SPECIAL NOTICE REGARDING
CORONAVIRUS DISEASE 2019 (COVID-19)
AND PARTICIPATION IN PUBLIC MEETINGS

On March 4, 2020, Governor Newsom declared a State of Emergency resulting from the threat of COVID-19. On September 16, 2021, Governor Newsom signed Assembly Bill No. 361 into law. Assembly Bill No. 361 amends Government Code section 54953(e) by adding provisions for remote teleconferencing participation in meetings by members of a legislative body, without the requirements of Government Code section 54953(b)(3), subject to the existence of certain conditions. The San Bernardino Valley Municipal Water District adopted a resolution determining, by majority vote, that, as a result of the declared State of Emergency, a meeting in person would present imminent risks to the health or safety of attendees. Accordingly, it has been determined that all Board and Workshop meetings of the San Bernardino Valley Municipal Water District will be held pursuant to the Brown Act and will be conducted via teleconference. There will be no public access to the meeting venue.

BOARD OF DIRECTORS WORKSHOP - ENGINEERING
TUESDAY, DECEMBER 14, 2021 – 2:00 P.M.

PUBLIC PARTICIPATION

Public participation is welcome and encouraged. You may participate in the December 14, 2021, meeting of the San Bernardino Valley Municipal Water District online and by telephone as follows:

Dial-in Info: (877) 853 5247 US Toll-free
Meeting ID: 753 841 573
PASSCODE: 3802020

https://sbvmwd.zoom.us/j/753841573

If you are unable to participate online or by telephone, you may also submit your comments and questions in writing for the District's consideration by sending them to comments@sbvmwd.com with the subject line "Public Comment Item #" (insert the agenda item number relevant to your comment) or "Public Comment Non-Agenda Item". Submit your written comments by 6:00 p.m. on Monday, December 13, 2021. All public comments will be provided to the Chair and may be read into the record or compiled as part of the record.

IMPORTANT PRIVACY NOTE: Participation in the meeting via the Zoom app is strongly encouraged. Online participants MUST log in with a Zoom account. The Zoom app is a free download.
Please keep in mind: (1) This is a public meeting; as such, the virtual meeting information is published on the World Wide Web and available to everyone. (2) Should you participate remotely via telephone, your telephone number will be your "identifier" during the meeting and available to all meeting participants; there is no way to protect your privacy if you elect to call in to the meeting.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT
380 E. Vanderbilt Way, San Bernardino, CA 92408

BOARD OF DIRECTORS WORKSHOP - ENGINEERING

AGENDA

2:00 PM Tuesday, December 14, 2021

CALL TO ORDER
Chairperson: Director Harrison
Vice-Chair: Director Hayes

1) INTRODUCTIONS

2) PUBLIC COMMENT
Any person may address the Board on matters within its jurisdiction.

3) SUMMARY OF PREVIOUS MEETING

3.1 November 9, 2021, Meeting(Page 3)
Summary Notes BOD Workshop - Engineering 110921

4) PRESENTATIONS

4.1 Update on the Sterling Natural Resource Center by Mr. John Mura

5) DISCUSSION ITEMS

5.1 Consider Third Amendment to the Reimbursement Agreement with East Valley Water District for Construction of the Regional Recycled Water Facilities(Page 12)
Staff Memo - Consider Third Amendment to the Reimbursement Agreement with East Valley Water District for Construction of the Regional Recycled Water Facilities
Updated Regional Recycled Water Facilities Map, December 2021
General Alignment of the Regional Recycled Water Pipeline
General Layout of the Weaver Basins
Draft Third Amendment to the Reimbursement Agreement with EVWD on RRWS

5.2 Consider Creating a Joint Powers Authority in Cooperation with the Yucaipa Valley Water District(Page 26)

Staff Memo - Consider Creating a Joint Powers Authority in Cooperation with the Yucaipa Valley Water District
Yucaipa Valley Water District Staff Memo on Proposed YVWD Financing Authority

5.3 Consider Tunneling Feasibility Study for Foothill Pipeline Crossing at City Creek Project (Page 46)
Staff Memo - Consider Tunneling Feasibility Study for Foothill Pipeline Crossing at City Creek Project
AECOM Proposal for Tunneling Feasibility Study for Foothill Pipeline Crossing at City Creek

5.4 Consider ICF contract amendment and budget augmentation for Upper SAR Habitat Conservation Plan (Page 177)
Staff Memo - Consider ICF contract amendment and budget augmentation for Upper SAR Habitat Conservation Plan
ICF Proposal
ICF Contract Amendment # 14

5.5 Consider Recruitment of Principal Engineer and Addition of Lead Water Systems Operator Position (Page 193)
Staff Memo - Consider Recruitment of Principal Engineer and Addition of Lead Water Systems Operator Position
Approved Organizational Chart, September 2021
Approved Salary Schedule, September 2021

5.6 Consider Entering Into an Agreement for Professional Consulting Services for the Redistricting of Division Boundaries (Page 197)
Staff Memo - Consider Entering Into an Agreement for Professional Consulting Services for the Redistricting of Division Boundaries
Proposal - Redistricting Insights

6) FUTURE BUSINESS

7) ADJOURNMENT

PLEASE NOTE:
Materials related to an item on this Agenda submitted to the Board after distribution of the agenda packet are available for public inspection in the District's office located at 380 E. Vanderbilt Way, San Bernardino, during normal business hours. Also, such documents are available on the District's website at www.sbvmwd.com subject to staff's ability to post the documents before the meeting. The District recognizes its obligation to provide equal access to those individuals with disabilities. Please contact Melissa Zoba at (909) 387-9228 two working days prior to the meeting with any special requests for reasonable accommodation.

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors Workshop – Engineering

FROM: Staff

SUBJECT: Summary of November 9, 2021, Board of Directors Workshop – Engineering

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The Engineering Workshop convened on November 9, 2021, via Zoom video-teleconference. Director Harrison chaired the meeting.

Directors Present: President Kielhold, Vice President Hayes, Director Botello, Director Harrison, and Director Longville.

Staff Present:

Heather Dyer, MS, MBA – Chief Executive Officer/General Manager
Joanna Gibson – Executive Director Upper SAR Habitat Conservation Program
Wen Huang, PE, MS – Deputy General Manager/Chief Engineer
Jose Macedo, ML, CPT-P (USA Retired) – Chief of Staff/Clerk of the Board
Cindy Saks, CPA – Deputy General Manager/Chief Financial Officer
Bob Tincher, PE, MS – Deputy General Manager/Chief Water Resources Officer
Melissa Zoba, MBA, MPA – Chief Information Officer

Michael Esquer – Senior Project Manager
Kristeen Farlow, MPA – Strategic Communications Manager
Anthony Flordelis – Business Systems Analyst
Matthew Howard, MS – Water Resources Senior Planner
Adekunle Ojo, MPA – Water Resources Manager
Shavonne Turner, MPA – Water Conservation Program Manager

Members of the Public Present:

Melody McDonald, San Bernardino Valley Water Conservation District
David E, Raley, San Bernardino Valley Water Conservation District
Mallory Gandara, Western Municipal Water District
Madeline Blua, Yucaipa Valley Water District
Nyles O'Harra, Yucaipa Valley Water District
Brian Dickinson, City of Colton
David Barnes, Geoscience
Johnson Yeh, Geoscience

Leonardo Ferrando, Riverside Public Utilities

1. Introductions

Deputy General Manager/Chief Engineer Wen Huang introduced Johnson Yeh and David Barnes of Geoscience.

Pursuant to the provisions of the Brown Act, this meeting will be conducted by teleconference only.

2. Public Comment

Director Harrison invited public comment. There was none.

3. Summary of Previous Meeting

The summary notes from the October 12, 2021 Board of Directors Workshop – Engineering were accepted with no comments.

4.1 Update on Improvements to WR-23 and Findings of Riverside North Basin Recharge Modeling

Deputy General Manager/Chief Engineer Wen Huang reminded the Board the effort to build the State Water Project (SWP) turnout WR-23 was led by Valley District staff, and the Riverside North Basin recharge modeling effort using the integrated model was led by the Geoscience team to determine effects of recharge.

Mr. Huang explained the 1969 Western-San Bernardino judgment and the work on the Watermaster annual report. Water levels in three key wells in the Colton Basin and the Riverside North Basin area are being monitored per the judgment threshold.

Due to the extended drought conditions and increased groundwater pumping, the water level of the three wells has been below the judgment threshold of 822 feet for the last three consecutive years. Staff reached out to western entities per the judgment to shift their pumping from that area to the San Bernardino Basin to allow the water level to recover. Staff is also working on ways to recharge in this particular area, he said.

Mr. Huang described the location of the monitoring wells. In June 2020, the Board approved acquisition of WR-23 off the Santa Ana Valley Pipeline, with a 25 cubic feet per second (cfs) capacity, which will allow SWP water into the Santa Ana River for recharge. The Board also approved the Geoscience contract for groundwater modeling to assure that the SWP recharge will help recover the groundwater level, he added.

Senior Project Manager Mike Esquer provided an update on the turnout improvements. The two parts to the project are the functional modification of the turnout itself, and the procurement of easements for the rights to transmit water from the SWP aqueduct across the property of the Department of Water Resources (DWR) and the San Bernardino Flood Control District (Flood Control). Two easements remain to procure, he explained. The first is awaiting Flood Control action to deem their property as surplus in order to obtain an appraisal for submission to the County real estate department, Mr. Esquer stated. He estimated four to six months from obtaining the easement. The second easement from DWR must be obtained for the City of Colton, which would hold the easement for electrical purposes, he explained. Staff hopes to have the easements completed by the end of the second quarter of 2022, at which time the City of Colton will install permanent power, Mr. Esquer advised.

Vice President Hayes requested clarification. Mr. Esquer explained Flood Control uses its surplus property process to determine that they have no future plans to build anything on that portion of the property, and the easement can be granted.

Director Botello asked about fees. Mr. Esquer indicated that fees are unknown at this time, but anticipated are appraisal costs, County review and fees based on the assessment.

Mr. Esquer shared plans and details of the WR-23 project, which were submitted last week to DWR.

Mr. Huang explained the modeling exercise by Geoscience in collaboration with Western Municipal Water District (WMWD) was to determine if the recharge would be effective. Mr. Johnson Yeh, principal geohydrologist with Geoscience introduced the modeling work for the project.

Mr. David Barnes of Geoscience provided an overview of the modeling project area and index wells. The purpose is to assess the effects of recharge from water release from WR-23 along the Santa Ana River down to La Cadena Drive, he stated. Project objectives include development of an operational recharge schedule to optimize groundwater recharge in the vicinity of the key wells, and provide a workplan for data collection during the recharge testing, he explained.

Mr. Barnes described the modeling efforts, use of the Integrated Santa Ana River Model, and scope of work. Outflow from WR-23 was assessed, along with environmental concern of releasing State Project Water (SPW) into the Santa Ana River, comingling with water downstream and flowing to the Prado Basin.

Mr. Barnes presented results of running the model, with the largest increases in groundwater downstream of WR-23. Running six months at 12 cfs, Well Flume No. 5 showed an increase of approximately ten feet. Even after ceasing releases at WR-23, the water level benefit from the recharge carries forward to the next summer period, he explained, so the storage benefits from additional recharge in the basin are cumulative.

Annual recharge will depend on the percolation rate along the channel and will be limited by the criteria of no flow below La Cadena Drive, Mr. Barnes continued. So, if limiting outflow, WR-23 releases would need to be made during periods when there are not large flows along the river, he advised. He recommended WR-23 releases during the summer months when inflows are less frequent, and the channel is mostly dry to conduct recharge testing and assess the benefits.

Mr. Barnes shared a summary of annual percolation and reiterated that storage benefits are persistent and continue even after the recharge has ceased, allowing for inter-annual increases in groundwater level at the key index wells.

Mr. Huang summarized that based on the model, SPW release from WR-23 is feasible to bring the water level back above the 822 feet threshold. Staff would like to continue work on this project, he said. Once WR-23 is ready, staff would like to start releasing water and monitoring how groundwater recovers in the project area to validate the results and come up with a long-term plan for recharge, Mr. Huang explained. SPW availability will also need to be taken into consideration, he added.

Director Longville asked about long-term outlook in terms of the 1969 judgment given ongoing drought and increased groundwater production, and measures that may be available to address production in these areas. Mr. Huang noted that the Riverside North Basin is part of the adjudicated area, which is not subject to Sustainable Groundwater Management Act, but the long-term plan is to form a groundwater council for that area and develop a long-term groundwater management plan.

CEO / General Manager Heather Dyer pointed to large water recharge projects via the Habitat Conservation Plan. The Geoscience model also shows rising groundwater levels in

the upper part of the Basin over time as the projects are implemented, she said, and Riverside, WMWD, and other partners are also thinking about how to shift production into areas where a lot of water can be recharged. She advocated looking at the Basin on a larger scale over time to strategically manage production and recharge to assure reliability and sustainability.

Public Works and Utility Services Director Brian Dickinson of the City of Colton acknowledged that this activity will also benefit the City.

Director Botello requested a site visit and complimented the presentation.

5.1 Consider Continued Participation in the Sites Reservoir Project by Executing the Third Amendment to the 2019 Reservoir Project Agreement

Deputy General Manager/Chief Water Resources Officer Bob Tincher explained staff recommends continued participation in the Sites Reservoir project at a level of 21,400 acre-feet (af) per year, translating to 133,408 af of upstream storage via the third amendment to the 2019 Sites Reservoir Project Agreement (amendment) which covers a work plan valued at $143 million from January 1, 2022 through December 31, 2024. This will complete the planning, permitting, and engineering design of the project, he stated. Valley District's portion of the cost would be approximately $8.5 million, to be paid over the next couple of fiscal years, he noted.

Staff continues to see this as a generational project that will restore between 12,000 and 16,000 af per year of SPW that has been lost in the past due to environmental constraints, Mr.Tincher continued. It provides most water in dry years, he noted.

Mr. Tincher reviewed prior commitments of the Board and background dating back to 2016. The third amendment would be the largest commitment to date, he said, and if approved the total investment in Sites would be approximately $14 million.

Administrative costs of the amendment have been reduced, he pointed out, and staff feels comfortable with the management direction. He reviewed the components of project affordability and permittability. Costs continue to be analyzed for opportunities to reduce, he advised.

At the end of this phase, Mr. Tincher continued, a final Environmental Impact Report will be completed, the District will have a water right from the State Water Resources Control Board, local agencies agreements and permits, and contracts with the DWR and California

Department of Fish and Wildlife. Mr. Tincher detailed additional work plan details for this phase related to buildability, effectiveness, and shared a chart of the project schedule.

Approval of Amendment No. 3 would include the participation level at 21,400 afy and the upstream storage at a cost of $8,560,000 and continuing the representation of CEO / General Manager Ms. Dyer and Mr. Tincher for the project. The $8.5 million is a portion of the $67 million to be raised from all participants, with a total value of the work plan of $142 million. The gap is bridged via grant funding, he explained.

Director Harrison indicated support and asked if the facility would also be available for recreational purposes; Mr. Tincher said he believed that was the goal and the DWR may assume the management role.

Ms. Dyer added that momentum is increasing. The draft EIR will be released later this month after a full revise and outreach. She said she is optimistic about the public review process. She also heard the project has been awarded an additional $80 million from the Bureau of Reclamation toward planning, engineering, and construction. The Sites Reservoir Project Authority also applied for WIFIA financing, she added.

Ms. Dyer acknowledged the leadership of Sites Executive Director Jerry Brown.

Mr. Tincher noted that the BOR has not yet invested in storage but is investing in the planning and engineering.

Director Harrison said it has been interesting to observe the increase in chorus of those urging more water storage in the past few months.

Ms. Dyer advised that staff hopes to bring to the Board some results of modeling analysis for the project related to finance at a workshop in December.

Action Item(s): The Board voted to move forward this item to the full Board of Directors for consideration at a future meeting by the following roll-call vote:

There was no motion or second.		APPROVED: 5-0
AYES:	Botello, Harrison, Hayes, Kielhold, Longville	
NOES:	None	
ABSTAIN:	None	
ABSENT:	None	

5.2 Update on Grant Application to the Wildlife Conservation Board's Riparian Habitat Conservation Program

Executive Director Upper Santa Ana River Habitat Conservation Program Joanna Gibson reminded the Board about Resolution No. 1122 authorizing grant submittal to the Wildlife Conservation Board identifying approximately 290 acres of riparian habitat adjacent to Sunnyslope Creek targeted for habitat restoration activities.

The grant application, which covers master planning, design and permitting, was successful, Ms. Gibson reported. It now goes before the Wildlife Conservation Board for approval of the grant, which requests $393,000 (25 percent of the total project cost). Additional funding is being pursued, she said.

5.3 Consider Resolution No. 1134 and 1135 Authorizing Staff to Submit Two Grant Applications to the Department of Water Resources Urban and Multi-Benefit Drought Relief Grant Program

Ms. Gibson explained these applications are for two different projects. This is an extremely fast paced grant process to address drought impacts, and there is no match requirement, she said. Guidelines were released in October and funding appears to be released in mini phases, with the DWR accepting applications in the first phase by November 19. She said she would like to get the District's application in by November 19 for the first phase.

The first project proposed for submittal is the Regional Recycled Water System including construction of the Weaver Basins and the water pipeline for up to $10 million, Ms. Gibson explained. The Resolution would authorize preparation and submittal of the application, the following acceptance and execution of an agreement with DWR, and submittal of required documents, invoices, and reports. She shared a map of the pipeline.

The second proposed project is a purple pipe to provide tertiary treated water to the tributary restoration sites along the Santa Ana River, Ms. Gibson explained. This is an Upper Santa Ana River HCP project seeking planning and construction costs and will target up to $5 million. Resolution No. 1135 would mirror the previous one, she stated, and showed a map of the pipeline alignment.

A purchase order for help with grant preparation has been executed with contracted grant writer Kennedy Jenks for an estimated $11,770 per application, Ms. Gibson reported. Valley District is contributing significant funds for the Weaver construction and the Regional

Recycled Water System, so grant funding would help defray those costs, she pointed out. For the purple pipe project, the HCP partners also contribute, she added.

On-call grant services are included in the FY 2020/2021 budget, Ms. Gibson advised.

Director Harrison indicated support. Director Botello asked about the limit of $10 million on the Regional Recycled Water System grant application. Ms. Gibson indicated there is always uncertainty about the request to be competitive, and the determination of Kennedy Jenks was up to $10 million, but this may change. Director Botello stated that his position, due to the large project cost, was to sharpen the pencil on those numbers. President Kielhold advocated temperance.

Action Item(s): By consensus, the Board directed staff to move forward this item to the full Board of Directors for consideration at a future meeting.

5.4 Select the District's Association of California Water Agencies Voting Representative to Cast the District's Ballot for the ACWA Election

Strategic Communications Manager Kristeen Farlow detailed the recommended action and explained the process of the Association of California Water Agencies (ACWA) elections at the Fall Conference every year. This year's election will be held December 1 at the conference in Pasadena, which is also being offered virtually. She reviewed the recommended slate of officers.

President Kielhold pointed out the candidate Pamela Tobin was nominated on the floor two years ago and was then elected by unanimous vote.

Action Item(s): The Board voted to appoint Director T. Milford Harrison as the voting representative at the 2021 ACWA Fall Conference by the following roll-call vote:

MOTION: Botello	SECOND: Hayes	APPROVED: 5-0
AYES:	Botello, Harrison, Hayes, Kielhold, Longville	
NOES:	None	
ABSTAIN:	None	
ABSENT:	None	

Action Item(s): The Board voted to appoint Vice President June Hayes as the alternate voting representative at the 2021 ACWA Fall Conference by the following roll-call vote:

MOTION: Botello	SECOND: Kielhold	APPROVED: 5-0
AYES:	Botello, Harrison, Hayes, Kielhold, Longville	
NOES:	None	
ABSTAIN:	None	
ABSENT:	None	

Action Item(s): The Board concurred with the recommended slate of officers and voted to direct staff to complete the required forms for the District to vote in the ACWA election on December 1, 2021, at the ACWA Conference by the following roll-call vote:

There was no motion or second	APPROVED: 5-0
AYES:	Botello, Harrison, Hayes, Kielhold, Longville
NOES:	None
ABSTAIN:	None
ABSENT:	None

6. Future Business

Feasibility of a proposed rain barrel program:

MOTION: Longville	SECOND: Hayes	APPROVED: 4-1
AYES:	Harrison, Hayes, Kielhold, Longville	
NOES:	Botello	
ABSTAIN:	None	
ABSENT:	None	

7. Adjournment.

The meeting was adjourned at 3:47 p.m.

Staff Recommendation

Receive and File

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors' Workshop - Engineering

FROM: Wen Huang, Chief Engineer/Deputy General Manager

SUBJECT: Consider Third Amendment to the Reimbursement Agreement with East Valley Water District for Construction of the Regional Recycled Water Facilities

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During the last few years, the Board of Directors received several presentations on the concept and development of a regional recycled water system (RRWS), which generally consists of recycled water conveyance pipeline, recharge basins, and other associated appurtenances. This RRWS is a major piece of infrastructure that supports Valley District's Local Resource Investment Program (LRIP), which incentivizes our local partners to develop new water resources for the region, such as recycled water or stormwater capture projects. Staff has been working with two retail agencies that have immediate plans for development of their recycled water projects and have formulated a roadmap for the development of the system.

At the January 22, 2019, November 19, 2019, and April 20, 2021, Board of Directors meetings, the Board approved a reimbursement agreement and two amendments with East Valley Water District (EVWD) for design of the Regional Recycled Water Pipeline (RRWP) and Weaver Basins along with construction of the RRWP west of Alabama Street. Subsequent to the Board approvals, the design team has since completed the design of the Weaver Basins and RRWP east of Alabama Street and is ready to begin construction pending approval from the State and the United States Fish and Wildlife Services (USFWS).

Similar to the previous arrangements, an amendment to the reimbursement agreement with EVWD is being drafted for consideration by the Board of Directors to facilitate EVWD contractor to construct these facilities. At the Regional Recycled Water Ad-Hoc Committee meeting on November 8, 2021, the Committee considered the cost proposals for construction of these RRWS facilities and recommended that the proposals be forwarded to Valley District Board of Directors. At the November

18, 2021, Policy workshop, the Board reviewed the proposals and a summary of the project to date. Several important clarifying questions emerged from the discussion and the Board requested additional information be presented at a future workshop for consideration. Answers to those questions and requested information will be provided during this workshop.

Background

In 2016, to promote efficient development of recycled water projects in the region and to create a new forum for ongoing cooperative management of recycled water for regional benefit, Valley District in collaboration with water and wastewater agencies in the region, developed a Regional Recycled Water Concept Study (Study) that identified and evaluated potential projects that provide a new supply of recycled water for the Valley District service area. At the conclusion of the Study, among other projects, EVWD's Sterling Natural Resource Center (SNRC) and the San Bernardino Municipal Water Department's (SBMWD) Tertiary Treatment System (TTS), formerly known as the Clean Water Factory (CWF), were identified as projects that should be further developed.

Valley District has historically been responsible for the construction of regional infrastructure for conveying local and imported water supplies. Until this point, most of the District's regional facilities have focused on imported water, local stormwater, and high groundwater mitigation. Now, in the face of an extended drought and a need to secure additional drought proof water supplies, in addition to continuing to work collaboratively with the San Bernardino County Flood Control District and San Bernardino Valley Water Conservation District for uses of their basins for recharge, the Board of Directors desires to develop the District's own infrastructure to promote uses and recharge of recycled water.

The development of regional recycled water infrastructure by Valley District was identified as an option for consideration in the above referenced Concept Study. At the workshop on August 14, 2018, the Board concurred with Staff's recommendation to continue its leadership role in regional water resource management through the development of a RRWS in support of the SNRC and TTS projects. Consequently, the Board of Directors, at their meetings on January 22, 2019, and November 19, 2019, approved a reimbursement agreement and an amendment with EVWD for design and construction of the RRWP west of Alabama Street, respectively.

To complete a functional RRWS (attached), an approximately 60-acre site located in the City of Highland is proposed to be used for recharging the recycled water received from EVWD and SBMWD. The proposed Weaver Basins, the first Valley District-owned recharge facility, will be located between Weaver Street and Merris Street, south of Greenspot Road in Highland. Based on recent field testing

and groundwater modeling efforts, this site is favorable for continuous recharge of recycled water; however, incorporation of additional locations for recharge in the future will be required in order to fully mitigate localized groundwater mounding with certain hydrologic conditions, which is being evaluated. In addition to the proposed Weaver Basins, the southeasterly portion of the site is currently occupied by the San Bernardino Kangaroo Rat (SBKR). It is proposed that this area be set aside as SBKR mitigation land. Consequently, the Board of Directors, at their meeting on April 20, 2021, approved an amendment to the Reimbursement Agreement with EVWD for design of the RRWP east of Alabama Street and the Weaver Basins.

Subsequent to the Board approval, the design-build team has since completed the design of the RRWP east of Alabama Street and Weaver Basins and developed a guaranteed maximum price (GMP) of $34,300,000 plus a contingency cost of $3,350,000 controlled by Valley District for a total of $37,650,000 for construction of the facilities. Similar to the previous arrangements, an amendment to the reimbursement agreement with EVWD to facilitate EVWD's contractor to construct these facilities for Valley District has been drafted for consideration by the Board of Directors. It is believed that this is the most efficient way for construction of these facilities and could save mobilization/demobilization and other costs, given the contractor is already working on EVWD's facilities.

As of today, in addition to the estimated cost for construction of the RRWP extension and Weaver Basins that is being considered, Valley District's investment on the RRWS is approximately $62 million, consisting of the acquisition of the Weaver Basins ($6 million) and the design and construction for the RRWP and the Weaver Basins ($56 million) through the previously-approved reimbursement agreement and amendments, including:

1. The original reimbursement agreement was executed in January 2019 for the cost of design of the Regional Recycled Water Pipeline (RRWP) from the SNRC to the Redlands Basins and the City Creek Discharge Location in the amount of $453,125.
2. The First Amendment to the reimbursement agreement was approved by the Board in November 2019 in the amount of $16,428,342 for construction of the RRWP to the Redlands Basins and for a design refinement of the RRWP branch to City Creek to be within the street right-of-way.
3. In April 2021, subsequent to the change of recharge locations from the Redlands Basins to the Weaver Basins, the Board approved the second amendment in the amount of $1,359,708 including the following scope of services:
    a. Design of the RRWP to the Weaver Basins;
    b. Design of Weaver Basins; and

c. Condition Assessment of the Alabama Street Pipeline.

It is important to note, in this type of reimbursement agreement amendments are based on, and brought to the Board, as a series of milestones once the required information and cost estimate for the next phase is sufficiently understood. The completion of RRWS Phase I facilities to facilitate recharge of recycled water from SNRC and TTS in the near future is pending the conclusion of the Condition Assessment of the Alabama Street Pipeline and recommendations for necessary facilities for pipeline/connectors between TTS and RRWP. The cost for the necessary facilities is unknown at this time.

The benefits of the project to our basin are substantial, as it will augment the local rainfall and imported state water project supplies year-round. Whereas rain and imported water are both highly vulnerable to drought conditions and the effects of climate change, the reliability of "drought-proof" treated wastewater as another source for groundwater recharge makes it an extremely valuable piece of our water resources portfolio. We estimate that the facility will recharge up to approximately 16,600 AFY when the SNRC and CWF are operated at their ultimate capacity. The average facility cost per acre-foot of this recycled water supply is estimated at approximately $110, by conservatively using the initial recycled water generated by SNRC and TTS at 10 MGD a day for 50 years (expected service life of these facilities) with the acquisition and construction costs to-date at $62 million for Phase I RRWP and Weaver Basins (excluding the cost for the pipeline/connectors between TTS and RRWP). This investment will mitigate the negative impacts to groundwater levels that result from drought conditions in either Northern California, Southern California, or both, for decades to come.

To minimize a short-term financial impact to the District, the cost of the RRWS of up to $46.5 million was included in the Phase I of the Watershed Connect Water Infrastructure Finance and Innovation Act (WIFIA) financing program. Additionally, an application for up to $10 million in grant funding has been submitted to the Department of Water Resources (DWR) Urban and Multi-Benefit Drought Relief Grant Program.

The attached Third Amendment to the Reimbursement Agreement for the Regional Recycled Water Facilities with EVWD has been reviewed by District Special Counsel, Meredith Nikkel, and approved as to its legal form.

Fiscal Impact:

The estimate cost of $37.65 million (including contingency) for construction of the RRWP east of Alabama Street and the Weaver Basins is partly included in the approved FY21-22 fiscal year General

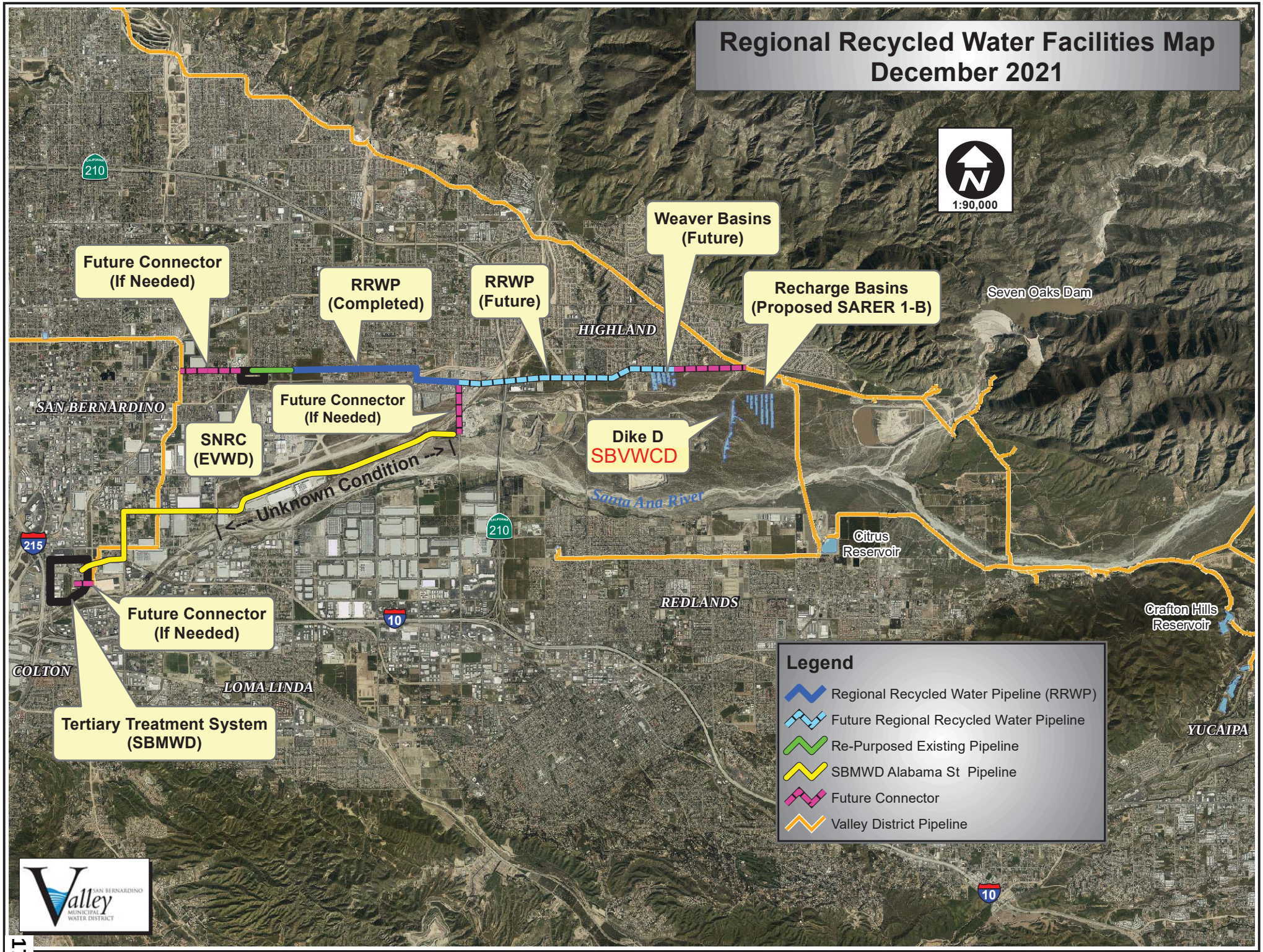
Fund Budget under Line Item No. 6280 for the Regional Recycled Water Facilities. The balance of the cost will be included in the FY22-23 General Fund Budget for consideration by the Board of Directors.

Staff Recommendation:

Forward the Third Amendment to the Reimbursement Agreement with EVWD for construction of the Regional Recycled Water Facilities to the next regular Board of Directors meeting for consideration.

Attachments:

1. Updated Regional Recycled Water Facilities Map, December 2021
2. General Alignment of the Regional Recycled Water Pipeline
3. General Layout of the Weaver Basins
4. Draft Third Amendment to the Reimbursement Agreement with EVWD



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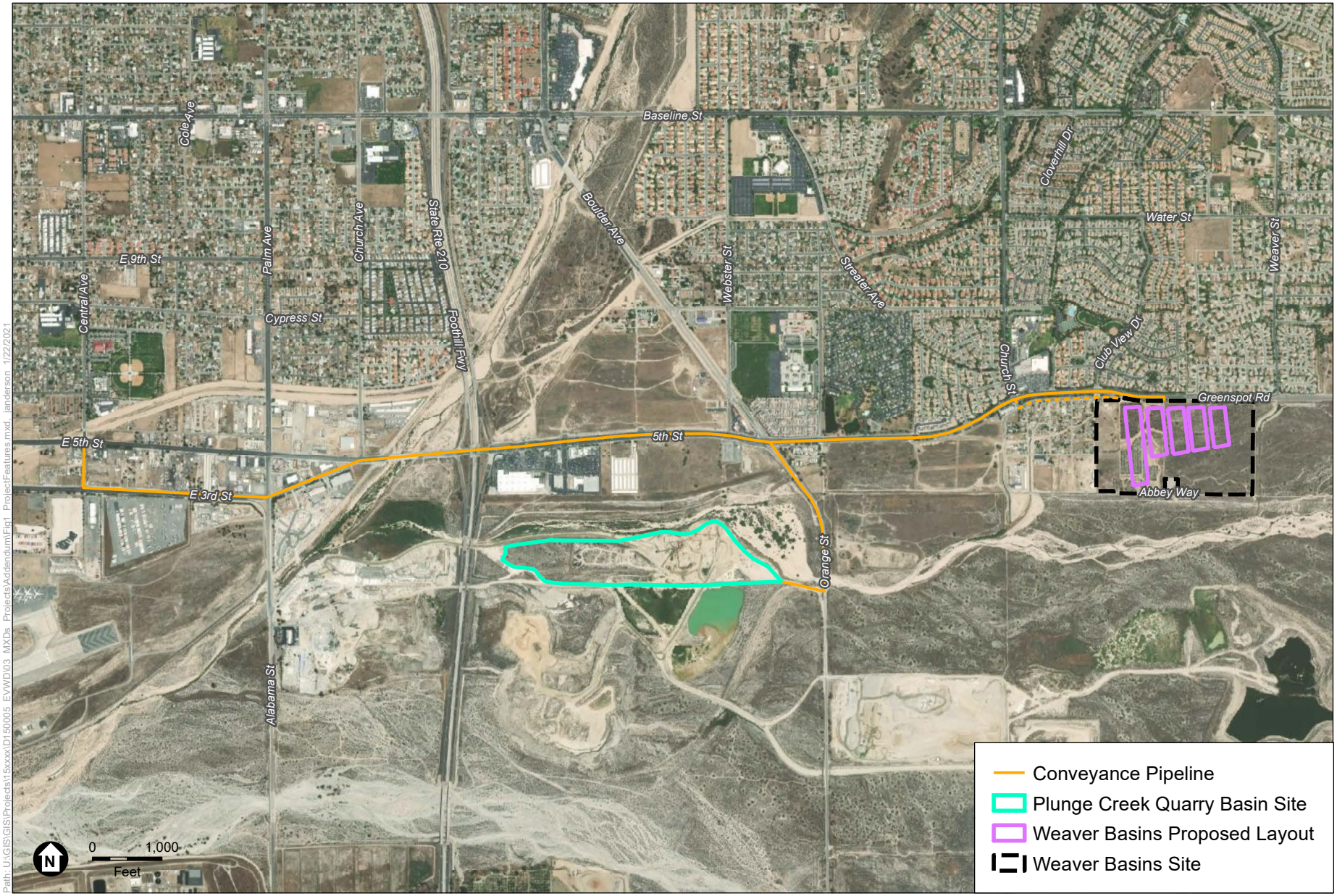
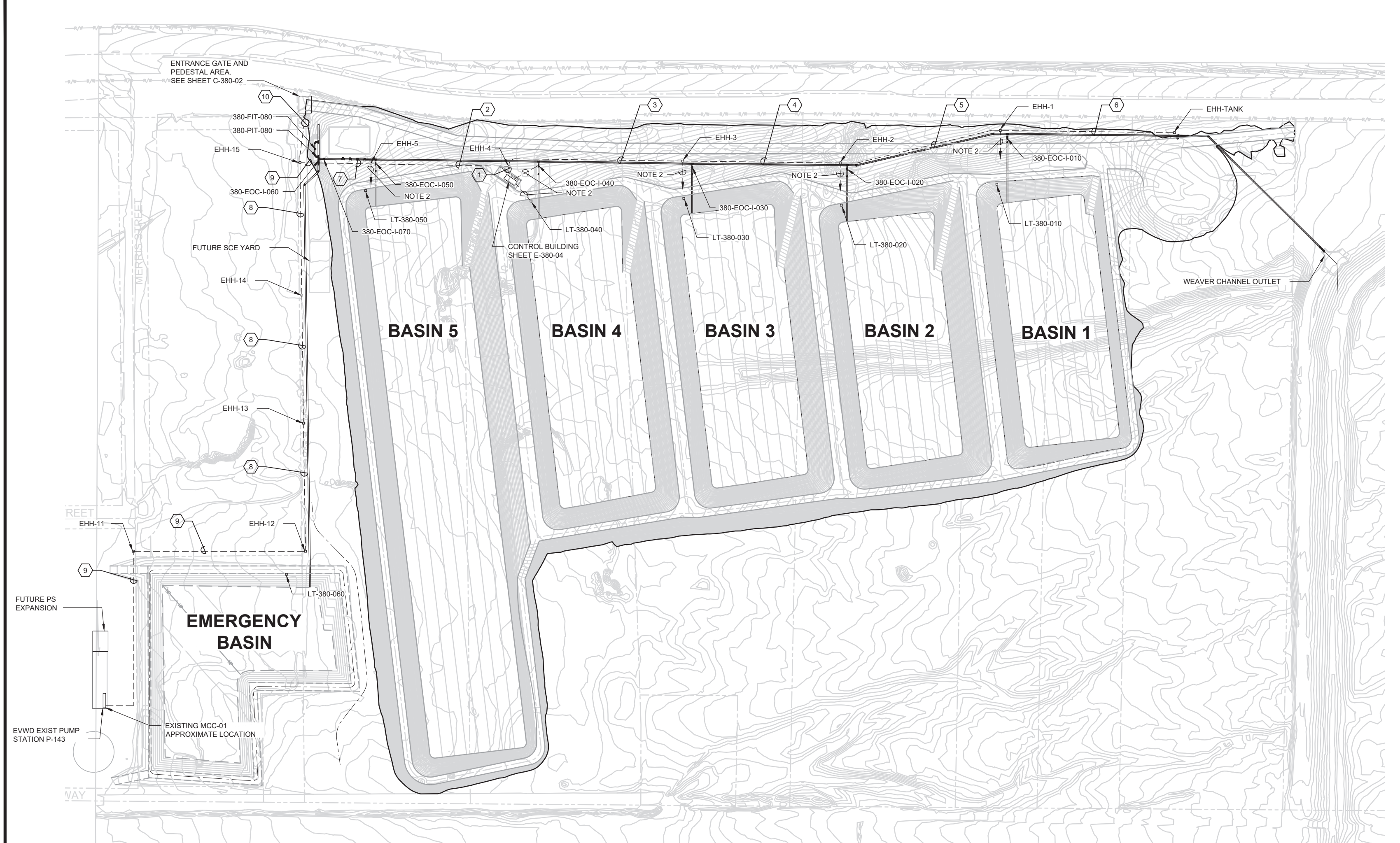


SOURCE: ESRI

EVWD

Figure 1
Project Features



ELECTRICAL PLAN

GENERAL SHEET NOTES

1. HANDHOLES ARE SHOWN IN APPROXIMATE LOCATION. FIELD ADJUST AS NEEDED.
2. SEE SHEET E-380-02 FOR CONDUITS. FIELD ROUTE TO EQUIPMENT.
3. LEVEL TRANSMITTERS ARE SHOWN IN APPROXIMATE LOCATION.
4. CAMERAS / POLES NOT SHOWN. SEE VIDEO SURVEILLANCE SYSTEM SUPPLIER DESIGN FOR LOCATIONS.
5. UNDERGROUND DUCTBANKS MAY BE DIRECT BURIED EXCEPT UNDER ROADWAYS WHICH SHALL BE CONCRETE ENCASED. PROVIDE SPECIFIED SEPARATION BETWEEN CONDUITS AND MAINTAIN AT LEAST 12 INCHES OF SEPARATION BETWEEN POWER CONDUITS AND CONTROL/ANALOG CONDUITS. COVER ABOVE CONDUITS SHALL BE 24 INCHES MINIMUM. INSTALL AT DEPTH NECESSARY FOR CONFLICT AVOIDANCE AND HANDHOLE ENTRY.

SHEET KEY NOTES

(#) DUCTBANK SEGMENT NUMBER. SEE SHEET E-380-02 FOR CONDUITS.

0 100' 200'
SCALE : 1' = 100'

CONSULTANT
ARCADIS
Balfour Beatty
BID SET
IFC
ENGINEER'S SEAL
SIGNED 9/8/2021

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT
WEAVER BASINS
AREA 380
OVERALL SITE PLAN

DATE: SEPTEMBER 2021
DESIGNED: EC
DRAWN: CML
REVIEWED: J. SOKOL
JOB NO: 00040819.0008
SCALE: AS SHOWN
DWG: E-380-03
SHT. 3 OF 5 SHTS.
DRAWING NO.

ORIGINAL SIZE : 22"x34"

THIRD ADDENDUM TO THE REGIONAL RECYCLED WATER FACILITIES REIMBURSEMENT AGREEMENT

This Third Addendum to Regional Recycled Water Facilities Reimbursement Agreement is entered into and effective as of XXX, 2021, by and between EAST VALLEY WATER DISTRICT, a County Water District, organized and operating pursuant to California Water Code Section 30000 et seq. (EVWD) and SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, a Municipal Water District, organized and operating pursuant to California Water Code Section 71000 et seq. (VALLEY DISTRICT) (Collectively "Parties").

RECITALS

WHEREAS, since 1969 VALLEY DISTRICT, together with a number of other public agencies including EVWD, have worked cooperatively to replenish the San Bernardino Basin Area (SBBA) and ensure that there are reliable sources of water for the residents of the San Bernardino Valley, among others; and

WHEREAS, VALLEY DISTRICT and EVWD have collaborated on the Sterling Natural Resource Center project (SNRC) which will be designed and constructed by EVWD and which includes a 10 million gallons per day (mgd) effluent discharge pipeline, (Discharge Line) which was originally planned to transport recycled water to the Redlands Basins and City Creek for discharge. The Discharge Line was the subject of a Regional Recycled Water Reimbursement Agreement entered into between the Parties in January 2019; and

WHEREAS, in November 2019, the Parties entered into a Regional Recycled Water Pipeline Construction and Design Refinement Reimbursement Agreement for reimbursement of all expenses incurred in the construction of the RRWP and design refinement for the segment to City Creek; and

WHEREAS, more recently it has been determined that that the region's groundwater resources would be better served by the design and construction of new recharge basins referred to as the Weaver Basins Project (WBP) to replace the use of the Redlands Basins; and

WHEREAS, VALLEY DISTRICT envisions that the SNRC Discharge Line and WBP are integral parts of regional recycled water infrastructure, including, but not limited to, combining recycled water flows from the SNRC and the Tertiary Treatment System, formerly known as the Clean Water Factory, a project proposed by the City of San Bernardino Municipal Water Department (SBMWD), which would require expanding the Discharge Line and increasing its capacity to 15 mgd to accommodate the combined flows, and which would be referred to as the Modified Regional Recycled Water Pipeline (MRRWP). The Parties envision that upon

operation VALLEY DISTRICT shall have full and complete discretion to determine whether recycled water shall be discharged to the Weaver Basins or any other basin except when the point of discharge is defined under the terms and conditions of the SNRC Final Environmental Impact Report (SCH 2015101058), and any amendments thereto; and Addendum No. l to the Final Environmental Impact Report SCH#:2015101058 dated July 2019 and Addendum No. 2 to the Final Environmental Impact Report SCH#:2015101058 dated January 2021.

WHEREAS, EVWD certified an environmental document pursuant to the California Environmental Quality Act for the work contemplated by this agreement; by Addendum No. 2 to the Final Environmental Impact Report SCH#:2015101058 dated January 2021.

WHEREAS, in April 2021 the Parties approved the Second Addendum to the Regional Recycled Water Facilities Reimbursement Agreement which addressed the WBP description, design and planning of the Project; and

WHEREAS, the Parties now wish to provide for reimbursement relative to the construction aspect of the Project; and

WHEREAS, VALLEY DISTRICT has historically been responsible for the construction of regional infrastructure for conveying local and imported water supplies; and

WHEREAS, VALLEY DISTRICT wishes to reimburse EVWD for all expenses incurred in the design and construction, including survey and geotechnical work, of the MRRWP and WBP in accordance with the terms and conditions set forth herein, as an integrated project (Project);

NOW THEREFORE, the Parties agree as follows:

AGREEMENT

1. <u>Project Construction.</u>

EVWD will construct the Project as a component of the SNRC project. The Project shall include the following components:

1.1 The MRRWP extension beginning from a location generally at 3rd Street and Palm Av e. in Highland then easterly roughly following and south of Greenspot Road to the Weaver Basins.

1.2 New recharge basins at the Weaver Basin site.

1.3 All related permitting and Project inspection costs and geotechnical work, surveying and associated construction costs.

EVWD shall be responsible for the construction of the Project, which will be in conjunction with the construction of the SNRC. EVWD shall be responsible for securing all permits and approvals from applicable regulatory agencies including, but not limited to the State and Regional Water Quality Control Boards and the Division of Drinking Water, U.S. Army Corps of Engineers, as well as California Department of Fish & Wildlife and U.S. Fish and Wildlife Service.

2. Reimbursement.

VALLEY DISTRICT shall reimburse EVWD for all actual fully burdened cost of construction management, permitting and construction of the Project, including surveying and geotechnical work, plus contractor mark-up and costs related to General Conditions and design refinement for the MRRWP and WBP. The current estimated cost of construction of the Project is $ 34,300,000 with a VALLEY DISTRICT controlled contingency of $3,350,000 for a total reimbursement not to exceed $37,650,000.

3. Review and Approval.

Upon completion of the Project design, VALLEY DISTRICT shall have the opportunity to review and approve the design plans of the Project, which approval shall not be unreasonably withheld.

4. Payments.

VALLEY DISTRICT shall make progress payments, in arrears, based on quarterly invoices prepared by EVWD and supported by appropriate and sufficient documentation of cost. VALLEY DISTRICT shall have 30 days to review the invoices and notify EVWD of any disputes. The parties will meet and confer in good faith to resolve any disputes. VALLEY DISTRICT will pay invoices within 30 days of receipt or within 30 days of resolution of disputes, whichever is later. Upon completion of the design, EVWD shall submit a final invoice to VALLEY DISTRICT representing the total actual cost of design of the Project less payments previously made by VALLEY DISTRICT. VALLEY DISTRICT shall have 30 days within which to pay the final invoice.

5. Title & Operation.

Title to the Project shall vest with VALLEY DISTRICT upon completion of construction as evidenced through a Notice of Completion filed by EVWD. VALLEY DISTRICT retains all discretion to determine operations of the PROJECT, except EVWD, as a recycled water discharger, shall be responsible for any and all permitting and mitigation requirements associated with water quality or other environmental impacts resulting from recharge of its recycled water and VALLEY DISTRICT shall take no intentional action which

would result in a violation of said permit or mitigation requirements.

6. Indemnification.

(a) EVWD Indemnity.

EVWD shall indemnify VALLEY DISTRICT against and agrees to hold VALLEY DISTRICT harmless of and from all liabilities, obligations, actions, suits, proceedings or claims, and all costs and expenses, including but not limited to, reasonable attorney's fees (collectively, Claims and Costs), based upon or arising out of any negligent or intentional breach or failure of EVWD to observe or perform any obligation of EVWD as set forth in this Agreement.

(b) VALLEY DISTRICT Indemnity.

VALLEY DISTRICT shall indemnify EVWD against and agrees to hold EVWD harmless of and from all liabilities, obligations, actions, suits, proceedings or claims, and all costs and expenses, including, but not limited to, reasonable attorney's fees (collectively, Claims and Costs), based upon or arising out of any negligent or intentional breach or failure of VALLEY DISTRICT to observe or perform any of the obligations of the VALLEY DISTRICT as set forth in this Agreement.

7. Notices.

All notices, requests, demands, or other communications required or permitted under this Agreement shall be in writing unless provided otherwise herein and shall be deemed to have been duly given and received if mailed to the parties to whom notices are to be given by first class mail, registered or certified, postage prepaid, addressed as follows:

Notice to VALLEY DISTRICT:

Heather Dyer, General Manager
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408

Meredith Nikkel
Downey Brand, LLP
621 Capital Mall
Sacramento, CA 95814

Notice to EVWD:

John Mura, General Manager/CEO
East Valley Water District
31111 Greenspot Road
Highland, CA 92346

Jean Cihigoyenetche
JC Law Firm
5871 Pine Avenue, Suite 200
Chino Hills, CA 91709

8. Binding Effect.

This Agreement shall inure to the benefit of and shall be binding upon the parties hereto and their respective successors and assigns.

9. Severability.

If any provision of this Agreement is determined to be illegal and unenforceable, all other provisions shall nevertheless be effective.

10. Governing Law.

This Agreement and the legal relations between the parties hereto shall be governed by and be construed in accordance with the laws of the state of California with venue in the Superior Court for the County of San Bernardino, California.

11. Counterparts.

This Agreement may be executed in several counterparts and all such executed counterparts shall constitute one document, binding on all the parties hereto, notwithstanding that all of the parties hereto are not signatories to the original or to the same counterpart.

IN WITNESS WHEREOF, the Parties, EVWD and VALLEY DISTRICT, have executed this Agreement as of the date first set forth above.

VALLEY DISTRICT:

By: _____

Heather Dyer, CEO/General Manager

EVWD:

By: _____

John Mura, CEO/General Manager

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors Workshop - Engineering

FROM: Heather Dyer, CEO/General Manager

SUBJECT: Consider Creating a Joint Powers Authority in Cooperation with the Yucaipa Valley Water District

Over the past several months, the Yucaipa Valley Water District (YVWD) staff has been working with our shared financial advisors, Fieldman Rolapp, to review their current debt structure and to fund their capital improvement projects more advantageously. Based on advice from Fieldman Rolapp, YVWD staff is proposing a Joint Exercise of Powers Agreement (JPA) to create the *Yucaipa Valley Water District Financing Authority* (Financing Authority) which would consist of a seven-member board with five elected officials from the Yucaipa Valley Water District and two elected officials from the San Bernardino Valley Municipal Water District. The Financing Authority, created by a separate and unique joint powers agreement, would assign all debt obligations, repayment obligations, and risk solely to the Yucaipa Valley Water District.

From a financing perspective, the creation of the Financing Authority provides an opportunity for the Yucaipa Valley Water District to refinance the existing water division and sewer division debt obligations into a single combined debt of the Yucaipa Valley Water District at more favorable terms than their current loans, which are issued through a financing corporation. Background on the Yucaipa Valley Water District Financing Corporation and their current secured loans can be found in the attached staff memo presenting this idea to the YVWD Board on December 7, 2021.

This mechanism would allow the YVWD to refinance their existing debt obligations into a single combined debt and better position them to actively secure additional funding for future projects. The portfolio of water projects YVWD proposes to refinance through this financing tool will improve water quality and water reliability throughout our shared service area by accelerating the construction of several capital improvement projects are also summarized in the attached YVWD staff memo.

There is no financial risk or obligation to Valley District associated with forming this JPA. If the Board indicates a desire to move forward with this cooperative effort, a Resolution of the Board authorizing the execution and delivery of a Joint Exercise of Powers agreement would be brought to a future Board of Directors meeting for consideration. Additionally, two members of our Board would need to be appointed to the new YVWD Financing Authority Board.

Financial advisors from Fieldman Rolapp and the General Manager of YVWD, Mr. Joe Zoba, will be attending the workshop to answer any specific questions for the Directors, as needed.

Fiscal Impact:

There is no fiscal impact to Valley District from this item.

Staff Recommendation:

Consider creating the Yucaipa Valley Water District Financing Authority (Financing Authority) in cooperation with the Yucaipa Valley Water District and if desired, direct staff to engage House Counsel to review the JPA agreement and place a resolution on a future Board of Directors meeting for consideration.

Attachment:

Yucaipa Valley Water District Staff Memo on Proposed YVWD Financing Authority

Yucaipa Valley Water District

Director Memorandum 21-186

Date: December 7, 2021 **Task:** Not Applicable

Prepared By: Joseph B. Zoba, General Manager

Subject: Consideration of Resolution No. 2021-62 Authorizing the Execution and Delivery of a Joint Exercise of Powers Agreement to Create the Yucaipa Valley Water District Financing Authority and Authorizing Certain Other Matters in Connection Therewith

Recommendation: That the Board adopt Resolution No. 2021-62.

On June 2, 2004, the Yucaipa Valley Water District created the Yucaipa Valley Water District Financing Corporation to finance the construction of the Yucaipa Valley Regional Water Filtration Facility. On June 29, 2004, the Yucaipa Valley Water District Financing Corporation issued $45,730,000 as Series 2004A Certificates of Participation for the construction of the new drinking water filtration facility. About ten years later on February 12, 2015, the Yucaipa Valley Water District refinanced the 2004A Certificates of Participation by issuing Water System Refunding Revenue Bonds as Series 2015A in the amount of $30,810,000.

To provide financing for the sewer treatment plant, recycled water system, and brine disposal pipeline, the Yucaipa Valley Water District relied on low-interest State Revolving Fund Loans provided by the State Water Resources Control Board. The following State Revolving Fund loans have been secured by the District:

- Wochholz Regional Water Recycling Facility Expansion - In 2010, the District started the repayment of a State Revolving Fund loan (2.4% interest rate) in the amount of $44,748,356 that was used for the expansion and upgrade of the Wochholz Regional Water Recycling Facility.

- Yucaipa Valley Regional Brineline – In 2014, the District started the repayment of a State Revolving Fund loan (2.7% interest rate) in the amount of $9,752,100 for the construction of the Yucaipa Valley Regional Brineline. The total construction cost for this facility was $19,706,156 which was also funded by several grants and cash.

- Wochholz Improved Salinity Effluent Project (W.I.S.E.) – In 2014, the District started the repayment of a State Revolving Fund loan (2.2% interest rate) in the amount of $2,988,095 for the construction of the reverse osmosis equipment at the Wochholz Regional Water Recycling Facility to achieve compliance with the Regional Water Quality Control Board Basin Plan objectives. The construction cost for this facility was $5,003,170 which was also funded by grants and cash.

- Recycled Water Reservoir R-10.3 – In 2014, the District started the repayment of a State Revolving Fund loan (2.2% interest rate) in the amount of $871,570 for the construction

of the Recycled Water Reservoir Complex R-10.3. The construction cost for this facility was $4,177,087 which was also funded by grants and cash.

- Crow Street Recycled Water Pipeline and Booster B-12.1 – In 2016, the District started the repayment of a State Revolving Fund loan (2.2% interest rate) in the amount of $310,179 for the construction of the Crow Street Recycled Water Pipeline and Recycled Water Booster Station B-12.1. The construction cost for this facility was $2,972,167 which was also funded by grants and cash.

- Calimesa Recycled Water Pipeline Project - In 2021, the District received a State Revolving Fund loan (0.9% interest rate) and grant for $1,758,750 for the expected project cost of $5,785,000 to be used to construct the Calimesa Recycled Water Pipeline Project. This project will begin construction in early 2022.

Over the past several months, the Yucaipa Valley Water District staff has been working with our financial advisors from Fieldman Rolapp to develop a plan to review the current debt structure of the District to fund capital improvement projects that will improve water quality and water reliability throughout our service area by accelerating the construction of several capital improvement projects.

The District staff is proposing to create the Yucaipa Valley Water District Financing Authority (Financing Authority) that would consist of a seven-member board - five elected officials from the Yucaipa Valley Water District and two elected officials from the San Bernardino Valley Municipal Water District. The Financing Authority, created by a separate and unique joint powers agreement, would assign all debt obligations, repayment obligations, and risk to the Yucaipa Valley Water District. From a financing perspective, the creation of the Financing Authority provides an opportunity for the Yucaipa Valley Water District to refinance the existing water division and sewer division debt obligations into a single combined debt of the Yucaipa Valley Water District. Additionally, the Financing Authority would be able to be an active entity to secure the necessary funding, if needed, to proceed with the following projects:

- **Salinity and Groundwater Enhancement (SAGE) Project** - The SAGE Project involves the relocation and expansion of the existing reverse osmosis membrane treatment system at the Wochholz Regional Water Recycling Facility. The related facilities for this equipment will also include a tertiary clarifier, reverse osmosis flush tank, decorbonator, and clean in place systems. The purpose of the SAGE Project is to purify the recycled water produced by the Wochholz Regional Water Recycling Facility to allow for groundwater injection and recharge.

- **Calimesa Aquifer Storage and Recovery (ASR) Project** - The Calimesa ASR Project involves the construction of several injection and extraction wells to fully utilize the recycled water produced from the Salinity and Groundwater Enhancement (SAGE) Project. These wells will allow for the storage of recycled water and extraction of drinking water in the Calimesa area.

- **Calimesa Regional Recycled Water Pipeline Project** - The Calimesa Regional Recycled Water Pipeline Project involves the construction of a recycled water transmission pipeline that will provide recycled water to dual-plumbed homes in Calimesa and supply recycled water to the Calimesa ASR Project.

- **R-12.5 Recycled Water Reservoir** - The R-12.5 Recycled Water Reservoir Complex is needed for the Calimesa Aquifer Storage and Recovery (ASR) Project as well as the sustainable construction of dual-plumbed communities in the Calimesa area.

- **Wochholz Regional Water Recycling Facility (WRWRF) Energy Resiliency Project** - The District is preparing to add energy resiliency equipment at the Wochholz Regional Water Recycling Facility that will include solar panels, battery storage equipment, and a natural gas generator. In order to construct this microgrid facility, the District will extend natural gas service and an access roadway to the Wochholz Regional Water Recycling Facility.

- **Yucaipa Valley Regional Water Filtration Facility (YVRWFF) Energy Resiliency Project** - The District is preparing to add energy resiliency equipment at the Yucaipa Valley Regional Water Filtration Facility that will include solar panels, battery storage equipment, and a natural gas generator. In order to construct this microgrid facility, the District will extend natural gas service and make other improvements to the Yucaipa Valley Regional Water Filtration Facility.

- **Salinity Concentration Reduction and Minimization (SCRAM) System** - The District has designed and prepared the existing building for the installation of Salinity Concentration Reduction and Minimization (SCRAM) equipment at the Yucaipa Valley Regional Water Filtration Facility. The installation and operation of this equipment will significantly reduce the amount of backwash water generated from this facility resulting in more than 1.0 million gallons per day of drinking water instead of recycled water.

- **Pressure Zone 11 Recycled Water Pipeline and Booster Station Project** - The District has installed some of the equipment needed for the construction of a recycled water booster station at the R-10 Recycled Water Reservoir Complex to lift water to the planned R-11 Recycled Water Reservoir. The booster facility will be connected to Pressure Zone 11 pipelines with the construction of approximately five miles of 20” recycled water conveyance pipeline.

- **Recycled Water Reservoir R-11.4 Project** - The District is preparing for the construction of a recycled water in Pressure Zone 11. Currently a recycled water reservoir does not exist in this pressure zone and recycled water must be pressure reduced from the Pressure Zone 12 which results in a great deal of wasted energy.

- **Resource Ranch Water Capture and Recharge Facility** - The District is planning to purchase approximately 50 acres for the construction of recharge facilities needed to recharge the San Timoteo Groundwater Basin with stormwater and high purity recycled water in order to enhance existing habitat resources. The spreading operations at the Resource Ranch will require the construction of spreading basins, two 150,000 gallon recycled water storage reservoirs, and associated pipeline facilities to provide fire protection, basin recharge, and discharge capabilities at this facility.

- **Calimesa Lake** - The District is planning to construct a five acre lake adjacent to the Oak Valley Town Center Project to provide improved aesthetics for the region as well as an environmental buffer for ultra-pure recycled water that will be used within the District’s service area and as part of the Aquifer Storage and Recovery Project. This facility will also include a small treatment system and circulation pumps for the water facility.

- **North Bench Recycled Water Facilities** - The District is planning to construct a series of booster facilities, pipelines and recycled water storage reservoirs to provide recycled water service to the North Bench area in the City of Yucaipa.

- **Supervisory Control and Data Acquisition Systems** - The District is currently preparing to upgrade existing Supervisory Control and Data Acquisition (SCADA) systems throughout the District to maintain the most current operating equipment to protect and control drinking water, sewer, recycled water, and brine disposal operations.

RESOLUTION NO. 2021-62

A RESOLUTION OF THE BOARD OF DIRECTORS AUTHORIZING THE EXECUTION AND DELIVERY OF A JOINT EXERCISE OF POWERS AGREEMENT TO CREATE THE YUCAIPA VALLEY WATER DISTRICT FINANCING AUTHORITY AND AUTHORIZING CERTAIN OTHER MATTERS IN CONNECTION THEREWITH

WHEREAS, the Yucaipa Valley Water District ("YVWD"), acting pursuant to Article 1 (commencing with Section 6500) of Chapter 5 of Division 7 of Title 1 of the Government Code of the State of California (the "JPA Law"), may enter into a joint exercise of powers agreement with one or more other public agencies pursuant to which such contracting parties may jointly exercise any power common to them and, pursuant to Government Code § 6588, exercise certain additional powers; and

WHEREAS, Yucaipa Valley Water District and the San Bernardino Valley Municipal Water District desire to create and establish the Yucaipa Valley Water District Financing Authority pursuant to the JPA Law to assist YVWD in issuing revenues bonds or incurring other financial obligations from time-to-time; and

WHEREAS, there has been presented to the Board at this meeting a proposed form of Joint Exercise of Powers Agreement by and among Yucaipa Valley Water District and the San Bernardino Valley Municipal Water District, which Joint Exercise of Powers Agreement creates the Yucaipa Valley Water District Financing Authority (the "Financing JPA"); and

WHEREAS, under California law and the Joint Exercise of Powers Agreement, the Financing JPA will be a public entity separate and apart from Yucaipa Valley Water District and the San Bernardino Valley Municipal Water District and the debts, liabilities and obligations of the Financing JPA will not be the debts, liabilities or obligations of the San Bernardino Valley Municipal Water District; and

WHEREAS, the Board of Directors of Yucaipa Valley Water District has reviewed the Joint Exercise of Powers Agreement and the provisions of the California Environmental Quality Act ("CEQA") and has considered whether any direct or indirect physical changes to the environment will result from entering into the Joint Exercise of Powers Agreement and from creating the Financing JPA, and has considered whether taking either or both of those actions may possibly have a significant effect on the environment.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE YUCAIPA VALLEY WATER DISTRICT HEREBY FINDS, DETERMINES, DECLARES AND RESOLVES AS FOLLOWS:

SECTION 1. The statements, findings, and determinations set forth above and in the preambles of the documents approved by this resolution are true and correct.

SECTION 2. The form of the Joint Exercise of Powers Agreement attached hereto as Exhibit A is hereby approved. The President or Vice-President of YVWD, acting singly, are each hereby authorized to execute and deliver the Joint Exercise of Powers Agreement substantially in the approved form, with such changes, insertions and omissions as may be recommended by YVWD General Counsel or Stradling Yocca Carlson & Rauth, a Professional Corporation, as bond counsel, said execution being conclusive evidence of such approval.

SECTION 3. The Board of Directors of YVWD does hereby determine that authorizing (1) the creation of the Financing JPA, (2) the execution of the Joint Exercise of Powers Agreement, and (3) all steps that are reasonably convenient or necessary to create the Financing JPA, does not constitute a project or projects under CEQA because: the proposed actions represent administrative activities of YVWD that will not result in direct or indirect physical changes in the environment (Section 15378(b)(5) of the CEQA Guidelines); and it can be seen with certainty that there is no possibility that the proposed action in question may have a significant effect on the environment, and thus the proposed action is not subject to CEQA (Section 15061(b)(3) of the CEQA Guidelines).

SECTION 4. The President, the Vice-President, the General Manager and any other proper officer of YVWD, acting singly, are each hereby authorized and directed to execute and deliver any and all documents and instruments and to do and cause to be done any and all acts and things necessary or proper for carrying out the transactions contemplated by the Joint Exercise of Powers Agreement.

SECTION 5. Unless otherwise defined herein, all terms used herein and not otherwise defined shall have the meanings given such terms in the Joint Exercise of Powers Agreement unless the context otherwise clearly requires.

SECTION 6. This resolution shall take effect immediately.

ADOPTED at a regular meeting of the Board of Directors at Yucaipa, California, this 7th day of December, 2021.

YUCAIPA VALLEY WATER DISTRICT

Chris Mann, President of the Board

ATTEST:

Joseph B. Zoba, Secretary of the Board

Joseph B. Zoba, Secretary

EXHIBIT A

JOINT EXERCISE OF POWERS AGREEMENT

CREATING THE

YUCAIPA VALLEY WATER DISTRICT FINANCING AUTHORITY

Stradling Yocca Carlson & Rauth
Draft of 11/9/21

JOINT EXERCISE OF POWERS AGREEMENT

by and between

YUCAIPA VALLEY WATER DISTRICT

and

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

creating the

YUCAIPA VALLEY WATER DISTRICT FINANCING AUTHORITY

December 7, 2021

4843-5280-4861v5/024636-0006

JOINT EXERCISE OF POWERS AGREEMENT

THIS AGREEMENT, dated December 7, 2021, by and between the YUCAIPA VALLEY WATER DISTRICT, a county water district that is duly organized and existing under and by virtue of the laws of the State of California, ("YVWD"), and SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, a municipal water district that is organized and existing under and by virtue of the laws of the State of California ("SBVMWD").

DECLARATION OF PURPOSE

A. Chapter 5 of Division 7 of Title 1 of the California Government Code (the "Act") authorizes YVWD and SBVMWD to create a joint exercise of powers entity which has the power to exercise any powers common to YVWD and SBVMWD and to exercise additional powers granted to it under the Act. This Agreement creates such an agency, which shall be known as the Yucaipa Valley Water District Financing Authority (the "Authority") for the purposes and to exercise the powers described herein.

B. YVWD and SBVMWD are each authorized to buy, sell, lease and use property and to incur indebtedness for public purposes pursuant to the California Water Code, the California Government Code and other laws of the State of California.

C. Article 4 of the Act (known as the "Marks-Roos Local Bond Pooling Act of 1985") authorizes and empowers the Authority to issue bonds and to purchase bonds issued by, or to make loans to, YVWD or SBVMWD for financing public capital improvements, working capital, liability and other insurance needs, or projects whenever there are significant public benefits, as determined by the Authority. The Marks-Roos Local Bond Pooling Act of 1985 further authorizes and empowers the Authority to sell bonds so issued or purchased to public or private purchasers at public or negotiated sale.

TERMS OF AGREEMENT

Section 1. Definitions. Unless the context otherwise requires, the terms defined in this Section 1 shall for all purposes of this Agreement have the meanings herein specified.

"*Act*" shall mean Articles 1, 2 and 4 of Chapter 5 of Division 7 of Title 1 of the California Government Code, as amended.

"*Agreement*" shall mean this Joint Exercise of Powers Agreement, as it may be amended from time to time, creating the Authority.

"*Authority*" shall mean the Yucaipa Valley Water District Financing Authority created by this Agreement.

"*Board*" or "*Board of Directors*" shall mean the governing board of the Authority.

"*Bonds*" shall mean bonds and any other evidences of indebtedness of the Authority authorized and issued pursuant to the Act.

"*Indenture*" shall mean each indenture, trust agreement, resolution or other such instrument pursuant to which Bonds are issued.

"*Local Agency*" shall mean YVWD or any other public agency which enters into a Security Agreement with the Authority.

"Members" shall mean YVWD and SBVMWD.

"*Security Agreement"* means any installment purchase agreement, lease agreement, payment agreement or other agreement which in each case obligates a Local Agency to pay all or a portion of the principal and interest on Bonds.

"*State*" shall mean the State of California.

Section 2. Purpose. This Agreement is made pursuant to the Act for the purpose of assisting in the financing and refinancing of capital improvement projects of the Local Agencies, working capital for the Local Agencies and other costs described in the Act by exercising the powers referred to in this Agreement. Any Bonds issued by the Authority shall be solely for projects benefiting the Local Agency or Local Agencies entering into a Security Agreement with respect to such Bonds.

Section 3. Term. This Agreement shall become effective as of the date hereof and shall continue in full force and effect until the Members terminate this Agreement in writing; provided however this Agreement shall not terminate so long as any Bonds or other obligations of the Authority remain outstanding under the terms of any indenture, trust agreement, contract, agreement, lease, sublease or other instrument pursuant to which such Bonds are issued or other obligations are incurred.

Section 4. The Authority.

(a) *Creation of the Authority.* There is hereby created pursuant to the Act an authority and public entity to be known as the "Yucaipa Valley Water District Financing Authority." As provided in the Act, the Authority shall be a public entity separate from the Members. The geographic boundaries of the Authority shall be coextensive with the boundaries of the Members. The debts, liabilities and obligations of the Authority shall not constitute debts, liabilities or obligations of the Members. Notwithstanding any other provision of this Agreement, the Authority shall not have the power to incur any debt, liability or obligation that is not subject to the preceding sentence, including but not limited to any debt, liability or obligation to a public retirement system or otherwise for pension, health care or other retirement benefits.

Within 30 days after the effective date of this Agreement or any amendment hereto, the Authority will cause a notice of this Agreement or amendment to be prepared and filed with the office of the Secretary of State of the State in the manner that is set forth in Section 6503.5 of the Act. Such notice shall also be filed with the office of the Finance Director of the State.

(b) *Governing Board.* The Authority shall be administered by the Board, which shall consist of five members appointed by YVWD and two members appointed by SBVMWD. The term of office as a member of the Board shall terminate when such member of the Board shall cease to hold his or her respective office at YVWD or SBVMWD, as applicable, and the successor to such

officer or director of YVWD or SBVMWD, as applicable, shall become a member of the Board, upon assuming such office.

Members of the Board shall not receive any compensation for serving as such, but shall be entitled to reimbursement for any expenses actually incurred in connection with serving as a member if the Board shall determine that such expenses shall be reimbursed and there are unencumbered funds available for such purpose.

(c) Meetings of Board.

(1) The Board shall hold regular meetings on the first and third Tuesdays of each calendar month at 6:00 P.M. at the offices of YVWD unless the Board determines to meet at an alternate location in accordance with California law. The Board may suspend the holding of regular meetings so long as there is no need for Authority business. The Board may hold special meetings at any time and from time to time in accordance with law, provided that, so long as required by the Act, any action taken regarding the sale of Bonds shall occur by resolution placed on a noticed and posted meeting agenda for a regular meeting of the Authority.

(2) All regular and special meetings of the Board shall be called, noticed, held and conducted subject to the provisions of the Ralph M. Brown Act (Chapter 9 of Part 1 of Division 2 of Title 5 of the California Government Code), or any successor legislation hereafter enacted.

(3) The Secretary of the Authority shall cause minutes of all meetings of the Board to be kept and shall, as soon as practicable after each meeting, cause a copy of the minutes to be forwarded to each member of the Board and to the Members.

(4) A majority of the members of the Board shall constitute a quorum for the transaction of business, except that less than a quorum may adjourn meetings from time to time.

(d) Officers; Duties; Bonds.

(1) The officers of the Authority shall be the Chair, Vice Chair, Executive Director, Secretary and Treasurer. Such officers may be directors or officers of YVWD serving *ex officio*.

(2) The Chair of the Authority shall be the Board member who is the President of YVWD. The term of office of the Chair shall be the same as the term of the President of YVWD. The Chair shall preside at all meetings of the Authority, and shall submit such information and recommendations to the Board as he or she may consider proper concerning the business, policies and affairs of the Authority.

(3) The Vice Chair of the Authority shall be the Board member who is the Vice President of YVWD. The term of office of the Vice Chair shall be the same as the term of the Vice President of YVWD. The Vice Chair shall perform the duties of the Chair in the absence or incapacity of the Chair. In case of the resignation or death of the Chair, the Vice Chair shall perform such duties as are imposed on the Chair, until such time as a new Chair is selected or appointed.

(4) The General Manager of YVWD is hereby designated as the Executive Director of the Authority and shall be responsible for execution and supervision of the

affairs of the Authority. Except as otherwise authorized by resolution of the Board, the Executive Director or the Executive Director's designee shall sign all contracts, deeds and other instruments executed by the Authority. In addition, subject to the applicable provisions of any trust agreement, indenture or resolution providing for a trustee or other fiscal agent, the Executive Director is designated as the public officer or person who has charge of, handles or has access to any property of the Authority, and shall file an official bond if so required by the Board and, as such, shall have the powers, duties and responsibilities that are specified in Section 6505.1 of the Act.

(5) The Secretary of YVWD is hereby designated as the Secretary of the Authority. The Secretary shall keep the records of the Authority, shall act as Secretary at the meetings of the Authority and record all votes, and shall keep a record of the proceedings of the Authority in a journal of proceedings to be kept for such purpose, and shall perform all duties incident to the office. Any assistant secretary of YVWD shall also serve as an assistant secretary of the Authority and may take any actions for which the Secretary has become authorized by the Agreement, any Indenture, and any resolution of the Board of the Authority or otherwise.

(6) The Treasurer of YVWD is hereby designated as the Treasurer of the Authority. The Treasurer of the Authority is designated as the public officer or person who has charge of, handles, or has access to any property of the Authority, and such officer shall file an official bond as required by the Board, and as such shall have the power, duties and responsibilities that are specified in Section 6505.1 of the Act. The cost of the bond shall be paid by the Authority.

(7) So long as required by Sections 6505 and 6505.5 of the Act, the Treasurer of the Authority shall prepare or cause to be prepared: (a) a special audit as required pursuant to Section 6505 of the Act every year during the term of this Agreement; and (b) a report in writing on the first day of January, April, July and October of each year to the Board and the Members, which report shall describe the amount of money held by the Treasurer of the Authority for the Board, the amount of receipts since the last such report, and the amount paid out since the last such report (which may exclude amounts held by a trustee or other fiduciary in connection with any Bonds to the extent that such trustee or other fiduciary provides regular reports covering such amounts).

(8) The services of the officers shall be without compensation by the Authority. YVWD may provide such other administrative services as required by the Authority.

(9) The Board shall have the power to appoint such other officers and employees as it may deem necessary and to retain independent counsel, consultants and accountants.

(10) All of the privileges and immunities from liability, exemptions from laws, ordinances and rules, all pension, relief, disability, worker's compensation and other benefits which apply to the activities of officers, agents or employees of YVWD when performing their respective functions within the territorial limits of YVWD, shall apply to them to the same degree and extent while engaged in the performance of any of their functions and duties extraterritorially under the provisions of this Agreement.

(11) None of the officers, agents or employees, if any, directly employed by the Authority shall be deemed, by reason of their employment by the Authority, to be employed by YVWD or, by reason of their employment by the Authority, to be subject to any of the requirements or benefits of YVWD.

(12) The Members hereby confirm their intent and agree that, as provided in Section 4(a) hereof and in the Act, the debts, liabilities and obligations of the Authority shall not constitute debts, liabilities or obligations of the Members, and they do not intend by the following sentence to impair this provision. Notwithstanding Section 4(a) hereof, the confirmation provided immediately above, and the Act, YVWD shall indemnify, defend and hold harmless the Authority and the other Members and each of the Authority and the other Member's officers, directors, employees, attorneys and agents from and against any and all costs, expenses, losses, claims, damages, and liabilities directly or indirectly arising out of or in connection with the activities of the Authority. Each Member may elect to defend itself in any such action with counsel of its choice, the reasonable fees of such counsel to be paid by YVWD. Notwithstanding the provisions of Section 895.6 of the Government Code of the State, a Member shall not have any right to contribution from the Authority. This paragraph shall survive the termination of this Agreement.

(13) In any event, the Authority shall cause all records regarding the Authority's formation, existence, operations, any Bonds issued by the Authority, obligations incurred by it and proceedings pertaining to its termination to be retained for at least six (6) years following termination of the Authority or final payment of any Bonds issued by the Authority, whichever is later.

(14) Confirmation of officers shall be the first order of business at the first meeting of the Authority, regular or special, held in each calendar year.

(15) No Board member, officer, agent or employee of the Authority, without prior specific or general authority by a vote of the Board, shall have any power or authority to bind the Authority by any contract, to pledge its credit, or to render it liable for any purpose in any amount.

Section 5. Powers. The Authority shall have any and all powers which are common powers of the Members, and the powers separately conferred by law upon the Authority. All such powers, whether common to the Members or separately conferred by law upon the Authority, are specified as powers of the Authority, except any such powers which are specifically prohibited to the Authority by applicable law. The Authority's exercise of its powers is subject to the restrictions upon the manner of exercising the powers of YVWD.

The Authority is hereby authorized, in its own name, to do all acts necessary or convenient for the exercise of its powers, including, but not limited to, any or all of the following: to sue and be sued; to make and enter into contracts; to employ agents, consultants, attorneys, accountants, and employees; to acquire, hold or dispose of property, whether real or personal, tangible or intangible, wherever located; to issue Bonds or otherwise incur debts, liabilities or obligations to the extent authorized by the Act or any other applicable provision of law and to pledge any property or revenues or the rights thereto as security for such Bonds and other indebtedness.

Notwithstanding the foregoing, the Authority shall have any additional powers conferred under the Act or under applicable law, insofar as such additional powers may be necessary to accomplish the purposes set forth in Section 2 hereof.

This section shall be subject to the limitations on the powers of the Authority set forth in Section 4(a).

Section 6. Termination of Powers. The Authority shall continue to exercise the powers herein conferred upon it until the termination of this Agreement in accordance with Section 3 hereof.

Section 7. Fiscal Year. The first fiscal year of the Authority shall be the period from the date of this Agreement to last day of June 2022. Each subsequent fiscal year of the Authority shall be the period from July 1 of each year through the last day of June of the succeeding year, unless changed by resolution of the Board.

Section 8. Disposition of Assets. Upon termination of this Agreement pursuant to Section 3 hereof, any surplus money in possession of the Authority or on deposit in any fund or account of the Authority shall be returned in proportion to any contributions made as required by Section 6512 of the Act. The Board is vested with all powers of the Authority for the purpose of concluding and dissolving the business affairs of the Authority. After rescission or termination of this Agreement pursuant to Section 3 hereof, all property of the Authority, both real and personal, shall be distributed to YVWD.

Section 9. Contributions and Advances. Contributions or advances of public funds and of personnel, equipment or property may be made to the Authority by YVWD for any of the purposes of this Agreement. Payment of public funds may be made to defray the cost of any such contribution. Any such advance made in respect of a revenue-producing facility shall be made subject to repayment, and shall be repaid, in the manner agreed upon by YVWD, and the Authority at the time of making such advance as provided by Section 6512.1 of the Act. It is mutually understood and agreed that the Members have no obligation to make advances or contributions to the Authority to provide for the costs and expenses of administration of the Authority.

Section 10. Bonds.

(a) *Authority to Issue Bonds*. When authorized by the Act or other applicable provisions of law and by resolution of the Board, the Authority may issue Bonds for the purpose of raising funds for the exercise of any of its powers or to otherwise carry out its purposes under this Agreement. Said Bonds shall have such terms and conditions as are authorized by the Board.

(b) *Bonds Limited Obligations*. The Bonds, including the principal and any purchase price thereof, and the interest and premium, if any, thereon, shall be special obligations of the Authority payable solely from, and secured solely by, the revenues, funds and other assets that are pledged therefor under the applicable Indenture(s) and shall not constitute a charge against the general credit of the Authority or the Members. The Bonds shall not be secured by a legal or equitable pledge of, or lien or charge upon or security interest in, any property of the Authority or any Members (other than property of the Member executing a Security Agreement to secure such Bonds and only to the extent set forth in such Security Agreement) or any Authority income or receipts or any Members income or receipts (other than income or receipts of the Member executing a Security Agreement to secure such Bonds and only to the extent set forth in such Security Agreement) except the property, income and receipts pledged therefor under the applicable Indenture(s). The Bonds shall not constitute a debt, liability or obligation of the State or any public agency thereof, including any Member, other than the special obligation of the Authority as described above. Neither the faith and credit nor the taxing power of the State or any public agency thereof, including any Member, shall be pledged to the payment of the principal or purchase price of, or the premium, if any, or interest on the Bonds, nor shall the State or any public agency or

instrumentality thereof, including any Member, in any manner be obligated to make any appropriation for such payment. The Authority shall have no taxing power.

No covenant or agreement contained in any Bond or Indenture shall be deemed to be a covenant or agreement of any director, officer, agent or employee of the Authority, a Member or a Local Agency, in his or her individual capacity, and no director or officer of the Authority executing a Bond shall be liable personally on such Bond or be subject to any personal liability or accountability by reason of the issuance of such Bond.

Section 11. Agreement not Exclusive. This Agreement shall not be exclusive and shall not be deemed to amend or alter the terms of other agreements between the Members, except as the terms of this Agreement shall conflict therewith, in which case the terms of this Agreement shall prevail.

Section 12. Accounts and Reports. All funds of the Authority shall be strictly accounted for in books of account and financial records maintained by the Authority, including a report of all receipts and disbursements. The Authority shall establish and maintain such funds and accounts as may be required by generally accepted accounting principles and by each Indenture for outstanding Bonds (to the extent that such duties are not assigned to a trustee for owners of Bonds). The books and records of the Authority shall be open to inspection at all reasonable times by the Members and their representatives.

The Authority shall require that each Indenture provide that if a trustee is appointed thereunder, such trustee shall establish suitable funds, furnish financial reports and provide suitable accounting procedures to carry out the provisions of such Indenture. Said trustee may be given such duties in said Indenture as may be desirable to carry out the requirements of this Section 12.

(a) *Audits*. The Treasurer of the Authority shall cause an independent audit to be made of the books of accounts and financial records of the Authority in compliance with the requirements of the Act; provided, however, that if the Authority is deemed a component unit of the District, no independent audit of the Authority shall be required. Any costs of the audit, including contracts with, or employment of, certified public accountants or public accountants in making an audit pursuant to this Section 12, shall be borne by the Authority and shall be a charge against any unencumbered funds of the Authority available for that purpose.

(b) *Audit Reports*. The Treasurer of the Authority, as soon as practicable after the close of each fiscal year but in any event within the time necessary to comply with the requirements of the Act shall file a report of the audit performed pursuant to this Section 12(b) as required by the Act and shall send a copy of such report to public entities and persons in accordance with the requirements of the Act.

Section 13. Funds. Subject to the provisions of each Indenture for outstanding Bonds providing for a trustee to receive, have custody of and disburse funds which constitute Authority funds, the Treasurer of the Authority shall receive, have the custody of and disburse Authority funds pursuant to accounting procedures approved by the Board and shall make the disbursements required by this Agreement or otherwise necessary to carry out the provisions and purposes of this Agreement.

Section 14. Adoption of Certain Codes and Policies. The Authority shall, by resolution, adopt a Conflict of Interest Code, an investment policy and a debt management policy to the extent required by law. Such Conflict of Interest Code, investment policy and debt management policy may be the respective code or policies of YVWD.

Section 15. Notices. Notices and other communications hereunder to the parties shall be sufficient if delivered to the clerk or secretary of the governing body of each party.

Section 16. Withdrawal. No Member may withdraw from this Agreement prior to the end of the term of this Agreement determined in accordance with Section 3.

Section 17. Effectiveness. This Agreement shall become effective and be in full force and effect and a legal, valid and binding obligation of the Members when each party has executed a counterpart of this Agreement.

Section 18. Severability. Should any part, term, or provision of this Agreement be decided by the courts to be illegal or in conflict with any law of the State, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining parts, terms or provisions hereof shall not be affected thereby.

Section 19. Successors; Assignment. This Agreement shall be binding upon and shall inure to the benefit of the successors of the parties hereto. Except to the extent expressly provided herein, neither party may assign any right or obligation hereunder without the consent of the other.

Section 20. Amendment of Agreement. This Agreement may be amended by supplemental agreement executed by the Members at any time; provided, however, that this Agreement may be terminated only in accordance with Section 3 hereof and, provided further, that such supplemental agreement shall be subject to any restrictions contained in any Bonds or documents related to any Bonds to which the Authority is a party.

Section 21. Waiver of Personal Liability. No Member, member of the Board, officer or employee of the Authority or the Members shall be individually or personally liable for any claims, losses, damages, costs, injury and liability of any kind, nature or description arising from the actions of the Authority or the actions undertaken pursuant to this Agreement, and the Authority shall defend such Members, members of the Board, officers or employees against any such claims, losses, damages, costs, injury and liability. Without limiting the generality of the foregoing, no Member, member of the Board, officer or employee of the Authority or of any Member shall be personally liable on any Bonds or be subject to any personal liability or accountability by reason of the issuance of Bonds pursuant to the Act and this Agreement. To the full extent permitted by law, the Board shall provide for indemnification by the Authority of any person who is or was a member of the Board, or an officer, employee or other agent of the Authority, and who was or is a party or is threatened to be made a party to a proceeding by reason of the fact that such person is or was such a member of the Board, or an officer, employee or other agent of the Authority, against expenses, judgments, fines, settlements and other amounts actually and reasonably incurred in connection with such proceeding, if such person acted in good faith and in the course and scope of his or her office, employment or agency. In the case of a criminal proceeding, the Board may provide for indemnification and defense of a member of the Board, or an officer, employee or other agent of the Authority to the extent permitted by law.

Section 22. Notices. Notices to a Member hereunder shall be sufficient if delivered to the General Manager of such Member.

Section 23. Section Headings. All section headings contained herein are for convenience of reference only and are not intended to define or limit the scope of any provision of this Agreement.

Section 24. Miscellaneous. This Agreement may be executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

Where reference is made to duties to be performed for the Authority by a public official or employee, such duties may be performed by that person's duly authorized deputy or assistant. Where reference is made to actions to be taken by a Member, such action may be exercised through the officers, staff or employees of such Member in the manner provided by law.

The principal office of the Authority shall be the principal office of YVWD.

THIS AGREEMENT IS MADE IN THE STATE, UNDER THE CONSTITUTION AND LAWS OF THE STATE AND IS TO BE CONSTRUED AS A CONTRACT MADE AND TO BE PERFORMED IN THE STATE.

This Agreement is the complete and exclusive statement of the agreement among the parties with respect to the subject matter hereof, which supersedes and merges all prior proposals, understandings, and other agreements, whether oral, written, or implied in conduct, between the parties relating to the subject matter of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their proper officers or officials thereunto duly authorized, as of the day and year first above written.

YUCAIPA VALLEY WATER DISTRICT

By_____
President

ATTEST:

_____
Secretary

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:_____
President

ATTEST:

_____
Secretary

4843-5280-4861v5/024636-0006

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors' Workshop – Engineering

FROM: Wen Huang, Deputy General Manager/Chief Engineer
Mike Esquer, Sr. Project Manager
Aaron Jones, Associate Engineer

SUBJECT: Consider Tunneling Feasibility Study for Foothill Pipeline Crossing at City Creek Project

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Since 2006 Valley District has been actively working to protect the portion of the Foothill Pipeline that crosses at City Creek Channel. The City Creek Channel has been both eroding and head cutting in the segment of the stream channel between Highland Avenue and Base Line Road in the City of Highland. Staff, therefore, released a Request for Proposal (RFP) for a Tunneling Feasibility Study of the Foothill Pipeline Crossing at City Creek (Project). Staff received five (5) proposal for this Project, ranging from $435K – $1.28M. Upon review of the five proposals by a review team, Staff is recommending forwarding AECOM's proposal with a cost of $435,000 to a future Board meeting for consideration.

BACKGROUND

Valley District constructed the 78-inch diameter Foothill Pipeline in 1970s, which is one of the District's primary water supply pipelines. A portion of the existing pipeline that crosses under City Creek has become exposed in recent years during major storm events, which increases the potential of pipe failure. Temporary measures, including construction of Gabion walls along the channel walls and placing boulders on top of the pipeline to armor and protect our pipeline encasement have been placed in recent years, to allow for studies and research for a permanent solution to be conducted.

A recent scour analysis performed by West Consultants indicated scouring depths of 25 to 80 feet. The United States Army Corps of Engineers (ACOE) is planning modifications to City Creek to reduce the channel velocity and scouring depth. However, the timing of these improvements is unknown. Therefore, the purpose of this project to prepare a preliminary design report evaluating

the feasibility of constructing an approximately new 700-foot-long tunnel approximately 70 to 100 feet deep to replace the exposed pipe segment in City Creek. The proposed tunnel will cross under Metropolitan Water District of Southern California's (MWDSC) existing 144-inch diameter Inland Feeder, which is located just upstream of our crossing.

To identify a qualified consultant to perform the feasibility study for tunneling Foothill Pipeline crossing under City Creek with expertise in tunnel construction, large diameter pipeline design and the resource agency permit/agreement processes, an RFP was prepared and distributed to solicit proposals. The scope of work for the feasibility study includes the following:

- Develop options for the horizontal alignment to minimize impacts to existing facilities, and locate the shafts outside of ACOE's jurisdiction;
- Develop the vertical alignment considering the recent scour analysis performed by West Consultants, geotechnical conditions, and separation requirements with MWDSC's Inland Feeder;
- Assess feasibility of trenchless and tunnel concepts and risks;
- Perform a geotechnical evaluation to identify the geotechnical constraints as it specifically relates to tunnel construction;
- Evaluate groundwater depth and disposal options;
- Identify necessary permits and develop a permit acquisition strategy; and
- Develop a preliminary construction cost and project schedule through construction.

In response to the RFP, five (5) very qualified proposals were received. Upon thorough review of all proposals, Staff believes that AECOM's proposal is the most qualified proposal with a reasonable fee for the proposed scope and recommends to the Board of Directors for consideration.

FISCAL IMPACT

The proposed cost to prepare a tunneling feasibility study for Foothill Pipeline crossing at City Creek is $435,000, which is included in the approved 2021-2022 General Fund budget.

STAFF RECOMMENDATION

Staff is recommending the Board of Directors direct staff to place an item on a future Board of Directors agenda for consideration that would authorize the CEO/General Manager to execute an agreement with AECOM in the amount of $435,000 for this scope of work.

ATTACHMENT

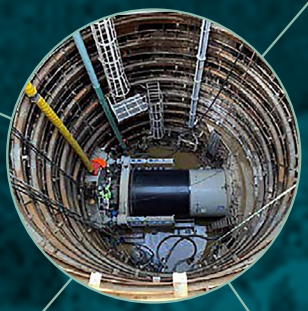
AECOM Proposal for Tunneling Feasibility Study for Foothill Pipeline Crossing at City Creek

AECOM

PROPOSAL FOR FEASIBILITY STUDY

FOOTHILL PIPELINE CROSSING AT CITY CREEK

San Bernardino Valley Municipal Water District | Revised November 24, 2021



LADWP River Supply Conduit (RSC) Upper Reach, Units 5 & 6, Los Angeles, CA

SECTION 1

Project Understanding

Project Understanding

Table of Contents

The Foothill Pipeline is a 78-inch-diameter welded steel water pipe constructed in the mid-1970s that crosses under City Creek. A portion of the pipeline within the creek has become exposed due to scouring of the creek bed. The San Bernardino Valley Municipal Water District (Valley District) has decided to replace the pipeline beneath City Creek and install a new carrier pipe within a casing at a deeper location to protect it from potential damage and failure. The pipe will be approximately 700-feet-long and 65- to 100-feet-deep. Geomorphologic and streambed erosion studies indicate that 15 feet to 25 feet of scour could occur during a major storm event. The new pipeline will need to be below the expected storm scour and under Metropolitan Water District of Southern California's (MWD's) existing 144-inch-diameter Inland Feeder (MWD-IF). The purpose of this study is to evaluate viable vertical and horizontal alignment alternatives that meet the project needs and to present recommendations for applicable installation methods in a Feasibility Study. The study will include data gathering and review, permitting requirements, field reconnaissance, utility investigations, a geotechnical investigation, and preparation of project memos and reports to summarize findings and recommendations. The results of the geotechnical investigation will be used to evaluate installation methods include tunneling methods and determine the preferred alignment, profile and method. The final deliverable of this project will be a Feasibility Study, and will include the following:

1. Develop the alignment to minimize impacts to existing facilities and locate the shafts outside of the United States (U.S.) Army Corps of Engineers (USACE) jurisdiction.
2. Develop the profile considering the scour analysis, geotechnical conditions, and separation with MWD's Inland Feeder.
3. Assess the feasibility and risk of trenchless and applicable tunneling methods.
4. Geotechnical evaluation to identify the constraints as it relates to tunnel construction.
5. Evaluate groundwater depth and disposal options.
6. Identify necessary permits and develop a permit acquisition strategy.
7. Develop a preliminary construction cost and project schedule through construction.
8. Prepare a preliminary design report.

#3

In 2020, AECOM was ranked #3 worldwide of the Top 50 firms providing Trenchless Design Technology according to *Trenchless Technology Magazine*.

Previous Studies by AECOM and Legacy Companies

Staff proposed for this study by AECOM, worked on the 144-inch Inland Feeder Project crossing of City Creek and are familiar with the geotechnical challenges. A comprehensive geotechnical and geologic investigation report was prepared by AECOM for the original City Creek segment of the MWD-IF, and the results of our investigation were presented in a report dated June 30, 1995 (D&M, 1995) and Supplementary Report No. 3 dated September 17, 1996 (D&M, 1996), a copy was provided as part of the current request for proposals (RFP). ***Key team members, Wolfgang Roth and Arnel Bicol, had primary responsibilities on the MWD-IF Design.***

Geotechnical Challenges

As a result of our previous studies, we are very familiar with the tunneling challenges of the proposed Foothill Pipeline re-alignment. Ground conditions range from fill to a depth of 30 feet underlain by sandy gravels with cobbles and boulders; these materials provide technical and logistical challenges for construction, and the site is also subject to seismic activity. Groundwater levels are seasonal and need to be monitored as part of this study, but the new pipeline will be below the water table—likely in very high permeable material.

Civil Challenges

The new alignment for the casing and carrier pipe will be at least 15 feet below the MWD-IF and the shafts located with adequate access, do not conflict with existing utilities, and are outside of USACE jurisdiction. Suitable shaft construction methods will be proposed. Cathodic protection measures will be provided to ensure a long service life of the pipeline.

The tie-in details and procedures for connecting the existing Foothill Pipeline with the new tunneled section of pipeline will be important. The goal is to specify tie-in procedures that minimize down-time of the existing pipeline.

Tunneling Challenges

The construction of the new Foothill Pipeline provides several challenges:

1. Two-pass tunneling method most likely with a lined tunnel—steel or reinforced concrete pipe (RCP) casing.
2. Construction below the water table in highly permeable coarse granular material with cobbles and boulders.
3. The MWD-IF invert is approximately 43 feet below ground level (GL) at City Creek.
4. With minimum 1.5x pipe diameter clearance between the two pipelines, the new pipeline invert is likely to be at least 65 feet below ground level, and possibly more.
5. Ground conditions will determine means and methods for shaft construction and tunneling which most likely will involve microtunneling (MT) or sequential excavation method (SEM) tunneling.

Tunneling Methods vs. Ground Conditions

Excavation Method and Diameter	Max Length Shaft to Shaft	Typical Support for Excavation (SOE) Method	Typical Shaft Size : 108-inch Tunnel Starting / Receiving Feet	Silt and Sand below Water Table	Silt and Sand Dry	Clay	Cobbles and Boulders Dry	Rock
Sequential Excavation Method (SEM) - Drill & Blask (D&B) , Excavator /Road Header 96"+	5+ miles	Bolts / Shotcrete	25 / 15	Dewatering				
Open Gripper Rock TBM 96" +	5+ miles	Bolts / Shotcrete	30 / 20					
Earth Pressure Balance (EPB) TBM 96"+	5+ miles	Segment Rings	40 / 30		with Foam			
Slurry TBM 96"+	5+ miles	Segment Rings	40 / 30					
Hybrid TBM 96" +	5+ miles	Segment Rings	40 / 30					
Trenchless Technology								
Microtunneling Slurry 12- 144"	3,000 feet*	Jacking Pipes	30 / 20					
Microtunneling EPB 60-144"	3,000 feet*	Jacking Pipes	30 / 20					
Open Shield Pipejacking 48-144"	1,000 feet	Jacking Pipes	30 / 10					
Auger Boring - (AKA Jack & Bore) 12-84"	500 feet	Steel Pipe	35 / 10					
Pipe Ramming- 12-160"	200 feet	Steel Pipe	35 / 10					

*Legend: **Yellow** = May not be best choice; **Green** = Suitable; **Red** = Not suitable.*

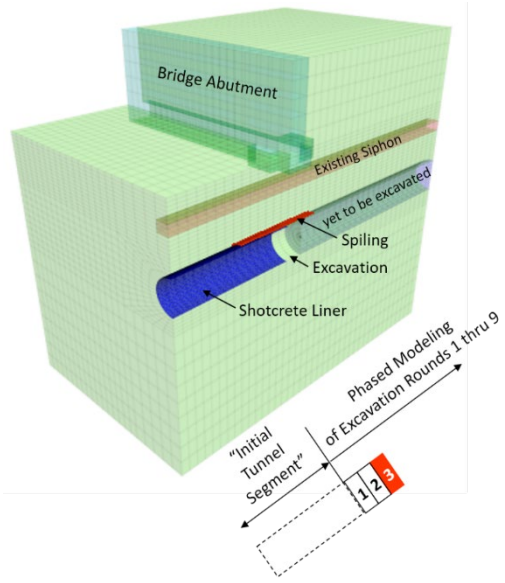


Figure 1. Example of 3-D Model for analyzing SEM tunnel-induced settlement of bridge abutment for LADWP.

Ground Support Design for Shafts and Tunnels

An assessment of the general behavior of the geologic strata on site will follow an established geomechanical design process following the "Guidelines for the Geotechnical Design of Underground Structures with Conventional Excavation," which has been successfully used on many challenging tunneling projects with variable ground conditions. As part of the study, two-dimensional (2D) and three-dimensional (3D) analyses will be performed to analyze required ground support to confirm stability during construction and evaluate tunneling-induced settlement of the MWD-IF.

Prior Experience

Recent projects designed by members of our team, in accordance with the SEM support principles outlined in this section, include Los Angeles Department of Water and Power's (LADWP's) Trunk Line South – Unit 4 and Foothill Trunk Line – Unit 3.

Risk Analysis

Our team members are recognized as industry leaders who use state-of-the-art practice procedures in risk evaluation and management. Risk management should be part of the feasibility planning, design and bidding process. As part the feasibility study a "Risk Register" will be developed by a group of our team's tunneling experts in workshops. Proper recognition and mitigation of risks leads to projects being completed on schedule and within budget.

SFPUC, New Irvington Water Supply Tunnel, Sunol to Fremont, CA

SECTION 2

Project Approach

Project Approach

Task 0 – Project Management and Administration

AECOM will conduct effective project management that adheres to the scope, schedule, and budget; provide efficient and frequent communication with Valley District and other project stakeholders; and implement AECOM's Quality Management System in order to provide effective quality assurance/quality control (QA/QC). Our Project Manager and Project Administrator will prepare monthly invoices, progress reports, and earned value analyses. We will also coordinate all work with our subcontractors to make sure they each know their assigned roles and responsibilities as we work toward a set of scheduled deliverables.

Task 1 – Investigations

Although AECOM had previously conducted subsurface investigations along the proposed Foothill Pipeline re-alignment route, our previous exploratory borings did not quite extend to a depth that would adequately support the development of tunneling options for the current project. Also, since groundwater monitoring data for the MWD-IFD reportedly is unavailable, some provisions to assess management of groundwater will be needed.

Arnel + Wolfgang

Geotechnical and Tunneling Leads, Arnel Bicol and Wolfgang Roth, were part of the design team for Inland Feeder pipeline for MWD.

A site-specific field investigation program will be conducted as part of the current feasibility study. The purpose of this program will be to obtain pertinent data for the development of tunneling options and to confirm our previous understanding of subsurface soil and groundwater conditions at the site. Per the RFP, a minimum of four (4) borings will be drilled with a sonic drill rig at the proposed locations indicated Figure 2 below. These borings will be converted into temporary groundwater monitoring and in-situ testing wells.

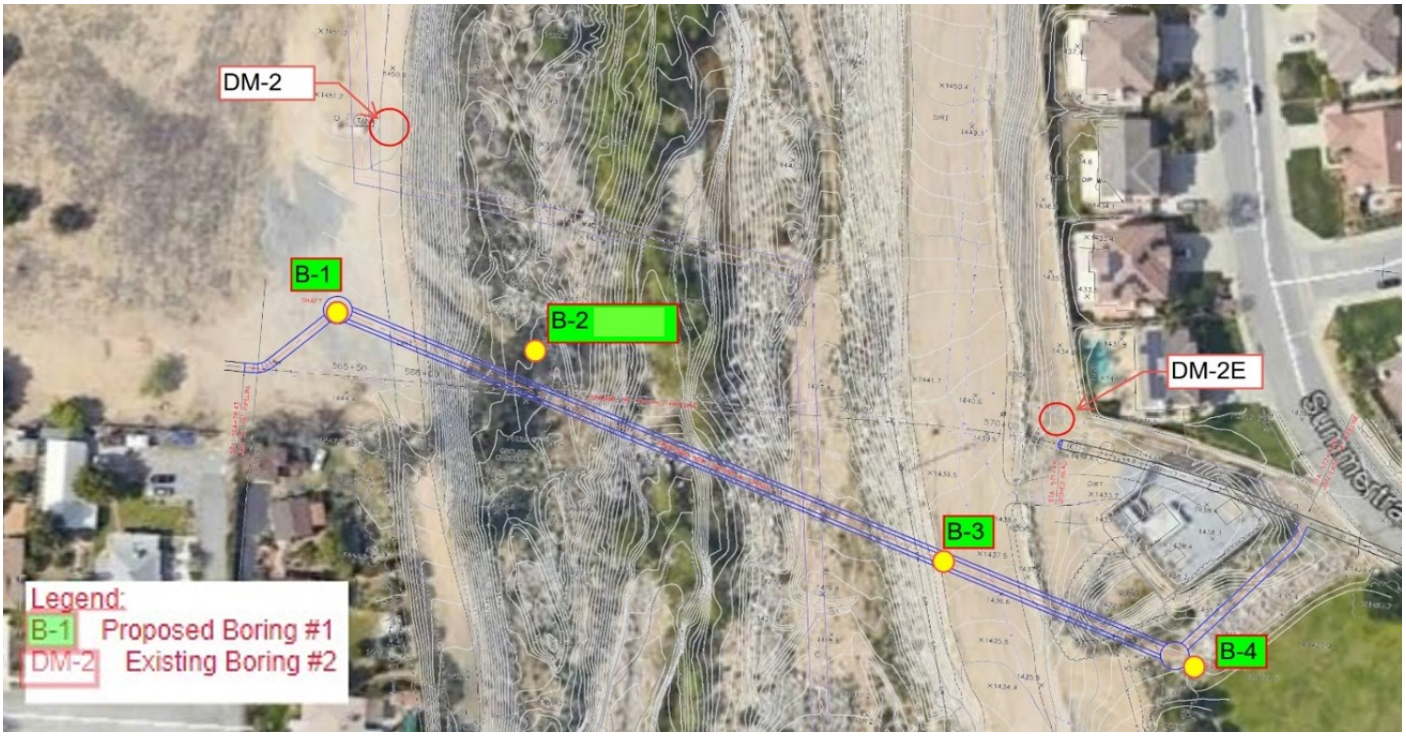


Figure 2. Sonic boring locations.

Environmental Planning and Permitting Support

Environmental Documentation Support Services. AECOM will prepare an Initial Study (IS) in compliance with the CEQA guidelines using the Valley District's standard form. The IS will assist with screening the CEQA environmental parameters and will provide focus for the Valley District in obtaining necessary permits to perform the geotechnical exploration work. The IS will include a brief description of the geotechnical exploration work and a brief discussion of the impacts that may result along with maps and technical data to support the conclusions. AECOM will prepare an administrative draft of the IS and submit it electronically for Valley District's review. AECOM will revise the IS to reflect the Valley District staff comments and resubmit the IS to the Valley

District for review/final approval. It should be noted that AECOM can work with the Valley District to determine if the geotechnical exploration work could classify as a Categorical Exemption under CEQA, which would then result in the elimination of the IS preparation.

Jurisdictional Delineation. AECOM will conduct a jurisdictional delineation[1] (JD) for Federal and State protocols in order to map jurisdictional waters of the U.S., including wetlands (jurisdictional to USACE/California Regional Water Quality Control Boards [RWQCB]), waters of the State (jurisdictional to RWQCB), and streambeds and riparian habitat (jurisdictional to California Department of Fish and Wildlife [CDFW]). The JD will include a one-day site visit for two AECOM staff (regulatory/wetland specialist and biologist), which may be done concurrently with the biological site visit in order to streamline staff time. The JD will be conducted according to federal regulations such as the *Navigable Waters Protection Rule* (effective 2020)[2] and the New Procedures developed by the SWRCB for waters of the State (2019, effective 2020).

Biological Survey and Technical Report. AECOM will conduct a site visit to determine the vegetation communities and general habitats at the project site, as well as the potential to occur for sensitive plant and wildlife species. This effort will not include protocol surveys for the San Bernardino Kangaroo Rat (SBKR), but rather will determine habitat suitability for this species. A biological technical report (BTR) will be prepared in support of regulatory permits for the geotechnical borings (e.g., Notification for Streambed Alteration Agreement), including the applicable regulatory process for compliance with the Federal and State *Endangered Species Acts*.

Assumptions:

- Proposal does not include protocol surveys for SBKR.
- Proposal does not include preparation of a Biological Assessment (BA) used for Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS).

Permitting Support for Geotechnical Work. AECOM will provide permitting support to Valley District staff as needed for pre-application meetings with the agencies, as well as the development, submittal of applications and subsequent agency consultation after submittal. It is anticipated that the following permits will be required: NWP No. 6 for survey activities (including geotechnical borings), Section 401 Water Quality Certification, and Section 1602 Streambed Alteration Agreement. In addition, biological support will be provided as needed for two potential processes regarding sensitive species: Federal ESA Section 7 Consultation; and *California Endangered Species Act* (CESA) Section 2081 authorization. AECOM will support Valley District staff through regulatory coordination with agency staff, including attending meetings with the Valley District and with Agency staff. AECOM will also support the Valley District in obtaining an encroachment permit through the San Bernardino County Flood Control District.

Assumptions:

- Agency coordination is in relation to the geotechnical work, not the feasibility study.
- Valley District will be responsible for preparation and submittal of applications; AECOM will provide support during this process.
- AECOM may attend up to six (6) coordination meetings with Valley District and three (3) coordination meetings with permitting agencies.

Permitting Plan and Schedule for Feasibility Study. An AECOM regulatory specialist will coordinate with Valley District staff to develop a permitting plan and strategy, as well as a proposed schedule for obtaining regulatory permits for the Feasibility Study. The permit plan will identify the anticipated permits required such as Section 404 Nationwide Permit or Standard Individual Permit (USACE), Section 401 Water Quality Certification (RWQCB), and Section 1600 et seq. Streambed Alteration Agreement (CDFW). AECOM will also investigate the potential need for other permit approvals, such as Section 408 (for USACE constructed/ maintained facilities such as levees). AECOM will coordinate with Valley District staff regarding ongoing Habitat Conservation Planning (HCP) processes in the County (SBVMWD HCP, SBCFCD HCP) and determine the applicability of any plan to this particular project.

1.1 Data Gathering and Review

We will review existing data on geology, soils, groundwater, aerial photographs, flood information, faulting and seismicity, and local

[1] The USACE now calls this an "Aquatic Resources Delineation Report" (ARDR).

[2] The JD will incorporate current regulations at the time of the work. For example, the U.S. Environmental Protection Agency (EPA) and USACE, under the Biden Administration, have made it known that *Clean Water Act* regulatory changes are being considered.

environmental and biological constraints. Data sources researched will include our information from our own archives including our MWD-IF reports, as well as reports and records from East Valley Water District, and information available from our long-standing client MWD.

1.2 Field Reconnaissance

The AECOM team, comprised of civil, geotechnical and tunnel engineers, will perform site reconnaissance jointly with Valley District staff to identify potential constraints regarding launching/receiving shaft locations; construction staging areas; site access; and existing surface improvements that may impede implementation of the project or require relocation.

A Health and Safety Plan (HSP) will be prepared prior to any field mobilization of personnel. The HSP will address the risks associated with the proposed field activities including any anticipated hazards that might be present on the surface and in subsurface soil and groundwater. The HSP will be in effect for all the fieldwork. All personnel and subcontractors will have sufficient health and safety training. AECOM will appoint a site safety officer, and a copy of the site-specific HSP will be available at the site whenever there is on-going field activity.

1.3 Site Utility Assessment

We have assumed that the Valley District will be responsible for timely acquisition of right of entries and permits to perform the field exploration work. AECOM will notify Underground Service Alert (USA) and utility companies for clearing the area for the drilling program. This may involve field meetings with utility locators. Due to potential presence of boulders that could obstruct and delay drilling progress, alternate locations, typically about 5 feet from the original location, will be pre-identified and cleared to allow continuation of drilling to the desired depth.

AECOM will subcontract with **Psomas** to provide aerial topographic mapping, field topographic surveying and right-of-way, property line, and easement research and plotting for the project. Psomas will establish survey control within the project limits using a combination of global navigation satellite system (GNSS), and conventional surveying. Psomas survey crews will set approximately nine (9) ground control points and supplemental control for the field topography and boundary base mapping tasks. Where possible, control will be centered on existing cadastral monuments. Where no such monument is found, the surveyors will set a semi-permanent monument to define the center of the target. All surveying and mapping for this project will be completed utilizing the horizontal datum of the North American Datum of 1983 (NAD83), and the vertical datum of the North American Vertical Datum of 1988 (NAVD88). A project survey control report will be prepared.

Topographic mapping will be provided for the project area as shown on Figures 3. Mapping will be provided in conformance with FGDC Geospatial Positioning Accuracy Standards, Part 4: Architecture, Engineering, Construction, and Facilities Management (FGDC-STD-007.4- 2002), nominally with a plotting scale of 1 inch = 40 feet and vertical accuracy suitable for 1-foot interval contours. Final deliverables will be a computer-aided design (CAD) base file with a digital terrain model (DTM) surface in AutoCAD®.

One day of field surveying will be provided for location of specific features in the project area. Field surveys will be completed to provide supplemental data on features that are not visible on the aerial topographic mapping. Some additional features may include existing grades, surface visible utilities, manholes, drainage, specific graded slope areas, and Valley Water Flood Channel.

A CAD topo base mapping file and DTM will be prepared. One additional day of field surveying will be provided to locate the location and elevation of four (4) geotechnical borings. An American Standard Code for Information Interchange (ASCII) point file will be provided with coordinates and elevations to the top center of the boring holes and with point identifiers specified by AECOM. The CAD topo base mapping file will be updated with geotechnical boring locations and identifiers.

Figure 3. Limits of topographic mapping.

1.4 Geotechnical Evaluation

All drilling operations will be directly supervised by our lead certified geologist, **Chris Goetz, PG, CEG**. Sonic sampling will be used to recover continuous, intact, 4-inch-diameter core samples for logging of the soils within the anticipated shafts and tunneling zones.

1.4.1 General Field Drilling and Well Installation Activities

Schedule and Coordination. AECOM will notify Valley District of the scheduled dates where field work will take place and coordinate with the assigned Valley District staff member(s) available to answer questions during field exploration. In our base cost estimate, we have assumed that all drilling can be performed Monday through Friday from 7 am to 7 pm. No drilling will be scheduled during weekends and Holidays.

Drill Rig Type Selection. Due to known abundant presence of gravels, cobbles and boulders, a sonic drilling method will be used. Borings will be drilled to depths of 100 to 110 feet below the existing ground surface. Upon completion, each boring will be converted into a 4-inch monitoring well for groundwater-level measurements and other tests in the future.

Drilling Subcontractor. Difficult drilling conditions have been anticipated. AECOM has selected **ABC-Liovin, Inc.** located in Signal Hill, CA, a very skilled drilling firm with local experience drilling in the materials expected at the project site.

Site Security during Investigation. Due to the estimated time to complete each boring, we have anticipated drill rigs will be left at drilling locations overnight but will be moved offsite on days when field work is not being performed (including Saturdays, Sundays, and Holidays). Due to concerns about potential equipment damage/theft, site security was included in our cost estimate.

Groundwater Monitoring Well Installations. All four (4) borings will be converted to 4-inch diameter groundwater monitoring wells. Details are provided in Section 1.4.2.

Backfilling of Exploratory Borings. Borings will be backfilled with one-sack sand cement slurry by tremie method from the bottom as needed. Additional details are provided in Section 1.4.2.

Waste Handling and Management. Our subcontractor **American Integrated Services (AIS)** will be responsible for the handling and management of all Investigation Derived Wastes (IDWs). We have assumed that clean groundwater and rinse water from the drilling activities can be discharged to the sanitary sewer system following analyses and permit from Valley District. We have included an optional contingency fee in the fee table that can be authorized by Valley District if contaminated soil or water are encountered.

1.4.2 Sonic Drilling Program

Sonic drilling is an exploration technique, which uses high-frequency vibration applied directly to the drill stem. In addition to vibration, rotation, and downforce is used to advance the borehole. Sonic drill stems incorporate both an inner core barrel and an outer sonic drill casing to penetrate the substrate, stabilize the borehole, and collect continuous, mainly undisturbed soil samples.

Based on our experience, the sonic method provides the optimum means and method for obtaining both soil and groundwater data. Moreover, the sonic rig can also be equipped with standard geotechnical sampling equipment (standard penetration test [SPT], CalMod, etc.). We have assumed that Valley District will provide a water source near the site (e.g., fire hydrant with flow meter) for cooling and lubricating the drill stems during difficult drilling through oversize materials.

The sonic cores will be geologically logged, photographed, and selected samples will be placed into plastic sleeves for handling and storage. The borings will be converted to polyvinyl chloride (PVC) monitoring wells as outlined below:

- All sonic borings will be advanced to planned depths of 100 feet to 110 feet below ground surface (bgs). The depth to first groundwater encounter will be recorded.
- A 4-inch-diameter monitoring well will be installed in all the borings. The two wells near the proposed shafts will contain at least 40 feet of screen between ~40 feet to ~80 feet bgs, and the rest will be blank casing. The other two borings will be prepared with blank casing in the upper 100 feet and with screen in the bottom 10 feet, to enable geophysical testing as well as groundwater-level monitoring.
- The wells will be constructed using 4-inch diameter Schedule 40 PVC blank casing and factory slotted PVC well screen. Screen for the PVC wells will consist of 0.020-inch slots. Construction will include centralizers and bottom cap. No. 3 filter pack will be placed to about 2 feet above the top of the screen. The upper seal will be completed with bentonite pellets topped with

cement-bentonite grout.

- A specialized well development rig will be mobilized to develop the monitoring wells by mechanical surging, bailing, and pumping techniques. As needed, a mud dispersant will aid in the development of each well. Wells will be developed until a turbidity of 10 Nephelometric Turbidity Units or relatively consistent field turbidity readings are achieved. Development will be monitored by the AECOM Geologist, **Chris Goetz, PE, CEG**.
- A 10-inch-diameter steel riser will be installed at each well location, finished 3-feet above existing grade, and surrounded by a 4-foot diameter concrete apron that tapers down from the well cover to the ground surface. Two bollards will be installed at each well location for protection.

1.4.3 Geophysical Testing

A geophysical investigation will be performed using downhole suspension P-S velocity logging. The objective is to obtain reliable Vs30 data in the upper 30 meters (100 feet). **GEOVision**, located in Corona, California, will conduct downhole suspension logging in two (2) of the borings that will be drilled to at least 110 feet. GEOVision will also assist with utility clearance of the proposed boring locations, including alternate locations.

1.4.4 Laboratory Testing

Geotechnical laboratory testing will be performed on any meaningful samples obtained from the borings to evaluate the physical characteristics of the soils. The project geotechnical engineer will review the samples and make appropriate laboratory testing assignments. Testing will be performed in AECOM's soil laboratory in Anaheim, California. A contingency cost for lab testing is included in the fee estimate. The following laboratory tests will be performed for each boring: particle-size distribution tests, corrosivity suites, unconfined compressive strength tests on rock, and point load strength tests on rock.

1.4.5 Groundwater Level Measurement and Monitoring

AECOM will procure and install one water level logger with sensor for each monitoring well (four total) and one wireless communication device that can be used to download the water level data with a laptop at the project site. The data loggers will continuously monitor and log the groundwater levels in the wells. AECOM will visit the site prior to the submittal of the Feasibility Study Report to download approximately four months of groundwater level data. The water level logger equipment will become the property of the Valley District so that long-term level data can be acquired and used for the future final design phase of the project.

1.4.6 Geotechnical Report

AECOM will prepare a Geotechnical Report summarizing the results of the field exploration program including the results of preliminary analyses as well as any conclusions and recommendations to be used for the tunnel evaluation study. The Geotechnical Report will include:

1. Vicinity map, site location map and logs of borings and well construction
2. Discussion of general site conditions
3. Description of the field exploration program
4. Geologic cross sections with discussion of source material and depositional history including strata names
5. Discussion of particle size, frequency of occurrence, and engineering material properties
6. Discussion of anticipated subsurface conditions including permeability, recharge pressures and groundwater level
7. Discussion of geohazards including seismicity, faulting, and liquefaction
8. Summary of anticipated ground conditions for tunneling
9. Preliminary conclusions and recommendations including options for tunnel and shafts excavation, temporary support, and permanent liner
10. Recommendations for further investigation as part of final design

A draft report will be submitted to Valley District for review. We have planned for one (1) round of review comments. Upon receipt and review of comments from Valley District, the final Geotechnical Report will be submitted within ten (10) working days.

Deliverable

Geotechnical Report to Valley District for review and discussion.

Task 2 – Tunnel Evaluation

The heart of the feasibility study for the new installation of the Foothill Pipeline across City Creek is the tunnel evaluation, which

will be based on the site background information and geotechnical conditions described in the Geotechnical Report, Task 1. The study will review open- and closed-face tunneling methods of construction and make recommendations based on the present state-of-the-art tunneling techniques—including MT and SEM. Below, we have provided an overview of both MT and SEM. Construction methods for shafts will also be an important aspect of this project, as they are likely to be 70-feet-deep reaching below the water table (WT) in difficult ground conditions including cobbles and boulders.

We will evaluate the effect of tunneling-induced settlement on the existing MWD-IF pipeline. This will be done by performing 3D modeling with fast lagrangian analysis of continua in three dimensions (FLAC3D).

Microtunneling Overview

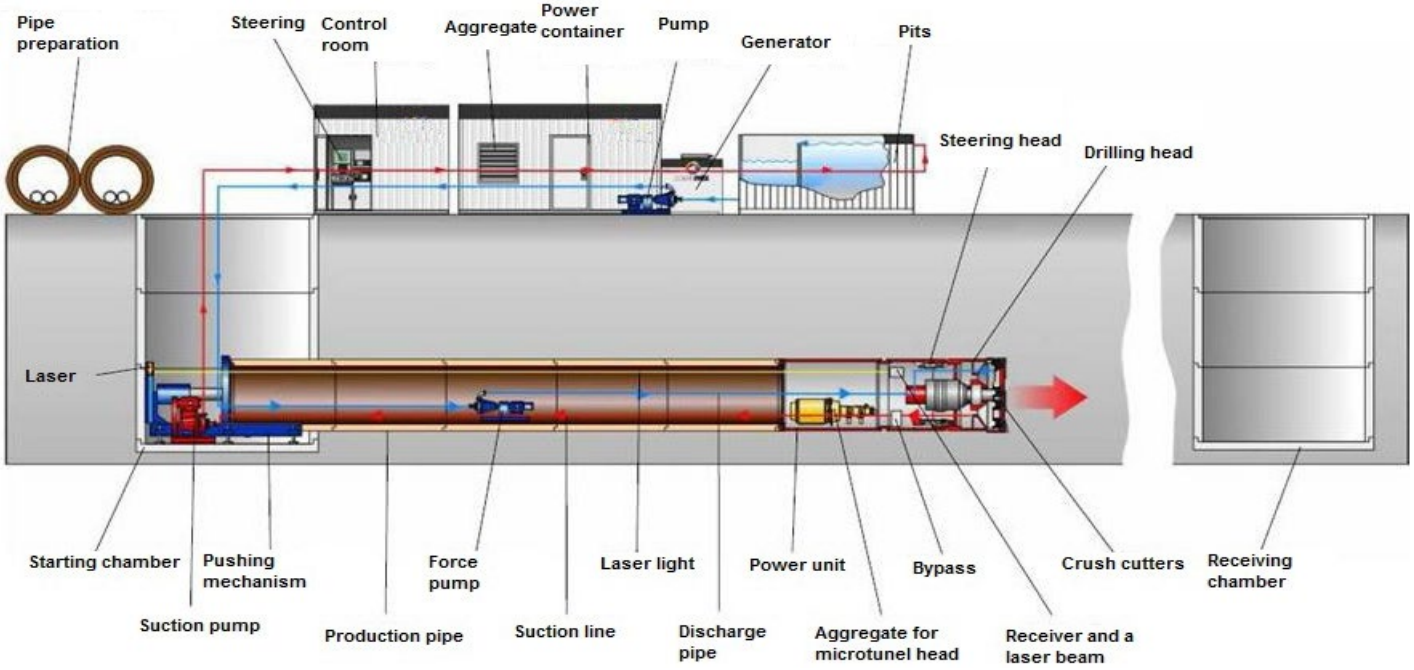


Figure 4. Various Components of a Slurry Microtunneling Process

MT, by definition (American Society of Civil Engineers [ASCE] Guideline 36) is a closed-face pipe jacking method, which installs pipes directly behind a remotely controlled, steerable, guided, MT tunnel boring machine (MTBM) with a continuous pressure on the face of excavation to balance groundwater and earth pressures. Remote control is typically from a control room located next to the jacking shaft. The pipe being jacked can either be the final carrier pipe, or an oversized casing in which a carrier pipe is later inserted and grouted in place (2-pass method). The pipe or casing sections can be anywhere from 6 to 20 feet in length and are inserted at the jacking shaft behind the MTBM. Because the MTBM is remotely operated, worker entry does not typically occur in the tunnel during the tunnel excavation. The illustration above, Figure 4, depicts the various components of a microtunneling process.

Process Summary. The microtunneling process involves pipe jacking to advance the MTBM simultaneously with cutterhead rotation and excavation. The jacking pipes are thrust forward with heavy-duty thrust cylinders installed in the jacking shaft, pushing the pipe string and MTBM together whilst excavating. The MTBM is articulated and can be steered to provide line and grade control. Larger MTBM, over 60-inch, are powerful and have crushers giving them the ability to excavate almost all ground types. The MTBM is a closed-face system and the slurry not only removes the excavated spoil from the face but is also pressurized and balances the ground water and ground pressures. MTBM diameters range from 12 inches to as large as 12 feet.

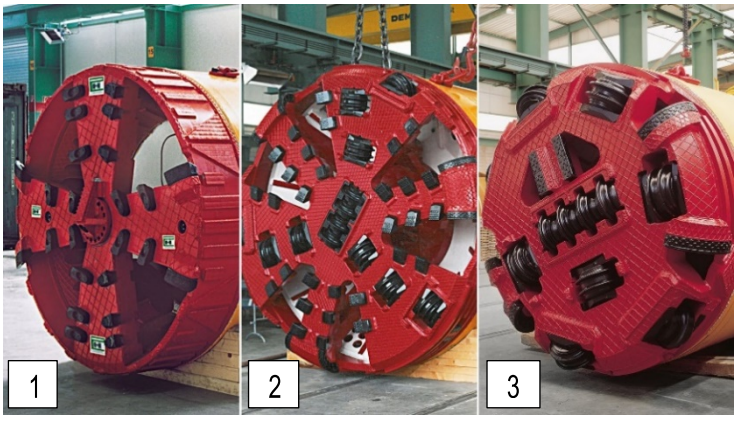


Figure 5. MTBM Cutterheads: 1) Soil; 2) Mixed Ground; 3) Rock

Cutterhead Design. The cutterhead can be equipped with disc cutters to excavate rock or cut through boulders. Figure 5 shows various cutterhead tooling typically used for different ground types. In addition, in larger diameter

machines, over 60 inches, crushers can be installed within the cutterhead chamber to reduce particle size of the muck such that it can be pumped out through the slurry lines. This enables the MTBM to excavate cobbles and boulders expected to be encountered for the Foothill Pipeline City Creek crossing.

An additional contingency measure that may be included in MTBM over 72 inches diameter face access through the pressure bulkhead to allow access to the cutterhead chamber. This is an important requirement for longer drives and rock where cutting tools may need to be replaced.

Jacking/Receiving Shafts. The size of a jacking shaft for a microtunneling operation is typically dictated by the length and diameter of the MTBM or pipe segment length, as well as the thrust wall and jacking frame dimensions. Jacking shafts may be circular or rectangular and range from as little as 15-feet- up to 30-feet-diameter or length.

A receiving shaft may be smaller than the jacking shaft and can be reduced to as little as 12 feet in length if necessary, as the MTBM can be disassembled and removed in pieces. Shafts need to be dry and since microtunneling is typically used below the WT watertight shaft construction methods are typical.

Overcut and Lubrication. Overcut of the MTBM on the outside radius of the pipe being installed is normally necessary to allow steering and to introduce lubricant to reduce frictional resistance along the pipe string. Overcut typically does not exceed one inch to minimize surface settlement. A bentonite lubricant is typically used to fill the overcut as the MTBM advances.

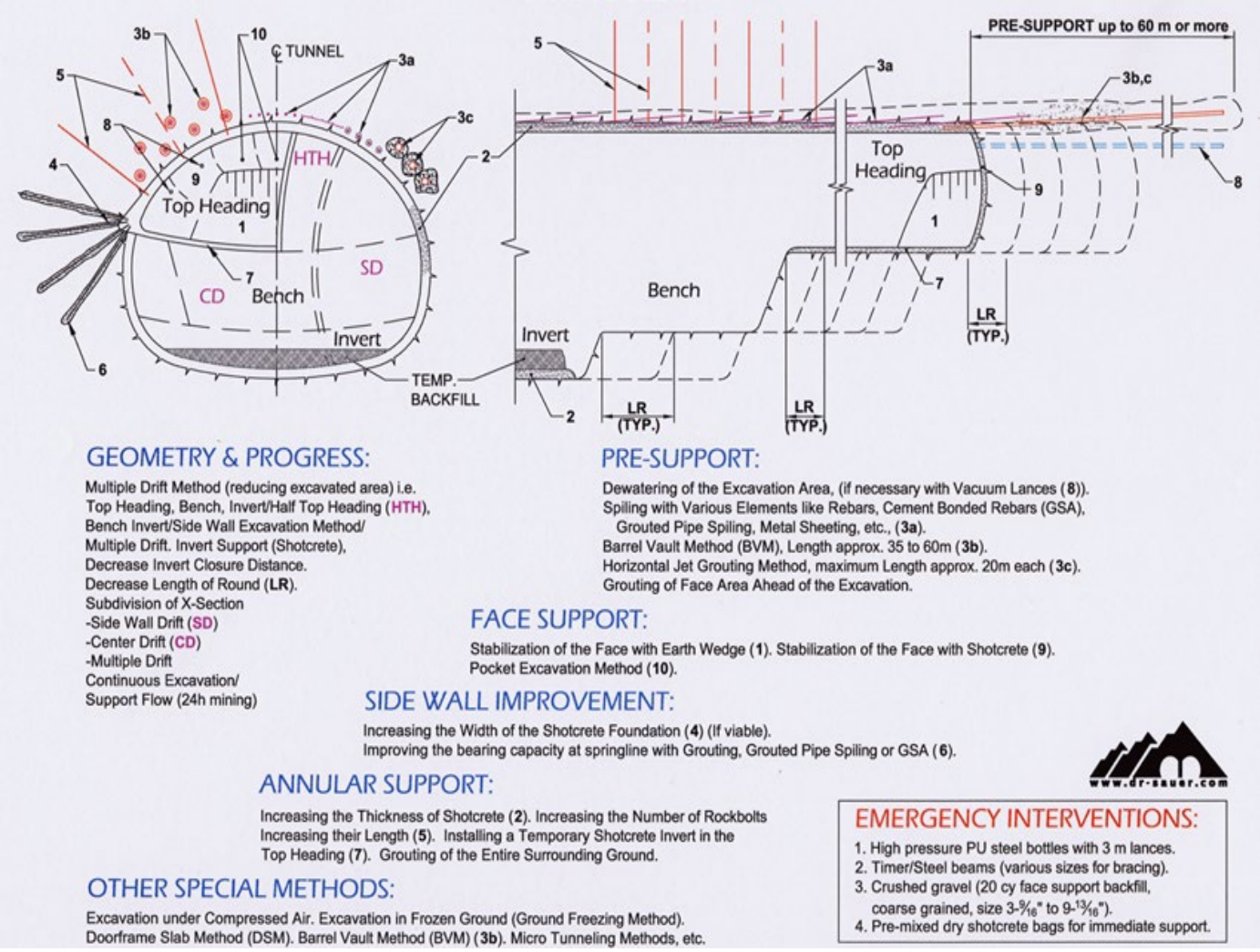


Figure 6. Summary of SEM Toolbox Items.

SEM Overview

The SEM Method, also known as New Austrian Tunneling Method (NATM), is one of the most adaptable and responsive tunneling excavation and support methods available.

The combined technique of sequential excavation, monitoring, and ground support that makes up SEM, offers several advantages over other tunneling methods. Benefits include an exposed excavation area, adaptability to unforeseen changes in geological and hydrogeological conditions, flexibility of cross-sectional changes, and rapid mobilization with readily available, unsophisticated, and relatively inexpensive excavation and equipment. Short underground tunnels are especially suitable for the method and SEM can be used in most ground conditions with ground improvement including dewatering and grouting as indicated in the SEM Toolbox items summarized in Figure 6 on the previous page.

SEM Principles

Mobilization of Soil or Rock Mass. SEM mobilizes the inherent strength of the soil or rock mass to support itself. Mobilization can be achieved by controlled deformation of the ground.

Pre-Support. Installation of fore-poling measures in weak ground conditions such as umbrella pipes, self-drilling spiles, rebar spiles, etc., to increase the stability in the working area by transferring loads in the longitudinal direction, decrease excavation induced deformations, and improve face stability of the tunnel.

Span and Ring Closure. The unsupported span is left as short as possible, while trimming of the invert closure to create a load-bearing ring varies depending on soil or rock conditions. Immediate closure is vital in soft ground tunnels.

Monitoring. SEM relies on the installation of sophisticated instrumentation schemes to monitor and measure deformations as excavation progresses.

Dynamic Design. SEM is an observational method that requires flexibility in the contract to make design changes during construction to respond to varying ground conditions.

AECOM + DSP + SEM

AECOM, with subconsultant, Dr. Sauer & Partners (DSP), designed two SEM tunnels for LADWP: City Trunk Line South – Unit 4, and Foothill Trunk Line Tunnel – Unit 3, which run beneath existing bridge foundations. AECOM performed geologic/geotechnical investigations, lab testing, and numerical modeling with FLAC3D of the tunnel and two shafts; and DSP prepared the SEM design drawings and specs. The projects are offered as Project Descriptions #1 and #2 on pages 25 and 26 in the Qualifications Appendix of this proposal.

Encountering Boulders

Encountering boulders will make application of standard shoring methods for shaft construction, such as soldier pile and lagging or secant piles, difficult to execute. Boulders combined with permeable soils also make it difficult to carry out construction methods requiring a bentonite slurry to support the excavation, such as slurry walls.

SEM is preferable for such conditions, as access to the face is available, and boulders can simply be broken up and/or removed during shaft or tunnel excavation.

Figure 7. LADWP City Trunk Line SEM Tunnel; shotcrete application.

Groundwater

Considering the short length of the proposed tunnel, and that it is likely to be below the WT with a potential for high flow rates, further investigation is required to identify suitable ground treatment methods for the ground conditions and SEM. Standard ground improvement that will be evaluated are in-tunnel dewatering and grouting. These can be installed in a systematic fashion according to the design or based on an observational approach and only installed as required.

In areas of high anticipated groundwater flows, dewatering capacity can further be improved with a well system from surface and permeation grouting, either from surface or in-tunnel.

Ground freezing is another approach to control groundwater and has been used successfully in the U.S. in combination with SEM.

Figure 8. Boulders encountered in excavation phase.

Deliverables

Technical Memoranda (TM) of 30 percent design will discuss the following issues:

Figure 9. In-tunnel dewatering system.

1. Environmental and other permitting activities including spoils transportation and disposal.
2. Shaft design and construction including settlement modeling to ensure USACE levy integrity.
3. Tunnel excavation and initial support design including settlement modeling to ensure MWD-IF integrity.
4. Carrier pipe design and installation considering operating pressure, surge pressure, and transient analysis for tunnel installation and suppressed current design.
5. Tie-in scheme including scheduling of tie-in activities, inspection, and testing for final acceptance.
6. Preparation of a concept level (Class 4) cost estimate of the feasible tunneling methods.
7. Drafts of the TM will be submitted to Valley District for review and discussion. Upon receipt and review of comments from Valley District, the final versions will be submitted within fifteen (15) working days.

Task 3 – Alignment Evaluation

3.1 Crossing Alignment Evaluation

Our team will review the assumptions, methodologies, and conclusions presented in the relevant background and geotechnical information and reports provided by MWD on the IF pipeline. We will evaluate the crossing alignment to identify at least two (2) horizontal and vertical profile alignments. A key effort in this task will be to update and refine the existing geotechnical database with the result from the geotechnical investigation of Task 1.

Deliverables

Our team will summarize the findings and decisions and present the preferred alignment in a draft TM. We will then host a workshop with Valley District to review the findings and recommendations and obtain agreement on a selected alignment in which to move forward. The TM will include:

1. Risk Analysis - risk register and risk-mitigation opportunities
2. Preliminary drawings in plan and profile
3. Detail for initial ground support - shafts and tunnel
4. Evaluate the effect of tunneling-induced settlement on MWD-IF pipeline (modeling)
5. Evaluate effect of shaft-induced settlement on USACE levy integrity
6. Settlement monitoring scheme
7. Excavation and construction means and methods for the shafts and tunnel

A draft of the Preliminary Design Report will be submitted to Valley District for review and discussion. Upon receipt and review of comments from Valley District, a final version of the report will be submitted within ten (10) working days after receiving comments.

Task 4 - Feasibility Study

4.1 Conceptual Drawings

AECOM will prepare conceptual drawings for the proposed tunnel design that is selected in the Alignment Evaluation. The drawings will be drafted on a full-size border at a scale of 1inch = 40 feet, and will include existing topographic data, existing utilities, surficial features, easements, and property lines. The conceptual drawing set will include a plan and profile drawing to show the horizontal and vertical alignment and a detail drawing with typical tunnel cross sections and launch and receiving pit plans and sections.

4.2 Feasibility Study Report

AECOM will prepare a Feasibility Study that will, at a minimum, include:

1. Executive Summary
2. Introduction
3. Geotechnical Summary
4. Alignment Alternative Analysis
5. Trenchless/Tunnel Construction Evaluation
6. Constructability Issues—including suitable shaft and worksite locations
7. Potential impacts of tunneling/shaft construction on adjacent infrastructure including settlement predictions and assessment of impacts
8. Details of any required ancillary methods such as ground treatment or dewatering
9. Details of potential spoil disposal locations
10. List of permitting agencies and potential MWD requirements
11. Recommendations for next stage of design

Deliverable

AECOM will prepare a Draft Feasibility Study for Valley District to review. AECOM will attend a review meeting to present finding from the Draft Feasibility Study and discuss review comments. Comments from Valley District will be incorporated into the Final Feasibility Study, which will be submitted within ten (10) working days after receiving comments. The final study will be signed and stamped by the team's engineering discipline leads.

SBVMWD, Upper Santa Ana River Wash Habitat Conservation Plan Permitting, San Bernardino, CA

SECTION 3

Organizational Chart

Organizational Chart

Mike Esqure, PE

Principal-in-Charge
Jagadish "Jack" Gundarlahalli, PE

Quality Control Manager and Risk Analysis
Mike Smith, PE, GE

Project Manager
Bryan Paine, PE, ENV SP, QSD/P
Keith Campbell, PE (Back-up)

Project Engineer
Jesus Lopez, PE
Seung Han Kim, PhD, PE (Back-up)

Technical Advisory Team
Paul Nicholas
Geotechnical & Tunneling
Andrew Romer, PE
Conveyance
Juergen Laubbichler, PE, PEng
Dr. Sauer & Partners •
Sequential Excavation Method (SEM)

Technical Team

Alignment Study
Jesus Lopez, PE
Alternative Analysis
Alex Franchi, PhD, PE, BCEE
Business Case Evaluation (BCE)

Geotechnical Engineer
Arnel Bicol, PE, GE
Leo Handfelt, PE, GE (Back-up)

Seismic
Andreas Skarlatoudis, PhD

Geology
Christopher Goetz, PE, CEG

Tunneling
Wolfgang Roth, PhD, PE, GE
Technical Lead & Trenchless Expert
Hossein Changani, PE (Back-up)
Technical Lead
Irwan Halim, PhD, PE
SEM Specialist

Geophysical Survey
GEOVision •
Subconsultant

Survey
Psomas •
Subconsultant

Drilling and Borings
ABC Liovin Drilling, Inc. •
Subconsultant
American Integrated Services (AIS) •
Subconsultant, Haul-away Services

Environmental Planning
Fareeha Kibriya, AICP, LEED AP
Jerry Flores (Back-up)

Resource Agency Permitting
Erik Larsen, D. Env
Arthur Popp (Back-up)

Cost Estimating | Scheduling
Martin Hammer

Nothing is more essential than the capability and quality of our team's leadership.

> I love this profession for the opportunity to give communities the gift of clean water. My purpose is to deliver a feasibility study that will make the Valley District and my Team proud.
>
> *Bryan Paine, PE*
> *Project Manger*

Key Staff Relevant Experience Summary

Team Member / Role	Geotechnical Analysis and Recommendations	Geotechnical Field Exploration and Lab Testing	Shaft and Tunnel Analysis / Design	Pipeline / Tunnel Alternatives Analysis	Feasibility Study	Cost Estimating	Environmental Planning and Documentation	Permitting Support Services	Site Civil Engineering Design	Tunnel and Pipeline Engineering Design
Bryan Paine, Project Manager	●	●	●	●	●	●	●	●	●	●
Jesus Lopez, Project Engineer			●	●	●	●		●	●	●
Arnel Bicol, Geotechnical Engineer	●	●	●	●	●	●		●	●	●
Wolfgang Roth, Tunneling Technical Lead	●	●	●	●	●	●				●
Erik Larsen, Permitting Lead					●	●	●	●		
Fareeha Kibriya, Environmental Planning Lead					●	●	●	●		
Michael Smith, QA/QC & Risk Analysis	●	●		●	●	●		●	●	●
Paul Nicholas, Geotechnical & Tunneling Technical Advisor	●	●	●	●	●	●		●	●	●

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Legend
Subconsultant •
Key Staff

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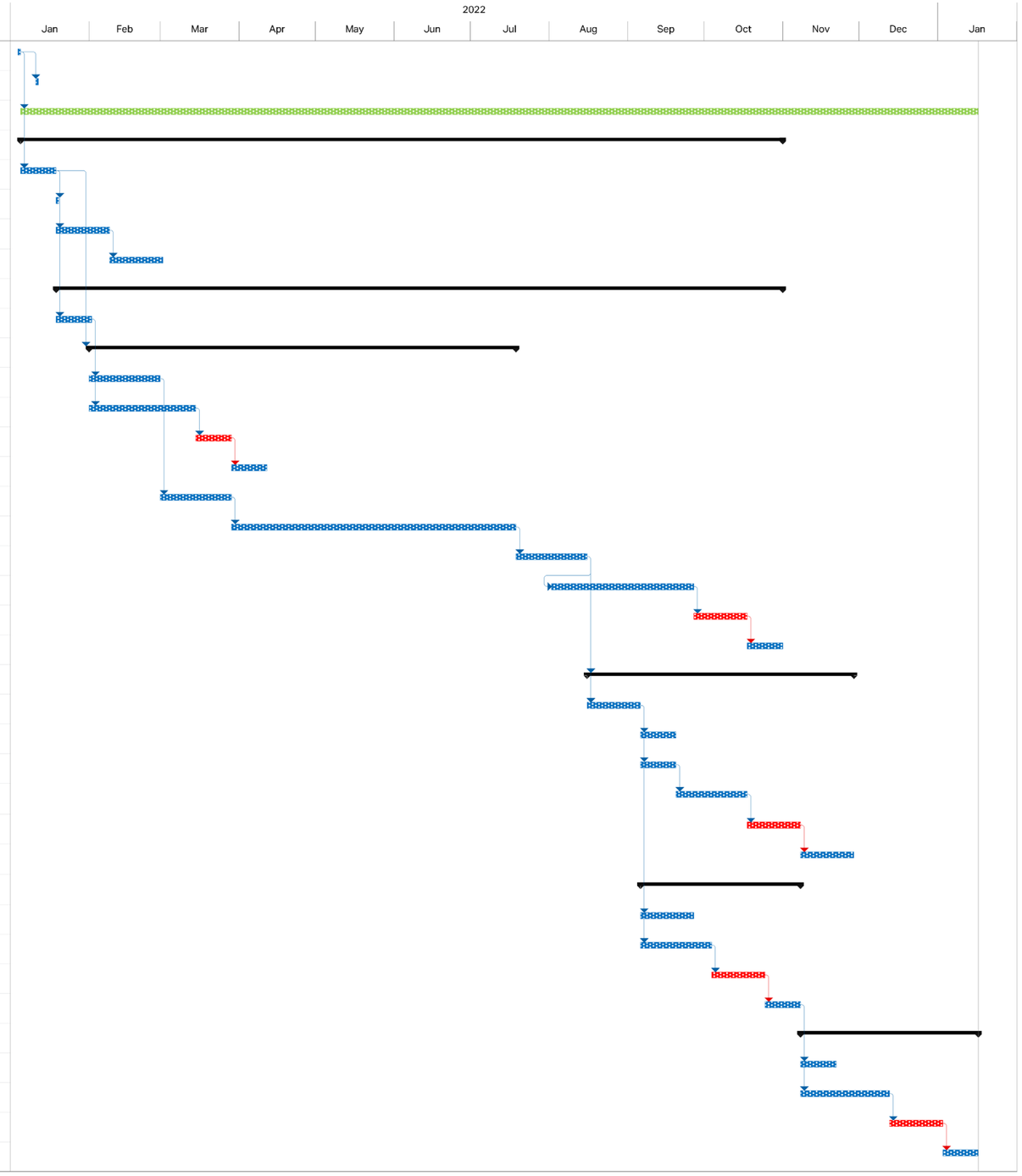
SECTION 4

Project Schedule

Project Schedule

ID	Task Name	Duration	Start	Finish
1	Estimated Contract Award/NTP	1 day	Tue 1/4/22	Tue 1/4/22
2	Kick-off Meeting	1 day	Tue 1/11/22	Tue 1/11/22
3	Project Management/Meetings	269 days	Wed 1/5/22	Mon 1/16/23
4	**Task 1 - Investigations**	**214 days**	**Wed 1/5/22**	**Mon 10/31/22**
5	Data Gathering and Review	10 days	Wed 1/5/22	Tue 1/18/22
6	Field Reconnaisance	1 day	Wed 1/19/22	Wed 1/19/22
7	Site Utility Assessment	15 days	Wed 1/19/22	Tue 2/8/22
8	Conduct Topographic Survey and prepare CAD topo and utility base map	15 days	Wed 2/9/22	Tue 3/1/22
9	Geotechnical Evaluation	204 days	Wed 1/19/22	Mon 10/31/22
10	Compile and review existing data	10 days	Wed 1/19/22	Tue 2/1/22
11	Obtain permits and environmental clearances for geotechnical exploration field work	120 days	Tue 2/1/22	Mon 7/18/22
12	Initial Study (CEQA)	20 days	Tue 2/1/22	Mon 2/28/22
13	Jurisdictional Delineation, Biological Study, Permitting Support	30 days	Tue 2/1/22	Mon 3/14/22
14	SBVMWD Review of Draft Reports	10 days	Tue 3/15/22	Mon 3/28/22
15	Prepare Final Reports	10 days	Tue 3/29/22	Mon 4/11/22
16	District Permit Application Preparation	20 days	Tue 3/1/22	Mon 3/28/22
17	Agencies Process & Issue Permits (USACE, RWQCB, CDFW)	80 days	Tue 3/29/22	Mon 7/18/22
18	Field Exploration Program	20 days	Tue 7/19/22	Mon 8/15/22
19	Prepare Draft Geotechnical Report	40 days	Tue 8/2/22	Mon 9/26/22
20	SBVMWD Review of Draft Geotechnical Report	15 days	Tue 9/27/22	Mon 10/17/22
21	Prepare Final Geotechnical Report	10 days	Tue 10/18/22	Mon 10/31/22
22	**Task 2 - Tunnel Evaluation**	**75 days**	**Tue 8/16/22**	**Mon 11/28/22**
23	Tunneling methods options assessments	15 days	Tue 8/16/22	Mon 9/5/22
24	Develop concept-level (Class 4) cost estimate	10 days	Tue 9/6/22	Mon 9/19/22
25	Prepare prescriptive specifications for tunnnel boring machine	10 days	Tue 9/6/22	Mon 9/19/22
26	Prepare Draft Technical Memoranda for tunnel construction impacts, shaft construction methods impacts, calculations, carrier pipe design/installation, and tie-in scheme	20 days	Tue 9/20/22	Mon 10/17/22
27	SBVMWD Review of Draft Task 2 Technical Memoranda	15 days	Tue 10/18/22	Mon 11/7/22
28	Prepare Final Technical Memoranda for tunnel construction impacts, shaft construction methods impacts, calculations, carrier pipe design/installation, and tie-in scheme	15 days	Tue 11/8/22	Mon 11/28/22
29	**Task 3 - Alignment Evaluation**	**45 days**	**Tue 9/6/22**	**Mon 11/7/22**
30	Prepare preliminary drawings for alignment alternatives	15 days	Tue 9/6/22	Mon 9/26/22
31	Prepare Draft Technical Memorandum for Alignment Evaluation	20 days	Tue 9/6/22	Mon 10/3/22
32	SBVMWD Review of Draft Task 3 Technical Memorandum	15 days	Tue 10/4/22	Mon 10/24/22
33	Prepare Final Technical Memorandum for Alignment Evaluation	10 days	Tue 10/25/22	Mon 11/7/22
34	**Task 4 - Feasibility Study**	**50 days**	**Tue 11/8/22**	**Mon 1/16/23**
35	Prepare conceptual drawings	10 days	Tue 11/8/22	Mon 11/21/22
36	Prepare Draft Feasibility Study	25 days	Tue 11/8/22	Mon 12/12/22
37	SBVMWD Review of Draft Feasibility Study	15 days	Tue 12/13/22	Mon 1/2/23
38	Prepare Final Feasibility Study	10 days	Tue 1/3/23	Mon 1/16/23



Adherence to the Project Schedule

Our management approach will be focused specifically on meeting the project schedule. To adhere to this schedule, AECOM will implement several tasks in parallel track. Key activities will require close coordination between project team members and Valley District. The critical path schedule will be managed using Microsoft Project and will be updated on a regular basis with actual completion dates to track the project progress relative to the baseline and forecast and immediately mitigate potential schedule issues. Our proposed project schedule, left, will be finalized after the kick-off meeting with input from Valley District.

Lockbourne Intermodal Sub Trunk, Columbus, OH

SECTION 5

Fee Schedule

Fee Schedule

Task No.	Task Description	AECOM LABOR[1]								AECOM TOTAL HOURS	AECOM LABOR COSTS	AECOM SUB-CONTRACTORS[2]					AECOM DIRECT COSTS & MATERIALS[3]	TOTAL
		Principal-in-Charge	Project Manager	Senior Engineer	Senior Project Engineer / Geologist / Scientist	Project Engineer / Geologist / Scientist / Estimator	Senior Staff Engineer / Geologist / Scientist / CAD	Staff Engineer / Geologist / Scientist / CAD	Project Admin / Tech Editor / Staff Planner			ABC Liovin Drilling (Geotechnical Borings)	GeoVision (Geophysical Testing)	American Integrated Services (Waste Disposal)	Psomas (Surveying)	Dr. Sauer & Partners (Tunneling Design Support)		
		$280	$255	$290	$200	$170	$155	$130	$110									
Task 0 - Project Management and Administration																		
0.1	Project Management services		40						40	80	$14,600							$14,600
	Subtotal Task 0		**40**						**40**	**5,480**	**$14,600**							**$14,600**
Task 1 - Investigations																		
1.1	Data gathering and review		2	2	2	2				8	$1,830							$1,830
1.2	Field reconnaissance		4	4	4		4			16	$3,600						$150	$3,750
1.3	Site utility assessment, topographic surveying, and ROW, PL, and easement plotting		2		2	4		16	2	26	$3,890				$42,300			$46,190
1.4	Geotechnical investigation and groundwater level monitoring		2	4	10		122	20	8	166	$26,060	$84,000	$12,075	$9,975			$7,130	$139,240
1.4A	Contingency for management of contaminated soil and groundwater		2			4				6	$1,190			$5,000				$6,190
1.5	Geotechnical Report	2	4	20	16	16	40	40	4	142	$25,140						$400	$25,540
	Subtotal Task 1	**2**	**16**	**30**	**34**	**26**	**166**	**76**	**14**	**364**	**$61,710**	**$84,000**	**$12,075**	**$14,975**	**$42,300**		**$7,680**	**$222,740**
Task 2 - Tunnel Evaluation																		
2.1	Environmental and other permitting activities		2		6	30	120	40	80	278	$39,410						$400	$39,810
2.2	Shaft design and construction including settlement modeling		2	4	20	20	8		2	56	$10,530							$10,530
2.3	Tunnel excavation and initial support design including settlement modeling		2	4	20	20	8		2	56	$10,530							$10,530
2.4	Carrier pipe design and installation		2	2		8		16	2	30	$4,750							$4,750
2.5	Tie-in scheme		2	2		8		16	2	30	$4,750							$4,750
2.6	Technical Memoranda	2	12	10	20	30			4	78	$16,060					$2,500	$200	$18,760
	Subtotal Task 2	**2**	**22**	**22**	**66**	**116**	**136**	**72**	**92**	**528**	**$86,030**					**$2,500**	**$600**	**$89,130**
Task 3 - Alignment Evaluation																		
3.1	Risk analysis		2	2	8	4	4			20	$3,990							$3,990
3.2	Preliminary drawings in plan and profile		4	4	4	4	4			20	$4,280							$4,280
3.3	Detail for initial ground support - shafts and tunnel		2	2	8	4	4			20	$3,990							$3,990
3.4	Evaluate effect of tunneling-induced settlement on MWD IF pipeline		2	2	8	12	12			36	$6,590							$6,590
3.5	Evaluate effect of shaft-induced settlement on USACOE levy integrity		2	2	8	12	12			36	$6,590							$6,590
3.6	Settlement monitoring scheme		2	2	8	4	4			20	$3,990							$3,990
3.7	Construction means & methods for shafts and tunnel		2	2	8	10	10			32	$5,940							$5,940
3.8	Technical Memoranda	2	24	8	16	16	16	32	4	118	$22,000					$2,500	$200	$24,700
	Subtotal Task 3	**2**	**40**	**24**	**68**	**66**	**66**	**32**	**4**	**302**	**$57,370**					**$2,500**	**$200**	**$60,070**
Task 4 - Feasibility Study																		
4.1	Conceptual drawings		8	4		8	8	36		64	$10,480							$10,480
4.2	Feasibility Study Report	2	24	24	40	16	16	40	4	166	$32,480					$5,500	$500	$38,480
	Subtotal Task 4	**2**	**32**	**28**	**40**	**24**	**24**	**76**	**4**	**230**	**$42,960**					**$5,500**	**$500**	**$48,960**
	TOTAL	**8**	**150**	**104**	**208**	**232**	**392**	**256**	**154**	**1,504**	**$262,670**	**$84,000**	**$12,075**	**$14,975**	**$42,300**	**$10,500**	**$8,980**	**$435,500**

Notes & Assumptions:

1) *Labor hours for meetings are included in the individual tasks.*
2) *Subconsultants include a 5% mark-up.*
3) *Direct Costs / Materials include costs such as geotechnical borings, lab testing, mileage to meetings/site, courier fees, and document reproduction costs.*

LADWP Foothill Trunk Line Tunnel Unit 3, Foothill Blvd. & Pacoima Wash, Los Angeles, CA

SECTION 6

Appendix - Qualifications (Relevant Project Experience and Personnel Resumes)

Appendix – Qualifications

AECOM – Delivering a Better World

AECOM Technical Services, Inc. (AECOM), a wholly owned subsidiary of AECOM Technology Corporation, is a global professional services firm. AECOM is the world's premier infrastructure consulting firm, delivering professional services throughout the project lifecycle–from planning, design and engineering to program and construction management. Our teams are driven by a common purpose to deliver a better world through our unrivaled technical expertise and innovation, a culture of equity, diversity and inclusion, and a commitment to environmental, social and governance priorities.

AECOM Southern California Offices.

Since it was launched as an independent company in 1990 formed by the merger of five entities and a corporation headquartered in Los Angeles, California, AECOM has become one of America's largest companies and is a Fortune 500 company with an approximate professional services revenue of $13.2 billion during fiscal year 2020. AECOM is a publicly traded company on the New York Stock Exchange.

AECOM has nearly 47,000 employees providing services in 150 countries. AECOM resources include 3,200 water/wastewater professionals in North America and over 6,000 worldwide. This size allows our team to access worldwide experience as well as give Valley District personalized attention. Our project staff will be supported by approximately 300 water business line professionals in a range of disciplines from multiple offices located within the Los Angeles basin and southern California. Specialists from our other offices will be used as necessary to provide the highest level of technical qualifications and service to Valley District.

AECOM is one of the top ranked engineering and design firms in the world, as evidenced by our consistently high ranking in *Engineering News-Record* (ENR). We are also ranked #1 and # 2 in Water/Wastewater Design in California and nationwide respectively by ENR. Additionally, we have recently been ranked #1 Most Admired Company in our industry by *Fortune Magazine*. More information on AECOM and its services can be found at www.aecom.com.

AECOM ENR Rankings.

Stability and Financial Responsibility

The team assures Valley District that we have the necessary facilities, ability, experience, and financial resources to provide the services specified herein in a satisfactory and timely manner.

Ability to Perform the Required Services

AECOM's tunneling specialists provide the technical expertise our clients rely on to meet the challenges of the most demanding tunneling projects. Our in-depth blend of technical knowledge and field experience enables us to offer innovative solutions to a broad range of tunnel projects for water, transportation, and energy. Our specialists deliver a wealth of experience in tunnel feasibility, design, inspection and rehabilitation, seismic resiliency, hydraulics and computational fluid dynamics analysis means and methods, and constructability reviews, cost estimating, environmental reviews and permitting, and safety management services. AECOM's tunneling experts have the local knowledge to deliver advanced solutions to complex challenges and have the benefit of ready access to a well-organized network of national and global specialists to call on as required.

Industry-Leading Water Tunneling Experience and Capabilities

From water conveyance and distribution to wastewater collection systems to hydropower, our integrated team of local, national, and global specialists, scientists, technical experts and engineers have extensive in-depth experience in the development and construction of all facets of tunneling project delivery. Locally, our experience includes the Riverside-Badlands Tunnel, part of MWD's Inland Feeder System. AECOM has developed the state of the art and has many firsts of a kind in tunneling and underground engineering including the first use of large diameter slurry TBM in Pittsburgh, the first use of curved microtunneling in the U.S., the design of the world largest diameter tunnel TM-CLK in Hong Kong, and the development of the American Concrete Institute's (ACI's) code for the design of fiber-reinforced concrete tunnel liner segments. ***AECOM has a long history of bringing innovations and cost-savings ideas to our clients and advancing the tunneling industry as a whole***.

Our AECOM Team – Qualified, Capable and Adaptable

AECOM's integrated team brings both the unrivaled local capacity and expertise to successfully deliver the feasibility study for tunneling the Foothill Pipeline crossing under City Creek. The AECOM team has the fundamental experience and expertise in tunnel construction, large diameter pipeline design, and the resources to assist the District in the permitting and agreements process.

AECOM is a world-recognized, large engineering company with over 3,200 water/wastewater professionals in North America, bringing tremendous resources and stability to Valley District. As our proposal demonstrates, we have the capabilities and qualifications to successfully conduct all work needed to support this project. AECOM brings the depth of resources and specialized expertise necessary to successfully complete this all-important study.

Dedicated Team of Local Experts + National Resources

AECOM is a California based firm that has been serving Southern California clients for more than 50 years. Our Southern California team includes nearly 300 water professionals including engineers, scientists, and planners who can provide virtually every service that might be needed during the planning and implementation of this project. We have aligned our local experts and national resources to address the challenges of the Foothill Pipeline feasibility study project.

Key Staff Biographies — *we have the RIGHT people*

Following here, we have provided brief overviews of the personnel whom we consider "key" to the project's success. They were selected on a "best person for the role" basis. Biographies are organized in the order they first appear on our organization chart (reference page 12).

Project Manager, Bryan Paine, PE | Experience: 23 years

Mr. Paine has spent his career focusing on planning, design, and construction support services for water, wastewater, recycled water, and storm water infrastructure projects in California. His project management experience makes him an excellent candidate to lead this study. Bryan has led or worked on 20+ projects related to gravity and pressure pipeline conveyance and tunneling. Bryan has experience in a variety of water infrastructure projects within California, small and large diameter pipelines, pump stations, and permitting. He has provided alignment alternatives analysis, preliminary/final design, permitting support, environmental documentation support, public outreach support, and construction support services for more than a dozen trenchless pipeline projects that have used methods such as directional drilling, jack-and-bore, and microtunneling. These tunneling projects have involved pipelines/casings as small as 6-inch to over 100-inches in diameter that have been routed under interstate highways, bridges, creeks, rivers, busy intersections, and hillsides.

Project Engineer, Jesus Lopez, PE | Experience: 31 years

Mr. Lopez has spent his career inspecting, designing, and constructing pipeline projects, including rehabilitation of corroding and aging waterlines and trunk sewers. Jesus was selected for this role based on his ability to design and oversee complex, multi-disciplined conveyance teams to successfully develop consistent, on-time preliminary design reviews (PDRs), and final construction documents.

Jesus has more than 31 years of experience, with responsibilities that have included project management; specifications preparation, design tasks for numerous water/recycled water pipelines and sewer/storm drain projects. He has been involved in underground utility searches, alignment route studies, horizontal and vertical alignments, utility relocations, hydraulic system analysis, public agency coordination, permit applications, and plans, specifications and estimates (PS&E). He has also prepared more than a dozen modeling studies for reclaimed water facilities and for sewer and water master plans using various computer applications for engineering, economic analysis, planning, alternatives, identification and ranking of pipeline deficiencies.

Geotechnical Engineer, Arnel Bicol, PE, GE | Experience: 37 years

Mr. Bicol is a Principal Engineer with 37 years of experience in geotechnical engineering projects involving site explorations and investigations, laboratory testing, site characterization, field instrumentation, site improvements, and construction quality assurance. He has managed geotechnical investigations and studies for hundreds of projects.

In the early 1990's, Arnel Bicol was a member of the legacy AECOM team that conducted the field explorations for Contract 3 of the MWD-IF Project, which included assessment of Valley District's Foothill Pipeline in the City Creek area. As a key member of the current AECOM team, Arnel's overall experience and in-house knowledge of the project site conditions will be brought to bear during our development of new field exploration programs and selection of preferred tunneling alternatives for the Foothill Pipeline re-alignment.

Arnel skillfully leads and manages an extensive array of tasks as the manager of our Los Angeles office geotechnical operations. In addition, he serves in a leading role on several On-Call contracts with LADWP, MWD, and the City and Los Angeles County Departments of Public Works.

Tunneling Technical Lead, Wolfgang Roth, PhD, PE, GE | Experience: 47 years

Dr. Roth combines a strong theoretical background with extensive practical experience in geotechnical engineering. His areas of expertise cover analysis-, design- and construction-related aspects of tunnels, earth dams, landslide stabilization, and foundation systems.

Working for AECOM and legacy companies for more than 45 years, Wolfgang has broad experience and knowledge in geotechnical engineering analysis, design, and construction. In earthquake engineering, he has pioneered the practical application of nonlinear, effective-stress dynamic analysis of earth structures including soil-structure interaction. He began his professional career working for ICOS of Vienna, Austria, which pioneered top-down, cut-and-cover construction with slurry diaphragm walls. Well-known in the industry, Wolfgang has received several Engineering Excellence awards from the American Consulting Engineers Council (ACEC), has authored numerous technical papers, and served on several Design Review Boards for tunnel projects.

Environmental Planning Lead, Fareeha Kibriya, AICP, LEED AP | Experience: 16 years

We have committed Ms. Kibriya, the Principal Environmental Planner in AECOM's Los Angeles office to this assignment. Fareeha will leverage both her extensive knowledge of the *California Environmental Quality Act* and the *National Environmental Policy Act* (CEQA/NEPA) requirements and the close working ties she enjoys with our team's proposed engineering staff to quickly and efficiently identify environmental issues that need to be considered in the feasibility study.

Fareeha's entire career had been based in Southern California, where she has provided environmental clearance support and delivered CEQA/NEPA documents, including environmental impact reports, joint NEPA documents (Environmental Impact Reports / Environmental Impact Statements [EIR/EIS] and EIR/Environmental Assessments [EA]), initial studies, negative declarations, proponent environmental assessments, and Mitigation Monitoring Reporting Programs. She has prepared documentation for regulatory approval on assignments for clients such as the USACE, LADWP, Orange County Transportation Authority, San Diego Gas & Electric, and the Port of Long Beach. She has worked on numerous recycled water projects, including the preparation of an EIR for the Los Angeles Groundwater Replenishment Project, which involves 30,000 acre-feet per year of recycled water from the Donald C. Tillman water reclamation plant and associated conveyance pipelines to the Hansen and Pacoima Spreading Grounds. Fareeha has overseen numerous large-scale environmental clearance projects for infrastructure agencies in Southern California, and understand the regulatory requirements and approvals needed for successful clearance of a project.

Resource Agency Permitting Lead, Erik Larsen, D. Env. | Experience: 23 years

Dr. Larsen is a regulatory specialist with extensive experience in regulatory issues related to water resources and environmental planning projects, having completed numerous permit application processes, ranging from nationwide permits to long-term, programmatic standard individual permits. Currently, Erik is working with the San Bernardino Valley Water Conservation District (SBVWCD) on developing their programmatic permit program for projects within the Wash Plan Area.

Erik has extensive experience in biological resources and regulatory issues related to wetlands, with expertise in wetland delineation and functional assessment, wetland ecology, restoration, permitting (per *Clean Water Act*, *Rivers and Harbors Act*, Section 408, California Fish and Game Code, Porter Cologne, *Coastal Act*), water quality issues, and watershed

management. In addition to wetlands, Dr. Larsen conducts rare plant surveys, vegetation mapping, and has extensive preparation of biological resources sections of CEQA documents. Erik also has extensive experience managing and preparing such environmental documentation as project level and programmatic NEPA/CEQA documents, innovative, programmatic permitting solutions, and Special Area Management Plans (SAMPs). Dr. Larsen has worked on many infrastructure projects including transmission lines, water distribution pipelines, mining, solar facilities, and transportation corridors (e.g., toll roads, arterial roads). Prior to AECOM, he worked at the USACE as a regulatory project manager responsible for permit applications for the *Clean Water Act*, Section 404 regulatory program.

Selected Subconsultants

Dr. Sauer & Partners (DSP) is one of the world's leading engineering firms specializing in design and construction management services for tunneling projects. Firm founder, Dr. Gerhard Sauer, played a major role in developing the New Austrian Tunneling Method (NATM) – also known as SEM, in the U.S., using sprayed concrete lining (SCL).

The firm was established more than 30 years ago and today employs tunnel engineers at offices located in Salzburg, London, Washington D.C., and New York. DSP recently established an office in Vancouver, British Columbia, Canada. Based on worldwide experience and involvement in numerous tunneling projects since 1980, DSP can refer to an unmatched pool of case histories and successful projects for utility tunnels, transit tunnels, and underground stations, highways, and railways. DSP designs tunnels in urban and rural areas and any type geology, including soft ground, mixed face and hard rock.

DSP is committed to AECOM for this assignment. DSP is proud to have worked on more than 400 successful tunneling projects worldwide. AECOM and DSP have a long and successful history collaborating on tunnel projects.

Figure 9. SEM Tunneling for City Trunk Line South Across Tujunga Wash - AECOM and DSP jointly designed the SEM tunnel along an S-shaped alignment.

Based on the information in the RFP and AECOM's experience in the area, the ground conditions including water table level will be critical in recommending feasible methods of tunneling and construction. Based on the known information it is likely that microtunneling or SEM will be the most likely choice for the tunneling. Both will be a two-pass method with microtunneling installing an RCP or steel casing pipe as the primary support and with SEM using a SCL. In both cases, the carrier pipe would be installed inside the tunnel. The basic principle of SEM is best described as "tunneling by relying on ground support" as opposed to "relying on steel or concrete support." Today, NATM/SEM is internationally recognized and is frequently used for the construction of tunnels with complex configurations and variable ground conditions.

GEOVision offers a full range of high-quality geophysical data acquisition, analysis, and imaging services. GEOVision specializes in non-invasive methods of investigation for engineering, environmental, groundwater, mining, and archaeological applications, including:

- Characterization of disposal areas
- Contaminant detection and monitoring
- Subsurface geologic and hydrologic characterization
- Subsurface infrastructure characterization
- Engineering properties of soil, rock, and structure
- High-speed GPR pavement and bridge deck condition evaluations
- Earthquake hazard mitigation
- Vibration and earthquake monitoring
- Mineral exploration
- Archaeology

ABC Liovin Drilling is a long-established small business entity-certified (SBE-certified) drilling company providing boring services, soil, soil gas, and discrete groundwater sampling, percolation and zone aquifer testing, subsurface conditions investigation and well development services. ABC Liovin Drilling operates drilling equipment utilizing hollow-stem auger, direct push, and rotary drilling techniques. They also perform utility locating services with air-knife rigs. ABC Liovin Drilling has been working closely with AECOM for various geotechnical investigation projects for LADWP.

Psomas (Surveying). Dedicated to balancing the natural and built environment, Psomas is ranked number one in surveying in California by ENR magazine and employs more than 600 staff. Psomas is renowned for producing award-winning projects through innovation, creativity and cutting-edge technical expertise in surveying and mapping, including professional land surveying, right-of-way engineering, photogrammetric mapping, static terrestrial laser scanning, mobile terrestrial laser scanning, and construction surveying.

American Integrated Services (AIS) (Haul-away Services). For the last 20 years, AIS has built a reputation as a leader in providing comprehensive environmental solutions through construction, remediation, demolition, abatement, industrial services, emergency and disaster response, specialty transportation and waste management services. AIS is a licensed contractor and certified minority business entity (MBE) with six strategically located offices. With over 350 employees and a fleet of heavy equipment and specialized vehicles valued at over $30 million, AIS has the in-house resources to deliver complete, cost-effective results.

Project Management and Implementation

AECOM's project management approach will include the following key components: (1) close coordination with Valley District for work planning and forecasting; (2) adherence to the project schedule; (3) monitoring and tracking project budgets and reporting and invoicing; and (4) quality assurance/quality control (QA/QC).

AECOM has a quality management process and procedures in place that will be applied to this study; ensuring high-quality deliverables:

Phase	Planning and Approach	Design and Development	Checking	Review	Deliverable Verification
Responsible Parties	Program Manager Project Manager Discipline Leads QA/QC Lead	Project Manager Discipline Leads Discipline Staff	Technical Advisor Review Team	Discipline Leads Project Manager Program Manager Peer Teams	QA/QC Lead Project Manager
Activity	Establishment of: • Health & Safety Protocol • Codes & Standards • Design Methodology • Software Validation • Deliverable Format • Project Limits • Scope of Work • QA Team • QA Schedule • Technical Approach	Preparation of: • Calculations • Drawings • Reports • Plans/Exhibits • Quantities • Specifications • Cost Estimates • Schedules	Detailed Check of: • Calculations • Drawings • Reports • Plans/Exhibits • Quantities • Specifications • Cost Estimates • Schedules • Discipline Interfaces	Senior Level Review of: • Discipline Deliverables • Level of Completeness • Constructability • Change Order Potential • Claim Potential	Verification of: • Adherence to QC Process • QC Documentation • Compliance with Contract • Readiness to Release
Output/Record	Project Plan Project Kickoff Meeting Project Approach Review	Work Products Self-Checking	Work Product Mark-ups Comment Resolution	Comment Resolution	Deliverable Record Release

Coordination with the District

Our Project Manager, **Bryan Paine, PE**, will maintain regular communication with Valley District. He will closely coordinate and communicate with Valley District's staff on a regular basis regarding organizational, technical, budget, quality, and schedule aspects of the project.

Monitoring and Tracking Project Budgets

Monitoring and tracking project budgets will be facilitated by our in-house Oracle® accounting system that generates weekly cost reports broken down by work item and activity. In addition to the weekly detail, the Oracle system will provide a running summary of cumulative costs by work item and a comparison of project costs to the project budget.

Quality Assurance/Quality Control

Quality management is a central component of our team structure and management approach, which we will implement on the project to make sure that each deliverable and work product meets our uniform standards of quality.

Our approach to quality follows the international standard for quality management systems (QMS), International Organization of Standardization (ISO) 9001. As one of the few ISO 9001-certified professional and technical services firms in North America, AECOM developed its system to address the standard's requirements, and we confirm compliance through formal auditing and verification. Initially certified in 2002, we have continuously expanded the scope of our ISO certification. In fact, during 2011 we achieved a single, unified ISO 9001:2008 certification covering all our business lines in North America and in 2017 successfully moved to ISO 9001:2015.

Quality is an attitude, a culture, and a way of life at AECOM. It is part of everything we do, every day. It is inherent in the way we plan, do, check and act to produce the work we perform for our clients, both internal and external.

What does this mean to our clients? It means that AECOM has a world-class quality program with tools and means to confirm it is followed. It means that AECOM consistently applies a set of quality practices throughout the company, regardless of where work is performed or managed. It means that AECOM's QMS is built upon the eight foundational principles that lie at the core of the ISO standard, providing a strong footing for positive results.

The outcome? Greater confidence that the quality of our services and deliverables will meet or exceed our clients' requirements and expectations.

Initiating Quality

To deliver quality, it is important that we understand our client's needs, expectations and requirements. That is why the delivery of quality starts well before the project begins with well-documented pre-contract communications.

Also prior to beginning work, AECOM assigns project-level technical staff to perform, monitor, check, review and deliver our work. AECOM confirms that the assigned staff members are proficient in these functions, first by hiring technically qualified individuals and, second, through ongoing formal and informal training. AECOM's executive leadership engages all AECOM employees in the quality process.

Finally, AECOM's QMS collaborates with the Office of Risk Management. Organization-wide, resources are assigned and coordinated to assess, instruct, implement, monitor and improve QMS processes.

Producing Quality

With the technology and resources in place and the talent assembled, our customized team assigned to the project begins its work. Their mission is to achieve project objectives while completing the project in accordance with the specified standards of quality. AECOM's approach to delivering quality is represented in the process and procedures chat above.

Well-planned and executed projects achieve successful outcomes. Our earliest project activities include the development of a project plan that spells out the scope, schedule, budget, technical criteria, assignments and other details. This plan provides the project team a common understanding of what needs to be done and how to do it.

The project plan is an integral part of our QMS. It includes quality-related details such as tasks and documents to be reviewed, a schedule for reviews, who does the reviews, and the budget for these activities. Each team member has specific responsibilities that are communicated during a project kickoff meeting and monitored during the project.

AECOM's project managers are ultimately responsible and accountable for the quality of work delivered to our clients, but they are not alone. Each team member has a role and a responsibility for quality. This starts with a clear expectation that individuals must self-check their own work — an all-too-often overlooked and understated component of the quality process.

In addition, several key staff positions provide direct assistance to the project manager as defined in our QMS procedures.

As work proceeds, each phase is supported with a series of quality-related activities that help confirm the project is on track and build quality into the work as it is developed. During preliminary work, this activity determines that

- client needs are understood;
- budget and schedule constraints are clear;
- design concepts and project approach are presented clearly and concisely;
- our approach is appropriate given the project's specifics and our client's objectives; and
- appropriate coordination occurs among disciplines.

As the work proceeds from the conceptual level toward the final deliverable, quality activities include

- proper application of codes, standards and criteria;
- ongoing checking for accuracy and completeness;
- distribution of in-progress documents at the appropriate intervals for review purposes;
- monitoring for conformance with conceptual design;
- coordination among disciplines;
- compatibility among various document types, such as drawings and specifications; and
- resolution and closure of in-progress review comments.

In addition to technical quality activities, all AECOM projects are reviewed regularly by the project manager and appropriate senior managers from a management perspective. Topics covered in these reviews include budget status, schedule compliance, personnel needs, outstanding technical or client concerns and compliance with quality activities. The emphasis is always on developing strategies to improve our quality of service and meeting our client's needs.

Confirming Quality

Formal quality checking and review are key functions of the AECOM QMS. These procedures focus primarily on technical correctness and completeness of the work at each stage of delivery. Important quality checking and review roles are assigned to qualified individuals at the start of every project and are listed in the project plan. As each delivery stage approaches, the project manager mobilizes the team to carry out the responsibilities assigned, including

Checking and Review of Calculations. All calculations are checked. This includes not only the obvious mathematics/arithmetic check, but also a check for the appropriateness of methodology, selection and validation of software, use of standards and codes, and general approach.

Checking and Review of Drawings. Drawings are reviewed within each discipline to confirm the correctness of the design layout, dimensions, details and other features. On multi-discipline projects, potential interferences, conflicts and other interface issues are identified and resolved through the inter-discipline review.

Checking and Review of Specifications. Specifications that accompany drawings are prepared and reviewed from a content perspective by a lead verifier and approved by a lead verifier. In addition, a specifications coordinator reviews all project specifications for uniformity, consistency and compliance with the prescribed format.

Checking and Review of Studies/Reports. When the project deliverable is a study or report, it is subject to a content review by a discipline reviewer, approved by a discipline lead, and ultimately reviewed by the project manager.

Delivering Quality

Quality reviews of all deliverable components are documented and approved on a Technical Quality Review Record by the lead verifier(s).

Once this occurs, an independent reviewer – a project quality representative – evaluates the end product and verifies completeness and adherence to quality procedures, including resolution of comments. When these activities have been confirmed, the project quality representative signs a technical quality review record and transmits it to the project manager. The project manager, upon confirming everything is complete, authorizes delivery of the product to the client.

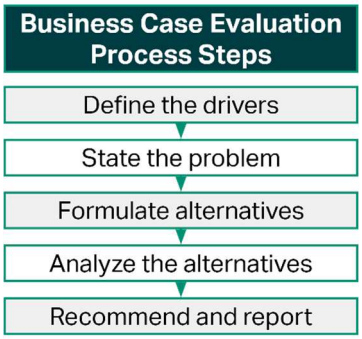
Improving Quality

While this action completes the delivery cycle, it does not complete the quality cycle. A key component of ISO 9001 and the AECOM quality program is a focus on continual improvement. We learn from our experiences and apply those lessons to our work going forward. This is done through a formal process of corrective and preventive actions, as specified in our quality system documents. We strive not only to make each project better than the one before, but also to improve our system to make our output stronger and more efficiently produced. The cycle of achieving quality never ends. This ongoing, iterative process embodies AECOM's focus on client satisfaction as a core value.

AECOM will develop a project-specific QA/QC plan to define key parameters and guide the work of the team. The plan will cover coordination among team members and the District, ongoing oversight and supervision for accuracy and completeness of work products, achievement of project milestones, and resolution and closure of in-progress review comments. Designated quality management personnel will perform formal checking and review of deliverables, outlined by the quality plan for completeness and consistency, adherence to quality requirements, and resolution of comments. The benefit to the District is that the review of specifications following ISO 9001 may highlight shortcomings in the documents and allow to fix them immediately, rather than further down the line during construction when it could affect budget and bottom line.

Business Case Evaluations

The business case evaluation (BCE) is an approach for alternatives evaluation that is widely used and accepted by many utilities. The BCE approach will be used for making decisions and taking actions because it is a structured economic analysis used to make decisions based on lifecycle costs that include community, environmental, and risk considerations. The BCE approach is a step-by-step process. This is a repeatable, defensible, and quantitative process that helps make clear, actionable decisions on alternative evaluation for rehabilitation, replacement, and construction of new facilities. The BCE spreadsheet is a Microsoft Excel-based spreadsheet where all costs of capital and operations and maintenance (O&M) will be input over the life of the project. The net present value (NPV) of the alternatives will be determined and usually the alternative with the lowest NPV is the chosen alternative. When the NPV of alternative options is very close, then other subjective factors such as owner preference and operations and maintenance staff input will weigh in before a final alternative is selected. ***AECOM team members have used this approach on many projects, where a multitude of alternatives were evaluated, and resulted in considerable cost savings without compromising functionality, operability, and maintenance aspects.***



Project Descriptions

Our past performance demonstrates specialized experience and technical competence in all scope areas identified in Valley Water's Request for Proposals.

A Proven Track Record of Success

Detailed information regarding resources, qualifications, and demonstrated track record of success for AECOM are provided throughout this proposal. The RFP requested specific qualifications be highlighted. In addition to the descriptions for the profiled projects, brief summaries of additional, relevant projects and assignments are provided beginning on page 25.

We have highlighted AECOM projects that match up with the scope of services and are of a size and complexity commensurate with that identified in Valley District's RFP. All of our selected projects are multi-dimensional—each one typically involves several of the services involved in the proposed Valley District's assignment. References for these projects are provided along with detailed information regarding associated fees, services, team members (highlighted), and scope.

The table below summarizes the projects we offer to Valley District as evidence of our extensive project experience. The table breaks down the services necessary to execute the proposed Feasibility Study required by Valley District's RFP.

Relevant Project Experience Summary of Service Provided

Project	Geotechnical Analysis and Recommendations	Geotechnical Field Exploration and Lab Testing	Shaft and Tunnel Analysis / Design	Pipeline / Tunnel Alternatives Analysis	Feasibility Study	Cost Estimating	Environmental Planning and Documentation	Permitting Support Service	Site Civil Engineering Design	Tunnel and Pipeline Engineering Design
1. LADWP Foothill Trunk Line Tunnel – Unit 3 Los Angeles, CA	●	●	●	●	●	●			●	●
2. LADWP City Trunk Line South – Unit 4 Los Angeles, CA	●	●	●	●	●	●			●	●
3. LADWP River Supply Conduit Upper Reach – Unit 7 Los Angeles, CA	●	●	●	●	●	●			●	●
4. LADWP River Supply Conduit Upper Reach – Units 5 & 6, Los Angeles, CA	●	●	●	●	●	●		●	●	●
5. SFPUC New Irvington Water Supply Tunnel Sunol to Fremont, CA	●	●	●	●	●	●			●	●
6. SBVWCD Upper Santa Ana River Wash Habitat Conservation Plan Permitting, San Bernardino, CA							●	●		
7. Susquehanna Area Regional Airport – Harrisburg Runway Crossing, Middletown, PA	●	●	●	●	●	●			●	●
8. Metro Vancouver Douglas Road Main No. 2 – Still Creek Section, Burnaby, British Columbia, Canada	●	●	●	●	●	●	●		●	●
9. SMWD Trampas Canyon Dam and Reservoir San Juan Capistrano, CA	●	●	●	●	●	●	●	●	●	●
10. City of Columbus Lockbourne Intermodal Sub Trunk Columbus, OH	●	●	●	●	●	●	●		●	●

1. Foothill Trunk Line Tunnel Unit 3, Foothill Blvd. & Pacoima Wash

Los Angeles, California

Client
Los Angeles Department of Water & Power (LADWP)
Start Date
2017
Completion Date
2019
Fee Value
$450K

Services Provided
- Geologic Reconnaissance
- Field Exploration/Testing
- Laboratory Testing
- Geotechnical Analysis and Recommendation
- SEM Shaft &Tunnel Analysis and Design
- Alignment Alternatives
- Permitting

Key Team Members
- Wolfgang Roth (Principal-in-Charge)
- Hossein Changani (Numerical Modeling)
- Arnel Bicol (Geotechnical Investigation and Report)
- Chris Goetz (Eng. Geologist)
- Dr. Sauer and Partners (DSP), SEM Design Drawings and Specs.

Client Reference
Charles Ngo
Trunk Line Design Manager
LADWP
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Los Angeles, CA 90012
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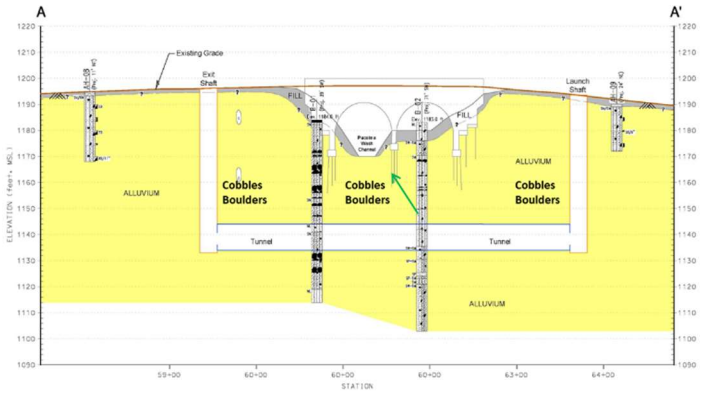
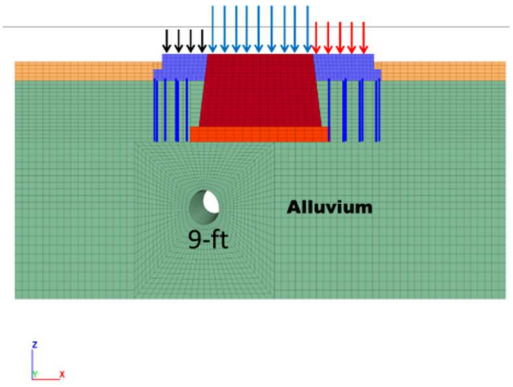
T: 213.367.0769

Like the Valley District's pipeline in this proposal, this project was a short tunnel with relatively small-diameter in coarse alluvium with cobbles and boulders, and is crossing a creek beneath a structure which is sensitive to tunneling-induced deformation, which required confident assessment by numerical modeling.

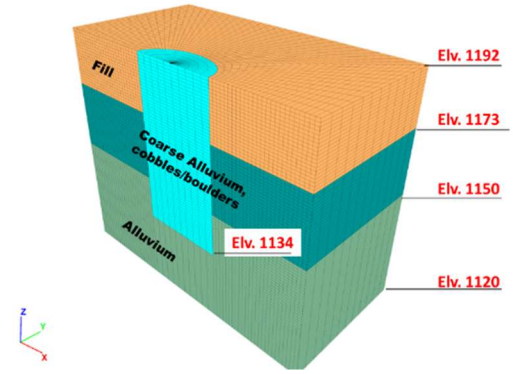


The alignment of the 54-in diameter Trunk Line runs along Foothill Blvd crossing Pacoima Wash at the location of a many decades-old concrete arch bridge. Due to right-of-way (ROW) permitting difficulties for an above-ground crossing of the pipeline, ***LADWP selected AECOM with subconsultant Dr. Sauer & Partners (DSP) to design a tunnel crossing running beneath the existing bridge foundations***. AECOM performed geologic/geotechnical subsurface investigations, lab testing, and numerical SSI modeling with FLAC3D of the tunnel and two shafts (launching and exit); and DSP prepared the SEM design drawings and specs.

FLAC3D model - SEM tunneling beneath bridge abutment



FLAC3D model - Launch Shaft to be constructed by SEM



Due to the lack of space available for construction, both the shafts and the tunnel were designed to be constructed with SEM using shotcrete. Crossing a potential fault rupture zone, the carrier pipe inside the tunnel will be constructed with Earthquake Resistant Ductile Iron Pipe (ERDIP) to accommodate horizontal ground extension of up to one percent strain, due to potential fault rupture displacement. The shotcrete liners of the circular/elliptic shafts provide stiff, semi-ridged confinements of the raiser pipes protecting them from damage caused by ground extension as a result of potential fault rupture.

After completion of the final design in 2019, the ready-for-bid tunneling project was put on temporary hold while LADWP awaits the outcome of one last attempt to obtain ROW permits for an above-ground crossing of the pipeline.

2. City Trunk Line South – Unit 4

Los Angeles, California

Client
Los Angeles Department of Water & Power (LADWP)
Completion Date
2016
Overall Value
$4M
Fee Value
$750K

Services Provided
- Geologic Reconnaissance
- Field Exploration & Testing
- Laboratory Testing
- Geotechnical Analysis and Recommendation
- SEM Shaft &Tunnel Analysis and Design

Awards
- 2016 Construction Project of the Year (ASCE-LA Section)
- 2016 Water Project of the Year (ASCE-LA Section)

Key Team Members
- Wolfgang Roth Principal-in-Charge
- Hossein Changani (Numerical Modeling, Construction and Instrumentation Monitoring)
- Arnel Bicol (Geotechnical Investigation and Report)
- Chris Goetz (Lead Eng. Geologist)
- Dr. Sauer and Partners (DSP), SEM Design Drawings and Specs.

Client Reference
Charles Ngo
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T: 213.367.0769

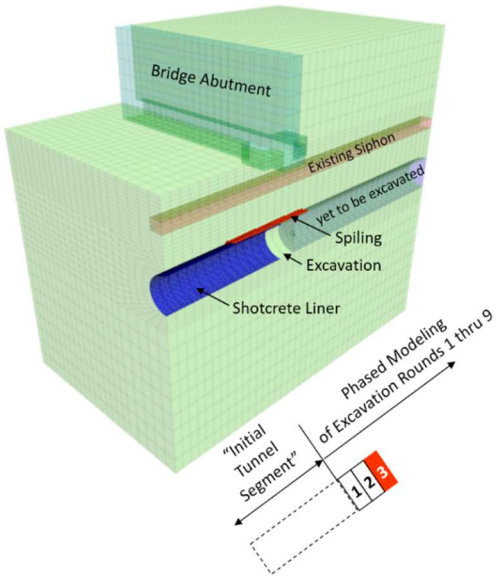
Like the pipeline on which we are proposing, this project was a short tunnel with a relatively small-diameter in alluvium and was crossing a channel beneath structures sensitive to tunneling-induced deformations, which required confident assessment by numerical modeling. This know-how and experience is invaluable to a successful outcome for Valley District.

SEM Toolbox item (installation of pipe spiling).

AECOM performed geotechnical investigation and provided tunnel design and construction services for this particularly challenging segment of Trunk Line South: a 60-inch pipeline beneath a 50-year old pile-supported road bridge over the Tujunga in Studio City.

Four alternatives had been considered for crossing the channel:
(1) Deep pipe-jacking below the tips of the bridge-abutment piles;
(2) Shallow pipe-jacking requiring the removal/underpinning of some piles;
(3) Shallow tunneling with SEM "snaking" between the piles; and (4) Above-ground pipe crossing hung below the bridge structure.

Option (3) SEM tunneling was finally selected as the preferred alternative. To evaluate the effect of tunneling-induced settlements on the bridge abutments and adjacent sewer lines, AECOM performed nonlinear soil-structure interaction (SSI) analyses with FLAC3D. Instrumentation monitoring during construction confirmed our analysis results in that no settlement damage was observed on neither the abutments nor in nearby sewer lines. Even though some of the existing piles supporting the bridge abutments had been partially exposed during tunneling.



3-D Model for analyzing SEM tunnel-induced settlement of bridge abutment.

3. River Supply Conduit (RSC) Upper Reach – Unit 7

Los Angeles, California

Client
Los Angeles Department of Water and Power (LADWP)

Start Date
2008

Completion Date
2021

Overall Value
$125M

Fee Value
$3.5M

Services Provided
- Subsurface Geotechnical Investigation
- Seismic Risk Analysis
- Geologic Reconnaissance
- Route Selection Studies
- Public Outreach Assistance
- Geotechnical Baseline Report (GBR)
- Tunnel Engineering Services Supporting LADWP's In-house Design Team
- Construction Monitoring

Key Team Members
- Wolfgang Roth Principal-In-Charge;
- Arnel Bicol Project Manager
- Hossein Changani Tunnel Engineer
- Chris Goetz, Project Geologist
- Paul Nicholas Technical Support & Construction Reviewer

Client Reference
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AECOM is the Geotechnical Engineer of Record for this 2.2 -mile long water tunnel constructed with EPB TBM and micro-tunneling TBM (MTBM). The latter tunneling method will also be considered for the proposed pipeline crossing of City Creek.

Steel-plate lined launching shaft for the MTBM.

Scope

AECOM provided geologic reconnaissance, seismic risk analysis, subsurface investigation, route-selection study, public-outreach assistance, and tunnel-design services in support of LADWP's in-house trunk-line design team. Currently we are providing around-the-clock construction-monitoring services and review of contractor submittals for the more than 2-mile-long, 14-foot-diameter Tunnel Segment 10 through densely developed areas of the Cities of Los Angeles and Burbank, which is being constructed with an earth pressure balance (EPB) TBM.

A 500-foot-long, 10-foot-diameter Tunnel Segment 11 of RSC-U7, crossing the Los Angeles river channel, was successfully completed last year using a MTBM. This tunnel segment is most relevant to the proposed pipeline crossing of City Creek. It involved difficult, mixed-face ground conditions with sedimentary bedrock in the invert overlain by coarse alluvium with barely 20 feet of overburden under the river channel. Using bentonite slurry for face support, the MTBM was launched from a 60-foot-deep shaft excavation south of the river to a 50-foot-diameter, 65-foot-deep exit shaft across the channel.

The exit shaft, supported by secant-pile walls, was also used for launching the EPB TBM for constructing Tunnel Segment-10. In order to use the full-length trailing gear from the start, and thereby speeding up tunneling operations, the contractor opted to construct an 80-foot-long starter tunnel and a 60-foot-long tail tunnel. These tunnels were constructed using open-faced, horse-shoe shaped shields with sand shelfs to minimize ground loss. The shields were advanced by jacking against a temporary tunnel support of steel ribs with timber lagging.

EPB TBM of Tunnel Segment 10.

MTBM break-through into EPB Launching shaft with EPB Tail Tunnel.

4. River Supply Conduit (RSC) Upper Reach -Units 5 & 6

Los Angeles, California

Client
Los Angeles Department of Water and Power (LADWP)
Start Date
2006
Completion Date
2018
Overall Value
$115M
Fee Value
$3.1M Services (Combined)

Services Provided
- Geologic Reconnaissance
- Field Exploration & Testing
- Laboratory Testing
- Geologic and Seismic Hazard Evaluation
- Geotechnical Analysis and Recommendations
- Geotechnical Baseline Report
- Construction Monitoring
- Community Outreach Support
- Cost Estimating
- Permitting

Key Team Members
- Wolfgang Roth (PIC and Tunnel Lead)
- Keith Campbell (Technical Advisor)
- Hossein Changani (Project Engineer)
- Arnel Bicol (Investigations)
- Andy Romer (Conveyance)
- Jesus Lopez (Conveyance)

Client Reference
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T: 213.367.0855

AECOM provided conveyance system engineering analysis and design in a highly urban area of Los Angeles.

The River Supply Conduit (RSC) is an aging water supply line stretching from the North Hollywood Pump Station to Ivanhoe Reservoir. It transports large amounts of water from San Fernando Valley to distribution facilities in central Los Angeles. The LADWP needed to make improvements to the RSC for

- safety and improved system reliability;
- improved water pressure to meet state regulations; and
- pipeline upsizing necessary to meet demand.

AECOM provided subsurface investigation, route-selection study, public-outreach assistance, and tunnel-engineering consulting to LADWP's in-house design team for a 3-mile-long, 78-inch-diameter steel pipeline using pipe jacking and bored tunneling through the Cities of Los Angeles and Burbank.

Pipe section being lowered into place at RSC Units 5 & 6.

Tunneling Detail

Tunnels were constructed mostly in alluvial soils with a 10-foot-diameter EPB TBM. AECOM provided review of contractor submittals, construction engineering support, and construction monitoring services around-the-clock for day and night shifts.

Relevant Firm Abilities

Demonstrates AECOM's ability to deliver the resources required for a large complex project for clients such as LADWP, even within the context of the ongoing demands of an as-needed contract. AECOM completed construction drawings and specifications for RSC Units 5 and 6, encompassing three miles of 78-inch-diameter welded steel pipeline. AECOM also provided geotechnical/ tunneling services.

Pipeline Design

Unit 5 is approximately 3,900 feet in length, of which approximately 3,700 feet is tunneled. Unit 6 is 12,000 feet in length, with more than half tunneled. AECOM also designed valve vaults, appurtenances, jacked casings, access manholes, asphalt concrete (AC) pavement replacement, walkways, curb and gutters replacements, several utilities relocations, and landscaping.

Tunneling

AECOM's geotechnical group conducted subsurface investigations for the tunneling portions of the project. The work included a route selection study, public outreach assistance, and tunnel engineering consulting to LADWP's in-house design team for 10- to 14-foot-diameter bored tunnels. The group also reviewed design drawings and tunnel construction specifications; assisted with answering contractors' questions during bidding; and, responded to requests for information after contract award. The tunnel alignments pass through densely developed areas of the San Fernando Valley and cross the 101 Freeway and Los Angeles River.

Traffic Control

In light of the impact construction would have on local businesses and residents along the alignment (Lankershim and Burbank Boulevards), most of the pipeline was tunneled. Tunnel shafts were deliberately located away from the driveways to maintain access.

Multi-Agency/Utilities Coordination

AECOM conducted an extensive utilities investigation and coordinated with multiple city departments responsible for approvals and permitting. To accommodate the City of Los Angeles Bureau of Engineering (LABOE), a portion of the pipe alignment was adjusted to avoid a potential conflict with a future, planned storm drain.

Public Outreach

AECOM assisted with public outreach, including working closely with the Laurel Grove Neighborhood Association, an affluent community in North Hollywood, to brief homeowners on the upcoming project and process.

Pipe section from image above now lowered into place in the tunnel at RSC Units 5 & 6.

Part of EPB TBM used in tunneling in RSC Units 5 & 6.

5. New Irvington Water Supply Tunnel Project

Sunol to Fremont, California

Client
San Francisco Public Utilities Commission (SFPUC)
Start Date
Design: 2006
Construction: 2010
Completion Date
Design: 2009
Construction: 2015
Overall Value
$260M
Fee Value
$14.5M (Design); $34M (Program Construction Management for Total Program)

Services Provided
- Geotechnical Investigation
- Engineering Design Services – tunnel, portal structures, pipeline connections, and related facilities
- Site Civil Design Services
- Program Construction Management

Key Team Members
- Irwan Halim Independent Technical Review
- Seung Han Kim Project Engineer
- Ted Feldsher – Project Manager
- Craig Smith Design Manager

Client Reference
David F. Tsztoo, PE
SFPUC
525 Golden Gate Avenue
San Francisco, CA 94102
E: davidtsztoo@sfwater.org
T: 415.934.5792

AECOM served as the prime consultant on the project and provided engineering design services for the tunnel, portal structures, pipeline connections, and related facilities. The tunnel is in a seismically active region crossed by at least four secondary fault zones between the Hayward and the Calaveras faults.

The New Irvington Tunnel is a 3½-mile-long water conveyance tunnel built parallel to the existing Irvington Tunnel between the Sunol Valley and Fremont, California. The existing tunnel, completed in 1930, served as a critical link in SFPUC's Hetch Hetchy water supply system for many years. However, water supply demands increased over time to a level that prevented shutdowns for maintenance or repair without severely impacting water supply for 3.5 million customers in the San Francisco Bay Area. The new tunnel is one of the most important projects in the SFPUC's $4.8 Billion Water System Improvement Program (WSIP), which was initiated in 2002 to improve the seismic and delivery reliability of the system.

As part of the design process, AECOM planned and executed a comprehensive program of geotechnical investigations for the project. The tunnel alignment crosses a region of complex geologic conditions and high groundwater levels. To establish an appropriate geotechnical baseline for tunneling, a total of 38 exploratory borings were drilled, ranging from 50- to 720-feet-deep. Field and laboratory tests were conducted to assess rock strength and other important properties. The investigations included geologic mapping, fault trenching, surface and downhole geophysics, down-hole packer testing of formation permeability, and groundwater monitoring with

Above: Tunnel junction with construction shaft.
Below: Drill and blast method was used to excavate tunnel.

piezometers in 28 of the borings. The completed project provides the region with a new large (8.5-foot finished) diameter water conveyance tunnel, with 18,200 lineal feet (LF) of rock tunnel, 30- to 700-feet below grade.

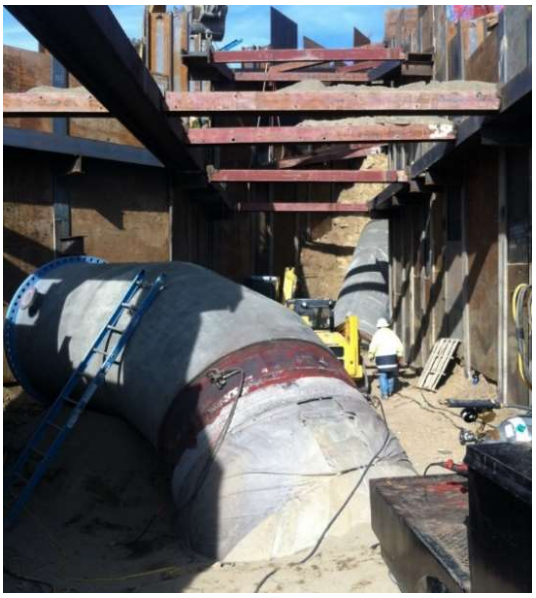
The project included large-diameter pipeline connections at each end of the tunnel. AECOM pipeline engineers designed connections from the tunnel to six large-diameter distribution mains. The connections are on steep hillsides and include old and relatively fragile pipes, including pre- stressed concrete. AECOM prepared all of the pipeline designs and site civil grading designs using 3D layout tools.

As part of the project, AECOM designed retrofits for both portals of the existing Irvington Tunnel to provide improved structural security and performance. We also carried out a detailed inspection of the existing Irvington Tunnel, which had not been entered since 1966. The inspection included documentation of defects and evaluation of the need for urgent repairs in the existing 85-year-old concrete liner.

Under a separate contract (before merging with URS) AECOM served as Program Construction Manager, responsible for contract administration, project controls, quality assurance, construction management (CM) operations, risk management, and construction safety oversight for the entire $4.8 Billion WSIP.

Project-Specific Conditions

- New large diameter water conveyance tunnel
- 18,200 LF of rock tunnel, 8.5-foot finished diameter, 30- to 700-feet below grade
- Steel pipe with cement mortar lining
- Excavation by roadheader and drill and blast
- Crossed numerous fault zones and squeezing ground conditions
- Gassy/Potentially Gassy ground conditions
- Mixed face conditions
- High groundwater pressures and inflows
- Bypass around critical link in SFPUC system
- Deep intermediate access shaft
- Existing tunnel inspection



Large diameter water main surface tie-in.

Horseshoe tunnel with rib and lag support of excavation (SOE).

6. Upper Santa Ana River Wash Habitat Conservation Plan Permitting

San Bernardino, California

Client
San Bernardino Valley Water Conservation District (SBVWCD)
Start Date
August 2020
Completion Date
Ongoing; Estimated 12/2021
Overall Value
$NA
Fee Value
$296K

Services Provided
- State and Federal Permitting Package Preparation
- Facilitation of all Agency Discussions
- Comprehensive Field Delineations
- Aquatic Resource Documentation
- Obtaining Final Permits

Key Team Members
- Michelle Fehrensen
  Project Manager
- Erik Larsen
  Senior Regulatory Specialist

Client Reference
Betsy Miller
Land Resources Manager/ Assistant General Manager
SBVWCD
1630 W. Redlands Blvd., Suite A
Redlands, CA 92373
E: bmiller@sbvwcd.org
T: 909.793.2503

AECOM is providing expert technical consultant services to obtain state and selected federal permits for the Upper Santa Ana River Wash Habitat Conservation Plan covered activities. AECOM has facilitated coordination between SBVWCD and SBVMWD, and there is area overlap between this project and the Foothill Crossing at City Creek Study. AECOM is thus prepositioned with knowledge of the overall regulatory context and relevant water district relationships.

Scope

AECOM is providing all services to support the San Bernardino Valley Water Conservation District and other Task Force members in obtaining programmatic waters permits to complement the Federal Incidental Take Permit (ITP) that was issued for its Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan).

Upper Santa Ana River, upstream of the confluence of Santa Ana River and City Creek.

AECOM is also supporting the Conservation District in its preparation of an application for a 2081 Permit for State-listed species. The Wash Plan describes 63 covered activities within the 4,892-acre Wash Plan area that are proposed by eight entities, including municipal, utility, and private. A subset of these activities require *Clean Water Act* Section 401 and 404 permits, Porter- Cologne waste discharge requirements, and/or authorization under

California Fish and Game Code Section 1602. The initial focus is on developing a permitting strategy tailored for the mix of new construction, facility maintenance and operation, and habitat enhancement activities covered under the Wash Plan that will be subject to regulations administered by USACE, RWQCB, and CDFW.

This project includes multiple meetings with two State and one Federal agency as well as the Wash Plan Task Force. AECOM is preparing meeting agenda and facilitating all agency discussions. AECOM led a comprehensive field delineation and documentation of all tributaries and other aquatic resources in the Wash Plan area. Additional services include preparing permit application packages, agency negotiations, and obtaining final permits.

Final Project Outcome/Client Benefits

- Aquatic Resources Programmatic Permitting for 4,892-acre Wash Plan Area
- Support for 2081 Permit
- Regulatory certainty and streamlining for the authorization of Covered Activities

Issues and Solutions

There are multiple permitting strategies among multiple agencies. AECOM is maintaining tabular and other summaries to track agency input and options for each Task Force member. These overviews facilitate client review and considerations for the permits.

View of City Creek, looking upstream at the Alabama Street bridge crossing (part of the Wash Plan HCP).

7. Harrisburg Airport Runway Crossing

Middletown, Pennsylvania

Client
Susquehanna Area Regional Airport

Start Date
2018

Completion Date
Under Construction Est. Q1 22

Overall Value
$30.1M

Fee Value
$1.1M Design Services

Services Provided
- Tunneling Design
- Geotechnical Investigation
- Trenchless Tunneling

Key Team Members
- Paul Nicholas
  Tunneling Expert
- Jennifer Lutz
  Principal-in-Charge
- Derek Hollinger
  Project Manager
- Jack Deter
- Mathew Francis
- Rajul Teredesai
- Trenton Hughes

Client Reference
David E. Spaulding
Deputy Director for Engineering & Planning
Susquehanna Area Regional Airport Authority
Harrisburg International Airport
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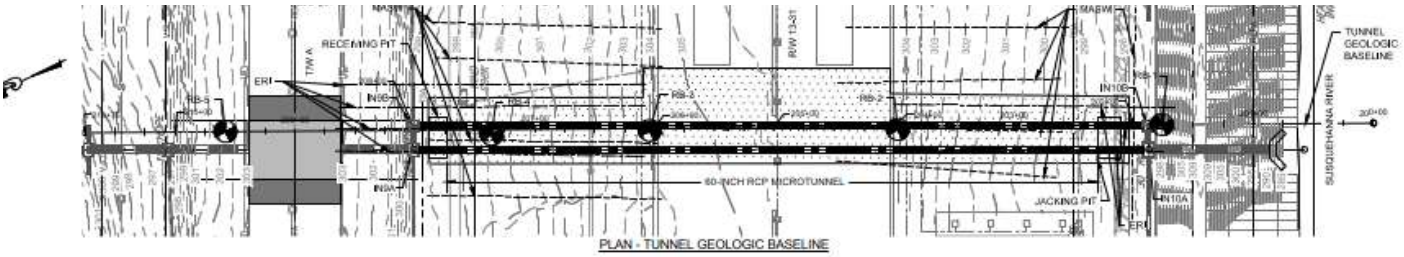
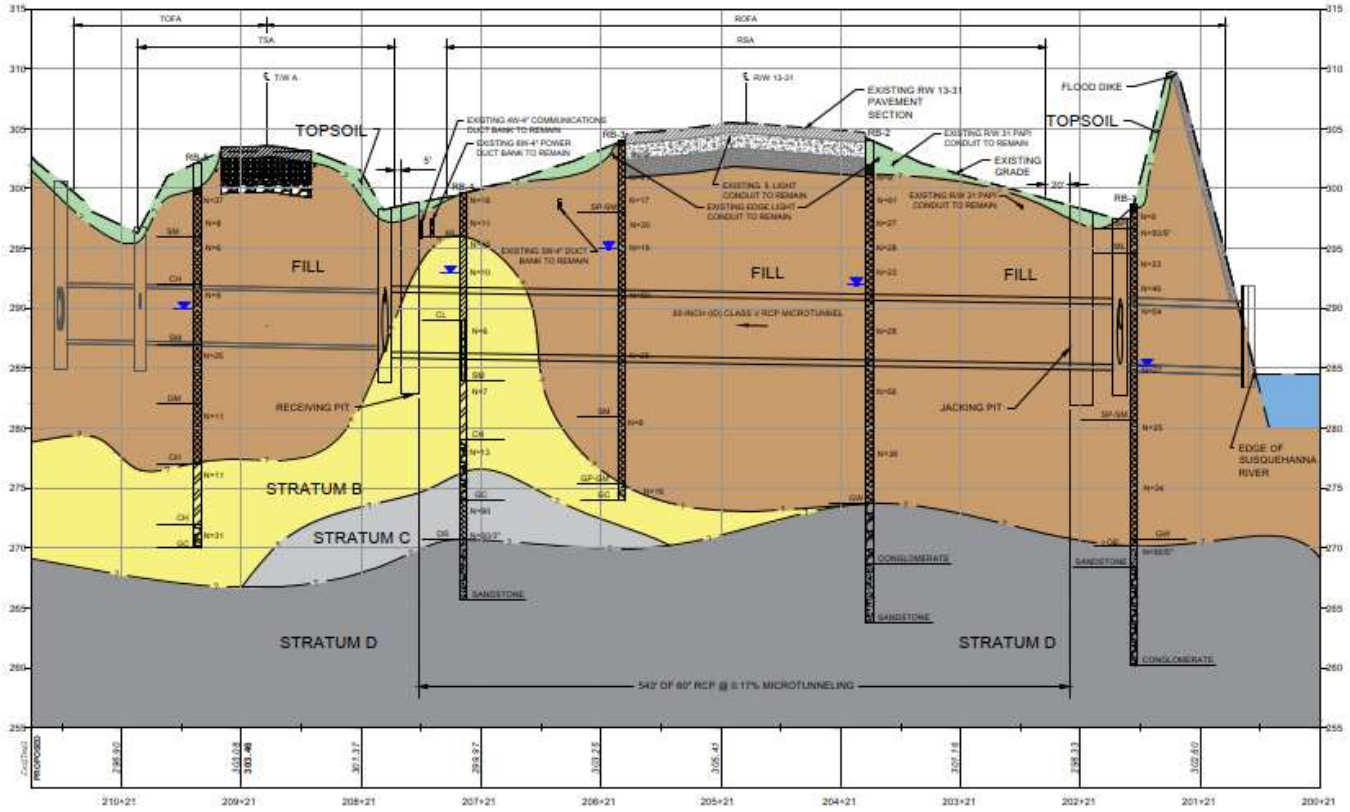
This airport expansion project, currently under construction, called for microtunneling to install storm drainage conveyance. The client's imperative is to avoid operational disruption, so AECOM conducted extensive analyses and investigations to determine best approach methodology.



PLAN - TUNNEL GEOLOGIC BASELINE



The graphic on the previous page shows a plan view of both the 72-inch O.D. Wetcast, ASTM C76, Class V, Wall C Reinforced Concrete Pipe specified; below the plan view is an interpretive profile of the geology, which microtunneling will traverse consisting of unstable fills and hard native material under the water table.

Scope

The Susquehanna Area Regional Airport Authority is planning the Cargo Expansion II project located at the Harrisburg International Airport in Middletown. The project includes demolition of hangar floor and site work for the 45,000 square yards of pavement expansion of the existing air cargo apron in order to accommodate three new cargo aircraft parking positions.

Tunneling Details

The expansion will include installation of new 2,556-foot-long storm drainage conveyance, including 543 feet of tunneling involving twin drives of 60-inch inside diameter (ID), 72-inch outside diameter (OD). RCPs installed using an MTBM under the existing active Runway 13-31 and Taxiway A, with open-cut box culvert on either side, connecting from the apron and discharging into the Susquehanna River.

To avoid disruption to the airport operations the crossing of the proposed drainage pipes will be performed using trenchless methods, namely microtunneling. Based on the data received from an extensive geotechnical investigation including test borings, laboratory and in-situ testing, and a geophysical investigation, we specified pressurized face, fully sealed microtunneling for the installation of two 60-inch ID. RCP storm drains crossing under the runway along with pre-excavation ground improvements designs along either tunneling envelope to prevent any impact to the runway that could cause operational delays. Liquidated Damages (LDs) for any delays in operations of the airport's runways are at $1,500/minute, and therefore settlement/heave/ frac-outs are unacceptable.

8. Douglas Road Main No. 2 – Still Creek Section

Burnaby, British Columbia, Canada

Client
Metro Vancouver
Start Date
2016
Completion Date
Ongoing; Estimated Q3 22
Overall Value
US $11M
Fee Value
Phase A: Preliminary Design Value: $873,750
Phase B: Detailed Design Value: $1,031,000

Services Provided
- Alignment Options Evaluation and Recommendations
- Preliminary Design of Recommended Route and Seismic Design Basis
- Geotechnical Investigation and Seismic Analysis
- EAs
- BCE (evaluation of three alignment options)
- Traffic Management
- Stakeholders Engagement

Key Team Members
- Paul Nicholas, Trenchless Technology Specialist
- Andrew Romer, Pipelines Technical Advisor

Client Reference
Peter Gates
Senior Project Manager
Metro Vancouver
4730 Kingsway
Burnaby, BC V5H 0C6
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T: +1.604.436.6810

AECOM has completed the final design of the Still Creek section of the Douglas Road Main No. 2. The AECOM team completed a route options analysis of the cut + cover sections and the crossings of the BCF rail tracks and the Trans-Canada Highway 1 by microtunneling.

Scope

The Douglas Road Watermain 2 – Still Creek Section (DRM2-SC) involves installation of approximately 2.7 kilometers (km) of 1500-millimeter (mm)-diameter water transmission pipeline and connects between Lougheed Highway at Delta Avenue and Canada Way at Kincaid Street. The endpoints of DRM2-SC are two segments of DRM2 that had been constructed by Metro Vancouver about 10 years ago. The Still Creek section of water main is particularly challenging in that there is no readily identifiable route to construct a new, watermain which has a larger diameter than DRM1 that was installed approximately 70 years ago. All possible routes will involve acquisition of property or rights-of-way by Metro Vancouver and use of trenchless technologies to overcome numerous access and constructability challenges.

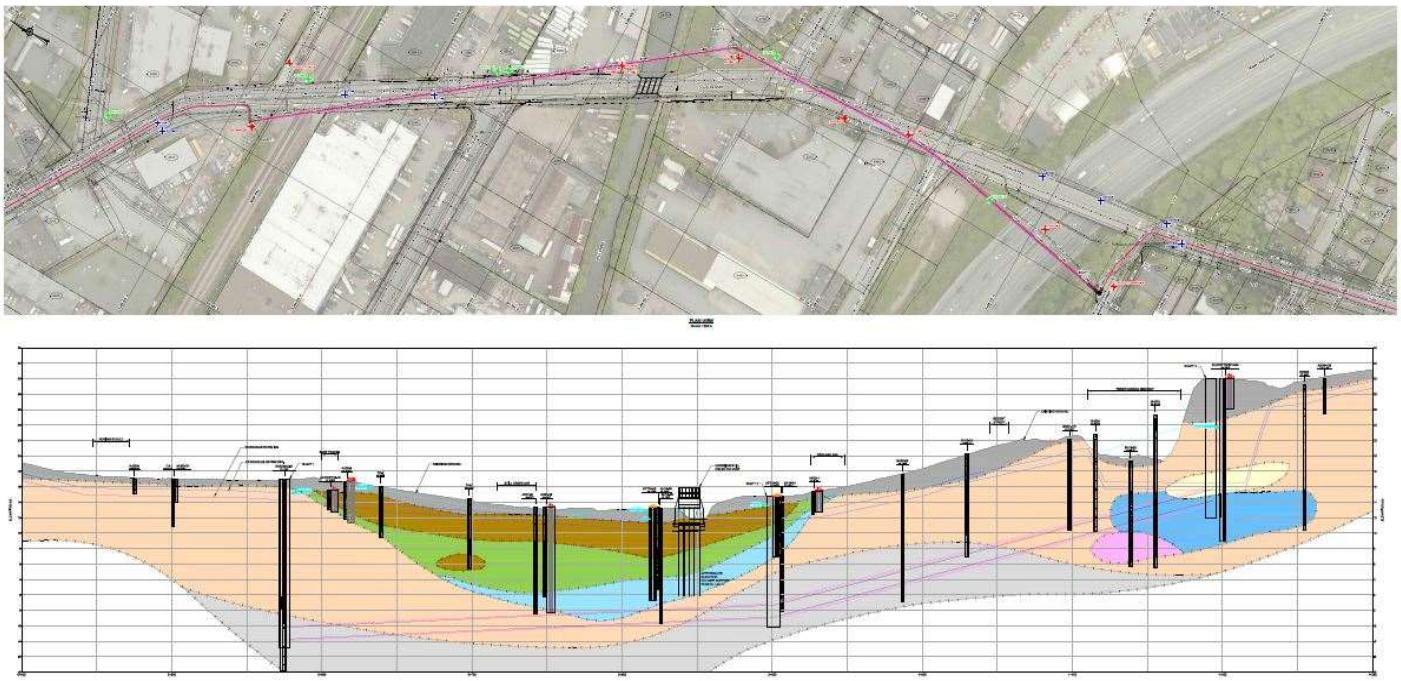
It is the first substantial portion of welded steel water transmission pipeline to be designed by a consultant team, rather than in-house by Metro Vancouver. AECOM was awarded Phase A, conceptual and preliminary design in late 2016.

In addition to the aspects of length, cost, construction methodology and construction risk, our evaluation will take into account the following items in order to confirm a single final preferred option for full preliminary design.

- Alignment options evaluation and recommendation
- Stakeholders engagement
- Geotechnical investigation and seismic analysis
- Environmental assessments, including contaminated soils
- Archaeological overview assessment
- Traffic management
- Preliminary design of recommended route and seismic design basis
- Traffic Management during construction
- Constructability challenges such as deep trench excavations at shaft locations and trenchless installation (microtunneling)
- Disruptions and relocations of existing utilities and services
- Operation and maintenance crew access to the system
- Workshop with Metro Vancouver Engineering, Operations and City of Burnaby

Geotechnical Scope

Golder did the initial route selection for this assignment. As a specialist subconsultant on AECOM's team, Golder is providing overview of geotechnical conditions, site reconnaissance; identifying geotechnical hazards, including seismic aspects; and input to tunnel design.



Complex variable geology on the Douglas Road 60-inch water main 2-pass trenchless section.

9. Trampas Canyon Dam and Reservoir

San Juan Capistrano, California

Client
Santa Margarita Water District (SMWD)
Start Date
2016
Completion Date
2020
Overall Value
$93M
Fee Value
$3.5M Services

Services Provided
- Geotechnical Investigation
- Geotechnical Laboratory Testing and Analysis
- Alternatives Analysis
- Stakeholder and Agency Coordination
- Engineering Design Services for Dam, Spillway, Pipelines and Appurtenant Structures
- Micro-tunneling
- Permitting Support Services
- Environmental Documentation Support

Key Team Members
- Mike Smith, Project Manager and Lead Dam Designer
- Bryan Paine, Deputy PM & Lead Civil Engineer
- Seung Han Kim, Geotechnical
- Chris Goetz, Geologist
- Jesus Lopez, QA/QC
- Erik Larsen, Regulatory Specialist
- Art Popp, Biological Resources
- Leo Handfelt Technical Review
- Andreas Skarlatoudis, Seismology

Client Reference
Jeff McDonnell, PE
Construction Engineering Manager, SMWD
26111 Antonio Parkway
Rancho Las Flores, CA 92688
E: jeffm@smwd.com
T: 949.459.6504

AECOM's scope of services included site feasibility studies, preliminary geotechnical investigations, engineering design, and coordination with the California Division of Safety of Dams.

AECOM provided engineering and design services for the Trampas Canyon Reservoir, a 1.6 billon gallon (5,000-acre-foot) recycled water storage reservoir in the side canyon south of the Ortega Highway within Rancho Mission Viejo. The project involved designing a zoned earthfill dam on 177-acres of property to create an unlined recycled water reservoir. The site was previously used for sand mining and the reservoir, when completed in 2020, was considered largest recycled water reservoir of its type in Southern California. Construction consisted of new inlet/outlet structures, a spillway, micro-tunneling, instrumentation, and a new dam control building.

Microtunnel installation of 63-inch-diameter casing.

AECOM performed an alternative analysis to determine the optimum site configuration and dam raise design to convert an existing quarry tailings dam facility into a recycled water storage reservoir. Once the preferred alternative was chosen at the Trampas site, AECOM proceeded with preparing preliminary and final design plans for the main dams, saddle dams, reservoir grading (cut, fill, and borrow site), inlet/outlet structures, recycled water pipelines, emergency release structures, spillways, access roads, drainage facilities, 3,000-gpm booster pump station, water supply facilities from Chiquita Water Reclamation Plant to the reservoir, lake aeration water quality facilities, and other required appurtenances.

Scope

- Design of earthfill dams including main dam and saddle dams.
- Main dam height 220 feet. Saddle dams range from 45 to 105 feet high.
- Zoned earthfill dams including imported filter, drain and riprap; and onsite borrow of sandstone and claystone for shells and core.
- Design of emergency outlet, I/O structure, I/O tunnel, control building, pump station and spillway.
- Inlet outlet structure/emergency outlet with 700-foot long microtunnel installation with 63-inch diameter casing and 36-inch-diameter carrier pipe.
- Plans, specifications, and construction cost estimates at 30 percent, 60 percent, 90 percent, and final.
- California Division of Safety of Dams (DSOD) jurisdictional. Made presentations and submittals to DSOD. Aided client with application.
- Engineering services during construction

10. Lockbourne Intermodal Sub Trunk

Columbus, Ohio

Client
City of Columbus
Division of Sewerage and Drainage
Start Date
2006, Bid Date 2016
Completion Date
Ongoing; Estimated 2021
Overall Value
$65M
Fee Value
$2.5M

Services Provided
- Geotechnical
- Microtunneling
- Shaft Design
- Open-cut Design

Key Team Members
- Irwan Halim
  Design Manager

Client Reference
Jeremy Cawley
Project Manager
City of Columbus
Div. of Sewerage & Drainage
111 N. Front Street
Columbus, OH 43215
E: jkcawley@columbus.gov
T: 614.645.6795

AECOM was the lead engineer for the design of the Lockbourne Intermodal Sewer, which includes over 10,000 feet of 78-inch-diameter microtunneling sewer and more than 7,000 feet of 60-inch-diameter open-cut sewer.

Launching of MTBM for a microtunneling drive.

AECOM provided planning, design, and construction services for the Lockbourne Intermodal Sub Trunk project located in southeastern Columbus in Franklin and Pickaway Counties, Ohio.

The Lockbourne Intermodal Sub Trunk consists of the installation of 10,218 LF of 78-inch sanitary sewer tunnel using direct jacked microtunneling method, installation of eight (8) flow control/junction/drop/access/manhole structures, installation of 7,016 LF of 60-inch sanitary sewer pipe by a combination of pipe-in-trench (open-cut) and trenchless construction under existing railroad tracks. There are 17 manholes along the open-cut portion and an additional five (5) temporary shafts located along the microtunneling portion. The open-cut portion is between 20- to 25-feet-deep, while the microtunneling portion ranges from 35- to 60-feet in depth.

The intent of the new sewer is to connect the approximately 10,000-acre area surrounding the Rickenbacker Airport and the CSX Intermodal facility to the City's collection system via gravity sewer and to provide future capacity for the Village of Lockbourne and the surrounding community, which is experiencing rapid industrial and commercial development.

Micro Tunneling Details

The micro tunneling shafts are located in the 100-year floodplain for the Big Walnut Creek and the sewer is planned to pass under Big Walnut Creek as well as the former Ohio and Erie canal. In addition, there are railroad as well as electrical substation crossings along the pipe alignment. A total of 38 easements from 16 landowners were required for the construction. There are 24 permanent easements and 14 temporary easements. A total of five (5) easements are subsurface or elevation-controlled easements.

The recommended microtunneling method is a slurry MTBM with centrifugally cast fiberglass reinforced polymer mortar (CCFRPM) jacking pipe. Drive lengths range from 530 feet with the potential to reach up to 1900 feet using intermediate jacking stations depending on the contractor specific plan and the number of shafts used in construction. Boulders and cobbles are anticipated to be present along the length of the drive and could be problematic for longer drive lengths. Allowances were provided for MTBM rescue and obstruction removal due to concern over the presence of numerous large boulders. As part of the design process, AECOM facilitated a formal Value Engineering (VE) workshop and implemented the workshop recommendations into the final project design.

Geotechnical Investigations

Geotechnical data was collected over several phases. A total of 91 test borings and six (6) rotosonic borings were collected along multiple alignments to characterize the subsurface conditions. The microtunneling portion of the construction consists of alluvial floodplain and channel deposits and glacial fluvial and outwash deposits. The open cut portion consists of glacial moraine till.

There is significant groundwater present in the area geology, which consists of channel alluvial and glacial outwash sand and gravel deposit. Perched water and artesian conditions exist in permeable layers above and below cohesive till layers. Dewatering of groundwater is anticipated to be a significant issue during shaft construction, requiring use of watertight shafts for construction or significant dewatering effort.

Representative sample of glacial deposits.

AECOM participated in public meetings to communicate the details of the project to the community and to answer any questions regarding the design and construction practices. Following the project award, AECOM will be providing full engineering services during construction

Resumes

Jagadish “Jack” Gundarlahalli, PE

Principal-in-Charge

Key Skills
Project Management
Wastewater Infrastructure Improvements
Feasibility Studies
Preliminary and Final Design
Quality Control
Regulatory Requirements

Years of Experience
31

Years with AECOM
31

AECOM Position
Vice President, Senior Project Director, Environment Business Line

Education
MS, Environmental Engineering, South Dakota School of Mines and Technology, 1990
BS, Civil Engineering, National Institute of Engineering, India, 1987

Contact information
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Registrations
Professional Civil Engineer, CA #54171, issued 7/14/1995, exp. 12/31/2021
Professional Engineer, Utah, #330780-2202

Professional Associations
California Association of Sanitation Agencies
American Society of Civil Engineers Water Environment Federation

Professional history

Jack Gundarlahalli has served as Project Manager, QA/QC Reviewer, Principal-in-Charge, and Client Service Manager on numerous projects for municipalities and is sensitive to the needs of the clients. He delivers on their expectations for quality technical work, responsiveness and cost-effectiveness. He is a performance-oriented leader and has managed many multidisciplinary infrastructure engineering projects in Southern California.

Jack has 31 years of civil and environmental engineering experience involving water/wastewater infrastructure projects and environmental restoration. In addition to his technical assignments, he serves as client services manager and business development leader for AECOM’s water and wastewater design-build capabilities in the southern California region. As an environmental engineer and project manager, Jack’s experience encompasses planning, design, construction quality management and construction quality control. He is experienced in developing work plans; preparing technical and cost proposals; conducting and supervising field activities; performing engineering analyses; preparing drawings, construction specifications, and test plans; and, supervising construction activities. He is knowledgeable in the regulatory process of federal, state and local agencies including the U.S. Environmental Protection Agency (EPA), California Regional Water Quality Control Board, Cal-EPA Department of Toxic Substances Control, and southern California air quality management agencies.

Selected project experience

Principal-in-Charge, Preparation of Water Infrastructure and Innovation Act (WIFIA) Program Framework Document and Letters of Interest (LOI), San Bernardino Valley Municipal Water District (SBVMWD), San Bernardino, CA
AECOM prepared a LOI for WIFIA funding that included project plan, program objectives, anticipated schedule, and a preliminary list of projects. AECOM did an outreach to USEPA and obtained their feedback to structure the LOI to best support the selection of projects. AECOM was also responsible for coordinating regular meetings with participating agencies. AECOM coordinated in submitting the LOI to USEPA. The entire effort was completed in 60 days.

Water Department (SBMWD), Tertiary Treatment System (TTS) Design, San Bernardino, CA
Led a multi-disciplinary team (civil, structural, process mechanical, seismic, geotechnical, HVAC, plumbing, electrical and I&C) to prepare preliminary and final design documents for a 2.5 mgd TTS to further treat the secondary effluent from the existing wastewater reclamation plant (WRP) owned and operated by the SBMWD. The TTS will produce disinfected tertiary Title 22 recycled water for the WRP’s on-site utility water and landscape irrigation by Caltrans and a golf course adjacent to the existing WRP. It will also add the potential for non-potable recycled water to be available to external customers, including groundwater recharge. The system is designed to be expanded to 5 mgd. The TTS consists of a cloth disc filtration system, UV disinfection, and pump station(s) to deliver treated water to the existing tertiary reservoir. Performed alternatives evaluation of various tertiary treatment technologies and also performed condition assessment of 21-inch secondary effluent pipeline.

Principal-in-Charge, OCSD, 3-64 Western Regional Sewers Rehabilitation, Fountain Valley, CA
Rehabilitation and/or reconstruction of the entire length of the Orange Western Sub- trunk, Los Alamitos Sub-trunk, the Westside Relief Interceptor, and the Seal Beach Boulevard Interceptor. Total length of pipeline to rehabilitate or replace is approximately 16 miles. Project included an engineering study, alternatives evaluation of pipeline alignment and to provide recommendations to rehab/ replace the wet well for the Westside Pump Station.

Project Manager (Construction), Orange County Sanitation District (OCSD), Plant No. 1, P1-100 Anaerobic Digester Rehabilitation, Fountain Valley, CA
Prepared engineering studies, preliminary design and final design for rehabilitation of 10 anaerobic digesters and two digested sludge storage tanks. The plant is designed to provide full secondary treatment for flows of 165 mgd using both trickling filter and activated sludge processes. The digesters are pump mixed using a large nozzle mixing arrangement. Evaluated sludge loadings; process operations; digester feeding, heating, and mixing of the digester which will receive a blend of primary and waste activated sludge which will be thickened by the centrifuges. Project included preparing plans and specifications for construction of the improvements. Reviewed shop drawings, submittals, RFIs, change orders during the construction phase.

Project Manager, OCSD, Plant No. 2, P2-105 Digester Ferric Chloride Rehabilitation, Huntington Beach, CA
Prepared preliminary design and final design for replacement of the digester ferric chloride feed system. The plant is designed to provide full secondary treatment for flows of 150 mgd using both the trickling filter/solids contact process and pure oxygen activated sludge process. The project includes two new ferric chloride storage tanks each 15,000-gallon capacity, six new chemical metering pumps, spill containment structure, and weather enclosure over the pumping equipment. The ferric chloride is injected into the digesters to reduce digester gas H_2S concentrations to 40 ppm or less to meet the stringent SCAQMD permit requirements. The system is designed to feed ferric chloride to 15 anaerobic digesters and two digester sludge holding tanks ranging from 80 to 105-feet in diameter. Reviewed shop drawings, submittals, RFIs, change orders during the construction phase.

Client Service Manager, OCSD, 1-2-4 Bushard Trunk Sewer, Huntington Beach and Fountain Valley, CA
Client liaison during construction of the $33M Bushard Trunk Sewer replacement and $13M intersection contract for OCSD. As CSM, served as client liaison and advocate through the project execution process to ensure client satisfaction and delivery of quality services and results. Supported AECOM's construction management team, as necessary, as they worked closely with OCSD, the contractor, suppliers, cities, utilities, residents, and other stakeholders to restart construction and maintain efficient production, with close attention to quality, safety, and schedule. The Bushard Trunk sewer project involved 20,920 feet of 108-inch-diameter trunk RCP sewer pipe. Appurtenances, such as structures, manholes, utilities, valves, meters, and roadway surface improvements, were managed to completion. Work was performed in major arteries, often in live traffic conditions, and adjacent to residential neighborhoods.

Quality Control Reviewer/Project Manager, OCSD, 3-58 Magnolia Trunk Sewer Rehabilitation, Orange County, CA
Pipeline condition assessment report on the Magnolia Trunk Sewer project. The project consisted of the assessment of 12 miles of 38- to 76-inch-diameter trunk sewer pipe. The scope of work included CCTV, physical inspections, odor control, permitting, hydraulic modeling, testing and NASSCO sewer defect classification. Delivered a condition assessment report that recommended appropriate rehabilitation techniques, contract packaging, and cost estimates. Prepared design-build template documents. AECOM was owner's representative on this project and was responsible for bid evaluation and subsequently providing oversight of the DB contractor.

AECOM Project Manager, OCSD, J-110 Final Effluent Sampler and Building Area Upgrades, Huntington Beach, CA
Performed condition assessment of the short outfall pipeline and design of a new laboratory building. As part of this project, led a multidisciplinary team (civil, structural, seismic, geotechnical, architectural, HVAC, plumbing, electrical and I&C) to complete this design job and to review RFIs and shop drawings during the construction of the project.

Michael Smith, PE, GE

Quality Control Manager and Risk Analysis

Key Skills
Water Resources, Geotechnical and Earthquake Engineering
Engineering Support during Construction
Pipelines
Reservoirs
Dams
Levees

Years of Experience
36

Years with AECOM
35

AECOM Position
Associate Vice President, Principal Geotechnical Engineer, U.S. West Region Water

Education
MS, Geotechnical Engineering, University of California, Berkeley, 1986
BS, Civil Engineering, University of California, Berkeley, 1984

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Registrations
Professional Civil Engineer, California, #42978 issued 8/21/1987, exp. 3/31/2022
Professional Geotechnical Engineer, California, #2229, issued 3/12/1993 exp. 3/31/2022

Professional Associations
American Society of Civil Engineers

Trainings and Certifications
AECOM Certified Project Manager

Professional history

Mr. Smith has supported numerous water projects in California including the $2.1 billion iconic Diamond Valley Lake Planning, Design, and Construction project. He is the project manager and lead dam designer for the 220 foot high Trampas Canyon Dam and Reservoir now under construction. Mike has worked with major water clients including the Metropolitan Water District, Los Angeles Department of Water and Power, and Los Angeles County.

Mike's engineering design and construction services career has encompassed 35 years in dam design, geotechnical engineering, earthquake engineering and design management. His experience includes a wide range of projects including reservoirs, dams, levees, pump stations, and pipelines. He has been a field engineer during construction for several projects including dams, canals, bridges, and roads. He has been project engineer for investigations and analyses of several projects including roads, airports, buildings, bridges, reservoirs, basins, and embankments.

Selected project experience

Project Manager and Lead Dam Designer, Santa Margarita Water District, Trampas Canyon Dam and Reservoir, San Juan Capistrano, CA
AECOM is lead engineer for the design to convert an existing tailings storage dam and reservoir to a 5,000-ac-ft recycled water reservoir to be integrated with Santa Margarita Water District's infrastructure, including the Chiquita Water Reclamation Plant.

This includes geotechnical field investigations (including soil borings, rock core borings, test pits, seismic refraction surveys), geotechnical laboratory testing and analysis, stakeholder and agency coordination (e.g., with DSOD), and design for the approximately $82M project, which includes construction of the dam raise, reservoir, new saddle dams, inlet/outlet structure, emergency outlet works (700-foot long 6-feet diameter tunnel), spillway, water transmission pipelines and pump station, site access roads and drainage facilities, and water quality systems.

Task Order Manager, Metropolitan Water District, Criteria to Assess Existing Dams, Reservoirs and Appurtenant Structures, Southern CA
Performed a "State of Practice" review of technical criteria used by utilities and agencies to assess their existing dams, reservoirs, and appurtenant structures. This review was then incorporated into a criteria assessment document which will be used by MWD to assess their dams and reservoirs.

Geotechnical Peer Review. Orange County Sanitation District (OCSD), Western Regional Sewers Rehabilitation Project, Los Alamitos, Cypress, Buena Park, Anaheim, Seal Beach, CA
Project includes geotechnical exploration for the existing sewer pipeline rehabilitation or replacement that is approximately 16 miles long, preparation of geotechnical investigation for design, analyses and provide recommendations for geologic and geotechnical parameters such as groundwater level, open trenching, shoring, excavation of soils. Includes providing recommendations for construction shoring

and dewatering, foundation design/shoring recommendations for Westside pump station that includes wet well design and manhole replacements. The project also includes providing recommendations for trenchless technology such as microtunneling, jack and bore, horizontal directional drilling etc., for the construction/rehabilitation of the sewer pipes. The field investigation program includes approximately 200 soil borings with 32 monitoring wells, 50 CPTs, 25 Geo Probe Borings for environmental sampling and aquifer testing that includes slug testing and 24 hour pump testing at 16 locations. Preparation of Geotechnical Data report, Geotechnical Interpretive Report and Geotechnical Baseline Report is part of the scope of work and is on-going.

Geotechnical Project Engineer, Metropolitan Water District, San Diego Canal Relocation at Domenigoni Valley, CA
Responsible for design and construction of the relocated canal. Oversaw geotechnical field exploration and laboratory testing. Prepared the geotechnical report and was on site during construction for foundation approval.

Project Manager. Riverside County Flood Control and Water Conservation District, Green Acres Dam, Riverside, CA
Clients considered the feasibility of constructing an earthfill flood-control dam (Green Acres Dam). AECOM performed necessary soils, geology, and geotechnical investigations to prepare a report which will assist the District in assessing the general feasibility of constructing a dam at the proposed site.

Design Engineer, Santa Margarita Water District, Preliminary Geotechnical Investigation Siting and Preliminary Design of Ortega Dam and Reservoir, Orange County, CA
Responsible for the geotechnical investigation, site selection, and preliminary design of Ortega Reservoir. The 5,000 ac-ft recycled water reservoir would be impounded by a 150-foot-high earth fill embankment dam. Geotechnical investigations include geologic mapping, air photo analysis, geophysics, core borings, and packer testing. Preliminary design includes embankment dam, spillway, inlet/outlet works, reservoir grading, road relocation, instrumentation, and reservoir grading.

Project Manager, LADWP, Van Norman Complex, Los Angeles Reservoir Water Quality Improvement, Sylmar, CA
A 15-year project involving improvements to the LADWP Van Norman Complex, including designing a division dam in the LA Reservoir. Project includes geotechnical investigations, geologic studies, seismic hazard evaluation, and dam design. Included was a large seismic hazard study to develop design ground motions for multiple structures including water treatment, maintenance facilities and dams. Required detailed analysis of fault characteristics, seismicity, geology and geotechnical subsurface conditions and probabilistic seismic hazard analysis.

Staff Engineer, County of San Bernardino, Design and Construction of Day Creek Dam, San Bernardino County, CA
Participated in the geotechnical investigation for the design of the embankment dam. Also participated in test fills and material testing during construction.

Task Manager, California Department of Water Resources Reclamation District 784, Geotechnical Levee Evaluation – Yuba-Feather-Bear Rivers, CA
Responsible for the geotechnical evaluation of over 27 miles of levee in Northern California. The levees are along the Yuba, Feather, and Bear Rivers. Work includes data review, analyses, investigations and evaluation of mitigation alternatives.

Contract Manager, U.S. Army Corps of Engineers, Indefinite Delivery Order Contract for Civil Engineering, including Geotechnical and Environmental Engineering for Civil Works at Various Locations in the Los Angeles District and South Pacific Division, CA
Services for Contract No. W912PL-10-D-0023 include Periodic Inspections, Geotechnical Investigations, Geotechnical, Civil and Structural Design, Contract Document Preparation, and Independent Technical Review. Projects included:

- Santa Ana River Reach 9 Phase 2A Geotechnical Design, Riverside and San Bernardino Counties, CA
- Santa Ana River Reach 9 Phase 5A Geotechnical Design, Santa Ana, Orange County, CA
- Nogales Wash Chula Vista Channel and Bridge Geotechnical and Structural Design, Nogales AZ
- Prado Dam Expert Reviews, Riverside County, CA
- Period Inspections of Levees Systems, Maricopa County, AZ and Los Angeles County, CA

Bryan Paine, PE, QSD, ENV SP

Project Manager

Key Skills
Project Management
Feasibility Studies/Alternatives Evaluation
Pipeline & Tunnel Design
Quality Control
Dam and Reservoir Engineering
Outlet Works
Hydrology & Hydraulics
Construction Support

Years of Experience
23

Years with AECOM
18

AECOM Position
Associate Vice President, Senior Civil Project Manager, Water

Education
BS, Civil Engineering, University of California, Irvine, 2000
BS, Environmental Engineering, University of California, Irvine, 2000

Registrations
Professional Civil Engineer, California, #64334, , issued 01/23/2003, expires 06/30/2023

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Professional Associations
American Society of Civil Engineers
American Water Works Association
Engineers Without Borders – Orange County Chapter
Water Environment Federation

Trainings and Certifications
AECOM Certified Project Manager
Envision® Sustainability Professional Credential
California Qualified Storm Water Pollution Plan Developer (QSD)

Professional history

Mr. Paine has spent his career focusing on planning, design, and construction support services for water, wastewater, recycled water, and storm water infrastructure projects in California. His project management experience makes him an excellent candidate to lead this study. Bryan has led or worked on 20+ projects related to gravity and pressure pipeline conveyance and tunneling. Bryan has experience in a variety of water infrastructure projects within California, small and large diameter pipelines, pump stations, and permitting.

Selected project experience

Deputy Project Manager, Engineer-of-Record, Santa Margarita Water District, Trampas Canyon Dam, Reservoir, and Pump Station, San Juan Capistrano, CA
Responsible for engineering design of the 5,300-acre-foot recycled water storage reservoir. Completed conceptual and preliminary design, geotechnical investigation, and final design including drainage facilities, water supply facilities, spillway design, H&H Report, Dam Breach and Inundation Study, and reservoir grading, and NPDES Dewatering Permit. The scope included geotechnical field investigations (including soil borings, rock core borings, test pits, seismic refraction surveys), geotechnical laboratory testing and analysis, stakeholder and agency coordination (e.g., with DSOD), and design for the approximately $93M construction project, which includes construction of the dam raise, reservoir, new saddle dams, inlet/outlet structure, emergency outlet works, 700 LF of 64” casing and 36” carrier pipe installed by microtunneling, spillway, water transmission pipelines, pump station, site access roads and drainage facilities, and water quality systems. The project achieved DSOD approval and was completed in March 2021.

Project Manager, Santa Margarita Water District, Arroyo Trabuco Sump and Zone C Recycled Water Pump Station, Las Flores, CA
Responsible for preliminary design, final design, and construction support services for the Arroyo Trabuco Sump (ATS) and Zone C Booster Pump Stations. The final design involved preparation of construction plans, specifications, and estimate for the two pump stations and a 16” welded steel transmission pipeline installed under a creek by microtunneling. The team prepared a geotechnical investigation and report, environmental documentation support, permitting, and construction support services.

Project Manager, IRWD and Serrano Water District, Santiago Creek Dam Outlet Tower and Spillway Replacement Project, Orange County CA
Project involves preliminary design, final design, and construction support services for seismic and hydrologic improvements to an earthen embankment dam, spillway, outlet tower, and dam outlet pipeline. The team prepared a seismic hazard analysis, structural evaluation, drawdown capability study, and outlet tower and spillway replacement design for the Santiago Creek Dam. The 36-inch outlet conduit for the dam will be relocated under a creek and upsized to a 54-inch pipeline within a casing that will be installed by jack and bore. The team submitted a preliminary design report, plans and cost estimates

for the new structures. The project is now in the final design phase.

Project Manager, IRWD), Eastwood Recycled Water Pump Station, Irvine, CA
Responsible for the design and construction of a multi-zone recycled water booster pump station with a capacity of 21,300-gpm, which included eight vertical turbine pumps. The pump station and related facilities were sized for a future expansion to 46,500-gpm with fourteen pumps. The project also included several welded steel transmissions mains that were routed to four different pressure zone. The pipes were installed under a major intersection and site perimeters walls by jack and bore trenchless methods. Due to the residential site location in the City of Irvine, specific attention was given to noise attenuation and enhanced architecture to meet local municipal codes. Design tasks included preparation of a design report, plans, specifications, estimates and hydraulic calculations, surge analysis, network modeling analysis, noise study, building architectural design, structural engineering, and landscape architecture. Construction support services included shop drawing reviews, RFI responses, addendums, inspections, CCO review, progress payment assistance, and as-built preparation.

Project Engineer, Alameda Corridor East, Durfee Avenue Grade Separation Stormwater Pump Station, Pico Rivera, CA
Managed the preliminary and final design of a 20 CFS storm water pump station, drainage collection and force main system, and stormwater treatment BMPs for the Durfee Avenue Grade Separation Project. The pump station was designed per County of L.A. Department of Public Works standards with two 10 CFS mixed flow vertical pumps and one submersible pump. The forcemain for the pump station was designed with casings under several major railroad crossings and river channels, which was installed by trenchless methods. The pump station also included a standby electrical generator, restroom, control room, and storm water treatment system for re-use as landscape irrigation water.

Project Engineer, Orange County Sanitation District and Orange County Water District, Groundwater Replenishment System Unit III Pipeline, Anaheim, CA
The Groundwater Replenishment (GWR) System is the largest water purification project of its kind in the world and provides a locally controlled, drought-proof supply of safe, very high-quality water. The GWR System takes highly treated sewer water and purifies it to near-distilled quality using microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide disinfection. Responsibilities on this project included design of 25,000 linear feet of 66-inch to 60-inch welded steel pipeline, percolation basin discharge facilities, diversion structures, isolation valve vaults, blow-off and air and vacuum valve assemblies, and tunneling underneath several major streets, a railway, and an interstate highway. This project delivered water the treated water to groundwater basin recharge ponds.

Project Engineer, California Department of Transportation, District 4, Stormwater Collection System and Treatment BMPs for Oakland Bay Bridge Approach, Oakland, CA
Provided stormwater services for this $15M (construction value) project that consisted of a hydrology study for a 155-acre watershed, structural inspection (with CCTV) and repair of the existing drainage system, an elaborate retrofit of the existing drainage system, new drainage system design with four bore-and-jacked drainage pipes under portions of freeway, seven new stormwater pump stations and associated force main piping, installation of pilot-study bioretention system BMPs and Caltrans approved treatment BMPs (biofilter swales, biofilter strips, and detention basins), design of new highway facilities (roadways, guard rails, utility relocations, and retaining walls), and a construction services contract. The team built a dynamic unsteady flow model of the complete freeway drainage system with XP-SWMM software to analyze complex hydrologic processes including infiltration, temporary storage, tidal inflows, and a network of drainage pump stations.

Task Lead, Los Angeles County Sanitation Districts, Colorado Lagoon Sewer Siphon, Long Beach, CA
Responsible for the planning, permitting, and design of a double barrel sewer siphon with air jumper line. The project involved preparation of a sewage handling report, construction plans, specifications, and hydraulic and structural calculations. The 24-inch VCP siphon lines and 14-inch PVC airline will have manholes, custom junction structures, and a 78-inch RCP casing. The casing will be installed by a jack and bored trenchless installation method.

Keith Campbell, PE

Project Manager – Back-up

Key Skills
Program Management
Project Management
Engineering Studies
Alternatives Evaluation
Planning, Design, Construction
Water Conveyance Systems

Years of Experience
36

Years with AECOM
36

AECOM Position
Vice President, Client Manager, U.S. West Region, Water

Education
BS, Civil Engineering, California State University, Fresno, 1984

Registrations
Professional Civil Engineer, CA, #41863, issued 08/21/1987, expires 03/31/2022

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Professional Associations
American Society of Civil Engineers

Trainings and Certifications
AECOM Certified Project Manager

Professional history

Mr. Campbell has spent his entire career delivering challenging conveyance projects vital to securing a safe water supply for all of California. He has directed several billion dollars in planning, design, and construction projects in his 35-year tenure with AECOM, specializing in the management of project planning, design and construction management interdisciplinary teams. Projects under his direction have included open-channel and pressure pipeline water conveyance systems, urban water distribution systems, pump stations, storage reservoirs, dams and spillways, river diversions, and water treatment and wastewater treatment facilities. Keith brings extensive program management expertise, proven through the successful delivery of over 100 conveyance projects, equating to billions of dollars in new and rehabilitated infrastructure assets throughout California.

Selected project experience

Technical Advisor, Los Angeles Department of Water and Power (LADWP), River Supply Conduit Improvement, Units 5 and 6, Los Angeles, CA
Advised the multidisciplinary team for the design of 78-inch-diameter steel pipelines within North Hollywood. Unit 5 is approximately 3,900 feet in length, of which approximately 3,700 feet is tunneled. Unit 6 is approximately 11,500 feet in length, with approximately half tunneled. Design also included 78-inch butterfly valves and valve vaults, jacked casings, appurtenances, access manholes, asphalt pavement replacement, walkways, curb and gutters replacements, utilities relocations, and landscaping.

Project Manager, Metropolitan Water District of Southern California (MWD), Bay Delta Conservation Plan/California Water Fix, Enabling Infrastructure Analysis, Various Locations, CA
Responsible for evaluation of access route alternatives and construction site configurations in the Sacramento and San Joaquin River Delta for TBM launch and retrieval shaft sites, determination of TBM power requirements, and identification of alternatives for transmission line alignments and power supply for construction of more than 35-miles of dual 40 ft diameter tunnels requiring more than 200 MW of construction power.

Project Manager, MWD, Bay-Delta Conservation Plan (BDCP) Hydraulic and Surge Analysis, Various Locations, CA
Responsible for evaluation of hydraulic performance of alternative conveyance configurations in the Sacramento and San Joaquin River Delta for the BDCP intakes, intermediate Forebay, tunnel systems, Clifton Court Forebay pump stations and surge shafts.

Project Manager, Orange County Sanitation District (OCSD), Rehabilitation of Western Regional Sewers, Fountain Valley, CA
Project Manager for Predesign Evaluation Studies, Preliminary and Final Design of more than 16-miles of sewer lining and replacement and condition assessment of the Westside Pump Station Wet well. The work involved extensive geotechnical and CCTV field investigations, pipeline and manhole condition assessments, hydraulic modeling, alignment studies, evaluation and design of bypassing systems, and extensive use of Cured-In-Place Pipe (CIPP) lining for one of the largest sewer rehabilitation projects ever undertaken by the district.

Principal-in-Charge, San Luis Obispo County, Nacimiento Water Project Pipeline, San Luis Obispo, CA
Responsible for design and construction phase engineering services for a 45-mile pipeline between Lake Nacimiento and the City of San Luis Obispo with intermediate turnouts serving the project participants including the City of Paso Robles, Templeton Community Services District, Atascadero Mutual Water Company, the City of San Luis Obispo, and Community Services Area 10. Services included establishing a basis of design; performing steady-state and transient hydraulics analyses; developing environmental program compliance plans; assisting in the acquisition of permits; preparing traffic management/control plans; closely coordinating pipeline design with other project consultants; and, developing a GIS model. Features included three long HDD crossings of the Nacimiento and Salinas rivers, mined tunnels under the Salinas River and U.S. Highway 101, three bridges, and fiber optic cable along the 45-mile-long pipeline.

Program Manager, Imperial Irrigation District, Irrigation System Improvements - Conservation Program, Imperial, CA
Responsible for development of an implementation plan, design, and construction management to reduce irrigation water spills within a 480,000-acre agricultural irrigation service area. Improvements to be implemented under the program include SCADA system for monitoring and control of over 10,500 remote sites, data and voice radio communications systems, automated headgates and check structures, spill and delivery monitoring, reservoirs, pump stations, canals, and pipelines. Implementation includes innovative project delivery methods including design-build-maintain, design-bid-build, and engineer-procure-construct involving over 30 separate bid packages, all structured to meet the goal of saving approximately 100,000 acre-feet of water annually as part of one of the largest agriculture-to-urban water transfers in the United States.

Principal-in-Charge, City of Madera, Wastewater Treatment Plant Expansion, Madera. CA
In charge of expansion of an existing treatment plant to add digesters, clarifiers, replace headworks, and return activated sludge systems. Work involved extensive coordination with plant operators to determine phased construction within the existing operating treatment facility to minimize disruption.

Project Manager, City of Delano, Wastewater Treatment Plant Expansion, Delano, CA
Managed expansion of the City's WWTP as to provide additional treatment capacity to serve a new state prison being constructed nearby. Project involved plant expansion and construction of an offsite screening and pumping facility and force main connecting the prison to the expanded plant. Extensive coordination with the City's operations and engineering staff was required to retrofit and add new facilities to minimize impacts and disruption to the existing plant operation during construction.

Project Manager, City of Visalia, Sewer System Master Plan, Visalia, CA
Responsible for the preparation of complete sewage collection system master plans for existing and full build-out service areas within the sphere of influence for each city. Work included extensive computer modeling, flow metering/ calibration, evaluation of pump stations and identification and preliminary design of replacement and new sewers required to serve the build-out areas.

Project Manager, City of Clovis, Armstrong Trunk Sewer, Clovis, CA
Responsible for design of a two-mile, 25- to 30-foot deep, 30-inch diameter trunk sewer within an urban arterial roadway. The work involved extensive utility relocation, roadway reconstruction and traffic handling.

Project Manager, Nacimiento Dam Spillway Modifications, Lake Nacimiento, CA
This construction project included plans, specifications, and cost estimate for a gated spillway structure to increase spillway capacity for flood projection. Work included physical hydraulic laboratory modeling, flood routing, gate structure design, spillway chute design and energy dissipation components.

Project Manager, South San Joaquin Irrigation District Main Distribution Canal, City of Ripon, Ripon, CA
This project included plans, specifications, and construction management for 16 miles of main distribution canal improvements including lining, gated turnout structures, side-channel spillway, 800 cfs flip-bucket chute spillway to the Stanislaus River and 13 new gated in-canal drop check structures with flows up to 1,500 cfs and checked drops of up to 20 feet.

Jesus Lopez, PE

Project Engineer; Alignment Study – Alternatives Analysis

Key Skills
Water/Wastewater Infrastructure
Hydraulic Analysis
Pipeline Design
Pump Station Design
Groundwater Wells
Reservoir Design
Construction Support Services

Years of Experience
32

Years with AECOM
32

AECOM Position
Senior Engineer, Water

Education
BS, Civil Engineering
California State University, Long Beach, 1989

Registrations
Professional Civil Engineer, CA #52517, issued 4/8/1997, exp. 12/31/2022

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Professional Associations
American Society of Civil Engineers
Society of Hispanic Engineers

Professional history

Mr. Lopez has spent his career inspecting, designing, and constructing pipeline projects, including rehabilitation of corroding and aging waterlines and trunk sewers. Jesus was selected for his roles based on his ability to design and oversee complex, multi-disciplined conveyance teams to successfully develop consistent, on-time PDRs, and final construction documents. Jesus has more than 30 years of experience, with responsibilities that have included project management; specifications preparation, design tasks for numerous water/recycled water pipelines and sewer/storm drain projects. He has been involved in underground utility searches, alignment route studies, horizontal and vertical alignments, utility relocations, hydraulic system analysis, public agency coordination, permit applications, and PS&E. He has also prepared more than a dozen modeling studies for reclaimed water facilities and for sewer and water master plans using various computer applications for engineering, economic analysis, planning, alternatives, identification and ranking of pipeline deficiencies, and CIPs.

Selected project experience

Project Engineer, Los Angeles Department of Water and Power (LADWP), River Supply Conduit Improvement Project, Upper Reaches - Units 5 & 6 Project, Specification 7241, CA
Project involved installation of a 78-inch-diameter steel pipelines inside a 12-foot diameter concrete segment tunnel liner. Unit 5 is 3,900-feet in length and completely tunneled. Unit 6 is 11,500-feet in length and half tunneled. The design included 78-inch butterfly valves and valve vaults, appurtenances, jacked casings, access manholes, asphalt concrete pavement replacement, walkways, curb and gutters replacements, utilities relocations, and landscaping. Responsible for team and client coordination, QA/QC, preparation of the plans and specifications, and technical oversight of other disciplines.

QA/QC, Santa Margarita Water District, Trampas Canyon Dam, Reservoir, and Pump Station, San Juan Capistrano, CA
Performed QA/QC on project design. Project scope included geotechnical field investigations, geotechnical laboratory testing and analysis, stakeholder and agency coordination, and design for the approximately $83M construction project, which includes construction of the dam raise, reservoir, new saddle dams, inlet/outlet structure, emergency outlet works, spillway, water transmission pipelines, pump station, site access roads and drainage facilities, and water quality systems. The project achieved DSOD approval and was completed in March 2021.

Project Engineer, Orange County Water District, North Basin Groundwater Protection Project, Anaheim, CA
Prepared a basis of design report and project design submittals at the 30%, 95%, and 100% stages. Also coordinated with Cities of Anaheim and Fullerton. Project involved design of a regional groundwater treatment system to treat perchlorate, VOCs, 1,4-dioxane, and nitrate. Perchlorate will be treated by ion exchange, VOCs by GAC, 1,4-dioxane by UV oxidation, and nitrate by regenerable ion exchange. The ultimate project will include extraction wells and a treatment system, all intended to clean up a contaminated groundwater plume.

Project Engineer, Orange County Sanitation District, Orange Park Acres Sewer, Orange County, CA
This project consisted of construction 3,110 linear feet of new 21-inch sewer while abandoning an old 12-inch adjacent sewer. The sewer segment connects the two

OCSD trunks through the Orange Park Acres area. Workspace was limited due to narrow streets and nearby residences. Construction work was staged to maintain access to the adjacent residences. Because the depth of the new sewer line varied from 8 to 30 feet, several types of pipe bedding were required to complete the project.

Project Engineer, San Diego County Water Authority, Relocation of Pipeline 3 at SR 125/94 Interchange, San Diego, CA
Prepared preliminary and final design construction plans for relocation of 1,660 feet of 72-inch water pipeline inside two separate tunnels under a major freeway interchange. This included preparation of an interim pipeline for continuous water supply, portals in dense business and residential areas, connections to PCCP pipelines, traffic control, utility relocations, permitting, and environmental studies. Assisted with formulating project options, alignments, alternatives costs, and final design and final bid package preparation for bid.

Project Engineer, Long Beach Water Department (LBWD), Palo Verde Avenue Pipeline Interconnection, Conjunctive Use Expansion Project, Lakewood, CA
The purpose of this portion of the Conjunctive Use Project is to construct a new 12-inch (about 6,000 feet long) pipeline in Palo Verde Avenue to link the proposed Aquifer Storage Recovery (ASR) well of the City of Lakewood to the LBWD water well collection system for transferring groundwater between the two water systems. A bidirectional flow meter at the ASR well site in Lakewood will measure and totalize the volume of water delivered and received by each agency. The project includes installation of a valve status indicator, local controls for the existing pressure-reducing valve, and new pressure-relief valve at Long Beach No. 1 turnout site.

Project Engineer, Capistrano Valley Water District, Phase I Desalter Project – Brine Line, Well Collection, Domestic Water Pipelines, San Juan Capistrano, CA
The design/build project included design of a desalter to treat brackish groundwater with high iron and manganese concentrations. Also in the design was a 5-mgd pumping station, eight groundwater production wells, and approximately 2,500 feet of pipelines. The pipelines range from 8 to 22 inches in diameter and are constructed of PVC, HDPE, or steel to convey raw groundwater, treated water, or brine. The project required permitting, environmental, acoustical studies, electrical, mechanical, architectural services, and two horizontal direction drillings to cross under the I-5.

Project Engineer, City of Riverside, North Orange Wellfield Transmission Mains, Riverside, CA
Jesus coordinated utility research on this project, which consisted of 3,300 feet of 16-inch pipe, 11,000 feet of 30-inch pipe, and 10,800 feet of 60-inch pipe including work at an existing reservoir site, valve vaults and flow metering, and miscellaneous pipeline appurtenances. All pipelines were installed in city streets, requiring extensive traffic control and utility coordination. The purpose of this project is to utilize contaminated well water by treating and/or blending it to produce a potable-quality product that enhances and expands the City's water supply.

Project Engineer, Inland Empire Utilities Agency, Edison Ave. Regional Recycled Water Pipeline, CA
Prepared plans and specifications for a 33,000 foot, 30-inch diameter ductile iron recycled water transmission main to interconnect the TP-1 Outfall and the Carbon Canyon WRP. An alignment was identified that allowed the pipeline to be constructed within unpaved areas instead of Edison Avenue and avoided expensive crossings at Euclid and Edison Avenue. Responsibilities included utility research, street centerline and pipe alignment, utilities coordination, horizontal and vertical design of pipeline, permitting with Caltrans, Ontario, Chino, as well as meetings with client, and other stakeholders.

Project Engineer, Nipomo County Services Supplemental Water Project, Bid Package 1 (BP-1), Santa Maria River Crossing by Mid-Path Intercept Crossing, Nipomo, CA
Project involved horizontal directional drilling (HDD) installation of 30-inch waterline underneath the Santa Maria River. Responsible for preparing design plans and specifications for installation, including managing project budget and schedule, reviewing existing utilities, obtaining permits, mitigating environmental impacts, and coordinating with other utilities.

Project Engineer, LBWD, Cistern 3 Vault Repair, Long Beach, CA
Scope included replacing a valve vault for a reservoir at a WTP. The steel piping within the vault had severely corroded over time, and appeared in danger of failure. Also replaced a concrete vault, installed a new 24-inch isolation valve, and dewatering pump/piping. Close coordination between the client, contractor, and AECOM allowed time to construct key elements during a one-month plant shutdown.

Seung Han Kim, PhD, PE

Project Engineer – Back-up

Key Skills
Geotechnical Engineering
Modeling of Ground Behavior
Tunnel Boring
Trenchless Technology

Years of Experience
11

Years with AECOM
11

AECOM Position
Senior Tunnel Engineer, U.S. West Water

Education
PhD, Civil Engineering, University of Texas, 2010
MS, Civil Engineering, Korea University, 2007
BS, Civil Engineering, Korea University, 2005

Registrations
Civil Engineer, CA #80218, issued 6/2012, Exp. 9/30/2022
Civil Engineer, Korea, #05202010256L

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Professional Associations
American Society of Civil Engineers
ASCE Geo-Institute San Francisco Chapter (SFGI)

Trainings and Certifications
AECOM Certified Project Manager

Professional history

Dr. Kim is a Senior Tunnel/Geotechnical Engineer at AECOM since 2010. He earned a PhD from the University of Texas at Austin in 2010, where he worked as a research/teaching assistant. Before joining AECOM, he worked for two major tunnel boring machine (TBM) manufacturers in 2009 and 2010, Herrenknecht AG and The Robbins Company, as an engineering intern. He embraces modern principles of tunneling methods and trenchless technologies, and possesses sound knowledge in geotechnical and structural engineering. Seung Han is very knowledgeable in all phases of tunnel design from alignment selection, alternatives analysis, geotechnical exploration, conceptual and detailed designs, bid support and estimates, and construction coordination and support. He is an expert in numerical modeling including geo-structural interaction and non-linear dynamic analyses.

Selected project experience

Senior Tunnels/Geotechnical Engineer, Santa Margarita Water District, Trampas Dam Outlet Tunnel, San Juan Capistrano, CA
Prepared geotechnical baseline reports. Developed design drawings and specifications for 700-foot long 6-foot diameter microtunnel. Assisted in bid support and during-construction engineering.

Senior Tunnels/Geotechnical Engineer, Los Angeles County Department of Public Works (LACDPW), Santa Anita Dam Upgrade Study, Los Angeles County, CA
Evaluated the impact of existing buried concrete structure under the existing dam embankment when additional surcharge pressure is applied near the toe of the dam using FLAC and SAP.

Staff Engineer, San Francisco Public Utilities Commission (SFPUC), New Irvington Tunnel Project, Alameda County, CA
Served as a staff engineer for this 3½-mile-long, 10-foot-diameter water conveyance tunnel that provides a critical link in SFPUC's Hetch Hetchy Water Supply System between the Sunol Valley and Fremont, California. Participated in preparing Safe Work Plan and monitoring of portal instability.

Senior Tunnel Engineer, Fermi National Laboratory, LBNF Particle Accelerator Near Detector Hall Cavern Design, Batavia, Il
As a senior geotechnical/tunnel engineer, he played a key role in designing and analyzing a large sized underground excavation in limestone rock with schistocity to expand the existing particle accelerator. He prepared a design and analysis report and engineering plans.

Senior Tunnel Engineer, Michigan Department of Transpiration (MDOT), I-75 Modernization Project – Storage and Drainage Tunnel, Detroit, MI
Played a key role in this fast-phased design-build project for the design of a precast segmental liner for a 4-mile long 14.5-foot finished diameter tunnel to be excavated in soft ground using an open face TBM. The liner consists of four regular segment blocks and two key blocks and reinforced solely by steel fibers. Performed various geotechnical and structural analysis to verify the proposed design satisfies the requirements on strength, distortion, durability and design life, specified in governing design codes (ACI 318, 350, and 544). Contributed in preparing Basis of Design Report, and coordinated with TBM

manufacturer (Herrenknecht AG), steel fiber manufacturer (Bekaert), and concrete accessories suppliers (Vertex Inc., Optimas, and Cooper & Turner).

Senior Tunnels/Geotechnical Engineer, Los Angeles Department of Water and Power (LADWP), Long Valley Dam Hydrojacking Evaluation, Mono County, CA
Performed static stress analysis for the existing spillway tunnel to evaluate the potential for hydrojacking where external groundwater pressure that is carried forward to the existing tunnel lining through the network of fractures in the extensively fractured rock mass and the annular void outside the tunnel lining.

Staff Engineer, U.S. Army Corps of Engineers (USACE), Lake Isabella Auxiliary Dam Spillway Tunnel Conceptual Study, Kern County, CA
Assisted in proposing feasible spillway tunnel alternatives with geotechnical and hydraulic considerations.

Senior Tunnels/Geotechnical Engineer, LACDPW, Castaic Dam Outlet Tunnel, Los Angeles, CA
Evaluated tunnel alternatives proposed by the owner. Developed conceptual level tunnel excavation method and support requirements for alternatives evaluation purposes.

Graduate Civil/Geotechnical Engineer, SFPUC, Central Bayside Improvement Project, San Francisco, CA
Assisted in tunnel alignment alternative selection and planning. Participated in preparing subsurface exploration campaign plan and in writing the Geotechnical Data Report.

Graduate Civil/Geotechnical Engineer, SFPUC and Hetch Hetchy Water and Power, Evaluation of Impact of New Transmission Tower Foundation on Foothills Tunnel, Tuolumne County, CA
Evaluated the geo-structural response of the reinforced concrete tunnel lining of Foothill Tunnel, where a new 12-foot-diameter, 35-foot-deep drilled pier is proposed. The design load of the drilled pier was high because it was intended to support a widely spaced electric transmission tower that crosses Don Pedro Reservoir with a span length of about 3,000 feet. The tunnel was constructed in early 1929 in a highly weathered gabbro, and has a vertical clearance distance of about 35 feet from the drilled pier. The behavior of the drilled pier was modeled using LPILE6, and the response of the ground and the tunnel lining was calculated using FLAC6 and SAP2000.

Staff Engineer, SFPUC, Mountain Tunnel Rehabilitation Project, Tuolumne County, CA
Served as a staff engineer for rehabilitation project of this 14-foot-diameter, 19-mile-long water conveyance tunnel that is a critical link in the Hetch Hetchy Water Supply System. Participated in reviewing tunnel condition assessment information.

Senior Tunnels/Geotechnical Engineer, Santa Clara Valley Water District (Valley Water), Anderson Dam Seismic Retrofit, San Jose, CA
Worked on the seismic retrofit of Anderson Dam Outlet tunnels. The dam is a 240-foot-high zoned rockfill embankment founded on alluvium, older deposits, and Franciscan bedrock and is near the active Calaveras Fault, and the site straddles the conditionally active Coyote Creek Range Front faults, with traces mapped crossing the dam footprint and the outlet works alignment. The scope of services includes the development and preparation of basis of design, static and seismic analysis of tunnels, portal stability including technical memoranda and reports, cost estimates, and plans and specifications.

Staff Engineer, City of Santa Cruz Water Department and Soquel Creek Water District (scwd2), Desalination Intake Facility Conceptual Design, Santa Cruz, CA
Performed constructability review and cost estimate for the launch shaft and the micro-tunneling portion of the pipeline alignment.

Senior Tunnels/Geotechnical Engineer, Stanford University, Searsville Dam Modification, Palo Alto, CA
Studied the potential dam modification alternatives to construct a new water diversion/sediment flush measures through the existing active concrete block dam. Numerically evaluated the impact of the installation of the orifice to the existing dam structure.

Senior Tunnel Engineer, Texas Department of Transportation (TxDOT), IH-35 Capital Corridor Upgrade – Tunnel Feasibility Study, Austin, TX
Performed a feasibility study for a very large cross section tunnel, 86 feet in width and 58 feet in height, proposed to bury the existing Interstate Highway 35 that crosses downtown Austin. Numerically evaluated temporary and permanent tunnel support needs, the potential tunneling methods, and optimum excavation sequence. Assisted in preparing investigative cost estimates and a white paper that presents engineers' opinion regarding the technical feasibility and constructability of the tunnel below the active highway.

Paul Nicholas

Technical Advisor – Geotechnical & Tunneling

Key Skills
Tunneling
Microtunneling
Trenchless Technology

Years of Experience
35+

Years with AECOM
9

AECOM Position
Associate Vice President,
AECOM Tunnel Practice
Operations Manager

Education
BSc, Geology, University of London

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Professional Associations
International Society of Trenchless Technology
North American Society for Trenchless Technology
Past NASTT Board Member
Microtunneling Achievement award

Professional history

Mr. Nicholas, a recognized specialist in microtunneling, pipe jacking, and trenchless technology, is a technical/project manager with over 35 years of experience in engineering, heavy infrastructure, and tunneling industries. With a geotechnical background, he specializes in means and methods, construction engineering for microtunneling, jack and bore, pipe bursting and horizontal directional drilling (HDD). Paul has worked extensively overseas on projects and TBM manufacturing, working with equipment manufacturers in analyzing ground conditions and completing constructability and risk assessments.

Selected project experience

Technical Reviewer, Los Angeles Department of Water and Power (LADWP), River Supply Tunnel 7, Los Angeles, CA
Providing technical review of contractors' microtunneling submittals and alternative construction design under the LA River for an 84-inch steel casing.

Trenchless Technology Specialist, Metro Vancouver Douglas Road Main No 2, Still Creek Section, Burnaby, BC, Canada
3 km of 1,500 mm steel waterline. Includes 600m of 1800mm Microtunneling for three crossings of rail tracks, Still Creek and Highway 1, including curved drives.

Tunneling Specialist, Susquehanna Area Regional Airport, Harrisburg Airport Runway Crossing, Middletown, PA
This airport expansion project, currently under construction, called for microtunneling to install storm drainage conveyance. The client's imperative is to avoid operational disruption, so AECOM conducted extensive analyses and investigations to determine best approach methodology. Paul provided technical review of the twin 60-in crossings including constructability issues for microtunneling to reduce settlement to a minimum during construction, which includes grouting, spacing and operational methodology of the drives to reduce these risks.

Tunneling and Trenchless Specialist, City of San Diego, Morena Pump Station and Conveyance System, San Diego, CA
Specialist for tunneling and trenchless technology on this 10-mile pipeline including 2500-ft of crossings with 120-in steel casing and 4500ft of 48- to 66-in microtunneling with twin curved drives.

Microtunneling Design, City of Oklahoma City, Atoka Pipeline, Oklahoma City, OK
Twin 60 and 72-in 2800-foot water main crossings of the Canadian River with twin RCP Casings in 4 microtunneling drives from 120-ft deep central shafts.

Trenchless Specialist, Orange County Sanitation District, 3-64- OCSD Rehabilitation of Western Sewers, Orange County CA
Providing design and constructability input for pipe bursting and upsizing of 18-inch sewer mains.

Trenchless Specialist, OCSD, Bay Bridge PS and Conveyance – OCSD Newport Beach CA
Responsible for the design of twin 24-inch HDPE pipelines crossing the PCH by microtunneling .

Microtunneling Design, Metro Vancouver, Burnaby Lake North Interceptor, Vancouver BC, Canada
Includes nearly 2.8 km of 1800 mm RCP installed by microtunneling including drives of over 700 m with S curves.

Trenchless Microtunneling Specialist, QA / Constructability Submittal reviews: Mcloughlin Point WWTP Outfall – Capital Region District, Victoria Vancouver Island. BC Canada
This Design Build project included an Outfall pipe installed by microtunneling of 122 m 2100 mm steel pipe to transition from the WWTP wet well through Granite to the seabed where it connects to the cut and cover section of the outfall the project. Involved underwater recovery of the MTBM.

Arlington Consolidation Conduit Sewer, Hartford CT
Estimate and bid specifications for 5000ft of 30-54 inch microtunneling.

Specialist Microtunneling Consultant, New York State DEC, Bay Park Conveyance Project, New York
Approximately 5 miles of 72-inch force main by microtunneling.

Design Review, Annacis Island WWTP Outfall, Metro Vancouver BC Canada
Review of 60% design and development of Risk register.

Microtunneling Specialist: North Shore WWTP Conveyance System – Metro Vancouver BC Canada
Tender design and specifications for microtunneling for this Design Build project including 900, 1200 & 2450mm microtunneling, review microtunneling design submittals and construction management support.

Northeast Ohio Sewer District (NORSD) Doan Valley Relief and Consolidation Sewer, Cleveland, Ohio
Specialist for tunneling and trenchless technology on this 4000-feet of 72 and 48-inch gravity sewer to be installed by tunneling / microtunneling by a two pass or single pass method.

Microtunneling Specialist, City of Columbus, Northern Pickaway Joint Economic Development District, Lockbourne Intermodal Subtrunk (LIS), Columbus, OH
Specialist/Consultant for 10,000 ft. of 78-inch Microtunneling with GFRP in very difficult ground conditions consisting of outwash deposits of gravels cobbles and boulders.

Pratibha PVT Ltd, Yamuna River Pollution Abatement Design-Build Project P2 & 3, New Delhi, India
Project Manager. Detail design of temporary and permanent works for a DB contract for 34 km of interceptor sewer, microtunneling from 2 to 10-foot dia.

Relevant Employment History:

International Manager, Akkerman Inc. Developed the international market for Akkerman products from Europe to Australia. Technical review on development of microtunneling and tunneling equipment to reflect the demands of the international marketplace.

Division Manager, Robbins Inc. Developed small TBMs and small boring units (SBU) to 15-foot-diameter. Responsible for the supply, design and manufacturing in U.S. and China.

Region Manager-Southeast Asia, Wirth GmbH Tunneling. Technical support and sales of NFM EPB and slurry TBMs, Wirth hard rock TBMs and microtunneling, HDD Power Bore, Paurat Road headers, and foundation drilling rigs.

President-USA, Wirth Soltau Microtunneling Inc. Managed all company operations, technical and commercial, project management, equipment specification, analysis of constructability, and means and methods for microtunneling and shafts for projects supplied with Soltau equipment.

An author for the 1st ASCE Microtunneling guideline, and originator of the Microtunneling short course at CSM.

Andrew Romer, PE

Technical Advisor – Conveyance

Key Skills
Water Transmission Pipelines
Tunneling
Trenchless Installations
Pumping Stations
Force Mains
Treatment Plants

Years of Experience
42

Years with AECOM
34

AECOM Position
Principal Engineer and Pipelines Technical Practice Leader - Water

Education
BS, Civil Engineering, University of Arizona, 1979
BS, Business Administration, University of Arizona, 1974

Registrations
Professional Civil Engineer: CA, #37116, issued 01/01/1983, expires 06/30/2022

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Professional Associations
American Society of Civil Engineers, Pipeline Safety and Risk Management Committee, Pipeline Design Manual Committee and Pressure Pipeline Design for Water and Wastewater Committee
American Water Works Association, Standards Committee on Concrete Pressure Pipe, Prestressed Concrete Cylinder Pipe, Rehabilitation of PCCP Committee and Manual M-9 Subcommittee, Standards Committee on Steel Pipe and Corrosion Committee Chair, 2009 – 2012 and chair of Manual M27, 3rd. Ed.

Professional history

As AECOM's Pipelines Technical Practice Leader, Mr. Romer provides Quality Control reviews and functions as a Project Advisor to a significant number of AECOM projects throughout North America. We are pleased to include him on our team of technical experts.

Andy has been responsible for design of well over $1 billion in major water transmission pipelines and associated facilities, pumping stations, treatment plants, tunnels, and trenchless installations. Mr. Romer has designed award-winning and innovative large diameter reclaimed waterlines, trunk sewers, outfalls, and force mains. He is a well-published author (nine books and 40 peer-reviewed papers) and is active on national standards committees. His contributions were acknowledged in 2012 with the Stephen D. Bechtel Pipeline Engineering Award by the American Society of Civil Engineers.

Selected project experience

Project Manager and Design Lead/Engineer-of-Record, Los Angeles Department of Water and Power (LADWP), River Supply Conduit Improvement, Units 5 and 6, Los Angeles, CA
Led the design of the 78-inch diameter steel pipelines within North Hollywood, California. Unit 5 is about 3,900 feet in length, of which approximately 3,700 feet is tunneled. Unit 6 is about 11,500 feet in length, with approximately half tunneled. Design also included 78-inch butterfly valves and valve vaults, appurtenances, jacked casings, access manholes, asphalt concrete (AC) pavement replacement, walkways, curb and gutters replacements, several utilities relocations, and landscaping.

Project Technical Advisor, Metro Vancouver, Second Narrows Water Supply Tunnel Project, Vancouver, BC.
Advisor for the surface works associated with a new water supply tunnel under Burrard Inlet including alternative alignments to accommodate three (3) watermains (2 x 2400mm and 1x 1500mm diameter) complete with shafts and valve chambers downstream of the shafts prior to connection into the existing water system (Capilano No 7, Seymour 2 and Seymour 5). The design criteria requires the system to withstand a 1:10,000 year seismic event. The surface works design package includes the tie-ins, piping, valve design and equipment selections and valve chambers at both the north and south shaft locations.

Pipelines Technical Practice Advisor, Metro Vancouver, Douglas Road Main No.2 – Still Creek Section, Burnaby, BC
Mr. Romer provided detailed design reviews of the Douglas Road Main No. 2 - Still Creek section large water main replacement, which included 3 kilometers of a new 1,500-millimeter-diameter steel pipe to replace an aging water main in the city of Burnaby. The work included design of open-cut trenching and microtunneling sections along an alignment crossing a number of major utilities, two major railroads, the Trans-Canada Highway, and tunneling under Still Creek.

Pipelines Technical Practice Advisor, Dallas Water Utilities, Elm Fork 72-in Water Main, Dallas TX
Mr. Romer provided initial field alignment and contracting suggestions (which were adopted) and continues to advise the team during design of $30M 2 pass Rib and Lag Tunnel 2 Pass 118-in Rib and Lag Tunnel with 72-in Carrier Water pipe.

Design Lead, Cachuma Operation and Maintenance Board, Upper Reach Reliability – South Coast Conduit, Santa Barbara, CA
Designed the 48-inch- diameter steel pipeline through steep terrain, approximately 8,300 feet in length.

Engineer-of-Record, Nipomo Community Services District, Supplemental Water Project, Santa Maria, CA
Responsible for design of the Santa Maria River Crossing. The Project is designed to transport up to 3,000 acre-feet-per year of water from the City of Santa Maria to the NCSD, and also includes selection of alignments for more than 27,000 linear feet of waterline, a 500,000 gallon reservoir, a 2,000 gpm pump station, and chloramination facilities. The Supplemental Water Project Bid Package #1 includes installation of more than 2,000 linear feet of 24-inch-diameter waterline constructed by multiple pass Horizontal Directional Drilling (HDD) using a mid-path intercept installation for the pilot bore. Located in and across the Santa Maria River, the project was conducted amid sensitive habitats.

Project Manager and Engineer-of-Record, San Luis Obispo County Flood Control & Water Conservation District, Nacimiento Water Pipeline Project, San Luis Obispo, CA
Selection of alignment and design of 45 miles of pipeline ranging in size from 36-inch-diameter down to 12-inch diameter to convey up to 17,500 acre-feet per year of untreated water from Lake Nacimiento as far south as San Luis Obispo. The work included HDD crossings of the Nacimiento River, US-101 freeway, and Salinas River. Ultimately, the project will deliver 15,750 acre-feet per year of raw water from Nacimiento Reservoir to turnouts serving the growing communities of Paso Robles, Atascadero, Templeton, San Luis Obispo and others. Additional services included establishing a basis of design; performing steady-state and transient hydraulics analyses; developing environmental program compliance plans; assisting in the acquisition of permits; preparing traffic management/control plans; closely coordinating pipeline design with other project consultants; and, developing a GIS model. *This project was a national finalist for the ASCE 2012 OPAL Award.*

Design Lead, Kern County Water Agency, Cross Valley Canal Expansion, Bakersfield, CA
Responsible for design of 132-inch-diameter RCP siphons for the expansion of the Cross Valley Canal. The canal delivers raw water from the California Aqueduct to six local agencies in the county.

Project Engineer, City of Fresno, Raw Water Pipeline, Fresno, CA
Responsible for the design of a 5-mile-long, 60-inch-diameter raw water pipeline between the Friant-Kern Canal and the City of Fresno Surface Water Treatment Facility. The project included flow control facilities and additional appurtenances and structures for draining the pipeline. Performed computerized hydraulic and transient analysis, prepared PS&E for the pipeline, specialized large diameter pipeline appurtenances and connection details to the treatment plant.

Senior Advisor, Colorado Springs Utilities, South Catamount Transfer Pipeline, Colorado Springs, CO
Advisor for the design-build (with Garney Construction) of a 36-inch-diameter (Ductile Iron Pipe Size) DR11 high density polyethylene (HDPE) pipe which was floated across and sunk within the South Catamount Reservoir, a part of the City's Blue River Pipeline. The total length of HDPE placed beneath the reservoir was 2,450 feet.

Project Engineer, Inland Empire Utilities Agency, Edison Avenue Regional Recycled Water Pipeline, Chino, CA
Responsible for the design of approximately 33,000 feet of 30-inch-diameter recycled water transmission main to interconnect the TP-1 Outfall and the Carbon Canyon Water Reclamation Plant. AECOM identified an alternative alignment that will allow the pipeline to be constructed within unpaved areas instead of Edison Avenue. The realignment also avoided an expensive crossing at Euclid and Edison in favor of a more cost-effective crossing further south. Project responsibilities included utility research, street centerline and pipe alignment, utilities coordination, horizontal and vertical design of pipeline, permitting with California Department of Transportation, Ontario, and Chino, and meetings with the client and stakeholders (including the Cities of Ontario and Chino).

CURRICULUM VITAE

Dr. SAUER & PARTNERS

Juergen Laubbichler, PE, PEng

Technical Advisor – Sequential Excavation Method (SEM)

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EDUCATION:

University of Technology, Vienna, Austria, M.S. Civil Engineering, 2001
University of Technology, Vienna, Austria, B.S. Civil Engineering, 1996

PROFESSIONAL ASSOCIATIONS:

P.E. Civil Engineering,	California, #67185; 2004, Expires 9/30/2022
P.E. Civil Engineering,	Texas, #105318; 2010
P.E. Civil Engineering,	District of Columbia, #905624; 2010
P.E. Civil Engineering,	Maryland, #38512; 2010
P.E. Civil Engineering,	Washington, #46778; 2010
PEng, Civil Engineering	Ontario; 2017

YEARS OF EXPERIENCE:

With Dr. Sauer & Partners:	19, Project Director, Partner, Principal Tunnel Engineer, Technical Expert
With other firms:	6

RELEVANT EXPERIENCE:

Juergen Laubbichler has more than twenty years of experience in providing final design services, design services during construction, and construction management services for tunnels constructed using the New Austrian Tunneling Method (NATM), cut-and-cover tunnels and TBM tunnels. In his current position he is responsible for managing tunnel projects involving geotechnical investigations, tunnel design, finite element analyses, waterproofing systems, tunnel rehabilitation, fire-life-safety, and electrical and mechanical components. Additional fields of his responsibility are providing design support services during construction, risk management and construction management services.

He has worked on highway, railway, transit and utility tunnel projects throughout Europe, the United States, the Middle East, Australia and Asia. His project experience includes traditional procurement using the Design-Bid-Build approach, as well as alternative procurement models including Design-Build, Design-Build-Finance-Maintain, and various forms of Concession Contracts.

Publications include “Benchmark for the Future - The largest NATM Soft Ground Tunnels in the United States” (NAT 2004), “Design and Risk Management Strategy for Sound Transit’s Beacon Hill Station and Tunnels” (RETC 2005), “Building Underground Stations in Soft Ground Conditions” (NAT 2010) “Innovative Tunneling Concepts for the Ottawa Light Rail” (George A. Fox 2015), “Innovations in NATM Tunneling for complex Tunneling Projects in North America” (ASG 2019) and “Construction the Ottawa Combined Sewage Storage Tunnel” (RETC 2021).

RELEVANT PROJECTS OF RECENT INVOLVEMENT: WITH DR. SAUER & PARTNERS:

Foothill Trunk Line – Unit 3, California, USA Engineer of Record & Project Manager, 2018 - 2019
Mr. Laubbichler acts as the Engineer of Record and Project Manager for this approximately 450ft long tunnel beneath the Pacoima Wash in Los Angeles. The tunnel connects to two SEM shafts (one circular, one elliptical in shape). He is responsible for excavation and support concepts of shafts and tunnel including SEM toolbox items to counter unforeseen ground conditions as well as minimizing the impact to an overlaying bridge structure. Description: Temporary shafts and tunnel for 54-inch diameter water main installation (450ft long, tunnel diameter 8ft)

City Trunk Line South - Unit 4 / Phase 2, Los Angeles, CA, USA, Design Manager / Tunnel Engineer, October 2009 - November 2009
As Design Manager/Tunnel Engineer, Mr. Laubbichler was responsible for the final design of a SEM/NATM tunnel segment carrying a 60-inch water main. The tunnel crosses under a riverbed between existing piles that support a bridge structure. Main design focus was on avoiding settlements of the existing structures and dealing with the limited space available.

Eglinton Crosstown LRT, Toronto, Canada Project Manager, Engineer of Record, August 2015 present
Mr. Laubbichler acts as Engineer of Record and Project Manager to develop the detailed designs for the NATM stations and special track works sections. He is also responsible for overseeing the construction, working with a team of on-site Tunnel Engineers and Tunnel Inspectors. The Crosstown is a light rail transit (LRT) line that will run across Eglinton Avenue in Toronto, between Mount Dennis (Weston Road) and Kennedy Station. This 19-kilometre corridor will include a 10-kilometre underground portion, between Keele Street and Laird Drive. The scheme consists of 15 underground and 12 above ground stations; three underground stations are being constructed using NATM.

Upper Llagas Creek Flood Protection Phase 2A, Morgan Hill, California, USA Project Manager, 2021
Mr. Laubbichler was acting as Project Manager for this 2,045-foot-long flood protection tunnel with a height of 12 feet and a width of 14 feet. DSP supported the contractor during the pre-bid phase with geotechnical assessment of ground conditions, development of support classes, and identification of critical project elements and respective mitigation measures. Description: Flood protection tunnel in widely ranging ground conditions (hard rock to soft ground).

Effluent Outfall Tunnel Los Angeles, California, USA Project Manager & Design Lead, 2019 - present
Mr. Laubbichler is leading the design for SEM starter and tail tunnels to facilitate the launch of the Tunnel Boring Machine (TBM). Mr. Laubbichler is also responsible for the design of temporary works elements such as crane pad, the TBM jacking frame, tremie slabs, etc. for a shaft structure comprised of a slurry wall, in order to facilitate the operation of the TBM. The project comprises a segmentally lined TBM tunnel with an inner diameter of 18 feet and a length 7 miles, with post-tensioned segmental lining in certain areas.

Los Angeles Purple Line Extension Section III, California, USA Project Manager & Design Lead, 2018 - present
Mr. Laubbichler is conducting the design of the initial lining, waterproofing, and permanent lining of 14 Cross Passages. He is responsible for developing de-watering and ground improvement measures for each individual Cross Passage as well as excavation and support concepts including SEM toolbox items to counter unforeseen ground conditions. Description: 2.59-mile double track heavy rail transit line. Contract involves tunnels and fourteen Cross Passages.

Alessandro (Alex) Franchi, PhD, PE, BCEE

Alignment Study – Business Case Evaluation (BCE)

Key Skills
Preparation of Feasibility Studies
Planning and Economic Evaluations
Design of Facilities
Technology Evaluation and Selection for the Treatment of Water/Wastewater Treatment
Water Reuse and Potable Water Permitting
Gas Powered Power Plants
Energy Recovery

Years of Experience
25

Years with AECOM
5

AECOM Position
Senior Project Manager

Education
PhD, Environmental Engineering, Johns Hopkins University, 2000
MSE, Environmental Engineering, Johns Hopkins University, 1995
BSE, Civil/Chemical Engineering, University of Maryland, 1992

Registrations
Professional Civil Engineer, CA #75225, issued 7/23/2009, Exp. 12/31/2021

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Professional Associations
Water Environment Federation (WEF)

Trainings and Certifications
American Academy of Environmental Engineering Board Certification (BCEE)

Professional history

Alex Franchi's experience encompasses planning and economic evaluation, permitting, and scheduling of pump station, pipelines, and treatment facilities. He has worked on the horizontal and vertical alignment in the public right-of-way and within treatment facilities. Alex brings more than 25 years of experience in the water / wastewater industry, specifically, in the planning, design, and management of pump stations, pipelines, and water/wastewater facilities projects. His additional experience includes the design and construction of gas-powered power plants and oil pipelines. He has worked for consulting firms, equipment manufacturers, and as independent contractor on projects in the United States and internationally.

Selected project experience

Process Engineering / Senior Reviewer, Tertiary Treatment System Design, San Bernardino Municipal Water Department, San Bernardino, CA
Consulting and engineering services for preliminary and final design of a 2.5 mgd, Tertiary Treatment System (TTS) to further treat the secondary effluent from the existing wastewater reclamation plant (WRP) owned and operated by the City of San Bernardino Municipal Water Department. The TTS will produce disinfected tertiary Title 22 recycled water for the WRP's on-site utility water and landscape irrigation by Caltrans and a golf course adjacent to the existing WRP. It will also add the potential for non-potable recycled water to be available to external customers, including groundwater recharge. The system is designed to be expanded to 5 mgd. The TTS consists of a cloth disc filtration system, UV disinfection, and pump station(s) to deliver treated water to the existing tertiary reservoir. Performed alternatives evaluation of the tertiary treatment system technologies. Deliverables included design package for design bid build, Title 22 Engineering Report for California Department of Drinking Water, and Title XIV Report for the U.S. Bureau of Reclamation.

Design Coordinator and Process Lead, Silicon Valley Clean Water, Pump Stations Improvements, Redwood City, CA
Progressive design build project involving the construction of a new 60-mgd pump station, the rehabilitation and upgrade of one 22 mgd pump station, rehabilitation of existing pipelines, and construction of new pipeline segments. The project included planning the alignment of pipelines crossing highly transited residential areas. Alternatives were evaluated using a business case evaluation (BCE) process.

Design Coordinator and Process Lead, Silicon Valley Clean Water, Front of Plant Project, Redwood City, CA
Progressive design build project involving the design and construction of a new 80-mgd front of the plant facilities, including deep-lift pump station (90 feet), new head works with screenings, grit removal, solids load out, chemicals storage, electrical room, and connection pipeline to the existing plant. The design included the horizontal and vertical alignment of 800 feet of 60-inch pipeline and connection to the existing facilities. Alternatives were evaluated using a business case evaluation (BCE) process.

Project Manager, City of Long Beach, On-site Chlorine Generation, Long Beach, CA
Project involved the preliminary design for replacing delivered chlorine gas with on-site generation for the Groundwater Treatment Plant (60 mgd). Work encompassed: evaluating chlorination feed alternatives and manufacturers of on-site generation systems; permitting assistance; developing of preliminary design for on-site generation systems; and preparing of design build bid package - including contractual and technical specifications.

Task Lead, Inland Empire Utility Agency, RP5 and RP1 Upgrades, Advanced Treatment, UV/Chlorine Disinfection and Cost Estimates, Chino, CA
Multi-phase project involved the design and economic analysis for expansion and upgrades at four water recycling facilities ranging between 10 and 60 mgd. Tasks included general site planning of facilities and pipelines, design, and economic analysis of wastewater treatment processes to produce California Title 22 water for public access reuse and groundwater injection. The groundwater injection component of the project included the predesign of a 3-mgd facility with MBR, microfiltration, reverse osmosis (RO), UV, AOP, and stabilization. Developed economic analysis for the alternatives.

Project and Design Manager, Orange County Water District (OCWD), PFAS Treatment, Irvine, CA
Preliminary design, final design services, bid phase, and construction management services for a PFAS treatment system at Well OPA-1. Treatment system to include lead/lag ion exchange treatment system capable of treating a flow rate of 2,000 gallons per minute, including appurtenant facilities. The design will incorporate provisions to accommodate intermittent operations of the well as IRWD is currently limited to operating the well to produce about 600 acre-feet per year. The ion exchange vessels will be located in a depressed structural concrete pit to minimize the visual impact of the vessels on the adjacent community. The project includes the alignment of a 16" cement lined pipeline within the boundary of the facility.

Process Lead, City of Fresno, Airport Satellite Water Reclamation Plant and Pipelines Feasibility Study, Fresno, CA
Project involved a feasibility study for a 5-mgd water reclamation facility that included MBR, RO, UV, and AOP and industrial source treatment. Water from this facility will be used for groundwater injection to recharge a depleted aquifer and public or agricultural irrigation uses. The project involved the preparation of a feasibility study, the goal of which was to determine production of high-quality recycled water from the City of Fresno's sewer system. The intake points from the sewer system, located near a winery, discharge 800,000 gallons per day to 2.7 mgd of partially treated wastewater to the sewer system. The feasibility study evaluated the possibility of converting partially treated discharge into high-quality recycled water using membrane bioreactor treatment, followed by UV light disinfection; and using the recycled water for irrigation of the airport golf course, groundwater recharge, and industrial uses. The project included the alignment of a force main to feed the new facility and recycled water distribution pipelines.

Senior Project Engineer, City of Redlands, Recycled Water Distribution System Title 22, Redlands, CA
Responsible for the development of a California Title 22 Engineering Report for presentation to the California Department of Health and Regional Water Quality Control Board to obtain a permit to distribute recycled water produced with an MBR system.

Technical Lead, Cities of Tampa and St. Petersburg, Florida, and Birmingham, Alabama, Finished Water Quality Deterioration Studies, Tampa and St. Petersburg, FL and Birmingham, AL
Planned and conducted studies on the effect of water quality changes on iron and lead corrosion in the distribution system. The results from these studies were used to devise and implement strategies for controlling finished water quality deterioration.

South Coast Water Reclamation, Barbados Water Authority, Plant Upgrade Feasibility, Barbados
The Barbados Water Authority (BWA) is evaluating the feasibility of upgrading its South Coast Sewage Treatment Plant to a tertiary/advanced treatment plant capable of producing water suitable for groundwater recharge in a potable aquifer and/or a non-potable aquifer, or suitable for edible food crop irrigation. The goals of the Project include augment existing water supplies, mitigate climate change effects, address seawater intrusion and sea-level rise, diversify potable water sources, enhance water supply resiliency, and reduce the impact of treated effluent on marine life and the environment. The project included the alignment of a 3 miles long pipeline for the distribution of recycled water.

Arnel Bicol, PE, GE

Geotechnical Engineer

Key Skills
Geotechnical Engineering
Project Management
Quality Control

Years of Experience
37

Years with AECOM
37

AECOM Position
Associate Vice President, Principal Engineer, LA Geotechnical Engineering Group Leader

Education
BS, Civil Engineering, University of Edinburgh, Scotland, 1982

Registrations
Civil Engineer, CA 55338, issued 7/26/1996, Exp. 12/31/2022
Geotechnical Engineer, CA 2646 , issued 4/23/2004, Exp. 12/31/2022

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D: 1-213-996-2405

Professional Associations
American Society of Civil Engineers

Trainings and Certifications
AECOM Certified Project Manager
AECOM Independent Technical Reviewer

Professional history

Mr. Bicol is a Principal Engineer with 37 years of experience in geotechnical engineering projects involving site explorations and investigations, laboratory testing, site characterization, field instrumentation, site improvements, and construction quality assurance. He has managed geotechnical investigations and studies for hundreds of projects.

In the early 1990's, Arnel Bicol was a member of the legacy AECOM team that conducted the field explorations for Contract 3 of the Metropolitan Water District Inland Feeder Project which included assessment of the Valley District's Foothill Pipeline in the City Creek area. As a key member of the current AECOM team, Arnel's overall experience and in-house knowledge of the project site conditions will be brought to bear during our development of new field exploration programs and selection of preferred tunneling alternatives for the Foothill Pipeline re-alignment.

Arnel skillfully leads and manages an extensive array of tasks as the manager of our Los Angeles office geotechnical operations. In addition, he serves in a leading role on several On-Call contracts with the Los Angeles Department of Water and Power, Metropolitan Water Districts of Southern California and the City and County of Los Angeles Public Works Departments.

Selected project experience

Geotechnical Team Member, Metropolitan Water District, Inland Feeder Project, Los Angeles, CA
In the early to mid-1990's AECOM (as legacy Dames & Moore), provided geotechnical engineering and consulting services on a segment of MWD's Inland Feeder Project (MWD-IFP), a 12-foot diameter by 44-mile-long conveyance system that connects the California State Water Project to the Diamond Valley Lake and the Colorado River Aqueduct. This large system of pipelines and tunnels greatly increases the operational flexibility necessary to store water in wet years, facilitates power generation, delivers water into the system by gravity, and provides State Water Project supplies to the Colorado River Aqueduct when needed. Tunneling took place in the San Bernardino Mountains and was completed in mid-2008. Tunnel lining and other work was completed in mid-2009 and the IFP was fully operational in September 2009. Due to a re-alignment involving re-routing of the MWD-IFP pipeline along City Creek in the Highland area, AECOM conducted additional investigations in 1996 specifically to assess impacts to the existing 79½-inch diameter Foothill Pipeline belonging to the San Bernardino Valley Municipal Water District (SBVMWD), which runs across City Creek just south of E. Highland Avenue. Other issues addressed included anticipated highway crossings at Baseline and Boulder Avenues, as well potential impacts to known habitats of endangered species (primarily Wooley Star) along the alignment.

AECOM explored the subsurface conditions in the vicinity of the 79½-inch diameter SBVMWD water line crossing by drilling and sampling borings extending below the IFP pipe invert elevation at the crossing location. Due to presence of oversize materials, specialty drilling techniques were used. Engineering analysis and assessments included site dewatering, stability of open cuts, management of oversize materials, options for trenchless pipe installations and geotechnical instrumentation.

Principal Engineer, LADWP, Van Norman and Other Infrastructure and Water Quality Projects, Contract C-47804, Los Angeles, CA
AECOM has worked with LADWP for more than 40 years. Under our most recent on-call contracts (held since 1998), Arnel has served as Principal Engineer for various geotechnical investigations, ranging from very small to large complex projects involving reservoir siting, tunnel design and construction, shoring design, deep excavations, slope stability, mass grading, landslide remediation, deep and shallow foundations, paving, geophysical surveys, and seismic hazard evaluation of existing dams and other facilities. Through this contract, with his team, has conducted hundreds of field explorations at LADWP facilities involving hollow stem, mud rotary, sonic and Becker techniques and laboratory testing after completion of the field programs. Five challenging TOs included:

- Tinemaha Dam Planning Studies,
- Long Valley Dam (LVD) Spillway Assessment
- Foothill Trunk Line Unit 3
- City Trunk Line Unit 4
- River Supply Conduit Unit 7

Geotechnical Investigations, LADWP, Foothill Truck Line Tunnel Unit 3, Los Angeles, CA
Arnel was responsible for the geotechnical investigation and report for this project. AECOM performed geologic/geotechnical subsurface investigations, lab testing, and numerical SSI modeling with FLAC3D of the tunnel and two shafts (launching and exit).

Geotechnical Investigations, LADWP, City Trunk Line South - Unit 4, Los Angeles, CA
Arnel was responsible for the geotechnical investigation and report for this project. The team performed geotechnical investigation and provided tunnel design and construction services for this particularly challenging segment of Trunk Line South: a 60-inch pipeline beneath a 50-year old pile-supported road bridge over the Tujunga in Studio City.

Project Manager, LADWP, River Supply Conduit (RSC) Upper Reach Unit 7, Los Angeles, CA
Arnel managed this project, for which we provided geologic reconnaissance, seismic risk analysis, subsurface investigation, route-selection study, public-outreach assistance, design of geotechnical instrumentation systems, and tunnel-engineering consulting services in support of LADWP's in-house trunk-line design team. AECOM is currently providing construction-monitoring including review of contractor submittals, for the 2-mile long RSC-Unit 7 tunnel through densely developed areas of the Cities of Los Angeles and Burbank.

Geotechnical Investigations, LADWP, River Supply Conduit Upper Reach Units 5 & 6. Los Angeles, CA
Along with Unit 7, project comprised a total of 6 miles of 10-14-ft diameter tunnels driven with EBP TBMs and pipe-jacking in predominantly alluvial soils through the cities of Los Angeles and Burbank. Arnel was responsible for geotechnical and environmental subsurface investigations. Other scope included lab testing, geologic and seismic-hazard assessments, and preparation of Geotechnical Data-, Interpretation, and Baseline Reports (GDR, GIR, and GBR).

Project Manager, City of Los Angeles Geotechnical Engineering Division, On-Call Geotechnical and Environmental Services, Los Angeles, CA
Project Manager and Point-of-Contact for on-going plus previous 3 consecutive On-call Geotechnical and Environmental Services contracts for City of Los Angeles since 1995. The contract scope involves responding to various requests for proposals from the City of Los Angeles pertaining to geotechnical and contamination investigations for new sewer infrastructure, libraries, police stations, fire stations maintenance facilities and other publicly funded projects. Major Sewer Infrastructures included:

- East Central Interceptor Sewer
- North Central Interceptor Sewer
- North East Interceptor Sewer Phase IIA
- Eagle Rock Interceptor Sewer
- North Outfall Sewer
- Vermont Avenue Sewer Replacement
- Venice Force Main
- Marina Interceptor Sewer
- Farmdale Storm Drain

Project Manager and Task Leader, County of Los Angeles Geotechnical Engineering and Materials Testing Division, On-Call Geotechnical Services, County of Los Angeles, CA
Project Manager and Task Leader for an on-call geotechnical services contract for County of Los Angeles. Task Leader scope involves responding to

various task requests from the county pertaining to geotechnical studies for subsurface infrastructures such as storm drains, sewer lines and major LA County hospitals. Task orders included:

Hospitals + Medical Facilities

LAC+USC Medical Center Replacement Project, 5P21 Rand Schrader (HIV/AIDS Clinic) Relocation Project, Marengo Parking Structure Project, Central Support Facility (former Center for Communicable Diseases Building) Investigation and Site Preparation, UCLA + Olive View Medical Center, Harbor- UCLA Medical Center, Martin Luther King, Jr. Community Hospital.

LA County Parks + Recreation

Alondra Park - 3580 W. Manhattan Beach Boulevard, Lawndale, Bassett County Park - 510 North Vineland Avenue, La Puente, Bill Blevins Park - 19500 East Windrose Drive, Rowland Heights, Enterprise Park, 13055 Clovis Avenue, Los Angeles, El Cariso Community Regional Park – 13100; Hubbard Street, Sylmar, Eaton Yard, 2986 New York Drive, Pasadena, Carolyn Rosas County Park, 18500 East Fajardo Street, Rowland Heights.

Geotechnical Engineer, Inglewood Basketball & Entertainment Center, Geotechnical Investigation, Inglewood, CA

Completed a geotechnical investigation for a new NBA professional basketball arena in Inglewood, CA. The arena will be multi- purpose with 18,000 seats capable of hosting a variety of events from NBA games to concerts, family shows, convocations and sports exhibitions. Other project components include training facility and offices; a sports medicine clinic; structured parking, office and retail; retail and other ancillary uses that would include community and youth-oriented space; outdoor event plaza; and infrastructure (roadways, utilities) typically associated with the development.

Leo Handfelt, PE, GE

Geotechnical Engineer - Backup

Key Skills
Geotechnical/Geologic Investigations
Earthquake Engineering
Coastal/Waterfront Engineering
Civil Engineering Design

Years of Experience
42

Years with AECOM
42

AECOM Position
Vice President, Senior Principal Engineer, Geotechnical Engineering, U.S. West Water

Education
MS, Soil Engineering, Iowa State University, 1978
BS, Civil Engineering, Iowa State University, 1976

Registrations
Civil Engineer, CA #31725 issued 8/1980, exp.12/31/2022
Geotechnical Engineer, CA #373, issued 9/1987, exp.12/31/2022

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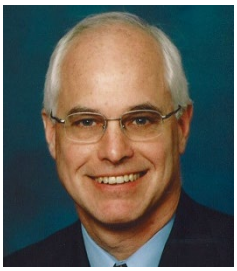
Professional Associations
American Society of Civil Engineers (ASCE) past chairman, Los Angeles Geotechnical group
American Public Works Association
Society of American Military Engineers (past board member, San Diego post)
American Consulting Engineers Council (past board member)



Professional history

Leo has 42 years of geotechnical, earthquake, and coastal engineering experience on complex infrastructure projects throughout the United States, Europe, and Asia. These projects have included investigations, engineering evaluations, and construction support. He received the ASCE Thomas A. Middlebrooks Award for co-authoring what was judged to be the most outstanding paper published in ASCE's 1988 Geotechnical Engineering Journal. Other recent awards include the Project of the Year Award in 2003 for the National City Marine Terminal from the San Diego Section of ASCE and the American Planning Works Association (APWA) and the ASCE Project of the Year Award in 2009 for the San Vicente Dam Raise Test Quarry and Sprinter Rail project.

Selected project experience

Independent Technical Review, Santa Margarita Water District, Trampas Lake Reservoir and Dam, Orange County, CA
Provided independent technical review of Preliminary Design Report and Interim Geotechnical Report for converting an existing quarry tailings impoundment to a recycled water reservoir. Modifications will include raising the existing dam, installation of internal drainage systems, construction of a downstream buttress, construction of two saddle dams, a new inlet/outlet structure and tunnel, and regrading of the deposited tailings. The dam is under the jurisdiction of the California Division of Safety of Dams.

Peer Reviewer, City of San Diego, Lake Hodges Projects, San Diego County, CA
Provided peer review for geotechnical investigation to support design of a 6,000-foot long tunnel that will connect Lake Hodges with Olivenhain Reservoir as part of a pumped storage hydroelectric scheme. Investigation provided foundation recommendations for design of pump and generator building.

Project Manager – Geotech, City of San Diego, South Bay Tunneled Ocean Outfall, San Diego, CA
Provided management oversight of offshore geotechnical investigation for proposed South Bay Tunnel Outfall just north of U.S. - Mexico border. This investigation included multi-channel geophysical surveys, deep borings drilled from both a jack-up platform and a floating barge, and vibracores. Also provided geotechnical services during construction. Construction of outfall entailed a 191-foot deep drop shaft, 19,000-foot long, 11-foot diameter tunnel, a 155-foot deep riser in 75 feet of water and laying 5000 feet of seafloor pipeline to two 2000-foot long diffuser pipes.

Principal Engineer, U.S. Army Corps of Engineers (USACE), Scour Protection, Lower Santa Ana River, Phase 5A, Yorba Linda, CA
Geotechnical investigation of right bank of the lower Santa Ana River. Due to larger releases from a dam upstream of the bridges, USACE designed scour protection including driven anchored sheet piles and grouted riprap on slopes. Geotechnical investigation supplemented work previously performed by USACE.

Principal Geotechnical Engineer, City of San Diego, Point Loma Outfall Tunnel Feasibility Study, San Diego, CA
Performed geotechnical investigation for tunnel alternative to seafloor outfall extension. Conducted deep drilling and in situ testing program at proposed 600-feet-deep drop shaft. Performed marine seismic reflection profiling to characterize offshore geologic structure at tunnel depth (200 feet below seafloor).

Geotechnical Engineer, Mexico/United States Colorado River Conveyance Facility, San Diego County, CA
Provided geotechnical engineering in support of an investigation for a feasibility study of a water conveyance facility between El Centro and San Vicente Reservoir in San Diego County. The investigation included cored borings ranging in depth from 200 to 1750 feet, for a total of over 4,800 lineal feet of drilling. The investigation included 214 packer tests to evaluate rock mass permeability.

Principal Geotechnical Engineer, Mission Valley East Light Rail Transit Extension, San Diego, CA
Preliminary geotechnical investigation performed to support the preliminary design of a light rail transit extension. The preliminary investigation focused on a tunnel below San Diego State University and an elevated portion immediately south of Interstate 8. A total of 35 borings were drilled along these alignments. Data from the investigation was compiled in a Geotechnical Data Report.

Lead Dam Designer, LADWP, Dam Design, North Haiwee Dam No. 2, Olancha, CA
Lead Dam Designer for a new dam to replace North Haiwee Dam which retains a regulating reservoir on the Los Angeles Aqueduct. The new dam will consist of a zoned earthen dam founded on alluvium.

Project Manager, Rancho California Water District, Vail Dam, Temecula, CA
Responsible for preparing plans and specifications for a new RCC gravity dam to replace the arch of an existing dam. The existing dam has both seismic and hydraulic deficiencies. The 152-foot high dam was completed in 1949 and has a crest length of 788-ft, which includes a gravity section on the right abutment and a significantly larger thrust block on the left abutment. The reservoir has a storage capacity of 51,000 acre-feet and a drainage area of 306 square miles and is used primarily for storage, irrigation, and domestic purposes.

Independent Technical Review, USACE, Periodic Inspections, Los Angeles River, Los Angeles, CA
Provided independent technical review of Periodic Inspection reports for two levee systems along the Los Angeles River in Los Angeles, California. The Periodic Inspections include a design review to compare the design of the levee system with the current USACE design criteria, field inspection findings and evaluations, and recommendations for addressing deficiencies.

Geotechnical Peer Reviewer, Boundary Crossing Facilities, Hong Kong, China
Geotechnical peer reviewer for design of retention system for reclamation works next to Hong Kong International Airport. Review focused on stability of rock fill dikes founded on very weak marine deposits. The strength of marine deposits was improved by installation of stone columns. Review included performing independent slope stability analyses of the dike and finite difference analyses of the interaction of the stone columns with the marine deposits in supporting the dike loads.

All-American and Coachella Canal Lining Projects, Imperial Counties, CA
Geotechnical reviewer for due diligence review for the San Diego County Water Authority of the proposed All-American and Coachella Canal Lining Projects. The Authority undertook the due diligence prior to committing to participate in the funding for the projects. The review indicated that the cost of excavating a new All-American Canal through high sand dunes was underestimated, as well as the contingencies for the project, given the level of the design.

Geotechnical/Environmental Indefinite Quantity Contract, U.S. Naval Facilities Engineering Command, Southwest Division, San Diego, CA
Managed a contract to provide geotechnical, environmental, and materials testing services at 12 Navy installations located throughout southern California. Managed 22 delivery orders for services ranging from verifying a contractor's quality control tests to performing seismic vulnerability assessments of critical facilities.

Geotechnical Task Manager, International Boundary and Water Commission, Tijuana River North Levee, San Diego County, CA
Responsible for geotechnical investigation to evaluate 10,500 linear feet of earthen levees near the U.S./Mexico border. The North Levee consists of three segments corresponding to a concrete-lined section at the border, a grouted stone or shotcrete section, and an earthen section. The geotechnical evaluations included embankment protection, foundation stability, slope stability, and potential for seepage or piping through and/or below the levee in critical and questionable areas. The purpose of the investigation was to regain certification of the levees from FEMA.

Andreas Skarlatoudis, PhD

Seismic

Key Skills
Seismic Hazard Analysis
Engineering Seismology

Years of Experience
19

Years with AECOM
9

AECOM Position
Principal Seismologist, Water

Education
Education
PhD, Geophysics, Aristotle University of Thessaloniki, 2019
MSc, Geophysics, Aristotle University of Thessaloniki, 2002
Diploma/Physics, Aristotle University of Thessaloniki, 2000

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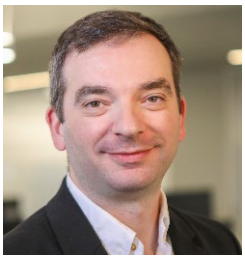
Professional Associations
Seismological Society of America (SSA)
Earthquake Engineering Research Institute (EERI)

Trainings and Certifications
AECOM Certified Project Manager



Professional history

Dr Skarlatoudis does research and development in strong ground motion including strong motion record processing and interpretation, empirical ground motion prediction models, modelling of earthquake source and ground motion amplifying effects of sedimentary basins. He has eight years' specialized experience in seismic hazard analysis for the design of critical facilities and a total of 19 years' experience in strong ground motion prediction and modeling.

Andreas has extensive experience in R&D in strong ground motions and its application to seismic hazard analysis for critical facilities. He has supported iconic AECOM projects providing engineers with estimates of ground shaking hazard in California and worldwide.

Selected project experience

Seismologist, Los Angeles Department of Water and Power (LADWP), Seismic Stability Evaluation Tinemaha Dam Risk Reduction, Big Pine, CA
Site specific seismic hazard analysis for the updated seismic stability analysis of the Tinemaha Dam. The analysis included source characterization, ground motion model selection and development of the Maximum Credible Earthquake (MCE) response spectrum.

Seismologist, Santa Margarita Water District, Site Specific Seismic Hazard Analysis, Trampas Canyon Dam, San Juan Creek, CA
Site specific seismic hazard analysis for the design and analysis of the dam. Analysis included source characterization, ground motion model selection and development of the MCE response spectrum.

Seismologist, California Division of Safety of Dams (CA DSOD), Seismic Hazard Analysis and Design Criteria for the Sawpit Debris Dam, Los Angeles County, CA
Estimated ground shaking hazard at the site for the liquefaction evaluation of the dam. The analysis included source characterization, ground motion model selection and development of the MCE response spectrum.

Seismologist, Windsor–Detroit Bridge Authority, Probabilistic Seismic Hazard Assessment for the Gordie Howe Bridge, USA-Canada
Site specific seismic hazard analysis for the design and analysis of the bridge. The analysis included source characterization, ground motion model selection and development of the design response spectrum.

Principal Seismologist, NEOM, spine infrastructure engineering design services, Kingdom of Saudi Arabia
Site specific seismic hazard analysis for the design and analysis of the NEOM spine. The analysis included source characterization, ground motion model selection and development of the design response spectrum.

Seismologist, Lima Airport expansion, Peru
Site specific seismic hazard analysis for the design and analysis at the Lima airport site. The analysis included source characterization, ground motion model selection and development of the design response spectra for the air control tower and the new terminal site.

Summary of California Seismic Hazard Projects

Dams: North Haiwee, Vail, Stone Canyon, Rimforest, Trampas Canyon Dam, Santa Anita Debris Dam

LAUSD: Mendez High School, A. Lincoln High School, Dena Elementary

Refineries: Torrance, De Soto DN Tanks, Tesoro Carson Crude, Wilmington, Avila Beach Tank farm

Health facilities: Harbor UCLA Hospital, Kaiser Permanente Medical Office Building, Palomar Medical Center, Martin Luther King Jr, Medical Campus

Other: Aliso Canyon, San Gabriel River Discovery Center, California High Speed Train, Inglewood Basketball and Entertainment Center, Alamitos Bay pump station, Diemer Wash Water Reclamation Plant, Weymouth Water Treatment Plant, NPCA (ground motions for DTSC permit renewal), Sepulveda Canyon Control Facility, East County Advanced Water Purification

Seismic Hazard Worldwide Projects

Performed the site-specific seismic hazard analysis for the design and analysis of major dams, in the following projects:

New South Wales, Australia: Snowy Hydro System, Bootawa, Burrendong, Deep Creek, Googong, Geehi, Murray 2, Tooma, Warragamba, Cowal TSF, Rylstone, Manuka TSF, Blue Mountains, Prospect.

Northern Territory, Australia: Weipa, Argyle AK1.

Queensland Australia: Atkinson, Cooloolabin, Ewen Maddock, North Pine Dam, Yarwun, BMA System, Sunwater System.

South Australia: Mt. Bold Dam, Olympic Dam, National Radioactive Waste Management Facility.

Tasmania, Australia: Lake Margaret, Rowallan, Scott's Peak, Ridgeway Dam, Mill Creek, HydroTas System.

Victoria, Australia: Tullaroop, Greenvale, Upper Yarra, Clover & Junction, Ballarat TSF.

Western Australia: Kalgoorie TSF, RTIO Pilbara, Pinjarra TSF, Kwinana TSF, Wagerup TSF.

South Island, New Zealand: Christchurch Hospital, Christchurch Art Gallery, Central Plains Water Canal, Christchurch Justice and Emergency Services Precinct, Opuha Dam.

Selected publications

Skarlatoudis A.A., C.B. Papazachos, N. Theodoulidis, J. Kristek and P. Moczo, (2010). Local site-effects for the city of Thessaloniki (N. Greece) using a 3D Finite-Difference method: A case of complex dependence on source and model parameters, Geoph. J. Int.,182, 279-298.

Skarlatoudis A.A., C.B. Papazachos, B.N. Margaris, Ch. Ventouzi, I. Kalogeras and the EGELADOS group, (2013). Ground motion prediction equations of intermediate-depth earthquakes in the Hellenic arc, southern Aegean subduction area, Bull. Seism. Soc. Am., 103, 1952-1968.

Skarlatoudis A.A., P.G. Somerville, H.K. Thio and J.R. Bayless, (2015). Broadband Strong Ground Motion Simulations Of Large Subduction Earthquakes, Bull. Seism. Soc. Am., 105, 3050-3067.

Somerville P., Skarlatoudis A.A. and H.K. Thio, (2015). Issues for Seismic Hazard Analysis in Regions of Low to Moderate Seismic Activity, 10th Pacific Conference on Earthquake Engineering Building an Earthquake-Resilient Pacific, 6-8 November, Sydney, Australia.

Skarlatoudis A.A., P.G. Somerville and H.K. Thio, (2016). Source Scaling Relations of Interface Subduction Earthquakes for Strong Ground Motion and Tsunami Simulation Bull. Seism. Soc. Am.,106, 1652-1662.

Dawson E., P. Somerville, A.A. Skarlatoudis, Jianping Hu and F. Tatone, (2018). Back Analyses of Stone Canyon Dam for the Northridge Earthquake, 11th NCEE, 25-29 June, Los Angeles, USA.

Boore, D. M., J. P. Stewart, A. Skarlatoudis, E. Seyhan, B. Margaris, N. Theodoulidis, E. Scordilis, I. Kalogeras, N. Klimis, and N. S. Melis (2021). A ground-motion prediction model for shallow crustal earthquakes in Greece, Bull. Seismol. Soc. Am. 111, 857-874.

Christopher Goetz, PG, CEG

Geology

Key Skills
Engineering Geology
Geologic Hazards
Investigations and Analysis

Years of Experience
33

Years with AECOM
32

AECOM Position
Principal Engineering Geologist

Education
MS, Geology, San Diego State University, 1989
BS, Geology, University of Cincinnati, 1984

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C: 1-949-374-4876

Registrations
Professional Geologist, CA #5758, issued 3/16/1993, exp 7/31/2023
Certified Engineering Geologist, California, #1833 issued 3/16/1993, exp 7/31/2023

Professional Associations
Association of Environmental and Engineering Geologists

Trainings and Certifications
AECOM Certified Project Manager
40-Hour HAZWOPER, Trench Safety

Professional history

Mr. Goetz is proud of his long-standing reputation for producing high quality technical findings on projects that are readily accepted by clients and regulators. He stands ready to apply his technical expertise to this tunneling feasibility study.

Chris has 33 years of experience in the fields of engineering geology and geologic hazards, relative to siting, permitting, design, and construction of civil works projects. His experience on these projects includes geologic field mapping, as-built logging, aerial reconnaissance, aerial photograph analysis, trench and borehole logging, aquifer testing, geophysical investigations, installation of monitoring wells and inclinometers, coordination of field exploration, report preparation, and project management.

Selected project experience

Project Geologist, Santa Margarita Water District, Trampas Canyon Dam, Orange County, CA
Directed the geotechnical investigation for the dam site which was repurposed from a tailings dam to a reclaimed water reservoir. Geotechnical investigations included excavation and logging of test pits, aerial photograph analysis, core, rotary wash, hollow stem and bucket auger drilling, and seismic refraction geophysical surveys. Chris performed dam foundation inspections and geologic mapping during construction.

Project Geologist, Los Angeles Department of Water & Power (LADWP), River Supply Conduit Unit 7, Los Angeles, CA
Directed a core drilling investigation that included two vertical and two shallow angle (25° from horizontal) core borings totaling 1002 feet of drilling. The angled core borings were drilled along the tunnel alignment beneath the concrete lined Los Angeles River. Borings encountered gravelly alluvium with cobbles and boulders and conglomeratic bedrock of the Topanga Formation. Co-authored the GDR and GBR for the tunnel project.

Engineering Geologist, LADWP, Foothill Trunk Line Tunnel Unit 3, Pacoima Wash, Los Angeles, CA
Project was a short tunnel with relatively small-diameter in coarse alluvium with cobbles and boulders, and is crossing a creek beneath a structure which is sensitive to tunneling-induced deformation. AECOM performed geologic/geotechnical subsurface investigations, lab testing, and numerical SSI modeling with FLAC3D of the tunnel and two shafts (launching and exit). Chris served as engineering geologist on the project.

Lead Engineering Geologist, LADWP, City Trunk Line South – Unit 4, Los Angeles, CA
AECOM performed geotechnical investigation and provided tunnel design and construction services for this particularly challenging segment of Trunk Line South: a 60-inch pipeline beneath a 50-year old pile-supported road bridge over the Tujunga in Studio City. Chris served as project lead engineering geologist.

Project Geologist, County of San Bernardino, General Plan, San Bernardino County, CA
Prepared the fault hazard section for a Geologic Background Report in support of the updated Safety Element. The Background Report provides a discussion of the geologic hazards that may lead to the loss of property or life as a result of an earthquake or other natural phenomena in the County.

Project Geologist, LADWP, North Haiwee Dam, Inyo County, CA
Directed an investigation of the surface fault rupture hazard at North Haiwee Dam. Investigation was done to assess the potential for surface faulting at a

proposed new dam site located 800 feet north of the existing dam. Comprehensive fault investigations performed in 2006 and 2012 included fault trenching, drilling, geologic mapping, aerial photograph analysis, acquisition and analysis of LiDAR mapping, cone penetrometer testing, sonic drilling, and seismic reflection geophysical surveys. Chris authored CEQA/ NEPA Geology, Soils, and Seismicity Technical Report.

Principal Engineering Geologist, Counties of San Diego and Imperial, Regional Colorado River Conveyance Feasibility Study Northern Alignment Geologic Study, San Diego/Imperial Counties, CA
Participated in preliminary feasibility level studies of a potential aqueduct corridor between El Centro and San Vincente Reservoir. Experience included aerial photo analyses, literature review, and geologic mapping.

Staff Geologist, Metropolitan Water District of Southern California (MWD), Inland Feeder Tunnel, San Bernardino, CA
Participated in the planning and design-level investigations for the Arrowhead East and West and Riverside Badlands tunnels of MWD's Inland Feeder Project. Experience includes aerial photograph analysis, geologic mapping, geologic logging of rock core borings, and geologic logging of several hundred feet of fault trench and side-hill cut exposures, in-situ testing of rock mass permeability, field testing and sampling of groundwater springs and wells, and monitoring well installation.

Project Geologist, City of Los Angeles Department of Public Works, Northeast Interceptor Sewer Tunnel (NEIS), Los Angeles, CA
Participated in the design level services for the NEIS Project. The project was a subsurface exploration for a proposed 8 ½ kilometer long, 2.4-meter finished diameter sewer line that varied from 20 to 50 meters below grade.

Project Geologist, Caltrans, On Call Services Contract, Various Locations, CA
Participated in a variety of subsurface field investigations for Districts 7 and 12. Work included drilling, drill waste hauling/disposal, and geotechnical reports. Services included supporting fast- track schedule projects, often performing field investigation as an extension of Caltrans staff.

Project Geologist, Irvine Ranch Water District (IRWD), Geotechnical Investigation for the Syphon Reservoir Improvement Project, Orange County, CA
Directed the geotechnical investigation for the dam/and reservoir site. IRWD is planning to replace its current dam and 500-acre-foot reservoir with a new earthfill dam creating a reclaimed water reservoir with a storage capacity of approximately 5000-acre feet. The geotechnical investigations included excavation and logging of fault trenches and geotechnical test pits, aerial photograph analysis, diamond core, rotary wash, hollow stem auger drilling, and seismic refraction geophysical surveys.

Project Geologist, LADWP, On-Call Geotechnical Services, Los Angeles, CA
Managed site characterization investigations for several projects performed under the LADWP On-Call Geotechnical Contract. Tasks performed included literature review, analysis of historic aerial photographs, geologic mapping, aerial reconnaissance, downhole logging of bucket auger borings, fault trenching, core drilling, seismic refraction surveys, acoustic televiewer surveys, installation of monitoring wells.

Project Manager and Geologist, City of Arcadia, Geologic and Geotechnical On-Call Services, Arcadia, CA
Managed a geotechnical on-call services contract for the City of Arcadia. Experience includes literature review, geologic mapping, aerial photograph analysis, report preparation and project management. On-call services focused on landslide, debris flow, and rockfall damage caused by storm events of January and February 2005.

Project Manager and Geologist, IRWD, Fault Investigation for Santiago Creek Dam, Orange County, CA
Directed an investigation of the surface fault rupture hazard at Santiago Creek Dam. The subject of the investigation was a fault identified as the "Terrace fault" which was suspected of crossing beneath the right abutment of the dam based on an as-built construction photograph from the 1930's.

Project Geologist, MWD, Diemer Filtration Plant, Slope Stabilization for East Wash Water Tank, Orange County, CA
Investigated the static and seismic stability of a 60-foot diameter, 80-foot-tall tank that straddles the contact between native bedrock and a fill slope. Directed field investigations which included rotary wash, core, and bucket auger drilling.

Project Manager, Rancho California Water District, Vail Dam Seismic and Hydrologic Remediation Project, Temecula, CA
Managed the geotechnical investigation phase of the project which included geologic mapping, core drilling, packer testing, piezometer installation, downhole geophysical surveys, and seismic refraction surveys.

Wolfgang Roth, PhD, PE, GE

Tunneling Technical Lead

Key Skills
Earthquake Engineering
Foundation Engineering
Tunneling
Numerical Modeling
Forensic Engineering
Landslide Stabilization
Ports & Waterfront Structures

Years of Experience
47

Years with AECOM
41

AECOM Position
Vice President, Principal Geotechnical Engineering, U.S, West Water

Education
Post-Doctoral Fellow, Foundation Engineering, University of California, Los Angeles, 1975
PhD, Soil Mechanics, Technical University, Graz, Austria, 1973
MS, Civil Engineering, Technical University, Graz, Austria, 1967
BS, Civil Engineering, Graz University of Technology, Austria, 1964

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Registrations
Geotechnical Engineer, CA #GE739, issued 9/9/1987, exp.3/31/2022
Professional Civil Engineer, CA, #30834 issued 8/15/1979, expires 3/31/2022

Professional Associations
American Society of Civil Engineers
Earthquake Engineering Research Institute
American Underground-Construction Association
United States Society on Dams
The Dispute Resolution Board Foundation
Associate Professor, Foundation Engineering/ Catholic University, Rio de Janeiro, Brazil, 1975-1977

Professional history

Dr. Roth combines a strong theoretical background with extensive practical experience in geotechnical engineering. His areas of expertise cover analysis-, design- and construction-related aspects of tunnels, earth dams, landslide stabilization, and foundation systems.

Working for AECOM and legacy companies for more than 45 years, Wolfgang has broad experience and knowledge in geotechnical engineering analysis, design, and construction. In earthquake engineering, he has pioneered the practical application of nonlinear, effective-stress dynamic analysis of earth structures including soil-structure interaction. He began his professional career working for ICOS of Vienna, Austria, which pioneered top-down, cut-and-cover construction with slurry diaphragm walls. Well-known in the industry, Wolfgang has received several Engineering Excellence awards from the American Consulting Engineers Council, has authored numerous technical papers, and served on several Design Review Boards for tunnel projects.

Selected project experience

Principal-in-Charge, Los Angeles Department of Water and Power (LADWP), River Supply Tunnel, Upper Reach, Units 5, 6, and 7, Los Angeles, CA
Subsurface investigation, route-selection study, public-outreach assistance, tunnel-engineering consulting, and tunnel construction monitoring to LADWP's in-house design team for total 5-mile long, 10 to 14-foot-diameter tunnels bored through the Cities of Los Angeles and Burbank. The tunnels are constructed in alluvium soils using Earth Pressure Balance (EPB) TBMs and Pipe Jacking. The alignments cut through densely populated areas of the San Fernando Valley and also cross the I-101 Freeway and the Los Angeles River.

Principal-in-Charge, LADWP, City Trunk Line South, Unit 4, Tujunga Wash Crossing, Studio City, CA
Subsurface investigation, concept/feasibility study of alternatives, and design and construction supervision jointly with subconsultant Dr. Sauer Corporation (DSC) for a 9-ft diameter SEM (NATM) tunnel under Tujunga Wash. The 300-foot-long S-shaped tunnel alignment was "snaked" thru tightly spaced bridge-foundation piles. Recognized by ASCE LA Section as 2016 Water Project of the Year, and 2016 Construction Project of the Year.

Principal-in-Charge, LADWP, Foothill Trunkline, Pacoima Wash Crossing, Los Angeles, CA
Subsurface investigation, conceptual and final design of 9-foot-diameter SEM tunnel under Pacoima Creek jointly with subconsultant DSC. The tunnel was to be driven in coarse alluvial deposits with cobbles/ boulders, beneath the foundations of a decades-old concrete-arch bridge. After completion of the final design in 2019, the ready-for-bid tunnel project was put on temporary hold while LADWP awaits the outcome of one last attempt to obtain ROW permits for above-ground crossing of the pipeline instead of tunneling.

Constructability Review/Technical Advisor, Caltrans, Devil's Slide Tunnels, San Mateo, CA
Member of joint AECOM/DSC Construction Management team; Pre-bid review of NATM (rock SCL) design package including GDR and GBR,

engineering analyses, drawings, and specifications; preparation of written recommendations for clarification and improvement of these documents; and value-engineering aimed at streamlining the design, while focusing on claim prevention.

Technical Lead, Santa Clara Valley Transportation Authority (VTA), Bay Area Rapid Transit (BART) Extension to San Jose, CA
Directed feasibility study for 5-mile twin tunnels proposed through downtown San Jose. Evaluated state-of-the-art EPB and Slurry TBM technologies for tunneling; and Deep Soil Mixing and slurry diaphragm walls for top-down construction of stations below the GW table. Participated in conceptual design workshops for station design through downtown San Jose.

Lead Geotechnical Engineer, LADWP, East Central Interceptor Sewer (ECIS) Project, LA, CA
Directed subsurface investigation and provided design and construction consultation for total 16-mile tunnels as part of integrated team with City's Geotechnical Engineering Division; consultation on specifying and operating EPB TBMs; and participation in the review/approval process for contractor submittals.

Member of Design Review Board, Sheppard Line Subway, Toronto, Canada
Review of tunnel and station design and construction methods. Based on Dr. Roth's findings from EPB-TBM failure investigations in Los Angeles and Taipei, he was instrumental in modifying owner-purchased EPB TBMs to be able to handle alluvium with cobbles and boulders below the groundwater table.

Special Consultant, Alameda Rail Corridor, Corridor Design, Los Angeles, CA
Developed Value Engineering alternative design based on numerical modeling and full-scale field testing, for reducing the required design depth of wall caissons for the 35-ft high trench walls of the 10-mile long Mid Corridor section. This work led to construction-cost savings of $5M.

Chief Geotechnical Engineer of CM team, LA Metro Redline, Los Angeles, CA
Reviewing contractor submittals for cut-and-cover stations and tunnels. Performing numerical modeling to (1) investigate failures of tunnel and station excavation support; (2) predict tunnel deformations induced by excavating 100-foot deep sinkhole-repair shaft on Hollywood Blvd; and (3) evaluate seismic performance of final tunnel liner.

Principal-in-Charge/Lead Geotechnical Engineer, LADWP, Stone Canyon Bypass Tunnel, Los Angeles, CA
Geotechnical investigation, tunnel design consultation, construction monitoring, and review of change order requests.

Lead Tunnel Engineer, LADWP, Pacoima Dam Spillway Tunnel, Los Angeles, CA
Geotechnical site investigations, feasibility study, preliminary and final design, and construction monitoring of tunnel enlargement from 15 feet to 20 feet in diameter, in hard volcanic rock.

Technical Advisor, LADWP, Harbor Siphon and Force Main, Los Angeles, CA
Special Consultant performing failure investigation of two 80-foot-deep tunnel starter shafts supported by ground freezing, which had collapsed due to insufficient thickness of ice walls and invert plugs.

Principal-in-Charge, LADWP, North Outfall Sewer (NOS) Rehab Project, Los Angeles, CA
Investigation of voids around tunnel liner, feasibility study of liner-rehab program for 80-year-old, 1-mile-long tunnel segment of NOS. Conceptual and final design, and construction inspection of comprehensive grouting program.

Selected Publications

"SEM Tunneling of City Trunk Line across Tujunga Wash" 2018 North Am. Tunnel Conf, Washington D.C.

"Effect of High In-Situ Stress on Braced Excavations," 2008 Int. Conf. Case Histories Geotech Eng, Arlington, VA

"Rehabilitation of 80-year old North Outfall Sewer (NOS) Tunnel," 2008 North American Tunnel Conf, San Francisco, CA

"Claims and Forensic Engineering in Tunneling," 2006, ASCE 4th Forensics Congress, Cleveland, OH.

"Numerical Modeling in Forensic Engineering," 2001, Int. Conf. Comp. Meth. in Geomechanics; Tucson, AZ.

"Design Analysis and Field Verification of Alameda Corridor Retaining Walls," 2001, Geo-Inst. Conf. Virginia Tech.

"Automated Instrumentation as a Design & Construction Aid," 2001, TRB Meeting; Washington, D.C.

"Numerical Modeling in Underground Design & Construction," 1999, Geo-Inst. Conf., Urbana-Champaign, Ill.

"Two Construction Claims on the NORS Project," 1997, World Tunnel Congress, Vienna, Austria.

Hossein Changani, PE

Tunneling Technical Lead - Back-up

Key Skills
Tunneling
Numerical Modeling
Landslide Stabilization
Earthquake Engineering
Foundation Engineering
Ports & Waterfront Structures

Years of Experience
17

Years with AECOM
7

AECOM Position
Civil Engineering VI, Project Manager - Tunneling

Education
MS, Mining Engineering, University of Utah, 2012
MS, Mining Engineering, Amirkabir University of Technology, Iran, 2005
BS, Mining Engineering, Yazd University, Iran, 2003

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Registrations
Professional Civil Engineer, CA #92677, issued 6/4/2021,exp. 9/30/2021
Professional Civil Engineer, UT # 11926349-2202,exp.3/31/2023

Professional history

Hossein Changani has a vast amount of experience in soil structural interaction (SSI) modeling in tunneling, slope stability, and seismic evaluation of dams and appurtenant works; he has supported many of AECOM's tunnel and dam projects in California as a senior project engineer and project manager.

Hossein has 17 years of broad experience and knowledge in tunnel engineering analysis, design, and construction in hard-rock/soil tunneling (NATM) projects. Throughout these years, Hossein has been involved closely with underground space design, instrumentation planning, installation, monitoring and ground control, and performed numerical analyses to evaluate seismic performance, design support systems for underground spaces and ground stability using UDEC, FLAC2D/3D, and PLAXIS 2D/3D. He began his broad experiences in underground mining design, and then moved on to numerous design and construction experiences in open TBM, D.S. TBM, EPB TBM, and Drill and Blast tunneling. Hossein combines a strong theoretical background with extensive practical experience in ground support and excavation engineering. His areas of expertise cover design and construction-related aspects of tunnels, landslide stabilization, earth dams, and foundation systems.

Selected project experience

Senior Tunnel Engineer, Los Angeles Department of Water and Power (LADWP), River Supply Tunnel, Upper Reach, Units 5, 6, and 7, Los Angeles, CA
A total of 6 miles of 10-14-ft diameter tunnels driven with Earth Pressure Balance (EPB) TBMs and Pipe-Jacking in predominantly alluvial soils through the cities of Los Angeles and Burbank, with alignments crossing beneath the 101 Fly and LA River. Geotechnical and environmental subsurface investigations and lab testing; geologic and seismic-hazard assessments; preparation of Geotechnical Data-, Interpretation-, and Baseline Reports (GDR, GIR, and GBR); seismic performance analysis of tunnel segmental liner with FLAC; consulting to LADWP's in-house tunnel design team; and assistance during bidding. Services provided during ongoing construction include contractor-submittal reviews, instrumentation installation and monitoring, and construction monitoring jointly with LADWP's in-house Geotech engineering and construction teams.

Senior Tunnel Engineer, LADWP, Foothill Trunk Line Tunnel, Los Angeles, CA
Geologic/geotechnical investigations, lab testing, and numerical SSI modeling with FLAC3D for a 10-ft diameter tunnel crossing Pacoima Wash under foundations of a decades-old concrete arch bridge. Shafts and tunnel were designed for construction with Sequential Excavation Method (SEM) using shotcrete. The carrier pipe will be Earthquake Resistant Ductile Iron Pipe (ERDIP) able to accommodate horizontal ground extension due to potential fault rupture displacement. The shotcrete liners of the circular shafts provide semi-ridged confinement of the raiser pipes protecting them from fault-rupture related damage. AECOM will also provide bid assistance and construction-monitoring services.

Tunnel Engineer, LADWP, City Trunk Line South–Unit 4, Studio City, CA
This tunnel constructed with SEM under Tujunga Wash. The S-shaped tunnel alignment had to be "snaked" thru tightly spaced bridge-foundation piles.

Construction monitoring of this project due to sensitivity of tunnel location under wash channel passing between bridge foundation and underneath of sold sewer line made lots of challenge during the design and construction. This project was recognized by ASCE Los Angeles Section as 2016 Water Project of the Year and 2016 Construction Project of the Year.

Project Manager, LADWP, Eagle Rock Dam, Los Angeles, CA
Managed support services to evaluate fault displacement characteristics of the Eagle Rock Fault (location, orientation, and sense of slip), potential dimension of ruptures, and calculation of deterministic fault displacement values. The existing dam fill is about 323,000 cubic yards and has a maximum height of 62 feet and impounds a reservoir with a capacity of 257 acre-feet.

Project Manager, LADWP, Long Valley Dam, Mono County, CA
Managed support services to evaluate static and pseudo-static slope stability analysis of rock slope adjacent to the Long Valley Dam Spillway forebay and sluice gate house by FLAC 2D, evaluate probability of rock-slope failure mode by analysis of joint study data by Dips v7. The existing dam is a freshwater reservoir of approximately 183,465-acre feet. An ungated Side-Channel Spillway is located at the left abutment of the dam with a trapezoidal reinforced concrete channel (forebay) transitioning into a spillway tunnel. The spillway tunnel comprises an approximately 130-foot long inclined section that transitions to a 625-foot long horizontal section. The entire spillway tunnel was constructed by mining through rock consisting of Rhyolitic Bishop Tuff.

Senior Project Engineer, LA Metro, Regional Connector Transit Corridor, Los Angeles, CA
Perform numerical analysis using FLAC 2D for evaluation of 4th street sewer manhole replacement impact on Right Corridor (RC) tunnel lining. Perform numerical analysis using PLAXIS 2D to back calculate geotechnical properties to adjust model with real time behavior of SOE and reanalyze SOE performance at 2nd/Broadway station.

Project Engineer, LADWP, Tinemaha Dam, Inyo County, CA
Seismic stability and nonlinear dynamic deformation analyses of Tinemaha dam by FLAC2D considering various reservoir pool elevations.

Project Engineer, Diemer Filter Outlet Conduit Seismic Upgrade, Final Analysis and Structural Design, Metropolitan Water District, Diemer, CA
Seismic performance analysis of 121" Filter Effluent Conduit to perform the final structural design of the caissons to provide the required seismic mitigation. Numerical modeling with FLAC3D was conducted to evaluate effects of earthquake on retrofit option.

Project Engineer, Diemer Wash Water Reclamation Plant #2, Metropolitan Water District, Diemer, CA
SSI analysis of a water plant that supported by caisson piles. Numerical modelling with FLAC3D was conducted to evaluate effects of normal and reverse polarity of earthquake on retrofit option.

Project Engineer. Geotechnical Engineering Design Analysis of LA Paseo Del Mar (White Point) Landslide, Back Analysis, Los Angeles, CA
Performed numerical back analysis of White Point Landslide using FLAC 2D with shear strength-reduction technique. In this numerical work, stability of rock masses containing joint planes modeled by combining the ubiquitous joint and Mohr-Coulomb models to analysis of sliding along slip surfaces without requiring the placement of actual interface elements in the numerical mesh. Different embankment options such as Buttress fill, CIDH piles, Pin piles are evaluated in preliminary design phase.

Project Engineer, Los Angeles County Museum of Art, LACMA Phase III Transformation Project, Los Angeles, CA
Responsible for developing pile testing program, which included instrumentations installation, provide testing plan, and on-site support to run pile load testing to update preliminary capacities assumptions and provide input for structural design team. Run soil-structure interaction (SSI) analyses with FLAC 2D/3D to evaluate construction effect of LACMA new building on existing Metro tunnels (Purple Line 1).

Project Engineer, Metropolitan Water District of Southern California (MWD), Sepulveda Canyon Control Facility, Los Angeles, CA
Served as engineer who ran dynamic soil-structure interaction (SSI) analyses with FLAC3D to investigate effect of potential for seismic-induced lateral spreading on facility's components. Performed Two comprehensive modeling to select a preferred seismic mitigation option as basis for developing a Preliminary Design Report focusing on the tanks, and one covering the entire site including tanks, PCS, HEP, and pipelines.

Irwan Halim, PhD, PE

Tunneling – SEM Specialist

Key Skills
Tunnels & Underground Structures
Geotechnical & Foundation Engineering
Sequential Excavation Method (SEM) Tunneling
Project Management

Years of Experience
31

Years with AECOM
13

AECOM Position
Vice President, Tunnel and Underground Engineering

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Education
PhD, Civil Engineering, University of Illinois, Urbana, 1990
MS, Civil Engineering, University of Illinois, Urbana, 1986
ST, Civil Engineering Technology, University of Indonesia, 1984

Registrations
Professional Civil Engineer, MA #38756, iss.1995, exp.6/30/2022
Professional Engineer, OH #76647, iss.2012, exp. 12/30/2021
Professional Engineer, VA #0402055985, iss.2016, exp. 5/31/2022
Professional Engineer, NY #099508, iss.2018, exp.10/31/2023
Professional Engineer, RI #7921, issued 2003, exp. 6/30/2023
Professional Engineer, MI #54966, iss.2008, exp. 12/6/2022

Professional Associations
Member, Underground Construction Association of SME
Member, American Society of Civil Engineers
Member, Boston Society of Civil Engineers
Member, BSCES Geo-Institute

Trainings and Certifications
Design and Manufacturing of Precast Segments, 2018 NAT
Tunnel Rehabilitation, 2017 RETC
Underground Blasting & Risk Management, 2015 RETC
Grouting in Underground Construction, 2014 NAT

Professional history

Dr. Halim's tunneling expertise comes from decades of experience with design and construction of mined and cut-and-cover tunnels and structures in both soft ground and hard rock; TBM-driven; drill-and-blast; New Austrian tunneling method/sequential excavation method (NATM/SEM) excavations; and soil/rock-structure interaction analyses.

Irwan has over 30 years of experience in geotechnical and underground projects in the US and abroad. He has provided engineering and design services for major transit and water/wastewater agencies throughout New England and the United States and is a nationally recognized specialist in his field. Irwan's experience includes major SEM and large TBM-driven tunnels up to 43 feet in diameter, and major transit and wastewater tunnels. His geotechnical expertise includes system reliability, subsurface investigations and characterizations, laboratory testing and analyses, design of foundations and retaining structures, slope stability analyses, seismic and liquefaction analyses of tunnels and embankments, land reclamation, and construction supervision. He has provided geotechnical engineering design and construction monitoring services on major deep excavations, embankment dams, and tunnels projects in the United States and Canada.

Selected project experience

Independent Technical Reviewer, San Francisco Public Utilities Commission (SFPUC), New Irvington Tunnel, Fremont, CA
Independent Technical Reviewer to provide design and constructability peer review of a new 3-1/2-mile-long water conveyance tunnel and shafts, which is being built as part of the SFPUC Water Supply Improvement Program.

Lead Tunnel Engineer, Upper Rouge Tunnel CSO Control Project, Detroit, MI
Lead Tunnel Engineer for this 30-foot finished diameter TBM-driven water storage tunnel in rock and the associated adits, chambers and shafts. Performed ground and groundwater characterizations for design purpose, and analyses for the tunnel initial support systems. Prepared contract documents including drawings, specifications, and geotechnical baseline reports. Tunnel support systems included two-pass initial support and cast-in-place concrete lining, and a single-pass bolted and gasketed concrete segmental lining in conjunction with open face TBM. Excavations for the underground chambers were designed for SEM with initial support consisting of rockbolts, shotcrete, and lattice girders.

Design Manager, City of Columbus Division of Sewerage and Drainage, Lockbourne Intermodal Subtrunk Sewer, Columbus, OH
Performed preliminary and final design engineering for the project consisting of approximately 10,000 LF of 78" diameter sewer to be installed by microtunneling, and another 7,000 LF of 60" diameter sewer to be placed in open cut. The geologic

condition consists of a complex stratigraphy of glacial, alluvial, and lacustrine deposits with numerous cobbles and boulders presence. Provided engineering services during construction.

Principal Tunnel Engineer, Silver Line Phase III Tunnel Project, Boston, MA
Performed preliminary design engineering for twin busway tunnels to be constructed with the SEM through densely populated urban areas. The tunnels, with diameter ranging from 25 to 35 feet, are to be built in soft grounds consisting of glacial soils and clays up to 100 feet deep below ground surface, and will have to cross underneath some existing subway and highway tunnels. Responsibilities include preliminary design of pre-support and initial support systems for tunnels and station excavations.

Lead Tunnel/Geotechnical Engineer and Project Manager, Narragansett Bay Commission CSO Phase I Tunnel Project, Providence, RI
Lead Tunnel/Geotechnical Engineer and Project Manager during construction. Performed evaluation of rock mass properties based on geotechnical data and numerical modeling and analyses for tunnel support requirements during final design. This included development of ground reaction and support curves based on tunnel geometry and in-situ stresses. The Main Spine tunnel consists of approximately 16,000 linear feet of deep tunnel in complex sedimentary rock formations. The finished inside diameter of the tunnel is 26 feet and the depth of the tunnel ranges from approximately 200 to 280 feet. Tunnel support systems consisted of expanded precast segmental lining for initial support, and cast-in-place concrete lining as permanent support.

The associated 60-foot wide by 120-foot long by 70-foot high underground pump station cavern was excavated in rock by drill-and-blast SEM with rockbolts and shotcrete as permanent lining system. Responsibilities include engineering oversight of all construction packages, design and bid packaging for various construction packages, and resolving all field related issues pertaining to the design.

Lead Geotechnical Engineer, Downtown Ottawa Transit Tunnel Project, Ottawa, ON
Manage subsurface investigation program for a new light rail transit system which include 3.2 km twin tunnels and four underground stations to be mined in rock. Dr. Halim's responsibilities include subsurface characterization and geotechnical analyses and design for the tunnel and station excavations, to be done by TBM and SEM respectively.

Tunnel Lead, Shepard Avenue East LRT Extension, Toronto, ON
Performed subsurface investigation and preliminary design engineering for twin LRT tunnels to cross underneath an existing highway. The tunnels are approximately 1 kilometer long and 6 m in diameter, to be constructed with the combination of mined and cut-and-cover excavations in soft grounds consisting of glacial till and silty fine sand layers. Alternative mined excavation techniques included twin TBM tunnels with precast segmental lining and SEM tunnels with pre-excavation support, initial shotcrete, and cast-in-place concrete lining.

Tunnel Designer, Linac Coherent Light Source Tunnel, Stanford University Linear Accelerator Center, Menlo Park, CA
Performed preliminary and final designs for 1500 feet of 20-ft diameter tunnel to be excavated in weak sedimentary rock by the SEM. The design also included several connecting tunnels and a 46-foot wide underground cavern, which was the largest of its kind. Tunnel support system consisted of the use of shotcrete as both the initial and final tunnel linings.

Tunnel Lead, Hartsfield Jackson International Automated People Mover Tunnel, Atlanta, GA
Performed design reviews and geotechnical baseline report for twin bored tunnel (21-ft inside diameter) of about 2,100-ft in total length, average 30-ft below grade. The majority of the tunnel will be mined through fill by SEM.

Erik Larsen, D.Env

Resource Agency Permitting Lead

Key Skills
Water Resources Regulatory Issues
Environmental Science, Planning and Permitting

Years of Experience
23

Years with AECOM
14

AECOM Position
Sr. Wetlands Scientist/Regulatory Specialist

Education
D.Env, Doctorate, Environmental Science and Engineering, University of California, Los Angeles
MS, Biology, California State University, Long Beach, 1995
BS, Biology, Westmont College, 1992

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Professional Associations
Society of Wetland Scientists
CRAM Level 2 Committee (California Wetland Monitoring Workgroup)
Environmental Law Institute
Association of State Wetland Managers
Society of Wetland Scientists

Trainings and Certifications
Wetland Delineation
California Rapid Assessment Method (CRAM) Certified trainer

Professional history

Dr. Larsen is a regulatory specialist with extensive experience in regulatory issues related to water resources and environmental planning projects, having completed numerous permit application processes, ranging from nationwide permits to long-term, programmatic standard individual permits. Currently, Erik is working with the San Bernardino Valley Water Conservation District (SBVWCD) on developing their programmatic permit program for projects within the Wash Plan Area.

Erik has extensive experience in biological resources and regulatory issues related to wetlands, with expertise in wetland delineation and functional assessment, wetland ecology, restoration, permitting (per Clean Water Act, Rivers and Harbors Act, Section 408, California Fish and Game Code, Porter Cologne, Coastal Act), water quality issues, and watershed management. In addition to wetlands, Dr. Larsen conducts rare plant surveys, vegetation mapping, and has extensive preparation of biological resources sections of CEQA documents. Erik also has extensive experience managing and preparing such environmental documentation as project level and programmatic NEPA/CEQA documents, innovative, programmatic permitting solutions, and Special Area Management Plans (SAMPs). Dr. Larsen has worked on many infrastructure projects including transmission lines, water distribution pipelines, mining, solar facilities, and transportation corridors (e.g., toll roads, arterial roads). Prior to AECOM, he worked at the USACE as a regulatory project manager responsible for permit applications for the Clean Water Act, Section 404 regulatory program.

Selected project experience

Lead Regulatory Specialist/Task Manager - Jurisdictional Delineation (JD), SBVWCD, Programmatic Permitting Process for Covered Activities, Cities of Redlands and Highland, San Bernardino County, CA
Led a team of delineators that conducted a JD within an approximately 5,000-acre project area. Arid stream delineation protocols were used to map and characterize this portion of the watershed. The "Wash Plan HCP" Process provided endangered and threatened species take coverage for multiple proposed projects; AECOM is leading a programmatic permit process for SBVWCD that provides waters permitting per Federal (404/401) and State (WDR/1602) processes. Delineation includes areas of the upper Santa Ana River (below Seven Oaks Dam), Mill Creek, Plunge Creek, and City Creek. Follow-up work includes developing programmatic permit process, and producing the applications for projects proposed over the next 30 years. Note: *The SBVMWD is not a part of the programmatic permit process for the Wash Plan, though Dr. Larsen has coordinated with SBVMWD staff in the process of establishing the permit process for SBVWCD.*

Regulatory Specialist - Santa Margarita Water District, Trampas Canyon Dam and Reservoir, San Juan Capistrano, CA
Project involved designing a zoned earthfill dam on 177-acres of property to create an unlined recycled water reservoir. The site was previously used for sand mining and the reservoir, when completed in 2020, was considered largest recycled water reservoir of its type in Southern California. Dr. Larsen served as regulatory advisor to the project team on permitting issues, specifically with the 401 Water Quality Certification and Biological Monitoring/Rare Plant Issues.

Wetland/Biological Biologist, Orange County Public Works (OCPW), Santa Ana River Parkway Extension Project, Orange County, CA
Wetland/biological technical studies and biological resources section of Environment Impact Report (EIR). AECOM prepared an EIR for the proposed Santa Ana

River Parkway Extension Project, and is currently preparing and leading the permit application process (404/408, 401, 1602). The project is located within a 2-mile stretch of the Santa Ana River downstream of Prado Dam. As part of the EIR preparation, AECOM conducted supplemental vegetation mapping, and a jurisdictional delineation for the extent of the project that overlaps waters of the U.S., including wetlands, as well as riparian habitat jurisdictional to the California Department of Fish and Wildlife (CDFW). AECOM assisted the OCPW in impact avoidance so that 404/401 were no longer required.

CEQA/Permitting Project Manager, OCPW/Parks, Multiple Projects, Orange County, CA
Served as CEQA/Permitting project manager for several IS-MND/Permitting projects. The East Bluff Drainage Repair Project involved preparation of CEQA Initial Study/Mitigated Negative Declaration (IS-MND), technical reports, and regulatory permits for the repair of a coastal bluff which eroded into the bay. As the repair would impact an on-site wetland, the permit process involved complex coordination with the Coastal Commission in the process of obtaining a CDP. The task included a jurisdictional delineation, preparation of regulatory permits for the USACE, CDFW, RWQCB, and Coastal Commission (a CDP), and preparation of both on-site and off-site restoration plans (HMMP).

Permitting, OC Sanitation District, 5-67 Bay Bridge Force Mains and Pump Station Project, Orange County, CA
AECOM served as lead regulatory permitting specialist for this project, and prepared a permit management plan, as well as permits for one of two phases (thus far) of the project (geotechnical investigation; 404, NMFS Consultation, Eelgrass Survey, 401, CDP de minimis waiver). Coordination involved presenting project to the SC-DMMT (required for dredging activities). Agency coordination involved City of Newport Beach planning staff, Coastal Commission (Long Beach, CA), USACE, RWQCB, State Lands Commission, CDFW, NMFS, USFWS, and County of Orange. Latter project phase will require CDP applications per the CCA and City's LCP, public outreach to City residents, and a Site Development Review Permit (City).

Regulatory Permitting, OCPW and OCFCD, Haster Basin and Recreational Field Project EIR, and Recreational Field Project Habitat Mitigation Monitoring Plan (HMMP), Orange County, CA
Assisted OCFCD with regulatory permitting, which included a Standard Individual Permit (SIP), and associated permitting documents such as the JD, Draft Public Notice and Environmental Assessment documents. Dr. Larsen provided oversight for the preparation of the HMMP and Long-Term Management Plan (LTMP). He developed the mitigation plan with native plant species, and then continued with maintenance and performance monitoring of the restoration site after construction (subsequent five-year period). AECOM assisted the OCPW in getting the mitigation site approved by the regulatory agencies.

Lead Regulatory Specialist/Task Manager (JD). City of Rancho Mirage, Frank Sinatra Bridge Project, Rancho Mirage, Riverside County, CA
Managed preparation of the JD report and rare plant survey as part of the CEQA IS-MND process. Delineation was conducted for a portion of the Whitewater River southeast of Palm Springs. A rare plant survey was also conducted for the Coachella Valley Milk Vetch, and endangered plant found within the Whitewater River watershed. Coordination is ongoing with the City and Caltrans, and regulatory permitting process will occur during 2021.

Technical Support – JD, Metropolitan Water District of Southern California (Metropolitan), Programmatic Regulatory Permitting for the Orange County Distribution System Infrastructure Improvement Plan (DSIPP) Project, Orange County, CA
AECOM has provided environmental services to Metropolitan under an on-call services agreement. The scope of the agreement included Phase 1 of a programmatic regional general permit program to support operations and maintenance activities for Metropolitan infrastructure in jurisdictional waters/wetlands in the Orange County. Dr. Larsen supported the JD Report, preparation of permit applications for SIP process, programmatic HMMP, and agency coordination process with the USACE.

Permitting Task Lead, Water Replenishment District of Southern California, Regulatory Permitting for Turn-Out Structure Projects and New Water Distribution Pipeline, Los Angeles County, CA
As part of Groundwater Reliability Improvement Program, Dr. Larsen was the lead for obtaining permits as required by Sections 404, 401 of the Clean Water Act and Section 1602 of the California Fish and Game Code. Duties involved conducting JDs for all project areas, preparing permitting documentation, and conducting agency coordination. Assisted with coordination with USACE on the Section 408 process for work within the levee along the San Gabriel River.

Arthur Popp

Resource Agency Permitting Lead – Back-up

Key Skills
Biologist
Aquatic Ecologist
Regulatory Specialist
NEPA/CEQA Permitting

Years of Experience
27

Years with AECOM
12

AECOM Position
Senior Biologist, Project Manager

Education
MS, Forestry, Fisheries and Wildlife, University of Nebraska, Lincoln,1993

BS, Biology, Nebraska Wesleyan University, Lincoln, 1991

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Trainings and Certifications
California Rapid Assessment Methodology (CRAM) for Wetlands
Range Safety Officer, U.S. Marine Corps Base Camp Pendleton

Professional history

Arthur Popp's qualifications as a biologist and project manager include 27 years of experience as a botanist, aquatic ecologist, and wetland specialist. Art has experience in conducting general vegetation surveys, focused surveys for sensitive plant species, aquatic bioassessments, and wetland determinations. He has assisted clients in understanding and complying with regulations that govern impacts to sensitive biological resources and provided options that may avoid or minimize such impacts, permitted the activities that propose impacts, and coordinate mitigation projects that satisfy both the client and regulatory agencies. Art also has experience with pre- and post-project natural resource monitoring, including assessments of stream habitats and macroinvertebrate community composition, and natural vegetation communities.

Art's experience in the consulting field involves designing, conducting, and managing projects for private landowners, utility companies, municipalities, regulatory agencies, and non-profit resource conservation groups. He has served as project manager and led efforts on utility, transportation, and renewable resource development projects, and habitat restoration projects. He has overseen projects from field surveys and technical reports through the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes.

Selected project experience

Biological Resource Lead, Los Angeles Department of Water and Power (LADWP), City Trunk Line North, Los Angeles, CA
Conducted a field survey and prepared the biological resources section of an Initial Study prepared in compliance with CEQA. Also prepared a biological resources technical memorandum in support of LADWP efforts to obtain funding from the State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund (SRF) for construction of the proposed water trunk line. Coordinated preparation of the report with LADWP and provided support during preparation of the SRF application package.

Biological Resource Lead, LADWP, LA Groundwater Replenishment Project, Los Angeles, CA
Conducted field surveys, prepared biological technical report, and assist with preparation of the biological resource section of the Environmental Impact Report being prepared for this groundwater recharge project. Proposed project includes construction of a water treatment plant and recycled water conveyance pipelines.

Project Manager, LADWP, Silver Lake Reservoir Complex Biological Surveys, Los Angeles, CA
Managed nesting bird surveys and biological monitoring efforts since 2014 during construction and maintenance projects, including installation of new conveyance water lines at the Silver Lake Reservoir Complex. Survey and monitoring efforts are focused on a great blue heron rookery within the complex. Conduct surveys for great blue heron and other nesting birds, monitor great blue heron nests during construction, prepare monthly monitoring reports, and perform various project management functions. Also has lead team of biologists that have conducted bat surveys and turtle trapping in the complex, and prepared "white papers" for DWP Public Affairs staff regarding the use of the complex by herons after draining of the reservoir in 2017, use of the complex by coyotes, and use of the complex and surrounding neighborhood of water birds.

Biological Resource Lead, LADWP, Victory Pump Station Replacement Project, Los Angeles, CA
Conducted field survey and prepared Biological Resources Memorandum in support of preparation of a Mitigated Negative Declaration for the project.

Biological Resource Lead, LADWP, North Haiwee Dam No. 2 Seismic Retrofit Project, Owens Valley, CA
Prepared the Biological Resources section of the Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) for the project. Also coordinated with LADWP on preparation of the biological technical report prepared by LADWP biologists in support of the EIR/EA. Also provided technical support for coordination with BLM regarding the project's compliance with the Desert Renewable Energy Conservation Plan during preparation of the EIR/EA.

Biological Lead, City of Los Angeles, Bureau of Engineering (BOE), Terminal Island Water Reclamation Plant Wildlife Surveys, Long Beach, CA
Conducted wildlife surveys and prepared a memo report to support environmental review in advance of facilitate upgrades at the Terminal Island Water Reclamation Plant.

Biological Resource Lead, BOE, Mt. Lee Pump Station and Pipeline Project, Los Angeles, CA
Conducted field survey and prepared a Biological Resources Assessment Report in support of environmental review of a project to install a water line and other components in Griffith Park in Los Angeles.

Project Manager, Los Angeles County Department of Public Works (LACDPW), Big Dalton Dam Sluiceway Rehabilitation/ Access Road Improvements Project, Glendora, CA
Directed subconsultant and AECOM biologists during various pre-construction surveys, conducted surveys, and coordinated preparation and submittal of survey reports to LACDPW, for further submittal to California Department of Fish and Wildlife (CDFW). Subsequently oversaw biological compliance monitoring during construction pursuant to permits from CDFW obtained for the project. Coordinating field visits and surveys and prepared monitoring updates for LACDPW.

Project Manager, Orange County Public Works (OCPW), Villa Park Dam Sub-drain System Modification Project, Villa Park, CA
Prepared Nesting Bird Management and Monitor Plan Report for submittal to CDFW. Managed preconstruction surveys and compliance monitoring during construction with a focus on special-status species. Prepared survey and monitoring reports and provided technical support to OCPW during coordination with CDFW and USFWS.

Project Manager, OCPW, Peters Canyon Channel Maintenance Project, Irvine, CA
Art managed and conducted pre-construction surveys for western pond turtle, bats, and nesting birds in compliance with regulatory permits issued for the project. Also managed biological resource compliance monitoring, prepared and submitted weekly monitoring reports, and performed various project management functions.

Project Manager, U.S. Army Corps of Engineers (USACE) – Los Angeles District, Supplemental Environmental Assessment (SEA)/Environmental Impact Report (EIR) Addendum for Reach 9, Phases 4, 5A, 5B, and BNSF Bridge, Orange and Riverside Counties, CA
Led preparation of a Draft SEA/EIR Addendums for four flood protection projects proposed for construction in Reach 9 of the Santa Ana River. Prepared sections and integrated sections written by other team members into the draft document. Also oversaw reconnaissance-level biological surveys of the project sites. Prepared a 401(b)(1) Evaluation to be appended to SEA/EIR Addendum.

Project Manager, USACE -Los Angeles District, SEA/EIR Addendums for the California Institution for Women Dike and the Yorba Slaughter Dike Projects, San Bernardino County, CA
Led preparation of two SEA/EIR Addendums for two flood protection dike structures proposed for construction in the Prado Basin. Prepared sections of the SEA/EIR Addendums, integrated sections written by other team members into the draft and final documents. Oversaw biological resource assessment surveys of the project sites and preparation of a biological technical report.

Biological Resource Lead, Water Replenishment District of Southern California, Groundwater Reliability Improvement Project, Los Angeles, CA
Conducted field surveys, prepared biological technical report, and assisted with preparation of the biological resource section of EIR prepared for this groundwater recharge project. Proposed project included construction of a water treatment plant and recycled water conveyance pipelines.

Compliance Lead, OCPW and OC Parks - Upper Newport Bay-East Bluff Drainage Repair Project, Newport Beach, CA
Coordinated construction monitoring efforts in support of compliance with permits issued by regulatory agencies for the project. Prepared a Nesting Bird Management Plan and provided other technical support to OC Parks during permit coordination and consultation with U.S. Fish and Wildlife Service, USACE and CDFW prior to and during construction. Subsequently served as Project Manager for 5-Year Maintenance and Monitoring Plan for restoration of the site.

Fareeha Kibriya, AICP, LEED AP

Environmental Planning

Key Skills
Environmental Consulting
Impact Assessment & Permitting
CEQA/NEPA
Environmental Impact Assessment

Years of Experience
16

Years with AECOM
14

AECOM Position
Associate Vice President, Environmental Planning

Education
MA, Urban and Regional Planning, University of California, Irvine, 2007
BA, Economics, University of California, Irvine, 2004
BA, Sociology, University of California, Irvine, 2004

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D: 1-213-593-8167
M: 1-714-396-0606

Registrations
AICP, American Institute of Certified Planners, issued 11/22/10

Professional Associations
American Planning Association

Trainings and Certifications
LEED Accredited Professional, National, issued 09/09/08

Professional history

We have committed Ms. Kibriya, the Principal Environmental Planner in AECOM's Los Angeles office to this assignment. Fareeha will leverage both her extensive knowledge of CEQA/NEPA requirements and the close working ties she enjoys with our team's proposed engineering staff to quickly and efficiently identify environmental issues that need to be considered in the feasibility study.

Fareeha's entire career had been based in Southern California, where she has provided environmental clearance support and delivered CEQA/NEPA documents, including environmental impact reports, joint NEPA documents (EIR/EIS and EIR/EA), initial studies, negative declarations, proponent environmental assessments, and Mitigation Monitoring Reporting Programs. She has prepared documentation for regulatory approval on assignments for clients such as the LADWP, Orange County Transportation Authority, San Diego Gas & Electric, and Port of Long Beach. She has worked on numerous recycled water projects, including the preparation of an EIR for the Los Angeles Groundwater Replenishment Project, which involves 30,000 acre-feet per year of recycled water from the Donald C. Tillman water reclamation plant and associated conveyance pipelines to the Hansen and Pacoima Spreading Grounds. Fareeha has overseen numerous large-scale environmental clearance projects for infrastructure agencies in Southern California, and understand the regulatory requirements and approvals needed for successful clearance of a project.

Selected project experience

Project Manager, Los Angeles Department of Water and Power (LADWP), Groundwater Replenishment Project Environmental Impact Report (EIR), Los Angeles, CA
Responsible for the preparation of an EIR for the proposed Los Angeles Groundwater Replenishment Project. The project proposed up to 30,000 acre-feet per year of recycled water from the Donald C. Tillman water reclamation plant be further treated and used for groundwater replenishment into the San Fernando Groundwater Basin, including the construction of a new Advanced Water Purification Facility. Project management duties include coordination of associated technical studies and surveys including air quality, biological resources, cultural resources, greenhouse gases, groundwater/ hydrology, noise and vibration, and traffic.

Project Manager, Water Replenishment District (WRD) of Southern California, Groundwater Reliability Improvement Program (GRIP) Recycled Water Project EIR and MMRP, Pico Rivera, CA
Preparation of an EIR for development of the GRIP Recycled Water Project. The project consisted of construction of an Advanced Water Treatment Plant in the City of Pico Rivera to further treat up to 21,000 acre-feet per year of recycled water for groundwater replenishment via the Montebello Forebay Spreading Grounds. The EIR was certified by the WRD Board of Directors on June 18, 2015. Project management duties include coordination of associated technical studies and surveys including air quality, biological resources, cultural resources, greenhouse gases, groundwater/ hydrology, noise and vibration, and traffic. AECOM also assisted with implementation of the MMRP and the State Revolving Fund application.

Project Director, LADWP, North Haiwee Dam 2 Project EIR/Environmental Assessment (EA), Cultural Resources Investigations, ROW Permitting, Inyo County, CA
Oversees the Environmental Services contract for the North Haiwee Dam No. 2 Project, including the management of the preparation of a joint CEQA/ NEPA document (EIR/EA), which was certified in July 2018. The project proposes construction of a new dam to the north of the existing North Haiwee Dam in order to provide sufficient seismic reliability for the North Haiwee Reservoir, maintain the function of an essential water conveyance infrastructure component for the Los Angeles region, and protect local populations from a hazardous flooding event. Duties include client management, project oversight, coordination with the NEPA lead agency – Bureau of Land Management (BLM), and coordination of associated technical studies and surveys. Coordinated with BLM on the Right-of-Way grants required for LADWP's use of federal lands, and with AECOM's cultural resources team on the extensive archaeological survey, testing and data recovery tasks, and the historical survey and documentation of project components, including NHPA Section 106 compliance and Tribal consultation.

Project Director, City of Los Angeles Department of Public Works, Bureau of Engineering, Paseo Del Mar Permanent Restoration Project EIR, Los Angeles, CA
Director for the preparation of an EIR analyzing the impacts of the restoration of the Paseo Del Mar roadway near White Point in the community of San Pedro, due to a landslide which destroyed a portion of the roadway in 2011. Responsible for coordination of the EIR and facilitated meetings with City officials.

Project Director, LADWP, Elysian Park-Downtown Water Recycling Projects EIR, Los Angeles, CA
Director for preparation of an EIR for two water conveyance pipelines. LADWP proposes to maximize the use of recycled water to replace potable sources for irrigation and industrial uses by extending the recycled water pipeline network to Elysian Park (2 miles) and downtown Los Angeles (16 miles).

Project Director, LADWP, Silver Lake Reservoir Storage Replacement Project Preconstruction Nesting Bird Surveys and Construction Monitoring, Los Angeles, CA
Responsible for preconstruction nesting bird surveys and nest monitoring for the Silver Lake Reservoir Storage Replacement Project. AECOM wildlife biologists and avian specialists conducted preconstruction nesting bird surveys in early 2015, with special focus on the great blue heron (GBHE) rookery, prior to ground-disturbing activities. Biologists have remained onsite during construction activities to monitor the GBHE rookery and other nesting birds. A focused survey for bats was also conducted by AECOM biologists. Project director duties include client management, team coordination, and project oversight activities.

Project Manager, LADWP, Aqueduct Filtration Plant Disinfection Contact Tank Initial Study/Mitigated Negative Declaration (IS/MND), Los Angeles, CA
Managed preparation of an IS/MND for the construction of a partially buried disinfection contact tank within the Van Norman Complex. The goal of the proposed project is to enable drinking water disinfection if the primary Los Angeles Aqueduct Filtration Plant disinfection system should temporarily fail or be taken out of service for maintenance.

Project Manager, LADWP, City Trunk Line North Project, MND, Los Angeles, CA
Managed the preparation of an IS/MND for the project, which included replacing the northern extent of the existing Los Angeles City Trunk Line with approximately 33,000 linear feet of 54-inch-diameter trunk line, originating at the LADWP Van Norman Complex in the Granada Hills community and terminate adjacent to the LADWP Tujunga Spreading Grounds in Sun Valley community of Los Angeles. Management duties included client management, project oversight, and coordination of associated technical studies including Air Quality, Biological Resources, Cultural Resources, Greenhouse Gases, Noise and Vibration, Traffic.

Task Lead, Southern California Edison, Proponent's EA for the Coolwater-Lugo Transmission Project (formerly South of Kramer), San Bernardino County, CA
Preparation of the PEA for the construction of a new 500/220/115/12 kV substation, a 34-mile 220-kV transmission line from an existing substation, a 14-mile 220-kV transmission line, a 17-mile 500-kV transmission line, temporary "shoo-fly" transmission lines, and the removal of 29 miles of existing Lugo-Pisgah 220-kV transmission line. Prepared chapters include socioeconomics/population and housing/ environmental justice, agricultural resources, utilities and service systems, and public services.

Jerry Flores

Environmental Planning – Back-up

Key Skills
Environmental Planning
California Environmental Quality Act (CEQA)
National Environmental Policy Act (NEPA)
Mitigated Negative Declarations (MNDs)
Environmental Assessments (EAs)
Environmental Impact Reports (EIRs)
Environmental Impact Statements (EISs)

Years of Experience
21

Years with AECOM
19

AECOM Position
Associate Principal, Senior Project Manager, Environment

Education
BS, Urban & Regional Planning, California State Polytechnic University, Pomona, 1999

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Jerry.flores@aecom.com
D: 1-714-648-2030

Professional Associations
Association of Environmental Professionals

Professional history

Mr. Flores' familiarity with CEQA/NEPA preparation/processing has been instrumental in preparing legally defensible environmental documentation for transportation, engineering, land use and planning, and water related projects. His focus on detailed technical issues, schedule management, budget tracking, and project coordination has proven to be very successful.

Jerry has considerable experience as the project manager for the preparation and processing of environmental documentation required under the CEQA and NEPA Acts for both public and private project/programs. As part of environmental documentation and processing, he has supported public outreach/scoping meeting efforts and has worked directly with engineers to identify project construction and operation elements that would need to be adequately addressed in environmental documents to acquire full CEQA/NEPA clearance. Over the past 21 years, he has been involved with public and private sector projects including pipelines, water treatment plants, transit, sanitary landfills, airport master plans, highway expansions, residential development, office/commercial development, and parks/recreational facilities.

Selected project experience

Environmental Planner, Metropolitan Water District of Southern California (Metropolitan), Second Lower Feeder and Rialto Pipeline Environmental Constraints Analyses of Prestressed Concrete Cylinder Pipe (PCCP) Sections, San Bernardino, Orange, and Los Angeles Counties, CA
Metropolitan identified the need to repair the PCCP portions of the Second Lower Feeder and Rialto pipelines and requested AECOM prepare a memorandums providing a general discussion of environmental constraints of potential construction repair work. The Rialto Pipeline alignment involved analysis of approximately 16 miles of PCCP pipeline, which spanned eight jurisdictions, crossed two major freeways, and traversed a number of canyons and washes potentially containing sensitive and endangered species (e.g. San Bernardino kangaroo rat and Santa Ana River woollystar). The Second Lower Feeder alignment involved analysis of approximately 28 miles of PCCP pipeline, which spanned 14 jurisdictions, crossed four major freeways and a number of other transportation corridors (BNSF, Metrolink, UPRR, Long Beach Municipal Airport), and traversed a number of biologically sensitive areas. Jerry provided management support and assisted in identifying environmental constraints.

Project Manager, Metropolitan, Diemer Plant North Access Road (DNAR) Project - Photo Station Monitoring, Streambed Restoration, and Walnut Woodland Monitoring and Reporting, and Biological Assessment Follow-up, Yorba Linda, Brea, and Orange County, CA
Photo station monitoring was necessary to help Metropolitan meet the Condition 1 requirements of the USFWS Section 7 Informal Consultation for the DNAR Project. Also, streambed restoration and walnut woodland monitoring and reporting were

necessary to help Metropolitan achieve CEQA compliance for the DNAR Project. Lastly, a follow-up Biological Assessment (BA) was necessary to help Metropolitan meet the Condition 6 requirements of the Regional Water Quality Control Board 401 Certification for the DNAR Project. Project management responsibilities included overseeing field monitoring and photo station reporting for four years (2013-2017), review of quarterly and annual reports, and review of walnut woodland monitoring and reporting efforts for three years (2014-2017).

Project Manager, Metropolitan, Robert B. Diemer Water Treatment Plant Upgrades Project EIR, Yorba Linda, Brea, and Orange County, CA
The Robert B. Diemer Water Treatment Plant (Diemer Plant) is an existing Metropolitan facility in the City of Yorba Linda and unincorporated Orange County. Upgrades to the Diemer Plant were necessary to maintain reliable water deliveries to the service area. The project was comprised of the following four project components: (1) Orange County Conveyance & Distribution Maintenance Facility; (2) Washwater Reclamation Plant Rehabilitation and Seismic Upgrades; (3) Filter Outlet Conduit Seismic Upgrades; and (4) Olinda Pressure Control Structure. Project management responsibilities included preparation/processing of the EIR in compliance with CEQA; coordination with Metropolitan staff, subconsultants and engineers; management and review of technical activities related to the EIR.

Environmental Monitoring, Metropolitan, San Diego Pipeline No. 6, Temecula, CA
Metropolitan proposed modifications to the previously approved San Diego Pipeline No. 6 (San Diego 6) Project in order to support consumer demand, system reliability, and system flexibility objectives as first detailed in the certified 1993 Final EIR for the San Diego 6 Project. The proposed construction included nearly one-quarter of the approved alignment for the San Diego 6 Project; specifically, the northern pipeline that would include approximately seven miles of ten-foot diameter pipeline and appurtenant facilities, originating at Metropolitan's Lake Skinner Reservoir and would traverse south to the intersection of Anza and De Portola roads, in unincorporated Riverside County. Jerry assisted in the environmental monitoring for San Diego 6. Responsibilities included daily mitigation monitoring and documentation of mitigation measures and permit conditions. Coordinated with specialty biological, archeological, and paleontological monitors, the Resident Engineer (RE) and inspection team and Metropolitan staff.

Environmental Planner, Water Replenishment District of Southern California (WRD), Groundwater Reliability Improvement Project (GRIP) EIR, Los Angeles County, CA
The WRD proposed to offset the current use of imported water through the GRIP by providing up to 21,000 acre-feet per year of recharge using reliable alternative supply sources, such as recycled water or storm water, for Central Basin replenishment from the Montebello Forebay. The Forebay is located on the Los Angeles Coastal Plain and is a significant area of recharge to the Central Basin of the County. Under the GRIP, three final alternatives were carried forward for analysis in the EIR. Alternatives include different combinations of four key components: Supply, Treatment (tertiary; advanced water treatment; hybrid), Conveyance (existing or new pipelines), and Recharge (spreading grounds and/or injection) and are dependent upon several existing facilities. Assisted in preparing/reviewing the various sections of the Draft EIR and assisted with public meetings and preparation of the Final EIR.

Project Manager, WRD, Basin No.2 Inlet/Turn-out and 001B Turn-out Structure Projects IS/MNDs, San Gabriel River, Los Angeles County, CA
The WRD proposed to increase the operational flexibility of the San Gabriel Coastal Spreading Grounds and enhance the ability to recharge more recycled water. Jerry was responsible for the MNDs to address the environmental effects of the proposed Basin No. 2 Inlet/Turn-out and the 001B Turn-out Structure Projects. These two projects would connect to an existing recycled water pipeline (RWP) that extends from the San Jose Creek Water Reclamation Plant under the western levee of the San Gabriel River and allow for the placement of recycled water directly into Basin No.2 and the San Gabriel River, respectively. Project management responsibilities included preparation of the MNDs; coordination with WRD staff, engineers, and project team; management of technical reports related to the MNDs; assisted WRD staff with public participation and notifications; and prepared and processed all the required notifications required under CEQA for these two projects.

Martin Hammer

Cost Estimating | Scheduling

Key Skills
Cost Estimating
Cost Management
Construction Management
Project Scheduling
Constructability
Pipelines

Years of Experience
36

Years with AECOM
22

Education
BS, Construction Management, Bowling Green State University, 1984

AECOM Position
Chief Estimator – Water

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Professional Associations
American Association of Cost Engineers (AACE)
American Society of Professional Estimators (ASPE)

Professional history

Mr. Hammer has been involved in construction of more than 25 projects of various complexities and magnitudes including water and wastewater treatment systems and a variety of groundwater treatment, soil vapor extraction, underground and aboveground storage tank removals/installs, mechanical dredging, hydraulic dredging, soil treatment, and remediation projects. Martin has 36 years of overall experience in the construction industry and has participated in or managed the estimating and bidding of hundreds of construction projects. He has expertise in various estimating software packages, including Sage Timberline Estimating, Composer Gold (MCACES), MII, MC2, WinEst, SUCCESS Estimator, Lotus 1-2-3 and Microsoft Excel spreadsheets, Estimation, Inc., In-Site, Topo, Pay Dirt, OnScreen TakeOff, and the Link Mechanical Estimating System developed by Limbach Corporation. In addition, he is familiar with the implementation of Parametric Estimating software such as TRACER, RACER, and PACES estimating.

Martin has served in multiple roles, including layout engineer, field engineer, project engineer, field superintendent, project manager, estimator, estimating manager, and chief estimator for projects ranging in size to over $25 billion. He also has strong experience in project scheduling, including the implementation of Primavera P6, Primavera SureTrak, and Microsoft Project. Project controls systems have included Primavera Expedition, Olson Construction Companies' (OCC) in-house Project Management software, Computer Guidance Corporation (CGC), ARES Prism, and an internal Project Cost Control System (PCS). He is knowledgeable in various construction trades, including demolition, heavy civil, site work, tunneling, utility work, yard piping, concrete work, masonry, structural, metals, finishes, HVAC, mechanical, electrical, and instrumentation.

Selected project experience

Chief Estimator, City of Rialto, Tablerock WWTP Expansion Progressive Design-Build Phase II, Rialto, CA
A progressive design-build joint venture with WM Lyles Construction. Features include new influent diversion, headworks expansion, new primary clarifiers, new aeration tank, mew secondary clarifiers, new disk filters, new chlorine contact tank, new thickening and dewatering.

Chief Estimator, City of Rialto, Tablerock WWTP Expansion Design-Build Phase I, Rialto, CA
Estimator for this progressive design-build project. Features include new influent diversion, headworks expansion, new primary clarifiers, new aeration tank, mew secondary clarifiers, new disk filters, new chlorine contact tank, new thickening and dewatering.

Cost Estimator, Orange County Sanitation District (OCSD), P-100 Sludge Digester Rehabilitation, Fountain Valley, CA
Work included engineer's estimate of digester modification/rehabilitation.

Chief Estimator, OCSD, P2-105 Digester Ferric Chloride Rehabilitation, Huntington Beach, CA
Work included 100% design engineer's estimate.

Chief Estimator, SBVMWD, San Bernardino Tertiary Treatment System Improvements, San Bernardino, CA
Responsible for this Class 4 engineer's estimate, consisting of influent pipeline, influent pump station, disc filters, and effluent pump station, UV disinfection, chemical storage and feed systems, new electrical building, effluent conveyance pipeline, electrical and I&C improvements.

Chief Estimator, Truckee Meadows Valley Authority (TMWA), American Flat Reno/Stead WRF, Silver Lake, NV
Responsible for the establishment and development of construction cost estimates for various projects. Work includes, pretreatment, Transfer Pump Station, APWF Facility, APW Export Pump Station, Conveyance Pipeline-95,000 linear feet 14" PVC force main, American Flat Secondary Treatment, Injection Wells, and Spreading Fields. Alternative Analysis. Resulting in Class 5 thru Class 3 estimates. Inclusive of construction costs, schedule, risk mitigation, and value engineering.

Chief Estimator, GDOT Georgia Department of Transportation, GA400 48-inch Force Main, Atlanta, GA
Design development of a 48-inch WSP pipeline. Inclusive of the pricing and analysis of seven (7) options resulting in Class 5, 4, and 3 estimates. Consisting of 3,400 lf of 48-inch welded steel pipe in an open-cut, road crossing, scenario.

Chief Estimator, City of Thornton, 42-inch Force Main, Thornton, GA
Led estimating for design development of a 42-inch WSP pipeline. Inclusive of the pricing and analysis of six (6) options resulting in Class 5, 4, and 3 estimates. Consisting of 36,754 lf of 42-inch welded steel pipe inclusive of open-cut, jack & bore, HDD, aerial bridge crossing.

Chief Estimator, City of Turlock, 8" Water Main Replacement, Modesto, CA
Led estimating for this engineer's class 4 estimate for the replacement of 14,580 lf of 8" D.I.P. water main replacement, inclusive of alternative analysis, demolition, new 8" line, service tie-ins, roadway removal and replacement, traffic control.

Chief Estimator, City of Davis, Davis WWTP Improvements, Davis, CA
Led estimating for this design-build joint venture. Included new primary influent pumps station, aeration tanks, blower building, secondary clarifiers, RAS pump station, secondary clarifiers, filters, CCT, digested sludge storage tanks, dewatering facility, greenhouse, cogeneration facility, maintenance building, operations building, and effluent pump station.

Chief Estimator, City of Fresno, RTM (Regional Water Transmission Lines), Fresno, CA
Led estimating for developing the opinion of probable construction cost for the 30% design development estimates. Features include 70,640 linear ft. of water mains, ranging in size from 12-inch to 66-inch diameter, ductile iron and welded steel pipe, open cut with site/pavement restoration. Features include, open cut, trench shoring, jack & bore, associated manholes, blow-off assemblies, air/vacuum release assemblies.

Chief Estimator, City of Oxnard, Oxnard Advanced Water Treatment Plant, Oxnard, CA
Work included development and evaluation of 204 price change orders, totaling more than $27M.

Chief Estimator, DeKalb water and wastewater Master Planning, DeKalb County, GA
Led estimating for this 10-year master plan of existing and new systems for the entre DeKalb water and wastewater systems. [19-048, 9/2019-ongoing]

Chief Estimator, San Francisco Public Utilities Commission (SFPUC), Mountain Tunnel, CA
Led estimating on this EPC project to update tunnel access, lining, and by-pass, Inclusive of access improvements, tunnel repairs, siphon extensions, new flow control facilities, 7-year construction.

Chief Estimator, OCSD, Sewer Replacement LCCA, Orange County, CA
Led estimating for this engineer's LCCA (Life Cycle Cost Analysis) over 50-year service of 1,895 lf force main.

Chief Estimator, MDWASA (Metro Dade Water and Sewer Authority), 72" Force Main, Miami-Dade, FL
Led estimating on this Class 3 Engineer's Estimate for 1,080 lf 72" force main replacement.

Chief Estimator, Pure Water San Diego, Morena Shaft & Tunnel BODR, San Diego, CA
Led estimating for this Basis of Design Report, inclusive of tunneling and shaft work.

Chief Estimator, Region of Peel, Hanlan Mainfeeder Tunnel and Tomken Road Force Main Tunnel, Thornhill, ON
Led estimating for two (2) feasibility estimates, consisting of 4,161 m of 6.25m diameter tunnels.

Lead Estimator, Miami-Dade Water and Sewer Authority, Government Cut Program, Miami, FL
Led estimating for developing engineer's estimates in support of preliminary design for the design-build effort for the replacement of existing 20-inch water main and 54-inch sewer force main from Fisher Island to Miami Beach and the Port of Miami, with tunnel applications, inclusive of 12 design alternatives.

Eddie Ramos

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30+ years experience Managing and Operating Environmental & Geotechnical Drilling projects throughout Southern California

Professional Experience

ABC Liovin Drilling | 2020 – present
Lead Sonic Driller | Signal Hill, CA
Responsibilities:

- Regional Operational Control
- Fiscal and monthly budgeting
- Strategic planning
- Marketing
- Companywide DOT & ARB Compliance Database
- Safety Compliance
- Employee Coaching & Training
- Environmental Drilling
- Geotechnical Drilling
- DPT Direct Push
- Well Installations
- Well Abandonments
- Mud/Air Rotary
- Reverse Circulation
- Sonic
- Rock Coring
- Well Development/Rehabilitation
- Supervised helpers and drillers on drill jobs

Cascade Drilling| 2013-2019
Project Manager
Responsibilities:

- Mud/Air Rotary/Core Drilling
- Environmental Drilling
- Geotechnical Drilling
- Well Installations
- Well Abandonments
- Supervised helpers and drillers on drill jobs

Boart Longyear | 2006-2013
Sonic Drill Operator
Responsibilities:

- Mud/Air Rotary/Core Drilling
- Environmental Drilling
- Geotechnical Drilling
- Well Installations
- Well Abandonments
- Supervised helpers and drillers on drill jobs

Prosonic Corporation | 2002-2006
Sonic Drill Operator
Responsibilities:

- Water Wells And Monitoring Well Installation
- Environmental And Geotechnical Drilling
- Soil Sampling
- Geophysical Logging
- Core Drilling
- Well Pump Repair And Installation • Well Rehabilitation And Mineral Exploration

Safety Certifications/Training

Licensed Well Driller Utah #363
40hr OSHA Trained Since 1989
8hr Hazwoper and Emergency
MSHA, First Aid,CPR and LPS
Boart Longyear Supervisory Training
National Ground Water Association

ABC LIOVIN

GEOVision
geophysical services

Mark J. Riches, P.GP. – Vice President

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mriches@geovision.com

Education/Qualifications:

B.S./1992/Geology
California Professional Geophysicist, R.GP. 1025 (05/21)
BPELSG Geophysics TAC Vice Chairman
29 CFR 1910.120 1993, and is current with refreshers
Member of National Utility Locating Contractors Association

Short courses including time domain, GPR, seismic reflection, utility location, UXO and LNAPL characterization

Relevant Experience:

Mr. Riches is a Vice President at **GEO***Vision* Geophysical Services. Mr. Riches has spent more than 30 years working in the field of geophysical data acquisition/processing/interpretation/ mapping and report writing. He has extensive practical and technical experience conducting high- resolution geophysical surveys in support of a variety of environmental and engineering investigations in conjunction with RCRA, SARA, CERCLA, UGST and CWA-type assessments. He is thoroughly experienced in planning and managing a wide variety of geophysical investigations, including seismic refraction and reflection, utility location, magnetic, electrical resistivity, electromagnetic, ground penetrating radar, and borehole logging investigations.

Mr. Riches's strengths include:

- Extensive experience managing large geophysical investigations
- Expertise in geophysical survey design
- Extensive project management experience
- Expertise in geophysical data interpretation and assessment
- Extensive knowledge of the application of geophysical methods to environmental, infrastructure and engineering problems
- Experience managing geophysical investigations at DOD and DOE facilities in California, Wyoming, Hawaii, Guam, Arizona, New Mexico, and Nevada.

Sample Projects/Experience

Mr. Riches was project manager of an investigation to clear 1,000 boring locations for detectable utilities at the Norton Air Force Base in San Bernardino. All 1,000 boring locations were drilled without incident.

Mr. Riches was project manager of multiple investigations at PGE's facility in Hinkley California. The purpose of the investigations were to locate and map utilities for proposed fences and underground piping as well as determine the location of faults and the optimum location for groundwater extraction wells using seismic and resistivity methods.

Mr. Riches was project manager of an ongoing yearlong investigation to clear 2,500 boring locations and 5,000 linear feet of proposed trenching for detectable utilities at the Boeing facility in Long Beach. GEOVision worked for five different environmental companies during the course of this project often having three crews onsite on a daily basis. All 2,500 boring locations were drilled without incident.

Mr. Riches was project manager of a ten year long ongoing investigation to clear boring locations and map all detectable utilities at approximately 150 Mobil Service Stations. The end product is an AutoCAD map of each facility showing all utilities and cleared boring locations. All service stations have been drilled without incident.

Mr. Riches was project manager of an investigation to delineate the surface trace and determine the approximate depths of buried utilities at numerous locations of proposed excavation along the Alameda Corridor in Los Angeles. The Alameda Corridor is currently the largest infrastructure project in the US with a total budget of $13billion. During the course of this ongoing 6-year project GEOVision has worked for at least six different contractors. The end product of one most recent investigation was AutoCAD maps of all detected utilities with depths.

Mr. Riches is project manager of a 22-year on-call contract with Disneyland to delineate the surface of trace of detectable utilities with the Disneyland theme park.

Mr. Riches was project manager of an investigation to delineate the surface trace and determine the approximate depths of buried utilities at East Bay Mud's 12-acre wastewater treatment facility in Oakland. The end product was a 3-D AutoCAD map of the entire facility. Vacuum extraction techniques were employed at over 100 locations by the client to test the accuracy of the utility location. The test criteria specified that utility location techniques have a 1-inch lateral resolution and +/- 25% for the depth criteria; all pothole locations passed these criteria.

Mr. Riches was project manager of an investigation to clear 2,000 boring locations for detectable utilities at the Schofield Barracks facility in Hawaii as part of the Navy CLEAN II program. All 2,000 boring locations were drilled without incident.

Sean Smith, PLS – Psomas

Psomas Project Manager – Survey Subconsultant

Sean has 25 years of professional experience in land surveying. His duties have included organizing, managing, and executing QA/QC plans and coordinating a broad range of assignments for various projects, requiring an extensive knowledge of land surveying and mapping, and supervising the technical work of other surveyors. As a Senior Project Manager, Sean oversees all land surveying activity. He is responsible for implementing and maintaining quality control to ensure product accuracy in all aspects of land surveying, including research and analysis, title reports, rights-of-way, easements, ALTA, topographic, photogrammetry, boundaries and mapping, and construction staking.

Sean reviews and administers project contracts. He is responsible for both Psomas and subconsultants staff ensuring each project has the proper resources and trained staff to complete each project efficiently and accurately.

REGISTRATION

2007/CA/Professional Land Surveyor/8233

CONTACT INFORMA

1500 Iowa Ave, Suite 210
Riverside, CA 92507 Tel
951.300.2807
sean.smith@psomas.com
www.psomas.com

EDUCATION

Coursework/Survey Related Courses/Santiago Canyon College, Orange, CA, and Riverside Community College, Riverside, CA

PROFESSIONAL AFFILIATIONS

California Land Surveyors Association, Riverside/San Bernardino Chapter

ACEC Riverside/San Bernardino Chapter Vice President 2021/2022

Joint Apprentice Committee/Board Member

EXPERIENCE

With Psomas: 12 years/With Other Firms for: 13 years

Experience

Santa Ana River Habitat Conservation Surveys, Phase I, San Bernardino and Riverside Counties, CA: Project Manager for surveying services of the streambed of the Santa Ana River at four separate locations. Surveying Services consisted of both GPS control surveys and conventional topographic surveys of the Santa Ana Riverbed Psomas acquired field survey data to provide a vertical and horizontal profile reflecting the channel and water surface elevations/gradients changes from upstream to downstream. Longitudinal elevation profile and channel cross section survey were performed. All Information of the major breaks in slope of the channel bed elevation, including steps in the channel created by large wood, rocks, debris was obtained by Psomas and reflected in the final delivery.

East Valley Water District, Sterling Ranch Natural Resource Center, Highland, CA: As part of the design build team, served as Project Manager of surveys for this new treatment facility, and the needed infrastructure, that will produce disinfected tertiary recycled water (Title 22 water quality for unrestricted use). The treated water will be discharged to basins at the new treatment plant site, to existing basins currently operated by the City of Redlands, to City Creek, or to alternative locations. The facility will transform and enhance the region's water supply by: Creating a new, local source of water for the community and region by replenishing the Bunker Hill Basin with recycled water, the region will be able to store hundreds of millions of gallons of water for dry years (2018-current). Work being performed for this project includes aerial mapping, engineering design surveys, utility locations surveys, centerline and right of way establishment.

Coachella Valley Water District Levee Survey, Riverside County, CA: Project Manager, as part of the Northwest Hydraulic Consultant, Inc. Team, to provide surveying services for the Coachella Valley Water District Stormwater Channel for about 40 miles of levee survey (20 miles along

each bank), which included 40 channel cross sections, 14 bridges cross sections, two low water crossing cross sections, and three drop structure cross sections.

East Side Dike Survey for FEMA, Indio, CA: Project Manager for an aerial mapping survey of a portion of the East Side Dike. This assisted Northwest Hydraulic Consultants in preparing plans and certifying the East Side Dike in conformance with FEMA standards. The survey densified the control along the levee for any future survey needs.

SBCTA SR-210 Mixed Flow Lane Addition and Base Line Street Interchange, San Bernardino County, CA: Project Manager for design surveys, mobile terrestrial laser scanning, and right-of-way engineering for this project. Sean served as survey project manager, providing design surveys and right-of-way engineering services in support of development of the PS&E for these projects. The SR-210 Lane Addition and Baseline Interchange is the combination of two projects that had proceeded independently during the preliminary engineering and environmental documentation phases of development. Sean oversaw the survey team in the preparation of design survey and mapping for the extents of the project as well as preparing various right of way surveys including land net mapping, appraisal maps and legal descriptions and plats.

SBCTA/Caltrans District 8, I-15/I-215 Devore Interchange Improvement, San Bernardino, CA: Project Manager for all the surveying and mapping services for this six-mile freeway construction project with the URS/Atkinson design/build team, which involves reconfiguring the I-15/I-215 interchange and adjacent local interchanges to reduce traffic delays, improve the flow of goods through the region, and enhance the reliability of goods headed to and from freight facilities in the Los Angeles Basin, including the Ports of Los Angeles and Long Beach. Psomas' services have included major survey control; topographic surveying; mobile and terrestrial laser scanning; cadastral monumentation survey; and construction surveying.

SBCTA/Caltrans District 8, I-15 Cajon Pass Rehabilitation Design-Build Project, San Bernardino County, CA: Project Manager for control survey, mobile scanning, design surveys, and construction staking for the 16-mile Cajon Pass Rehabilitation Project. The Cajon Pass Pavement Rehabilitation project is one of several Design-Build projects included in the pilot program under the new Design-Build Demonstration Program enacted by Senate Bill 4. The project limits are approximately from Post Mile 15 to Post Mile 31 on Interstate 15 in San Bernardino County. The estimated construction cost is $120 million.

Certifications and Licenses

In this section, we provide evidence of staff engineering registrations, professional certifications, as well as firm licenses.

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
AUGUST 21, 1987
EXPIRATION DATE
MARCH 31, 2022
CURRENT DATE / TIME
JULY 7, 2021
1:29:01 PM

LICENSING DETAILS FOR: 41863

NAME: CAMPBELL, KEITH THOMAS
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
1520 LANCASHIRE PL
PASADENA CA 91103
LOS ANGELES COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JUNE 4, 2021
EXPIRATION DATE
SEPTEMBER 30, 2021
CURRENT DATE / TIME
JUNE 11, 2021
2:58:18 PM

LICENSING DETAILS FOR: 92677

NAME: CHANGANI KHORASGANI, HOSSEIN
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
91 STREAMWOOD
IRVINE CA 92620
ORANGE COUNTY

MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 23, 2009
EXPIRATION DATE
DECEMBER 31, 2021
CURRENT DATE / TIME
JUNE 11, 2021
3:31:14 PM

LICENSING DETAILS FOR: 75225

NAME: FRANCHI, ALESSANDRO
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
10184 NAPA VALLEY CT
FOUNTAIN VALLEY CA 92708
ORANGE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
MARCH 16, 1993
EXPIRATION DATE
JULY 31, 2023
CURRENT DATE / TIME
AUGUST 10, 2021
9:45:31 AM

LICENSING DETAILS FOR: 1833

NAME: GOETZ, CHRISTOPHER
LICENSE TYPE: ENGINEERING GEOLOGIST
LICENSE STATUS: CLEAR

ADDRESS
24522 PRISCILLA
DANA POINT CA 92629
ORANGE COUNTY
MAP

LICENSE RELATIONSHIPS

NAME: GOETZ, CHRISTOPHER
LICENSE/REGISTRATION TYPE: GEOLOGIST
LICENSE NUMBER: 5758 **PRIMARY STATUS:** CLEAR

ADDRESS :
24522 PRISCILLA
DANA POINT CA 92629
ORANGE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 14, 1995
EXPIRATION DATE
DECEMBER 31, 2021
CURRENT DATE / TIME
JUNE 11, 2021
1:15:39 PM

LICENSING DETAILS FOR: 54171

NAME: GUNDARLAHALLI, JAGADISH RAMANJANEYA
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
3 SARATOGA
IRVINE CA 92620
ORANGE COUNTY
MAP

Information Pertaining To:
Civil Engineer 38756

Licensee Detail Massachusetts Verification

License Number: 38756
Licensing Entity: Board of Registration of Professional Engineers and of Land Surveyors
License Type: Civil Engineer
Type Class: C
License Issue Date: 08/10/1995
License Expiration Date: 06/30/2022 **Status:** Current
Current Discipline:
Prior Discipline:

Name: IRWAN S HALIM
Business Name: AECOM
DBA Name:

Home Search New Help

Register for an Account Login

NOTE: If you would like to Renew your license follow these instructions:

- You must use a desktop or laptop computer to complete the registration and renewal process.
- Login to MiPLUS.
- Click on the “Licenses” tab.
- Find your License Number under the “Record Number” column. Click on the “Renew License” link located under the “Action” column.

Home Licenses Enforcement

Advanced Search

Licensed Professional Information: Professional Engineer 6201054966

Michigan Verification

Licensee Detail

License Type: Professional Engineer

License Number: 6201054966

Name: Irwan Suwarno Halim

License Issue Date: 12/06/2007

License Expiration Date: 12/06/2022

License Status: Active

County: Non-Michigan County

<--- Click to view Public Documents

New York Verification

Verification Searches

The information furnished at this web site is from the Office of Professions' official database and is updated daily, Monday through Friday. The Office of Professions considers this information to be a secure, primary source for license verification.

License Information *

07/02/2021

Name : HALIM IRWAN S
Address : LEXINGTON MA
Profession : PROFESSIONAL ENGINEERING
License No: 099508
Date of Licensure : 06/22/2018
Additional Qualification :
Status : REGISTERED
Registered through last day of : 10/23

* Use of this online verification service signifies that you have read and agree to the terms and conditions of use. See HELP glossary for further explanations of terms used on this page.

- Use your browser's back key to return to licensee list.
- You may search to see if there has been recent disciplinary action against this licensee.
- Note: The Board of Regents does not discipline *physicians(medicine), physician assistants,* or *specialist assistants.* The status of individuals in these professions may be impacted by information provided by the NYS Department of Health. To search for the latest discipline actions against individuals in these professions, please check the New York State Department of Health's Office of Professional Medical Conduct homepage.

Current date & time: **6/23/2021 7:31 PM**

Name	Board	License/Endorsement #	Type	Status	Sub Status	Sub Category	Board Action?	City	State	County	Zip Code
Halim , Irwan S	Engineers and Surveyors Board	PE.76647	Professional Engineer	Active			No	Lexington	MA	Out of State	02421

License Activity

Issue Date: 5/25/2012
Effective Date: 1/1/2020
Expiration Date: 12/31/2021

Endorsements

None

VIEW MORE INFO

1

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Rhode Island verification

Lookup Detail View

Name and Address

Name	City/Town	State	Zip Code	Country
IRWAN S. HALIM	LEXINGTON	MA	02421	United States

Registration Information

License	License Type	First Issuance Date	Expiration Date	Status
PE.0007921	Professional Engineer	11/07/2003	06/30/2023	ACTIVE

Generated on: 7/2/2021 7:53:45 PM

DPOR License Lookup License Number 0402055985

Virginia Verification

License Details

Name	HALIM, IRWAN S
License Number	0402055985
License Description	Professional Engineer License
Rank	Professional Engineer
Address	LEXINGTON, MA 02421
Initial Certification Date	2016-05-13
Expiration Date	2022-05-31

DPOR License Lookup build 1,472 (built 2021-02-15 10:16:48).

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
AUGUST 14, 1980
EXPIRATION DATE
DECEMBER 31, 2022
CURRENT DATE / TIME
JULY 7, 2021
1:08:38 PM

LICENSING DETAILS FOR: 31725

NAME: HANDFELT, LEO DAVID
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
9939 RUE BIARRITZ
SAN DIEGO CA 92131
SAN DIEGO COUNTY
MAP

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
SEPTEMBER 9, 1987
EXPIRATION DATE
DECEMBER 31, 2022
CURRENT DATE / TIME
JULY 7, 2021
1:12:47 PM

LICENSING DETAILS FOR: 373

NAME: HANDFELT, LEO DAVID
LICENSE TYPE: GEOTECHNICAL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
9939 RUE BIARRITZ
SAN DIEGO CA 92131
SAN DIEGO COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JUNE 29, 2012
EXPIRATION DATE
SEPTEMBER 30, 2022
CURRENT DATE / TIME
JULY 7, 2021
1:19:54 PM

LICENSING DETAILS FOR: 80318

NAME: KIM, SEUNG HAN
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
300 LAKESIDE DR STE 400
OAKLAND CA 94612
ALAMEDA COUNTY
MAP

LICENSE RELATIONSHIPS

NAME: KIM, SEUNG HAN
LICENSE/REGISTRATION TYPE: GEOTECHNICAL ENGINEER
LICENSE NUMBER: 3154 **PRIMARY STATUS:** CLEAR

ADDRESS :
300 LAKESIDE DR STE 400
OAKLAND CA 94612
ALAMEDA COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JUNE 25, 2004
EXPIRATION DATE
SEPTEMBER 30, 2022
CURRENT DATE / TIME
JUNE 23, 2021
3:43:53 PM

LICENSING DETAILS FOR: 67185

NAME: LAUBBICHLER, JUERGEN MARTIN
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
560 HERNDON PKWY STE 310
HERNDON VA 20170
OUT OF STATE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 8, 1994
EXPIRATION DATE
DECEMBER 31, 2022
CURRENT DATE / TIME
JUNE 11, 2021
3:28:18 PM

LICENSING DETAILS FOR: 52517

NAME: LOPEZ, JESUS
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
534 S HILDA CT
ANAHEIM CA 92806
ORANGE COUNTY

MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JANUARY 23, 2003
EXPIRATION DATE
JUNE 30, 2023
CURRENT DATE / TIME
JUNE 11, 2021
1:02:11 PM

LICENSING DETAILS FOR: 64334

NAME: PAINE, BRYAN
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
2231 PACIFIC AVE UNIT B1
COSTA MESA CA 92627
ORANGE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 11, 1999
EXPIRATION DATE
MAY 31, 2023
CURRENT DATE / TIME
JULY 7, 2021
4:37:29 PM

LICENSING DETAILS FOR: 1025

NAME: RICHES, MARK J
LICENSE TYPE: GEOPHYSICIST
LICENSE STATUS: CLEAR

ADDRESS
1124 OLYMPIC DRIVE
CORONA CA 92881
RIVERSIDE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 22, 1983
EXPIRATION DATE
JUNE 30, 2022
CURRENT DATE / TIME
JUNE 11, 2021
3:26:54 PM

LICENSING DETAILS FOR: 37116

NAME: ROMER, ANDREW ELLIS
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
14321 HACIENDA DR
HUNTINGTON BEACH CA 92647
ORANGE COUNTY

MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
SEPTEMBER 9, 1987
EXPIRATION DATE
MARCH 31, 2022
CURRENT DATE / TIME
JUNE 11, 2021
3:14:43 PM

LICENSING DETAILS FOR: 739

NAME: ROTH, WOLFGANG H
LICENSE TYPE: GEOTECHNICAL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
19773 GRANDVIEW DR
TOPANGA CA 90290
LOS ANGELES COUNTY
MAP

LICENSE RELATIONSHIPS

NAME: ROTH, WOLFGANG HELMUT
LICENSE/REGISTRATION TYPE: CIVIL ENGINEER
LICENSE NUMBER: 30834 **PRIMARY STATUS:** CLEAR

ADDRESS :
19773 GRANDVIEW DR
TOPANGA CA 90290
LOS ANGELES COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
AUGUST 21, 1987
EXPIRATION DATE
MARCH 31, 2022
CURRENT DATE / TIME
JUNE 11, 2021
1:09:46 PM

LICENSING DETAILS FOR: 42978

NAME: SMITH, MICHAEL GREGORY
LICENSE TYPE: CIVIL ENGINEER
LICENSE STATUS: CLEAR

ADDRESS
1038 S CASCADE LN
ANAHEIM CA 92808
ORANGE COUNTY
MAP

LICENSE RELATIONSHIPS

NAME: SMITH, MICHAEL GREGORY
LICENSE/REGISTRATION TYPE: GEOTECHNICAL ENGINEER
LICENSE NUMBER: 2229 **PRIMARY STATUS:** CLEAR

ADDRESS :
1038 S CASCADE LN
ANAHEIM CA 92808
ORANGE COUNTY
MAP

CA.GOV dca SEARCH

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

ISSUANCE DATE
JULY 27, 2007
EXPIRATION DATE
DECEMBER 31, 2021
CURRENT DATE / TIME
JULY 14, 2021
9:33:40 AM

LICENSING DETAILS FOR: 8233

NAME: SMITH, SEAN M
LICENSE TYPE: LAND SURVEYOR
LICENSE STATUS: CLEAR

ADDRESS
35445 CARTER STREET
YUCAIPA CA 92399
SAN BERNARDINO COUNTY
MAP

ABC Liovin Drilling, Inc.
1180 East Burnett Street, Signal Hill, CA 90755
Phone: 562-981-8575 Fax: 562-981-9594
http://www.abcdrilling.com
California Contractor C-57 License No. 422904

Certified Small Business
CA SBE #22141

QUOTE

Quote # 41834

Supplier Profile Page 1 of 1

Printed on: 8/12/2020 7:47:48 PM

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DGS
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

Office of Small Business & DVBE Services

Certification ID: 22141

Legal Business Name:
ABC LIOVIN DRILLING INC

Doing Business As (DBA) Name 1:
ABC LIOVIN DRILLING INC

Doing Business As (DBA) Name 2:

Address:
1180 EAST BURNETT ST
SIGNAL HILL
CA 90755

Email Address:
eric@abcdrilling.com

Business Web Page:
http://www.abcdrilling.com

Business Phone Number:
562/981-8575

Business Fax Number:
562/981-9594

Business Types:
Construction

Certification Type	Status	From	To
SB	Approved	01/29/2020	01/31/2022

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Questions?
Email: OSDSHELP@DGS.CA.GOV
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

https://caleprocure.ca.gov/pages/SupplierProfile/supplier-profile-print.html 8/12/2020

Contractor Information

Legal Entity Name
ABC LIOVIN DRILLING, INC.
Legal Entity Type
Corporation
Status
Active
Registration Number
1000002851
Registration effective date
7/1/2021
Registration expiration date
6/30/2022
Mailing Address
1180 EAST BURNETT STREET SIGNAL HILL 90755 CA United...
Physical Address
1180 EAST BURNETT STREET SIGNAL HILL 90755 CA United...
Email Address
Trade Name/DBA
License Number(s)
CSLB:422904
CSLB:422904

Registration History

Effective Date	Expiration Date
5/25/2018	6/30/2019
6/15/2017	6/30/2018
5/13/2016	6/30/2017
5/16/2016	6/30/2017
6/11/2015	6/30/2016
11/19/2014	6/30/2015
7/1/2019	6/30/2020
7/1/2020	6/30/2021
7/1/2021	6/30/2022

Legal Entity Information

Corporation Number:
Federal Employment Identification Number:
President Name:
IVAN LIOVIN
Vice President Name:
Treasurer Name:
Secretary Name:
CEO Name:

Agent of Service Name:
VASSILI LIOVIN
Agent of Service Mailing Address:
1180 EAST BURNETT ST SIGNAL HILL 90755 CA United States of America

Workers Compensation

Do you lease employees through Professional Employer Organization (PEO)?: No

Please provide your current workers compensation insurance information below:

PEO InformationName	PEO Phone	PEO Email

Insured by Carrier
Policy Holder Name:ABC LIOVIN DRILLING, INC.**Insurance Carrier:**State Compensation Insurance Fund
Policy Number:9279125-2020**Inception date:**6/30/2020**Expiration Date:**6/30/2021

Home | Online Services | License Details

Contractor's License Detail for License # 422904

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

- CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure click on link that will appear below for more information. Click here for a definition of disclosable actions.
- Only construction related civil judgments reported to CSLB are disclosed (B&P 7071.17).
- Arbitrations are not listed unless the contractor fails to comply with the terms.
- Due to workload, there may be relevant information that has not yet been entered into the board's license database.

Business Information

A B C LIOVIN DRILLING INC
1180 E BURNETT STREET
SIGNAL HILL, CA 90755
Business Phone Number:(562) 981-8575

Entity Corporation
Issue Date 05/03/1982
Reissue Date 09/22/2000
Expire Date **09/30/2022**

License Status

This license is current and active.

All information below should be reviewed.

Classifications

C57 - WELL DRILLING

Contractor Information

Legal Entity Name
GEOVISION INC.
Legal Entity Type
Corporation
Status
Active
Registration Number
1000028582
Registration effective date
7/1/2019
Registration expiration date
6/30/2022
Mailing Address
1124 OLYMPIC DR CORONA 92881 CA United States of Am...
Physical Address
1124 OLYMPIC DR CORONA 92881 CA United States of Am...
Email Address
Trade Name/DBA
GEOVISION GEOPHYSICAL SERVICES
License Number(s)

Registration History

Effective Date	Expiration Date
6/29/2018	6/30/2019
9/8/2017	6/30/2018
7/13/2016	6/30/2017
8/25/2015	6/30/2016
7/1/2019	6/30/2022

Legal Entity Information

Corporation Number:
20-2352123
Federal Employment Identification Number:
President Name:
JOHN DIEHL
Vice President Name:
ANTONY MARTIN
Treasurer Name:
ROBERT STELLER
Secretary Name:
ROBERT NIGBOR
CEO Name:
JOHN DIEHL

Agent of Service Name:
JOHN DIEHL
Agent of Service Mailing Address:
1124 OLYMPIC DR CORONA 92881 CA United States of America

Workers Compensation

Do you lease employees through Professional Employer Organization (PEO)?: No

Please provide your current workers compensation insurance information below:

PEO Information	PEO Name	PEO Phone	PEO Email

Insured by Carrier
Policy Holder Name:GEOVISION INC**Insurance Carrier:**STATE COMPENSATION INSURANCE FUND**Policy Number:** 91583252-20**Inception date:**5/4/2020**Expiration Date:**5/4/2021

Home | Online Services | License Details

Contractor's License Detail for License # 757133

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

- CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure click on link that will appear below for more information. Click here for a definition of disclosable actions.
- Only construction related civil judgments reported to CSLB are disclosed (B&P 7071.17).
- Arbitrations are not listed unless the contractor fails to comply with the terms.
- Due to workload, there may be relevant information that has not yet been entered into the board's license database.

Business Information

AMERICAN INTEGRATED SERVICES INC
PO BOX 92316
LONG BEACH, CA 90809
Business Phone Number:(310) 522-1168

Entity Corporation
Issue Date 12/14/1998
Expire Date **12/31/2022**

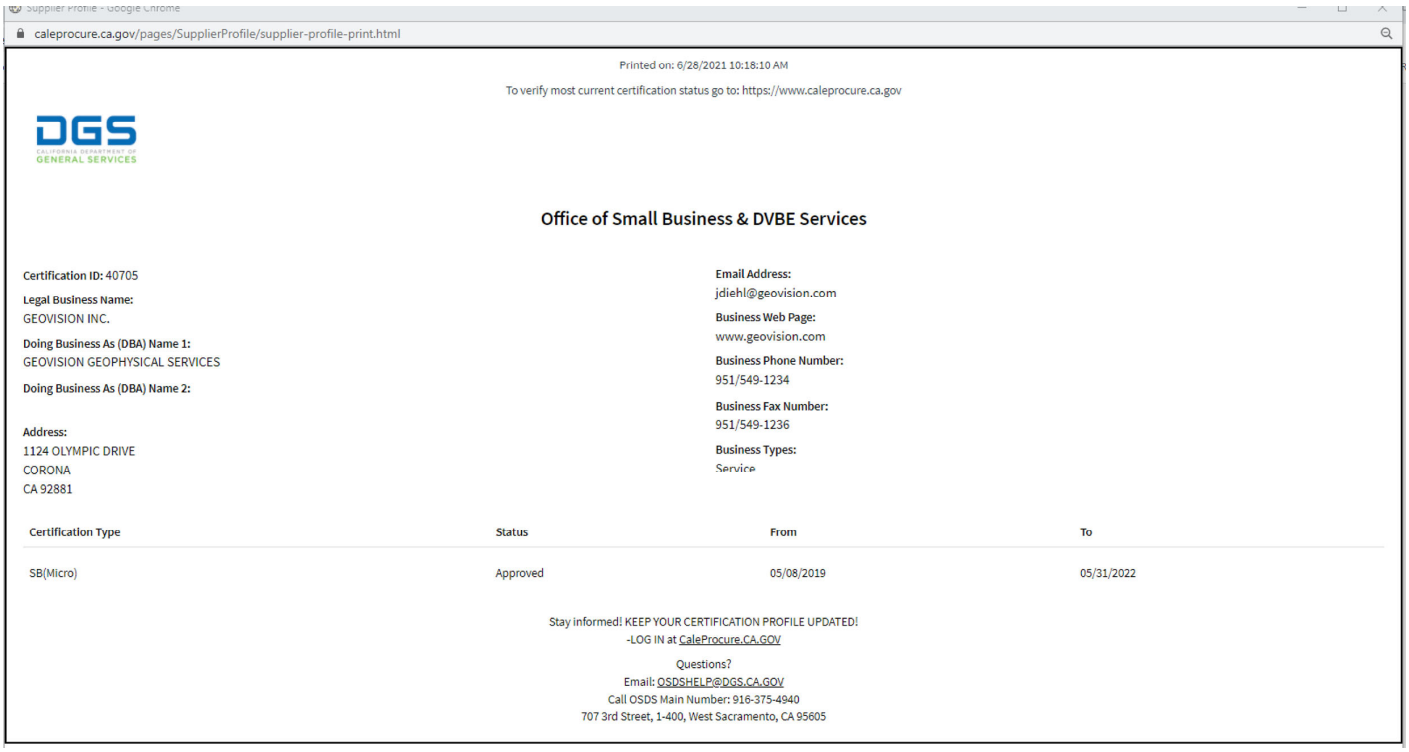
License Status

This license is current and active.

All information below should be reviewed.

Classifications

- A - GENERAL ENGINEERING
- C21 - BUILDING MOVING, DEMOLITION
- B - GENERAL BUILDING
- C10 - ELECTRICAL
- C42 - SANITATION SYSTEM
- C22 - ASBESTOS ABATEMENT (Check DOSH Asbestos Registration)



Supplier Profile - Google Chrome

caleprocure.ca.gov/pages/SupplierProfile/supplier-profile-print.html

Printed on: 6/28/2021 10:18:10 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

Office of Small Business & DVBE Services

Certification ID: 40705

Legal Business Name:
GEOVISION INC.

Doing Business As (DBA) Name 1:
GEOVISION GEOPHYSICAL SERVICES

Doing Business As (DBA) Name 2:

Address:
1124 OLYMPIC DRIVE
CORONA
CA 92881

Email Address:
jdiehl@geovision.com

Business Web Page:
www.geovision.com

Business Phone Number:
951/549-1234

Business Fax Number:
951/549-1236

Business Types:
Service

Certification Type	Status	From	To
SB(Micro)	Approved	05/08/2019	05/31/2022

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Contractor's License Detail for License # 757133

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- Only construction related civil judgments reported to CSLB are disclosed (B&P 7071.17).
- Arbitrations are not listed unless the contractor fails to comply with the terms.
- Due to workload, there may be relevant information that has not yet been entered into the board's license database.

Business Information

AMERICAN INTEGRATED SERVICES INC
PO BOX 92316
LONG BEACH, CA 90809
Business Phone Number:(310) 522-1168

Entity Corporation
Issue Date 12/14/1998
Expire Date **12/31/2022**

License Status

This license is current and active.

All information below should be reviewed.

Classifications

- A - GENERAL ENGINEERING
- C21 - BUILDING MOVING, DEMOLITION
- B - GENERAL BUILDING
- C10 - ELECTRICAL
- C42 - SANITATION SYSTEM
- C22 - ASBESTOS ABATEMENT (Check DOSH Asbestos Registration)

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SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors Workshop - Engineering

FROM: Joanna Gibson, Executive Director Upper SAR HCP Program

SUBJECT: Consider ICF contract amendment and budget augmentation for Upper SAR Habitat Conservation Plan

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SUMMARY

Staff is requesting the Board consider an amendment and budget augmentation to the ICF Upper SAR HCP Contract to address public review comments received on the Draft Environmental Impact Report (DEIR) for the HCP, and additional changes to the HCP requested by the US Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). An additional $199,972.85 is needed to complete the DEIR response to comments and finalize the EIR; address the requested changes to and finalize the HCP; and carry these changes forward into the National Environmental Policy Act (NEPA) document. The cost for this work was anticipated and was included in Line Item 6780 - Environmental/HCP Implementation, in the approved Valley District General Fund Budget for Fiscal Year 2021-22.

BACKGROUND

Due to numerous endangered and threatened species issues associated with water supply projects in the upper Santa Ana River watershed an HCP is being collaboratively developed by staffs from Valley District and ten other agencies in our region with projects needing endangered and threatened species permit coverage. On April 15, 2014, the Board of

Directors authorized Valley District's participation and role as lead agency for the development of the HCP. The HCP currently has eleven funding partners, including Valley District. The HCP planning process began with 8 participating agencies and approximately 20 proposed water infrastructure projects (Covered Activities). Since that time, three additional partners have joined the effort and the list of Covered Activities permitted by the Plan has expanded to over 100 projects. Over 80,000 acre-feet of new local water resources for the region (recycled water and stormwater capture) will be permitted by the HCP.

The effort was also expanded to include programmatic Aquatic Resources permits from CDFW, Army Corps of Engineers, and the Regional Water Quality Control Board, and a comprehensive mitigation reserve program that allows the program to implement mitigation measures well before the impacts will occur, resulting in reduced mitigation requirements and overall cost.

The DEIR and draft HCP was released for public review on May 17, 2021, for a 60-day comment period, closing July 16, 2021. A total of 13 comment letters were received on the DEIR and HCP. In addition to these comments, Valley District has been working closely with the USFWS and CDFW to identify necessary revisions to the HCP to facilitate issuance of permits from both agencies.

At the request of Valley District, our primary consulting firm on the program, ICF Jones & Stokes, prepared the attached scope and budget (Attachment 1) to support Valley District staff in addressing the DEIR public comments, revising portions of the HCP, and carrying these changes forward into the NEPA document. The tasks identified in the attached ICF proposal include:

1. Project/Program Management
2. Additional Funding Analysis Support
3. Ongoing Public Outreach Support
4. Prepare Final HCP
5. Prepare Final EIR
6. Additional NEPA Support
7. Updates to the CAMMP Portal website: uppersarhcp.com

8. Contingency - Additional Hydrology/Analysis, as needed and approved by Valley District

The budget augmentation being requested at this time is $199,972.85, which we anticipate to be sufficient to complete the final analysis and documents needed for approval by the USFWS. The ICF contract amendment 1, signed in 2014 for Phase 2 Planning, development of the HCP, was $1,975,247 (Phase 1 was a Feasibility Study completed by the original HCP partners).

We have had three contract amendments related to Phase 2 HCP Planning work since that time (Figure 1). Previously approved contract increases were for the inclusion of three new partners, increased hydrology analysis funding with reallocation of grant funds, and expanded scope to the HCP and EIR. Other approved amendments to the ICF contract were related to our advanced mitigation strategy (Phase 3 Advanced Implementation, Figure 1).

Of the $3,177,342 total for Phase 2 Planning costs, $635,345 was reimbursed by the USFWS 2014 Section 6 grant, bringing the total ICF cost to the HCP partners for Phase 2 to $2,107,343. Valley District's share is approximately 40% or $842,937.

Of the $6,221,352 total for Phase 3 Implementation costs, approximately $4,029,395 of our total cost, which will eventually include construction, will be reimbursed from the Prop 84 SARCCUP grant (for the Anza, Old Ranch, Lower Hole, and Hidden Valley Creek and Wetlands tributary restoration projects), and an additional $2,000,000 will be reimbursed from the Prop 1, Round 1, Santa Ana IRWM Implementation Grant (for the Evans Lake Tributary Restoration Project).

Fiscal Impact

The total cost for this budget augmentation is $199,972.85. Valley District will be reimbursed approximately 60% or $119,983.71. The fiscal impact to Valley District is $79,989.14.

The cost for this work was included in Line Item 6780 – Environmental/HCP Implementation, in the approved Valley District General Fund Budget for Fiscal Year 2021-22.

Recommendation

Staff recommends the Board direct staff to place this budget augmentation and amendment to the ICF contract on the next regular Board of Director's meeting agenda for consideration.

Attachment

1. ICF Proposal
2. ICF Contract Amendment # 14

CONTRACT AMENDMENT	DATE	AMOUNT	PURPOSE	HCP PHASE	GRANT FUNDING RECEIVED
	9/27/2013	$ 179,000	Feasibility Study for Regional Habitat Conservation Plan	Planning	
1	4/30/2014	$1,975,247	Develop Regional Habitat Conservation Plan	Planning	$ 635,345
2	1/28/2015	$ -28,000	Correction of Contract Error		
3	8/18/2015	$ 30,625	Add City of Rialto	Planning	
4	5/17/2016	$1,336,270	Add Tributaries Restoration Design & Planning	Mitigation	$4,029,395
5	7/19/2016	$ 110,898	Add OCWD and Metropolitan	Planning	
6	2/21/2017	$ 207,892	Budget Augmentation for Additional Hydrology Modeling and Impacts Analyses for Covered Activities	Planning	
7	6/20/2017	$ 96,447	Add Hidden Valley Wetlands Restoration Design & Planning	Mitigation	
8	1/16/2018	$ 429,801	Add CEQA and Permitting for Tributaries Restoration	Mitigation	
9	2/20/2018	$ -0-	No Cost Contract Extension		
10	6/19/2018	$ 593,697	Add Corps and CDFW Programmatic Permits, Lake Evans Conceptual Design & Planning	Planning/Mitigation	
11	9/18/2018	$ 246,054	Budget Augmentation for Expanded HCP Scope and CEQA Analysis	Planning	
12	4/2/2019	$3,273,430	Add Tributaries Restoration Advanced Designs and Construction Management	Mitigation	
13	10/6/2020	$ 926,362	Add Lake Evans Restoration Advanced Design, CEQA, and Permitting	Mitigation	$2,000,000
14	10/14/2021	$ 199,973	Budget Augmentation for Final HCP, Final EIR, and NEPA document (Proposed)	Planning	

NOTES:
*Budget Augmentations Needed for HCP Planning Work from 2014 to Present = $653,919 (2017, 2018, 2021)
*Total HCP Planning Costs = $3,356,342 including initial Feasibility Study ($2,720,997 after application of $635,345 grant)
*Total Contract 2013 to present = $9,577,694

Figure 1. Summary of ICF Contract Amendments for Phase 2, Planning, and Phase 3, Advanced Implementation of the Upper SAR HCP.

September 17, 2021

Ms. Joanna Gibson
Executive Director
Upper Santa Ana River HCP
380 E Vanderbilt Way
San Bernardino, CA 92408

Subject: Proposal for HCP and EIR Amendment

Dear Ms. Gibson:

ICF Jones & Stokes, Inc. ("ICF") is pleased to present this scope of work and cost estimate to the San Bernardino Valley Municipal Water District (Valley District) to address the public review comments and additional changes to the HCP and EIR requested by Valley District.

Services include support for HCP and EIR edits in response to public comments and other Valley District HCP and EIR text changes; revisions to most of the species distribution models; removal of two covered activities; evaluation of the potential effects on hydrology and sediment transport; rerunning the GIS analyses to recalculate impacts and conservation acreages; updating the funding analysis; revisions to the CAMMP portal; ongoing public outreach support; and overall program management support. We have also included an additional contingency task at your request. A more detailed scope of work is provided below.

Thank you for your consideration of this amendment proposal. ICF looks forward to continuing to provide Valley District support on key components of this very important program. ICF's proposal is valid for 90 days from its submittal, at which time ICF reserves the right to revise the contents or extend the validity date, if needed. ICF shall provide services, as outlined in the attachment, under the terms and conditions of its existing agreement number 1770 with the District dated September 27, 2013. Please contact Scott Fleury (Scott.Fleury@icf.com) if there are questions regarding the scope or budget.

Sincerely,

Trina L. Fisher
Contracts Administrator

Scope of Work

This scope of work has been prepared to provide ongoing support to Valley District staff to complete the final HCP and EIR for the HCP along with several other supplemental tasks. The actual level of support that Valley District will require for each task may vary and is not completely known at this time; therefore, the number of hours assigned to each task are general estimates. Any additional budget not used for an individual task may be shifted to other tasks as needed or rolled into the contingency task. No inter-task budget shifts will occur without written authorization from Valley District. The task numbering below matches the current project task numbers.

Task 011. Ongoing Program and Project Management.

The overall program management and coordination across all the major ICF-led components of the Upper SAR Program has been budgeted through the HCP project budget. This task provides ongoing program management and coordination support as well as HCP and HCP EIR project management support.

Assumptions:

- *Approximately 4 hours per week for 26 weeks.*

Task 022. Additional Funding Analysis Support.

MCubed is a subcontractor providing funding analysis to support the funding chapter of the HCP. Substantial updates to the species models, covered activities, and other HCP changes may cause the need to revise the funding analysis of the HCP. MCubed will provide updated funding analyses and revisions to the funding chapter as needed.

Deliverables:

- *Revised funding chapter and associated tables.*

Task 024. Ongoing Public Outreach Support.

ICF will coordinate with Kristeen Farlow and Joanna Gibson regarding stakeholder communication and engagement continue to provide as needed public outreach support.

Assumptions:

- *Approximately 4 hours per month for 6 months.*

Task 026. Prepare Final HCP.

ICF will support Valley District in the revisions to the HCP text in response to public comments and to accommodate other changes requested by Valley District. Additional changes requested by Valley District include the removal of two covered activities from the HCP (VD. 2.03 Lytle Creek Diversion and Basin, and VD.2.07 Cajon-Vulcan 1 Diversion and Basin); evaluation of the changes in hydrology and sediment transport without these two projects; major revisions to nearly all species distribution models. This task includes rerunning all GIS calculations for impacts and conservation, and updating all figures, tables, and text related to the changes in covered activities and species models. This task also includes the technical editing and formatting of the final HCP document.

Assumptions:

- *Approximately 4 hours per species model for 20 models.*

Deliverables:

- *Revised and updated figures, tables, and text of the HCP.*
- *Final formatted HCP document (PDF and Word files).*

Task 028. Prepare Final EIR.

ICF will support Valley District in the revisions to the HCP EIR text in response to public comments and to accommodate other changes in the HCP or EIR requested by Valley District (see Task 026). This task includes rerunning any additional GIS calculations needed for the EIR that are not completed under Task 026, and updating all figures, tables, and text related to the changes in covered activities and species models. This task also includes the technical editing and formatting of the final HCP document.

Deliverables:

- *Revised and updated figures, tables, and text of the HCP EIR.*
- *Final formatted HCP EIR document (PDF and Word files).*

Task 029. Additional NEPA Support.

ICF is currently scoped and funded to complete an EA for the USFWS on the HCP. The $110,000 in our current budget is expected to be sufficient for the EA as scoped. However, if USFWS determines an EIS is required and/or if the number of meetings and coordination with USFWS becomes more intense that assumed for this EA, then additional funding may be needed in the future. The additional funding could come from the contingency task or through a future amendment.

Task 030. CAMMP Portal Updates.

We have included a small budget in this task to cover a limited number of additional requested changes to the CAMMP Portal. Any requested changes exceeding this budget could come from the contingency task or through a future amendment.

Deliverables:

- *Limited revisions to the CAMMP Portal.*

Task 031. Contingency Budget for Miscellaneous Support.

We have included a contingency task to support additional Valley District requests more readily and/or effort that substantially exceeds that assumed for the tasks above. Any unused budget in previous tasks may be moved into the continency task. ICF will require written authorization before using any of the budget reserved in the contingency task.

Schedule

This scope has been developed with a 6-month schedule in mind. We anticipate that the majority of HCP and EIR support will be completed during the fourth quarter of 2021but some ongoing support may be needed in the first quarter of 2022.

Cost Estimate

The scope described above is proposed to be completed on a time and materials basis for a Not-to-Exceed amount of $199,973. The detailed cost estimate is provided in Table 1. ICF shall invoice costs monthly.

Table 1. Upper Santa Ana River HCP & EIR/EA

	Consulting Staff													ICF Production Staff			Subcontractors					
Employee Name	Fleury Scott	Payne Rebecca	Belby Brendan	Frye Kylan	Turner Debra	Nichols Greg	Walker Jonathan	Berney Jason	Jenkins Seth	Zeff Sally	Cornejo Zachary	Mendoza Tiffany		Cherry Kenneth	Mountain-Castro Jenelle		Mcubed					
Project Role	Program Director	Conserv'n Planner	Hydrology	Conserv'n Planner	GIS	GIS Modeling				CEQA/NEPA	CEQA/NEPA Support	Public Outreach					Funding Analysis					
Labor Classification	Proj Dir	Sr Consult I	Sr Consult III	Sr Consult I	Sr Consult II	Sr Consult III	Sr Consult II	Assoc Consult II	Assoc Consult II	Proj Dir	Assoc Consult I	Sr Consult I		Assoc Consult I	Asst Consult				Sub Mark-up:			
Task													Subtotal			Subtotal		Subtotal	10%	Labor Total	Direct Costs	Total Price
Task 011. Project/Program Management (4 hrs/week for 26 weeks)	108.0												$26,141.40			$0		$0	$0	$26,141.40		$26,141.40
													$0.00			$0		$0	$0	$0.00		$0.00
Task 022. Additional Funding Analysis Support	8.0				12.0								$3,736.40			$0	$10,000	$10,000	$1,000	$14,736.40		$14,736.40
													$0.00			$0		$0	$0	$0.00		$0.00
Task 024. Ongoing Public Outreach Support (4 hr./month for 6 months)												24.0	$4,080.00			$0		$0	$0	$4,080.00		$4,080.00
													$0.00			$0		$0	$0	$0.00		$0.00
Task 026. Prepare Final HCP													$0.00			$0		$0	$0	$0.00		$0.00
Support for response to public comments on HCP	16.0	24.0		24.0									$11,312.80			$0		$0	$0	$11,312.80		$11,312.80
Removing two covered activities from text/tables in HCP and Appendices	2.0	8.0		12.0									$3,564.10			$0		$0	$0	$3,564.10		$3,564.10
Hydrology/sediment transport support	4.0		16.0										$3,934.60			$0		$0	$0	$3,934.60		$3,934.60
Major revisions to nearly all species models (avg. 4hr./model x 20 models)	20.0					80.0							$18,841.00			$0		$0	$0	$18,841.00		$18,841.00
Update all species figures, update/new covered activity figures as needed	12.0				120.0								$20,904.60			$0		$0	$0	$20,904.60		$20,904.60
													$0.00			$0		$0	$0	$0.00		$0.00
Task 028. Prepare Final EIR													$0.00			$0		$0	$0	$0.00		$0.00
Update based on changes to the HCP					40.0					30.0	60.0		$19,650.00			$0		$0	$0	$19,650.00		$19,650.00
Response to public comments										40.0	100.0		$20,500.00			$0		$0	$0	$20,500.00		$20,500.00
Produce final EIR										4.0	15.75		$2,711.25	40.0	24.0	$7,760		$0	$0	$10,471.25		$10,471.25
													$0.00			$0		$0	$0	$0.00		$0.00
Task 029. Additional NEPA Support (none at this time)													$0.00			$0		$0	$0	$0.00		$0.00
													$0.00			$0		$0	$0	$0.00		$0.00
Task 030. CAMMP Portal Updates							2.0	12.0	24.0				$4,573.20			$0		$0	$0	$4,573.20		$4,573.20
													$0.00			$0		$0	$0	$0.00		$0.00
Task 031. Contingency for miscellaneous support as needed			160.0										$29,664.00			$0		$0	$0	$29,664.00		$29,664.00
Total hours **1,041.75**	170.0	32.0	176.0	36.0	172.0	80.0	2.0	12.0	24.0	74.0	175.75	24.0		40.0	24.0							
Billing Rates	$242.05	$160.00	$185.40	$150.00	$150.00	$175.00	$154.50	$128.75	$113.30	$225.00	$115.00	$170.00		$125.00	$115.00							
Subtotal	$41,148.50	$5,120.00	$32,630.40	$5,400.00	$25,800.00	$14,000.00	$309.00	$1,545.00	$2,719.20	$16,650.00	$20,211.25	$4,080.00	$169,613.35	$5,000	$2,760	$7,760	$10,000	$10,000	$1,000	$188,373.35		
Other Direct Costs																						
500.00 Subcontractor																					$10,000.00	
523.02 Reproductions																					$545.00	
Mark-up on Direct Expenses : 10%																					$1,054.50	
Direct expense subtotal																					$11,599.50	
Total price																						$199,972.85

FOURTEENTH AMENDMENT TO THE CONSULTING SERVICES AGREEMENT

This Fourteenth Amendment to the Consulting Services Agreement ("***Amendment***") is entered into as of December 7, 2021, by and between ICF Jones & Stokes, Inc. ("***Consultant***"), and San Bernardino Valley Municipal Water District, a water district organized and existing under the California Municipal Water District Law of 1911 ("***District***"). Consultant and District are hereafter referred to individually as "***Party***" and collectively as the "***Parties***."

RECITALS

A. The Parties entered into that certain Consulting Services Agreement, dated September 27, 2013 (as amended, "***Consulting Agreement***"), whereby Consultant agreed to provide certain professional environmental and engineering services to District in connection with the preliminary design for the habitat restoration project. The Consulting Agreement provided for a Maximum Fee of $160,000.

B. On or about February 19, 2014, District agreed to increase the Maximum Fee by $19,000, reflecting a total Maximum Fee of $179,000.

C. On or about April 30, 2014, the Parties agreed to the First Amendment which increased the Maximum Fee by One Million Nine Hundred Seventy-Five Thousand Two Hundred Forty-Six Dollars and Fifty-Two Cents ($1,975,246.52), reflecting a new total Maximum Fee of Two Million One Hundred Fifty-Four Thousand Two Hundred Forty-Six Dollars and Fifty-Two Cents ($2,154,246.52).

D. On or about January 20, 2015, District found that the First Amendment Maximum Fee incorrectly added $28,000 to the compensation amount for Consultant.

E. On or about January 27, 2015, the Parties agreed to the Second Amendment which decreased the Maximum Fee by Twenty-Eight Thousand Dollars (-$28,000), reflecting a new total Maximum Fee of Two Million One Hundred Twenty-Six Thousand Two Hundred Forty-Six Dollars and Fifty-Two Cents ($2,126,246.52).

F. On or about August 18, 2015, the Parties agreed to the Third Amendment which increased the Maximum Fee by Thirty Thousand Six Hundred Twenty-Five Dollars ($30,625), reflecting a new total Maximum Fee of Two Million One Hundred Fifty Six Thousand Eight Hundred Seventy One Dollars and Fifty Two Cents ($2,156,871.52).

G. On or about May 17, 2016, the Parties agreed to the Fourth Amendment which expanded the scope of services and increased the compensation to include Early Implementation Services for the Upper Santa Ana River Habitat Conservation Plan which increased the Maximum Fee by One Million Three Hundred Thirty-Six Thousand Two Hundred Seventy Dollars ($1,336,270), reflecting a new Maximum Fee of Three Million

Four Hundred Ninety-Three Thousand One Hundred Forty-One Dollars and Fifty-Two Cents ($3,493,141.52).

H. On or about July 19, 2016, the Parties agreed to the Fifth Amendment which expanded the scope of services to include two new members, Orange County Water District (OCWD) and the Metropolitan Water District of Southern California (MWDSC), in the Upper Santa Ana River Habitat Conservation Plan (HCP) and increased the Maximum Fee by One Hundred Ten Thousand Eight Hundred Ninety-Eight Dollars ($110,898), reflecting a new Maximum Fee of Three Million Six Hundred Four Thousand Thirty-Nine Dollars and Fifty-Two Cents ($3,604,039.52).

I. On or about February 21, 2017, the Parties agreed to the Sixth Amendment which expanded the scope of professional services to include additional hydrological and covered activities analyses and increased the Maximum Fee by Two Hundred Seven Thousand Eight Hundred Ninety-One Dollars and Ninety-One Cents ($207,891.91), reflecting a new Maximum Fee of Three Million Eight Hundred Eleven Thousand Nine Hundred Thirty-One Dollars and Forty-Three Cents ($3,811,931.43).

J. On or about June 20, 2017, the Parties agreed to the Seventh Amendment which expanded the scope of professional services to include additional analysis of restoration opportunities at the Hidden Valley Wetlands and support services for the development of the Santa Ana River Integrated Model and increased the Maximum Fee by Ninety-Six Thousand Four Hundred Forty-Seven Dollars and Zero Cents ($96,447.00), reflecting a new Maximum Fee of Three Million Nine Hundred Eight Thousand Three Hundred Seventy-Eight Dollars and Forty-Three Cents ($3,908,378.43).

K. On or about January 16, 2018, the Parties agreed to the Eighth Amendment which expanded the scope of professional services to include CEQA and regulatory permitting for the HCP tributaries restoration projects and increased the Maximum Fee by Four Hundred Twenty-Nine Thousand Eight Hundred One Dollars and Zero Cents ($429,801.00), reflecting a new Maximum Fee of Four Million Three Hundred Thirty-Eight Thousand One Hundred Seventy-Nine Dollars and Forty-Three Cents ($4,338,179.43).

L. On or about February 20, 2018, the Parties agreed to the Ninth Amendment which extended the Term of the Agreement to September 27, 2020, with no change to the Maximum Fee.

M. On or about June 19, 2018, the Parties agreed to the Tenth Amendment which expanded the scope of professional services and activities related to development of Programmatic Aquatic Resources Permitting (404, 401, and 1602 Permits) for HCP Covered Activities and increased the Maximum Fee by Five Hundred Ninety-Three Thousand Six Hundred Ninety-Seven Dollars and Zero Cents ($593,697.00), reflecting a new Maximum Fee of Four Million Nine Hundred Thirty-One Thousand Eight Hundred Seventy-Six Dollars and Forty-Three Cents ($4,931,876.43).

N. On or about September 18, 2018, the Parties agreed to the Eleventh Amendment which expanded the scope of professional services related to the HCP Plan Document and its EIR and increased the maximum fee by Two Hundred Forty-Six Thousand Fifty-Three Dollars and Ninety-Eight Cents ($246,053.98), reflecting a new Maximum Fee of Five Million One Hundred Seventy-Seven Thousand Nine Hundred Thirty Dollars and Forty-One Cents ($5,177,930.41).

O. On or about April 2, 2019, the Parties agreed to the Twelfth Amendment which expanded the scope of professional services related to Construction Management and Detailed Design Services for Upper Santa Ana River HCP Early Implementation and Upper Santa Ana River Habitat Conservation Plan communications and increased the maximum fee by Three Million Two Hundred Seventy-Three Thousand Four Hundred Twenty-Nine Dollars and Fifty-Two Cents ($3,273,429.52), reflecting a new Maximum Fee of Eight Million Four Hundred Fifty-One Thousand Three Hundred Fifty-Nine Dollars and Ninety-Three Cents ($8,451,359.93).

P. On or about October 6, 2020, the Parties agreed to the Thirteenth Amendment which expanded the scope of professional services related to Detailed Design and Environmental Compliance Services for Lake Evans for Upper Santa Ana River HCP Early Implementation and increased the maximum fee by Nine Hundred Twenty-Six Thousand Three Hundred Sixty-One Dollars and Fifty-Three Cents ($926,361.53), reflecting a new Maximum Fee of Nine Million Three Hundred Seventy-Seven Thousand Seven Hundred Twenty-One Dollars and Forty-Six Cents ($9,377,721.46).

Q. The Parties desire to further amend the Consulting Agreement to expand the scope of services and increase the Maximum Fee as described herein.

OPERATIVE TERMS

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained in this Amendment, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Recitals; Defined Terms. The Recitals are material to this Amendment, and by this reference are hereby incorporated herein. For purposes of this Amendment, all capitalized terms shall have the meanings given to such terms in the Consulting Agreement, unless such terms are otherwise defined herein.

2. Additional Services. In accordance with Section 3 of the Consulting Agreement, the Parties hereby expand the Services to include the additional professional services and activities described in that certain Proposal for HCP and EIR Amendment, which is attached to this Amendment as ***Attachment A***, and incorporated herein by this reference. Said services and activities shall be considered Additional Services under the Consulting Agreement and shall be performed and completed in accordance with the standards and obligations set forth in the Consulting Agreement.

3. Term. The Term of the Agreement is not changed and automatic termination shall remain the earlier of (a) October 6, 2022, or (b) the successful completion of Services, unless earlier terminated.

4. Compensation. The Maximum Fee is hereby increased by One Hundred Ninety-Nine Thousand Nine Hundred Seventy-Two Dollars and Eighty-Five Cents ($199,972.85), reflecting a new Maximum Fee of Nine Million Five Hundred Seventy-Seven Thousand Six Hundred Ninety-Four Dollars and Thirty-One Cents ($9,577,694.31). All references to Maximum Fee in the Consulting Agreement shall refer to the amount set forth herein.

5. Binding Effect. This Amendment shall be binding upon and inure to the benefit of the Parties' permitted successors and assigns. The Parties acknowledge and agree that except to the extent specifically provided in this Amendment, the Consulting Agreement shall continue in full force and effect as previously written.

6. No Other Modifications. The Parties acknowledge that this Amendment evidences the entire agreement between the Parties with respect to the matters addressed herein and supersedes all previous negotiations and discussions related thereto.

7. Counterparts. This Amendment may be executed in two or more counterparts, each of which shall be an original, but all of which shall constitute one and the same instrument.

[*Signature Page Follows*]

IN WITNESS WHEREOF, the Parties hereby execute this Amendment as of the date first set forth above.

DISTRICT:

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:_____

Name: _____

Its: _____

Date: _____

CONSULTANT:

ICF JONES & STOKES, INC.

By:_____

Name: _____

Its: _____

Date: _____

Attachment A

Proposal for HCP and EIR Amendment

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: December 14, 2021

TO: Board of Directors' Workshop - Engineering

FROM: Heather Dyer, CEO/General Manager

SUBJECT: Consider Recruitment of Principal Engineer and Addition of Lead Water Systems Operator Position

Staff is requesting the Board consider directing staff to begin recruitment for a Principal Engineer, a position that was previously approved during the 2021/2022 budget discussions. Staff is also requesting the Board consider adding another Lead Water Systems Operator Position to our organization chart and salary schedule. These new staff will help with the tremendous workload in the Engineering and Operations Department, which has increased significantly in the past year, and is expected to increase even more in coming years, due to several important District initiatives such as the ACWA JPIA safety program, funding of more than 20 District infrastructure projects through the Watershed Connect WIFIA program, and construction of our own recharge facilities at the Weaver Basins and Enhanced Recharge basins. Having a well-staffed and highly functional engineering and operations team is critical to our success on these and many more District priorities.

Background

At the Board of Directors' Wages, Benefits, and Insurance Workshop on May 10, 2021, the Board of Directors agreed to add a "vacant" position, Principal Engineer, in the Engineering/Operations Department on the organizational chart for FY2021-22 in order to indicate where we are heading in the near future in terms of succession planning and workforce development. The Engineering/Operations department has the need for additional staff with expertise in this field in order to free up time for our Chief Engineer to work on strategic initiatives. It was envisioned that this position will be filled in FY2022-23 and spend several years working side by side with our executive staff, preparing to potentially become the next Chief Engineer. However, among other things, with the District and its partners' recent successful endeavor to secure the WIFIA loan financing, eleven projects are now on

accelerated schedules for implementation during Phase 1 of the Watershed Connect program. Staff recommends that the Board of Directors consider beginning recruitment of this position after the new year to address the immediate needs of the department.

Staff also proposes to add a new Lead Water Systems Operator position to the new organization chart in the Engineering/Operations Department. This new position will work under the general direction of the Water Operations Manager and may exercise periodic supervisory duties, as needed, to lead a team of operators for installation, replacement, troubleshooting, and repair of water appurtenances and facilities, in addition to other routine duties for operation and maintenance of the facilities. In anticipation of District's expansion of our own recharge facilities, this position will be required to operate heavy equipment safely and legally, such as backhoes, loaders, excavators, etc. Furthermore, with the District's recent joining of the ACWA JPIA this position will lead the operations side of the District's safety program, in collaboration with our incoming Human Resources and Risk Manager, to ensure requirements for modernizing safety protocols and procedures in the field and operations settings.

Based on the recently completed Classification and Compensation Study, the Principal Engineer salary range in the approved schedule is Range 31, $11,823 - $16,145/month. The Lead Water Systems Operator position salary range in the approved schedule is Range 21A, $7,669 - $10,430/month. Both of these positions are integral to the District's succession planning and workforce development efforts.

Fiscal Impact:

The annual fiscal impact of the Principal Engineer position is approximately $203,000 and the annual fiscal impact of the Lead Water Systems Operator position is approximately $142,000 per year. These costs include salary and benefits.

Staff Recommendations:

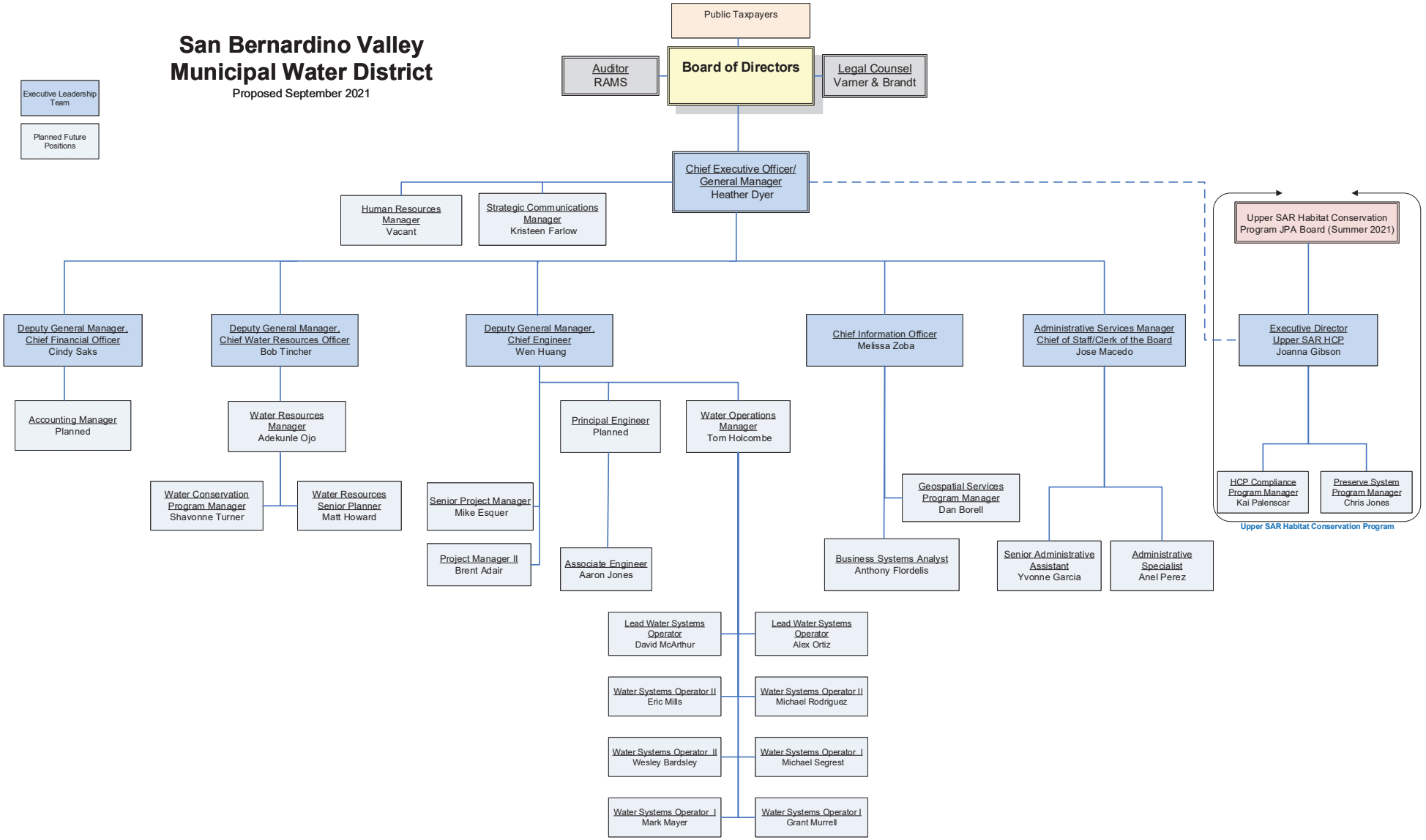
1) Consider directing staff to begin recruitment for the previously approved Principal Engineer position.
2) Consider request to add another Lead Water Systems Operator position to the organizational chart and salary schedule and if so desired, direct staff to place an updated organizational chart and salary schedule on a future Board meeting for consideration.

Attachments:

Approved Organizational Chart, September 2021
Approved Salary Schedule, September 2021

San Bernardino Valley Municipal Water District

Proposed September 2021



San Bernardino Valley Municipal Water District
Job Position and Salary Range Table
Effective Date: July 1, 2021
Revised Date: September 7, 2021

Job Position	Salary Range	Salary Range amount per Month Low	Salary Range amount per Month High	# of FTE's Authorized Positions	# of FTE's Filled
Accounting Manager	30	11,295	15,409	1	-
Administrative Services Manager	30	11,295	15,409	1	1
Administrative Specialist	14	5,470	7,404	1	1
Associate Engineer	24A	8,736	11,903	1	1
Business System Analyst	22	7,885	10,728	1	1
CEO / General Manager	43A	21,335	29,209	1	1
Chief Engineer - Deputy General Manager	39A	17,526	23,983	1	1
Chief Financial Officer - Deputy General Manager	39A	17,526	23,983	1	1
Chief Information Officer	37	15,618	21,358	1	1
Chief Water Resources - Deputy General Manager	39A	17,526	23,983	1	1
Electrical and Mechanical Maintenance Technician	16	5,986	8,117	1	1
Electrical and Mechanical Maintenance Technician II	19A	6,984	9,499	1	1
Environmental Compliance and Permitting Program Manager	30	11,295	15,409	1	1
Executive Director, Upper SAR Sustainable Resources Alliance	34A	13,877	18,966	1	1
Geospatial Services Program Manager	30A	11,558	15,771	1	1
Human Resources Manager	30	11,295	15,409	1	-
Lead Electrical and Mechanical Maintenance Technician	23A	8,377	11,401	1	1
Lead Water Systems Operator	21A	7,669	10,430	1	1
Manager of Water Resources	33	12,965	17,711	1	1
Preserve System Program Manager	30	11,295	15,409	1	1
Principal Engineer	31	11,823	16,145	1	-
Project Manager II	27A	10,022	13,664	1	1
Senior Administrative Assistant	12	5,073	6,888	1	1
Senior Project Manager	30A	11,558	15,771	1	1
Strategic Communications Manager	31A	12,063	16,468	1	1
Water Conservation Program Manager	30	11,295	15,409	1	1
Water Operations Manager	31A	12,063	16,468	1	1
Water Resources Senior Planner	30	11,295	15,409	1	1
Water Systems Operator I	13A	5,409	7,326	2	2
Water Systems Operator II	18A	6,718	9,123	2	2
Total FTE Count				32	29

Effective Date: July 1, 2021
Cost of Living Adjustment effective date: July 1, 2021 = 4.1%
Presented and Adopted by the Board on June 15, 2021
Revised to add Human Resources Manager on September 7, 2021

DATE: December 14, 2021

TO: Board of Directors Workshop - Engineering

FROM: Melissa Zoba, Chief Information Officer
Dan Borell, Manager of Geospatial Services

SUBJECT: Consider Entering Into an Agreement for Professional Consulting Services for the Redistricting of Division Boundaries

The Board is being asked to consider entering into a professional consulting services agreement with Redistricting Insights for the redistricting of Valley's District's division boundaries based on the 2020 Census data and in compliance with California and federal Voting Rights Acts and the Fair Maps Act.

Background

California Elections Code Section 22000 requires each special district to adjust division boundaries after each decennial census, and using that census as a basis, adjust the boundaries of any division so that the divisions are, as far as practicable, equal in population.

Using the 2020 census data released in September 2021, staff calculated the total population of Valley District to be 709,704 which represents an increase of 48,158 from the 2010 census. Based on this total, the target population for each of the five divisions is 141,941. SB 594 provides that special districts with a regular election on the same day as the 2022 statewide general election must adopt adjusted division boundaries no later than April 17, 2022.

At the October 12, 2021 Engineering Workshop, the Board directed staff to engage the services of a professional consultant to analyze and rebalance the division boundaries to reflect changes in population and demographics.

In November, Valley District released a Request for Proposal (RFP) for the Redistricting of Division Boundaries. Two (2) proposals were received. The scope of work included an analysis of 2020 Census data, development of the dataset needed to draft new maps, community

outreach and engagement of public feedback, production of several draft maps, finalization of a map proposal and assistance with the transmission of final maps to the County Registrar of Voters. The RFP also allowed for consultants to present optional services based on their expertise and assessment of the project. Staff is not recommending any optional services as part of the professional consulting services agreement being considered at this time, however, they may be added at a later date, if the need arises.

Staff evaluated the proposals and conducted interviews with each of the consultant teams to gain additional information and a more detailed discussion of project approach, timeline, and the proposed project team. Redistricting Insights was selected as the preferred consultant for this project. The project proposal fees from the two consultant proposals are summarized in Table 1.

Table 1 – Consultant Proposal Summary

	Redistricting Insights	Consultant 2
Project Proposal Fee	**$30,000**	**$40,000**

Redistricting Insights is a redistricting firm that works on advocacy and demography projects across the country. Their team combines a data-driven approach that utilizes cutting edge technology with an extensive knowledge base. Their proposal demonstrates the breadth of their team's experience in redistricting cycles and their extensive work with municipalities, counties and special districts including current redistricting client, the County of San Bernardino. The proposal outlines a structured but flexible approach and an open, accessible and transparent process that will meet the goals of the project within the timeline defined by SB594.

Fiscal Impact

The total cost of the project proposal is $30,000. Funds for these services are available in the Consultants, 6360 line item of the approved FY 2021-2022 General Fund Budget.

Staff Recommendation

Staff recommends that the Board forward the consulting services agreement with Redistricting Insights in the amount of $30,000 to the next regular meeting of the Board of Directors for consideration.

Attachments

1) Proposal – Redistricting Insights

Redistricting Services Proposal

Prepared for the San Bernardino Valley Municipal Water District

Submitted on November 23rd, 2021

Redistricting Insights

Melissa Zoba, *Chief Information Officer*
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408

Dear Ms. Melissa Zoba,

Redistricting Insights welcomes the opportunity to work with the San Bernardino Municipal Water District to help you accomplish your goal of enacting balanced and representative district lines for your Board of Directors elections.

Redistricting Insights is a premier redistricting firm currently working on advocacy and demography projects across the country. Our team combines a data-driven approach that utilizes cutting-edge technology with an extensive knowledge base spanning the past two decades of redistricting cycles. We have worked with municipalities, counties, and special districts across the state to help manage redistricting in an open, transparent, and fair way.

Our team has also worked with public agencies in a variety of communications, community engagement, and consulting roles apart from redistricting—giving us a unique ability to work with your staff to solve problems and deliver the highest quality of service for your constituents.

This redistricting cycle, our team has contracted with several public agencies to manage redistricting in their jurisdictions. We also have worked with several jurisdictions in the past on the initial transition to trustee areas– both on their own volition and as a result of litigation.

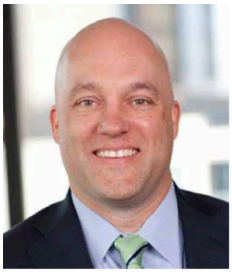
In this proposal, you will find our agency client list and references, our project proposal, a proposed timeline for this project and a fee proposal.

If you have any questions about the content of this proposal, please do not hesitate to reach out. We look forward to working with you.

Sincerely,

Matt Rexroad
Chief Legal Counsel
Redistricting Insights, LLC

Our Team



Matt Rexroad, *Chief Legal Counsel*

Matt Rexroad earned his undergraduate degree from the University of Southern California, a Juris Doctor degree from McGeorge School of Law while working full-time in the State Legislature, and a Masters of Public Administration from the University of Southern California Sacramento Center. He is an active member of the California State Bar. Matt was a founding partner at Meridian Pacific, Inc., a nationwide strategic political consulting and public affairs firm. He also served as a senior staff person in the California state legislature. Rexroad served four years on the Woodland City Council and twelve years on the Yolo County Board of Supervisors.

Fabian Valdez Jr., *Chief Demographer*

Fabian Valdez has a proven track record of integrating data analytics and predictive modeling to form quantitative strategies to drawing districts. Valdez's approach is to let the data tell the story. Fabian has worked on data analytics projects across the State of California, including serving as the Director of Data and Digital Marketing at Meridian Pacific Inc, prior to joining Redistricting Insights. Fabian is responsible for onboarding the 2020 Census data and ensuring that future models and redistricting projects accurately reflect the changing nature of California demographics.

Eddy Harrity, *Data Scientist*

Eddy Harrity received both his Bachelor's and Master's degrees from Pepperdine University, where he researched incentivizing candidates to represent the median voter and the effects of the top-two primary on the partisanship of California Legislators. He has worked on campaigns from California to New Hampshire, focusing on voter behavior and data analytics.

Ryan Gardiner, *Communications Director*

Ryan Gardiner is a seasoned communications professional with a track record of engaging communities to achieve deliberate public affairs outcomes. Ryan has previously worked in strategic political consulting for Meridian Pacific, Inc. and as a policy and communications aide in the California State Senate. Ryan graduated from UC Davis with a degree in political science and earned a graduate certificate in applied public policy from the Center for California Studies at Sacramento State.

Clients

The team at Redistricting Insights has a breadth of experience that covers all aspects of the redistricting process. We have been contracted as redistricting consultants for various municipal and county governing bodies as well as for community interests.

The following are a few examples of previous projects similar in scope to this proposal:

Redistricting for the County of San Bernardino

- Client Name: County of San Bernardino
- Project Description: Conducting 2021 decennial supervisorial redistricting
- Contact: Pam Williams, 909-387-4377

City of Elk Grove 2011 Council Districting

- Client Name: City of Elk Grove
- Project Description: Assisting with transitioning from at-large to district elections
- Contact: Gary Davis, 916-705-9538

Chualar Union Elementary 2011 Districting

- Client Name: Chualar Union Elementary School District
- Project Description: Assisting with transitioning from at-large to district elections (2011)
- Contact: Ginny Brown, 831-755-0303

Salinas Memorial Hospital 2011 Districting

- Client Name: Salinas Valley Memorial Hospital District
- Project Description: Assisting with transitioning from at-large to district elections (2011)
- Contact: 831-757-3627

Current Public Redistricting Clients

San Bernardino County
City of Barstow
Cherry Valley Beaumont Water District
Tuolumne Utilities District
South Placer Municipal Utilities District
Monterey Peninsula Regional Park District
Cordova Parks and Recreation District
Salinas Valley Memorial Hospital District
Alan Hancock Community College District
New York Independent Redistricting Commission

Project Proposal

The objective of this project is to assist the San Bernardino Valley Municipal Water District with drawing a legally permissible division map for your Board of Directors elections. This includes compliance with the California and federal Voting Rights Acts, the Fair Maps Act, and ensuring an open, accessible, transparent process that engages constituents in your district.

The Redistricting Insights team will assist district staff in developing a timeline, plan, agenda/board materials, community engagement materials, draft maps, revised maps, and final maps in accordance with the preexisting staff procedures at your district. Specifically, we will provide:

- Data: *we will create a dataset that incorporates all the legally required sources of information needed to draft new maps.*
- Community Engagement: *working with staff to engage community organizations, leaders, and constituents with information and tools to be able to participate in the redistricting process. This could include public forums, mapping worksheets, etc. Our team will take all submitted materials, whether they be sophisticated maps, hand drawings, or written statements and convert them into a standard format that can be accessed by the Board of Directors, and other members of the public.*
- Draft Maps: *once the public has engaged, our team will produce several draft maps, utilizing the feedback received from the public, for the board to consider and deliberate on.*
- Final Maps: *after the consideration of draft maps, we will work with staff to finalize a map proposal, present the proposal to the board and when approved, work with staff to transmit the final maps to the County Registrar of Voters.*

Data

The first step in beginning the redistricting process is providing district staff with the dataset we will use for mapping. We will create the GIS files that outline the boundaries of the district and will match those boundaries to census blocks utilizing the Census Bureau's TIGER files. Then, we will incorporate P.L. 94-171 files (2020 census results) along with additional data on prison redistribution figures from the California Statewide Database. We also

will incorporate any additional local data that may be necessary, or could be helpful, in identifying communities of interest. These could include enrollment boundaries, other jurisdictional boundaries, environmental data, health data, etc. Upon creating the dataset, our team will send an analysis to District staff of the current population and demographic information for your electoral districts which will provide an indication of how the current lines will need to shift.

Community Engagement

The first step of public engagement will be to solicit input and proposals from the public in identifying "communities of interest." Communities of interest are essentially groups of residents that share some sort of similarity, whether it be social, racial, economic, etc. By defining communities of interest and identifying their geographic makeup, we can set the foundations for the communities that the new district boundaries will represent. Engaging the public in defining communities of interest can happen through online forms, hard copy materials, or public forums and meetings.

As we move further into the redistricting process, we will engage the public to directly solicit suggested maps and provide worksheets/materials that allow them to produce maps.

Finally, it will be critical to provide the public with opportunities to comment on and engage with draft maps that the board is considering. Our team will ensure that public testimony received during the map consideration process is incorporated into any action taken by the board.

Draft Maps

Once preliminary public engagement has concluded, we will seek direction from your Board of Directors to draw draft maps based on priorities outlined by the board and guided by public testimony and map submissions. There are many forms that this could take, based on how your board would like to proceed. The board could chose to specify themselves how they would like draft maps to look or the board could identify community submitted maps that they would like to use as a starting point for discussion.

Our team will present these options to the board and then produce the draft maps based on their input. These drafts will be provided in several different formats including a basic PDF version that can be included in agenda materials and posted on the district's website, a digital version that is interactive and available online, and the shape file for use by GIS and mapping professionals.

Final Maps

Once the public has been thoroughly engaged, we will present a final map to the Board of Directors with a detailed explanation of the process leading to the map's development and the many considerations of the particular map. Our final map proposal will include documentation from the public meetings held, PDF versions of the final map, GIS shape files for county elections staff, and a Metes and Bounds legal document describing the boundaries.

With approval by the board, we will work with county elections staff to transmit the maps for use in future elections. We will also work with district staff to produce materials accessible to the public that illustrate the new district boundaries. Redistricting Insights will be available on a continuing basis to make any technical changes to the map files and provide additional versions as necessary.

Additional Options

Redistricting Insights recognizes that no single approach to redistricting works in every single community in California. As such, we approach our projects with flexibility and the option to customize your district's redistricting plan in a way that works better for your community. Such options include:

- Multi-lingual outreach
- Paid advertising that could include print, digital, TV, or radio efforts to generate engagement
- Online mapping tools for the public to use to propose their own maps

These options would create an additional cost not included in the cost of this proposal.

Project Schedule

The State of California gives more flexibility during the districting process to special districts than to Cities and Counties. That being said, the main timeline constraint will be completing the districting process with ample time for the County Registrar of Voters to process the new maps in time for the 2022 election process. As such, we would suggest completing this project in early 2022. Other than that, the timeline for this project can largely be determined by staff and board direction. The below schedule is simply a sample schedule that can be amended based on the scheduling needs of the staff and board. These meetings may be incorporated into a regular meeting of the Board of Directors, should that be the preference of staff and the board. The board may also choose to appoint a sub-committee to engage with this process and make a recommendation on map adoption to the board. The timeline below consists of three public meetings on redistricting which is our recommendation, however should the board or district staff feel that additional or fewer meetings are necessary to adequately engage the public, we are happy to accommodate that with no change to our proposed fee.

Ongoing/Immediate

- Meet with district staff and develop a custom plan for the District's redistricting.
- Redistricting Insights will construct and maintain a district-specific redistricting dataset.

January 2021

- Public Hearing #1 (Introduction): Redistricting Insights will give a Redistricting 101 presentation to the Board of Directors to explain the districting process and seek direction from the board on their preferences for timeline and outreach.
- Redistricting Insights will assist district staff in developing and publishing materials for the public engagement on communities of interest. This may include a press release announcing the availability of the tools, information made available on the District's website describing the process, and outreach to community members and groups to utilize the engagement materials.

- Community members may engage by utilizing the outreach materials we have prepared.

February 2021

- Public Hearing #2 (Map Scenarios): based on previous board direction, Redistricting Insights will present up to four map scenarios. Public testimony will be invited to help identify communities of interest, support or opposition to the mapping scenarios, as well as suggestions for how the scenarios could be improved.
- The board will discuss the public testimony and map scenarios and identify specific scenarios they would like adjusted or prepared as draft maps. The board may also provide independent direction for the development of draft maps.
- Redistricting Insights will prepare a draft map for the board to consider.

March 2022

- Public Hearing #3 (Draft Map): Redistricting Insights will provide a draft map for the public and board to consider, made available seven days prior to the hearing. Public testimony will be invited on the draft plan.
- Should there be no further revisions, the board may adopt the draft map as final.
- Should there be further revisions, Redistricting Insights will revise the draft maps as directed.
- Public Hearing #4 (Optional: Final Map): Redistricting Insights will provide the revised draft maps for the public and board to consider, made available seven days prior to the hearing. Public testimony will be invited on the final plan.
- After approval, Redistricting Insights will transmit the final maps to the County Registrar of Voters.

Proposed Fee

The cost of this project includes the software and licensing required for mapping, as well as the services described in this proposal:

- Dataset creation/management
- Community outreach
- Mapping services
- Technical support
- Public hearing coordination

Cost: $30,000