AGENDA
IRVINE RANCH WATER DISTRICT
ENGINEERING AND OPERATIONS COMMITTEE MEETING
TUESDAY, MAY 20, 2025

This meeting will be held in-person at the District's Operations Center located at 3512 Michelson Drive, 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=m2b76d44c0c2a14a171b3103619028038
Meeting Number (Access Code): 2489 679 9047
Meeting password: XBcdKM2tm77

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: Daniel Ferons _____
Committee Member: John Withers _____

ALSO PRESENT

| | | | | | |
|---|---|---|---|---|---|
| Paul Cook | ___ | Kevin Burton | ___ | Wendy Chambers | ___ |
| Neveen Adly | ___ | Paul Weghorst | ___ | Steve Choi | ___ |
| Jim Colston | ___ | Jason Manning | ___ | Jose Zepeda | ___ |
| Eric Akiyoshi | ___ | Malcolm Corez | ___ | Jacob Moeder | ___ |
| Harry Cho | ___ | Alex Murphy | ___ | Scott Giatpaiboon | ___ |
| Belisario Rios | ___ | Joe Lam | ___ | Lance Kaneshiro | ___ |
| Cameron Smith | ___ | _____ | ___ | _____ | ___ |
| _____ | ___ | _____ | ___ | _____ | ___ |
| _____ | ___ | _____ | ___ | _____ | ___ |
| _____ | ___ | _____ | ___ | _____ | ___ |
| _____ | ___ | _____ | ___ | _____ | ___ |

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 8:00 a.m. on Tuesday, May 20, 2025.

## 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 and determine which items may be approved without discussion.

## PRESENTATION

4. IRWD SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM UPGRADES – LAM / ZEPEDA / CHAMBERS

   Recommendation: Receive and file.

## INFORMATION

5. UPCOMING PROJECTS – BURTON

   Recommendation: Receive and file.

6. ENTERPRISE GEOGRAPHIC INFORMATION SYSTEM NEEDS ASSESSMENT – SMITH / KANESHIRO / ADLY

   Recommendation: Receive and file.

7. TECHNICAL INFORMATON MANAGEMENT SYSTEM UPDATE – REMPEL / GIATPAIBOON / COLSTON / BURTON

   Recommendation: Receive and file.

## ACTION

8. DISCOVERY PARK SUPPLEMENTAL REIMBURSEMENT AGREEMENT – RIOS / AKIYOSHI / BURTON

   Recommendation: That the Board authorize the General Manager to execute a Supplemental Reimbursement Agreement with Irvine Community Development Company, LLC, for the Discovery Park Capital Sewer Facilities.

**ACTION (continued)**

9. MICHELSON WATER RECYCLING PLANT BIOSOLIDS IMPROVEMENTS CONSULTANT SELECTION – MURPHY / CORTEZ / BURTON

   Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of $1,052,221 for engineering design services for the Michelson Water Recycling Plant Biosolids Handling Improvements, Project 12555.

**OTHER BUSINESS**

10. Directors' Comments

11. Adjournment

**********

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

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May 20, 2025
Prepared by: J. Lam / J. Zepeda
Submitted by: W. Chambers
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

IRWD SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM UPGRADES

SUMMARY:

IRWD leverages its Supervisory Control and Data Acquisition (SCADA) system as a vital tool for the real-time monitoring and operation of its critical infrastructure. This network of specialized hardware and software provides the crucial capability to monitor and operate IRWD's sewer collections, water and recycled water distribution systems, treatment facilities, and solids treatment processes in real time. Staff will provide the Committee an update on ongoing projects aimed at further enhancing the capabilities of IRWD's SCADA system.

BACKGROUND:

IRWD's SCADA system provides local and remote monitoring and control of field equipment. Ongoing improvements focus on three critical areas to facilitate safety, functionality, reliability, and security of IRWD's operating systems:

- Asset Replacement: A program is in place to proactively replace aging and obsolete SCADA hardware and software, as identified in the IRWD Target Activities. Staff will present the program's outcomes and the Programmable Logic Controller (PLC) replacement cycle.
- Cybersecurity and Network System: IRWD utilizes a sophisticated and resilient high-speed wireless network for data exchange across its expanding infrastructure. This network, designed and implemented with expert support, is well-protected against cyber threats. Staff will update the Committee on current and planned cybersecurity initiatives.
- SCADA Connectivity and Accessibility: To centralize operations and maintenance oversight, IRWD is establishing a Unified Operations Control Center. This hub will integrate critical tools, including the SCADA, GIS, security, and asset management (Maximo) systems, providing a unified platform for monitoring, control, and remote operation. Staff will provide a tour of this evolving Center, which is located at the Michelson Operations Center.

A draft of staff's powerpoint presentation is provided as Exhibit "A."

FISCAL IMPACTS:

Not applicable.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Upgrades to IRWD SCADA System Draft Powerpoint

DRAFT

# IRWD SCADA SYSTEM UPGRADES

ENGINEERING AND OPERATIONS COMMITTEE
MAY 20, 2025

Irvine Ranch Water District

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## AGENDA

1. Automation / SCADA System Asset Replacement Program
   - Aging / Outdated Infrastructure
   - PLC Replacement Cycle Study
2. SCADA Cybersecurity Update
   - Completed Defensible Network Architecture
3. Unified Operations Control Center (TV Wall)
   - Collaboration Center
   - Tour

Irvine Ranch Water District

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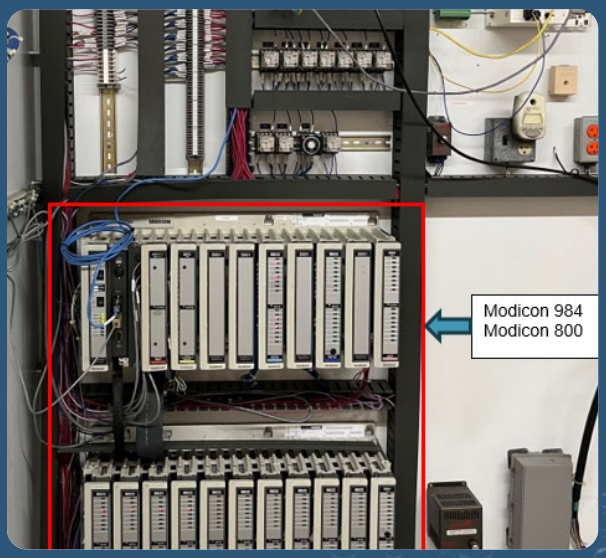
## BACKGROUND: PROGRAMMABLE LOGIC CONTROLLER (PLC)

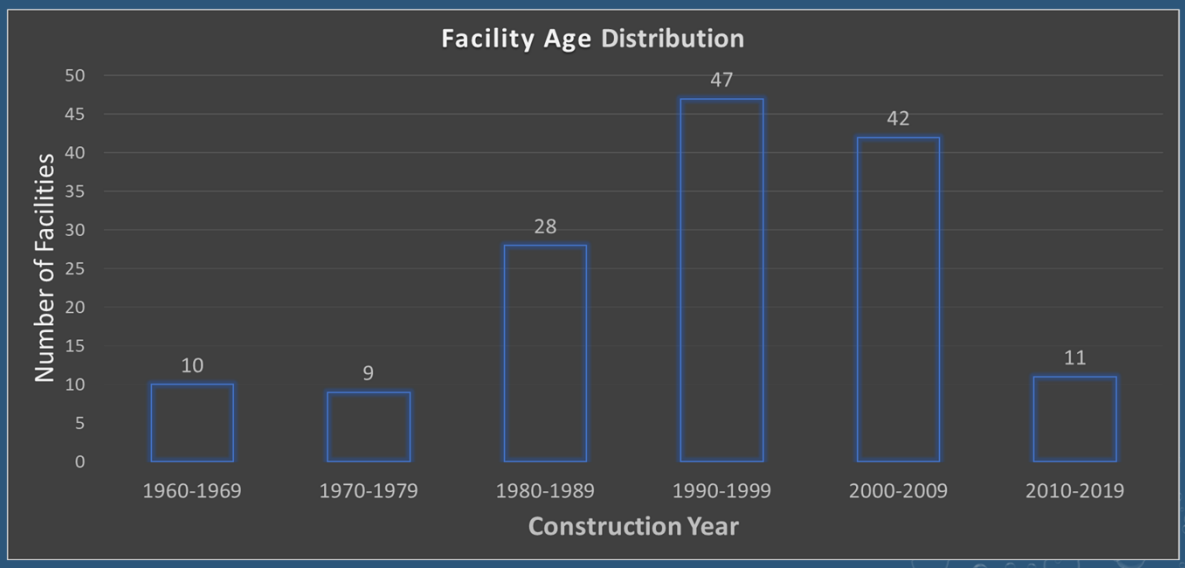
- Smart control device used to automate and manage equipment (e.g., pumps, valves, treatment systems, etc.).
- Collects data from sensors (e.g., flow, water levels, pressure and pH), executes programmed instructions to make decisions, and sends commands to devices (e.g., valves and pumps).
- Improves efficiency, reduces manual work, and enhances overall safety and reliability.



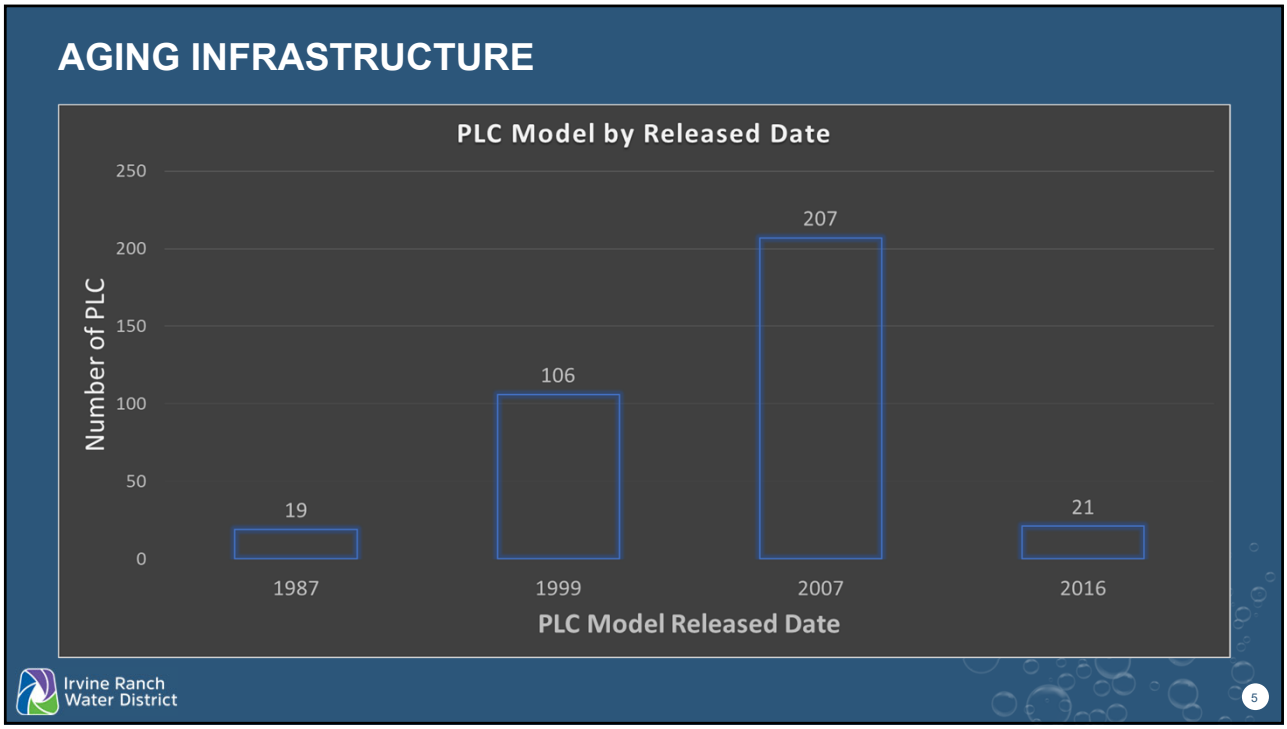

Irvine Ranch Water District

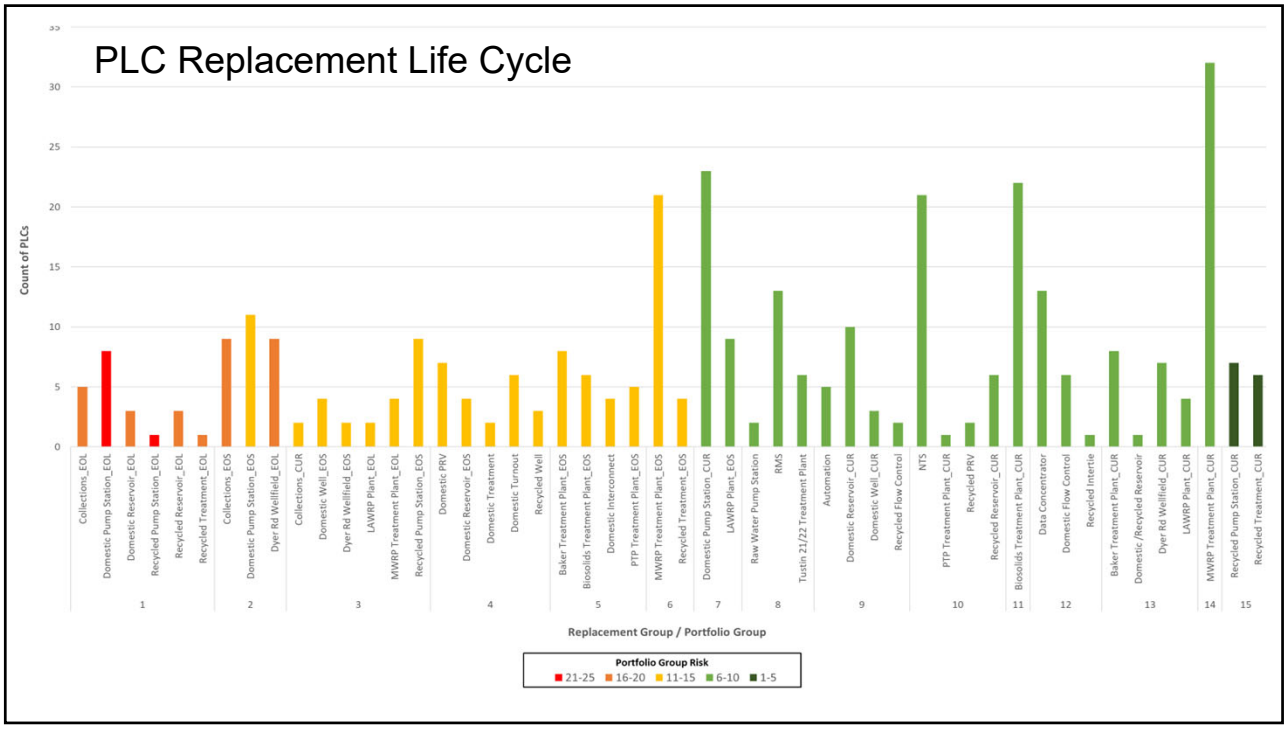


## AGING INFRASTRUCTURE




Irvine Ranch Water District


AGING INFRASTRUCTURE
PLC Model by Released Date
Number of PLC
250
200
150
100
50
0
19
106
207
21
1987
1999
2007
2016
PLC Model Released Date
Irvine Ranch Water District
5


PLC Replacement Life Cycle
Count of PLCs
30
25
20
15
10
5
0
Collections_EOL
Domestic Pump Station_EOL
Domestic Reservoir_EOL
Recycled Pump Station_EOL
Recycled Reservoir_EOL
Recycled Treatment_EOL
Collections_EOS
Domestic Pump Station_EOS
Dyer Rd Wellfield_EOL
Collections_CUR
Domestic Well_EOS
Dyer Rd Wellfield_EOS
LAWRP Plant_EOL
MWRP Treatment Plant_EOL
Recycled Pump Station_EOS
Domestic PRV
Domestic Reservoir_EOS
Domestic Treatment
Domestic Turnout
Recycled Well
Baker Treatment Plant_EOS
Biosolids Treatment Plant_EOS
Domestic Interconnect
PTP Treatment Plant_EOS
MWRP Treatment Plant_EOS
Recycled Treatment_EOS
Domestic Pump Station_CUR
LAWRP Plant_EOS
Raw Water Pump Station
RMS
Tustin 21/22 Treatment Plant
Automation
Domestic Reservoir_CUR
Domestic Well_CUR
Recycled Flow Control
NTS
PTP Treatment Plant_CUR
Recycled PRV
Recycled Reservoir_CUR
Biosolids Treatment Plant_CUR
Data Concentrator
Domestic Flow Control
Recycled Intertie
Baker Treatment Plant_CUR
Domestic /Recycled Reservoir
Dyer Rd Wellfield_CUR
LAWRP Plant_CUR
MWRP Treatment Plant_CUR
Recycled Pump Station_CUR
Recycled Treatment_CUR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Replacement Group / Portfolio Group
Portfolio Group Risk
21-25
16-20
11-15
6-10
1-5

## TOP 5 CYBERSECURITY CRITICAL CONTROLS

Top 5 Critical Controls for SCADA / Operational Technology (OT) *

- Industrial Control System (ICS) Incident Response Plan [Completed Oct 2024]
- Defensible Architecture [Completed April 2025]
  - Deployed 16 Pair of High-Availability Next Generation Firewalls
  - Hardware based Firewall (Data Diode)
  - Completed Micro-segmentation
- Network Visibility & Monitoring [Ongoing]
- Secure Remote Access [Completed April 2018]
- Risk-Based Vulnerability Management [Completed Oct 2024]


* Ranked by SANS institute. https://www.sans.org/white-papers/five-ics-cybersecurity-critical-controls/

Irvine Ranch Water District

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## UNIFIED OPERATIONS CONTROL CENTER

Irvine Ranch Water District

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## UNIFIED OPERATIONS CONTROL CENTER


Irvine Ranch Water District



## Questions?

Irvine Ranch Water District

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May 20, 2025
Prepared by: E. Akiyoshi / M. Cortez / J. Moeder
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

# UPCOMING PROJECTS STATUS REPORT

## SUMMARY:

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

## BACKGROUND:

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

## FISCAL IMPACTS:

Not applicable.

## ENVIRONMENTAL COMPLIANCE:

Not applicable.

## RECOMMENDATION:

Receive and file.

## LIST OF EXHIBITS:

Exhibit "A" – Upcoming Projects Status Report

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Exhibit "A"

IRWD UPCOMING PROJECTS STATUS REPORT

| | Project Name | Code No. | Project No. | Program Manager | Project Manager | Planning | Design | Construction | Construction Final Acceptance |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Orange Heights SAC/Baker Pipeline Relocation | 6691 | 02766 | Cortez | Botello | Completed | Completed | Sep-25 | Apr-26 |
| 2 | SOCWA Effluent Transmission Main Reach A Rehabilitation | - | 11842 | Cortez | Botello | Jul-25 | - | - | - |
| 3 | Coastal ZB and ZD Pump Stations Electrical Replacement | - | 11568 | Cortez | Botello | Aug-25 | - | - | - |
| 4 | Park Plaza RW Pipeline Replacement | 8205 | 13106 | Cortez | Foo | Completed | Completed | In-Process | Sep-25 |
| 5 | HVAC System Replacement at Sand Canyon HQ and Operations Center | 8262 | 12550/12551 | Cortez | Foo | Completed | In-Process | Sep-25 | Oct-26 |
| 6 | Dyer Road Wellfield Facility Rehabilitation Group 1 | 8312 | 11570 | Cortez | Foo | Completed | In-Process | Oct-25 | Apr-27 |
| 7 | Operations Center Warehouse | 7796 | 11854/11855 | Cortez | Foo | Completed | Completed | In-Process | Jul-26 |
| 8 | Rehabilitation of Irvine Desalter Wells 76, 110, 115R and Destruction of Wells 72, 106 | 8055 | 11137/11847/12264 | Cortez | Foo | Completed | Completed | In-Process | Jul-25 |
| 9 | Silverado Bridge 174 DW Improvements | 7836 | 11588 | Cortez | Foo | Completed | Completed | In-Process | Jan-27 |
| 10 | Silverado Bridge 175 DW Improvements | 7588 | 11587 | Cortez | Foo | Completed | In-Process | Jan-27 | Jun-27 |
| 11 | Silverado Bridge 177 DW Improvements | 8101 | 11589 | Cortez | Foo | Completed | Completed | In-Process | Mar-26 |
| 12 | DRWF Well No. 7 Rehabilitation | 8320 | 13252 | Cortez | Foo | Completed | In-Process | Aug-25 | Jan-26 |
| 13 | Recycled Water PRVs Decommissioning | 8305 | 13160 | Cortez | Ige | Completed | In-Process | Jul-25 | Nov-25 |
| 14 | Technology Drive and Ada RW Pipeline Replacement | 8250 | 12979 | Cortez | Ige | Completed | In-Process | Jul-25 | Feb-26 |
| 15 | Turtle Rock/Concordia RW Pipeline Replacement | 8321 | 13162 | Cortez | Ige | Completed | In-Process | Oct-25 | May-26 |
| 16 | Irvine Business Complex Appurtenance Relocations Phase 3 | 8097 | 12827 | Cortez | Ige | Completed | In-Process | Jul-25 | Jan-26 |
| 17 | EV Charging Facilities | - | 12971 | Cortez | Ige | In-Process | - | - | - |
| 18 | Cabinland DW Pipeline Sizing Verification | - | 13231 | Cortez | Ige | In-Process | - | - | - |
| 19 | San Joaquin Hills Road RW Pipeline Replacement | - | 13113 | Cortez | Ige | In-Process | Jul-25 | - | - |
| 20 | LAWRP SOCWA Pump Station Tank Repair | - | 12527 | Cortez | Ige | Completed | In-Process | Aug-25 | - |
| 21 | Biosolids Dust Mitigation - Cable Trays | - | 13244 | Cortez | Mai | Completed | In-Process | Sep-25 | - |
| 22 | Biosolids Lift Station and Sewer Improvement | 8098 | 12541 | Cortez | Mai | Completed | Completed | Jul-25 | Jan-27 |
| 23 | Radio Tower Improvements | 8099 | 11154 | Cortez | Mai | Completed | In-Process | Jul-25 | Apr-26 |
| 24 | Manning Pump Station Replacement | 8322 | 13191 | Cortez | Mai | Completed | In-Process | Jan-26 | Aug-26 |
| 25 | Biosolids Handling Dust Mitigation | - | 13224 | Cortez | Mai | Completed | In-Process | Aug-25 | Jan-26 |
| 26 | Lake Forest Woods Sewer Improvements | 7936 | 11123 | Cortez | Murphy | Completed | Completed | In-Process | Sep-26 |
| 27 | Santiago Canyon Pump Station Improvements | 7524 | 01398 | Cortez | Murphy | Completed | Completed | In-Process | Aug-25 |
| 28 | Biosolids Processing Improvements | - | 12555 | Cortez | Murphy | Completed | In-Process | Aug-26 | Jul-27 |
| 29 | Coastal Z2 and Z4 Pump Stations Rehabilitation | 7925 | 11912 | Cortez | Murphy | Completed | Completed | Jun-25 | Jan-27 |
| 30 | MWRP Compressed Natural Gas and Diesel/Gasoline Fueling Station | 7706 | 07881/07882 | Cortez | Ovcharenko | Completed | Completed | In-Process | Sep-25 |
| 31 | MWRP Tertiary Filter Rehabilitation | 7764 | 07892 | Cortez | Ovcharenko | Completed | Completed | In-Process | Jul-26 |
| 32 | Santiago Creek Dam Improvements | 7140 | 01813 | Moeder | Moeder | Completed | In-Process | Aug-26 | - |
| 33 | Syphon Reservoir Improvements | 7847 | 03808 | Moeder | Moeder | Completed | In-Process | Jun-25 | - |
| 34 | Santiago Hills Zone C+ Strainer Facility Repair | - | - | Moeder | Moeder | In-Process | - | - | - |
| 35 | Howiler Supply Pipeline Vault Rehabilitations | - | 13190 | Moeder | Moeder | In-Process | - | - | - |
| 36 | Santiago Hills Zone 5 Tank Repair | - | 13316 | Moeder | Moeder | In-Process | - | - | - |
| 37 | Orange Heights SAC/Baker Pipeline Relocation | 6691 | 02766 | Moeder | Burk | Completed | Completed | Sep-25 | Apr-26 |
| 38 | Orange Heights Zn 5 to 6 and C+ to E Pump Stations | 8286 | 07136/07139 | Moeder | Burk | Completed | In-Process | - | - |
| 39 | SWD Interconnection Pipeline | 8327 | 13149 | Moeder | Burk | Completed | In-Process | Nov-25 | - |
| 40 | Howiler to Zone 5 Pump Station | 8328 | 13174 | Moeder | Burk | In-Process | - | - | - |
| 41 | Well OPA-1 PFAS Treatment | 7728 | 11720 | Moeder | Burk | Completed | Completed | In-Process | May-25 |
| 42 | Well ET-1 PFAS Treatment | 7732 | 11171 | Moeder | Burk | Completed | Completed | In-Process | Jun-25 |
| 43 | SGU PFAS Treatment | 7732 | 11834 | Moeder | Burk | Completed | Completed | In-Process | Jun-25 |
| 44 | Zone A to Rattlesnake Reservoir BPS | 7410 | 05476/06216 | Moeder | Burk | Completed | Completed | In-Process | Jun-25 |
| 45 | Rattlesnake Dam Risk Reduction Investigation | - | 12101 | Moeder | Cho | Completed | In-Process | - | - |
| 46 | Santiago Canyon Fleming Zone 8 Tank and Zone 8-9 BPS | 7614 | 10101 | Moeder | Cho | Completed | Completed | In-Process | Oct-25 |
| 47 | Orange Heights Zone 6 Reservoir | 6892 | 7138 | Moeder | Cho | Completed | In-Process | Sep-25 | - |
| 48 | Generator Fuel Storage Upgrades | 7955 | 11536/11537 | Moeder | Cho | Completed | Completed | In-Process | Dec-25 |
| 49 | San Joaquin Reservoir Outlet Valve Replacement | - | 13111 | Moeder | Cho | Completed | Completed | In-Process | Dec-25 |

IRWD UPCOMING PROJECTS STATUS REPORT

| | Project Name | Code No. | Project No. | Program Manager | Project Manager | Planning | Design | Construction | Construction Final Acceptance |
|---|---|---|---|---|---|---|---|---|---|
| 50 | San Joaquin Reservoir Filtration | 7430 | 10436 | Moeder | Lu | Completed | Completed | In-Process | Aug-25 |
| 51 | Sewer Siphon Improvements Phase II | 7916 | 11841 | Moeder | Lu | Completed | Completed | In-Process | May-26 |
| 52 | Syphon Reservoir Intersection Improvements and Access Road | 7846 | 03808 | Moeder | Lu | Completed | Completed | Completed | May-25 |
| 53 | BWTP Chemical Line Repair | - | 13200 | Moeder | Lu | In-Process | - | - | - |
| 54 | Rattlesnake Dam Outlet Pipeline Rehabilitation | - | 12101 | Moeder | Lu | In-Process | - | - | - |
| 55 | MWRP MPS-2 Pump Bases Replacement | 7991 | 12545 | Moeder | Mwe | Completed | Completed | In-Process | Jun-25 |
| 56 | UCI Meter Vault Replacement | 8100 | 11774 | Moeder | Mwe | Completed | Completed | Completed | May-25 |
| 57 | Lake Forest Zone 4 Tank Rehabilitations | 8104 | 12568 | Moeder | Mwe | Completed | In-Process | Sep-25 | - |
| 58 | Chapman Tank Replacement | 8330 | 12569 | Moeder | Mwe | In-Process | - | - | - |
| 59 | IDF Chemical Pump Replacement | 8267 | 13183 | Moeder | Mwe | Completed | Completed | In-Process | Dec-25 |
| 60 | San Joaquin Dam Drainage Improvements | 8269 | 13166 | Moeder | Mwe | Completed | In-Process | Aug-25 | Dec-25 |
| 61 | Sand Canyon Dam Spillway Rehabilitation | - | 12505 | Moeder | Sanchez | In-Process | - | - | - |
| 62 | Sand Canyon Dam Instrumentation | 8101 | 12506 | Moeder | Sanchez | Completed | In-Process | Jun-25 | - |
| 63 | Sand Canyon Dam Seepage Improvements | - | 13232 | Moeder | Wimenta | Completed | In-Process | - | - |
| 64 | PA 1, Jeffrey Road Extension RW and DW (RA w/CDC) | 7547 | 11500/12784 | Akiyoshi | Rios | Completed | Completed | Completed | May-25 |
| 65 | PA 51, Serrano Creek Sewer Relocation | 7806 | 12146 | Akiyoshi | Rios | Completed | Completed | Completed | May-25 |
| 66 | PA 51, District 5 South Chinon DW, RW (RA with Heritage Fields) | 7809 | 12231/12232 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 67 | PA 51, Marine Way Stage 2 from Skyhawk to Treble DW, RW (RA with Heritage Fields) | 7902 | 12371/12386/12387 | Akiyoshi | Rios | Completed | Completed | Completed | Apr-25 |
| 68 | PA 51 Marine Way Stage 3 from County to Lynx | 8166 | 13107/13109/13110 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 69 | PA 51 Marine Way Stage 4 from Lynx to OCTA Rail | 8180 | 13099/13100/13101 | Akiyoshi | Rios | Completed | In Process | Jun-25 | Jun-26 |
| 70 | PA 51, Treble from GP5 to Marine Way DW, RW (RA with Heritage Fields) | 7909 | 12404/12405/12406 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 71 | PA 51 Lynx from Harrier to Marine Way DW, SS (RA with Heritage Fields) | 7931 | 12432/12433 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 72 | PA 1, Orchard Hills Neighborhood 4 DW (RA with TIC) | 8044 | 12781 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 73 | PA 1, Orchard Hills Neighborhood 4 RW (RA with TIC) | 7568 | 1722 | Akiyoshi | Rios | Completed | Completed | In-Process | Jun-25 |
| 74 | East Orange, Orange Heights Tract 16199 SS, RW | 6762 | 07484/07486 | Akiyoshi | Rios | Completed | In-Process | Aug-25 | Aug-26 |
| 75 | East Orange, Orange Heights Tract 17995 DW, RW | 6799 | 07376/07377 | Akiyoshi | Rios | Completed | In-Process | Aug-25 | Aug-26 |
| 76 | East Orange, Orange Heights Jamboree and Chapman DW SS, RW | 6815 | 07451/07452/07453 | Akiyoshi | Rios | Completed | In-Process | Aug-25 | Aug-26 |
| 77 | Discovery Apartments 12-inch Sewer Up-size | 8290 | 13302 | Akiyoshi | Rios | Completed | Apr-25 | Jun-25 | Dec-25 |
| 78 | PA 40 Marine Way Capital Domestic | 7957 | 12510 | Akiyoshi | Rios | Completed | Completed | In-Process | Aug-25 |
| 79 | Land Management and Permitting Enterprise System Implementation | - | - | Akiyoshi | Rios | In-Process | - | - | - |
| 80 | I-5 Widening Sand Canyon 12 inch DW Relocation Seg1 | 8336 | 13205 | Akiyoshi | Kuan | Completed | In-Process | Aug-25 | Dec-25 |
| 81 | I-5 Widening Sand Culver 36 inch RW Relocation Seg2 | 8337 | 13204 | Akiyoshi | Kuan | Completed | In-Process | Aug-25 | Dec-25 |
| 82 | Modjeska Grade Road DW Pipeline Relocation | 8285 | 13238 | Akiyoshi | Kuan | Completed | In-Process | Aug-25 | Dec-25 |
| 83 | Replacement Planning Model Update | - | - | Akiyoshi | Robinson | In-Process | Aug-25 | - | - |
| 84 | CIP Asset Management Phase II - Linear Asset Prioritization | - | 12534 | Akiyoshi | Robinson | In-Process | Jun-25 | - | - |
| 85 | Santiago Canyon Steel Tank Rehabilitation Planning Analysis | - | 11782 | Akiyoshi | Robinson | In-Process | May-25 | - | - |

May 20, 2025
Prepared by: C. Smith / L. Kaneshiro
Submitted by: N. Adly
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

ENTERPRISE GEOGRAPHIC INFORMATION SYSTEM NEEDS ASSESSMENT

SUMMARY:

The Enterprise Geographic Information System (GIS) Needs Assessment is presented to the Committee for information.

BACKGROUND:

The information, which is provided as Exhibit "A", is a District-wide assessment of IRWD's current and future Enterprise GIS needs.

FISCAL IMPACTS:

Not applicable.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Enterprise GIS Needs Assessment

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# IRWD ENTERPRISE GIS NEEDS ASSESSMENT

ENGINEERING AND OPERATIONS COMMITTEE MEETING
MAY 20, 2025

Irvine Ranch Water District

## IRWD ENTERPRISE GIS NEEDS ASSESSMENT

## BACKGROUND AND APPROACH

- In 2024, IRWD created the vision for an Enterprise GIS to better serve the District's needs.
- The existing GIS would evolve beyond its focus on record drawings of locations and descriptions of facilities.
- The GIS group was moved to the Information Technology Department and IRWD's first Enterprise GIS Manager was hired in December 2024.
- An IRWD-wide GIS assessment was developed, based on:
  - A review of IRWD GIS Master Plan, IRWD' s goals, and other documents;
  - Interviews with over 30 key IRWD staff; and
  - Consideration of best practices, external inputs, and industry practices.
- The Enterprise GIS Needs Assessment will provide that framework to build upon past work and transition IRWD to an enterprise-based GIS that will best serve the District's expanding needs for information to efficiently provide top-class services to all its customers.

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# STAKEHOLDER FEEDBACK

*ENTERPRISE GIS OPPORTUNITIES ACROSS IRWD*

- Inspections (dams, construction, etc.)
- Water sampling
- Improve vehicle routing to reduce driving time / improved dispatching
- Information for the public
- Spatial information for other systems
- Accurate data and faster updates
- Valve isolation / shutoff
- Sanitary Sewer Overflow (SSO) response
- In-house GIS team to reduce consultant dependency
- And more...

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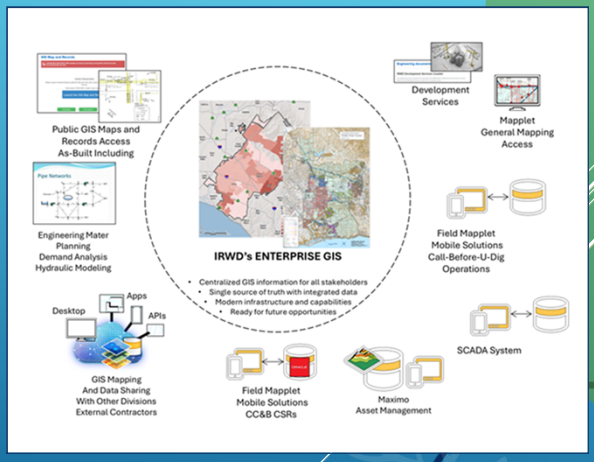
# ENTERPRISE GIS NEEDS FRAMEWORK

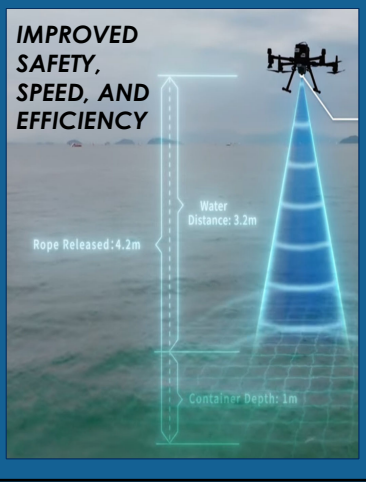
- **Governance & Alignment:** Enterprise GIS aligned with IRWD's mission & values and District-wide needs
- **Enhancing Operations**: Real-time tracking, tighter field integration, better CMMS integration, improved safety and emergency response
- **Transparency & Integrity**: Dashboards & analytics for enterprise decision-making
- **Innovation**: Forward-leaning awareness of GIS industry trends, including AI, tools, uses, data
- **Collaboration**: District-wide participation, GIS tools empowering field & office staff
- **Internal Customer Service**: Integration with IT processes and to improve solution-oriented support and response times

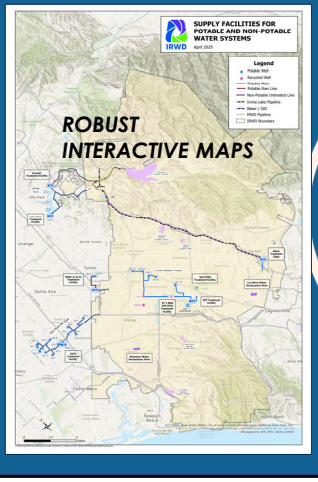


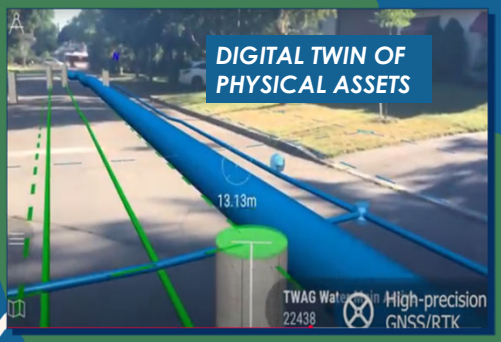

4

# IMPROVING SERVICE WITH AN ENTERPRISE GIS

*INTEGRATED, COMMON OPERATING PICTURE EXAMPLES...*





5

# CONCLUSIONS

- The Enterprise GIS will better serve the needs of all District stakeholders and will **drive safety, operational efficiency, innovation, and transparency**
- Continued commitment and collaboration in **technology, staffing, and training are essential**
- Regular assessments and progress tracking will keep the Enterprise GIS aligned with IRWD's needs

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Note:  This page is intentionally left blank.

May 20, 2025
Prepared by: J. Rempel / S. Giatpaiboon
Submitted by: J. Colston / K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

## TECHNICAL INFORMATION MANAGEMENT SYSTEM UPDATE

### SUMMARY:

In February 2024, the Board approved the acquisition and implementation of the Accelerated Technology Laboratories, Inc. (ATL) software package for IRWD's new technical information management system (TIMS). Since then, staff has been working to configure and implement the new system that will replace the previous system and meet the District's ongoing and future information management needs, ensure regulatory compliance and water quality reporting requirements are met, manage field monitoring through a mobile application, and interface a streamlined instrument-technical information transfer. The projected go-live date is July 1, 2025. Staff will update the Committee regarding this TIMS implementation process.

### BACKGROUND:

Since 1997, IRWD has utilized LabWorks laboratory information management system (LIMS) to record and retrieve laboratory data. Throughout the years, LabWorks has undergone ownership and company changes that have impacted the quality of the software and services provided by the company. In recent years (since Perkin Elmer sold the company), LabWorks has not been able to provide the support needed to meet the new requirements of IRWD's Environmental Laboratory Accreditation Program (ELAP), mobile application needs, regulatory compliance and water quality regulatory reporting requirements, and data management needs.

In 2023, IRWD evaluated multiple technical information management system (TIMS) software packages to determine how best to meet the District's needs. After a thorough evaluation of multiple systems, ATL was selected as IRWD's next TIMS system. ATL's software was selected because it encompasses the complete package for managing the collection of samples in the field to the analytical testing and reporting capabilities in the laboratory, and the accessibility of data component that other software packages lacked.

Staff is close to completing the implementation of the TIMS from ATL, which includes Titan LIMS, Titan iMobile, and Results Point software. The new software will meet ongoing and future needs to maintain the District's ELAP, ensure regulatory compliance and water quality reporting requirements are met, manage field monitoring through a mobile application, and interface a streamlined instrument-technical information transfer. The go-live launch of TIMS is expected in July 2025.

After successful implementation of the TIMS for the Water Quality and Regulatory Compliance Department, opportunities to utilize this system in other IRWD departments will be considered. At the Committee meeting, staff will provide a presentation, attached as Exhibit "A", on the new TIMS.

FISCAL IMPACTS:

The initial implementation of the Software as a Service (SaaS) for the new TIMS was funded through the FY 2023-24 Operating Budget. The initial implementation cost for TIMS for FY 2023-24 was $182,892, which included professional services and training for implementation and the initial SaaS startup fees for February through June 2024 during the initial implementation phase. The ongoing annual SaaS fee for the next three years will cost $160,872 per fiscal year (FY 2024-25, 2025-26, and 2026-27). The total TIMS SaaS fees for three fiscal years is $482,616.

ENVIRONMENTAL COMPLIANCE:

Not Applicable.

RECOMMENDATION:

Receive and File.

LIST OF EXHIBITS:

Exhibit “A” – Technical Information Management System Update Draft Presentation


DRAFT
Irvine Ranch Water District
TECHNICAL INFORMATION MANAGEMENT SYSTEM (TIMS) UPDATE
ENGINEERING AND OPERATIONS COMMITTEE MEETING
MAY 20, 2025
1


AGENDA
State of TIMS Project
iMobile Improvements
Titan Improvements
Next Steps and Beyond
Questions
Irvine Ranch Water District
2

# STATE OF TIMS PROJECT

Irvine Ranch Water District

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## DATABASE

- 200 Analysis Methods
- 194 Method References
- 1,545 Analytes
- 78 Sample Sets
- 1,555 Sample Sites
- 424 Assets/Instruments
- And more!

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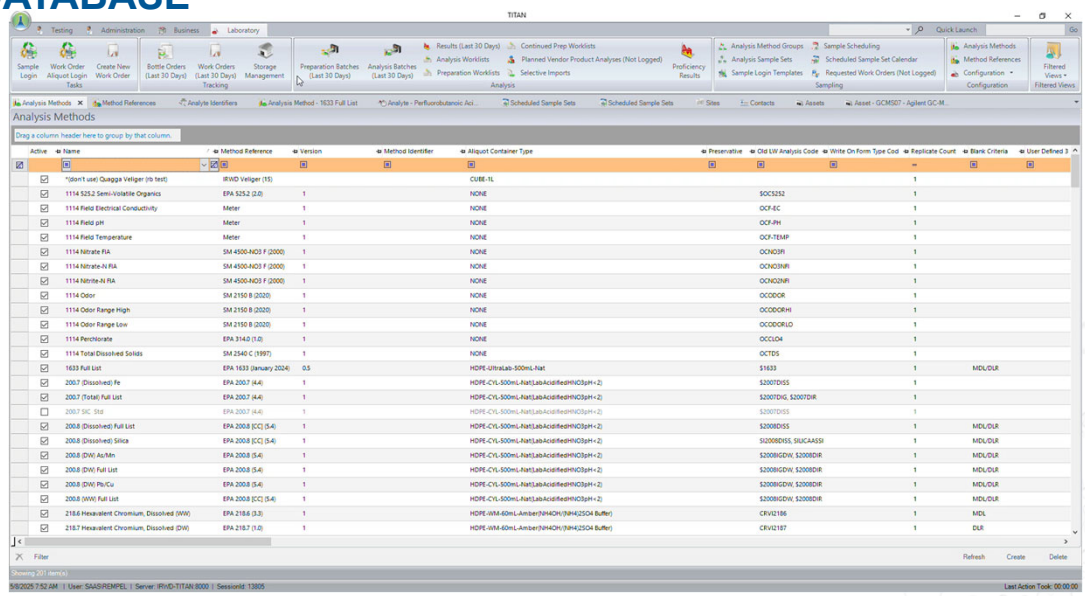
# DATABASE




Irvine Ranch Water District

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# SINGLE SIGN-ON (SSO)

- IT and Confience successfully implemented SSO
- Reduction in account lockouts and downtime
- Increased data security and control

SSO

Irvine Ranch Water District

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## EMAIL NOTIFICATIONS

- IT and Confience set up outgoing email from TIMS
- Dramatically increases the ability to automate information delivery
- Endless possibilities when combined with reports and database

Irvine Ranch Water District

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## IMOBILE IMPROVEMENTS

Irvine Ranch Water District

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## SAMPLING

- Sample sets are automatically scheduled, internally tracked
- Field data is collected digitally, no transcription errors
- Sample collection data is already in TIMS when the Lab receives samples

ATL iMOBILE TITAN
INFORMATION MANAGEMENT GIANT ON THE GO

Irvine Ranch Water District

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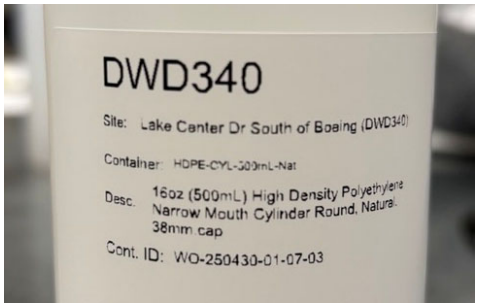
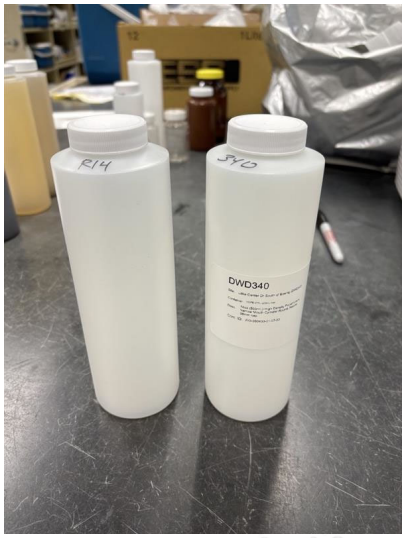
## SAMPLE LABELS

- Upgrading bottle labeling
- No legibility issues
- Reduced confusion, unique ID for each container
- No missing containers for collection

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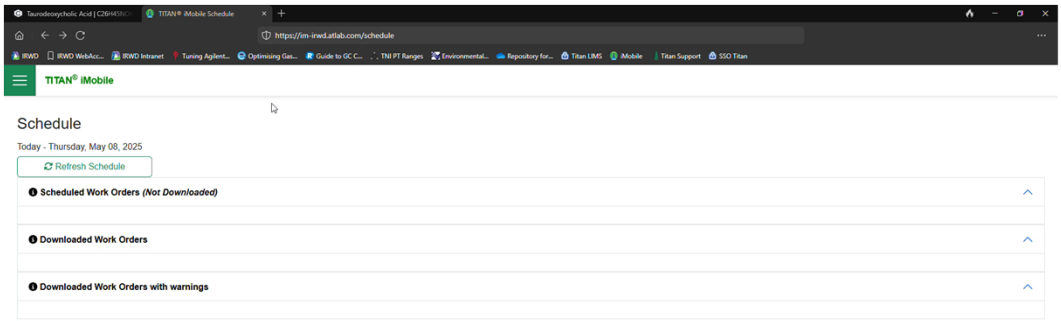
# SAMPLE COLLECTION

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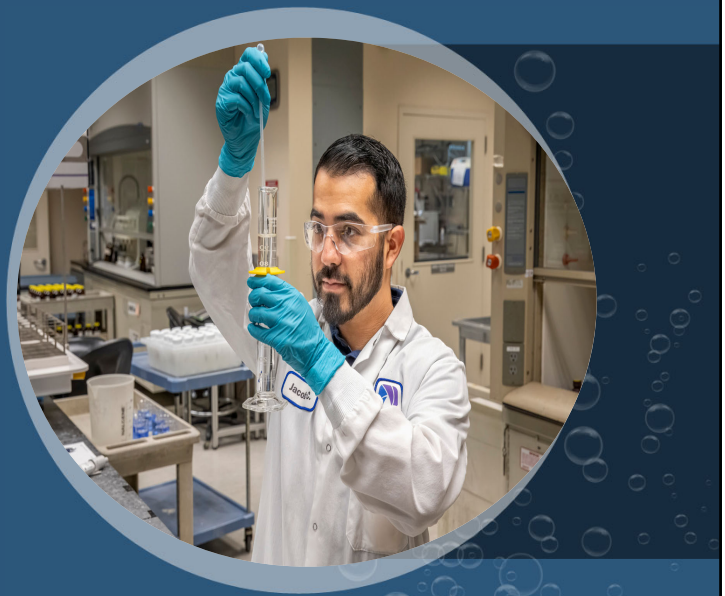
# TITAN IMPROVEMENTS



Irvine Ranch Water District

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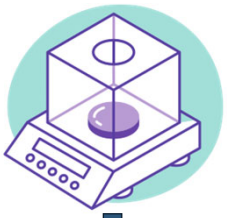
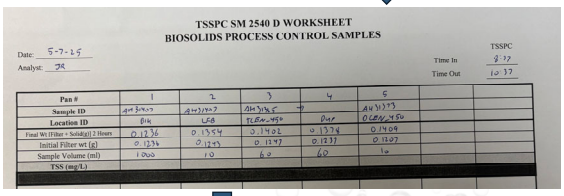
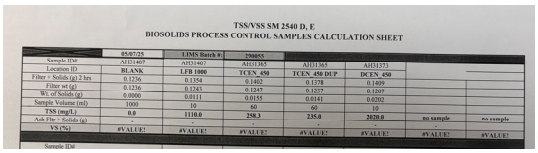
## IMPROVING WORKFLOWS

- Old system:
  1. Write weight on a worksheet
  2. Transfer to Excel file for calculation
  3. Transfer result to the LIMS
- Multiple chances for errors, 3 transfers of information
- Wastes time






LABWORKS

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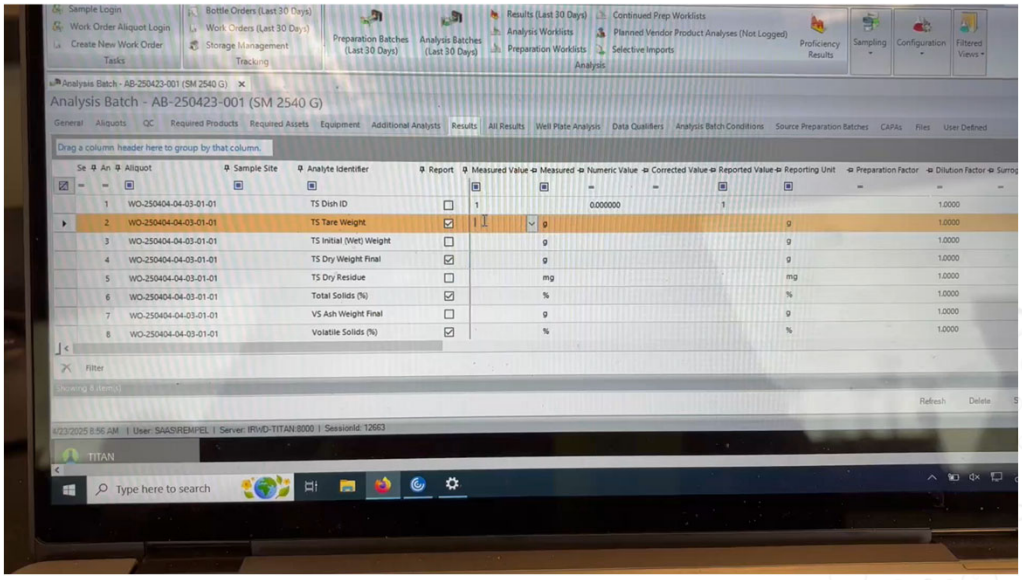
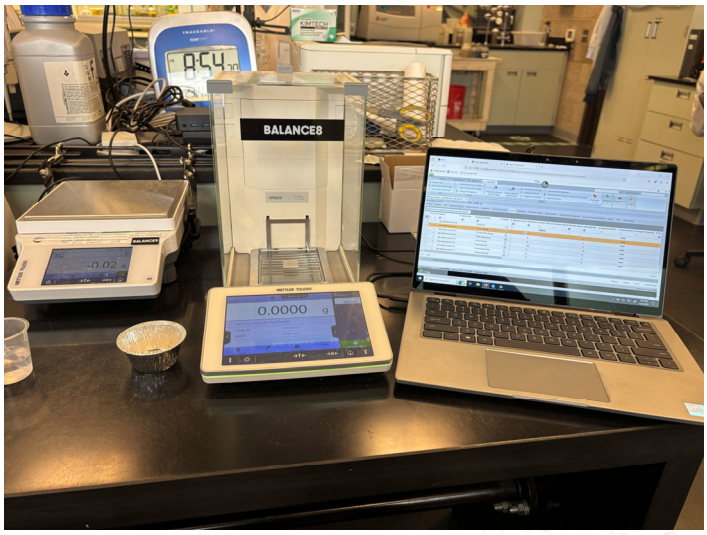
## IMPROVING WORKFLOWS




Irvine Ranch Water District

## GOING PAPERLESS AND AUTOMATING

- Most instruments are digital, skip the paper
- Direct transfers reduce or eliminate transcription errors
- Easy to search and store

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## MORE AUTOMATING

- More advanced instruments output files with data
- Current data entry is manual, direct typing or copy/paste
- Automate the transfer, simply upload data file
- Less time, less errors


Irvine Ranch Water District

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# MORE AUTOMATING

| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | Cup | Type | ID | Sample Details | Result | Units | QC Pro | Raw Data | Auto Dil. | Man Dil. | User | Time & Date | |
| 41 | | S94 | Standard 94 | | 0.7711 | | | 0.771054 | | | | 8/5/2024 11:31 | |
| 42 | | S93 | Standard 93 | | 0.5635 | | | 0.563493 | | | | 8/5/2024 11:33 | |
| 43 | | S92 | Standard 92 | | 0.3809 | | | 0.380884 | | | | 8/5/2024 11:35 | |
| 44 | | S91 | Standard 91 | | 0.192 | | | 0.191954 | | | | 8/5/2024 11:37 | |
| 45 | | S90 | Standard 90 | | 0.0209 | | | 0.020906 | | | | 8/5/2024 11:39 | |
| 46 | | S1 | Standard 1 | | 0.0058 | | | 0.005835 | | | seal | 8/5/2024 11:40 | |
| 47 | | S89 | C30 | | 0.7698 | | | 0.769768 | | | seal | 8/5/2024 11:42 | |
| 48 | | S0 | Standard 0 | | 0.011 | | | 0.010952 | | | seal | 8/5/2024 11:44 | |
| 49 | | ICV | ICV | | 1.9323 | | | 0.296783 | | | seal | 8/5/2024 11:46 | |
| 50 | | MB | MB | | 0.0144 | | | 0.005483 | | | seal | 8/5/2024 11:48 | |
| 51 | | LCS | LFB | | 1.9211 | | | 0.295079 | | | seal | 8/5/2024 11:50 | |
| 52 | | C5 | DLR 0.1 | | 0.1053 | | | 0.019281 | | | seal | 8/5/2024 12:46 | |
| 53 | | C5 | DLR 0.1 | | 0.162 | | | 0.027904 | | | seal | 8/5/2024 11:51 | |
| 54 | 3 | U1 | AG90349 FECOMP | | 12.1805 | | | 0.373296 | x5.0000 | | seal | 8/5/2024 11:53 | |
| 55 | 4 | U2 | AG90352 CBECOMP | | 14.2513 | | | 0.436202 | x5.0000 | | seal | 8/5/2024 11:55 | |
| 56 | 5 | U3 | AG90355 MBRPERMC | | 9.9436 | | | 0.305348 | x5.0000 | | seal | 8/5/2024 11:57 | |
| 57 | 6 | U4 | AG90356 SE10COMP | | 12.73 | | | 0.38999 | x5.0000 | | seal | 8/5/2024 11:59 | |
| 58 | 7 | U5 | AG90357 PEPSCOMP | | 0.8989 | | | 0.139816 | | | seal | 8/5/2024 12:00 | |
| 59 | 8 | U6 | PEPSCOMP+ | | 3.1511 | | | 0.481888 | | | seal | 8/5/2024 12:02 | |
| 60 | 9 | U7 | PEPSCOMP+ D | | 3.2088 | | | 0.490653 | | | seal | 8/5/2024 12:04 | |
| 61 | 10 | U8 | AG90359 SECOMP | | 14.1496 | | | 0.433112 | x5.0000 | | seal | 8/5/2024 12:06 | |
| 62 | 11 | U9 | AG90362 AT1AN2 | | 0.2389 | | | 0.039573 | | | seal | 8/5/2024 12:08 | |
| 63 | 12 | U10 | AG90364 AT2AN2 | | 0.4686 | | | 0.074465 | | | seal | 8/5/2024 12:10 | |
| 64 | 13 | U11 | AG90366 AT3AN2 | | 0.0618 | | | 0.012687 | | | seal | 8/5/2024 12:11 | |
| 65 | 14 | U12 | AG90368 AT4AN2 | | 0.6615 | | | 0.103764 | | | seal | 8/5/2024 12:13 | |
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| 67 | | CCB | CCB | | 0.0118 | | | 0.005084 | | | seal | 8/5/2024 12:17 | |
| 68 | | MB | MB | | 0.0338 | | | 0.008429 | | | seal | 8/5/2024 12:19 | |
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| 70 | 15 | U13 | AG90370 AT5AN2 | | 3.3277 | | | 0.50872 | | | seal | 8/5/2024 12:22 | |
| 71 | 16 | U14 | AG90372 AT6AN2 | | 2.1747 | | | 0.333593 | | | seal | 8/5/2024 12:24 | |
| 72 | 17 | U15 | AG90374 AT7AN | | 0.3741 | | | 0.060116 | | | seal | 8/5/2024 12:26 | |
| 73 | 18 | U16 | AG90376 AT8AN | | 0.1538 | | | 0.026647 | | | seal | 8/5/2024 12:27 | |
| 74 | 19 | U17 | AT8AN+ | | 2.4903 | | | 0.381526 | | | seal | 8/5/2024 12:27 | |
| 75 | 20 | U18 | AT8AN+ D | | 2.2936 | | | 0.351661 | | | seal | 8/5/2024 12:28 | |
| 76 | 21 | U19 | AG90380 LARAWC | | 0.2064 | | | 0.034647 | | | seal | 8/5/2024 12:29 | |
| 77 | 22 | U20 | AG90384 LASEG | | 0.0266 | | | 0.007334 | | | seal | 8/5/2024 12:30 | |
| 78 | 23 | U21 | AG90385 LAPOND3 | | 0.0233 | | | 0.00683 | | | seal | 8/5/2024 12:31 | |
| 79 | 24 | U22 | AG90386 LAPOND4 | | 0.0523 | | | 0.011235 | | | seal | 8/5/2024 12:32 | |
| 80 | | CCV | CCV | | 1.9348 | | | 0.297151 | | | seal | 8/5/2024 12:33 | |

Irvine Ranch Water District

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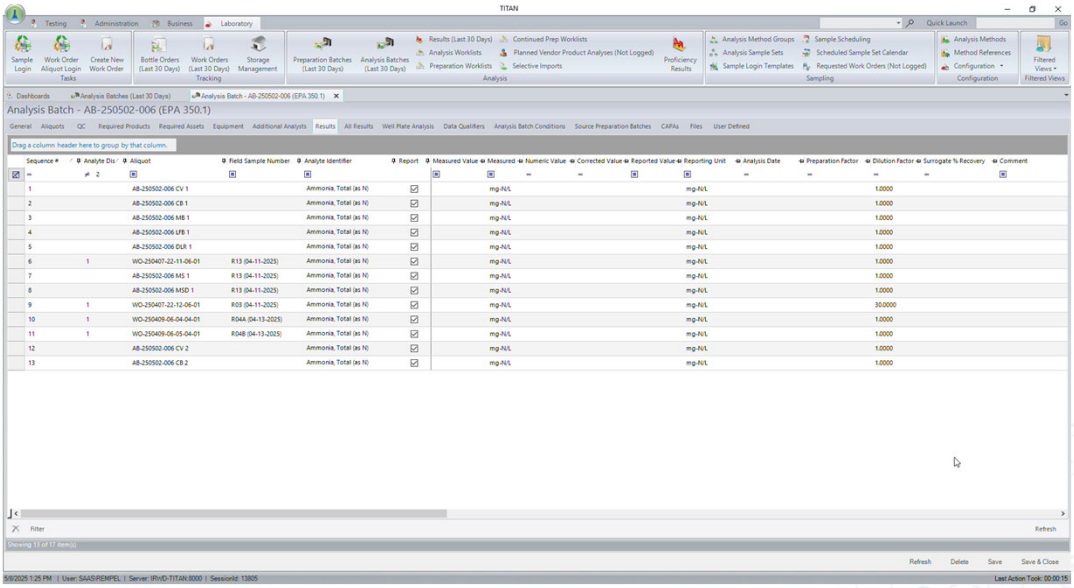
# MORE AUTOMATING




Irvine Ranch Water District

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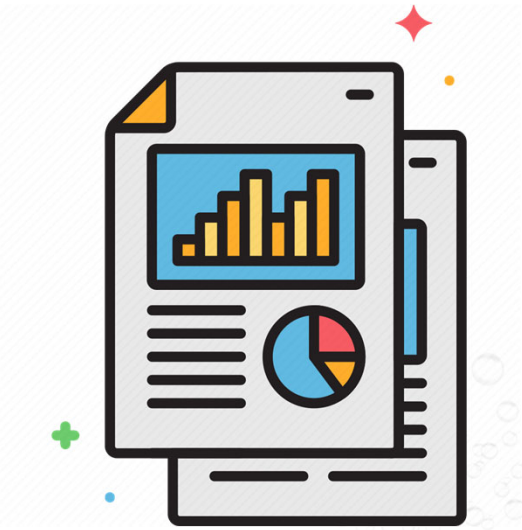
## REPORTS

- Report formats are in development by Confience
- Several drafts are completed and under validation testing
- Simplifying creation



Irvine Ranch Water District

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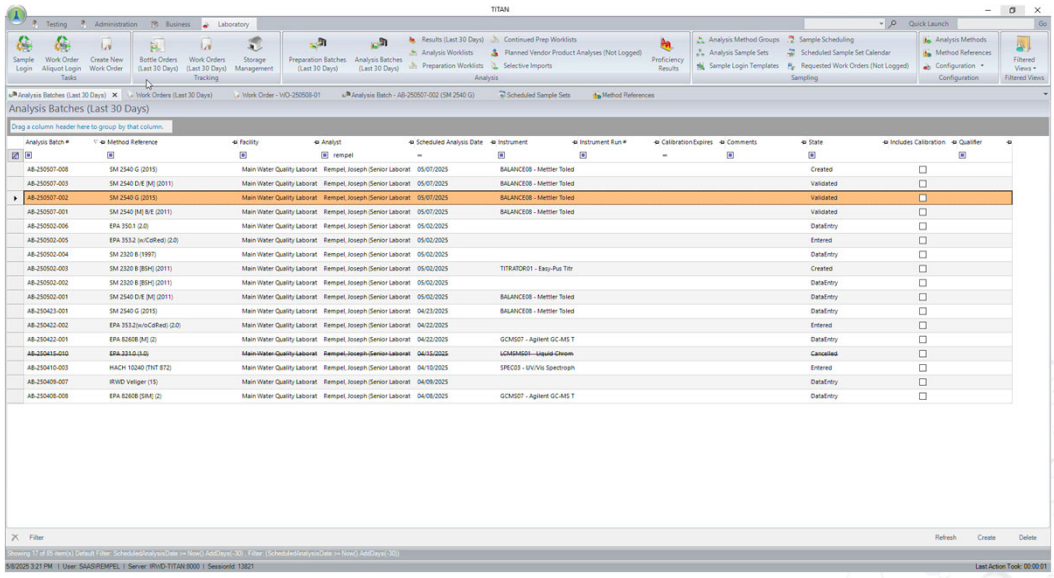
## REPORTS




Irvine Ranch Water District

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# NEXT STEPS AND BEYOND

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## NEXT STEPS

- Database Completion
- Testing, testing, and more testing
- Modifications & Improvements
- Define Processes
- Go-Live, Summer 2025


Irvine Ranch Water District

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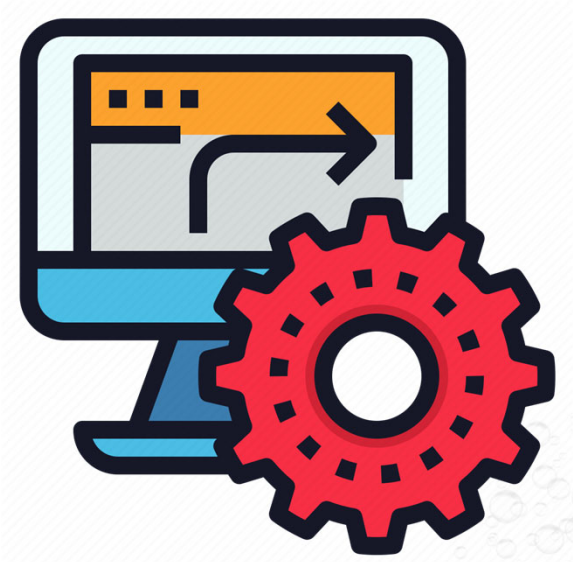
## BEYOND GO-LIVE

- Digitize
- Consolidate
- Automate
- Customize



Irvine Ranch Water District

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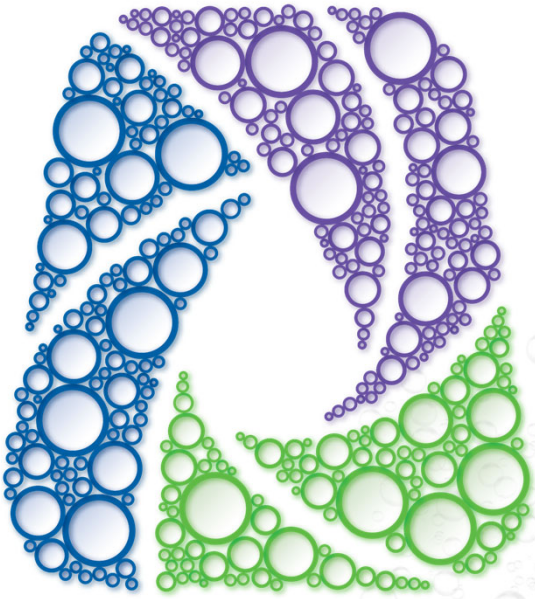
# QUESTIONS?



Irvine Ranch Water District

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May 20, 2025
Prepared by: B. Rios / E. Akiyoshi
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

DISCOVERY PARK SUPPLEMENTAL REIMBURSEMENT AGREEMENT

SUMMARY:

Irvine Community Development Company, LLC (ICDC) is proceeding with residential development of the Discovery Park Apartments, which includes the construction of streets, storm drains, domestic water, sanitary sewer, and recycled water improvements. As part of the development, ICDC will construct IRWD capital sanitary sewer facilities under a proposed Supplemental Reimbursement Agreement (SRA). Staff recommends that the Board authorize the General Manager to execute a Supplemental Reimbursement Agreement with ICDC for the Discovery Park Capital Sewer Facilities.

BACKGROUND:

The Discovery Business Park Project is located along Laguna Canyon Road between Sand Canyon Avenue and Irvine Center Drive adjacent to the I-5 Freeway. ICDC's original concept in 2018 was an office building development. However, the site has remained undeveloped to date. More recently, with the recent City of Irvine effort to update the housing overlay to accommodate the State-required Regional Housing Needs Assessment, ICDC processed a new application with the City for the construction of 1,858 apartment units in place of the intended business park. In addition to developer donated sized IRWD facilities, the Sub-Area Master Plan for the new development has identified 1,475 linear feet of required 12-inch capital sewer improvements to support the new residential version for the site.

The design and construction of the IRWD facilities will be performed under the terms of the Master Reimbursement Agreement between IRWD and ICDC approved by the Board in May 1997 and as further refined in the SRA. The SRA, which covers capital facilities within the Discovery Park development, is attached as Exhibit "B" and has been reviewed and approved by IRWD's legal counsel.

FISCAL IMPACTS:

The SRA exhibits show the required amount of capital sanitary sewer reimbursable facilities as well as estimated costs associated with the improvements. The estimated cost for the sewer upsizing project is $1,443,000. The FY 2025-27 Capital Budget Update includes a capital project for the required sanitary sewer improvements. At the time that ICDC opens bids and seeks construction award, IRWD staff will bring a future Board item forth for construction concurrence and to request budget adjustments as necessary.

ENVIRONMENTAL COMPLIANCE:

Construction of capital sanitary sewer facilities for the Discovery Park development is subject to CEQA. In conformance with the California Code of Regulations Title 14, Chapter 3, Article 7 an Environmental Impact Report (EIR) was certified by the City of Irvine, the lead agency on March 15, 2024 (SCH# 2023070463).

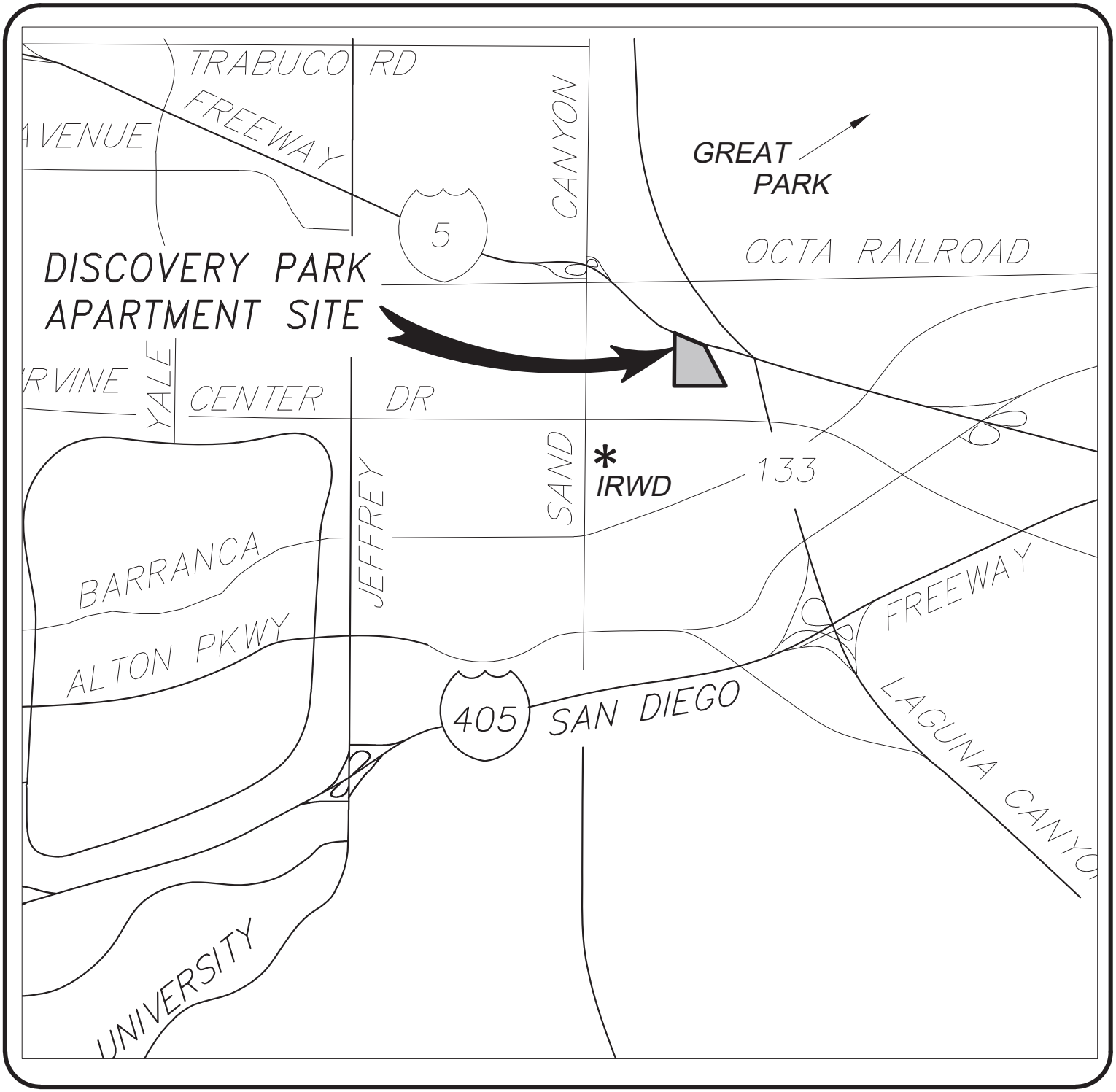
RECOMMENDATION:

That the Board authorize the General Manager to execute a Supplemental Reimbursement Agreement with Irvine Community Development Company, LLC, for the Discovery Park Capital Sewer Facilities.

LIST OF EXHIBITS:

Exhibit "A" – Location Map
Exhibit "B" – Supplemental Reimbursement Agreement with ICDC for Discovery Park Capital Sewer Facilities

Exhibit "A"


TRABUCO RD
FREEWAY
CANYON
GREAT PARK
5
OCTA RAILROAD
DISCOVERY PARK
APARTMENT SITE
YALE
CENTER DR
SAND
IRWD
133
JEFFREY
BARRANCA
ALTON PKWY
405
SAN DIEGO
FREEWAY
UNIVERSITY
N
not to scale
EXHIBIT "A"
LOCATION MAP

Note:  This page is intentionally left blank.

# SUPPLEMENTAL REIMBURSEMENT AGREEMENT

BY AND BETWEEN

IRVINE RANCH WATER DISTRICT

AND

IRVINE COMMUNITY DEVELOPMENT COMPANY

This SUPPLEMENTAL REIMBURSEMENT AGREEMENT ("Agreement") is entered into as of this _____ day of _____, 20_____, by and between Irvine Ranch Water District, a California water district formed and existing pursuant to the California Water District Law of the state of California ("IRWD"), and Irvine Community Development Company ("ICDC"). All capitalized terms used herein and not otherwise defined shall have the meanings given such terms in the Reimbursement Agreement.

WHEREAS, IRWD and ICDC have previously entered into that certain Reimbursement Agreement dated May 21, 1997 ("Reimbursement Agreement") respecting the construction of certain Capital Facilities by ICDC, the costs of which will be reimbursed by IRWD; and

WHEREAS, said Reimbursement Agreement made reference to the fact that certain supplemental agreements would be entered into by the parties regarding construction of Capital Facilities and reimbursement therefore consistent with the provisions of said Reimbursement Agreement; and

WHEREAS, the parties now wish to enter this Agreement regarding the construction of Capital Facilities associated with the Discovery Park Apartments development as further described below, subject to all of the terms of the Reimbursement Agreement, except as provided herein.

NOW, THEREFORE, the parties hereto, in consideration of the mutual promises and covenants hereinafter set forth, do agree as follows:

1. Except as provided herein, the parties hereby incorporate by reference all of the terms and conditions of the Reimbursement Agreement into this Agreement.

2. The name of the Project to which this Agreement pertains is:
Discovery Park Capital Sewer Facilities.
The Project is depicted on Exhibit 1 attached to this Agreement.

3. The Capital Facilities to be constructed pursuant to this Agreement are as follows: Approximately 1,475 linear feet of 12-inch sanitary sewer as shown and described in Exhibit 3 . The Capital Facilities ☐ **do** /☒ **do not** include any facilities that are a part of the Michelson/ Los Alisos Reclamation Plants Upgrades and Distribution System Expansion Project identified in the Agreement No. 61719 2003 LRP Local Resources Program Agreement, entered into as of June 13, 2005, by and between IRWD and the Metropolitan Water District of Southern California (the "MWD Local Project").

4. The total costs for the Capital Facilities shall include, but not be limited to, the actual costs for construction, surveying, compaction testing, permits, construction bonds, legal fees and an administration fee equal to one percent (1%) of the actual cost of construction (all such actual costs are collectively referred to as the "Costs"). The estimated amount of the Costs is $1,443,000 as shown in Exhibit 3.

5. The following special terms apply to the construction of the Capital Facilities under this Agreement and supersede the provisions of the original Reimbursement Agreement referenced above:
"The "Costs" shall also include consultant design and consultant construction administration assistance.
_____
_____
_____
_____
_____
_____
_____.

6. In accordance with Section 10 of the Reimbursement Agreement, ICDC is executing concurrently herewith an Assignment Agreement in the form of Exhibit 2, to be effective upon the Effective Date specified in the Assignment Agreement.

IN WITNESS WHEREOF, the parties have entered this Agreement as of the date set forth above.

| | |
|---|---|
| IRVINE RANCH WATER DISTRICT | IRVINE COMMUNITY DEVELOPMENT COMPANY |
| By: _____ | By: _____ |
| General Manager | Title: _____ |
| | By: _____ |
| | Title: _____ |

Exhibit "1"
to
Supplemental Reimbursement Agreement


Depiction of Project

Exhibit "2"
to
Supplemental Reimbursement Agreement

Assignment Agreement

This ASSIGNMENT AGREEMENT is made as of _____, 20____, by and between IRVINE COMMUNITY DEVELOPMENT COMPANY, LLC ("Assignor"), to IRVINE RANCH WATER DISTRICT, a California water district formed and existing pursuant to the California Water District Law of the State of California ("Assignee") based upon the following recitals:

A. Assignor has previously (or will, prior to the Effective Date hereof, have) entered into that certain Construction Contract relating to the Project and Capital Facilities identified in Schedule A hereto (the "Construction Contract").

B. Assignee desires to acquire (I) Assignor's right, title and interest in and to the Capital Facilities constructed under the Construction Contract, and (II) the warranty rights of Assignor as to the Capital Facilities under the Construction Contract, and Assignor desires to assign such rights to Assignee.

NOW, THEREFORE, in consideration of the foregoing, the covenants and agreements contained herein and other valuable consideration, receipt of which is hereby acknowledged, the parties hereto agree as follows:

1. ASSIGNMENT. Effective upon the date specified in Section 2 hereof (the "Effective Date"), Assignor assigns and transfers to Assignee all of Assignor's right, title, claim and interest in and to (a) the Capital Facilities constructed pursuant to the Construction Contract, and (b) the warranties and guarantees of contractor as to the Capital Facilities constructed pursuant to the Construction Contract. This Assignment is made by Assignor pursuant to the provisions of Section 10, entitled "Assignment of Interest)", contained in that certain Reimbursement Agreement between Assignor and Assignee dated as of May 21, 1997.

2. EFFECTIVE DATE. The Effective Date shall be the date of the filing of the Notice of Completion for the Construction Contract unless a different date is inserted in the following space:_____

3. TRANSFER OF DOCUMENTATION. On or prior to the Effective Date, Assignor shall provide Assignee with a copy of the Construction Contract.

IN WITNESS WHEREOF, Assignor has executed this Assignment Agreement as of the date first above written.

ASSIGNOR:

IRVINE COMMUNITY DEVELOPMENT COMPANY, LLC

By: _____

Title: _____

By: _____

Title: _____

Schedule A
to
Assignment Agreement

This Schedule A to Assignment Agreement relates to the assignment of certain matters pursuant to the Supplemental Reimbursement Agreement between Assignor and Assignee dated _____ ("Supplemental Reimbursement Agreement").

Insert name of Project from Section 2 of Supplemental Reimbursement Agreement: Discovery Park Capital Sewer Facilities

Insert description of Capital Facilities from Section 3 of Supplemental Reimbursement Agreement: Approximately 1,475 linear feet of 12-inch sanitary sewer as shown and described in Exhibit 3 .

Contractor's Name: _____

License No. _____

Address: _____

_____

Phone #: _____ Fax #: _____

Contact Person: _____

Exhibit "3"
to
Supplemental Reimbursement Agreement

Capital Sewer Facilities

Exhibit "3"
to
Supplemental Reimbursement Agreement

**Table 9. Estimated Improvement Project Costs**

| Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Item Total |
|---|---|---|---|---|---|
| 1 | Replace existing IRWD 8" sewer gravity main with 12" pipe | LF | 1,475 | $540 | $797,000 |
| | | | | **Subtotal** | **$797,000** |
| | | | | General Requirements (10%) | $80,000 |
| | | | | Contingency (20%) | $160,000 |
| | | | | **Construction Total:** | **$1,037,000** |
| | | | | Engineering (18%) | $187,000 |
| | | | | Construction Management (15%) | $156,000 |
| | | | | ESDC, Environmental, Admin (6%) | $63,000 |
| | | | | Project Total | $1,443,000 |

Estimated Cost Exhibit

Exhibits to Supplemental Reimbursement Agreement:

Exhibit 1 - Depiction of Project

Exhibit 2 - Assignment Agreement

Exhibit 3 - Description of Capital Facilities (as needed)

May 20, 2025
Prepared by: A. Murphy / M. Cortez
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

MICHELSON WATER RECYCLING PLANT BIOSOLIDS HANDLING IMPROVEMENTS CONSULTANT SELECTION

SUMMARY:

The Michelson Water Recycling Plant Biosolids Handling Improvements project will address mechanical and performance issues with the solids thickening and dewatering processes. Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of $1,052,221 for engineering design services for the MWRP Biosolids Handling Improvements.

BACKGROUND:

IRWD's MWRP Biosolids Facility was completed in early 2020 and put into operation in fall of 2020. Since then, staff has seen operational, performance, and equipment issues related to the thickening and dewatering processes. In May 2022, IRWD retained Carollo Engineers, Inc. to study the solids handling systems and document issues faced by staff, identify potential causes, and develop solutions that the District could then implement to modify operational practices and systems to improve system performance and reliability.

In October 2022, Carollo documented its findings in a technical memorandum which included potential operational changes as well as mechanical and electrical changes. Some of the issues identified in the study include higher solids loading than design, undersized sludge pumping capacity, centrifuge piping and control issues, and issues with the process instrumentation reliability. The overall effect of these issues with the biosolids handling system is reduced operational efficiency, increased maintenance, and increased facility down time. The study identified over 30 recommended changes, of which staff has implemented over ten. This project will address the more complex issues that involve significant modifications to the solids system. This project will design improvements to the biosolids handling system to address the operational, performance, and equipment issues identified in Carollo's technical memorandum.

Consultant Selection Process:

In March 2025 staff issued a Request for Proposals (RFP) for the preliminary and final design of improvements to address the issues identified in Carollo's technical memorandum. Staff sent the RFP to four consultants including Brown and Caldwell, Carollo, Hazen and Sawyer, and HDR. Staff met with each consultant to review the scope of work and tour the facility, with the exception of Brown and Caldwell who declined to submit a proposal. After the pre-proposal meetings, both Hazen and Sawyer and HDR informed staff that they would also not be providing proposals citing their disadvantage in needing to complete additional prerequisite work to confirm the information contained in Carollo's technical memorandum.

Carollo submitted a proposal in the amount of $1,052,221. Carollo's proposal demonstrates an excellent understanding of the issues affecting the solids handling system and identifies a clear and logical strategy for evaluating potential options and identifying the best solutions to correct those issues. The scope of work includes preliminary and final design and bid phase services. Carollo's proposal also includes an optional item for LiDAR and 3D laser scanning of the existing facility to document the true as-built conditions. This optional item will be beneficial to the design due to the congested nature of the solids handling building and the need for accuracy to correctly design the improvements and avoid potential conflicts and costly construction changes. Carollo's proposal is provided as Exhibit "A". Staff recommends the selection of Carollo to provide design services for the MWRP Solids Handling Improvements Project.

The scope of design will be complex including modifications to treatment processes, process piping, and equipment. The design will also include extensive investigations, and the design is anticipated to take approximately 14 months to complete.

FISCAL IMPACTS:

Project 12555 is currently included in the FY 2025-26 Capital Budget and the existing budget is sufficient to fund the design.

ENVIRONMENTAL COMPLIANCE:

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

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of $1,052,221 for engineering design services for the Michelson Water Recycling Plant Biosolids Handling Improvements, Project 12555.

LIST OF EXHIBITS:

Exhibit "A" – Carollo Engineers, Inc. Proposal

*PREPARED FOR* IRVINE RANCH WATER DISTRICT

# Engineering Design Services for MWRP Solids Handling Improvements

**PROPOSAL** / APRIL 2025

carollo®

3150 Bristol Street, Suite 500
Costa Mesa, California 92626
714-593-5100
carollo.com

April 15, 2025

Alex Murphy
Irvine Ranch Water District
15600 Sand Canyon Ave
Irvine, CA 92619

Subject: Proposal for Engineering Design Services for MWRP Solids Handling Improvements

Dear Mr. Murphy:

The Irvine Ranch Water District (IRWD, District) invested in a state-of-the-art solids treatment facility at the Michelson Water Recycling Plant (MWRP) during the Biosolids and Energy Recovery Facilities Project. Since startup, several of the solids systems have not performed as intended and operations have often been unreliable. The District retained Carollo Engineers, Inc. (Carollo) to investigate the reasons behind this subpar performance, and through various projects, Carollo developed suggestions for modifications intended to reduce operational issues, improve system performance, and increase overall system reliability. Demands on staff time prevented the District from fully implementing the suggestions on its own, so you have decided to secure engineering services to implement the most impactful modifications recommended. In addition, District staff aim to reduce system complexity and make processes more intuitive to operate, thereby improving operational reliability and safety.

Based on our past work with you, we understand the challenges your staff face, the goals you have for this project, and how best to implement the suggestions that we developed. Our team has the expertise, institutional knowledge and staff to upgrade the MWRP's solids processes and deliver a more reliable, O&M-friendly, higher performing system.

Carollo offers:

- **Direct Previous and Ongoing Experience with MWRP's Solids Systems.** Our team's knowledge of your facilities, our work on the Centrifuge System Improvements and Grit Issues Assistance projects, and support provided for the digester gas and dryer systems through our temporary staff augmentation services provide us with unmatched understanding of this project's scope of work, staff preferences, and District goals. Our Project Manager, Rashi Gupta, and Zhongtian Li developed the technical memoranda that led to this current project. Technical Advisors Sudhan Paranjape and Peter Blackley recently assisted the District investigate the fire in the dryer system recycle bin and produced multiple recommendations for modifications to reduce fire risk and improve system performance. Our team members will use their knowledge of the issues that must be addressed, the recommended changes, and how best to implement the changes to deliver modifications that improve operations, performance, reliability, and safety.
- **Extensive Expertise in Solids System Rehabilitation and Design.** With more than 20 years of specialized biosolids experience, Rashi is a nationally recognized leader in all phases of solids treatment improvements, from planning through design to startup and optimization. She has worked with Project Engineer Matt Spick and Process/Mechanical Leads Nora Labib and Benito Gutierrez on multiple solids system rehabilitation projects that include the same elements as this project. Their experience working together on similar projects paired with Sudhan's and Peter's drying expertise will provide the District with vetted, efficiently delivered solutions.

- **Creative Ideas and Practical Solutions.** As described in the Scope section of our proposal, we have suggested numerous ideas to address the various issues that have hampered the solids processes. These include practical elements such as improved piping alignments to facilitate solids flow to the creative use of heated digested sludge recirculation to mitigate pipe clogging. We have also offered the use of LiDAR and 3D laser scanning to document true as-built conditions in Revit BIM. This allows the subsequent design to be as accurate and customized as possible, thereby reducing the potential for changes in the field.
- **Proven Track Record of Service.** As demonstrated by our work with the District to-date, we value our hands-on collaboration with plant staff and seek to help the District see its solids system investments fully realized. When called to help, we show up, dig into the issues, and develop solutions. We will continue to prove our commitment to the District by helping you implement those solutions through a thorough design and high-quality deliverables.

We look forward to working with the District on this critical project. Please contact us if you have any questions or wish to discuss our proposal.

Sincerely,

CAROLLO ENGINEERS, INC.

Rashi Gupta, PE
Project Manager/Senior Vice President

Jeff Weishaar, PE
Principal-in-Charge

# Scope

## Our approach to rehabilitating the MWRP solids handling system will improve performance, operability, and reliability.

### Project Understanding

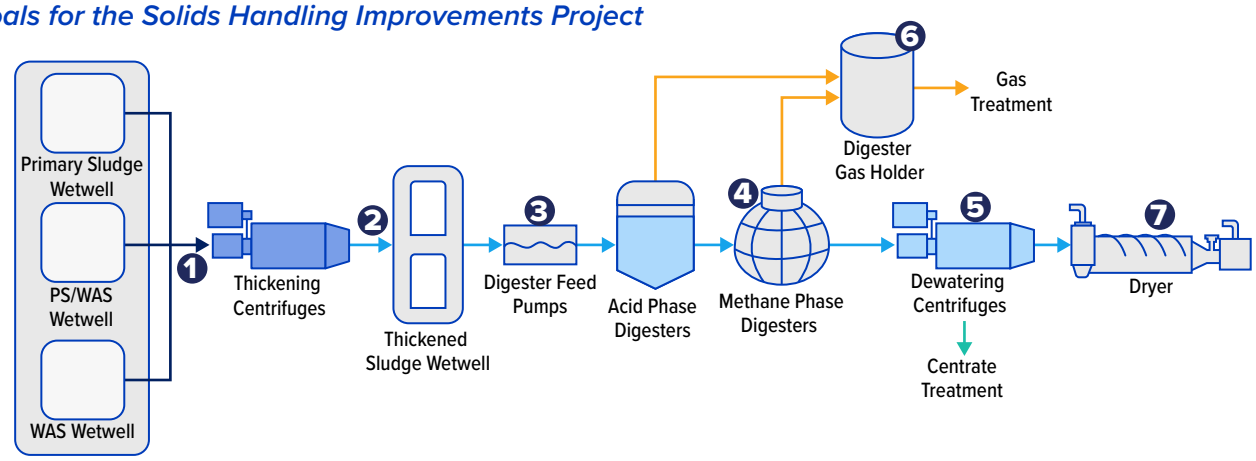
Having recently constructed the comprehensive solids treatment train at the MWRP, the District seeks to fully realize its investments by addressing operational issues, improving overall performance, and increasing system reliability. Over the last two years, the District has asked Carollo to investigate the causes of subpar thickening performance, excessive damage of the dewatering centrifuges, "grit" accumulation within the sludge stream and digesters, poor condensate drainage from the digester gas system, and other issues that have plagued the system almost from startup.

To provide answers to the District and develop suggestions for how to address the problems, our Project Manager, Rashi Gupta, led discussions with O&M staff, studied the system design and as-built conditions, oversaw sampling efforts, and analyzed data. Our findings and mitigation suggestions were presented to District staff and documented in several technical memoranda. Those suggestions the District deemed most impactful for the overall solids system formed the basis for many of the scope elements on this project.

Most of the project design elements focus on the thickening process to improve thickening centrifuge feed consistency, increase thickened sludge (TS) concentration, facilitate TS flow to the TS wet wells and enable thicker sludge pumping to the acid phase digesters (APDs). These thickening improvements will reduce the hydraulic load on the methane phase digesters, improve retention time and digestion performance, and enable digester cleaning. The remaining design elements include modifications to the centrate and slop piping downstream of the dewatering centrifuges and the digester gas condensate drainage system.

Our more recent work with staff has been to improve the reliability and safety of the drum dryer system, including investigating the cause of the recycle bin fire. We understand that the dryer needs to operate consistently, and for that to happen, all elements need to function reliably and the system needs to be simpler to operate.

***Goals for the Solids Handling Improvements Project***




1. Increase thickened sludge concentration by feeding the centrifuges a more consistent, and better mixed sludge.
2. Improve TS flow to TS wetwells with better piping alignment and protect thickening centrifuges from damage with new overflows on centrate and TS chutes.
3. Reduce clogging in lines feeding thickened sludge to the APDs with heated sludge flushing and more powerful pump.
4. With thicker feed sludge, reduce hydraulic load on methane phase digesters to reduce digestion volume needs and enable digester cleaning.
5. Improve centrate and slop drainage to protect dewatering centrifuges from damage and maximize performance.
6. Manage digester gas condensate in an environmentally sound and reliable manner.
7. Develop options for how to simplify the solids treatment system and increase reliability of dryer operations.

## Improve PS and WAS Feed Consistency to Thickening Centrifuges

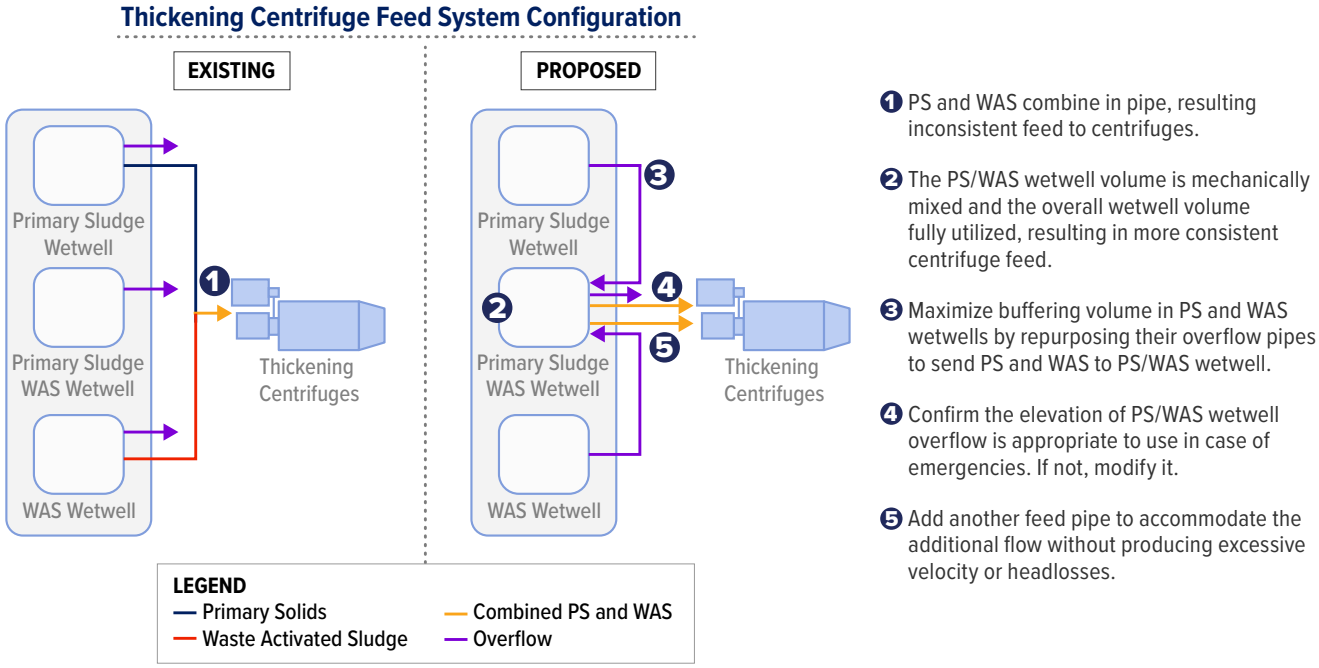
The thickening centrifuges currently produce 3 to 4% thickened sludge, rather than their specified 6% TS concentration. This poor performance results in more hydraulic load on all downstream systems, including pumps, digesters, digester heating, and dewatering. Even though the MWRP is not at its design capacity, it has had to operate all three MPDs to achieve Class B SRT. This has not allowed staff to take digesters down for cleaning, which is essential to remove the vast volume of precipitate that has formed within the tanks and damaged associated equipment throughout. The higher hydraulic load has also necessitated the operation of more Digester Feed Pumps which has led to premature wear and operational issues.

During our previous work at the MWRP, we determined that the extreme fluctuations in primary sludge (PS) flow and solids concentration were playing havoc with the centrifuge operation and performance. Centrifuges operate most efficiently when they are fed a constant feed. To improve overall feed consistency, we suggested that the volume of the three wetwells available to store the PS and WAS feed be fully utilized through physical and operational changes. Namely, feeding PS to the PS wetwell, WAS to the WAS wetwell, and then allowing those wetwells to passively overflow into the middle PS/WAS wetwell. This middle PS/WAS wetwell would then feed the thickening centrifuges a consistent blend of mixed PS and WAS. Current operations do not use this wetwell to combine PS with WAS, but rather as a swing tank when needed. With the operational modification, each well would continue to be fully mixed and fitted with emergency overflow protection. This operating method would buffer the fluctuations in the PS, improve the combined feed, and allow for co-thickening of the PS and WAS together.

The record drawings for the system have conflicting information regarding the current elevations of the overflow pipes. We will work with MWRP staff to take each tank out of service so we can confirm actual overflow penetration and pipe inlet elevations. Based on the findings, we would modify the overflow pipe inlets or actual penetration locations to allow the PS and WAS wetwells to passively overflow into the middle PS/WAS wetwell, while maintaining higher emergency overflows to protect each well from overfilling.

The suction piping that connects the PS/WAS wetwell to the Thickening Centrifuge Feed Pumps must have sufficient capacity to convey the flow while avoiding excessive velocities and pressure loss. To minimize piping changes, we suggested the addition of another pipe inlet at the wetwell and connecting that new pipe to the feed pump suction manifold. New penetrations must be carefully situated to protect the structural integrity of the wetwell walls. We will locate rebar through scanning. Depending on scan results, we will shift the penetration location and develop repair details that retain structural integrity.

### *Modifications to the PS and WAS Wetwell System to Improve Thickening Feed Consistency*




1. PS and WAS combine in pipe, resulting inconsistent feed to centrifuges.
2. The PS/WAS wetwell volume is mechanically mixed and the overall wetwell volume fully utilized, resulting in more consistent centrifuge feed.
3. Maximize buffering volume in PS and WAS wetwells by repurposing their overflow pipes to send PS and WAS to PS/WAS wetwell.
4. Confirm the elevation of PS/WAS wetwell overflow is appropriate to use in case of emergencies. If not, modify it.
5. Add another feed pipe to accommodate the additional flow without producing excessive velocity or headlosses.

## Leverage the Power of Sludge Density Meters by Improving Reliability

The MWRP has many sludge density meters within the solids system. The four units on the thickening centrifuge feed piping measure and monitor the solids concentration of the PS and WAS. The four units on the Digester Feed Pump discharge lines track thickened sludge concentration. These eight meters reportedly function satisfactorily but can drift at times. There are four more units connected to the sample pump discharge below each thickening centrifuge. These units and the centrifuges' automated pond depth modulation system have never worked well, even though staff implemented every modification made by the manufacturers. Having expended all that effort, the District decided that they would remove those meters and instead focus on improving the reliability of the thickening feed and thickened sludge units.

When functioning reliably, density meters on centrifuge feed lines can help optimize polymer dosing through mass-based flow pacing to reduce operating costs. Units on the Digester Feed Pump discharge lines can be used to track overall thickening system performance. However, density meters can be impacted by grease or other buildup.

While periodic heated sludge recirculation or pipe flushing can help reduce buildup on the meters, the most effective method for keeping the sensor elements clean is through the regular use of hot water via spray rings installed with each meter. The existing meters' spray rings are not fitted to a hot water supply or automated valves to control flushing. During our past work, we suggested that solenoid valves and hot water flushing provisions be provided at each meter to reduce buildup through regular automated hot water flush cycles and subsequently improve the reliability and accuracy of meter readings.

We will calculate heating and flow requirements to provide hot water to the meters. Given the large number of sludge density meters in this project, we will evaluate hot water supply options such as individual tankless water heaters, vs. a central larger water heater. We will also evaluate whether electrically powered or natural gas fueled systems provide the best value to the District.

Regardless of the type of heater selected, automation will be provided to free up the operators' time for other more critical tasks. We will utilize solenoid valves to automate duration and frequency of flushing.

### *Possible Alternatives for Hot Water Supply*

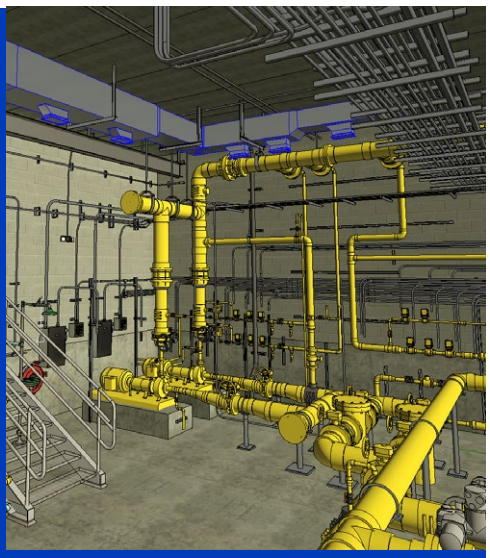
Natural gas fueled water heater and pump.

Wall mounted electric tankless water heater.

## LiDAR to Capture As-Built Conditions and Avoid Field Changes

The District does not have accurate as-builts of the system, which can hamper the design of modifications or lead to conflicts in the field. Light detection and ranging equipment (LiDAR) can capture precise 3D data of existing conditions and create 3D models that reflect as-built conditions. These models can be used during design to better customize modifications and avoid changes.

Carollo offers LiDAR services and has included them as an optional task. Carollo would create the model prior to design to record site conditions. The model would be used during design, to provide the team with information about the existing facility, equipment, and infrastructure. This allows the team to identify conflicts early on, saving time and money during construction. After construction, the District can reengage our LiDAR team to capture the modifications for final record drawings.



A 3D model of a pump station developed through LiDAR scanning by Carollo.

## Improve Sludge Flow and Protect the Thickening Centrifuge System

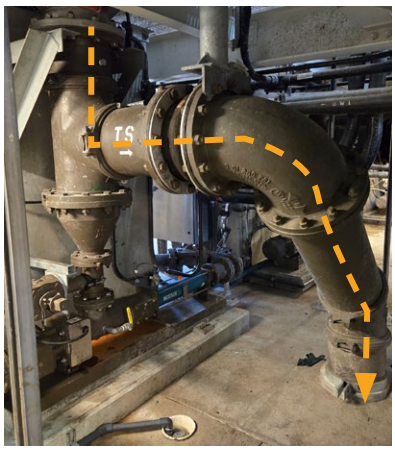
Centrifuges have two primary discharges - centrate and thickened sludge (TS). Both of these fluids must discharge freely and continuously for optimal performance. If the centrate or solids back up into the centrifuge casing, they can damage the bowl and hamper performance. This has already happened at the MWRP, and the District already implemented centrate venting modifications per our earlier suggestions to partially address this issue. The remaining recommendations that we will now implement include simplification of the TS piping and overflow piping on both the centrate and TS chutes.

The first improvement focuses on the TS piping system from the centrifuge discharge to the TS wetwell. This fluid has high solids content and is viscous, meaning it does not flow easily. Sharp bends, flat pipe runs, pipe constrictions, and small diameter piping make TS flow even more difficult. All of these elements are present at IRWD's thickening centrifuges, where the thickened sludge leaves through a 12" pipe, tees off to make a 90-degree turn, and then flows through several more bends and flat runs of piping before discharging into the TS wetwell. This tortuous path hampers free flow of TS and should be simplified to reduce turns and maintain constant downward slopes towards the wetwell.

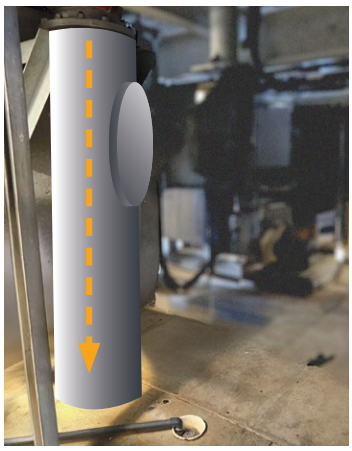
The other side of the tee reduces to 4" to feed a sample pump, that sends TS through the small density meter for analysis of TS solids concentration. This setup was intended to tie into the automated pond depth modulation system (Varipond) provided with the thickening centrifuges. In Carollo's experience, this system has not worked well elsewhere and the District has been unable to make it work at the MWRP. The constant pond depth modulation is not essential to centrifuge operation and most plants perform well without it. Earlier, we described how we will improve the feed consistency to the centrifuges and

*Connect New Overflow Piping to Centrate and TS Chute Nozzles for Centrifuge Protection*

*Existing Tortuous Path for TS Flow*




*Proposed Simplified Path for TS Flow*



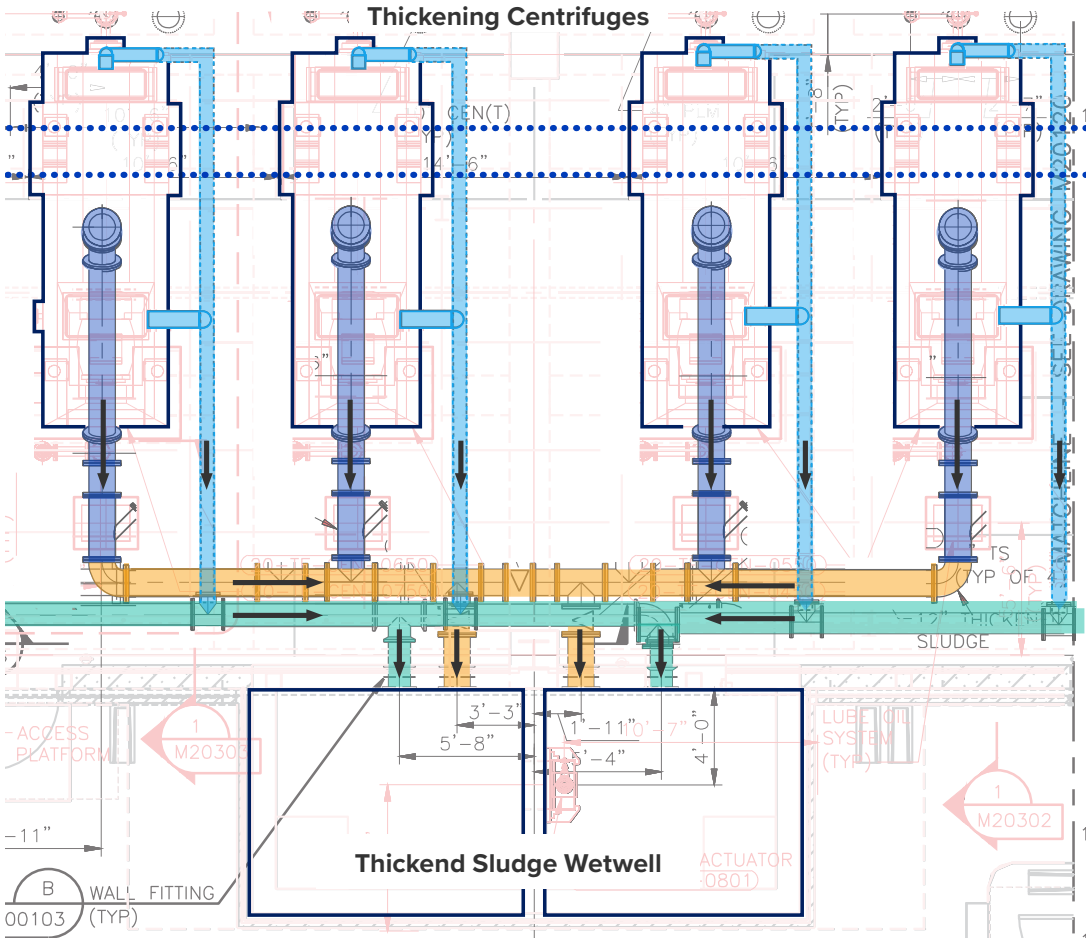
that will mitigate the need for constant pond depth adjustments. Hence, the District decided to remove the sample pumps and TS density meters and allow the centrifuges to operate with the automated pond depth functionality disabled.

To simplify the TS piping, we suggest replacing the 12" tees with 12" pipes that go straight down and connecting to the TS discharge manifold. The LiDAR scan and 3D model would be especially beneficial for this work, so that we can accurately locate the cores without hitting the structural beams running below the centrifuges and to facilitate optimal pipe routing of the TS discharge and overflow pipes that comprise the second main improvement in this area.

Overflow protection is a passive way to avoid backups that might occur due to clogs or other operational issues from reaching the centrifuge casing and thereby preventing centrifuge damage. As shown in the graphics, we propose to use existing blind flanged nozzles on the centrate and TS chutes to connect to new overflow piping that would be routed below the mezzanine and tied into the main overflow manifold that currently discharges to the TS wetwell.

For both the TS and overflow pipes, we will provide the maximum slopes possible and use pipe materials that enable smooth flow and customized fittings to tie into the existing TS and overflow lines. Sequencing of the work will focus on piping connected to half the wet well at a time, to allow the other half of the wet well and the associated centrifuges to continue operating during modifications.

### *TS and Overflow Improvements*



## Address Pumping and Line Clog Issues within the Acid Phase Digester Pumping System

When thickened sludge concentration exceeds 3%, the digester feed pumps trip on high pressure and stop working. This forces operators to sacrifice thickening performance due to pumping limitations. Thickened sludge concentration needs to increase to fully leverage centrifuge thickening and maximize digestion capacity, and that will require the Digester Feed Pumps to operate more reliably and at higher pressures. In our past work, we identified multiple causes for the high pressures and suggestions for how to increase pumping reliability for thicker sludge:

- The single-stage pumps and 10 hp pump motors are insufficient to deliver the high torque and power required. We recommended upsizing the pumps to accommodate the thicker sludge resulting from the thickening system improvements.

  Upsizing the pumps and motors will be one of the most mechanically and electrically intensive elements of the project scope. From preliminary efforts, there is sufficient space to install larger 2-stage pumps and modify connecting piping. The electrical system also appears sufficiently sized to handle 20-hp motors and VFDs but we will confirm the District's standby loads to ensure that duty load capacity meets NEC requirements.

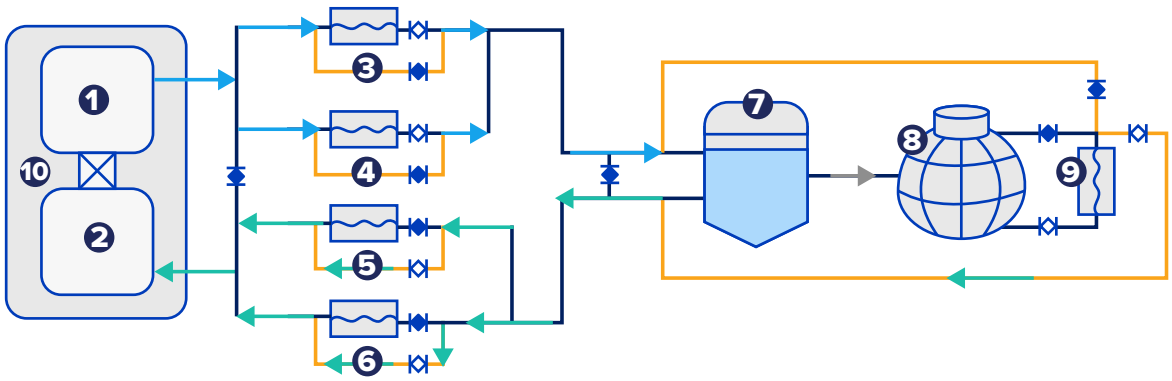
- As we confirmed through sampling, the pipes are clogging from organic buildup. Preventing the buildup will reduce system pressures and facilitate smoother pumping. To do this, we developed a concept to utilize the parallel digester feed piping system for periodic flushing of the TS lines with digested sludge without interrupting digester feed operations.

  Circulation of hot digested sludge has reduced pipe clogging on FOG and PS lines at other utilities because the active biomass hydrolyzes grease and the heat softens the material, allowing it to be scoured. The existing parallel piping system allows implementation of this flushing with relatively minor piping modifications as illustrated in the schematic. With these changes, while half the digester feed pumping system and TS wetwell are used for flushing, the other half will continue to feed the digestion process.

- High points in piping can entrap air, which forms large bubbles that limit usable piping diameter for flow and increase system pressure. Air release valves should be installed at the high points to remove air. High pipes should also be lowered, without compromising space for access, allowing air release valves and other appurtenances to be more easily maintained. Piping will be reconfigured in a way that allows operators to continue using the existing crane.

We will develop a construction sequence plan to replace the pumps and piping one pump at a time, reducing operational disruptions.

***Use of Parallel Pipes to Feed Digestion while Flushing TS Pipes***




1. Thickened Sludge Wetwell No.1.
2. Thickened Sludge Wetwell No.2.
3. Digester Feed Pump No. 1.
4. Digester Feed Pump No. 2.
5. Digester Feed Pump No. 3.
6. Digester Feed Pump No. 4.
7. Acid Phase Digesters (x 3).
8. Methane Phase Digesters (x 3).
9. Methane Phase Digester Recycle Pumps (x2).
10. Wetwell Isolation Gate.

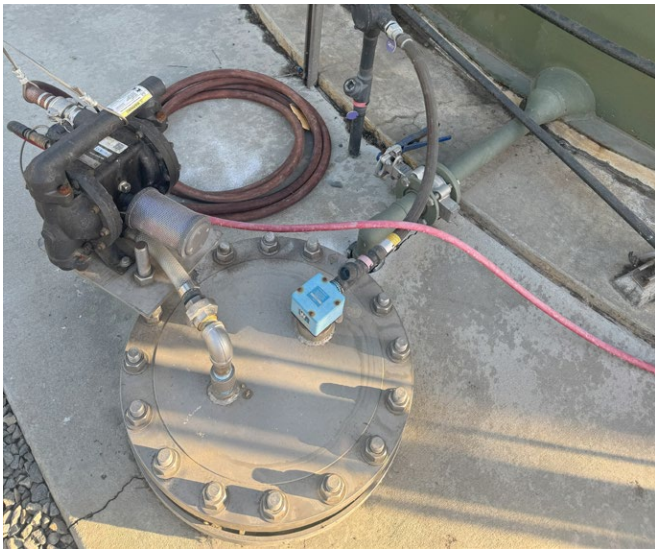
= Close valve
= Open valve
= Flushing
= Normal Operations
= New pipe segments required

## Handle Digester Gas Condensate Safely and Reliably

Digester gas from the digesters combines in a 12” digester gas pipe that conveys gas to the gas holder. Condensate from the gas holder and the 12” digester gas pipe collects inside a condensate trap that consists of a buried 16” pipe with a capped bottom, a flanged top and a 2” drain.

During storm incidents, rainwater seeps into the vault trap, impacting its operations and hampering condensate and digester gas flow. The trap design allows condensate to drain into the surrounding soil, which may create unsafe conditions and damage due to its corrosivity and low pH.

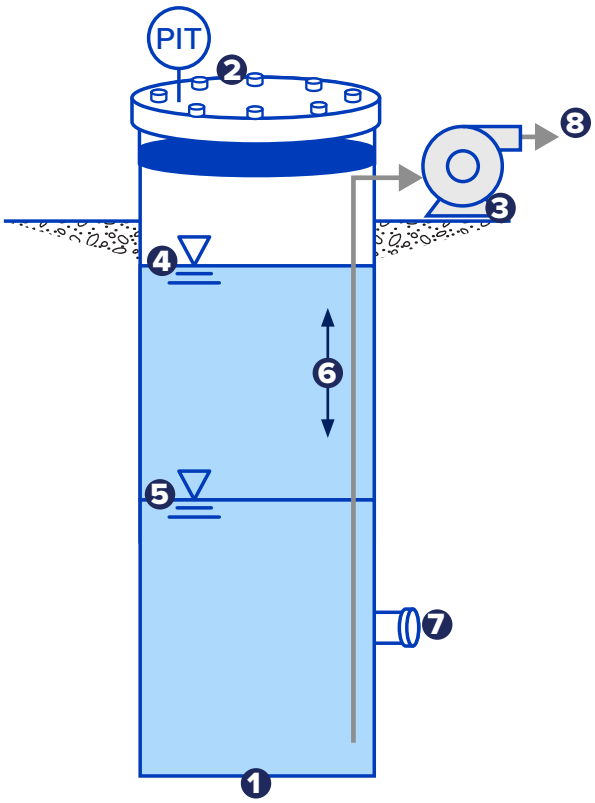
We developed the concept shown below to improve condensate drain and allow active pumping of the condensate into the plant drain system for further treatment. We will select robust materials for the pump and pipes, so they can last in this corrosive service. Additionally, because this area is crowded with buried utilities, potholing will be instrumental in developing a route for the condensate piping that avoids conflicts. We will also develop a construction sequence plan and provide temporary provisions that allow condensate to be managed during construction.



Existing Condensate Trap at Gas Holder with Temporary Pumping Setup.

The permanent condensate pump system will be rated for Class 1 Div 1 service and suitable for corrosive condensate.

### *Improvements for Digester Gas Condensate System*

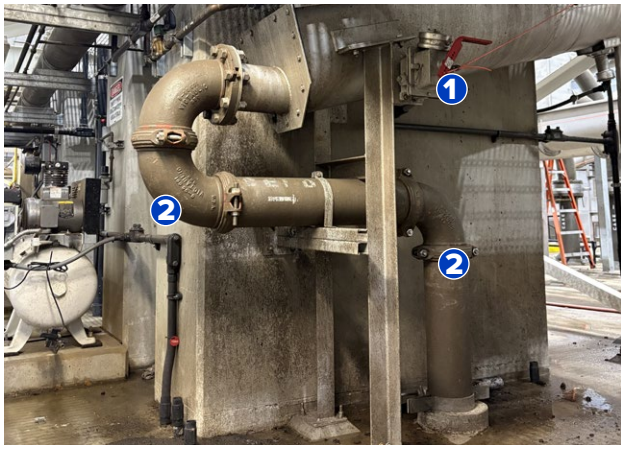



1. Reuse existing 16" pipe well for condensate collection.
2. Connect new pressure transmitter to trap and monitor level at SCADA.
3. Install new self-priming, explosion-proof pump.
4. Alarm at high level.
5. Alarm at low level.
6. Using the new pressure transmitter and pump, the level within the trap can be controlled to always be within a safe operating range.
7. Plug the existing drain to block condensate from discharging into surrounding soil.
8. Actively pump condensate to nearby plant drain manhole to maintain digester gas flow and avoid unsafe discharges.

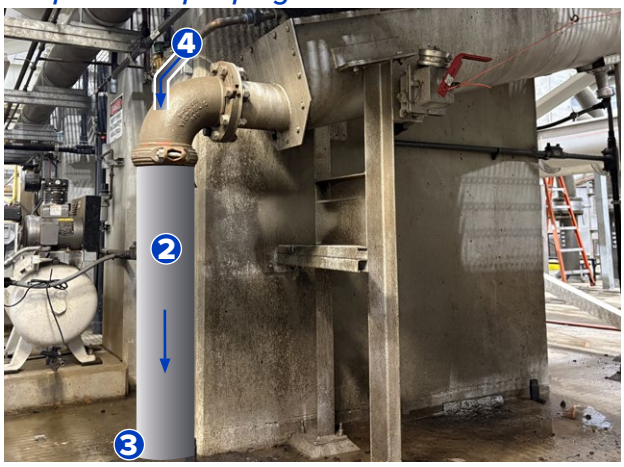
## Investigate and Improve Centrate Piping and Slop Management

Centrate and slop from the three dewatering centrifuges combine into two 10” centrate pipes inside the Solids Handling Building. The two pipes leave the building and enter the yard before combining in a splitter box that splits flow to two centrate treatment sequencing batch reactors. The District has noted that the centrate pipes get plugged and centrate backs up into the dewatering centrifuge casings which has contributed to the bowl damage in these units. In addition, the piping that conveys insufficiently dewatered cake or "slop" to the centrate system requires this material to essentially make a U-turn, which its viscous characteristics do not allow.

### *Existing Slop Piping*




### *Proposed Slop Piping*




1. The inclined conveyor only moves in forward when cake is produced. At startup and shutdown, slop drains out the bottom.
2. Replace 90-degree bends on slop line with straight piping.
3. Core floor for the new slop pipe.
4. Tap into the utility water line to provide an additional flushing connection that sprays water straight down the slop pipe.

As illustrated below, we suggest modifications to remove this U-turn and improve flushing of the slop to avoid clogging the centrate line. We will also study the routing of the dual centrate lines and conduct a pipe inspection to assess whether both lines are clogging, where the clogs are occurring, and whether there are high or low points that must be fixed. The sequential approach to this work is summarized to the right.

### *Centrate Piping Inspection and Modification Approach*

**Develop the Plan**

- Meet with staff to discuss clogging issues, locations, and efforts to investigate and address the issues to date.
- Develop an inspection and isolation plan in conjunction with staff to enable pipe drainage and inspection with minimal operational disruptions. This may include isolation of the splitter box and one of the dual centrate lines at a time with bypass pumping into the SBRs.

**Investigate the Pipes**

Use cam rover and GPR scanning to identify buried pipe locations, alignments, and location of clogs or buildup. Visually inspect above-grade pipe routing to identify problematic bends and confirm appropriate slopes.

**Document the Findings**

Document findings relative to materials that might be clogging the piping (i.e. solids or struvite/precipitate), alignment or elevation issues, and poor pipe routing.

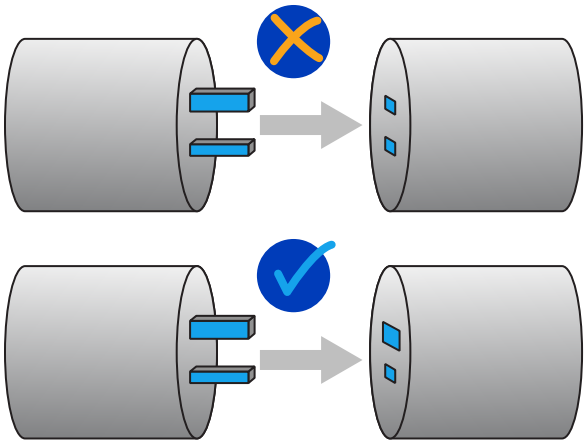
**Design Solutions**

- Depending on the issues, possible design solutions can include:
  - » Replacing sharp bends, such as 90-degree bends and tees, with straight piping, 45 bends, and wyes.
  - » Using rolled custom made connections to make tight connections within existing piping.
  - » Adding flushing connections to mitigate clogs by facilitating solids flow.
  - » Re-sloping the pipes, where possible, in a constant downward direction to aid gravity flow.
  - » Leveraging existing anti-scalant ports to dose ferric chloride or Flosperse mitigate struvite formation.
  - » If not already present and usable, provide cross connections between dual centrate lines to enable one to remain in service while the other is routinely cleaned or flushed.

## Simplify the Solids System to Improve Understanding and Operability

Day-to-day operations are hindered by a lack of operator clarity, non-standardized control screens, and cumbersome workflows. IRWD seeks to improve the overall usability and intuitiveness of its existing solids handling system by reducing operational complexity, enhancing clarity in control logic, and making SCADA interfaces more intuitive and user-friendly.

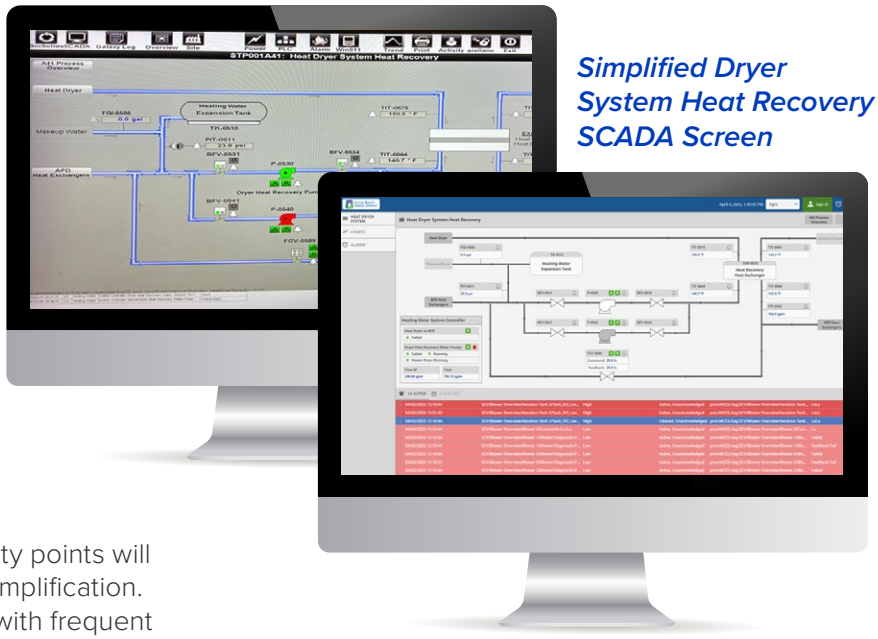
We will address these operational challenges by developing conceptual recommendations for system simplification, in-field cues, incorporation of "Poka-Yoke" philosophies to reduce inadvertent errors, and more intuitive operator interfaces, including graphical SCADA improvements, refined operational guidance, and enhanced interface usability.



Poka-Yoke is a Japanese technique in which errors are reduced by design. An example of that is designing an electric plug that can only fit into a specific outlet.

*IRWD's Current Heat Dryer System Heat Recovery SCADA Screen*

*Simplified Dryer System Heat Recovery SCADA Screen*



Our team, consisting of field operations experts, biosolids process designers, and programmers, will visit the plant to observe solids operations and engage with operators, maintenance staff, and automation personnel to document how the system is operated in practice, identify operational pain points, and gather input on where simplification would have the most impact. In addition, we will review available system documentation including SCADA screenshots, control narratives, and SOPs provided by IRWD to identify operational gaps, ambiguous logic flows, and inconsistencies in the user interface. A matrix of key complexity points will be created to help prioritize areas for simplification. Emphasis will be placed on processes with frequent operator interaction, alarm management, and decision-making that is not adequately supported by on-screen information.

We will develop conceptual-level recommendations for critical processes that address our key findings. Recommendations may include screen navigation hierarchy improvements, clearer graphical organization, embedded SOP access, and alarm prioritization strategies. We will also prepare one sample SCADA screen concept mock-up (similar to the mock-up shown) that illustrates how a simplified layout could improve usability for a selected subsystem. We have previously worked with the District and made some recommendations around improved SOPs, KPIs, etc., and those recommendations will be incorporated into the recommendations we will develop in this task.

We will compile all findings, observations, and conceptual recommendations into a dedicated section within the Preliminary Design Report (PDR). Should IRWD choose to implement any of the recommendations in the final design phase, Carollo will assist in defining scope and effort under a separate task. PDR recommendations will explore only critical biosolids processes, such as thickening and dewatering, not peripheral ones, such as chemical or odor systems.

## Increase Dryer System Reliability

The dryer has not been reliably operating and has been experiencing many operational issues since startup. The District has been coordinating with Andritz, who supplied the dryer, to investigate and rectify these issues for over a year. Issues appear to get temporarily rectified only to start reappearing shortly after Andritz leaves the site.

Carollo will leverage its national relationship with Andritz and other utilities with dryer operating experience to identify key operational and monitoring parameters that must be maintained for successful and sustained operations. We will also work with Andritz to promote a maintenance service agreement between the District and Andritz, with acknowledgement that a well-functioning dryer serves the interests of both Andritz and the District. Carollo team members, including Rashi, Sudhan Paranjape, and Peter Blackley have recently assisted the District with issues related to heat exchanger clogging on the heat recovery system and the fire that occurred within the recycle bin. We will continue to leverage our expertise and our relationships to improve dryer system reliability and safety.

Carollo has extensive solids handing experience across the Untied States.

Peter Blackley discussing dryer improvements with IRWD staff.

As a national solids expert, Rashi has built relationships with clients operating dryers.

### *Strong National Presence and Relationship with Andritz*

Carollo has provided design and planning services for utilities around the nation, including many focused on sludge drying. Due to its many equipment offerings, Andritz is currently the most established manufacturer in the US sludge drying market, so Carollo works with them often. We will leverage this relationship to facilitate a more successful and sustained partnership between the District and Andritz.

### *Strong Technical Expertise, Coupled With Operator's Insight*

This project would not be the first time that Sudhan, Peter, and Andritz work together to improve dryer operations. For JEA's Buckman WRF Biosolids Conversion Projects, where two larger dryers were designed, the three collaborated to enhance ease of access, O&M, and safety. Sudhan's strong technical and design background, and Peter's operational experience will provide the District with invaluable expertise, advice, and guidance on how to improve its dryer operations.

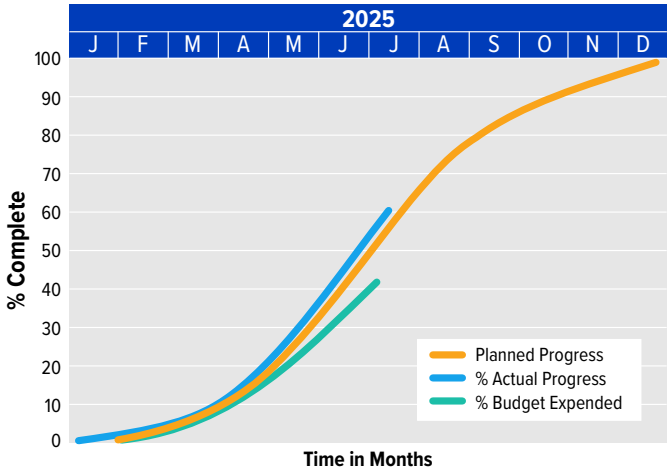
### *Strong Relations with Utilities Operating Dryers*

Based on our regional and national work, we have developed strong relationships with utilities operating dryers, including the Encina Wastewater Authority. Jeff Weishaar and Rashi have worked with Encina for years and they will facilitate site visits and calls with IRWD staff to allow MWRP O&M personnel to speak directly with their counterparts at Encina. This knowledge sharing and documentation of lessons learned will help the District improve dryer operation reliability and safety.

## Project Management

Carollo uses an engaging management approach to enhance coordination, maintain continual project progress, and monitor project metrics. To do this, we will utilize the following strategies:

- **Daily Interactions with the Design Team.** Collaboration through Teams, document sharing portals like Bluebeam, and regular check-ins will facilitate project progress and allow early identification of issues that must be addressed.
- **Bi-weekly Check-ins With District.** We will conduct bi-weekly check-ins with the District's PM to discuss project status, completed/planned activities, and decisions made or needed.
- **Bi-Weekly and Monthly Progress Reports.** We will prepare bi-weekly and monthly project progress reports. Monthly reports will include invoices and summarize the project's schedule and budget. Bi-weekly reports will document the discussions included in the check-ins.
- **Productive Design Meetings.** For design meetings to be productive, we will 1) clearly define the agenda and objectives; 2) review information and key decisions in advance; 3) make sure key stakeholders/ decision makers are in attendance; 4) manage communication to balance progress with consensus; 5) document decisions and action items; and 6) follow through on action items.

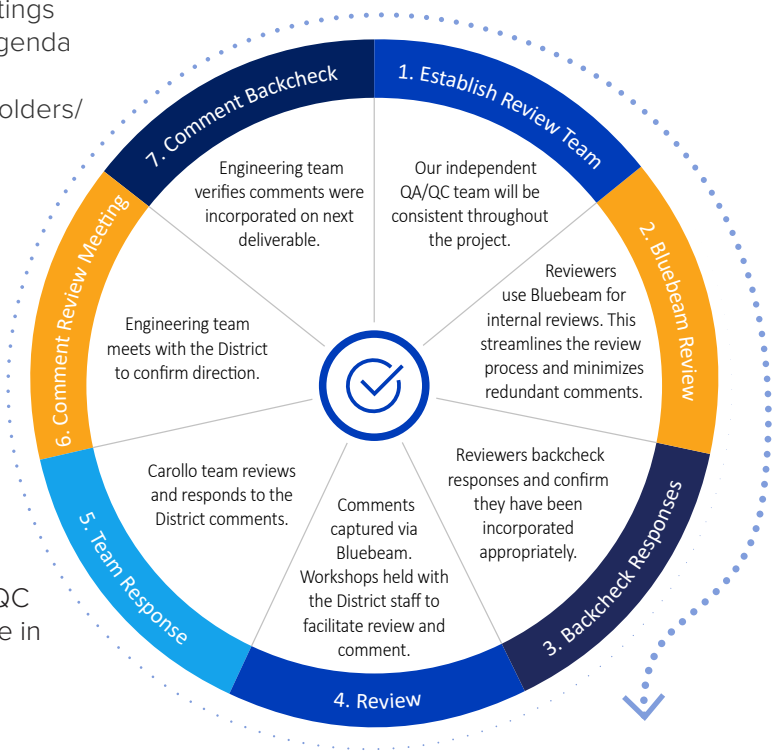



As project manager, Rashi will use the S-curve software to keep your project on schedule and within budget.

**Our QM activities will be conducted throughout the duration of the project to consistently provide high-quality deliverables.**

## Quality Management

Our team is committed to quality. Our quality assurance/quality control (QA/QC) review process provides proven results and begins with a tailored project plan. This plan details procedures, standards, team roles, report checklists, review procedures, and a project deliverables schedule. Before submitting a deliverable to the District, we will conduct a QA/QC review using senior level engineers with expertise in the appropriate discipline area.




**Our repeatable process will provide the District with quality work that you have come to expect from our teams.**

## Control of Costs

Our approach to cost validation and QA/QC review of cost estimates submitted by the design team is centered on development of independent cost estimates using the same methods and local market pricing used by general contractors.

### Local Cost Validation and QA/QC Review

Jason Rozgony will lead our cost validation and QA/QC review efforts. He is backed by a team of full-time Carollo estimators, most of whom are past ccontractors focused on the water/wastewater market. We utilize industry-standard estimating software, which allows us to interface with other external pricing databases that add quality and consistency to the pricing process.

# Scope of Work

The following represents our understanding of the Scope of Services and is the basis for our level of effort and fee estimates.

## Task 1 – Project Management

This task includes all aspects of project management including managing scope, schedule, budget, preparing progress reports and attending meetings. Under this task, we will also implement an effective quality assurance/quality control (QA/QC) program. We will organize, attend, and conduct required meetings.

### TASK 1 – DELIVERABLES

- Meeting agendas for each meeting, submitted as a PDF document to IRWD at least 3 days in advance of the meeting.
- Meeting minutes for each meeting, submitted to IRWD within one week after each meeting by email with a PDF attachment.
- **Bi-weekly status reports:** Each report will consist of a brief email summarizing the activities completed the previous week, the activities planned for the upcoming week, and critical decisions that need to be made.
- **Monthly status report with invoices:** Each report will summarize the work completed and review work status relative to budget and schedule.

### TASK 1 – ASSUMPTIONS

- Meetings shall include:
  - **Kickoff/Site Meeting:** One 2-hour meeting. In-person. 2 Attendees.
  - **Site visits:** Three 4-hour visits and two 2-hour visits. In-person. 4 Attendees.
  - **Individual Discipline Meetings:** Four 1-hour meetings. Hybrid. 3 Attendees.
  - **Meetings/Site Visits with Local Utilities Operating a Drying System:** One full day. In-person. 4 Attendees.
  - **Meetings with Dryer Manufacturer:** Two 2-hour meetings. Virtual. 3 Attendees.
  - **Draft Preliminary Design Report Submittal Presentation:** One 2-hour meeting. Hybrid. 4 Attendees.
  - **Final Preliminary Design Report Submittal Presentation:** One 2-hour meeting. Hybrid. 4 Attendees.
  - **Construction Sequencing and Commissioning:** Two 2-hour meetings. Hybrid. 4 Attendees.
  - **60% Draft Submittal Presentation:** One 1.5-hour meeting. Hybrid. 4 Attendees.
  - **90% Design Submittal Presentation:** One 1.5-hour meeting. Hybrid. 4 Attendees.
  - **Final Submittal Meeting:** One 1-hour meeting. Hybrid. 4 Attendees.
  - **Pre-bid Meeting:** One 2-hour meeting, in-person, 2 attendees.
- Hybrid meetings will include up to 2 in-person personnel.

## Task 2 – Preliminary Design Report

This task includes preparation of a draft and final Preliminary Design Report (PDR). The report will include:

- An executive summary including major recommendations, a preliminary class 4 construction cost, and preliminary design and construction timeframes.
- A summary of key findings from site visits, meetings, staff feedback and documentation review. Prior to meetings with staff, general questions and discussion topics will be emailed to the District one week prior to each meeting. Carollo will document staff feedback and key findings from the site visits and documentation review into the Preliminary Design Report.
- Improvements Recommendations will be compliant with the latest applicable codes and IRWD standards and will include:
  - Alternatives for improvements, design criteria, and recommendations.

  - » Preliminary layouts of the recommended improvements
  - » Preliminary single-line diagrams.
  - » Estimated lead times for new materials.
- Design Drawing and Specification Schedule: A list of design drawings and specifications expected for final design.
- Project schedule.
- Procurement strategies.
- A Class 4 Opinion of probable construction cost.
- Site and condition assessment for the following:
  - » **Utility survey:** O'Day Consultants will perform a utility research to locate utilities in the vicinity of the centrate and condensate piping. The survey will be for all above-ground features, horizontal angle points, and vertical grade breaks. An AutoCAD file, CSV file, and digital photos of the survey results will be submitted.
  - » **Pothole investigation:** Underground Solutions (USI) will perform potholing to accurately locate depths of existing utilities in the path of the centrate and condensate pipe routes. USI will vacuum excavate, backfill, compact and patch each pothole site. It will prepare a subsurface utility report with data, photos, and pothole location map. The potholing investigation will also include electromagnetic/GPR scanning to identify the buried centrate pipes alignment.
  - » **Centrate piping inspection:** V&A will perform an inspection of the centrate piping to identify the locations of clogs, and high/low points. V&A will review all relevant background information, visit the site to plan for the inspection, and submit a work plan prior to inspecting the pipe. During the inspection, V&A will coordinate and manage two subconsultants: GPRS, which will provide a specialty CCTV tractor to obtain video footage of the interior of the pipe to identify clog locations, and Jamison Engineering Contractors, which will provide scaffolding and removal /re-installation of 90-degree exposed bends to gain access into the piping. V&A will provide a draft and a final electronic report describing the field assessment methods, activities, results, and conclusions.
- System simplification analysis.
- Dryer system reliability analysis.

## TASK 2 – DELIVERABLES

- The Preliminary Design Report will be transmitted via email (PDF file) to IRWD for review at the draft and final submittals. One (1) hard copy of the final PDR will be submitted.

## TASK 2 – ASSUMPTIONS

- Digester feed pumps can be upsized and powered through the existing MCCs. No new MCCs are required.
- Geotechnical services will not be required and past geotechnical information will be suitable for this project's needs.
- Preliminary Design Report will be based on the findings and recommendations from TM-01 with additions for the following elements:
  - » Centrate piping.
  - » Digester gas system.
  - » Density meter flushing water arrangement.
- The cost for developing the system simplification and dryer project elements past the Preliminary Design Report phase is not included.
- The survey will include the yard area associated with the new condensate drain pipe (between the condensate vault and the sanitary sewer) and the centrate pipes (between the Solids Handling Building and the SBR splitter box). Aerial topography is not included.
- Three (3) pothole excavations and one (1) slot trench are included. Potholes and trenches would be up to 8' deep and 12' L x 8', respectively. USI assumes digable conditions using air excavation process. Restoration of potholes and trench, including hot asphalt, is included.
- Centrate piping inspection assumes that the centrate pipes are glass-lined ductile iron pipe. A CCTV tractor will be inserted into the centrate pipes to identify clog locations after the pipes have been emptied. Bends, inside the building, will be removed and reinstalled by a subconsultant (included in the cost) to allow the tractor to be inserted and removed. Scaffolding is also included in the cost. Operations staff will shut down, empty and isolate the centrate pipes and the splitter box in preparation for the inspection. V&A assumes that work can be completed in two days.
- Schedule will include estimated design, bid, and construction phases, Contractor's Notice of Award and Notice to Proceed, review and acceptance of Contractor's Submittals, estimated delivery of critical materials and equipment based on vendor proposals for major equipment, IRWD's holidays, and construction close out.
- Pre-procurement will include summary of estimated

lead times for the equipment and materials included in the project and review of procurement strategies. Lead time estimates will be based on vendor proposals for major equipment.

- System simplification will include: one SCADA screen mock-up for one process and a summary of recommendations for augmenting the physical signage/other improvements at one process area (e.g. thickening, dewatering, drying) for simplification and operational clarity.
- Dryer system reliability, for this task, will include documentation of the meetings, coordination, and findings based on site visits and phone conversations. Analysis will include recommendations to the District for improvements.

## Task 3 – Final Design

This task includes the preparation of a final design and 60%, 90%, and Final submittals. Work performed will conform to IRWD standards and requirements including, but not limited to, the IRWD Project Manual and Construction Manual, and all applicable codes (e.g., NEC and CEC).

The final design will include:

- Pre-purchase documentation for major long lead items (e.g. pumps, switchgear), if applicable. If necessary, this documentation will be provided at the 90% design submittal. It is not assumed that valves, piping, etc. that may have long lead times would be included through pre-purchase.
- **Project Manual:** The Manual will be in standard IRWD format, and will use IRWD's front end documents. We will 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 work, schedule, constraints, necessary temporary provisions, maximum shutdown durations, coordination requirements with operations staff, and possible sequencing associated with the work. Project Manual will also include General Technical Specifications, modifications thereto, and any Project Technical Specifications.
- **Construction Drawings:** Drawings will be 22-inch x 34-inch. The drawings will be developed in the latest version of AutoCAD, using NCS V4.0 layering standards, and utilizing IRWD's standard border template. Drawings prepared in AutoCAD will use the NAVD 88 and NAD 83 survey standards.
- **Estimated Project Schedule:** The preliminary project schedule will be updated as the project progresses and provided with each final design submittal.
- **Opinion of Probable Construction Cost:** The preliminary construction cost opinion will be updated as the project progresses and provided with each final design submittal. The format for the cost opinion will follow the itemized Schedule of Work within the Bid Documents of the Project Manual.

### TASK 3 – DELIVERABLES

- **60% Draft Submittal:** 60% Drawing set and 60% Project Manual, in searchable PDF format.
- **90% Design Submittal:** 90% Drawing set and 90% Project Manual that has been QA/QC'd by Carollo. Sets will be substantially complete. For any items that are recommended for pre-purchase, Carollo will provide complete documentation required for bid. Searchable PDF files of the Drawings and Project Manual will be submitted.
- **Final Design Submittal:** Final Drawing and Project Manual draft set to be backchecked for inclusion of all previous comments, with Carollo's Project Manager's electronic stamp and signature added. Once the submittal is reviewed and minor comments addressed by Carollo, the Final Design Submittal set will be submitted to be signed by IRWD. We will provide AutoCAD files for the entire Drawing set once signed by the Executive Director. Searchable PDF files of the Drawings and Project Manual will be submitted. The Project Manual will also be submitted in Microsoft Word format. One (1) hard copy of the Drawings in half-size (11x17) and Project Manual will be provided after backcheck is complete and signed by IRWD's Executive Director.
- Project Schedule and Opinion of Probable Construction Cost for each deliverable.

### TASK 3 – ASSUMPTIONS

- To minimize construction cost, Carollo intends to replace only the piping that requires replacement to improve pumping operations. We assume that includes the suction and discharge piping associated with the APD digester feed pumps, including piping elevated above the pumps. At this time, we do not expect that the piping mounted on the walls of the thickened sludge wetwells requires

replacement. The wall mounted piping is assumed to be GL-DIP and in good condition and hence does not require replacement. However, if in the course of the work, it is determined that this piping or its elements need to be modified or replaced, we will include that work in the project.

- The Project Manual template will be provided in Microsoft Word format. Bidding documents will be provided in Microsoft Word file and a searchable PDF file in 8-1/2 inch x 11-inch paper size.
- Project schedule will include design, bid, and construction phases, Contractor's Notice of Award and Notice to Proceed, review and acceptance of Contractor's Submittals, delivery of critical materials and equipment, IRWD's holidays, and construction close out.

## Task 4 – Bid Period Assistance

During the bidding period, we will assist with providing information and clarification of bid documents to prospective bidders and attend the pre-bid meeting. This effort will include the preparation of an addendum for bidding, including revisions to the design plans and specifications, and assistance with addressing bidder questions.

### TASK 4 – DELIVERABLES

- Addendum.

### TASK 4 – ASSUMPTIONS

- One addendum will be provided.
- 32 hours are budgeted for plan revisions to construction drawings.
- 24 hours are budgeted for revisions or additions to the project specifications.
- 24 hours are budgeted to address and respond to bidder questions.
- 8 hours are budgeted for 2 attendees at the pre-bid meeting.

## Task 5 – Optional Tasks - LiDAR Scanning and BIM Development

We have included an optional adder for the LiDAR scanning and BIM development service. This adder assumes a 3D scan of the Solids Handling Building during the preliminary design phase. If elected, the model will be used where appropriate to develop the design drawings for the modifications.

### TASK 5 – DELIVERABLES

- Revit model of Solids Handling Building.

### TASK 4 – ASSUMPTIONS

- The scan includes Mechanical, Structural, HVAC, electrical boxes and conduits. While the footprint of the electrical boxes is included, modeling the details of the electrical boxes, such as levers and push buttons, is not included.

## General Assumptions

- IRWD shall furnish Carollo available studies, reports and other data pertinent to our services; obtain or authorize Carollo to obtain or provide additional reports and data as required; furnish to Carollo services of others required for the performance of Carollo's services hereunder, and Carollo shall be entitled to use and rely upon all such information and services provided by IRWD or others in performing our services under this Agreement.
- Carollo has no control over the cost of labor, materials, equipment or services furnished by others, over the incoming water quality and/or quantity, or over the way IRWD's plant and/or associated processes are operated and/or maintained. Data projections and estimates are based on Carollo's opinion based on experience and judgment. Carollo cannot and does not guarantee that actual costs and/or quantities realized will not vary from the data projections and estimates prepared by us and Carollo will not be liable to and/or indemnify IRWD and/or any third party related to any inconsistencies between our data projections and estimates and actual costs and/or quantities realized by IRWD and/or any third party in the future, except to the extent such inconsistencies are caused by Carollo's negligent performance hereunder.
- The services to be performed by Carollo are intended solely for the benefit of IRWD. No person or entity not a signatory to this Agreement shall be entitled to rely on Carollo's performance of its services hereunder, and no right to assert a claim against Carollo by assignment of indemnity rights or otherwise shall accrue to a third party as a result of the project Agreement or the performance of Carollo's services hereunder.

## Improvement Plan Sheet Set

| Sheet No. | Sheet Type | Title |
|---|---|---|
| 1 | General | Cover Sheet, Vicinity Map, and Location Map |
| 2 | General | Drawing Index and General Abbreviations |
| 3 | General | General Notes, Legends, and Symbols |
| 4 | General | Site Plan |
| 5 | Civil | General Civil Notes |
| 6 | Civil | Yard Piping Plan 1 |
| 7 | Civil | Yard Piping Plan 2 |
| 8 | Demolition | PS/WAS Wet Wells - Demolition 1 |
| 9 | Demolition | PS/WAS Wet Wells - Demolition 2 |
| 10 | Demolition | Thickening Centrifuges - Demolition 1 |
| 11 | Demolition | Thickening Centrifuges - Demolition 2 |
| 12 | Demolition | Thickening Centrifuges - Demolition 3 |
| 13 | Demolition | Thickening Centrifuges - Demolition 4 |
| 14 | Demolition | Thickening Centrifuges - Demolition 5 |
| 15 | Demolition | Acid Phase Digester Feed - Demolition 1 |
| 16 | Demolition | Acid Phase Digester Feed - Demolition 2 |
| 17 | Demolition | Acid Phase Digester Feed - Demolition 3 |
| 18 | Demolition | Acid Phase Digester Feed - Demolition 4 |
| 19 | Demolition | Acid Phase Digester Feed - Demolition 5 |
| 20 | Demolition | Digester Gas System - Demolition 1 |
| 21 | Demolition | Digester Gas System - Demolition 2 |
| 22 | Demolition | Centrate Piping – Demolition 1 |
| 23 | Demolition | Centrate Piping – Demolition 2 |
| 24 | Demolition | Centrate Piping – Demolition 3 |
| 25 | Demolition | Electrical Demolition 1 |
| 26 | Demolition | Electrical Demolition 2 |
| 27 | Demolition | Electrical Demolition 3 |
| 28 | Demolition | Electrical Demolition 4 |
| 29 | Structural | General Structural Notes |
| 30 | Structural | PS/WAS Wet Wells Modifications - Plan |
| 31 | Structural | PS/WAS Wet Wells Modifications - Sections and Details |
| 32 | Structural | Thickening System Modifications - Plan |
| 33 | Structural | Thickening System Modifications - Sections and Details |
| 34 | Structural | APD Feed System Modifications - Plan |
| 35 | Structural | APD Feed System Modifications - Sections and Details |
| 36 | Structural | Misc Details |
| 37 | Mechanical | General Mechanical Notes |
| 38 | Mechanical | PS/WAS Wet Wells Modifications - Plan |
| 39 | Mechanical | PS/WAS Wet Wells Modifications - Sections |
| 40 | Mechanical | PS/WAS Wet Wells Modifications - Sections and Details 1 |

| Sheet No. | Sheet Type | Title |
|---|---|---|
| 41 | Mechanical | PS/WAS Wet Wells Modifications - Sections and Details 2 |
| 42 | Mechanical | PS/WAS Wet Wells Modifications - Sections and Details 3 |
| 43 | Mechanical | Thickening System Modifications - Upper Plan |
| 44 | Mechanical | Thickening System Modifications - Intermediate Plan |
| 45 | Mechanical | Thickening System Modifications - Lower Plan |
| 46 | Mechanical | Thickening System Modifications - Ventilation Plan |
| 47 | Mechanical | Thickening System Modifications - Sections |
| 48 | Mechanical | Thickening System Modifications - Sections and Details 1 |
| 49 | Mechanical | Thickening System Modifications - Sections and Details 2 |
| 50 | Mechanical | APD Feed System Modifications - Plan |
| 51 | Mechanical | APD Feed System Modifications - Sections |
| 52 | Mechanical | APD Feed System Modifications - Sections and Details 1 |
| 53 | Mechanical | APD Feed System Modifications - Sections and Details 2 |
| 54 | Mechanical | Digester Control Building Modifications - Plan |
| 55 | Mechanical | Digester Control Building Modifications - Sections |
| 56 | Mechanical | Digester Control Building Modifications - Sections and Details 1 |
| 57 | Mechanical | Digester Control Building Modifications - Sections and Details 2 |
| 58 | Mechanical | Digester Gas Storage Modifications - Plan |
| 59 | Mechanical | Digester Gas Storage Modifications - Sections and Details |
| 60 | Mechanical | Centrate Piping Modifications - Plans |
| 61 | Mechanical | Centrate Piping Modifications - Sections |
| 62 | Mechanical | Centrate Piping Modifications - Details |
| 63 | Mechanical | Misc Details |
| 64 | Electrical | General Electrical 1 |
| 65 | Electrical | General Electrical 2 |
| 66 | Electrical | Site Plan |
| 67 | Electrical | Cable and Conduit Schedules |
| 68 | Electrical | Panelboard Schedules |
| 69 | Electrical | Digester Gas MCC-4102 and MCC-4103 Partial Modification Elevations |
| 70 | Electrical | Digester Gas MCC-4102 and MCC-4103 Partial Modification One-Lines |
| 71 | Electrical | Solids Handling Building MCC-4100 and MCC-4101 Partial Modification Elevations |
| 72 | Electrical | Solids Handling Building MCC-4100 and MCC-4101 Partial Modification One-Lines |
| 73 | Electrical | Solids Handling Building Overall Plan |
| 74 | Electrical | Solids Handling Building Thickening Centrifuge Modifications Plan 1 |
| 75 | Electrical | Solids Handling Building Thickening Centrifuge Modifications Plan 2 |
| 76 | Electrical | Solids Handling Building PS/WAS Wet Well Modifications Plan 1 |
| 77 | Electrical | Solids Handling Building PS/WAS Wet Well Modifications Plan 2 |
| 78 | Electrical | Solids Handling Building APD Feed System Modifications Plan 1 |
| 79 | Electrical | Solids Handling Building APD Feed System Modifications Plan 2 |
| 80 | Electrical | Solids Handling Building APD Feed System Modifications Plan 3 |
| 81 | Electrical | Solids Handling Building APD Feed System Modifications Plan 4 |

| Sheet No. | Sheet Type | Title |
|---|---|---|
| 82 | Electrical | Digester Control Building Electrical Room Plan |
| 83 | Electrical | Digester Gas Holding Tanks Plan |
| 84 | Instrumentation | General Instrumentation 1 |
| 85 | Instrumentation | General Instrumentation 2 |
| 86 | Instrumentation | PS/WAS Wet Well Modifications 1 |
| 87 | Instrumentation | PS/WAS Wet Well Modifications 2 |
| 88 | Instrumentation | Thickening System Modifications 1 |
| 89 | Instrumentation | Thickening System Modifications 2 |
| 90 | Instrumentation | APD Feed System Modifications 1 |
| 91 | Instrumentation | APD Feed System Modifications 2 |
| 92 | Instrumentation | APD Feed System Modifications 3 |
| 93 | Instrumentation | APD Feed System Modifications 4 |
| 94 | Instrumentation | Digester Gas Storage Modifications 1 |
| 95 | Instrumentation | Misc 1 |
| 96 | Instrumentation | Misc 2 |
| 97 | Typical Details | Civil |
| 98 | Typical Details | Structural 1 |
| 99 | Typical Details | Structural 2 |
| 100 | Typical Details | Mechanical/Piping 1 |
| 101 | Typical Details | Mechanical/Piping 2 |
| 102 | Typical Details | Electrical Details 1 |
| 103 | Typical Details | Electrical Details 2 |
| 104 | Typical Details | Instrumentation |

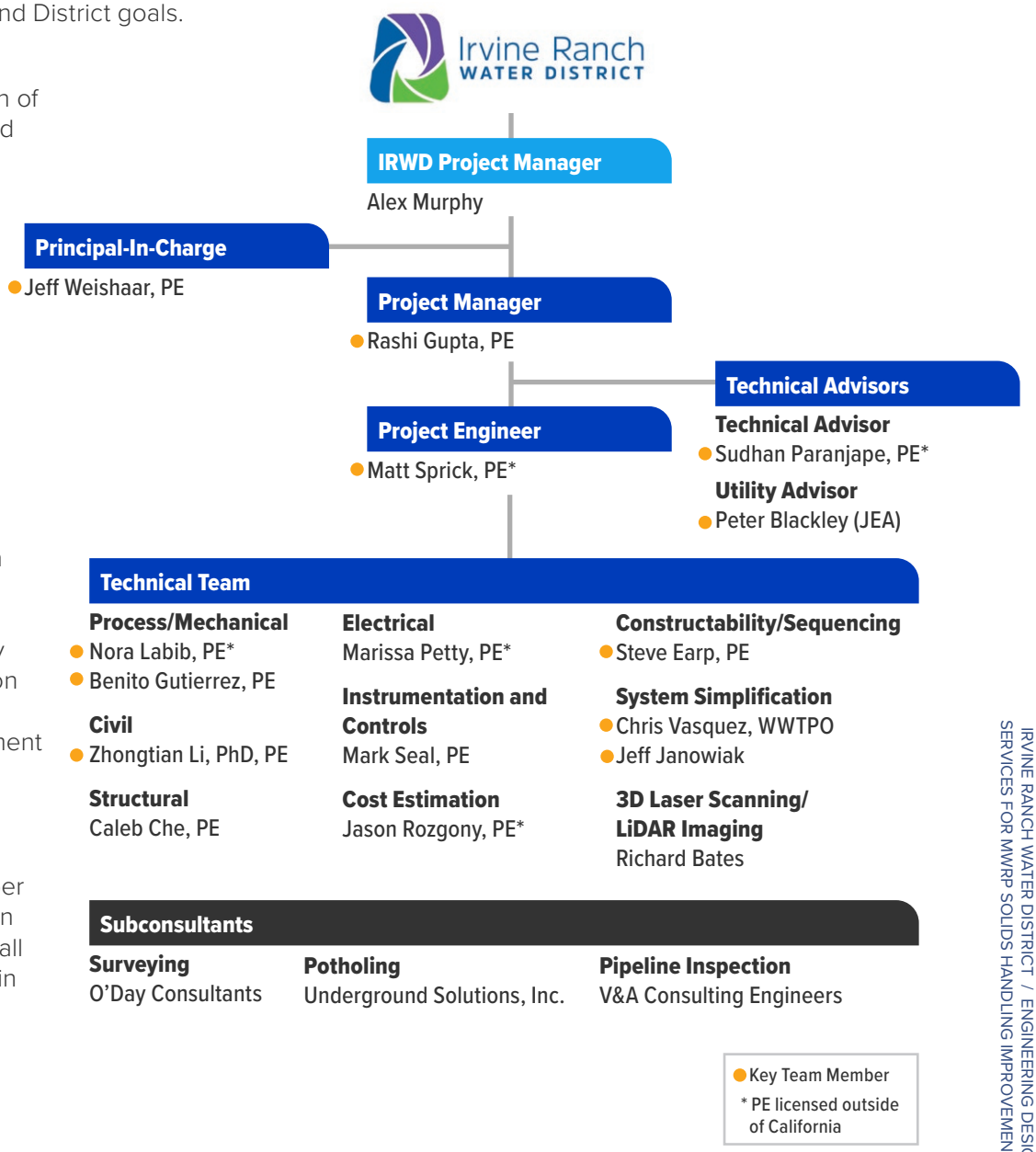
# Team

## Our team's technical expertise and facility understanding enables efficient system modifications to improve operational performance, reliability, and safety.

IRWD invested in a state-of-the-art solids processing system and seeks to fully realize those investments through this MWRP Solids Handling Improvements Project. Our team's knowledge of your facilities, our work on the Centrifuge System Improvements and Grit Issues Assistance projects, and support provided for the digester gas and dryer systems through our temporary staff augmentation services provide us with unmatched understanding of this project's scope of work, staff preferences, and District goals.

Project manager, Rashi Gupta, has managed each of our previous solids-related projects with you and led the development of most of the recommendations comprising this project's scope of services. She will be supported by our Principal-in-Charge, Jeff Weishaar, who has assisted the District on several projects, national centrifuge expert Matt Sprick as the Project Engineer, and the team shown in the organization chart to the right. Our key team members have worked together on many solids system rehabilitation projects and we will work with the District to implement solutions that improve solids system reliability, performance, and safety.

Bios for each team member are provided beginning on page 3, with resumes for all team members provided in the appendix.



# The Right Project Manager to Lead the Team

## *Rashi Gupta, PE*

Rashi, a Senior Project Manager, specializes in the delivery of reliable, O&M-friendly solutions for biosolids treatment and management. As a nationally recognized solids treatment specialist, she has managed solids-related projects spanning the initial planning phase through design to start-up and optimization after construction. Some of her recent project management experience includes:

- Project manager for Irvine Ranch Water District's (IRWD, District) Centrifuge System Improvements and Grit Issues Assistance projects and the Temporary Reliability Engineering Staff Augmentation effort that has included assistance with the District's drying and digester gas systems.
- Project manager for the South Orange County Wastewater Authority (SOCWA), CA, JB Latham Treatment Plant Facility Improvements Package "B" and Dewatering and Digester System Assessment planning and design projects.
- Project manager for the Union Sanitary District (USD), CA, Solids System/Capacity Assessment and WAS Thickener Replacement planning and design projects.
- Project manager for the City of Los Angeles, CA, Terminal Island Water Reclamation Facility Solids Management and Hyperion Treatment Plant CLARTS Impacts planning studies.

**50+**
**SOLIDS PROJECTS IN LAST 10 YEARS**

**4**
**SOLIDS-RELATED PROJECTS WITH IRWD**

**20+**
**YEARS WITH CAROLLO**

> *Rashi has been working with EMWD for over 10 years. In that time she has designed our digesters and thickening facilities, trained our operators on solids processes and regulations, and continues to help us with optimization of our dewatering processes. She listens to our concerns and follows through. When we have a solids-related question or need, we don't hesitate to call Rashi."*
>
> ***– Jeff Wall, PE, Assistant General Manager (retired), Operations & Maintenance, Eastern Municipal Water District, CA***

## Key Team Members

San Diego, CA

### **Jeff** Weishaar, PE

PRINCIPAL-IN-CHARGE

**Jeff** is a senior wastewater treatment planning and design engineer with 21 years of experience, including several projects with the District, the most recent of which is the engineering services during construction for the San Joaquin Reservoir Filtration project. He has played a leadership role in projects involving nearly all aspects of wastewater treatment processes and facilities, including analysis, design, and construction. Jeff has completed numerous rehabilitation and replacement design projects throughout California, providing valuable insights into facilities, operations, and protocols. He has worked with Rashi, Benito, and Nora on projects for the Encina Wastewater Authority and SOCWA. As Principal-in-Charge, Jeff will work with you to make sure your expectations are being met and with Rashi to confirm that the team is afforded adequate resources.

Costa Mesa, CA

### **Rashi** Gupta, PE

PROJECT MANAGER

**Rashi** will be your primary point of contact and oversee all aspects of the project. She will have ultimate responsibility for the project's success. Rashi has 21 years of specialized experience, was Carollo's National Biosolids Practice Lead for 8 years, and currently serves as Carollo's National Wastewater Practice Director. She has led solids system designs and plans on projects in the US and Canada with total construction costs of more than $5B. Rashi will leverage her knowledge of that work and her national expertise to develop and deliver an O&M-friendly design that is intuitive and safe to operate.

Nashville, TN

### **Matt** Sprick, PE*

PROJECT ENGINEER

**Matt** has nearly 20 years of experience in process and mechanical designs of wastewater treatment processes such as sludge thickening, anaerobic digestion, centrifuge dewatering, and sludge drying systems. Matt has worked with Rashi and completed similar solids improvements for Clean Water Services, OR; Hawaii County, HI; and the cities of Bend, OR; Salem, OR; and Longmont, CO. His design management experience includes the Solids Handling Dewatering Improvements Project for Bend and the Rock Creek Centrifuge Replacement Final Design for Clean Water Services. He also completed a thermal dryer design for the City of Oak Harbor, WA, that he will leverage to improve the overall reliability of the District's dryer system. Matt will work alongside Rashi and lead the team's day-to-day efforts.

Vancouver

### **Nora** Labib, PE*

PROCESS/MECHANICAL

**Nora** is a process engineer with 10 years of experience in the design of water and wastewater treatment facilities. She has provided engineering design and construction services for facilities throughout the U.S., including the JBLTP Package B Upgrades for the South Orange County Wastewater Authority, Hilo Wastewater Treatment Plant Rehabilitation and Replacement Project in Hawaii, and the Sioux Falls WRF Improvement and Expansion Project in South Dakota. In these projects, she has worked alongside Rashi, Matt, and Benito to develop solids system designs and provide services during construction. She will work with Benito to develop the process/mechanical design for the solids systems to be upgraded.

** PE license outside of California*

## Key Team Members *Continued*

San Diego, CA

### **Benito** Gutierrez, PE

PROCESS/MECHANICAL

**Benito** is a mechanical engineer with 10 years of experience in the design and hydraulic modeling of wastewater facilities and providing services during construction. Benito's expertise includes pump stations, solids thickening, centrate treatment, secondary treatment, and digester process upgrades. He has worked on several solids-related projects for the Encina Wastewater Authority, JBLTP Package B Upgrades for the South Orange County Wastewater Authority, Hilo Wastewater Treatment Plant Rehabilitation and Replacement Project in Hawaii. Benito has worked with Jeff on all of the Encina projects and is currently assisting IRWD with ESDC on the San Joaquin Filtration Project. He developed designs and provided construction services with Rashi, Matt, and Nora on the Hilo and SOCWA projects, and will do likewise for the mechanical systems included in this project.

Costa Mesa, CA

### **Zhongtian** Li, PhD, PE

CIVIL

**Zhongtian** has focused on treatment system optimization and biosolids treatment during his 10-year career. He has assisted the Padre Dam Municipal Water District in San Diego, CA as an Owner's Advisor for the solids systems during construction of a $450M greenfield advanced water purification facility that includes new thickening, digestion, dewatering, and biogas utilization systems. He has provided similar assistance for the Sand Island Wastewater Treatment Plant in Honolulu, HI. He worked with IRWD's O&M group during the Temporary Reliability Engineering Staff Augmentation effort, during which he investigated and provided suggestions to address operational issues with the digester gas, density meters, and sludge pumping systems. His knowledge of the facilities and operations will enable him to lead the civil design for the digester gas system and centrate piping scope elements.

Inland Empire, CA

### **Steve** Earp, PE

CONSTRUCTABILITY/SEQUENCING

**Steve** has over 40 years of experience in the engineering and construction industry. His expertise lies in construction management, particularly in water and wastewater projects. He has held various roles, including Construction Manager, Resident Engineer, and Project Manager, contributing to significant projects such as the Perris Valley Regional Water Reclamation Facility Plant 3 Expansion for the Eastern Municipal Water District, CA. Steve's career highlights include managing complex construction projects, developing performance metrics, and leading teams to successful project completions. Steve will review the design and advise the team on constructability during the design phase such that the improvements can be constructed smoothly. Similarly, he will work with the design team to develop appropriate sequencing and work constraints to avoid operational disruptions during the construction phase.

## Key Team Members *Continued*

Fresno, CA

### **Chris** Vasquez, WWTPO

SYSTEM SIMPLIFICATION

**Chris** is a seasoned professional with extensive experience in the water industry. He has served as a senior operations specialist at Carollo since 2022, focusing on process control, troubleshooting, and startup/commissioning of wastewater facilities. Chris has a robust background in operating and optimizing wastewater treatment plants, and he will work with the District and the team to identify measures that will simplify the solids treatment system and make it more intuitive to operate.

Roseville, CA

### **Jeff** Janowiak, PE

SYSTEM SIMPLIFICATION

**Jeff** has over 30 years of experience in water and wastewater automation and controls. His expertise includes control system design, PLC and RTU programming, SCADA development, historical database and reporting configuration, alarm management, and system integration. Jeff will lead the SCADA-related simplification efforts, focusing on the development of concepts that illustrate how SCADA screens could be modified to improve the solids system's overall operator-friendliness and ease of use.

Orlando, FL

### **Sudhan** Paranjape, PE*

TECHNICAL ADVISOR

**Sudhan** has over 30 years of experience with water, wastewater and reclaimed water treatment plant process and detail design. His experience includes planning, preliminary and final design, and construction of several water and wastewater treatment facilities, including several solids thickening and dewatering facilities for the City of Orlando, FL and the Toho Water Authority, FL, where he worked with Rashi. Sudhan brings hands on management and technical experience from leading the design of wastewater treatment projects of varying size and complexity and employing an array of advanced treatment technologies. Sudhan will use his expertise in various drying technologies and lessons learned from similar projects such as the Buckman Water Reclamation Facility Biosolids Conversion Project for JEA in Jacksonville, FL to help the District improve dryer system reliability and safety.

Jacksonville, FL

### **Peter** Blackley

UTILITY ADVISOR

**Peter** has more than 30 years of operational experience at wastewater treatment facilities, including as Operations Coordinator for JEA in Jacksonville, Florida. Peter has led JEA's biosolids drum drying operations for over 20 years and worked hand-in-hand with Sudhan on the new solids treatment train that includes dual drum dryers, thickening, dewatering, solids receiving, and sludge pumping systems. In this work, Peter used his past dryer operating experience to inform the new facility's design such that O&M-friendly features, access provisions, and safety measures were incorporated. Peter and Sudhan recently assisted the District investigate the potential causes for the recycle bin fire and developed suggestions to mitigate thermal risks in the future. As a technical advisor, Peter will share his operational experience to help the District improve and sustain its drum drying operations.

** PE license Outside of California*

## Team Members

Costa Mesa, CA

### **Caleb** Che, PE

STRUCTURAL

**Caleb** is a structural engineer with over 20 years of experience in civil engineering, specializing in the design of water and wastewater treatment facility structures. His expertise includes developing structural specifications and ensuring compliance with current building code standards. Caleb has been involved in various projects, providing engineering services during construction, reviewing structural shop drawings, and responding to requests for information regarding construction issues. His project experience includes significant roles in the design and expansion of facilities such as the San Jacinto Valley Regional Water Reclamation Facility and Hilo Wastewater Treatment Plant in Hawaii. He will lead the structural design for this project.

Albuquerque, NM

### **Marissa** Petty, PE*

ELECTRICAL

**Marissa** specializes in electrical and instrumentation design and construction management of wastewater treatment facilities. Her electrical experience includes power distribution, lighting, motor controls, high voltage, and grounding. She is also experienced in the coordination of electrical and instrumentation work with civil, structural, and mechanical work during design and construction, including the City of Lubbock, TX Southeast Water Reclamation Plant Solids Handling Improvements project on which she worked with Rashi. She also provided electrical and I&C engineering for American Valley, CA WWTP Improvements, and the Metro Wastewater Reclamation District, Denver, CO Digester Complex Rehabilitation Project. Marissa will provide expertise for electrical components of the project, leading the electrical system design.

San Diego, CA

### Mark Seal, PE*

INSTRUMENTATION AND CONTROLS

**Mark** is a versatile and experienced Instrumentation and Controls (I&C) engineer who has worked through the design, construction, and commissioning phases of many water and wastewater treatment facilities. He is adept at all aspects of I&C for water and wastewater projects and will lead the I&C design for this project. Mark provided I&C support for SCADA Network Design for Sonoma Water, CA, and for Albuquerque Bernalillo County Water Utility Authority, NM's Primary Clarification Odor control projects.

** PE license Outside of California*

## Team Members *Continued*

Denver, CO

### **Jason** Rozgony, PE*

COST ESTIMATING

**Jason** brings experience focused on cost estimating for engineering projects and "at-risk," CMAR, design-build, and hard-bid projects. He has developed corporate estimating standards and has managed estimating staff across the United States. Jason has prepared discipline-level estimates and has led complete estimates for more than 250 design and fixed price construction projects requiring collaboration with design engineers, vendors, and subcontractors from preliminary through final design. Jason will lead the cost estimating portion of this project, drawing on his experience working as a general contractor and as Carollo's cost estimating group lead.

Tampa, FL

### **Richard** Bates

3D LASER SCANNING/LiDAR IMAGING

**Richard** has eight years of experience completing LiDAR scans of facilities and converting scan results to BIM for use in design or documentation of as-built conditions. He has been involved in a broad range of design and construction projects that included design, layout, 3D modeling and coordination across multiple disciplines utilizing Revit software. He will lead the fieldwork for LiDAR scanning at the MWRP and the subsequent LiDAR to BIM modeling efforts.

** PE license Outside of California*

**Our project team is available and dedicated to performing their designated tasks for the full duration of this project.**

Carollo will not replace key team members without prior approval from the District to avoid affecting the project.

Individual commitment will be consistent with job requirements provided by the District to provide high-quality services. From a project management standpoint, we confirm that each individual has adequate availability to meet the project requirements for your assignments, as indicated in the table on the right.

**TEAM'S AVAILABILITY TABLE**

| Name | Duration | Percentage Availability |
|---|---|---|
| Jeff Weishaar | 14 Months | 10% |
| Rashi Gupta | 14 Months | 20% |
| Matt Sprick | 14 Months | 25% |
| Sudhan Paranjape | 14 Months | 10% |
| Peter Blackley | 14 Months | 10% |
| Nora Labib | 14 Months | 40% |
| Benito Gutierrez | 14 Months | 40% |
| Zhongtian Li | 14 Months | 40% |
| Steve Earp | 14 Months | 15% |
| Chris Vasquez | 14 Months | 20% |
| Jeff Janowiak | 14 Months | 20% |

## Subconsultants

We have chosen our subconsultants based on their proven technical expertise, resource capacity; and knowledge of the project needs; and their existing relationships with Carollo. We have provided a brief description of each of their roles and capabilities below.

### O'Day Consultants

SURVEYING

O'Day is a full-service civil engineering and land surveying firm with 39 years of experience. They offer comprehensive civil engineering, design, surveying, mapping and consulting services. O'Day has provided services for public works, utilities, industrial, commercial, retail, and large housing projects. Since 1981, they have successfully worked with local public agencies, private developers, general contractors, architects and other consulting firms on numerous development and redevelopment projects throughout Southern California.

### V&A

PIPELINE INSPECTION

With expertise in corrosion failure analysis, V&A Consulting Engineers (V&A) will lead the corrosion and cathodic protection portion. Carollo has partnered with V&A for more than 50 projects in the last 15 years. Our long-term relationship allows us to provide efficient and seamless collaboration to deliver a quality product for IRWD.

### Underground Solutions, Inc.

POTHOLING

Underground Solutions, Inc. (USI) is the leading underground utility location company in Southern California. Their team of highly qualified operators and management are committed to performing fast, safe and accurate utility locating services. Their high velocity air-driven excavation delivers the power to cut precise holes into the earth without damaging the utility being located.

# References

## Carollo's industry-leading solids system design experience provides the District with vetted solutions tailored to the MWRP's needs.

### Firm Overview

For 92 years, Carollo has provided similar services to clients and helped them navigate increasingly complex water-related challenges. Carollo is a full-service, environmental engineering firm that specializes in the planning, design, and construction management of water and wastewater facilities. We are one of the largest firms in the country that is exclusively focused on water and nationally recognized for delivering solutions that are innovative, affordable, and sustainable.

### Team Capabilities

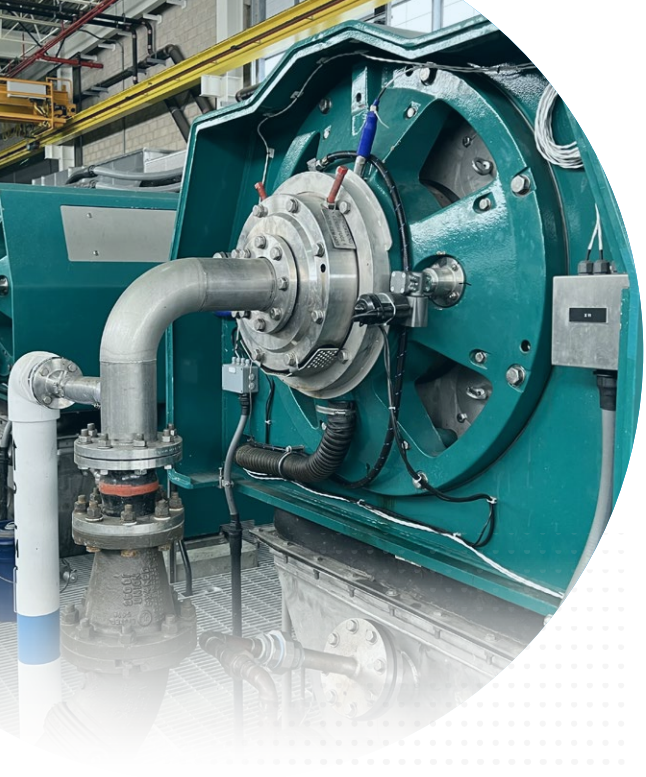
Carollo has significant experience with biosolids, particularly in design and rehabilitation. Our team has completed multiple projects across the country, including IRWD's Centrifuge System Improvements and Grit Issues Assistance; JBLTP Package B Upgrades for the South Orange County Wastewater Authority; Hilo Wastewater Treatment Plant Rehabilitation and Replacement Project in Hawaii; and Buckman Water Reclamation Facility Biosolids Conversion Project for JEA in Jacksonville, FL. These projects demonstrate our ability to provide tailored solutions that improve treatment efficiency, performance, and operational reliability. A snapshot of our work is shown on the map below.

***Our Experience Throughout The Country*** **enables us to improve the MWRP solids handling system through creative and practical solutions that we have demonstrated successfully before.**

## We Have Extensive Local and National Experience

Our team's knowledge, experience, and expertise delivering solids projects spans planning and preliminary design to final design and commissioning. Our track record of previous project success demonstrates that we offer the District a tested team ready to deliver a design that will improve O&M-friendliness, system performance, and overall reliability. The chart below includes some of the projects we have completed with similar project elements as the MWRP Solids Handling Improvements Project. Those projects shown in bold are further described in the subsequent pages, with references noted.

| Client and Project | Thickening/Dewatering | Anaerobic Digestion | Thickened Sludge Pumps | Centrate Piping Optimization | Rehabilitation Design | Sequencing Complexity | O&M-focused Improvements |
|---|---|---|---|---|---|---|---|
| **Michelson Water Reclamation Plant Centrifuge Improvements – Irvine Ranch Water District, CA** | ■ | ■ | ■ | ■ | | ■ | ■ |
| **Water Reclamation Facility Solids Handling Improvement – City of Bend, OR** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Rock Creek Advanced Wastewater Facility Centrifuge Replacement Final Design – Clean Water Service, OR** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **JB Latham Facility Plan Implementation Package B - Biosolids Upgrades – South Orange County Wastewater Authority, CA** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Hilo WWTP Rehabilitation Phases 1 and 2 – County of Hawaii, HI** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Oak Orchard Wastewater Treatment Plant Program Management – Onondaga County WEP, NY** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Buckman Water Reclamation Facility Biosolids Conversion, JEA, Jacksonville, FL** | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Michelson WRP Biosolids and Energy Recovery Facilities Preliminary Design – Irvine Ranch WD, CA | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Regional Water Recycling Plant No. 1 Liquids and Solids Capacity Recovery – Inland Empire Utilities Agency, CA | ■ | ■ | ■ | | ■ | ■ | ■ |
| Sludge Thickening and Dewatering Building Projects – Miami-Dade Water and Sewer Department, Miami, FL | ■ | | ■ | ■ | | ■ | ■ |
| San Jacinto Valley Regional Water Reclamation Facility Plant 2 – Eastern Municipal Water District, CA | ■ | ■ | ■ | | ■ | ■ | ■ |
| Perris Valley Regional Water Reclamation Facility Plant 3 Facilities – Eastern Municipal Water District, CA | ■ | ■ | ■ | | ■ | ■ | ■ |
| Water Reclamation Facility Improvements and Expansion – City of Sioux Falls, SD | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Alvarado WWTP Solids System Capacity Assessment – Union Sanitary District, CA | ■ | ■ | | | | | ■ |
| Alvarado WWTP WAS Thickener Replacement – Union Sanitary District, CA | ■ | | ■ | | ■ | ■ | ■ |
| Water Pollution Control Plant Dewatering Improvement Project – City of Las Vegas, NV | ■ | | | ■ | ■ | ■ | ■ |
| Blue River WWTP Solids Improvements – City of Kansas City, MO | ■ | ■ | ■ | | ■ | ■ | ■ |
| WWTP Upgrade – City of Palm Springs, CA | ■ | ■ | | | ■ | ■ | ■ |
| Grants Pass WRP Facilities Plan and Digester Cleaning – City of Grants Pass, OR | ■ | ■ | ■ | | ■ | ■ | ■ |
| Additional Digester Facility Upgrade – City of San Jose, CA | ■ | ■ | ■ | ■ | ■ | ■ | ■ |



# Centrifuge System Improvements and Grit Issues Assistance

## Irvine Ranch Water District, CA

During these projects, Carollo assisted the Irvine Ranch Water District (IRWD, District) with many operational and performance issues hampering the solids treatment train at the Michelson Water Reclamation Plant (MWRP). Carollo first evaluated thickening and dewatering performance data and inspected the existing thickening and dewatering centrifuge systems, associated feed and solids conveyance systems, instrumentation, and controls to assess current conditions and potential issues impacting the plant's ability to meet the intended performance for its solids systems. Based on this work, Carollo developed recommendations and mitigation measures to address the identified issues and improve operational performance and reliability. These recommendations comprise many of the elements in the District's current Solids Handling Improvements scope of work.

Following the centrifuge system work, the District enlisted Carollo to investigate potential causes and mitigation measures for "grit" plaguing the solids system. Carollo coordinated sampling to characterize the "grit" at several locations of MWRP, and determined that the "grit" was not material left over from poor grit removal at the headworks. The grit removal system was found to be performing well and the "grit" was determined to be an iron precipitate forming in the methane phase digesters. The team then recommended mitigation measures to reduce formation of this precipitate and also enable the District to clean the egg-shaped digesters while they remained in service.

Most recently, team members visited the MWRP following clogging issues within the heat recovery plate exchanger and a fire in the dryer system recycle bin. Changes to the heat exchanger design were investigated and recommendations provided to staff about options for reducing exchanger clogging. The team's dryer experts spoke with staff and investigated the dryer system to identify potential causes of the fire and develop suggestions for modifications needed to mitigate such risks in the future.

### REFERENCE

Jason Manning
Director of Maintenance
949-453-5841
manning@irwd.com

### TEAM INVOLVEMENT

Rashi Gupta, Sudhan Paranjape, Zhongtian Li, Peter Blackley (JEA employee)


# Solids Handling Dewatering Improvements Design and ESDC

## City of Bend, OR

The Bend Water Reclamation Facility (WRF) produces high quality, Class A biosolids, suitable for land application without restriction – including use as a fertilizer and soil amendment on farms and home gardens. The solids processing facility had ongoing safety, reliability, structural, mechanical, and process issues that needed to be addressed to create a safe and healthy work environment, lower operating costs, and extend the life of the building that houses the solids processing equipment. Carollo designed a dewatering centrifuge system with full redundancy, progressing cavity cake pumps, and new emulsion polymer room for improved operations.

### *Applicable Project Elements:*

- Identified and implemented improvements, including solids processing equipment selection, centrifuge-based design, and process control optimization.
- Performed analysis of primary and secondary sludge fed to the digesters and the dewaterability of digested sludge to develop achievable performance criteria.
- Retrofitted the existing solids handling building to remove existing belt filter press, install new centrifuge trains, improve odor control for existing equipment, and provide a new polymer room.
- Completed major structural modifications to the existing building to enable centrifuge installation and improve overall O&M access.
- Developed temporary dewatering plan to accelerate construction within existing dewatering building.

### Relevance to IRWD:

- Sequencing to enable construction of modifications within existing building without impacting plant's ability to process solids.
- O&M focused design and design elements, including provisions to optimize polymer use and reduce operating costs.
- Improved dewatering cake dryness by 7% TS dryness points.

**REFERENCE**

Oliver Murray, PE
Project Engineer
541-693-2183
omurray@bendoregon.gov

**TEAM INVOLVEMENT**

Rashi Gupta, Matt Sprick, Nora Labib, Caleb Che, Jason Rozgony

> ***The team at Carollo has done a great job to help the City of Bend deliver our Solids Handling Improvements and Dewatering project. A solutions-oriented approach during construction has helped to keep the project on schedule while monitoring the budget allocated to the work done. The professionalism and expertise that Carollo has brought to the project has made for great relationships and we look forward to more projects with them in the future.***
>
> ***- Oliver Murray, PE, Project Engineer***

# Buckman WRF Biosolids Conversion Projects

## JEA, Jacksonville, FL

As part of JEA's largest Capital Improvements Project at Buckman WRF, Carollo was retained to complete the design of a new biosolids processing facility to house new thickening, dewatering, and thermal drying systems suitable for treating 260 wet tons/day and producing Class A biosolids. The facility combines the solids handling processes under one roof, to provide an O&M friendly facility with essential reliability and redundancy. The facility includes new thickeners, thickened sludge pumps, dewatering centrifuges, cake conveyance, centrate piping, and dual thermal drum drying facilities with a pellet (92% dried pellet) truck loading station and ancillary support systems. Repairs and rehabilitation of the existing 20-year old drum dryer are underway to serve JEA until the new biosolids processing facility is operational. Lessons learned by JEA O&M staff were incorporated into the new dryer system design, with a focus on safety, reliability, and product quality. To enhance safety, the new facility was designed to use nitrogen gas to transport the dried pellets from the thermal drum to the pellet storage silos. Deflagration systems have been designed with appropriate instrumentation throughout the process to mitigate fire hazards.

### *Applicable Project Elements:*

- Single solids handling building with thickening, centrifuge dewatering, and drum drying.
- Thickened sludge pumping.
- Struvite mitigation strategies and centrate piping.
- Regional solids receiving station.

### Relevance to IRWD:

- Safety- and O&M-focused design and design elements for all systems, including drum drying.
- Provisions to optimize polymer use and reduce operating costs.
- Biogas conditioning to provide fuel for dryer.

**REFERENCE**

Bill Clendening
Project Manager
904-665-4723
clenwm@jea.com

**TEAM INVOLVEMENT**

Rashi Gupta, Sudhan Paranjape, Peter Blackley (JEA employee), Jason Rozgony

**Peter Blackley is the lead biosolids operations coordinator for JEA and operates the Buckman Biosolids Handling Facility, a regional biosolids facility that treats biosolids from nine JEA owned and operated wastewater treatment facilities.**

He has over 23 years of experience in the operation of thermal drying process. His expertise will be critical to IRWD to identify and develop solutions to optimize the thermal drying process at IRWD's Biosolids facilities.

# Rock Creek Advanced Wastewater Facility (RCAWF) Centrifuge Replacement Final Design

## Clean Water Service, OR

Carollo provided planning and final design for the Rock Creek Advanced Wastewater Facility (AWWTF) Dewatering Centrifuge Installation Project. The Rock Creek AWWTF had one centrifuge and four belt filter presses (BFPs) in an existing dewatering building. To improve reliability, two new centrifuges were pre-procured and included in final design for a contractor to install. The new centrifuges were installed within the existing building, replacing the belt filter presses. Structural modifications and improvements to the polymer and cake conveyance systems were provided to enable centrifuge dewatering. Final design included careful consideration of sequencing to avoid operational disruptions and O&M access, which had been limited due to the existing facility layout.

### REFERENCE

Rick Shanley
Engineering Division Manager
Clean Water Services
503-547-8178
shanleyr@cleanwaterservices.org

### TEAM INVOLVEMENT

Rashi Gupta, Matt Sprick, Caleb Che, Jason Rozgony

### *Applicable Project Elements:*

- Construction sequencing to avoid operational disruptions.
- O&M-focused design and optimization elements geared towards polymer optimization and clear centrate quality.
- Automation to facilitate consistent centrifuge operation and performance.
- Modifications to existing solids system elements, including pumping and centrate, to reduce struvite formation within centrate system and avoid centrate pipe clogging.

### Relevance to IRWD:

- Work within an existing solids building, including sequencing to avoid operational disruptions.
- Focus on system optimization and O&M-friendliness.
- Use of automation to reduce burden on operational staff.
- Features and system design to mitigate struvite formation and clogging within centrate system.

# JB Latham Treatment Plant Package B

## South Orange County Wastewater Authority, CA

Carollo provided planning, design, and ESDC for improvements to the J.B. Latham Treatment Plant. Improvements included rehabilitation of primary and secondary sedimentation basins, dissolved air flotation thickeners, thickened sludge pumping, digester mixing, digester heating, effluent pump station and valves, and associated electrical and controls systems. In separate projects, Carollo assessed the plant's dewatering centrifuges and added biogas conditioning and cogeneration systems to beneficially use biogas from the digesters.

### *Applicable Project Elements:*

- Rehabilitation of existing thickening and digestion systems.
- New thickened sludge pumping designed for high startup pressures.
- Modifications of existing digester feed and sludge heating systems to reduce system clogging issues.
- Assessment of centrate pipe clogging issues and development of mitigation recommendations.
- Integration into existing piping and electrical systems within carefully laid out construction sequence.

### Relevance to IRWD:

- Rehabilitation modifications within existing facilities.
- Construction sequencing to minimize operational disruptions.
- Thickening and thickened sludge pumping upgrades to maximize digestion capacity and improve system reliability.

**REFERENCE**

Roni Young Grant
Capital Improvement Program Manager
949-234-5410
rgrant@socwa.com

**TEAM INVOLVEMENT**

Rashi Gupta, Jeff Weishaar,
Benito Guetterez, Nora Labib, Caleb Che

# Hilo Wastewater Treatment Plant Rehabilitation and Replacement Project

## County of Hawaii Environmental Management Department, HI

The County of Hawaii, Department of Environmental Management hired Carollo to provide full design and permitting services for the Hilo Wastewater Treatment Plant (WWTP) Rehabilitation and Replacement project. This project provides comprehensive rehabilitation as recommended by a condition assessment and master plan, along with increased secondary treatment reliability and nutrient removal, per County requests.

### *Applicable Project Elements:*

- **New PS and WAS blend tank system for co-thickening.**
- **New anaerobic digesters, digester mixing, digester heating, sludge pumping.**
- **New flare and biogas conditioning for beneficial use.**
- **New solids handling building with thickening, dewatering, polymer, cake conveyance, and dewatered cake loadout in enclosed truck bay.**
- New headworks and septage receiving facilities.
- Rehabilitation of the existing primary sedimentation tanks.
- New biological nutrient removal (BNR) activated sludge bioreactor and new blower building.
- Rehabilitation of the existing secondary clarifiers.
- Rehabilitation of the existing disinfection system.
- New alkalinity chemical feed system.
- New odor control system.
- New three-water (3W) pump station.
- Plant-wide electrical improvements, including a new standby generator and a new plant-wide SCADA system.

### Relevance to IRWD:

- Comprehensive upgrade of plant's solids treatment systems to address poor condition, improve reliability, increase performance, and address O&M needs.
- Construction sequencing and integration with existing plant systems to avoid operational disruptions.
- O&M-focused design and optimization elements geared towards polymer optimization and clear centrate quality.
- Automation to facilitate consistent thickening and dewatering operation and performance and reduce burdens on O&M staff.

### REFERENCE

Mark Grant – TA Wastewater Deputy Chief
DEM – Wastewater Division
808-961-8589
MarkJ.Grant@hawaiicounty.gov

### TEAM INVOLVEMENT

Rashi Gupta, Matt Sprick,
Benito Gutierrez, Nora Labib,
Zhongtian Li, Caleb Che, Jason Rozgony

# Oak Orchard Wastewater Treatment Plant Program Management

## Onondaga County Department of Water Environment Protection, NY

Carollo is serving as Program Manager for the Onondaga County Department of Water Environment Protection (WEP) Oak Orchard Service Area WWTP Expansion Project, which includes a new regional biosolids processing and receiving facility. The regional facility will include sludge and external waste receiving, thickening, anaerobic digestion, beneficial biogas utilization, dewatering, and drying systems. Carollo developed flow and load projections and design criteria for all of the plant processes, including the regional solids facility. Based on the projections, the Carollo team evaluated various technologies to develop the recommended overall solids treatment train and associated technologies. The team is responsible for the preliminary design of the expansion project, and has developed designs for the receiving stations, thickening and dewatering building, anaerobic digestion system, and drying facility.

### REFERENCE

Shannon Harty
Onondaga County Department of Water Environment Protection, Commissioner
315-960-6287
ShannonHarty@ongov.net

### TEAM INVOLVEMENT

Rashi Gupta, Matt Sprick, Nora Labib, Jason Rozgony

### *Applicable Project Elements:*

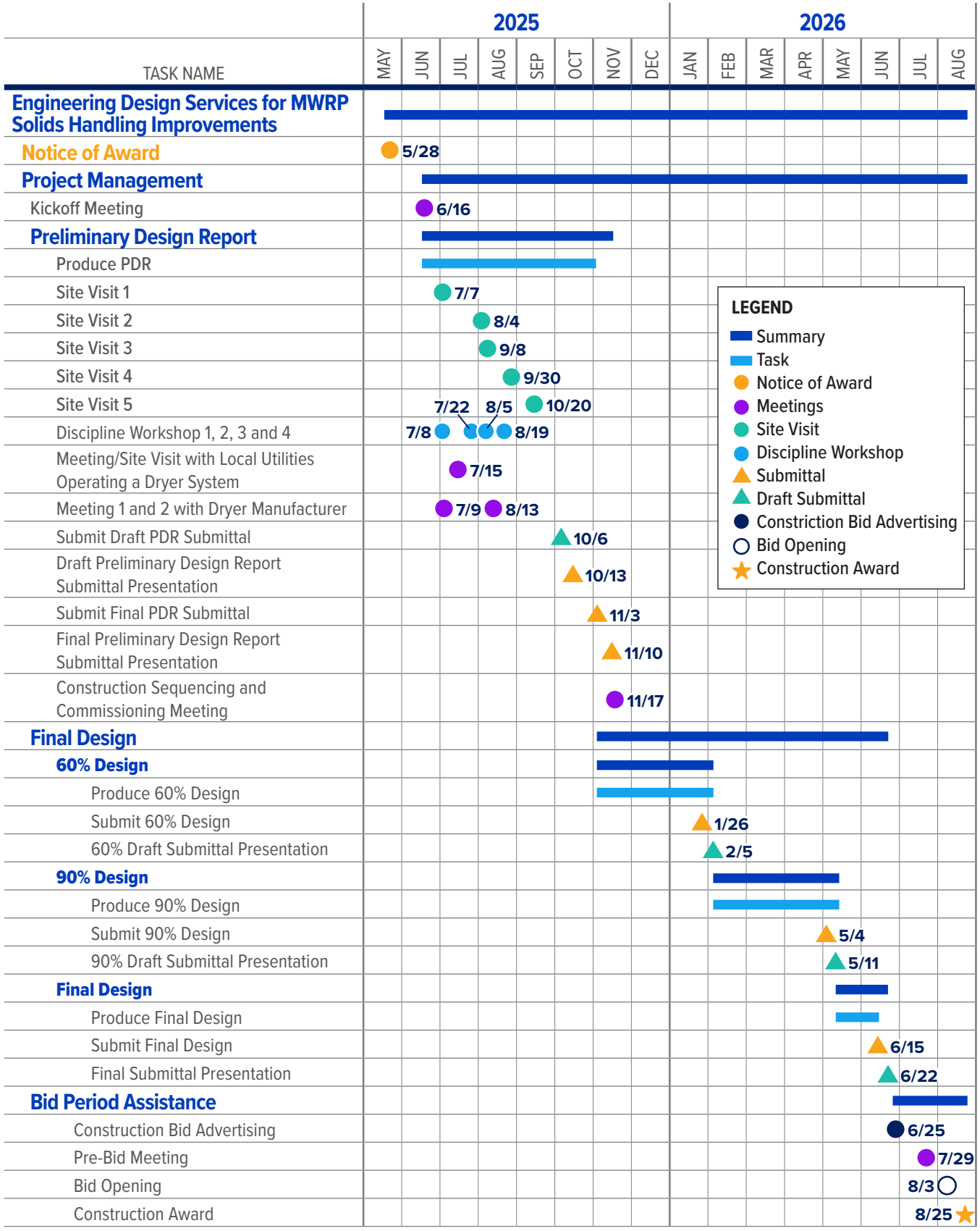
- Blend tanks for consistent performance in downstream systems.
- Sludge pumping within various parts of the overall solids treatment train, including robust thickened sludge pumps.
- Centrifuge based dewatering and sludge drying for Class A biosolids production.
- Struvite mitigation measures within centrate and centrifuge dewatering systems.
- Provisions for future advanced thermal processes to address potential changes in biosolids regulations.

### Relevance to IRWD:

- Comprehensive solids treatment train, including sludge pumps, centrifuges, digestion, and sludge drying.
- Incorporation of best practices and optimization measures for solids processing systems.
- O&M friendly layouts and equipment.

# Schedule

Carollo will strategically manage the project to drive consistent progress and reduce the workload on District staff, while streamlining the review process for all deliverables.



# Contractual Matters

The information below includes administrative and contractual matters as requested in the RFP.

## E - Budget

The budget proposal, including fee schedules and breakdown of fee by task, is provided in a sealed envelope, separate from the project proposal.

## F - Joint Venture

Carollo is not participating in a joint venture for this project.

## G - Conflict of Interest

Carollo, individuals employed by Carollo, or firms employed by or associated with Carollo, including subconsultants, do not have a conflict of interest with this project. Carollo, at all times, conducts its professional and business activities in a manner to prohibit conflict of interest on the part of the firm, and its employees. We foresee no circumstances in which an actual conflict of interest could arise.

## H - Contract

Carollo takes no exceptions to IRWD's Professional Services Agreement.

## I - Insurance

Carollo maintains insurance to protect both our client and our firm, against the types of claims that may be alleged to result from our services on this project. We have provided proof of our liability coverage on the following page.

## J - Public Work Requirement

The following firms will provide work on this contract. Each firm's Department of Industrial Relations (DIR) number is below.

| Firm Name | Role | DIR# |
|---|---|---|
| Carollo Engineers, Inc. | Prime | 1000007174 |
| O'Day Consultants | Subconsultant | 10000011418 |
| Underground Solutions | Subconsultant | 1000007851 |
| V&A Consulting Engineers | Subconsultant | 1000007205 |

# CERTIFICATE OF LIABILITY INSURANCE

7/4/2025

DATE (MM/DD/YYYY): 4/3/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

| | |
|---|---|
| PRODUCER: Lockton Companies, LLC<br>444 W. 47th St., Ste. 900<br>Kansas City MO 64112-1906<br>(816) 960-9000<br>kcasu@lockton.com | CONTACT NAME:<br>PHONE (A/C, No, Ext):<br>FAX (A/C, No):<br>E-MAIL ADDRESS: |
| INSURED 1472613<br>CAROLLO ENGINEERS, INC.<br>2795 MITCHELL DR.<br>WALNUT CREEK CA 94598-1601 | INSURER A: Zurich American Insurance Company — NAIC # 16535<br>INSURER B: Allied World Surplus Lines Insurance Company — 24319<br>INSURER C:<br>INSURER D:<br>INSURER E:<br>INSURER F: |

**COVERAGES** **CERTIFICATE NUMBER:** 21608354 **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | TYPE OF INSURANCE | ADDL INSD | SUBR WVD | POLICY NUMBER | POLICY EFF (MM/DD/YYYY) | POLICY EXP (MM/DD/YYYY) | LIMITS | |
|---|---|---|---|---|---|---|---|---|
| A | X COMMERCIAL GENERAL LIABILITY<br>CLAIMS-MADE / X OCCUR<br>GEN'L AGGREGATE LIMIT APPLIES PER:<br>POLICY X PRO-JECT LOC<br>OTHER: | Y | Y | GLO 9730569 | 7/4/2024 | 7/4/2025 | EACH OCCURRENCE<br>DAMAGE TO RENTED PREMISES (Ea occurrence)<br>MED EXP (Any one person)<br>PERSONAL & ADV INJURY<br>GENERAL AGGREGATE<br>PRODUCTS - COMP/OP AGG | $ 2,000,000<br>$ 2,000,000<br>$ 25,000<br>$ 2,000,000<br>$ 4,000,000<br>$ 4,000,000 |
| A | AUTOMOBILE LIABILITY<br>X ANY AUTO<br>OWNED AUTOS ONLY / SCHEDULED AUTOS<br>X HIRED AUTOS ONLY / X NON-OWNED AUTOS ONLY | Y | Y | BAP 9730571 | 7/4/2024 | 7/4/2025 | COMBINED SINGLE LIMIT (Ea accident)<br>BODILY INJURY (Per person)<br>BODILY INJURY (Per accident)<br>PROPERTY DAMAGE (Per accident)<br>DED: COMP/COLL | $ 2,000,000<br>$ XXXXXXX<br>$ XXXXXXX<br>$ XXXXXXX<br>$ 1,000 |
| | UMBRELLA LIAB / OCCUR<br>EXCESS LIAB / CLAIMS-MADE<br>DED / RETENTION $ | | | NOT APPLICABLE | | | EACH OCCURRENCE<br>AGGREGATE | $ XXXXXXX<br>$ XXXXXXX<br>$ XXXXXXX |
| A | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY<br>ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N: N<br>If yes, describe under DESCRIPTION OF OPERATIONS below | N / A | Y | WC 9730570 | 7/4/2024 | 7/4/2025 | X PER STATUTE / OTH-ER<br>E.L. EACH ACCIDENT<br>E.L. DISEASE - EA EMPLOYEE<br>E.L. DISEASE - POLICY LIMIT | $ 1,000,000<br>$ 1,000,000<br>$ 1,000,000 |
| B | PROFESSIONAL LIABILITY<br>FULL PRIOR ACTS | N | Y | 0313-9010 | 7/4/2024 | 7/4/2025 | EACH CLAIM: $1,000,000;<br>AGGREGATE: $1,000,000 | |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RFP - Engineering Design Services for MWRP Solids Handling Improvements. Irvine Ranch Water District, its directors, officers, employees, and agents are additional insureds as respects general liability and auto liability, and these coverages are primary and non-contributory, as required by written contract. (SEE ATTACHED.)

**CERTIFICATE HOLDER**

21608354
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine CA 92618-3102

**CANCELLATION** See Attachments

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE: Joseph M Agnello



ACORD 25 (2016/03) The ACORD name and logo are registered marks of ACORD

*PREPARED FOR* IRVINE RANCH WATER DISTRICT

# Engineering Design Services for MWRP Solids Handling Improvements

**FEE TABLE** / APRIL 2025

carollo®

3150 Bristol Street, Suite 500
Costa Mesa, California 92626
714-593-5100
carollo.com

April 15, 2025

Alex Murphy (via email)
Irvine Ranch Water District
15600 Sand Canyon Ave
Irvine, CA 92619

Subject: Fee Table for MWRP Solids Handling Improvements Project

Dear Mr. Murphy:

Enclosed please find our Fee Table for the MWRP Solids Handling Improvements Project. It provides the number of labor hours and costs for each task and subtask, the proposed labor rates by personnel classification, and our not-to-exceed value for this project based on our understanding of the Scope of Services and assumptions included therein.

We have included the hours and costs for our subconsultant partners and direct costs for reproduction and travel. Direct costs are shown at cost, with no markup. A 5% markup was applied to the subconsultant costs. We have also included our fee schedule, which includes our billing rates by staff classification.

Our assumptions in developing this fee estimate are included in the Scope of Services provided within the Technical Proposal. Should we be selected for this work, we would welcome the opportunity to sit down with you to discuss the project in greater detail, further define the scope, and finalize the budget to accomplish the work to your satisfaction. Thank you for considering Carollo for this project, and for the opportunity to be of further service to the Irvine Ranch Water District.

Sincerely,

CAROLLO ENGINEERS, INC.

Rashi Gupta, PE
Project Manager/Senior Vice President

Jeff Weishaar, PE
Principal-in-Charge

# Fee Table

| Task | Task and Sub-Task Description | CAROLLO | | | | | | | | | | | | | Other Direct Costs | | Subconsultants | | | | | | | TOTAL PROJECT COSTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Senior Project Manager/Principal-in-Charge | Principal Professional (Technical Advisor, QA/QC) | Design Manager I | Supervising Professional | Senior Professional | Professional | Staff Professional | Staff Technician (LiDAR) | BIM Designer I | Staff Designer | Document Processing 1 | Total Labor Hours | Total Labor Cost | Carollo Other Direct Costs | ODC Subtotal | O'Day Consultants Labor Hours | Underground Solutions Labor Hours | V&A Labor Hours | O'Day Consultants Labor and Direct Costs with 5% Markup | Underground Solutions Labor and Direct Costs with 5% Markup | V&A Labor and Direct Costs with 5% Markup | Subtotal Costs | |
| | *Hourly Rates* | *$ 352* | *$ 347* | *$ 288* | *$ 326* | *$ 276* | *$ 238* | *$ 225* | *$ 125* | *$ 227* | *$ 181* | *$ 180* | | | | | | | | | | | | |
| **1** | **Project Management** | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | Meetings/Workshops/Bi-Weekly Check Ins | 52 | 4 | 44 | 4 | | 83 | 50 | | | | | 237 | $ 64,672 | $ 6,100 | $ 6,100 | | | | | | | $- | $70,772 |
| 102 | Quality Assurance/Quality Control Plan | | 8 | | | | | | | | | 2 | 10 | $ 3,136 | $ - | $ - | | | | | | | $- | $3,136 |
| 103 | Safety Plan | | 8 | | | | | | | | | 2 | 10 | $ 3,136 | $ - | $ - | | | | | | | $- | $3,136 |
| 104 | Team Management | 48 | | 48 | | | 48 | | | | | | 144 | $ 42,144 | $ - | $ - | | | | | | | $- | $42,144 |
| 105 | Progress Report Preparation (Bi-weekly and Monthly) | 12 | | 24 | | | 24 | | | | | 12 | 72 | $ 19,008 | $ - | $ - | | | | | | | $- | $19,008 |
| **TOTAL TASK 1: Project Management** | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Hours** | **112** | **20** | **116** | **4** | **0** | **155** | **50** | **0** | **0** | **0** | **16** | **473** | | | | **0** | **0** | **0** | | | | | |
| | **Cost** | **$ 39,424** | **$ 6,940** | **$ 33,408** | **$ 1,304** | **$ -** | **$ 36,890** | **$ 11,250** | **$ -** | **$ -** | **$ -** | **$ 2,880** | | **$ 132,096** | **$ 6,100** | **$ 6,100** | | | | **$ -** | **$-** | **$ -** | **$-** | **$138,196** |
| **2** | **Preliminary Design Report** | | | | | | | | | | | | | | | | | | | | | | | |
| 201 | Executive Summary | 4 | 4 | 4 | | 4 | 16 | 16 | | | | 8 | 56 | $ 13,900 | | | | | | | | | $- | $13,900 |
| 202 | Site Visits, Staff Feedback, and Documentation Review | 24 | | 20 | 20 | 20 | 40 | 48 | | | | | 172 | $ 46,568 | $ 5,800 | $ 5,800 | | | | | | | $- | $52,368 |
| 203 | Individual Discipline Meetings (Included in Task 101) | | | | | | | | | | | | 0 | $ - | $ - | $ - | | | | | | | $- | $- |
| 204 | Improvements Recommendations (Excluding System Simplification, Dryer, Field Investigations) | 17 | 10 | 34 | 10 | 17 | 51 | 51 | - | 41 | 96 | 14 | 341 | $ 80,014 | $ - | $ - | | | | | | | $- | $80,014 |
| 205 | Improvements Recommendations - Field Investigations | 4 | | | | | 4 | 8 | | | | | 16 | $ 4,160 | $ - | $ - | 42 | 30 | 166 | $ 13,799 | $12,863 | $ 73,230 | $99,891 | $104,051 |
| 206 | Improvements Recommendations - System Simplification and Dryer System Reliability | 8 | 8 | | 28 | 32 | 32 | 48 | | | 8 | | 164 | $ 43,416 | $ 2,500 | $ 2,500 | | | | | | | $- | $45,916 |
| 207 | Preliminary Design Drawings and Specifications Schedule | 2 | | 4 | | | 8 | | | 2 | 4 | | 20 | $ 4,938 | $ - | $ - | | | | | | | $- | $4,938 |
| 208 | Procurement Strategies | 4 | 2 | 4 | 2 | 2 | 4 | 8 | | | | | 26 | $ 7,210 | $ - | $ - | | | | | | | $- | $7,210 |
| 209 | Project Schedule | 1 | | 4 | 2 | 4 | | | | | | | 11 | $ 3,260 | $ - | $ - | | | | | | | $- | $3,260 |
| 210 | Opinion of Probable Cost | 2 | 2 | 8 | 4 | | 8 | 16 | | | | | 40 | $ 10,510 | $ - | $ - | | | | | | | $- | $10,510 |
| 211 | Preliminary Design Report | 8 | 16 | 8 | 4 | 8 | 16 | 32 | | | | 16 | 108 | $ 28,072 | $ - | $ - | | | | | | | $- | $28,072 |
| **TOTAL TASK 2: Preliminary Design Report** | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Hours** | **74** | **42** | **86** | **70** | **87** | **179** | **227** | **0** | **43** | **108** | **38** | **954** | | | | **42** | **30** | **166** | | | | | |
| | **Cost** | **$ 26,048** | **$ 14,574** | **$ 24,768** | **$ 22,820** | **$ 24,012** | **$ 42,602** | **$ 51,075** | **$ -** | **$ 9,761** | **$ 19,548** | **$ 6,840** | **$ -** | **$ 242,048** | **$ 8,300** | **$ 8,300** | | | | **$ 13,799** | **$12,863** | **$ 73,230** | **$99,891** | **$350,239** |
| **3** | **Final Design** | | | | | | | | | | | | | | | | | | | | | | | |
| 301 | Pre-Purchase | 4 | | 8 | | | 16 | 8 | | | | 8 | 44 | $ 10,760 | $ - | $ - | | | | | | | $- | $10,760 |
| 302 | Project Schedule and Opinion of Construction Cost | 4 | 4 | 16 | 8 | 16 | 16 | 32 | | | | | 96 | $ 25,436 | $ - | $ - | | | | | | | $- | $25,436 |
| 303 | 60% Draft Submittal | 40 | 24 | 80 | 24 | 40 | 119 | 119 | - | 96 | 223 | 32 | 797 | $ 187,324 | $ - | $ - | | | | | | | $- | $187,324 |
| 304 | 90% Design Submittal | 40 | 24 | 80 | 24 | 40 | 119 | 119 | - | 96 | 223 | 32 | 797 | $ 187,324 | $ - | $ - | | | | | | | $- | $187,324 |
| 305 | Final Design Submittal | 17 | 10 | 34 | 10 | 17 | 51 | 51 | - | 41 | 96 | 14 | 341 | $ 80,014 | $ 1,000 | $ 1,000 | | | | | | | $- | $81,014 |
| **TOTAL TASK 3: Final Design** | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Hours** | **105** | **62** | **218** | **66** | **113** | **321** | **329** | **0** | **233** | **542** | **86** | **2075** | | | | **0** | **0** | **0** | | | | | |
| | **Cost** | **$ 36,960** | **$ 21,514** | **$ 62,784** | **$ 21,516** | **$ 31,188** | **$ 76,398** | **$ 74,025** | **$ -** | **$ 52,891** | **$ 98,102** | **$ 15,480** | | **$ 490,858** | **$ -** | **$ -** | | | | **$ -** | **$-** | **$ -** | **$-** | **$490,858** |
| **400** | **Bid Period Assistance** | | | | | | | | | | | | | | | | | | | | | | | |
| 401 | Bid Period Assistance | 4 | | 16 | 4 | 4 | 16 | 16 | | 2 | 12 | 14 | 88 | $ 20,978 | $ - | $ - | | | | | | | $- | $20,978 |
| **TOTAL TASK 4: Bid Period Assistance** | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Hours** | **4** | **0** | **16** | **4** | **4** | **16** | **16** | **0** | **2** | **12** | **14** | **88** | | | | **0** | **0** | **0** | | | | | |
| | **Cost** | **$ 1,408** | **$ -** | **$ 4,608** | **$ 1,304** | **$ 1,104** | **$ 3,808** | **$ 3,600** | **$ -** | **$ 454** | **$ 2,172** | **$ 2,520** | | **$ 20,978** | **$ -** | **$ -** | | | | **$ -** | **$-** | **$ -** | **$-** | **$20,978** |
| **TOTAL BASE PROJECT** | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Hours** | **295** | **124** | **436** | **144** | **204** | **671** | **622** | **0** | **278** | **662** | **154** | **3590** | | | | **42** | **30** | **166** | | | | | |
| | **Cost** | **$ 103,840** | **$ 43,028** | **$ 125,568** | **$ 46,944** | **$ 56,304** | **$ 159,698** | **$ 139,950** | **$ -** | **$ 63,106** | **$ 119,822** | **$ 27,720** | | **$ 885,980** | **$ 14,400** | **$ 14,400** | | | | **$ 13,799** | **$12,863** | **$ 73,230** | **$99,891** | **$1,000,271** |
| ***500*** | ***Optional Tasks*** | | | | | | | | | | | | | | | | | | | | | | | |
| | *501 LiDAR Scanning and BIM Development (Optional)* | | | | | | | | *364* | | | | *364* | *$ 45,500* | *$ 6,450* | *$ 6,450* | | | | | | | *$-* | *$51,950* |
| ***TOTAL TASK 5: Optional Tasks*** | | | | | | | | | | | | | | | | | | | | | | | | |
| | ***Hours*** | ***0*** | ***0*** | ***0*** | ***0*** | ***0*** | ***0*** | ***0*** | ***364*** | ***0*** | ***0*** | ***0*** | ***364*** | | | | ***0*** | ***0*** | ***0*** | | | | | |
| | ***Cost*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ 45,500*** | ***$ -*** | ***$ -*** | ***$ -*** | | ***$ 45,500*** | ***$ 6,450*** | ***$ 6,450*** | | | | ***$ -*** | ***$-*** | ***$ -*** | ***$-*** | ***$51,950*** |
| ***TOTAL PROJECT WITH OPTIONAL TASKS*** | | | | | | | | | | | | | | | | | | | | | | | | |
| | ***Hours (Including Optional Tasks)*** | ***295*** | ***124*** | ***436*** | ***144*** | ***204*** | ***671*** | ***622*** | ***364*** | ***278*** | ***662*** | ***154*** | ***3954*** | | | | ***42*** | ***30*** | ***166*** | | | | | |
| | ***Cost (Including Optional Tasks)*** | ***$ 103,840*** | ***$ 43,028*** | ***$ 125,568*** | ***$ 46,944*** | ***$ 56,304*** | ***$ 159,698*** | ***$ 139,950*** | ***$ 45,500*** | ***$ 63,106*** | ***$ 119,822*** | ***$ 27,720*** | | ***$ 931,480*** | ***$ 20,850*** | ***$ 20,850*** | | | | ***$ 13,799*** | ***$12,863*** | ***$ 73,230*** | ***$99,891*** | ***$1,052,221*** |

# Rate Schedule

## Carollo's proposed billing rate schedule and other direct costs are included in the table below.

| Billing Classification | Hourly Rate |
|---|---|
| **Engineers/Scientists** | |
| Senior Project Manager | $352.00 |
| Project Manager | $352.00 |
| Senior Design Manager | $352.00 |
| Senior Program Manager | $352.00 |
| Program Manager | $259.00 |
| Principal Professional | $347.00 |
| Service Delivery Lead | $362.00 |
| Supervising Professional | $326.00 |
| Design Manager II | $320.00 |
| Design Manager I | $288.00 |
| Senior Professional | $276.00 |
| Lead Professional | $259.00 |
| Professional | $238.00 |
| Staff Professional | $225.00 |
| Engineering Intern | $127.00 |
| Senior Analyst | $285.00 |
| Lead Analyst | $263.00 |
| Digital Analyst | $242.00 |
| Staff Analyst | $214.00 |
| **Technicians** | |
| Senior Designer | $288.00 |
| Supervising Designer | $277.00 |
| Lead Designer | $255.00 |
| CAD/BIM Technician II | $249.00 |
| CAD/BIM Technician I | $173.00 |
| BIM Designer 3 | $255.00 |
| BIM Designer 2 | $244.00 |
| BIM Designer 1 | $227.00 |
| Designer | $181.00 |
| Staff Designer | $181.00 |
| Senior Drafter | $176.00 |
| CAD Drafter | $165.00 |
| Staff Technician | $125.00 |

| Billing Classification | Hourly Rate |
|---|---|
| **Support Staff** | |
| Lead Document Processor | $235.00 |
| Document Processing II | $197.00 |
| Document Processing I | $180.00 |

| Billing Classification | Hourly Rate |
|---|---|
| **Other Direct Expenses** | |
| Travel and Subsistence | Cost |
| Mileage | At Current IRS reimbursement rate |
| Subconsultant | Cost + 5% |
| Other Direct Cost | Cost |
| Expert Witness | Hourly Rate x 2.0 |

**Rates effective through September 1, 2026. Should project extend beyond this time, rates will be adjusted based on mutual agreement between the District and Carollo.**

Note:  This page is intentionally left blank.