

AGENDA
IRVINE RANCH WATER DISTRICT
ENGINEERING AND OPERATIONS COMMITTEE MEETING
TUESDAY, APRIL 19, 2022

This meeting will be held in-person at the District's headquarters located at 15600 Sand Canyon Avenue, Irvine, California. The meeting will also be broadcasted via Webex for those wanting to observe the meeting virtually.

To observe this meeting virtually, please join online using the link and information below:

Via Web: <https://irwd.webex.com/irwd/j.php?MTID=mae108464a00e0a54d2ee9a6e2d3834a2>

Meeting Number (Access Code): 2489 272 8733

Meeting Password: pD7EpvemR43

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

CALL TO ORDER 1:30 p.m.

ATTENDANCE Committee Chair: Doug Reinhart _____
 Committee Member: Karen McLaughlin _____

<u>ALSO PRESENT</u>	Paul Cook	_____	Kevin Burton	_____	Wendy Chambers	_____
	Jose Zepeda	_____	Paul Weghorst	_____	Cheryl Clary	_____
	Steve Choi	_____	Jim Colston	_____	Fiona Sanchez	_____
	Rich Mori	_____	Eric Akiyoshi	_____	Richard Mykitta	_____
	Jacob Moeder	_____	Malcolm Cortez	_____	Ken Pfister	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____

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. Public comments 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, April 19, 2022.

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.
4. Determine which items may be approved without discussion.

ACTION

5. ORANGE HEIGHTS ZONE 5 TO 6 AND ZONE C+ TO E PUMP STATIONS AND ZONE 6 RESERVOIR CONSULTANT SELECTION– MOEDER / MORI / BURTON

Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with Lee & Ro in the amount of \$602,000 for engineering design services for the Zone 5 to 6 and Zone C+ to E Pump Stations, Projects 07136 and 07139; and authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$484,000 for engineering design services for the Orange Heights Zone 6 Reservoir, Project 07138.

6. LAKE FOREST WELL 2 TREATMENT SYSTEM CONSULTANT SELECTION – SPANGENBERG / CORTEZ / BURTON

Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$340,729 for design engineering services for the Lake Forest Well 2 Treatment System, Project 11218.

OTHER BUSINESS

7. Directors' Comments
8. 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.

April 19, 2022

Prepared by: J. Moeder / R. Mori

Submitted by: K. Burton

Approved by: Paul A. Cook 

ENGINEERING AND OPERATIONS COMMITTEE

ORANGE HEIGHTS ZONE 5 TO 6 AND ZONE C+ TO E PUMP STATIONS AND ZONE 6 RESERVOIR CONSULTANT SELECTION

SUMMARY:

The Irvine Community Development Company (ICDC) is developing the Orange Heights development (formerly Santiago Hills II) located in the City of Orange along Santiago Canyon Road between the 261 Toll Road and Jamboree Road. The Sub-Area Master Plan for the development identifies the need for a new Zone 5 to 6 domestic water pump station, Zone C+ to E recycled water pump station, and a Zone 6 domestic water reservoir. Staff developed the design of these facilities in 2016 before ICDC postponed the schedule for this development and is now restarting the engineering contracts for design of these facilities. Staff recommends the Board:

- Authorize the General Manager to execute a Professional Services Agreement with Lee & Ro in the amount of \$602,000 for engineering design services for the Zone 5 to 6 and Zone C+ to E Pump Stations project, and
- Authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$484,000 for engineering design services for the Orange Heights Zone 6 Reservoir project.

BACKGROUND:

The proposed Zone 5 to 6 and Zone C+ to E pump stations, which will be located next to the existing Zone 5 to 8 pump station along Santiago Canyon Road, will supply domestic water and recycled water to the new development. The proposed Zone 5 to 6 domestic water pump station will supply the proposed 2.4-million-gallon (MG) Zone 6 domestic water reservoir that will serve the development. The proposed Zone C+ to E recycled water pump station will directly feed the entire development through a closed loop system.

In 2016, when ICDC was actively advancing development, staff separated the IRWD facility improvements into two design contracts: 1) the Zone 5 to 6 and Zone C+ to E Pump Stations Project, and 2) the Zone 6 Reservoir Project. IRWD contracted with Lee & Ro for the new pump stations and with Kleinfelder for the reservoir. Both consultants progressed design activities until November 2016 when ICDC halted its development plans, and staff stopped the design of both projects. The pump station design was stopped at the 30 percent completion level, and the reservoir design was stopped at the 60 percent completion level.

In February 2022, ICDC notified staff that development of the Santiago Hills II area, now called Orange Heights, is being restarted. To meet ICDC's aggressive schedule for the development, ICDC requested that IRWD's facilities be completed and online by September 2025.

Consultant Selection:

Staff contacted Lee & Ro and Tetra Tech to negotiate a scope of work and fee to complete the design of the pump stations and reservoir, respectively. The Lee & Ro design team that worked on the project in 2016 is still intact and is ready to continue the project. Staff did not contact Kleinfelder as it has lost key staff members since working on the project in 2016 and has not worked on recent IRWD reservoir projects. Tetra Tech has recently completed the design of the 3.7 MG Zone 1 and the 1.3 MG Fleming reservoirs. It has performed well on both projects and is ready to complete the project in accordance with the required completion schedule.

Lee & Ro and Tetra Tech submitted proposals to complete the designs. Staff negotiated both proposals with the respective consultants and confirmed that the scopes of work and fees are consistent with other recently completed pump station and reservoir projects. Staff recommends the Board authorize the General Manager to execute Professional Services Agreements in the amount of \$602,000 with Lee & Ro for the design of Zone 5 to 6 and Zone C+ to E pump stations and in the amount of \$484,000 with Tetra Tech for the design of the Zone 6 Reservoir.

Design and Construction Schedule:

Staff anticipates that the project will be designed and constructed according to the following schedule:

Notice of Award (Anticipated)	April 26, 2022
Kick-Off Meeting	May 2022
Updated Basis of Design Report	June 2022
Final Plans Approved	March 2023
Construction Notice of Award	May 2023
Construction Completion – Pump Stations	March 2025
Construction Completion – Reservoir	April 2025

FISCAL IMPACTS:

The Zone 5 to 6 Pump Station and Zone C+ to E Pump Station, Projects 07136 and 07139, and the Zone 6 Reservoir Project, Project 07138, are included in the FY 2021-22 Capital Budget. The existing budgets are sufficient to fund the recommendations presented herein.

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA). In compliance with CEQA, the California Public Resources Code Section 21000 et. seq., and per the California CEQA Guidelines in the Code of Regulations, Title 14, Division 6, Chapter 3, as lead agency, the City of Orange filed a Notice of Determination with the County of Orange on November 8, 2005. On July 12, 2016, the City of Orange adopted an Addendum to Santiago Hills Environmental Impact Report (EIR) to address changes in the development since certification, including the construction of the Zone 5 to 6 and Zone C+ to E Pump Station and Zone 6 Reservoir.

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement with Lee & Ro in the amount of \$602,000 for engineering design services for the Orange Heights Zone 5 to 6 and Zone C+ to E Pump Stations, Projects 07136 and 07139; and authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$484,000 for engineering design services for the Orange Heights Zone 6 Reservoir, Project 07138.

LIST OF EXHIBITS:

Exhibit “A” – Lee & Ro Scope of Work and Fee Proposal
Exhibit “B” – Tetra Tech Scope of Work and Fee Proposal

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March 30, 2022

Mr. Richard Mori, PE
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, Ca 92618

Subject: IRWD Santiago Hills Zone 5 to 6 and Zone C+ to E Booster Pump Stations

(Rev 2)

Dear Mr. Mori:

The project has a PDR that has already gone through several preliminary reviews with IRWD. Due to the more than five years that have passed since the PDR was issued, IRWD will re-review the PDR and it is anticipated that LEE + RO will receive minor comments to the PDR from IRWD. LEE + RO will incorporate the comments into the PDR and re-issue as final. Other elements of the PDR will have to be updated and or reviewed, such as the cost estimates, upsizing of the generator to feed both the recycled and potable water BPS, and include updated Zone C+ Tank information since it is now constructed and as-builts are available.

Below is preliminary anticipated schedule showing engineering design through bidding. The schedule will be further refined in the Final PDR.

Preliminary Schedule

Major Task Anticipated Milestones	Completion After NTP (Calendar Days)	Start	Finish	Duration (Calendar Days)
Contract NTP	0	05/02/22	05/02/22	1
Variance NTP	1	05/03/22	05/03/22	1
Kick-Off-Meeting	8	05/10/22	05/10/22	1
Receive Draft PDR Comments	20	05/02/22	05/22/22	20
Prepare Final PDR	40	05/02/22	06/11/22	40
Prepare & Issue 60%	98	06/12/22	08/08/22	57
Receive 60% Design Comments	119	08/09/22	08/29/22	20
Prepare & Issue 90%	165	08/30/22	10/14/22	45
Receive 90% Design Comments	186	10/15/22	11/04/22	20
Prepare & Issue 100%	213	11/05/22	12/01/22	26
Receive 100% Design Comments	229	12/02/22	12/17/22	15
Prepare & Issue Final	248	12/18/22	01/05/23	18
Contracts Issue Bid Release	263	01/06/23	01/20/23	14
Construction Bids Due	284	01/21/23	02/10/23	20

The anticipated drawings are as follows:

GENERAL		
SHEET	DWG #	DESCRIPTIONS
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	SITE DEMOLITION PLAN
CIVIL		
7	C-1	YARD PIPING PLAN
8	C-2	PAVING AND GRADING PLAN
9	C-3	WALL AND SIGNAGE PLAN
10	C-4	CIVIL DETAILS - 1
11	C-5	CIVIL DETAILS - 2
12	C-6	CIVIL DETAILS - 3
ARCHITECTURAL		
13	A-1	ARCHITECTURAL ABBREVIATIONS, NOTES , & SCHEDULES
14	A-2	ARCHITECTURAL FLOOR PLAN
15	A-3	ARCHITECTURAL ROOF PLAN
16	A-4	ARCHITECTURAL ELEVATIONS - 1
17	A-5	ARCHITECTURAL ELEVATIONS - 2
18	A-6	ARCHITECTURAL DETAIL - 1
19	A-7	ARCHITECTURAL DETAIL - 2
STRUCTURAL		
20	S-1	STRUCTURAL ABBREVIATIONS & NOTES
21	S-2	STRUCTURAL FLOOR PLAN
22	S-3	STRUCTURAL ROOF FRAMING PLAN
23	S-4	STRUCTURAL - SURGE TANK FOUNDATION PLAN & DETAILS
24	S-5	STRUCTURAL SECTIONS - 1
25	S-6	STRUCTURAL SECTIONS - 2
26	S-7	STRUCTURAL DETAILS - 1
27	S-8	STRUCTURAL DETAILS - 2
28	S-9	STRUCTURAL DETAILS - 3
29	S-10	STRUCTURAL DETAILS - 4
30	S-11	STRUCTURAL DETAILS - 5
31	S-12	STRUCTURAL DETAILS - 6
MECHANICAL		
32	M-1	MECHANICAL MATERIALS LIST & GENERAL NOTES
33	M-2	MECHANICAL FLOOR PLAN
34	M-3	MECHANICAL SECTIONS - 1
35	M-4	MECHANICAL SECTIONS - 2
36	M-5	MECHANICAL SECTIONS - 3
37	M-6	SURGE TANK(S) PLAN
38	M-7	SURGE TANK(S) SECTION AND DETAILS
39	M-8	MECHANICAL DETAILS - 1
40	M-9	MECHANICAL DETAILS - 2

41	M-10	MECHANICAL DETAILS - 3
42	M-11	MECHANICAL DETAILS - 4
PLUMBING		
43	P-1	DRAINAGE PLAN
44	P-2	RESTROOM PLAN AND SECTIONS
HVAC		
45	HVAC-1	HVAC PLAN
46	HVAC-2	HVAC SCHEDULE
47	HVAC-3	HVAC DETAILS
ELECTRICAL		
48	E-1	ELECTRICAL SYMBOLS & ABBREVIATIONS
49	E-2	ELECTRICAL OVERALL SITE PLAN
50	E-3	ELECTRICAL ENLARGE SITE PLAN (SURGE TANK(S))
51	E-4	ELECTRICAL POWER PLAN
52	E-5	ELECTRICAL CONTROL AND SIGNAL PLAN
53	E-6	ELECTRICAL SINGLE LINE DIAGRAM
54	E-7	ELECTRICAL PANEL ELEVATIONS
55	E-8	ELECTRICAL CABLE AND CONDUIT SCHEDULE - 1
56	E-9	ELECTRICAL CABLE AND CONDUIT SCHEDULE - 2
57	E-10	ELECTRICAL GROUNDING & LIGHTING PLAN
58	E-11	ELECTRICAL LIGHTING SCHEDULE
59	E-12	ELECTRICAL DETAILS - 1
60	E-13	ELECTRICAL DETAILS - 2
61	E-14	CONTROL SCHEMATIC - VARIABLE SPEED PUMPS
62	E-15	CONTROL SCHEMATIC - CONSTANT SPEED PUMPS
63	E-16	CONTROL SCHEMATIC - VENTILATION FANS
64	E-17	PLC PANEL LAYOUT
65	E-18	CONTROL PANEL POWER WIRING - 1
66	E-19	CONTROL PANEL POWER WIRING - 2
67	E-20	CONTROL PANEL I/O WIRING - 1
68	E-21	CONTROL PANEL I/O WIRING - 2
69	E-22	CONTROL PANEL I/O WIRING - 3
70	E-23	CONTROL PANEL I/O WIRING - 4
71	E-24	CONTROL PANEL I/O WIRING - 5
72	E-25	CONTROL PANEL I/O WIRING - 6
73	E-26	CONTROL PANEL I/O WIRING - 7
74	E-27	CONTROL PANEL I/O WIRING - 8
75	E-28	CONTROL PANEL I/O WIRING - 9
76	E-29	CONTROL PANEL I/O WIRING - 10
77	E-30	CONTROL PANEL I/O WIRING - 11
78	E-31	CONTROL PANEL I/O WIRING - 12
79	E-32	UPS PANEL POWER DISTRIBUTION AND CONTROLS
80	E-33	COMMUNICATION EQUIPMENT DETAILS
INSTRUMENTATION		
81	I-1	INSTRUMENTATION SYMBOLS & ABBREVIATIONS
82	I-2	PROCESS INSTRUMENTATION DIAGRAM - DOMESTIC WATER PUMPS
83	I-3	PROCESS INSTRUMENTATION DIAGRAM - RECYCLED WATER PUMPS
84	I-4	PROCESS INSTRUMENTATION DIAGRAM - PUMP STATION GENERAL
85	I-5	PROCESS INSTRUMENTATION DIAGRAM - SURGE TANK(S)

86	I-6	PROCESS INSTRUMENTATION DIAGRAM - GENERATOR
87	I-7	COMMUNICATION BLOCK DIAGRAM
88	I-8	INSTRUMENTATION DETAILS - 1
89	I-9	INSTRUMENTATION DETAILS - 2

SCOPE OF WORK

Task 1 Project Management

The Engineer shall conduct project management activities to ensure adherence to scope, schedule, and budget; promote efficient communication between the Engineer, IRWD, and others as required; and implement an effective quality assurance/quality control (QA/QC) program.

- A. Preparation of Project Status Reports. Prepare weekly and monthly status reports. Each weekly status report shall be submitted on Monday and shall consist of a brief (one or 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 shall be submitted on the last Thursday of the month and shall provide more detail, summarizing the work completed and reviewing work status relative to budget and schedule. The project schedule shall also be updated on a monthly basis for inclusion in the monthly status report.
- B. Meetings and Workshops. The Engineer shall organize, attend, and conduct meetings and workshops as required; prepare and submit meeting agendas for IRWD review and concurrence at least five days prior to the meeting; and prepare draft and final minutes for all meetings and workshops and submit them to IRWD within one week of the meeting. The anticipated meetings and workshops are as follows.

Meeting/Workshop
1. General project management and design development meetings (meetings as needed and assumes most meetings will be conducted virtually in TEAMS).
2. Site Visits (assumes 2 site visits)
3. Coordination activities with jurisdictional agencies and project stakeholders including, but not limited to, City of Orange Fire Department, The Irvine Company, Southern California Edison (assumes 1 meeting per agency)
4. Preliminary Design Workshop
5. Present the 60% design, discuss IRWD's comments, and discuss how the outstanding items were addressed
6. Present the 90% design, discuss IRWD's comments, and discuss how the outstanding items were addressed
7. Present the 100% design, discuss IRWD's comments, and discuss how the outstanding items were addressed

- C. Quality Assurance/Quality Control. The Engineer shall develop and implement proven QA/QC measures throughout the project to ensure ongoing and consistent quality control throughout all project phases. As part of the QA/QC measures, the Engineer shall capture comments from review

meetings and submittals and thoroughly check the work product to ensure that comments are addressed.

Task 2 Preliminary Design

The Engineer shall perform the following subtasks as part of the preliminary design phase. The subtasks shall be documented and compiled into a Preliminary Design Report (PDR) as summarized below.

- A. Electrical and Controls. The PDR will be modified to have the emergency generator resized to feed both the recycled and potable water BPS.
- B. Project Schedule. The Engineer shall prepare an updated project schedule, which shall include 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 in accordance with the proposed schedule. The schedule shall be prepared in Microsoft Project.
- C. Opinion of Probable Construction Cost. The Engineer shall prepare an updated detailed and itemized opinion of probable construction cost for the proposed facilities.
- D. Preliminary Design Report (PDR).

LEE + RO will incorporate the comments to the PDR and re-issue as final. Upon resolution and incorporation of review comments, one (1) electronic copy in PDF shall be submitted. PDR assumptions:

- i. It is anticipated that no significant changes are included in the 2022 SAMP report, and this proposal assumes no changes will be required to the PDR's hydraulic appendices and the surge study appendices. As such, any changes required to the hydraulics or surge study can be done, but at added cost.
- ii. The Site Master Plan preferred layout has previously been agreed to by all parties. We anticipate only minor modifications to the plans to reissue into the Final PDR.
- iii. We anticipate having to repackage and pickup only minor comments to the Draft PDR issued in 2017.
- iv. Work still to be completed by subconsultants includes geotechnical report, potholing, and survey. This work will commence shortly after the new NTP is received, and will not be included in the PDR, but information will be included in the 60% design. The previous hydraulic surge study was finalized in 2016 and also completed by one of our subconsultants. We do not anticipate making any changes to Appendix B-1 (*Hydraulic Analysis Technical Memorandum*) and B-2 (*Santiago Hills Zone 5 to 6 Domestic Water Booster Pump Station Pressure Surge Analysis TM and Zone C+ to E BPS Pressure Surge Analysis TM prepared by Flow Science, Inc.*). As such, any changes required can be done, but at added cost.

Task 3 Final Design

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

- A. Project Manual. The Engineer shall prepare a Project Manual in standard IRWD format. IRWD's front end documents shall be utilized, and the Engineer shall assess IRWD's documents to determine any needed supplemental general/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 any connections and tie-ins to existing IRWD facilities. The Project Manual shall also include the IRWD General Technical Specifications, modifications thereto, and any project specific technical specifications. It is incumbent upon the selected Engineer to familiarize themselves with IRWD's standards, use the standards as a starting point, and modify them as needed for the project.
- B. Construction Plans. The Engineer shall 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. Separate sheets with sheet index/location map/legend, general notes, index map, construction notes, condensed profiles, phasing, and detail connections shall be included. Construction notes shall be used (callouts on the plans are not allowed) on all construction drawings. Existing IRWD utilities shall be identified on the plan view by as-built plan set number with the pipeline material and IRWD pressure zone labeled. The index map shall include sheet legend, final alignment, valve locations, surrounding streets, and significant project site locations. Construction plans shall be prepared using the NAVD 88 and NAD 83 survey standards.
- C. Utility Research. The Engineer shall review the existing information and identify the location of existing underground utilities and/or other physical features in the immediate vicinity of the proposed facilities and appurtenances. Information on utilities including material, size, horizontal and vertical locations shall be identified. The Engineer shall include budget to pothole four (4) existing utilities.
- D. Electrical/Instrumentation. The Engineer shall prepare an operational scheme including P&IDs, single line diagrams, PLC loop drawings, control equipment list, and method of integrating the proposed facilities into IRWD's existing SCADA system. Prior to this process, the Engineer shall meet with IRWD electrical/automation staff to incorporate IRWD's standard operations, PLC and SCADA programming, and equipment tagging requirements into the design. The Engineer shall develop and provide the operational scheme and functional descriptions (in plain English) for District review and approval.
- E. SCE Final Service Plan. The Engineer shall coordinate with SCE early in the design process to obtain the Final Service Plan, which shall be inserted in the appendix of the Project Manual. This task shall include the coordination efforts necessary to communicate the project requirements, address any comments from SCE, and implement all requirements into the project design.
- F. Project Schedule. The Engineer shall maintain and consistently update the project schedule, which shall include 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 in accordance with the proposed schedule. The schedule shall be prepared in Microsoft Project.

- G. Opinion of Probable Construction Cost. The Engineer shall prepare a detailed and itemized opinion of probable construction cost for the proposed facilities, which shall be updated and submitted with each of the design deliverables.
- H. Architectural Renderings. The Engineer shall prepare architectural renderings of the site based on the preferred site plan with different building material/color options. The renderings shall depict the pump station building and all exterior facilities located on the site. The renderings shall include, at a minimum, a bird's eye view and a view from each direction of the site including the proposed building(s) and all site improvements. The building options shall include the use of only noncombustible materials, evaluation of up to three (3) different roof styles (e.g. parapet, gable, sloped, etc.) with closed eaves, and analysis of three (3) different types of architectural treatment using CMU block.
- I. Geotechnical Investigation. The Engineer shall conduct a geotechnical investigation to adequately characterize the conditions at the proposed pump station site. Performance of a geotechnical subsurface evaluation consisting of the excavation, logging and sampling of two small-diameter borings up to approximately 30 feet below adjacent grades or to refusal (whichever is shallower). Borings will be backfilled with a cement bentonite grout in accordance with the boring permit. Excess drill cuttings will be spread thinly in suitable areas onsite. The following tasks, at a minimum, shall be conducted as part of the geotechnical investigation:
- a. Perform a geotechnical reconnaissance to observe site conditions and to locate exploratory borings.
 - b. Conduct soil borings necessary to observe, test and classify soils, and monitor groundwater. The number, location, and depth of borings shall be adequate to characterize the soils to at least five feet below any proposed structure, pipeline invert, or pump cans.
 - c. Collect soil samples for testing as needed based on Engineer's professional judgment.
 - d. Plot the location of all soil borings on a map and attach the map to the Geotechnical Report. Include complete logs of the soil profiles in the report.
 - e. Conduct laboratory tests of selected samples to evaluate moisture content, density, gradation, Atterberg limits, consolidation, shear resistance, expansion, R-value, corrosivity, and/or other criteria as recommended by the geotechnical engineer or requested by the structural engineer for the structural design.
 - f. Prepare a geotechnical report presenting findings, conclusions, and recommendations for the design and construction of the proposed facilities. The report shall include, at a minimum, (1) groundwater presence and levels, (2) construction dewatering requirements, (3) pipe bedding requirements, (4) trench shoring requirements, (5) settlement potential, (6) excavability of soils, (7) location of rock, (8) backfill suitability, and (9) backfill compaction. The report shall emphasize specific concerns regarding construction methods and the integrity of pipelines, pavements, and structures. The report shall make recommendations regarding the design of facilities. Recommendations shall include (1) active, at-rest, passive and dynamic earth pressures, (2) foundation type, (3) allowable bearing pressure, (4) coefficient of friction between the foundation and soils/subgrade, (5) foundation design data, (6) settlement potential, (7) pipe bedding, (8) maximum cut slope requirements, (9) structural needs, (10) groundwater dewatering well(s) design criteria, and/or 11) other standard design criteria.
 - g. One (1) electronic copy of the Geotechnical Report shall be provided as a PDF.

J. Topographic Mapping. The Engineer shall conduct appropriate surveying for the proposed facilities including, but not limited, to the following:

- Establish survey ground control using NAD83 coordinates and NAVD88 county benchmark elevations,
- Provide contour mapping at 10 scale with 1-ft contours, and
- Field locate and add obscured surface features for all areas of the project.

The Engineer shall establish horizontal and vertical control and shall provide topographic maps to be used in the construction drawings for the proposed facilities and to facilitate preparation of detailed plans. An electronic copy of the topographic maps shall be provided to IRWD.

K. Permits. The Engineer shall make applications and secure all permits with appropriate agencies. The permit acquisition process shall be initiated as early as practical to avoid project delay. Copies of completed permits and approvals shall be inserted in the Appendix of the Project Manual. IRWD will reimburse the Engineer for actual permit fees without surcharge. At a minimum, IRWD anticipates the following.

- a. Fire Master Plan. The Santiago Hills Zone 5 Reservoir is equipped with a Reservoir Management System (RMS) that utilizes liquid sodium hypochlorite and aqueous ammonia. The City of Orange Fire Department previously reviewed and issued a Fire Master Plan for the facility. IRWD anticipates updating the Fire Master Plan to account for the new improvements, including modifications to the site access. The Engineer shall review and update the existing Fire Master Plan and secure the approval of the City of Orange Fire Department.

L. Final Design Deliverables. Deliverables shall be made as follows:

- a. Each major deliverable will include one electronic copy.
- b. The final design submittal will include One (1) full size final stamped and signed reproducible plan set on bond and one (1) original signed Project Manual for District's signatures.

M. Addenda Preparation and Pre-Bid Meeting. During the bidding period, the Engineer shall assist with providing information and clarification of bid documents to prospective bidders. This shall include the preparation of addenda including revisions to the design plans and specifications and assistance with addressing bidder questions. At a minimum, addenda preparation activities shall include:

- Plan Revisions: The Engineer shall budget twenty (20) hours of appropriate staff time for plan revisions to the construction drawings.
- Specification Revisions: The Engineer shall budget fifteen (15) hours of appropriate staff time for revisions or additions to the project specifications.
- Bidder Questions: The Engineer shall budget fifteen (15) hours of appropriate staff time to address and respond to bidder questions.
- Pre-Bid Meeting: During the bidding period, the Engineer shall attend one (1) two-hour pre-bid meeting that will be conducted by IRWD. This may include a site visit with potential bidding contractors.

LEE & RO will provide the above services per the enclosed Fee Breakdown Exhibit for a not to exceed amount of \$602,000.

If you have any questions, please call me at (858) 332-4284.

Sincerely,

A handwritten signature in cursive script, reading "Eric D. Lovering". The signature is fluid and stylized, with a large loop at the end of the last name.

Eric Lovering, P.E.
Chief Engineer

Enclosures – Exhibit 1: Fee Breakdown
Exhibit: FY 2021-2022 Hourly Billing Rate Schedule A
Exhibit: FY 2022 Other Direct Costs (ODC) Billing Schedule

Exhibit 1: FEE BREAKDOWN
Santiago Hills Zone 5 to 6 and Zone C+ to E Booster Pump Stations

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	TOTAL FEES
		E8	E7	E6	E5	E3	T4	T3	A2					
		Billing Rates (\$/Hour)									1.00			
		PROJECT TASK DESCRIPTION	\$283	\$257	\$238	\$214	\$179	\$155	\$138		\$136			
1	Project Management													
1.A	Weekly / Monthly Status Reports	26				16			10	52	\$11,582			\$11,582
1.B	Meetings and Workshops													
1.B.1	General Project Management and Design Development Meetings	24				24				48	\$11,088	\$100		\$11,188
1.B.2	Site Visits	2		10		10				22	\$4,736	\$300		\$5,036
1.B.3	Coordination Meetings with Agencies and Stakeholders		16			16				32	\$6,976	\$150		\$7,126
1.B.4	Preliminary Design Workshop	4				4				8	\$1,848	\$100		\$1,948
1.B.5	60% Design Review	4				4				8	\$1,848	\$100		\$1,948
1.B.6	90% Design Review	4				4				8	\$1,848	\$100		\$1,948
1.B.7	100% Design Review	4				4				8	\$1,848	\$100		\$1,948
1.C	QA/QC	40	60	40					24	164	\$39,524	\$100		\$39,624
	SUBTOTAL TASK 1 - PROJECT MANAGEMENT	108	76	50	0	82	0	0	34	350	\$81,298	\$1,050	\$0	\$82,348
2	Preliminary Design													
2.A	Electrical and Controls	2		16				12		30	\$6,030			\$6,030
2.B	Project Schedule	4			16					20	\$4,556			\$4,556
2.C	Opinion of Probable Construction Cost	2	4	4	4	12				26	\$5,550			\$5,550
2.D	Preliminary Design Report (PDR)	24		60		60	36		16	196	\$39,568	\$350		\$39,918
	SUBTOTAL TASK 2 - PRELIMINARY DESIGN	32	4	80	20	72	36	12	16	272	\$55,704	\$350	\$0	\$56,054
3	Final Design													
3.A	Project Manual	36		36		42			36	150	\$31,170			\$31,170
3.B	Construction Plans	60	60	250		300	200	250		1,120	\$211,100			\$211,100
3.C	Utility Research					16	4			20	\$3,484		\$5,500	\$8,984
3.D	Electrical/Instrumentation	24	40	50		250	150	200		714	\$124,572			\$124,572
3.E	SCE Final Service Plan	2	2		20					24	\$5,360			\$5,360
3.F	Project Schedule	5			12					17	\$3,983			\$3,983
3.G	Opinion of Probable Construction Cost	4		4		12				20	\$4,232			\$4,232
3.H	Architectural Renderings			8		18	60			86	\$14,426			\$14,426
2.I	Geotechnical Investigation	2				4				6	\$1,282		\$21,000	\$22,282
2.J	Topographic Mapping	2				4				6	\$1,282		\$11,500	\$12,782
2.K	Permits					16				16	\$2,864	\$600		\$3,464
2.L	Final Design Deliverables					40				40	\$7,160	\$1,208		\$8,368
3.M	Addenda Preparation and Pre-Bid Meeting	4		16		40	5			65	\$12,875			\$12,875
	SUBTOTAL TASK 3 - FINAL DESIGN	139	102	364	32	742	419	450	36	2,284	\$423,790	\$1,808	\$38,000	\$463,598
	TOTAL NOT TO EXCEED	279	182	494	52	896	455	462	86	2,906	\$ 560,792	\$ 3,208	\$ 38,000	\$ 602,000

LEE & RO, Inc.
FY 2021 -2022 HOURLY BILLING RATE SCHEDULE - A

(Effective From November 1, 2021 to October 31, 2022)

PERSONNEL CLASSIFICATION			BILLING RATES (\$/HOUR)
ENGINEERS			
Engineer 8	E8	Managing Engineer	\$283
Engineer 7	E7	Supervising Engineer	\$257
Engineer 6	E6	Principal Engineer	\$238
Engineer 5	E5	Senior Engineer	\$214
Engineer 4	E4	Engineer	\$199
Engineer 3	E3	Associate Engineer	\$179
Engineer 2	E2	Assistant Engineer	\$155
Engineer 1	E1	Junior Engineer	\$138
CAD / DESIGNERS			
Designer 6	T6	Principal Designer	\$199
Designer 5	T5	Principal Designer	\$179
Designer 4	T4	Principal Designer	\$155
Designer 3	T3	Principal Designer	\$138
Designer 2	T2	Principal Designer	\$116
Designer 1	T1	Principal Designer	\$97
FIELD PROFESSIONALS			
Field Professional 5	F5	Senior Resident Engineer	\$214
Field Professional 4	F4	Resident Engineer	\$199
Field Professional 3	F3	Senior Inspector	\$179
Field Professional 2	F2	Inspector	\$155
Field Professional 1	F1	Assistant Inspector	\$138
ADMINISTRATIVE			
Administrative 4	A4	Senior Contract Manager	\$152
Administrative 3	A3	Contract Manager	\$141
Administrative 2	A2	Senior Word Processor	\$136
Administrative 1	A1	Word Processor / Admin. Assistant	\$121

LEE + RO

FY 2022 Other Direct Cost (ODC) Billing Rate Schedule

(Effective from November 1, 2021 to October 31, 2022)

Automobile Mileage	IRS Published Rate
In-house Reproduction	\$0.08 / sheet (8.5 x 11 Bond B & W) \$0.20 / sheet (8.5 x 11 Bond Color) \$0.15 / sheet (11 x 17 Bond B & W) \$0.50 / sheet (11 x 17 Color) \$1.25 / sheet (24 x 36 Bond)
Mylar Original Drawing	\$8.00 / sheet (24 x 36 or 22 x 34)
Computers & Work Stations	No Charge
Subconsultant Mark-up	Subconsultant Invoice Amount Plus 5%, Unless Client Specifies Otherwise
Bulk Reproduction by Outside Printing Firm	Invoice amount plus 10% Handling Charge
Overnight Mailing, Air Fare, Project-Specific Software, Equipment Rental, etc.	At Cost



March 24, 2022

Transmitted via E-mail: Moeder@irwd.com
Cho@irwd.com

Jacob M. Moeder, P.E.
Engineering Manager, Dams & Storage
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

**Reference: Proposal to Provide Engineering Services for the Santiago Hills (Orange Heights)
Zone 6 Domestic Water Reservoir Project**

Dear Mr. Moeder,

Tetra Tech is pleased to submit our proposal for engineering design services for the Santiago Hills (Orange Heights) Zone 6 Domestic Water Reservoir Project. [We value the relationship that has been built with IRWD on our past reservoir projects, the 1.3 MG Fleming Zone 8 and the 3.7 MG Zone 1 Reservoirs.](#) It is our desire to once again provide the same consistently diligent and faithful service to the District.

PROJECT BACKGROUND

IRWD's Santiago Hills (Orange Heights) Zone 6 Domestic Water Reservoir Project will support the new Irvine Community Development (ICDC) Santiago Hills II (SHII) development. The Irvine Company is now calling this development Orange Heights instead of Santiago Hills II development. Based on peak water and fire flow demands identified in the Santiago Hills II Sub Area Master Plan Update, a total volume of 2.4 million gallons (MG) will be needed to support the development. A new domestic water reservoir will be constructed, which will be fed by a new Zone 5-6 pump station that will be constructed at the site of the existing Zone 5 and Zone C+ reservoirs.

The general improvements that are associated with the Santiago Hills (Orange Heights) Zone 6 Reservoir include:

- New 2.4 MG buried concrete reservoir with a high water level (HWL) of 892 feet located at the northeast portion of the SHII Development;
- Reservoir appurtenances including internal tank mixer, chlorine analyzer, and reservoir subdrain system;
- New 12-inch diameter reservoir inlet, outlet, overflow and drainage pipelines, including isolation valve vault;
- On-site pipelines, including water main, storm drain and sewer main for future Reservoir Management System (RMS);
- Site improvements, including access road (alignment by others) from the development to the reservoir and provisions for installation for future RMS; and
- Electrical service and telemetry.

Kleinfelder was selected by IRWD to perform the design of the reservoir. The preferred reservoir location was selected by ICDC, Kleinfelder and the District. Kleinfelder submitted the Final Preliminary Design Report for the project on November 1, 2016. Kleinfelder submitted the 60% design of the Zone 6 Reservoir Project on November 17, 2016. The 60% design was not distributed for review by IRWD. IRWD informed Kleinfelder that the project was to be put on hold indefinitely as a result of a delay in beginning construction on the Santiago Hills II Development by ICDC. IRWD has requested Tetra Tech to prepare a proposal to pick up the design of the previously placed-on-hold Kleinfelder design.

KEY PROJECT ISSUES

IRWD has provided Tetra Tech with Kleinfelder's Final Preliminary Design Report (PDR) and their 60% plans. Based on our review of this information, Tetra Tech has identified the following as the key project issues that will need to be resolved to allow for the preparation of the final plans and specifications:

- IRWD will provide topographic mapping that was used by Kleinfelder in its preparation of the plans. Included will be the mapping horizontal and vertical control.
- IRWD will provide the CADD file from Kleinfelder, including coordinates for the access road alignment, pipe alignments and reservoir location.
- Confirmation of additional geotechnical boring. Based on the latitude and longitude of the center of the reservoir based on Kleinfelder's PDR, boring LGC-B14 was located almost on top of the reservoir location. Leighton, our geotechnical subconsultant, will review the available data and determine if an additional boring is required. Leighton may recommend that the boring not be performed until the mass grading by ICDC is completed in order to have the actual field geology to confirm no changes from the design assumptions.
- Verification of the Fire Agency and its requirements. Confirm: minimum width of fire lanes; maximum grade; minimum radius curves; is the site in the State Responsibility Area (SRA) and adopted high Fire Hazard Severity Zone (FHSZ); requirements of Fire Master Plan; and is a Conceptual Fuel Modification Plan required. Based on our preliminary review of the agency requirements, we are assuming the width, maximum grade and minimum radius may need to be changed (latest City of Orange Fire requirements).
- Confirmation of construction work area and turnaround by the reservoir.
- Confirm scope of grading to be completed by ICDC prior to reservoir construction and the limits of IRWD work and ICDC work regarding storm drain, water and electrical facilities. Also, confirm location of the stockpile.
- Confirm limits of terrace drain construction with ICDC work.
- Confirm with SCE the 12kV connection location.
- Review the Surge Report prepared by Flow Science.

The key design issue for Tetra Tech is to meet with ICDC to determine the site access requirements, restrictions, drainage and schedule of the mass grading of the site. Tetra Tech recommends consistent coordination meetings with ICDC to monitor mass grading and limits (point of connection) of the drain, water and electrical facilities. Coordination with ICDC will be required for future irrigation meter and pump as well as any coordination with the proposed Zone 5-6 Booster Pump Station.

SCOPE OF SERVICES

Members of our Project Team have performed a review of Kleinfelder's PDR and 60% plans as well as our previous proposal for this project. We have a good understanding of the work due to our previous reservoir projects with the District. The following is a summary of our anticipated scope of services.

Task 1: Project Management

Tetra Tech will conduct project management activities to ensure adherence to scope, schedule, and budget; promote efficient communication between Tetra Tech, IRWD, and others as required; and implement an effective quality assurance/quality control (QA/QC) program.

- A. Preparation of Project Status Reports.** Tetra Tech will prepare bi-weekly and monthly status reports. Each bi-weekly status report shall consist of a brief (one or two paragraphs) e-mail summarizing the activities

completed the previous week, the activities planned for the upcoming weeks, and critical decisions that need to be made.

Each monthly status report shall provide more detail, summarizing the work completed and reviewing work status relative to budget and schedule. The project schedule shall also be updated on a monthly basis, if needed.

- B. Meetings and Workshops.** Tetra Tech will organize, attend, and conduct meetings and workshops as required; prepare and submit meeting agendas for IRWD review and concurrence at least five days prior to the meeting; and prepare draft and final minutes for all meetings and workshops and submit them to IRWD within one week of the meeting. For budgeting purposes, Tetra Tech has assumed the following in-person meetings at a minimum.

Meeting/Workshop	Description
Kick-off meeting and follow up discussion of key issues	Two (2) one-hour meetings
Discussion of Fire Master Plan Requirements	One (1) two-hour meeting
Coordination meetings with jurisdictional agencies/ stakeholders including, but not limited to, Fire Agency, ICDC, and SCE	Five (5) two-hour meetings
Present Preliminary Basis of Design Update	One (1) two-hour meeting
Preliminary Basis of Design Update Review	One (1) two-hour meeting
Summary of Plan Changes from Kleinfelder 60% Submittal	One (1) two-hour meeting
Present the 60% design, discuss IRWD's comments, and discuss how the outstanding items were addressed	One (1) two-hour meeting
Present the 90% design, discuss IRWD's comments, and discuss how the outstanding items were addressed	One (1) two-hour meeting
Present the 100% design, discuss IRWD's comments, and discuss how the outstanding items were addressed	One (1) two-hour meeting
Final Plan Signing	One (1) two-hour meeting

- C. Quality Assurance/Quality Control.** Tetra Tech will develop and implement proven QA/QC measures throughout the project to ensure ongoing and consistent quality control throughout all project phases. As part of the QA/QC measures, Tetra Tech will capture comments from review meetings and submittals and thoroughly check the work product to ensure that comments are addressed.

Task 2: Basis of Design Update

In order for IRWD to have a paper trial of the design decisions, Tetra Tech will prepare a Basis of Design Update. The purpose of the Basis of Design Update is to verify the design decisions made in Kleinfelder's PDR. The report organization will follow the organization of Kleinfelder's PDR. Tetra Tech will provide any modifications, revisions, or additional design issues as an update to the previous submitted PDR. Tetra Tech will perform the following subtasks as part of the Basis of Design Update phase of the work. The subtasks shall be documented and compiled into the Basis of Design Update as summarized below.

- A. Background Information.** Tetra Tech will provide a comprehensive review of existing documents including: Kleinfelder's PDR and 60% plan submittal; geotechnical reports; surge report; CAD base files and topographic mapping; and previous correspondence provided by IRWD.

- B. Fire Authority.** Tetra Tech will contact the City of Orange Fire Department and Orange County Fire Authority to confirm the correct regulatory agency, the minimum width of fire lanes, maximum grades and horizontal curves for Fire Master Plan requirements and if a Conceptual Fuel Modification Plan is required. Based on search on the web, the City of Orange Fire requirements have changed since 2016, and the latest requirements are: 28 feet minimum width for hazardous fire areas (PDR and 60% have 20 feet); maximum grade of 12% (PDR and 60% are greater than 12% at two locations); and a minimum of 56 feet between compound curves (PDR and 60% have four feet).
- C. Additional Geotechnical Work.** Tetra Tech and Leighton will perform detailed review of the existing geotechnical reports and borings to determine if an additional boring is required prior to the proposed ICDC mass grading. Based on findings, Leighton will provide their recommendation whether a boring is required prior to the mass grading. Leighton may recommend that the boring not be performed until the mass grading by ICDC is completed in order to have the actual field geology to confirm no changes from the design assumptions.
- D. Update Background, Design Requirements and Existing Conditions.** Tetra Tech will update the first two sections of the PDR based on the existing direction provided by IRWD and the latest information provided by ICDC.
- E. Update Site Design.** Tetra Tech will revise the grading of the access road as required to meet the Fire Agency requirements for minimum width and slope and provide the required turn around capabilities on top of the reservoir. This will allow for the future RMS building and/or will allow the potential for fire agency to use the road to fight any potential fire within the property. Tetra Tech is not planning to re-evaluate the location of the reservoir. Tetra Tech is basing our budget on providing a new access road (holding to 28 feet wide, 10% slope (to the turnaround location) and horizontal curve requirements) and will not be evaluating alternative alignments.
- F. Reservoir Structural Design.** Tetra Tech will perform the structural calculations for the reservoir based on the latest building code and reference codes. The reservoir roof will be designed for support fire engines or H-20 loading, whichever is greater. Based on the results, Tetra Tech will summarize any impacts to the design as previously done by Kleinfelder.
- G. Reservoir Appurtenances.** Based on lessons learned from Fleming Tank and the Zone 1 Reservoir project, Tetra Tech will provide recommendations for any changes to the reservoir appurtenances, pipe connections, subdrain facilities, reservoir mixing, etc.
- H. Site Layout.** Tetra Tech will review the recommended layouts, site piping and appurtenances to confirm there are recommended by Tetra Tech. Based on our preliminary review, we are not assuming an evaluation of alternatives will be needed. Once the access road alignment and profile has been revised, the corresponding piping alignment and profile will be revised as well.
- I. Drain and Valve Vaults.** Based on lessons learned from Fleming Tank and the Zone 1 Reservoir project, Tetra Tech will provide recommendations for any changes to the two vault structures. We anticipate only minor changes, if any, will be determined to be required.
- J. Future RMS Facility.** IRWD will revisit the potential future need of the RMS facility. Tetra Tech will provide support as requested by IRWD to assist in determining if the RMS facility is required. It is recommended that the Fire Master Plan be prepared now if the RMS facility may be required in the future.
- K. Electrical Design.** Based on lessons learned from Fleming Tank and the Zone 1 Reservoir project, Tetra Tech will provide recommendations for any changes to the electrical design. We anticipate only minor changes, if any, will be determined to be required.

- L. Regulatory Permits and Approvals.** Tetra Tech will update the section regarding regulatory permits and approvals based on our latest reservoir projects. We are assuming a more focused summary of the requirements for the Fire Master Plan and ultimate approval from the Fire Agency due to the fire potential in the project area.

Tetra Tech will make applications and secure all permits with appropriate agencies. The permit acquisition process shall be initiated as early as practical to avoid project delay. Copies of completed permits and approvals shall be inserted in the appendix of the Project Manual. IRWD will reimburse Tetra Tech for actual permit fees without surcharge. Tetra Tech will include a \$5,000 allowance within their budget for the payment of permit fees in addition to the labor effort described above.

- M. Construction General Permit.** Our proposal is based on the assumption that TIC will prepare a SWPPP for the overall project and IRWD's contractor will need to follow the provisions of TIC's SWPPP.
- N. WQMP.** Tetra Tech will evaluate and provide a summary of the requirements for a WQMP similar to what was done on the Fleming Reservoir Project. This work will need to be coordinated with ICDC and the City of Orange but will not be submitted to the City for review and approval. For budgeting purposes, we have assumed similar facilities as designed for the Fleming Reservoir Project.
- O. City of Orange.** Tetra Tech has assumed that the grading plans will not be submitted to the City of Orange for review and comments. We are assuming that ICDC will submit its mass grading plans to the City for approval.
- P. SCE Coordination.** Tetra Tech will continue the coordination with SCE for the new electrical service.
- Q. Construction Phasing and Sequencing.** Tetra Tech will update the construction phasing and sequencing based on discussions with ICDC and the District.
- R. Plans, Specifications, Schedule and Cost Estimate.** Tetra Tech will update the anticipated plans, specifications, design and construction schedule and the engineer's opinion of probable construction costs.
- S. Basis of Design Update.** The work described above shall be summarized and compiled into a Basis of Design Update. At a minimum, the Basis of Design Update shall summarize the results of the subtasks identified above along with additional design criteria identified by Tetra Tech during this phase of the work.
- One (1) electronic copy in PDF of Draft Basis of Design Update shall be submitted for review. Upon resolution and incorporation of review comments, five (5) copies of the final Basis of Design Update and one (1) electronic copy in PDF shall be submitted. The final Basis of Design Update shall be submitted prior to proceeding with the 60 percent design deliverable.
- T. ICDC Coordination.** Throughout this phase of the work, Tetra Tech, in conjunction with IRWD, will continue its coordination with ICDC for the design of the project, including schedule and proposed mass grading. For this proposal, we have assumed one (1) virtual meeting per month for this coordination effort.

Task 3: Final Design

The final design shall result in the preparation of the Contract Documents. In the final design phase, Tetra Tech will address the items discussed hereunder.

- A. ICDC Coordination.** Throughout this phase of the work, Tetra Tech, in conjunction with IRWD, will continue its coordination with ICDC for the design of the project, including schedule and proposed mass grading. For this proposal, we have assumed one (1) virtual meeting per month for this coordination effort.

- B. Fire Master Plan.** Tetra Tech will prepare the required Fire Master Plan and Conceptual Fuel Modification Plan as required by the Fire Regulatory Agency. Tetra Tech has assumed a total of three (3) submittals and re-submittals will be required to get approval.
- C. Project Manual.** Tech will prepare a Project Manual in standard IRWD format. IRWD's front end documents shall be utilized, and Tetra Tech will assess IRWD's documents to determine any needed supplemental general/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 any connections and tie-ins to existing IRWD facilities. The Project Manual shall also include the IRWD General Technical Specifications, modifications thereto, and any project specific technical specifications.
- D. Construction Plans.** Tetra Tech 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. Separate sheets with sheet index/location map/legend, general notes, index map, construction notes, condensed profiles, phasing, and detail connections shall be included. Construction notes shall be used (callouts on the plans are not allowed) on all construction drawings. Existing IRWD utilities shall be identified on the plan view by as-built plan set number with the pipeline material and IRWD pressure zone labeled. The index map shall include sheet legend, final alignment, valve locations, surrounding streets, and significant project site locations. Construction plans shall be prepared using the NAVD 88 and NAD 83 survey standards.

The following is a summary of the drawings that we envision for the project:

Sheet Title
General Sheets (4 sheets)
Construction Notes
Horizontal Control Plan (3 sheets)
Existing Site and Vegetation
Overall Site Plan
Fire Master Plan
Construction Phase Grading Plan (40 scale)
Construction Phase Cross Sections and Site Details
Final Grading Plan (40 scale)
Grading Cross Sections (2 sheets)
Site Drainage Plan
Grading and Drainage Details (2 sheets)
Erosion Control Plan
Access Road Plan and Profile (3 sheets)
Access Road Cross Sections
Reservoir Site Plan and Precise Grading at Reservoir (10 scale)
Drain and Valve Vault Site Plan and Precise Grading Plan (10 scale)
Future RMS Site Layout Plan (10 scale)
Site Details including Subgrade Preparation
Gate and Fencing Details
Fire Agency Details
Reservoir Yard Piping Plan

Sheet Title
Reservoir Subdrain Piping Plan
Inlet/Outlet Plan and Profile (3 sheets)
Drain/Overflow Pipe Plan and Profile (2 sheets)
Piping Details (2 sheets)
Connection Details
Miscellaneous Details
Reservoir Subdrain Details
Reservoir Access Hatches/Ladders
Reservoir Piping Details (2 sheets)
Reservoir Miscellaneous Appurtenances (2 sheets)
Drain Vault Plan and Section
Valve Vault Mechanical Plan and Section (2 sheets)
Vault Details
Biofiltration Plan, Section and Details
General Structural Notes and Special Inspection Requirements (2 sheets)
Foundation Plan
Roof Deck Plan
Partial Roof Deck Reinforcing Plan
Typical Reservoir Sections
Roof Deck Sections
Wall Section and Elevations
Typical Structure Details
Foundation Details
Wall Details
Roof Deck Details
Miscellaneous Structural Details (2 sheets)
Electrical Symbols and Abbreviations
Electrical Site Plan
Reservoir Area Site Plan
Lower Area Site Plan and Valve Vault Plan
Power Site Plan
I&C Site Plan
Single Line Diagram and Electrical Schedules
Elevation Drawings and Panel Schedule
Lighting and Grounding Plan
Electrical Details (2 sheets)
I&C Symbols and Abbreviations
PLC Loop Diagram (3 sheets)
P&ID (2 sheets)
Control Panel Layout and System Architecture
Total Number of Sheets: 84 sheets

- E. Geotechnical Investigation.** Tetra Tech has included the budget to perform a geotechnical boring at the reservoir site in case it is recommended. Leighton Consulting, Inc., as a subconsultant to Tetra Tech, will perform the work and will prepare an updated report.
- F. Field Survey Confirmation.** Tetra Tech has assumed that a field survey after ICDC has completed the rough grading of the access road and the reservoir site will be valuable and desired by IRWD. Tetra Tech will perform the following topographic survey after the rough grading: 50 foot cross sections of the completed rough grading access road as well as the proposed water tank location. The survey will collect all topographic site features as well as surface utilities using a combination of Trimble R8 GPS and Trimble S6 Robotic Total Station Equipment. The survey will be tied horizontally to the California State Plan Coordinate System (NAD83) and vertically to the Orange County Public Works benchmark control network (NAVD88). All survey work performed by Tetra Tech will be under the direct supervision of a Professional Land Surveyor licensed in the State of California.
- G. Electrical/Instrumentation.** Tetra Tech will prepare an operational scheme including P&IDs, single line diagrams, PLC loop drawings, control equipment list, and method of integrating the proposed facilities into IRWD's existing SCADA system. Prior to this process, Tetra Tech will meet with IRWD electrical/automation staff to incorporate IRWD's standard operations, PLC and SCADA programming, and equipment tagging requirements into the design. Tetra Tech will develop and provide the operational scheme and functional descriptions (in plain English) for District review and approval.
- H. SCE Final Service Plan.** Tetra Tech will coordinate with SCE early in the design process to obtain the Final Service Plan, which shall be inserted in the appendix of the Project Manual. This task shall include the coordination efforts necessary to communicate the project requirements, address any comments from SCE, and implement all requirements into the project design.
- I. Project Schedule.** Tetra Tech will maintain and consistently update the project schedule, which shall include 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 in accordance with the proposed schedule. The schedule shall be prepared in Microsoft Project.
- J. Liquidated Damages Spreadsheet.** Tetra Tech will assist in calculating the liquidated damages value for the construction project, should the contract time be exceeded. IRWD's standard liquid damage calculation form will be provided.
- K. Opinion of Probable Construction Cost.** Tetra Tech will prepare a detailed and itemized opinion of probable construction cost for the proposed facilities, which shall be updated and submitted with each of the design deliverables described below.
- L. Final Design Deliverables.** Deliverables shall be made as follows:

 - 1. One (1) CD or a OneDrive link or Dropbox of the 60 percent submittal containing a single PDF file of the entire plan set. Show civil/site, preliminary reservoir plans and sections, mechanical, and electrical plans. Show basic mechanical equipment, structural layouts, pipeline alignments, preliminary profiles, and existing utilities at a minimum. Provide a complete table of contents for the Project Manual.
 - 2. One (1) CD or a OneDrive link or Dropbox of the 90 percent submittal containing a single PDF file of the entire plan set. Show concepts of each component of the design such as civil, structural, mechanical, electrical and instrumentation. Show plan, profile, connections, details, and location of appurtenances. Plan and profile drawings and mechanical details/drawings shall be developed to a high level of detail.

Provide three (3) color coded copies of the 90 percent Project Manual, including all sections; contract documents, general & special provisions, general requirements, technical specifications, and appendix.

3. One (1) CD or a OneDrive link or Dropbox of the 100 percent submittal containing a single PDF file and the AutoCAD files of the entire plan set. Include complete plans and three (3) color coded copies of the Project Manual, a notebook with the design calculations (including, but not limited to, mechanical, civil, structural, electrical, pipe thickness and restraint), and one (1) CD containing all MS Word files used in the preparation of the Project Manual.
4. One (1) full size final stamped and signed reproducible plan set on bond and one (1) original signed Project Manual for District's signatures.

Task 4: Bid Phase Services

During the bidding period, Tetra Tech will assist with providing information and clarification of bid documents to prospective bidders. Tetra Tech will include budget for the preparation of up to three (3) addenda including revisions to the design plans and specifications and assistance with addressing bidder questions. At a minimum, addenda preparation activities shall include:

- **Plan Revisions:** Tetra Tech will budget ten (10) hours of appropriate staff time for plan revisions to the construction drawings.
- **Specification Revisions:** Tetra Tech will budget ten (10) hours of appropriate staff time for revisions or additions to the project specifications.
- **Bidder Questions:** Tetra Tech will budget fifteen (15) hours of appropriate staff time to address and respond to bidder questions.
- **Pre-Bid Meeting:** Tetra Tech will prepare for and conduct one (1) two-hour pre-bid meeting and shall provide agendas, exhibits, sign-in sheet, and minutes for the meeting. This may include a site visit with potential bidding contractors.

SCHEDULE

Tetra Tech has reviewed the project scope of services and understand the importance of the schedule. We are familiar with the project site and understand the purpose of the work and the extent of our efforts which will be necessary to complete the project. In addition, our project team's familiarity with IRWD standards and our past experience with reservoir design will be valuable to meeting and accelerating your schedule. Tetra Tech has reviewed the current and planned workload for our project team. They are available to immediately begin work on this project.

Tetra Tech will meet the following significant project milestones:

Task Milestone	Date
Notice of Award (Design)	April 26, 2022
Kick-off Meeting	May 4, 2022
Draft Basis of Design Update Submittal	June 8, 2022
Final Basis of Design Update Submittal	June 29, 2022
60% Design Submittal	July 27, 2022
90% Design Submittal	October/November 2022
100% Design Submittal	December 2022
Plans Approved	January 2023

PROJECT TEAM

For this project, we are proposing the following Project Team:

Project Manager:	Tom Epperson, P.E.
Team Leader:	Mike Tsoi, P.E.
QA/QC:	Ken Berard, P.E.
Mechanical/Piping Technical Lead:	Erin Cabanero, P.E.
Grading/Site/WQMP/SWPPP:	Nate Schreiner, P.E., QSD
Electrical/Controls Lead:	Mazen Kassar, P.E.
Structural Lead:	Eric Yuen, P.E., S.E.

Subconsultants: Geotechnical – Leighton Consulting, Inc.; Survey will be performed by Tetra Tech staff.

Resumes of most of these team members were included within our November 21, 2019 proposal for the Fleming Zone 8 Tank and Zone 8 to 9 Booster Pump Station Project. All of the team members were involved in the design of both the Zone 1 Reservoir and the Fleming Zone 8 Tank projects. We can provide you with project specific resumes if you request.

PROJECT TEAM EXPERIENCE

In general, our project team's experience was described in our June 7, 2016 proposal for Santiago Hills Zone 6 Domestic Water Reservoir proposal (Reservoir, IRWD Design and Extensive Grading Experience). In addition, our November 21, 2019 proposal for Fleming Zone 8 Tank updated our reservoir and IRWD design experience. The following is a summary of our reservoir experience.

Reservoir Experience

During the last 18 years, our Project Team has designed over 24 prestressed concrete tanks within Southern California. The following table summarizes the experience of our Project Team on all reservoir projects, not just on prestressed concrete tanks.

Type of Tank	Last 8 Years (2014 to 2021)	From 2009 to 2013	From 2004 to 2008	Total During Last 15 Years
Prestressed Concrete	8	3	13	24
Reinforced Concrete	11	2	11	24
Steel Tank	4	1	9	14
Subtotal	23	6	33	62

Therefore, our project team is high on the learning curve and can apply their expertise to addressing and resolving your project issues in a cost-effective and timely manner. We feel our best reference is the latest two reservoir projects that the project team has completed for IRWD: Fleming Zone 8 Tank and Zone 1 Reservoir Projects. Our project team knows IRWD's design procedures and standards, electrical and P&ID standards, preferred materials, and operational preferences which will allow us to complete the design in the most cost-effective and timely manner.

MISCELLANEOUS

Joint Venture. No joint ventures will be used on the project.

Conflict of Interest. Tetra Tech has no Conflicts of Interest on this project.

Insurance. Tetra Tech has insurance coverage in the limits required for your typical projects.

SUMMARY OF FEE

Tetra Tech will perform the work for the above scope of services for the following not-to-exceed fee amount.

Scope of Services	Budget
Task 1: Project Management	\$43,000
Task 2: Basis of Design Update	\$99,900
Task 3: Final Design	\$331,600
Task 4: Bid Phase Services	\$9,500
Total Not-to-Exceed Amount	\$484,000

We have included herewith our staff hourly breakdown per task as well as our Hourly Rate Schedule.

Thank you for giving us the opportunity to submit our proposal, we look forward to working with you. Should you require additional information or have any questions, please feel contact me at 949/809-5156 or via email at tom.epperson@tetrattech.com.

Sincerely,



Tom Epperson, PE
Vice President

TLE/de

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Price Proposal			Labor Plan																Price Summary / Totals					
			16 Resource																Task Pricing Totals		484,000			
																			Specify Add'l Fees on Setup		0			
Santiago Hills Zone 6 Reservoir		Proj Area >	Civil/Mechanical	QA/QC	Civil/Mechanical	Civil/Mechanical	Site	Site	Civil/Mechanical	Civil/Mechanical	Civil/Mechanical	Structures	Structures	Structures	Structures	Electrical/Controls	Electrical/Controls	Electrical/Controls	Technology Use Fee					
Submitted to: Irvine Ranch Water District (Attn: Jacob Moeder, PE)			Project Manager (Tom Epperson)	QA/QC (Ken Berard)	Team Leader (Mike Tsol)	Project Engineer (Erin Cabanero)	WQMP/SWPPP (Nate Schreiner)	Grading Engineer (Tyler Parra)	Design Engineer (Michael Mojica)	Engineer 1 (Sam Ortiz)	Word Processor (Deana Escamilla)	QA/QC (Vic Ramirez)	Project Manager (Eric Yuen)	Project Engineer (Geoffrey Heinen)	CADD (Eric Hutchins)	Project Manager (Mazen Kassar)	Project Engineer (Doug Seaman)	Design Engineer (James Roberts)	Total Price			484,000		
Contract Type: T&M		Total Labor Hrs	Pricing by Resource																					
Project Phases / Tasks			2,858	48	60	260	400	20	182	544	450	24	8	84	152	124	86	204	212	Labor Rate Esc.	Labor	Subs	ODCs	Task Pricing Totals
Task 1: Project Management			176	28	60	64	-	-	-	-	-	4	8	-	-	-	12	-	-	0.00%	428,830	45,609	9,561	484,000
Project Status Reports (16 biweekly/ 8 monthly)			32	8		24															6,680			6,680
Meetings (15)			64	20		40						4									13,880		420	14,300
Constructability Review and QA/QC			80		60							8				12					22,020			22,020
Task 2: Basis of Design Update			450	8	-	70	124	8	52	120	8	4	-	12	12	-	12	16	4		71,890	22,425	5,585	99,900
Review Background Information			34	2		4	8			4				4	4		4	4			6,400			6,400
Fire Authority: Agency and Requirements			10			4	6														1,650			1,650
Additional Geotechnical Work			14			2	4			4				4							2,390	22,425		24,815
Update Background and Design Requirements			2				2														330			330
Update Existing Conditions			10			2	4			4											1,510			1,510
Site Design - Access (Revise alignment/profile)			76			8	12	4	40	12											11,740			11,740
Site Design - Turn around			20			2	4	2	8	4											3,150			3,150
Reservoir Structural Design (Current Code)			12											4	8						1,920			1,920
Update Reservoir Appurtenances			24			4	8			12											3,540			3,540
Update Reservoir Mixing			6			2	4														990			990
Update Reservoir Piping Connections			14			2	4			8											2,030			2,030
Update Reservoir Sub-drain/footing drain			10			2	4			4											1,510			1,510
Update Site Layout (Revise Piping plan/profile)			42			6	12			24											6,090			6,090
Update Reservoir Drain Vault			14			2	4			8											2,030			2,030
Update Reservoir Valve Vault			14			2	4			8											2,030			2,030
Update Future RMS Facility			14			2	4			8											2,030			2,030
Update Electrical Design			16														4	8	4		2,880			2,880
Update Regulatory Permits and Approvals			8			2	6														1,320	5,000		6,320
Fire Master Plan Requirements			12			4	8														1,980			1,980
Construction General Permit (WQMP)			20			2		2	4	8	4										2,810			2,810
SCE Coordination			8														4	4			1,820			1,820
Update Construction Phasing and Sequencing			8			2	6														1,320			1,320
Prel. Design Plans/Specs/Estimate/Schedule			22	2		4	8			8											3,700			3,700
Basis of Design Report			32	4		8	8			4	4	4									5,400		585	5,985
ICDC Coordination			8			4	4														1,320			1,320
Task 3: Final Design			2,184	6	-	112	266	12	130	424	442	16	-	68	140	120	58	182	208		304,860	23,184	3,556	331,600
ICDC Coordination			8			4	4														1,320			1,320
Fire Master Plan			20			2	8			8		2									2,930			2,930
Project Manual			54	4		8	12					8		2	8		4	8			9,520			9,520
Construction Plans			-																		-			-
General Sheets (5 sheets)			70			4	16			20	30										8,900			8,900
Horizontal Control Plans (3 sheets)			28							12	16										3,160			3,160
Existing Site and Vegetation			14				2			4	8										1,650			1,650
Overall Site Plan			26				6			8	12										3,230			3,230
Fire Master Plan			24			2	4			6	12										2,970			2,970
Grading and Drainage Plans (9 sheets)			292			14	40	8	90	60	80										39,970			39,970
Access Road (4 sheets)			114			12	16		16	40	30										15,220			15,220
Specific Site Plans and Precise Grading (3 sheets)			76			6	16			30	24										9,930			9,930
Site and Gate Details (2 sheets)			44			4	4			12	24										5,280			5,280
Fire Agency Site Details			18			2	4				12										2,190			2,190
Piping Plans and Profiles (7 sheets)			130			8	16			56	50										16,240			16,240
Piping Details (5 sheets)			96			6	20			30	40										12,190			12,190
Reservoir Details (5 sheets)			98			6	12			40	40										12,170			12,170
Drain & Valve Vault Plan, Sections, Details (4 sheets)			104			8	24			40	32										13,680			13,680
Biofiltration Plan, Section and Details			30			2	4	4		8	12										4,110			4,110
Structural Plans (14 sheets)			300										60	120	120						43,800			43,800
Electrical Plans (11 sheets)			198													22	66	110			29,260			29,260
Instrumentation Plans (7 sheets)			144													14	60	70			21,320			21,320
Final Drainage Report			48			4	16		24		4										7,300			7,300
Geotechnical Investigation			8				4					2		2							1,340	16,675		18,015
Field Survey Confirmation			4				2			2											590	6,509		7,099
Electrical/Instrumentation			40													8	24	8			6,960			6,960
SCE Final Service Plan			18													2	8	8			2,730			2,730
Schedule/LDs/Probable Costs			44	2		8	12			8			2	6		2	4				7,450			7,450
Final Deliverables			134			12	24			40	16	4		2	6		6	12	12		19,450		3,556	23,006
Task 4: Bidding Assistance			48	6	-	14	10	-	-	-	-	-	4	-	4	4	6	-			9,500	-	-	9,500
Pre-Bid Meeting			8			4	4														1,320			1,320
Addenda (plan & spec revisions, questions)			40	6		10	6						4		4	4	6				8,180			8,180
Totals			2,858	48	60	260	400	20	182	544	450	24	8	84	152	124	86	204	212	0.00%	428,830	45,609	9,561	484,000



2022

HOURLY CHARGE RATE AND EXPENSE REIMBURSEMENT SCHEDULE

Project Management

Project Manager 1	\$220.00
Project Manager 2	\$270.00
Sr Project Manager	\$305.00
Program Manager	\$340.00
Principal in Charge	\$340.00

Engineers

Engineering Technician	\$37.00
Engineer 1	\$100.00
Engineer 2	\$115.00
Engineer 3	\$130.00
Project Engineer 1	\$150.00
Project Coordinator	\$165.00
Project Engineer 2	\$165.00
Sr Engineer 1	\$175.00
Sr Engineer 2	\$185.00
Sr Engineer 3	\$210.00
Principal Engineer	\$300.00

Planners

Planner 1	\$104.00
Planner 2	\$115.00
Sr Planner 1	\$125.00
Sr Planner 2	\$151.00
Sr Planner 3	\$175.00

Designers & Technicians

CAD Technician 1	\$65.00
CAD Technician 2	\$75.00
CAD Technician 3	\$90.00
CAD Designer	\$105.00
Sr CAD Designer 1	\$125.00
Sr CAD Designer 2	\$150.00
CAD Director	\$155.00
Survey Tech 1	\$50.00

Health & Safety

H&S Administrator	\$95.00
Sr H&S Administrator	\$115.00
H&S Manager	\$145.00

Construction

Construction Project Rep 1	\$80.00
Construction Project Rep 2	\$90.00
Sr Constr Project Rep 1	\$105.00
Sr Constr Project Rep 2	\$120.00
Construction Manager 1	\$170.00
Construction Manager 2	\$190.00
Construction Director	\$235.00

General & Administrative

Project Assistant 1	\$67.00
Project Assistant 2	\$75.00
Project Administrator	\$95.00
Sr Project Administrator	\$120.00
Sr Graphic Artist	\$130.00
Technical Writer 1	\$97.00
Technical Writer 2	\$124.00
Sr Technical Writer	\$155.00

Information Technology

Systems Analyst / Programmer 1	\$77.00
Systems Analyst / Programmer 2	\$115.00
Sr Sys Analyst / Programmer 1	\$130.00
Sr Systems Analyst / Programmer 2	\$196.00

Project Accounting

Project Analyst 1	\$90.00
Project Analyst 2	\$114.00
Sr Project Analyst	\$155.00

Reimbursable In-House Costs:

Photo Copies (B&W 8.5"x11")	\$ 0.15/Each
Photo Copies (B&W 11"x17")	\$ 0.40/Each
Color Copies (up to 8.5"x11")	\$ 2.00/Each
Color Copies (to 11"x17")	\$ 3.00/Each
Compact Discs	\$10/each
Large format copies	\$0.40 S.F.

Mileage-Company Vehicle	\$0.80/mile
Mileage-POV	\$0.55/mile*

*current GSA POV mileage rate subject to change

All other direct costs, such as production, special photography, postage, delivery services, overnight mail, printing and any other services performed by subconsultant will be billed at cost plus 15%.

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April 19, 2022

Prepared by: C. Spangenberg / M. Cortez

Submitted by: K. Burton

Approved by: Paul A. Cook 

ENGINEERING AND OPERATIONS COMMITTEE

LAKE FOREST WELL 2 TREATMENT SYSTEM CONSULTANT SELECTION

SUMMARY:

Lake Forest Well 2 has not operated since 2019 due to issues with iron and manganese precipitation. An economic analysis of the cost effectiveness of installing a water treatment system shows a payback period of six years. Staff recommends the Board authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$340,729 for design engineering services for the Lake Forest Well 2 Treatment System.

BACKGROUND:

Lake Forest Well 2 is located in the City of Lake Forest on Osterman Road as shown in Exhibit "A". It was reconstructed in 2011 using stainless steel casing in conformance with the California Well Construction Standards and permitted for use as a potable water supply. The original production rate was 300 gallons per minute (gpm). The most recent production rate was 250 gpm in 2019 when the well was shut down due to increased color resulting from iron and manganese precipitation.

Staff performed an economic analysis to determine the cost effectiveness of a water treatment system to remove iron and manganese to make Lake Forest Well 2 a reliable water supply to the potable water system. Capital expenditures included design, iron / manganese treatment, well bypass pipeline, waste discharge pipeline for off-specification and backwash waters, electrical and instrumentation and all ancillary equipment. Annual operation and maintenance (O&M) costs included power, periodic pump replacement, well rehabilitation, and chemical costs. Lost revenue on the capital investment was included in the O&M costs. The cumulative costs were then evaluated against current and projected water costs from Metropolitan Water District for the equivalent annual well production in acre-feet. Based on this analysis, the payback period to recover an estimated initial capital cost of \$1,800,000 is approximately six years. Based on this outcome, staff deems the project as viable.

Consultant Selection:

On February 17, 2022, staff issued a request for proposal for design engineering services for the project to three consultants: AECOM, Lee & Ro, and Tetra Tech. Proposals were received from all three consultants on March 17 and interviews of the project teams were held on March 29. Staff completed its evaluation of the proposals and based upon its strong project team, extensive knowledge and experience of the available treatment technologies, design that provides the most flexibility for treatment selection, design, and procurement, staff recommends awarding a Professional Services Agreement to Tetra Tech in the amount of \$340,729. The consultant selection matrix and Tetra Tech's proposal are provided as Exhibits "B" and "C", respectively.

FISCAL IMPACTS:

Lake Forest Well 2 Treatment System, Project 11218, is included in the FY 2021-22 Capital Budget. The existing budget is sufficient to fund the project's design phase.

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA) and in conformance with the California Code of Regulations Title 14, Chapter 3, Sections 15301 and 15303. Section 15301 provides exemption for minor alterations of existing public structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. Section 15303 provides exemption of new, small facilities or structures; installation of small new equipment and facilities in small structures; water main, sewage, electrical, gas or other utility extensions, including street improvements of reasonable length to serve such construction. A Notice of Exemption will be prepared for the project and filed with the County of Orange.

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of \$340,729 for design engineering services for the Lake Forest Well 2 Treatment System, Project 11218.

LIST OF EXHIBITS:

Exhibit "A" – Location Map
Exhibit "B" – Consultant Selection Matrix
Exhibit "C" – Tetra Tech Scope of Work and Fee Proposal



Exhibit "A"

Regency Park

Lake Forest Well No. 2
20034 Ostermann Road, Lake Forest, CA

Ostermann Road

Project Location Map

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EXHIBIT "B"				
	Weights	AECOM	Lee & Ro	Tetra Tech
TECHNICAL APPROACH	60%			
*Project Approach	40%	2	3	1
*Project Details in PDR	20%	3	2	1
*Scope of Work	40%	2	3	1
Weighted Score (Technical Approach)		2.20	2.80	1.00
EXPERIENCE	40%			
*Firm/Team	15%	2	3	1
*Project Manager	40%	2	3	1
*Project Engineer 1 - Mech	15%	2	3	1
*Project Engineer 2 - Elec	15%	2	3	1
*Project Engineer 2 - Struct	15%	1	3	2
Weighted Score (Experience)		1.85	3.00	1.15
Project Manager		Alex Franchi 26 Yrs	Kevin Saleh 25 Yrs	Beverly Encina 19 Yrs
Project Engineer/Civil/Site		Dylan LaFrance 10	Adam Betworth 12	Kyle Matsumoto 4
QC/QA		Jack Gundariahalli 31	Sam Lee 15	Steve Tedesco 37
Mechanical & Process Design		Ben Shanthikumar 9	Roman Silvestre 20	Amanda Taylor 13
Electrical		Narciso Ubario 34	Linkture 30	Mazen Kassar 29
Structural		David Ambartsumyan 15	Alice Maupin 20	Eric Yuen 14
Traffic Control Desgin		Not Listed	Not Listed	Peter Kim 27
Pilot Study		Angel Gabeau 23	Jay Jung 14	Steve Ellis 42
Surveying/ Mapping		Psomas	OnPoint Land	Metz Surveying Inc.
Noise Analysis		AECOM	Behrens and Assoc.	Behrens and Assoc.
Potholing		T2 utility Engineers	Bess Testlab	Not Listed
COMBINED WEIGHTED SCORE		2.06	2.88	1.06
		Man-hours	Man-hours	Man-hours
Task 1 Project Management		226	90	205
Task 2 Preliminary Design Report		856	372	611
Task 3 Final Design & 4 Bid Support		1,122	543	1,196
TOTAL DESIGN HOURS		1,978	915	1,807
Optional Tasks				
Replace Well Pump			60	
Replace PLC/RTU			38	
Preprocurement Treatment Package			50	
TOTAL HOURS		2,204	1,153	2,012
Sheet Count				
General		4	5	3
Civil		6	8	10
Mechanical/process		9	6	10
Structural		4	4	8
Electrical		7	5	11
Instrumentation		3	3	10
Traffic Control		0	0	2
Subtotal		33	31	54
TOTAL SHEETS		33	31	54
FD HRS/SHT		60	30	33
FEE				
Average \$/manhrs (design)		\$173	\$242	\$189
Does not include \$s for:		Traffic Control Plans, Design for multiple vendors.	Traffic Control Plans	
Project Management		\$44,300	\$22,518	\$44,976
PDR		\$144,590	\$67,188	\$101,041
Add Items		\$0	\$27,680	\$0
Final Design		\$153,280	\$104,202	\$194,712
Grand Total- PM&PDR & Design		\$342,170	\$221,588	\$340,729
Number of Drawings		33 dwgs	31 dwgs	54 dwgs
Final Design Unit Prices (\$/dwg)		\$10,369	\$7,148	\$6,310
Professional Liability Insurance		YES	YES	YES
General Liability Insurance		YES	YES	YES
FORCED RANKINGS:		2 - Second	3 -Third	1 - First

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EXHIBIT "C"

PROPOSAL TO PROVIDE ENGINEERING DESIGN
AND CONSTRUCTION SERVICES FOR THE



Lake Forest Well No. 2 Treatment and Sewer Bypass Project



MARCH 2022



March 17, 2022

Carl Spangenberg, PE
Project Manager
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

Reference: Proposal to Provide Engineering Design and Construction Services for the Lake Forest Well No. 2 Treatment and Sewer Bypass Project

Dear Mr. Spangenberg,

Thank you for the opportunity to submit our proposal to provide engineering services for the Lake Forest Well No. 2 Treatment and Sewer Bypass Project. We value the relationship that has been built with Irvine Ranch Water District (IRWD/District) based on our past and current ongoing projects. It is our desire to continue to provide the same consistently diligent and faithful service to IRWD. We have an outstanding team which combines the experience, depth, and understanding needed for the successful delivery of this project. Our team brings the following advantages to the District:

- ▶ **Extensive Experience in Iron and Manganese Removal Water Treatment Systems:** During the last 15 years, our Project Team has designed over 8 iron and manganese removal systems within Southern California.
- ▶ **Project Team with Extensive IRWD Experience:** Our Project Team, specifically our **Project Director, Mr. Steve Tedesco, PE**, and our **Project Manager, Ms. Beverly Encina, PE**, have worked together on over 15 projects for IRWD during the last 15 years. We know IRWD's design requirements, preferred materials, operational preferences, electrical and P&ID standards which will allow us to deliver a complete design in the most cost-effective manner. These projects include: **the Wells 21 and 22 Desalter; and the Irvine Desalter Project, which includes the Potable Treatment Plant, Manganese Removal System, and seven (7) other associated projects.**
- ▶ **Local In-House Structural, Electrical and Control Capabilities:** Tetra Tech has our own in-house local, graphics team to create architectural renderings, registered plumbing and HVAC, structural, electrical and control engineers with extensive experience with IRWD facilities.
- ▶ **Dedication to the District:** Tetra Tech believes IRWD is an important client with our long-standing partnership and history of projects (over 30 in the last 20 years). Our approach will include a "teaming and partnering" relationship. We will strive to exceed your expectations through hard work, attention to detail, close communication, schedule and budget management.

Our project team is looking forward to working with you and we are committed to providing IRWD with the same high-quality service you expect and deserve. Should you have any questions or require additional information regarding our proposal, please feel free to contact us.

Sincerely,

A blue ink signature of Steve Tedesco, consisting of a stylized 'S' and 'T'.

Steve Tedesco, PE
Senior Vice President

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FIRM OVERVIEW

Based in Pasadena, California, Tetra Tech is a full-service engineering and science firm with a substantial global presence. We help our clients conceptualize and execute innovative solutions to their most difficult problems. From front-end science and planning to design, construction management and operations, Tetra Tech's global service network, facilitated by our initiatives program that coordinates resources for specific markets and provides best in-class experts with worldwide project experience.

Founded in 1966, Tetra Tech is a nationally recognized engineering and resource management firm of more than 21,000 engineers, scientists, construction specialists, and technical support personnel in 450 offices worldwide. Listed on the NASDAQ Exchange (TTEK), Tetra Tech's annual revenues now exceed \$3.2 billion (2021). Thus, we are in an excellent financial position and can provide the necessary resources to rapidly deploy and meet aggressive project schedules.

Tetra Tech consistently ranks among the top engineering firms annually according to the *Engineering News-Record*. **In 2021, Tetra Tech was ranked 4th among the top 500 design firms nationwide and was ranked #1 in the water service industry for the 18th year in a row!**

Tetra Tech's more than 56 years of experience in water resources management is directly associated with municipal water, wastewater, recycled water, and stormwater facilities encompassing collection and distribution pipelines, pumping stations, storage reservoirs/tanks, treatment and reclamation plants, and disposal systems. Over the years, we have gained the confidence of our clients by meeting the expectations and performance goals of both clients and regulatory agencies.

DEDICATION TO THE DISTRICT

Tetra Tech is dedicated to Irvine Ranch Water District (IRWD/District) as illustrated in working together on over 30 projects for IRWD during the last 20 years. Our approach will include a teaming and partnering relationship with the District. We will strive to exceed your expectations through proactive project management, strong quality control measures, attention to detail, extensive design experience, close communication, and schedule and budget management.

PROJECT UNDERSTANDING

IRWD'S Lake Forest Well No. 2 (LF Well No. 2) is located at 20034 Osterman Road in a residential area adjacent to Regency Park in the City of Lake Forest, California and was constructed in May 2011. LF Well No. 2 initially had a production rate of 300 gallons per minute (gpm), however the most recent production rate was 250 gpm in 2019 when the well was shut down due to increased color resulting from iron/manganese precipitation. Despite the color issue, the initial water quality for LF Well No. 2 indicates that iron and manganese levels were slightly below the State secondary maximum contaminant levels (MCL). Due to the brown water complaints by both domestic and recycled water users, the well has remained offline since that time.

Tetra Tech understands the financial impact of being able to operate LF Well No. 2 and using it as a potable supply based on the economic analysis summary provided in the Request for Proposal (RFP). IRWD has estimated a payback period of approximately two years for capital expenditures for the new treatment system and improvements. As costs for imported water from Metropolitan Water District continuously increase, it is beneficial financially for IRWD to continue to move forward with installation of the treatment system.



The main goal of the project is to install a new treatment system at the existing wellhead for the removal of iron/manganese using small, package water treatment skids. In order to achieve this, the scope of work in the preliminary phase shall include evaluation of various treatment technologies, whether pilot testing is required for recommended treatment method, and conducting the pilot testing efforts, if required.

In addition to the treatment system, IRWD requires the following additional facilities:

■	The addition of well flush piping to the existing storm drain. A dedicated flush line does not exist and well flushing is accomplished via the well discharging into IRWD's existing reclaimed water reservoir.
■	The addition of piping and connections for backwash water and/or off-spec treated water to the existing sewer in Osterman Road.
■	Evaluation of existing electrical service, instrumentation, controls and equipment. The design will include modification or additional facilities to provide power and controls to the new treatment system.
■	Structural design of foundations required for new treatment equipment chemical feed system.
■	Replacement of the existing chemical feed system for disinfection. We understand that the current chemical feed and storage system cabinet is corroded and need of replacement. The storage area can be replaced with chemically resistant materials such as a prefabricated fiberglass enclosure or steel canopy with concrete foundation. Additionally, Tetra Tech will evaluate the following:
	• Determine if existing equipment can continue to be utilized to meet potential additional chemical dosing for the selected treatment method and determine if existing feed equipment and materials need to be upsized. We understand that in its current state, this facility requires two chemical deliveries per week and at minimum, the tank shall be upsized to reduce the frequency of deliveries. • Tetra Tech will evaluate post disinfection by free chlorine or chloramines. At the pre-proposal meeting, IRWD Operations staff indicated that existing reservoir management system at Zone 2 reservoir may provide sufficient ammonia feed for chloramines. We will evaluate this further as updated chemical dosing criteria is established during design.
■	Hydraulic analysis shall be performed to sufficiently size the supporting facilities mentioned above to ensure appropriate capacity is available. Tetra Tech will evaluate if any well modifications are required to operate with the new treatment system and other proposed improvements. A hydraulic analysis will be performed to confirm adequate pressure is available to discharge to the existing distribution system. If required, Tetra Tech will size and design an inline booster system post-treatment to supplement for any pressure deficiencies based on the existing submersible well pump and the hydraulic requirements for the recommended treatment system.

APPROACH

Why Tetra Tech

Tetra Tech's team brings the following advantages to the District for the LF Well No. 2 Treatment and Sewer Bypass project:

- ▶ **Extensive Experience with Groundwater Treatment Systems:** Tetra Tech's process water/wastewater treatment engineers have a wide array of project experience ranging from small to large capital improvement projects, but in particular, have worked on many groundwater treatment systems that are similar in scope and scale to this project.
- ▶ **In-House Civil, Process, Structural and Electrical Capabilities:** Tetra Tech's project team includes our own in-house structural, process mechanical, and electrical engineers who have worked together for many years as a team on numerous projects for other Southern California agencies, as well as several projects for IRWD.
- ▶ **Key Subconsultants:** To provide all of the services required for the project, Tetra Tech has added the following key subconsultants: Metz Surveying, Inc. and Behrens and Associates, Inc. for noise analysis. We have successfully worked with both on several projects for other Southern California agencies.
- ▶ **Dedication to IRWD:** Our approach will include a "teamwork and partnering" relationship. We will do this by exceeding your expectations through innovative and smart solutions, attention to detail, and our understanding of IRWD's design processes and requirements.

Our extensive experience with similar groundwater treatment projects will ensure that IRWD will receive a high level of service delivered by qualified, knowledgeable engineering professionals. Highly meticulous and coherent plans and specifications greatly benefit all project stakeholders, with the largest benefit realized by the Owner. Quality contract documents clearly lead to a larger number of bidders, lower competitive bid prices *due to increased competition, the contractor has less to assume and take the risk for and a greater overall comfort level in our design based on a long history of successful projects*, and lowest overall cost while achieving a very high-quality end product *quality contract documents mitigates the potential, and impact of change orders, and sets forth a standard of quality the contract must achieve*.

No two projects are the same, although many are similar. The key is to utilize elements of work that have been successful and can be appropriately applied to this project, continue to improve construction efficiencies without lowering quality based on contractor feedback, and maximize the overall operational flexibility. We want to utilize the experience gained from working on previous projects, and to continue providing IRWD with exceptional services to assure that another project is successfully completed to the satisfaction of IRWD.

General Approach

Tetra Tech fully understands the importance of your project. We are offering an outstanding team, which combines the experience, depth, and understanding needed for the successful delivery of this project. Our core principles establish how we plan to work together with IRWD to successfully complete this project:

- ❖ **Service:** Tetra Tech puts its clients first. We listen to and better understand our clients' needs and deliver smart, cost-effective solutions that meet those needs. Our philosophy is to "Do it Right."
- ❖ **Value:** Tetra Tech takes on our clients' problems as if they were our own. We develop and implement real-world solutions that are cost-effective, efficient, and practical.
- ❖ **Excellence:** Tetra Tech brings superior technical capability, disciplined project management, and excellence in safety and quality to all of our work.
- ❖ **Opportunity:** Our people are our number one asset. Our workforce is diverse and includes leading experts in our fields. Our entrepreneurial nature and commitment to success provides challenges and opportunities.

We value the relationship that has been established with IRWD and look forward to continuing and further developing this association in the future. We are committed to providing IRWD with the same high-quality service you expect and deserve. Our strength lies in our proven track record that has led to successful completion of multiple projects for IRWD, as well as other project participants or nearby agencies.

Project Management

Over the years, Tetra Tech has established well defined, rigorous procedures for project management. These techniques have been developed and refined and have contributed to our success and reputation. The keys to our project management system are communications, project planning, monitoring, and quality assurance. The Tetra Tech team's goal is to keep IRWD staff "in the loop" from day one of the project. Communication tools include the formal progress reports afforded through our project management system and an informal give-and-take approach starting with **Beverly Encina, PE, our Project Manager**, and extending to every member of our project team. At the project's outset, the chain of command and appropriate communication methods will be agreed upon.

We will conduct formal meetings with agenda and typewritten notes, and we will use informal meetings with notes to file. We will also have documentation of telephone communications, with notes to file or letters of understanding as appropriate follow-up. Another important communication link will be our e-mail system.

We are proposing to use e-mail to keep IRWD aware of the status of the project. Every week, Tetra Tech will prepare a brief (one or two paragraphs or bullet items) e-mail summarizing the following: activities completed in the previous week; the activities planned for the upcoming week; any critical decisions that need to be made; and schedule of upcoming events/meetings. In addition, each month we will prepare a project status memorandum containing the following: summary of project schedule; description of key issues/concerns which have surfaced along with proposed options and solutions; and a project status summary report showing current schedule and budget.

Quality Control

Tetra Tech has a well-established Quality Practices Manual (QPM) which will be in effect during the entire duration of the project. The QPM describes Tetra Tech's quality program policy and requirements for all engineering services. The purpose of the QPM is to define basic quality assurance and quality control (QA/QC) requirements that will guide, as applicable, all Tetra Tech projects during planning, implementation, work product preparation, and field activities. The QPM describes Tetra Tech's quality program organization; basic quality management system requirements; and basic QA and QC requirements during all phases of the project. The Tetra Tech quality program is modeled after the quality management principles outlined in the International Organization for Standardization (ISO) 9000.

KEY DESIGN ISSUES

Successful implementation of this project will involve resolution of several key issues. We believe Tetra Tech has an excellent grasp of these issues based on our overall experience, capabilities and familiarity with other groundwater treatment projects as well as our experience with IRWD projects, personnel, and policies. Our approach to resolving project issues is summarized below.

Site Layout: Tetra Tech recognizes the LF Well No. 2 site is limited in space for the addition of new treatment facilities. This will be a critical consideration in key areas of the evaluation of treatment technology alternatives that can fit in the space available, while maintaining vehicular and operational access within the site. Tetra Tech proposes the evaluation of oxidation-filtration technologies for the following media types such as Greensand, Pyrolusite, and proprietary media (Filtronics electromedia, and Tonka IMAX) as discussed in the subsequent section, Treatment Technology methods.



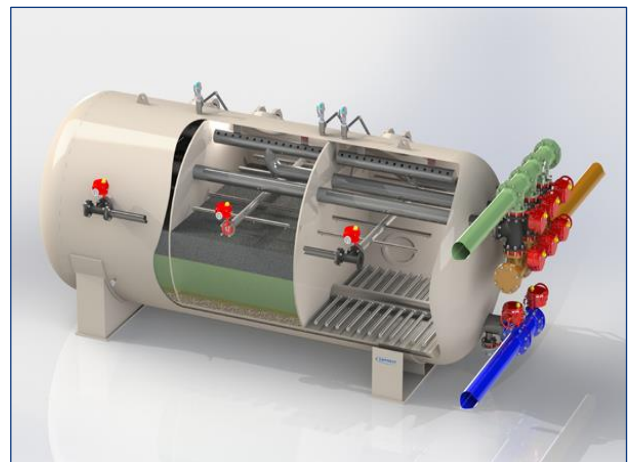
Conceptual site layout at LF Well No. 2 site

Space-saving strategies will be evaluated such as:

- Single-cell filter unit configuration
- Multi-cell filter units (including redundancy to allow continuous operation during backwashes)
- Backwash waste direct connection to the sewer, to eliminate the need for a backwash tank



Single-cell vessel configuration



Multi-cell vessel configuration

Tetra Tech shall describe each of the alternatives and configurations in the Preliminary Design Report (PDR), evaluate the advantages and disadvantages of each option, and provide our recommendations.

Treatment Technology Alternatives:

There are a number of different oxidation/filtration options for treating high iron and manganese levels in groundwater. Manganese can be removed through oxidation of the soluble divalent ions to the insoluble trivalent forms. These insoluble forms precipitate in subsequent sedimentation or filtration steps. The process involves addition of an oxidant such as chlorine into the flow stream to form manganese precipitates, which are then removed with a pressure filter. The filter requires a daily backwash cycle. The backwash water can be supplied from the treated well water and upon completion of the backwash cycle, the wastewater is stored in a backwash settling tank equipped with a dolphin strainer/skimmer which recycles the supernatant solution and pumps it back into the treatment feed stream. During the design phase, Tetra Tech shall evaluate if there is adequate space available for a backwash tank, otherwise, backwash waste can be discharged to the sewer.

Various types of filter media such as Greensand Plus, Pyrolusite and other proprietary media (Filtronics Electromedia and Tonka IMAX) are commonly used in the treatment system. The filter media, when combined with an oxidant like sodium hypochlorite or potassium permanganate, oxidize both iron and manganese to a less soluble form which precipitates out and accumulates in the filter bed. The precipitates are removed by backwashing the filter media. The oxidative capacity of the media is regenerated using an oxidant such as chlorine or permanganate, which is continuously fed to the influent.

Optimum precipitation occurs at a pH greater than 6.4 for iron and greater than 9.3 for manganese. The reaction can be impeded by the presence of organic carbon, biological oxygen demand or ammonia which compete for available oxygen. The stoichiometric requirement for the oxidation reduction process are generally 0.63 mg/l of chlorine per mg/l of iron and 1.29 mg/l of chlorine per mg/l of manganese. Other parameters can affect the process which include temperature of the feed water, pH, total organic carbon (TOC), and ammonia.

Oxidation reactions can take up to 2 hours; therefore, it is important that the filter media selected has demonstrated adsorptive properties to attract iron and manganese ions in place while oxidation occurs. Medias which have demonstrated effective iron and manganese removal when coupled with chemical oxidation include Greensand, Pyrolusite, Electromedia I, and IMAX.

Four types of filter media can be considered for the treatment facility including: Pyrolusite, Greensand, Electromedia I, and IMAX (which is a proprietary blend of pyrolusite and sand by Tonka). A summary of the filter system design components is presented in Table X.

Pyrolusite is a heavy, denser type media and can attain hydraulic loading rates of 5 to 10 gpm/sf. Electromedia can sustain higher loading rates of 10 to 15 gpm/sf, whereas greensand filter loading rates are typically 2 to 4 gpm/sf, thereby requiring larger filter vessels. Accordingly, filter backwash rates for Pyrolusite and Electromedia are substantially greater due to the denser material and can vary from 20 to 30 gpm/sf for, compared with 12 to 15 gpm for greensand media.

The filter run times and backwash frequencies can vary depending on the raw water quality. A filter backwash can be initiated by a pressure drop across the filter bed, constituent breakthrough or run time. Typical operating experience at similar facilities indicates that filters should be backwashed every 12 to 24 hours. While air scouring or a surface rinse of the media is not required for Pyrolusite and Electromedia, it is recommended for Greensand and IMAX to remove precipitates and clean the filter bed more thoroughly.

The filter vessels need a minimum 30 to 35 psi operating feed pressure coming from the influent wells. The expected pressure drop across the treatment facility is anticipated at about 15 psi. Treated filtered water would be discharged to the forebay reservoir.

Iron and Manganese Filter Media Options			
Criteria	Pyrolusite	Electromedia®	Greensand Plus
Media	Pyrolusite	Proprietary	Greensand Plus, Anthracite
Local System Suppliers	Atec	Filtronics	1. Loprest 2. Hungerford and Terry (rep by Gierlich-Mitchell) 3. Wigen (rep by JBI Water)
Media Density (lbs/cf)	120	85 (estimated)	85
Hydraulic Loading Rate (gpm/sf)	5 - 10	10 - 15	7 - 10
Backwash Duration ^(a) (min)	5	5	12
Backwash Rate (gpm/sf)	25 - 28	20 - 30	12 - 15
Backwash Frequency	24 hours	12 hours	24 - 48 hours

^(a) Includes rinse to waste.

Pyrolusite filter media has been used in many iron and manganese treatment facilities, primarily in the Pacific Northwest; however, this media is less commonly used in Southern California. Electromedia is a proprietary media which can limit the District's options for a competitive bid. Greensand offers the most competitive bid process and may be best if the District elects to design a single system. However, if desired, Tetra Tech can provide a flexible design that can accommodate either Greensand or an alternative proprietary media system supplier.

Water Quality Review and Recommendations: Tetra Tech has reviewed the water quality data provided in Exhibit B-Summary of Water Quality Analytical Data, 2011 and Exhibit H LF Well No. 1 and 2 Water Quality Data, 2016-2018. As noted in the RFP, water quality results for iron and manganese were generally below the State's Secondary Drinking Water Standard MCLs, however we understand the need for treatment due to brown water issues causing complaints from users. As we are proposing to evaluate various oxidation-filtration type systems which utilize an oxidant such as sodium hypochlorite for the oxidation of iron and manganese to occur, it is critical that the sodium hypochlorite injected into the feed water is present as free chlorine. Based on our experience from past projects that utilize these treatment methods, we have found it necessary to test for the presence of ammonia, as the development of chloramines will reduce the amount of free chlorine available for the treatment process to be effective. Therefore, we recommend additional water quality sampling and testing for ammonia to determine the amount of free chlorine that will be available, as well as identifying the need for additional dosing required.

Replacement of the Chemical Feed System: As noted by IRWD in the RFP the existing chemical feed system enclosure is significantly corroded, likely due to incompatibility of the steel enclosure and the sodium hypochlorite being stored. The enclosure will need to be replaced with a non-corrosive weather-proof structure. We will evaluate various options such as a fiberglass enclosure and concrete foundation and concrete containment curb structure with metal shade structure.

IRWD staff also noted at the pre-proposal meeting that the chemical deliveries to the site occurred about twice a week and was too frequent to accommodate. Additionally, it is anticipated that the new iron and manganese treatment system will require additional dosing of sodium hypochlorite. Based on these factors and any other IRWD feedback, we will perform calculations to determine appropriate sizing of the storage tank, feed equipment, piping, and appurtenances and determine whether existing equipment can be utilized or will need replacement.

Mechanical Appurtenances: Vendor packaged systems typically do not come with valves, instruments, gages, and other items that meet IRWD standards. For IRWD's Irvine Desalter Project Manganese Removal System (2009), we spoke with the vendors of these systems and provided a specification that met IRWD

standards. For example, instead of pneumatic control valves we used electric motor operators on IRWD valves meeting IRWD standards. For this project, we will identify appurtenances on the packaged systems that do not meet IRWD standards and confirm with IRWD that these appurtenances are noted in the specifications to meet the District's standards.

Construction Staging/Storing: Tetra Tech will provide exhibits to IRWD for staging and storage for construction during the preliminary design report and thoroughly vetted during the design phase of the project.

Traffic Control: Tetra Tech will ensure that their traffic engineers assess the maintenance of traffic for the project area. The project site fronts Osterman Road, which is comprised of a two-lane street, with one lane in each direction. Additionally, it is in a residential area where vehicular traffic on Osterman Road is expected to be frequent during construction hours. We anticipate two (2) traffic control plan sheets will be needed for permitting purposes and to ensure that the contractor accounts for proper traffic control within the project work area.

Noise Mitigation: As the site is in a residential area, Tetra Tech shall enlist the services of a noise subconsultant Behrens and Associates, Inc. to evaluate and comply with local noise ordinance requirements for the site for new facilities that will generate noise and require noise mitigation. Sound attenuation enclosures or other appurtenances for equipment exceeding noise levels will be incorporated in the proposed project facilities plans, specifications, and construction cost estimate as required.

Geotechnical: Tetra Tech recommends a geotechnical investigation to adequately characterize the soil conditions at the LF Well No. 2 site if this has not been completed. As noted in the pre-proposal meeting, IRWD will enlist the services of their on-call geotechnical consultant if required, to perform and provide recommendations based on any subsurface investigations. Therefore, the investigation is not reflected in Tetra Tech's fee and scope, but Tetra Tech will be responsible for reviewing the geotechnical report and designing the proposed facilities in accordance with the report recommendations.

Permits: Tetra Tech will identify the required permits needed for this project and prepare applications and submittal documents as required for IRWD to apply for the permits. Additionally, we recommend scheduling one meeting with each of the affected jurisdictional agencies as well as an overall permitting requirements summary meeting (between IRWD and Tetra Tech) based on directions and requirements provided at the agency meetings. It is anticipated the following permits are required:

- Orange County Fire Authority: We anticipate that this facility and the improvements for this project will required the following according to OCFA guidelines - Fire Master Plan, Hazardous Material Identification and Classification.
- Department of Drinking Water (DDW): The DDW permit will require the preparation of an Engineer's Report and Operation, Maintenance, and Monitoring Plan. This is reflected in our scope and fee.
- City of Lake Forest/County of Orange: Tetra Tech will review requirements for encroachment permits and provide submittal forms and documentation for IRWD's execution and submittal.
- We anticipate two (2) traffic control plan sheets will be needed for permitting purposes and to ensure that the contractor accounts for proper traffic control within the project work area.

Miscellaneous Items:

- Specifications shall include NSF-61 certification requirements as applicable for required materials and equipment in use for potable drinking water systems.
- Well piping modifications: in addition to modifications to add a dedicated well flush line, it was observed in the plans and at the pre-proposal site visit that a surge tank is installed on the well discharge line. With the incorporation of the new treatment system, the current installation may not be effective for surge protection at this location. Tetra Tech will review the information available on the surge tank and determine if a surge tank is required at the treatment product water discharge.

SCOPE OF WORK

Members of the Project Team have performed an in-depth review of the project description and scope of work within the RFP. We propose to provide the following scope of work for the preliminary design, final design and bid phase services.

All work performed on this project will conform to IRWD standards and requirements including, but not limited to, the following: IRWD Project Manual; IRWD Construction Manual; and IRWD Electrical and Instrumentation and Control (I&C) Design Standards.

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

Task 1 — Project Management

Tetra Tech will conduct project management activities to ensure adherence to scope, schedule, and budget; promote efficient communication between Tetra Tech, IRWD, and others as required; and implement an effective quality assurance/quality control (QA/QC) program.

Preparation of Project Status Reports: Tetra Tech will prepare weekly and monthly status reports. Each weekly status report will be submitted on a Monday and will 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 and will provide more detail, summarizing the work completed and reviewing work status relative to budget and schedule. The project schedule will also be updated on a monthly basis with the monthly status report.

Meetings: Tetra Tech will organize, schedule, attend, and conduct meetings as required. We will prepare and submit meeting agendas for IRWD review and concurrence at least three days prior to the meeting. We will prepare draft and final minutes for all meetings and workshops and submit them to IRWD within one week of the meeting.

Tetra Tech has assumed the following meetings and provided possible meeting topics and potential attendees for these meetings as required in the RFP:

Meeting/Workshop	Possible Agenda/Meeting Topics	Attendees
Kick-off Meeting	• Introduction of Parties • Lines of Communication • Summary of Project Goals and Approach • Preliminary Schedule	Tetra Tech PM, Discipline leads, IRWD PM, Mechanical, Electrical, and Operations Staff
Pilot Study Evaluation	• Summary of Evaluation Process and Parameters • Conclusions and Recommendations on whether to Pilot is required	Tetra Tech PM, Pilot Study Manager, IRWD PM, and others as needed
Additional Design Development Meetings	• 60% Design Development Meeting • 99% Design Development Meeting	Tetra Tech PM, IRWD PM, and other leads as required
Coordination activities with jurisdictional agencies and project stakeholders	One meeting with each of the following: • City of Lake Forest • DDW • OCFA • Others as required	Tetra Tech PM, IRWD PM, City of Lake Forest, DDW, OCFA, and other agencies as required
Overall Permit Requirements Meeting	Follow up meeting to discuss and summarize permitting requirements after meeting with agency representatives	Tetra Tech PM, Process Engineer, IRWD PM

Meeting/Workshop	Possible Agenda/Meeting Topics	Attendees
Site Visits	- Field data collection - Photographs - Site measurements	Tetra Tech PM and/or Civil Engineer, IRWD Representative
Draft PDR Presentation	- Treatment Technology Alternatives and Recommended Option - Pilot Study Evaluation	Tetra Tech PM, discipline leads, IRWD PM, Mechanical, Electrical, Operations Staff
60% Design Presentation	- Discussion of Comments and Responses - Coordination of design issues - Permitting Status	Tetra Tech PM, discipline leads, IRWD PM, Mechanical, Electrical, Operations Staff
99% Design Presentation	- Discussion of Comments and Responses - Coordination of design issues - Permitting Status	Tetra Tech PM, discipline leads, IRWD PM, Mechanical, Electrical, Operations Staff
Final Design Presentation	Discussion of Comments and Responses	Tetra Tech PM, discipline leads, IRWD PM, Mechanical, Electrical, Operations Staff

Quality Assurance/Quality Control (QA/QC): Tetra Tech will implement proven QA/QC measures throughout the project to ensure ongoing and consistent quality control throughout all project phases.

Project Schedule: Tetra Tech shall prepare and will update the project schedule for design and construction activities in Microsoft Project on a monthly basis at minimum. Included herein is a proposed schedule of preliminary through design phase activities.

Task 2 — Preliminary Design Report

The preliminary design will be used to document the basis of the final design for the facility, e.g. code requirements, permitting requirements, site piping layouts, process mechanical layouts, electrical service onsite, structural improvements, etc. As required per the RFP, recommendations for wellhead equipment, modifications, site improvements, pilot study, water treatment system, product water delivery, hydraulic analysis, off spec water conveyance to sewer, well bypass to storm drain, backwash water storage and conveyance to sewer, instrumentation and controls, ancillary equipment, construction materials summary, redundancy, noise mitigation measures, and a preliminary site plan. Tetra Tech's evaluation of the PDR shall also include an opinion of construction and operations and maintenance costs. Supporting documentation in the form of budgetary quotations, data sheets of major equipment, and other pertinent data will be included for reference.

The work will consist of, but not be limited to, the following subtasks:

A. Information, Data Collection, and Site Investigation: Tetra Tech shall identify and gather all information from IRWD including, but not limited to, reports, historical data, hydraulics, and perform any site investigations as necessary to complete the design of the treatment, wellhead, utility, electrical, instrumentation SCADA, pipelines, and appurtenances. As part of the site investigations Tetra Tech shall identify equipment that can be salvaged or in poor condition which warrants disposal and/or replacement along with consideration from input from IRWD staff on the conditions of the existing equipment.

Record drawings which IRWD has already furnished shall be reviewed, but additional documents will be reviewed at the beginning of NTP:

- IRWD Legal Documents (well site title, easement, deed, and plat record)
- County Road Legal Documents (easement, deed, and plat record)
- County Park Legal Documents (Regency Park title, easement, deed, and plat record)

Tetra Tech will also complete a site visit to identify and collect any other existing site data in the form of 3D and 2D photographs, and field measurements of existing site features.

B. Regulatory Water Quality Requirements: Tetra Tech shall collect, compile, review, and evaluate all available relevant groundwater quality data for the purpose of predicting critical design water quality criteria to produce potable water from Lake Forest Well No. 2 for compliance with California Drinking Water and USEPA standards for public consumption.

C. Permitting: Identify all permits required and their controlling agencies during the construction phase, including but not limited to the Department of Drinking Water (DDW) City of Lake Forest, Orange County and Orange County Fire Authority (OCFA).

Initiate and complete application process and secure permits with appropriate agencies. Copies of completed permits shall be made a part of the Project Manual. IRWD will reimburse Tetra Tech for actual permit fees without surcharge.

D. Siting Design: Prepare a preliminary site layout for the preferred treatment alternative and include all necessary pre-treatment, chemical systems, site piping/valves, electrical and instrumentation equipment, building(s) and/or enclosures, site access, drainage, as applicable. Coordinate with IRWD to determine ultimate facility sizing and layout.

E. Treatment Alternatives: Evaluate treatment alternatives and make recommendation of preferred alternative and prepare short list of acceptable and approved vendors. Activities included in this task are as follows:

- Establish the process selection and design criteria for the treatment system
- Establish groundwater production requirements for the treatment system
- Prepare a process flow diagram for the treatment system
- Selection and sizing of equipment
- Establish design criteria for all engineering disciplines

As IRWD is willing to consider pre-purchase of the treatment unit, Tetra Tech will compare the advantages, disadvantages, and estimated cost impacts of a pre-purchase versus purchase by the selected contractor during the construction phase. This evaluation along with any supporting documents will be provided within the PDR.

F. Pilot Testing: Tetra Tech shall evaluate the need for pilot testing based on historical water quality data to determine operational performance of the recommended treatment system in order to achieve the required water quality goals. As the need for pilot testing and recommended technology has not yet been fully evaluated, a preliminary estimate for this effort is included in our fee based on discussions with oxidation-filtration system suppliers. Note that the estimate does not include costs for water sampling and lab testing.

G. Wellhead/piping Modifications and Improvements: Tetra Tech will review existing well data sheets and reports to perform a hydraulic analysis on the wellhead, existing piping, well bypass piping at startup, and improvements necessary to accommodate the recommended treatment alternatives. An evaluation of the existing submersible pump shall be performed to ensure that it has sufficient capacity to discharge flow through the treatment vessels. Any pressure deficiencies for potable distribution within IRWD's system shall be made up by using a post treatment booster system and will be included in the hydraulic analysis.

- H. Utility Search and Needs:** Utility research shall include completing a search of available record drawings and performing onsite utility pothole testing and site topographic survey. Utility survey will be based on the evaluated as-built record drawings, onsite utility markings. We will also perform a Dig-Alert search of the area to identify and request maps of existing utility agencies that have facilities within the project area; which will be used as part of the development of CADD site background files for the construction plans. Additionally, we will utilize record drawings of facilities that will require connection from proposed pipelines such as sewer and storm drain for the development of connection details. As IRWD has indicated there are no plans available for the 8-inch water distribution pipeline from LF Well No. 2 to the reservoirs, we assume some potholing services will be required to locate this horizontally and vertically. We will pothole other utility points of connection and additional utilities that may be impacted by proposed facilities and have included this in our fee.

Tetra Tech will evaluate if the existing power supply available on site will sufficiently accommodate loads generated by all existing and new equipment.

- I. Geotechnical Investigation:** If required, subsurface geotechnical investigations shall be performed by IRWD's on-call consultant and not by Tetra Tech. Tetra Tech will coordinate with IRWD's on-call geotechnical consultant who shall prepare a geotechnical report that will be reviewed by Tetra Tech to ensure facilities proposed onsite are designed in accordance with the recommendations noted in the report and applicable California Building Codes.
- J. Site Survey:** Topographic survey of the site will be performed which will extend from the LF Well No. 2 Site to the limits of the road right-of-way headed north of the site. As noted above, utility pothole testing shall be performed to confirm horizontal and vertical locations of some subsurface utilities.
- K. Improvement Plan Sheets:** Schematic drawings shall be prepared for the PDR along with a drawing list to complete the design phase of the project.

Sheet Title
Process Flow Diagram
Horizontal Control Plan
Overall Site Plan
Grading and Paving Plan
Overall Process/Mechanical Plan
Electrical Site Plan
Single Line Diagram
Process and Instrumentation Legend and Abbreviations
Process and Instrumentation Diagram 1
Process and Instrumentation Diagram 2
Process and Instrumentation Diagram 3

- L. Instrumentation and Control Design Criteria:** Tetra Tech shall include a process and instrumentation diagram (P&ID) for the recommended alternative treatment system including all existing instrumentation and control at the wellhead. Additionally a preliminary operational scheme including the P&ID, single line diagram, control equipment list, and method of integration with IRWD's existing SCADA system.

Prior to this, Tetra Tech shall develop control loop functional description, control system input/output list, and an action matrix identifying control/alarm points and what items or functions they will control (per IRWD standard format) for District review and approval. Tetra Tech shall identify existing IRWD

telemetry cabling and facilities and recommend new telemetry connections and extensions, coordinating with IRWD's Electrical Engineer.

- M. Opinion of Probable Construction Cost and O&M Costs:** Tetra Tech shall prepare a detailed and itemized opinion of probable construction cost and O&M costs for the proposed facilities, updated at each design phase, corresponding to the appropriate AACE Cost Estimate Classifications and standards. The basis of construction costs will be developed based on budgetary quotations from equipment and material vendors. Tetra Tech will also engage IRWD staff for input regarding recent historical costs for labor and maintenance-related purchases, if available.
- N. Construction Schedule:** An updated design schedule and an initial construction schedule shall be developed. Long lead items will be noted, and the schedule will indicate key critical path tasks.
- O. Deliverables – Draft PDR, Final PDR:** The work described above shall be summarized and compiled into a PDR. One (1) electronic copy in PDF format shall be submitted for review. Upon resolution and incorporation of review comments, one (1) electronic copy in PDF format shall be submitted. The PDR shall be finalized prior to proceeding with the 60 percent design deliverable.

Task 3 – Final Design

The final design will result in the preparation of the Contract Documents. In the final design phase, Tetra Tech will address the items discussed below:

- A. Project Manual:** Tetra Tech will prepare a Project Manual in standard IRWD format for the Contract Documents. IRWD's front end documents will be utilized, and Tetra Tech 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 will describe the allowable shutdown durations and sequencing associated with construction activities. The Project Manual will also include the IRWD General Technical Specifications, modifications thereto, any project specific technical specifications, and any appendices for reports or documents needed for the selected contractor's reference for construction and permitting.
- B. Improvement Plans:** Tetra Tech will prepare detailed construction drawings in the latest version of AutoCAD and using NCS V4.0 layering standards, on 24-inch x 36-inch sheets utilizing IRWD's standard border template. Sheet index/location map/legend, general notes, construction notes, and details will 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.

Tetra Tech will provide plans, calculations and specifications as needed to clearly define the preferred treatment system and supporting facilities. We envision the final design will include the following construction drawings and anticipate a total of 54 sheets as shown in the table below:

Sheet No.	Sheet Title	60% Submittal	99% and Final Submittals
1	Cover Sheet	■	■
2	Sheet Index, Abbreviations, Legend, Project Location Map	■	■
3	General Notes and Agency Index	■	■
4	Process Flow Diagram	■	■
5	Horizontal Control Plan	■	■
6	Staging, Work Area and Access Plan		■
7	Demolition Plan and Section	■	■
8	Overall Site Plan	■	■

Sheet No.	Sheet Title	60% Submittal	99% and Final Submittals
9	Grading and Paving Plan	■	■
10	Yard Piping Plan	■	■
11	Piping Profiles	■	■
12	Connection Details		■
13	Civil Details 1		■
14	Civil Details 2		■
15	Overall Process/Mechanical Plan	■	■
16	Well Piping Modifications Plan and Section	■	■
17	Treatment Equipment Plan and Section	■	■
18	Backwash Tank Plan and Section (if required)	■	■
19	Chemical Feed System Plan and Section	■	■
20	Process Details 1		■
21	Process Details 2		■
22	Process Details 3		■
23	Structural General Notes	■	■
24	Special Inspections	■	■
25	Foundation Plan 1	■	■
26	Foundation Plan 2	■	■
27	Chemical Storage Foundation Plan and Roof Framing Plan	■	■
28	Chemical Storage Section (if required)		■
29	Structural Details 1		■
30	Structural Details 2		■
31	Foundation and Equipment Anchorage Details		■
32	Electrical Symbols and Abbreviations	■	■
33	Electrical Demolition Plan	■	■
34	Electrical Site Plan	■	■
35	Power Plan 1	■	■
36	Power Plan 2	■	■
37	Power Plan 3	■	■
38	Control Plan 1	■	■
39	Control Plan 2	■	■
40	Control Plan 3	■	■
41	Lighting and Grounding		■
42	Single Line Diagram	■	■
43	Conduit and Panel Schedule	■	■
44	Control Schematic 1	■	■
45	Control Schematic 2	■	■
46	Control Schematic 3	■	■
47	Electrical Details 1		■
48	Electrical Details 2		■

Sheet No.	Sheet Title	60% Submittal	99% and Final Submittals
49	Process and Instrumentation Legend and Abbreviations	■	■
50	Process and Instrumentation Diagram 1	■	■
51	Process and Instrumentation Diagram 2	■	■
52	Process and Instrumentation Diagram 3	■	■
53	Traffic Control Plan 1		■
54	Traffic Control Plan 2		■

- C. Opinion of Probable Construction Cost:** Prepare a detailed itemized opinion of probable construction cost for the proposed upgrades. The estimate will be provided at each project deliverable.
- D. Project Schedule:** Maintain and consistently update the project schedule, which will include detailed schedules for both design and construction activities. The schedule will be updated and submitted with each of the design deliverables described below. The schedule will include all critical factors impacting the project schedule including implementation, permitting, and coordination activities to ensure that the project is completed in accordance with the proposed schedule. The schedule will be prepared in Microsoft Project.
- E. Design Deliverables:** Deliverables shall be provided as follows:
- 60% Design Submittal:** Tetra Tech will provide the following:
 - A single searchable PDF file of the entire 60-percent plan set as defined in the previous table.
 - A table of contents of the Project Manual shall be provided in addition to the plan set, referencing applicable and modified IRWD standard specification sections, as well as additional specifications sections that will be required for the project.
 - A tabulated comment-response form generated based on IRWD's review of the PDR.
 - 99% Design Submittal:** Tetra tech will provide the following:
 - A single searchable PDF file of the entire 90-percent plan set as defined in the table above.
 - Five color-coded hardcopies of the 99 percent Project Manual, complete with all sections as required by IRWD's standard project manual and the RFP. An itemized Opinion of Probable Construction Cost in the form of the list of Bid Items shall be provided along with the Project Manual.
 - A tabulated comment-response form generated based on IRWD's review of the 60% submittal.
 - Final (100%) Design Deliverable:** Tetra Tech will provide the following:
 - One full size, printed, final set of plans in a single PDF with Tetra Tech's electronic stamp and signature, including IRWD's signatures on the design sheets.
 - A single searchable PDF file of the Project Manual including Tetra Tech's electronic stamp and signature on the signature page.
 - A tabulated comment-response form generated based on IRWD's review of the 99% submittal.
- We understand that this submittal will be backchecked for inclusion of all previous comments prior to adding the Executive Director's electronic signature on the cover sheets of the plans and Project Manual. Once the submittal is reviewed and signed by IRWD, Tetra Tech will provide AutoCAD files for the entire plan set. Provide Microsoft Word files used in the preparation of the Project Manual.

The final submittal shall consist of the following:

- One (1) CD – AutoCAD Files
- One (1) CD – PDF File of Plan Set
- One (1) CD – Project Manual MS Word Files
- One full-size final stamped and signed reproducible plan set consisting of a mylar title sheet and all remaining sheets on bond paper, and one (1) original signed Project Manual for District's signatures.

Task 4 — Bid Phase

During the bidding period, Tetra Tech will assist with providing information and clarification of bid documents to prospective bidders. This will include the preparation of up to two (2) addenda including revisions to the design plans and specifications and assistance with addressing bidder questions. Addenda preparation activities will include:

- Plan Revisions
- Specification Revisions
- Bidder Questions
- Pre-Bid Meeting

Task 5 — Engineering Support During Construction

Tetra Tech shall provide support during the duration of construction of the project. Support services are outlined in the subtasks noted below as described in the RFP requirements.

- A. Project Meetings:** Tetra Tech attend/conduct up to five (5) project meetings of two hours each during the construction and provide meeting minutes.
- B. Shop Drawing Reviews:** Tetra Tech shall review up to forty (40) shop drawing submittals accounting for two (2) review cycles per submittal.
- C. Requests for Information (RFI):** Tetra Tech shall review up to fifteen (15) Requests for Information (RFI).
- D. Minor Plan Revisions:** Tetra Tech shall provide up to 40 hours of staff time to make any minor plan revisions.
- E. Record Drawings:** Tetra Tech shall prepare Record Drawings at construction completion, using Contractor's and IRWD Inspector's redlines. A draft set of Record Drawings in PDF format will be submitted to IRWD for their review. This will be repeated once record drawings are determined to be complete and accurate by IRWD; Tetra Tech will then submit Final Record Drawings in PDF and AutoCAD file formats. IRWD record drawing requirements shall be followed for generating the record drawings.

Task 6 — Training, Commissioning, and Startup Services

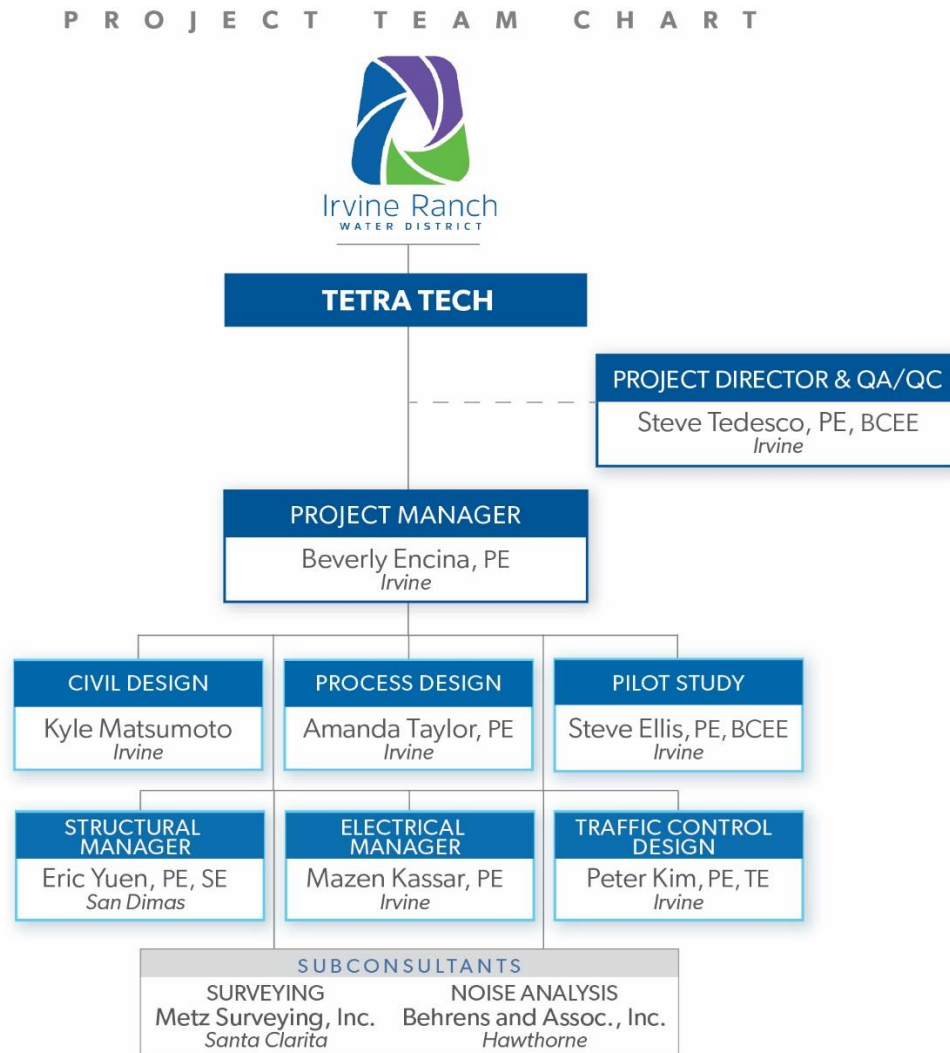
Tetra Tech shall provide support and coordination with our staff and vendor staff to provide all startup, commissioning, and training services for IRWD.

Task 7 — Post Construction Services

Tetra Tech shall develop an O&M Plan for the treatment facility and will collaborate with the treatment vendor and all other applicable equipment vendors for input. A draft O&M plan including five (5) hard copies and one (1) electronic PDF format copy shall be prepared for IRWD review and comments. The final version shall include five (5) hard copies and one (1) electronic PDF format, and the MS Word file.

PROJECT TEAM

Tetra Tech has assembled a project team that possesses the knowledge, experience, and enthusiasm necessary to successfully complete this project. **Our Project Team is devoted to completing your project within schedule and under budget, and not only meet, but exceed your expectations.** Resumes for our project team members can be found in the Resumes section of this proposal.



Project Director & QA/QC

Steve Tedesco, PE, BCEE, will be the Project Director and will serve as overall project delivery quality control. Steve has more than 38 years of experience and will provide his technical expertise to assist the design team in the areas of constructability, specifications, review and as-needed project management support. Steve has been involved on over 25 different projects for IRWD.

Project Manager

Beverly Encina, PE, will serve as the Project Manager and will oversee the day-to-day management of the project. Beverly has more than 19 years of experience in the water and wastewater field and her qualifications include experience in project management and engineering design of water treatment, distribution, hydraulic analysis for water, sewer, storm drain, as well as construction phase services. Beverly has been involved on over 15 different projects for IRWD. With guidance and input from Steve Tedesco, she will provide overall management of the various phases to this project to ensure they are delivered on time and within budget.

Lead Civil and Site Layout Engineer

Kyle Matsumoto, will lead the civil design of the project as well as assist the project manager with coordination within the team. Kyle has more than four years of experience working on water treatment and water distribution projects.

Lead Process Engineer

Amanda Taylor, PE will lead the process design of the project as well as assist the project manager with coordination within the team. Amanda has more than 13 years of experience working on water treatment and water distribution projects.

Pilot Studies

Steve Ellis, PE, BCEE, will lead the Pilot Study Evaluation and coordination of testing for the project as well as has more than 42 years of experience in project management and design of water treatment and water distribution projects. Steve has been involved in past project piloting efforts such as the Wellhead Treatment Strategy and Preliminary Design Project for Rancho California Water District.

Electrical Task Leader

Mazen Kassar, PE, will assist our Project Manager and direct the activities of other members of the design team in the capacity of the Electrical Task Leader. At Tetra Tech, Mazen has been responsible for the design of electrical systems for the majority of all of our water/wastewater facilities in Southern California.

Structural Engineer

Eric Yuen, PE, SE, will assist our Project Manager and direct the activities of other members of the design team in the capacity of the structural aspects of the project. For the past 14 years Eric has been involved in the structural design of the majority of our treatment facility **structures including IRWD's Wells 21 and 22 Desalter.**

Traffic Control

Peter Kim, PE, TE, will assist as our Traffic Control Engineer and provide Traffic Control Design for the project. For the past 27 years Peter has been involved in responsible for over 20 freeway projects requiring preparation of traffic design plans and traffic management plans throughout Southern California as well as traffic control plans for various water districts (including IRWD) on more than 100 projects. **Peter most recently provided Traffic Control Design for IRWD's Harvard Avenue Trunk Sewer Diversion Structure Rehabilitation and IRWD's Principal Aquifer Plant (PAP, Well ET-1) Optimization for PFAS Treatment.**

Subconsultants

In order to provide the full range of services required for this project, we have added **Metz Surveying, Inc.** and **Behrens and Associates, Inc.** as Subconsultants to our project team. Tetra Tech will be responsible for coordinating and integrating the efforts of our surveyor and noise analysis specialists.

Surveying: Metz Surveying, Inc. (DIR Registration #: 1000045062)

Noise Analysis: Behrens and Associates, Inc. (DIR Registration #: 1000018695)

Percentage of Staff Contribution

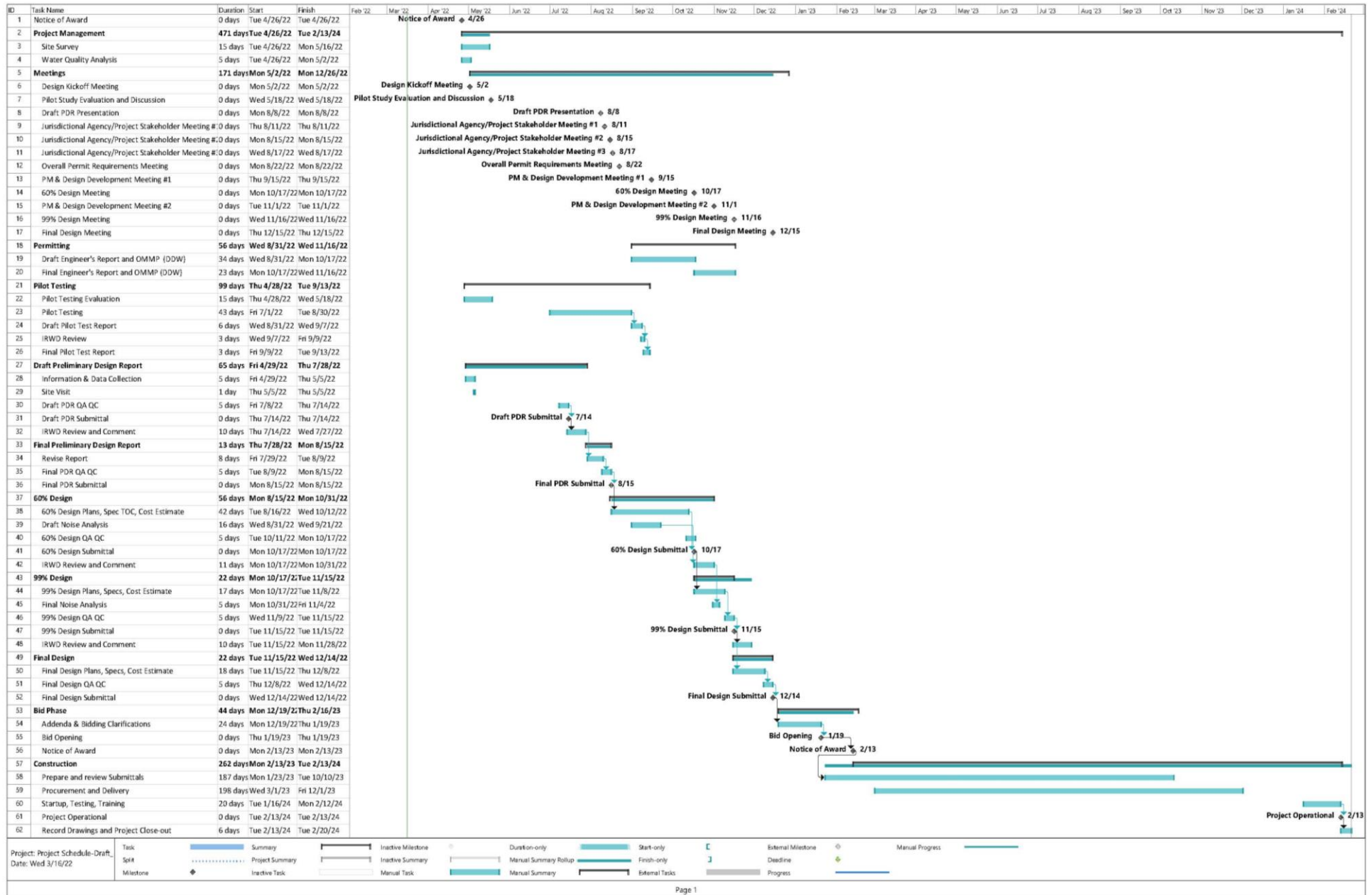
As requested in the RFP, the following is our estimate for Percentage of Staff Contribution:

Team Member	Contribution Percentage	Team Member	Contribution Percentage
Steve Tedesco, PE, BCEE	5%	Amanda Taylor, PE	10%
Beverly Encina, PE	20%	Mazen Kassar, PE	10%
Kyle Matsumoto	20%	Eric Yuen, PE, SE	5%
Steve Ellis, PE, BCEE	20%	Additional Design and Administrative Support Staff	25%

EXPERIENCE

Our Project Team has performed similar work on many wellhead treatment system projects. The following is just a brief summary of this experience and additional project summary sheets with more details can be found in the Project Experience and References section.

Client	Project Name	Treatment	Capacity (GPM)	Year Completed
Eastern Municipal Water District	San Jacinto Enhanced Recharge and Recovery Program	Oxidation - Filtration for Iron and Manganese Removal	6,300	2021
Orange County Water District	Fullerton Main Water Treatment Plant	Ion Exchange (IX) for PFOA, PFAS Removal	8,300	2021
Water Replenishment District	Tract 349 Mutual Water Company Wells 3 and 4 Preliminary Design Report	Oxidation - Filtration for Manganese Removal	800 and 900	2020
Orange County Water District	Yorba Linda Water District Headquarters PFAS Water Treatment Plant	Ion Exchange (IX) for PFOA, PFAS Removal	17,300	2020
Eastern Municipal Water District	Moreno Valley Groundwater Treatment Plant	Oxidation - Filtration for Iron and Manganese Removal	3,000	2019
Orange County Water District	Kimberley 1A PFAS Water Treatment Plant	Ion Exchange (IX) for PFOA, PFAS Removal	3,200	2019
Orange County Water District	Serrano Water District PFAS Water Treatment Plant	Ion Exchange (IX) for PFOA, PFAS Removal	3,000	2019
U.S. Army Corps of Engineering	Joint Base Lewis McChord Field Housing Water System	Oxidation - Filtration for Iron and Manganese Removal	2,125	2018
Water Replenishment District	Sativa Well 5 Technical Evaluation Study and Design Projects	Oxidation - Filtration for Manganese Removal	750	2017
Pascal & Ludwig/Goleta Water District	Design-Build of Four Small Wells	Oxidation - Filtration for Manganese Removal (Shirrell Well)	280	2016
Irvine Ranch Water District	Irvine Desalter Manganese Removal Treatment Project	Oxidation - Filtration for Manganese Removal	1,800	2009
South Coast Water District	Groundwater Recovery Program Desalination Facility	Oxidation - Filtration for Iron and Manganese Removal	163	2008





March 17, 2022

Carl Spangenberg, PE
Project Manager
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

Reference: Fee Proposal to Provide Engineering Design and Construction Services for the Lake Forest Well No. 2 Treatment and Sewer Bypass Project

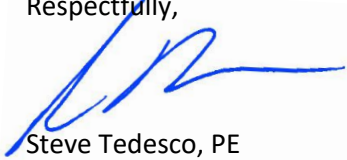
Dear Mr. Spangenberg,

Tetra Tech is eager to submit our fee proposal to provide engineering design and construction services for the Lake Forest Well No. 2 Treatment and Sewer Bypass Project. All work will be performed on a time and material basis "not-to-exceed" the contract price and no additional compensation will be received beyond the price negotiated to be performed unless changes are approved in advance by an amendment to our contract signed by the Irvine Ranch Water District.

Attached is our work plan with a breakdown of labor hours by employee billing classification, together with the cost of non-labor and subconsultant services. The attached rate schedule includes Tetra Tech's billing rates for this project for all classifications of staff likely to be involved in the project; as well as overhead, profit, and expenses.

Tetra Tech appreciates the opportunity to submit our fee proposal and looks forward to your positive response. Should you require additional information or have any questions regarding our submittal, please don't hesitate to contact us.

Respectfully,



Steve Tedesco, PE
Project Manager

SDT/BSE/de

Attachments



Price Proposal

Lake Forest Well No. 2 Treatment and Sewer Bypass

Design and engineering services during construction for a new treatment system to remove iron and manganese for IRWD's existing Well No. 2

Submitted to: Irvine Ranch Water District (Attn: Carl Spangenberg)

Contract Type: T&M

Project Phases / Tasks	Schedule			Work Days Off	Work Days	Total Labor Hrs
	From	Thru	Months			

1.0 Project Management	04/26/22	02/13/24	21.2	47	423	205	27	100	2	13	-	2	21	2	25	2	-	-	-	11
1.01 Project Management						54	4	50												
1.02 Preparation of Project Status Reports						16		16												
1.03 Meetings and Workshops						77	5	18	2	13	-	2	9	2	13	2	-	-	-	11
Kick-off Meeting (1)						/	1	1		1		1	1		1					1
Pilot Testing Evaluation Meeting (1)						5	1	1		1		1								1
Additional Design Meetings (2)						9		2		2			2		2					1
Jurisdictional Agency Meetings (3)						8	1	3		1										3
Overall Permit Requirements Meeting (1)						3	1	1												1
Site Visits (2)						12		2	2				2	2	2	2				
Draft PDR Presentation (1)						9	1	2		2			1		2					1
60% Design Presentation (1)						8		2		2			1		2					1
99% Design Presentation (1)						8		2		2			1		2					1
Final Design Presentation (1)						8		2		2			1		2					1
1.04 QA/QC Reviews						50	18	8					12		12					
1.05 Project Schedule Updates						8		8												
2.0 Preliminary Design	04/26/22	09/13/22	4.5	10	90	611	4	87	106	84	94	34	8	12	21	48	62	-	31	20
2.01 Information, Data Collection, & Site Investigation						48		8	8	4	8		2	4	2	4	8			
2.02 WQ Data Collection and review						16		2		8	2	4								
2.03 Permits/Environmental						32		12	8	8	4									
2.04 Siting Design						26		8	12	2	4									
2.05 Treatment Alternatives						42	2	8		8	16	8								
2.06 Pilot Testing Evaluation						42	2	4	8	8		20								
2.07 Well Piping Modifications						24		8	16											
2.08 Utility Search						25		4	16						1	2	2			
2.09 Site Survey						-														
2.10 Improvement Plan Sheets						142	-	5	10	18	40	-	-	-	4	14	28	-	23	-
Process Flow Diagram (1)						7				2	4								1	
Horizontal Control (1)						5		1	2										2	
Overall Site Plan (1)						8		2	4										2	
Grading and Paving (1)						8		2	4										2	
Overall Mechanical/Process (1)						24				4	12								8	
Treatment System Plan (1)						14				2	8								4	
Chemical Area Plan (1)						10				2	4								4	
Electrical Site Plan (1)						14									2	4	8			
Single Line Diagram (1)						11									1	2	8			
PIDs (4)						41				8	12				1	8	12			
2.11 Instrumentation & Control Design Criteria						22				8					2	12				
2.12 Opinion of Probable Construction Cost and O&M Costs						74		8	20	4	12		2	4	4	8	12			
2.13 Construction Schedule						4		4												
2.14 Deliverables - Draft & Final PDR						114		16	8	16	8	2	4	4	8	8	12		8	20
3.0 Final Design	08/15/22	12/14/22	3.9	9	78	1,140	-	99	150	114	146	-	31	81	34	101	150	23	160	51
3.01 60% Plans, Spec TOC, Cost Estimate	08/15/22	10/17/22	2.0	5	40	440	-	42	66	50	63	-	11	24	11	31	60	-	65	17
General (3)						6		2	4											
PFD (1)						3				1	1								1	
Civil (6)						84		20	40										24	
Process/Mechanical (5)						62				12	30								20	
Structural (5)						48						8	20						20	
Electrical (15)						80									8	24	48			
PID (4)						36				4	12				2	6	12			
Project Manual TOC						11		4	2	1			1		1	1				1
Construction and O&M Cost Estimate						42		8	12	8	8		2	4						
Permitting Asst, including Draft Eng Report & OMMP						68		8	8	24	12									16
Draft Noise Analysis						-														

Price Summary / Totals

Task Pricing Totals	284,739
Specify Add'l Fees on Setup	0
Technology Use Fee	
Total Price	394,739

Pricing by Resource

Labor Rate Esc.	Labor	Subs	Travel	Mat'ls & Equip	ODCs	Task Pricing Totals
0.00%	374,460	12,601	1,078	6,600	-	394,739
	44,360	-	616	-	-	44,976
	11,070					11,070
	3,120					3,120
	15,470	-	616	-	-	16,086
	1,535		88			1,623
	1,065					1,065
	1,830					1,830
	1,465					1,465
	645					645
	2,140		264			2,404
	1,945					1,945
	1,615		88			1,703
	1,615		88			1,703
	1,615		88			1,703
	13,140					13,140
	1,560					1,560
	96,140	4,901	-	-	-	101,041
	7,200					7,200
	3,070					3,070
	5,300					5,300
	3,860					3,860
	7,500					7,500
	8,520					8,520
	3,480					3,480
	3,475					3,475
		4,901				4,901
	20,275					20,275
	1,020					1,020
	755					755
	1,190					1,190
	1,190					1,190
	3,480					3,480
	1,980					1,980
	1,500					1,500
	1,990					1,990
	1,435					1,435
	5,735					5,735
	3,830					3,830
	10,670					10,670
	780					780
	18,180					18,180
	171,990	7,700	-	6,600	-	186,290
	65,270	4,400	-	-	-	69,670
	870					870
	470					470
	12,540					12,540
	9,080					9,080
	7,620					7,620
	10,920					10,920
	4,930					4,930
	1,950					1,950
	6,450					6,450
	10,440					10,440
		4,400				4,400

3.02 99% Plans, Specs, Cost Estimate	10/17/22	11/15/22	0.9	3	18	575	-	45	66	55	69	-	14	46	16	56	78	19	86	25		87,310	3,300	-	2,200	-	92,810
General (3)						3		1	2													435					435
PFD (1)						2				1	1											310					310
Civil (10)						96		16	40											40		14,320					14,320
Process/Mechanical (7)						56				16	40											7,840					7,840
Structural (9)						80						8	32							40		12,440					12,440
Electrical (17)						72								8	24	40						10,040					10,040
PID (4)						32				2	4				2	8	16					4,330					4,330
Traffic Control (2)						22												16	6			5,040					5,040
Project Manual						134		8	8	20	12		4	12	4	20	20	2		24		19,850					19,850
Construction and O&M Cost Estimate						33		4	8	4	4		2	2	2	4	2	1				5,265					5,265
Permitting Asst. including Final Eng Report & OMMP						44		16	8	12	8											7,320					7,320
Project Manual Prints (5)						1														1		120			2,200		2,320
Final Noise Analysis						-																	3,300				3,300
3.03 Final Plans, Specs, Cost Estimate	11/15/22	12/14/22	0.9	3	18	110	-	8	14	7	14	-	4	11	5	14	12	3	9	9		16,575	-	-	4,400	-	20,975
Revise and Prepare Bid Set Plans						61		4	8	4	8		2	8	2	8	8	1	8			9,095					9,095
Revise and Prepare Bid Set Specs						30		2	4	2	4		1	2	2	4		1		8		4,540					4,540
Finalize Construction and O&M Cost Estimate						17		2	2	1	2		1	1	1	2	4	1				2,660					2,660
Full-size Plan Plots and Proj Manual Prints (5)						2													1	1		280			4,400		4,680
3.04 Construction Schedule Updates						15		4	4	2			2		2			1				2,835					2,835
4.0 Bid Phase	12/14/22	02/13/23	2.0	5	39	56	-	4	6	4	6	-	3	6	3	6	2	-	4	12		8,400	-	22	-	-	8,422
4.01 Conformed Documents & Pre-Bid Meeting						22		2	2	2	2		1	2	1	2			4	4		3,410		22			3,432
4.02 Addenda & Meeting Minutes						34		2	4	2	4		2	4	2	4	2			8		4,990					4,990
4.03 Engineering Support During Construction	02/13/23	02/13/24	11.8	26	225	702	-	31	22	11	20	-	10	18	16	25	12		28			22,320		320		-	22,640
5.01 Project Meetings (6)						16		10					4		2							3,320					3,485
5.02 Shop Drawing Reviews (30)						72		4	12	4	12		4	12	4	12	8					10,600					10,600
5.03 Requests For Information (15)						28		4	2	4	2		4	2	4	4	2					4,990					4,990
5.04 Minor Plan Revisions (40 hrs)						40		2	4	2	4		2	4	2	4			16			6,370					6,370
5.05 Site Visits (5)						22		10					4		4	4						4,430		165			4,595
5.06 Record Drawings						24		1	4				1		1	2			12			3,610					3,610
6.0 Training, Commissioning, & Startup Services	01/13/24	02/13/24	1.0	3	20	48	-	12	8	12	4	-	-	8	-	-	-	-	-	-		9,420	-	110	-	-	9,530
6.01 Startup & Commissioning Support						48		4	12	8	12			8								9,420		110			9,530
7.0 Post Construction Services	02/13/24	02/27/24	0.5	1	9	66	4	6	-	12	16	-	-	-	4	8	-	-	-	16		10,830	-	-	-	-	10,830
7.01 Draft O&M Plan						40		2	4		8				2	4				12		6,470					6,470
7.02 Final O&M Plan						26		2	2		8				2	4				4		4,360					4,360
Totals	04/26/22	02/27/24	21.7			2,328	39	339	294	250	286	36	82	119	111	190	226	23	223	110	0.00%	374,460	12,601	1,078	6,600	-	394,739

Total = \$340,729

Sum of PM, PDR, Design
+ Bid Phase

(excludes construction
phase services,
training / Start up &
post construction
services)