
Miscellaneous Refund				
Interest Earnings	1	27	25	2
Total General Revenue	**$1**	**$30,027**	**$30,025**	**($2)**
General Expenditures:				
General Government				
Bank Fees				
Insurance	182	2,183	2,350	167
Memberships		2,635	2,650	15
Outreach	200	5,187	5,000	(187)
Purchased Water				
Miscellaneous			500	500
Contract Services - Administration	2,084	13,413	15,000	1,587
Contract Services - Other			2,000	2,000
Total General Expenditures	**$2,466**	**$23,419**	**$27,500**	**$4,081**
Program Revenues:				
Contributions - Member Programs (USGS & CASGEM)		$61,100	$61,100	
Contributions - Others (AVRWMG)				
Grant Re-imbursement - IRWMP 2013 Update				
Water Sales - Pilot In-Lieu Banking				
Total Program Revenue		**$61,100**	**$61,100**	
Program Expenditures:				
Contract Services - USGS & CASGEM		$62,350	$75,900	$13,550
Contract Services - AVIRWMP				
Contract Services - IRWMP 2013 Update				
Total Program Expenditures		**$62,350**	**$75,900**	**$13,550**