AGENDA
IRVINE RANCH WATER DISTRICT
ENGINEERING AND OPERATIONS COMMITTEE
TUESDAY, MARCH 16, 2021

Due to COVID-19, this meeting will be conducted as a teleconference pursuant to the provisions of the Governor's Executive Orders N-25-20 and N-29-20, which suspend certain requirements of the Ralph M. Brown Act. Members of the public may not attend this meeting in person.

Participation by members of the Committee will be from remote locations. Public access and participation will only be available telephonically/electronically.

To virtually attend the meeting and to be able to view any presentations or additional materials provided at the meeting, please join online via Webex using the link and information below:

Via Web: https://irwd.webex.com/irwd/j.php?MTID=m5814487175466132ebd471d17ced4716
Meeting Number (Access Code): 146 441 0356
Meeting Password: SNe7AqEXa68

After joining the meeting, in order to ensure all persons can participate and observe the meeting, please select the "Call in" option and use a telephone to access the audio for the meeting by using the call-in information and attendee identification number provided.

As courtesy to the other participants, please mute your phone when you are not speaking.

PLEASE NOTE: Participants joining the meeting will be placed into the Webex lobby when the Committee enters closed session. Participants who remain in the "lobby" will automatically be returned to the open session of the Committee once the closed session has concluded. Participants who join the meeting while the Committee is in closed session will receive a notice that the meeting has been locked. They will be able to join the meeting once the closed session has concluded.

CALL TO ORDER 1:30 p.m.

ATTENDANCE Committee Chair: John Withers _____
Committee Member: Karen McLaughlin _____

ALSO PRESENT	Paul Cook _____	Kevin Burton _____	Wendy Chambers _____
	Jose Zepeda _____	Paul Weghorst _____	Cheryl Clary _____
	Rich Mori _____	Eric Akiyoshi _____	Richard Mykitta _____
	Kelly Lew _____	Jim Colston _____	Ken Pfister _____
	Lars Oldewage _____	Malcolm Cortez _____	Scott Toland _____
	John Dayer _____	Bruce Newell _____	Mitch Robinson _____
	Belisario Rios _____	Jacob Moeder _____	_____ _____
	_____ _____	_____ _____	_____ _____
	_____ _____	_____ _____	_____ _____

PUBLIC COMMENT NOTICE

If you wish to address the Committee on any item, please submit a request to speak via the "chat" feature available when joining the meeting virtually. Remarks are limited to three minutes per speaker on each subject. You may also submit a public comment in advance of the meeting by emailing comments@irwd.com before 9:00 a.m. on Tuesday, March 16, 2021.

ALL VOTES SHALL BE TAKEN BY A ROLL CALL VOTE.

COMMUNICATIONS

1. Notes: Burton

2. Public Comments

3. Determine the need to discuss and/or take action on item(s) introduced that came to the attention of the District subsequent to the agenda being posted.

PRESENTATION

4. LINEAR ASSET MOBILE WORK MANAGEMENT PROGRAM DEMONSTRATION – MORENO / MYKITTA / CHAMBERS

   Staff will provide a virtual demonstration of the Linear Asset Mobile Work Management program.

INFORMATION

5. UPCOMING PROJECT STATUS REPORT – CORTEZ / LEW / AKIYOSHI / MORI / BURTON

   Recommendation: Receive and file.

6. RESEARCH BUSINESS PLAN UPDATE– COLSTON / BURTON

   Recommendation: Receive and file.

`ACTION

7. MICHELSON WATER RECYCLING PLANT TERTIARY FILTER IMPROVEMENTS BUDGET INCREASE AND CONSULTANT SELECTION – BURKE / CORTEZ / BURTON

   Recommendation: That the Board authorize a budget increase in the amount of $9,409,600, from $466,000 to $9,875,600, and authorize the General Manager to execute a Professional Services Agreement with HDR in the amount of $735,163 for engineering design services for the MWRP Tertiary Filter Improvements, Project 07892.

8. TURTLE ROCK ZONE 3 RESERVOIR CHLORAMINE BOOSTER STATION BUDGET ADDITION AND CONSULTANT SELECTION - MURPHY / CORTEZ / BURTON

   Recommendation: That the Board authorize the addition of Project 11840, Turtle Rock Zone 3 Reservoir Chloramine Booster Station to the FY 2020-21 Capital Budget in the amount of $1,705,000 and authorize the General Manager to execute a Professional Services Agreement with Lee & Ro, Inc. in the amount of $375,477 for engineering design services for the Turtle Rock Zone 3 Reservoir Chloramine Booster Station, Project 11840

9. GROUNDWATER WELLS AND TREATMENT AGREEMENT WITH EAST ORANGE COUNTY WATER DISTRICT AND THE CITY OF ORANGE – WEGHORST

   Recommendation: That the Board authorize the General Manager to execute the Groundwater Wells and Treatment Agreement with East Orange County Water District and the City of Orange subject to substantive changes approved by the Engineering and Operations Committee.

OTHER BUSINESS

10. Directors' Comments

11. Adjourn

Availability of agenda materials: Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the above-named Committee in connection with a matter subject to discussion or consideration at an open meeting of the Committee are available for public inspection in the District's office, 15600 Sand Canyon Avenue, Irvine, California ("District Office"). If such writings are distributed to members of the Committee less than 72 hours prior to the meeting, they will be available from the District Secretary of the District Office at the same time as they are distributed to Committee Members, except that if such writings are distributed one hour prior to, or during, the meeting, they will be available electronically via the Webex meeting noted. Upon request, the District will provide for written agenda materials in appropriate alternative formats, and reasonable disability-related modification or accommodation to enable individuals with disabilities to participate in and provide comments at public meetings. Please submit a request, including your name, phone number and/or email address, and a description of the modification, accommodation, or alternative format requested at least two days before the meeting. Requests should be emailed to comments@irwd.com. Requests made by mail must be received at least two days before the meeting. Requests will be granted whenever possible and resolved in favor of accessibility.

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March 16, 2021
Prepared by: M. Cortez / E. Akiyoshi / K. Lew / R. Mori
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

UPCOMING PROJECTS STATUS REPORT

SUMMARY:

A status report of Irvine Ranch Water District's Upcoming Projects is presented to the Committee for information.

BACKGROUND:

The information, which is provided as Exhibit "A", is a status report submitted quarterly to the Committee for review.

FISCAL IMPACTS:

Not applicable.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Upcoming Projects Status Report

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EXHIBIT "A'

IRWD UPCOMING PROJECTS STATUS REPORT

Project Name	Start Planning	Start Design	Construction Award	Construction Final Acceptance
Operations Center Purchasing Warehouse Expansion		Summer 2021		
Gillette/Morse DW Pipeline Relocation			Spring 2021	Summer 2021
Aliso Creek Remediation			Winter 2021	Spring 2021
2020 Vault Lid Replacement				Summer 2021
MWRP Tertiary Filter Rehabilitation		Winter 2021		
MWRP MBR Fall Protection			Winter 2021	Spring 2021
MWRP Primary Tanks Replacement Covers				Summer 2021
MWRP Compressed Natural Gas and Diesel/Gasoline Fueling Station			Fall 2021	
HATS Diversion Structure Relining			Spring 2021	Spring 2022
Generator Fuel Storage Upgrades		Spring 2021		
Crystal Cove RW PRV			Spring 2021	Fall 2021
San Joaquin Reservoir Filtration Facility			Spring 2021	Spring 2022
Rattlesnake Outlet Pipe Assessment		Winter 2021		
Silverado Bridge 174 DW Improvements		Winter 2021	Spring 2022	
Silverado Bridge 175 DW Improvements			Summer 2021	
Santiago Canyon Pump Station Improvements			Spring 2021	
Sewer Siphon Improvements Phase 1				Spring 2021
Baker Campus Entrance Improvements				Winter 2021
Turtle Rock RMS		Winter 2021		
Lake Forest Woods Sewer Improvements		Winter 2021		
Wells 51 Rehabilitation		Winter 2021	Summer 2021	
Wells 1, 11, and 13 Rehabilitation				Spring 2021
DATS Miscellaneous Repairs			Winter 2021	Summer 2021
Lake Forest Zone C Pipeline				Spring 2021
Well OPA-1 PFAS Treatment			Fall 2021	Summer 2022
15 MG Zone 1 Reservoir Coating Replacement and Improvements			Spring 2021	Summer 2022
Well ET-1 PFAS Treatment		Spring 2021		
Eastwood Zone A-B BPS and Zone A-C BPS				Spring 2021
Zone A to Rattlesnake Reservoir BPS				Spring 2023
Lake Forest Zone B-C BPS			Summer 2021	Fall 2022
Serrano Creek Outlet Structure Improvements				Winter 2021
SAC Pipeline Relocation in Santiago Creek at Irvine Regional Park			Spring 2021	Fall 2021
Zone C+ Reservoir Strainer Improvements				Winter 2021
MWRP Sludge Receiving Study	Winter 2021			
LAWRP Construction Bypass Study	Spring 2021			
LAWRP Process Validation Study	Winter 2021			
PDF Sodium Hypochlorite Storage and Feed System				Spring 2022
Santiago Creek Dam Improvements			Spring 2023	

IRWD UPCOMING PROJECTS STATUS REPORT

Project Name	Start Planning	Start Design	Construction Award	Construction Final Acceptance
Santiago Canyon Fleming Zone 8 Tank and Zone 8-9 BPS			Fall 2021	
MWRP Unit Substation T-1 Replacement				Spring 2021
MWRP Biosolids and Energy Recovery Facilities				Spring 2021
Syphon Reservoir Improvements		Winter 2021		
PA 6, Neighborhood 5B and C Phase 2 RW (RA w/ICDC)				Spring 2021
PA 12, Innovation Park DW and RW (RA w/ICDC)				Spring 2021
PA 12, Innovation Park DW (RA w/ICDC)				Spring 2021
PA 12, Innovation Park Regional RW (RA w/ICDC)				Fall 2022
PA 1, Jeffrey Road Extension RW (RA w/CDC)			Summer 2021	
Tustin Legacy, Flight Drive RW (RA w/Tustin)				Summer 2021
Tustin Legacy, Neighborhood South Phase 1, S (RA with/Tustin)				Summer 2022
PA 51, Marine Way DW, RW (RA w/Heritage Fields)				Summer 2021
PA 51, South C St and LY St, S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, Alton Pkwy from Technology to Muirlands, DW S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, Marine Way from Barranca Pkwy to Alton Pkwy, DW S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, Alton Interceptor Sewer (RA w/Heritage Fields)				Summer 2021
PA 51, Marine Way from Alton to Barranca Sewer (RA w/Heritage Fields)				Summer 2021
PA 51, Sociable from Z St to B St, RW (RA w/Heritage Fields)				Summer 2021
PA 51, GP1 St DW, S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, GP2 St, DW, S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, Magnet from Ridge Valley to Bosque RW (RA w/Heritage Fields)				Summer 2021
PA 51, Cadence South DW, S, RW (RA w/Heritage Fields)				Summer 2021
PA 51, District 5 A St DW, RW (RA w/Heritage Fields)				Summer 2021
PA 51, Chinon from Cadence South to Cadence (RA w/Heritage Fields)				Summer 2021
PA 51, District 5, F and N St DW, RW				Fall 2021
PA 51, District 5, E St RW (RA w/Heritage Fields)				Fall 2021
PA 51, District 5, Astor DW, RW (RA w/Heritage Fields)				Fall 2021
PA 51, District 5, Merit DW, RW (RA w/Heritage Fields)				Fall 2021
PA 51, District 5, BB St RW (RA w/Heritage Fields)				Fall 2021
PA 51, District 5, P St and Cadence DW, RW (RA w/Heritage Fields)				Fall 2021
PA 51, Marine Way from Alton Pkwy to Bake Pkwy DW, RW (RA w/Heritage Fields)			Fall 2021	
Biennial Capital Budget and Long-Term Capital Program	In-Process			
Capital Improvement Program (CIP) Asset Management Phase 1 (Facilities)	In-Process			
Capital Improvement Program (CIP) Asset Management Phase 2 (Linear)	Fall 2021			
Facility Agreement Search Tool (FAST)	In-Process			
Potable Hydraulic Model Updates	In-Process			
IRIS Replacement Planning Model Treatment Plant Cost Update	Winter 2021			
Updates to Water Resources Master Plan for 2020 Urban Water Management Plan	In-Process			
GIS Master Plan	Summer 2021			

IRWD UPCOMING PROJECTS STATUS REPORT

Project Name	Start Planning	Start Design	Construction Award	Construction Final Acceptance
			Category	**Months**
			Winter	Jan. Feb. & Mar.
			Spring	Apr. May & June
			Summer	Jul. Aug. & Sep.
			Fall	Oct. Nov. & Dec.

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March 16, 2021
Prepared by: J. Colston
Submitted by: J. Colston / K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

RESEARCH BUSINESS PLAN UPDATE

SUMMARY:

Staff will provide an update on the research projects in which IRWD is currently involved.

BACKGROUND:

Periodically IRWD receives requests to participate in various research projects pertaining to emerging technologies through either direct funding or dedication of in-kind staff resources. Guidelines were developed to assist staff with its evaluation and response to those requests. These guidelines were incorporated into the IRWD Research Business Plan, which also provides a tracking mechanism for the various requests and ongoing research projects and programs in which IRWD participates. The underlying purpose of the Research Business Plan is to ensure that IRWD's research resources are being prioritized and utilized effectively.

One of the components of the Research Business Plan is for staff to provide a status update on the research projects to the Engineering and Operations Committee on a quarterly basis. IRWD actively participates in the Technology Approval Group (TAG) sponsored by Isle Utilities. The TAG hosts numerous developing technology providers to match interested agencies with their technologies. IRWD has included three recent technologies under consideration. A status update on the current research projects is provided as Exhibit "A".

FISCAL IMPACTS:

Not applicable.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Research Projects Summary Table

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Exhibit "A"

Research Projects Summary Table

No.	Project Title	Project Description	IRWD Contact	Organizations Involved	Type of Research	IRWD Participation Resource	Start Date	Projected Completion Date	Comments/Next Steps
1	Practical Framework for Water Infrastructure Resilience (WRF 5014)	This project will help water utilities better understand the relationships between various "enterprise risk management" planning tools, performance, and level of service. The Project will also develop frameworks summarizing currently available resources, approaches, and legislation regarding infrastructure risk and resilience.	Akiyoshi	Water Research Foundation and Black & Veatch	Case study, data review, best practice analysis and technical report.	Staff time for review of reports, sharing information, and site analysis.	Oct-19	May-21	Staff commented on the draft final report in February and the project team anticipates scheduling a review meeting in early April. Subsequently, the project team anticipates releasing the final report in late April or early May.
2	UCI Industry-University Research Center-Perfluorinated Compound Sources and Loading at Wastewater Treatment Plants-A Sewershed-Scale Analysis	This project will develop and implement methodology for sewershed analysis to identify raw wastewater sources of PFAS.	Weghorst	UCI Industry-University Research Center	Case study, data review, best practice analysis and technical report.	Staff time for review of reports, sharing information, and site analysis.	Sep-20	TBD (1-2 years)	The Civil and Environmental Engineering Department at UCI began the research on September 1, 2020. The research has been delayed due to staffing issues and COVID-19 related limitations on obtaining samples from residences. UCI expects these issues and limitations to improve soon.
3	Sampling Design Study for SARS-Cov-2 in Wastewater	Drs. Rosso and Jiang from UC Irvine propose to sample IRWD sewersheds to develop a sampling design to measure the presence (signal) of SARS-Cov-2 virus. The ultimate goal is to provide an early warning and location determination for outbreaks or increases in cases of Covid-19 ahead of individual testing.	Colston	UC Irvine with grant from the Water Research Foundation (WRF)		Provide access to IRWD sewer facilities for sampling.	Apr-20	TBD	UC Irvine conducted a proof of concept with six MWRP influent samples for SARS-Cov-2. Based on this work, UC Irvine has been provided a grant from WRF. The final application was submitted to WRF on September 15, 2020. Monitoring to be completed in March 2021 at 9 Southern California wastewater treatment plants including MWRP and LAWRP.
4	Restoration of Local Recharge Sources from Invasive Mussels	This is an independent study that supports a larger effort by the Metropolitan Water District to control invasive Dreissenid Mussels. Task 1 is to establish dose-response curves for mussel control with EarthTec Qz at locations that feed IRWD MWD water. Task 2 will evaluate the toxicity of EarthTec QZ to other species including minnow, trout and the water flea.	Colston	Trussel Technologies, Inc.	In situ	IRWD provides $26K funding and access to Irvine Lake.	Jul-20	Dec-21	Trussel has begun Task 1; however, insufficient mussels have been found in Irvine Lake. IRWD staff continues to take samples at Irvine Lake. The research continues at other local sites using Metropolitan Water District imported water. 3 of 5 sites have completed testing.
5	Automated, AI Based CCTV Video Analysis for Pipeline Assessments	The Abyss Extract software utilizes machine learning and AI technologies to automate the analysis of CCTV video footage. CCTV videos of sewer pipes are collected and analysed using machine learning algorithms to identify anomalies. The goal is to increase the time it takes to inspect and identify, and recommend repairs for any defects.	Zepeda	Abyss Solutions	Testing and Optimization	Staff time for review of reports, sharing information, and compare results of software tool against current methods.	Apr-21	Aug-21	Technology will be reviewed by staff and for possible implementation to optimize current work practice of inspecting sewer pipelines and identifying defects.

Exhibit "A"

Research Projects Summary Table

No.	Project Title	Project Description	IRWD Contact	Organizations Involved	Type of Research	IRWD Participation Resource	Start Date	Projected Completion Date	Comments/Next Steps
6	Bio-electrochemical Sensor for Real-time Monitoring of Microbial Activity and organic carbon	The SENTRY system can be inserted at various locations at the treatment process (aerobic and anaerobic), providing real-time visualisation of microbial metabolic activity and correlations to bio-available carbon. The sensor provides real-time data for insight on the health of the treatment plant and organic load at key locations (influent, nutrient removal bioreactors, anaerobic digesters and effluent).	Zepeda	Island Water Technologies (IWT)	Treatment Process Optimization	Staff time for review of performance data.	Jun-20	Dec-21	A test unit will be installed at MWRP to collect data. IRWD staff will work with IWT to evaluate the collected data. The goal will be to use the data to optimize CAS, MBR, and Digestion processes.
7	Aerator for Efficient Odor and Corrosion Control in force mains and aeration in treatment	The Vortex Force™ a relitively new product designed to solve odor and corrosion problems in municipal wastewater treatment application, and collection systems.	Zepeda	IPEX	Odor and Corrosion Control	Staff time for testing of product and review performance results.	Jun-20	Oct-21	Staff is working with the IPEX representitive to find a suitable location for testing of the equipment.

March 16, 2021
Prepared by: R. Burk / M. Cortez
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

MICHELSON WATER RECYCLING PLANT TERTIARY FILTER IMPROVEMENTS
BUDGET INCREASE AND CONSULTANT SELECTION

SUMMARY:

The Michelson Water Recycling Plant (MWRP) Tertiary Filter Improvements project will rehabilitate the MWRP tertiary filters to improve performance and reliability by replacing deteriorating and obsolete equipment and infrastructure at the tertiary filters' tanks area, air scour blower area, and the backwash supply pumps area. Staff recommends the Board:

- Authorize a budget increase in the amount of $9,409,600, from $466,000 to $9,875,600, and
- Authorize the General Manager to execute a Professional Services Agreement with HDR in the amount of $735,163 for engineering design services for the MWRP Tertiary Filter Improvements, Project 07892.

BACKGROUND:

This project will rehabilitate the MWRP tertiary filters to improve performance and reliability by replacing deteriorating and obsolete infrastructure and equipment. Last year, IRWD retained Hazen and Sawyer to complete a condition assessment of the existing infrastructure and equipment to confirm the scope of the rehabilitation for the tertiary filter tanks, backwash system, air scour system, mechanical equipment, electrical equipment, instrumentation, programmable logic controller (PLC) and communication system. Based on the assessment's recommendations and feedback from MWRP Operations and Mechanical Maintenance, staff developed the scope of the design including improvements to replace deteriorating and obsolete equipment and infrastructure at the tertiary filters' tanks area, air scour blower area, and the backwash supply pumps area, including valves, slide gates, instrumentation, aboveground piping, air compressor, air scour blower, backwash supply pumps, PLC, electrical equipment, and conduits. The scope will also include detailed construction sequencing, temporary backwash supply pumping, and temporary instrumentation and control systems to allow the work to proceed while maintaining operation of the tertiary filters.

A site plan is shown in Exhibit "A".

Consultant Selection:

Staff issued a request for proposal for the design to three consultants: Black & Veatch, Carollo Engineers, and HDR. All three firms submitted proposals on December 10, 2020. Staff evaluated the proposals based on each consultant's project approach, project team and relevant experience; staff recommends the selection of HDR. A few differentiators are discussed as follows.

HDR and Black & Veatch provided proposals that reflected a good understanding of the scope of work, the work effort and commensurate fees required to complete the design. Both HDR and Black & Veatch included the design scope for fully rehabilitating the Backwash Supply Tank, whereas Carollo did not. This task will design the temporary pumping and tank isolation necessary to allow concrete and coating repair for the entirety of the tank. Based on this, the proposed design fees are $708,000 from HDR, $656,928 from Black & Veatch, and $594,970 from Carollo (who did not include the design scope and fee to fully rehabilitate the Backwash Supply Tank).

HDR also separated itself from Black & Veatch and Carollo by proposing an optional task to address operational issues affecting chlorine addition at the Chlorine Contact Chamber (based on conversations with IRWD Operations staff). This task would assess alternatives to move the intake supplying water for the Backwash Supply Tank. Staff believes this would be an opportune time to review this operational issue. If this task is included in HDR's proposal, its fee becomes $735,163.

With HDR's past history of working on the MWRP Phase 2 Expansion and other projects at MWRP, staff believes its experience and superior knowledge of MWRP is highly advantageous and will result in the best design for this project. Staff therefore recommends the selection of HDR based on the design concepts, project approach presented within its proposal, and the strength of its project team. The consultant evaluation matrix is provided as Exhibit "B", and HDR's proposal is provided as Exhibit "C".

FISCAL IMPACTS:

Project 07892 is included in the FY 2021-22 Capital Budget. The original budget was created to perform the condition assessment for the tertiary filters. Staff has updated the budget based on the scope of work from the condition assessment and the estimated cost to complete the rehabilitation improvements at the tertiary filters. A budget increase is required to fund the design and construction phases for the project as shown in the table below.

Project No.	Current Budget	Budget Addition	Total Budget
07892	$466,000	$9,409,600	$9,875,600

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA). In conformance with the California Code of Regulations Title 14, Chapter 3, Section 15004, the appropriate environmental document will be prepared when meaningful information becomes available. It is expected that preliminary analysis will lead to the preparation of a Notice of Exemption for the project.

RECOMMENDATION:

That the Board authorize a budget increase in the amount of $9,409,600, from $466,000 to $9,875,600, and authorize the General Manager to execute a Professional Services Agreement with HDR in the amount of $735,163 for engineering design services for the MWRP Tertiary Filter Improvements, Project 07892.

LIST OF EXHIBITS:

Exhibit "A" – Site Plan
Exhibit "B" – Consultant Selection Evaluation Matrix
Exhibit "C" – HDR's Proposal

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EXHIBIT “A”

PROJECT SITE PLAN

MICHELSON WATER RECYCLING PLANT TERTIARY FILTER IMPROVEMENTS

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Michelson Water Recycling Plant (MWRP) Tertiary Filter Improvements Consultant Selection Matrix
2-Mar-21

	Weights	Black and Veatch	Carollo	HDR
TECHNICAL APPROACH	60%			
*Project Approach	50%	2	3	1
*Scope of Work	50%	2	3	1
Weighted Score (Technical Approach)		2.00	3.00	1.00
EXPERIENCE	40%			
*Firm/Team	60%	3	2	1
*Project Manager	40%	1	3	2
Weighted Score (Experience)		2.20	2.40	**1.40**
Principal-in-Charge/Technical Advisor		Jeff Neemann	Patrick Carlson, Andy Salveson	Gregorio Estrada
Project Manager		David Kurtti	Jim Meyerhofer	Amy Omae
Project Engineer		Roxanne Massey	Danny Murphy	
QA/QC		Mark Wilson	Jeff Weishaar	John Koch, Dan Ellison, Oskar Agustsson
Process Mechanical/ Mechanical		Sandeep Sathyamoorthy, Raghu Kadava, Julie Gass	Danny Murphy, Michael Bundy,	Chandrikaa Balendhran
Tertiary Filters		Gary Hunter	Taylor Romenesko	Rich Stratton, Mandira Sudame
Electrical		Holly Murakami	Ron Burdick, Robert	Dan Gott
I&C		Marc Zamora	Morroni, Monte Richard	Brandon Erndt
Structural		Mark Lowe	James Doering	Tom Hamlin
Condition Assessment (Optional)		Bethany McDonald	subconsultant (see below)	Lucy Jaramillo, Adam McGinnis, Bradley Stuart
Cost Estimating		Kirk Johnson		Pete Bredehoeft
Construction Sequence				Gregorio Estrada
Permitting				Gregorio Estrada
<u>Subconsultants:</u>				
Surveying		The Prizm Group	O'day Consultants, Inc.	Borchard Surveying
Potholing		C-Below	Underground Solutions, Inc.	T2 Utility Engineers
Geotechnical (Optional)		Ninyo & Moore	Ninyo & Moore	Ninyo & Moore
Condition Assessment (Optional)		V&A Consulting	Corrpro	
COMBINED WEIGHTED SCORE		2.08	2.76	**1.16**
		Hours	Hours	Hours
Task 1 Project Management		299	292	419
Task 2 Preliminary Design		1,227	782	1,251
Task 3 Final Design		2,114	1,740	2,331
Task 4 Pre-bid Phase Services		44	Included in Task 3	Included in Task 3
TOTAL HOURS		3,684	2,814	4,001

Michelson Water Recycling Plant (MWRP) Tertiary Filter Improvements Consultant Selection Matrix
2-Mar-21

	Weights	Black and Veatch	Carollo	HDR
Number of Construction Drawings		81	71	71
FEE				
Task 1 Project Management		$61,553	$61,550	$100,500
Task 2 Preliminary Design		$228,895	$222,950	$235,900
Task 3 Final Design		$343,360	$310,470	$359,300
Task 4 Pre-bid Phase Services		$7,280	Included in Task 3	Included in Task 3
Additional Tasks Included in Total Fee:				
Permitting Assistance		$4,320	Included in Task 2	$12,300
Final Design of New PLC Platform		$11,520	Included in Task 3	Included in Task 3
Study for New BWS Connection from CCC		-	-	$27,163
TOTAL FEE		**$656,928**	**$594,970**	**$735,163**
Average $/hour		$178	$211	$184
Professional Liability Insurance General Liability Insurance		YES YES	YES YES	YES YES
FORCED RANKINGS:		**2**	**3**	**1**
1 - First				
2 - Second				
3 - Third				

Irvine Ranch WATER DISTRICT

Engineering Design Services

Michelson Water Recycling Plant Tertiary Filters Rehabilitation

PR 07892

December 10, 2020

SECTION A

SCOPE

A

SCOPE

The Irvine Ranch Water District (IRWD or District) originally constructed the dual-media tertiary filters at the Michelson Water Recycling Plant (MWRP) over 40 years ago and have since experienced several upgrades and rehabilitation work. A condition assessment was performed earlier this year for the tertiary filters, backwash supply, spent backwash, and air scour blower systems as well as the associated electrical equipment located in the Filter Pump Station No. 2 (FPS-2). The 2020 Condition Assessment Report identified many of the mechanical, electrical, instrumentation and controls (I&C), and structural assets as having little or no remaining useful life (RUL). The MWRP Tertiary Filters Rehabilitation project (Project) will rejuvenate the system to improve treatment efficiency and system reliability.

The HDR Team brings an overall understanding of the District's objectives for this project based upon knowledge and experience gained on similar projects, including the MWRP Phase 2 Expansion and MWRP FPS-2 Header Replacement recently designed by HDR's team. Our team has been actively and continuously engaged in various upgrades and improvement projects at MWRP since 2005, resulting in a thorough understanding of the MWRP process configuration, mechanical and electrical interconnections, and operational challenges. This makes our team uniquely qualified to complete this project successfully.

The Phase 2 Expansion design included a process validation study that explored upgrade and expansion alternatives for the tertiary filters and resulted in the decision to construct the MBR and HRC. This study provided key members of our team (Amy, Gregorio, and Rich) with insights to system configuration and operational approach, which provides our team with a "heads start" on the review of previous documents.

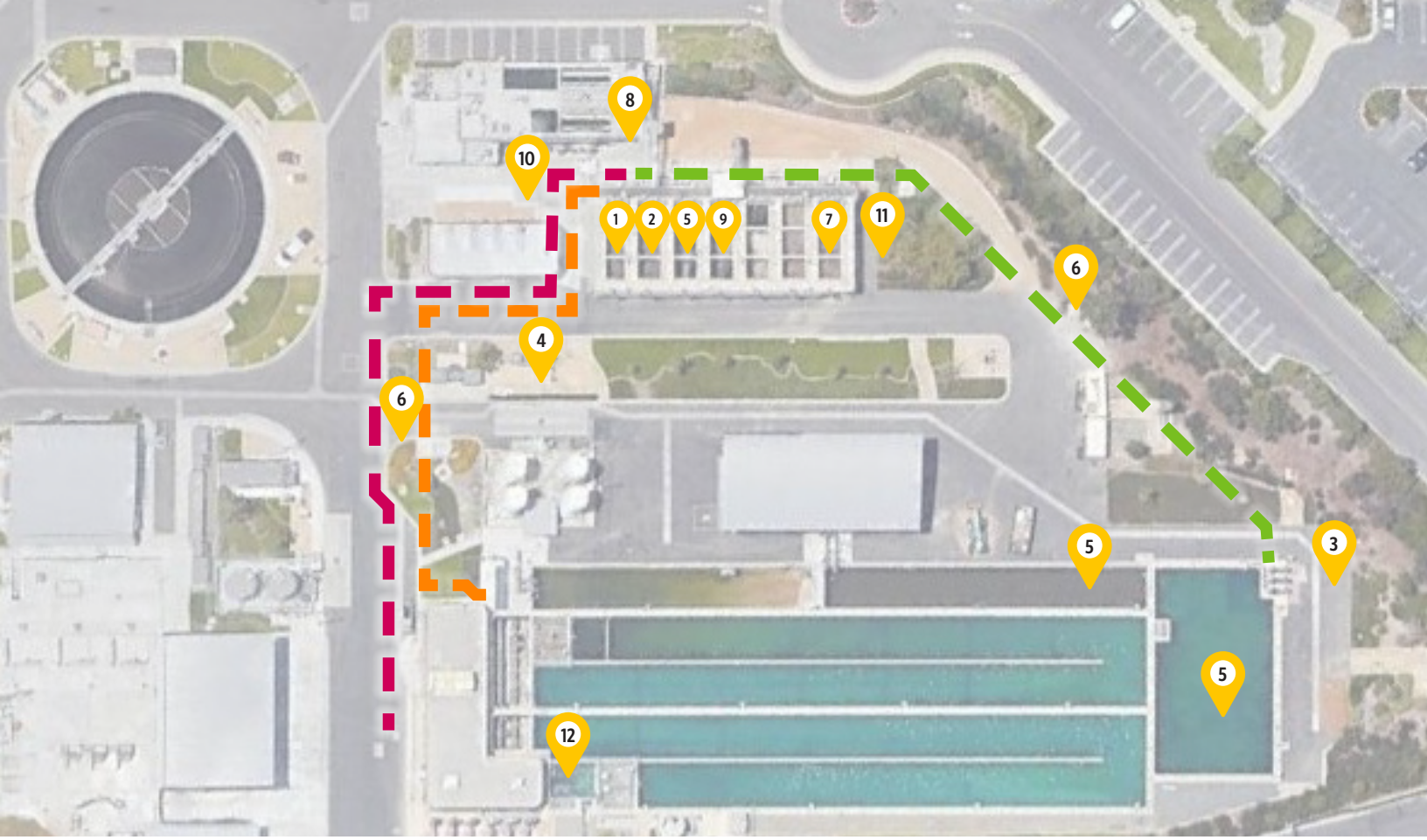
WE UNDERSTAND THE PRIMARY OBJECTIVES OF THIS PROJECT WHICH INCLUDE:

Rehabilitate the tertiary filters, backwash supply, spent backwash, air scour blower, and associated electrical and controls systems to extend the RUL beyond 15+ years.

Maintain consistent and reliable performance of the filters during construction and have a strategy in place in the event of a failure at the MBR treatment train.

Improve IRWD's ability to operate and monitor the tertiary filters by upgrading the outdated controls system.

Assess and evaluate the potential root cause(s) of poor performance from Filter No. 7, the condition of buried pipelines and system layout, and recommend improvements to optimize system performance.



In the table below, we've identified key issues, our approach to solving those key issues, and the benefits to the District our solutions bring. Each key issue is supplemented with figure(s) that help illustrate the issues and considerations in greater depth.

#	KEY ISSUE	HDR'S APPROACH	BENEFITS TO IRWD
1	Aging mechanical, electrical, and instrumentation assets have signs of corrosion, performance issues, and need to be replaced with little to no remaining useful life.	• Thorough review of existing tertiary facility to gain comprehensive understanding of project scope and quantities. • Incorporate clear delineation of project scope of work into bid package (drawings and specifications).	• Reduces risk of unexpected failures and increases system reliability to control the system and respond to failures or water quality issues. • More accurate bid estimates and clarity to reduce potential change orders.
2	Must maintain consistent and reliable performance of filters during construction.	• Collaborate with IRWD staff to develop detailed construction sequence to clearly define tasks, anticipated work durations, and identify opportunities or limitations to performing concurrent work. • Identify points of isolation to replace assets and maintain operation with only one filter offline at a time under normal and failure scenarios. Avoid doing high-risk work during wet season. If needed, operate the high-rate clarifier (HRC). • Perform work on each filter one-by-one to replace assets concurrently with underdrain inspection.	• Clear understanding of the work sequence and durations to minimize surprises and maintain compliance. • Avoids high-risk situations by having a backup strategy ready to treat additional 5 mgd in case of an MBR failure. • Potentially avoids need for temporary bypass pumping and piping. • Establish a methodical procedure to rehab each filter for clarity and efficiency.
3	Remote location of the MCC and PLC in FPS-2 electrical room does not allow IRWD staff to have eyes on the pumps when changing controls and operations.	• Install NEMA 3R walk-in enclosure with VFDs and remote PLC cabinet in landscaped area near the pumps. • Route ductbank from FPS-2 electrical room to new enclosure and then to pumps prior to removal of existing pumps, motors, etc. Sequence the removal of one pump and associated infrastructure at a time. • Coordinate siting with potential MWRP capital improvements as a result of the IRWD Sewage Treatment Master Plan (STMP).	• Remote PLC cabinet located closer to pumps to more easily confirm and test operation. • Backwash supply pumps remain online with minimal downtime. • Reduces potential future costs by optimizing site layout with the STMP.

4	Air scour blower system has no backup and must be kept online.	• Evaluate MCC electrical loads to confirm if new blower can be added on existing MCC or if need to remove load from Backwash Pumps first. • Provide, connect, and commission one of the new air scour blowers prior to removal of existing air scour blower. Consider alternate locations that provide better access and facilitate installation.	• Air scour blower system remains online with minimal downtime.
5	Concrete structures are showing signs of corrosion with cracking, exposed aggregate, exposed rebar, discoloration, and/or spalling.	• Rehabilitate concrete and repair. Consider applying a coating to areas where extensive corrosion is found.	• Extends RUL of existing structures at significantly less cost than future replacement.
6	Condition of large buried piping is unknown (Backwash Supply, Spent Backwash, and Filter Effluent). Some above-ground piping is in good condition while others have signs of corrosion. HDR's work on filter influent pipe identified soil corrosivity to vary within a short distance.	• Review existing record drawings and previous reports, including previous soil corrosivity analyses to understand existing conditions. • Perform external corrosion direct assessment (ECDA), collect soil samples, and conduct in-house laboratory testing for corrosivity. • OPTIONAL TASK: Perform Emag and cell-to-cell testing along the alignments to identify potential "hot spots" with highest likelihood of active corrosion and prioritize them.	• Comprehensive understanding of this site provides holistic recommendations if the pipes are in good condition or in need of recoating or replacement. • OPTIONAL TASK: Saves money and assists identifying the worst-case condition of buried pipe through informed decision-making to prioritize "hot spots" before digging.
7	The 2020 Condition Assessment and Filter Surveillance Report could not identify a root cause for Filter No. 7's poor performance. Media was replaced and it continues to require more backwashing than other filters.	• Conduct thorough investigation by understanding the history (evaluate previous reports, review record drawings, discuss history with Operations staff), evaluate influent hydraulics to confirm equal distribution, and bring lessons learned from other tertiary filter design/rehab projects. • OPTIONAL TASK: Develop and execute Performance Testing Plan to evaluate impacts of changing operational parameters.	• Restore Filter No. 7 performance, to save energy costs and reduce media loss due to excessive backwashing. • Restore redundancy and reliability of the tertiary filtration system to meet Title 22 standards.
8	Limited available space on top of tertiary filters for new filter control panel (FCP) while keeping existing FCP operational.	• Evaluate installation of permanent FCP at alternate locations (on top of HRC or at ground-level on west side of filters). After demolishing existing FCP, then install OIT in same location. • Alternatively, install a temporary FCP to allow demolition of the existing FCP, then install replacement in same location.	• Avoids need for temporary FCP and simplifies construction sequence. • Frees up space for more working area. • Operators have more control over the system from the top deck or at ground level.
9	Surface wash system is not functional and may not be needed in conjunction with the air scour blower system.	• Remove the surface wash system. Adding a redundant blower to the air scour system significantly reduces the likelihood of air scour system failure, and the subsequent need for a backup surface wash system.	• Reduces cost and schedule by removing scope not needed for reliable filter operation. • Clears the area. • Less O&M and likelihood of installing assets that will be stranded due to lack of use.
10	Moisture in compressed air system that is used for high-pressure air for pneumatic actuators.	• Design replacement of compressed air system with dryer (120% capacity of compressor) and filters (particulate and coalescing). • Provide condensate drain valves in piping.	• Improved reliability for pneumatic actuators to operate properly without delay, sticking, or failure due to excess moisture/air quality.
11	Tertiary filter overflow pipeline discharges to surface of road.	• Review record drawings, identify underground utilities, and evaluate gravity hydraulic calculations to verify viability of alternative routes. • Identify potential layout(s) to route buried gravity overflow pipe to spent backwash channel in consideration of potential capital improvements from IRWD STMP.	• Reduce O&M by safely routing unforeseen overflow events to the spent backwash channel. • Avoid potential future costs by optimizing conceptual layout to consider future changes at MWRP.
12	Elevated risks associated with meeting NPDES and Title 22 standards during construction.	• Tertiary Filter Expert, Rich Stratton, will work with Gregorio Estrada to identify and evaluate potential treatment issues during specific phases of construction. • Collaborate with IRWD staff to meet permit requirements throughout, and obtain temporary permit, if necessary.	• Develop risk mitigation strategies. • Avoid being out of compliance with existing regulatory permits.

METHODOLOGY

To accomplish these objectives we have developed a comprehensive methodology based on our experience with the design and performance of the facility and understanding of the operational challenges. The following sections identify key issues associated with the work, our methodology to solving these issues, and the benefits that our solutions bring to the District.

Additionally, we propose several innovative ideas to provide added value to the project. These opportunities to improve the system can be accomplished while already performing work in the area and are offered as optional tasks for your consideration.

Rehabilitate the Tertiary Filters Facility to Last the Next 25 Years

The mechanical, electrical, and instrumentation components of the Tertiary Filters Facility have little to no remaining useful life and require replacement. As documented in the 2020 Condition Assessment Report, most assets are showing signs of corrosion and some are having performance issues. The increasing age of assets leads to increasing risk of unexpected failures and reduced reliability to implement response plans to those failures during an emergency.

HDR will perform a detailed review of the record drawings and reports to capture each asset in the detailed rehabilitation design as identified in the RFP. The design will clearly identify components (equipment, valves, actuators, piping, conduit, wiring, cables, supports, instrumentation, etc.) to be replaced as well as components (e.g. concrete tanks) to be repaired and the method of repair as applicable. Our team has a long history of working with IRWD and are familiar with your standards and expectations. We will engage your staff in several discussions to identify limitations/constraints, communicate design intent, collaborate on strategy, and obtain consensus on the project approach.

The filter media and diffuser assemblies will be replaced while rehab work is being done inside each of the filters. Filter underdrains will be inspected during construction with photo documentation. During our coordination meetings with your staff, we will identify points of isolation to replace mechanical process equipment to keep the tertiary filtration system operational.

Concrete structures are showing signs of corrosion with cracking, exposed aggregate, exposed rebar, discoloration, and/or spalling. The concrete will be rehabilitated and repaired to avoid continued deterioration of concrete and structural rebar and more significant costs for repair (or replacement) later. The rehabilitation design may also consider applying a coating to areas where extensive corrosion is found, which will further extend the RUL of existing structures.

Timely and Relevant Experience

HDR designed the rehabilitation for the City of Thousand Oaks Digester No. 3, which included a condition assessment, valve replacement, and repair and rehabilitation of structural concrete, miscellaneous metals, and coatings. This led to a follow-on design to do the rehabilitation work for Digester No. 2 and a Secondary Clarifier.

The surface wash system was originally intended to provide redundancy and serve as a backup to the air scour blower system. However, the air scour system has been operating consistently and the surface wash system has not been needed. As such, it has fallen into disrepair and no longer functional. Adding a redundant blower to the air scour system significantly reduces the likelihood of failure and the need for a backup surface wash system. Therefore, HDR's recommendation would be to remove the surface wash system. **This decreases cost and schedule by removing scope that is not needed for reliable filter operation, and clears the congested area by reducing piping, valves, and instrumentation.** Removing the surface wash system reduces O&M and avoids installing assets that will be stranded due to lack of use. In our recent experience with tertiary media filters, surface wash systems are no longer frequently implemented into current designs and the air scour systems have become the more conventional approach.

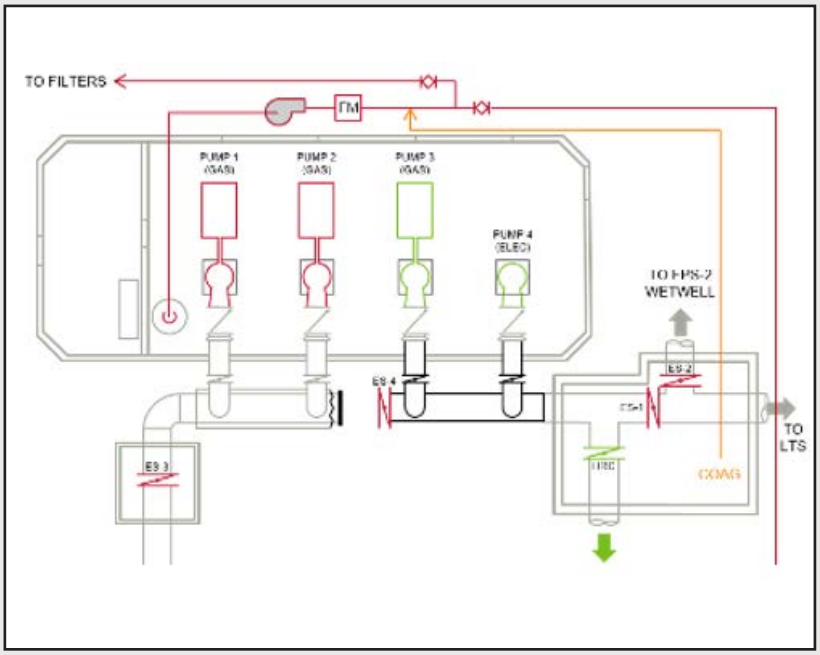
IRWD staff indicated that there is a lot of moisture present in the compressed air system that supplies high-pressure air to the pneumatic actuators, which can cause issues with the proper functioning of pneumatic actuators. Moisture may also cause corrosion in distribution piping and components, such as the receiver tank, which can result in failures at these higher pressures. The design to replace the compressed air system can improve the quality of air going to the pneumatic actuators. **Based on lessons learned, dryers should be sized to 120% capacity of the air compressor and incorporate upstream and downstream particulate and coalescing filters.** A refrigerated dryer should be sufficient for this application, but if preferred, a desiccant dryer may be installed as well. Condensate drain valves will be incorporated at low points in piping. Reduced moisture in high-pressure air system allows the pneumatic actuators operate without delay, sticking, or being overwhelmed with moisture.

Detailed Construction Sequence for Consistent and Reliable Treatment Performance of the Tertiary Filters During Construction

The Tertiary Filters Facility is critical to the conventional treatment process train at MWRP to produce recycled water and meet NPDES and Title 22 standards. For consistent and reliable treatment performance, only one filter may be taken offline at any given time and the remaining six filters must maintain normal operation, allowing for one filter to be in a backwash cycle. There are two key aspects of developing a robust implementation plan: a detailed construction sequence that is tied to schedule performance requirements in the contract documents, and an operational plan that includes mitigation strategies should something unexpected occur. By developing a "routine" procedure to rehabilitate each filter one-by-one while the remaining filters maintain normal operation will improve consistency in the quality and efficiency of the Contractor's work. **Each phase of work will include an isolation/decommissioning step to confirm reliable operation of the remaining filter cells before work begins, and a commissioning step to confirm reliable operation of the rehabilitated filter cell before the next filter cell is taken offline.** The construction sequencing plan must also have a backup strategy in the event of a failure in the MBR train.

Gregorio Estrada is our task lead to develop the construction sequence in consideration of the potential risks to performing certain tasks. He is a trusted partner to IRWD staff and is intimately familiar with IRWD standards and procedures with his work on the MWRP Phase 2 Expansion project. HDR will facilitate several coordination meetings with IRWD staff to develop and review the construction sequence based on our combined

Gregorio is intimately familiar with the MWRP treatment processes, capabilities, and needs as well as IRWD standards and procedures; he has a long history of working with IRWD staff to resolve dificult challenges and he will work with you to develop a construction sequence that minimizes IRWD risk.



Construction Sequence that Maintains Operation

HDR developed a detailed construction sequence to replace the MWRP FPS-2 discharge header while maintaining the capability to discharge to the tertiary filters or HRC to meet effluent requirements. The workshop-driven approach resulted in a robust sequencing and bypass plan that integrated with existing plant controls and provided uninterrupted operation. This approach led to identification of potential failure scenarios and provided mitigation strategies for each. Since the workshops included key members of operation, electrical, and engineering teams there was clear understanding and buy-in of each step of the plan. The plan included proactive communication with plant operations staff to seek their input on facility needs and to establish operational protocols at each phase of the plan.

knowledge of MWRP treatment limitations, capacities, and staff needs for reliability and redundancy. The detailed construction sequence will clearly define tasks, anticipated work durations, and identify opportunities or limitations to performing concurrent work. Additionally, we will discuss potential risks associated with the work to avoid doing high risk work during wet season or anticipated storms. Part of the strategy to reliably meet effluent limits will likely include the operation of the HR, which effectively reduces filter influent turbidity. This will be especially beneficial if an additional 5 to 10 mgd of flow needs to be routed to the conventional activated sludge (CAS) in the event of a failure in the MBR train. A clear understanding of the sequence of work and durations to execute the plan will minimize surprises and maintain compliance. We will work with you to identify the isolation points and limitations to avoid or limit the need for temporary bypass pumping and piping if possible.

The air scour blower system must be kept online and operational during construction. During normal operation, one filter is usually in backwash cycle and there is no redundant blower providing scour air. The back-up surface wash system is not operational. The construction sequence will plan to provide, connect, and commission one of the new air scour blowers prior to removal of existing air scour blower. Alternate locations may be considered that provide better access, improved air distribution, and facilitate installation. In doing so, the air scour blower system remains online with minimal downtime. **As part of the MWRP Phase 2 Expansion, HDR added one additional aeration blower for the CAS train. While the mechanical installation was simple, the electrical integration of the new blower required sequence planning and coordination with Operations staff to ensure uninterrupted operation. Similar to the replacement of the scour blower, our approach will simplify the mechanical installation, but the more challenging aspect is the electrical integration.**

The backwash supply pumps must also be kept online and operational during construction. Prior to removal of the existing pumps, motors, etc., the replacement will be sequenced to remove one pump and associated infrastructure at a time to minimize the downtime.

OPTIONAL PERMITTING ASSISTANCE.

Tertiary filters are a significant treatment component to meet NPDES and Title 22 standards. While there are mitigation strategies to maintain reliable treatment, such as operation of the HR, there is still added risk with one filter offline during construction. Our Tertiary Filter Expert, Rich Stratton, will work with Gregorio Estrada to determine if there is an elevated risk during construction to meet discharge requirements. By working together with IRWD Regulatory Compliance staff, we will

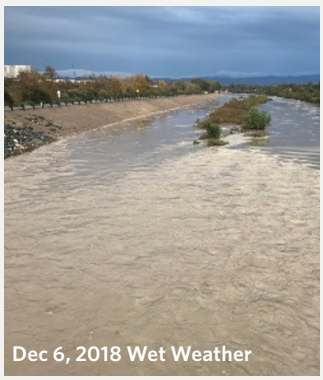
determine capability to meet permit requirements throughout construction, and if necessary, coordinate with the RWQCB to obtain temporary permit conditions. This avoids the potential risk of being out of compliance with regulatory discharge permits.

Updating Electrical and Controls Systems is an Opportunity to Improve Operator Access and System Monitoring

There is limited available space on the deck of the Tertiary Filters to install a new filter control panel (FCP) while keeping the existing FCP operational during construction. Space will not be freed up until after demolition of existing FCP. HDR has identified options to install a permanent FCP at alternative locations to avoid having to install a temporary FCP during construction, and thereby reducing the construction schedule and project cost. Potential locations include on top of the HRC or at ground-level on the west or north side of the filters. The design may also incorporate the installation of an operator interface terminal (OIT) in same location as the existing FCP after demolition to serve as a local operation station. **Identifying a more permanent location for the FCP reduces the number of cutovers needed during construction to simplify sequencing and reduces cost.** During our Coordination meetings and site visits, HDR will vet these proposed locations with your staff to determine their viability. If none prove to be acceptable, then alternatively, we will install a temporary FCP to allow demolition of the existing FCP,and install permanent replacement in same location on top of the filters.

The variable frequency drives (VFDs) for the Backwash Supply Pump system are located in the Filter Pump Station No. 2 (FPS-2) electrical room. During normal operation, one filter is usually in backwash cycle requiring continuous availability of the backwash supply pumps, and there is no redundant pipeline providing backwash supply water from the pump station. The remote location of the VFDs does not allow IRWD staff to have eyes on the pumps when changing controls and operations. As indicated in the RFP, the design will provide a NEMA 3R walk-in enclosure with VFDs and remote PLC cabinet in an area nearby the pumps. **Our team's current work on the IRWD Sewage Treatment Master Plan project will provide more insight towards coordinating potential future MWRP capital improvements with the location of this new enclosure and the routing of the ductbank from the FPS-2 electrical room to the new enclosure and to the backwash supply pumps.** The remote PLC cabinet located closer to the pumps will allow staff to more easily confirm and test operation. There is also potential for avoiding future costs by optimizing site layout and coordinating with the Sewage Treatment Master Plan.


Oct 26, 2017 Dry Weather


Dec 6, 2018 Wet Weather

IRWD Emergency Discharge HDR provided technical and regulatory guidance in negotiating with the Regional Board to allow discharge of treated effluent to the San Diego Creek during emergency conditions. The work included water quality modeling of Newport Bay, development of reasonable treatment objectives and assistance in negotiations with the Regional Board. HDR worked closely with IRWD Regulatory Staff in the development of approaches and background information in support of the revised permit conditions. This experience working directly with your regulatory staff will streamline the strategy development and coordination effort with Regional Board staff.

Our Experts will Collaborate with Operations to Diagnose the Problem and Recommend the Right Solution

INVESTIGATE CAUSE OF POOR PERFORMANCE FOR FILTER NO. 7.

The 2020 Condition Assessment and the 2020 Filter Surveillance Report could not identify a root cause for the poor performance of Filter No. 7. Media was replaced and continues to require more backwashing than other filters. Filter No. 7 reduces reliability of the tertiary filter system as a whole because only one filter may be in backwash at a time, which is an issue when one filter is in backwash twice as much as the others. More energy is being used due to excessive backwashing, and potentially less treated water is being produced.

Mandira Sudame will lead and coordinate our investigation with our Tertiary Filter Expert, **Rich Stratton**, to evaluate previous reports, review record drawings, visit the site, and discuss operational history with District staff. **Rich has designed over 10 tertiary filtration projects and will bring lessons learned to optimize the performance of Filter No. 7.** Our investigation team will evaluate influent hydraulics for potential unequal flow distribution to the tertiary filters, whereby too much flow is sent to Filter No. 7 and may be a contributing factor to its poor performance. Unequal flow distribution could be increasing loading to the cell, which would also contribute to media loss. Discussions with your staff will identify methods already tried, the resulting impact based on readily available data, and any potential outliers or considerations for a holistic understanding of the history associated with Filter No. 7.

Based on our investigation, HDR will develop informed recommendations for improvements to restore the performance of Filter No. 7 to be similar to the other tertiary filters, which saves energy costs, potentially improves treatment efficiency, and reduces media loss due to excessive backwashing. This also restores operational efficiency, redundancy, and reliability of the tertiary filtration system to reduce turbidity to below Title 22 standards. Maintaining low turbidity in filter effluent is important to increase disinfection efficiency and reduce chlorine usage at the chlorine contact basin.

OPTIONAL TASK:

If a culprit cannot be identified based on readily available data, we will work with you to develop a Filter Test Plan to change operational parameters and observe the resulting impact on tertiary filter performance. Additionally, we can collect samples and perform bench-scale tests to confirm consistent water quality into the filters. For the IRWD Los Alisos Water Recycling Plant (LAWRP) Total Suspended Solids Investigation Study, HDR performed bench- and pilot-scale investigations and recommended modifications that successfully solved water quality issues in LAWRP's tertiary effluent.

UNDERGROUND PIPELINE CONDITION ASSESSMENT.

While the 2020 Condition Assessment identified most of the existing assets for rehabilitation, there are several assets still with an unknown condition because it was only a visual assessment. Several buried pipelines are critical to the normal operation of the tertiary filters. The 30-inch Backwash Supply (DIP), 36-inch Spent Backwash (DIP),

and 42-inch Filter Effluent (CMLC steel) are over 40 years old, and the 30-inch Backwash Supply (CMLC steel) is over 20 years old. The Condition Assessment visually assessed above-ground piping to determine filter influent piping was in good condition, but other piping showed signs of corrosion. Our team knows from our previous condition assessment work on the IRWD FPS-2 Header Replacement project that the buried piping is likely not connected and soil corrosivity can vary in a short distance. Certain areas are severely corrosive while others 50-feet away may be only mildly corrosive. Review of existing record drawings and previous reports will be performed, including previous soil corrosivity analyses, to understand existing conditions.

HDR IS A RECOGNIZED LEADER IN THE FIELD OF CONDITION ASSESSMENT.

Our team will perform external corrosion direct assessments (ECDA) of the three buried pipelines to estimate the percentage loss of wall thickness based on ultrasonic thickness (UT) measurements and evaluate condition of the cement mortar coating. Soil and mortar samples will be collected and analyzed by our in-house laboratory. Soil will be tested for corrosivity and mortar testing will consist of the determination of chloride concentration and pH to provide unbiased recommendations for incorporation into the detailed design. Based on our findings from the condition assessment, our report will identify recommendations for these buried pipes, which may include continued monitoring, repair, rehabilitation, or replacement.

OPTIONAL TASK:

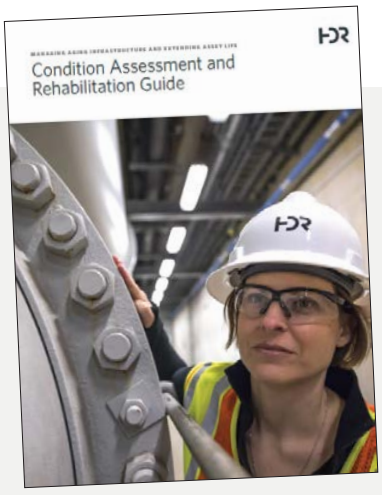
Our condition assessment team may perform electromagnetic conductivity/ resistivity (Emag) testing along the existing pipe alignments to identify potential "hot spots" for active corrosion. More focused cell-to-cell testing may also be performed to verify those "hot spots" and prioritize them to as potential excavations for ECDA. These "hot spots" are the locations with highest likelihood for active corrosion sites. Excavations are expensive. By performing these assessments along the surface first to identify the "hot spots" informs the decision-making to select locations for ECDA that have the highest likelihood of active corrosion cells. This approach saves money and assists with potential identification of the worst-case condition of the buried pipe. These results will inform IRWD if the pipes are in good condition or in need of recoating/rehab or replacement.

FILTER UNDERDRAINS.

The underdrain for Filter No. 7 was inspected this year and found to be in good condition, so there is potential that the underdrains for Filters 1-6 are in a similar condition. Most of the underdrains were replaced in 1999, except for Filters 4 and 6 that are still original from 1978 construction. Our design will incorporate the inspection of all the underdrains during construction. Our strategy is to sequence the rehabilitation work to allow early inspection of one underdrain installed in 1978 and one from 1999 towards the beginning of the project. This will inform the likely condition and expectations for the remaining filter underdrains and incorporate potential replacement of the underdrains if found to be in poor condition as an optional bid item in the contract documents to limit IRWD exposure to unforeseen change orders during construction.

EXTENSION OF OVERFLOW PIPELINE CONCEPTUAL LAYOUT.

Tertiary filter overflow pipeline discharges to surface of road. Unforeseen overflow events cause flooding of the road surface and introduces potential safety issue. Identifying the optimal conceptual layout to bury and extend the overflow pipe to the spent backwash channel

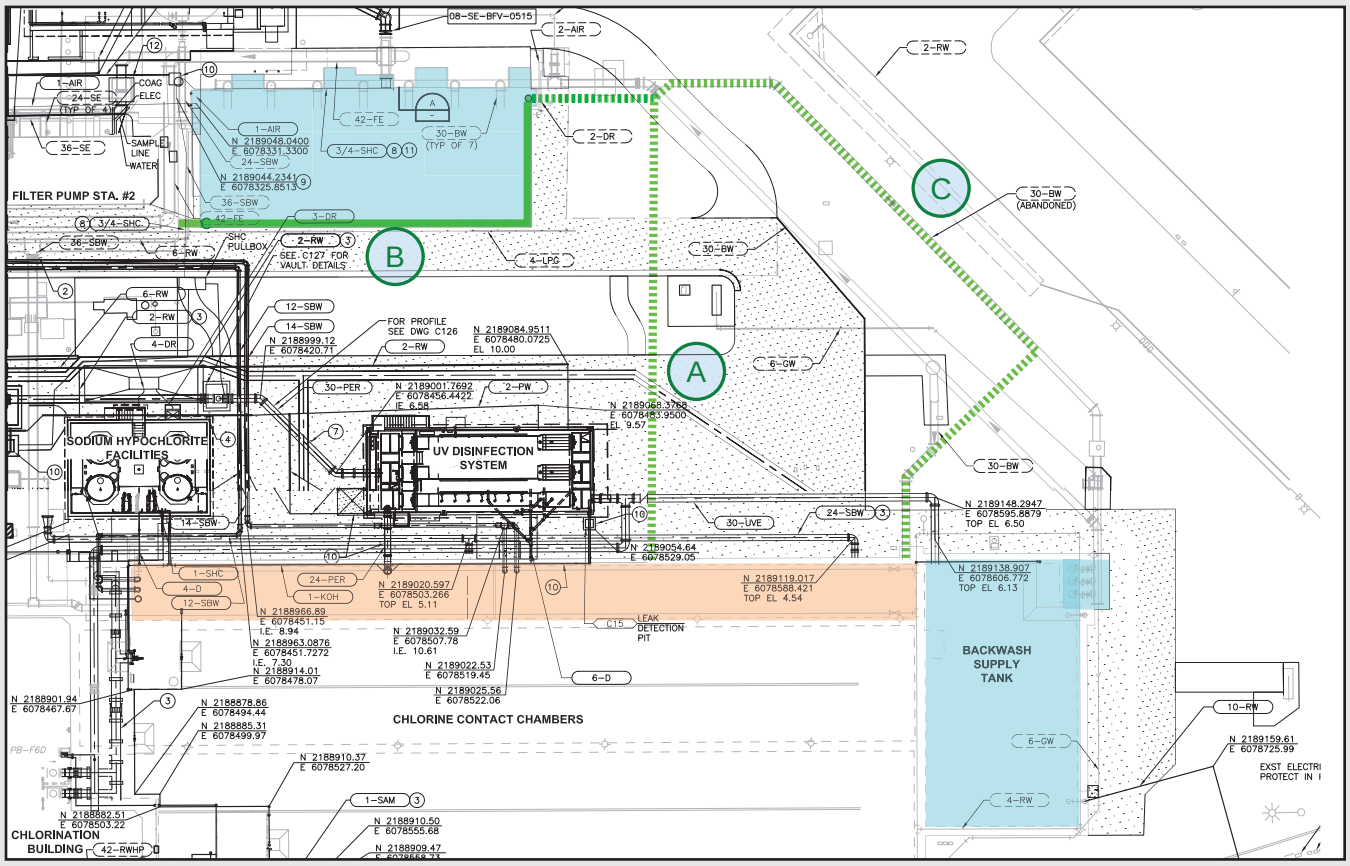


In the last half of 2019, HDR published our latest Condition Assessment and Rehabilitation Guide, to provide our clients and others with readily available summarized information. We will leverage this expertise and collaborate with you to select and implement the most appropriate and most cost effective technology or combination of technologies.

should consider more than the gravity hydraulics and existing subsurface utilities, but also the potential future capital improvements at MWRP resulting from HDR's work with the IRWD Sewage Treatment Master Plan. We will review record drawings to identify underground utilities, perform potholing if needed, and evaluate gravity hydraulic calculations to verify viability. The preferred conceptual layout will be selected and ready for design and consider future changes at MWRP. Unforeseen overflow events will be safely routed to the spent backwash channel to not flood the road surface and reduce O&M efforts.

Holistic Approach to Future Savings

Developing the conceptual layout in consideration of HDR's current work with IRWD on the Sewage Treatment Master Plan can save significant costs by avoiding conflicts with potential future MWRP improvements and the need to re-route the new overflow pipeline.



OPTION A

is a new buried pipeline and new concrete penetration into the spent backwash tank. This requires significant underground work and a new penetration to the spent backwash channel, requiring isolation and temporary rerouting of the backwash supply surge tower overflow.

OPTION B

routes the overflow pipe above-grade along the wall of the tertiary filters before going below ground to connect into the existing 24-inch spent backwash pipe. Need to consider concurrent head conditions to ensure spent backwash flow is not disrupted during an overflow. This option requires the least underground work.

OPTION C

is routed underground to an abandoned 30-inch backwash pipe and to the backwash supply surge tower overflow pipe to discharge into the spent backwash tank. This takes advantage of existing pipelines and reduces underground work and eliminates new penetrations to the spent backwash channel.

DETAILED SCOPE OF WORK

Based on our review of the RFP and exhibits, site walk, and discussions with IRWD staff, we have developed a scope of work for the Tertiary Filters Rehabilitation project. The scope of work is organized and detailed to provide a clear understanding of the project work and so that progress can be monitored and verified. We would welcome the opportunity to discuss the addition, deletion, or modification of any of the individual scope items during negotiations with the District.

The scope of work identified below generally follows that provided in Section II of the RFP with the noted exceptions and changes to facilitate an efficient flow of the required analyses, evaluations, decisions, and documentation.

Task 1 Project Management

Our project management approach is built on trust, a clear definition of shared goals, and a mutual understanding of the necessary steps to achieve those goals. Our proposed Project Manager, Amy Omae, has been working with IRWD for over 13 years and continues to effectively deliver quality products that IRWD can be proud of. She will develop, execute, and update the mainstay of the project—the Project Management Plan (PMP). Even the most brilliant technical approach to a project will be stifled if not counterbalanced by an equally detailed and well-planned approach to project management. It is this recognition that enables us to successfully deliver projects on-time with creative solutions. Weekly check-ins between Rachael, Amy, and critical staff as needed, and monthly status reports will provide IRWD with regular progress updates as well as identify potential risks early to mitigate cost or schedule impacts.

HDR will organize and facilitate project meetings and workshops identified in the RFP by providing timely meeting agendas and minutes for IRWD review. The meeting minutes will document the list of participants, action items, key decisions, and highlights of discussions.

Our approach to quality assurance and quality control (QA/QC) starts on day one of the project. HDR administers a quality management system (QMS) focused on the achievement of our strategic and tactical business objectives that is rooted in the principles and guidelines set forth by ISO 9001:2015. Our policy is to consistently provide professional services that uphold our objectives, satisfy applicable statutory and regulatory requirements, and meet or exceed our client expectations. HDR has assembled a uniquely qualified team for this project, many of whom have worked on IRWD projects for over a decade. Our team has analyzed the project requirements, developed specific tasks, and paired them with the correct staff to assure our ability to have the right people doing the right thing at the right time.

All deliverables will receive rigorous QC reviews before submittal to the District. In addition, the management team will perform regular quality assurance (QA) audits of the project files, document control systems, technical memoranda, calculations, specifications, invoices, progress reports, and correspondence to confirm the procedures and systems put in place by the PMP are being followed. If deviations are found, corrective measures will be made or the PMP will be modified to memorialize the new procedures.

DELIVERABLES:

- Weekly Status Reports – Brief summary email transmitted on Mondays, including activities completed the previous week, activities planned for the upcoming week and critical decisions.
- Monthly Status Reports – Transmitted with monthly billing invoice summarizing the work completed, reviewing work status relative to budget and schedule, and updated project schedule.
- Meeting Agendas – Submitted at least five days prior to the meeting.
- Draft Meeting Minutes – Submitted within two working days following the meeting.
- Final Meeting Minutes – Submitted within one week following the meeting.

ASSUMPTIONS:

- The level of effort for Task 1B is limited to meeting attendance and development of agendas and meeting minutes. The level of effort for meeting preparation are included in the corresponding preliminary design (Task 2) or final design (Task 3) phase. IRWD will provide review comments on within 1 to 2 days of draft meeting minutes submittal.
- Key staff to attend the meetings include the HDR Project Manager and up to three task leads.
- The Preliminary Design Kickoff, Coordination Meeting #1, and Coordination Meeting #2 will be attended in-person. All other meetings and workshops will be

facilitated via HDR's virtual meeting platform (Cisco Webex). Alternatively, IRWD may opt to setup the meetings through their preferred virtual meeting platform (i.e. Microsoft Teams) as the host, and HDR will conduct the meeting.

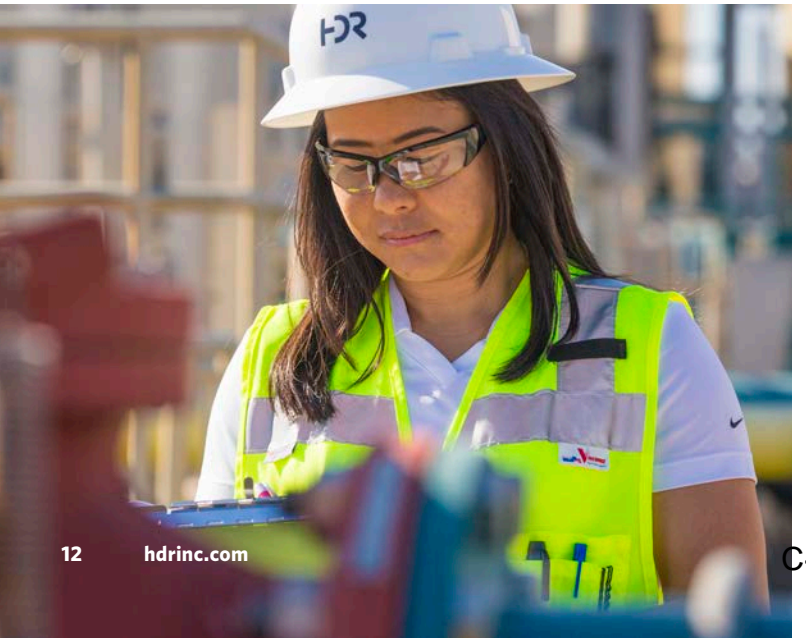
- If Monday is a recognized holiday, then the weekly status report will be transmitted on the following business day.

Task 2 Preliminary Design

The HDR Team brings an overall understanding of IRWD's objectives for this project based upon knowledge and experience gained on previous IRWD projects, including the MWRP Phase 2 Expansion and the FPS-2 Header Replacement Project. As such, we know IRWD's expectations for a comprehensive Preliminary Design Report (PDR) that compiles information and knowledge gained and serves as the justifiable basis of design with identified design criteria.

A. Tertiary Treatment Facility. Identify and define design criteria for the rehabilitation or replacement of the process mechanical, electrical, instrumentation and control (I&C), and structural assets identified in the RFP that comprise the Tertiary Treatment Facility.

1. Tertiary Filters Tanks Area:
   a. Filter media for all tertiary filters tanks.
   b. Air diffuser assemblies for all tertiary filters tanks.
   c. Surface wash systems for all tertiary filters tanks. HDR will consider replacement of the surface wash systems; however, it is our understanding that the original intent of the surface wash system, which has rarely (if ever) been used, was to act as a backup to the air scour system. Since this project will incorporate a redundant blower, the potential for air scour system failure is unlikely; therefore, we propose to demolish the surface wash systems.
   d. Wall wash system assemblies for all tertiary filters tanks.
   e. All effluent sluice gates.
   f. All valves at tertiary filters tanks and valve vaults.
   g. All valve actuators at tertiary filters tanks and valve vaults.
   h. Exposed piping at valve vaults noted to be in poor condition in the Condition Assessment.
   i. Air compressors for pneumatic actuators: compressors, air dryer, filters, and compressed air storage tanks
   j. All above-ground electrical conduit at the Tertiary Filters Tanks Area;
   k. Upgraded filter control panel to provide full automated and manual control of the Filters through the District's PLC to the SCADA system.
   l. Purge control panels;
   m. Level transmitters;
   n. Pressure switches;
   o. Structural repairs to cracks, exposed aggregate, spalling and scaling: filter structure and tanks, four (4) effluent wet wells, and four (4) valve vaults (based on the V&A assessment of concrete structures included in appendix of the 2020 Condition Assessment);
   p. Filter underdrain inspection. A discussion of options associated with the condition of the filter underdrain upon inspection during construction will be included in the PDR and incorporated into the design documents;
   q. Temporary filter control system. The RFP identifies provisions to provide a temporary filter control system with communication to the District's existing PLC so the existing PLC cabinet can be replaced and tested. However, HDR will provide alternate locations for a permanent filter control panel and operator interfaces to avoid the need for temporary panels during construction and to perform cut overs twice.



Amy places an emphasis on collaboration and communication to get projects completed on-time and within budget.

2. Air Scour Blower Area
   a. Fully replace the air scour blower system, including the blower, motor, enclosure, disconnect, mass flow transmitter, intake filter assembly, muffler, temperature switches, valves, and valve actuators; and incorporate a redundant blower
   b. Verify if the existing electrical feed is adequate for the new blower and verify a new feed for the additional blower.

3. Backwash Supply Pumps Area
   a. Fully replace the backwash supply pumps system, including the pumps, motors, disconnects, level transmitter, flow meter, and valves;
   b. Structural repairs to exposed aggregate at the Backwash Supply Tank;
   c. Analyze the power supply to the backwash supply pumps. HDR's knowledge obtained from our work on the IRWD Sewage Treatment Master Plan will also inform the proposed placement of the new NEMA 3R walk-in enclosure containing VFDs and remote PLC cabinet and the routing of underground conduit to avoid conflict with potential future improvements and additional cost.
   d. Electrical conduit:
      » Provide underground power, control and signal conduits from the FPS2 electrical room to the backwash supply pump area.

INNOVATIVE IDEA AND OPTIONAL TASK:

The inlet to the backwash supply tank draws off of the first pass of the chlorine contact basin (CCB), which results in additional chlorine usage and affects the CT calculation for Title 22 disinfection. HDR can evaluate potential relocation of the backwash supply tank inlet towards the end of the CCB to reduce chlorine residual loss and minimize impact to CT.

B. Underground Pipeline Condition Assessment. Summarize findings and recommendations from the condition assessment to be performed on the buried backwash supply pipe (30-inch DIP and 30-inch CMLC steel), spent backwash pipe (36-inch DIP), and filter effluent (42-inch CMLC steel). HDR is a recognized leader in the corrosion and cathodic protection industry. Our team has extensive experience performing external corrosion direct assessments (ECDA) and soil corrosivity analyses as we did with the IRWD FPS-2 Header Replacement project. Based on this previous work, we know the soil corrosivity near the Tertiary Treatment Facility can vary significantly within a short distance (less than 50 feet).

INNOVATIVE IDEA AND OPTIONAL TASK:

As an Optional Task, HDR proposes to perform surface evaluations to identify locations along the buried pipelines that have the highest likelihood of active corrosion cells prior to ECDA. These surface evaluations include electromagnetic (Emag) testing and/or cell-to-cell testing. These evaluations can be performed within a single day, and in conjunction with the soil corrosivity analyses, the findings can provide valuable insight regarding recommending excavation locations for ECDA. As we have done for many other clients, this will help IRWD prioritize locations where corrosion is actively occurring. This reduces the risk of spending money on excavating an area to expose pipes perfectly intact while further along the same pipe may be experiencing more significant corrosion.

C. Investigate Cause of Poor Performance for Filter No. 7. Summarize findings and recommendations from the investigation of the poor performance for Filter No. 7. Our proposed task lead, Mandira Sudame, has been involved in several troubleshooting and startup of wastewater treatment processes and will work closely with Rich Stratton, HDR's Tertiary Filter Expert, to review existing record drawings, reports, and data to identify the potential root cause(s) leading to the reduced run time from Filter No. 7. This will likely involve interviews with IRWD staff to understand methods and operational correction measures that have already been attempted and to vet ideas. **Rich will bring lessons learned from his extensive experience with tertiary filter rehabilitation and design to provide recommendations to restore Filter No. 7 performance run times to be similar to Filter No. 1-6.**

D. Extension of Overflow Pipeline Conceptual Layout. Utilizing our team's intimate knowledge of the IRWD Sewage Treatment Master Plan, HDR will provide a conceptual layout to route the overflow pipeline underground to the spent backwash tank in consideration not only of existing utilities and features but also future capital improvement projects at MWRP as well. **This foresight allows IRWD to avoid locating new or recently rehabilitated assets in areas that may conflict with future modifications and reduces additional costs for relocation.**

E. Electrical. The existing above-ground, exposed conduit at the tertiary filters is corroded and will be replaced as part of this project. It is assumed that the existing wiring is near its end of useful life and is experiencing corrosion and degradation similar to the conduits they are in. Replacing the exposed conduit will require the existing conductors to be removed and will be a good opportunity to replace them at the same time in consideration of the fact that only one filter can be offline at any given time. HDR's electrical engineer will participate in two coordination meetings and site visits to discuss electrical and control improvements and construction sequencing. Sequencing the work in the backwash supply area to install the new variable frequency drives, remote PLC cabinet, and ductbanks prior to replacing the pumps allows the pumps to be replaced and connected to the new electrical system one at a time, thereby minimizing downtime.

Similarly, installing and commissioning the new blower prior to replacement of the existing blower will allow the air scour system to remain fully functional and minimize downtime as well.

F. Instrumentation and Control. Based on our understanding of the project objectives, the I&C design in the PDR will include:

a. Replacement of mature current Modicon Quantum PLC with District Standard PLC
b. Replacement of PLC panel on the Tertiary Filter Deck
c. Replacement of annunciator panel in PLC panel on the Tertiary Filter Deck to current standard OIT (Maple Systems OMI6815A)
d. Provide a new PLC within the new enclosure to support the Backwash Supply Pump Area.
e. Development of updated process control descriptions (PCDs) for each impacted process area
f. Development of current and consolidated documentation for impacted process area including process control descriptions (PCDs), P&IDs, and communication block diagrams.
g. Identification and implementation of process improvements in coordination with plant Operations and Maintenance (O&M) to right-size process operation taking advantage of automation, monitoring, and process mechanical improvements

If proposed alternate control panel locations are acceptable by IRWD staff, then there may be no need for temporary control improvements.

G. Construction Sequence. Our task lead, Gregorio Estrada, will participate in two coordination meetings and develop a preliminary construction sequence based those discussions in collaboration with IRWD Operations and Automation staff to maintain continuous operation and permit compliance of the tertiary filters. Key considerations, such as performing work concurrently so that only one filter being offline at any given time and potential response in the event of an MBR failure (reliable treatment capacity at 12 to 18 mgd), will be factored into the construction sequence. He was a significant contributor to the development of detailed construction sequencing for several successful IRWD projects, such as the MWRP Phase 2 Expansion and the FPS-2 Header Replacement. **Gregorio is intimately familiar with IRWD staff, treatment processes, capability, and needs as well as IRWD standards and procedures; he will work with you to develop a construction sequence that minimizes IRWD risk.** Although the RFP allows for temporary pumps, piping, control, or power facilities to be considered, there is potential to avoid temporary facilities if proposed locations for permanent options are acceptable to District staff.

H. Site Survey. Our team will perform an aerial survey and verify spot elevations of visible features and up to ten (10) potholes to create a topographic map with one-foot contours based on NAVD 88 and NAD 83 coordinate system.

I. Potholing Underground Utilities. Our team will perform up to ten (10) potholes to identify subsurface utilities or other physical features.

J. Geotechnical Investigation. Our subconsultant Ninyo & Moore has performed extensive geotechnical work at MWRP and understands the soil conditions on-site. Based on these previous reports, the HDR team will determine if additional soils investigation is needed.

INNOVATIVE IDEA AND OPTIONAL TASK:

As an additional Optional Task, and potential alternative to this optional geotechnical investigation, the HDR team proposes to collect and analyze soil samples during the potholing effort. This provides more results covering a broader area at minimal additional cost.

K. Optional Geotechnical Investigation: In accordance with the RFP, the level of effort to perform additional geotechnical investigation and drill one soil boring with a hand auger is included as an optional task.

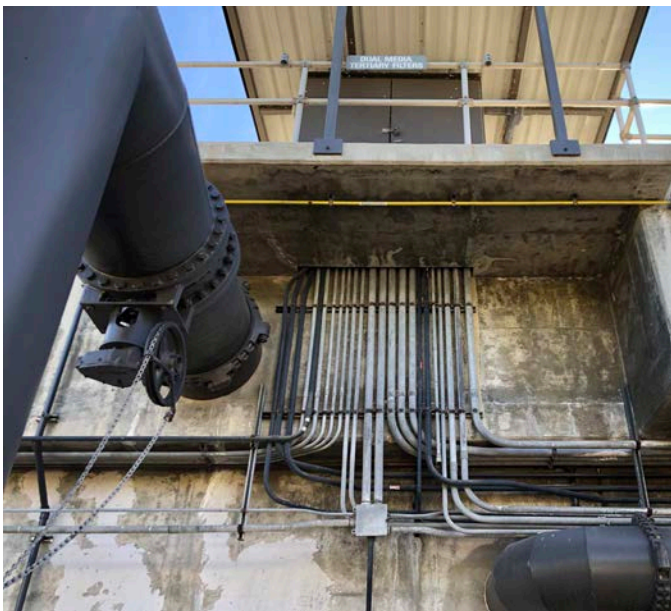
L. Optional Permitting Assistance. During the preliminary design phase, HDR will determine if there is a need for IRWD to obtain a temporary permit variance from meeting current NPDES and Title 22 discharge requirements during construction and apply for temporary permits, if necessary. Gregorio Estrada and Rich Stratton will identify and outline potential exceedances or risk of exceeding permitted limits in consideration of typical influent variations during the construction sequence.

M. Project Schedule. HDR will develop a preliminary construction project schedule identifying key milestones and critical path issues based on anticipated design completion, preliminary construction sequence, and recommendations within the PDR.

N. Estimates of Probable Construction Costs. HDR will develop an opinion of probable construction cost estimate (OPCC) as a Class 3 estimate as defined by American Association Cost Engineering International. This cost estimate will be a built-up of cost elements with productivity adjustments for the work's complexity. This will include major equipment quotations on process and electrical equipment, media, and large valves. The OPCC consists of a written basis of estimate, which provides major assumptions, estimate methodology, cost basis, and excluded items. The OPCC will consist of a summary table in the main body of the PDR with detailed cost reports provided in the appendix.

O. Team Meetings. Meetings, workshops, and site visits during the preliminary design phase are important to provide a smooth approach to the development and clear direction to execute the detailed final design work. Active engagement in these meetings by the IRWD and HDR team are important to understand project constraints/ limitations and existing control and operations as well as collaborate and communicate construction sequence. During Draft Technical Memorandum (TM) Submittal Meetings, HDR will develop a presentation to provide a summary of the draft submittal to communicate findings and results of the Filter Performance Evaluation and the Underground Pipeline Condition Assessment. HDR will conduct meetings to summarize and discuss recommendations in the Draft and Final Preliminary Design Report (PDR).

HDR will organize and facilitate project meetings and workshops identified in the RFP by providing timely meeting agendas and minutes for IRWD review. The meeting minutes will document the list of participants, action items, key decisions, and highlights of discussions.



P. Technical Specifications. HDR will develop an outline of the project manual and technical specifications. The main body of the PDR will include a list of technical specifications anticipated to be added to the Project Manual that are not part of IRWD's Construction Manual. The complete outline of the Project Manual will be incorporated as an appendix.

Q. Construction Plans. Based on our project understanding and scope, we expanded on the drawings list identified in the RFP to develop our proposed list of design drawings (78 sheets total) shown in the table below. This drawings list serves as the basis for our level of effort. From this, we identified 16 sheets that will be developed as part of the preliminary design submittal. The drawings marked with an asterisk were not included in the RFP and are recommend to be included in the design package.

We understand the importance of meeting project schedules.

Often the most difficult aspect of a project is keeping it moving forward promptly. Many projects these days fall victim to gridlock, either from public protest, permitting, loss of leadership and/or loss of momentum or funding. Diligence, flexibility, credibility and tact are needed to work through these potential delays or stopping points. **Our proposed project manager, Amy Omae, understands your policies, procedures, standards of expected work and overall organization structure, and has worked closely on previous projects with many of the staff members assigned to this project.**

Proposed List of Drawings

SHEET COUNT	DISCIPLINE	DRAWING NUMBER	INCLUDED IN PDR	DRAWING NAME
1	General	G001	X	Title Sheet
2	General	G002	X	Vicinity and Location Maps, Sheet Index
3	General	G003		General Symbols, Notes and Legends
4	General	G004	X	Construction Sequencing Plan 1
5	General	G005		Construction Sequencing Plan 2*
6	General	G006		Construction Sequencing Details
7	Demolition	X001	X	Demolition Site Plan
8	Demolition	X002		Demolition Plan Tertiary Filter
9	Demolition	X003		Demolition Plan Air Scour Blowers
10	Demolition	X004		Demolition Plan Back Wash Pumps, Sections and Details
11	Demolition	X005		Tertiary Filter Demolition Sections
12	Demolition	X006		Tertiary Filter Demolition Details
13	Demolition	X007		Tertiary Filter Demolition Photographs*
14	Demolition	X008		Air Scour Blowers Sections & Details
15	Civil	C001		General Civil Notes*
16	Civil	C002	X	Site Plan - Paving & Grading
17	Civil	C003		Yard Piping
18	Civil	C004		Details, Enlarged Plans, and Sections
19	Civil	C005		Details, Sections*
20	Structural	S001		Structural Notes

SHEET COUNT	DISCIPLINE	DRAWING NUMBER	INCLUDED IN PDR	DRAWING NAME
21	Structural	S002		Special Inspections, Structural Observations & Abbrevs*
22	Structural	S003		Structural Details
23	Structural	S004		Tertiary Filters Plan
24	Structural	S005		Tertiary Filters - Sections
25	Structural	S006		Tertiary Filters - Sections/Details*
26	Structural	S007		Air Scour Blowers Plan
27	Structural	S008		Air Scour Blowers - Sections/Details
28	Structural	S009		Back Wash Pumps Plan
29	Structural	S010		Back Wash Pumps - Sections/Details
30	Process	D001		Process General Notes
31	Process	D002		Process Standard Details I
32	Process	D003	X	Tertiary Filter Plan
33	Process	D004		Tertiary Filter Partial Plan*
34	Process	D005		Tertiary Filter - Sections
35	Process	D006		Tertiary Filter - Details
36	Process	D007		Tertiary Filter - Details*
37	Process	D008	X	Air Scour Blowers Plan
38	Process	D009		Air Scour Blowers- Sections
39	Process	D010		Air Scour Blowers - Details*
40	Process	D011	X	Back Wash Pumps Plan
41	Process	D012		Back Wash Pumps- Sections
42	Electrical	E001	X	Electrical Legend and Symbols
43	Electrical	E002	X	Electrical Site Plan
44	Electrical	E003		Equipment Elevations
45	Electrical	E004		Details I*
46	Electrical	E005		Details II*
47	Electrical	E006		Ductbank Sections*
48	Electrical	E007		Ductbank Foldouts*
49	Electrical	E008	X	Electrical Single Line Diagram
50	Electrical	E009		Panel Schedules
51	Electrical	E010		Conduit Schedule I
52	Electrical	E011		Conduit Schedule II*
53	Electrical	E012		Schematics I
54	Electrical	E013		Schematics II*
55	Electrical	E014		Schematics III*
56	Electrical	E015		Tertiary Filters Power Plan

SHEET COUNT	DISCIPLINE	DRAWING NUMBER	INCLUDED IN PDR	DRAWING NAME
57	Electrical	E016		Tertiary Filters Control and Signal Plan
58	Electrical	E017		Tertiary Filters Lighting and Grounding Plan
59	Electrical	E018		Backwash Supply Pump Station Power Plan
60	Electrical	E019		Backwash Supply Pump Station Enlarged Plan
61	Electrical	E020		Backwash Supply Pump Station Control and Signal Plan
62	Electrical	E021		Backwash Supply Pump Station Lighting and Grounding Plan
63	Electrical	E022		Air Scour Blowers Power, Control, and Signal Plan
64	Electrical	E023		Air Scour Blowers Lighting and Grounding Plan
65	Instrumentation and Control	Y001	X	Instrumentation Notes
66	Instrumentation and Control	Y002		Typical Details 1*
67	Instrumentation and Control	Y003	X	SCADA Network Architecture
68	Instrumentation and Control	Y004		Standard Control Panel I/O Wiring Diag. DI*
69	Instrumentation and Control	Y005		Standard Control Panel I/O Wiring Diag. DO*
70	Instrumentation and Control	Y006		Standard Control Panel I/O Wiring Diag. AI*
71	Instrumentation and Control	Y007		Standard Control Panel I/O Wiring Diag. AO*
72	Instrumentation and Control	Y008		Standard Control Panel Rack Bill of Material
73	Instrumentation and Control	Y009		Standard Control Panel Cabinet Layout
74	Instrumentation and Control	Y010		Control Panel Elevation
75	Instrumentation and Control	Y011		Control Panel Backpanel
76	Instrumentation and Control	Y012	X	Tertiary Filters
77	Instrumentation and Control	Y013	X	Air Scour Blowers
78	Instrumentation and Control	Y014	X	Backwash Pumps

R. Preliminary Design Report (PDR). HDR will provide a Draft and Final PDR to document and summarize the discussions with IRWD staff, findings of the preliminary design subtasks, basis of recommendations, and establish design criteria that is comprehensive to provide a seamless transition into the Final Design phase.

DELIVERABLES:

- Draft TM for the Underground Pipeline Condition Assessment (in electronic format)
- Draft TM for the Investigation of Poor Performance of Filter No. 7 (in electronic format)
- Draft PDR (eight hard copies and one electronic PDF copy)
  - Outline of the Project Manual including Technical Specifications (in electronic PDF format)
    - » Preliminary control descriptions to facilitate programing for improvements.
  - Preliminary Design Drawings (in electronic PDF format; 22-inch x 34-inch to be consistent with Final Design)
  - Final TM for the Underground Pipeline Condition Assessment
  - Final TM for the Investigation of Poor Performance of Filter No. 7
- Final PDR (eight hard copies and one electronic PDF copy)
  - Outline of the Project Manual including Technical Specifications (in electronic PDF format)
    - » Preliminary control descriptions to facilitate programing for improvements.
  - Preliminary Design Drawings (in electronic PDF format; 22-inch x 34-inch to be consistent with Final Design)
  - Final TM for the Underground Pipeline Condition Assessment
  - Final TM for the Investigation of Poor Performance of Filter No. 7

ASSUMPTIONS:

- The level of effort includes meeting preparation. The level of effort for participation and development of agendas and minutes.
- The excavations and safety measures needed for HDR's team to perform the ECDAs (up to four) will be provided by IRWD. If selected, this may be discussed during contract negotiation to be incorporated into HDR's scope of work and level of effort.
- Implementation of the recommendations from the Filter Performance Evaluation and Underground Pipeline Condition Assessment are not currently included in the level of effort.
- The Electrical and I&C design and associated level of effort to develop the preliminary design associated with Task 2.A (Tertiary Treatment Facility) is allocated to Task 2.E (Electrical) and Task 2.F (I&C), respectively, in the proposed fee.
- No additional changes to the Final TMs will be made from the Draft PDR to the Final PDR submittals.
- IRWD review comments on draft submittals will be compiled into one version and identify resolution and/or direction for any conflicting comments between multiple reviewers.
- IRWD will directly pay the permitting agency for any application fees associated with acquiring the temporary permit.

Task 3 Final Design

Based on the recommendations in the Preliminary Design Phase, the HDR team will prepare contract documents during the Final Design Phase for the 60-percent, 90-percent, 100-percent, and Final Design Submittals). The 60-percent design phase will put the key building blocks in place for the complete set of contract documents and design documentation for the project. It will establish the framework for the drawings and specifications. Development of the 60-percent drawings will provide an opportunity for project reviews and to make refinements and address project issues before a more detailed design is developed. HDR will coordinate and conduct a meeting with IRWD staff at each design submittal (60-percent, 90-percent, 100-percent, and Final) to review the contact documents, obtain review comments and concurrence, and discuss how comments from the previous design submittal were addressed.

The final design shall result in the preparation of the Contract Documents. In the final design phase, the Engineer shall address the items discussed below:

A. Project Manual: HDR will prepare a Project Manual in standard IRWD format for the Contract Documents. IRWD's front end documents shall be utilized, and determine any needed supplemental special provisions that should be added to comply with IRWD's general provisions and front-end requirements. Based on discussions with IRWD staff, the Project Manual will describe the allowable shutdown durations and sequencing associated with construction activities. The Project Manual will include the IRWD General Technical

Specifications, identify any modifications, and any project specific technical specifications.

B. Construction Plans: HDR will develop detailed construction drawings in AutoCAD and using NCS V4.0 layering standards on 22" x 34" sheets utilizing IRWD's standard border template. The table shown previously on pages 16 to 18 identifies our proposed list of final design drawings and serves as the basis for our level of effort. This list is based on our project understanding of the scope, which increased the number of drawings from that identified in the RFP to 78 sheets total. From our experience and familiarity with IRWD's expectations, we believe that this is the number of sheets required to meet this project's needs.Construction notes will be used (callouts on the plans are not allowed) on all construction drawings. Construction plans will be prepared using the NAVD 88 and NAD 83 survey standards.

C. Electrical/Instrumentation. HDR will coordinate with IRWD staff to incorporate IRWD's standard operations, programming, security, and tagging requirements into the design. We will develop P&IDs, single line diagrams, control equipment list, control loop descriptions, and method of integrating the proposed temporary and permanent facilities into IRWD's existing SCADA system. An operational scheme and functional descriptions (in plain English) will be developed and submitted for District review and approval.

D. Project Schedule. HDR will regularly maintain and update the project schedule to include detailed schedules for both design and construction activities. Key milestones and critical factors impacting the project schedule including implementation, permitting, and coordination activities will be incorporated into the proposed schedule to stay on track. The schedule shall be prepared in Microsoft Project. A preliminary schedule outlining the preliminary and final design phase activities shall be included in the proposal.

E. Opinion of Probable Construction Cost. HDR will update the OPCC at the 60-percent, 90-percent, and 100-percent design submittals providing more detail as the design is further defined. The deliverable will include a written basis of estimate. The OPCC will consist of a summary and detailed cost reports delivered in a PDF.

F. Design Deliverables. HDR will produce design deliverables at the 60-percent, 90-percent, 100-percent, and Final Design Submittals as listed below.

DELIVERABLES:

- 60-Percent Design Submittal
  - Construction Plans (Civil/site, demolition, process mechanical, structural, and electrical plans. Basic mechanical equipment, structural layouts, pipeline alignments, preliminary profiles, and existing utilities will be shown, at a minimum.)
    - Six 11"x17" bound hard copies
    - Two 22"x34" bound hard copies
    - One CD containing a single PDF file of the entire plan set
  - Project Manual (Complete table of contents)
    - Electronic PDF file transmitted via email.
  - Updated OPCC (AACE Class 2 estimate)
    - Electronic PDF file transmitted via email.
- 90-Percent Design Submittal
  - Construction Plans (Concepts of each component of the design such as civil, structural, demolition, process mechanical, electrical and instrumentation. Plan, profile, connections, details, and location of appurtenances will be shown. Plan and profile drawings and process mechanical details/drawings will be developed to a high level of detail.)
    - Six 11"x17" bound hard copies
    - Two 22"x34" bound hard copies
    - One CD containing a single PDF file of the entire plan set
  - Project Manual (Contract documents, general provisions, special provisions, general requirements, technical specifications, and appendix)
    - Five color coded hard copies.
  - Updated OPCC (AACE Class 1 estimate)
    - Electronic PDF file transmitted via email.
- 100-Percent Design Submittal
  - Construction Plans (Concepts of each component of the design such as civil, structural, demolition, process mechanical, electrical and instrumentation. Plan, profile, connections, details, and location of appurtenances will be shown. Plan and profile drawings and process mechanical details/drawings will be developed to a high level of detail.)
    - Six 11"x17" bound hard copies
    - Two 22"x34" bound hard copies
    - One CD containing a single PDF file of the entire plan set
    - One CD containing AutoCAD files for the entire plan set
  - Project Manual (Contract documents, general provisions, special provisions, general requirements, technical specifications, and appendix)

    - » Five color coded hard copies.
    - » One CD containing all MS Word files used in the preparation of the Project Manual
  - Notebook with the design calculations (including, but not limited to, process mechanical, civil, structural, electrical, pipe thickness and restraint).
    - » Five color coded hard copies.
  - Updated OPCC (AACE Class 1 estimate)
    - » Electronic PDF file transmitted via email.
  - Final Design Submittal
  - Construction Plans
    - » PDF files of the final submittal transmitted electronically.
    - » One 22"x34" final stamped and signed reproducible plan set (mylar title sheet and all remaining sheets on bond paper)
  - Project Manual (Contract documents, general provisions, special provisions, general requirements, technical specifications, and appendix)
    - » PDF files of the final submittal transmitted electronically.
    - » One original signed Project Manual for IRWD's signatures.

ASSUMPTIONS:

- The level of effort includes meeting preparation. The level of effort for participation and development of agendas and minutes is included in Task 1.
- The Electrical and I&C design and associated level of effort to develop the preliminary design associated with Task 3.A (Project Manual) and Task 3.B (Construction Plans) is allocated to Task 3.C (Electrical/Instrumentation) in the proposed fee.
- IRWD review comments on draft submittals will be compiled into one version and identify resolution and/or direction for any conflicting comments between multiple reviewers.

G. Addenda Preparation and Pre-Bid Meeting: During the bidding period, HDR will assist the District with providing information and clarification of bid documents to prospective bidders. The estimated level of effort includes the preparation of up to three addenda including revisions to the design plans and specifications and assistance with addressing bidder questions based on the requirements identified in the RFP.

DELIVERABLES:

- Plan Revisions (in electronic PDF format).
- Specification Revisions (in electronic PDF format).
- Bidder Questions (in email and/or electronic PDF format, as appropriate).

ASSUMPTIONS:

- Plan Revisions. Up to 24 hours of appropriate staff time for plan revisions to the construction drawings.
- Specification Revisions. Up to 24 hours of appropriate staff time for revisions or additions to the project specifications.
- Bidder Questions. Up to 24 hours of appropriate staff time to address and respond to bidder questions.
- Pre-Bid Meeting duration is two-hours, inclusive of a site visit with potential bidding contractors. HDR's Project Manager and up to two task leads, as appropriate, will attend the meeting and site visit.

The partnership between IRWD and HDR is based on a foundation of teamwork, collaboration, and technical excellence.

Our team will work with you to successfully deliver a high-quality product to accomplish IRWD's goals. We welcome the opportunity to discuss any part of our proposed approach, scope, and level of effort to deliver this important project that meets your needs.

SECTION B

TEAM

B

TEAM

We have assembled an experienced team of fully committed staff that will work in partnership with your staff. Our core team members have been working with IRWD for 10+ years. Our expertise in similar projects combined with our thorough knowledge of the MWRP will help provide rehabilitation and improvement recommendations.

The organizational chart below provides the names and job title of each proposed team member, including subconsultants. The individuals proposed for this project represent our best and most qualified staff to support the District with this important project. The organization of the HDR team profiles for key team members are provided on the following pages.

Our proposed Project Manager and your primary point of contact for this project is Amy Omae. She has demonstrated technical expertise, leadership and ability to deliver this Project. She will lead the HDR team and partner with IRWD staff to envision innovative ideas and cost effective solutions for your wastewater facility.

Amy has worked with you for over 13 years and will leverage her knowledge of your facilities, relationships with staff and understanding of your standards to lead the team in delivering a cost effective, innovative project.

Amy will be backed by core team of technical experts who also have holistic knowledge from their history of working for IRWD that allows us to advance prior work efforts. Our proposed project leadership and core team will not be reassigned without prior IRWD approval.

Irvine Ranch WATER DISTRICT

Project Manager
Rachael L. Burk, PE

PROJECT LEADERSHIP

Principal-in-Charge
Gregorio Estrada, PE, LEED AP
(Irvine, CA)

Project Manager
Amy Omae, PE, LEED AP
(Irvine, CA)

Quality Control
John Koch, PE *(Bellevue, WA)*
Dan Ellison, PE, SE *(Ventura, CA)*
Oskar Agustsson, PE *(Bellevue, WA)*

CORE TEAM

Electrical
Dan Gott, PE
(Folsom, CA)

I&C
Brandon Erndt, PE
(Phoenix, CA)

Process Mechanical
Chandrikaa Balendhran, PE, BCEE
(Irvine, CA)

Tertiary Filter Expert
Rich Stratton, PE
(Folsom, CA)

Filter Performance Investigation
Mandira Sudame, PE
(San Diego, CA)

Structural
Tom Hamlin, SE
(Phoenix, AZ)

SUPPORT TEAM

Electrical/I&C
Justin Lee, EIT
(Irvine, CA)

Condition Assessment
Lucy Jaramillo, NACE CP-2 *(Claremont, CA)*
Adam McGinnis, NACE CP-2 *(Claremont, CA)*
Bradley Stuart, EIT, CP-2, CIP-1 *(Claremont, CA)*

Construction Sequence
Gregorio Estrada, PE, LEED AP
(Irvine, CA)

Cost Estimate
Pete Bredehoeft, CEP
(Atlanta, GA)

Surveying
Borchard Surveying*
(San Clemente, CA)

Potholing
T2 Utilitiy Engineers*
(Huntington Bch., CA)

Geotechnical (Optional)
Ninyo & Moore*
(Irvine, CA)

Permitting (Optional)
Gregorio Estrada, PE, LEED AP
(Irvine, CA)

Key Staff
"*" denotes subconsultant

The key to efficient project delivery is assigning qualified professional staff who can deliver results. Our proposed key personnel will not be reassigned without prior approval from IRWD.

AMY OMAE, PE, LEED AP
PROJECT MANAGER

Amy is a proven Project Manager with 13 years of experience in water and wastewater master planning, design, and engineering services during construction projects throughout California. Amy has the demonstrated project management and leadership skills necessary to manage the team of technical experts and deliver this important rehabilitation. Her dedication to delivering quality projects has made her one of IRWD's most trusted project managers. **Amy has a long history of working with IRWD on critical projects, such as the MWRP FPS-2 Header Replacement, MWRP Phase 2 Expansion, Sewage Treatment Master Plan, Salt Management Plan, LAWRP TSS Investigation, and Cienega Selenium Treatment Facility Pilot Test and Verification Study. Her knowledge of IRWD's facilities and treatment systems will be invaluable in guiding the successfully delivery of this project.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Recycling Plant Phase 2 Expansion*
- *Irvine Ranch Water District, Michelson Water Recycling Plant Filter Pump Station 2 Header Replacement Design*
- *City of Thousand Oaks, Digesters No. 2 and 3 Rehabilitation*

RICH STRATTON, PE
TERTIARY FILTER EXPERT

Rich has more than 43 years of water and wastewater engineering experience, which includes master planning, design, and construction of treatment plants, pumping stations, pipelines, storage tanks, wells, biosolids handling, and reverse osmosis and brine management. He is considered one of HDR's top water, wastewater, and advanced wastewater treatment plant engineers, and typically involved with HDR's largest and most complex nationwide. He has served as project manager, quality assurance/quality control (QA/QC) reviewer, technical advisor, or project engineer on more than 90 water treatment plant projects. **Rich is familiar with the IRWD's facilities and treatment systems having provided design support for the Phase 2 expansion of the Michelson Water Recycling Plant.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Reclamation Plant Phase 2 Expansion*
- *City of San Jose, Filter Rehabilitation Condition Assessment*
- *Clean Water Services, Durham Advanced Wastewater Treatment Facility, Tertiary Treatment Systems Improvements*

MANDIRA SUDAME, PE
FILTER PERFORMANCE INVESTIGATION

Mandira has 15 years of experience in planning, design, construction, condition assessment, and management of wastewater and recycled water facilities. Specialization includes wastewater process design for biological nutrient removal, membrane technology, disinfection and solids handling. She has managed designs of large diameter pipeline, sewer pumps stations, and wastewater facilities condition assessment along with construction support services. **Mandira served as the lead design engineer for the 10 mgd membrane bioreactor process (MBR) including two, 35 mgd each mixed liquor pumping system during the Michelson Water Recycling Plant Phase 2 Expansion. Mandira will leverage her knowledge and experience with IRWD's systems to recommend filter operation improvements.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Recycling Plant Phase2 Expansion*
- *Orange County Sanitation District, Sludge Dewatering and Odor Control at Plant No. 1 (P1-101)*
- *City of San Diego, As-Needed Engineering Wastewater Facilities Condition Assessment*

GREGORIO ESTRADA, PE, LEED AP
PRINCIPAL IN CHARGE

Gregorio has been working with IRWD for over 14 years on critical projects ranging from planning, design, and construction. In these past 14 years, he has worked onsite at both the Los Alisos and Michelson plants and has acquired extensive knowledge of your collections system, treatment processes, and reuse practices. **His history and relationships with IRWD staff brings a solid understanding of all of IRWD's facilities, design standards, company culture, and staff preferences that will increase our team's efficiency and understanding for this project. As the Principal-in-Charge and Construction Sequencing Lead, Gregorio will be involved continuously throughout the project. He will provide project oversight and serve as an advisor throughout the project.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Recycling Plant Phase 2 Expansion*
- *Irvine Ranch Water District, Sewage Treatment Plant Master Plan*
- *Irvine Ranch Water District, Michelson Water Recycling Plant, Emergency Discharge Design*

BRANDON ERNDT, PE
I&C LEAD

Brandon Erndt has over 20 years of experience as a controls engineer, project manager, and I&C/Programming department manager. He has been responsible for managing several SCADA Master Plans and I&C Design projects to maintain project budgets and schedules. Brandon's additional experience includes the planning, design, PLC and HMI programming, system migration, and upgrading planning, and maintenance of control systems networks and software logic diagrams. **He has been responsible for developing several vendor software programs including Modicon, Wonderware, FactoryTalk, View SW, RSView32, Cimplicity, Proficy (Intellution) iFix, and Visual Basic.**

RELEVANT EXPERIENCE

- *City of Chandler, SCADA Standards and Plant Control Network Audit*
- *City of Glendale, Cholla Water Treatment Plant Booster Pump Station and Admin Building Improvements*
- *City of Spokane, SCADA Upgrades*

DAN GOTT, PE
ELECTRICAL LEAD

Daniel Gott has more than 28 years of experience administering and directing all aspects of electrical, instrumentation, and control systems for water, wastewater, and industrial facilities and systems. His experience has included planning, design, programming and configuration, construction support, equipment inspection and testing, facility startup, and training in system operations and maintenance (O&M) for water, wastewater treatment plants and pumping stations. **Dan has served as electrical engineer on more than 60 water and wastewater treatment plant projects nationwide.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Recycling Plant Phase 2 Expansion*
- *Irvine Ranch Water District, Cienega Selenium Treatment Facility*
- *Orange County Sanitation District, Sludge Dewatering and Odor Control at Plant No. 1 (P1-101)*

CHANDRIKAA BALENDHRAN, PE, BCEE
PROCESS MECHANICAL LEAD

Chandrikaa Balendhran has over 19 years of experience with membrane bioreactors (MBRs), biosolids management and construction support services. She has prepared hydraulic profiles, civil and mechanical design drawings, cost estimates, life cycle cost analyses, and various agency reports. Chandrikaa was responsible for the mechanical design for agencies such as Orange County Sanitation District, South Orange County Wastewater Authority, Goleta and City of Bastow. **Chandrikaa has worked with IRWD on multiple projects, including MWRP Phase 2 Expansion, MWRP FPS-2 Header Replacement Design, MWRP Biosolids & Energy Recovery Facility Construction Management Support Services, Cienega Selenium Treatment Facility, Biosolids/Energy Management Plan, and Los Alisos Water Reclamation Plant Upgrades allowing her to have a solid understanding of IRWD's design standards.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water District, Michelson Water Reclamation Plant Phase 2 Expansion*
- *Irvine Ranch Water District, Michelson Water Recycling Plant Biosolids & Energy Recovery Construction Management Support Services*
- *Irvine Ranch Water District, Michelson Water Recycling Plant FPS-2 Header Replacement*

TOM HAMLIN, PE, SE
STRUCTURAL LEAD

Tom is the Design Center Manager in the Desert Southwest and has more than 16 years of experience as a structural engineer. His experience includes structural design, plan development, quality control reviews, and construction administration for a wide range of structure types including water/wastewater facilities, mining, and industrial facilities. **Tom has extensive experience in performing structural investigations and rehabilitations of existing water/ wastewater facilities for clients, including Irvine Ranch Water District, Orange County Sanitation District and City of San Diego.**

RELEVANT EXPERIENCE

- *Irvine Ranch Water, District, Michelson Water Recycling Plant Emergency Discharge*
- *Orange County Sanitation District - Sludge Dewatering and Odor Control at Plant No. 1 Job No. P1-101*
- *City of San Diego, As-Needed Engineering Wastewater Facilities Condition Assessment*

Technical Support Staff

Our team offers a full range of related engineering services provided by technical professionals with years of experience in their disciplines. We will work with IRWD to carefully identify engineering needs, develop work plans that fully and efficiently address those needs, and implement engineering tasks in a manner that provides best solutions in a cost-effective manner. Some of our engineering specialties include:

QA/QC
John Koch, **Dan Ellison** and **Oskar Agutsson** will provide ongoing and consistent quality reviews with their extensive knowledge of rehabilitation project.

Electrical/I&C
Justin Lee will assist in the update and replacement of the electrical and instrumentation and control systems. Justin assisted with the review of MWRP Phase 2 Electrical Record Drawings and is familiar with IRWD's standards.

Condition Assessment
Lucy Jamarillo, **Adam McGinnis** and **Bradley Stuart** will perform a condition assessment of underground backwash supply, spent backwash and filter effluent piping. Our team is familiar with your systems having surveyed multiple pipelines and reservoir tanks under IRWD's 3-Year Cathodic Protection Monitoring Program. Our team will leverage that experience with your facilities to provide recommendations for improvements to the pipelines.

Cost Estimating
Pete Bredehoeft will be responsible for providing estimates of probable construction costs. Having completed more than 3,300 cost estimates on all levels, Pete will utilize his expertise in cost estimating process and procedures to prepare IRWD for future costs.

Team Commitment to the Project

Current project workload allows the members of our proposed team to begin on this project immediately upon selection. With this in mind, our team members were carefully selected not only for their expertise, but also for their availability to work on the project for its duration. We follow well established and time proven procedures to manage our project workload. Our strong team is available to begin work upon Notice-to-Proceed.

The requirements and commitment of our team members will vary over the duration of the project as the technical needs change. The table below shows the estimated time we expect our team members to dedicate to delivering the MWRP Tertiary Filters Rehabilitation project.

PROJECT TEAM MEMBERS | ROLE	LOCATION	% OF TIME CONTRIBUTE
Amy Omae, PE, LEED AP | Project Manager	Irvine, CA	40
Gregorio Estrada, PE, LEED AP | Principal in Charge	Irvine, CA	20
Rich Stratton, PE | Tertiary Filter Expert	Folsom, CA	20
Mandira Sudame, PE | Filter Performance Investigation	San Diego, CA	30
Brandon Erndt, PE | I&C Lead	Phoenix, AZ	40
Dan Gott, PE | Electrical Lead	Folsom, CA	30
Chandrikaa Balendhran, PE, BCEE | Process Mechanical Lead	Irvine, CA	40
Tom Hamlin, PE, SE | Structural Lead	Phoenix, AZ	30
John Koch, PE, BCEE | QA/QC	Bellevue, WA	10
Dan Ellison, PE, SE | QA/QC	Ventura, CA	10
Oskar Agustsson, PE | QA/QC	Olympia, WA	10
Justin Lee, EIT | Electrical/I&C	Irvine, CA	50
Lucy Jaramillo, NACE CP-2 | Condition Assessment	Claremont, CA	20
Adam McGinnis, NACE CP-2 | Condition Assessment	Claremont, CA	20
Bradley Stuart, EIT, CP-2, CIP-1 | Condition Assessment	Claremont, CA	20
Pete Bredehoeft, CEP | Cost Estimate	Atlanta, GA	20

SECTION E

BUDGET

(One hard-copy is submitted under separate cover in a sealed envelope)

January 28, 2021

Irvine Ranch Water District
Ms. Rachael Burk, PE, Project Manager
Michelson Water Recycling Plant
3512 Michelson Drive
Irvine, California 92618

Sent Via Email: burk@irwd.com

Regarding: Clarification to Follow-up Questions for the Michelson Water Recycling Plant Tertiary Filters Rehabilitation, PR 07892

Dear Ms. Burke,

Thank you for setting up the meeting with Irvine Ranch Water District (IRWD or District) electrical and controls staff to clarify the additional scope as it pertains to the follow-up questions #4 and #8 and the Task 1 Project Management level of effort. We also received your email indicating that Task 2B Underground Pipeline Condition Assessment was removed from the scope of work. Based on these communications, we have revised our responses to the follow-up questions (below) and the associated level of effort as shown in the attached table. An updated summary table is provided at the end for the previously proposed optional tasks.

In addition, Task 1 Project Management level of effort was reduced to reflect only the meetings identified in the RFP and the required attendees. Note that Task 1 of our original proposed fee and our revised proposed fee included additional scope to perform up to three site visits ($10,812). These site visits were not identified in the RFP, but HDR anticipates they will be needed during the preliminary design and design phase.

Response to Questions

The following responses are offered to the questions posed by email on December 23, 2020 and updated based on subsequent clarification discussion on January 21, 2021 and email on January 26, 2021. We are available to discuss these questions further. The questions are reproduced below for reference and our responses are shown in blue text.

Question 1: How will the backwash tank be rehabilitated? Will temporary pumps be needed for a period of time to address the lower portions of the tank? If not, what is your approach for rehabilitating the backwash supply tank without temporary pumping while still providing system redundancy?

> Rehabilitation of the Backwash Supply Tank will require isolation and dewatering of the tank to allow concrete and coating repair. During this time, temporary pumping will be required to supply the filters with backwash supply water. We have identified two options for temporary

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(714) 730-2300

pumping that are summarized below. Please refer to the attached Figure 1.1 for illustrations of these options.

Option 1: Convert east half of Spent Backwash Tank to serve as the temporary Backwash Supply Tank. Temporary backwash supply pumps can be installed in the tank and connected to plant controls with a header branching to the existing above-ground pump discharge lines connecting to the existing below-ground portion of the backwash supply header. The temporary backwash supply tank can be supplied using one of the Chlorine Contact Chamber (CCC) drain pumps and installing a simple float actuated control scheme to keep the tank above a minimum level.

Note that we investigated the use of the existing submersible spent backwash bypass pumps, but these pumps do not have adequate capacity to supply the filter backwash demands.

Option 2: Use the CCC as a direct source for backwash supply water by installing temporary backwash supply pumps at the end of the third pass. The temporary backwash supply pumps can be connected to plant controls with a header branching to the existing above-ground pump discharge lines connecting to the existing below-ground portion of the backwash supply header.

Question 2: Excavations for ECDAs should be completed by HDR rather than the District.

Based on January 26, 2021 email from IRWD, Task 2B Underground Pipeline Condition Assessment was removed from the scope of work. As such, the meeting to report on the findings from this work was also removed under Task 1B Meetings.

Question 3: The District would prefer to locate the new control panel at the tertiary filters area. What would be HDR's thoughts of extending the platform at the existing control panel location to locate a new control panel adjacent to the existing panel thereby eliminating the need for a temporary panel?

Extending the platform would provide closer proximity of the controls to the operation of the filter cells in addition to not requiring temporary panel. To place the control panel in the tertiary filter area would require some structural modifications to the concrete platform as noted in your question but could be accomplished and would eliminate the need for a temporary panel for control of the filters during construction.

These structural modifications would require additional effort to develop one additional design drawing to show the plan, section, and details for these modifications. There would be no additional effort for either the electrical or controls disciplines to accomplish to revision to the proposal.

Question 4: Did HDR consider using a local control panel (LCP) for each tertiary filter? The LCP panel for each filter could be connected to a permanent (preferred) or temporary PLC as each filter is rehabilitated greatly reducing the number of connections or reconnections.

Based on January 21, 2021 virtual meeting, IRWD staff clarified the intent of the filter LCPs is to function as an remote I/O based on the ASCO Numatic controller at each filter, connected and controlled by the main control panel via Modbus TCP/IP. Based on the meeting, HDR understands that the IRWD preference is to have two (2) LCP panels for each filter to simplify installation and routing of lines, and maintenance of the Filters. Attached is the updated Drawings List to provide these drawings, which are highlighted.

Question 5: Please provide fee estimates for all of the optional tasks.

A. Study for New Backwash Supply Connection to CCC

Modifications to address operational issues with withdrawing water at the end of the first pass of the Chlorine Contact Chamber to fill the Backwash Supply Tank require evaluation of multiple alternatives. We propose to provide a brief study to develop and evaluate alternatives and arrive at cost impacts and benefits/considerations for each alternative. The study will be performed concurrent to the investigatory phase of the work and prior to completion of the preliminary design. Recommendations can then be incorporated into the final design effort and impacts to design will be better defined so that a variance to the contract can be issued.

B. Surface Evaluations (Emag and Cell-to-Cell)

Based on January 26, 2021 email from IRWD, Task 2B Underground Pipeline Condition Assessment was removed from the scope of work.

C. Filter Test Plan

As part of the Filter 7 investigation, HDR will develop a Filter Test Plan and perform the water quality sampling and testing. HDR will rent three automatic composite samplers that will be located at:

1. The influent to the filter complex
2. Influent to Filter 7
3. Effluent from Filter 7

We plan to collect composite samples at these locations for seven consecutive days and they will be tested for the following parameters:

- TSS

- TOC
- FOG
- pH
- Alkalinity
- Iron & Manganese
- Turbidity

Testing of the samples will be contracted with Eurofins and results will be summarized in the Investigation of Poor Performance of Filter No. 7 TM.

Based on the results of the proposed water quality testing, HDR may suggest additional work that may be required to determine the cause of performance issues at Filter 7. This may include additional water quality sampling and testing or investigations into operational procedures. The extent and nature of this effort won't be known until HDR is able to further evaluate the water quality and operational data.

D. Pothole soils testing

Based on January 26, 2021 email from IRWD, Task 2B Underground Pipeline Condition Assessment was removed from the scope of work.

Question 6: What are the limitations to the proposed Emag study to determine the optimal locations for excavations (i.e. does it work with the pipe materials and depths and existing access points that we have along these pipelines)? Also, please verify that the required effort to perform this task is included in your optional task fee.

The Emag will identify soil resistivity along the entire length of pipe over which the study is performed at simultaneous depths of 1, 2, and 3 meters or 2, 4, and 6 meters depending on the configuration. This provides a strong indication of soil corrosivity towards ferrous metal piping and should be used to help determine where soil samples are collected for further testing. Important additional criteria involved in selection of sample locations are accessibility, pipe depth, etc.

Question 7: On page 10 of the proposal, why would Option A for the overflow piping require temporary bypass of the backwash supply surge tower overflow? The locations of the new and existing penetrations in the tank appear to be far apart.

Option A on Page 10 of our proposal requires a new penetration into the Spent Backwash Tank, which would require confined space entry into the tank. During this time all sources of flow need to be isolated. While all other sources have a positive isolation device (valve or gate), the overflow from the constant head tower does not. As such, a temporary bypass redirecting the flow to the backwash supply tank will be required. This can be accomplished with a bypass plug and a goose neck pipe to get over the tank wall. See attached Figure 7.1 for a

representation of the bypass configuration. The tower would provide enough head to get over the gooseneck if an overflow occurs.

Question 8: Does the scope of work and fee proposal include the effort to include all existing I/O on the drawings for the project areas?

Based on January 21, 2021 virtual meeting, HDR understands that the I/O will be handled via an I/O list in the specifications and individual I/O drawings are not required. The I/O list is based on identifying all I/O impacted by the work. The updated fee estimate reduced the level of effort for drawings production to reflect the deletion of the I/O drawings.

Impacts to Fee Estimate

We have updated our fee based on the questions and attached an updated fee estimate. Below is a summary of the fee impacts by question.

Question	Fee Impact	Comments
1	None	
2	None	Removed from scope of work.
3	+ $ 6,283	Based on additional structural design effort.
4	+ $ 24,244	Based on additional electrical and instrumentation & controls design effort.
5A	+ $ 27,553	Study for New Backwash Supply Connection to CCC
5B	None	Removed from scope of work
5C	+ $ 22,852	Filter Test Plan
5D	None	Removed from scope of work
6	None	
7	None	
8	None	

In addition to the fee impacts noted in the table above, other changes to the level of effort were identified resulting from the January 21 meeting:

Task	Fee Impact	Comments
1	+ $ 1,783	Additional PM coordination and management for the additional work elements
1	- $ 10,309	Reduction to meetings requirements
1	- $ 1,722	Reduction in QA/QC effort
2	- $ 6,085	Deletion of I/O Drawings and reduction in effort for design
2	- $ 9,567	Deletion of Underground Pipeline Condition Assessment
3	- $ 13,851	Deletion of I/O Drawings and reduction in effort for design

An updated level of effort table and fee estimate is included as an attachment, which highlights the hours and costs that changed from our originally submitted proposal. A modest increase to Task 1 Project Management was still included to capture the oversight needed for project management, coordination, quality assurance, and administration for these potential scope items.

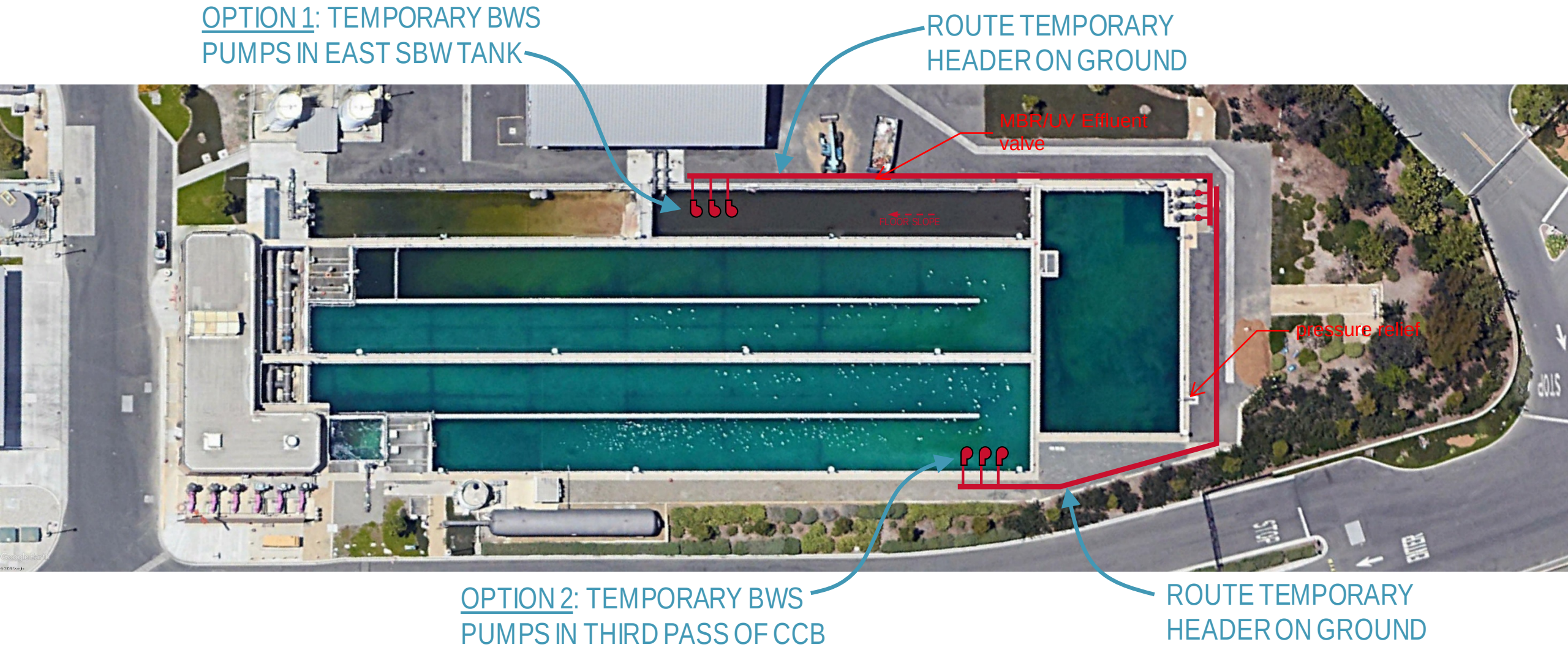
We appreciate the opportunity to provide additional information regarding our proposed approach and look forward to hearing from you. If you have any other questions please contact Amy Omae at 714.730.2344 or amy.omae@hdrinc.com.

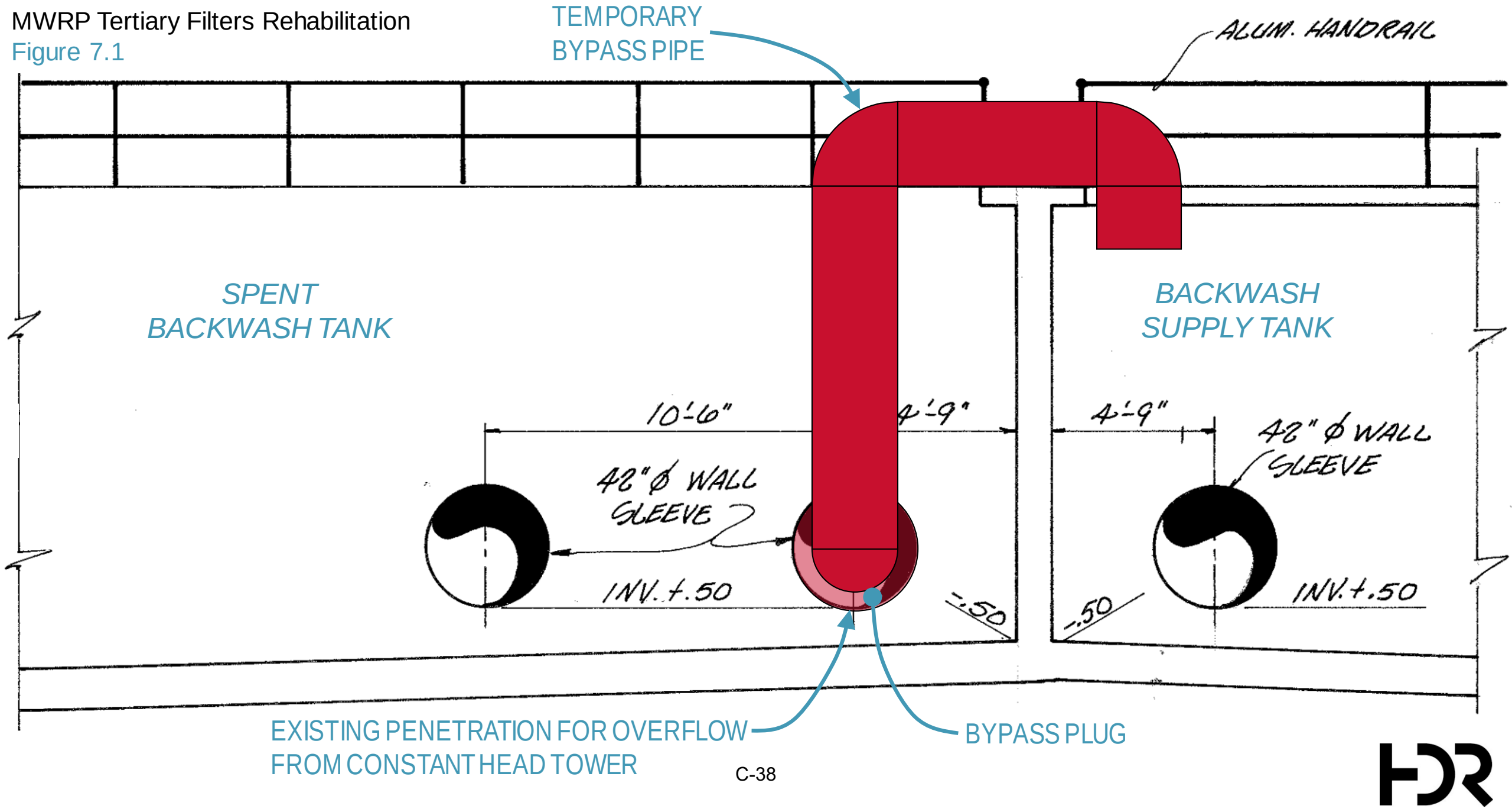
Sincerely,
HDR Engineering, Inc.

Kip Field, PE
Senior Vice President

Amy Omae, PE, LEED AP
Project Manager, Point of Contact

Figure 1.1


OPTION 1: TEMPORARY BWS PUMPS IN EAST SBW TANK
ROUTE TEMPORARY HEADER ON GROUND
MBR/UV Effluent valve
FLOOR SLOPE
pressure relief
OPTION 2: TEMPORARY BWS PUMPS IN THIRD PASS OF CCB
ROUTE TEMPORARY HEADER ON GROUND


TEMPORARY
BYPASS PIPE
ALUM. HANDRAIL
SPENT
BACKWASH TANK
BACKWASH
SUPPLY TANK
10'-6"
4'-9"
4'-9"
42" Ø WALL
SLEEVE
42" Ø WALL
SLEEVE
INV.+.50
INV.+.50
-.50
-.50
EXISTING PENETRATION FOR OVERFLOW
FROM CONSTANT HEAD TOWER
BYPASS PLUG

Irvine Ranch Water District
MWRP Tertiary Filters Rehabilitation Design
Drawings List

Updated 2/23/2021

Sheet Number	Discipline	Drawing Number	Included in PDR	Drawing Name
1	General	G001	X	Title Sheet
2	General	G002	X	Vicinity and Location Maps, Sheet Index
3	General	G003	X	General Symbols, Notes and Legends
4	General	G004	X	Construction Sequencing Plans
5	General	G005	X	Construction Sequencing Plans and Details
	~~General~~			~~Construction Sequencing Details~~
6	Demolition	X001	X	Demolition Site Plan
7	Demolition	X002	X	Tertiary Filters - Demolition Plan
8	Demolition	X003		Tertiary Filters - Demolition Sections
9	Demolition	X004	X	Tertiary Filters - Demolition Details
	~~Demolition~~			~~Tertiary Filters - Demolition Photographs~~
10	Demolition	X005	X	Backwash Supply Pump Station - Demolition Plan
11	Demolition	X006		Backwash Supply Pump Station - Demolition Sections & Details
12	Demolition	X007	X	Air Scour Blowers - Demolition Plan
13	Demolition	X008		Air Scour Blowers - Demolition Sections & Details
	~~Civil~~			~~General Civil Notes~~
14	Civil	C001	X	Site Plan - Paving & Grading
15	Civil	C002	X	Site Plan - Yard Piping
16	Civil	C003		Details, Enlarged Plans, and Sections
	~~Civil~~			~~Details, Sections~~
17	Structural	S001	X	Structural Notes
	~~Structural~~			~~Special Inspections, Structural Observations & Abbrevs~~
18	Structural	S002		Structural Details
19	Structural	S003	X	Tertiary Filters - Plan
20	Structural	S004		Tertiary Filters - Plans and Sections
21	Structural	S005	X	Tertiary Filters - Sections
22	Structural	S006		Tertiary Filters - Sections & Details
23	Structural	S007	X	Air Scour Blowers - Plan
24	Structural	S008		Air Scour Blowers - Sections & Details
25	Structural	S009	X	Backwash Pumps - Plan
26	Structural	S010		Backwash Pumps - Sections & Details
	~~Process~~			~~Process General Notes~~
27	Process	D001	X	Process Mechanical Details
28	Process	D002	X	Tertiary Filters - Plan
29	Process	D003		Tertiary Filters - Enlarged Plans
30	Process	D004	X	Tertiary Filters - Sections
31	Process	D005		Tertiary Filters - Sections & Details
	~~Process~~			~~Tertiary Filter - Details~~
32	Process	D006	X	Air Scour Blowers - Plan
33	Process	D007		Air Scour Blowers - Sections & Details
	~~Process~~			~~Air Scour Blowers - Details~~
34	Process	D008	X	Backwash Pumps - Plan
35	Process	D009		Backwash Pumps - Sections & Details
36	Electrical	E001	X	Electrical Legend and Symbols
37	Electrical	E002	X	Electrical Site Plan
38	Electrical	E003		Equipment Elevations
39	Electrical	E004	X	Electrical Details I
40	Electrical	E005		Electrical Details II
41	Electrical	E006		Ductbank Sections & Foldouts
	~~Electrical~~			~~Ductbank Foldouts~~
42	Electrical	E007	X	Electrical Single Line Diagram
43	Electrical	E008		Panel Schedules

Irvine Ranch Water District
MWRP Tertiary Filters Rehabilitation Design
Drawings List

Updated 2/23/2021

Sheet Number	Discipline	Drawing Number	Included in PDR	Drawing Name
44	Electrical	E009	X	Conduit Schedule I
45	Electrical	E010		Conduit Schedule II
46	Electrical	E011	X	Schematics I
47	Electrical	E012	X	Schematics II
48	Electrical	E013		Schematics III
49	Electrical	E014	X	Tertiary Filters Power Plan
50	Electrical	E015		Tertiary Filters Control and Signal Plan
51	Electrical	E016		Tertiary Filters Lighting and Grounding Plan
52	Electrical	E017	X	Backwash Supply Pump Station Power Plan
	~~Electrical~~			~~Backwash Supply Pump Station Enlarged Plan~~
53	Electrical	E018		Backwash Supply Pump Station Control and Signal Plan
54	Electrical	E019		Backwash Supply Pump Station Lighting and Grounding Plan
55	Electrical	E020	X	Air Scour Blowers Power, Control, and Signal Plan
56	Electrical	E021		Air Scour Blowers Lighting and Grounding Plan
57	Instr & Control	Y001	X	Instrumentation Notes, Legend, Symbols
58	Instr & Control	Y002		Instrumentation Details
59	Instr & Control	Y003	X	SCADA Network Architecture
60	Instr & Control	Y004	X	Filter “Front” LCP Valve Rack I/O and Valve Manifold Wiring
61	Instr & Control	Y005	X	Filter “Back” LCP Valve Rack I/O and Valve Manifold Wiring
62	Instr & Control	Y006	X	Backwash Pump PLC Panel Layout
63	Instr & Control	Y007		Backwash Pump PLC Bill of Material
64	Instr & Control	Y008		Backwash Pump PLC Backpanel
65	Instr & Control	Y009		Standard Control Panel Rack Bill of Material
66	Instr & Control	Y010	X	Standard Control Panel Cabinet Layout
67	Instr & Control	Y011		Control Panel Elevation
68	Instr & Control	Y012	X	Control Panel Backpanel - Main PLC
69	Instr & Control	Y013	X	Tertiary Filters P&ID
70	Instr & Control	Y014	X	Air Scour Blowers P&ID
71	Instr & Control	Y015	X	Backwash Pumps P&ID

Irvine Ranch Water District
MWRP Tertiary Filters Rehabilitation Design
Estimated Level of Effort and Fee

Revised 2/23/2021

NO.	TASK DESCRIPTION	LEVEL OF EFFORT (HOURS)																		FEE (DOLLARS)				
		Principal	Project Manager	Quality Manager	Quality Reviewer	Technical Expert	Cost Estimator	Sr Corrosion Engineer	Senior Engineer	Project Engineer	Staff Engineer	Corrosion Engineer	Corrosion Technician	BIM Manager	BIM Technician	Document Specialist	Accountant	Project Coordinator	Total Labor	Labor	Subs	Direct Costs	Total	TOTAL
1	**Project Management**																							
1.A	Preparation of Project Status Reports																							
1.A.1	Project Adminstration (including Initiation and Reviews)	2	16	2														25	45	7,540	0	189	7,729	
1.A.2	Project Coordination		30						18									16	64	13,120	0	328	13,448	
1.A.3	Weekly and Monthly Reports		48														24		72	15,120	0	378	15,498	
1.B	Meetings/Workshops																							
1.B.1	Kickoff Meeting and Site Visit		4			2			6										12	3,000	0	324	3,324	
1.B.2	Coordination Meeting #1		4			2			4										10	2,520	0	474	2,994	
1.B.3	Coordination Meeting #2		4			2			4										10	2,520	0	474	2,994	
1.B.4	Workshop Draft TM - Filter Performance Evaluation		3			2			2										7	1,800	0	24	1,824	
1.B.5	Not Used																		0	0	0	0	0	
1.B.6	Workshop Draft PDR		4			2			4										10	2,520	0	24	2,544	
1.B.7	Workshop Final PDR		2			1			1										4	1,020	0	24	1,044	
1.B.8	Workshop 60% Design Submittal		4			2			2										8	2,040	0	24	2,064	
1.B.9	Workshop 90% Design Submittal		4						2										6	1,440	0	24	1,464	
1.B.10	Workshop 100% Design Submittal		3						1										4	960	0	24	984	
1.B.11	Meeting - Final design Plan Signing		2								1								3	600	0	16	616	
1.B.12	Site Visits		12						12	12	8								44	8,520	0	972	9,492	
1.C	QA/QC			4	116														120	33,680	0	842	34,522	
	Subtotal 1 | Project Management	**2**	**140**	**6**	**116**	**13**	**0**	**0**	**56**	**12**	**9**	**0**	**0**	**0**	**0**	**0**	**24**	**41**	**419**	**96,400**	**0**	**4,141**	**100,541**	**100,500**
2	**Preliminary Design**																							
2.A	Tertiary Treatment Faciltity																							
2.A.1	Tertiary Filters Tank Area					10			8	8	16								42	8,040	0	201	8,241	
2.A.2	Air Scour Blower Area								4		4								8	1,440	0	36	1,476	
2.A.3	Backwash Supply Pumps Area								2		2								4	720	0	18	738	
2.B	Not Used																		0	0	0	0	0	
2.C	Performance Investigation of Filter 7																							
2.C.1	Investigation					6			12										18	4,680	0	152	4,832	
2.C.2	Meeting					2			4										6	1,560	0	92	1,652	
2.C.3	Draft and Final TM		2			2			24										28	6,840	0	171	7,011	
2.D	Extension of Overflow Pipe Conceptual layout					2			8	16					16				42	6,920	0	173	7,093	
2.E	Electrical								28	28									56	10,920	0	273	11,193	
2.F	Instrumentation & Control								46	74									120	22,140	0	554	22,694	
2.G	Construction Sequence		2			20			20	28									70	15,480	0	387	15,867	
2.H	Site Survey									2	2								4	540	11,250	14	11,804	
2.I	Potholing									4	1								5	720	10,290	18	11,028	
2.J	Geotechnical Investigation								8	2									10	2,220	0	56	2,276	
2.M	Project Schedule		2						14	16									32	6,240	0	156	6,396	
2.N	Estimates of Probable Construction Costs						16		6		24								46	8,720	0	218	8,938	
2.O	Team Meetings (Covered under Task 1B)																		0	0	0	0	0	
2.P	Technical Specifications		2						6	8									16	3,120	0	78	3,198	
2.Q	Construction Plans		10						60	124	168			80	200				642	95,360	0	91	95,451	
2.R	Preliminary Design Report		4						10	32	32					24			102	15,600	0	396	15,996	
	Subtotal 2 | Preliminary Design	**0**	**22**	**0**	**0**	**42**	**16**	**0**	**260**	**342**	**249**	**0**	**0**	**80**	**216**	**24**	**0**	**0**	**1,251**	**211,260**	**21,540**	**3,084**	**235,884**	**235,900**
3	**Final Design**																							
3.A	Project Manual		4						20	40	40								104	16,560	0	414	16,974	
3.B	Construction Plans																							
3.B.1	60% Design		8						96	160	240			120	360				984	144,960	0	457	145,417	
3.B.2	90% Design		8					3	72	120	170	0		120	240				733	110,535	0	787	111,322	
3.B.3	100% Design		8					3	20	60	80	0		42	124				337	49,325	0	2,366	51,691	
3.C	Electrical & Instrumentation								16	8	8								32	6,000	0	150	6,150	
3.D	Project Schedule		4						8		8								20	3,840	0	96	3,936	
3.E	Opinion of Probable Construction Cost		1				28				16								45	9,860	0	247	10,107	
3.G	Addenda Preparation and Pre-bid meeting																							
3.G.1	Plan Revisions		4							8	4			8					24	4,120	0	103	4,223	
3.G.2	Specification Revisions		2							4	20								26	3,480	0	87	3,567	
3.G.3	Bidder Questions		4						16		4								24	5,280	0	132	5,412	
3.G.4	Pre-Bid Meeting		2																2	480	0	12	492	
	Subtotal 3 | Final Design	**0**	**45**	**0**	**0**	**0**	**28**	**6**	**248**	**400**	**590**	**0**	**0**	**290**	**724**	**0**	**0**	**0**	**2,331**	**354,440**	**0**	**4,851**	**359,291**	**359,300**
TOTAL, hours		**2**	**207**	**6**	**116**	**55**	**44**	**6**	**564**	**754**	**848**	**0**	**0**	**370**	**940**	**24**	**24**	**41**	**4,001**					
TOTAL, dollars																				**662,100**	**21,540**	**12,076**	**695,716**	**695,700**
Optional Tasks																								
2	**Preliminary Design**																							
2.K	Optional Geotechnical Investigation		2																2	480	5,756	12	6,248	
2.L	Optional Permiting Assistance					40													40	12,000	0	300	12,300	
	Subtotal 2 | Preliminary Design	**0**	**2**	**0**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**42**	**12,480**	**5,756**	**312**	**18,548**	**18,500**
4	**Additional Optional Tasks**																							
4.A	Study for New BWS Connection from CCC (Question 5A)																							
4.A.1	Alternatives Development					16	8			8	20				12				64	12,100	0	303	12,403	
4.A.2	Workshop		2			4					4								10	2,160	0	54	2,214	
4.A.3	Draft and Final TM		2		4	12				12	32				4	6			72	12,240	0	306	12,546	
4.B	Not Used																		0	0	0	0	0	
4.C	Filter Test Plan (Question 5C)		6			8			24		56								94	16,320	5,193	1,099	22,612	
4.D	Not Used																		0	0	0	0	0	
	Subtotal 4 | Additional Optional Tasks	**0**	**10**	**0**	**4**	**40**	**8**	**0**	**24**	**20**	**112**	**0**	**0**	**0**	**16**	**6**	**0**	**0**	**240**	**42,820**	**5,193**	**1,762**	**49,775**	**49,800**
TOTAL for Optional Tasks, hours		**0**	**12**	**0**	**4**	**80**	**8**	**0**	**24**	**20**	**112**	**0**	**0**	**0**	**16**	**6**	**0**	**0**	**282**					
TOTAL for Optional Tasks, dollars																				**55,300**	**10,949**	**2,074**	**68,323**	**68,300**
TOTAL for all Tasks (including Optional Tasks), hours		**2**	**219**	**6**	**120**	**135**	**52**	**6**	**588**	**774**	**960**	**0**	**0**	**370**	**956**	**30**	**24**	**41**	**4,283**					
TOTAL for all Tasks (including Optional Tasks), dollars																				**717,400**	**32,489**	**14,150**	**764,039**	**764,000**

TOTAL $735,163

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March 16, 2021
Prepared by: A. Murphy / M. Cortez
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

TURTLE ROCK ZONE 3 RESERVOIR CHLORAMINE BOOSTER STATION
BUDGET ADDITION AND CONSULTANT SELECTION

SUMMARY:

The Turtle Rock Zone 3 Reservoir Chloramine Booster Station project will construct a chlorine and ammonia (chloramine) dosing facility and a reservoir mixing system to improve water quality and prevent nitrification in the reservoir. Staff recommends the Board:

- Authorize the addition of Project 11840, Turtle Rock Zone 3 Reservoir Chloramine Booster Station, to the FY 2020-21 Capital Budget in the amount of $1,705,000, and
- Authorize the General Manager to execute a Professional Services Agreement with Lee & Ro, Inc. in the amount of $375,477 for engineering design services for the Turtle Rock Zone 3 Reservoir Chloramine Booster Station.

BACKGROUND:

This project will install a chloramine booster station at the Turtle Rock Zone 3 Reservoir and Zone 3 to 4 Pump Station site to improve water quality and reduce nitrification events by maintaining proper chlorine residual and mixing in the reservoir. Construction of these improvements will replace the existing in-pipe chloramine injection facility at the Turtle Rock Zone 1 to 3 Pump Station that has experienced multiple operational issues due to chemical precipitation in the injection line. The scope of design for this project includes a new chloramine booster station building with chemical storage and dosing facilities, a new reservoir mixing system and new access from the chemical building to the top of the buried reservoir. A major challenge for the design will be siting the new chemical building entirely within IRWD property, adjacent to the Turtle Rock Zone 3 to 4 Pump Station, while providing room for chemical deliveries and maintenance access.

Based on concerns of residents living adjacent to the reservoir site regarding pedestrian use of the reservoir access road at night, the design scope also includes an optional task for a new security fence across the access road to prevent trespassers from using it to access the City of Irvine's open space beyond the existing Turtle Rock Homeowners Association (HOA) fence.

A location map of Turtle Rock Zone 3 Reservoir is shown in Exhibit "A".

Consultant Selection:

Staff issued a request for proposal for the preliminary and final design to seven consultants and three responded with proposals: Dudek, Lee & Ro and Tetra Tech. While each consultant showed a good understanding of the scope of work and Lee & Ro and Dudek expounded their ideas on project approach, staff determined that Lee & Ro demonstrated a greater amount of

thought and dedication by providing several alternative building location renderings in its proposal for our consideration. Staff also found that the preliminary siting studies reflect Lee & Ro's superior understanding of the site constraints, and the scope of work and effort required for this project. Fees proposed by Lee & Ro ($375,477) and Tetra Tech ($380,000) were nearly equal and Dudek ($483,085) was approximately $100,000 more. Based on these considerations, along with Lee & Ro's project team and its previous experience on District projects, staff recommends the selection of Lee & Ro. The consultant evaluation matrix is provided as Exhibit "B", and Lee & Ro's proposal is provided as Exhibit "C".

FISCAL IMPACTS:

Project 11840 is currently not included in the FY 2020-21 Capital Budget. The budget shown below is required to fund the design and construction phases for the project.

Project No.	Current Budget	Budget Addition	Total Budget
11840	$0	$1,705,000	$1,705,000

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA). In conformance with the California Code of Regulations Title 14, Chapter 3, Section 15004, the appropriate environmental document will be prepared when "meaningful information" becomes available.

RECOMMENDATION:

That the Board authorize the addition of Project 11840, Turtle Rock Zone 3 Reservoir Chloramine Booster Station, to the FY 2020-21 Capital Budget in the amount of $1,705,000 and authorize the General Manager to execute a Professional Services Agreement with Lee & Ro, Inc. in the amount of $375,477 for engineering design services for the Turtle Rock Zone 3 Reservoir Chloramine Booster Station, Project 11840.

LIST OF EXHIBITS:

Exhibit "A" – Location Map
Exhibit "B" – Consultant Selection Evaluation Matrix
Exhibit "C" – Lee & Ro's Proposal

EXHIBIT "A"

TURTLE ROCK ZONE 3 RESERVOIR AND PUMP STATION LOCATION MAP

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Exhibit "B" Turtle Rock Zone 3 Reservoir Chloramine Booster Station Consultant Selection Matrix

	Weights	Dudek	Lee & Ro	Tetra Tech
TECHNICAL APPROACH	60%			
*Project Approach	50%	2	1	3
*Scope of Work	50%	1	2	3
Weighted Score (Technical Approach)		1.50	1.50	3.00
EXPERIENCE	40%			
*Firm/Team	60%	3	2	1
*Project Manager	40%	3	1	2
Weighted Score (Experience)		3.00	1.60	1.40
Principal-in-Charge/Technical advisior		Bob Ohlund	Eric Lovering	Tom Epperson
Project Manager		Michael Metts	Kevin Saleh	Neha Gajjar
Project Engineer		Amanda Combs & Brandon Lacap	Jay Jung	Matt Vera
QA/QC		Bob Ohlund	Richard Davis	Steve Ellis
Process Mechanical/ Mechanical		Greg Guillen	Sam Lee	
Civil		Charles Greely	Adam Betsworth	
Electrical		*subconsultant*	Mike Assadourian	Mazen Kassar/Nicole Han
I&C		*subconsultant*	Mike Assadourian	Astrid Fleischer
Structural		Galit Ryan	Alice Maupin	Victor Ramirez/Eric Yuen
Architect		*subconsultant*		
<u>Subconsultants:</u>				
Surveying		Guida Surveying	OnPoint Landsurveying	
Potholing		TC Mueller	Bess Testlab	
Geotechnical (optional)		Converse Consultants	Asociated Soils Engineering	
Reservoir Mixing CFD Modeling		Flow Science	Resolved Analytics	
Electrical		Mores Pham Associates		
Architect		MBN Group		
COMBINED WEIGHTED SCORE		2.10	**1.54**	2.36
		Hours	Hours	Hours
Task 1 Project Management		149	134	170
Task 2 Preliminary Design Report		543	784	428
Task 3 Final Design		1,451	1,051	1,342
TOTAL DESIGN HOURS		1,994	1,835	1,770
Optional Task Hours		319	164	39
TOTAL HOURS		2,313	1,999	1,809
Sheet Count				
Number of Construction Drawings		55	50	50
PDR Meetings		4	5	4
Review Meetings		4	4	4
Total Meetigs		8	9	8
FEE				
Task 1 Project Management		$38,304	$32,682	$42,400
Task 2 Preliminary Design		$118,626	$136,994	$80,630
Task 3 Final Design		$268,924	$170,521	$193,540
Optional Tasks Included in Total Fee				
CFD Analysis of Outer Ring		$29,683	$13,596	$32,890
Geotechnical Investigation		$14,985	$9,646	$16,310
SCE Permiting Assistance		$3,767	$4,724	$3,970
Reservoir Access Road/ Security Fence		$8,795	$7,314	$10,260
TOTAL FEE		**$483,084**	**$375,477**	**$380,000**
Average $/hour		$209	$188	$210
Professional Liability Insurance General Liability Insurance		YES YES	YES YES	YES YES
FORCED RANKINGS:		**2**	**1**	**3**
1-First				
2-Second				
3-Third				

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EXHIBIT "C"

Proposal for

Irvine Ranch
WATER DISTRICT

ENGINEERING DESIGN SERVICES FOR THE TURTLE ROCK CHLORAMINE BOOSTER STATIONS

FEBRUARY 12, 2021

LEE+RO
WATER INFRASTRUCTURE ENGINEERS
1199 SOUTH FULLERTON ROAD
CITY OF INDUSTRY, CA 91748
(626) 912-3391

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APPENDICES

A. SCOPE

Project Understanding, Approach, and Scope of Work

LEE + RO's approach to each Project is tailored to the established goals, objectives, schedules, and budgets identified by our clients. Our work plans are detailed and specific to each Project's requirements. However, core values and principles are employed and integrated into each Project undertaken. Project development begins at the Request for Proposal (RFP) stage and culminates in creating final reports or design documents. We have reviewed the RFP and visited the project site to assess the work's technical requirements and the delivery schedule. We will deliver the work within the time constraints established by the District. We have the ability to make these commitments and assurances because of our experienced and diverse staff, and our corporate organization allows us to respond to requests and organize resources as needed. Each phase is essential to overall project success.

Project Understanding

Irvine Ranch Water District (District) currently owns and operates the dual tank below-grade reinforced concrete circular tanks with a total capacity of 5.0 Million Gallon (MG) capacity Turtle Rock Zone 3 (TR Z3) Domestic Water Reservoir and Zone 3 to Zone 4 booster pump station located at 13 ½ Minaret in the City of Irvine. The water in the reservoir is currently disinfected with chloramines injected in zone 1 to zone three booster station. IRWD has experienced degraded water quality at the TR Z3 Res due to nitrification caused by chlorine residual loss, excess free ammonia, and low water supply turnover. IRWD doses chlorine and ammonia at the Turtle Rock Zone 1 to Zone 3 Pump Station to reduce nitrification in the system. Still, this process is susceptible to chemical precipitation in the pipe where the chemical is injected and has required multiple injection pipe replacements. This Project will design a chloramine booster station at TR Z3 Reservoir to address and avoid the nitrification and in-pipe chemical precipitation issues. This facility will be similar to the other chloramine booster stations in service at multiple reservoirs throughout IRWD's potable system.

The Project aims to improve the water quality in Turtle Rock Zone 3 and Zone 4 by constructing a chloramine booster station at Turtle Rock Zone 3 Reservoir and upgrading the mixing inside the reservoir.

Engineering services include:

- Design improvements including the chloramine booster station building with chemical storage for chlorine and ammonia, chemical metering pumps, chlorine analyzer equipment, reservoir mixing equipment, and related electrical, instrumentation, and control equipment.
- Evaluate the station's alternative locations, including the three (3) potential locations shown on RFP's Exhibit "H" and any other feasible alternative within IRWD's property.
- The station could meet chemical storage code requirements without falling under CALARP classifications and meet all emergency response access requirements.
- The station's location and design must allow for safe and efficient delivery of chemicals via the existing Turtle Rock Zone 4 Pump Station (TR Z4 PS) driveway.
- The station's location should allow for operation and maintenance of the existing pump station and pipelines during and after construction and provide operation and maintenance access for the new chloramine booster station facility.
- Evaluate and recommend improvements to provide adequate mixing of the existing reservoir, including but not limited to recommendations for mixer type and locations, best possible maintenance access through the roof opening.
- Develop a chemical dosing control strategy based on chlorine residual. Evaluation of the existing chlorine analyzers located on top of the reservoir and recommendation of improvements including but not limited to installing new analyzer equipment inside the chloramine booster building and adding new sample pumps or utilizing the mixing pumps to supply sample to the analyzers. Evaluate the performance and reliability benefits and costs associated with relocating the analyzer equipment inside the building versus the current locations.
- Evaluate the existing power supply at the TR Z4 PS and the power supply for the current mixers and analyzers and identify the necessary electrical improvements to power the new chloramine booster station mixers and analyzers.
- Design the instrumentation and control system for the new chloramine booster station, including a new PLC with HMI, chemical tank levels, leak detection for the chemical containment and chemical delivery system, chemical dosing control based on chlorine residual, and feedback from the reservoir mixers. The system will connect to SCADA via a hard-wired connection back to the existing PLC and radio communications system in the TR Z4 PS.
- The design will include the addition of sewer service to the new chemical containment drainage system to facilitate drainage for a routine cleaning or in the case of a chemical spill. The drain should include a drain valve, which generally is closed to prevent a chemical spill from entering the sewer before neutralization and cleanup.
- The design will include providing access to the reservoir from the chloramine building, including stairs and a concrete walkway along the pump station's backside to allow staff access to the top of the existing pump station building and the reservoir.
- Removal of the existing BBQ and other debris on top of the reservoir and repainting the exterior of the natural gas tank in the pump station driveway.
- Optional task – design of a steel or chain-link fence along the access path to the reservoir and demolition and widen the access road to the reservoir to provide better construction work and ongoing maintenance.

Technical Approach

The LEE + RO team has extensive knowledge and experience designing chemical booster stations and reservoir mixing, critically has reviewed available documents, and has formulated our preliminary analysis. We have identified the following design considerations and key points for this Project.

Design Considerations and Key Points

Underground Utilities

The exact location of all underground piping, vaults, electrical/control duct banks located within pump station property shall be identified and shown on plans before finalizing the chemical booster station location to avoid/minimize utility relocations. Suppose any relocation of piping, electrical/control duct banks, and pull boxes are deemed necessary; in that case, we will identify them at the early design stages, which will help plan construction sequencing accurately. After creating the site base map and showing the location of underground utilities, according to available record drawings, we will identify the potholing locations for utilities that may interfere with the chemical booster station's construction. Any upfront information gathering will ease construction and avoid impacting the schedule or budget with unnecessary change orders or stand-by time.

IRWD Standards

LEE + RO has a broad knowledge of IRWD and industry standards and federal, State, and local government requirements and will implement these requirements and recommendations into this Project's design. These agencies include but are not limited to the Environmental Protection Agency (EPA), California Department of Public Health (CDPH), and Orange County Fire Authority (OCFA).

Project Management

LEE + RO's project manager will conduct project management activities to ensure adherence to scope, schedule, and budget; promote efficient communication between us, IRWD, and others as required; and implement an effective quality assurance/quality control (QA/QC) program. Our project manager will be the point of contact with the District and will have full technical and administrative responsibility for the Project. Our project manager's responsibility is to meet with the District regularly, ascertain the goals, incorporate them into the Project promptly, and communicate them to the project team members to develop a superior product within the budget and schedule. He will work with our QA/QC Manager to ascertain that the Project is reviewed before any milestone submittal and is of decent quality.

Preparation of a Management Plan is one of the first tasks that will be undertaken for the Project. The Management Plan will define project roles and responsibilities, communicate management philosophy, and establish project procedures and policies. Specifically, our plan includes:

- Project policies and procedures that will cover document control, lines of communications among the project team members and the District, sign-off procedures, report formats, and billing instructions.
- The project performance plan identifies specific work scopes on a task-by-task basis and assigns schedules and budgets to each task establishing the base for subsequent control.

Key elements of our project management are:

KEY ELEMENTS OF PROJECT MANAGEMENT

Project Identification	Work Program	Project Management	Technical Execution
Listen to the Client	Establish Work Plan and Schedule	Progress Reporting	Project Execution
Ascertain project Needs	Establish Work Breakdown Structure (WBS)	Comparison of Progress Reporting with WBS and Resources Loaded Schedule	Internal Quality Control
Identify Problem/Constraints	Resource Determination	Resolution of Discrepancies	
Review Schedule	Review and Adjustment in Plan and Schedule	Identification of Impact(s)	
Review Budget	Establish Project Milestones	Development of Mitigation (s)	
SiteReview		Continuous Coordination	
Data Review			
Determine Expectations			
Determine Approval Process			
Establish Scope of Technical Services			

QA/QC

We have developed and implemented a proven QA/QC measures to ensure ongoing and consistent quality control throughout all project phases. LEE + RO's QA/QC plan for this Project includes:

- Review of project deliverables and definition of procedures and required standards.
- Identification of elements of the Project review requiring special quality control attention or emphasis.
- Identification of technical experts required for and consultation.
- Estimate of resources required for quality control functions.
- Description of specific quality control procedures to be followed in particular activities, including the level and frequency of review required.

Construction Staging

The contractor staging area will be considered during the design and identified on the plans to ensure that the Operations will have access to the facility during the construction and avoid future conflicts and potential change orders due to access restraints.

Constructability Review

Contract documents will be developed, including construction plans, special provisions, and cost estimates. These documents will be reviewed for constructability by our construction management team to avoid potential construction issues.

Facility Operation

We understand that the facility shall remain operational during the construction, and preferably, even a short-term shutdown shall be avoided. LEE + RO will select the type of mixer to prevent any shutdown and keep the reservoir up and running during the construction of mixers and chemical injection points.

Potential Site Layouts

To provide an accurate count for the number of construction drawing sheets and provide a fair assessment of engineering consulting fees, LEE + RO presents four Alternative "big picture" site layout options. Our initial effort will also allow for faster development of the PDR. During the initial workshops with IRWD, we can choose which of the four options is preferred so we can provide various focused options of the preferred "big picture" alternative.

Possible Building Layout

We have developed an initial conceptual layout so the overall size of each of the various components could be examined to fit within site. During the PDR, we will create multiple building layouts and further refine as necessary. Besides, we can consider splitting the building up into two pieces if determined to benefit. Not all of the appurtenance is shown at this conceptual stage, such as ventilation, air condition, chemical pumps, etc. The final design of the entire site and the pump station will consider fire hardening methodologies as required.

FIGURE 1 - BOOSTER STATION LOCATION (OPTION A)

Booster Station Location – Option A	
Advantages	**Disadvantages**
Minimum Site Grading	Flow Meter Vault Vents need to be Relocated
Minimum Visibility from the street	Narrow Access Way between Existing Building and Proposed Building
No Need of Relocating Storm Water V-Ditch and Underground Drain and Overflow Piping	May Need to relocate Main Power Supply Conduits
Existing retaining Wall Remains in Place	
Easy Maintenance and Operation Access	
Easy Chemical Supply and tanks Fill	

- The figure is conceptual and will be updated in Preliminary Design Phase.

FIGURE 2 - BOOSTER STATION LOCATION (OPTION B)

Booster Station Location – Option B	
Advantages	**Disadvantages**
Minimum Site Grading	Flow Meter Vault Vents need to be Relocated
Minimum Visibility from the street	Perimeter Walls adjacent to Proposed Building Need to Be relocated
No Need of Relocating Storm Water V-Ditch and Underground Drain and Overflow Piping	Need to relocate Main Power Supply Conduits
Existing retaining Wall Remains in Place	Maintenance Trucks Accessibility

- The figure is conceptual and will be updated in Preliminary Design Phase.

FIGURE 3 - BOOSTER STATION LOCATION (OPTION C)

Booster Station Location – Option C	
Advantages	**Disadvantages**
No Need of Relocating Overflow and Drain Piping	Existing retaining Wall Shall be Modified
Minimum Visibility from the street	Maintenance Trucks Accessibility
Easy Chemical Supply and tanks Fill	Storm Water V-Ditch Shall be Re-designed and Relocated
Flow Meter Vault Vents Do Not need to be Relocated	Excavation Accessibility
	Grading; Plant removal

- The figure is conceptual and will be updated in Preliminary Design Phase.

FIGURE 4- BOOSTER STATION LOCATION (OPTION D)

Booster Station Location – Option D	
Advantages	**Disadvantages**
No Need of Relocating Overflow and Drain Piping	Existing retaining Wall Shall be Modified
Lower Construction Cost Than Option C	Visibility from the street
Easy Chemical Supply and tanks Fill	Storm Water V-Ditch Shall be Re-designed and Relocated
Flow Meter Vault Vents Do Not need to be Relocated	Excavation Accessibility
Maintenance Trucks Accessibility	Grading; Plant removal

Chemical Storage

Since the City of Irvine Building and Safety Department / Orange County Fire Authority will review structural plans, LEE + RO's design team will obtain a copy of the Building and Safety's Plan Correction Checklist at the beginning of the design to assist us in complying with the requirements and to expedite review.

The occupancy category of the chemical booster station building will be "Utility and Miscellaneous Group U" if maximum quantities of hazardous material stored on-site follow the amounts indicated in Table below:

TABLE 1:
CODE MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS FOR NON-HAZARDOUS INDOOR OCCUPANCY CATEGORIES

Chemical	CBC Classification	Applicable Code Table and Chapter	NFPA Hazard Rating	Allowable Quantity per Control Area per Code	Code Occupancy Classification if Limit Exceeded
Ammonium Hydroxide NH_4OH (Aqueous Ammonia) 19%	Toxic Corrosive Liquid	CBC 307.1(1) CBC 307.1(2) CBC 414.2.5(1) CFC 2703.1.1(1) CFC 2703.1 1(2)	Health 3 Fire 1 Reactivity 0 CORR	100 gallons	H-4
Ammonium Hydroxide NH_4OH (Aqueous Ammonia) 29%	Toxic Corrosive Liquid	CBC 307.1(1) CBC 307.1(2) CBC 414.2.5(1) CFC 2703.1.1(1) CFC 2703.1 1(2)	Health 3 Fire 1 Reactivity 0 CORR	100 gallons	H-4
Sodium Hypochlorite NaClO 12-15% (Bleach)	Corrosive Liquid	CBC 307.1(1) CFC 2703.1 1(2)	Health 3 Fire 0 Reactivity 1 CORR OX	500 gallons	H-4

CFC Section 2703.4 requires material safety data sheets (MSDS) to be available on-site for all materials shown above.

CFC Section 2704 requires hazardous materials signs and placarding be placed on all stationary containers and above-ground tanks and at entrances to locations where materials listed above are stored or dispensed.

We will propose the following safety measures for chemical storage building:

- Smoke Detector to detect fast flaming fires and dense smoke, which could be FAP-325-V2F Analog Photoelectric Smoke Detector or any other model, that will be discussed with the District during the preliminary design.

- Ammonia Gas Detector for an on-line monitoring system to detect chlorine or ammonia gas in ambient air, which could be Acutec 35 system by Evoqua or District's preference, will be discussed during the preliminary design.

- Scrubber tank to address discharging vapor from ammonia tank during operation and filling. It is essential to accommodate proper Actual Cubic Feet Per Minute for the system.

Scope of Services

The Project is relatively straightforward in its scope. We have reviewed the scope of services in Section II of the District's RFP and take no exceptions to the scope as prepared by the District. The scope of services below is essentially the District's scope with the following clarifications:

1. Site visits will be performed by key staff as necessary (minimum of two site visits). We will follow all District's health and safety protocols.

2. CFD modeling of the inner reservoir is added to the work scope to ensure proper mixing and document the inner segment's future mixing condition.

The detailed scope of work presented herein shall be used to establish the minimum requirements for the Project. We have reviewed the work scope and RFP's attached documents and provide a comprehensive work scope that reflects all the efforts needed to complete the Project.

IRWD has developed guidelines and standards for many aspects of the design and construction process. All work performed on this Project must conform to IRWD standards and requirements, including, but not limited to, the following:

1. IRWD Project Manual: IRWD has developed and periodically updates the IRWD Project Manual, which contains front-end documents related to bidding, agreements, general provisions, and special provisions. This manual shall be edited and incorporated into the Contract Documents for all construction contracts.

2. IRWD Construction Manual: IRWD has developed and periodically updates the IRWD Construction Manual, which contains General Technical Specifications and Standard Drawings to be used for the preparation of plans and project technical specifications. This manual shall be incorporated into the Contract Documents for all construction contracts.

Work shall generally consist of, but not be limited to, the following tasks.

Task 1 – Project Management

LEE + RO's project management is set up to deliver a technically outstanding project within schedule and budget. We will accomplish this by establishing a work breakdown structure and schedule at the inception of the Project. We will communicate with the District to ascertain that the Project's goals are clear, all constraints are identified and properly addressed as the Project is developed. Our project manager has implemented this approach on numerous successful projects and is well equipped to oversee the Project's completion. Key elements of our project management are:

A. Preparation of Project Status Reports: LEE + RO recognizes the District's need for comprehensive, up-to-date information and will Prepare weekly and monthly status reports.

Each weekly status report will be submitted on Monday and shall consist of a brief (one to two paragraphs) e-mail summarizing the activities completed the previous week, the activities planned for the upcoming week and critical decisions that need to be made.

Each monthly status report will be submitted along with the billing invoice for that month. It will provide more detail, summarize the work completed, and review work status relative to budget and schedule. The project schedule will also be updated every month for inclusion in the monthly status report. This report also includes discussing events occurring during the month that affect the estimate of completion, problems, issues, and actions being taken to mitigate the District's issues.

B. Meetings: Organize, attend, and conduct meetings as required. Prepare and submit meeting agendas for IRWD review and concurrence at least five days before the meeting. Prepare draft and final minutes for all meetings and workshops and submit them to IRWD within one week of the meeting. Due to the ongoing pandemic, all meetings will be virtual meetings unless they are field meetings conducted outside. For budgeting purposes, the following meetings are budgeted.

C. Quality Assurance/Quality Control: The quality of our work product is a corporate commitment at LEE + RO. Past performance with respect to the quality of our work and compliance with schedules is indicated by repeat business, low insurance rates, minimal scope or cost changes, and recognition by industry peers. Over 90 percent of our work is with repeat clients.

A key element in satisfactorily completing any project is implementing a quality assurance/quality control program implemented for all our projects.

The Project is regularly reviewed by the Project Manager, who monitors the Project's progress against established work breakdown structure and schedule. The Project Engineer reviews the entire project team's work weekly for technical accuracy, consistency, and coordination between the disciplines. The Project Manager makes decisions regarding the project issues in consultation with the project engineer and lead discipline engineers. Additionally, the Project is reviewed by the assigned QA/QC Manager before any submittal for conformance to established standards and constructability. Any technical difficulties, schedule slips, or previously unforeseen conditions are immediately recognized, quantified, and addressed through this process. The status is reported to the District in project status reports. As a result, an interactive, responsive, and proactive quality control system is utilized.

Table 2: Project Meetings Description

Meeting/Workshop	Description	LEE + RO's Attendees
Preliminary Design Kickoff and Site Visit	One (1) two-hour meeting on-site or virtual	Principal-in-Charge, Project Manager, Project Engineer, Electrical/Process Engineer, Structural Engineer
Chloramine Station Location Selection Meeting	One (1) two-hour meeting; Virtual Meeting	Project Manager
Present Draft PDR Submittal Meeting	One (1) two-hour meeting; Virtual Meeting	Project Manager, any team member as needed
Present Final PDR Submittal Meeting	One (1) two-hour meeting; Virtual Meeting	Project Manager
Present the 60% design and record IRWD's comments	One (1) two-hour meeting; Virtual Meeting	Project Manager
Present the 90% design, discuss IRWD's comments, and discuss how the comments were addressed	One (1) two-hour meeting; Virtual Meeting	Project Manager
Present the 100% design, discuss IRWD's comments, and discuss how the comments were addressed	One (1) two-hour meeting; Virtual Meeting	Project Manager
Final design plan signing	One (1) two-hour meeting; on IEWD Office	Staff(s) Authorized to Sign
Supplementary Site Visit	One (1) two-hour meeting on-site	Project's team member(s) who need to collect field information. The meeting will be coordinated with the District at an early stage of the design, if necessary.

We will provide evidence of quality control on the Project to the District with each submittal. These will consist of checked calculations, checked plans, specifications, estimates, and correspondence regarding the QA/QC program.

Task 2 - Preliminary Design

LEE + RO will perform the following subtasks as part of the preliminary design phase. The primary goal of this task is to establish facility design criteria. The subtasks will be documented and compiled into a Preliminary Design Report (PDR) as summarized below.

A. Chloramine Booster Station: Our team will document the preliminary design criteria for the construction of a new Chloramine Booster Station:

1. Chloramine Booster Station Building:

   a) Evaluate multiple locations on District Property and make a recommendation for the optimal location and building design considering the following criteria:

      i. Constructability and construction cost

      ii. Operation and maintenance access for new and existing facilities

      iii. Chemical storage and fire code criteria

      iv. Access for chemical deliveries through the existing pump station driveway

      v. Minimizing impact to the existing pump station and reservoir, including buried pipeline, which must maintain operations throughout the Project

      vi. Review of existing geotechnical reports and an optional geotechnical investigation;

      vii. Minimizing visual impact to the surrounding neighborhood

The evaluation will be summarized in a matrix format with weighted criteria of evaluation and score of each alternative for that criteria. We will prepare a conceptual layout for each potential building location.

2. Chemical storage system for 12.5% sodium hypochlorite and aqueous ammonia, including tank, ammonia chiller, tank level equipment, secondary containment, and leak detection. Our team will evaluate the use of 19% aqueous ammonia as an alternative to 29% (current concentration of aqueous ammonia used by IRWD) to minimize odor and vapor lock issues. We will determine the proposed switch's implications to 19%, including the differences in chemical delivery cost and incidence of delivery, differences in chemical dosing performance, and differences in equipment required (larger tank, chiller versus no chiller). The evaluation results will be summarized in a matrix format.

Based on this information, the District will decide which chemical concentration to use at this site.

3. Chemical delivery system, including specifying pumps and piping and secondary containment and leak detection.

4. Evaluation of the existing power supply at TR Z4 PS and recommendations for improvements to power the proposed chloramine booster station and mixer analyzer improvements.

5. Instrumentation and control system for chloramine booster station including control description for all chemical delivery, leak detection, chemical level, and reservoir mixing equipment systems and specifying I&C system equipment for the proposed improvements.

B. Reservoir Mixing System: Our Project team will evaluate the existing reservoir mixing system and make recommendations for improvements. These recommendations will include specifying new mixer equipment and locations to properly mix chemicals at the injection point and prevent dead zones in the reservoir while providing maintenance access to the equipment.

C. Optional CFD Analysis of Outer Ring: Our team will perform the CFD analysis of the inner and outer ring to verify the optimal size, type, and mixers' location to complete the reservoir and the chemicals injection point. We highly recommend performing CFD analysis for both inner and outer reservoirs as a mandatory task. It will help select the best mixing option using existing openings in the reservoir's roof and prevent shutdowns for the reservoir roof modifications.

a) Establishing the Range of Mixer Designs to be Tested

There are variety of commercially available mixer designs. We have gathered a significant amount of information useful in down-selecting the appropriate technology to be used at the Zone 3 Reservoir through that experience.

The most common type of mixer used in the water industry is the submersible impeller type. These mixers are inexpensive but have two significant drawbacks – limited mixing efficiency and limited accessibility for maintenance.

Another common type of mixer is the eductor or venturi-nozzle type mixer. This mixer requires fluid pumping but has a greater mixing efficiency and no submerged mechanical or electrical components. The eductor design takes advantage of the venturi effect to move more significant amounts of fluid than are directly impact, with a multiplication factor of around three typically. Eductor locations can be manipulated to excite the whole tank and move many more fluids if run continuously.

Lastly, new mixer designs have recently come onto the market to reduce maintenance and greater mixing efficiency. Two of these are the Blue Fusion and the Pax Lily Impeller. The Blue Fusion technology is a modified pipe stand that is custom designed for each potential application and provides energy-efficient mixing and aeration. The Pax technology is especially beneficial in cylindrical tanks where the cyclonic flow it induces can have a multiplicative effect when used continuously.

b) CFD Evaluations

Once an initial set of mixer designs and configurations is established for testing, our team will carry out the required simulations to evaluate each's performance. The designs and configurations will be further down-selected by comparing the relative performance of each. Those mixer designs and configurations showing the highest potential will be refined and further evaluated as needed to establish the design that provides the best balance of mixing efficiency, cost, and low maintenance requirements.

For each case modeled in each project phase, the models will predict velocity, fuel, air, temperature, pressure, and particulate profiles in the fluid space being analyzed. At the end of each phase of the Project, a PowerPoint-style report will be issued that summarizes the CFD model setup, geometry, flow cases, and results for each case, as well as any animations of the relevant cases.

D. Chlorine Analyzer System: Our team will evaluate the existing chlorine analyzer system and provide recommendations for improvements, including specifying replacement analyzer equipment as necessary to provide proper feedback for chemical dosing.

E. Site Survey: Our sub-consultant will survey the District's Turtle Rock property, including the reservoir, reservoir access road, and pump station, to create an overall topographic map including one-foot contours and spot elevations, specific dimensions and locations of existing utilities, and location of potholes, easements, and property lines so that right of way information and utility information may be incorporated into the topographic mapping and serve as the basis for the design of the Project.

F. Potholing Underground Utilities: Perform potholing to locate utilities or other physical features, including all IRWD utilities and potholes (10) utilities, to ensure none of the utilities will interfere with the construction of the building.

G. Geotechnical Investigation: The geotechnical report (G. A. Nicoll & Associates, 1980) in Exhibit "C" is a compaction (as-built) report, containing observation and density test results during grading/compaction of backfill soils for construction of Turtle Rock Booster Pump Station. The geotechnical investigation report dated 1978 was not part of the package provided by IRWD. We recommend performing a geotechnical investigation. Additionally, since building code and seismic design requirements have changed considerably over the past 42 years, the site geotechnical information needs to be verified/updated even if we will be provided with the 1978 report.

H. Optional Geotechnical Investigation: If necessary, conduct a geotechnical investigation and drill one soil boring to determine the geotechnical conditions. Provide soil analysis for use in the design.

The geotechnical report will include:

- Site plan
- Boring log
- Site conditions
- Geologic hazards
- Seismicity
- Foundations
- Earthwork
- Retaining walls
- Corrosion
- Pavement design

This task will be included in the professional services agreement's work scope and will be authorized if needed.

I. Permitting Assistance: LEE + RO will identify and apply for all applicable permits required for construction. This task will include identifying all applicable code requirements for the chemical facility and coordinating with the OCFA to permit and approve the plans, which will consist of creating a comprehensive site fire master plan for existing and new facilities.

J. Optional Permitting Assistance: Include an optional item for permitting and coordination with SCE to relocate existing SCE switching capacitor or transformers if necessary to facilitate the improvements.

K. Project Schedule: Our project manager will submit a construction project schedule that reflects coordination items, date of completed plans, critical path issues, any long lead items, and IRWD review times.

L. Estimates of Probable Construction Costs: our team will provide and submit a preliminary estimate of the construction project's probable construction cost.

M. Team Meetings: Our project manager will schedule and lead meetings with IRWD to ensure that all design, operational, and maintenance issues are addressed. He will provide meeting minutes and action items. This task will help determine that all the technical problems are addressed and that the Project stays on schedule. During preliminary design, scheduled meetings include the project kickoff meeting, coordination meetings to discuss electrical and control improvements, and sequence of construction, preliminary design progress meeting to review the preliminary design recommendations before submitting the draft PDR a final PDR submittal meeting.

N. Technical Specifications: Our team will produce an outline of the Project Manual for the construction project. The outline shall include a list of technical specifications, including items not already covered by IRWD's Construction Manual, latest edition.

O. Construction Plans: We will prepare preliminary design drawings in the latest AutoCAD version and use NCS V4.0 layering standards on 22-inch x 34-inch sheets utilizing IRWD's standard border template. Plans shall be prepared using the NAVD 88 and NAD 83 survey standards. The following sheet list is anticipated for the preliminary design. The sheet list provided herein is not intended to be exhaustive.

TABLE 3: LIST OF DRAWINGS

SHEET NO.	DWG NO.	DESCRIPTIONS
GENERAL		
1	G-1	TITLE SHEET
2	G-2	LOCATION & VICINITY MAPS & DRAWING INDEX
3	G-3	GENERAL NOTES - 1
4	G-4	GENERAL NOTES - 2
5	G-5	SYMBOLS & ABBREVIATIONS
DEMOLITION		
6	D-1	DEMOLITION PLAN -1
7	D-2	DEMOLITION PLAN - 2
8	D-3	DEMOLITION DETAILS - 1
9	D-4	DEMOLITION DETAILS - 2
CIVIL		
10	C-1	SITE PLAN
11	C-2	TEMPORARY RESERVOIR ACCESS ROAD AND SITE FENCING
12	C-3	GRADING PLAN
13	C-4	ACCESS STAIRWAY AND SITE FENCING MODIFICATIONS PLAN
14	C-5	YARD PIPING AND DRAIN PIPING
15	C-6	FENCE AND RESERVOIR ACCESS MODIFICATIONS PLAN
16	C-7	CIVIL DETAILS - 1
17	C-8	CIVIL DETAILS - 2
ARCHITECTURAL		
18	A-1	ARCHITECTURAL ABBREVIATIONS, NOTES, & SCHEDULES
19	A-2	ARCHITECTURAL PLAN
20	A-3	ARCHITECTURAL ELEVATIONS
21	A-4	ARCHITECTURAL DETAILS - 1
22	A-5	ARCHITECTURAL DETAILS - 2
STRUCTURAL		
23	S-1	STRUCTURAL ABBREVIATIONS & NOTES
24	S-2	STRUCTURAL FLOOR AND ROOF FRAMING PLAN
25	S-3	STRUCTURAL RESERVOIR ROOFTOP PLAN
26	S-4	STRUCTURAL BLDG SECTIONS - 1
27	S-5	STRUCTURAL BLDG SECTIONS - 2
28	S-6	STRUCTURAL BLDG DETAILS - 1
29	S-7	STRUCTURAL BLDG DETAILS - 2
MECHANICAL		
30	M-1	MECHANICAL PLAN - 1
31	M-3	MECHANICAL PLAN - 2
32	M-4	MECHANICAL SECTIONS - 1
33	M-5	METERING PUMPS PLAN AND ELEVATION
34	M-6	INNER TANK MIXER PLAN, SECTION, AND DETAILS
35	M-7	OUTER TANK MIXER PLAN, SECTION, AND DETAILS
36	M-8	MECHANICAL DETAILS - 1
37	M-9	MECHANICAL DETAILS - 2

SHEET NO	SHEET NO	DESCRIPTIONS
ELECTRICAL		
38	E-1	ELECTRICAL SYMBOLS & ABBREVIATIONS
39	E-2	SINGLE LINE DIAGRAM, AND LP "A" ELEVATION
40	E-3	CONDUIT PLAN
41	E-4	LIGHTING PLAN, SCHEDULE, AND DETAILS
42	E-5	DIGITAL AND ANALOG I/O
43	E-6	NITRATE AND CHLORINE ANALYZER ELEVATIONS AND CONTROL DIAGRAM
44	E-7	GENERAL ELECTRICAL DETAILS
INSTRUMENTATION		
45	I-1	INSTRUMENTATION SYMBOLS & ABBREVIATIONS
46	I-2	AQUA AMMONIA STORAGE PROCESS AND INSTRUMENTATION DIAGRAM
47	I-3	SODIUM HYPOCHLORITE STORAGE PROCESS AND INSTRUMENTATION DIAGRAM
48	I-4	RESERVOIR MIXERS PROCESS AND INSTRUMENTATION DIAGRAM
49	I-5	INSTRUMENTATION DETAILS - 1
50	I-6	INSTRUMENTATION DETAILS - 2
50	TOTAL DRAWINGS*	

* If the location of the chloramine booster station building requires the construction of a retaining wall, two sheets for retaining wall design will be added to the set of drawings

P. Preliminary Design Report (PDR): The work described above will be summarized and compiled into a PDR. At a minimum, the PDR will summarize the results of the subtasks identified above and additional design criteria identified by our team during the preliminary design phase.

Deliverables:

Eight (8) copies of the Draft PDR and one (1) electronic copy in PDF shall be submitted for review. Upon resolution and incorporation of review comments, eight (8) copies of the final PDR and one (1) electronic copy in PDF shall be submitted.

Task 3 Final Design

The final design shall result in the preparation of the Contract Documents. In the final design phase, our team shall address the items discussed below:

A. Project Manual: Our team will prepare a Project Manual in standard IRWD format for the Contract Documents. IRWD's front-end documents shall be utilized. Our team will assess IRWD's documents to determine any needed supplemental special provisions that should be added to comply with IRWD's general provisions and front-end requirements. The Project Manual shall describe the allowable shutdown durations and sequencing associated with construction activities. The Project Manual shall also include the IRWD General Technical Specifications, modifications to it, and any project-specific technical specifications.

B. Construction Plans: LEE + RO will prepare detailed construction drawings in the latest version of AutoCAD and using NCS V4.0 layering standards on 22-inch x 34-inch sheets utilizing IRWD's standard border template. Sheet index/location map/legend, general notes, construction notes, and details shall be included. Construction notes shall be used (callouts on the plans are not allowed) on all construction drawings. Construction plans shall be prepared using the NAVD 88 and NAD 83 survey standards.

C. Electrical/Instrumentation: Our team will prepare an operational scheme including P&IDs, single line diagrams, control equipment list, and control loop descriptions. Before this process, Our team shall meet with IRWD staff to incorporate IRWD's standard operations, programming, and tagging requirements into the design. Our team shall develop and provide the operational scheme and functional descriptions (in plain English) for District review and approval.

D. Project Schedule: Our project manager will maintain and consistently update the project schedule, including detailed schedules for both design and construction activities. The schedule shall include all critical factors impacting the project schedule, including implementation, permitting, and coordination activities to ensure that the Project is completed per the proposed schedule. The schedule shall be prepared in Microsoft Project. A preliminary schedule outlining the preliminary and final design phase activities shall be included in the Proposal.

E. The opinion of Probable Construction Cost: Our team will prepare a detailed and itemized opinion of probable construction cost for the proposed upgrades, which shall be updated and submitted with each of the design deliverables described below.

Deliverables:

60% Design Submittal: Six 11" x17" and two 22" x34" bound copies and one CD containing a single PDF file of the entire plan set. Show civil/site, demolition, process mechanical, structural, and electrical plans. Show necessary mechanical equipment, structural layouts, pipeline alignments, preliminary profiles, and existing utilities at a minimum. Provide a complete table of contents for the Project Manual.

90% Design Submittal: Six 11" x17" and two 22" x34" bound copies of the 90 percent submittal and one CD containing a single PDF file of the entire plan set. Show concepts of each design component such as civil, structural, demolition, process mechanical, electrical, and instrumentation. Show plan, profile, connections, details, and location of appurtenances. Plan and profile drawings and process mechanical details/drawings shall be developed to a high detail level. Provide five color-coded copies of the 90 percent Project Manual, including all sections; contract documents, general provisions, special provisions, general requirements, technical specifications, and appendix.

100% Design Submittal: Six 11" x17" and two 22" x34" bound copies of the 100 percent submittal, one CD containing AutoCAD files for the entire plan set, and one CD containing a single PDF file of the entire plan set. Include complete plans and five color-coded copies of the Project Manual, a notebook with the design calculations (including, but not limited to, process mechanical, civil, structural, electrical, pipe thickness, and restraint), and one CD containing all MS Word files used in the preparation of the Project Manual.

F. Final Submittal: PDF files of the final submittal. One full-size final stamped and signed reproducible plan consisted of a mylar title sheet and all remaining sheets on bond paper, and one original signed Project Manual for District's signatures.

G. Addenda Preparation and Pre-Bid Meeting: During the bidding period, LEE + RO will provide information and clarify bid documents to prospective bidders. This shall include the preparation of up to three addenda, including revisions to the design plans and specifications and assistance with addressing bidder questions. At a minimum, addenda preparation activities shall include:

1. **Plan Revisions:** We have budgeted 24 hours of appropriate staff time for plan revisions to the construction drawings.

2. **Specification Revisions**: We have budgeted 24 hours of appropriate staff time for revisions or additions to the project specifications.

3. **Bidder Questions:** We have budgeted 24 hours of appropriate staff time to address and respond to bidder questions.

4. **Pre-Bid Meeting:** Our project manager will attend a two-hour pre-bid meeting during the bidding period. This may include a site visit with potential bidding contractors.

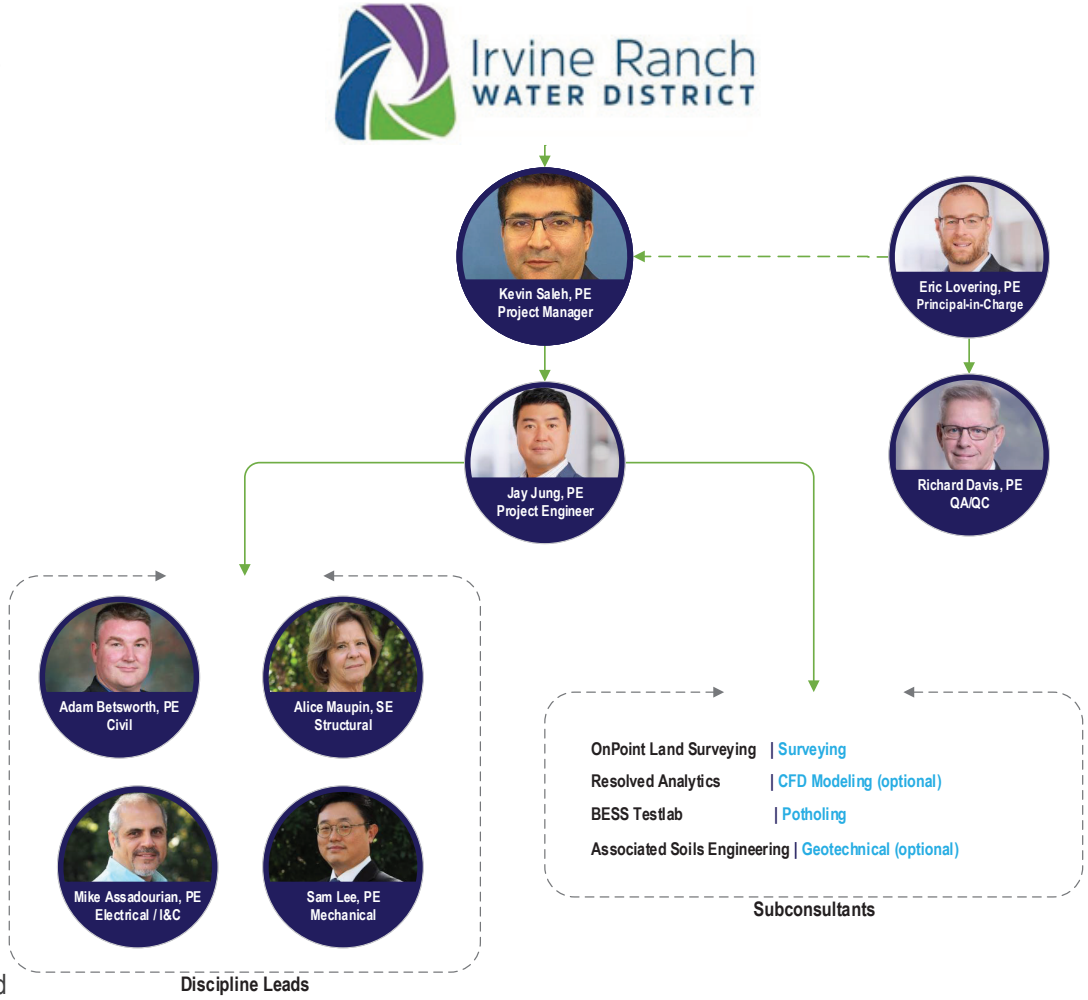
B. TEAM

The LEE + RO key staff members chosen for this project have significant experience executing similar services for other municipal agency clients. We have assembled a team that can successfully deliver this complex project to you in the most efficient manner. mechanical, civil, electrical, and instrumentation and controls (I&C) disciplines are all LEE + RO employees. This will make the LEE + RO team efficient and productive. The team includes three subconsultants which will augment our expertise. Full resumes for the proposed LEE + RO team members are in **Appendix A**.

Kevin Saleh, PE will be your **Project Manager** and will be your main point of contact. Kevin has over 20 years of experience as a civil engineer. His professional experience includes planning, design, construction management, and construction support services for various public works projects, with specific areas of practice in water and wastewater. **Jay Jung, PE** will be your **Project Engineer.** Jay has 15 years of process research and design, as well as water treatment facilities engineering projects. His areas of expertise include experiment setup, pilot or full-scale testing, sampling and data analysis, and development of treatment process trains.

Kevin and Jay will be supported by a highly skilled team with many years of proven success. **Adam S. Betsworth, PE, Civil Engineer,** has 15 years of experience as a civil engineer, and has performed his duties as civil engineer at various job sites and a Civil 3D expert. **Alice Maupin, PE**, **Structural Engineer**, has more than 20 years of seismic structural analysis, field investigation, design, constructability assessment, and project management experience working for the Metropolitan Water District of Southern California. **Michael Assadourian, PE**, **Electrical and Instrumentation & Controls Engineer,** has over 25 years of experience covering, electrical and control systems engineering, design, construction and project management for water and wastewater treatment plants, pump stations, emergency power generation systems, water conveyance facilities, petrochemical plants, and refineries. **Sam Lee, PE**, **Mechanical Engineer** has 15 years of diversified civil, sanitary, mechanical and process engineering and design experience with water and wastewater infrastructure engineering projects. He has acquired diverse design and inter-discipline coordination skills. facility investigation and evaluation, condition assessments, documentation of as-built conditions through field verification of existing dimensions. **Richard Davis, PE**, **Quality Assurance & Quality Control Engineer**. Richard has more than 35 year's management experience and is a results-oriented Civil Engineer with experience in management of wastewater and water infrastructure projects.

Eric Lovering, PE, **Principal-in-Charge**, is a California State registered "Civil" and "Electrical" engineer with 19 years of diversified planning, engineering, design, and construction experience. Eric's extensive training and familiaraity with the District. will allow him successfully guide the team to a successful project.



PROJECT ENGINEERS

25 Years Experience

Civil Engineer, CA # 90535
Professional Engineer, MD # 36759

Higher National Diploma, 2004, Computer Programming/ Systems Analysis, Seneca College

KEVIN SALEH, PE | PROJECT MANAGER

Kevin Saleh has over 20 years of experience as a civil engineer. His professional experience includes planning, design, construction management, and construction support services for various public works projects, with specific areas of practice in water and wastewater. His relevant experience includes water distribution and treatment facilities, pumping facilities, treatment plant projects/processes, reservoirs, pressure reducing, and surge facilities. Wastewater projects include conveyance systems, pumping stations, and treatment plant projects and processes.

Kevin's Relevant Experience Includes:

- Design of Ammonia Injection System including Ammonia tank and scrubber, metering pumps, safety equipment inside the chemical building for City of Corona's Arlington Desalter Connection Project.
- Design of chloramine booster station and tanks mixers for PA3 Interim Reservoirs in Rancho Mission Viejo, including Pax mixers for two (2) 1MG potable water reservoirs, chlorine and ammonia tanks, and metering pumps, and chloramine management system.
- Design of Ammonia Injection Station for the City of Corona's Mangular and Garretson Ammonia Injection Stations. Projects included the design of the buildings, mechanical and safety measures.
- Design of modifications in chemical storage and feed system including Sodium Hypochlorite and Aqua Ammonia for the City of San Juan Capistrano's Ground Water Recovery Plant Expansion project.

15 Years Experience

Civil Engineer, CA #75672

PH. D. Candidate University Of Southern California (Completed 4 Years In Ph.D. Program)

MS, Environmental Engineering, University Of Southern California;

MS, Environmental Engineering, Yonsei, Korea

JAY JUNG, PE | PROJECT ENGINEER

Jay Jung has 15 years of process research and design, as well as water treatment facilities engineering projects. His areas of expertise include experiment setup, pilot or full-scale testing, sampling and data analysis, and development of treatment process trains. He also has considerable experience with feasibility studies, analysis of existing process trains, and preparation of project or preliminary design reports. During the last ten years, Mr. Jung has been a project engineer responsible for development of plant design criteria, P&IDs, hydraulic profiles, and detailed facility design drawings and specifications. His area of expertise includes chemical conditioning and chemical handling facilities, disinfection, spent backwash water treatment, granular activate carbon adsorption, and membrane biofiltration.

Jay's Relevant Experience Includes:

- Project Manager for a chloramine disinfection system design includes a chemical feed system and storage design for Utility Site in West Palmdale for a potable water facility with a 10,700gpm capacity.
- Project Manager for engineering, design, and construction support services to convert on-site hypochlorite generation systems to bulk liquid sodium hypochlorite for ammonia chloramine disinfection at different water reservoir sites in the MNWD service area.
- Project Manager for converting on-site hypochlorite generation systems and liquid ammonia systems to bulk liquid sodium hypochlorite and ammonia chloramine disinfection systems at two (2) different water reservoir sites in the SMWD service area. The project also includes replacing the tank's shark mixer at the Estado Reservoir with a new PAX mixer.

ADAM BETSWORTH, PE | CIVIL ENGINEER

15 Years Experience

Civil Engineer, CA # C73790

Adam S. Betsworth has 15 years of experience as a civil engineer. Adam has performed his duties as a civil engineer at various job sites. Adam has supervised and trained employees in multiple tasks and the use of Civil 3D. He has calculated and resolved complex mathematical/ engineering problems and formulas to meet project specifications. He presented projects to clients, from concept to 3D model designs using Civil 3D in conjunction with product samples and presentation material. Adam has a proper understanding of government rules and regulations as needed to complete projects. He can draft plans and concepts using Civil 3D, LDD, and AutoCAD

Adam's Relevant Experience Includes:

- Civil Engineer for two (2) water booster station projects in which Adam was responsible for the on-site grading, wall plans, buildings, and pump station.
- Civil Engineer for rough and precise grading for many water infrastructure facilities.
- Civil Engineer for design of site layout of a recycled water tank and booster pump station.
-

ALICE MAUPIN, PE | STRUCTURAL ENGINEER

20 Years Experience

Civil Engineer, CA # C51691;
Structural Engineer, NV # S020877
Structural Engineer, AZ # S50525

MS, Civil Engineering with emphasis on Water and Wastewater Treatment Graduate courses in structural design, University of Southern California

BS, Civil Engineering (Structural Option), California State University, Los Angeles

Alice Maupin is a California registered civil engineer with more than 20 years of seismic structural analysis, field investigation, design, constructability assessment, and project management experience. In her work with Metropolitan Water District of Southern California (MWD) and CalPortland Cement Company (CPC), she has produced numerous foundation designs with seismic anchorage for large diameter water tanks and concrete cement silos. Part of her graduate work at USC dealt with seismic sloshing effects on tank foundations.

Alice's Relevant Experience Includes:

- Structural Engineer for Cement Hill Water Treatment Plant Chemical rehabilitation.
- Structural Engineer for Pomerado Park Reservoir Upgrade Project.
- Structural Engineer for Metropolitan Water Distrct of Southern California's Water and chemical tank foundation and anchorage design for Skinner, Diemer, and Mills Water Treatment Plants.

25 Years Experience

Civil Engineer, CA # E14390

MS, Industrial And Systems Engineering & Management, University of Southern California

BS, Electrical Engineering, University Of Southern California

MICHAEL ASSADOURIAN, PE | ELECTRICAL & INSTRUMENTATION & CONTROLS ENGINEER

Michael Assadourian has over 25 years of experience covering, electrical and control systems engineering, design, construction and project management for water and wastewater treatment plants, pump stations, emergency power generation systems, water conveyance facilities, petrochemical plants, and refineries. He has in-depth knowledge of power distribution and lighting systems, both NEMA and IEC standards-based; motor controls and variable frequency drives; coordination with power & utility companies; and SCADA and radio/microwave systems. His work experience includes P&ID development, electrical system condition assessment, ETAP analysis, load flow and short-circuit analysis, and protective device coordination studies. He has extensive experience in retrofitting existing plants with new power and controls and resolving construction-related problems. Michael has provided a wide variety of construction support services including equipment & shop drawings review, processing of RFIs, resolving construction issues, and electrical system commissioning and start-up.

Michael's Relevant Experience Includes:

- Electircal and I&C Engineer for pumping facilities electrical system assessment and backup power design for City of Ontario's 32 facilities.
- Electircal and I&C Engineer for 2016-17 and 2017-18 Reservoir Management Systems replacement projects for the Moulton Niguel Water District.
- Electircal and I&C Engineer for South Orange County Water Authority's J.B. Latham Wastewater Treatment Plant Improvements Project.

15 Years Experience

Civil Engineer, CA # C78939

MS, Environmental Engineering University of Southern California

BS, Environmental Engineering Yonsei University, Korea

SAM LEE, PE | MECHANICAL ENGINEER

Sam Lee has 15 years of diversified civil, mechanical and process engineering and design experience with water and wastewater treatment and pump station projects. His experience includes facility investigation and evaluation, condition assessment, preparation of as-built background drawings through verification of existing facility dimensions, CAD based equipment and piping layout, engineering analysis and final design, and construction phase engineering services for wastewater and water treatment plants and pump stations including emergency generators and other auxiliary equipment. Through a variety treatment plant engineering & design projects, Sam has acquired diverse design skills as well as project coordination skills with electrical and structural design engineers. His construction phase engineering experience includes shop drawing and equipment submittal reviews, RFI processing, preparation of as built drawings, and coordination with resident engineering staff. Recent experience includes project engineering on two potable water reservoir disinfection and management systems projects.

Sam's Relevant Experience Includes:

- Mechanical Engineer for the Ammonia Containment and analyzer and drainage improvements project for the Santa Clarita Valley Water Agency.
- Project & Mechancial Engineer for Upgrades and Improvements for City of Calexico's Wastewater Treatment Plant.
- Project & Mechancial Engineer for Upgrades and Improvements for City of Brawley Wastewater Treatment Plant.

RICHARD DAVIS, PE | QUALITY ASSURANCE & QUALITY CONTROL MANAGER

35 Years Experience

Civil Engineer, CA #C27804
Engineer, NV #17689
Engineer, MD #41041
Engineer, DC #PE906402

MS, Civil Engineering,
Sacramento State University

BS, Civil Engineering,
San Jose State University

Richard has more than 35 years of management experience and is a results-oriented Civil Engineer with expertise in managing wastewater and water infrastructure projects. He has planned, designed, and constructed sewage collection systems, pump stations, water transmission systems, and other capital improvement projects. He also has overseen the development of master plans, Geographic Information Systems, sewer flow models, and many engineering studies and reports. He also has experience preparing environmental documents in compliance with state laws and ordinances; implementing required mitigation measures.

Richard's Relevant Experience Includes:

- QA/QC Manager for the City of Colton's Prado Booster Station Upgrades.
- QA/QC Manager for the Orange County Sanitation District's Seal Beach Pump Station Replacement Project.
- QA/QC Manager for Electrical Standard Details for various LEE + RO Projects for various clients.

ERIC LOVERING,PE | PRINCIPAL-IN-CHARGE

19 Years Experience

Civil Engineer, CA #C70807
Electrical Engineer, CA #E18727

BS, Aeronautical Engineering,
University of California, Davis

Eric Lovering is a California State registered "Civil" and "Electrical" engineer with 19 years of diversified planning, engineering, design, and construction experience. Eric has extensive training and hands-on knowledge in hydraulics, civil, mechanical, and electrical engineering, including instrumentation & controls (I&C), programmable logic controllers (PLCs), and SCADA systems. As lead mechanical/electrical engineer and project manager, Eric has completed the design, construction, start-up, and commissioning of water, recycled water, and wastewater pumping facilities (capacities range from 200 gallons/minute to 450 million gallons/ day) projects and emergency power-generation systems (capacities from 150 kW to 10 mega Watt). Eric has developed exceptional hydraulic analysis skills, pump selection, pumping system control logics, surge controls, and related electrical and I&C/SCADA system design and construction. Additionally, he has completed pump station evaluations, condition assessments, and the development of rehabilitation and upgrading schemes.

Eric's Relevant Experience Includes:

- Project Manager & Electrical Engineer for the Design of Booster Pump Station 3501, including a new chemical storage building for the Coachella Valley Water District.
- Project Manager & Electrical Engineer for the Preparation of P&IDs for various LEE + RO projects for various clients.
- Project Manager & Electrical Engineer for the Design and Construction Support for the Irvine Ranch Water District's Foothill Zone 6A Pump Station.

SUB-CONSULTANTS

ON POINT LAND SURVEYING | SURVEYING

On Point Land Surveying, Inc. is certified as a Small Business Enterprise (SBE) with a Coalition of Southern California Public Agencies (#24235) and is also certified as a Micro Small Business (MB) with the State of California (#1447060). The firm is registered with the State of Arizona, Board of Technical Registration, and the State of California, Board for Professional Engineers and Land Surveyors. On Point Land Surveying offers a highly experienced staff that can manage any level of projects to consistently exceed client's expectations by providing the highest degree of coordination, communication, and client contact while maintaining very competitive pricingASEALTA/ ACSM Surveys

RESOLVED ANALYTICS | CFD MODELING

Resolved Analytics specializes in computational engineering, computational fluid dynamics, computational solid mechanics, multiphysics simulations and optimization. They are also the first ever STAR-CCM+ Platinum Level Certified STAR User. Because they believe their clients know their processes and products better than they do. Resolved Analytics encourages a collaborative process with a focus on specific measures of success. The result is a combined team with less wasted effort. Some recent water treatment/mixing tank experiences:

- Maynilad Water (Philippines) – Las Pinas 88 MLD Reclamation Facility:
  - *Distribution tank, equalization tank, anaerobic tank, aeration tanks, grit sump, clarifier, disc filter, sludge holding tank, thickened sludge sump, digested sludge tank, RAS*
- TankPro: 500,000 gal municipal water tank mixing optimization
- Arauco: Hot water lagoon mixing and aeration
- Saskatoon City: Richard Miller 240 mgd WTP:
  - *Bioreactor, Clarifier, Fermenter, UV Treatment*
- Peroxychem: Hydrogen Peroxide Mixing Tank Optimization

BESS TESTLAB | POTHOLING

BTL provides a full range of Subsurface Utility Engineering (SUE) including underground utility locating services to mitigate buried utility related risks associated with the design and construction of infrastructure projects. Specifically, BTL provides utility locating, concrete scanning, electromagnetic pipe locating, CCTV pipe inspection, ground penetrating radar (GPR), vacuum excavation and utility mapping services.

ASSOCIATED SOILS ENGINEERING | GEOTECHNICAL

Associated Soils Engineering (ASE), incorporated in 1974 in the State of California, has provided geotechnical design, material testing, and construction testing services for over four decades in Southern California and can use the vast experience, information and data gathered over the years to provide quick and cost-effective geotechnical solutions to a wide variety of public works construction projects. ASE has provided geotechnical engineering services on many of LEE + RO's projects since 2000. ASE is very familiar with the geology of the Southern California areas through their previous geotechnical investigation work.

TEAM AVAILABILITY

KEY PERSONNEL	ROLE	% OF TIME COMMITTED ON PROJECT	OFFICE LOCATION
Kevin Saleh, PE	Project Manager	50	City of Industry
Jay Jung, PE	Project Engineer	65	City of Industry
Sam Lee, PE	Lead Mechanical	65	City of Industry
Michael Assadorian, PE	Electrical and I & C	65	City of Industry
Alice Maupin, PE	Structural	50	City of Industry
Adam Betsworth, PE	Civil / Site	50	City of Industry
Richard Davis, PE	Technical Advisor (QA/QC)	10	Walnut Creek
Eric Lovering, PE	Principal in Charge	5	San Diego

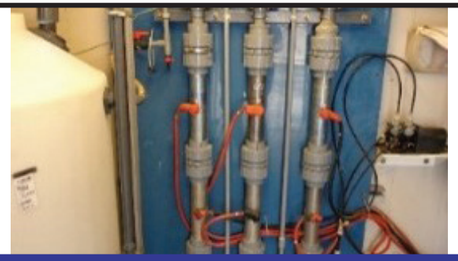
C. EXPERIENCE

2017-18 RESERVOIR MANAGEMENT SYSTEMS REPLACEMENT PROJECTS
MOULTON NIGUEL WATER DISTRICT

Reference:
Todd Dmytryshyn, Principal Engineer
(949) 425-3549
TDmytryshyn@mnwd.com

LEE + RO is providing engineering, design, and construction support services for the conversion of on-site hypochlorite generation systems and liquid ammonia systems to bulk liquid sodium hypochlorite and ammonia chloramine disinfection systems at five (5) different water reservoir sites in the MNWD service area, (1) 4 MG Crown Valley Reservoir, (2) 2 MG Highlands Reservoir, (3) 2.5 MG Marguerite Reservoir, (4) 4 MG Moulton Peak Reservoir, and (5) 5 MG Pacific Park Reservoir. Each site contains a potable water storage reservoir that supplies domestic water to the communities. The water is disinfected utilizing chloramines in the reservoirs to maintain the residual chlorine concentration prior to delivery to the communities. Each disinfection facility contains new bulk sodium hypochlorite and ammonia storage and feeding systems and includes a masonry block chemical storage building with separate rooms for each chemical, ventilation and split system AC units for the chemical rooms, storage tanks, chemical pumps and piping, reservoir mixers, analyzers and dosage control, chemical leak detection systems, sample and drain piping, electrical, process monitoring and control via SCADA, shower/eyewash stations, and site utilities. Site modifications for the Highlands and Marguerite chemical building include grading of the slope, protection of existing tree, modification of chain link fence, and a retaining wall.

Location of the Project: Laguna Hills, CA
Project Start Date: September 2016
Completion Date: Ongoing
Cost: $3 Million
Team Members Involved: Jay Jung- Project Manager, Sam Lee - Project Engineer, Michael Assadourian - Electrical and I&C Engineer



2016-2017 RESERVOIR MANAGEMENT SYSTEMS REPLACEMENT PROJECTS
MOULTON NIGUEL WATER DISTRICT

Reference:

Todd Dmytryshyn, Principal Engineer
(949) 425-3549
TDmytryshyn@mnwd.com

LEE + RO provided engineering, design, and is providing construction support services for the conversion of onsite hypochlorite generation systems and liquid ammonia systems to bulk liquid sodium hypochlorite and ammonia chloramine disinfection systems at three (3) different water reservoir sites in the MNWD service area, (1) 10 MG East Aliso Creek Reservoir, (2) Seville Reservoirs – 2ea. x 1.125 MG, and (3) Mathis-Nellie Gail Reservoirs – 1ea. x 1.75 MG and 1ea. x 4 MG. Each site contains one or two potable water storage reservoirs that supply domestic water to the communities. The water is disinfected utilizing chloramines in the reservoirs to maintain the residual chlorine concentration before delivery to the communities. Each disinfection facility contains new bulk sodium hypochlorite and ammonia storage and feeding systems and includes a masonry block chemical storage building with separate rooms for each chemical, ventilation and split system AC units for the chemical rooms, storage tanks, chemical pumps and piping, reservoir mixers, analyzers, and dosage control, chemical leak detection systems, sample and drain piping, electrical, process monitoring and control via SCADA, shower/eyewash stations, and site utilities. Site modifications for the East Aliso Creek chemical building included grading of the slope and a retaining wall. Mathis-Nellie Gail requires temporary power during construction to maintain the operation of the existing disinfection facility. This $3 million project is currently in construction.

Location of the Project: Laguna Hills, CA
Project Start Date: September 2016
Completion Date: Ongoing
Cost: $3 Million
Team Members Involved: Jay Jung- Project Manager, Sam Lee - Project Engineer, Michael Assadourian - Electrical and I&C Engineer

ESTADO RESERVOIR MANAGEMENT INSTALLATION SYSTEM
SANTA MARGARITA WATER DISTRICT

Reference:
Tricia Butler, Chief Engineer
(949) 456-6554
triciab@smwd.com

Santa Margarita Water District (District) currently owns and operates the 1.3 MG capacity Estado Domestic Water Reservoir in Coto de Caza. The water in the reservoir is disinfected with chloramines. The District performed extensive pilot testing of disinfection system equipment at various reservoir sites and decided to change their disinfection system at the Talega Reservoir from on-site generation (OSG) systems to 12.5% bulk sodium hypochlorite and 38% bulk ammonium sulfate. Based on the pilot testing that was performed, the District has selected the Monoclor RCS Residual Control System for installation at the Estado Reservoir site. LEE + RO is providing engineering, design, and construction support services for the conversion of on-site generation to the bulk system. Engineering services include designs for construction of new bulk sodium hypochlorite and ammonium sulfate systems, including all equipment, double-walled chemical storage tanks, pumps, analyzers and controllers, connected piping, valves, electrical and instrumentation. The Estado Reservoir facility is not equipped with an RMS building, and a new RMS building will be constructed. The design will include all components necessary for complete and operational reservoir management systems. The existing Tank Shark mixer at the Estado Reservoir will be replaced with a new PAX mixer.

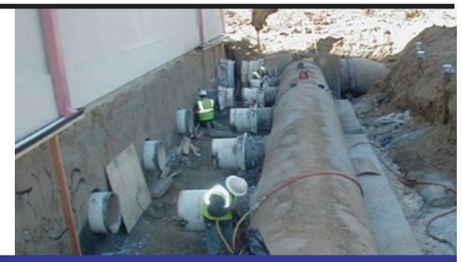
Location of the Project: Santa Margarita, CA
Project Start Date: July 2018
Duration of Construction: Ongoing
Cost: $1 Million
Team Members Involved: Jay Jung- Project Manager, Sam Lee - Project Engineer

TALEGA ZONE I RESERVOIR MANAGEMENT INSTALLATION SYSTEM
SANTA MARGARITA WATER DISTRICT

Reference:
Tricia Butler, Chief Engineer
(949) 456-6554
triciab@smwd.com

Santa Margarita Water District (District) currently owns and operates the 6.0 Million Gallon (MG) capacity Talega Zone 1 Domestic Water Reservoir in San Clemente. The water in the reservoir is disinfected with chloramines. The District performed extensive pilot testing of disinfection system equipment at various reservoir sites and decided to change their disinfection system at the Talega Reservoir from onsite generation (OSG) systems to 12.5% bulk sodium hypochlorite and 38% bulk ammonium sulfate. Based on the pilot testing that was performed, the District has selected the Monoclor RCS Residual Control System for installation at the Talega Reservoir site. LEE + RO is providing engineering, design, and construction support services for the conversion of onsite generation to the bulk system. Engineering services include designs for construction of new bulk sodium hypochlorite and ammonium sulfate systems, including all equipment, double-walled chemical storage tanks, pumps, analyzers and controllers, connected piping, valves, electrical and instrumentation.

Location of the Project: Santa Margarita, CA
Project Start Date: August 2018
Duration of Construction: Ongoing
Cost: $750,000
Team Members Involved: Jay Jung- Project Manager, Sam Lee - Project Engineer



EARL SCHMIDT INTAKE PUMP STATION MODIFICATIONS
SANTA CLARITA VALLEY WATER DISTRICT

Reference:
Jason Yim, Principal Engineer
(661) 513-1277
jyim@scvwa.com

The exisitng ESIPS, constructed in 2006, is equipped with two vertical diffusion vane pumps, each is rated for 12,000 gpm at 80 feet TDH and driven by 350 HP motor. The station was built with three suction and discharge pipe headers for three future pumps. SCVWA noticed that the 54-in dia. suction and discharge headers were leaking and discharge header was vibrating abnormally. LEE + RO was retained to perform a comprehensive system condition assessment and leak/misalignment/ vibration investigation. LEE + RO located and confirmed differential settlements in the buried pump discharge header. Using ultrasonic leak detection instrumentation with a non-destructive and minimally invasive air/ vacuum potholing, LEE + RO also located underground leaks. In the subsequent geotechnical evaluation, it was concluded that the cause of the 54-in dia. header misalignment and differential settlement were due to poor construction. Upon excavation of the affected area, the leaks were discovered at pipe joints (e.g. restrained coupling joints) on the 54-in pipe headers. LEE + RO designed corrective backfill and compaction and split-type couplings and a rigid welded welding band joints to replace the leaky coupling. Welded band joint solution resulted minimum shutdown of the pump station.
LEE + RO also provided continuous inspection of the construction work including specialty welding installed. Due to difficulty in achieving proper compaction, controlled low-strength material (CLSM) was used as the backfill material up to the spring line of the 24-in dia. discharge piping. Finally, LEE + RO was also tasked to design and provide construction support services for the installation of third pump to increase the station capacity to firm 24,000 gpm. The total construction cost for correction of the header settlement was $1.9 million and addition of the third pump was $900,000. The construction was completed in 2015.

Location of the Project: Carson, CA
Project Start Date: 2013
Duration of Construction: 2015
Cost: $2.6 Million
Team Members Involved: Jay Jung - Project Manager, Sam Lee - Project Engineer

E. BUDGET

Separate Sealed Envelope

Per the RFP's requirements, the budget has been provided in a separate sealed envelope.

LEE+RO
WATER INFRASTRUCTURE ENGINEERS

Celebrating 40 years
as partners in possibility.

1199 South Fullerton Road
City of Industry, CA 91748

626-912-3391
lee-ro.com

February 12, 2021

Mr. Alex Murphy, Project Manager
Irvine Ranch Water District
3512 Michelson Drive
Irvine, CA 92618

Subject: **Request for Proposal – Engineering Design Services for the Turtle Rock Chloramine Booster Station**

Dear Mr. Murphy:

LEE + RO, Inc. is pleased to submit this fee proposal for engineering services for the subject project. The total not-to-exceed fee proposed is $347,511. There is an option for additional services for CFD analysis, geotechnical investigation and permitting assistance for $27,966, which if included would bring the total-not-to-exceed fee to $375,477.

The enclosed spreadsheet (Exhibit 1) shows the breakdown of our fee in detail. Our current billing rate schedule (Exhibit 2), and other direct costs (Exhibit 3), are enclosed with this letter.

Thank you for the opportunity to submit this proposal. Please do not hesitate to call if you have any questions or comments.

Respectfully Submitted,

Eric Lovering, PE,
Principal-in-Charge/Vice President
LEE + RO, Inc.

Encl: Exhibit 1 - Fee Estimate, Exhibit 2 - Billing Rate Schedule, Exhibit 3 – Other Direct Costs

LEE+RO
WATER INFRASTRUCTURE ENGINEERS

Exhibit 1: Engineering Design Services for the Turtle Rock Chloramine Booster Station

TASK NO.	ENGINEERING CLASSIFICATIONS: E8 Managing Eng, E7 Supervising Eng, E6 Principal Eng, E5 Senior Eng, E3 Associate Engineer, T4 Designer, T3 Associate Designer, A2 Word Processor II (See Billing Rate Schedule for Entire Labor Classifications).	LEE & RO Hours per Labor Category									Total Hours	Labor Cost	Other Direct Costs (ODCs)	Subs (hrs)	Subs	TOTAL FEES
		E8	E7	E6	E5	E4	E3	T4	T3	A2		1.00				
	PROJECT TASK DESCRIPTION	Billing Rates ($/Hour)														
		$274	$249	$229	$206	$191	$172	$149	$133	$133						
1	**Project Management**															
1.A	Preparation of Project Status Reports	4	42								46	$11,554				$11,554
1.B, 2.M	Meetings and Workshops (includes site visits)	4	32	4		4	4			4	52	$11,964	$100			$12,064
1.C	Quality Assurance/Quality Control	4	32								36	$9,064				$9,064
	SUBTOTAL TASK 1 - PROJECT MANAGEMENT	12	106	4	0	4	4	0	0	4	134	$32,582	$100	0	$0	$32,682
2	**Preliminary Design**															
2.A	Chloramine Booster Station	2	16	8	16	20	24		40		126	$22,928				$22,928
2.B	Reservoir Mixing System		4	12		12	4				32	$6,724				$6,724
2.D	Chlorine Analyzer System		2	4		2	2				10	$2,140				$2,140
2.E	Site Survey		2			2					4	$880	$3,000	36	$5,450	$9,330
2.F	Potholing underground Utilities		2				2				4	$842		68	$8,600	$9,442
2.G	Geotechnical Investigation		8								8	$1,992				$1,992
2.I	Permitting Assistance						12			8	20	$3,128				$3,128
2.K	Project Schedule		2			6					8	$1,644				$1,644
2.L	Opinion of Probable Construction Cost		4			8					12	$2,524				$2,524
2.N	Technical Specifications		8			16					24	$5,048				$5,048
2.O	Construction Plans		28	14	24	58	34	16	194		368	$60,234				$60,234
2.P	Preliminary Design Report (PDR)		8			40			16		64	$11,760	$100			$11,860
	SUBTOTAL TASK 2 - PRELIMINARY DESIGN	2	84	38	40	164	78	16	250	8	680	$119,844	$3,100	104	$14,050	$136,994
3	**Final Design**															
3.A	Project Manual		14	14		32					60	$12,804				$12,804
3.B	Construction Plans		32	51	12	96	78	20	308		597	$97,815				$97,815
3.C	Electrical/Instrumentation	2	28			40	24	16	120		230	$37,632				$37,632
3.D	Project Schedule		6								6	$1,494				$1,494
3.E	Opinion of Probable Construction Cost		2	12		4					18	$4,010				$4,010
3.F	Design Deliverables		2						12	6	20	$2,892	$300			$3,192
3.G	Addenda Preparation and Pre-Bid Meeting		6	8	12	24			24		74	$13,574				$13,574
	SUBTOTAL TASK 3 - FINAL DESIGN	2	90	85	24	196	102	36	464	6	1,005	$170,221	$300	0	$0	$170,521
	TOTAL NOT TO EXCEED	16	280	127	64	364	184	52	714	18	1,819	$ 322,647	$3,500	104	$ 14,050	$ 340,197
	Optional Tasks															
2.C	CFD Analysis		4								4	$996		72	$12,600	$13,596
2.H	Geotechnical Investigation		4								4	$996		52	$8,650	$9,646
3.B(o)	Design of Steel Chain Link Fence and Widening of the Access Road			2	12			8	24		46	$7,314				$7,314
2.J	Permitting Assistance						12			20	32	$4,724				$4,724
	TOTAL-OPTIONAL TASKS	0	8	2	12	0	12	8	24	20	86	$14,030	$0	124	$21,250	$35,280

EXHIBIT 2

FY 2020 -2021 HOURLY BILLING RATE SCHEDULE

(Effective from November 1, 2020 to October 31, 2021)

This schedule will be subject to change at the beginning of the new fiscal year (November 1st).

PERSONNEL CLASSIFICATION			BILLING RATES ($/HOUR)
ENGINEERS			
Engineer 8	E8	Managing Engineer	$274
Engineer 7	E7	Supervising Engineer	$249
Engineer 6	E6	Principal Engineer	$229
Engineer 5	E5	Senior Engineer	$206
Engineer 4	E4	Engineer	$191
Engineer 3	E3	Associate Engineer	$172
Engineer 2	E2	Assistant Engineer	$149
Engineer 1	E1	Junior Engineer	$133
CAD / DESIGNERS			
Designer 6	T6	Principal Designer	$191
Designer 5	T5	Senior Designer	$172
Designer 4	T4	Designer	$149
Designer 3	T3	Associate Designer	$133
Designer 2	T2	Assistant Designer	$112
Designer 1	T1	Junior Designer	$93
FIELD PROFESSIONALS			
Field Professional 5	F5	Senior Resident Engineer	$206
Field Professional 4	F4	Resident Engineer	$191
Field Professional 3	F3	Senior Inspector	$172
Field Professional 2	F2	Inspector	$149
Field Professional 1	F1	Assistant Inspector	$133
ADMINISTRATIVE			
Administrative 4	A4	Senior Contract Manager	$149
Administrative 3	A3	Contract Manager	$138
Administrative 2	A2	Senior Word Processor	$133
Administrative 1	A1	Word Processor / Admin. Assistant	$118

March 16, 2021
Prepared and submitted by: P. Weghorst
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

GROUNDWATER WELLS AND TREATMENT AGREEMENT WITH
EAST ORANGE COUNTY WATER DISTRICT AND THE CITY OF ORANGE

SUMMARY:

IRWD and Orange County Water District (OCWD) are currently designing treatment facilities at IRWD's Well OPA-1 that will be used to clean up per- and poly-fluoroalkyl substance (PFAS) contamination in the Orange County Groundwater Basin. OCWD is also designing PFAS treatment facilities for a new well to be constructed by East Orange County Water District (EOCWD) and two new wells to be constructed by the City of Orange (City). To facilitate the mutual interests of IRWD, EOCWD, and the City in pumping and treating groundwater from these wells, a Groundwater Wells and Treatment Agreement has been prepared. Staff recommends the Board authorize the General Manager to execute the agreement subject to substantive changes approved by the Engineering and Operations Committee.

BACKGROUND:

IRWD owns and operates Well OPA-1, located within the City of Orange, which can provide groundwater to IRWD's customers within the City's sphere of influence. IRWD proposes to increase pumping at Well OPA-1 from 900 acre-feet per year (AFY) to 3,200 AFY. This will allow OCWD to construct treatment facilities at the well to clean up PFAS contamination in the Basin. The increased pumping would be used to serve IRWD customers outside the City's sphere of influence. To provide for the environmental review of the increased pumping and PFAS treatment at Well OPA-1, staff expects to prepare an addendum to the Initial Study / Mitigated Negative Declaration (IS/MND) that was adopted by the Board in June 2012 for the Orange Park Acres Well Replacement Project.

EOCWD proposes to construct a new well and will also work with OCWD to construct PFAS treatment facilities at that well. With this new well, EOCWD would increase groundwater pumping from 890 AFY to 1,050 AFY. By the end of March 2021, EOCWD is expected to adopt an IS/MND for the construction and operation of the new well, the anticipated increased pumping and the construction and operation of the PFAS treatment facilities.

The City or Orange is currently planning to construct two new wells in its service area. OCWD would construct PFAS treatment facilities at these new wells. The City's preparation of an IS/MND for the construction and operation of the new City wells and treatment facilities is anticipated to occur in 2021.

OCWD Groundwater Modeling:

OCWD has modeled the well drawdown impacts of the proposed increased pumping at Well OPA-1 and the proposed increased pumping by EOCWD. OCWD's modeling results demonstrate that the groundwater drawdown resulting from the projects will have a less-than-

significant impact on IRWD's, EOCWD's and the City's wells. OCWD will be modeling pumping from the City's new wells, and OCWD expects the modeling will demonstrate that the drawdown impacts from the City's new wells will also have a less-than-significant impact.

Wells and Treatment Agreement:

To facilitate the mutual interests of IRWD, EOCWD and the City in pumping water from the wells described above and cleaning up PFAS contamination in the Basin, the agreement provided as Exhibit "A" has been prepared where the parties would acknowledge and agree that:

1. Pumping of the wells will have a less-than-significant impact;
2. The agencies will not challenge any aspect of their respective well and treatment projects or related CEQA documents;
3. Should any of the three agencies have difficulty pumping from one of the wells, the parties would meet to discuss and evaluate the problems, and would develop and implement a mutually acceptable solution to any identified impacts; and
4. IRWD's additional pumping at Well OPA-1 could be used to serve water outside the sphere of influence of the City of Orange and inside IRWD's service area.

FISCAL IMPACTS:

OCWD will pay for the capital facilities to treat for PFAS at Well OPA-1. IRWD and OCWD will share equally in the operations and maintenance costs of the treatment facilities.

ENVIRONMENTAL COMPLIANCE:

To provide for the environmental review of the increased pumping and PFAS treatment at Well OPA-1, staff expects to prepare an addendum to the IS/MND that was adopted by the Board in June 2012 for the Orange Park Acres Well Replacement Project.

RECOMMENDATION:

That the Board authorize the General Manager to execute the Groundwater Wells and Treatment Agreement with East Orange County Water District and the City of Orange subject to substantive changes approved by the Engineering and Operations Committee.

LIST OF EXHIBITS:

Exhibit "A" – Draft Groundwater Wells and Treatment Agreement Between IRWD, East Orange County Water District and the City of Orange

EXHIBIT "A"

DRAFT - Groundwater Wells and Treatment Agreement

This Groundwater Wells and Treatment Agreement ("**Agreement**") is effective March 22, 2021 and is between Irvine Ranch Water District ("**IRWD**"), East Orange County Water District ("**EOCWD**"), and the City of Orange ("**City**") (together the "**Parties**" and each a "**Party**").

The Parties and Orange County Water District ("**OCWD**") met in February 2021 to discuss how each of the agencies could support the others in connection with remediating per- and poly-flouroalkyl substances ("**PFAS**") contamination in the Orange County Groundwater Basin, including coordinating and supporting the environmental review of the parties' proposed well and PFAS treatment projects.

Each of the Parties have near-term plans to construct wells or increase groundwater pumping, and install PFAS treatment, in areas that are hydrogeologically interconnected and impacted by PFAS contamination, as follows:

- IRWD plans to increase pumping at its Well OPA-1 from 900 acre feet per year ("**AFY**") to 3,200 AFY for use in IRWD's service area, and to add wellhead PFAS treatment ("**IRWD Project**").

- EOCWD plans to construct a new production well (Vanderwerff Well) increase pumping from 890 AFY to 1,050 AFY, and add PFAS treatment ("**EOCWD Project**").

- The City plans to construct two new wells in its service area ("**City Wells Project**") resulting in a pumping increase by the City of _____ AFY, at which the City will add PFAS treatment. The closest new City well will be located _____ miles from the IRWD Project and _____ miles from the EOCWD Project.

OCWD has modeled the well drawdown impacts of the proposed increased pumping under the IRWD Project and the proposed increased pumping under the EOCWD Project. OCWD's modeling demonstrates that the groundwater drawdown resulting from those projects will have a less than significant impact on IRWD's, EOCWD's and the City's existing wells. OCWD will model pumping from the City Wells Project, and OCWD expects the modeling to demonstrate that the drawdown impacts from the City's new wells will also have a less-than-significant impact on IRWD's and EOCWD's wells.

In an effort to facilitate the Parties' mutual interests in effectively pumping and treating groundwater under the projects described above, the Parties acknowledge and agree to the following:

1. Projected Pumping Impacts Not Significant. The Parties have each determined that the other Parties' projects and pumping as described above will have a less-than-significant impact on that Party's own projects or pumping identified above.

2. CEQA. Each Party will comply with the California Environmental Quality Act ("**CEQA**") in connection with its own project, including responding to all comments submitted by the other Parties on CEQA documentation. However, the Parties shall not challenge any aspect of the projects or the CEQA documents associated with the IRWD Project, the EOCWD Project, or the City Wells Project. The Parties acknowledge that each of their projects will proceed on different timelines, and in an effort to ensure all Parties' compliance with this provision and in order to discourage breach, the Parties hereby agree to toll the statute of limitations in connection with challenging any of the projects under CEQA until 36 days following the last Notice of Exemption or Notice of Determination filed for any of the three projects.

3. City of Orange-IRWD Matters. This Term No. 3 applies only to the City and IRWD, and not to EOCWD. EOCWD's approval of this letter agreement does not imply approval or concurrence with the details of this term.

3.1 IRWD and the City entered into a Second Amended Agreement for Water Supply and Service, Sewer and Reclaimed Water Supply and Service, and Natural Treatment System Service ("**Second Amended Agreement**") dated August 28, 2006. Under the Second Amended Agreement, IRWD provides retail services to customers in the Santiago Hills II and East Orange Area I developments within the City's jurisdiction, subject to certain limitations. Section 11 of the Second Amended Agreement provides (emphasis in original):

> Groundwater Production. ORANGE and IRWD will review and evaluate cooperative groundwater production opportunities. Any municipal groundwater production wells operated by IRWD within the Sphere of Influence of ORANGE shall only serve water customers within the Sphere of Influence of ORANGE (to be determined on the basis of water accounting, showing no net export) unless otherwise authorized by ORANGE's prior written consent.

3.2 The City hereby authorizes IRWD to serve the additional water produced as part of the IRWD Project outside of the sphere of influence of the City of Orange and inside IRWD's service area. Section 11 of the Second Amended Agreement is hereby deleted and superseded by this letter agreement.

4. Other Limitations. The Parties each acknowledge that their groundwater well pumping is subject to OCWD's Basin Production Limitation, Basin Production Percentage, any assessment and surcharge validly imposed by OCWD and other contractual obligations.

5. Cooperation; Meet and Confer. If any Party experiences difficulties in pumping from one of its wells described above, then the Parties shall meet to discuss and evaluate the problems and shall develop and implement a mutually-acceptable solution to any identified impacts, which could include changing pumping patterns or providing each other temporary water supply assistance.

6. Attorneys' Fees. If any Party brings a declaratory or other legal or equitable action against another Party in connection with this letter agreement, then the prevailing party will be entitled to recover from the losing party all of its costs and expenses, including court costs and reasonable attorneys' fees.

The Parties hereby agree to the terms set out above.

East Orange County Water District

By:_____
Print Name/Title:

City of Orange

By:_____
Print Name/Title:

Irvine Ranch Water District

By:_____
Paul A. Cook, General Manager