

**NOTICE OF REGULAR MEETING
OF THE
SOUTH ORANGE COUNTY WASTEWATER AUTHORITY
ENGINEERING COMMITTEE**

**May 11, 2023
8:30 a.m.**

NOTICE IS HEREBY GIVEN that a Regular Meeting of the South Orange County Wastewater Authority (SOCWA) Engineering Committee was called to be held on **May 11, 2023, at 8:30 a.m.** SOCWA staff will be present and conducting the meeting at the SOCWA Administrative Office located at 34156 Del Obispo Street, Dana Point, California.

THE SOCWA MEETING ROOM IS WHEELCHAIR ACCESSIBLE. IF YOU REQUIRE ANY SPECIAL DISABILITY RELATED ACCOMMODATIONS, PLEASE CONTACT THE SOUTH ORANGE COUNTY WASTEWATER AUTHORITY SECRETARY'S OFFICE AT (949) 234-5452 AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE SCHEDULED MEETING TO REQUEST SUCH ACCOMMODATIONS. THIS AGENDA CAN BE OBTAINED IN ALTERNATE FORMAT UPON REQUEST TO THE SOUTH ORANGE COUNTY WASTEWATER AUTHORITY'S SECRETARY AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE SCHEDULED MEETING. MEMBERS OF THE PUBLIC HAVE THE OPTION TO PARTICIPATE IN AND MAY JOIN THE MEETING REMOTELY VIA VIDEO CONFERENCE FOR VISUAL INFORMATION ONLY (USE ZOOM LINK BELOW) AND BY TELECONFERENCE FOR AUDIO PARTICIPATION (USE PHONE NUMBERS BELOW). THIS IS A PHONE-CALL MEETING AND NOT A WEB-CAST MEETING, SO PLEASE REFER TO AGENDA MATERIALS AS POSTED ON THE WEBSITE AT WWW.SOCWA.COM. ON YOUR REQUEST, EVERY EFFORT WILL BE MADE TO ACCOMMODATE PARTICIPATION. FOR PARTIES PARTICIPATING REMOTELY, PUBLIC COMMENTS WILL BE TAKEN DURING THE MEETING FOR ORAL COMMUNICATION IN ADDITION TO PUBLIC COMMENTS RECEIVED BY PARTIES PARTICIPATING IN PERSON. COMMENTS MAY BE SUBMITTED PRIOR TO THE MEETING VIA EMAIL TO ASSISTANT SECRETARY DANITA HIRSH AT DHIRSH@SOCWA.COM WITH THE SUBJECT LINE "REQUEST TO PROVIDE PUBLIC COMMENT." IN THE EMAIL, PLEASE INCLUDE YOUR NAME, THE ITEM YOU WISH TO SPEAK ABOUT, AND THE TELEPHONE NUMBER YOU WILL BE CALLING FROM SO THAT THE COORDINATOR CAN UN-MUTE YOUR LINE WHEN YOU ARE CALLED UPON TO SPEAK. THOSE MAKING PUBLIC COMMENT REQUESTS REMOTELY VIA TELEPHONE IN REAL-TIME WILL BE ASKED TO PROVIDE YOUR NAME, THE ITEM YOU WISH TO SPEAK ABOUT, AND THE TELEPHONE NUMBER THAT YOU ARE CALLING FROM SO THE COORDINATOR CAN UN-MUTE YOUR LINE WHEN YOU ARE CALLED UPON TO SPEAK. ONCE THE MEETING HAS COMMENCED, THE CHAIR WILL INVITE YOU TO SPEAK AND ASK THE COORDINATOR TO UN-MUTE YOUR LINE AT THE APPROPRIATE TIME.

AGENDA ATTACHMENTS AND OTHER WRITINGS THAT ARE DISCLOSABLE PUBLIC RECORDS DISTRIBUTED TO ALL, OR A MAJORITY OF, THE MEMBERS OF THE SOUTH ORANGE COUNTY WASTEWATER AUTHORITY ENGINEERING COMMITTEE IN CONNECTION WITH A MATTER SUBJECT FOR DISCUSSION OR CONSIDERATION AT AN OPEN MEETING OF THE ENGINEERING COMMITTEE ARE AVAILABLE FOR PUBLIC INSPECTION IN THE AUTHORITY ADMINISTRATIVE OFFICE LOCATED AT 34156 DEL OBISPO STREET, DANA POINT, CA ("AUTHORITY OFFICE") OR BY PHONE REQUEST MADE TO THE AUTHORITY OFFICE AT 949-234-5452. IF SUCH WRITINGS ARE DISTRIBUTED TO MEMBERS OF THE ENGINEERING COMMITTEE LESS THAN SEVENTY-TWO (72) HOURS PRIOR TO THE MEETING, THEY WILL BE AVAILABLE IN THE RECEPTION AREA OF THE AUTHORITY OFFICE AT THE SAME TIME AS THEY ARE DISTRIBUTED TO THE ENGINEERING COMMITTEE AND SENT TO ANY REMOTE PARTICIPANTS REQUESTING EMAIL DELIVERY OR POSTED ON SOCWA'S WEBSITE. IF SUCH WRITINGS ARE DISTRIBUTED IMMEDIATELY PRIOR TO, OR DURING, THE MEETING, THEY WILL BE AVAILABLE IN THE MEETING ROOM OR IMMEDIATELY UPON VERBAL REQUEST TO BE DELIVERED VIA EMAIL TO REQUESTING PARTIES PARTICIPATING REMOTELY.

**THE PUBLIC MAY PARTICIPATE REMOTELY BY VIRTUAL MEANS. FOR AUDIO OF MEETING USE
THE CALL IN PHONE NUMBERS BELOW AND FOR VIDEO USE THE ZOOM LINK BELOW.**

Join Zoom Meeting
<https://socwa.zoom.us/>

Meeting ID: 898 8885 0133
Passcode: 278890

Dial by your location:
+1 669 900 6833 US (San Jose) +1 253 215 8782 US (Tacoma)
+1 346 248 7799 US (Houston) +1 312 626 6799 US (Chicago)
Find your local number: <https://socwa.zoom.us/j/kd6Eoult3z>

AGENDA

1. Call Meeting to Order
2. Public Comments

THOSE WISHING TO ADDRESS THE ENGINEERING COMMITTEE ON ANY ITEM LISTED ON THE AGENDA WILL BE REQUESTED TO IDENTIFY AT THE OPENING OF THE MEETING AND PRIOR TO THE CLOSE OF THE MEETING. THE AUTHORITY REQUESTS THAT YOU STATE YOUR NAME WHEN MAKING THE REQUEST IN ORDER THAT YOUR NAME MAY BE CALLED TO SPEAK ON THE ITEM OF INTEREST. THE CHAIR OF THE MEETING WILL RECOGNIZE SPEAKERS FOR COMMENT AND GENERAL MEETING DECORUM SHOULD BE OBSERVED IN ORDER THAT SPEAKERS ARE NOT TALKING OVER EACH OTHER DURING THE CALL.

PAGE NO.

3. Operations Report..... 1
Recommended Action: Information Item.
4. Upcoming Changes to Engineering Committee Members 2
Recommended Action: Information Item.
5. Aliso Creek Ocean Outfall Seal Replacement Project Update [Project Committees 24] 3
Recommended Action: Information Item.
6. Capital Improvement Construction Projects Progress and Change Order Report (April) [Project Committees 2, 15, & 17] 4
Recommended Action: Information Item.
7. Regional Treatment Plant (RTP) Aeration Diffuser Replacement Project Closeout [Project Committee 17] 15
Recommended Action: Information Item.
8. Regional Treatment Plant (RTP) Consequence of Failure Analysis Project Update [Project Committee 17] 16
Recommended Action: Information Item.

Adjournment

I hereby certify that the foregoing Notice was personally emailed or mailed to each member of the SOCWA Engineering Committee at least 72 hours prior to the scheduled time of the Regular Meeting referred to above.

MAY 11, 2023

I hereby certify that the foregoing Notice was posted at least 72 hours prior to the time of the above-referenced Engineering Committee meeting at the usual agenda posting location of the South Orange County Wastewater Authority and at www.socwa.com.

Dated this 5th day of May 2023.



Danita Hirsh, Assistant Secretary
SOUTH ORANGE COUNTY WASTEWATER AUTHORITY

Agenda Item

3

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee
FROM: Jim Burror, Director of Operations
SUBJECT: Operations Report

Overview

Verbal update on operations and maintenance activities.

Recommended Action: Information Item.

Agenda Item

4

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee
FROM: David Baranowski, Director of Engineering
SUBJECT: Upcoming Changes to Engineering Committee Members

Overview

Recent and upcoming changes in SOCWA membership will affect the Engineering Committee. Staff will discuss the changes and their effect on the Committee.

Recent Changes

On May 4, 2023, Trabuco Canyon Water District's withdrawal from SOCWA was approved by the Board of Directors. The Committee now consists of 8 members. In order to have a quorum, there will need to be 5 members present (in person or remote appearance via AB 2449).

Upcoming Changes

On June 30, 2023, the Irvine Ranch Water District is expected to complete its withdrawal from SOCWA. Starting July 1, the Committee will consist of 7 members. In order to have a quorum, there will need to be 4 members present (in person or remote appearance via AB 2449). Staff requests that members notify SOCWA in advance if no one from their agency can attend a meeting.

With regard to capital projects, the following PCs will be affected by the Irvine Ranch Water District withdrawal:

- PC 21 Effluent Transmission Main Reach B/C/D will consist of 1 member (El Toro Water District)
- PC 21 Effluent Transmission Main Reach E will consist of 2 members (El Toro Water District and Moulton Niguel Water District)
- PC 24 Aliso Creek Ocean Outfall will consist of 5 members (City of Laguna Beach, Emerald Bay Service District, El Toro Water District, Moulton Niguel Water District, and South Coast Water District)

Recommended Action: Information Item.

Agenda Item

5

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee

FROM: David Baranowski, Director of Engineering

SUBJECT: Aliso Creek Ocean Outfall Seal Replacement Project Update [Project Committee 24]

Overview

Later this year, minor repairs will be made to the Aliso Creek Ocean Outfall (ACOO). The project involves divers replacing five seals on the interior of the outfall. The project is out for bid and staff plan to bring the contract for approval at the June meeting.

Project Schedule

Below is a summary of the project timeline.

- May 19 – Contractor Bids Due
- June 8 – Engineering Committee Bid Review
- July 6 – Board Meeting
- July 10 to October 30 – Dive Window (17 weeks, 6 dives)
- November 30 – Project Completion

Shutdown Coordination

During the work, flow through the outfall will need to be stopped. SOCWA staff will coordinate the shutdown activities with all the affected agencies. Staff will meet with each agency to prepare a more detailed shutdown plan. Below are some shutdown restrictions in the contract.

- Shutdowns are allowed between 11 p.m. and 6 a.m. Monday night through Friday morning.
- No more than one shutdown is allowed per week. There are 13 potential weeks where low tide will allow for the work. Up to 6 dives are allowed, but fewer are better.
- Update the shutdown plan implemented for past dives.

Staff requests contact information for the person(s) at each agency to be included in the shutdown planning meetings.

Recommended Action: Information Item.

Agenda Item

6

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee

FROM: David Baranowski, Director of Engineering

SUBJECT: Capital Improvement Construction Projects Progress and Change Order Report (*May*) [Project Committee Nos. 2, 15 & 17]

Overview

Attached are the updated CIP reports. Please note that there are no new change orders.

Project Updates

JBL Package B:

The project is nearly complete. Staff continue to work with the Construction Management team to close out all outstanding items.

JBL Admin Building Roofing Replacement:

The contract has been awarded and the staff are working with the contractor to schedule the work.

CTP AWMA Road Guardrail Replacement:

The contract has been awarded and the staff are working with the contractor to schedule the work.

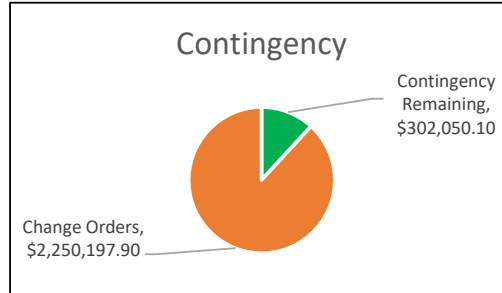
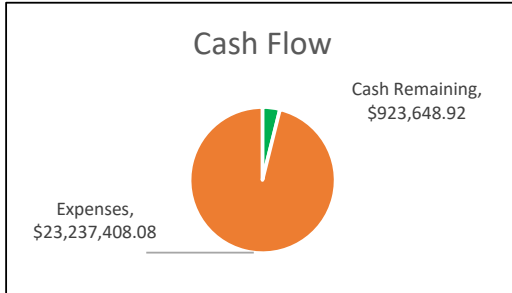
Recommended Action: Information Item.

Project Financial Status

Data Last Updated

Project Committee	2
Project Name	Package B
Project Description	Plant 1 basin repairs, DAF rehabilitation, Energy Building seismic retrofit and minor rehabilitation, Digester 4 rehabilitation

May 1, 2023



Cash Flow

Collected	\$ 24,161,057.00
Expenses	\$ 23,237,408.08

Project Completion

Schedule	100%
Budget	97%

Contracts

Company	PO No.	Original	Change Orders*	Amendments	Total	Invoiced
Olsson	13497	\$ 17,325,000.00	\$ 1,301,867.89		\$ 18,626,867.89	\$ 18,486,864.83
Butier	13647	\$ 895,727.00		\$ 1,005,251.00	\$ 1,900,978.00	\$ 1,883,687.00
Carollo	13616	\$ 846,528.00		\$ 616,037.00	\$ 1,462,565.00	\$ 1,287,240.86
TetraTech	13605	\$ 94,000.00		\$ -	\$ 94,000.00	\$ 93,884.70
Ninyo & Moore	14279	\$ 49,399.00		\$ 30,000.00	\$ 79,399.00	\$ 50,166.27
ADS Environmental	16452	\$ 107,200.00	\$ -		\$ 107,200.00	\$ 61,875.00
Hallsten	16578	\$ 251,422.00	\$ 16,715.25		\$ 268,137.25	\$ -
Dudek	17401	\$ 48,360.00		\$ -	\$ 48,360.00	\$ 36,270.00
		\$ 19,617,636.00	\$ 1,318,583.14	\$ 1,651,288.00	\$ 22,587,507.14	\$ 21,899,988.66

*Values include change orders to be reviewed by Engineering Committee and deductive change orders

Contingency

Area	Project Code	Amount **	Change Orders	Total Remaining	Percent Used
Liquids	3220-000	\$ 969,679.00	\$ 868,639.46	\$ 101,039.54	89.6%
Common	3231-000	\$ 38,120.00	\$ 3,305.76	\$ 34,814.24	8.7%
Solids	3287-000	\$ 1,544,449.00	\$ 1,378,252.68	\$ 166,196.32	89.2%
		\$ 2,552,248.00	\$ 2,250,197.90	\$ 302,050.10	88.2%

** Amount reflects contingency for Construction Contracts only

Summary of New Change Orders

Change Order No	MNWD	SCWD	SMWD	\$ Amount
Grand Total				

Change Orders and Amendments

Change Order No.	Vendor Name	Project ID	Description	Status Date	Days	Amount
Approved by Board of Directors					191	\$ 1,318,583.14
1	Olsson	3287-000	Addition of Loop Piping to the Existing Hot Water Lines Adjacent to Digester 3	12/12/2019	0	\$ 4,725.00
2	Olsson	3287-000	Asbestos Gaskets in Boiler hazardous disposal	6/4/2020	0	\$ 6,343.10
3	Olsson	3287-000	Add Analog Infrastructure and Cabling	6/4/2020	11	\$ 37,969.60
4	Olsson	3287-000	Digester 4 Coating Additional Sealant	6/4/2020	3	\$ 24,001.54
5	Olsson	3220-000	Valve Handwheel Ergonomic extension	8/6/2020	28	\$ 16,370.30
6	Olsson	3287-000	Change to DeZurik Plug Valves to match existing	8/6/2020	90	\$ 41,993.87
7	Olsson	3287-000	Digester 4 Additional Concrete Repair	8/6/2020	3	\$ 7,412.74
8	Olsson	3287-000	Repair Existing Damaged Electrical Box	8/6/2020	0	\$ (1,829.00)
9	Olsson	3220-000	Change the Telescoping Valve Boxes and Piping from Carbon Steel to Stainless Steel	8/6/2020	0	\$ 18,677.63

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
10	Olsson	3287-000	Duct bank J Interferences	12/17/2020	18	\$ 73,639.42
11	Olsson	3220-000	Blasting of Existing Influent Pipe Spools	12/17/2020	5	\$ 20,868.52
12	Olsson	3220-000	Duct bank K Interferences	12/17/2020	0	\$ 15,567.08
13	Olsson	3287-000	Digester 3/4 PLC Relocation	12/17/2020	14	\$ 41,367.51
14	Olsson	3287-000	Digester 4 Additional Tank Repair	12/17/2020	18	\$ 33,642.75
15	Olsson	3220-000	Duct bank O Interferences	12/17/2020	0	\$ 1,686.88
16	Olsson	3287-000	Digester 3/4 Control Building Roof Replacement	2/4/2021	0	\$ 42,780.00
17	Olsson	3287-000	MCC-D1 Modifications due to Change in Motor Size	5/6/2021	0	\$ 34,392.02
18	Olsson	3287-000	Integrator Additional Site Visits	5/6/2021	0	\$ 7,571.97
19	Olsson	3287-000	Multi-zone air conditioning unit in the Cogen MCC Room and Office	6/3/2021	0	\$ 29,417.20
20	Olsson	3220-000	Overhead Walkway Removal at Plant 1 Secondary Basins 5 through 9	6/3/2021	0	\$ 62,113.50
21	Olsson	3287-000	Cogeneration PLC Modifications and Integration	6/3/2021	0	\$ 42,922.67
22	Olsson	3220-000	Plant 1 Secondary Basins UV Rated Wear Strips	9/2/2021	0	\$ 28,965.33

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
23	Olsson	3287-000	MCC-F1 Design Change	9/2/2021		\$ 481,290.42
24	Olsson	3287-000	DAF 2 Investigation Work and Inspection Blast	10/7/2021		\$ 67,838.71
25	Olsson	3287-000	New Fiber Conduit in West Blower Building	10/7/2021		\$ 4,957.71
26	Olsson	3220-000	Plant 1 Primary Basin Conduit Obstruction	10/7/2021		\$ 8,444.20
27	Olsson	3220-000	Plant 1 Influent Channel Additional Coating between Primary Basins 5 and 6	10/7/2021		\$ 15,469.98
28	Olsson	3287-000	MCC-F1 Lighting Changes	10/7/2021		\$ 7,843.04
29	Olsson	3287-000	Digester 3 Ground Rod	10/14/2021		\$ 7,269.16
30	Olsson	3220-000	New Fiber Conduits at East Electrical and Storm Water Buildings	10/14/2021		\$ 8,045.43
31	Olsson	3220-000	Plant 2 Primary Influent Channel Repair Credit	12/9/2021		\$ (15,903.00)
32	Olsson	3220-000	Plant 1 and 2 Telescoping Valve Pipe Supports	12/9/2021		\$ 6,132.27
33	Olsson	3287-000	4" Gas Line Routing Modifications	12/9/2021		\$ 18,146.07
34	Olsson	3287-000	Gas Mixer Conduit Conflict	12/9/2021		\$ 12,383.89
35	Olsson	3220-000	P1 Primary Tanks 5 and 6 Temporary Power	3/10/2022		\$ 7,256.05

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
36	Olsson	3220-000	P1 Primary Tanks Skimmers Starter Modification	3/10/2022		\$ 45,374.13
37	Olsson	3220-000	P1 Primary Tanks Hopper Wall Coating	3/10/2022		\$ 34,505.41
38	Olsson	3220-000	P1 Effluent Channel Conduit Conflict	3/10/2022		\$ 9,274.98
39	Olsson	3220-000	P1 Primary Tanks Torque Limit Switch	3/10/2022		\$ 7,149.86
40	Olsson	3287-000	Multi-zone air conditioning unit in the Cogen MCC Room and Office	3/10/2022		\$ (2,309.09)
41	Olsson	3287-000	DAFT 2 Repair	3/10/2022		\$ 59,403.53
42	Olsson	3287-000	Digesters 1 and 2 Heat Exchanger Layout Reconfiguration Electrical	6/2/2022	1	\$ 12,885.18
43	Olsson	3287-000	Digester 3 Heat Exchanger Hot Water Loop Tie-In	6/2/2022		\$ 2,774.58
44	Olsson	3220-000	Plant 1 Primary Basin 1 Shutdown Repair Work	6/2/2022		\$ 1,009.86
45	Olsson	3287-000	Replace Compressor Line and Valve at Digester 4	6/2/2022		\$ 10,762.85
46	Olsson	3220-000	Plant 2 Influent Gates Removal and Concrete Demo	6/2/2022		\$ 5,389.66
47	Olsson	3287-000	DAFT 2 Launder Support Detail	6/9/2022		\$ 45,682.30
48	Olsson	3220-000	Plant 1 Primary Basins 1, 2, 5 and 6 Coating Removal	6/9/2022		\$ 111,101.16

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
49	Olsson	3220-000	Plant 1 Primary Basins 1, 2, 5 and 6 Existing Equipment Removal and Reinstallation	6/9/2022		\$ 71,864.17
50	Olsson	3287-000	Digester Mixing Pumps Control Programming Change	8/4/2022		\$ 4,397.77
51	Olsson	3220-000	Plant 1 Primary Basins Skimmers I/O Connection and Programming Change	8/4/2022		\$ 14,237.83
52	Olsson	3287-000	Fiber Patch Cables to Connect the Centrifuge PLC to the Centrifuge Patch Panel	8/4/2022		\$ 3,755.90
53	Olsson	3220-000	Plant 1 Primary Basins 3 and 4 Coating Removal	8/4/2022		\$ 43,222.24
54	Olsson	3220-000	Plant 1 Secondary Basins Concrete Structural and Basins 2 and 3 Drive Plate Rework	8/4/2022		\$ 20,860.16
55	Olsson	3220-000	Plant 2 Primary Basins Repair and Rehab of Head-Shaft Bearings	8/4/2022		\$ 4,618.44
56	Olsson	3231-000	Board SOCWA Front Office with Plywood to Cover Windows	8/4/2022		\$ 3,305.76

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
57	Olsson	3220-000	Seal the Openings at Plant 1 Primary Influent and Effluent Channels	8/4/2022		\$ 25,491.03
58	Olsson	3220-000	Plant 1 Primary Basins 3 and 4 Existing Equipment Removal and Reinstallation	9/1/2022		\$ 26,498.32
59	Olsson	3220-000	Plant 1 Secondary Basins Existing Embedded Metal Plates	9/1/2022		\$ 4,290.48
60	Olsson	3220-000	Plant 2 Primary Baffle Frame Replacement	9/1/2022		\$ 18,291.57
61	Olsson	3287-000	Digester hatch connection, temperature guage adjustment, and potholing	11/3/2022		\$ 9,971.62
62	Olsson	3220-000	Plant 1 Primary and Secondary Basins crack injection, concrete repair, channel cleaning, solids removal	11/3/2022		\$ 146,734.55
63	Olsson	3287-000	Boiler Room Modifications	12/8/2022		\$ 14,797.83
64	Olsson	3287-000	DAFT 1 Repair	12/8/2022		\$ 66,992.33
65	Olsson	3220-000	Secondary Clarifier Telescoping Valve Modifications (Design Error)	12/8/2022		\$ 32,709.94
66	Olsson	3287-000	Digester Control Buildings Modifications	2/2/2023		\$ 9,746.81

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
67	Olsson	3220-000	Plant 1 and 2 Field Obstructions	2/2/2023		\$ 8,871.74
68	Olsson	3287-000	MCC-F1 Site Modifications	2/2/2023		\$ 57,233.12
69	Olsson	3287-000	DAFT and TWAS area additional slab modification and piping material change	2/2/2023		\$ 19,368.58
70	Olsson	3287-000	DAFT 1 Area Reconfiguration	3/2/2023		\$ 3,046.43
71	Olsson	3287-000	Digester 2 Hot Water Loop Change	3/2/2023		\$ 29,525.46
72	Olsson	3220-000	Plant 1 Seal Influent Channel Openings and Helical Drives Temporary Covers	4/6/2023		\$ 10,831.51
Duduct-Common	Olsson	3231-000	Energy Building Monorail System Descope (F1-F4)	8/4/2022		\$ (70,585.34)
Duduct-Liquids	Olsson	3220-000	Effluent Pump Station Descope (A1-A6)	8/4/2022		\$ (483,605.73)
Duduct-Solids	Olsson	3287-000	Energy Building Modifications Descope (G1-G2, & H1-H2)	8/4/2022		\$ (357,382.60)
HAL 01	Hallsten	3220-000	Cover Layout Modifications	8/4/2022		\$ 16,715.25
Approved by Board of Directors (Amendments)						\$ 1,651,288.00
1CM Common	Butier	3231-000	CM Change Order No. 1	7/13/2021		\$ 48,995.00
1CM Liquids	Butier	3220-000	CM Change Order No. 1	7/13/2021		\$ 294,125.00
1CM Solids	Butier	3287-000	CM Change Order No. 1	7/13/2021		\$ 269,595.00
1ESDC Common	Carollo	3231-000	ESDC Change Order No. 1	6/3/2021		\$ 18,210.00
1ESDC Liquids	Carollo	3220-000	ESDC Change Order No. 1	6/3/2021		\$ 109,256.00

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
1ESDC Solids	Carollo	3287-000	ESDC Change Order No. 1	6/3/2021		\$ 100,151.00
1G Common	Ninyo & Moore	3231-000	Geotechnical Services Change Order No. 1	2/3/2022		\$ 5,400.00
1G Liquids	Ninyo & Moore	3220-000	Geotechnical Services Change Order No. 1	2/3/2022		\$ 12,300.00
1G Solids	Ninyo & Moore	3287-000	Geotechnical Services Change Order No. 1	2/3/2022		\$ 12,300.00
2CM Liquids	Butier	3220-000	CM Change Order No 2	5/12/2022		\$ 196,268.00
2CM Solids	Butier	3287-000	CM Change Order No. 2	5/12/2022		\$ 196,268.00
2ESDC Common	Carollo	3231-000	ESDC Change Order No. 2	12/9/2021		\$ 11,075.00
2ESDC Liquids	Carollo	3220-000	ESDC Change Order No. 2	12/9/2021		\$ 196,440.00
2ESDC Solids	Carollo	3287-000	ESDC Change Order No. 2	12/9/2021		\$ 180,905.00
Potential Change						\$ 258,000.00
PCO 005	Olsson	3287-000	TWAS Slab Modifications	3/9/2023		\$ 50,000.00
PCO 038	Olsson	3287-000	Existing Valves at Digester 4 Heat Exchanger	(blank)		\$ 5,000.00
PCO 047	Olsson	3287-000	Digester 3/4 Control Building Tee Replacement	(blank)		\$ 5,000.00
PCO 054	Olsson	3220-000	Plant 1 Primary Effluent Channel Wall Corrosion	(blank)		\$ 5,000.00
PCO 055	Olsson	3287-000	Additional Concrete Repair behind Digesters 1 & 2	(blank)		\$ 7,500.00
PCO 057	Olsson	3220-000	Recoating of Basin Drive Shaft Steel Plates	(blank)		\$ 10,000.00
PCO 058	Olsson	3220-000	Aluminum Kickplate at Aeration Basins	(blank)		\$ 5,000.00

<u>Change Order No.</u>	<u>Vendor Name</u>	<u>Project ID</u>	<u>Description</u>	<u>Status Date</u>	<u>Days</u>	<u>Amount</u>
PCO 061	Olsson	3220-000	Steel Plate Coating and Blasting Extra Work	(blank)		\$ 7,000.00
PCO 063	Olsson	3220-000	Concrete Repair at Secondary Basin Drive Units	(blank)		\$ 8,000.00
PCO 064	Olsson	3220-000	Effluent Channel FA Duct Footing Conflicts	(blank)		\$ 5,000.00
PCO 068	Olsson	3287-000	Chopper Pump Impeller Issues	(blank)		\$ 5,000.00
PCO 070	Olsson	3220-000	Tread Plate-Slide Gate Conflicts at Effluent Channel	(blank)		\$ 5,000.00
PCO 071	Olsson	3220-000	Effluent Channel Unforeseen Existing Conduit	(blank)		\$ 5,000.00
PCO 072	Olsson	3287-000	Existing Conflicts at DAFT 2 Stairs	(blank)		\$ 2,000.00
PCO 075	Olsson	3220-000	Bypass Pumping Plan Issues	(blank)		\$ 100,000.00
PCO 083	Olsson	3220-000	Replacing the P1 Head Shaft Plate	(blank)		\$ 5,000.00
PCO 095	Olsson	3287-000	Foul Air Rerouting at DAFT 2	9/2/2021		\$ 5,000.00
PCO 106	Olsson	3287-000	DAFT 2 Isolation Valve	(blank)		\$ 5,000.00
PCO 109	Olsson	3220-000	P1P Influent Channel Scum Gate Openings	(blank)		\$ 2,500.00
PCO 121	Olsson	3287-000	DAFT 1 Additional Repair - Flange	(blank)		\$ 3,000.00
PCO 140	Olsson	3287-000	DAFT 1-TWAS Changes	(blank)		\$ 10,000.00
PCO 143	Olsson	3287-000	Revisions to DG Line	(blank)		\$ 3,000.00
Grand Total					191	\$ 3,227,871.14

Agenda Item

7

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee

FROM: David Baranowski, Director of Engineering

SUBJECT: Regional Treatment Plant (RTP) Aeration Diffuser Replacement Project Closeout
[Project Committee 17]

Overview

The RTP aeration diffuser replacement project was completed in 2022. Staff will present closeout information for the project.

Recommended Action: Information Item.

Agenda Item

8

Engineering Committee Meeting

Meeting Date: May 11, 2023

TO: Engineering Committee

FROM: David Baranowski, Director of Engineering

SUBJECT: Regional Treatment Plant (RTP) Consequence of Failure Analysis Project Update [Project Committee 17]

Overview

Starting in 2020, SOCWA has been evaluating the consequences of failure and risks of failure at the three treatment plants. The Consequence of Failure Analysis (CoFA) at the J.B. Latham Treatment Plant was completed in August 2021. The CoFA at the Coastal Treatment Plant was completed in June 2022. The CoFA at the Regional Treatment Plant began in July 2022 and is nearing completion.

Staff will present a summary of the draft results from the RTP CoFA. The draft report is included in the following pages. Staff can distribute the final report, when ready, to any members that wish to have a copy.

Recommended Action: Information Item.

Consequence of Failure Analysis

Regional Treatment Plant

MARCH 2023

Prepared for:

SOUTH ORANGE COUNTY WASTEWATER AUTHORITY

34156 Del Obispo St

Dana Point, California 92629

Contact: David Baranowski

Prepared by:

DUDEK

605 Third Street

Encinitas, California 92024

DRAFT

DRAFT

Table of Contents

SECTION	PAGE NO.
Executive Summary	iii
1 Introduction	1
1.1 Methodology	3
1.1.1 Consequence of Failure.....	4
1.1.2 Probability of Failure.....	5
1.1.3 Risk Exposure Designation.....	6
1.1.4 Analysis and Recommendations.....	7
2 Results.....	9
3 Conclusions and Recommendations	11

TABLES

1-1 RTP Plant CoFA Unit Process and Major Equipment Summary.....	1
1-2 Description of Consequence of Failure Categories.....	4
1-3 Consequence of Failure Scoring Guideline	5
1-4 Probability of Failure Scoring Guideline.....	6
1-5 Risk Exposure Designations	6
2-1 Prioritized Summary of Extra High, High, and Medium Risk Failure Modes.....	10
3-1 Summary of RTP Mitigation Measures and Recommendations	11

FIGURES

1-1 Consequence of Failure Analysis Flow Chart.....	3
1-2 Risk Exposure Designation Matrix	7
2-1 Risk Designations by Failure Mode.....	9

INTENTIONALLY LEFT BLANK

Executive Summary

The South Orange County Wastewater Authority (SOCWA) contracted Dudek to prepare a Consequence of Failure Analysis (CoFA) for process areas and facilities within the Regional Treatment Plant (RTP). The CoFA is intended to identify and prioritize risks within these facilities to guide strategic Operates and Maintenance (O&M) and Capital Improvement Program (CIP) planning and scheduling for SOCWA in in the short-term to mid-term future.



Regional Treatment Plant

Summary of Findings

The analysis found that the RTP has three top priority project needs requiring capital investment to mitigate risk (i.e. consequences and probability of failure) within the facilities.

The majority of secondary and tertiary priority projects are addressed in SOCWA's current ten-year CIP, however, additional project needs and recommendations are made to either improve current budgeted project effectiveness or address a project need that is not currently identified in the CIP.

Summary of Recommendations

It is recommended that SOCWA proceed with capital project planning, design, and construction of top priority projects followed by secondary and tertiary priority projects, as applicable. Where practical, it is recommended to implement O&M recommendations made herein to mitigate risk of critical systems. Top priority capital project needs are identified below along with the current CIP projects and/or recommendations to adjust priority and scope of those projects.

- Replace the existing primary clarifier and effluent channel covers and install fall protection anchors and safety measures where confined space entry may be required to access primary clarifiers. **(Recommend inclusion in Project No. 17054 Primary Sedimentation Basin Upgrade and re-prioritize this project as an immediate need.)**
- Replace the existing grit influent/effluent channel covers and install fall protection anchors and safety measures where confined space entry may be required to access grit chambers. **(Not included in any current budgeted CIP project. Recommend as an addition to Project No. 17054 Primary Sedimentation Basin Upgrade and re-prioritize project as an immediate need or complete using on-call engineering and construction services.)**
- Replace the existing aeration influent/effluent gates (stop plates). The galvanized steel bracing on the frames is severely corroded. Exercise and removal/reinsertion of the stop plates requires unorthodox methods that could present a health and safety risk to staff exercising the gate. **(Not included in existing CIP. Recommend addition of project and prioritize as immediate need).**

It is recommended that adjustments are made to SOCWA's CIP scope and implementation schedule considering recommendations made in **Section 3**. Top priority projects (i.e., projects that address one or more extra high risk failure modes) are recommended to be re-prioritized for implementation within the next 2 years. Refer to **Appendix A** for complete workshop notes and scoring for each process area and failure mode assessed as part of this Consequence of Failure Analysis.

INTENTIONALLY LEFT BLANK

1 Introduction

The South Orange County Wastewater Authority (SOCWA) contracted with Dudek to prepare a Consequence of Failure Analysis (CoFA) for process areas and facilities at the Regional Treatment Plant (RTP). The CoFA is intended to identify and prioritize risk within these facilities to guide strategic operations and maintenance (O&M) and capital investments for SOCWA in the short-term and mid-term future.

Regional Treatment Plant Facility Overview

The RTP is a wastewater treatment facility in Laguna Niguel, CA. The RTP is regulated by the State of California Regional Water Quality Control Board (RWQCB) San Diego Region, according to Waste Discharge Requirements (WDR) Order No. R9-2012-0013 and NPDES No. CA0107611. Currently, the RTP treats raw wastewater generated in the Moulton Niguel Water District (MNWD) service area. The RTP is permitted to treat discharge 12 million gallons per day (mgd). The capacity of the existing tertiary treatment is 11.4 MGD. A portion of the secondary effluent is reclaimed for irrigation. All effluent not reclaimed from the RTP is discharged to the Pacific Ocean through the Aliso Creek Ocean Outfall (ACOO). The RTP also receives solids from the Coastal Treatment Plant (CTP) and El Toro Water District for digestion, dewatering, and ultimate disposal.

Background description, function, and major equipment in each process area assessed as part of this CoFA are summarized in Table 1-1, which also served as the outline to the workshops for the RTP plant.

Table 1-1. RTP Plant CoFA Unit Process and Major Equipment Summary

Process Area	Description	Key Assets
Influent Sewer	The influent sewer functions to convey raw, untreated wastewater to the RTP. There are two force mains feeding the RTP: North MNWD and South MNWD force mains. Both force mains enter the RTP at the influent junction structure.	<ul style="list-style-type: none"> ▪ North MNWD force main ▪ South MNWD force main
Headworks	Functions to remove rags, grit, and other large materials from the influent wastewater before entering downstream processes. Influent flow through the headworks flows by gravity through mechanical screens located in the headworks building. Screened wastewater flows by gravity to aerated grit chambers. Odor Scrubber and HVAC systems function to remove foul air, gases, and provide ventilation in the headworks building.	<ul style="list-style-type: none"> ▪ Headworks building ▪ Mechanical screens ▪ Aerated grit chambers ▪ Grit pumps ▪ Odor Control Scrubber
Primary Treatment	Functions to remove settleable solids and floatable scum from plant influent before entering downstream secondary process.	<ul style="list-style-type: none"> ▪ Primary clarifier tanks ▪ Sludge/scum collectors ▪ Primary sludge pumps ▪ Interstage pumps

Table 1-1. RTP Plant CoFA Unit Process and Major Equipment Summary

Process Area	Description	Key Assets
Secondary Treatment (Biological)	Functions to remove BOD and TSS from the wastewater utilizing a conventional activated sludge process. The process is intended to operate with a low SRT in order not to nitrify based on current effluent waste discharge requirements. The aeration system consists of fine-bubble diffusers. Important parameters which control biomass growth rates and microbial communities are the Return Activated Sludge (RAS) and Waste Activated Sludge (WAS).	<ul style="list-style-type: none"> ▪ Aeration basins ▪ Diffusers ▪ Blowers ▪ Secondary Clarifiers ▪ RAS Pumps ▪ WAS Pumps
Tertiary Treatment ¹	Functions to remove turbidity and residual total suspended solids (TSS) from secondary effluent and achieve Title 22 tertiary recycled water quality standards for irrigation.	<ul style="list-style-type: none"> ▪ Sand Filters
Plant Water System	Functions to inactivate pathogens and bacteria in the filtered effluent using sodium hypochlorite for plant utility water and provide water throughout the plant for operation and maintenance (O&M) purposes.	<ul style="list-style-type: none"> ▪ Chlorine Dosing System ▪ Chlorine Contact Tanks ▪ 2W System ▪ 3W System
Sludge Handling	The sludge equalization tank (SET) functions to equalize and store sludge before it is transferred to the digesters. The dissolved air floatation thickener (DAFT) functions to thicken WAS and scum before the thickened sludge is sent to the SET or digesters.	<ul style="list-style-type: none"> ▪ Sludge Equalization Tank ▪ DAFT
Sludge Digestion	Anaerobic digesters function to reduce quantity of sludge and stabilize biosolids through volatile solids reduction, and to produce biogas. Gas cleaning vessels function to remove contaminants from biogas generated in anaerobic digesters. Generated methane gas from the digestion process is either flared or used for cogeneration. Cogeneration functions to produce electricity and heat used for various plant processes.	<ul style="list-style-type: none"> ▪ Anaerobic Digesters ▪ Anaerobic Digester Gas Building ▪ Digester Gas Cleaning Vessels ▪ Flare ▪ Cogeneration
Sludge Dewatering	Functions to remove water from digested sludge to increase density of solid waste that is disposed of at an offsite location, and to reduce hauling costs.	<ul style="list-style-type: none"> ▪ Centrifuges ▪ Cake Conveyors ▪ Polymer Dosing system
Ancillary Systems (Electrical and Controls)	Functions to provide power distribution, motor and equipment controls, and communication to plant process and equipment. Electrical, communication and control systems are critical to plant operation and performance. SCADA functions to monitor, collect, and process data from sensors placed throughout the wastewater treatment plant.	<ul style="list-style-type: none"> ▪ Emergency generator ▪ Communication/SCADA Systems
Miscellaneous	Buried utilities around the site functions to connect various unit processes, facilities, and equipment.	<ul style="list-style-type: none"> ▪ Buried Utilities / Yard piping

Note:

¹ Operated by Moulton Niguel Water District. SOCWA no longer operates the tertiary filters

1.1 Methodology

CoFA is a process that facilitates deliberate discussion and analysis of the criticality of process systems, drilling down to the component-level failure modes that may occur. Each process area identified for upgrade in the CIP is analyzed through the major assets and functions of that process and further by the failure modes of those assets. Through a workshop format, critical operations staff input is captured to expeditiously define a consequence of failure score and probability of failure score. Figure 1-1 presents the CoFA flowchart.

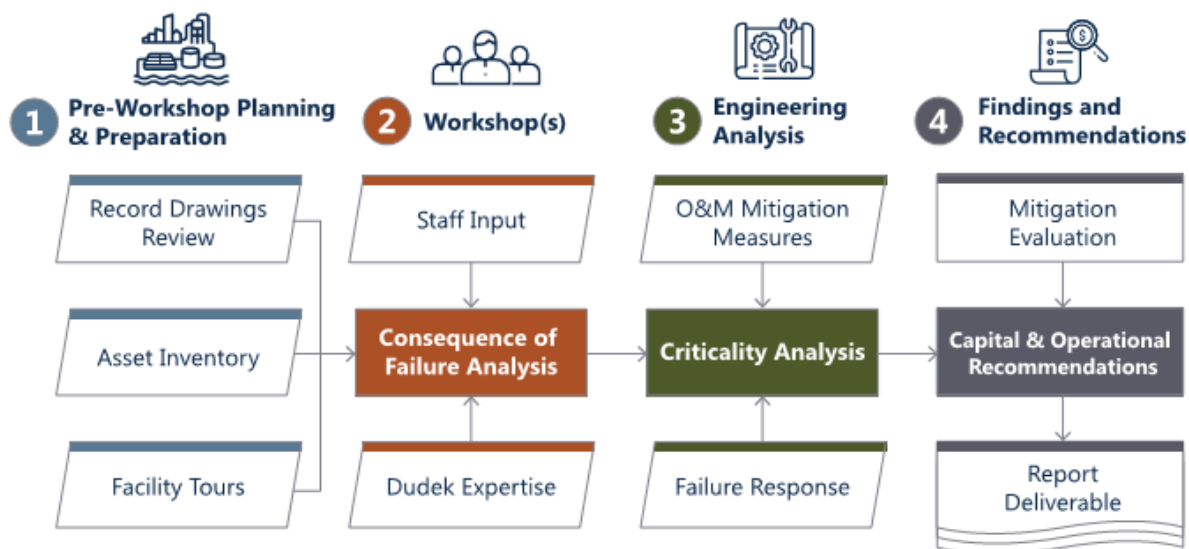


Figure 1-1. Consequence of Failure Analysis Flow Chart

Through the CoFA process, the project team establishes a risk profile of the facilities evaluated and provides conclusions and recommendations related to each process area and/or project. The outcomes of the CoFA process include:

- Prioritized list of CIP project needs based on mitigated risk vs. do-nothing alternative.
- Documentation of complete CoFA analysis and notes.
- O&M recommendations to mitigate risk, which may include process management adjustments, small projects, etc.
- Recommendations for adjusting scope of CIP projects, if applicable.

The Consequence of Failure (CoF) and Probability of Failure (PoF) are used to establish a risk designation that allows for the prioritization of risk-based strategic planning. Depending on the risk designation and the nature of the defined failure mode, operational-based and/or capital-based recommendations are made to mitigate the risk by either reducing the defined consequence and/or probability of failure.

1.1.1 Consequence of Failure

Consequence of Failure (CoF) is a scoring metric to provide context to the effect of a failure and are conventionally focused on capacity, level of service, and mortality. The effects of a failure are categorized among four distinct categories: Health and Safety, Treatment Performance/Regulatory, Economic/Personnel Resources, and Public Image. Each CoF category is weighted to align with the SOCWA’s risk management priorities and philosophies. The CoF categories, weight factors, and descriptions are summarized in Table 1-2.

Table 1-2. Description of Consequence of Failure Categories

CoF Categories	Weight Factor	Description
Health & Safety	7	Failure results in potential health and safety risk for Operations staff or visitors on WWTP site.
Treatment Performance/Regulatory	5	Failure results in treatment performance impacts and potential regulatory violations, penalties, fines, etc.
Economic/Personnel Resources	5	Failure results in economic resources cost and/or major staff time and resource allocation.
Public Image & Board Concerns	3	Failure results in potential negative public attention and scrutiny.

Each CoF category receives a numerical score, 1 to 5, for each failure mode based on the tolerance of failure of the process or equipment. The CoF scores for each category generally apply as follows:

1. Insignificant Consequence
2. Minor Consequence
3. Moderate Consequence
4. Major Consequence
5. Catastrophic Consequence

After the CoF score is determined for each category, the category scores are multiplied by the corresponding weight factor and summed (i.e., a sum-product is performed) to produce a comprehensive score defined as “criticality”. The criticality of each unit process or asset is established by the criticality score(s) associated with its failure mode(s). The guidelines used to score each CoF category in detail are presented in Table 1-3. Using these weight factors, the highest possible criticality score is 100 and the lowest possible criticality score is 20.

The baseline (existing conditions) CoF scores were defined given the assumption that no activity is performed to mitigate the consequence of failure to the process. The baseline CoF score is important for prioritizing recommendations for O&M mitigation measures. Additional O&M and/or CIP recommendations have considered existing mitigation and/or activities that reduce the risk potential of a given failure mode.

Table 1-3. Consequence of Failure Scoring Guideline

CoF Category	Weight Factor	CoF Score				
		1	2	3	4	5
Health & Safety	7	Negligible Injury	Minor injury, medical attention required	Serious injury hospitalization required	Serious injury, extensive hospitalization and/or permanent health impacts	Loss of Life
Treatment Performance/ Regulatory	5	Insignificant loss of treatment performance	Minor loss of treatment performance, impacts on multiple processes. No regulatory violations.	One-time regulatory violation.	Major loss of treatment performance, extended violation or multiple violations, regulatory sanctions	Plant-wide catastrophic failure, treatment process uncontrollable for 48 hrs+ regulatory sanctions.
Economic/ Personnel Resources	5	<\$5,000	<\$25,000	<\$50,000	<\$250,000	>\$250,000
Public Image & Board Concerns	3	Insignificant effect or community/ Board concern	Minor community/ Board interest or complaints	Public community discussion and local paper coverage	Loss of confidence by community/ Board. Public agitation for action.	Public investigation, news coverage, management changes demanded.

1.1.2 Probability of Failure

While Consequence of Failure evaluates the effects of failure modes it lacks the context of defining the likelihood of the failure scenario actually happening. Therefore, it is equally important to evaluate the probability of the failure mode to complete a comprehensive risk assessment. Probability of Failure (PoF) is qualitatively assessed by assigning a relative probability level derived primarily upon input from Operations staff regarding past failures, current condition assessment, and current operational procedures. Probability of Failure is ranked according to the system described in Table 1-4.

The baseline (existing conditions) PoF scores were defined given the assumption that no activity is performed to mitigate the probability of failure to the process or equipment (i.e. routine maintenance, preventative maintenance, condition assessment, etc.). The baseline PoF score is important for justifying current O&M practices and identifying needs for additional mitigation measures to reduce the risk of a given failure.

Table 1-4. Probability of Failure Scoring Guideline

PoF	Likelihood of Occurrence	Current Probability of Condition Based Occurrence
A	Rare	3+ years
B	Unusual	Within 1 - 3 years
C	Annual	Within 6 - 12 months
D	Occasional	Within 1 - 6 months
E	Common	Within 1 month
F	Certain - Ongoing	Daily

1.1.3 Risk Exposure Designation

Following the workshop from which CoF and PoF scores are established for each failure mode, a risk exposure designation is assigned by combining the two scores. The risk exposure designation represents the relative level of risk associated with the failure mode evaluated. Risk exposure is designated according to four levels described in Table 1-5.

Table 1-5. Risk Exposure Designations

Risk Designation		Strategy for Risk Mitigation
L	Low	Reactive strategy is acceptable. The risk level does not suggest proactive monitoring strategies or capital improvement projects are necessary. Recommend that applicable CIP projects are maintained for current budget year or deferred.
M	Medium	Proactive strategy for monitoring performance and condition may be recommended. Mix of proactive and reactive strategies may also apply. Capital Improvement projects may be recommended to mitigate risk where applicable. Recommend that applicable CIP projects are maintained for current budget year.
H	High	Proactive planning and risk mitigation strategy is required. Capital Improvement projects will be recommended if operations and maintenance strategies are insufficient to mitigate risk to an acceptable level. Recommend that applicable CIP projects are maintained for current budget year or expedited where practical.
E	Extra High	Proactive planning and risk mitigation strategy is required immediately. Capital Improvement projects and operations and maintenance strategies must be developed and implemented as soon as possible to mitigate risk to an acceptable level. Recommend that applicable CIP projects are expedited where practical.

These levels of risk designations are assigned to each failure mode according to the PoF ranking and criticality score generated through workshop discussion according to the matrix presented in Figure 1-2.

PoF	Criticality								
	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
A	L	L	L	L	L	M	M	M	
B	L	L	L	M	M	H	H	H	
C	L	L	M	M	H	H	H	E	
D	L	M	M	H	H	E	E	E	
E	L	M	H	H	E	E	E	E	
F	L	M	H	H	E	E	E	E	

Figure 1-2. Risk Exposure Designation Matrix

Recommendations for risk mitigation are prioritized based on the resulting risk designations. Mitigation measures are categorized as O&M procedural adjustments or as recommended CIP projects. Depending on the risk designation, the recommendations can be prioritized over the planning horizon. Items with significant risk potential that cannot be adequately mitigated by O&M measures are recommended for CIP projects which could supersede programmed replacement scheduling.

1.1.4 Analysis and Recommendations

Each unit process and asset failure mode is categorized and ranked according to the risk designation that it received. Failure modes designated to result in high-to-extra high exposure to risk are prioritized and mitigation measures aimed to reduce the probability or consequence of failure are identified to mitigate risk to an acceptable level. Capital project recommendations identified through the CoFA process should be prioritized according to their risk designation and the criticality score within the designation. In most cases, medium risk is acceptable for critical assets and unit processes, and a low-risk designation may not be achievable.

If a number of failure modes are designated to be high-risk, the priority of capital projects should be made to address the highest criticality scores as a first measure of priority and probability of failure ranking should be a secondary measure of priority.

INTENTIONALLY LEFT BLANK

2 Results

In total, 57 unique failure mode scenarios were identified and analyzed through the workshop process for the RTP. Of these 57 failure mode scenarios, 3 were identified as “Extra High” risk, 9 were identified as “High” risk, 15 were identified as “Medium” risk, and 30 were identified as “Low” risk. This breakdown is depicted in Figure 2-1.

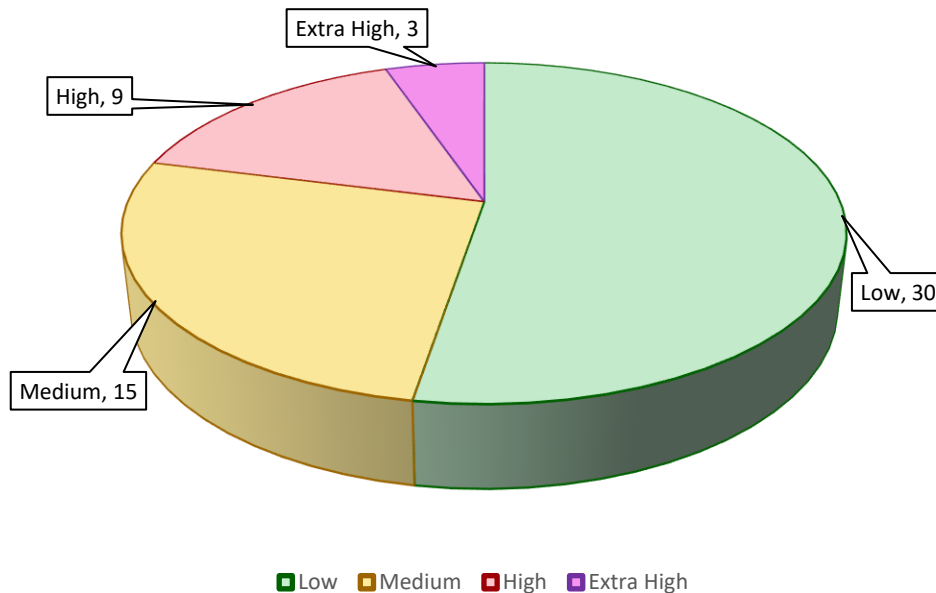


Figure 2-1. Risk Designations by Failure Mode

SOCWA faces a variety of unique challenges for the RTP such as high H₂S loading in the influent wastewater, a lack of primary effluent equalization, managing sludge operations for three different plants, a lack of standby power for the aeration system, and aging infrastructure and equipment for certain facilities. Key plant challenges include grit influent/effluent channel and primary clarifier effluent channel covers that present health and safety hazards, and the condition of the aeration basin gates. Staff have taken appropriate and proactive measures to mitigate the consequences and probability of failure to critical process systems, however, despite best efforts, risks are still present in process systems required to maintain compliance and safety.

Notes, scoring, and complete documentation of the workshops and recommendations are provided in full in Appendix A to this report. Appendix A documents all the notes from the workshop, including current system performance and condition, current operations and maintenance mitigation measures, potential operational and maintenance adjustments that could be implemented by staff, as well as potential capital projects that could be used to mitigate risk and reduce consequences or probability of failure occurrence for each failure mode. Refer to the specific failure mode in Appendix A for more information.

The prioritized summary of Extra High, High, and Medium risk failure modes are summarized in Table 2-1.

Table 2-1. Prioritized Summary of Extra High, High, and Medium Risk Failure Modes

Failure Mode / Scenario	Criticality	Probability of Failure (PoF)	Risk Designation
Primary Clarifier and Effluent Channel Covers failure	70	F	E
Grit Chamber Influent/Effluent Channel Covers failure	70	F	E
Aeration Influent/Effluent Gates failure	65	F	E
Digesters Methane Piping Failure	77	B	H
Standby Power failure (>6 hours)	71	B	H
Flare Mechanical Failure	70	C	H
Digesters Building HVAC Failure	67	C	H
Odor Control System Fan failure	63	C	H
Influent Sewer Sulfide Control failure	55	F	H
Hydrogen Sulfide Removal Vessels Failure	54	D	H
Ferric Dosing System failure	52	E	H
RAS Wet well Isolation Gate failure	49	F	H
Digesters Structural Failure	73	A	M
Mixed Liquor Channels Grating Brace failure	70	A	M
MCC failure	56	C	M
SET System failure	50	C	M
Buried Piping / Yard Piping	50	C	M
Communication/SCADA Systems failure	50	B	M
Odor Control System Performance failure	48	C	M
Standby Power failure (<6 hours)	45	D	M
Cogeneration Engine failure	45	D	M
DAFT Polymer Dosing failure	42	D	M
3W Pumps / System failure	42	C	M
Sand Filtration Performance failure	41	C	M
Primary Clarifiers Scum Collectors Performance failure	32	D	M
Grit Chamber Influent Stop Plates failure	32	D	M
CCT Mechanical Equipment failure	30	F	M

3 Conclusions and Recommendations

Table 3-1 summarizes the current O&M mitigation measures, recommendations for O&M best practices, and associated capital improvement projects with additional considerations aimed to mitigate risk to an acceptable level at the RTP.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
E	Primary Clarifier and Effluent Channel Covers failure	Staff have laid plywood over covers where main foot traffic occurs because of concerns about cover safety. Staff are aware of the safety concerns and take extra precaution around the covers.	Install fall protection anchors around areas where confined space entry may be required to access primary clarifiers.	Replace the primary clarifier and effluent channel covers. Primary sedimentation system upgrade scheduled for FY 32 / 33. If including covers, re-prioritize as an immediate need.
E	Grit Chamber Influent/Effluent Channel Covers failure	Staff have laid plywood over covers where main foot traffic occurs because of concerns about cover safety. Staff are aware of the safety concerns and take extra precaution around the covers.	Install fall protection anchors around areas where confined space entry may be required to access grit chambers.	Replace the grit chamber influent and effluent channel covers. Grit management facility scheduled for FY 31 / 32. If including grit influent/effluent channel covers. re-prioritize as an immediate need.
E	Aeration Influent/Effluent Gates failure	Plates are operated and removed at least once a year. This mitigates the issue of the plates getting stuck on the effluent side. In general, exercising the gates is the primary mitigation measure.	No additional O&M measures are identified to mitigate this failure.	Replace the aeration basin influent/effluent gates. Prioritize as an immediate need.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
H	Digesters Methane Piping Failure	Select pipe patching and replacements are performed for any notable leak that develops. Gas detectors are installed in the buildings and tied to SCADA with alarm. Staff have personal gas monitors if there is a concern.	No additional O&M measures are identified to mitigate this failure.	Design and construct system-wide digester gas piping and appurtenances replacement to eliminate any methane pipe leaks. Include in Digester Gas Management Building Rehabilitation project scheduled for FY 24/25, if applicable.
H	Standby Power failure (>6 hours)	Staff are no longer going to hard wire the blower to a generator in the event of a prolonged utility power outage. Staff is looking into purchasing a portable generator for the blower building to mitigate the standby power failure.	No additional O&M measures are identified to mitigate this failure.	Install a dedicated standby generator sized to run the aeration blowers and other critical process equipment in the event of a power outage.
H	Flare Mechanical Failure	Since the solenoid failed, staff check the pilot light every day to make sure it is on. Need the pilot to make sure flare will burn the digester gas instead of vent.	No additional O&M measures are identified to mitigate this failure.	Flare replacement project was scheduled for FY 21 / 22. Recommend completing the budgeted project.
H	Digesters Building HVAC Failure	The gas meter in the building is tied into SCADA and has an alarm which will alert staff if gas concentrations get above a certain safety threshold in the building. Staff also have personal gas monitors if there is a concern. Staff have the equipment and tools to manually ventilate the building in case the installed HVAC equipment fails prior to staff entry.	No additional O&M measures are identified to mitigate this failure.	Replace HVAC equipment in the Digester Gas Management Building Rehabilitation scheduled for FY 24/25, if applicable.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
H	Odor Control System Fan failure	Routine maintenance on system. Hydrogen sulfide monitoring alarms in place.	Recommend purchasing critical spare parts for the main odor control fan on the headworks odor control system.	Odor control scrubber no.1 replacement scheduled for FY 25 / 26. Odor control scrubber no.2 replacement scheduled for FY 26 / 27. Odor control scrubber no.3 replacement scheduled for FY 30 / 31.
H	Influent Sewer Sulfide Control failure	RTP operators do not manage odor control in the MNWD collection system. Staff dose ferric chloride at the influent junction structure to mitigate potential septicity and odor issues in influent wastewater.	Recommend installing an OdaLog sulfide gas logger to monitor H2S gas levels and/or conducting periodic readings in influent junction structure to monitor H2S levels.	Consider performing an odor control optimization study looking at the existing odor control system and ferric usage to optimize the system for performance and cost.
H	Hydrogen Sulfide Removal Vessels Failure	Staff added a humidifier because the gas is very dry. Operations have just had to get accustomed to replacing the media quarterly.	No additional O&M measures are identified to mitigate this failure.	Perform an investigation/study of why the media gets spent and needs to be replaced so frequently. Incorporate recommendations into a capital improvement project, if applicable.
H	Ferric Dosing System failure	Routine maintenance. Standard Operating Procedures (SOPs) are in place for working with chemicals.	Recommend replacing chemical feed system and repairing concrete secondary containment.	Consider performing an odor control optimization study looking at the existing odor control system and ferric usage to optimize the system for performance and cost.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
H	RAS Wet well Isolation Gate failure	None. Operations only use RAS pumps that have the stop plates removed.	No additional O&M measures are identified to mitigate this failure.	Replace the existing large stop plates with a traditional sluice-style slide gate. RAS pump station reconstruction scheduled for FY 28 / 29.
M	Digesters Structural Failure	None.	Recommend performing periodic inspection of digester structural elements such as concrete and roof for signs of corrosion and/or deterioration.	Anaerobic Digester System Reconstruction project scheduled for FY 30/31.
M	Mixed Liquor Channels Grating Brace failure	Staff have laid plywood over grating where main foot traffic occurs because of concerns about safety. Staff are aware of the safety concerns and take extra precaution around the grating.	Place cones or other safety features around unsafe grating areas to avoid situations where staff or visitors could potentially step on unstable or corroded grating surfaces.	Mixed liquor channel rehabilitation scheduled for FY 26 / 27. Replace braces and/or grating covering the mixed liquor channels.
M	MCC failure	Staff manage what they can while parts get harder to come by. This can be modifying new parts to make them work. Staff keep spare parts for most cabinet components.	Recommend standardizing equipment selected during submittal processes to consolidate numerous manufacturer types. With multiple manufacturer types, many different replacement and spare parts will be required to fix future issues from each company. Currently utilized manufacturers at the Plant for MCC's are: A. Federal Pacific B. Allen Bradley C. Siemens D. Eaton	Recommend evaluating and scheduling replacement of old MCC's when the equipment reaches 40 years old and/or parts are obsolete. MCC D,E,F Condition Assessment scheduled for FY 23/24. MCC replacement scheduled for FY 20 / 21, FY 24 / 25, FY 26 / 27, FY 31 / 32, FY 32 / 33.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
M	SET System failure	Staff use only SET #2 which has the muffin monster grinder on the inlet side. There is an old piping connection to send primary sludge and WAS directly to the digesters in case of clogging.	No additional O&M measures are identified to mitigate this failure.	Sludge equalization system mechanical and electrical rehabilitation scheduled for FY 27 / 28. Consider performing a condition assessment of the SET system leading to a capital project to Rehabilitate and repair broken elements of the SET systems, including restoring SET #1 to operational condition. Install another Muffin Monster grinder for redundancy.
M	Buried Piping / Yard Piping	Repair leaking/failed piping as required if a failure occurs.	Perform condition assessment of larger buried pipes, if feasible.	Buried water pipe reconstruction scheduled for FY 21 / 22. Underground piping reconstruction Area A and Area B scheduled for FY 25 / 26. Underground piping reconstruction Area C and Area D scheduled for FY 28 / 29.
M	Communication/SCADA Systems failure	Scheduled to replace servers at all 3 plants, SCADA in good condition and functioning. System has redundancy. Staff mitigate failures through efforts of key staff maintaining the SCADA and communication systems. Loss of key staff would result in more frequent and problematic failures.	Place additional emphasis on recruiting a second SCADA/Communications system staff member to update and maintain the system.	Continue to update servers and SCADA programming as required over time. SCADA system upgrade scheduled for FY 21 / 22 and FY 33 / 34.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
M	Odor Control System Performance failure	Staff try to minimize the time that the headworks roll-up door is open to 15 minutes at a time to prevent odor issues from moving too far upstream. Staff hired Don King to perform a system assessment and to balance system airflow and pressure. A contractor has come out to perform vibration analysis, bearing replacement, and balancing for main fan.	No additional O&M measures are identified to mitigate this failure.	Odor control chemical tank scheduled for FY 20 / 21. Odor control scrubber no.1 replacement scheduled for FY 25 / 26. Odor control scrubber no.2 replacement scheduled for FY 26 / 27. Odor control scrubber no.3 replacement scheduled for FY 30 / 31.
M	Standby Power failure (<6 hours)	Staff are no longer going to hard wire the blower to a generator in the event of a prolonged utility power outage. Staff is looking into purchasing a portable generator for the blower building to mitigate the standby power failure.	No additional O&M measures are identified to mitigate this failure.	None.
M	Cogeneration Engine failure	Preventative maintenance on equipment including inspections of all pumps, motors, gear boxes, fans, and other key components.	No additional O&M measures are identified to mitigate this failure.	Recommend a feasibility study to evaluate the concept of selling treated digester gas back to SoCal Gas distribution system as opposed to running and operating a gas cogeneration system.
M	DAFT Polymer Dosing failure	Staff perform routine inspection and maintenance on equipment.	Recommend constructing more effective spill containment.	Replace DAF (Mannich) polymer system scheduled for FY 19 / 20. Mannich polymer shade scheduled for FY 21 / 22. Polymer storage tank (Mannich replacement) scheduled for 31 / 32.

Table 3-1. Summary of RTP Mitigation Measures and Recommendations

Risk	Failure Mode/Scenario	Current O&M Mitigation Measures	O&M Recommendations	Capital Improvement Project
M	3W Pumps / System failure	Staff monitor pressure and rotate pumps as needed. Pumps are sent out for a full rebuild every 10-15 years or if there is a problem.	No additional O&M measures are identified to mitigate this failure.	Plant Water Pumping System Reconstruction scheduled for FY 27 / 28.
M	Sand Filtration Performance failure	Routine maintenance. As necessary, alum can be dosed to the filter feed as a coagulant to improve turbidity removal.	No additional O&M measures are identified to mitigate this failure.	Not Applicable to SOCWA. MNWD may consider replacing the filters with a more robust filtration technology when the filters reach the end of their useful life.
M	Primary Clarifiers Scum Collectors Performance failure	Routine maintenance and trough inspection are performed daily. A spray bar mechanism is used to push rags into troughs to avoid potential clogging. Scum pumps are manually controlled.	No additional O&M measures are identified to mitigate this failure.	Primary sedimentation condition assessment scheduled for FY 20 / 21. Primary scum skimmer scheduled for FY 24 / 25.
M	Grit Chamber Influent Stop Plates failure	Routine maintenance	Consider staging A-frame hoists or another type of hoist in the area which could allow staff to more safely remove and reinstall the stop plates.	None.
M	CCT Mechanical Equipment failure	None.	No additional O&M measures are identified to mitigate this failure.	Replace the CCT mechanical equipment in both tanks to restore operability and capacity.

SOCWA’s Ten Year Capital Improvement Program (dated August 5, 2019) defines the capital improvement project list through 2028. SOCWA staff revisit the CIP periodically and make adjustments over time. Many of the considerations and recommendations made as part of the CoFA are addressed within the scope of currently budgeted CIP projects. The results of the CoFA are intended to prioritize current CIP projects and where applicable, recommend adjustments to their scope to address deficiencies and mitigate risk.

In summary, the following capital improvement project needs are identified by priority for consideration in SOCWA’s Capital Improvement Program. Project recommendations are separated by priority based on risk designation and

where practical, lower priority projects are integrated with higher priority projects for synergy to consider practical implementation. Where applicable, current CIP projects that address the project need and comments on priority are included in **(bold parentheses)**.

Top Priority Projects (Address Extra High Risk Failure Modes)

- Replace the existing primary clarifier and effluent channel covers and install fall protection anchors and safety measures where confined space entry may be required to access primary clarifiers. **(Recommend inclusion in Project No. 17054 Primary Sedimentation Basin Upgrade and re-prioritize this project as an immediate need.)**
- Replace the existing grit influent/effluent channel covers and install fall protection anchors and safety measures where confined space entry may be required to access grit chambers. **(Not included in any current budgeted CIP project. Recommend as an addition to Project No. 17054 Primary Sedimentation Basin Upgrade and re-prioritize project as an immediate need or complete using on-call engineering and construction services.)**
- Replace the existing aeration influent/effluent gates (stop plates). The galvanized steel bracing on the frames is severely corroded. Exercise and removal/reinsertion of the stop plates requires unorthodox methods that could present a health and safety risk to staff exercising the gate. **(Not included in existing CIP. Recommend addition of project and prioritize as immediate need).**

Secondary Priority Projects (Address High Risk Failure Modes)

- Perform system-wide replacement of digester methane piping and appurtenances to eliminate any methane leaks from the system. **(Include with Project No. 17529 Digester Gas Management Building Rehabilitation scheduled for FY 24/25).**
- Design and construct a standby generator to be able to handle the load of the blowers in the event of a power outage. Any existing power outage results in a loss of the aeration system and treatment. **(Not included in any current budgeted CIP project. Recommend adding this project and including it in the near-term CIP).**
- Replace the existing flares due to age and ignition deficiencies. New flares would be required to comply with newer, more stringent SCAQMD requirements. **(Project No. 17536 Gas Flare Replacement was scheduled for FY 21/22. Recommend completing the budgeted project).**
- Replace the existing digester building HVAC system due to failed and inoperable equipment. **(Recommend inclusion with Project No. 17529 Digester Gas Management Building Rehabilitation scheduled for FY 24/25).**
- Recommend purchasing and keeping critical spare parts for the main odor control fan for the headworks odor control system. Perform condition assessment and subsequent upgrade of ventilation and odor control system for the headworks building in particular. Site observations and staff input identified ventilation and odor control to be in poor condition and in need of improvement. **(Included in the following projects: Project No. 17052 Odor control scrubber no.1 replacement scheduled for FY 25 / 26).**
- Consider performing an odor control optimization study for the influent sewer sulfide control system. Look at the existing odor control system and ferric usage to optimize the system for performance and cost. **(Not included in any current budgeted CIP project. As a small project, it may be feasible to add this project to the CIP and complete using on-call professional services).**

- Perform study on the digester gas hydrogen sulfide removal system to identify and diagnose why vessel media gets spent and needs to be replaced quarterly. Incorporate recommendations into a capital improvement project, if applicable. **(Not included in any current budgeted CIP project. As a small project, it may be feasible to add this project to the CIP and complete using on-call professional services).**
- Replace the existing RAS Wet well Isolation stop plates with a traditional sluice-style slide gate. The existing gates are corroded and seized/stuck into the frame. The existing plates are 2 ft wide and 10 ft tall, making them bulky and difficult to remove. **(Include in Project No. 17059 RAS Pump Station reconstruction scheduled for FY 28/29. Consider re-prioritizing to a near-term project due to condition of equipment and operators' health and safety).**

Tertiary Priority Projects (Address Medium Risk Failure Modes)

- Recommend inspection and required rehabilitation of digester structural elements such as concrete and roof. **(Included in Project No. 17527 Anaerobic Digester System Reconstruction project scheduled for FY 30/31.)**
- Replace braces and/or grating covering the mixed liquor channels and rehabilitate damaged concrete. Place cones and install other safety features around unsafe grating to avoid situations where staff or visitors could potentially step on unstable or corroded grating surfaces. **(Recommend including in Project No. 17062 Mixed Liquor Channel Rehabilitation scheduled for FY 26 / 27.)**
- Recommend evaluating and scheduling replacement of old MCC's when the equipment reaches 40 years old and/or parts are obsolete. **(Included in Project No. 17357 MCC D,E,F Condition Assessment scheduled for FY 23/24.)**
- Consider performing a condition assessment of the SET system leading to a capital project to rehabilitate and repair broken elements of the SET systems, including restoring SET #1 to operational condition. Install another Muffin Monster grinder for redundancy. **(Included in Project No. 17523 Sludge equalization system mechanical and electrical rehabilitation scheduled for FY 27 / 28.)**
- Perform condition assessment of larger buried utility pipes. **(Included in Project Nos. 17346 buried water pipe reconstruction scheduled for FY 21/22, 17349 and 17350 underground piping reconstruction Area A and Area B scheduled for FY 25 / 26. And in Project Nos. 17351 and 17352 Underground piping reconstruction Area C and Area D scheduled for FY 28 / 29.)**
- Continue to update servers, communication between the PLCs and SCADA system as required over time to keep communication continuous and reliable. **(Included in Project No.17333 SCADA system/1st phase upgrade scheduled for FY 21 / 22 and Project No. 17353 SCADA system/2nd phase upgrade scheduled for FY 33 / 34.)**
- Perform feasibility study to evaluate the concept of selling treated digester gas back to SoCal Gas distribution system as opposed to running and operating a gas cogeneration system. **(Not included in any current CIP budget.)**
- Recommend constructing a more effective spill containment for DAFT polymer dosing system to avoid spills and any potential slip hazard for staff. **(Recommend implementing as an independent, small project prior to related scope in Project No. 17075 Mannich Polymer Storage System Upgrade scheduled for FY 31 / 32).**
- Rehabilitate the existing 3W pumps. **(Included in Project No. 17322 Plant Water Pumping System Reconstruction scheduled for FY 27 / 28.)**

- Replace or rehabilitate primary clarifiers scum skimmers when the equipment reaches the end of their useful life. **(Project No. 17080 Primary Scum Skimmer Replacement scheduled for FY 24 / 25.)**
- Replace the CCT mechanical equipment in both tanks to restore operability and capacity. **(Not included in any current CIP budget).**

In conclusion, it is recommended that adjustments are made to SOCWA's 10-year CIP implementation schedule and scope of projects to consider recommendations made herein. Top priority projects (i.e. projects that address one or more extra high risk failure modes) are recommended for expedited design and implementation, consistent with SOCWA's current CIP schedule. SOCWA's schedule for certain secondary priority and tertiary priority projects may also need to be expedited based on the project needs and associated risk designation. Refer to Appendix A for complete notes for each process area and failure mode assessed as part of this Consequence of Failure Analysis.

INTENTIONALLY LEFT BLANK