Dedicated to Satisfying our Community's Water Needs

AGENDA
MESA WATER DISTRICT
BOARD OF DIRECTORS
Tuesday, March 23, 2021
1965 Placentia Avenue, Costa Mesa, CA 92627
3:30 p.m. Adjourned Regular Board Meeting

BOARD OF DIRECTORS COMMITTEE MEETING

IN AN EFFORT TO MITIGATE THE SPREAD OF COVID-19 (CORONAVIRUS), AND IN ACCORDANCE WITH THE GOVERNOR'S EXECUTIVE ORDER N-29-20, THERE WILL BE NO PUBLIC LOCATION FOR ATTENDING THIS BOARD MEETING IN PERSON. MEMBERS OF THE PUBLIC MAY LISTEN AND PROVIDE PUBLIC COMMENT BY TELEPHONE AUDIO AS FOLLOWS:

Telephone Audio: (669) 900 6833
Meeting ID: 930 6748 9066
Passcode: 860312

CALL TO ORDER

PLEDGE OF ALLEGIANCE

PUBLIC COMMENTS

Items Not on the Agenda: Members of the public are invited to address the Board regarding items which are not on the agenda. Each speaker is limited to three minutes. The Board will set aside 30 minutes for public comments.

Items on the Agenda: Members of the public may comment on agenda items before action is taken, or after the Board has discussed the item. Each speaker is limited to three minutes. The Board will set aside 60 minutes for public comments.

ITEMS TO BE ADDED, REMOVED, OR REORDERED ON THE AGENDA
At the discretion of the Board, all items appearing on this agenda, whether or not expressly listed as an Action Item, may be deliberated and may be subject to action by the Board.

CONSENT CALENDAR ITEMS:
Approve all matters under the Consent Calendar by one motion unless a Board member, staff, or a member of the public requests a separate action.

1. Receive and file the Developer Project Status Report.
2. Receive and file the Mesa Water and Other Agency Projects Status Report.
3. Receive and file the Water Quality Call Report.
4. Receive and file the Water Operations Status Report.
5. Receive and file the Accounts Paid Listing.
6. Receive and file the Monthly Financial Reports.
7. Receive and file the Major Staff Projects.
8. Receive and file the State Advocacy Update.
9. Receive and file the Orange County Update.
10. Receive and file the Outreach Update.

ACTION ITEMS:

11. CALIFORNIA SPECIAL DISTRICTS ASSOCIATION BOARD OF DIRECTORS ELECTION, SOUTHERN NETWORK, SEAT A, CONCURRING NOMINATION:

    Recommendation: Adopt Resolution No. 1539 Concurring in the Nomination of Jo MacKenzie as a candidate for the California Special Districts Association Board of Directors, Southern Network, Seat A.

12. WATER SUPPLY, ENERGY, AND SUPPLY CHAIN RELIABILITY ASSESSMENT:

    Recommendation: Recommend that the Board of Directors approve the proposed recommendations for the Water Supply, Energy, and Supply Chain Reliability Assessment as identified in the Executive Summary and Technical Memorandums 1, 2 and 3, and implement as part of the Capital Improvement Program Renewal.

13. FINANCIAL AUDITOR SELECTION:

    Recommendation: Recommend that the Board of Directors approve a one-year contract extension to Clifton Larson Allen, formerly White Nelson Diehl Evans LLP, to perform annual financial audit services for the fiscal year ending June 30, 2021.

PRESENTATION AN DISCUSSION ITEMS:

None

REPORTS:

14. REPORT OF THE GENERAL MANAGER

15. DIRECTORS' REPORTS AND COMMENTS

INFORMATION ITEMS:

16. OTHER (NO ENCLOSURE)

In compliance with California law and the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services in order to participate in the meeting, or if you need the agenda provided in an alternative format, please contact the District Secretary at (949) 631-1206. Notification 48 hours prior to the meeting will enable Mesa Water District (Mesa Water) to make reasonable arrangements to accommodate your requests.

Members of the public desiring to make verbal comments utilizing a translator to present their comments into English shall be provided reasonable time accommodations that are consistent with California law.

*Agenda materials that are public records, which have been distributed to a majority of the Mesa Water Board of Directors (Board), will be available for public inspection at the District Boardroom, 1965 Placentia Avenue, Costa Mesa, CA and on Mesa Water's website at **www.MesaWater.org**. If materials are distributed to the Board less than 72 hours prior or during the meeting, the materials will be available at the time of the meeting.*

ADJOURN TO A REGULAR BOARD MEETING SCHEDULED FOR THURSDAY, APRIL 8, 2021 AT 6:00 P.M.

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0013-20-02	570 W. 18th Street	Lion's Park Project	Plans received on 5/21/20 and plan check fees are waived. Application for New Service received on 6/15/20. 1st Plan check submitted on 5/21/20 and redlines returned on 6/23/20 after required field investigation. 2nd Plan check submitted on 10/5/20 and returned on 10/6/20. Permit issued on 10/27/20. (3/12/21)
C0013-21-02	Merrimac Way Immprovement - City Project # 20-20	Merrimac Way Bicycle Facility Improvements	Plans received on 2/2/21 and plan check fees are waived. Application for New Service received on 2/2/21. 1st Plan check submitted on 2/2/21 and returned on 2/7/21. 2nd Plan check submitted on 2/26/21 and returned on 2/26/21. Conducted a field meeting with Contractor on 2/26/21.
C0014-21-01	1170 Baker Street, Units C and D	Commercial Building	Plans received on 7/15/20 and plan check fees paid on 7/20/20. Redlines returned on 7/23/20. 2nd Plan check submitted 8/13/20 and redlines returned on 8/14/20. 3rd Plan check submitted 8/31/20 and returned on 9/6/20. Permit issued on 10/23/20. (3/12/21)
C0043-21-01	2032 President Place	CMSD Pump Station	Plan check fees and Application for New Service submitted on 8/18/20. 1st Plan Check submitted on 6/30/20 and returned on 7/4/20. 2nd Plan check submitted on 9/8/20 and returned on 9/12/20. Permit issued on 11/12/20. (3/12/21)
C0058-19-01	585 & 595 Anton Boulevard (P2)	Apartment Complex	Final permit fees paid on 5/8/19. Permit issued on 5/8/19. Precon meeting held on 5/16/19. Waiting for revised Easements and Quit Claims regarding legal entities. Services installed 6/28/19. Pressure tests done on 7/2/19, Bac-T tests done on 7/8/19. Fireline charged on 9/12/19. Mesa Water staff removed two fire hydrants from jobsite on 9/18/19. Pipeline installed on 11/19/19. Raised valve can to grade on 4/22/20. Developer confimed that water utilities will commence April 2021. (3/12/21)
C0071-20-01	2277 Harbor Boulevard	Apartment Complex	Plans received and plan check fees paid on 3/17/20 and redlines returned on 3/26/20. 2nd Plan check received on 3/31/20. 2nd plan check submitted on 4/5/20 and redlines returned on 4/8/20. Received quitclaim exemption on 10/9/20. Permit issued on 12/22/20. (3/12/21)

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0092-19-01	2089 Harbor Blvd (Harbor and Hamilton)	28 New Townhomes	Plans received and plan check fees paid on 4/23/19. 1st plan check submitted 4/23/19 and redlines to be picked up on 5/6/19. 2nd plan check submitted on 6/11/19 and redlines picked up on 6/18/19. 3rd Plan Check submitted on 11/25/19 and redlines returned to customer on 11/27/19. 4th Plan Check submitted on 2/4/20 and redlines emailed to customer on 2/12/20. Permit issued 6/6/20. Precon meeting held on 6/25/20. Hot taps done on 10/9/20, 10/12/20, 10/13/20. 29 Meters installed on 10/15/20. Shutdown to tie in the fireline on 10/15/20. Two Backflows tested on 10/23/20. Abandonment completed on 10/28/20. Meter install on 11/2/20. Water service abandonments performed on 1/7/21. (3/12/21)
C0102-20-02	3550 Cadillac Avenue	Commercial	Plans received and plan check fees paid on 11/25/19. 1st Plan check submitted 11/25/19 and redlines emailed on 12/4/19. Issued plan check application termination to Owner due to non-responsiveness to complete plan check process. 2nd Plan check submitted on 7/2/20 and returned on 7/5/20. (3/12/21)
C0105-20-01	3333 Avenue of the Arts	Commercial	Plans received and plan check fees paid on 7/24/19. 1st Plan check submitted 7/26/19 and redlines to be picked up on 7/26/19. 2nd Plan check submitted on 8/30/19 and resubmitted on 9/11/19. 3rd plan check resubmitted on 10/8/19. Permit approved and final fees paid on 10/24/19. Precon held on 11/24/19. Temporary RW pipeline inspected and approved on 11/27/19 and report sent to DDW on 12/4/19. Precon meeting conducted on 3/5/21. Mainline and Fireline excavations inspected on 3/12/21.
C0122-20-01	925 W. 18th Street	Commercial	Plans received and plan check fees paid on 10/28/19. 1st Plan check submitted 10/28/19 and redlines picked up on 10/29/19. 2nd plan check submitted 12/4/19. 3rd Plan check submitted on 1/2/20 and redlines picked up on 1/6/20. Final plan check fees paid on 2/26/20. Inspector did a site pre-survey on 3/4/20. Permit issued on 4/18/20. Precon meeting held on 1/6/21. Shutdown performed on 2/1/21. Installed services on 2/3/21. Pressure test completed on 2/8/21, and Bac-T samples taken on 2/8/21 and again on 2/9/21. (3/12/21)

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0124-20-01	2209 Fairview Road	Commercial	Plans received and plan check fees paid on 11/18/19. 1st Plan check submitted 11/5/19 and redlines picked up on 11/19/19. 2nd Plan check submitted on 11/21/19 and redlines picked up on 11/27/19. 3rd Plan check submitted on 2/3/20 and redlines returned to customer on 2/4/20. Permit issued on 6/2/20. Precon meeting held on 7/9/20. Mainline and trench excavation inspected on 7/10/20. Meeting to refresh Precon with new Contractor held on 10/30/20. Precon with new contractor held on 3/9/21. Services installed and backfilled on 3/12/21.
C0131-20-01	1975 Wallace Avenue	6 Unit Apartments	Plans received and plan check fees paid on 11/18/19. 1st Plan check submitted 11/18/19 and redlines picked up on 11/22/19. 2nd Plan check submitted on 12/2/19 and redlines picked up on 12/3/19. Final permit fees paid on 3/6/20 and permit issued on 3/6/20. Issuing permit termination to Owner due to non-responsiveness to complete inspection process. (3/12/21)
C0137-20-01	3001 Murray Lane	Single Family Home	Plans received and plan check fees paid on 2/28/20. 1st Plan check submitted on 2/28/20 and redlines returned on 3/9/20. 2nd submittal submitted on 9/30/20 and returned on 10/11/20. (3/12/21)
C0138-20-01	1966 Wallace Avenue	Five Single Family Homes	Plans received and plan check fees paid on 3/4/20. 1st Plan check submitted on 3/4/20. 2nd Plan check submitted on 3/20/20 and redlines returned on 3/22/20. Issued permit on 6/2/20. Precon meeting held on 10/5/20. Services installed and backfilled on 11/9/20. Meters installed and locked off on 11/16/20. (3/12/21)
C0140-20-01	2163 National Avenue	Single Family Home	Plans received and plan check fees paid on 3/4/20. 1st Plan check submitted on 3/4/20 and redlines returned on 3/13/20. Followed up with Owner on 8/15/20 expecting 2nd submittal late December 2020. Received Fire Department approval and Owner working on 2nd Plan Check submittal. (3/12/21)
C0142-20-01	2309 Santiago Drive	Single Family Home	Plans received on 4/23/20 and plan check fees paid on 4/29/20. 1st Plan check submitted on 4/23/20 and redlines returned on 5/9/20. 2nd Plan check submitted on 5/15/20 and redlines returned on 5/28/20. Issued Permit on 6/10/20. Precon held on 3/16/21.

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0148-20-01	2094 Balmoral Place	Single Family Home	Application for New Service received on 5/15/20. 1st Plan check submitted on 6/15/20 and redlines returned on 6/21/20. Plan check fees paid on 7/3/20. Awaiting response from customer on status. Site visit to check construction progress on 3/16/21.
C0149-20-01	1964 Raymond Avenue	Single Family Home	Application for New Service received on 5/15/20 and plan check fees paid on 6/21/20. 1st Plan check submitted on 6/10/20 and redlines returned on 6/21/20. 2nd Plan check submitted on 6/22/20 and redlines returned on 6/23/20. Issued permit on 7/16/20. Precon meeting held on 1/11/21. Meter upgraded and locked on 1/28/21. (3/12/21)
C0150-20-01	220 E. 21st Street	Single Family Home	Plans received on 7/3/20 and plan check fees paid on 6/25/20. 1st Plan check submitted on 6/25/20 and redlines returned on 7/5/20. 2nd Plan check submitted on 7/7/20 and redlines returned 7/12/20. 3rd Plan check submitted on 2/1/21 and redlines returned on 2/2/21. 4th Plan check submitted 2/4/21 and returned on 2/7/21. Permit issued on 3/5/21.
C0150-20-02	165 Merrill Place	Single Family Home	Plans received on 7/3/20 and plan check fees paid on 6/25/20. 1st Plan check submitted on 6/25/20 and redlines returned on 7/5/20. Rescinded permit on 9/16/20. 2nd Plan check submitted 9/28/20 and returned on 9/29/20. Issued permit on 10/27/20. Precon held on 3/17/21.
C0152-21-01	369 Costa Mesa Street	Single Family Home	Plans received on 7/21/20 and plan check fees paid on 7/15/20. 1st Plan check submitted on 7/22/20 and redlines returned on 7/22/20. Followed up with Owner on 11/13/20 regarding status. Owner to provide Construction cost estimate so Payment Voucher and Water Service Agreement can be prepared. (3/12/21)
C0155-21-01	451 Cabrillo Street	Single Family Home	Plans received on 7/21/20 and plan check fees paid on 7/21/20. 1st Plan check submitted on 7/22/20 and redlines returned on 7/22/20. 2nd Plan check submitted on 9/29/20 and response submitted on 9/29/20. Waiting for customer to pay the Payment Voucher and return Water Service Agreement. (3/12/21)
C0157-21-01	251 E. 20th Street	Single Family Home	Plan check fees paid on 8/5/20 and Application for New Service submitted on 8/5/20. 1st Plan check submitted on 8/5/20 and returned on 8/13/20. 2nd Plan check submitted on 8/19/20 and returned on 8/20/20. Issued permit on 9/17/20. Precon meeting held on 9/22/20. Contractor requested meter box only on 9/30/20. (3/12/21)

DEVELOPER PROJECT STATUS REPORT

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FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0158-21-01	396 E. 21st Street	Mobile Home Park	Plan check fees paid on 8/13/20 and Application for New Service submitted on 8/7/20. 1st Plan check submitted on 7/30/20 and returned on 8/15/20. 2nd Plan check submitted on 9/2/20 was rejected. Revised 2nd Plan check submitted on 9/10/20 and returned on 9/12/20. Issued permit on 10/27/20. Waiting for Precon inspection request. (3/12/21)
C0160-21-01	272 Rose Lane	Single Family Home	Plan check fees paid and Application for New Service submitted on 8/24/20. 1st Plan check submitted on 8/2420 and returned on 8/30/20. 2nd Plan check submitted on 8/31/20 and returned on 9/6/20. Issued permit on 9/30/20. Waiting for Precon inspection request. (3/12/21)
C0161-21-01	1775 and 1781 Monrovia Avenue	Commercial	Plan check fees paid and Application for New Service submitted on 8/27/20. 1st Plan check submitted on 8/20/20 and returned on 8/30/20. 2nd Plan check submitted on 9/21/20 and returned on 9/23/20. Issued permit on 11/12/20. Precon held on 2/16/21. Installed services on 2/17/21. Thrustblock placement inspected on 2/25/21. Backfill compaction and test and pressure tests completed on 3/2/21. Contractor requested meter box only on 3/3/21.
C0162-21-01	355 E. 19th Street	Single Family Home	Plan check fees paid and Application for New Service submitted on 8/27/20. 1st Plan check submitted on 8/27/20 and returned on 8/30/20. 2nd Plan check submitted on 9/2/20 and returned on 9/6/20. Issued permit on 9/17/20. Precon meeting held on 10/9/20. (3/12/21)
C0164-21-01	282 E. 18th Street	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/3/20. 1st Plan check submitted on 8/31/20 and returned on 9/6/20. Issued permit on 9/30/20. Waiting for Precon inspection request. (3/12/21)
C0165-21-01	2110 Monrovia Avenue	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/3/20. 1st Plan check submitted on 9/2/20 and returned on 9/6/20. Issued permit on 9/17/20. Waiting for Precon inspection request. (3/12/21)
C0166-21-01	470 Walnut Place	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/3/20. 1st Plan check submitted on 9/2/20 and returned on 9/6/20. Issued permit on 9/17/20. Waiting for Precon inspection request. (3/12/21)

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PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0169-21-01	785 Center Street	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/14/20. 1st Plan check submitted on 9/14/20 and returned on 9/18/20. 2nd Plan check submitted on 9/24/20 and returned on 9/25/20. Issued permit on 10/5/20. Site presurvey completed on 12/28/20. Waiting for Precon inspection request. (3/12/21)
C0170-21-01	446 Flower Street	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/25/20. 1st Plan check submitted on 9/25/20 and returned on 9/28/20. 2nd Plan check submitted on 9/29/20 and returned on 9/29/20. Permit issued on 10/23/20. Waiting for Precon inspection request. (3/12/21)
C0171-21-01	1719 Samar Drive	Single Family Home	Plan check fees paid and Application for New Service submitted on 9/25/20. 1st Plan check submitted on 9/25/20 and returned on 10/3/20. 2nd Plan check submitted on 10/6/20 and returned on 10/6/20. Permit issued on 10/23/20. Waiting for Precon inspection request. (3/12/21)
C0172-21-01	377, 379, 385 and 387 La Perle Place	4 Single Family Homes	Application for New Service submitted on 10/9/20 and waiting for Plan check fees to arrive via check. 1st Plan check submitted on 10/9/20 and returned on 10/12/20. 2nd Plan check submitted on 10/20/2020 and returned on 10/20/20. 3rd Plan check submitted on 10/27/20 and returned on 10/28/20. Permit issued on 12/22/20. Waiting for Precon inspection request. (3/12/21)
C0173-21-01	1815 Anaheim Ave	Kiddie Academy	Application for New Service and plan check fees submitted on 10/14/20. 1st Plan check submitted on 10/14/20 and returned on 10/27/20. 2nd Plan check submitted on 2/26/21 and returned on 2/28/21.
C0175-21-01	1499 Monrovia Avenue	Commercial	Application for New Service and Plan Check Fee submitted on 12/14/20. 1st Plan check submitted on 12/10/20 and returned on 12/23/20. 2nd Plan check submitted on 2/4/21 and returned on 2/7/21. Permit issued 2/22/21.
C0176-21-01	752-756 W. 19th Street	Mix Use	Application for New Service and plan Check Fees submitted on 12/21/20. 1st Plan check submitted on 12/21/20 and returned on 12/23/20. 2nd Plan check submitted 1/25/21 and returned on 2/2/21. 3rd Plan check submitted on 2/15 and returned on 2/15/21.
C0177-21-01	2141 Orange Avenue	Single Family Home	Application for New Service and Plan Check Fee submitted on 12/21/20 and returned on 12/23/20. 2nd Plan check submitted on 12/24/20 and returned on 12/24/20. Issued permit on 1/5/21. Waiting for Precon inspection request. (3/12/21)

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0178-21-01	3025 Capri Lane	Single Family Home	Application for New Service and plan Check Fees submitted on 12/21/20. 1st Plan check submitted on 12/21/20 and returned on 12/23/20. (3/12/21)
C0179-21-01	2183 and 2185 Tustin Avenue	Two Single Family Home	Application for New Service and Plan Check Fee submitted on 12/21/20. 1st Plan check submitted on 12/21/20 and returned on 12/23/20. 2nd Plan check submitted on 1/26/21 and returned on 2/2/21.
C0180-21-01	3197 Airport Loop, Building F	Commercial	Application for New Service and Plan Check Fee submitted on 12/23/20. 1st Plan check submitted on 12/23/20 and returned on 12/24/20. 2nd Plan check submitted on 1/11/21 and returned on 1/12/21. 3rd Plan check submitted on 2/4/21 and returned on 2/7/21.
C0181-21-01	381 Walnut Street	Single Family Home	Application for New Service submitted on 7/27/2020 and Plan Check Fee submitted on 12/31/20. 1st Plan check submitted on 12/22/20 and returned on 1/12/21. (3/12/21)
C0182-21-01	1850 Paros Circle	Single Family Home	Application for New Service submitted on 01/28/21 and Plan Check Fee received on 01/26/21. 1st Plan check submitted on 01/28/21 and redlines returned on 2/2/21. 2nd Plan check submitted on 2/4/21 and returned on 2/7/21. Permit issued 3/5/2021.
C0183-21-01	148 E. 22nd Street	Sr. Mary Armenian Church	Plan Check Fee received on 2/4/21. 1st Plan check submitted on 2/4/21. Waiting for Application for New Service. (3/12/21)
C0184-21-01	238 Flower Street	Single Family Home	Application for New Service submitted on 02/2/21 and Plan Check Fee received on 02/01/21. 1st Plan check submitted on 02/16/21 and redlines returned on 2/20/21. 2nd Plan Check submitted on 2/25/21 and returned on 2/28/21.Issued permit on 3/5/21.
C0185-21-01	125 and 127 Cabrillo Street	Commercial Property	Application for New Service submitted on 02/16/21 and Plan Check Fee received on 02/20/21. 1st Plan check submitted on 2/25/21 and returned on 2/28/21. 2nd Plan check submitted on 3/12/21 and returned on 3/14/21.
C0186-21-01	2033 Lemnos Drive	Single Family Home	Application for New Service submitted on 02/27/21 and Plan Check Fee received on 02/26/21. 1st Plan check submitted on 2/26/21 and returned on 2/28/21.

DEVELOPER PROJECT STATUS REPORT

PROJECT STATUS - DEVELOPER PROJECTS			
FILE NO.	PROJECT ADDRESS	PROJECT DESCRIPTION	PROJECT NOTES/STATUS
C0187-21-01	237 E. 21st Street	Single Family Home	Application for New Service submitted on 2/23/21 and Plan Check Fee received on 2/25/21. 1st Plan check submitted on 3/1/21 and returned on 3/5/21. 2nd Plan check submitted on 3/13/21 and returned on 3/14/21.
C0188-21-01	3190 Pullman Street	Commercial Property	Application for New Service submitted on 3/1/21 and Plan Check Fee received on 3/4/21. 1st Plan check submitted on 3/2/21 and returned on 3/5/21. 2nd Plan check submitted on 3/12/21 and returned on 3/14/21.
C0189-21-01	975 West 18th Street	Commercial Property	Application for New Service submitted on 03/04/21 and Plan Check Fee received on 03/04/21. 1st Plan check submitted on 3/4/21 and returned on 3/5/21.
C0190-21-01	934 West 17th Street	Commercial Property	Application for New Service submitted on and Plan Check Fee received on 3/9/21. 1st Plan check submitted on 3/8/21 and returned on 3/14/21.

MESA WATER AND OTHER AGENCY PROJECTS STATUS REPORT
March 2021

Project Title: OC-44 Replacement and Rehabilitation Evaluation and Cathodic Protection Study

File No.: M 2034

Description: Evaluate potential repair and replacement options.

Status: Request for Bids sent out to contractors on February 6, 2019. Six bids received on 3/6/19. E&O Committee recommended award of the contract to lowest bidder (E.J. Meyer Company) on 3/19/19. Kick-off meeting held on 4/25/2019. Reviewed submittals. Met with SARWQB on 5/24/19 and discussed permit requirements w/ Susan Beeson. On 5/30/19 met with OCSD and went over requirements for the Special Purpose Discharge Permit (SPDP). Project Progress meeting on 6/6/19 and coordination meeting with MWD on 6/20/19. Held Permit Status Meeting on 7/11/2019, Traffic Coordination Meeting with Fletcher Jones on 7/23/2019 and Project Progress Meeting on 7/23/2019. Submitted Application Package to OCSD for SPDP on 7/31/2019. Received Special Purpose Discharge Permit from OCSD on 9/1/2019. Coordination meeting with Fletcher Jones and Project Progress Meeting held on 9/11/19. Contractor mobilized on 9/15/19 and started dewatering efforts. Project is substantially complete and line is ready for use. Native planting is complete and the contractor is providing maintenance of planted vegetation. The post-construction walk-through meeting held on 4/30/20. Planting Establishment and 120-day Maintenance Period completed on 7/2/20. The final inspection and walk-though meeting held on 7/23/20. Planting Establishment and Maintenance Report submitted to the regulatory agencies on September 29, 2020. Non-native plant herbiciding performed on 11/14/20. (3/12/21)

Project Title: Pipeline Testing Program

File No.: MC 2141

Description: Implement Resolution No. 1442 Replacement of Assets to annually perform non-destructive testing of 1% of the distribution system, and destructive testing of segments that are shown to have less than 70% of original wall thickness by non-destructive testing.

Status: Three miles of AC pipe constructed in 1956 were selected for non-destructive wall thickness measurement, which occurred during the week of January 14, 2019. The report was received on February 8, 2019. Five AC pipe samples were sent to the testing lab in May 2019, and the wall thickness measurement report was received on June 24, 2019. With more data collected from AC pipe samples, a proposed update of the Res. 1442 Replacement of Assets was approved by the E&O Committee in September 2019. Staff developed a process for classifying pipeline breaks, and provided a class to the Distribution crews on November 21, 2019. Four AC pipe samples collected during valve replacements were sent for EDS testing on January 28, 2020. Lab reports were received on March 19, 2020 and evaluation of the lab results was received on June 12, 2020. MWDOC performed approximately 40 miles of leak detection and found one suspected pipeline leak. Staff performed a follow up leak detection and could not replicate the suspected leak. Thirteen (13) AC pipe samples collected by staff during valve replacements and break responses we sent for wall thickness measurement, EDS testing, and remaining useful life estimates. Wall thickness lab reports were received and useful life estimate report is expected on February 24, 2021. MWDOC staff performed 30 miles of leak detection for main lines and service laterals in January 2021. A report of their findings found no mainline leaks. 30 additional miles of leak detection is currently in progress. (3/12/21)

Project Title: Chandler & Croddy Wells and Pipeline Project

File No.: M18-113

Description: Design, documentation, permitting, and construction of two new wells located on Chandler Avenue and Croddy Way in the City of Santa Ana and the distribution pipeline connecting the wells to Mesa Water's supply system.

Status: The Chandler Well 12 and Croddy Well 14 and Pipeline Project Team includes Design Engineer TetraTech, Construction Manager Butier Engineering, and Community Outreach Consultant Murakawa & Associates. The project has four phases, with a construction bid package for each phase. The status of each phase is below.

Phase 1: Demolition. Demolition of the existing office buildings at the well site properties was awarded to Standard Demolition on July 9, 2020 and was completed on October 14, 2020.

Phase 2: Well Drilling. Well Drilling was awarded to Zim Industries dba Bakersfield Well & Pump on August 13, 2020. Permits for well drilling were received from Orange County Heath Care Agency (OCHCA) on October 7, 2020. Mobilization for drilling at the Croddy Well 14 site started on October 12, 2020. Construction of sound walls is complete at both sites. The Croddy Well 14 pilot hole was drilled, and aquifer and water quality samples were collected and analyzed. The Croddy Well 14 casing was designed based on the analyses, and installed during the week of February 8, 2021. The gravel pack and sanitary seal were also installed. Well development will be performed the week of February 15, 2021 Test pumping is in progress. Drilling of the Chandler Well 12 pilot hole is currently in progress.

Phase 3: Well Equipping. The RFB for Chandler Well 12 and Croddy Well 14 Well Equipping was released on December 17, 2020 to six prequalified bidders. Addendum 1 to the RFB was released on January 14, 2021. A contract award to Gateway Pacific was approved at the February 11, 2021 Board of Directors meeting. A project team kickoff meeting was held on March 10, 2021.

Phase 4: Pipeline. Pipeline design is complete. The encroachment permit applications for the pipeline were submitted to the City of Costa Mesa and Santa Ana. Permit comments from both cities have been received and addressed. Permit applications have been resubmitted. The RFB will be released the week of March 15, 2021, and bids will be opened on April 14, 2021. (3/12/20)

Project Title: Meter Technology Evaluation

File No.: MC 2248

Description: The lifespan of a water meter is approximately 15 years. As a meter ages, the accuracy drops off due to wear. In preparation for its annual water meter replacement, staff has been reviewing water meter technology determining what water meter and reading solutions would be the best fit for Mesa Water's aging register technology. With today's technology, there are several types of meters and meter reading solutions available. The most common are as follows: Fixed Network, Automatic Meter Reading (AMR) System, Handheld or Touch Technology, and Advanced Metering Analytics - Cellular Endpoint.

Status: A request for bids was sent out the on-call contractors for the installation of the Route 600 Meter Technology Pilot Project Meters. Bids from the on-call contractors were received on October 15, 2020 and reviewed by staff. W.A. Rasic was selected from the bids received. The preconstruction meeting was held on 11/12/2020. Kickoff meeting with Contractor was held on November 12, 2020. The official notice to proceed was issued on 11/30/20. W.A. Rasic began their field investigation of the Route 600 meters the week of 11/30/20. W.A. Rasic has begun replacing meters and installing the cellular endpoints. To date, approximately 180 endpoints have been installed and 100 meters replaced. Based on the current construction schedule, the project is anticipated to be substantially complete by the end of March. (3/15/21)

Project Title: Reservoirs 1 & 2 Chemical Systems Design

File No.: M18-117

Description: Improve disinfection and mixing in both reservoirs to improve water quality and minimize nitrification.

Status: Final Design Contract awarded to Hazen & Sawyer on February 14, 2018. 50% design report received on July 17, 2018. Design review workshop took place in September 2018. A site visit to Laguna Beach County's El Morro reservoirs occurred on November 8, 2018, to evaluate the Vortex mixing system. Staff met with the designer on December 5, 2018, to incorporate design-for-reliability and design-for-maintainability principals into the mixing system design. The consultant provided a Technical Memo summarizing the options for maintainability and reliability of the Vortex mixer system on April 4, 2019. The 90% design deliverable was received on June 4, 2019, and is being reviewed by staff. Per the E&O Committee's request, the Preliminary Design Report describing the basis of this project was included in the October E&O Committee package. The consultant is working with the reservoir management system supplier to use Mesa Water's standardized analytical equipment to maintain disinfectant residual in the reservoirs. 100% design deliverable was received on April 29, 2020 and was reviewed by staff. Revised 100% was received on June 23, 2020 and reviewed by staff. Resolution to final comments is expected to be completed in March 2021. (3/12/21)

Project Title: District Wide Security System

File No.: M20-600

Description: Planning and Design Services for a District-Wide Security System

Status: The District-Wide security system is among the first new projects to be awarded as part of the Capital Improvement Program Renewal (CIPR). The draft scope of work was developed and sent for consultant review on June 16, 2020. Consultant comments were received on June 23, 2020. The final Request for Task Order proposal was issued on July 21, 2020. Three proposals were received on August 3, 2020 and evaluated. A Task Order authorization was issued to HDR. Kickoff and site visits were conducted on August 25-27, 2020. The consultant is conducting the evaluation. The draft white paper was received on October 12, 2020, and was reviewed by staff. The revised white paper was received on November 9, 2020, and was being reviewed by staff. A meeting was held on November 18, 2020, to discuss the options. A revised white paper was received on December 4, 2020, and was reviewed by staff. Final decisions on implementation are pending evaluation of Fiber Optic communication availability being performed by a different consultant. (3/12/21)

Project Title: Mesa Water Education Center Project

File No: M20-105

Description: Mesa Water Education Center and Storage Facility

Status: In November 2019, the Board directed staff to proceed with Design Concept 2 of the Mesa Water Reliability Facility Outreach Center. Mesa Water obtained a cost proposal from IBI Group to provide professional design services and construction support services for the Mesa Water® Education Center. The scope of work also incorporates the design of a MWRF spare parts storage building (located at the MWRF) and wells spare parts storage building (located at Well 9 or other well site) as part of the design services. Board approved this item at its 4/9/2020 Board Meeting. The pre-design kick-off meeting was held on 4/27/20. Conceptual design reviewed on 6/10/20 and preliminary cost estimate discussed on 7/9/2020. At the August 25, 2020 Committee Meeting the Mesa Water® Education Center building concept was approved by the Board. Additionally, a contract was awarded to Mad Systems for the exhibit design. On September 17, 2020 a final design kick-off meeting was held with the architect and exhibit design teams. On October 6, 2020, the Mesa Water team toured the Albert Robles Center for Water Recycling and Environmental Learning with Mad Systems. On October 15, 2020 the design team held a site visit at the MWRF to discuss landscaping and courtyard concepts. The design team held progress meetings on 10/29/20, 11/12/20, and 11/25/20 to discuss project alternatives and progress. A preliminary landscaping concept was received on 11/25/20. The 50% design submittal was received on 12/15/2020. The comments to the submittal were discussed during progress meetings on 1/21/21 and 2/4/21. 50% Construction Documents were submitted 3/12/21 and are currently being reviewed. The architectural team is currently developing finish alternatives for review and selection by the Mesa Water team. (3/15/21)

Project Title: MWRF Parking Project

File No.: M20-105

Description: Construct Parking on Gisler Avenue

Status: The Board approved Alternative No. 3 Parking option along Gisler Ave. on 3/15/2014. E & O Committee accepted the conceptual design (by NV5 former Civil Source) and provided comments at the May 2015 E&O Committee Meeting. An Encroachment Permit was received from the City of Costa Mesa in September 2016. The final bid package was completed 3/15/16. Board approved the Hold Harmless Agreement for the Installation of off-site parking improvements within public right-of-way at the August 2016 E&O Committee Meeting. Agreement sent to the City for execution and recording on 9/7/16. Recorded Agreement received from the City on 10/19/16.

Request for Bids sent out to contractors on February 25, 2020. Two bids received on 3/24/20. Board awarded contract to the lowest bidder (GMC Engineering, Inc.) on 4/9/20. The City of Costa Mesa Encroachment/Traffic Permit received on 5/21/20. Construction started on 6/29/20 and completed 8/20/20. The 180-Day Landscape & Irrigation Maintenance period started on 8/21/20 and ended on 2/17/21. The final walk through was held on 2/16/21. The project is being closed. (312/21)

Project Title: Wilson Avenue Pipeline Replacement Project

File No.: M21-220A

Description: Design, documentation, and permitting for replacement of pipeline in Wilson Avenue between Newport Blvd and Harbor Blvd.

Status: Scope of Work and Request for Quotes for the design, documentation, and permitting for the Wilson Avenue Pipeline Replacement Project was prepared and sent to the design consultants on 7/13/2020. Received five proposals on 8/27/20. Water Systems Consultants, Inc (WSC) selected to prepare the design. Kick-off meeting held on 8/13/2020. Technical Memorandum No. 1 providing alternative pipeline layout submitted for review on 10/12/20. 50% Design package submitted for review on 12/23/20. The comments to the submittal were analyzed and discussed on 2/8/21. WSC completed the 90% Design Submittal on 3/9/21. The submittal is being reviewed. (3/12/21)

Project Title: 1951 Cohort Pipeline Replacement Project

File No.: TBD

Description: Design, documentation, and permitting for replacement of 3.5 miles of pipeline in Hamilton St., Pomona Ave., Wallace Ave., Anaheim Ave., and Maple Ave.

Status: Scope of Work and Request for Proposals for providing CM services for the Wilson Avenue and 1951 Cohort Pipeline Replacement Projects sent out to As-Needed Consultants on 11/30/20. Five proposals received on 12/14/20. CDM Smith was selected to provide the CM Services. (2/12/21).

Scope of Work and Request for Proposals for providing design services for the 1951 Cohort Pipeline Replacement sent out to As-Needed Consultants on 12/1/20. Two proposals received on 12/15/20. Tetra Tech was selected to prepare the design. The project kick-off meeting was held on 2/2/21. Tetra Tech is currently developing the project's permit plan and 50% submittal. (3/12/21)

Project Title: Mainline Valve Replacement Project Phases I through IV

File No.: M21-001MV

Description: Design, documentation, and permitting for replacement of mainline valves within the distribution system per the Mainline Valve Spacing Policy.

Status: At the October 8, 2020 Board Meeting the Mainline Valve Spacing Policy was approved by the Board. A Scope of Work and Request for Quote for the design, documentation, and permitting for the Mainline Valve Replacement Project was prepared and was sent to on-call design consultants the week of October 19, 2020. Received four proposals on 11/3/20. Tetra Tech was selected to prepare the final design. The project Kick-off meeting was held on 1/12/21. Tetra Tech developed the project's permit plan and continues working on 50% Design Submittal. (3/12/21)

Project Title: Water and Energy Supply Chain Reliability Study

File No.: M21-210B

Description: The study will evaluate Mesa Water's water and energy supplies and backup capabilities under normal and emergency operations, identify potential water and energy supply reliability gaps, evaluate Mesa Water's supply chain system relative to emergency readiness, and provide recommendations to improve water and energy supply reliability.

Status: A scope of work and request for task order proposals were sent to on-call design consultants on June 5, 2020. Five task order proposals were received on June 19, 2020. Brown and Caldwell was selected to perform the study. The project Kick-off Meeting and site visits were held the week of July 27, 2020. The draft version of TM-1 Water Supply Reliability was received on August 21, 2020. The project team held Single-Point of Failure meetings on September 14 and 21 to evaluate single-points of failure and criticality of the failure for the clear wells, Reservoirs, and MWRF. The draft version of TM-2 Energy Supply Reliability Assessment was delivered on September 15, 2020. The final version of TM-1 was received on October 5, 2020. The project team is currently working to resolve comments and questions regarding TM-2 and TM-3. The anticipated delivery date for the final version of TM-2 and draft version of TM-3 is the week of October 26, 2020. Final versions of TMs 1 and 2 were delivered on 10/30/20 and 11/5/20, respectively. The draft version of TM-3 was delivered on 11/4/20 and is currently being reviewed by the Mesa Water team. Mesa Water Staff has been working with Brown and Caldwell to resolve comments and finalized TMs 1, 2, and 3. Updated versions of TMs 1, 2, and 3 and a draft version of the Executive Summary were received on 12/4/20 and are being reviewed by staff. The report recommendations were presented to the Board at the December Committee Meeting. Staff is currently working with Brown and Caldwell to address report comments. Mesa Water Staff has addressed comments from the December Committee Meeting with Brown and Caldwell and an updated report will be presented to the Board at the March Committee Meeting. (3/15/21)

Project Title: Excavation Slurry Dewatering Pit Project

File No.: M21-250D

Description: Design, documentation, and permitting for a dewatering process that will be constructed in Mesa Water's Operations Yard to provide dewatering for the hydrovac excavation slurry.

Status: A Scope of Work and Request for Quote for the design, documentation, and permitting for the Excavation Slurry Dewatering Pit Project was prepared and sent to on-call design consultants the week of October 19, 2020. The task order and notice to proceed are being developed by the Mesa Water team for the selected consultant. The kick-off meeting and site visit were held on 11/30/20. The project team held a progress meeting on 12/23/2020 and the draft report is currently in progress. The Draft memo was submitted for review on 2/3/21 and is currently being reviewed by Mesa Water Staff. (3/15/21)

Project Title: Vault Rehabilitation and Abandonment

File No.: M20-220B

Description: Design and construction of abandonment of obsolete facilities and rehabilitation of interties with neighboring agencies.

Status: NV-5 was selected as the design consultant. Project kickoff was held on September 30, 2020. Site visits for all of the vaults were conducted in October 2020. A preliminary design report was received in November 2020 and review by staff. This project is divided into two phases. Phase 1 is the fast track abandonment of four vaults on the OC-44 Pipeline prior to the OC Feeder import line being taken out of service by Metropolitan Water District (Met) from September 15, 2021-June 15, 2022. Phase 2 is the abandonment of three unused pressure relief stations and rehabilitation or abandonment of three interties. Fast track design of the Phase 1 vaults is in process. Phase 1 80% design was received on March 3, 2021, and is being reviewed by staff. Phase 2 is on hold pending decisions on the need for the interties. (3/21/21)

Water Quality Call Report February 2021

Date: 2/10/2021
Source: Phone/Visit
Address: 1645 Corsica
Description: Customer concerned about black particles in the water from kitchen sink. She was not clear if the black particles were isolated to the kitchen only.

Outcome: Water from front hose bib was checked and was clear. It did not contain the black particles seen in the samples the customer collected and saved from the kitchen sink. The black particles appeared to be degraded rubber particles used in household plumbing/hoses. Customer was advised to call a plumber to troubleshoot. Customer requested and was given a list of local laboratories since she was interested in testing the black particles.

Water Operations Status Report
July 1, 2020 - February 28, 2021

Operations Department Status Report	Wk Unit	Plan Days	Act Days	Plan Qty	Act Qty	Plan Cost	Actual Cost
01 - HYDRANTS							
WD-0101 - HYDRANT MAINTENANCE	HYDRANTS	117	76	2233	1489	$47,273	$35,000
WD-0102 - HYDRANT PAINTING	HYDRANTS	9	0	279	2	$3,923	$125
WD-0103 - HYDRANT REPAIR	HYDRANTS	27	31	40	52	$9,939	$27,462
Program 01 TOTAL		153	107			$61,135	$62,587
02 - VALVES							
WD-0201 - DISTRIBUTION VALVE MAINTENANCE	VALVES	79	67	1587	1313	$35,375	$30,572
WD-0202 - NIGHT VALVE MAINTENANCE	VALVES	6	0	82	0	$3,004	$0
Program 02 TOTAL		86	67			$38,379	$30,572
03 - METERS							
CS-0301 - NEW METER INSTALLATION	METERS	6	8	69	50	$29,246	$19,653
CS-0302 - RAISE REPLACE METER BOX	BOXES	5	1	53	8	$2,345	$597
CS-0303 - METER LEAK INVESTIGATION/REPAIR	INV/REP	14	8	214	84	$5,771	$3,378
CS-0305 - ANGLE STOP/BALL VALVE REPLACE	REPLACE	22	22	54	61	$13,361	$8,976
CS-0306 - LARGE METER TEST/REPAIR - C	TESTS	15	4	77	15	$6,241	$1,320
WD-0305 - ANGLE STOP/BALL VALVE REPLACE	REPLACE	17	7	34	16	$10,966	$3,849
Program 03 TOTAL		80	50			$67,930	$37,773
04 - MAIN LINES							
WD-0401 - MAIN LINE REPAIR	REPAIRS	66	37	13	6	$40,263	$24,245
WD-0402 - AIR VAC MAINTENANCE/REPAIR	REPAIRS	18	2	105	1	$6,928	$812
Program 04 TOTAL		84	39			$47,191	$25,057
05 - SERVICE LINES							
WD-0501 - SERVICE LINE REPAIR	REPAIRS	38	53	14	27	$19,399	$37,635
Program 05 TOTAL		38	53			$19,399	$37,635
06 - CAPITAL							
CAP AV - CAPITAL AIR VACUUM REPLACE	AIR VACS	10	0	5	0	$5,733	$0
CAP BI - CAPITAL BYPASS & METER INSTALL	REPLACE	12	0	1	0	$7,381	$0
CAP FH - CAPITAL HYDRANT UPGRADE	HYDRANTS	66	189	10	28	$64,464	$180,584
CAP MV - CAPITAL MAINLINE VALVE REPLACE	VALVES	75	111	13	21	$60,033	$83,478
CAP SL - CAPITAL SERVICE LINE REPLACE	SERVICES	25	14	7	6	$16,117	$9,618
CAP SS - CAPITAL SAMPLE STATION REPLACE	STATIONS	5	8	5	12	$2,788	$3,874
CAP LM - CAPITAL LARGE METERS	METERS	5	1	33	2	$13,082	$1,540
CAP SM - CAPITAL SMALL METERS	METERS	11	10	166	101	$15,994	$13,528
Program 06 TOTAL		209	333			$185,592	$292,622
TOTAL						$419,626	$486,246

Payment Listing by Class

2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
CAPITAL					
BUTIER CONSULTING ENGINEERS	000003043	02/18/21	B007MWD	M18-100 CHANDLER & CRODDY	$8,622.59
	1				**$8,622.59**
MICHAEL BAKER INTERNATIONAL	000002929	02/04/21	1106069	OCTA 2246INSP 405 FAIRVIEW	$2,870.00
	000003075	02/25/21	1108858	OCTA 2246INSP 405 FAIRVIEW	$15,820.00
	2				**$18,690.00**
MURAKAWA COMMUNICATIONS, INC.	000002930	02/04/21	MESA WATER-7	M20-109 PUBLIC OUTREACH	$14,800.00
	000002961	02/11/21	MESA WATER-8	M20-109 PUBLIC OUTREACH	$7,350.00
	2				**$22,150.00**
NV5, INC.	000002931	02/04/21	197181	M21-220B VAULT REHAB ABANDMNT	$3,580.00
	1				**$3,580.00**
STANDARD DEMOLITION	000002991	02/18/21	2	M18-100 CHANDLER/CRODDY DEMO	$151,071.85
	1				**$151,071.85**
TETRA TECH, INC	000003040	02/18/21	51690910	OCTA 2246INSP-405 WIDENING	$2,100.00
		02/18/21	51690702	M18-100 CHANDLER & CRODDY	$12,607.50
	1				**$14,707.50**
Total CAPITAL	**8**				**$218,821.94**
CHECK SIGNATURE EXEMPT					
SOUTHERN CALIFORNIA EDISON CO	000002885	02/04/21	2236281499JAN 21	ELECTRICITY - JANUARY 2021	$99,921.34
	1				**$99,921.34**
Total CHECK SIGNATURE EXEMPT	**1**				**$99,921.34**
DEPARTMENT EXPENSE					
ACWA JOINT POWERS INSURANCE AUTHORITY	000003046	02/25/21	MAR2021EAP	MARCH 2021 EAP	$140.42
	1				**$140.42**
BAVCO	000002888	02/04/21	984958	CALIBRATION SERVICE	$215.00
	1				**$215.00**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
CA ASS'N OF PUBLIC PURCH OFCR	000002891	02/04/21	300007765	2021 MEMBERSHIP RENEW MARY	$130.00
	1				**$130.00**
CALPERS BENEFIT PAYMENTS	0160152	02/18/21	021821	PPE 2/3/21	$40,218.55
	0160153	02/03/21	020321	PPE 1/15/21	$39,505.96
	0160154	02/04/21	16304559	FEBRUARY HEALTH PREMIUM	$56,548.95
	0160155	02/04/21	16304571	FEBRUARY PA HEALTH PREMIUM	$6,947.13
	4				**$143,220.59**
COLONIAL LIFE & ACCIDENT INS	000002915	02/04/21	8892333-0208652	INSURANCE - PPE 01/29/21	$201.68
	000003053	02/25/21	8892333-0222544	INSURANCE - PPE 02/12/21	$201.68
	2				**$403.36**
HOOVER PRINTING	000002958	02/11/21	96002	PRINTING - POSTCARDS	$287.43
	000003059	02/25/21	96020	DESIGN WORK	$120.00
	2				**$407.43**
ORANGE COUNTY EMPLOYEES ASSN	000002916	02/04/21	OCEA PPE 02/03/21	MEMBERSHIP DUES PPE 02/03/21	$275.52
	000003077	02/25/21	OCEA PPE 02/12/21	MEMBERSHIP DUES PPE 02/12/21	$285.36
	2				**$560.88**
TASC	000003022	02/18/21	IN1966639	FSA ADMIN FEES - JANUARY 2021	$462.25
	1				**$462.25**
ULTIMATE STAFFING SERVICES	000002936	02/04/21	13976540	TEMP LABOR, HR, WE 01/17	$1,033.65
		02/04/21	13975186	TEMP LABOR, PA, WE 01/17	$1,374.96
	000002987	02/11/21	13980532	TEMP LABOR, PA, WE 01/31	$1,374.96
		02/11/21	13977893	TEMP LABOR, PA, WE 01/24	$1,374.96
	000003028	02/18/21	13983234	TEMP LABOR, PA, WE 02/07	$1,374.96
	000003082	02/25/21	13985906	TEMP LABOR, PA, WE 02/14	$1,374.96
		02/25/21	13977894	TEMP LABOR, HR, WE 01/24	$1,033.65

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
ULTIMATE STAFFING SERVICES	000003082	02/25/21	13985907	TEMP LABOR, HR, WE 02/14	$1,197.33
		02/25/21	13980533	TEMP LABOR, HR, WE 01/31	$999.76
		02/25/21	13983235	TEMP LABOR, HR, WE 02/07	$1,033.65
	4				**$12,172.84**
VISION SERVICE PLAN - (CA)	000003069	02/25/21	811716417	MAR 21 VISION INSURANCE	$1,244.68
	1				**$1,244.68**
VISTA DEL VERDE LANDSCAPE	000003029	02/18/21	34772	LANDSCAPE MAINTENANCE - FEB21	$2,532.80
	1				**$2,532.80**
Total DEPARTMENT EXPENSE	**20**				**$161,490.25**
GENERAL AND ADMINISTRATIVE					
360 BC GROUP INC.	000002951	02/11/21	20835	WEBSITE MAINTENANCE - JAN	$2,000.00
	1				**$2,000.00**
ACI PAYMENTS INC.	000003014	02/18/21	1000040203	ONLINE PAYMENT MAINT FEE	$150.00
	1				**$150.00**
ALL AMERICAN ASPHALT	000002942	02/04/21	CHEQ00099007 708	20071300 Cheque Deposits 20071	$1,018.66
	1				**$1,018.66**
AMY BYRNE	000002995	02/18/21	CHEQ00099007 717	09104500 Cheque Deposits 09104	$245.49
	1				**$245.49**
APPLIED BEST PRACTICES, LLC/FIELDMAN ROLAPP	000003071	02/25/21	25901	PROFESSIONAL SERVICES	$350.00
	1				**$350.00**
ATKINSON, ANDELSON, LOYA, RUUD & ROMO	000002887	02/04/21	612804	LEGAL SERVICES - DECEMBER 2020	$13,764.80
	1				**$13,764.80**
BARTEL & ASSOCIATES LLC	000003072	02/25/21	20-763	CONSULTING - OPED VALUATION	$2,868.00
		02/25/21	20-947	CONSULTING - OPED VALUATION	$5,632.00
		02/25/21	20-1078	CONSULTING - OPED VALUATION	$2,200.00
	1				**$10,700.00**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
BLUECOSMO SATELLITE COMMUNICATIONS	000002889	02/04/21	BU01292345	SATELLITE PHONE SERVICE	$93.12
	000003049	02/25/21	BU01299890	SATELLITE PHONE SERVICE	$93.12
	2				**$186.24**
BOLLAND AND ASSOCIATES	000002952	02/11/21	210301	REGULATORY CONSULTING FEE	$400.00
	1				**$400.00**
BRIAN GILCHRIST	000002949	02/11/21	CHEQ00099007 713	01224100 Cheque Deposits 01224	$101.80
	1				**$101.80**
BROWN & CALDWELL	000002920	02/04/21	12394281	M21-250D EXCAVATION SLURRY	$2,950.00
	000003073	02/25/21	12395640	M21-210B WATER SUPPLY ASSESMNT	$3,324.00
	2				**$6,274.00**
CALIFORNIA ADVOCATES INC.	000002953	02/11/21	022163	PROFESSIONAL SERVICES	$7,700.00
	1				**$7,700.00**
CANON FINANCIAL SERVICES, INC.	000002890	02/04/21	26056241	PRINTER EQUIPMENT LEASE	$3,902.71
	000002996	02/18/21	26154560	PRINTER EQUIPMENT LEASE	$2,024.93
	000003050	02/25/21	26246878	PRINTER EQUIPMENT LEASE	$2,000.93
	3				**$7,928.57**
CCS ORANGE COUNTY JANITORIAL INC.	000002923	02/04/21	502232	JANITORIAL SERVICES	$3,798.08
		02/04/21	500934	JANITORIAL SERVICES	$3,798.08
		02/04/21	500935	M20-099 DAY PORTER SERVICE	$3,264.08
	1				**$10,860.24**
CHUBB	000003051	02/25/21	122120	BUSINESS TRAVEL INSURANCE	$3,750.00
	1				**$3,750.00**
CITY OF SANTA ANA	000003074	02/25/21	35776303JAN21	CHANDLER WATER/SEWER	$194.59
		02/25/21	35821304JAN21	CRODDY WATER/SEWER	$772.11
	1				**$966.70**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
CITY OF TUSTIN	000002921	02/04/21	2021	CY2021 HR MEMBERSHIP RENEWAL	$75.00
	1				**$75.00**
CLIFTON JONES	000002943	02/04/21	CHEQ00099007 709	30000037 Cheque Deposits 30000	$429.37
	1				**$429.37**
CLIFTONLARSONALLEN LLP	000002922	02/04/21	2688489	CONSULTING - FY20	$1,500.00
		02/04/21	2716562	CONSULTING - FY20	$4,800.00
	000002998	02/18/21	2737978	CONSULTING - FY20	$1,500.00
	2				**$7,800.00**
COSTCO WHOLESALE	000002924	02/04/21	030121	ANNUAL MEMBERSHIP RENEWAL	$240.00
	1				**$240.00**
EAN SERVICES LLC	000003000	02/18/21	26216518	M20-099 TRUCK RENTAL	$6,162.77
	1				**$6,162.77**
EMPOWER	0160150	02/03/21	020321	PPE 1/29/21	$13,086.74
	0160151	02/03/21	0203211	PPE 1/29/21	$1,028.96
	0160157	02/17/21	21221	PPE 2/12/21	$1,028.96
	0160158	02/17/21	0212211	PPE 2/12/21	$13,042.25
	4				**$28,186.91**
ENTERPRISE FM TRUST	000003056	02/25/21	FBN4145803	AUTO LEASES - FEBRUARY 2021	$1,025.68
	1				**$1,025.68**
FM THOMAS AIR CONDITIONING INC	000002895	02/04/21	42062	REPLACE VFD COOLING UNIT	$14,847.63
	1				**$14,847.63**
FULL CIRCLE RECYCLING	000002925	02/04/21	26148	RECYCLING SERVICES	$133.50
	1				**$133.50**
GEMPLER'S	000002896	02/04/21	INV0004459196	PROTECTIVE GEAR	$190.24
	000003001	02/18/21	INV0004460494	PROTECTIVE GEAR	$74.24
	2				**$264.48**
GERARD SIGNS & GRAPHICS INC	000003002	02/18/21	29366	DESIGN SERVICES	$985.00
	1				**$985.00**
GLOBAL ENVIRONMENTAL NETWORK INC.	000003035	02/18/21	968491	SAFETY TRAINING	$890.00
		02/18/21	968489	SAFETY TRAINING	$880.00

Payment Listing by Class

2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
	1				**$1,770.00**
HDR ENGINEERING INC	000002957	02/11/21	1200313606	M20-600 DIST SECURITY SYSTEM	$14,337.50
	1				**$14,337.50**
IBI GROUP	000003044	02/25/21	10012081	M20-105 MWRF OUTREACH CENTER	$6,169.50
		02/25/21	10012005	M20-105 MWRF OUTREACH CENTER	$50,450.97
	1				**$56,620.47**
INFOSEND INC	000002897	02/04/21	184807	CUSTOMER BILLING SERVICE	$1,430.96
	1				**$1,430.96**
INSIGHT PUBLIC SECTOR	000003007	02/18/21	1100805644	MS SOFTWARE RENEWAL	$24,942.00
	1				**$24,942.00**
JOHN ROBINSON CONSULTING, INC.	000003009	02/18/21	MW202001-07	M20-100 METER TECH IMPLEMENT	$4,800.00
		02/18/21	MW201901-22	CONSULTING SERVICES	$7,200.00
	1				**$12,000.00**
KEITH CRECELIUS	000002993	02/18/21	CHEQ00099007716	08703100 Overpayment	$311.75
	1				**$311.75**
KLEEN KRAFT SERVICES	000003010	02/18/21	1060034	UNIFORMS, MATS, TOWELS	$226.27
		02/18/21	1059372	UNIFORMS, MATS, TOWELS	$220.13
		02/18/21	1060701	UNIFORMS, MATS, TOWELS	$221.78
	000003060	02/25/21	1062027	UNIFORMS, MATS, TOWELS	$221.78
	2				**$889.96**
LAUREN HAMPTON	000002948	02/11/21	CHEQ00099007712	02514500 Cheque Deposits 02514	$9.34
	1				**$9.34**
LIEBERT CASSIDY WHITMORE	000002900	02/04/21	1512497	PROFESSIONAL SERVICES - DEC	$1,921.00
	1				**$1,921.00**
McDERMOTT WILL & EMERY	000002960	02/11/21	3480678	CONSULTING SERVICES	$19,112.50
	1				**$19,112.50**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
MENDE CONSULTING	000003061	02/25/21	2021-01	CONSULTING WATER CONVERSION	$4,880.00
	1				**$4,880.00**
NOACK AWARDS & ENGRAVING INC	000003037	02/18/21	26555	LASER GRAVING AWARDS	$30.17
	1				**$30.17**
NOVATIME TECHNOLOGY INC	000003013	02/18/21	SI-091438	MONTHLY FEE - TIME CARDS	$190.25
	1				**$190.25**
OC 405 PARTNERS JV	000003032	02/18/21	CHEQ00099007718	20076800 Cheque Deposits 20076	$959.84
	1				**$959.84**
O'NEIL STORAGE #0481	000003015	02/18/21	2101055	FILE STORAGE - JANUARY 2021	$141.68
	1				**$141.68**
ORANGE COUNTY TREASURER - TAX COLLECTOR	000002932	02/04/21	140-041-57-FY21.	FY21 SPECIAL ASSESSMENT	$169.50
		02/04/21	415-014-03-FY21.	FY21 SPECIAL ASSESSMNT-CHANDLR	$269.42
		02/04/21	415-024-17-FY21.	FY21 SPECIAL ASSESSMNT-CRODDY	$212.42
		02/04/21	422-301-03-FY21.	FY21 SPECIAL ASSESSMNT-1965PL	$1,462.96
	000003062	02/25/21	SC12669	QUARTERLY 1/21-3/21 OCSD COMM	$313.00
	2				**$2,427.30**
PACIFIC TRUCK EQUIPMENT INC	000002982	02/11/21	72332	VEHICLE REPAIR	$11,414.47
	000003063	02/25/21	72398	VEHICLE MAINTENANCE	$6,063.02
	2				**$17,477.49**
PROCARE WORK INJURY CENTER (DBA)	000002983	02/11/21	303749	MEDICAL SERVICES	$120.00
		02/11/21	303658	MEDICAL SERVICES	$150.00
		02/11/21	303503	MEDICAL SERVICES	$120.00
	1				**$390.00**
QUADIENT FINANCE USA, INC	000003025	02/18/21	3751JAN21	POSTAGE - JANUARY 2021	$499.98
	1				**$499.98**
RAFTELIS FINANCIAL CONSULTANTS	000003018	02/18/21	18194	CONSULTING - WATER COST COMP	$4,080.00

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
RAFTELIS FINANCIAL CONSULTANTS	000003018	02/18/21	18193	CONSULTING-WATER COST ANALYS	$3,912.50
	1				**$7,992.50**
RAYNE WATER SYSTEMS	000002902	02/04/21	30486FEB21	SOFT WATER SERVICE FEB 21	$41.42
	1				**$41.42**
REBECCA CHADWICK	000002939	02/04/21	CHEQ00099007710	07620200 Cheque Deposits 07620	$218.89
	1				**$218.89**
ROBERT DIMEL	000002994	02/18/21	CHEQ00099007715	10020501 Cheque Deposits 10020	$126.15
	1				**$126.15**
RSM US PRODUCT SALES, LLP	000002903	02/04/21	6207435	GREAT PLAINS ANNUAL RENEWAL	$27,860.00
	1				**$27,860.00**
SAM RIEMER	000002940	02/04/21	CHEQ00099007711	03810502 Cheque Deposits 03810	$5.50
	1				**$5.50**
SONSRAY MACHINERY	000002984	02/11/21	W10400-03	FLEET REPAIR	$929.05
		02/11/21	W10398-03	FLEET REPAIR	$789.63
		02/11/21	W10399-03	FLEET REPAIR	$922.78
		02/11/21	W10401-03	FLEET REPAIR	$784.88
		02/11/21	W10397-03	FLEET REPAIR	$882.58
		02/11/21	W-10582-03	FLEET REPAIR	$1,458.89
	1				**$5,767.81**
STAFFING SOLUTIONS	000002904	02/04/21	32838	TEMP LABOR, CUS SVC, WE 01/24	$1,540.48
	000002986	02/11/21	32885	TEMP LABOR, CUS SVC, WE 01/31	$1,925.60
	000003039	02/18/21	32793	TEMP LABOR, CUS SVC, WE 01/17	$1,925.00
	000003081	02/25/21	32931	TEMP LABOR, CUS SVC, WE 02/07	$1,925.60
	4				**$7,316.68**
SWRCB	000002886	02/04/21	LW-1029538	FY21 WATER SYSTEM FEES	$57,699.06
	1				**$57,699.06**
T2 TECHNOLOGY GROUP, LLC	000002946	02/11/21	00307284	M21-120A APP MIGRATION & SEC	$21,541.54
		02/11/21	00307250	M21-120A APP MIGRATION & SEC	$6,170.32

Payment Listing by Class
2/1/2021 - 2/28/2021

TIME WARNER CABLE	000003024	02/18/21	0012934020321	INTERNET - DISTRICT	$699.90
	000003067	02/25/21	1774795020621	INTERNET - DISTRICT	$71.98
	3				**$3,215.73**
TUSTIN URGENT CARE, APC DBA XPRESS URGENT CARE HUTINGTON BEACH	000002911	02/04/21	2645	MEDICAL SERVICES	$675.00
	1				**$675.00**
UNIVERSAL WASTE SYSTEMS, INC	000002906	02/04/21	0000912832	WASTE REMOVAL - FEBRUARY	$95.75
	1				**$95.75**
UNUM	000002966	02/11/21	04205600016MAR21	LIFE INSURANCE - MAR 2021	$4,275.60
	1				**$4,275.60**
VERIZON WIRELESS	000002908	02/04/21	9871420967	MOBILE INTERNET 12/17-01/16	$2,909.59
	1				**$2,909.59**
VILLAGE NURSERY/SITE ONE LANDSCAPE	000002937	02/04/21	106020204-001	GARDEN SUPPLIES	$88.89
	1				**$88.89**
VORTEX INDUSTRIES, INC	000002989	02/11/21	09-1479013	M18-100 CRODDY GATE REPAIR	$3,997.57
		02/11/21	09-1475864	GLASS DOOR REPAIR	$4,251.81
	1				**$8,249.38**
WASTE MANAGEMENT OF OC	000002969	02/11/21	0389904-2515-9	TR CONTAINER RENTAL FEB21	$1,359.75
	1				**$1,359.75**
WATER SYSTEMS CONSULTING, INC.	000003042	02/18/21	5310	M21-220A WILSON PIPELINE PROJ	$38,055.00
	1				**$38,055.00**
WESTERN EXTERMINATOR COMPANY	000002990	02/11/21	7103981	PEST CONTROL - DISTRICT	$92.50
		02/11/21	7252889	PEST CONTROL - DISTRICT	$92.50
		02/11/21	7252890	PEST CONTROL - MWRF	$92.50
	1				**$277.50**
YORKE ENGINEERING, LLC	000002912	02/04/21	24414	AQ & ES ENVIROMENTAL SERVICES	$1,199.50
	1				**$1,199.50**
ZONES INC	000003031	02/18/21	K16643180101	SUBSCRIPTION RENEWAL SUPPORT	$14,488.22
	1				**$14,488.22**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
Total GENERAL AND ADMINISTRATIVE	**91**				**$874,816.01**
RETIREE CHECKS					
ALAN COOK	000002918	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$94.83
	1				**$94.83**
ART HERNANDEZ	000002913	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$179.08
	1				**$179.08**
COLEEN L MONTELEONE	000002892	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$241.00
	1				**$241.00**
DIANA LEACH	000002893	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$271.06
	1				**$271.06**
JOHN CERNEK	000002928	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$62.28
	1				**$62.28**
LORI MULLER	000002901	02/04/21	020121	FEB 2021 INSURANCE SUBSIDY	$94.83
	1				**$94.83**
Total RETIREE CHECKS	**6**				**$943.08**
VARIOUS					
AC POZOS ELECTRIC CORPORATION	000002971	02/11/21	ACP2020-1022	ELECTRICAL REPAIRS	$267.89
	1				**$267.89**
AMAZON BUSINESS	000002972	02/11/21	1XW7-R3NM-TL4F	PRIME MEMBERSHIP	$537.67
		02/11/21	1XPM-DPYR-FC9V	OFFICE SUPPLIES	$16.05
		02/11/21	1KGK-TYRH-9TDX	OFFICE SUPPLIES	$14.54
		02/11/21	1VLW-GCMJ-HKCP	OFFICE SUPPLIES	$422.62
	000003033	02/18/21	1NX3-7XKW-HG4X	OFFICE SUPPLIES	$188.79
		02/18/21	1X3H-4HMX-7T4M	OFFICE SUPPLIES	$25.85
		02/18/21	1XW9-1GF9-G1Y6	OFFICE SUPPLIES	$135.76
		02/18/21	1CR1-T4R3-RR4J	OFFICE SUPPLIES	$17.76

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
AMAZON BUSINESS	000003033	02/18/21	1VCV-Q797-G6D7	OFFICE SUPPLIES	$19.14
	000003047	02/25/21	1XTF-MDL6-GCJJ	OFFICE SUPPLIES	$7.28
	3				**$1,385.46**
AT&T	000002914	02/04/21	8315FEB21	714-241-8315 FEBRUARY 2021	$945.06
	000002973	02/11/21	8274JAN21	949-722-8274 JANUARY 2021	$186.51
	000002974	02/11/21	9337FEB21	714-435-9337 FEBRUARY 2021	$2,516.34
	000002975	02/11/21	9024FEB21	339-264-9024 FEBRUARY 2021	$354.67
	000002976	02/11/21	8883FEB21	949-631-8883 FEBRUARY 2021	$370.89
	000002977	02/11/21	3066FEB21	960-350-3066 FEBRUARY 2021	$5,732.18
	000002978	02/11/21	3044FEB21	949-574-3044 FEBRUARY 2021	$3,715.48
	000002979	02/11/21	0926FEB21	949-650-0926 FEBRUARY 2021	$1,788.14
	000002980	02/11/21	0779FEB21	339-263-0779 FEBRUARY 2021	$1,609.31
	000003034	02/18/21	000015982419	ACCT# 9391061444 JANUARY	$55.87
		02/18/21	000015981561	ACCT# 9391055284 JANUARY	$2,606.76
	000003048	02/25/21	4054001FEB21	030 203 4054 001 FEB 2021	$95.34
	11				**$19,976.55**
CITADEL ENVIRONMENTAL SERVICES INC	000002997	02/18/21	0027026	EHS AUDIT	$116.50
	1				**$116.50**
CLIENT FIRST CONSULTING GROUP	000003052	02/25/21	12302	PROCUREMENT PROCESS REVIEW	$5,870.00
	1				**$5,870.00**
ELITE EQUIPMENT	000003055	02/25/21	42180	REPAIRS	$831.89
		02/25/21	42106	REPAIRS	$102.99
	1				**$934.88**
FEDERAL EXPRESS CORPORATION	000002894	02/04/21	7-252-02127	SHIPPING SERVICES	$38.14
	000002954	02/11/21	7-258-83686	SHIPPING SERVICES	$55.56
	000003057	02/25/21	7-266-58447.	SHIPPING SERVICES	$51.85

Payment Listing by Class

2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
FEDERAL EXPRESS CORPORATION	000003057	02/25/21	7-274-13063	SHIPPING SERVICES	$144.07
	3				**$289.62**
GENERAL PUMP COMPANY	000002926	02/04/21	27864	WELL 1 MOTOR REPAIR	$18,744.00
	1				**$18,744.00**
GRAINGER	000002927	02/04/21	9778244906	SAFETY TOOLS & EQUIPMENT	$556.01
		02/04/21	9780629490	SAFETY TOOLS & EQUIPMENT	$159.31
	000002955	02/11/21	9789761039	SAFETY TOOLS & EQUIPMENT	$78.10
	000003003	02/18/21	9786686452	SAFETY TOOLS & EQUIPMENT	$24.02
		02/18/21	9798004181	SAFETY TOOLS & EQUIPMENT	$54.58
	3				**$872.02**
HACH COMPANY	000003004	02/18/21	12296496	WATER QUALITY SUPPLIES	$3,756.34
	000003058	02/25/21	12285753	WATER QUALITY SUPPLIES	$334.75
	2				**$4,091.09**
HASHTAG PINPOINT	000002956	02/11/21	1375	STRATEGIC COMMUNICATIONS	$4,000.00
	1				**$4,000.00**
HRCHITECT	000003006	02/18/21	2021-0096	M18-110 HRIS SYSTEM CONSULTANT	$2,012.50
		02/18/21	2021-0051	M18-110 HRIS SYSTEM CONSULTANT	$2,275.00
	1				**$4,287.50**
LEED ELECTRIC	000002981	02/11/21	210206	ON CALL ELECTRICAL REPAIR	$4,735.00
		02/11/21	210207	ON CALL ELECTRICAL REPAIR	$796.00
		02/11/21	210205	ON CALL ELECTRICAL REPAIR	$8,636.00
	1				**$14,167.00**
LEWIS CONSULTING GROUP	000002899	02/04/21	2021-104	GOV'T RELATIONS SERVICES	$5,000.00
	1				**$5,000.00**
ORANGE COUNTY HOSE CO	000003038	02/18/21	159813	WATER HOSE & FITTINGS	$121.22

Payment Listing by Class
2/1/2021 - 2/28/2021

	1				**$121.22**
PAULUS ENGINEERING INC	000002945	02/11/21	2	M17-100 WELL 1 NOISE MITIGATON	$138,776.00
	000003078	02/25/21	20164	M20-004A ON CALL REPAIR	$17,550.93
	2				**$156,326.93**
PRIME SYSTEMS INDUSTRIAL AUTOMATION	000003064	02/25/21	825-22	SCADA SYSTEM SUPPORTT	$10,113.90
	1				**$10,113.90**
SHERWIN WILLIAMS COMPANY	000003066	02/25/21	5177-6	PAINTING SUPPLIES	$398.98
	1				**$398.98**
SOUTHERN CALIFORNIA GAS CO	000002965	02/11/21	05060829008JAN21	NATURAL GAS, WELL 5, JAN 2021	$12,707.01
	000003065	02/25/21	05200799004FEB21	NATURAL GAS RES 2, FEB 2021	$2,723.70
	2				**$15,430.71**
SPRYPOINT SERVICES INC	000002917	02/04/21	INV-0652	BADGER ANNUAL SUBSCRIPTION	$2,100.00
	000003021	02/18/21	INV-0673	M21-100,M21-101 CONSULTING	$16,850.00
	2				**$18,950.00**
THE HOME DEPOT COMMERCIAL ACCT	000003005	02/18/21	1915JAN21	TOOLS & EQUIPMENT	$828.25
	1				**$828.25**
TJC & ASSOCIATES INCORPORATED	000003041	02/18/21	34307	M21-220E SCADA COMMUNICATIONS	$12,043.25
	1				**$12,043.25**
TYCO/ JOHNSON CONTROLS	000003027	02/18/21	10460399	QUARTERLY SECURITY SERVICE	$8,955.37
	1				**$8,955.37**
VONAGE HOLDINGS CORPORATION	000002967	02/11/21	2051217	TELEPHONE SERVICES	$10,446.53
	1				**$10,446.53**
WECK ANALYTICAL ENVIRONMENTAL SERVICES INC.	000003070	02/25/21	70689	WATER QUALITY ANALYSIS	$3,204.00
	1				**$3,204.00**
WHITTINGHAM PUBLIC AFFAIRS ADVISORS	000002910	02/04/21	000979	SCAQMD CONSULTING	$1,925.00
	000002970	02/11/21	000946	SCAQMD CONSULTING	$1,925.00
	2				**$3,850.00**
Total VARIOUS	**47**				**$320,671.65**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
WATER SUPPLY					
AIRGAS USA LLC	000002919	02/04/21	9975178127-1	CYLINDER RENTAL	$22.00
	000002950	02/11/21	9977371106	CYLINDER RENTAL	$198.70
	2				**$220.70**
CULLIGAN OF SANTA ANA	000002999	02/18/21	1205487	WATER SOFTENER - SALT	$613.94
	1				**$613.94**
JCI JONES CHEMICAL CO.	000003008	02/18/21	844431	CAUSTIC SODA	$2,043.04
	1				**$2,043.04**
LINDE INC.	000002933	02/04/21	61026132	CARBON DIOXIDE TANK RENTAL	$2,489.03
		02/04/21	61614736	CARBON DIOXIDE TANK RENTAL	$2,489.03
	000003017	02/18/21	61468086	CARBON DIOXIDE	$3,525.37
	2				**$8,503.43**
NALCO WATER PRETREATMENT SOLUTIONS	000003012	02/18/21	2508130	MWRF GARDEN SUPPLIES	$604.32
	1				**$604.32**
OCWD	0160156	02/04/21	22473	DECEMBER 20 GAP WTR	$45,992.10
	1				**$45,992.10**
PACIFIC STAR CHEMICAL DBA NORTHSTAR CHEMICAL	000003036	02/18/21	187571	SOD HYPO	$2,393.96
		02/18/21	187570	SOD HYPO	$1,958.69
	000003076	02/25/21	188521	SOD HYPO	$1,741.06
		02/25/21	188522	SOD HYPO	$1,594.17
		02/25/21	188520	SOD HYPO	$1,741.06
		02/25/21	188917	SOD HYPO	$2,189.39
	2				**$11,618.33**
SEPARATION PROCESSES, INC	000003020	02/18/21	10033	SUPPORT SERVICES	$6,495.98
	1				**$6,495.98**
TESTOIL	000003023	02/18/21	287686	OIL TESTING	$528.00
	1				**$528.00**
UNITED WATERWORKS INC.	000002907	02/04/21	S100093931.002	WATER OPS SUPPLIES	$2,081.40
	000003068	02/25/21	S100094716.001	WATER OPS SUPPLIES	$3,010.01
	2				**$5,091.41**
Total WATER SUPPLY	**14**				**$81,711.25**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
WATER SYSTEM					
ALS TRUESDAIL LABORATORIES INC	000003026	02/18/21	522100627	WATER QUALITY TESTING	$62.00
	1				**$62.00**
DIG SAFE BOARD	000003054	02/25/21	DSB20200337	DIG SAFE BOARD FEES	$317.32
	1				**$317.32**
IRVINE PIPE & SUPPLY	000002959	02/11/21	1012413	PIPE FITTINGS AND SUPPLIES	$1,170.80
	1				**$1,170.80**
LARRY'S BUILDING MATERIALS	000002898	02/04/21	CM-128690	PAVING MATERIALS	$31.79
	000003011	02/18/21	CM-129424	PAVING MATERIALS	$98.32
	2				**$130.11**
PRAXAIR DISTRIBUTION, INC.	000002963	02/11/21	61348252	CARBON DIOXIDE TANK RENTAL	$116.94
	000003016	02/18/21	61497982	WELDING SUPPLIES	$60.38
	2				**$177.32**
RELIABLE MONITORING SERVICES	000003079	02/25/21	2021-20698	REPAIR SERVICES	$878.63
		02/25/21	2021-20696	GAS DETECTION SYS-CALIBRATE	$355.00
		02/25/21	2021-20697	GAS DETECTION SYS-CALIBRATE	$355.00
	1				**$1,588.63**
S & J SUPPLY CO.	000002934	02/04/21	S100166432.001	PIPELINE MATERIALS	$2,083.89
		02/04/21	S100163258.001	PIPELINE MATERIALS	$9,830.04
		02/04/21	S100163047.002	PIPELINE MATERIALS	$1,457.86
		02/04/21	S100166122.001	PIPELINE MATERIALS	$2,988.99
	000002964	02/11/21	S100167654.002	PIPELINE MATERIALS	$3,771.25
	000003019	02/18/21	S100167654.001	PIPELINE MATERIALS	$3,827.28
	000003080	02/25/21	S100168408.001	PIPELINE MATERIALS	$7,738.61
		02/25/21	S100168440.001	PIPELINE MATERIALS	$3,501.88
	4				**$35,199.80**
SOUTHERN COUNTIES LUBRICANTS, LLC	000002944	02/04/21	136531	CHEVRON HDAX 5200 LOW ASH	$2,235.28
	000002985	02/11/21	136527	CHEVRON HDAX 5200 LOW ASH	$2,255.28
		02/11/21	136512	CHEVRON HDAX 5200 LOW ASH	$4,382.01
	2				**$8,872.57**

Payment Listing by Class
2/1/2021 - 2/28/2021

Vendor Name	Check #/Count	Payment Date	Invoice Number	Invoice Description	Payment Amount
UNDERGROUND SERVICE ALERT/SC	000002905	02/04/21	120210432	UNDERGROUND DIG ALERT	$742.60
	1				**$742.60**
VINCENT PIRES -DBA VINNIE'S PORTABLE WELDING	000002988	02/11/21	103020	WELDING SERVICES	$600.00
	1				**$600.00**
VULCAN MATERIALS	000002909	02/04/21	72813887	PAVING MATERIALS	$168.52
		02/04/21	72818164	PAVING MATERIALS	$210.31
	000002968	02/11/21	72813888	PAVING MATERIALS	$252.09
	000003030	02/18/21	72837535	PAVING MATERIALS	$181.63
		02/18/21	72844709	M21-001MV PAVING MATERIALS	$253.73
	3				**$1,066.28**
WEST COAST SAND & GRAVEL	000002938	02/04/21	334030	FILL SAND	$2,260.95
	1				**$2,260.95**
Total WATER SYSTEM	**20**				**$52,188.38**
Total Payments (All)	**207**				**$1,810,563.90**

MEMORANDUM

Mesa Water District

Dedicated to Satisfying our Community's Water Needs

TO: Board of Directors
FROM: Marwan Khalifa, CPA, MBA, Chief Financial Officer
DATE: March 23, 2021
SUBJECT: Monthly Financial Reports

RECOMMENDATION

Receive and file the Monthly Financial Reports.

STRATEGIC PLAN

Goal #3: Be financially responsible and transparent.

PRIOR BOARD ACTION/DISCUSSION

None.

DISCUSSION

The attached Treasurer's status reports reflect the performance of Mesa Water's cash and investment accounts.

FINANCIAL IMPACT

None.

ATTACHMENTS

Attachment A: Monthly Treasurer's Status Report on Investments as of 2/28/21
Attachment B: Monthly Treasurer's Status Report on Investments as of 1/30/21

Mesa Water District
Monthly Treasurer's Status Report on Investments
As of 02/28/2021

Investments are in compliance with the Investment Policy adopted as Resolution 1506 of the Mesa Water District Board of Directors.
The liquidity of investments will meet cash flow needs for the next six months except under unforeseen catastrophic circumstances.

Investments	Maturity Date	Days to Maturity	YTM@Cost	Cost Value	% of Portfolio	Policy % Limit	Market Value
Local Agency Investment Fund (LAIF)	Liquid	1	0.41%	1,081.37	0.00%	No Limit	1,081.37
Orange County Investment Pool (OCIP)	Liquid	1	0.87%	2,819,870.35	7.72%	No Limit	2,819,870.35
Miscellaneous Cash (Petty, Emergency, etc.)	Liquid	1	0.00%	14,000.00	0.04%	N/A	14,000.00
US Bank Custody Account							
Negotiable Certificate of Deposit	Various	958	1.51%	11,607,000.00	32.60%	30.00%	11,904,221.69
US Agency Bonds	Various	1,104	0.96%	12,916,363.67	35.50%	No Limit	12,963,853.20
Sub Total / Average		1,034	1.23%	24,523,363.67			24,868,074.89
US Bank Custody Account	Liquid	1	0.01%	1,689,124.11	4.63%	No Limit	1,689,124.11
Union Bank Account	Liquid	1	0.45%	257,036.49	0.70%	No Limit	257,036.49
Pacific Premier Bank	Liquid	1	0.00%	6,869,790.25	18.81%	No Limit	6,869,790.25
Total / Average		**705**	**0.91%**	**$ 36,174,266.24**	**100.00%**		**$ 36,518,977.46**

PARS OPEB & Pension Trust	Monthly Rate of Return	Cost Value	Market Value
Public Agency Retirement Services (PARS)			
Capital Appreciation HighMark PLUS Fund			
OPEB	2.89%	1,531,640.19	1,900,646.21
Pension Trust	2.91%	12,762,003.74	15,648,907.71
		$ 14,293,643.93	**$ 17,549,553.92**

Local Agency Investment Fund (LAIF)

LAIF includes funds designated for allocation of working capital cash to reserves, working capital cash and advances for construction. LAIF market value on Monthly Treasurer's Status Report on Investments for months between quarters is the dollar amount invested times the fair market value Fair Value factor of prior quarter end. The general ledger LAIF carrying value reflects market value (unrealized gains and losses) only at fiscal year end. LAIF provides the Fair Value factor as of March 31, June 30, September 30 and December 31 each year. LAIF market value on this report is based on the December 2020 Fair Value Factor of 1.002271318.

Orange County Treasurer's Investment Pool (OCIP)

The MY 2020 net asset value factor is estimated at 1.00, and the interest rate is the Monthly Net Yield.

Weighted Average Return

Mesa Water® Funds | 0.90%
Benchmark: 3 Month Treasury Bill - February 2021 | 0.04 %

Weighted Average Maturity

Years | 1.9
Days to Maturity | 705

PARS OPEB & Pension Trust Benchmark - S & P 500 Index

1 Month | 2.61 %

Mesa Water District
Transactions Summary
Monthly Treasurer's Status Report - Investment Activity
Group By: Action
Portfolio / Report Group: Report Group | Treasurer's Report
Begin Date: 01/31/2021, End Date: 02/28/2021

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Buy								
FFCB 0.125 5/3/2023-21	3133EMPA4	0.125	2/5/2021	5/3/2023	250,000.00	250,000.00	1.74	250,001.74
FFCB 0.32 2/3/2025-21	3133EMPV8	0.305	2/5/2021	2/3/2025	250,000.00	250,148.18	4.44	250,152.62
Live Oak Banking NC 0.5 2/10/2026	538036NE0	0.500	2/10/2021	2/10/2026	249,000.00	249,000.00	0.00	249,000.00
Luana Savings Bank IA 0.2 8/19/2024	549104WN3	0.200	2/19/2021	8/19/2024	249,000.00	249,000.00	0.00	249,000.00
Homestreet Bank WA 0.1 8/22/2022	43785QPQ0	0.100	2/22/2021	8/22/2022	249,000.00	249,000.00	0.00	249,000.00
Sub Total / Average Buy					**1,247,000.00**	**1,247,148.18**	**6.18**	**1,247,154.36**

Mesa Water District
Date To Date
Monthly Interest | Received
Report Format: By Transaction
Group By: Asset Category
Portfolio / Report Group: Report Group | Treasurer's Report
Begin Date: 1/31/2021, End Date: 2/28/2021

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
LAIF							
	LGIP0012	6/30/2010	N/A	N/A	1,081.37	0.00	0.00
Sub Total/Average					**1,081.37**	**0.00**	**0.00**
Orange County LGIP							
	LGIP9LC	9/30/2011	N/A	N/A	2,819,870.35	1,941.62	0.00
Sub Total/Average					**2,819,870.35**	**1,941.62**	**0.00**
Miscellaneous Cash (Petty | Emergency)							
	CASH	6/30/2015	N/A	N/A	14,000.00	0.00	0.00
Sub Total/Average)					**14,000.00**	**0.00**	**0.00**
Negotiable CD							
First Technology CU CA 1.75 6/30/2021	33715LAD2	6/30/2016	6/30/2021	1.750	247,000.00	0.00	0.00
Wells Fargo SD 1.6 8/3/2021	9497486Z5	8/3/2016	8/3/2021	1.600	247,000.00	335.65	0.00
Privatebank and Trust IL 1.5 8/30/2021	74267GVM6	8/29/2016	8/30/2021	1.500	247,000.00	1,852.50	0.00
Mercantil Commerce Bank FL 1.65 9/28/2021	58733ADJ5	9/28/2016	9/28/2021	1.650	247,000.00	0.00	0.00
Countryside Federal CU NY 1.65 10/28/2021	22239MAL2	10/28/2016	10/28/2021	1.650	247,000.00	346.14	0.00
Beneficial Mutual Savings PA 1.55 11/16/2021	08173QBU9	11/16/2016	11/16/2021	1.550	247,000.00	0.00	0.00
Bank of Baroda 1.85 11/23/2021	06062QXG4	11/23/2016	11/23/2021	1.850	247,000.00	0.00	0.00
Business Bank MO 2 1/20/2022	12325EHH8	1/20/2017	1/20/2022	2.000	247,000.00	419.56	0.00
First National Bank MI 2 1/20/2022	32110YJT3	1/20/2017	1/20/2022	2.000	201,000.00	341.42	0.00
Franklin Synergy Bank TN 2 1/31/2022	35471TCV2	1/31/2017	1/31/2022	2.000	247,000.00	378.96	0.00
Synchrony Bank UT 2.3 2/24/2022	87165FPA6	2/24/2017	2/24/2022	2.300	247,000.00	2,863.85	0.00
Capital One Bank VA 2.3 3/1/2022	140420Y53	3/1/2017	3/1/2022	2.300	247,000.00	0.00	0.00
State Bank India NY 2.35 3/14/2022	8562846V1	3/14/2017	3/14/2022	2.350	247,000.00	0.00	0.00
Amercian Express 2.45 4/5/2022	02587DN38	4/5/2017	4/5/2022	2.450	247,000.00	0.00	0.00
Homestreet Bank WA 0.1 8/22/2022	43785QPQ0	2/22/2021	8/22/2022	0.100	249,000.00	0.00	0.00
Ally Bank UT 1.85 10/24/2022	02007GML4	10/24/2019	10/24/2022	1.850	247,000.00	0.00	0.00
Preferred Bank CA 0.25 7/17/2023	740367LV7	7/17/2020	7/17/2023	0.250	249,000.00	52.87	0.00
Merrick Bank UT 3 7/31/2023	59013J6G9	1/30/2019	7/31/2023	3.000	249,000.00	634.44	0.00
Enterprise Bank & Trust 1.75 11/8/2023	29367SJR6	11/8/2019	11/8/2023	1.750	249,000.00	370.09	0.00

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
Raymond James Bank 1.75 11/8/2023	75472RAH4	11/8/2019	11/8/2023	1.750	247,000.00	0.00	0.00
Third Federal Savings 1.75 11/13/2023	88413QCJ5	11/12/2019	11/13/2023	1.750	247,000.00	0.00	0.00
Marlin Business Bank UT 1.7 12/4/2023	57116ATG3	12/2/2019	12/4/2023	1.700	249,000.00	359.52	0.00
John Marshall Bancorp VA 0.2 12/29/2023	47804GGC1	12/30/2020	12/29/2023	0.200	249,000.00	39.57	0.00
Goldman Sachs NY 3.3 1/16/2024	38148P4E4	1/16/2019	1/16/2024	3.300	245,000.00	0.00	0.00
Bankwell Bank CT 0.35 1/30/2024	06654BCM1	7/30/2020	1/30/2024	0.350	249,000.00	0.00	0.00
Morgan Stanley UT 3.05 1/31/2024	61690UDV9	1/31/2019	1/31/2024	3.050	246,000.00	0.00	0.00
Morgan Stanley NY 3.05 1/31/2024	61760AVF3	1/31/2019	1/31/2024	3.050	246,000.00	0.00	0.00
Enerbank UT 1.15 4/29/2024	29278TNY2	4/29/2020	4/29/2024	1.150	249,000.00	235.36	0.00
First Freedom Bank 1.1 4/30/2024	32027BAM9	4/30/2020	4/30/2024	1.100	249,000.00	217.62	0.00
Capital One VA 2.65 5/22/2024	14042RLP4	5/22/2019	5/22/2024	2.650	246,000.00	0.00	0.00
Eaglebank MD 2.5 5/24/2024	27002YEN2	5/24/2019	5/24/2024	2.500	249,000.00	528.70	0.00
Farm Bureau Bank NV 0.25 7/9/2024	307660LK4	10/9/2020	7/9/2024	0.250	249,000.00	52.87	0.00
Luana Savings Bank IA 0.2 8/19/2024	549104WN3	2/19/2021	8/19/2024	0.200	249,000.00	0.00	0.00
Sallie Mae Bank UT 1.9 10/16/2024	7954504P7	10/17/2019	10/16/2024	1.900	247,000.00	0.00	0.00
Celtic Bank UT 1.65 10/23/2024	15118RSV0	10/23/2019	10/23/2024	1.650	249,000.00	348.94	0.00
Garnett State Bank 1.7 11/19/2024	366526AW1	11/19/2019	11/19/2024	1.700	249,000.00	359.52	0.00
Citizens State Bank 1.7 11/22/2024	176688CR8	11/22/2019	11/22/2024	1.700	249,000.00	359.52	0.00
BMO Harris Bank IL 0.5 3/28/2025-20	05600XAY6	9/28/2020	3/28/2025	0.500	249,000.00	0.00	0.00
First Commercial Bank MS 0.3 3/31/2025	31984GFK0	9/30/2020	3/31/2025	0.300	249,000.00	59.35	0.00
Flagstar Bank MI 1.25 4/30/2025	33847E3A3	4/30/2020	4/30/2025	1.250	248,000.00	0.00	0.00
Apex Bank TN 0.95 5/8/2025	03753XBK5	5/8/2020	5/8/2025	0.950	249,000.00	200.91	0.00
Seattle Bank WA 0.75 6/2/2025-20	81258PKJ1	6/2/2020	6/2/2025	0.750	249,000.00	158.61	0.00
Medallion Bank UT 0.6 7/15/2025	58404DHM6	7/15/2020	7/15/2025	0.600	249,000.00	126.89	0.00
BMW Bank UT 0.5 9/25/2025	05580AXF6	9/25/2020	9/25/2025	0.500	249,000.00	0.00	0.00
Texas Exchange Bank TX 0.6 12/18/2025	88241TJR2	12/18/2020	12/18/2025	0.600	249,000.00	126.89	0.00
JPMorgan Chase OH 0.5 12/29/2025-21	48128UUZ0	12/29/2020	12/29/2025	0.500	249,000.00	0.00	0.00
Live Oak Banking NC 0.5 2/10/2026	538036NE0	2/10/2021	2/10/2026	0.500	249,000.00	0.00	0.00
Sub Total/Average					**11,607,000.00**	**10,769.75**	**0.00**
US Agency							
FHLB 2 11/10/2021-18	3130A9S44	11/10/2016	11/10/2021	2.000	750,000.00	0.00	0.00
FNMA 1.875 4/5/2022	3135G0T45	3/23/2020	4/5/2022	1.875	500,000.00	0.00	0.00
FNMA 1.375 9/6/2022 FHLB	3135G0W33	11/8/2019	9/6/2022	1.375	500,000.00	0.00	0.00
3 12/9/2022	3130AFE78	1/9/2019	12/9/2022	3.000	1,000,000.00	0.00	0.00
FFCB 0.125 5/3/2023-21	3133EMPA4	2/5/2021	5/3/2023	0.125	250,000.00	0.00	0.00
FFCB 2.125 6/5/2023	3133EKPT7	11/8/2019	6/5/2023	2.125	500,000.00	0.00	0.00
FHLMC 0.375 7/14/2023-22	3134GV5F1	7/14/2020	7/14/2023	0.375	250,000.00	0.00	0.00
FHLMC 0.5 8/28/2023-21	3134GVXS2	5/28/2020	8/28/2023	0.500	249,000.00	0.00	0.00

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
FAMC 3.05 9/19/2023	3132X06C0	1/9/2019	9/19/2023	3.050	500,000.00	0.00	0.00
FFCB 0.25 9/21/2023-22	3133EMAM4	9/24/2020	9/21/2023	0.250	500,000.00	0.00	0.00
FHLMC 0.4 10/23/2023-21	3134GV6D5	7/23/2020	10/23/2023	0.400	250,000.00	0.00	0.00
FFCB 0.27 11/3/2023-22	3133EMFN7	11/3/2020	11/3/2023	0.270	250,000.00	0.00	0.00
FHLMC 0.3 11/13/2023-22	3134GXAY0	11/13/2020	11/13/2023	0.300	250,000.00	0.00	0.00
FFCB 0.8 4/22/2024-21	3133ELXC3	4/22/2020	4/22/2024	0.800	750,000.00	0.00	0.00
FHLMC 0.5 5/20/2024-22	3134GVXR4	5/21/2020	5/20/2024	0.500	500,000.00	0.00	0.00
FAMC 2.15 6/5/2024	31422BGA2	11/8/2019	6/5/2024	2.150	500,000.00	0.00	0.00
FHLMC 0.45 7/8/2024-22	3134GV4S4	7/13/2020	7/8/2024	0.450	750,000.00	0.00	0.00
FHLMC 0.35 9/30/2024-22	3134GWVM5	9/30/2020	9/30/2024	0.350	250,000.00	0.00	0.00
FFCB 0.32 2/3/2025-21	3133EMPV8	2/5/2021	2/3/2025	0.320	250,000.00	0.00	0.00
FFCB 1.3 3/24/2025-21	3130AJF95	3/24/2020	3/24/2025	1.300	750,000.00	0.00	0.00
Baycoast Bank MA 0.9 3/31/2025	072727BG4	3/31/2020	3/31/2025	0.900	248,000.00	0.00	0.00
FHLMC 0.85 4/29/2025-21	3134GVPK8	5/1/2020	4/29/2025	0.850	500,000.00	0.00	0.00
FHLMC 0.7 5/13/2025-21	3134GVSY5	5/13/2020	5/13/2025	0.700	500,000.00	0.00	0.00
FNMA 0.6 7/29/2025-22	3136G4D75	12/18/2020	7/29/2025	0.600	250,000.00	0.00	0.00
FNMA 0.375 8/25/2025	3135G05X7	11/12/2020	8/25/2025	0.375	250,000.00	463.54	0.00
FHLMC 0.4 9/30/2025-21	3134GWVP8	9/30/2020	9/30/2025	0.400	250,000.00	0.00	0.00
FNMA 0.54 11/3/2025-22	3135GA2G5	10/30/2020	11/3/2025	0.540	500,000.00	0.00	0.00
FNMA 0.56 11/17/2025-22	3135GA2Z3	11/17/2020	11/17/2025	0.560	325,000.00	0.00	0.00
FNMA 0.58 11/25/2025-22	3135GA5E7	11/30/2020	11/25/2025	0.580	250,000.00	0.00	0.00
FFCB 0.47 12/22/2025-22	3133EMLC4	12/22/2020	12/22/2025	0.470	250,000.00	0.00	0.00
Sub Total/Average					**12,822,000.00**	**463.54**	**0.00**
US Bank Custody							
US Bank | Custodian MM	MM65000	7/31/2020	N/A	N/A	1,689,124.11	5.52	0.00
Sub Total/Average					**1,689,124.11**	**5.52**	**0.00**
Union Bank Accounts							
	MM2110	11/30/2013	N/A	N/A	257,036.49	0.00	0.00
Sub Total/Average					**257,036.49**	**0.00**	**0.00**
Pacific Premier Bank							
	CASH0831	5/28/2020	N/A	N/A	6,869,790.25	0.00	0.00
Sub Total/Average					**6,869,790.25**	**0.00**	**0.00**
Total / Average					**36,079,902.57**	**13,180.43**	**0.00**

Mesa Water District
Portfolio Holdings
Investment Report | PARS Trust
Report Format: By CUSIP / Ticker
Group By: Portfolio Name
Average By: Market Value
Portfolio / Report Group: PARS OPEB Trust
As of 2/28/2021

Description	CUSIP/Ticker	Security Type	Face Amount/Shares	Cost Value	Market Value
PARS OPEB Trust					
Columbia Contrarian Fund	19766M709	Mutual Fund	4,986.70	121,999.00	159,673.56
DFA Large Cap	233203868	Mutual Fund	3,378.08	70,200.80	85,735.30
Dodge & Cox International	256206103	Mutual Fund	1,221.65	45,803.29	55,901.72
Dodge & Cox Stock Fund	256219106	Mutual Fund	592.55	102,453.87	124,690.94
Doubeline Core Fix Income	258620301	Mutual Fund	10,128.61	111,611.95	113,035.15
Harbor Capital Appreciation	411512528	Mutual Fund	760.59	57,106.19	79,101.47
Hartford Schroders	41665X859	Mutual Fund	6,103.31	97,194.25	129,512.37
iShares Russell Mid Cap	464287499	Mutual Fund	1,533.00	36,029.62	110,621.28
iShares SP500	464287408	Mutual Fund	372.00	46,272.83	49,628.52
MFS International	552746356	Mutual Fund	1,258.71	37,438.53	52,978.89
PGIM Total Return Bond	74440B884	Mutual Fund	7,671.07	112,691.16	112,073.59
PIMCO	693390841	Mutual Fund	2,090.81	18,910.72	18,859.07
Pimco Total Return Fund	693390700	Mutual Fund	10,878.43	114,564.16	112,809.27
Price T Rowe Growth	741479406	Mutual Fund	815.63	53,471.94	81,074.52
Undiscovered	904504479	Mutual Fund	1,451.56	86,919.47	107,952.69
US Bank PARS - OPEB Trust MM	MM4900	Money Market	17,693.19	17,693.19	17,693.19
Vanguard Growth & Income	921913208	Mutual Fund	3,211.95	238,457.48	306,325.01
Vanguard Real Estate	922908553	Mutual Fund	438.00	36,319.34	38,487.06
Vanguard Short Term	922031836	Mutual Fund	4,136.34	44,780.17	45,416.80
Victory RS	92647Q363	Mutual Fund	915.41	81,722.23	99,075.81
Sub Total / Average PARS OPEB Trust			**79,637.59**	**1,531,640.19**	**1,900,646.21**
Total / Average			**79,637.59**	**1,531,640.19**	**1,900,646.21**

Mesa Water District
Portfolio Holdings
Investment Report | PARS Trust
Report Format: By CUSIP / Ticker
Group By: Portfolio Name
Average By: Market Value
Portfolio / Report Group: PARS Pension Trust
As of 2/28/2021

Description	CUSIP/Ticker	Security Type	Face Amount/Shares	Cost Value	Market Value
PARS Pension Trust					
Columbia Contrarian Fund	19766M709	Mutual Fund	41,406.25	1,076,955.55	1,325,827.84
DFA Large Cap	233203868	Mutual Fund	27,932.36	583,539.22	708,923.26
Dodge & Cox International	256206103	Mutual Fund	10,101.37	416,464.44	462,238.94
Dodge & Cox Stock Fund	256219106	Mutual Fund	4,899.76	907,468.02	1,031,054.41
Doubeline Core Fix Income	258620301	Mutual Fund	83,749.19	918,893.20	934,640.69
Harbor Capital Appreciation	411512528	Mutual Fund	6,288.92	480,878.13	654,048.79
Hartford Schroders	41665X859	Mutual Fund	50,465.91	799,821.80	1,070,886.77
iShares Russell Mid Cap	464287499	Mutual Fund	12,403.00	183,584.41	895,000.48
iShares SP500	464287408	Mutual Fund	3,081.00	389,057.15	411,036.21
MFS International	552746356	Mutual Fund	10,407.68	346,940.52	438,059.96
PGIM Total Return Bond	74440B884	Mutual Fund	63,288.36	923,928.56	924,643.26
PIMCO	693390841	Mutual Fund	17,288.18	156,361.63	155,939.39
Pimco Total Return Fund	693390700	Mutual Fund	89,793.77	935,557.47	931,161.37
Price T Rowe Growth	741479406	Mutual Fund	6,744.07	461,094.67	670,362.20
Undiscovered	904504479	Mutual Fund	12,002.72	726,153.36	892,641.83
US Bank PARS - Pension Trust MM	MM4901	Money Market	87,001.00	87,001.00	87,001.00
Vanguard Growth & Income	921913208	Mutual Fund	26,672.89	2,038,177.02	2,543,793.43
Vanguard Real Estate	922908553	Mutual Fund	3,613.00	292,582.32	317,474.31
Vanguard Short Term	922031836	Mutual Fund	34,149.71	368,839.00	374,963.66
Victory RS	92647Q363	Mutual Fund	7,569.14	668,706.27	819,209.91
Sub Total / Average PARS Pension Trust			**598,858.28**	**12,762,003.74**	**15,648,907.71**
Total / Average			**598,858.28**	**12,762,003.74**	**15,648,907.71**

Mesa Water District
Transactions Summary
PARS Monthly Treasurer's Status Report - Investment Activity
Group By: Action
Portfolio / Report Group: PARS OPEB Trust
Begin Date: 01/31/2021, End Date: 02/28/2021

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Buy								
PIMCO	693390841	0.000	2/3/2021	N/A	10.13	92.08	0.00	92.08
Hartford Schroders	41665X859	0.000	2/3/2021	N/A	390.297	8,613.85	0.00	8,613.85
iShares SP500	464287408	0.000	2/3/2021	N/A	8.00	1,036.91	0.00	1,036.91
DFA Large Cap	233203868	0.000	2/3/2021	N/A	57.69	1,464.63	0.00	1,464.63
Undiscovered	904504479	0.000	2/3/2021	N/A	24.54	1,694.93	0.00	1,694.93
Dodge & Cox Stock Fund	256219106	0.000	2/3/2021	N/A	17.628	3,505.01	0.00	3,505.01
Dodge & Cox International	256206103	0.000	2/3/2021	N/A	34.916	1,558.31	0.00	1,558.31
MFS International	552746356	0.000	2/3/2021	N/A	10.18	439.96	0.00	439.96
Vanguard Short Term	922031836	0.000	2/3/2021	N/A	10.70	117.91	0.00	117.91
Victory RS	92647Q363	0.000	2/3/2021	N/A	2.77	300.93	0.00	300.93
iShares Russell Mid Cap	464287499	0.000	2/3/2021	N/A	184.00	13,026.96	0.00	13,026.96
Pimco Total Return Fund	693390700	0.000	2/28/2021	N/A	18.78	194.71	0.00	194.71
PGIM Total Return Bond	74440B884	0.000	2/28/2021	N/A	16.947	247.59	0.00	247.59
Vanguard Short Term	922031836	0.000	2/28/2021	N/A	6.258	68.71	0.00	68.71
Sub Total / Average Buy					**792.836**	**32,362.49**	**0.00**	**32,362.49**
Dividend								
Doubeline Core Fix Income	258620301	0.000	2/1/2021	N/A	0.00	0.00	257.25	257.25
PIMCO	693390841	0.000	2/28/2021	N/A	0.00	0.00	67.22	67.22
Pimco Total Return Fund	693390700	0.000	2/28/2021	N/A	0.00	0.00	194.71	194.71
PGIM Total Return Bond	74440B884	0.000	2/28/2021	N/A	0.00	0.00	247.59	247.59
Vanguard Short Term	922031836	0.000	2/28/2021	N/A	0.00	0.00	68.71	68.71
Sub Total / Average Dividend					**0.00**	**0.00**	**835.48**	**835.48**
Interest								
US Bank PARS - OPEB Trust MM	MM4900	0.000	2/28/2021	N/A	0.00	0.00	0.48	0.48
Sub Total / Average Interest					**0.00**	**0.00**	**0.48**	**0.48**
Sell								
Vanguard Real Estate	922908553	0.000	2/3/2021	N/A	24.00	2,093.72	0.00	2,093.72
Pimco Total Return Fund	693390700	0.000	2/3/2021	N/A	749.11	7,873.18	0.00	7,873.18
PGIM Total Return Bond	74440B884	0.000	2/3/2021	N/A	527.19	7,860.39	0.00	7,860.39
Price T Rowe Growth	741479406	0.000	2/3/2021	N/A	36.10	3,659.14	0.00	3,659.14

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Doubeline Core Fix Income	258620301	0.000	2/3/2021	N/A	688.53	7,766.64	0.00	7,766.64
Harbor Capital Appreciation	411512528	0.000	2/3/2021	N/A	21.20	2,287.91	0.00	2,287.91
Sub Total / Average Sell					**2,046.13**	**31,540.98**	**0.00**	**31,540.98**

Mesa Water District
Transactions Summary
PARS Monthly Treasurer's Status Report - Investment Activity
Group By: Action
Portfolio / Report Group: PARS Pension Trust
Begin Date: 01/31/2021, End Date: 02/28/2021

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Buy								
PIMCO	693390841	0.000	2/3/2021	N/A	9.851	89.55	0.00	89.55
Hartford Schroders	41665X859	0.000	2/3/2021	N/A	3,023.70	66,733.05	0.00	66,733.05
iShares SP500	464287408	0.000	2/3/2021	N/A	54.00	6,999.14	0.00	6,999.14
DFA Large Cap	233203868	0.000	2/3/2021	N/A	359.258	9,121.56	0.00	9,121.56
Undiscovered	904504479	0.000	2/3/2021	N/A	153.352	10,592.01	0.00	10,592.01
Dodge & Cox Stock Fund	256219106	0.000	2/3/2021	N/A	127.087	25,268.74	0.00	25,268.74
Dodge & Cox International	256206103	0.000	2/3/2021	N/A	247.229	11,033.84	0.00	11,033.84
MFS International	552746356	0.000	2/3/2021	N/A	39.673	1,713.89	0.00	1,713.89
iShares Russell Mid Cap	464287499	0.000	2/3/2021	N/A	1,200.00	84,958.44	0.00	84,958.44
Sub Total / Average Buy					**5,214.15**	**216,510.22**	**0.00**	**216,510.22**
Dividend								
Doubeline Core Fix Income	258620301	0.000	2/1/2021	N/A	0.00	0.00	2,136.28	2,136.28
PIMCO	693390841	0.000	2/28/2021	N/A	0.00	0.00	556.09	556.09
Pimco Total Return Fund	693390700	0.000	2/28/2021	N/A	0.00	0.00	1,610.52	1,610.52
PGIM Total Return Bond	74440B884	0.000	2/28/2021	N/A	0.00	0.00	2,047.76	2,047.76
Vanguard Short Term	922031836	0.000	2/28/2021	N/A	0.00	0.00	568.18	568.18
Sub Total / Average Dividend					**0.00**	**0.00**	**6,918.83**	**6,918.83**
Interest								
US Bank PARS - Pension Trust MM	MM4901	0.000	2/28/2021	N/A	0.00	0.00	6.85	6.85
Sub Total / Average Interest					**0.00**	**0.00**	**6.85**	**6.85**
Sell								
Vanguard Real Estate	922908553	0.000	2/3/2021	N/A	227.00	19,803.13	0.00	19,803.13
Pimco Total Return Fund	693390700	0.000	2/3/2021	N/A	6,450.37	67,793.40	0.00	67,793.40
PGIM Total Return Bond	74440B884	0.000	2/3/2021	N/A	4,489.18	66,933.73	0.00	66,933.73
Price T Rowe Growth	741479406	0.000	2/3/2021	N/A	329.06	33,349.83	0.00	33,349.83
Vanguard Short Term	922031836	0.000	2/3/2021	N/A	3.22	35.44	0.00	35.44
Victory RS	92647Q363	0.000	2/3/2021	N/A	9.92	1,079.91	0.00	1,079.91
Doubeline Core Fix Income	258620301	0.000	2/3/2021	N/A	6,078.67	68,567.41	0.00	68,567.41
Harbor Capital Appreciation	411512528	0.000	2/3/2021	N/A	200.25	21,606.76	0.00	21,606.76
Sub Total / Average Sell					**17,787.67**	**279,169.61**	**0.00**	**279,169.61**

Mesa Water District
Monthly Treasurer's Status Report on Investments
As of 01/31/2021

Investments are in compliance with the Investment Policy adopted as Resolution 1506 of the Mesa Water District Board of Directors.
The liquidity of investments will meet cash flow needs for the next six months except under unforeseen catastrophic circumstances.

Investments	Maturity Date	Days to Maturity	YTM@Cost	Cost Value	% of Portfolio	Policy % Limit	Market Value
Local Agency Investment Fund (LAIF)	Liquid	1	0.46%	1,081.37	0.00%	No Limit	1,081.37
Orange County Investment Pool (OCIP)	Liquid	1	0.95%	2,817,928.73	7.81%	No Limit	2,817,928.73
Miscellaneous Cash (Petty, Emergency, etc.)	Liquid	1	0.00%	14,000.00	0.04%	N/A	14,000.00
US Bank Custody Account							
Negotiable Certificate of Deposit	Various	970	1.59%	10,860,000.00	30.99%	30.00%	11,178,000.01
US Agency Bonds	Various	1,132	0.99%	12,416,215.49	34.65%	No Limit	12,501,537.59
Sub Total / Average		1,056	1.28%	23,276,215.49			23,679,537.60
US Bank Custody Account	Liquid	1	0.01%	2,920,032.24	8.09%	No Limit	2,920,032.24
Union Bank Account	Liquid	1	0.45%	105,331.51	0.29%	No Limit	105,331.51
Pacific Premier Bank	Liquid	1	0.00%	6,540,638.52	18.13%	No Limit	6,540,638.52
Total / Average		**693**	**0.91%**	**$ 35,675,227.86**	**100.00%**		**$ 36,078,549.97**

PARS OPEB & Pension Trust	Monthly Rate of Return	Cost Value	Market Value
Public Agency Retirement Services (PARS)			
Capital Appreciation HighMark PLUS Fund			
OPEB	-0.29%	1,528,240.06	1,847,693.13
Pension Trust	-0.33%	12,801,432.65	15,275,964.87
		$ 14,329,672.71	**$ 17,123,658.00**

Local Agency Investment Fund (LAIF)

LAIF includes funds designated for allocation of working capital cash to reserves, working capital cash and advances for construction. LAIF market value on Monthly Treasurer's Status Report on Investments for months between quarters is the dollar amount invested times the fair market value Fair Value factor of prior quarter end. The general ledger LAIF carrying value reflects market value (unrealized gains and losses) only at fiscal year end. LAIF provides the Fair Value factor as of March 31, June 30, September 30 and December 31 each year. LAIF market value on this report is based on the December 2020 Fair Value Factor of 1.002271318.

Orange County Treasurer's Investment Pool (OCIP)

The MY 2020 net asset value factor is estimated at 1.00, and the interest rate is the Monthly Net Yield.

Weighted Average Return

Mesa Water® Funds | 0.91%
Benchmark: 3 Month Treasury Bill - January 2021 | 0.08 %

Weighted Average Maturity

Years | 1.9
Days to Maturity | 693

PARS OPEB & Pension Trust Benchmark - S & P 500 Index

1 Month | - 1.11 %

Mesa Water District
Date To Date
Monthly Interest | Received
Report Format: By Transaction
Group By: Asset Category
Portfolio / Report Group: Report Group | Treasurer's Report
Begin Date: 12/31/2020, End Date: 1/31/2021

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
LAIF							
	LGIP0012	6/30/2010	N/A	N/A	1,081.37	1.71	0.00
Sub Total/Average					**1,081.37**	**1.71**	**0.00**
Orange County LGIP							
	LGIP9LC	9/30/2011	N/A	N/A	2,817,928.73	2,144.60	0.00
Sub Total/Average					**2,817,928.73**	**2,144.60**	**0.00**
Miscellaneous Cash (Petty | Emergency)							
	CASH	6/30/2015	N/A	N/A	14,000.00	0.00	0.00
Sub Total/Average 3. Miscellaneous Cash (Petty | Emergency)					**14,000.00**	**0.00**	**0.00**
Negotiable CD							
First Technology CU CA 1.75 6/30/2021	33715LAD2	6/30/2016	6/30/2021	1.750	247,000.00	0.00	0.00
Wells Fargo SD 1.6 8/3/2021	9497486Z5	8/3/2016	8/3/2021	1.600	247,000.00	335.65	0.00
Privatebank and Trust IL 1.5 8/30/2021	74267GVM6	8/29/2016	8/30/2021	1.500	247,000.00	0.00	0.00
Mercantil Commerce Bank FL 1.65 9/28/2021	58733ADJ5	9/28/2016	9/28/2021	1.650	247,000.00	0.00	0.00
Countryside Federal CU NY 1.65 10/28/2021	22239MAL2	10/28/2016	10/28/2021	1.650	247,000.00	346.14	0.00
Beneficial Mutual Savings PA 1.55 11/16/2021	08173QBU9	11/16/2016	11/16/2021	1.550	247,000.00	0.00	0.00
Bank of Baroda 1.85 11/23/2021	06062QXG4	11/23/2016	11/23/2021	1.850	247,000.00	0.00	0.00
Business Bank MO 2 1/20/2022	12325EHH8	1/20/2017	1/20/2022	2.000	247,000.00	419.56	0.00
First National Bank MI 2 1/20/2022	32110YJT3	1/20/2017	1/20/2022	2.000	201,000.00	341.42	0.00
Franklin Synergy Bank TN 2 1/31/2022	35471TCV2	1/31/2017	1/31/2022	2.000	247,000.00	419.56	0.00
Synchrony Bank UT 2.3 2/24/2022	87165FPA6	2/24/2017	2/24/2022	2.300	247,000.00	0.00	0.00
Capital One Bank VA 2.3 3/1/2022	140420Y53	3/1/2017	3/1/2022	2.300	247,000.00	0.00	0.00
State Bank India NY 2.35 3/14/2022	8562846V1	3/14/2017	3/14/2022	2.350	247,000.00	0.00	0.00
Amercian Express 2.45 4/5/2022	02587DN38	4/5/2017	4/5/2022	2.450	247,000.00	0.00	0.00
Goldman Sachs NY 3.3 1/16/2024	38148P4E4	1/16/2019	1/16/2024	3.300	245,000.00	4,075.73	0.00
Merrick Bank UT 3 7/31/2023	59013J6G9	1/30/2019	7/31/2023	3.000	249,000.00	634.44	0.00
Morgan Stanley UT 3.05 1/31/2024	61690UDV9	1/31/2019	1/31/2024	3.050	246,000.00	3,782.33	0.00
Morgan Stanley NY 3.05 1/31/2024	61760AVF3	1/31/2019	1/31/2024	3.050	246,000.00	3,782.33	0.00
Capital One VA 2.65 5/22/2024	14042RLP4	5/22/2019	5/22/2024	2.650	246,000.00	0.00	0.00
Eaglebank MD 2.5 5/24/2024	27002YEN2	5/24/2019	5/24/2024	2.500	249,000.00	528.70	0.00
Sallie Mae Bank UT 1.9 10/16/2024	7954504P7	10/17/2019	10/16/2024	1.900	247,000.00	0.00	0.00
Celtic Bank UT 1.65 10/23/2024	15118RSV0	10/23/2019	10/23/2024	1.650	249,000.00	348.94	0.00
Ally Bank UT 1.85 10/24/2022	02007GML4	10/24/2019	10/24/2022	1.850	247,000.00	0.00	0.00
Enterprise Bank & Trust 1.75 11/8/2023	29367SJR6	11/8/2019	11/8/2023	1.750	249,000.00	370.09	0.00
Raymond James Bank 1.75 11/8/2023	75472RAH4	11/8/2019	11/8/2023	1.750	247,000.00	0.00	0.00
Third Federal Savings 1.75 11/13/2023	88413QCJ5	11/12/2019	11/13/2023	1.750	247,000.00	0.00	0.00
Garnett State Bank 1.7 11/19/2024	366526AW1	11/19/2019	11/19/2024	1.700	249,000.00	359.52	0.00
Citizens State Bank 1.7 11/22/2024	176688CR8	11/22/2019	11/22/2024	1.700	249,000.00	359.52	0.00
Marlin Business Bank UT 1.7 12/4/2023	57116ATG3	12/2/2019	12/4/2023	1.700	249,000.00	359.52	0.00
Enerbank UT 1.15 4/29/2024	29278TNY2	4/29/2020	4/29/2024	1.150	249,000.00	243.20	0.00

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
First Freedom Bank 1.1 4/30/2024	32027BAM9	4/30/2020	4/30/2024	1.100	249,000.00	232.63	0.00
Flagstar Bank MI 1.25 4/30/2025	33847E3A3	4/30/2020	4/30/2025	1.250	248,000.00	0.00	0.00
Apex Bank TN 0.95 5/8/2025	03753XBK5	5/8/2020	5/8/2025	0.950	249,000.00	200.91	0.00
Seattle Bank WA 0.75 6/2/2025-20	81258PKJ1	6/2/2020	6/2/2025	0.750	249,000.00	158.61	0.00
Medallion Bank UT 0.6 7/15/2025	58404DHM6	7/15/2020	7/15/2025	0.600	249,000.00	126.89	0.00
Preferred Bank CA 0.25 7/17/2023	740367LV7	7/17/2020	7/17/2023	0.250	249,000.00	52.87	0.00
Bankwell Bank CT 0.35 1/30/2024	06654BCM1	7/30/2020	1/30/2024	0.350	249,000.00	439.33	0.00
BMW Bank UT 0.5 9/25/2025	05580AXF6	9/25/2020	9/25/2025	0.500	249,000.00	0.00	0.00
BMO Harris Bank IL 0.5 3/28/2025-20	05600XAY6	9/28/2020	3/28/2025	0.500	249,000.00	0.00	0.00
First Commercial Bank MS 0.3 3/31/2025	31984GFK0	9/30/2020	3/31/2025	0.300	249,000.00	63.44	0.00
Farm Bureau Bank NV 0.25 7/9/2024	307660LK4	10/9/2020	7/9/2024	0.250	249,000.00	52.87	0.00
Texas Exchange Bank TX 0.6 12/18/2025	88241TJR2	12/18/2020	12/18/2025	0.600	249,000.00	126.89	0.00
JPMorgan Chase OH 0.5 12/29/2025-21	48128UUZ0	12/29/2020	12/29/2025	0.500	249,000.00	0.00	0.00
John Marshall Bancorp VA 0.2 12/29/2023	47804GGC1	12/30/2020	12/29/2023	0.200	249,000.00	42.30	0.00
Sub Total/Average					**10,860,000.00**	**18,203.39**	**0.00**
US Agency							
FHLB 2 11/10/2021-18	3130A9S44	11/10/2016	11/10/2021	2.000	750,000.00	0.00	0.00
FHLB 3 12/9/2022	3130AFE78	1/9/2019	12/9/2022	3.000	1,000,000.00	0.00	0.00
FAMC 3.05 9/19/2023	3132X06C0	1/9/2019	9/19/2023	3.050	500,000.00	0.00	0.00
FFCB 2.125 6/5/2023	3133EKPT7	11/8/2019	6/5/2023	2.125	500,000.00	0.00	0.00
FNMA 1.375 9/6/2022	3135G0W33	11/8/2019	9/6/2022	1.375	500,000.00	0.00	0.00
FAMC 2.15 6/5/2024	31422BGA2	11/8/2019	6/5/2024	2.150	500,000.00	0.00	0.00
FNMA 1.875 4/5/2022	3135G0T45	3/23/2020	4/5/2022	1.875	500,000.00	0.00	0.00
FFCB 1.3 3/24/2025-21	3130AJF95	3/24/2020	3/24/2025	1.300	750,000.00	0.00	0.00
Baycoast Bank MA 0.9 3/31/2025	072727BG4	3/31/2020	3/31/2025	0.900	248,000.00	0.00	0.00
FFCB 0.8 4/22/2024-21	3133ELXC3	4/22/2020	4/22/2024	0.800	750,000.00	0.00	0.00
FHLMC 0.85 4/29/2025-21	3134GVPK8	5/1/2020	4/29/2025	0.850	500,000.00	0.00	0.00
FHLMC 0.7 5/13/2025-21	3134GVSY5	5/13/2020	5/13/2025	0.700	500,000.00	0.00	0.00
FHLMC 0.5 5/20/2024-22	3134GVXR4	5/21/2020	5/20/2024	0.500	500,000.00	0.00	0.00
FHLMC 0.5 8/28/2023-21	3134GVXS2	5/28/2020	8/28/2023	0.500	249,000.00	0.00	0.00
FHLMC 0.45 7/8/2024-22	3134GV4S4	7/13/2020	7/8/2024	0.450	750,000.00	1,687.50	0.00
FHLMC 0.375 7/14/2023-22	3134GV5F1	7/14/2020	7/14/2023	0.375	250,000.00	468.75	0.00
FHLMC 0.4 10/23/2023-21	3134GV6D5	7/23/2020	10/23/2023	0.400	250,000.00	500.00	0.00
FFCB 0.25 9/21/2023-22	3133EMAM4	9/24/2020	9/21/2023	0.250	500,000.00	0.00	0.00
FHLMC 0.35 9/30/2024-22	3134GWVM5	9/30/2020	9/30/2024	0.350	250,000.00	0.00	0.00
FHLMC 0.4 9/30/2025-21	3134GWVP8	9/30/2020	9/30/2025	0.400	250,000.00	0.00	0.00
FNMA 0.54 11/3/2025-22	3135GA2G5	10/30/2020	11/3/2025	0.540	500,000.00	0.00	0.00
FFCB 0.27 11/3/2023-22	3133EMFN7	11/3/2020	11/3/2023	0.270	250,000.00	0.00	0.00
FNMA 0.375 8/25/2025	3135G05X7	11/12/2020	8/25/2025	0.375	250,000.00	0.00	0.00
FHLMC 0.3 11/13/2023-22	3134GXAY0	11/13/2020	11/13/2023	0.300	250,000.00	0.00	0.00
FNMA 0.56 11/17/2025-22	3135GA2Z3	11/17/2020	11/17/2025	0.560	325,000.00	0.00	0.00
FNMA 0.58 11/25/2025-22	3135GA5E7	11/30/2020	11/25/2025	0.580	250,000.00	0.00	0.00
FNMA 0.6 7/29/2025-22	3136G4D75	12/18/2020	7/29/2025	0.600	250,000.00	750.00	0.00
FFCB 0.47 12/22/2025-22	3133EMLC4	12/22/2020	12/22/2025	0.470	250,000.00	0.00	0.00
Sub Total/Average					**12,322,000.00**	**3,406.25**	**0.00**
US Bank Custody							
	MM65000	7/31/2020	N/A	N/A	2,920,032.24	3.06	0.00
Sub Total/Average					**2,920,032.24**	**3.06**	**0.00**

Description	CUSIP/Ticker	Settlement Date	Maturity Date	Coupon Rate	Ending Face Amount/Shares	Interest/Dividends	Sell Accrued Interest
Union Bank Accounts							
	MM2110	11/30/2013	N/A	N/A	105,331.51	0.00	0.00
Sub Total/Average					**105,331.51**	**0.00**	**0.00**
Pacific Premier Bank							
	CASH0831	5/28/2020	N/A	N/A	6,540,638.52	0.00	0.00
Sub Total/Average					**6,540,638.52**	**0.00**	**0.00**
Total / Average					**35,581,012.37**	**23,759.01**	**0.00**

Mesa Water District
Portfolio Holdings
Investment Report | PARS Trust
Report Format: By CUSIP / Ticker
Group By: Portfolio Name
Average By: Market Value
Portfolio / Report Group: PARS OPEB Trust
As of 1/31/2021

Description	CUSIP/Ticker	Security Type	Face Amount/Shares	Cost Value	Market Value
PARS OPEB Trust					
Columbia Contrarian Fund	19766M709	Mutual Fund	4,986.70	121,999.00	153,091.14
DFA Large Cap	233203868	Mutual Fund	3,320.39	68,736.17	82,079.68
Dodge & Cox International	256206103	Mutual Fund	1,186.73	44,244.98	51,479.58
Dodge & Cox Stock Fund	256219106	Mutual Fund	574.92	98,948.86	110,460.35
Doubeline Core Fix Income	258620301	Mutual Fund	10,817.14	119,026.00	122,125.38
Harbor Capital Appreciation	411512528	Mutual Fund	781.79	58,431.19	80,540.09
Hartford Schroders	41665X859	Mutual Fund	5,713.01	88,580.40	120,430.46
iShares Russell Mid Cap	464287499	Mutual Fund	1,349.00	23,002.66	92,204.15
iShares SP500	464287408	Mutual Fund	364.00	45,235.92	45,856.72
MFS International	552746356	Mutual Fund	1,248.53	36,998.57	52,413.09
PGIM Total Return Bond	74440B884	Mutual Fund	8,181.31	120,041.74	122,228.07
PIMCO	693390841	Mutual Fund	2,080.68	18,818.64	18,809.31
Pimco Total Return Fund	693390700	Mutual Fund	11,608.76	122,124.54	122,240.18
Price T Rowe Growth	741479406	Mutual Fund	851.73	55,470.37	82,874.18
Undiscovered	904504479	Mutual Fund	1,427.02	85,224.54	93,855.23
US Bank PARS - OPEB Trust MM	MM4900	Money Market	18,407.46	18,407.46	18,407.46
Vanguard Growth & Income	921913208	Mutual Fund	3,211.95	238,457.48	299,355.03
Vanguard Real Estate	922908553	Mutual Fund	462.00	38,476.69	39,251.52
Vanguard Short Term	922031836	Mutual Fund	4,119.38	44,593.55	45,395.43
Victory RS	92647Q363	Mutual Fund	912.64	81,421.30	94,596.08
Sub Total / Average PARS OPEB Trust			**81,605.14**	**1,528,240.06**	**1,847,693.13**
Total / Average			**81,605.14**	**1,528,240.06**	**1,847,693.13**

Mesa Water District
Portfolio Holdings
Investment Report | PARS Trust
Report Format: By CUSIP / Ticker
Group By: Portfolio Name
Average By: Market Value
Portfolio / Report Group: PARS Pension Trust
As of 1/31/2021

Description	CUSIP/Ticker	Security Type	Face Amount/Shares	Cost Value	Market Value
PARS Pension Trust					
Columbia Contrarian Fund	19766M709	Mutual Fund	41,406.25	1,076,955.55	1,271,171.57
DFA Large Cap	233203868	Mutual Fund	27,573.10	574,417.66	681,607.05
Dodge & Cox International	256206103	Mutual Fund	9,854.14	405,430.60	427,472.83
Dodge & Cox Stock Fund	256219106	Mutual Fund	4,772.67	882,199.28	916,971.74
Doubeline Core Fix Income	258620301	Mutual Fund	89,827.86	984,256.27	1,014,156.33
Harbor Capital Appreciation	411512528	Mutual Fund	6,489.17	495,476.42	668,515.41
Hartford Schroders	41665X859	Mutual Fund	47,442.21	733,088.75	1,000,082.01
iShares Russell Mid Cap	464287499	Mutual Fund	11,203.00	98,625.97	765,725.05
iShares SP500	464287408	Mutual Fund	3,027.00	382,058.01	381,341.46
MFS International	552746356	Mutual Fund	10,368.01	345,226.63	435,249.65
PGIM Total Return Bond	74440B884	Mutual Fund	67,777.54	988,466.65	1,012,596.72
PIMCO	693390841	Mutual Fund	17,278.33	156,272.08	156,196.09
Pimco Total Return Fund	693390700	Mutual Fund	96,244.14	1,001,137.93	1,013,450.76
Price T Rowe Growth	741479406	Mutual Fund	7,073.13	482,982.02	688,217.19
Undiscovered	904504479	Mutual Fund	11,849.37	715,561.35	779,332.57
US Bank PARS - Pension Trust MM	MM4901	Money Market	89,782.39	89,782.39	89,782.39
Vanguard Growth & Income	921913208	Mutual Fund	26,672.89	2,038,177.02	2,485,913.25
Vanguard Real Estate	922908553	Mutual Fund	3,840.00	312,987.21	326,246.40
Vanguard Short Term	922031836	Mutual Fund	34,152.93	368,872.46	376,365.08
Victory RS	92647Q363	Mutual Fund	7,579.06	669,458.40	785,571.32
Sub Total / Average PARS Pension Trust			**614,213.19**	**12,801,432.65**	**15,275,964.87**
Total / Average			**614,213.19**	**12,801,432.65**	**15,275,964.87**

Mesa Water District
Transactions Summary
PARS Monthly Treasurer's Status Report - Investment Activity
Group By: Action
Portfolio / Report Group: PARS OPEB Trust
Begin Date: 12/31/2020, End Date: 01/31/2021

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Buy								
PIMCO	693390841	0.000	1/12/2021	N/A	465.666	4,218.93	0.00	4,218.93
Vanguard Real Estate	922908553	0.000	1/12/2021	N/A	205.00	16,776.57	0.00	16,776.57
Undiscovered	904504479	0.000	1/12/2021	N/A	390.027	27,520.30	0.00	27,520.30
Pimco Total Return Fund	693390700	0.000	1/12/2021	N/A	25.066	263.19	0.00	263.19
PGIM Total Return Bond	74440B884	0.000	1/12/2021	N/A	18.702	278.85	0.00	278.85
Price T Rowe Growth	741479406	0.000	1/12/2021	N/A	12.753	1,227.82	0.00	1,227.82
Victory RS	92647Q363	0.000	1/12/2021	N/A	293.664	32,103.34	0.00	32,103.34
Doubeline Core Fix Income	258620301	0.000	1/12/2021	N/A	20.314	228.53	0.00	228.53
Pimco Total Return Fund	693390700	0.000	1/31/2021	N/A	18.958	199.63	0.00	199.63
PGIM Total Return Bond	74440B884	0.000	1/31/2021	N/A	19.445	290.51	0.00	290.51
Vanguard Short Term	922031836	0.000	1/31/2021	N/A	6.637	73.14	0.00	73.14
Sub Total / Average Buy					**1,476.232**	**83,180.81**	**0.00**	**83,180.81**
Dividend								
PIMCO	693390841	0.000	1/31/2021	N/A	0.00	0.00	57.89	57.89
Pimco Total Return Fund	693390700	0.000	1/31/2021	N/A	0.00	0.00	199.63	199.63
PGIM Total Return Bond	74440B884	0.000	1/31/2021	N/A	0.00	0.00	290.51	290.51
Vanguard Short Term	922031836	0.000	1/31/2021	N/A	0.00	0.00	73.14	73.14
Sub Total / Average Dividend					**0.00**	**0.00**	**621.17**	**621.17**
Interest								
US Bank PARS - OPEB Trust MM	MM4900	0.000	1/31/2021	N/A	0.00	0.00	0.45	0.45
Sub Total / Average Interest					**0.00**	**0.00**	**0.45**	**0.45**
Sell								
Hartford Schroders	41665X859	0.000	1/12/2021	N/A	310.29	6,677.38	0.00	6,677.38
Vanguard Growth & Income	921913208	0.000	1/12/2021	N/A	565.32	53,858.13	0.00	53,858.13
DFA Large Cap	233203868	0.000	1/12/2021	N/A	20.64	530.99	0.00	530.99
Dodge & Cox Stock Fund	256219106	0.000	1/12/2021	N/A	6.32	1,293.44	0.00	1,293.44
Columbia Contrarian Fund	19766M709	0.000	1/12/2021	N/A	12.66	400.97	0.00	400.97
Dodge & Cox International	256206103	0.000	1/12/2021	N/A	8.84	406.07	0.00	406.07
MFS International	552746356	0.000	1/12/2021	N/A	13.10	568.41	0.00	568.41
Vanguard Short Term	922031836	0.000	1/12/2021	N/A	16.84	185.43	0.00	185.43

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Vanguard Short Term	922031836	0.000	1/12/2021	N/A	20.93	230.47	0.00	230.47
Vanguard Short Term	922031836	0.000	1/12/2021	N/A	34.52	380.03	0.00	380.03
Vanguard Short Term	922031836	0.000	1/12/2021	N/A	856.51	9,430.14	0.00	9,430.14
Harbor Capital Appreciation	411512528	0.000	1/12/2021	N/A	7.78	821.06	0.00	821.06
iShares Russell Mid Cap	464287499	0.000	1/12/2021	N/A	32.00	2,276.52	0.00	2,276.52
Sub Total / Average Sell					**1,905.75**	**77,059.04**	**0.00**	**77,059.04**

Mesa Water District
Transactions Summary
PARS Monthly Treasurer's Status Report - Investment Activity
Group By: Action
Portfolio / Report Group: PARS Pension Trust
Begin Date: 12/31/2020, End Date: 01/31/2021

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
Buy								
PIMCO	693390841	0.000	1/12/2021	N/A	3,798.40	34,413.53	0.00	34,413.53
Vanguard Real Estate	922908553	0.000	1/12/2021	N/A	1,689.00	138,222.53	0.00	138,222.53
Undiscovered	904504479	0.000	1/12/2021	N/A	3,280.19	231,450.21	0.00	231,450.21
Dodge & Cox Stock Fund	256219106	0.000	1/12/2021	N/A	131.272	26,870.10	0.00	26,870.10
Columbia Contrarian Fund	19766M709	0.000	1/12/2021	N/A	2,716.30	86,052.40	0.00	86,052.40
Pimco Total Return Fund	693390700	0.000	1/12/2021	N/A	3,253.16	34,158.13	0.00	34,158.13
Dodge & Cox International	256206103	0.000	1/12/2021	N/A	57.82	2,655.68	0.00	2,655.68
Price T Rowe Growth	741479406	0.000	1/12/2021	N/A	323.054	31,103.60	0.00	31,103.60
Victory RS	92647Q363	0.000	1/12/2021	N/A	2,412.67	263,752.67	0.00	263,752.67
Harbor Capital Appreciation	411512528	0.000	1/12/2021	N/A	617.314	65,114.28	0.00	65,114.28
Sub Total / Average Buy					**18,279.18**	**913,793.13**	**0.00**	**913,793.13**
Dividend								
PIMCO	693390841	0.000	1/31/2021	N/A	0.00	0.00	481.20	481.20
Pimco Total Return Fund	693390700	0.000	1/31/2021	N/A	0.00	0.00	1,640.11	1,640.11
PGIM Total Return Bond	74440B884	0.000	1/31/2021	N/A	0.00	0.00	2,415.21	2,415.21
Vanguard Short Term	922031836	0.000	1/31/2021	N/A	0.00	0.00	608.52	608.52
Sub Total / Average Dividend					**0.00**	**0.00**	**5,145.04**	**5,145.04**
Interest								
US Bank PARS - Pension Trust MM	MM4901	0.000	1/31/2021	N/A	0.00	0.00	6.55	6.55
US Bank PARS - Pension Trust MM	MM4901	0.000	1/31/2021	N/A	0.00	0.00	0.20	0.20
Sub Total / Average Interest					**0.00**	**0.00**	**6.75**	**6.75**
Sell								
Hartford Schroders	41665X859	0.000	1/12/2021	N/A	2,358.80	50,761.33	0.00	50,761.33
iShares SP500	464287408	0.000	1/12/2021	N/A	11.00	1,446.43	0.00	1,446.43
Vanguard Growth & Income	921913208	0.000	1/12/2021	N/A	3,040.09	289,629.37	0.00	289,629.37
DFA Large Cap	233203868	0.000	1/12/2021	N/A	313.18	8,055.02	0.00	8,055.02
PGIM Total Return Bond	74440B884	0.000	1/12/2021	N/A	24.44	364.45	0.00	364.45
MFS International	552746356	0.000	1/12/2021	N/A	76.77	3,331.05	0.00	3,331.05
Vanguard Short Term	922031836	0.000	1/12/2021	N/A	7,851.78	86,448.10	0.00	86,448.10
Doubeline Core Fix Income	258620301	0.000	1/12/2021	N/A	289.34	3,255.05	0.00	3,255.05

Description	CUSIP/Ticker	YTM @ Cost	Settlement Date	Maturity Date	Face Amount/Shares	Principal	Interest/Dividends	Total
iShares Russell Mid Cap	464287499	0.000	1/12/2021	N/A	321.00	22,836.29	0.00	22,836.29
Sub Total / Average Sell					**14,286.40**	**466,127.09**	**0.00**	**466,127.09**

MesaWater DISTRICT®

MONTHLY COMMITTEE

Major Staff Projects

Title	Comments	Status
Human Resource Information System/Payroll System	Human Resource Information System/Payroll System	In Process
Invoice Cloud	Invoice Cloud (New Billing System)	In Process
Fiscal Year 2022 Budget	Fiscal Year 2022 Budget	In Process

Mesa Water District

Dedicated to Satisfying our Community's Water Needs

MEMORANDUM

TO: Board of Directors
FROM: Stacy Taylor, Water Policy Manager
DATE: March 23, 2021
SUBJECT: State Advocacy Update

RECOMMENDATION

Receive and file the State Advocacy Update.

STRATEGIC PLAN

Goal #7: Actively participate in regional and statewide water issues.

PRIOR BOARD ACTION/DISCUSSION

This item is provided at the monthly Board of Directors Committee meeting.

DISCUSSION

An updated State Advocacy report will be provided at the March 23, 2021 meeting.

FINANCIAL IMPACT

In Fiscal Year 2021, $205,000 is budgeted for Support Services; $141,985 has been spent to date.

ATTACHMENTS

None.

Mesa Water DISTRICT®

Dedicated to Satisfying our Community's Water Needs

MEMORANDUM

TO: Board of Directors
FROM: Stacy Taylor, Water Policy Manager
DATE: March 23, 2021
SUBJECT: Orange County Update

RECOMMENDATION

Receive and file the Orange County Update.

STRATEGIC PLAN

Goal #7: Actively participate in regional and statewide water issues.

PRIOR BOARD ACTION/DISCUSSION

This item is provided at the monthly Board of Directors Committee meeting.

DISCUSSION

Mesa Water District's (Mesa Water®) government relations program includes monitoring local and regional political issues and policy-setting authorities (i.e., County of Orange, Orange County Local Agency Formation Commission, etc.). An updated Orange County report will be provided at the March 23, 2021 meeting.

FINANCIAL IMPACT

In Fiscal Year 2021, $205,000 is budgeted for Support Services; $141,985 has been spent to date.

ATTACHMENTS

None.

Mesa Water DISTRICT®

Dedicated to Satisfying our Community's Water Needs

MEMORANDUM

TO: Board of Directors
FROM: Celeste Carrillo, Public Affairs Coordinator
DATE: March 23, 2021
SUBJECT: Outreach Update

RECOMMENDATION

Receive and file the Outreach Update.

STRATEGIC PLAN

Goal #4: Increase public awareness about Mesa Water and about water.
Goal #6: Provide outstanding customer service.
Goal #7: Actively participate in regional and statewide water issues.

PRIOR BOARD ACTION/DISCUSSION

This item is provided at the monthly Board of Directors Committee meeting.

DISCUSSION

Mesa Water District's (Mesa Water®) outreach program aims to connect Mesa Water with its constituents in order to achieve Goal #4 of the Board of Directors' (Board) Strategic Plan. Outreach activities are also designed to achieve the Strategic Plan goals related to customer service and/or regional water issues involvement by educating and informing the District's constituents about Mesa Water, water issues, and water in general. Mesa Water's constituents include external audiences, such as customers, community members, elected officials, industry colleagues, media, water districts and special districts – as well as internal audiences, such as staff, retirees and Board members.

Upcoming Fiscal Year 2021 Events

No Upcoming Events

The benefits of Mesa Water's outreach program include:

- Informing constituents about Southern California's perpetual drought, the historical drought facing California, and the importance of developing local and cost-effective sources of safe, reliable water for Mesa Water's service area and the region at large;
- Educating constituents about the importance of water and water stewardship, in order to sustain Southern California's population, quality of life, business, and economy;
- Educating constituents about Mesa Water's stewardship of ratepayer funds and financial responsibility to fund, invest in, and save for the current and future provision of safe and reliable water for the District's service area;
- Informing constituents of the District's infrastructure improvements to ensure water quality and water reliability for its service area;

- Learning from constituents and evolving as a well-informed Board of Directors;
- Promoting water use efficiency to Mesa Water's customers and community members to help them save water, money, and the environment;
- Ensuring, for public health and safety reasons, that Mesa Water customers and community members identify the District as their water provider and as the source of information about water in emergency situations;
- Supporting Mesa Water's service area as an actively involved participant in programs that provide added value and benefits to the community;
- Informing the media of Mesa Water's activities that benefit the District's customers and community;
- Empowering Mesa Water's Board and staff with information that will help them provide the best possible service to the District's customers and community members; and,
- Strengthening Mesa Water's industry relations to provide opportunities for improving the District's business and operations -- including the areas of financial and human resources strength, infrastructure and technological innovation, and setting/supporting policies that have a positive impact on Mesa Water's service area -- so that the District can continue to provide safe, high-quality, reliable, and affordable water to its customers.

FINANCIAL IMPACT

In Fiscal Year 2021, $595,330 is budgeted for the District's Public Affairs department expenses; $331,220 has been spent to date.

ATTACHMENTS

None.

MesaWater DISTRICT®

Dedicated to Satisfying our Community's Water Needs

MEMORANDUM

TO: Board of Directors

FROM: Stacy Taylor, Water Policy Manager

DATE: March 23, 2021

SUBJECT: California Special Districts Association Board of Directors Election, Southern Network, Seat A, Concurring Nomination

RECOMMENDATION

Adopt Resolution No. 1539 Concurring in the Nomination of Jo MacKenzie as a candidate for the California Special Districts Association Board of Directors, Southern Network, Seat A.

STRATEGIC PLAN

Goal #4: Increase public awareness about Mesa Water and about water.
Goal #7: Actively participate in regional and statewide water issues.

PRIOR BOARD ACTION/DISCUSSION

None.

DISCUSSION

The California Special Districts Association (CSDA) is the governing body responsible for all policy decisions related to CSDA's member services, legislative advocacy, education and resources. The Board of Directors is crucial to the operation of the association and to the representation of the common interests of all California's special districts before the legislature and the State Administration. Serving on the Board requires one's interest in the issues confronting special districts statewide.

The leadership of CSDA is elected from its six geographical networks. Each of the six networks has three seats on the Board with staggered 3-year terms. Mesa Water District (Mesa Water®) is located in the Southern Network, consisting of the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and San Diego. This year, Seat A in the Southern Network is open for election.

Director Jo McKenzie from the Vista Irrigation District is the incumbent and is seeking re-election. Director MacKenzie serves (since 1992) on the Board of Directors for the Vista Irrigation District in San Diego. She has served the Southern Network on CSDA's Board since 2003, where her service has also included the roles of Board President (2011), Vice President (2010), and Treasurer (2008 and 2009). In addition to serving as an effective leader on CSDA's Board, Director MacKenzie is also President of the CSDA Finance Corporation which provides competitive financing for capital improvement projects.

Mesa Water received correspondence from Director MacKenzie requesting a concurring resolution from the District nominating her as a qualified candidate for the CSDA Board of Directors, Southern Network, Seat A. The deadline to submit the concurring nomination resolution to CSDA is Monday, March 29, 2021.

The CSDA Board of Directors Election electronic ballots will be emailed May 28, 2021 and all cast ballots must be received by CSDA no later than 5:00 p.m. on July 16, 2021. The successful candidates will be notified no later than July 20, 2021 and all selected Board Members will be introduced at CSDA's Annual Conference in Monterey, CA in August 2021.

FINANCIAL IMPACT

None.

ATTACHMENTS

Attachment A: Draft Resolution No. 1539
Attachment B: CSDA Election Information
Attachment C: CSDA Candidate Correspondence and Statement of Qualifications

RESOLUTION NO. 1539

RESOLUTION OF THE
MESA WATER DISTRICT BOARD OF DIRECTORS
CONCURRING IN THE NOMINATION OF JO MACKENZIE
TO THE CSDA BOARD OF DIRECTORS

WHEREAS, the Mesa Water District is a county water district organized and operating pursuant to the provisions of the laws of the State of California (State or California); and

WHEREAS, the California Special Districts Association (CSDA) is holding an election for its Board of Directors for the Southern Network, Seat A for the 2022-24 term; and

WHEREAS, the Mesa Water District is a voting member of CSDA and a voting member of the Southern Network; and

WHEREAS, the incumbent, Jo MacKenzie, of Vista Irrigation District is seeking re-election for this position; and

WHEREAS, Jo MacKenzie has been involved with the CSDA Board since 2003 and has served in a wide variety of roles including Board President in 2011, Vice President in 2010, and Treasurer in 2008 and 2009; and

WHEREAS, the Board of Directors of the Mesa Water District believe that Jo MacKenzie is an effective leader on the CSDA Board.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE MESA WATER DISTRICT DOES HEREBY RESOLVE, DETERMINE, AND ORDER AS FOLLOWS:

<u>Section 1.</u> The Board of Directors of Mesa Water District hereby concurs with the nomination of Jo MacKenzie to represent the Southern Network, Seat A, on the CSDA Board of Directors; and

<u>Section 2.</u> The District Secretary is hereby directed to transmit a copy of this resolution to the attention of the Board Secretary of the Vista Irrigation District at 1391 Engineer Street, Vista, CA 92081, or email Lsoto@vidwater.org forthwith.

ADOPTED, SIGNED, and APPROVED this 23rd day of March 2021 by a roll call vote.

AYES: DIRECTORS:
NOES: DIRECTORS:
ABSENT: DIRECTORS:
ABSTAIN: DIRECTORS:

Marice H. DePasquale
President, Board of Directors

Denise Garcia
District Secretary

California Special Districts Association
Districts Stronger Together

DATE: January 28, 2021

TO: CSDA Voting Member Presidents and General Managers

FROM: CSDA Elections and Bylaws Committee

SUBJECT: **CSDA BOARD OF DIRECTORS CALL FOR NOMINATIONS SEAT A**

The Elections and Bylaws Committee is looking for Independent Special District Board Members or their General Managers who are interested in leading the direction of the California Special Districts Association for the 2022 - 2024 term.

The leadership of CSDA is elected from its six geographical networks. Each of the six networks has three seats on the Board with staggered 3-year terms. Candidates must be affiliated with an independent special district that is a CSDA Regular Member in good standing and located within the geographic network that they seek to represent. (See attached CSDA Network Map)

The CSDA Board of Directors is the governing body responsible for all policy decisions related to CSDA's member services, legislative advocacy, education and resources. The Board of Directors is crucial to the operation of the Association and to the representation of the common interests of all California's special districts before the Legislature and the State Administration. Serving on the Board requires one's interest in the issues confronting special districts statewide.

Commitment and Expectations:

- Attend all Board meetings, usually 4-5 meetings annually, at the CSDA office in Sacramento.
- Participate on at least one committee, meets 3-5 times a year at the CSDA office in Sacramento.
  (CSDA reimburses Directors for their related expenses for Board and committee meetings as outlined in Board policy).
- Attend, at minimum, the following CSDA annual events: Special Districts Legislative Days - held in the spring, and the CSDA Annual Conference - held in the fall.
  *(CSDA does **not** reimburse expenses for the two conferences even if a Board or committee meeting is held in conjunction with the event)*
- Complete all four modules of CSDA's Special District Leadership Academy within 2 years of being elected.
  *(CSDA does **not** reimburse expenses for the Academy classes even if a Board or committee meeting is held in conjunction with the event).*

Nomination Procedures: Any Regular Member in good standing is eligible to nominate one person, a board member or managerial employee (as defined by that district's Board of Directors), for election to the CSDA Board of Directors. **A copy of the member district's resolution or minute action and Candidate Information Sheet must accompany the nomination. The deadline for receiving nominations is March 29, 2021. Nominations and supporting documentation may be mailed or emailed.**

Mail: 1112 I Street, Suite 200, Sacramento, CA 95814
Fax: 916.442.7889
E-mail: amberp@csda.net

Once received, nominees will receive a candidate's letter. The letter will serve as confirmation that CSDA has received the nomination and will also include campaign guidelines.

CSDA will begin electronic voting on May 28, 2021. All votes must be received through the system no later than 5:00 p.m. July 16, 2021. The successful candidates will be notified no later than July 20, 2021. All selected Board Members will be introduced at the Annual Conference in Monterey, CA in August 2021.

Expiring Terms
(See enclosed map for Network breakdown)

Northern Network	Seat A – Ralph Emerson, GM, Garberville Sanitary District*
Sierra Network	Seat A – Noelle Mattock, Director, El Dorado Hills Community Services District*
Bay Area Network	Seat A – Chad Davisson, GM, Ironhouse Sanitary District*
Central Network	Seat A – Vacant
Coastal Network	Seat A – Elaine Magner, Director, Pleasant Valley Recreation and Park District*
Southern Network	Seat A – Jo MacKenzie, Director, Vista Irrigation District*

This year we will be using a web-based online voting system, allowing your district to cast your vote easily and securely. *Electronic Ballots will be emailed to the main contact in your district May 28, 2021.* All votes must be received through the system no later than 5:00 p.m. July 16, 2021.

Districts can opt to cast a paper ballot instead; but you must contact Amber Phelen by e-mail ***Amberp@csda.net by March 29, 2021*** *in order to ensure that you will receive a paper ballot on time.*

CSDA will mail paper ballots on May 28, 2021 per district request only. ALL ballots must be received by CSDA no later than 5:00 p.m. July 16, 2021.

The successful candidates will be notified no later than July 20, 2021. All selected Board Members will be introduced at the Annual Conference in Monterey, CA in August 2021.

(* = Incumbent is running for re-election)

If you have any questions, please contact Amber Phelen at amberp@csda.net.

California Special Districts Association
Districts Stronger Together

2021 BOARD OF DIRECTORS NOMINATION FORM

Name of Candidate: ______________________________

District: ______________________________

Mailing Address: ______________________________

____

Network: ______________________________ **(see map)**

Telephone: ______________________________
(PLEASE BE SURE THE PHONE NUMBER IS ONE WHERE WE CAN REACH THE CANDIDATE)

Fax: ______________________________

E-mail: ______________________________

Nominated by (optional): ______________________________

Return this <u>form and a Board resolution/minute action supporting the candidate and Candidate Information Sheet</u> by mail or email to:

CSDA
Attn: Amber Phelen
1112 I Street, Suite 200
Sacramento, CA 95814
(877) 924-2732

amberp@csda.net

DEADLINE FOR RECEIVING NOMINATIONS – March 29, 2021

California Special Districts Association
CSDA
Districts Stronger Together

2021 CSDA BOARD CANDIDATE INFORMATION SHEET

The following information MUST accompany your nomination form and Resolution/minute order:

Name: ______________________________

District/Company: ______________________________

Title: ______________________________

Elected/Appointed/Staff: ______________________________

Length of Service with District: ______________________________

1. **Do you have current involvement with CSDA (such as committees, events, workshops, conferences, Governance Academy, etc.):**

____

____

2. **Have you ever been associated with any other state-wide associations (CSAC, ACWA, League, etc.):**

____

____

3. **List local government involvement (such as LAFCo, Association of Governments, etc.):**

____

____

4. **List civic organization involvement:**

____

____

****Candidate Statement** – Although it is not required, each candidate is requested to submit a candidate statement of no more than 300 words in length. **Any statements received in the CSDA office after March 29, 2021 will not be included with the ballot.**

California Special Districts Association
DISTRICT NETWORKS

Stacy Lynne Taylor

From: Jo MacKenzie <mackgroup@cox.net>
Sent: Monday, March 08, 2021 2:55 PM
To: Jo MacKenzie
Subject: CSDA CONCURRING NOMINATION REQUEST
Attachments: CONCURRING RESO (2021).docx; 2021 CSDA concurring reso template_2021 (F).docx

Board Members and General Manager,

Nominations are now in progress for the CSDA Board of Directors, Seat A. There are three directors in each Network with rotating 3-year terms. I am running for my seat on the CSDA Board. I would appreciate your board of directors consider approving a concurring nomination resolution on my behalf. A Concurring Nomination Resolution Template is attached for your convenience.

It has been a privilege and honor to represent the California Special Districts Southern Network. I have served as President and Treasurer, plus serving on other CSDA Committees. I am presently President of the CSDA Finance Corp---if you need money for a capital improvement project, the Finance Corp provides competitive financing. I believe during my tenure on the board of directors I have provided the leadership necessary to grow the association so that it has the influence and visibility needed in the Capitol to represent the diverse needs of all special districts. I hope to continue this leadership role to provide the direction, ideas and participation necessary for CSDA to continue its upward progress.

Serving on the CSDA Board of Directors requires a commitment of time along with an interest in the issues confronting special districts statewide. Also, it's imperative that a Board Member have a true interest in seeing that our members have the information and assistance they need in a timely fashion in order for them stay on top of new legislation affecting special districts and the educational opportunities provided by CSDA. I try to connect with new members so that they know what CSDA has to offer in the way of educational opportunities along with how CSDA represents our members at the Capitol.

I would truly be honored if your district would approve the concurring resolution. Thank you for your consideration.

Jo MacKenzie, Director
Vista Irrigation District
mackgroup@cox.net
760-743-7969

FYI*: UPCOMING EDUCATION EVENTS--WEBINARS ARE FREE!*

3/12/2021	Webinar: Do's & Don'ts: Initiative Campaigns
3/16/2021	Virtual Workshop: CVRA
3/18/2021	Webinar: How-To-Do-It for Special Districts with Revenue Need
3/24/2021	Virtual Workshop: Prevailing Wage: Basics and Beyond
3/24/2021	Virtual Workshop: SDLA Module 1 - Governance Foundations
3/30/2021	Webinar: Independent Contractors, Dynamex & AB5
4/1/2021	Webinar: Is Your District Recession Ready?
4/6/2021	Webinar: Litigation Lessons Learned From 2020
4/7/2021	Virtual Workshop: Financial Management for Special Districts
4/12/2021	Virtual Workshop: SDLA Module 2: Setting Direction

CONCURRING RESOLUTION REQUEST

Re-ELECT JO MacKENZIE
TO
CSDA BOARD OF DIRECTORS, SEAT A
SOUTHERN NETWORK

Board Member Southern Network,

I would appreciate your board of directors consider approving a Concurring Nomination Resolution on my behalf. Nominations are now in progress for the CSDA Board of Directors, Seat A. There are three directors in each Network with rotating three-year terms. I am running for my seat on the CSDA Board so I can continue serving you. I have attached a Concurring Nomination Resolution Template for your convenience.

It has been a privilege and honor to represent the California Special Districts Southern Network. I have served on the CSDA Board as President, Vice President and Treasurer, as well as on nearly all of the CSDA Committees. During my tenure on the board of directors, I have provided the leadership to grow the association. CSDA's influence and visibility in the Capitol has grown because legislators know the association represents the diverse needs of all special districts. In this leadership role, I will continue to provide the direction, ideas, and participation necessary for CSDA to continue its upward progress. I am presently the President of the CSDA Finance Corp---if your agency is in need of funding for a capital improvement project, the Finance Corp provides competitive financing. I was appointed by the CSDA Board to serve on the Special District Leadership Foundation (SDLF) Board of Directors in 2013 where I continue to serve as its Treasurer since 2014.

Serving on the CSDA Board of Directors requires a commitment of time along with a sincere interest in the issues confronting special districts statewide and nationally. It is also imperative that CSDA Board Members are driven to assure that members receive timely information and assistance in order to be up-to-date on new legislation affecting special districts, and the educational opportunities offered by CSDA. I connect with the Southern Network members so that they know what CSDA, CSDA Finance Corp, and the Special District Leadership Foundation have to offer: educational opportunities and representation at the Capitol; financing to meet district's needs; and scholarship availability to attend CSDA events.

I would truly be honored if your district would approve the concurring resolution. Thank you for your consideration of my request.

Jo MacKenzie, Director
Vista Irrigation District
CSDA Past President
mackgroup@cox.net
760-743-7969

CSDA EDUCATION CATALOG LINK:
https://www.csda.net/viewdocument/2021-professional-development-catal All webinars are free to CSDA Members this year. The Workshops and Conferences are at the reduced Membership fee. If your district needs financial assistance in order to attend, check out the Scholarships available to ALL districts on a first come basis (funds are limited) at WWW. SDLF.ORG.

Mesa Water DISTRICT®

Dedicated to Satisfying our Community's Water Needs

MEMORANDUM

TO: Board of Directors
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: March 23, 2021
SUBJECT: Water Supply, Energy, and Supply Chain Reliability Assessment

RECOMMENDATION

Recommend that the Board of Directors approve the proposed recommendations for the Water Supply, Energy, and Supply Chain Reliability Assessment as identified in the Executive Summary and Technical Memorandums 1, 2 and 3, and implement as part of the Capital Improvement Program Renewal.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.
Goal #2: Practice perpetual infrastructure renewal and improvement.
Goal #6: Provide outstanding customer service.

PRIOR BOARD ACTION/DISCUSSION

At its May 14, 2020 meeting, the Board of Directors (Board) awarded on-call professional design services contracts for the Capital Improvement Program Renewal.

At its December 17, 2020 meeting, the Board received a presentation on the results of the Water Supply, Energy, and Supply Chain Reliability Assessment. The Board directed staff to bring back an updated assessment to a future Committee meeting.

BACKGROUND

Mesa Water District (Mesa Water®) owns and operates two reservoirs with a combined maximum storage capacity of approximately 30 million gallons and associated pump stations strategically located within its service area along with five clear wells with a total approximate capacity of 14 million gallons per day (MGD). The District also owns and operates two deep production wells that feed the 8.4 MGD Mesa Water Reliability Facility (MWRF) that treats amber-tinted water from the Orange County Groundwater Basin's (Basin) deep aquifer. These aforementioned production, storage, and treatment facilities allow Mesa Water to be the only Orange County water agency to provide 100% local water supply reliability.

Through the 2014 Capital Improvement Program (CIP) Master Plan Update (Master Plan), Mesa Water adopted a 115% water supply reliability requirement that provides for the District to ensure there is production capacity to meet 115% of all demands in any given season. This action resulted in Mesa Water purchasing two new commercial properties within the City of Santa Ana to initiate construction of two new wells and a connecting pipeline.

Mesa Water has taken great strides to provide robust diversification of both its energy and water supply reliability. Examples of this diversification are the construction of the MWRF, which allowed the District to obtain 100% local reliability, use of natural gas engines in both reservoirs and Well No. 5, and implementation of diesel back-up generators at a majority of the clear water well sites. While the efforts to date have provided a robust, cost-effective operational flexibility, a more systematic approach to the District's water, energy, and supply chain reliability is desired.

In 2017, the Reservoirs 1 & 2 Pumps, Controls, and Chemical System Assessment Project determined that much of the Reservoirs 1 and 2 chemical and mechanical equipment (e.g., pumps, engines, control system, chemical dosing systems, etc.) was at the end-of-life or soon approaching end-of-life. With the need to replace the mechanical equipment at Reservoirs 1 and 2, there is an opportunity to improve the distribution system. The District wanted to assess the state of its overall energy and water supply reliability from a readiness-to-serve perspective, long-term capital and operating cost approach, maintenance standardization, and regulatory permitting and compliance requirements to determine the best equipment for replacement of mechanical systems at Reservoirs 1 and 2. The idea of reliability expanded to assess the water supply, energy supply, and supply chain interruptions (e.g., materials, services, spare parts, energy supplies, chemicals, etc.) that could occur due to emergency events (e.g., earthquakes, floods, etc.). Knowing that the reservoirs, wells, and MWRF work together as one system, the District wanted to evaluate the entire system in determining the recommended replacements.

To achieve these goals, staff developed the Water Supply, Energy, and Supply Chain Reliability Assessment. The objectives of this assessment are as follows:

1. Evaluate existing water supply capacities relative to meeting 115% of all demand seasons using local groundwater resources;
2. Evaluate existing Mesa Water energy supply capacities, types, and backup capabilities relative to ensuring reliable groundwater supplies can be pumped and distributed during normal and emergency operations;
3. Identify water supply and energy reliability gaps (from Objective Nos. 1 & 2) and provide recommended solutions;
4. Evaluate Mesa Water's Supply Chain system relative to emergency readiness; and
5. Identify Supply Chain system reliability gaps (from Objective No. 4) and provide recommended solutions.

This project resulted in three technical memorandums (TMs). The key project elements include:

TM-1 Water Supply Reliability: TM-1 analyzes Mesa Water's water supply program if emergency and operational scenarios caused certain water sources to be unavailable.

TM-2 Energy Supply Reliability: TM-2 assesses Mesa Water's energy supply reliability, evaluates regulatory and permitting compliance concerns associated with these supplies, forecasts future supply costs, and assesses and recommends the best available equipment technologies for replacement of end-of-life equipment.

TM-3 Energy Supply Chain Reliability and Disruption: The purpose of TM-3 is to perform an Emergency Supply Chain Reliability and Disruption Assessment (ESCRDA) to determine Mesa Water's ability to respond to a local or regional emergency event and to provide recommendations that support the reliable and safe delivery of water to its customers.

Following the Board's December Committee meeting, staff worked to incorporate comments from the Board into the Executive Summary and TMs 1, 2, and 3. The following additions were made to each of the memoranda.

Executive Summary:

- Changes from TMs 1, 2, and 3 that impacted the Executive Summary were updated accordingly.

TM-1 Water Supply Reliability:

- Section 3.6 - A description of the Huntington Beach Desalination Plant was added to describe the facility as a potential future supply source for Mesa Water.

TM-2 Energy Supply Reliability:

- Section 4.2.1 – A description of Southern California Edison's substation capacities was added to highlight SCE's ability to support the Reservoir 1 and 2 electrical loads if the natural gas engines were replaced with electric motors.
- Section 6.1 – Text updates indicating that the reservoir upgrade designs will be furthered during the preliminary design phase of the project.
- Section 7.2 – A description regarding noise mitigation of standby diesel engine generators was added.
- Section 9 – A statement regarding potential future regulations of standby diesel engine generators was added.
- Section 10 – A paragraph regarding the expected accuracy of the Class 5 cost estimates was added.
- Section 10 – This section was edited to further explain the development of the cost estimates. Additionally, the project costs were reevaluated and an additional contingency was added to the project costs to better account for unknown conditions at the planning level of the design.
- Section 11 – The costs presented in this section were reevaluated and an additional contingency was added to the project cost to better account for unknown conditions at the planning level of design.
- Section 11.1 – This section was edited to include a description of decentralized diesel fuel storage.

TM-3 Energy Supply Chain Reliability and Disruption:

- Section 8 - Costs that were updated in TM-2 and also presented in TM-3 were updated.

<u>DISCUSSION</u>

Findings, recommendations, and costs for each of the TMs are summarized below. More detailed information can be found in the Executive Summary (Attachment A) and TMs 1, 2, and 3 (Attachments B, C, and D). The Executive Summary and TMs are included as red-lined drafts to highlight changes made to each document following the Board's December Committee meeting.

MesaWater DISTRICT®

TM-1 Water Supply Reliability

For the GAP analysis, water demands and production capacities are compared in three operational scenarios for both 2020 and 2040 cases. Scenario 1 represents normal operating conditions and establishes a baseline scenario for comparison. Scenario 2 consists of three different emergency situations in which several supply options are impaired or non-operational. Finally, Scenario 3 simulates the condition when several local supply options need critical repairs. Whenever a gap between water supply and demands are identified, various additional supply options are considered to address the deficiency based on the limitations and costs of each option. A summary of the TM-1 recommendations is provided in Table 1. below:

Table 1. Summary of Scenario Results

Year	Scenario	Existing Operational Facilities			GAP with Existing Supplies (AF)(1)	Recommended Solution	Annual Cost Over Baseline	Lump Sum Capital Improvement Cost (30-Year Debt Cycle)
		Clear Wells	MWRF Capacity	MWD Import Available				
2020	1	7 of 7	100%	Yes	-	N/A	$-	$-
	2a	6 of 7	0%	No	720	Increased Restrictions	$(88,219)	$-
	2b	4 of 7	100%	No	640	Increased Restrictions	$(41,927)	$-
	2c	2 of 7	0%	Yes	1,661	Import from MWD	$2,147,681	$-
	3	4 of 7	50%	Yes	908	Import from MWD	$1,321,823	$-
2040	1	7 of 7	100%	Yes	-	N/A	$-	$-
	2a	6 of 7	0%	No	1,270	Additional Clear Wells	$1,914,009	$31,821,284
	2b	4 of 7	100%	No	1,189	Additional Clear Wells and MWRF Capacity	$2,348,122	$31,418,604
	2c	2 of 7	0%	Yes	2,211	Import from MWD	$2,828,399	$-
	3	4 of 7	50%	Yes	1,458	Import from MWD	$2,002,541	$-

1. *Monthly supply deficit based on max month demand conditions.*

Due to the high costs to maintain self-sufficiency on local water supplies during an emergency, it is ultimately recommended that Mesa Water purchase imported water in the event of a supply shortage, whenever available. In the event of a rare situational emergency such that Metropolitan Water District of Southern California (MWD) supplies are not available, Mesa Water may offset any supply shortages through the implementation of water usage restrictions if the emergency occurs in the near term (5-10 years). In the long-term, Mesa Water can expand its local production capabilities either by installing additional clear wells, expanding MWRF treatment capacity, or a combination of both. The upcoming Huntington Beach Desalination Plant may present a potential future water supply opportunity; however, this is not considered as a current available water source in the GAP analysis due to the large amount of uncertainty associated with the project. As more information is made available, desalination will be re-evaluated as a potential supply option.

TM-2 Energy Supply Reliability

The GAP analysis from TM-1 is further expanded by evaluating the availability and deficiencies of backup energy supplies in each of the scenarios. Overall, it is recommended that Mesa Water standardize its operations on electric motors, which offer a long useful life with relatively little maintenance required compared to reciprocating engines. Also, using an electric driver provides flexibility in power sources, which will become more relevant in the shifting energy landscape. Planning level review of the Southern California Edison (SCE) infrastructure substations around both reservoirs indicates there is sufficient electrical capacity to service both reservoirs. Additionally, the cost to bring this enhanced service capacity to Mesa Water's site is SCE's costs. If all facilities used electric drivers, the backup power generation systems can be standardized around diesel fuel as well. The recommended improvements are outlined in Table 2. below:

Table 2. Summary of Recommended Improvements

Site	Existing		Recommended	
	Primary	Backup	Primary	Backup
Reservoir 1 BPS	(3) 137 hp natural gas engines	(2) natural gas generators; (1) 1,200 gal propane tank	(3) 150 hp electric motors	(1) 1,000 kW diesel generator; (1) 2,000 gal diesel fuel tank
Reservoir 2 BPS	(4) 369 hp natural gas engines	(1) natural gas generator; (1) 1,200 gal propane tank	(4) 400 hp electric motors	(1) 2,000 kW diesel generator; (1) 3,000 gal diesel fuel tank
MWRF	(2) 400 hp well pumps; (3) 350 hp high lift pumps; (2) 250 hp feed pumps; (4) 100 kW CIP tank heaters; (3) 40 hp product transfer pumps; (2) 30 hp degasifier blowers; (3) 30 hp CO2 booster pumps	Onsite generator for shut- down only	No upgrades necessary	(1) 2,500 kW diesel generator; (1) 4,000 gal diesel fuel tank
Well 1	(1) 400 hp well pump	Connection for portable generator	No upgrades necessary	Truck-Mounted Portable Generator
Well 3	(1) 300 hp well pump	(1) 350 kW diesel generator; (1) 426 gal integral diesel storage tank	No upgrades necessary	No upgrades necessary
Well 5	(1) 450 hp natural gas engine	(1) 1,150 gal propane tank	(1) 450 hp electric motor (at end of useful life)	Diesel generation and fuel tank (at end of useful life)
Well 7	(1) 300 hp well pump	(1) 350 kW diesel generator; (1) 333 gal integral diesel storage tank	No upgrades necessary	No upgrades necessary
Well 9	(1) 300 hp well pump	(1) 350 kW diesel generator; (1) 426 gal integral diesel storage tank	No upgrades necessary	No upgrades necessary
Well 12 (Future)	(1) 600 hp well pump	(1) 600 kW diesel generator (1) 1,000 gal diesel storage tank	No upgrades necessary	No upgrades necessary
Well 14 (Future)	(1) 600 hp well pump	(1) 600 kW diesel generator (1) 1,000 gal diesel storage tank	No upgrades necessary	No upgrades necessary

Additionally, each onsite fuel storage tank is sized for 24 hours of operation. To improve reliability, Mesa Water can install a centralized bulk diesel fuel storage tank to replenish onsite fuel tanks during a prolonged emergency. Two 30,000 gallon tanks could be constructed in order to provide ten days of overall operational capacity. Since the wells and reservoirs work together to meet the various demand conditions, standardization of energy sources and back-up storage can provide a robust and self-reliant system.

TM-3 Energy Supply Chain Reliability and Disruption

For the SCA, Mesa Water's crucial material and service suppliers are categorized as a low, medium, or high risk for failure based on physical constraints, practices, and past history. From the results, it is recommended that Mesa Water identify back-up suppliers for carbon dioxide and water quality analyses. Also, temporary provisions such as diesel, aggregates, pipe repair materials, and street repair materials should be stored in the event of an emergency. For the SPFA, systems and equipment at each facility are assigned a risk factor based on their ability to interrupt production and their available redundancy. Based on the findings, a number of recommendations are made to mitigate the quantity of single points of failure, ranging from mechanical, electrical, and instrumentation modifications. To further mitigate risks, it is also recommended that Mesa Water stock spare parts for crucial equipment, including but not limited to spare pumps, valves, and PLCs. As there is little additional space for storage at existing facilities, the parts recommended in TM-3 should be stored in a new centralized warehouse, which could be located at either of the proposed sites for new Well Nos. 12 and 14 or at the centralized bulk fuel storage depot site.

Overall Recommendations

The overall recommendations across all technical memorandums are provided in Table 3. The recommendations are categorized as short-term (1 to 5 years) or long-term (greater than 5 years) and are ordered by priority. Prioritization is based on several factors, including criticality, ease of implementation, cost, and return on investment.

Table 3. Overall Recommendations

Priority	Recommendation	Estimated Cost
Short-Term Decisions (1-5 years)		
1	Minimize single points of failure with new equipment and instrumentation. Procure spare parts for critical equipment and instrumentation. Implement asset management system.	$1.1M[(1)]
	Construct new storage warehouse (Location TBD).	$0.4M
2	Replace pump motors at Reservoirs 1 and 2 with electric motors. Provide backup diesel generators and fuel storage.	$5.4M
3	Provide truck-mounted portable generator system for Well 1.	$0.6M
	Drill new well at Well 5 and provide electrical drives, backup power, and associated electrical improvements.	$2.7M
4	Construct centralized bulk diesel fuel storage tanks to replenish onsite fuel tanks during a prolonged emergency.	$6.3M[(2)]
	Subtotal	$16.3M
Long-Term Decisions (5+ years)		
5	Evaluate installation of additional clear wells or MWRF expansion.	Up to $32M
6	Provide backup power generation and fuel storage for the MWRF.	$1.7M

1. *Costs derived from Table 8-1 in TM-3.*
2. *Includes property acquisition.*

In the short term, making minor system improvements is the top priority, as it is simple to execute and can quickly eliminate several reliability risks. Additionally, storing spare parts allows these critical system components to remain available even during a supply chain emergency. A new warehouse can be considered to centralize and protect these critical spare parts as well. Replacing the pump drives and providing backup power at Reservoirs 1 and 2 is the next priority. The reservoirs are critical for meeting peak water demands, especially during an emergency. Installing electric motors and diesel powered generators is an improvement in reliability compared to the existing equipment and provides maintenance standardization across all of Mesa Water's sites. Providing backup generation at Well No. 1 and upgrading the propane back-up equipment at Well No. 5 is particularly important because the clear wells provide the bulk of water supplies during an emergency. Once all onsite backup power systems within the supply system are standardized around diesel powered generators, constructing a bulk diesel storage tank would provide an additional level of energy security during prolonged electrical and supply chain outages.

In the long term, Mesa Water can evaluate the feasibility of additional clear wells and MWRF treatment. Providing enough additional infrastructure to account for the worst-case scenarios examined where MWD water is unavailable will cost up to an estimated $32MM in capital improvements. However, this estimate should be viewed as an upper limit. The value and extent of the additional reliability insurance needed is open for discussion and should be examined closer in further assessment. Although much lower in cost, providing additional backup power at the MWRF is the lowest priority recommendation. The MWRF is less critical during an emergency due to its lower overall capacity in comparison to the capacity of the clear well supply system. In addition, the need for chemicals in the treatment process adds another layer of vulnerability to the MWRF during a disaster, which will not be mitigated with the addition of backup power.

The short-term recommendations from the Water Supply, Energy, and Supply Chain Reliability Assessment can be executed through the development of two Capital Improvement Program Renewal projects:

1. **Reservoirs 1 & 2 Motor/Engine, Pump, and Control System Replacement** – End-of-life equipment will be replaced at Reservoirs 1 and 2. The existing natural gas engine-driven pumps and propane backup systems will be replaced using electrically driven motors and diesel backup generators.
2. **Mesa Water Emergency Preparedness Center** – The project would identify locations for and construct a centralized bulk diesel storage facility, procure critical spare parts, design and construct additional warehouse space, and design and procure a truck-mounted portable generator system for Well No. 1.

The long-term recommendations from the Water Supply, Energy, and Supply Chain Reliability Assessment will be further evaluated in a future assessment.

Overall, Mesa Water has taken great strides to reliably meet typical water demands using exclusively local supplies. With the aforementioned recommendations, Mesa Water can take its objectives to an elite level to remain reliable even during uncertain emergencies and natural disasters.

FINANCIAL IMPACT

Funds for the proposed recommendations are budgeted for Fiscal Year 2021 and are part of the Capital Improvement Program Renewal.

ATTACHMENTS

Attachment A: Brown and Caldwell Executive Summary
Attachment B: TM-1 Water Supply Reliability Assessment
Attachment C: TM-2 Energy Supply Reliability
Attachment D: TM-3 Emergency Supply Chain Reliability and Disruption

18500 Von Karman Avenue, Suite 1100
Irvine, CA 92612

T: 714.730.7600

Prepared for: Mesa Water District

Project Title: Water Supply, Energy, and Supply Chain Reliability Assessment

Project No.: 155448

Executive Summary

Subject: Water Supply, Energy, and Supply Chain Reliability Assessment

Date: February 11, 2021

To: Phil Lauri, Mesa Water District Assistant General Manager

From: Adam Zacheis, Ph.D., P.E., Project Manager

Copy to: Andrew Wiesner, P.E., Principal Engineer

Prepared by: ______________________________
Alan Mangosong

Reviewed by: ______________________________
Adam Zacheis

Table of Contents

List of Tables

Abbreviations

BC	Brown and Caldwell
ESCRDA	Emergency Supply Chain Reliability and Disruption Assesment
ESRA	Energy Supply Reliability Assessment
Mesa Water	Mesa Water District
MWD	Metropolitan Water District of Southern California
MWDOC	Municipal Water District of Orange County
MWRF	Mesa Water Reliability Facility
PLC	programmable logic controller
SCA	Supply Chain Analysis
SPFA	Single Points of Failure Analysis
TM-1	Technical Memorandum No. 1
TM-2	Technical Memorandum No. 2
TM-3	Technical Memorandum No. 3
WSRA	Water Supply Reliability Assessment

Section 1: Executive Summary

Mesa Water District (Mesa Water) owns and operates a diverse water supply portfolio that has provided 100 percent local water supply reliability; the only Orange County water agency to accomplish this. Mesa Water's production and storage facilities include five (5) clear groundwater wells, two (2) deep production wells producing amber-tinted water that is subsequently treated at the Mesa Water Reliability Facility (MWRF), and two (2) reservoirs used for storage and handling of peak flows. Mesa Water also adopted a reliability requirement to ensure production can meet 115 percent of all demands in any given season. This action has resulted in Mesa Water pursuing the development of two (2) additional clear wells to further enhance their water reliability and resiliency. Although not a local water supply, Mesa Water also has the ability to import water from Metropolitan Water District (MWD) through the local wholesaler, the Municipal Water District of Orange County (MWDOC). For energy reliability, Mesa Water has implemented backup generation at the majority of its clear well sites and provided natural gas engines at both reservoirs. These actions have demonstrated how Mesa Water has established a robust and diverse water production system, but a systematic approach is desired to assess potential gaps in water, energy, and supply chain reliability, particularly during periods of emergency (e.g. earthquakes, floods, etc.). Mesa Water engaged Brown and Caldwell (BC) to conduct a Water Supply, Energy, and Supply Chain Reliability Assessment with the following objectives:

1. Evaluate existing water supply capacities relative to meeting 115 percent of all demand seasons using local groundwater resources;
2. Evaluate existing Mesa Water energy supply capacities, types, and backup capabilities to ensure groundwater supplies can be pumped and distributed during normal and emergency operations;
3. Identify water supply and energy reliability gaps (from Objectives Nos. 1 and 2) and provide recommended solutions;
4. Evaluate Mesa Water's Supply Chain system relative to emergency readiness; and
5. Identify Supply Chain system reliability gaps (from Objective No. 4) and provide recommended solutions.

To investigate these objectives, the assessment is divided into three Technical Memorandums (TM), each focusing on a separate aspect of reliability.

1.1 TM-1: Water Supply Reliability

Technical Memorandum No. 1 (TM-1) focuses on the following Water Supply Reliability Assessment (WSRA) components:

- Evaluate Mesa Water's current and future water demands;
- Confirm Mesa Water's current and future water supply capacity against demands;
- Conduct GAP analysis for various emergency and operational scenarios to water sources; and
- Present cost-efficient solutions to address water supply deficiencies identified in the GAP analysis.

For the GAP analysis, water demands, and production, capacities are compared in three operational scenarios for both 2020 and 2040 cases. Scenario 1 represents normal operating conditions and establishes a baseline scenario for comparison. Scenario 2 consists of three different emergency situations in which several supply options are impaired or non-operational. Finally, Scenario 3 simulates the condition when several local supply options need critical repairs. Whenever a gap between water supply and demands are identified, various additional supply options are considered to address the deficiency based on the limitations and costs of each option. A summary of the TM-1 recommendations is provided in Table ES-1.

Table ES-1. Summary of Scenario Results

Year	Scenario	Existing Operational Facilities			GAP with Existing Supplies (AF)	Recommended Solution	Annual Cost Over Baseline	Lump Sum Capital Improvement Cost (30-Year Debt Cycle)
		Clear Wells	MWRF Capacity	MWD Import Available				
2020	1	7 of 7	100%	Yes	-	N/A	$-	$-
	2a	6 of 7	0%	No	720	Increased Restrictions	$(88,219)	$-
	2b	4 of 7	100%	No	640	Increased Restrictions	$(41,927)	$-
	2c	2 of 7	0%	Yes	1,661	Import from MWD	$2,147,681	$-
	3	4 of 7	50%	Yes	908	Import from MWD	$1,321,823	$-
2040	1	7 of 7	100%	Yes	-	N/A	$-	$-
	2a	6 of 7	0%	No	1,270	Additional Clear Wells	$1,914,009	$31,821,284
	2b	4 of 7	100%	No	1,189	Additional Clear Wells and MWRF Capacity	$2,348,122	$31,418,604
	2c	2 of 7	0%	Yes	2,211	Import from MWD	$2,828,399	$-
	3	4 of 7	50%	Yes	1,458	Import from MWD	$2,002,541	$-

Due to the high costs involved in maintaining self-sufficiency on local water supplies during an emergency, it is ultimately recommended that Mesa Water purchase imported water in the event of a supply shortage, whenever available. In the event of a rare situational emergency such that MWD supplies are not available, Mesa Water may offset any supply shortages through the implementation of water usage restrictions if the emergency occurs in the near term (5-10 years). In the long-term, Mesa Water can expand its local production capabilities either by installing additional clear wells, expanding MWRF treatment capacity, or a combination of both. The upcoming Huntington Beach Desalination Plant may present a potential future water supply opportunity; however, this is not considered a currently available water source in the GAP analysis due to the large amount of uncertainty associated with the project. As more information is made available, desalination will be re-evaluated as a potential supply option.

1.2 TM-2: Energy Supply Reliability

Technical Memorandum No. 2 (TM-2) focuses on the following Energy Supply Reliability Assessment (ESRA) components:

- Evaluate Mesa Water's historic demands for energy usage at well sites and treatment facilities;
- Estimate Mesa Water's future energy demands and costs;
- Provide recommendations for pump drive technologies, considering life cycle costs; and
- Provide recommendations for backup power and fuel requirements.

The GAP analysis from TM-1 is further expanded upon by evaluating the availability and deficiencies of backup energy supplies in each of the scenarios. Overall, it is recommended that Mesa Water standardize its operations on electric motors, which offer a long useful life with relatively little maintenance required compared to reciprocating engines. When accounting for maintenance costs, electric motors provide an overall capital savings in comparison. Also, using an electric driver provides flexibility in power sources, which may become more relevant in the shifting energy landscape. If all facilities used electric drivers, the backup power generation systems can be standardized around diesel fuel as well.

All existing clear wells are currently equipped with electric motors and backup generation, with the exception of Well 1 (which lacks a backup generator) and Well 5 (which is natural gas driven with a backup propane fuel tank). It is recommended that a truck-mounted portable generator be purchased for Well 1, and the drives at Well 5 be replaced with electric motors along with diesel backup generators once the existing equipment reaches the end of its useful life. The natural gas engines and generators at each reservoir should each be replaced with electric motors and diesel generators. The reservoirs are critical to meeting peak day demands, and considering that the natural gas engines are nearing the end of their useful life, replacing with electric motors is recommended. The pumps at the MWRF are currently electric and do not require upgrades, but it is recommended that a diesel generator and fuel tank be installed as a backup energy supply. However, backup power at the MWRF is a relatively low priority compared to the other recommendations. The recommended improvements are outlined in Table ES-2 below.

Table ES-2. Summary of Recommended Improvements

Site	Existing		Recommended	
	Primary	Backup	Primary	Backup
Reservoir 1 BPS	(3) 137 hp natural gas engines	(2) natural gas generators; (1) 1,200 gal propane tank	(3) 150 hp electric motors	(1) 1,000 kW diesel generator; (1) 2,000 gal diesel fuel tank
Reservoir 2 BPS	(4) 369 hp natural gas engines	(1) natural gas generator; (1) 1,200 gal propane tank	(4) 400 hp electric motors	(1) 2,000 kW diesel generator; (1) 3,000 gal diesel fuel tank
MWRF	(2) 400 hp well pumps; (3) 350 hp high lift pumps; (2) 250 hp feed pumps; (4) 100 kW CIP tank heaters; (3) 40 hp product transfer pumps; (2) 30 hp degasifier blowers; (3) 30 hp CO2 booster pumps	On-site generator for shutdown only	No upgrades necessary	(1) 2,500 kW diesel generator; (1) 4,000 gal diesel fuel tank

Since each on-site fuel storage tank is sized for 24 hours of operation, Mesa Water can also install a centralized bulk diesel fuel storage tank to replenish on-site fuel tanks during a prolonged emergency. ~~It is recommended that t~~Two (2) 30,000 gallon tanks could be ~~installed at a location to be determined~~constructed in order to provide 10 days of overall operational capacity.

1.3 TM-3: Emergency Supply Chain Reliability and Disruption

Technical Memorandum No. 3 (TM-3) focuses on the following Emergency Supply Chain Reliability and Disruption Assessment (ESCRDA) tasks:

- Perform Supply Chain Analysis (SCA) of typical materials and services used during routine operation;
- Perform Single Points of Failure Analysis (SPFA) for each core production facility;
- Conduct GAP analysis for core production facilities after application of emergency scenarios;
- Evaluate suitability of storage for necessary equipment/parts needed during emergency scenarios; and
- Evaluate diesel fuel storage needed to supply backup power during emergency scenarios.

For the SCA, Mesa Water's crucial material and service suppliers are categorized as a low, medium, or high risk for failure based on physical constraints, practices, and past history. From the results, it is recommended that Mesa Water identify backup suppliers for carbon dioxide and water quality analyses. Also, temporary provisions such as diesel, aggregates, pipe repair materials, and street repair materials should be stored in the event of an emergency. For the SPFA, systems and equipment at each facility are assigned a risk factor based on their ability to interrupt production and their available redundancy. Based on the findings, a number of recommendations are made to mitigate the quantity of single points of failure, ranging from mechanical, electrical, and instrumentation modifications. To further mitigate risks, it is also recommended that Mesa Water stock spare parts for crucial equipment, including but not limited to spare pumps, valves, and programmable logic controllers (PLCs). As there is little additional space for storage at existing facilities, the parts recommended in TM-3 should be stored in a new centralized warehouse, which could be located at either of the proposed sites for new Wells 12 and 14 or at the centralized bulk fuel storage depot site.

1.4 Overall Recommendations

The overall recommendations across all technical memorandums are provided in Table ES-3. The recommendations are categorized as short-term (one to five years) or long-term (greater than five years) and are ordered by priority. Prioritization is based on several factors, including criticality, ease of implementation, cost, and return on investment.

Table ES-3. Overall Recommendations

Priority	Recommendation	Estimated Cost
Short-Term Decisions (1-5 years)		
1	Minimize single points of failure with new equipment and instrumentation. Procure spare parts for critical equipment and instrumentation. Implement asset management system.	$1.1M(1)
	Construct new storage warehouse (Location TBD).	$0.243M
2	Replace pump motors at Reservoirs 1 and 2 with electric motors. Provide backup diesel generators and fuel storage.	$5.22.8M
3	Provide truck-mounted portable generator system for Well 1.	$0.65M
	Drill new well at Well 5 and provide electrical drives, backup power, and associated electrical improvements.	$2.71.5M

4	Construct centralized bulk diesel fuel storage tanks to replenish onsite fuel tanks during a prolonged emergency.	$6.3~~3.5~~M(2)
	Subtotal	**$16.3M**
Long-Term Decisions (5+ years)		
5	Evaluate installation of additional clear wells or MWRF expansion.	Up to $32M
6	Provide backup power generation and fuel storage for the MWRF.	$1.7~~0~~M

1. Costs derived from Table 8-1 in TM-3.

~~1.~~2. Includes property acquisition.

In the short term, making minor system improvements is the top priority, as it is simple to execute and can quickly eliminate several reliability risks. Additionally, storing spare parts allows these critical system components to remain available even during a supply chain emergency. A new warehouse can be considered to centralize and protect these critical spare parts as well. Replacing the pump drives and providing backup power at Reservoirs 1 and 2 is the next priority. Although costly, the reservoirs are critical for meeting peak water demands, especially during an emergency. Installing electric motors and diesel powered generators is an improvement in reliability compared to the existing equipment. Providing backup generation at Well 1 and upgrading the propane backup equipment at Well 5 is particularly important because the clear wells provide the bulk of water supplies during an emergency. Once all on-site backup power systems within the supply system are standardized around diesel powered generators, constructing a bulk diesel storage tank would provide an additional level of energy security during prolonged electrical and supply chain outages.

In the long term, Mesa Water can evaluate the feasibility of additional clear wells and MWRF treatment. Providing enough additional infrastructure to account for the worst-case scenarios examined where MWD water is unavailable will cost up to an estimated $32M in capital improvements. However, this estimate should be viewed as an upper limit. The value and extent of the additional insurance needed is open for discussion and should be examined closer in further studies. Although much lower in cost, providing additional backup power at the MWRF is the lowest priority recommendation. The MWRF is less critical during an emergency due to its lower overall capacity in comparison to the capacity of the clear well supply system. In addition, the need for chemicals in the treatment process adds another layer of vulnerability to the MWRF during a disaster, which will not be mitigated with the addition of backup power.

Overall, Mesa Water has taken great strides to reliably meet typical water demands using exclusively local supplies. With the aforementioned recommendations, Mesa Water can take its objectives a step further to remain reliable even during uncertain emergencies and natural disasters.

18500 Von Karman Avenue, Suite 1100
Irvine, CA 92612

T: 714.730.7600

Technical Memorandum No. 1

Prepared for: Mesa Water District

Project Title: Water Supply, Energy, and Supply Chain Reliability Assessment

Project No.: 155448.150

Technical Memorandum No. 1

Subject: Water Supply Reliability Assessment

Date: February 11, 2021

To: Phil Lauri, Mesa Water District Assistant General Manager

From: Adam Zacheis, Ph.D., P.E., Project Manager

Copy to: Andrew Wiesner, P.E., Principal Engineer

Prepared by: ___________________________________
Manuel Alvarez

Reviewed by: ___________________________________
Paul Selsky

Table of Contents

List of Tables

Abbreviations

AF	acre-feet
AFY	acre-feet per year
Basin	Orange County Groundwater Basin
BC	Brown and Caldwell
BEA	Basin Equity Assessment
BPP	Basin Production Percentage
cfs	cubic feet per second
FYE	fiscal year ending
gpm	gallons per minute
GWRS	Groundwater Replenishment System
Mesa Water	Mesa Water District
MG	million gallons
MGD	million gallons per day
MWD	Metropolitan Water District of Southern California
MWDOC	Municipal Water District of Orange County
MWRF	Mesa Water Reliability Facility
OCWD	Orange County Water District
O&M	Operations and Maintenance
PSOP	Production Systems Operations Plan
RA	Replenishment Assessment

RTS	Readiness-to-Serve	WSRA	Water Supply Reliability Assessment
TM-1	Technical Memorandum No. 1	WSA	Water Supply Assessment
UWMP	Urban Water Management Plan	YTD	Year to date

Section 1: Introduction

Mesa Water District (Mesa Water) engaged Brown and Caldwell (BC) to conduct a Water Supply, Energy, and Supply Chain Reliability Assessment with the following objectives:

1. Evaluate existing water supply capacities relative to meeting 115 percent of all demand seasons using local groundwater resources;
2. Evaluate existing Mesa Water energy supply capacities, types, and backup capabilities relative to ensuring reliable groundwater supplies can be pumped and distributed during normal and emergency operations;
3. Identify water supply and energy reliability gaps (from Objectives Nos. 1 and 2) and provide recommended solutions;
4. Evaluate Mesa Water's Supply Chain system relative to emergency readiness; and
5. Identify Supply Chain system reliability gaps (from Objective No. 4) and provide recommended solutions.

1.1 Purpose

Technical Memorandum No. 1 (TM-1) is one of the components of Mesa Water's overall assessment of water supply, energy, and supply chain reliability. TM-1 focuses on the following Water Supply Reliability Assessment (WSRA) components:

- Evaluate Mesa Water's current and future water demands;
- Confirm Mesa Water's current and future water supply capacity against demands;
- Conduct GAP analysis applying various emergency and operational scenarios to Mesa Water's water sources; and
- Present cost-efficient solutions to address water supply deficiencies identified in the GAP analysis.

1.2 Background

Mesa Water is located within the County of Orange and serves approximately 17,00 acre-feet per year (AFY) to approximately 110,000 people throughout the City of Costa Mesa, a portion of the City of Newport Beach, and John Wayne Airport.

Mesa Water can supply its service area from a variety of sources including groundwater and imported water, when needed. Currently, Mesa Water owns and operates five (5) clear wells with an approximate capacity of 13 million gallons per day (MGD) from the Orange County Groundwater Basin (Basin). Two (2) additional aquifer-production wells are also available to pump and treat up to 8.6 MGD of deep aquifer amber-tinted (organic) groundwater through the Mesa Water Reliability Facility (MWRF).

In October 2019, Mesa Water performed a Water Supply Assessment (WSA) as part of a proposed high-density development project to be constructed in the City of Costa Mesa (One Metro West Project). The purpose of the WSA was to satisfy requirements under Senate Bill 610 (SB 610), Water Code Section 10910 et seq., and Senate Bill 221 (SB 221). Government Code Section 66473.7 requires that adequate water supplies be or will be available to meet the water demand associated with the One Metro West Project. Using projected demands identified in Mesa Water's *2015 Urban Water Management Plan* (UWMP), the WSA concluded that Mesa Water's water supply can adequately meet existing and future water demands. Mesa Water is the only water supplier in Orange County that is currently 100 percent reliable on local water supplies and has not needed to purchase imported water from outside resources (Metropolitan Water District of Southern California) in recent years.

However, the 2019 WSA did not consider any situations which would potentially affect or reduce Mesa Water's supplies for an extended period of time during an emergency situation. TM-1 further expands on the WSA by analyzing Mesa Water's water supply program if emergency and operational scenarios caused certain water sources to be unavailable. Three scenarios are evaluated in this memorandum. Scenario 1 presents a baseline for comparison in which all water supplies are available. Scenario 2 presents three separate disaster situations in which local supplies are either partially or completely unavailable and imported water may or may not be available as a back-up supply. In Scenario 2a, one clear well is not available, and the MWRF is unavailable. In Scenario 2b, several clear wells are unavailable, and the MWRF is available. In Scenario 2c, nearly all clear wells are unavailable, and the MWRF is unavailable, however, imported water is available as a back-up. Lastly, Scenario 3 simulates that local production is partially impaired due to extended maintenance while imported water supplies are still available. In the event any deficiencies are identified in Mesa Water's supply, various solutions are presented to increase the water supply to meet the necessary demands.

The following major documents were used to develop TM-1:

1. 2019 Water Supply Assessment
2. 2015 Urban Water Management Plan
3. 2014 Water Master Plan Update
4. 2019 Orange County Water District (OCWD) Engineer's Report
5. Mesa Water's Water Supply Reports for Fiscal Year Ending (FYE) 2019 and 2020
6. Production System Operations Plan (PSOP)

Section 2: Water Demands

Water usage demands are broken down into the following customer account use types: single family, multi-family, institutional, commercial, industrial, irrigation, and other. Irrigation demands will be examined further in Section 4, as Mesa Water has the option to call for restricted landscaping water usage during an emergency event as described in the water shortage contingency plan.

2.1 Annual Water Demands

TM-1 demand data was pulled from Mesa Water supply reports for the most recent two fiscal years (i.e. July 1, 2018 through June 30, 2020) as well as projections through 2040. Table 2-1 summarizes the annual demands in acre-feet (AF) for each FYE that will serve as the basis for the GAP analysis. Data was derived from the WSA, unless otherwise noted. The breakdown of percent volume by customer type was extracted from the WSA and applied to the 2019 and 2020 demands for consistency.

Table 2-1. Water Demands (AF)

Customer Type	2019	2020	2025	2030	2035	2040
Single Family	4,920	4,936	5,975	5,995	6,015	6,036
Multi-Family	4,876	4,892	5,922	5,942	5,962	5,982
Institutional	1,084	1,087	1,316	1,321	1,325	1,330
Commercial	3,092	3,102	3,755	3,767	3,780	3,793
Industrial	287	288	349	350	351	353
Irrigation	1,792	1,798	2,176	2,184	2,191	2,198
Other	14	14	17	17	17	17
Total	**16,065**	**16,118**(1)	**19,510**	**19,576**	**19,641**	**19,709**

1. *From the FY20 Water Supply Report.*

Currently, irrigation accounts for 11.2 percent of the total water demand within Mesa Water's service area and includes landscaping for public parks, businesses, and golf courses. However, as further described in TM-1, a call for no irrigation may include some or all of the customer types in order to reduce total demands by up to 25 percent. This percentage will be used throughout TM-1 to represent demand reductions associated from a call for no irrigation during an emergency condition.

2.2 115 Percent Maximum Demands

Using the demand data presented under Section 2.1, the 115 percent demands were calculated by applying a factor of 1.15 to each year's demand. From there, the relevant peaking factors can be applied to arrive at the maximum day and maximum hour demands, which can be calculated using the peaking factors outlined in Table 2-2.

Table 2-2. Peaking Factors		
Demand	Factor	Applied To
Max Day Demand	1.5	Annual average day demand
Max Hour Demand	1.5	Max day demand

The 115 percent maximum demands, as well as maximum day and maximum hour demands, are summarized in Table 2-3 on an annual and seasonal basis. The winter months are assumed to be November through April when demands are lowest. Summer months are assumed to be May through October when demands are highest.

Table 2-3. 115% Demands (AF/day)					
Demand	2020	2025	2030	2035	2040
Annual Overview					
115% Year Average	50.8	61.5	61.7	61.9	62.1
115% Max Day	76.2	92.2	92.5	92.8	93.1
115% Max Hour	114.3	138.3	138.8	139.2	139.7
Winter Season					
115% Winter Average	43.2	52.3	52.5	52.7	52.8
Summer Season					
115% Summer Average	58.3	70.6	70.9	71.1	71.3

The table above illustrates how water demand increases steadily in the future. It also shows how water demands on a seasonal, daily, and hourly scale can fluctuate significantly. Throughout the succeeding GAP analysis, 115 percent demands are used as a conservative representation of annual demand. For additional conservatism, demands during period of emergencies are calculated using maximum day (150 percent) peaking factors.

Section 3: Water Supplies

3.1 Basin Characteristics

As Mesa Water's most cost effective and reliable source of supply, the Basin underlies the northerly half of Orange County beneath broad lowlands. There are three major aquifer systems subdivided by the basin's managing agency, OCWD; the shallow aquifer system, the principal aquifer system, and the deep aquifer system with the majority of the groundwater production coming from wells screened through the principal aquifer system and only a minor amount pumped from the deep aquifer system. Mesa Water happens to be one of the few agencies that pump and treat from the deep aquifer as further described under Section 3.3.

3.2 Clear Groundwater Wells

Mesa Water currently operates five (5) clear wells (Well 1, Well 3, Well 5, Well 7, and Well 9) with the ability to pump from the principal aquifer system. All wells are operated with electric motors, apart from Well 5, which is natural gas driven. Mesa Water is also in the process of constructing two (2) additional clear wells (Well 12 and Well 14) that will further increase Mesa Water's local water supply portfolio and reliability. Note that Wells 12 and 14 are assumed as 'Active' under TM-1. A summary of the clear well capacities can be found in Table 3-1. Both active and future pumping capacities will be considered as available supply in the succeeding GAP analysis.

Table 3-1. Clear Groundwater Well Production Capacity

Well	Status	Capacity (gpm)	Capacity (MGD)	Capacity (AFY)
Well 1	Active	2,300	3.31	3,710
Well 3	Active	1,600	2.30	2,581
Well 5	Active	2,200	3.17	3,549
Well 7	Active	1,300	1.87	2,097
Well 9	Active	1,800	2.59	2,903
Well 12	Active	3,000	4.32	4,839
Well 14	Active	3,000	4.32	4,839
Total Active Pumping Capacity		**15,200**	**21.89**	**24,518**

The capacities above represent the most stable well production rates based on pump system capacities and optimal production to limit excessive sand production and/or well casing damage. The OC Basin is not adjudicated and, as such, pumping from the OC Basin is managed through a process that uses financial incentives to encourage groundwater producers to pump a sustainable amount of water. The framework for the financial incentives is based on establishing the Basin Production Percentage (BPP), the percentage of each producer's total water supply that comes from groundwater pumped from the Basin. Groundwater production at or below the BPP is assessed a Replenishment Assessment (RA). While there is no legal limit as to how much an agency can pump from the Basin, there is a financial disincentive to pump above the BPP. Agencies that pump above the BPP are charged the RA plus the Basin Equity Assessment (BEA), which is calculated so the cost of groundwater production becomes approximately equal to the cost of purchasing imported water. The BEA can also be increased to discourage further pumping production above the BPP. The BPP is set uniformly for all producers by OCWD on an annual basis.

The BPP is set based on groundwater conditions and Basin management objectives. The supplies available for recharge must be estimated for a given year. The supplies of recharge water that are estimated are: 1) Santa Ana River stormflow, 2) Natural incidental recharge, 3) Santa Ana River baseflow, 4) Groundwater Replenishment System (GWRS) supplies, and 5) other supplies such as imported water and recycled water purchased for the Alamitos Barrier. The BPP is a major factor in determining the cost of groundwater production from the Basin for that year. In the succeeding sections of TM-1, a BPP limit of 77 percent is assumed for current and future supplies. Because the cost of pumping above the BPP is the same as imported water, pumping above the BPP may not be cost effective under certain GAP analysis scenarios.

3.3 Amber-Tinted Groundwater Wells and the MWRF

In order to supplement the clear wells, Mesa Water currently owns two (2) amber-tinted water wells that pump from the deep aquifer system. Both amber wells are located on-site at the MWRF, along with a 1.25 MG reservoir, and remove the organic amber color using nanofiltration. Nanofiltration removes organic color molecules and is protected from sand and particle fouling using sand separators upstream of the nanofiltration cartridge filters. Wells 6 and 11 also contain trace amounts of methane and hydrogen sulfide, which are removed through the nanofiltration system degasifiers. Polysulfides, which result in taste and odor concerns, are removed through sodium bisulfite addition prior to final chloramination for final disinfection upstream of the water reservoir.

Table 3-2 below summarizes the production capacities of the amber-tinted wells, which were confirmed by Mesa Water.

Table 3-2. Amber-Tinted Groundwater Well Capacity

Well	Status	Capacity (gpm)	Capacity (MGD)	Capacity (AFY)
Well 6	Active	3,000	4.32	4,839
Well 11	Active	3,000	4.32	4,839
Total Active Pumping Capacity		6,000	8.64	9,678
Total Treatment Capacity		**6,000**	**8.64**	**9,678**

OCWD encourages treating and pumping groundwater that does not meet drinking water standards in order to protect water quality, such as pumping from the deep aquifer and treating it through a facility like the MWRF. This is achieved by using a financial incentive called the BEA Exemption. The BEA Exemption is used to clean up and contain the spread of less desirable groundwater. OCWD uses a partial or total exemption of the BEA to compensate a qualified participating agency or producer for the costs of treating lower quality groundwater. Once OCWD authorizes a BEA exemption for a project, it is obligated to provide the replenishment water for the production above the BPP and forgo the BEA revenue that OCWD would otherwise receive from the producer. As a result, any production from amber-tinted wells and the MWRF does not contribute to Mesa Water's BPP.

3.4 Imported Water Turnouts

Mesa Water can supplement its local groundwater production capabilities with imported water purchased from Metropolitan Water District (MWD) through the local wholesaler, the Municipal Water District of Orange County (MWDOC). Table 3-3 summarizes the capacity of all imported water connections.

Table 3-3. Imported Water Capacity

Pipeline/Turnout	Active Number of Turnouts	Turnout Capacity (cfs)	Turnout Capacity (AFY)	Max Delivery Capacity (MGD)
OC-44	3	67	48,506	43.3
OC-14	1	10	7,239	6.5
CM-2	1	15	10,859	9.7
CM-6	1	4	2,896	2.6
Total	**6**	**96**	**69,500**	**62.1**

3.5 Reservoirs

Mesa Water owns and operates two (2) reservoirs (Reservoirs 1 and 2) that provide storage capabilities within the distribution system. Table 3-4 summarizes the capacities of these reservoirs.

Table 3-4. Reservoir Capacities

Reservoir	Storage Capacity (MG)	Flow Capacity (gpm)
Reservoir 1	9.5	10,250
Reservoir 2	18.7	15,000
Total	**28.2**	**25,250**

As described in the PSOP, these reservoirs may be used in lead-lag operation to meet demands during peak hours as well as provide additional pumping capacity throughout peak day demands. The reservoirs are replenished overnight when water demands are minimal. For the purposes of TM-1, it is assumed the reservoirs are available at all times and used for flow equalization.

3.6 Huntington Beach Desalination Plant - ~~Future Water~~ Potential Future Supply~~ies~~

In the near future, desalination may become an available resource for Mesa Water. The Huntington Beach Desalination Plant, located adjacent to the AES Huntington Beach Power Station, is currently in development and designed to deliver up to 50 MGD throughout Orange County. As of now, the project is in the permitting process and expected to be operational by 2023. The process uses reverse osmosis technology to produce drinking water from seawater. Because seawater supplies are boundless, the facility has been promoted as a "drought-proof" water supply that is independent from shared sources like the Orange County Groundwater Basin, the Sacramento-San Joaquin Delta, and the Colorado River.

Poseidon Water, a private development company that owns the facility, uses a partnership approach with public agencies to execute their projects. This approach involves agencies developing contracts with Poseidon Water for supplies sourced from their facility, which is similar to existing partnerships with MWD and MWDOC.

Water produced from the facility would be conveyed through new and existing pipelines. In addition, the pricing structure and distribution practices for supplies sourced from the facility are currently estimated and will need to be further evaluated to determine the specific quantity and associated costs to optimize Mesa Water's supply portfolio. Due to aforementioned uncertainties, the succeeding GAP analysis will not consider desalination as an available current supply option but will be re-evaluated in the future for potential inclusion as plans for project completion are made available.

Section 4: GAP Analysis and Cost Estimate

Using the demand and supply data from the preceding sections, a GAP analysis was performed to identify local water supply disparities under several operational or emergency scenarios. Three types of scenarios are examined. Scenario 1 represents normal operating conditions and establishes a baseline scenario for comparison. Scenario 2 consists of three different emergency scenarios, in which several supply options are impaired or non-operational. Finally, Scenario 3 simulates that several local supply options need critical repairs. For each case, the most cost-effective solution to address the supply deficiency is proposed. The conditions evaluated under each are summarized in Table 4-1. For the GAP analysis, Wells 12 and 14 are assumed to be operational.

Table 4-1. Summary of Scenario Conditions

Scenario	Operational Clear Wells	MWRF Capacity	MWD Import Available
1	7 of 7	100%	Yes
2a	6 of 7	0%	No
2b	4 of 7	100%	No
2c	2 of 7	0%	Yes
3	4 of 7	50%	Yes

4.1 Additional Supply Options and Cost Basis

Wherever there were gaps between water supply and demand, BC evaluated various supply options to address the deficiency. The supply options considered are as follows:

1. **Call for No Irrigation Usage:** Mesa Water can turn off all irrigation customers during an emergency condition. This option can reduce demands by up to 25 percent with negligible costs to Mesa Water. In the event a 25 percent reduction is not sufficient, Mesa Water has the ability to reduce consumption by up to 50 percent as noted under Mesa Water's Ordinance No. 26. Enacting restrictions such as this to reduce demand is used only as a last resort in the event that demands cannot be met with the available existing supply and any of the additional supply options below.
2. **Install Additional Clear Water Wells:** If existing clear well capacity is reached, additional clear wells can be installed to increase production capabilities.
3. **Increase MWRF Treatment Capacity:** If existing MWRF capacity is reached, additional treatment capacity can be installed. Treatment capacity is assumed to be expanded by treatment train, and up to two (2) additional trains can be installed.
4. **Purchase Imported Water from MWDOC:** Lastly, water may be imported from MWD via MWDOC. However, Mesa Water takes great pride in being 100 percent locally reliable and not using imported water as a routine part of its normal operations.

The production cost of each supply option is summarized in Table 4-2. These costs are on a per AF basis and only apply when water is being supplied.

Table 4-2. Production Cost Basis ($/AF)			
Supply Option	Cost	Limitations	Cost Assumptions
Base Supply Options			
Clear Wells[(1)]	$568	Up to BPP limit	Includes RA, energy, and chemicals. Does not include capital and O&M.
MWRF[(2)]	$594	Up to MWRF max capacity	Includes RA, energy, and chemicals minus LRP. Does not include capital and O&M.
Additional Supply Options			
Call for No Irrigation	$-	Up to 25% of total demand	Negligible cost to implement.
Additional Clear Wells[(1)]	$568	Cannot implement short-term (2020)	Includes RA, energy, and chemicals. Does not include capital and O&M.
Increase MWRF Capacity[(2)]	$594	Cannot implement short-term (2020)	Includes RA, energy, and chemicals minus LRP. Does not include capital and O&M.
Import from MWD[(3)]	$1,104		Does not include fixed fees.

1. *From Production Well Costs (2019)*
2. *From Regional MWRF Usage (2016)*
3. *Tier 1 supply rate in 2021*

Annualized capital and operations and maintenance (O&M) costs for additional clear wells or additional MWRF treatment capacity are considered as fixed costs rather than production costs, as the capital and maintenance costs for new equipment are applied regardless if the equipment is operational or not. In all the scenarios examined, the additional investment for clear wells beyond Wells 12 and 14 or MWRF expansion is not needed under normal conditions and is only required during an emergency condition. Also, for each scenario, where a portion of the existing clear wells are non-operational, it is assumed that the same proportion of any additional clear wells are non-operational as well, with fixed costs scaled accordingly. O&M costs are included for all existing clear wells, however, only Wells 12 and 14 require capital debt servicing. All other clear wells were paid off at the time when they were constructed. It is assumed that remaining capital debt servicing for the existing MWRF will be completed by 2027, so capital costs are included only for 2020 GAP scenarios and not in 2040. O&M costs for the MWRF are applied for all scenarios in both 2020 and 2040.

Purchase of imported water from MWD through MWDOC also includes several fixed annual fees for their services, such as the Readiness-to-Serve Charge (RTS) based on an agency's four-year rolling average of purchases compared to other MWDOC member agencies. In order to compare each scenario more effectively, the costs in the subsequent years will be annualized and included in the cost for the current year evaluated. It is also assumed that an emergency condition will not be encountered for at least three subsequent years. The Capacity Charge is based on an agency's highest one-day flow experienced over the past three years. Similarly, the charges in the subsequent years will be annualized and included in the current year evaluated for comparison. MWDOC also collects revenue through a Retail Meter Charge based on the quantity of retail meters in service. This fee is omitted from the GAP analysis since it is charged regardless of use and will not differ between any of the scenarios examined. Annual fixed costs are summarized in Table 4-3.

Table 4-3. Annual Fixed Costs			
Supply Option	Cost	Unit Notes	Cost Assumptions
Capital Costs			
Existing Clear Wells	$1,104,589		Includes capital for Wells 12 and 14 and O&M for all existing wells, running or idle.
Existing MWRF	$2,732,200		2020 cost. Includes capital and O&M for the existing MWRF, running or idle.
	$232,200		2040 cost. Includes O&M for the existing MWRF, running or idle. Assumes capital debt servicing is completed by 2027.
Additional Clear Wells(1)	$85	Per AFY of additional production capacity needed	Includes capital and O&M. Assumes capital costs are scalable based on production capacity.
MWRF Expansion(2)	$728,053	For up to +3,000 gpm capacity	Includes capital. Based on expansion by one treatment train.
	$1,262,918	For up to +6,000 gpm capacity	Includes capital. Based on expansion by two treatment trains.
MWD & MWDOC Fixed Fees			
Readiness-to-Serve Charge (RTS)(3)	$113,546	Per percent of 4-year average of water share among all MWDOC customers	Assumes combined 4-year average volume among all other MWDOC customers is 206,178 AF. Cost based on 2020-2021 MWDOC RTS rate. Charged for subsequent years.
Capacity Charge(3)	$10,700	Per cfs of peak delivery from the past 3 years	2021 MWD capacity charge. Charged only if used and applied to subsequent years.

1. *From Production Well Costs (2019)*
2. *Rough order of magnitude*
3. *From MWDOC Water Rates and Charges - 2021 (2020)*

To compare between scenarios, total annual costs are calculated as follows:

$$[Total\ Costs] = [Production\ Costs] + [Fixed\ Costs]$$

$$[Production\ Costs] = [Clear\ Well\ Production] + [MWRF\ Production] + [MWD\ Imports]$$

$$[Fixed\ Costs] = [Clear\ Well] + [MWRF] + [RTS\ Charge] + [Capacity\ Charge]$$

An expanded description of the cost basis and calculations are provided in Attachment A.

4.2 Overall Assumptions

For each scenario, cases for both 2020 and 2040 are examined. Demands and supplies are compared on a monthly basis. To represent a worst-case scenario, the emergency conditions described in each scenario are applied to August, where demands are typically highest. Maximum day (150 percent) demands are used for the entire duration of August. For all other months, 115 percent demand is used, and supplies are available as described under the normal operating conditions of Scenario 1.

To represent typical operation in Scenario 1, the percentage of total supply from the MWRF will match the FY2020 MWRF usage. For Scenarios 2 and 3, MWRF usage in the months following the emergency in August is scaled such that clear well production is maximized and the year-to-date BPP is 77 percent. BPP is calculated as the percentage of total supply derived from clear well production from both existing and new clear wells.

When a supply deficiency is identified in a scenario, the available additional supply options are chosen to minimize total cost. For cases in 2020, it is assumed that additional clear wells and MWRF expansion are not viable options. These options require time and planning for engineering and construction and therefore cannot be implemented immediately. A call for no irrigation is used as the last resort to address a supply deficit. As a result of other additional supply options being available by 2040, a call for no irrigation is only assumed as a viable option under 2020 cases.

To ensure that peak hour demands can be fulfilled during an emergency condition, the maximum storage and flow capacities of Mesa Water's two reservoirs shall be used. It is assumed that none of the emergency conditions will affect the pumping rates of these reservoirs.

4.3 Scenario 1 – Normal Operating Conditions

The purpose of this scenario is to simulate normal operating conditions, as described in the PSOP and provide a baseline for the other scenarios. Under this scenario, the following conditions shall apply:

- All wells are operational with routine maintenance being performed. Downtime for Well 5 is four days per month and one day per month for all other clear water wells.
- The MWRF is operational and at full capacity.
- MWD supplies are available as a back-up supply.

The resulting available water supply is summarized in Table 4-4.

Table 4-4. Scenario 1 Available Supplies

Source	Baseline Capacity (AF/month)
Clear Wells	1,947
Well 1	299
Well 3	208
Well 5	257
Well 7	169
Well 9	234
Well 12	390
Well 14	390
MWRF	807
Local Subtotal	**2,754**
MWD Back-Up	5,792
Total	**8,545**

It should be noted that clear well production capacity to-date is 1,167 AF/month. However, the addition of new Wells 12 and 14 is in progress and will be available within the next couple years. For the purposes of TM-1, these new wells will be assumed available in 2020 scenarios in order to help meet increased water demands.

4.3.1 Scenario 1 – 2020

A GAP analysis was performed for Scenario 1 using 2020 demands. Tables 4-5 and 4-6 summarize the results.

Table 4-5. Scenario 1, 2020 GAP Analysis (AF)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	1,847	1,892	1,784	1,747	1,488	1,182	1,316	1,370	1,290	1,242	1,626	1,752	**18,536**
Base Supply Options													
Clear Wells	1,369	1,408	1,335	1,396	1,232	1,182	1,316	1,095	1,060	777	917	982	**14,068**
MWRF(1)	479	484	449	352	255	-	-	275	230	465	709	770	**4,468**
115% GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Expand MWRF Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Import from MWD	-	-	-	-	-	-	-	-	-	-	-	-	-
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage.*

Table 4-6. Scenario 1, 2020 Costs

Production Costs	$10,644,436
Fixed Costs	$3,836,789
Total Cost	**$14,481,225**
YTD BPP	75.9%

Under baseline conditions, Mesa Water currently has the supply capabilities to meet 115 percent demands, with the assumption that Wells 12 and 14 are operational. Peak hour demands can be met using reservoir pumping capacity. No additional actions or supply infrastructure are needed. The baseline production cost in 2020 is $14.5M annually.

4.3.2 Scenario 1 - 2040

A GAP analysis was performed for Scenario 1 using 2040 demands. Tables 4-7 and 4-8 summarize the results.

Table 4-7. Scenario 1, 2040 GAP Analysis (AF)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	2,259	2,313	2,181	2,137	1,819	1,446	1,609	1,675	1,577	1,519	1,988	2,143	**22,665**
Base Supply Options													
Clear Wells	1,673	1,722	1,632	1,707	1,507	1,446	1,609	1,339	1,296	950	1,182	1,336	**17,398**
MWRF[(1)]	585	591	549	430	312	-	-	336	281	569	807	807	**5,267**
115% GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	-	-	-	-	-	-	-	-	-	-	-	-	-
Expand MWRF Capacity	-	-	-	-	-	-	-	-	-	-	-	-	-
Import from MWD	-	-	-	-	-	-	-	-	-	-	-	-	-
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage.*

Table 4-8. Scenario 1, 2040 Costs

Production Costs	$13,010,870
Fixed Costs	$1,336,789
Total Cost	**$14,347,659**
YTD BPP	76.8%

Even with increased demands by 2040, Mesa Water's existing local supply infrastructure is equipped to meet 115 percent demands. In the absence of an emergency, no further improvements are needed. Reservoir pumping will ensure peak hour demands are met. The baseline cost in 2040 is $14.3M annually.

4.4 Scenario 2a – Emergency Condition 1

Scenario 2a simulates that a local or regional emergency has occurred (e.g., Earthquake, fires, flood, etc.) that will last for 30 calendar days. Most clear water wells are operational, but MWRF production and MWD supplies are unavailable. Under this scenario, the following conditions shall apply:

- Six of seven clear water wells (Well 5 not available) are operational with routine maintenance deferred.
- The MWRF is not available.
- MWD supplies are not available as a back-up supply.

The resulting available water supply is summarized in Table 4-9. After the 30-day emergency, the capacities of each well return to the baseline condition. Note that the capacities of each available well are higher during the emergency condition since routine maintenance is deferred.

Table 4-9. Scenario 2a Available Supplies

Source	Emergency Capacity (AF/month)	Baseline Capacity (AF/month)
Clear Wells	1,747	1,947
Well 1	309	299
Well 3	215	208
Well 5	-	257
Well 7	175	169
Well 9	242	234
Well 12	403	390
Well 14	403	390
MWRF	-	807
Local Subtotal	**1,747**	**2,754**
MWD Back-Up	-	5,792
Total	**1,747**	**8,545**

4.4.1 Scenario 2a – 2020

A GAP analysis was performed for Scenario 2a using 2020 demands. Tables 4-10 and 4-11 summarize the results.

Table 4-10. Scenario 2a, 2020 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	1,847	2,468	1,784	1,747	1,488	1,182	1,316	1,370	1,290	1,242	1,626	1,752	**19,111**
Base Supply Options													
Clear Wells	1,369	1,747	1,300	1,369	1,213	1,182	1,316	1,074	1,042	741	863	946	**14,161**
MWRF(2)	479	N/A	483	379	275	-	-	296	248	501	763	807	**4,230**
115% GAP Deficiency	-	720	-	-	-	-	-	-	-	-	-	-	**720**
Additional Supply Options													
Call for No Irrigation	-	617	-	-	-	-	-	-	-	-	-	-	**617**
Additional Clear Wells	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**-**
Expand MWRF Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**-**
Import from MWD	-	N/A	-	-	-	-	-	-	-	-	-	-	**-**
Level 2 Shortage	-	103	-	-	-	-	-	-	-	-	-	-	**103**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	**-**

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-11. Scenario 2a, 2020 Costs

Production Costs	$10,556,217
Fixed Costs	$3,836,789
Total Cost	**$14,393,006**
YTD BPP	77.0%

Because MWD supplies are not available and expansion of clear wells or MWRF production cannot be implemented in the short-term, under this scenario Mesa Water would not be able to meet demands in August, even with a call for no irrigation. However, if desired, Mesa Water also has the ability to enact a Level 2 Water Supply Shortage, as described in Mesa Water's Ordinance No. 26. This action can decrease usage by up to 30 percent and reduce demand to within the available local supply. Conservation measures covered by a Level 2 action include, but are not limited to, designated watering days, obligation to fix leaks and malfunctions, and limits on filling ornamental water features. This case illustrates how, in the short-term, increased regulation can help mitigate an emergency supply deficit. In the long-term, Mesa Water has additional options at its disposal, as shown in the following case.

4.4.2 Scenario 2a – 2040

A GAP analysis was performed for Scenario 2a using 2040 demands. Tables 4-12 and 4-13 summarize the results.

Table 4-12. Scenario 2a, 2040 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	2,259	3,017	2,181	2,137	1,819	1,446	1,609	1,675	1,577	1,519	1,988	2,143	**23,369**
Base Supply Options													
Clear Wells	1,673	1,747	1,477	1,585	1,419	1,446	1,609	1,244	1,216	790	1,182	1,336	**16,724**
MWRF(2)	585	N/A	704	551	400	-	-	431	361	729	807	807	**5,375**
115% GAP Deficiency	-	1,270	-	-	-	-	-	-	-	-	-	-	**1,270**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	-	1,270	-	-	-	-	-	-	-	-	-	-	**1,270**
Expand MWRF Capacity	-	N/A	-	-	-	-	-	-	-	-	-	-	-
Import from MWD	-	N/A	-	-	-	-	-	-	-	-	-	-	-
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-13. Scenario 2a, 2040 Costs

Production Costs	$13,413,578
Fixed Costs	$2,848,091
Total Cost	**$16,261,668**
YTD BPP	77.0%

By 2040, capital improvements can be implemented to expand clear well production. Since the MWRF is unavailable in this case, expanding MWRF capacity is not a viable option. To meet demands under these supply conditions, additional clear wells will be needed to provide an additional 1,270 AF in one month. Assuming a portion of the new clear wells are non-operational like the existing clear wells, at least four (4) additional 3,000 gpm clear wells are needed along with the use of reservoir pumping to meet peak hour demands. MWRF usage will need to increase in the subsequent months to compensate for the increased clear well production in August and to stay below the YTD BPP. Annual costs would exceed baseline 2040 costs by $1.9M. Capital improvements would cost an estimated $31.8M over the life of a 30-year debt.

4.5 Scenario 2b – Emergency Condition 2

Scenario 2b simulates that a local or regional emergency has occurred (e.g., Earthquake, fires, flood, etc.) that will last for 30 calendar days. The MWRF and some clear water wells are operational, but MWD supplies are unavailable. Under this scenario, the following conditions shall apply:

- Four of seven clear water wells (Wells 3, 12, and 14 not available) are operational with routine maintenance deferred.
- The MWRF is available.
- MWD supplies are not available as a back-up supply.

The resulting available water supply is summarized in Table 4-14. After the 30-day emergency, the capacities of each well return to the baseline condition. Note that the capacities of each available well are higher during the emergency condition since routine maintenance is deferred.

Table 4-14. Scenario 2b Available Supplies

Source	Emergency Capacity (AF/month)	Baseline Capacity (AF/month)
Clear Wells	1,022	1,947
Well 1	309	299
Well 3	-	208
Well 5	296	257
Well 7	175	169
Well 9	242	234
Well 12	-	390
Well 14	-	390
MWRF	807	807
Local Subtotal	**1,828**	**2,754**
MWD Back-Up	-	5,792
Total	**1,828**	**8,545**

4.5.1 Scenario 2b – 2020

A GAP analysis was performed for Scenario 2b using 2020 demands. Tables 4-15 and 4-16 summarize the results.

Table 4-15. Scenario 2b, 2020 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	1,847	2,468	1,784	1,747	1,488	1,182	1,316	1,370	1,290	1,242	1,626	1,752	**19,111**
Base Supply Options													
Clear Wells	1,369	1,022	1,404	1,450	1,272	1,182	1,316	1,137	1,095	849	1,027	1,101	**14,223**
MWRF(2)	479	807	379	297	216	-	-	233	194	393	599	651	**4,249**
115% GAP Deficiency	-	640	-	-	-	-	-	-	-	-	-	-	**640**
Additional Supply Options													
Call for No Irrigation	-	617	-	-	-	-	-	-	-	-	-	-	**617**
Additional Clear Wells	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Expand MWRF Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**-**
Import from MWD	-	N/A	-	-	-	-	-	-	-	-	-	-	**-**
Level 2 Shortage	-	23	-	-	-	-	-	-	-	-	-	-	**23**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	**-**

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-16. Scenario 2b, 2020 Costs

Production Costs	$10,602,509
Fixed Costs	$3,836,789
Total Cost	**$14,439,298**
YTD BPP	77.0%

In this scenario, water demands are nearly met with a 25 percent usage reduction from a call for no irrigation, showing that current MWRF production is not quite enough to provide the necessary capacity if several clear wells are non-operational and imported water cannot be used as a back-up supply. If a Level 2 Water Supply Shortage is enacted, the usage reduction can extend up to 30 percent, and all demands would be met with the available supply. As described in Scenario 2a, conservation measures covered under a Level 2 shortage include designated watering days, obligation to fix leaks and malfunctions, and limits on filling ornamental water fixtures. Similar to the 2020 case of Scenario 2a, additional regulation can mitigate a supply shortage in the short-term, but additional options are available in the long run given adequate time for infrastructure improvements.

4.5.2 Scenario 2b - 2040

A GAP analysis was performed for Scenario 2b using 2040 demands. Tables 4-17 and 4-18 summarize the results.

Table 4-17. Scenario 2b, 2040 GAP Analysis (AF)

	Jul	Aug[(1)]	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	2,259	3,017	2,181	2,137	1,819	1,446	1,609	1,675	1,577	1,519	1,988	2,143	**23,369**
Base Supply Options													
Clear Wells	1,673	1,022	1,774	1,818	1,588	1,446	1,609	1,426	1,369	1,097	1,346	1,445	**17,612**
MWRF[(2)]	585	807	407	319	231	-	-	249	208	421	642	698	**4,568**
115% GAP Deficiency	-	1,189	-	-	-	-	-	-	-	-	-	-	**1,189**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	-	382	-	-	-	-	-	-	-	-	-	-	**382**
Expand MWRF Capacity	-	807	-	-	-	-	-	-	-	-	-	-	**807**
Import from MWD	-	N/A	-	-	-	-	-	-	-	-	-	-	-
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-18. Scenario 2b, 2040 Costs

Production Costs	$13,413,577
Fixed Costs	$3,282,204
Total Cost	**$16,695,781**
YTD BPP	77.0%

Because it is assumed that a portion of any additional clear wells are non-operational, the scaled capital costs makes installing more clear wells a less desirable option to meet the supply deficit. To minimize costs, MWRF capacity is expanded as much as possible (two additional treatment trains), however, this alone is not enough to address the deficit. Then, additional clear wells would be installed to meet the remaining deficit of 382 AF. At least two (2) new 3,000 gpm wells would be needed, assuming some were affected by the emergency. Again, reservoir pumping will be needed to meet peak hour demands. With this proposed solution, annual costs would exceed baseline 2040 costs by $2.3M. Capital improvements would cost an estimated $31.4M over the life of a 30- year debt.

4.6 Scenario 2c – Emergency Condition 3

Scenario 2c simulates that a local or regional emergency has occurred (e.g., Earthquake, fires, flood, etc.) that will last for 30 calendar days. Few clear water wells are operational, and the MWRF is unavailable. However, MWD services are available for back-up supply. Under this scenario, the following conditions shall apply:

- Two of seven clear water wells are operational (Wells 1, 3, 5, 7, and 9 not available) with routine maintenance deferred.
- The MWRF is not available.
- MWD supplies are available as a back-up supply.

The resulting available water supply is summarized in Table 4-19. After the 30-day emergency, the capacities of each well return to the baseline condition. Note that the capacities of each available well are higher during the emergency condition since routine maintenance is deferred.

Table 4-19. Scenario 2c Available Supplies

Source	Emergency Capacity (AF/month)	Baseline Capacity (AF/month)
Clear Wells	807	1,947
Well 1	-	299
Well 3	-	208
Well 5	-	257
Well 7	-	169
Well 9	-	234
Well 12	403	390
Well 14	403	390
MWRF	-	807
Local Subtotal	**807**	**2,754**
MWD Back-Up	5,792	5,792
Total	**6,598**	**8,545**

4.6.1 Scenario 2c – 2020

A GAP analysis was performed for Scenario 2c using 2020 demands. Tables 4-20 and 4-21 summarize the results.

Table 4-20. Scenario 2c, 2020 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	1,847	2,468	1,784	1,747	1,488	1,182	1,316	1,370	1,290	1,242	1,626	1,752	**19,111**
Base Supply Options													
Clear Wells	1,369	807	1,495	1,521	1,323	1,182	1,316	1,193	1,142	943	1,170	1,256	**14,716**
MWRF(2)	479	N/A	289	226	164	-	-	177	148	299	456	496	**2,734**
115% GAP Deficiency	-	1,661	-	-	-	-	-	-	-	-	-	-	**1,661**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Expand MWRF Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Import from MWD	-	1,661	-	-	-	-	-	-	-	-	-	-	**1,661**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-21. Scenario 2c, 2020 Costs

Production Costs	$11,816,794
Fixed Costs	$4,812,113
Total Cost	**$16,628,907**
YTD BPP	77.0%

MWD back-up supplies provide an immediate option to address the remaining supply deficit such that the overall gap deficiency is eliminated. Peak hour demands are still met by pumping from the reservoirs. As noted in Section 4.1, fixed costs would be incurred for using MWD supplies. By importing water, costs would exceed baseline 2020 costs by $2.1M.

4.6.2 Scenario 2c – 2040

A GAP analysis was performed for Scenario 2c using 2040 demands. Tables 4-22 and 4-23 summarize the results.

Table 4-22. Scenario 2c, 2040 GAP Analysis (AF)

	Jul	Aug[(1)]	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	2,259	3,017	2,181	2,137	1,819	1,446	1,609	1,675	1,577	1,519	1,988	2,143	**23,369**
Base Supply Options													
Clear Wells	1,673	807	1,851	1,878	1,631	1,446	1,609	1,473	1,408	1,177	1,467	1,576	**17,994**
MWRF[(2)]	585	N/A	330	259	188	-	-	202	169	342	521	567	**3,164**
115% GAP Deficiency	-	2,211	-	-	-	-	-	-	-	-	-	-	**2,211**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	-	-	-	-	-	-	-	-	-	-	-	-	-
Expand MWRF Capacity	-	N/A	-	-	-	-	-	-	-	-	-	-	-
Import from MWD	-	2,211	-	-	-	-	-	-	-	-	-	-	**2,211**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77%.*

Table 4-23. Scenario 2c, 2040 Costs	
Production Costs	$14,541,148
Fixed Costs	$3,000,188
Total Cost	**$17,541,336**
YTD BPP	77.0%

Although the installation of new clear wells or expanded MWRF capacity is feasible by 2040, taking imported water during an emergency is still the most cost-effective and readily available supply option. Production costs for the local alternatives are less than the unit cost of imported water. However, the additional capital for new clear wells or MWRF capacity is not needed under baseline conditions, as shown in Scenario 1, and would only be used during an infrequent emergency. Therefore, the capital costs would need to be paid for even though the equipment is not typically used. Using imported water supplies presents an alternative that does not require stockpiling capital for exceptional circumstances. Any fixed fees would be incurred only during years with an emergency, in comparison to paying for capital costs over the lifespan of infrastructure and capacity that may or may not be needed. Refilling and pumping from reservoirs will still be needed to meet peak hour demands. With this proposed solution, annual costs would exceed baseline 2040 costs by $2.8M.

4.7 Scenario 3 – Extended Maintenance/Repair Condition

This scenario simulates that several supply units are undergoing extended maintenance or need critical repairs. Some clear water wells are operational, and half of MWRF capacity is available. MWD supplies are also available. Under this scenario, the following conditions shall apply:

- Four of seven clear water wells are operational (Wells 1, 7, and 12 not available) with routine maintenance deferred.
- 50 percent of MWRF capacity is available.
- MWD supplies are available as a back-up supply.

The resulting available water supply is summarized in Table 4-24. After the 30-day emergency, the capacities of each well return to the baseline condition. Note that the capacities of each available well are higher during the emergency condition since routine maintenance is deferred.

Table 4-24. Scenario 3 Available Supplies

Source	Emergency Capacity (AF/month)	Baseline Capacity (AF/month)
Clear Wells	1,156	1,947
Well 1	-	299
Well 3	215	208
Well 5	296	257
Well 7	-	169
Well 9	242	234
Well 12	-	390
Well 14	403	390
MWRF	403	807
Local Subtotal	**1,559**	**2,754**
MWD Back-Up	5,792	5,792
Total	**7,351**	**8,545**

4.7.1 Scenario 3 – 2020

A GAP analysis was performed for Scenario 3 using 2020 demands. Tables 4-25 and 4-26 summarize the results.

Table 4-25. Scenario 3, 2020 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	1,847	2,468	1,784	1,747	1,488	1,182	1,316	1,370	1,290	1,242	1,626	1,752	**19,111**
Base Supply Options													
Clear Wells	1,369	1,156	1,450	1,486	1,298	1,182	1,316	1,165	1,119	896	1,099	1,180	**14,716**
MWRF(2)	479	403	334	261	190	-	-	204	171	346	527	573	**3,487**
115% GAP Deficiency	-	908	-	-	-	-	-	-	-	-	-	-	**908**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Expand MWRF Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Import from MWD (Optional: Level 3 Shortage)	-	908	-	-	-	-	-	-	-	-	-	-	**908**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-26. Scenario 3, 2020 Costs

Production Costs	$11,432,897
Fixed Costs	$4,370,151
Total Cost	**$15,803,048**
YTD BPP	77.0%

If extended maintenance were to occur today, taking imported water would be the only option to address the remaining supply shortage of 908 AF. To meet peak hour demands, Mesa Water would still need to pump from the reservoirs to equalize production flow. Costs would increase by $1.3M over the baseline 2020 condition.

Although not recommended, Mesa Water has the ability to enact up to a Level 3 Water Supply Shortage to reduce usage and offset a portion of the supply deficit.

4.7.2 Scenario 3 – 2040

A GAP analysis was performed for Scenario 3 using 2040 demands. Tables 4-27 and 4-28 summarize the results.

Table 4-27. Scenario 3, 2040 GAP Analysis (AF)

	Jul	Aug(1)	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	YTD
115% Demand	2,259	3,017	2,181	2,137	1,819	1,446	1,609	1,675	1,577	1,519	1,988	2,143	**23,369**
Base Supply Options													
Clear Wells	1,673	1,156	1,806	1,843	1,606	1,446	1,609	1,445	1,385	1,130	1,396	1,499	**17,994**
MWRF(2)	585	403	375	294	213	-	-	230	192	389	592	644	**3,917**
115% GAP Deficiency	-	1,458	-	-	-	-	-	-	-	-	-	-	**1,458**
Additional Supply Options													
Call for No Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Clear Wells	-	-	-	-	-	-	-	-	-	-	-	-	-
Expand MWRF Capacity	-	-	-	-	-	-	-	-	-	-	-	-	-
Import from MWD (Optional: Level 2 Shortage)	-	1,458	-	-	-	-	-	-	-	-	-	-	**1,458**
Remaining GAP Deficiency	-	-	-	-	-	-	-	-	-	-	-	-	-

1. *August demand shown reflects max day (150 percent) demand applied throughout the entire month. 30-day emergency analysis performed for August.*
2. *Percentages of monthly supplies from the MWRF match FY2020 MWRF usage prior to August emergency. After August, MWRF usage is adjusted to maximize clear well production while maintaining YTD BPP of 77 percent.*

Table 4-28. Scenario 3, 2040 Costs

Production Costs	$14,157,252
Fixed Costs	$2,192,948
Total Cost	**$16,350,200**
YTD BPP	77.0%

Similar to the 2040 case of Scenario 2c, importing from MWD is the more cost-effective option compared to expanding clear well or MWRF capacity. With this proposed solution, annual costs would exceed baseline 2040 costs by $2.0M. Similar to the 2020 case of Scenario 3, Mesa Water has the ability to instead choose to enact a Level 2 Water Supply Shortage rather than import water from MWD.

4.8 Summary of Scenario Results

A comparison of the scenario results is presented in Table 4-29. The supply deficiency with available existing supplies, the recommended solution to address the deficiency, and the change in costs from the baseline scenario are shown. Note that total costs decrease in the 2020 cases of Scenarios 2a and 2b because demands cannot be met, and less water is supplied.

Table 4-29. Summary of Scenario Results

Year	Scenario	GAP with Existing Supplies (AF)	Recommended Solution	Annual Cost Over Baseline	Lump Sum Capital Improvement Cost (30-Year Debt Cycle)
2020	1	-	N/A	$-	$-
	2a	720	Increased Restrictions	$(88,219)	$-
	2b	640	Increased Restrictions	$(41,927)	$-
	2c	1,661	Import from MWD	$2,147,681	$-
	3	908	Import from MWD	$1,321,823	$-
2040	1	-	N/A	$-	$-
	2a	1,270	Additional Clear Wells	$1,914,009	$31,821,284
	2b	1,189	Additional Clear Wells and MWRF Capacity	$2,348,122	$31,418,604
	2c	2,211	Import from MWD	$2,828,399	$-
	3	1,458	Import from MWD	$2,002,541	$-

For the short-term 2020 cases, where neither clear well or MWRF expansion are feasible, demands must be met using MWD imported water as illustrated in Scenarios 2c and 3. When importing is not an option, like in Scenarios 2a and 2b, Mesa Water's only alternative to bridge the gap between supply and demand is to further reduce usage through increased water usage restrictions. Expanded conservation efforts can also be used to offset a portion of water imports in Scenario 3.

For the long-term 2040 cases, importing water from MWD is the most cost-effective solution, whenever available. This is shown in Scenarios 2c and 3. Otherwise, the cost-effectiveness between installing additional clear wells or expanding MWRF treatment capacity depends on the type of emergency encountered. In the 2040 case under Scenario 3, additional water restrictions are an alternative to importing water during an extended maintenance condition, as shown in Scenario 3.

Section 5: Conclusion and Recommendations

5.1 Overall Findings

Under normal operating conditions including Wells 12 and 14, Mesa Water is currently well-equipped to supply water to accommodate 115 percent demands using existing infrastructure, even with projected demand increases over the next 20 years. This exemplifies Mesa Water's past and current success in continuing to be self-reliant upon their local water supplies.

However, being self-reliant can pose additional risk in the event of an emergency. If a portion of existing local supply infrastructure were to become unavailable, Mesa Water's supply system would need a significant amount of redundancy in their clear and amber wells to remain self-sufficient. Additional capital would not be required to meet demands under typical circumstances for the foreseeable future. If Mesa Water were to increase its number of wells and/or expand the MWRF, the redundant equipment would remain unused for much of its lifespan or at a minimum be cycled intermittently with the existing infrastructure.

5.2 Recommendations by Situation

5.2.1 Imported Water is Unavailable (Scenarios 2a and 2b)

Whenever available, imported water is the most cost-effective solution to increase supply during a temporary supply outage. However, it is recognized that importing water is not always an option. For example, a strong seismic event may affect MWD's imported water connections and/or infrastructure. Situations like this are illustrated under Scenarios 2a and 2b. Looking at current year (2020) cases of these scenarios, as shown in Tables 4-10 and 4-15, Mesa Water's only option to mitigate the gap is to employ regulatory action to curtail demand. When planning for future emergencies, there is additional insurance in owning redundant supplies, albeit at an additional capital and O&M cost. Providing enough clear well redundancy for a hypothetical deficit similar to the 2040 case of Scenario 2c, as shown in Table 4-22, would result in several millions in additional annual capital and O&M costs, even when Mesa Water does not encounter an emergency.

5.2.2 Unexpected and Extended Maintenance (Scenario 3)

While natural disasters can be unpredictable, some emergency condition effects can be mitigated. Scenario 3 simulates an outage due to several supply units requiring critical repairs. With careful maintenance protocols in place, it would be highly unlikely that almost half of the clear well and amber well supply capacity would be unavailable for an extended period. If preventive maintenance is staggered, the groundwater wells can be maintained without significant reductions in supply, allowing all demands to be met using existing infrastructure. Additional reliability improvements will be discussed in TM-3 as well.

5.2.3 Complete Self-Sufficiency

In the event Mesa Water decides to pursue self-sufficiency under all circumstances and scenarios, selecting between installing additional clear wells, expanding MWRF treatment production, or a combination of both would require additional in-depth analysis and further investigation. Various factors such as fixed costs, production costs, and operational flexibility within Mesa Water's system would also need to be further refined. The year 2040 cases under Scenarios 2a and 2b assume the most drastic situations examined in which imported water is not available. If these cases are used as an estimate of the extent of infrastructure improvements needed to become completely self-sufficient, lump sum capital costs could total up to $32M over the course of a 30-year debt cycle, as shown in Table 4-29. However, this capital cost is an upper limit; the ultimate extent of improvements depends on the amount of risk Mesa Water is willing to take on. The overall long term value and resiliency gained from expanding supply infrastructure would need to be further investigated.

5.3 Final Recommendations

Because of the high costs to maintain self-sufficiency on local water supplies during an emergency, it is ultimately recommended that Mesa Water purchase imported water in the event of a supply shortage, as detailed on Table 4-28. In the event of a rare situational emergency such that MWD supplies are not available, Mesa Water may offset any supply shortages through the implementation of water usage restrictions if the emergency occurred in the near future. In the long-term, Mesa Water can expand its local production capabilities by installing additional clear wells or expanding MWRF treatment capacity. Additional feasibility and criticality studies would be needed in order to make a final determination as to which is the most cost-effective and reliable balance between the two local alternatives.

References

Lauri, P., *Production Well Costs*, Mesa Water District, 2016.

Lauri, P., *Regional MWRF Usage*, Mesa Water District, 2016.

Mesa Water FY19 Water Supply Report, Mesa Water District, 2019.

Mesa Water FY20 Water Supply Report, Mesa Water District, 2020.

"MWDC Water Rates and Charges - 2021," *Water Rates and Charges* | *MWDOC*, https://www.mwdoc.com/about-us/about-mwdoc/water-rates-and-charges/ (September 29, 2020).

One Metro West – Water Supply Assessment, Mesa Water District, 2019.

Production System Operations Plan, Mesa Water District, 2018.

2015 Urban Water Management Plan, Mesa Water District, 2016.

2018-2019 Engineer's Report on Groundwater Conditions, Water Supply and Basin Utilization in the Orange County Water District, Orange County Water District, 2020.

Water Master Plan Update, Mesa Water District, 2014.

Ordinance No. 26: Ordinance of the Mesa Water District Board of Directors Adopting the Mesa Water District Water Conservation and Water Supply Emergency Program Rescinding Ordinance Nos. 8, 19, 24, Mesa Water District, 2015.

Attachment A: Cost Basis and Calculations

Cost Basis

The production cost of each supply option, as outlined in Section 4.1, is summarized in Table A-1. These costs are on a per acre-foot basis and only apply when water is being supplied.

Table A-1. Production Cost Basis ($/AF)

Supply Option	Cost	Limitations	Cost Assumptions
Base Supply Options			
Clear Wells(1)	$568	Up to BPP limit	Includes RA, energy, and chemicals. Does not include capital and O&M.
MWRF(2)	$594	Up to MWRF max capacity	Includes RA, energy, and chemicals minus LRP. Does not include capital and O&M.
Additional Supply Options			
Call for No Irrigation	$-	Up to 25% of total demand	Negligible cost to implement.
Additional Clear Wells(1)	$568	Cannot implement short-term (2020)	Includes RA, energy, and chemicals. Does not include capital and O&M.
Increase MWRF Capacity(2)	$594	Cannot implement short-term (2020)	Includes RA, energy, and chemicals minus LRP. Does not include capital and O&M.
Import from MWD(3)	$1,104		Does not include fixed fees.

1. *From Production Well Costs (2019)*
2. *From Regional MWRF Usage (2016)*
3. *Tier 1 supply rate in 2021*

The annual fixed costs, which include both the annualized capital costs and O&M costs for equipment and the fixed fees imposed by MWD and MWDOC for importing water, are provided in Table A-2. Capital and O&M costs for equipment apply regardless if water is or is not supplied.

Table A-2. Annual Fixed Costs			
Supply Option	Cost	Unit Notes	Cost Assumptions
Capital Costs			
Existing Clear Wells	$1,104,589		Includes capital for Wells 12 and 14 and O&M for all existing wells, running or idle.
Existing MWRF	$2,732,200		2020 cost. Includes capital and O&M for the existing MWRF, running or idle.
	$232,200		2040 cost. Includes O&M for the existing MWRF, running or idle. Assumes capital debt servicing is completed by 2027.
Additional Clear Wells(1)	$85	Per AFY of additional production capacity needed	Includes capital and O&M. Assumes capital costs are scalable based on production capacity.
MWRF Expansion(2)	$728,053	For up to +3,000 gpm capacity	Includes capital. Based on expansion by one treatment train.
	$1,262,918	For up to +6,000 gpm capacity	Includes capital. Based on expansion by two treatment trains.
MWD & MWDOC Fixed Fees			
Readiness-to-Serve Charge (RTS)(3)	$113,546	Per percent of 4-year average of water share among all MWDOC customers	Assumes combined 4-year average volume among all other MWDOC customers is 206,178 AF. Cost based on 2020-2021 MWDOC RTS rate. Charged for subsequent years.
Capacity Charge(3)	$10,700	Per cfs of peak delivery from the past 3 years	2021 MWD capacity charge. Charged only if used and applied to subsequent years.

1. *From Production Well Costs (2019)*
2. *Rough order of magnitude*
3. *From MWDOC Water Rates and Charges - 2021 (2020)*

Cost Calculations

Total annual costs for each scenario are calculated as the sum of the total production and fixed costs:

$$[Total\ Costs] = [Production\ Costs] + [Fixed\ Costs]$$

Total annual production costs are calculated as follows:

$$[Production\ Costs] = [Clear\ Well\ Production] + [MWRF\ Production] + [MWD\ Imports]$$

The cost of each production component is based on the volume of water supplied or imported:

$$[Clear\ Well\ Production] = \left(\frac{\$568}{AF}\right)[Total\ clear\ well\ production\ in\ AF]$$

$$[MWRF\ Production] = \left(\frac{\$594}{AF}\right)[Total\ MWRF\ production\ in\ AF]$$

$$[MWD\ Imports] = \left(\frac{\$1{,}104}{AF}\right)[Total\ imports\ in\ AF]$$

Total annual fixed costs are calculated as follows:

$$[Fixed\ Costs] = [Clear\ Well] + [MWRF] + [RTS\ Charge] + [Capacity\ Charge]$$

Capital improvement costs for additional clear wells and expansion of the MWRF are based on additional production capacity needed to meet emergency demands. Costs are scaled based on the proportion of wells that are non-operational.

$$[Clear\ Well] = \$1{,}104{,}589 + \frac{\left(\frac{\$85}{AFY}\right)[Max\ production\ rate\ in\ AFY]}{[\%\ operational\ wells]}$$

$$[MWRF]_{2020} = \$2{,}732{,}200 + [MWRF\ expansion\ cost, depending\ on\ trains\ needed]$$

$$[MWRF]_{2040} = \$232{,}200 + [MWRF\ expansion\ cost, depending\ on\ trains\ needed]$$

The RTS Charge is based on the four-year rolling average of services. It is assumed that Mesa Water does not import water in the years prior and succeeding the period examined in each scenario. Therefore, the total costs over four years is equivalent to the cost of all MWD imported water paid in one year if imported water is used. To adequately estimate Mesa Water's future water purchases as part of the GAP analysis, it is assumed that imported water quantities for other member agencies is consistent with the information published by MWDOC for FY2018-2019.

$$[RTS\ Charge] = \left(\left(\frac{[Imported\ water\ in\ AF]}{206{,}178\ AF}\right) \times 100\%\right)\left(\frac{\$113{,}546}{\%\ share}\right)$$

The Capacity Charge is based on the maximum delivery rate over the past three years. Again, it is assumed that Mesa Water does not need imported water unless in an emergency. To calculate the Capacity Charge, the peak delivery rate is identified and applied for three years. For comparison, the charges over the 3-year period will be included in the fixed costs for the year when water is imported.

$$[Capacity\ Charge] = 3\left(\frac{\$10{,}700}{cfs}\right)[Max\ delivery\ rate\ in\ cfs]$$

Technical Memorandum

Prepared for: Mesa Water District

Project Title: Water Supply, Energy, and Supply Chain Reliability Assessment

Project No.: 155448.150

Technical Memorandum No. 2

Subject: Energy Supply Reliability

Date: February 11, 2021

To: Phil Lauri, Mesa Water District Assistant General Manager

From: Adam Zacheis, Ph.D., P.E., Project Manager

Copy to: Andrew Wiesner, P.E., Principal Engineer

Prepared by: ______________________________
Christopher Kindle, P.E.

Reviewed by: ______________________________
Adam Zacheis, Ph.D., P.E., Project Manager

Table of Contents

List of Figures

List of Tables

Abbreviations

AEEC International	Association for the Advancement of Cost Engineering International
AF	acre feet
AWWA	American Water Works Association
BC	Brown and Caldwell
BPP	Basin Production Percentage
BPS	Booster Pump Station
Btu	British thermal units
Cal ISO	California Independent System Operator
Cal OES	California Office of Emergency Services
CEC	California Energy Commission
CMMS	computerized maintenance management system
CPUC	California Public Utilities Commission
dBA	A-weighted decibels
EIA	U.S. Energy Information Administration
ESRA	Energy Supply Reliability Assessment
gph	gallons per hour
gpm	gallons per minute
hp	horsepower
kWh	kilowatt-hour
IEPR	Integrated Energy Policy Report
MAIFI	Momentary Average Interruption Frequency Index
MDD	maximum daily demand
MED	Major Event Day
Mesa Water	Mesa Water District
MMcfd	million cubic feet per day
MWD	Metropolitan Water District of Southern California
MWRF	Mesa Water Reliability Facility
NFPA	National Fire Protection Association
O&M	operations and maintenance
OPLAN	Southern California Catastrophic Earthquake Response Plan
PSPS	Public Safety Power Shutoff
RPS	Renewables Portfolio Standard
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SoCalGas	Southern California Gas Company
TM-2	Technical Memorandum No. 2
TOU	time of use
VFD	variable frequency drive

Section 1: Introduction

Mesa Water District (Mesa Water) engaged Brown and Caldwell (BC) to conduct a Water Supply, Energy, & Supply Chain Reliability Assessment with the following objectives:

1. Evaluate existing water supply capacities relative to meeting 115 percent of all demand seasons using local groundwater resources;
2. Evaluate existing Mesa Water energy supply capacities, types, and backup capabilities relative to ensuring reliable groundwater supplies can be pumped and distributed during normal and emergency operations;
3. Identify water supply and energy reliability gaps (from Objectives Nos. 1 & 2) and provide recommended solutions;
4. Evaluate Mesa Water's Supply Chain system relative to emergency readiness;
5. Identify Supply Chain system reliability gaps (from Objective No. 4) and provide recommended solutions.

1.1 Purpose

Technical Memorandum No. 2 (TM-2) is one of the components of Mesa Water's overall assessment of water supply, energy, and supply chain reliability. TM-2 focuses on the following Energy Supply Reliability Assessment (ESRA) components:

- Evaluate Mesa Water's historic demands for energy usage at well sites and treatment facilities;
- Estimate Mesa Water's future energy demands and costs;
- Provide recommendations for pump drive technologies, considering life cycle costs;
- Provide recommendations for backup power/fuel requirements.

Section 2: Background

Mesa Water's facilities are located in Orange County, California and receive electric power from Southern California Edison (SCE) and natural gas from Southern California Gas Company (SoCalGas). SCE is a private electric utility and its service area includes most of Orange County. SCE operates a regional electrical system consisting of high and medium voltage transmission and distribution lines, and low voltage distribution systems. SoCalGas is a private utility and its service area extends throughout Southern California. SoCalGas operates a regional natural gas system consisting of pipelines, compressor stations, and storage facilities. Propane is used as a backup fuel source at Mesa Water's facilities that utilize natural gas reciprocating engines as a primary driver. Propane is delivered by truck from local propane brokers.

Mesa Water's clear wells are all equipped with electric motor-operated pumps and diesel engine backup generators (either on site or have a connection for a portable generator) apart from Well 1 and Well 5. Well 1 has infrastructure in place to power the electric motor-operated pump by a portable generator and Well 5 is driven by a natural gas-powered engine that can use propane as a backup fuel source. The pumps at Mesa Water's two reservoirs are primarily powered by natural gas engines and are connected to a backup propane supply. Reservoir 1 Booster Pump Station (BPS) is also each equipped with two electric motor driven jockey pumps. Both reservoirs are also equipped with a natural gas engine generator which provides power to the control system and critical valves used to remove the facilities from being online in case of a system outage. The Mesa Water Reliability Facility (MWRF) is equipped with electric motor driven pumps and does not have provisions for backup power to operate the process, only a small standby generator for the building and operation of the nanofiltration air compressors and valves. Table 2-1 summarizes the existing equipment at the different facilities. Table 2-2 summarizes the reference information used throughout TM-2.

Table 2-1. Existing and Future Equipment

Site	Primary (Natural Gas Powered)	Primary (Electric Powered)	Backup Supplies
Reservoir 1 BPS	(3) 137 hp pumps at 2,500 gpm each	(2) 60 hp jockey pumps at 1,000 gpm each	(1) natural gas engine generator; (1) 1,150 gal horizontal propane storage tank
Reservoir 2 BPS	(4) 369 hp pumps at 4,200 gpm each	N/A	(1) natural gas engine generator; (1) 1,150 gal horizontal propane storage tank
Well 1	N/A	(1) 400 hp pump at 2,300 gpm	Connection for portable generator
Well 3	N/A	(1) 300 hp pump at 1,600 gpm	(1) 350 kW diesel generator; (1) 426 gal integral diesel storage tank
Well 5	(1) 450 hp pump at 2,200 gpm	N/A	(1) 1,150 gal horizontal propane storage tank
Well 7	N/A	(1) 300 hp pump at 1,300 gpm	(1) 350 kW diesel generator; (1) 333 gal integral diesel storage tank
Well 9	N/A	(1) 300 hp pump at 1,800 gpm	(1) 350 kW diesel generator; (1) 426 gal integral diesel storage tank
Well 12 (Future)	N/A	(1) 600 hp pump at 3,000 gpm	(1) 600 kW diesel generator (1) 1,000 gal diesel storage tank
Well 14 (Future)	N/A	(1) 600 hp pump at 3,000 gpm	(1) 600 kW diesel generator (1) 1,000 gal diesel storage tank
MWRF	N/A	(2) 400 hp well pumps; (3) 350 hp high lift pumps; (2) 250 hp nanofiltration feed pumps; (4) 100 kW CIP tank heaters; (3) 40 hp product transfer pumps; (2) 30 hp degasifier blowers; (3) 30 hp CO2 booster pumps	See Section 5

Notes:

1. *Pump and motor information for Reservoir BPSs are as reported in the 2017 Reservoir1&2 Pumps, Controls, and Chemical System Assessment Project.*

2. *Pump capacities for the clear wells are the maximum observed production, as provided by Mesa Water in TM-1. Motor information is per the design criteria specified in the Well Automation record drawings.*
3. *Capacity of backup supplies for future wells is estimated from pump motor size and assumes 24 hours of runtime at maximum fuel consumption.*
4. *Only major process equipment for the MWRF is listed. Equipment smaller than 30 hp is not shown.*

Table 2-2. Reference Information		
Reference No.	Reference	Description
1	TM-1 Water Supply Reliability Assessment	Assessment of Mesa Water's current water production in various operating or emergency scenarios.
2	2014 Water Master Plan Update	Report that includes pumping capacities for Mesa Water's groundwater extraction wells and fire flow analysis of the entire system, prepared by Carollo Engineers. Findings were further developed by the 2017 Reservoir 1&2 Pumps, Controls, and Chemical System Assessment Project.
3	2017 Reservoir 1&2 Pumps, Controls, and Chemical System Assessment Project	Report that includes the latest condition assessment of Reservoirs 1 and 2 and fire flow analysis of the entire system, prepared by Hazen and Sawyer.
4	SoCalGas Monthly Billing Statements	Monthly billing statements from July 2018 through July 2020 for Reservoirs 1 and 2 and Well 5 were provided. The statements include a breakdown of the billed amount.
5	SCE Monthly Billing Statements	Monthly billing statements from August 2018 through July 2020 for Wells 1, 3, 5, 7, and 9 were provided. The statements include a breakdown of the billed amount.
6	2019 Integrated Energy Policy Report	Annual assessment and forecast of California's natural gas and electricity sectors, prepared by the CEC.
7	2019 RPS Annual Report	Annual assessment of California's progress in complying with the Renewables Portfolio Standard program, prepared by the CPUC.
8	SoCalGas Historical Procurement Prices	SoCalGas's natural gas procurement prices from November 2009 to September 2020.
9	2013 Integrated Energy Policy Report	Annual assessment and forecast of California's natural gas and electricity sectors, prepared by the CEC.
10	U.S. EIA	Historical data for natural gas consumption, production, and net imports in the U.S. Provides conversion factors for various fuel sources.
11	SCE Historical Retail Rates	SCE's retail rates from 2009 to 2020.
12	FY19 Water Supply Report	Planned and actual water supply demand data for all of Mesa Water's facilities from July 2018 to June 2019.
13	FY20 Water Supply Report	Planned and actual water supply demand data for all of Mesa Water's facilities from July 2019 to June 2020.
14	SCE Annual System Reliability Report	Annual assessment of SCE system reliability and major outages.
15	Cal OES 2010 OPLAN	Provides a coordinated response to a catastrophic earthquake in Southern California.
16	SCAQMD Certified ICE-Emergency Generators	List of internal combustion engine emergency standby generators that are approved by the SCAQMD. List was updated July 31, 2020

Section 3: Energy Supply Consumption

Monthly billing statements and publicly available annual reports were reviewed to determine the historical energy usage and cost fluctuations over the last 10 years. The historical data was subsequently evaluated to establish a baseline usage pattern. As determined in TM-1, the water supply demand is highest in the summer (May through October), with the peak typically being in August, and the demand is lowest in the winter

(November through April). Historical water supply demands were referenced from the FY19 and FY20 Water Supply Report. Annual reports published by the SoCalGas, SCE, the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and U.S. Energy Information Administration (EIA) were reviewed to forecast energy supply and cost fluctuations for the next 1, 3, and 5 years. The forecasts were compared to the baseline usage pattern to estimate future energy supply reliability and cost impacts for Mesa Water.

It should be noted that the SoCalGas and SCE billing periods do not always coincide with the water supply demand periods, which begin and end on the 1st day of the month. Table 3-1 summarizes the average SoCalGas and SCE billing periods for each facility and will be referenced throughout this section. The date corresponding to the end of the period was used to graph the monthly water supply demand and energy usage for the figures in this section.

Table 3-1. SoCalGas and SCE Billing Periods

Site	SoCalGas[1]	SCE[1]
Reservoir 1 BPS	21st day of the month	28th day of the month
Reservoir 2 BPS	18th day of the month	N/A
Well 1	N/A	30th day of the month
Well 3	N/A	9th day of the month
Well 5	1st day of the month	N/A
Well 7	N/A	9th day of the month
Well 9	N/A	1st day of the month
MWRF	N/A	27th day of the month

1. *Listed day represents the average beginning and end of the billing period.*

3.1 Natural Gas

Mesa Water purchases natural gas from SoCalGas to power the engine-driven pumps at Reservoirs 1 and 2 and Well 5. Table 3-2 lists the assumptions made during analysis of Mesa Water's natural gas supplies.

Table 3-2. Natural Gas Supplies Assumptions

Assumption No.	Description
1	Since natural gas procurement prices are volatile and account for a significant portion of the billed amount, SoCalGas' historical procurement prices were used to estimate historical retail rates and forecast future retail rates.
2	The latest SCE, CPUC, and CEC annual reports are for 2018. It is assumed that the conclusions and recommendations from these reports are current.
3	Reservoirs 1 and 2 are not production facilities and do not have associated water supply demand values.
4	Pumping rates at Reservoirs 1 and 2 BPSs are not available.

3.1.1 Historical Usage

SoCalGas retail rates are primarily comprised of commodity and transportation fees. Commodity fees are affected by natural gas procurement prices, which refers to the cost that SoCalGas pays to acquire natural gas. The volume of natural gas used is measured in therms, which is equivalent to 100,000 British thermal units (Btu).

Billing statements for July 2018 through July 2020 were provided for Reservoirs 1 and 2 BPSs and Well 5. The historical data for Reservoirs 1 and 2 and Well 5 was analyzed to determine the average annual consumption, range of consumption, and peak seasons. A pattern was established to estimate an average cost per acre-foot (AF) of natural gas usage.

Reservoir 1 BPS is located at 1971 Placentia Avenue, Costa Mesa CA 92626. The site is equipped with 3 natural gas engine-driven pumps, a propane/natural gas engine standby generator which is not used for water delivery loads, and a propane storage tank. Each pump has a design capacity of 2,500 gallons per minute (gpm) and is powered by a 137 horsepower (hp) engine. The manufacturers and models are Ingersoll-Rand 16NKL 6 Stages (renamed to Flowserve 16EML) for the pumps and Waukesha Engines F1197G for the engines. The horizontal propane storage tank volume is 1,150 gallons. Table 3-3 presents the natural gas usage from July 2018 to July 2020. Reservoir 1 and Reservoir 1 BPS were not considered as contributing to production for the purpose of this evaluation. Historical pumping rates for the reservoir were not available.

Peak usage occurred in August 2018 and February 2019 at 1,864 therms and 1,801 therms, respectively. Minimum usage occurred in August 2019 at 783 therms. The average usage from July 2018 to July 2020 was 1,345 therms/month.

Table 3-3. Reservoir 1 Historical Usage – Natural Gas Supplies

Month	Usage (therms)	Month	Usage (therms)	Month	Usage (therms)
July 2018	1,431	April 2019	1,287	January 2020	1,594
August 2018	1,864	May 2019	1,171	February 2020	1,313
September 2018	1,524	June 2019	1,159	March 2020	1,361
October 2018	1,389	July 2019	1,028	April 2020	1,696
November 2018	1,182	August 2019	783	May 2020	946
December 2018	1,600	September 2019	1,209	June 2020	1,151
January 2019	1,488	October 2019	1,450	July 2020	1,357
February 2019	1,801	November 2019	1,128		
March 2019	1,565	December 2019	1,139		

Reservoir 2 BPS is located at 2340 Orange Avenue, Costa Mesa CA 92626. The site is equipped with 4 natural gas engine-driven pumps, a propane/natural gas engine standby generator which is not used for water delivery loads, and a propane storage tank. Each pump has a design capacity of 4,200 gpm and is powered by a 369 hp engine. The manufacturers and models are Floway 19FKM 4 Stages for the pumps and Waukesha Engines F2895G for the engines. The horizontal propane storage tank volume is 1,150 gallons. Table 3-4 presents the natural gas usage from July 2018 to July 2020. Reservoir 2 and Reservoir 2 BPS were not considered as contributing to production for the purpose of this evaluation. Historical pumping rates for the reservoir were not available.

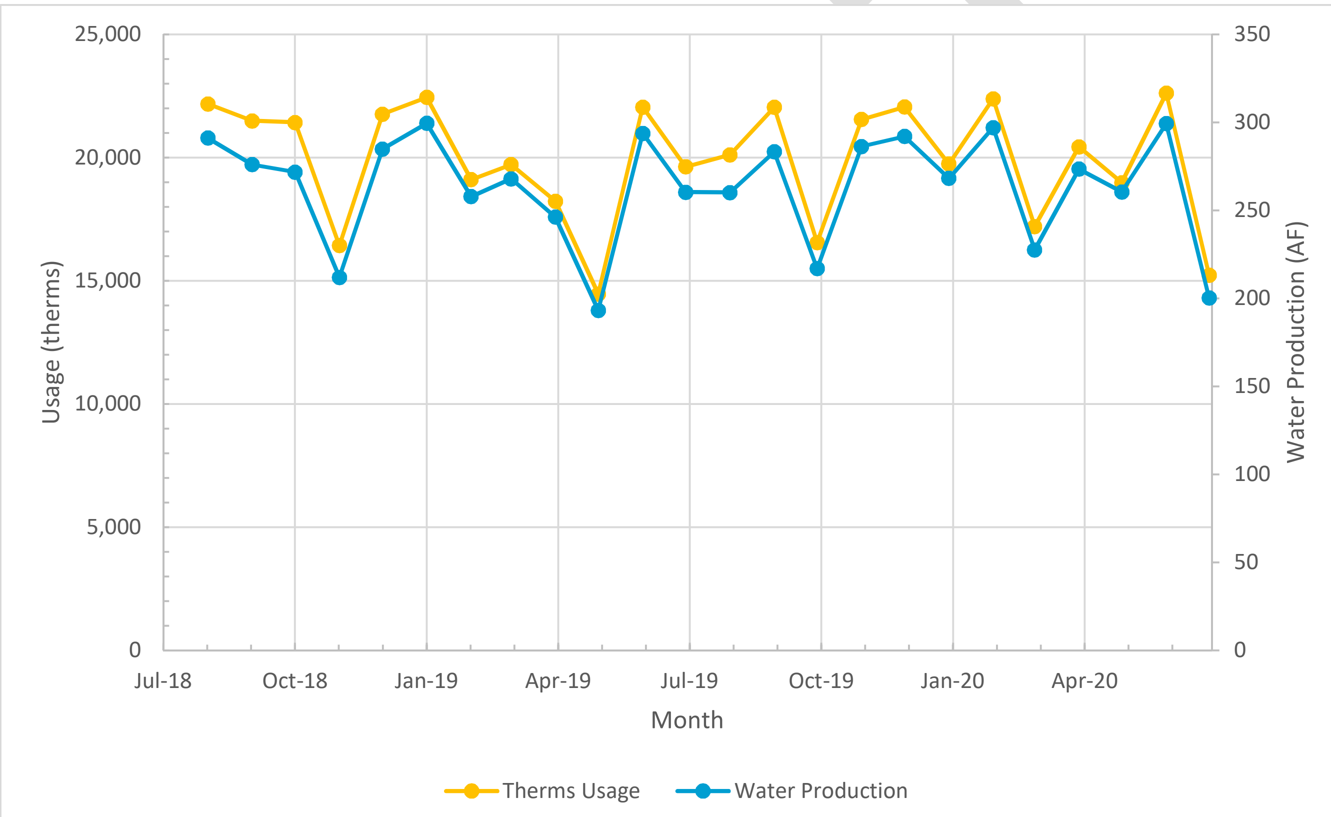
Peak usage occurred in December 2018 at 4,726 therms. Minimum usage occurred in October 2019 at 2,378 therms. The average usage from July 2018 to July 2020 was 3,460 therms/month.

Table 3-4. Reservoir 2 Historical Usage – Natural Gas Supplies

Month	Usage (therms)	Month	Usage (therms)	Month	Usage (therms)
July 2018	3,572	April 2019	2,598	January 2020	3,642
August 2018	3,357	May 2019	2,611	February 2020	3,202
September 2018	2,682	June 2019	3,517	March 2020	3,447
October 2018	3,502	July 2019	3,434	April 2020	3,377
November 2018	3,138	August 2019	3,238	May 2020	4,016
December 2018	4,726	September 2019	3,121	June 2020	3,173
January 2019	3,540	October 2019	2,378	July 2020	3,829
February 2019	4,433	November 2019	4,146		
March 2019	3,887	December 2019	3,932		

Well 5 is located at 3596 Cadillac Avenue, Costa Mesa CA 92626. The site is equipped with a natural gas engine-driven vertical turbine pump and a propane storage tank. The pump has a production capacity of 2,200 gpm and is powered by a 450 hp engine. The manufacturers and model(s) of the pump is National Pump Co. Q57228-3 and Waukesha for the engine. The horizontal propane tank volume is 1,150 gallons. Figure 3-1 presents the natural gas usage and actual water production from July 2018 to June 2020 and Table 3-5 summarizes the peak and minimum usage seasons. It should be noted that the Well 5 site and equipment was upgraded in 2018. As part of the upgrade project, the booster pump was removed from the site.

Well 5 was used to establish the baseline natural gas usage pattern since it is the only natural gas production facility. The average natural gas usage during the summer and winter months was 77 therms/AF and 75 therms/AF, respectively.



Note: Date graphed for therms usage and water production corresponds to the end of the billing/production period.

Figure 3-1. Well 5 Historical Usage – Natural Gas Supplies

Table 3-5. Well 5 Historical Usage – Natural Gas Supplies		
Parameter	Natural Gas Usage (therms/month)	Water Production (AF/month)
Peak Usage		
January 2020	22,450	300
June 2020	22,620	300
Minimum Usage		
April 2019	14,470	193
June 2020	15,230	200

3.1.2 Costs

SoCalGas' retail rates are primarily composed of commodity and transportation costs. Since SoCalGas procures its natural gas from external suppliers, retail rates are subject to market prices and are volatile. The CEC 2019 Integrated Energy Policy Report (IEPR) estimates that 85 to 90 percent of Southern California's gas supply is from out of state resources. These resources include the Western Canadian Sedimentary Basin (Alberta and British Columbia, Canada), Permian Basin (west Texas and southwestern New Mexico), San Juan Basin (northwestern New Mexico and southwestern Colorado), and Rocky Mountains (Wyoming).

The historical retail rates are not available online; however, natural gas procurement prices for the last 10 years are available. Figure 3-2 shows a downward trend in gas prices since 2009, despite price spikes. Improvements in technology and development of shale-deposited natural gas production were significant in recent natural gas price decreases. The 2019 IERP discusses the correlation between procurement prices and temperature, as well as system maintenance. Price increases in 2018 and 2019 coincided with major cold spells and heat waves. Additionally, the price increase in 2013 coincided with the sudden closure of the San Onofre Nuclear Generating Station. The 2013 IERP states that the closure abruptly increased the natural gas demand in California, since natural gas power plants were used to provide nearly all the energy production lost due to the closure.

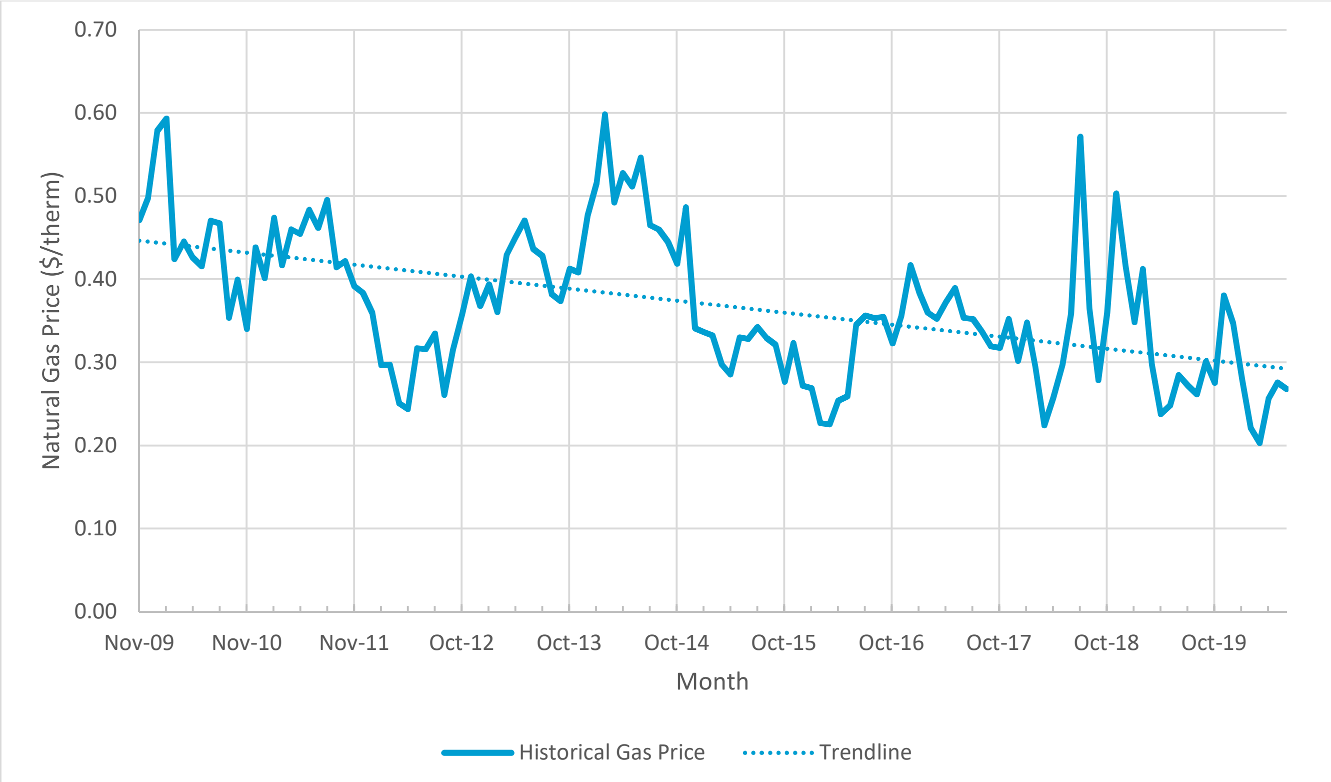


Figure 3-2. Historical Natural Gas Procurement Price

3.2 Electricity

Mesa Water purchases electricity from SCE to power the electric motor-driven pumps at Reservoir 1 BPS, the MWRF, and Wells 1, 3, 7, and 9. Electricity Table 3-6 lists the assumptions made during analysis of Mesa Water's electric supplies.

Table 3-6. Natural Gas Supplies Assumptions	
Assumption No.	Description
1	Clear well capacities are per TM-1 and represent the most stable well production rates.
2	Reservoirs 1 and 2 are not production facilities and do not have associated water supply demand values.
3	Pumping rates at Reservoirs 1 and 2 BPSs are not available.

3.2.1 Historical Usage

Billing statements for July 2018 to June 2020 were provided for Reservoir 1 BPS, the MWRF, and Wells 1, 3, 7, and 9. The historical data was analyzed to determine the average annual consumption, range of consumption, and peak seasons. A pattern was established to estimate an average cost of electricity per AF of production. The water production totals shown in the graphs of this section are for calendar months beginning on the first of each month. The electricity demand shown in the graphs of this section are for the SCE billing period which varies in duration and start date at each facility, therefore the electricity demand and water production rates on a month-by-month rarely are for exactly the same period.

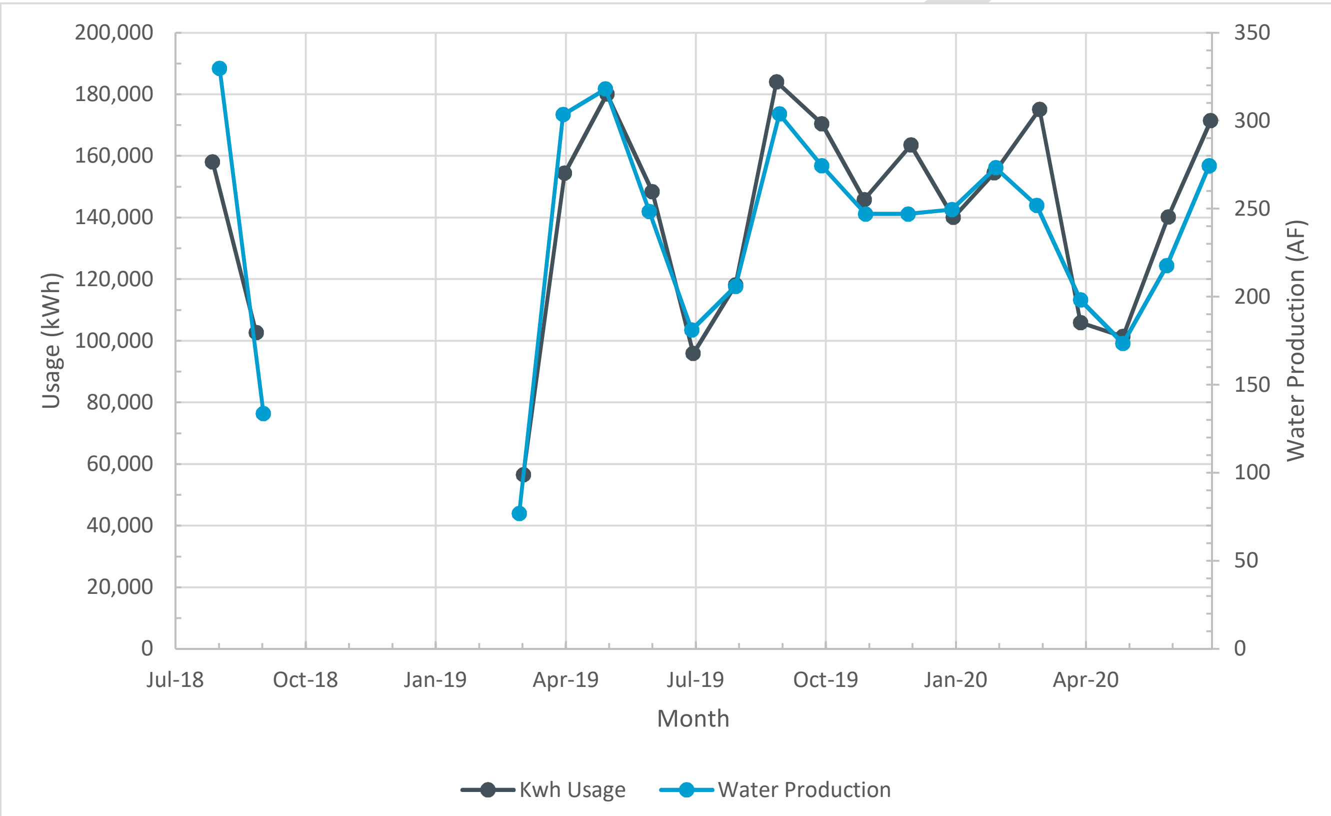
Reservoir 1 BPS is equipped with 2 electric motor-operated jockey pumps. Each pump has a design capacity of 1,000 gpm and is powered by a 60 hp motor. The manufacturers and models are Ingersoll-Rand 14KKH 7 Stages for the pump and General Electric 5KS404DP7005 for the motor. Table 3-7 presents the kWh usage from July 2018 to June 2020. Reservoir 1 and Reservoir 1 BPS operate as storage and do not contribute to production and thus, the water supply demand is not applicable. Historical pumping rates for the reservoir were not available.

Peak usage occurred in August 2019 at 6,044 kWh. Minimum usage occurred in April 2020 at 2,853 kWh. The average usage from July 2018 to July 2020 was 4,098 kWh/month.

Table 3-7. Reservoir 1 Historical Usage – Electric Supplies

Month	Usage (kWh)	Month	Usage (kWh)	Month	Usage (kWh)
July 2018	3,945	April 2019	4,833	January 2020	3,304
August 2018	4,540	May 2019	4,289	February 2020	3,127
September 2018	4,283	June 2019	3,645	March 2020	2,957
October 2018	3,998	July 2019	5,498	April 2020	2,853
November 2018	4,371	August 2019	6,044	May 2020	3,466
December 2018	3,031	September 2019	4,762	June 2020	3,131
January 2019	3,385	October 2019	4,822		
February 2019	3,654	November 2019	4,820		
March 2019	3,766	December 2019	5,831		

Well 1 is located at 1150 Sunflower Avenue, Costa Mesa CA 92626. The site is equipped with an electric motor-operated vertical turbine pump and a connection for a portable generator. The pump has a production capacity of 2,300 gpm and is powered by a 400 hp motor. The manufacturers and models are National Pump Co. Q-57228-1 for the pump and US Motors for the motor. Figure 3-3 presents the kWh usage and water production from July 2018 to June 2020 and Table 3-8 identifies the peak and minimum usage seasons. It should be noted that Well 1 was offline from September 2018 through January 2019 as part of Mesa Water's Well Automation Project.



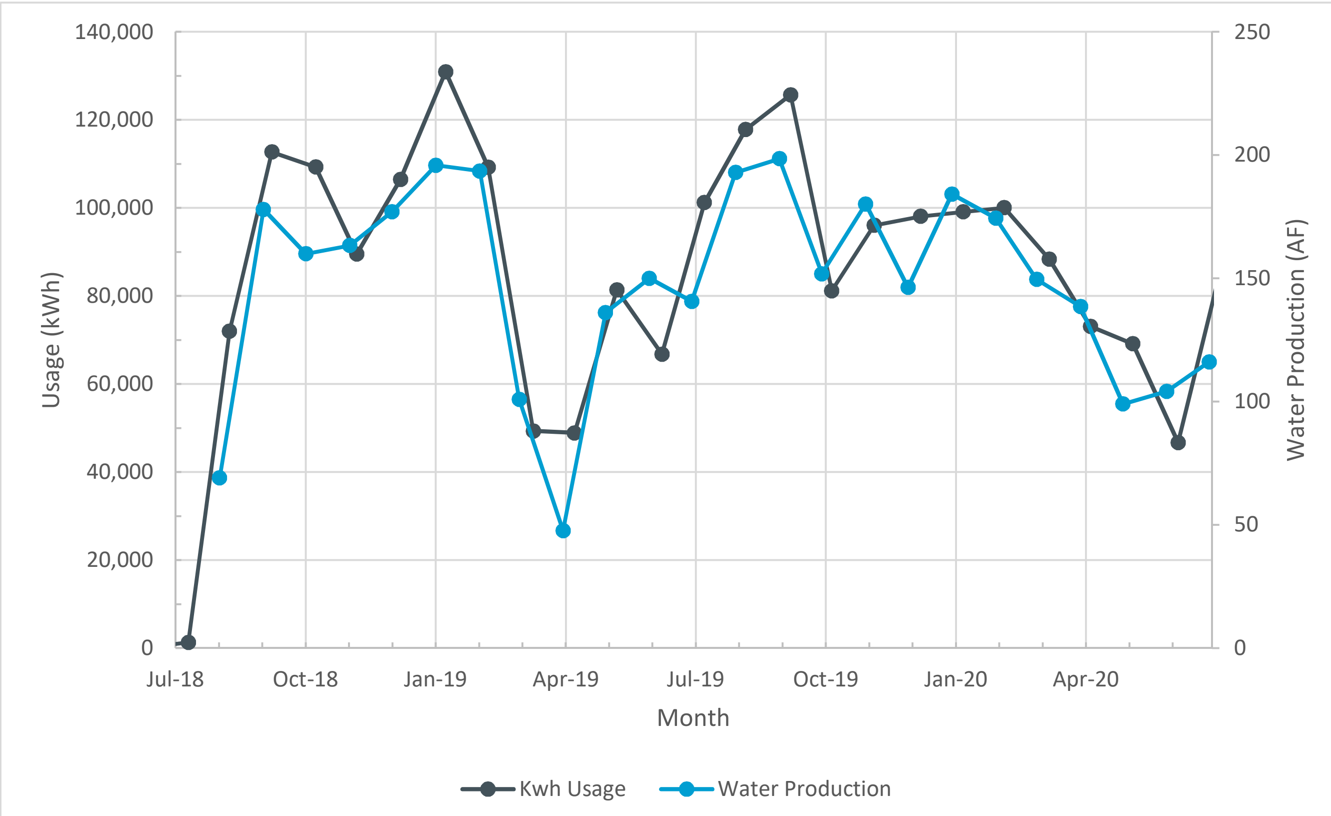
Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-3. Well 1 Historical Usage – Electric Supplies

Table 3-8. Well 1 Historical Usage – Electric Supplies

Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
April 2019	180,050	318
August 2019	184,100	304
Minimum Usage		
February 2019	56,600	77

Well 3 is located at 3581 Harbor Boulevard, Costa Mesa CA 92626. The site is equipped with an electric motor-driven vertical turbine pump and diesel engine driven standby generator. The pump has a production capacity of 1,600 gpm and is powered by a 300 hp motor. The manufacturers and models are National Pump Co. Q-57228-2 for the pump and US Motors for the motor. Figure 3-4 presents the kWh usage and water production from July 2018 to June 2020 and Table 3-9 identifies the peak and minimum usage seasons.

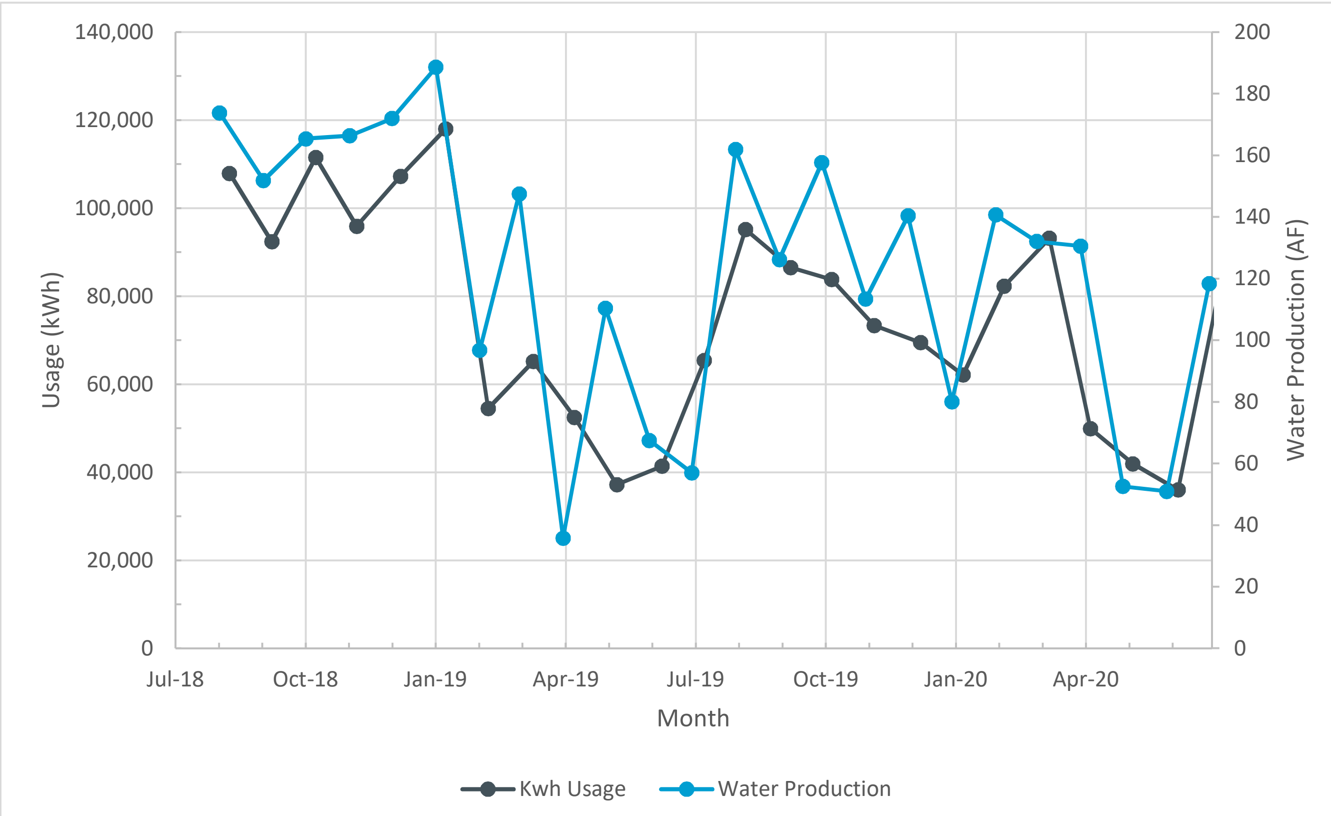


Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-4. Well 3 Historical Usage – Electric Supplies

Table 3-9. Well 3 Historical Usage – Electric Supplies		
Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
December 2018	130,950	196
August 2019	125,700	199
Minimum Usage		
February 2019	49,350	101
March 2019	48,900	48
May 2020	46,750	104

Well 7 is located at 3325 Harbor Boulevard, Costa Mesa CA 92626. The site is equipped with an electric motor-driven vertical turbine pump and diesel engine driven standby generator. The pump has a production capacity of 1,300 gpm and is powered by a 200 hp motor. The manufacturers and models are National Pump Co. Q-57228-3 for the pump and US Motors for the motor. Figure 3-5 presents the kWh usage and water production from July 2018 to June 2020 and Table 3-10 identifies the peak and minimum usage seasons.

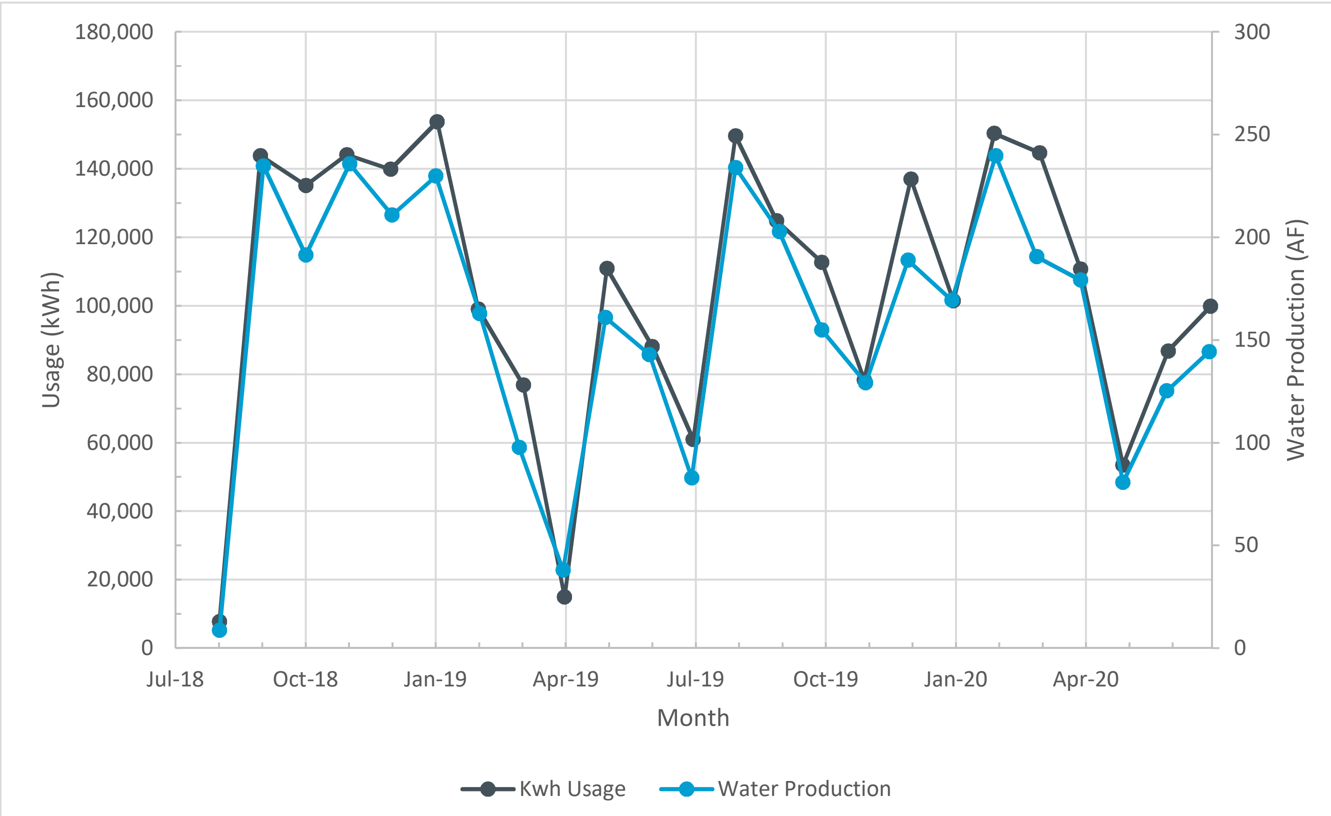


Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-5. Well 7 Historical Usage – Electric Supplies

Table 3-10. Well 7 Historical Usage – Electric Supplies		
Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
January 2020	118,000	189
Minimum Usage		
April 2019	37,200	110
May 2020	36,050	51

Well 9 is located at 1301 Sunflower Avenue, Costa Mesa CA 92626. The site is equipped with an electric motor-driven vertical turbine pump and diesel engine driven standby generator. The pump has a production capacity of 1,800 gpm and is powered by a 300 hp motor. The manufacturers are Goulds for the pump and US Motors for the motor. Figure 3-6 presents the kWh usage and water production from July 2018 to June 2020 and Table 3-11 identifies the peak and minimum usage seasons.

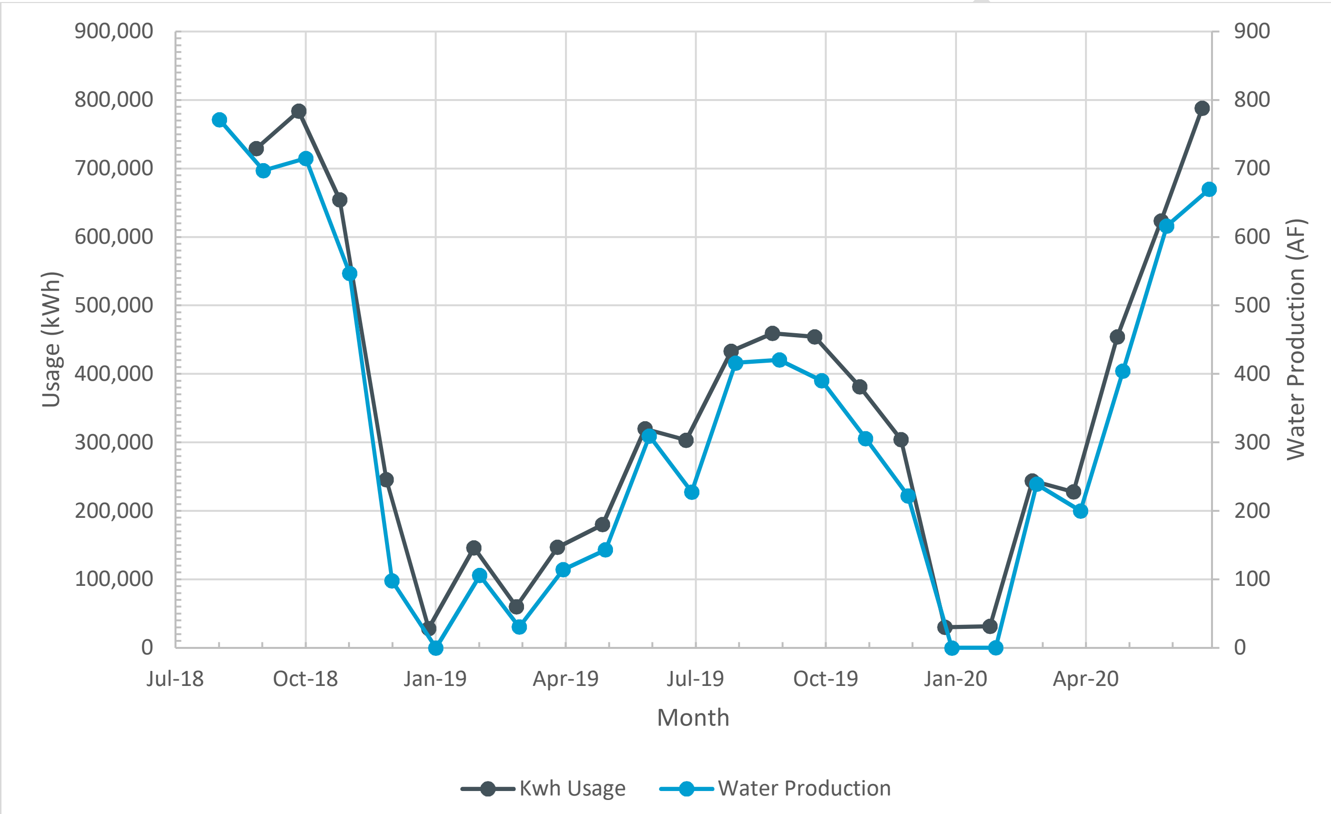


Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-6. Well 9 Historical Usage – Electric Supplies

Table 3-11. Well 9 Historical Usage – Electric Supplies		
Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
December 2018	153,750	230
July 2019	149,650	234
January 2020	150,375	240
Minimum Usage		
March 2019	14,950	38

The MWRF is located at 1350 Gisler Ave, Costa Mesa 92626. The site is equipped with numerous electric driven pumps and equipment. The MWRF is equipped with a small standby generator for maintaining power to the control system and administrative loads but there is no standby power available for water production loads. Figure 3-7 presents the kWh usage and water production from July 2018 to June 2020 and Table 3-12 identifies the peak and minimum usage seasons.

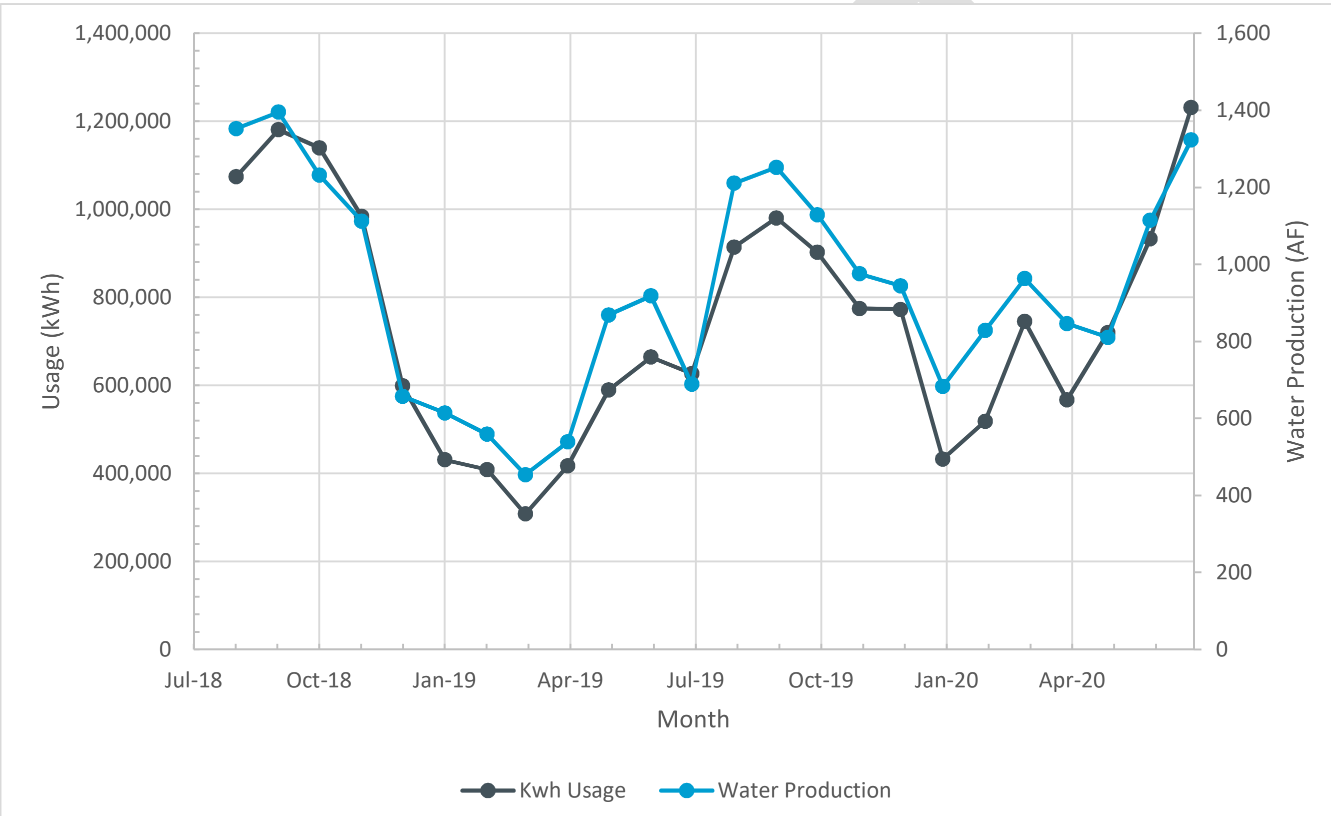


Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-7. MWRF Historical Usage – Electric Supplies

Table 3-12. MWRF Historical Usage – Electric Supplies		
Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
September 2018	784,010	715
June 2020	788,085	670
Minimum Usage		
February 2019	60,240	31

Figure 3-8 presents the total electric usage and total water production for all of Mesa Water's electric powered production facilities discussed above. Table 3-13 identifies the corresponding peak and minimum usage seasons. The electric usage and water production include Wells 1, 3, 7, and 9 and the MWRF. It was determined that the average electric usage is 832 kWh/AF during summer months and 741 kWh/AF during winter months. Water production is higher in the summer months due to increases in the water supply demand. The higher electricity usage per AF produced by the clear wells and MWRF is likely due to the facilities and pumps operating at higher flow rates and thus incurring higher operating pressures due to increasing head loss in pipes and treatment systems. The electricity usage at the reservoirs is constant during the summer and winter months and accounts for a small percentage of the total usage.



Note: Date graphed for kWh usage and water production corresponds to the end of the billing/production period.

Figure 3-8. Overall Historical Usage – Electrical Supplies

Table 3-13. Overall Historical Usage – Electric Supplies		
Parameter	Electricity Usage (kWh/month)	Water Demand (AF/month)
Peak Usage		
August 2018	1,194,190	1,396
June 2020	1,239,840	1,323
Minimum Usage		
February 2019	315,560	454

3.2.2 Costs

Nearly 80 percent of SCE's retail rates are composed of generation and delivery costs, with generation costs being the majority. Rates vary by season (summer and winter) and demand periods (on peak, mid peak, off peak). Electric costs are the highest for summer on peak, and lowest for winter super-off peak. Historical retail rates for the last 10 years for all rate plans are available online. Mesa Water's facilities fall under the time of use (TOU) rate plans. This category is divided into subcategories by service type, such as PA2 (Agricultural and Pumping – Small to Medium) and PA3 (Agricultural and Pumping – Large). Wells 1, 3, and 9 fall under TOU-PA3; Reservoir 1 and Well 7 fall under TOU-PA2.

The highest rates for generation are summer on peak. The fluctuations for both generation rates are presented in Figure 3-9. Winter rates are relatively steady, but summer rates have varied. The price increase in 2013 and 2014 coincided with the sudden closure of the San Onofre Nuclear Generating Station. As previously mentioned, natural gas power plants were used to provide nearly all the energy production lost due to the closure. This caused a temporary spike in natural gas procurement prices and is reflected in SCE's generation costs. California's efforts to lower greenhouse gas emissions and increase reliance on renewable energy sources have contributed to increases in generation rates. Clean energy sources are more costly than other older technologies, such as ocean cooled natural gas power plants and coal-based power plants.

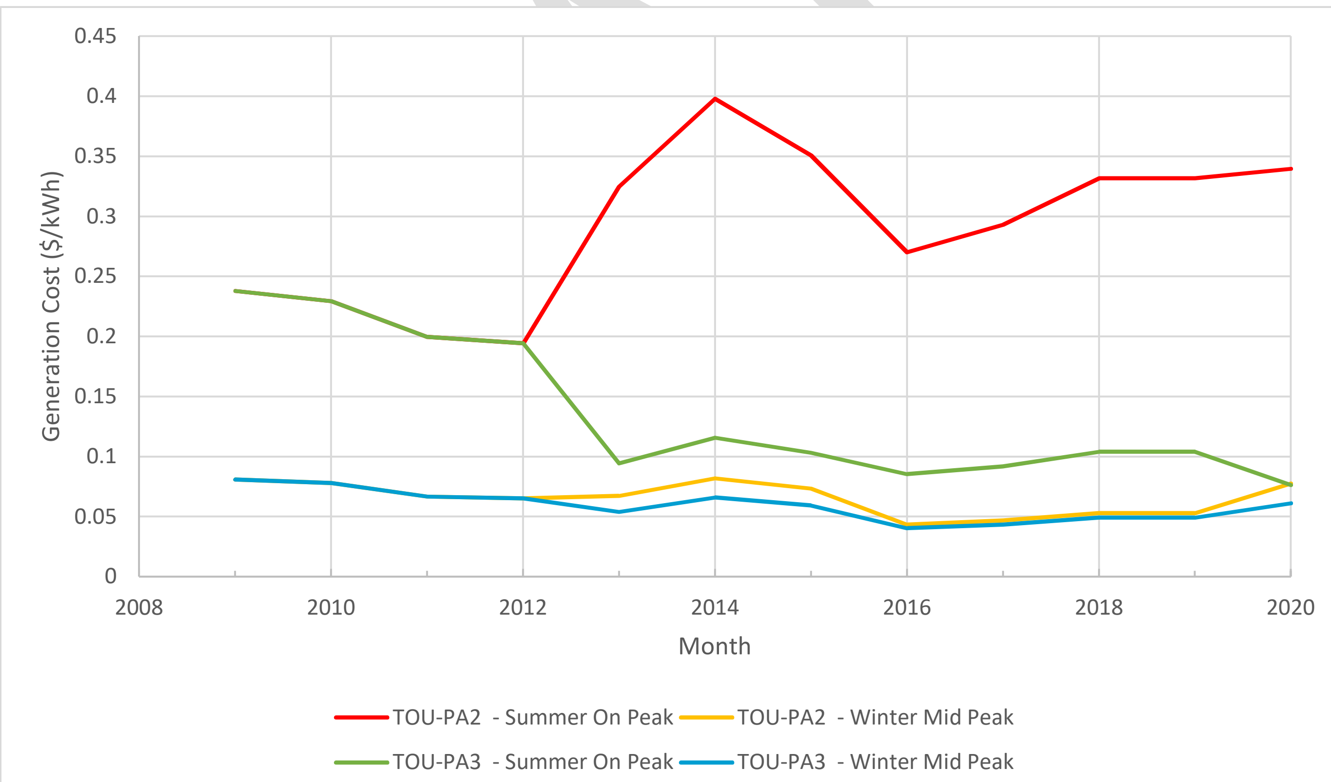


Figure 3-9. Historical Electric Generation Rates

Section 4: Energy Supply Forecasts

4.1 Natural Gas Supply Forecast

Within the next 1, 3, and 5 years, the natural gas demand in California is forecasted to steadily decrease. The California Renewables Portfolio Standard (RPS) program was established in 2002 to increase the use of carbon-free renewable energy. The program requires that by 2020, 33 percent of electricity sold by large Investor-Owned Utilities, such as SCE, is procured from renewable energy sources. By 2030, the requirement will increase to 60 percent and by 2045 the requirement will increase to 100 percent. The program is currently phasing out coal-fired power plants, of which there is only one operating within the state, and will target natural gas power plants next. Although the goal is to eliminate natural gas generation in California, it is currently a major source of energy. Renewable energy, such as wind and solar energy, require storage systems and planning to service peak demands. Approximately 75 percent of California's flexible energy capacity for peak events is provided by natural gas generation since the facilities can quickly adjust production levels.

Although the demand for natural gas is forecasted to decrease, the supply is expected to remain steady. Therefore, natural gas supply will be available to customers where it is necessary to be used as a fuel. It should be noted that projects installed in the future are less likely to receive regulatory approval if zero emission options are available.

As previously stated, 85 to 90 percent of California's natural gas supply is procured from Canada, Texas, New Mexico, Colorado, and Wyoming. Natural gas enters SoCalGas' system at 5 separate receipt points and is then boosted by compressor stations to transmission lines and storage fields. City gate stations, located in the Los Angeles region, are used to modulate the flow within the system. Natural gas leaves the system through the receipt point located at the California-Mexico border. Figure 4-1 presents a map of SoCalGas' system.

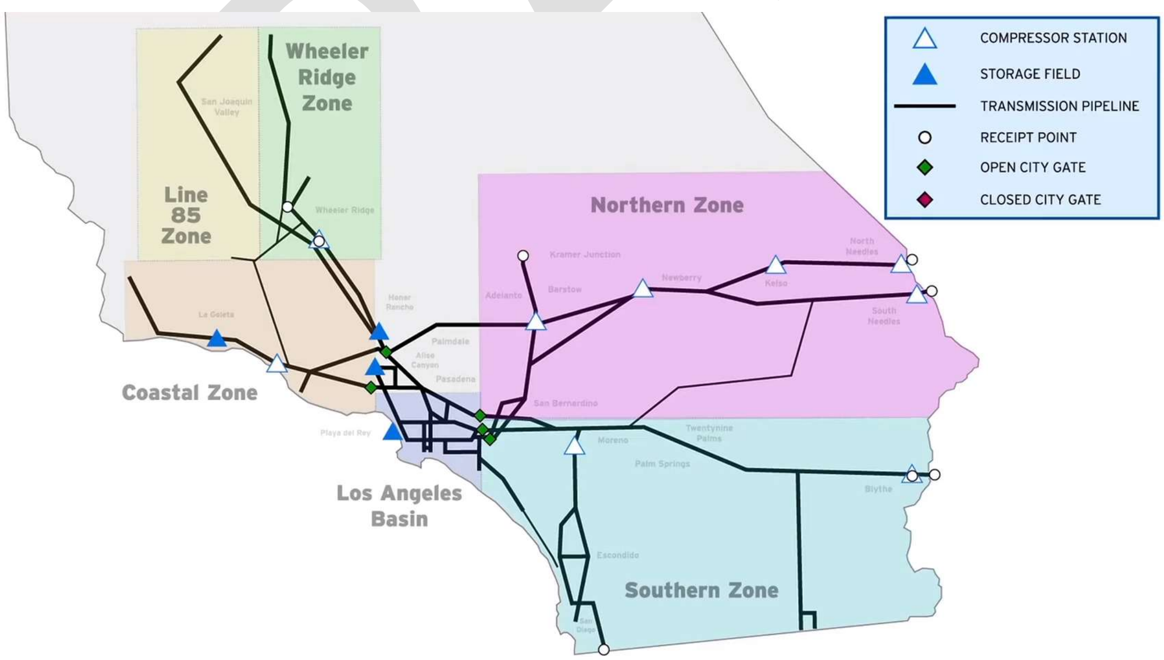


Figure 4-1. SoCalGas System Map

Figure from Southern California Gas Company

In 2018, California consumed approximately 4,930 million cubic feet per day (MMcfd) of natural gas. In the same year, the United States produced 83,400 MMcfd and exported 9,900 MMcfd, with 4,500 MMcfd being exported to Mexico. Additional natural gas export facilities are being constructed and the export volume increased to 12,800 MMcfd in 2019. Increases in export could result in cost or reliability repercussions for California. Figure 4-2 shows the natural gas consumption, production, and net imports for the U.S. in the last 10 years, per the U.S. EIA.

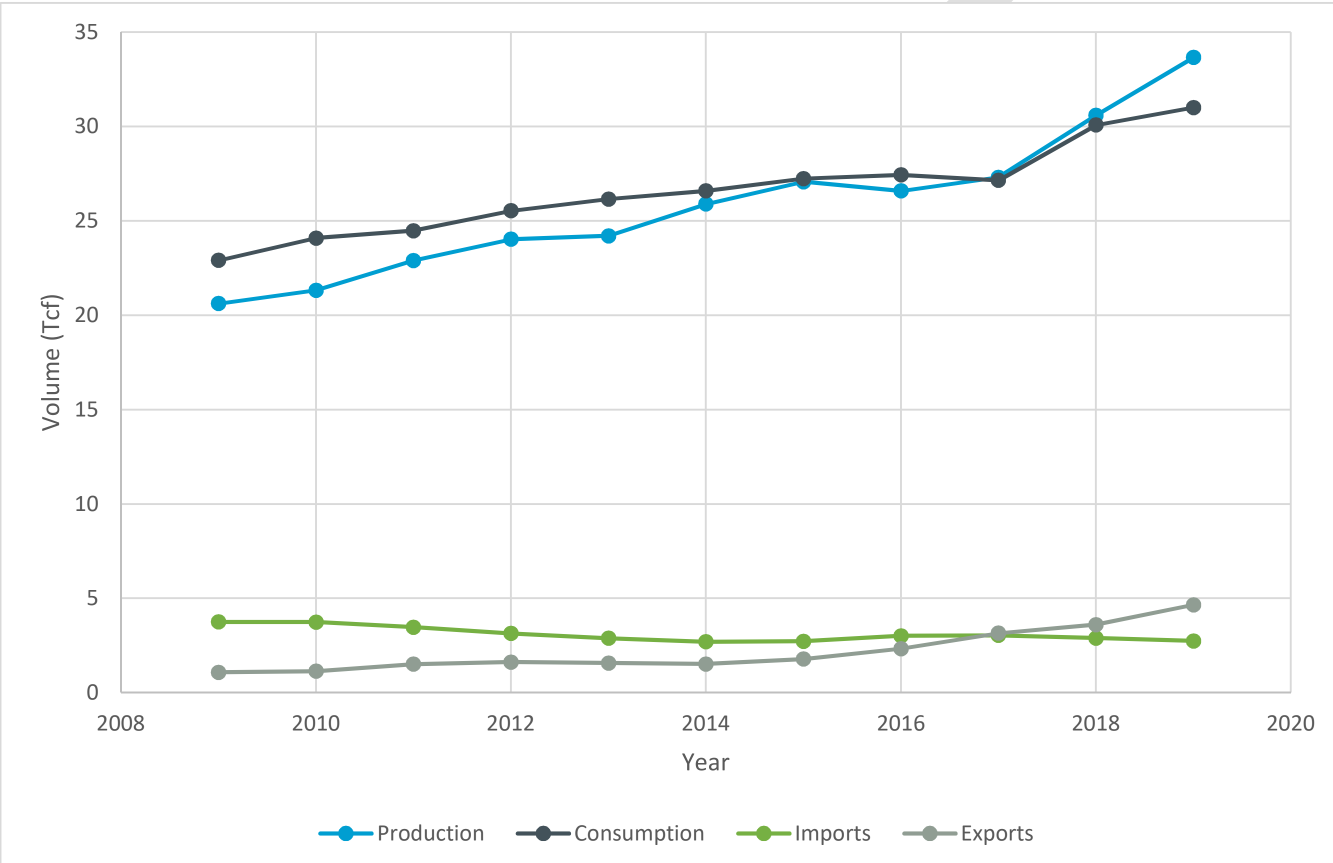


Figure 4-2. U.S. Natural Gas Consumption, Production, and Net Imports

Because of the RPS goal, there are no plans for expanding California's natural gas infrastructure and the existing infrastructure must be utilized. The 2015 leak at the Aliso Canyon natural gas storage field and recent pipeline outages have raised concerns regarding the existing infrastructure's reliability. In addition, the CPUC and CEC are currently investigating the feasibility of permanently closing the Aliso Canyon facility. The 2019 IERP states that pipeline outages were one of the causes of SoCalGas' natural gas price spikes. Approximately 20 percent of system capacity was lost during recent outages at Line 235-2, Line 4000, Line 3000, and Line 2000. SoCalGas plans to invest $6 billion over five years to improve pipeline safety, and the resulting pipeline outages can have direct effects on retail rates. The 2019 IERP estimates that natural gas prices will rise 2.37 percent per year between 2019 and 2030 because of supply, demand, and reliability issues. Figure 4-3 shows the forecasted natural gas procurement price for the next 1, 3, and 5 years.

Additional external factors, such as decreased petroleum demand due to COVID-19, will increase the volatility of natural gas procurement prices. Since hydraulic fracturing extracts both petroleum and natural gas, both commodities are similarly affected by market demands. The reduced demand for petroleum and natural gas results in decreased production, increased storage, and flaring of excess gas if storage facilities are at capacity.

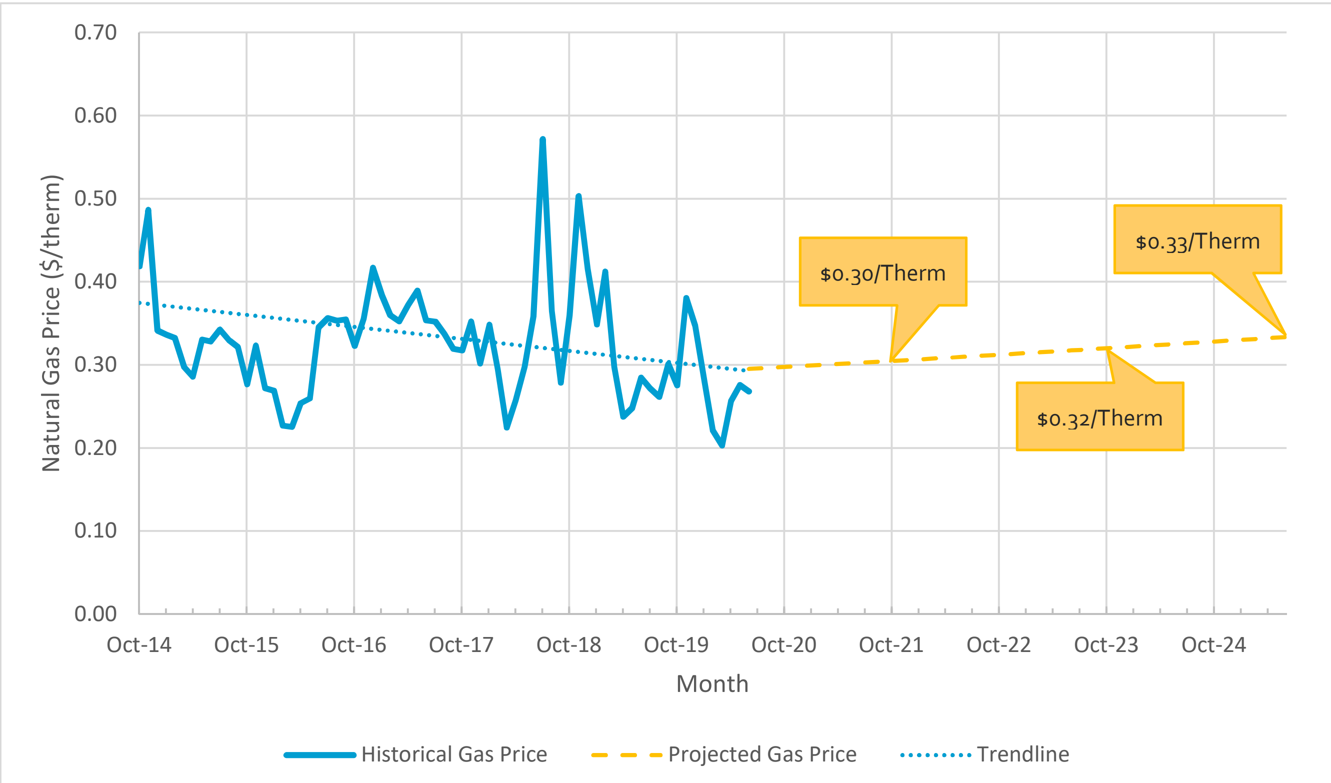


Figure 4-3. Forecasted Natural Gas Procurement Price

4.2 Electric Supply Forecast

California imports roughly one-third of its electricity from out of state. The remaining two-thirds are generated in-state using mostly renewable energy (34 percent) and natural gas (46 percent). California's renewable energy electric generation includes wind, solar thermal, solar photovoltaic, and hydropower. Electricity consumption in California has increased approximately 10 percent in the last 10 years. Within the next 1, 3, and 5 years, the electricity demand in California is forecasted to steadily increase. As previously stated, the RPS program requires that by 2020, 33 percent of electricity sold by large Investor-Owned Utilities, such as SCE, is procured from renewable energy sources. By 2030, the requirement will increase to 60 percent and by 2045 the requirement will increase to 100 percent.

To comply with the RPS program and meet peak demands, additional renewable energy and storage systems need to be integrated into the distribution grid. Wind and solar energy resources alone are not suitable to service peak demands since the production is dictated by weather conditions. Storage systems are needed to absorb excess energy during off-peak demands and supply energy during peak demands. The 2019 IERP estimates that during the next 1 to 3 years, California's electricity production is insufficient to meet peak demands.

The shortfall is due to regulations on natural gas plants cooled by ocean water, a reduction on energy generated by coal and nuclear resources, and a shift in peak electricity demands. Natural gas plants cooled by ocean water account for a significant portion of natural gas plants in-state and will be entirely phased out by 2029. Imported coal generation and nuclear generation will be entirely phased out by 2025. Trends show that peak electricity demands are moving to early evening, which is when solar production is reduced or unavailable. Solutions, such as constructing generation and storage facilities, importing electricity, and upgrading the distribution grid, can potentially affect near term retail rates.

Due to California's electricity sector reliance on natural gas generation, natural gas procurement prices affect electricity prices. The high natural gas prices resulted in an increase of $0.014 per kWh effective 2019. Electricity is produced throughout the western United States and controlled regionally by system operators that manage production to match demand. Generation in California is primarily done at natural gas fired power plants and is distributed throughout the state on high voltage transmission lines at voltages above 135 kV. For the SCE system, the voltage is transmitted to substations before being fed to customers. The substations transform the voltages to either medium voltages (typically between 12 kV to 66 kV) or low voltages (typically between 120 V to 480 V).

SCE uses three standard indices to quantify reliability. The System Average Interruption Duration Index (SAIDI) represents the average time (in minutes) that a customer was without power in a year. The System Average Interruption Frequency Index (SAIFI) represents the average number of times that a customer was without power for over 5 minutes. The Momentary Average Interruption Frequency Index (MAIFI) represents the average number of times that a customer was without power for 5 minutes or less.

Mesa Water is within SCE's Huntington Beach District. Figure 4-4 depicts the historical SAIDI, SAIFI, and MAIFI for the district and overall SCE system. Note that the data presented includes both planned and unplanned outages. Indices corresponding to the Huntington Beach District are prefixed by the lowercase letter "d". The figure shows a downward trend in interruptions since 2016 and that the district generally has less interruptions than the entire SCE system. On average, in 2019 each SCE customer in the district was without power for approximately 2.5 hours, experienced 1.2 interruption greater than 5 minutes, and experienced 1.1 interruptions less than 5 minutes. This corresponds to a down-time of 0.03 percent annually.

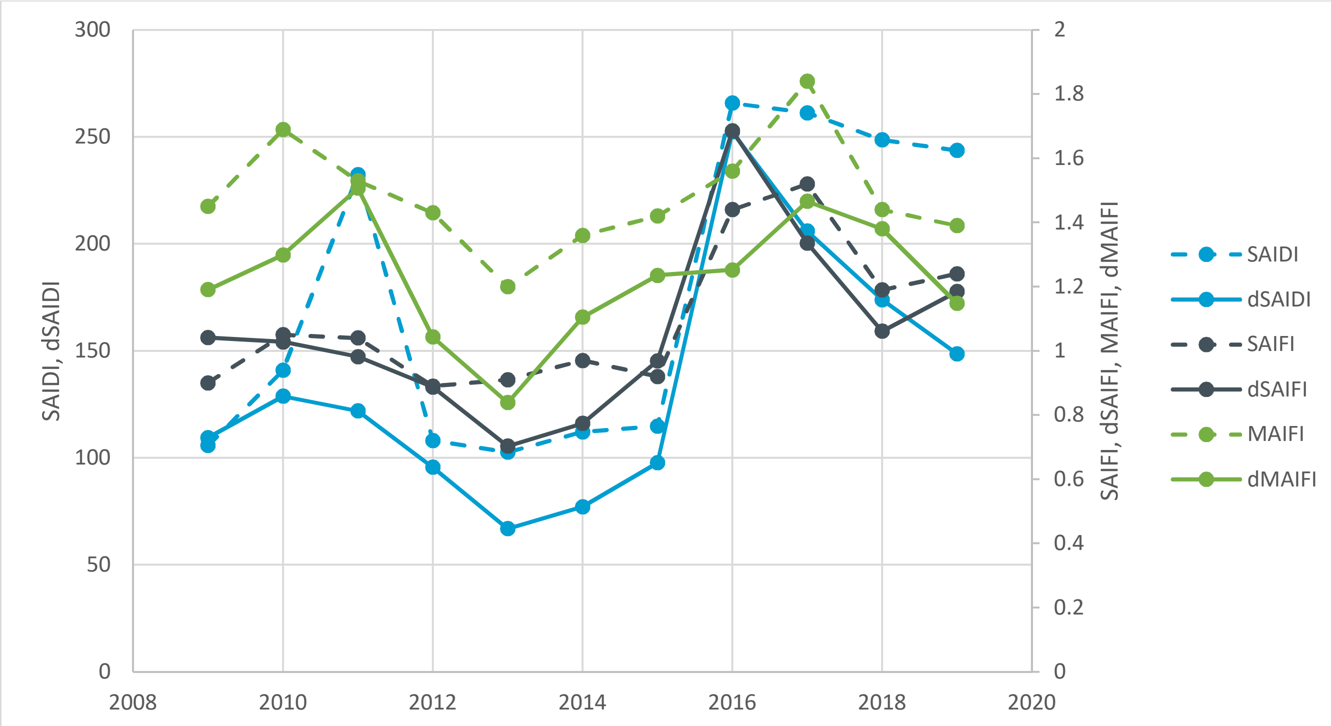


Figure 4-4. SCE Historical Reliability

In general, an electric utility with SAIDI and SAIFI values shown in Figure 4-4 would be considered extremely reliable. However, natural disasters such as regional wildfires and extreme heat events have reduced the perceived reliability of the electrical system that provides power to Mesa Water facilities. From a historic perspective, the SAIDI and SAIFI values have increased over the last five years which coincides with increased frequency and intensity of natural events. SCE classifies an outage as a Major Event Day (MED) if the daily SAIDI value exceeds a threshold value. Table 4-1 lists the total number and types of MEDs since 2016. Widespread natural disasters often affect multiple districts within SCE's service area. Not all events will affect the Huntington Beach District; however, the SAIFI and SAIDI values of the overall SCE system will be affected.

SCE started implementing the Public Safety Power Shutoff (PSPS) de-energization protocol towards the end of 2018 to minimize the threat of wildfires. Conditions that trigger a PSPS include high winds, low humidity, and dry vegetation. Additionally, SCE customers have experienced power outages due to extreme heat events where California Independent System Operator (Cal ISO), the state's electricity grid management agency, has implemented Stage 3 power emergencies which require utilities to implement rolling blackouts. These preventive measures negatively affect the SAIDI, SAIFI, and MAIFI. The increase in frequency, size, scope, and impact of wildfires raises concern over future electrical reliability and availability. Figure 4-5 and Table 4-2 show the forecasted electric generation rates for the next 1, 3, and 5 years.

Table 4-1. SCE Historical MEDs			
Year	Total Number of MEDs	MED Types	Total Number of Customers Affected
2016	7	Wind Storm, Fire, Lightning Storm	1,298,722
2017	9	Wind Storm, Fire, Vegetation Blown, Toppled Pole	3,768,753
2018	13	Wind Storm, Fire, Lightning Storm, Vegetation Blown, Landslide	1,668,621
2019	15	Wind Storm, PSPS	1,676,646

Note:

1. *Information referenced from SCE Annual System Reliability Reports.*

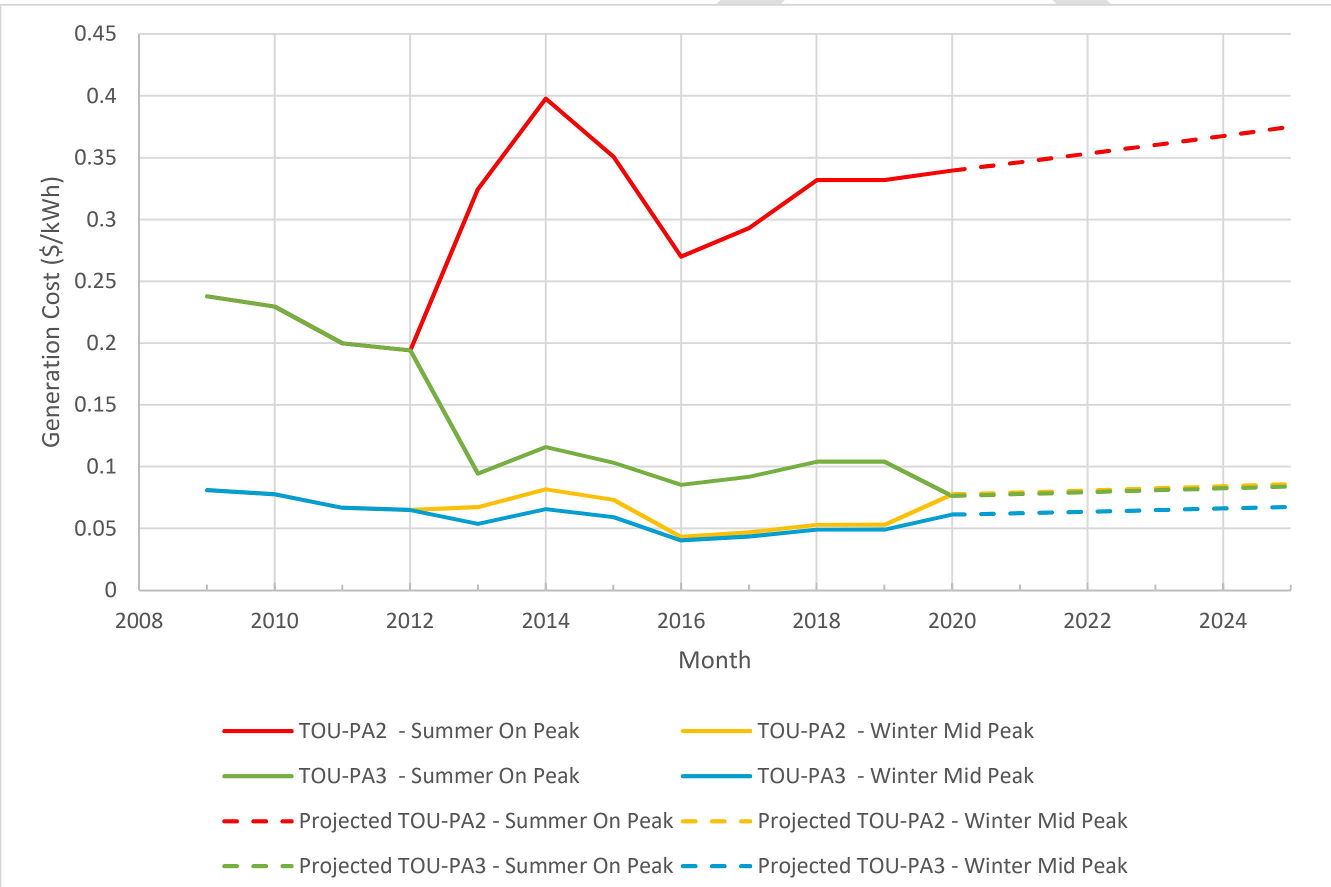


Figure 4-5. Forecasted Electric Generation Rates

Table 4-2. Forecasted Electric Generation Rates				
Rate Plan	Mesa Water Facilities	2021 ($/kWh)	2023 ($/kWh)	2025 ($/kWh)
TOU-PA2 – Summer On Peak	Reservoir 1 and Well 7	0.346	0.360	0.375
TOU-PA2 – Winter Mid Peak		0.079	0.083	0.086
TOU-PA3 – Summer On Peak	Wells 1, 3, and 9	0.078	0.081	0.084
TOU-PA3 – Winter Mid Peak		0.062	0.065	0.068

4.2.1 Existing Substation Capacity

SCE was contacted to determine the spare capacity available at Hamilton and Bayside Substations, which are located in SCE's Huntington Beach District. SCE confirmed both substations have sufficient spare capacity to reliably power each of the reservoir sites if they are converted to electric motor drives. Both Hamilton and Bayside Substations are fed from Ellis Substation, which is located in Fountain Valley, CA. Ellis Substation was recently upgraded to a capacity of 1,120 MVA from 840 MVA.

The conversion of Reservoir 1 to electric motors would increase the connected electric load to approximately 0.5 MVA. Reservoir 1 is primarily fed from Hamilton Substation located on Brookhurst Street north of Victoria Street in Huntington Beach, CA. The impact of Reservoir 1 is 1 percent of Hamilton Substation's rated capacity, which is approximately 56 MVA.

The conversion of Reservoir 2 to electric motors would increase the connected load to approximately 1.6 MVA. Reservoir 2 is primarily fed from Bayside Substation located on Fairview Street north of Wilson Street in Costa Mesa, CA. The impact of Reservoir 2 is 3 percent of Bayside Substation's rated capacity, which is also approximately 56 MVA.

4.3 Infrastructure Risk

The movement of the Pacific Plate in relation to the North American Plate occurs at approximately 1" per year. A major earthquake on the San Andreas Fault, which is the boundary between the two plates, is expected to cause widespread destruction. The California Office of Emergency Services' (Cal OES) Southern California Catastrophic Earthquake Response Plan (OPLAN), dated December 14, 2010, assumes a magnitude 7.8 earthquake on the San Andreas Fault and that natural gas and electricity supplies into Southern California are disrupted. Natural gas is primarily transported into and distributed throughout California using underground pipelines. These pipelines cross the San Andreas Fault 39 times and are subject to damage from a major seismic event. Electricity transmission lines cross the San Andreas Fault 141 times but are overhead. While the powerlines are at less risk as their overhead nature allows more movement separate from ground shaking, it is predicted severe ground shaking and resultant landslides will lead to failure of the towers that support these lines. Thus, a major earthquake would cause failures of the electricity transmission system.

The OPLAN prioritizes restoration of water, power, and communications infrastructure and has plans in place to assist utilities with restoration of said infrastructure. The OPLAN also outlines a strategy to implement emergency air operations, search and rescue operations, health and medical services, evacuations, and mass emergency shelters. For the purposes of TM-2, the following discussion will focus on the infrastructure response. The response plan is divided into three phases, as shown by Figure 4-6.

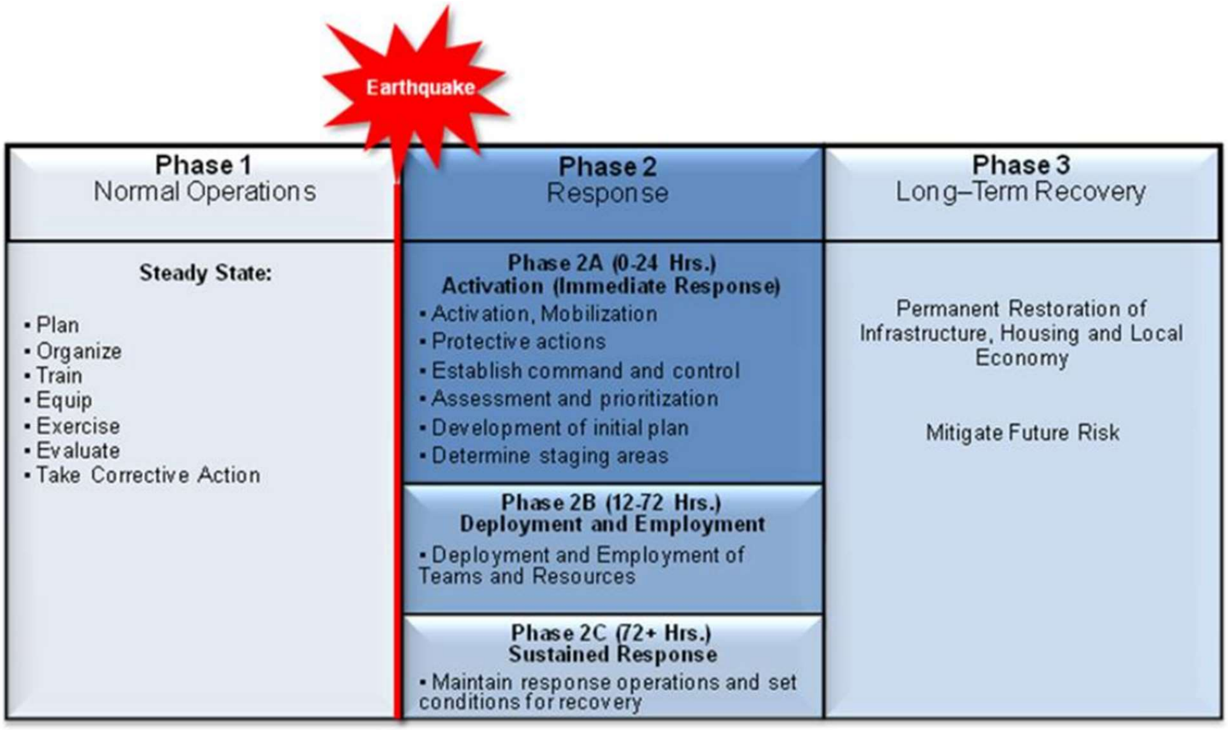


Figure 4-6. OPLAN Response Plan

Figure from Cal OES 2010 OPLAN

Phase 1 is comprised of planning, training, and preparations necessary for responding to the disaster. Phase 2 is divided into 3 subphases based on the time from the disaster. Phase 2A is the first 24 hours and consists of activation of task forces – ground transportation routes are established, airspace and airfields are coordinated, temporary sources of water, power, and fuel are acquired. This phase includes implementing mass distribution of bottled water and portable sanitation to affected communities, as well as coordinating federally provided equipment to produce potable water. It also includes coordinating repairs to water, power, and communications infrastructure. Phase 2B is within 12 to 72 hours after the disaster and consists of resource deployment – temporary sources of water and fuel are delivered from ground, sea, and air transport and alternate sources of water and power are rerouted to critical regions. Phase 2C is beyond 72 hours after the disaster and consists of sustaining emergency operations, such as temporarily repairing damaged infrastructure. Measures include temporary piping and temporary power generation infrastructure. Phase 3 consists of permanent measures to return to normal operations. The OPLAN estimates that 75 percent of normal electrical capacity in Orange County would be restored within 1 to 2 days. Up to 80 percent of normal electrical capacity in Los Angeles County could be restored using local generation, assuming the natural gas supply is available. No additional information regarding the expected capacities of natural gas or electricity from SoCalGas or SCE is available in the OPLAN.

Mesa Water can install a central natural gas or diesel fuel backup supply for additional reliability. This would ensure facilities remain operational during the beginning of an emergency, while regional power generation and distribution is restored. Further analysis is required to determine the capacity of the central backup supply. Local fuel delivery is expected eventually be available since the OPLAN also prioritizes road repairs.

Section 5: Available Backup Supplies

Mesa Water's clear wells and reservoir BPSs are equipped with backup fuel storage, except for Well 1. Wells 3, 7, and 9 have a diesel engine-driven generator on site, and Well 1 has a connection for a portable generator. Well 5, which is driven by a natural gas driven pump, has an onsite propane storage tank that provides fuel to the well pump and a propane engine-driven generator. The generator provides electricity to the well control system and critical valves.

Similar to Well 5, both Reservoir 1 and 2 BPSs are equipped with natural gas engine driven pumps that are connected to an onsite propane storage tank. Although Reservoir 1 and 2 BPSs and Well 5 are configured to operate using propane in the case of a natural gas outage, the systems are unreliable and not in use. Due to recent changes in maintenance and operating procedures, it was discovered that the backup propane systems need to be upgraded to provide for continues operation of the Reservoir and Well 5 as engines. At Well 5 Mesa Water has reported that the evaporator valves freeze after approximately 10 minutes of operation. Therefore, Well 5's pumping capacity is not available in the case of a natural gas outage. If production of other existing clear wells and MWRF can be increased, the loss of Well 5 would not impact Mesa Water's ability to meet demand.

The MWRF, which makes up 20 percent to 30 percent of locally produced water under normal demand conditions, is not equipped with standby generation for continuing production of water. In the event of a power outage, there is an onsite generator dedicated to the Administration Building and SCADA system for shutting down the plant. During peak demand seasons, water may need to be imported from Metropolitan Water District of Southern California (MWD) if the MWRF is without SCE power.

Table 5-1 summarizes backup fuel capacity and storage rating at each existing facility. The storage rating is estimated using the maximum fuel consumption rate. The 2017 Reservoir1&2 Pumps, Controls, and Chemical System Assessment Project performed field tests for the natural gas engines at the reservoirs. The results provided the fuel consumption at maximum flow in terms of therms/AF. The EIA states that 1 gallon of propane contains approximately 91,452 Btu, 1 gallon of diesel fuel contains 137,381 BTU, and 100,000 Btu is equal to 1 therm. Product data sheets for the generator at Well 7 were provided – since Wells 3 and 9 are equipped with generators of the same capacity, the same fuel consumption rate was assumed. Well 5's fuel consumption was estimated using a natural gas-powered engine with similar capacity.

Table 5-1. Available Backup Supplies		
Facility	Backup Fuel Capacity	Storage Rating (hours)
Reservoir 1 and BPS	1,150 gal horizontal propane storage tank	44[1,6]
Reservoir 2 and BPS	1,150 gal horizontal propane storage tank	32[2,6]
Well 1	N/A, connection for portable generator	N/A
Well 3	350 kW diesel generator; 426 gal subbase diesel storage tank	15[3]
Well 5	1,150 gal horizontal propane storage tank	25[4,6]
Well 7	350 kW diesel generator; 333 gal subbase diesel storage tank	12[3]
Well 9	350 kW diesel generator; 426 gal subbase diesel storage tank	15[3]
Well 12 (Future)	600 kW diesel generator; 1,000 gal diesel storage tank	24[5]
Well 14 (Future)	600 kW diesel generator; 1,000 gal diesel storage tank	24[5]

1. *Estimated maximum fuel consumption of 27 therms/AF at 2301 gpm (converts to 13 gal propane/hr) per pump. Assume two pumps in operation.*
2. *Estimated maximum fuel consumption of 27 therms/AF at 3352 gpm (converts to 18 gal propane/hr) per pump. Assume two pumps in operation.*
3. *Estimated maximum fuel consumption of 28.4 gal/hr. Referenced Caterpillar C-15.*
4. *Estimated maximum fuel consumption of 46 gal propane/hr. Referenced Cummins KTA19G.*
5. *Recommended that the minimum rating is 24 hours. Generator size is estimated from pump motor size. Diesel storage tank volume is estimated assuming a maximum fuel consumption of 43 gal/hr. Referenced Caterpillar C-18.*
6. *Existing propane backup system is not functional.*

Section 6: GAP Analysis

6.1 Emergency Conditions

The GAP analysis performed in TM-1 presented local water supply disparities under several operational or emergency scenarios. The three types of scenarios were as follows: Scenario 1 represented normal operating conditions, Scenario 2 consisted of three variations where several supply options are impaired or non-operational due to a local or regional emergency lasting 30 calendar days, and Scenario 3 represented several local supply options needing critical repairs. TM-1 verified that Mesa Water could meet water supply demands for 2020 and 2040 for all scenarios through various combinations of supply options, assuming that the power supply was not compromised. TM-2 builds upon the GAP analysis by evaluating the availability and deficiencies of backup energy supplies in each of the scenarios. Though the scenarios assume a duration of 30 days, backup energy supplies in this analysis are assumed to be needed for 10 days.

Scenario 1 assumed that the existing clear wells, future Wells 12 and 14, and the MWRF are available. Scenario 2a assumed that Well 5, the MWRF, and MWD supplies are not available. Scenario 2b assumed that Wells 3, 12, and 14 and MWD supplies are not available. Scenario 2c assumed that Wells 1, 3, 5, 7, and 9 and the MWRF are not available. Scenario 3 assumed that Wells 1, 7, and 12 and 50 percent of the MWRF are not available. Since Scenario 1 does not simulate an emergency condition, it will not be further evaluated in this GAP analysis. Scenario 2c demonstrates that Mesa Water can meet water supply demands if MWD supplies are utilized; since this GAP analysis focuses on backup power supplies, this scenario will also be removed from further consideration. While the scenarios do not consider the reason why some clear wells are unavailable, loss of utility power is likely a cause. Table 6-1 summarizes which facilities are in operation for each of the scenarios.

Table 6-1. Operational Facilities by GAP Analysis Scenario

Mesa Water Facility	Scenario 2a	Scenario 2b	Scenario 3
Well 1	✓	✓	
Well 3	✓		✓
Well 5		✓	✓
Well 7	✓	✓	
Well 9	✓	✓	✓
Well 12	✓		
Well 14	✓		✓
MWRF		✓	✓ (50% available)
Reservoir 1 and BPS	✓	✓	✓
Reservoir 2 and BPS	✓	✓	✓

Note:

1. *Refer to TM-1 for further information on which scenarios require importing water from MWD or expanding infrastructure.*

The GAP analysis scenarios are based on emergencies that last 30 calendar days before conditions return to normal. Typically, standby fuel storage is sized to provide 24 to 48 hours of supply at an engine's maximum fuel consumption. In practice, this results in the prime mover providing power for a longer duration since it will not continuously operate at maximum capacity. This often translates to fuel supplies having capacity to operate a facility for twice as long as they are rated for. The current capacities of onsite diesel fuel or propane storage at existing and future facilities is approximately 24 hours and is insufficient to provide power for the entire duration of a 30 day outage emergency. Assuming that SoCalGas and SCE are unavailable for only the first several days during a regional emergency, Mesa Water may still have to purchase water from MWD to meet demand. Optionally, Mesa Water can construct a centralized bulk fuel storage tank(s) in addition to the existing 24 hours of backup supplies at each facility. The capacity of the centralized tank depends on the desired degree of reliability and would need to be further evaluated during preliminary design. As discussed in Section 4.3, it is anticipated that local fuel delivery would be available within 72 hours of a regional emergency; however, the OPLAN's estimation of 72 hours may be optimistic and it is recommended that a longer duration for bulk fuel storage of 10 days be considered. Since onsite backup supplies provide approximately 24 hours of operation, the centralized backup supplies ~~should~~ could be sized to provide for 9 days of operation. Thus, the combination of onsite and centralized backup supplies would accommodate 10 days of runtime during an outage emergency. Capacity beyond this duration may result in excessive maintenance costs since it would be more cost effective to utilize local fuel deliveries to replenish the bulk storage tanks. If this option is selected, it is recommended that Mesa Water's facilities standardize on diesel fuel for backup supplies so that only one type of fuel needs to be maintained.

As demonstrated in TM-1, peak day demands in August can be met in 2020 and 2040 if Wells 1, 3, 5, 7, 9, 12, & 14, the reservoirs, and the MWRF are online. The 150% demand for August 2020 is 2,468 AF and August 2040 is forecasted to be 3,017 AF. The analysis for sizing bulk fuel storage tanks assumes the following:

- Peak day demand is constant throughout a 30-day emergency;
- Backup generators are installed at the reservoirs and the MWRF;
- Well 5 has been replaced with a newly drilled well having a capacity of 3,000 gpm, is driven by a 600 hp motor and utilizes a 600 kW backup generator, similar to the other future wells.
- All of Mesa Water's facilities are operational during an emergency. If a facility is offline, it will not consume diesel fuel and water may need to be imported from MWD to meet water supply demands.
- The onsite diesel fuel storage at each facility offsets the bulk fuel storage volume.

Referencing the diurnal curve for August 30, 2013 in the 2014 Water Master Plan Update, the peak hours are approximately 4 am through 12 pm. It is assumed that the reservoirs are online and operating in lead lag during these hours to maintain pressure in the distribution system. For a 150% demand, 30-day emergency in 2020, the clear wells and the MWRF do not need to run continuously to meet demands; in 2040, the clear wells and the MWRF must run continuously to meet demands. To meet operation requirements for these conditions, the total centralized bulk diesel fuel storage tank volume ~~must~~ could be 90,000 gallons and 100,000 gallons, respectively. Based on the conditions discussed in TM-1, the 2020 water supply demand was used as the basis for the bulk fuel storage tank capacity. The difference between the 2020 and 2040 demands is an additional 10,000 gallons of bulk storage. Due to the conservative nature of assuming peak day demands throughout the 30-day emergency, BC recommends that the backup supply capacities are further evaluated in the future when demand can be more closely determined. It is anticipated that the cost to increase storage by an additional 10,000 gallons in the future is relatively small compared to the present day capital cost, since majority of the cost is related to land acquisition and initial construction of the site. Using the 150% demand, three 30,000 gallon diesel fuel storage tanks ~~would be recommended to~~could meet the current year requirements. Fuel polishing is expected to cost approximately $12,000 annually with costs increasing with inflation.

A more cost-effective approach to the centralized bulk storage tank capacity is to assume 115% year average demands during a 30-day emergency in 2020 and 2040. To meet operation requirements for these conditions, the volume should could be 60,000 gallons and 70,000 gallons, respectively. Using the 2020 demand water demands as the basis for diesel fuel storage capacity, two 30,000 gallon fuel tanks would need to be installed. The ultimate configuration and storage capacity would be determined during preliminary design. The fuel polishing cost would be reduced to approximately $8,000 annually with costs increasing with inflation.

The reservoirs are necessary to meet peak hour demands in all scenarios and thus, it is recommended that backup supplies are provided at both. Scenarios 2a, 2b, and 3 show that combinations of the clear wells and the MWRF are sufficient to meet peak demands in August, the month with the highest demand. Following construction of two new clear wells, Mesa Water further improves system reliability in the event either of the existing water sources are unavailable during an emergency. The MWRF has a high production capacity and considerably exceeds the production capacity of any existing individual clear well. Mesa Water would be better able to meet water demands if backup supplies were provided at the MWRF when utility power is unavailable.

Though providing backup supplies at the MWRF has a significant initial cost, it may be advantageous to invest in backup supplies to strengthen overall system reliability and to provide redundancy. The Freeway Complex Fire in 2008 was the fourth largest wildfire to have occurred in Orange County, burning approximately 30,305 acres. During the event, one of Yorba Linda Water District's pump stations failed and fire flow was lost in the Hidden Hills area. This resulted in a lawsuit where the district was held responsible for millions of dollars in property damages. To mitigate similar environmental risks at Mesa Water facilities, installing standby generation at all facilities should be considered.

6.2 Fire Protection Supply

Per AWWA M31, the 2014 Master Plan Update states that the minimum service pressure for fire flow demands is 40 psi under normal operating conditions. The requirement is lowered to 20 psi during maximum daily demand (MDD). The MDD occurred during summer weekdays and was determined to be 25 MGD. Fire flow demand was assumed to be 1,500 gpm at all structures. The report concluded that, under these conditions, 98.5 percent of the distribution system by length can support National Fire Protection Association (NFPA) Class AA rated hydrants, with the remaining 1.0 percent and 0.5 percent supporting Class A and Class B hydrants, respectively. NFPA 291-2019 classifies hydrants based on their rated capacities, as summarized in Table 6-2.

Table 6-2. NFPA Hydrant Classification

NFPA Class	Rated Capacity (gpm)
Class AA	≥1,500
Class A	1,000-1,499
Class B	500-999
Class C	<500

The fire flow analysis considered under the Reservoir 1 & 2 Pump, Controls, and Chemical System Assessment Project built off of the 2014 Master Plan Update, and assumed that the MDD is 25 MGD and determined that fire flow demand is 5 hours at 5,000 gpm. The reservoirs are currently operated with a minimum capacity of 10 MG and the clear wells have a pumping capacity of approximately 9,200 gpm, assuming the most stable operation. The existing and recommended standby fuel sources are capable of providing pumping capacity for at least 24 hours. As long as at least one Reservoir has the ability to pump into the system, fire flow and normal demand can be met.

Section 7: Energy Supply Diversity Requirements

Each of the facilities operated by Mesa Water are critical to the operation of the system and are instrumental in delivering water to customers. Mesa Water's goal of remaining 100 percent reliant on local supplies, even during emergencies, requires a thoughtful approach to equipment needs to be sure that energy is available to continue water production. Therefore, backup supplies are necessary for any primary energy drive that is selected.

7.1 Existing Energy Supplies

Water production in AF will be used as the common metric for comparison. From July 2018 to June 2020, approximately 77 percent of water produced was from electric powered sites and the remaining 23 percent was produced by natural gas-powered sites. Wells 1, 3, 7, and 9 and the MWRF produce an average of 937 AF/month and Well 5 produces an average of 263 AF/month. Table 7-1 presents the natural gas and electricity usage patterns established in Section 3.1.1 and 3.2.1.

Table 7-1. Existing Energy Usage

Energy Supply Type	Usage Pattern
Natural Gas	
Summer	77 therms/AF
Winter	75 therms/AF
Electricity	
Summer	832 kWh/AF
Winter	741 kWh/AF

To compare the usage patterns, kWh will be used as the common metric as majority of Mesa Water's existing facilities utilize electricity as the primary energy drive. Well 5 is the only natural gas-powered production facility and will be compared to Well 1 because the production volumes are the most similar. In FY2020 Well 1 produced a total of 2,917 AF and used 1,770,992 kWh, while Well 5 produced a total of 3,166 AF and used 238,977 therms. The resulting conversion factor is 7.93 therms/kWh. The equivalent natural gas usage pattern is 610 kWh/AF in the summer and 595 kWh/AF in the winter. Production in FY2019 was not used since Well 1 was offline for several months as part of the Well Automation Project.

As discussed in Section 4.1 and 4.2, SoCalGas and SCE are both reliable sources of energy. In FY2019 and FY2020, Mesa Water's electric powered equipment were not removed from service for any major duration due to unforeseen circumstances. In the same period, multiple natural gas-driven engines at Reservoir 1 and 2 BPSs were removed from service for 6 months unplanned maintenance. Additionally, there have been 171 work orders for the natural gas-driven engines since 2017, totaling $97,050.

7.2 Energy Supply Diversity

Mesa Water has implemented policies and constructed facilities to increase reliability by diversifying its energy supply. As discussed in Section 4, California is moving towards carbon-free energy sources and does not intend to expand natural gas infrastructure. It is expected that regulations on natural gas will become more stringent such that renewable energy is favorable. Generally, private industry and utility agencies alike have standardized on electric motors to drive equipment because they are readily available, require minimal maintenance, and have long (30+ years) lifespans.

If natural gas-driven engines remained, the existing propane storage is suitable to provide backup fuel for the engines on-site. It should be noted that the propane storage system at both reservoirs would need to be fixed since they are currently out of operation and unable to provide fuel to the engines driven pumps. Conversely, if standardizing on electric motors for pumps, standby power needs to be provided. Diesel engine standby generators are typically selected for facilities due to the reliable nature of the engines and high energy density of diesel fuel. Permitting for the generators is simplified as the South Coast Air Quality Management District (SCAQMD) maintains a list of pre-approved standby generators. Sound attenuation is required for generators in close proximity to residential areas. Generators cannot exceed sound pressure levels outlined by state or city noise ordinances. Sound enclosures are available for the size generators anticipated to be required for these facilities and are rated for 75 dBA (A-weighted decibels) at 7 meters. The required sound enclosure rating should be further analyzed during preliminary design.

Diesel fuel is produced locally in California and is delivered to the site by truck. California's refining capacity for distillate, which includes diesel fuel, is approximately 13.7 MGD with sales of distillates averaging 10.8 MGD over the previous five years. The diesel fuel supply is forecasted to remain constant. Figure 7-1 shows the trend for historical distillate fuel deliveries.

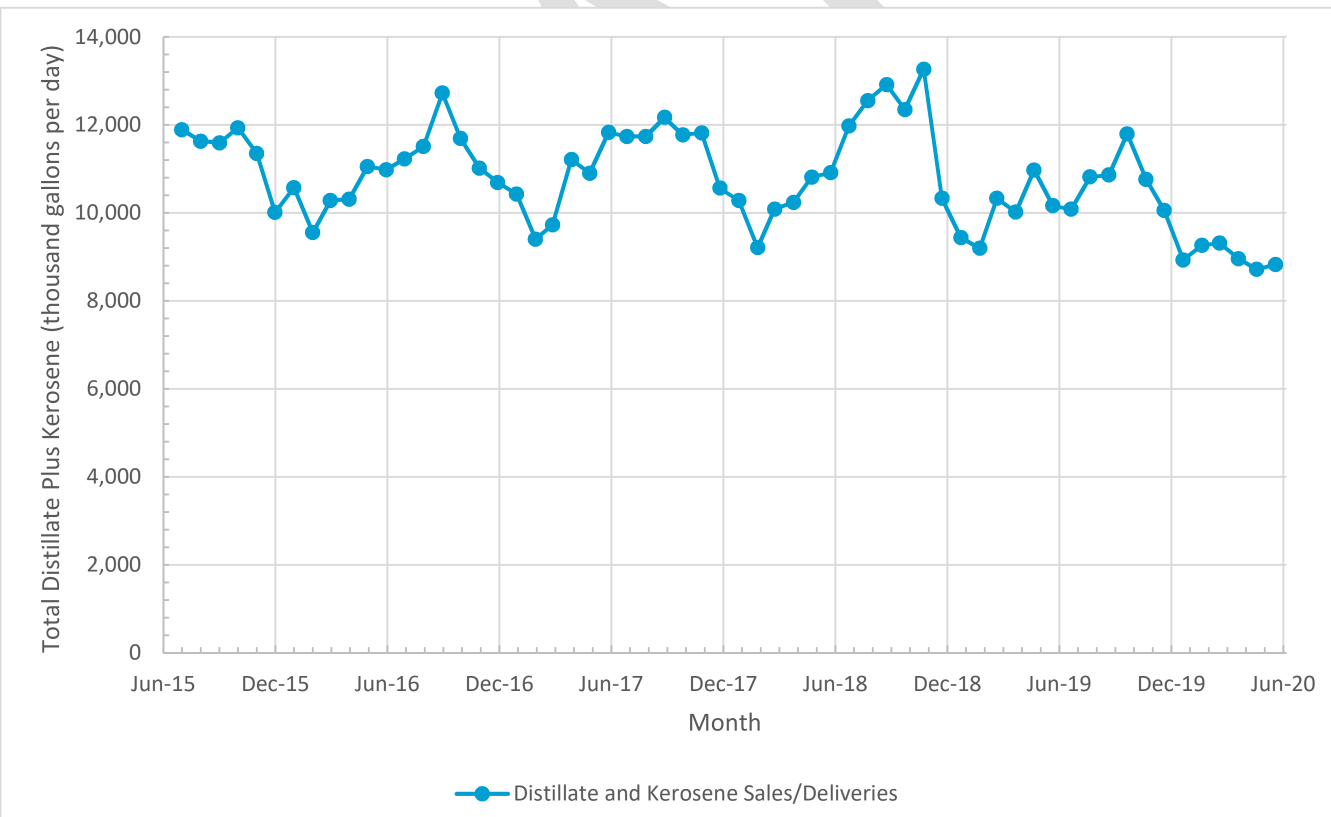


Figure 7-1. California Total Distillate Plus Kerosene Sales/Deliveries

An added benefit of utilizing electric motors for pump drives is the ease of deploying low emissions or zero emissions equipment into the energy portfolio to provide power to the pumps as a supplement to power from SCE or a diesel standby generator, or as a replacement to diesel engine standby generation. Solar generation coupled with battery storage can be operated in a number of modes:

- Solar panels can charge the batteries and offset utility demand during the day. The batteries can then be discharged during nighttime periods to offset electricity demand at night.
- Batteries can be charged overnight during off-peak periods and used to shave peak electrical demand during the day.
- Batteries can be charged using either solar panels or utility power and stored to be used exclusively during a power outage.

Coupling a battery storage system with solar panels would allow for operation of facilities, even if on a limited basis, when SCE cannot provide power for long durations because generation of solar power occurs locally. There is a limitation of solar generation due to the large area necessary to install solar panels. Generally, the more solar generation installed the more resilient a facility can be. At present there is no advantage in deploying local generation, such as solar systems, to Mesa Water facilities. Existing facilities have insufficient real estate to install the large footprint battery and inverter systems as well as solar panels necessary to utilize solar for backup. The relative smaller size of diesel engine standby generator systems, energy density, and control of fuel make them a better option for providing standby power when needed.

To best meet water delivery requirements Mesa Water should utilize electric motor driven equipment for water production and delivery at existing and future facilities. Coupling the high reliability and uptime of the SCE power grid with diesel engine driven standby generators, that will operate during the rare instances of an SCE outage, provides the best overall system reliability for Mesa Water facilities. Electricity should be selected as the primary power source for the following reasons:

- Electric motors are extremely reliable and require very little maintenance (fewer moving parts), especially when compared to natural gas driven engines which require numerous hours of annual maintenance and testing to keep in operation efficiently and are subject to extremely long outages in case of a parts failure. The maintenance costs for an electric motor throughout its life expectancy is estimated to be 8% of the maintenance costs for a gas burning reciprocating engine throughout its life expectancy. The life expectancy of an electric motor is expected to be nearly double the life expectancy of a reciprocating engine;
- Standardizing on electric motors for driven equipment simplifies operation and maintenance across assets. Motor maintenance is fairly typical across manufacturers and the routine maintenance required does not require specialized skills. This broadens the pool of people who can perform maintenance which keeps costs competitive whether it's performed by in-house staff or contracted out;
- Most of the electric motors in Mesa Water facilities are available in commodity sizing which means in the extremely rare occurrence of a premature motor failure, a new replacement motor can typically be procured and delivered within seven days and are available from numerous manufacturers and local vendors;
- While Variable Frequency Drives (VFDs) are likely to be used for speed control of electric motors, they do have life expectancies that are equal to reciprocating engines and need to be replaced at the end of their useful life. However, VFDs can be equipped with bypass contactors or could be completely bypassed with another drive or contact starter allowing the electric motors to operate in case of a drive

failure. Operating in a bypass configuration could have an impact on efficiency but the equipment will still be able to operate;

- Using electricity as the primary power source allows flexibility for providing power, whether it be by the utility, stationary standby generators, mobile/portable standby generators, or other future technologies such as fuel cells;
- The liquid nature of diesel fuel is more stable, is easier to manage, store, deploy, and transfer, and provides more energy density than both natural gas and propane. The gaseous fuels are subject to loss to atmosphere as a result of leaks or faulty equipment without the chance of recovery;
- Much of the electricity distribution infrastructure is located above grade. Large seismic events could induce more damage on below grade infrastructure such as pipelines than above grade infrastructure which typically allows for more movement and may be more resilient to ground movement. In the short term, while the majority of power generation is from natural gas, an interruption in natural gas supplies could impact the availability of electricity, but as California's energy portfolio transitions to renewable sources, the reliance on natural gas will decrease and the availability of electricity following a seismic event is likely to increase;
- As regulations throughout California work toward phasing out equipment that utilizes fossil fuels, transitioning equipment to electric powered reduces, or eliminates, the risk of high regulatory compliance costs in the future that may be required for equipment replacements or retrofits.

~~At present there is no advantage in deploying local generation, such as solar systems, to Mesa Water facilities. Existing facilities have insufficient real estate to install the large footprint battery and inverter systems as well as solar panels necessary to utilize solar for backup. The relative smaller size of diesel engine standby generator systems, energy density, and control of fuel make them a better option for providing standby power when needed.~~

Section 8: Reservoir Drive System Technology Solutions

The previously produced Reservoirs 1 & 2 Pumps, Controls, and Chemical System Assessment made recommendations for new control system upgrades to the Reservoir control systems. The recommendations made included upgrading the Murphy Engine Controllers to Allen Bradley PLCs to better integrate with the facility's existing control system and to eliminate the need for communications converters. This TM does not recommend any changes to control system topology previously proposed. The selection of electric motors in lieu of natural gas-driven engines will render engine controllers, or PLCs to replace those functions, unnecessary, thus further saving approximately $600,000 in procuring a new proprietary engine control system. The plant PLCs would send commands to the motor VFDs to adjust motor speed based on operational parameters such as pressure and flow requirements.

Section 9: Regulatory Permitting and Compliance Requirements

SCE is regulated in part by the CPUC. Legislation passed by the State of California (SB 901 and AB 1054) in recent years impacts how electric utilities operate their electrical systems and requires them to prioritize wildfire mitigation and system safety. As this legislation is new, its full impact cannot yet be assessed; however, electric utilities, including SCE, are shutting down transmission and distribution lines in high fire risk areas during high risk events. Shutting down these transmission lines could have an impact on power availability and capacity at local substations depending on overall system demand. As noted in Section 5, SCE has relatively high system reliability and uptime indexes and has operated the distribution system in the Orange County area at higher than their overall average. Therefore, it is difficult to predict with certainty what the impact of new operational modes will be on the system reliability and uptime. However, it is reasonable to predict wildfire mitigation efforts are likely to have a negative impact on those system indices.

SoCalGas is regulated in part by the CPUC. The CPUC is taking an active role in the decarbonization of California and reducing impacts on climate change. Coupled with the state's goal of moving to a carbon-free energy system is a goal to reduce methane emissions from the state's natural gas system. The CPUC is enforcing new rules and regulations that require operators of natural gas systems to improve the safety and reliability of natural gas storage and conveyance systems. To meet those goals, the natural gas utilities are expected to increase maintenance spending on infrastructure. As noted in Section 3.1.3, the capital that SoCalGas plans to spend over the next five years on maintenance is expected to drive up the cost of natural gas for the foreseeable future. These maintenance projects are not expected to have an impact on the natural gas supply and availability.

At the local level, SCAQMD is responsible for managing air quality in the Southern California region. Under their purview they provide permits for emissions generating vehicles and stationary equipment, such as the natural gas engines that are drivers of some pumps at Mesa Water facilities. The regulatory landscape for engine emissions appears relatively stable for the next few years. However, the State of California has a goal of carbon neutrality in 2045, which will require a reduction of fossil fuel usage. The air quality districts are driven by state regulations to meet climate and emissions goals to tighten emissions standards and reduce fossil fuel usage. Air districts will require lower emission equipment and zero emission equipment as the technologies becomes available.

As California regulations reduce operation of fossil fuel burning equipment throughout the state Mesa Water's equipment would be at risk of being forced to be replaced or required to be retrofitted to meet more stringent emissions requirements if natural gas engines were retained. For utilities such as Mesa Water, forced obsolescence of operating equipment could also be a factor for this type of equipment. To avoid the risk and uncertainty of the future requirements associated with phasing out fossil fuel equipment Mesa Water should transition to electric motor driven equipment for existing and future production and distribution facilities.

There are no expected changes to regulatory rate structures for emergency generators since it is a widely implemented and proven technology. Permitting standards and rate structures between diesel-engine standby generators and continuous duty natural gas fired engines are similar and cost-competitive to one another, assuming an engine is selected from a SCAQMD pre-approved list of equipment. The time to permit an engine of either type, selected from the pre-approved list, is typically 3 to 6 months. Additionally, the permitting process for replacing engines in kind is accelerated if the technical specifications of the new equipment match the existing equipment. Permitting for generators that are not pre-certified or that have higher ratings than existing equipment is subject to longer timelines and may require health risk assessments. Although permitting diesel standby generators for emergency operation is currently a well-defined process, future regulations to reduce air emissions will need to be evaluated and implemented accordingly.

Solar energy with battery storage and hydrogen fuel cell technology are potential new energy supply options. Solar energy with battery storage is an approved technology and would not require air permitting since the technology does not produce any emissions. Hydrogen fuel cell technology is still in development and there is no pending or recently approved legislation related to environmental permitting.

Section 10: Costs

In accordance with the AACE International (Association for the Advancement of Cost Engineering International) criteria, Class 5 cost estimates should be prepared at the project advancement level. The engineer or estimator prepares a Class 5 estimate for concept screening, based on limited information. Engineering is typically from 0 percent to 2 percent complete. The applied contingency factor ranges from 30 to 50 percent but may be higher if there is uncertainty, such as potentially poor geotechnical conditions. Expected accuracy for a Class 5 estimate typically ranges from -30 to -50 percent on the low side and +50 to +100 percent on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Figure 10-1 illustrates the accuracy ranges for each estimate class. Cost estimates provided in the following sections assume a contingency of 50 percent.

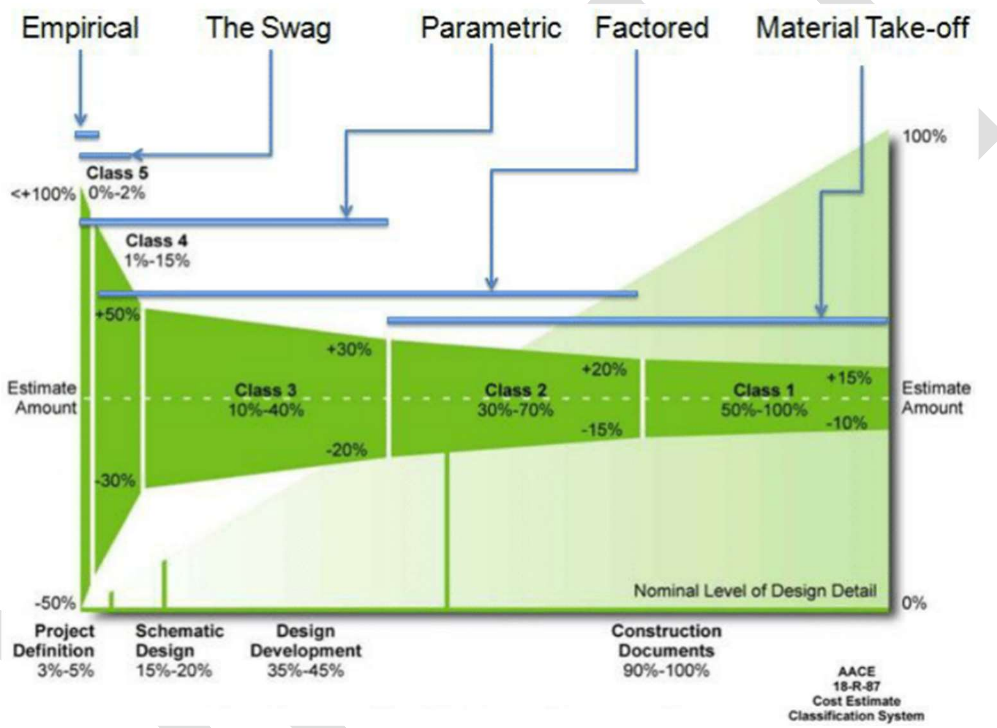


Figure 10-1. AACE International Cost Estimate Accuracy Ranges

~~Section 10:~~

10.1 Life Cycle Costs

The costs shown below in Tables 10-1 and 10-2 are Class 5 estimates to determine life cycle costs of replacing the existing pumps at Reservoir 1 and Reservoir 2 with new equipment. The estimate compares the options of replacing the existing natural gas engines with new natural gas engines or with electric motors. For electric motor replacements, upgrades to the existing electrical service infrastructure is necessary and is considered, as is the cost for new standby generators. Life cycle is assumed to be 20 years as diesel engines are expected to have reached the end of their expected life at that time. For the purposes of this analysis, the electric motors are assumed to be driven by VFDs. The electric motors are expected to have a life expectancy of 40 years while VFDs are expected to require replacement at 20 years. The depreciated value of assets is deducted from the electric motor life cycle cost to account for the differing life expectancy. Project costs, presented below, were estimated for the Reservoirs 1 and 2 pumping system upgrades.Design and construction costs for new equipment are included in the capital costs.

The capital cost for natural gas-driven pumps includes the pump and engine, butengine but does not include sound attenuation as it is assumed that existing will be reused. The operations and maintenance (O&M) costs for natural gas-driven pumps are based on a 20-year life cycle and based on computerized maintenance management system (CMMS) data for the existing engines. The annual increases in O&M costs is based on the current CMMS cost increases. Capital costs to replace the existing MurCal engine control system is included, as recommended in the 2017 Reservoir 1&2 Pumps, Controls, and Chemical System Assessment Project.

Capital costs for electric-motor operated pumps includes VFDs and ancillary electrical equipment. Upgrades to the electrical system are required if switching to electric motor-operated pumps since the existing service at both reservoirs is unable to support the higher electrical demand. Capital costs for electrical system upgrades includes a new service, transformer, and switchgear. In accordance with Southern California Edison Electrical Service Requirements Manuals, Mesa Water is not liable for costs associated with upsizing existing electrical service. Mesa Water would bear the design and construction costs for infrastructure to install cables from SCE's nearest service drop to Mesa Water's new Service Entrance Equipment, which would be the switchboard (installed by Mesa Water in accordance with SCE standards) where the electric meter is located. Since transformers are likely necessary at both reservoir sites, Mesa Water would construct the transformer pads, while SCE would install the necessary cabling and transformers at no cost to Mesa Water. If Mesa Water was unable to install necessary infrastructure in a public right-of-way, SCE would perform the work and bill Mesa Water for that work only. However, Mesa Water's status as a utility provider makes this scenario unlikely.

Capital costs for the diesel generator includes sound attenuation required to meet sound pressure requirements for residential areas. O&M costs for the diesel generator is composed of routine operation and fuel polishing. Capital costs for required SCADA improvements are included.

Energy costs are based on the estimated water supply demands established in TM-1 and the forecasted increases described in Section 4 of this TM. Energy costs for natural gas-engine pumps assume that new engines will be more efficient than existing. Energy costs for electric motor-operated pumps were estimated using the conversion factor established in Section 7.1.

Table 10-1. Reservoir 1 – Upgrade Costs

Equipment	Capital Costs	O&M Costs	Energy Costs	Total
Natural Gas Engine-Driven Pumps	$1,510,000$1,090,000	$650,000	$260,000	$3,151,000$2,731,000
MurCal Engine Control System Replacement	$731,000	N/A	N/A	
Electric Motor-Operated Pumps	$280,000$190,000	$24,000	$540,000	$2,439,000$1,514,000
Electrical System Upgrades	$270,000$195,000	$30,000	N/A	
Diesel Generator	$1,260,000$500,000	$20,000	$15,000	
SCADA Improvements	$234,000$130,000	N/A	N/A	

Table 10-2. Reservoir 2 – Upgrade Costs				
Equipment	Capital Costs	O&M Costs	Energy Costs	Total
Natural Gas Engine-Driven Pumps	$2,160,000~~$1,560,000~~	$860,000	$650,000	**$4,350,000~~$3,750,000~~**
MurCal Engine Control System Replacement	$680,000	N/A	N/A	
Electric Motor-Operated Pumps	$1,050,000~~$750,000~~	$24,000	$1,100,000	**$4,278,000~~$2,919,000~~**
Electrical System Upgrades	$270,000~~$195,000~~	$30,000	N/A	
Diesel Generator	$1,530,000~~$650,000~~	$25,000	$15,000	
SCADA Improvements	$234,000~~$130,000~~	N/A	N/A	

10.2 Capital Costs

Class 5 capital cost estimates for the recommended upgrades at Mesa Water's facilities are shown in Table 10-3. It should be noted that the depreciated value of assets is no longer deducted from the capital costs for upgrades at the reservoirs. Capital costs for reliability upgrades at Well 1 and 5 are also included. Refer to TM-3 for discussion of purchasing a portable backup generator for Well 1 and semitruck for hauling. The capital cost for upgrades at Well 5 includes drilling a new well and installing an electric motor-operated pump, VFD, switchgear, and backup diesel generator. The centralized bulk diesel fuel storage tank capacity is designed for a total of 10 days of runtime during a 30-day regional emergency. Refer to Section 11.1 for sizing of the centralized bulk diesel fuel storage tanks and associated fuel polishing costs. Refer to TM-3 for breakdown of costs for the bulk diesel fuel storage tanks. TM-1 Scenario 1 established that Mesa Water's existing facilities can meet 2040 peak water supply demands and thus, the MWRF generator capacity is based on existing equipment. Project costs, presented below, were estimated for all energy supply reliability upgrades.~~Design and construction costs for new equipment are included in the capital costs.~~

Table 10-3. Upgrades Cost	
Upgrade	Capital Cost
Reservoir 1 electric motor-operated pumps, backup diesel generator, and electrical upgrades	$2,074,000~~$1,045,000~~
Reservoir 2 electric motor-operated pumps, backup diesel generator, and electrical upgrades	$3,114,000~~$1,755,000~~
Well 1 portable backup generator and semi-truck[1]	$630,000~~$500,000~~
Drill new well at Well 5 and install electrical equipment[2]	$2,700,000~~$1,500,000~~
Centralized (2) 30,000 gal bulk diesel fuel storage tanks[1]	$6,650,000~~$3,500,000~~

MWRF 2,500 kW diesel engine generator and 4,000 gal diesel fuel tank	$1,710,000~~$950,000~~

1. *Refer to TM-3 for further discussion.*
2. *Includes drilling new well and installing electric motor-operated pump, VFD, switchgear, and backup diesel generator.*

Section 11: Recommendations

It is recommended that Mesa Water standardizes on electric motors with backup diesel engine generators considering the life cycle cost benefits, ease of operation and maintenance, andmaintenance and forecasted regulatory atmosphere. Additionally, standardizing on energy supplies across all sites allows for greater flexibility when moving fuel supplies, portable generators, or providing additional power. Due to the expected accuracy of Class 5 estimates, the life cycle costs for the alternatives are similar and not a factor in the recommendation of electric motors.

Based on the operating and failure scenarios discussed in TM-1, maintained operation at as many of the Mesa Water facilities as possible is necessary to meet current and future water demand. The scenarios,The scenarios discussed in TM-1 vary slightly and peak summer demand can be met through efforts to reduce demand and/or purchases of water from MWD if necessary. Production of the MWRF and existing clear wells is sufficient to meet daily average demand through all seasons if all resources are available. By providing reliable pump drivers and standby power at each facility, including the MWRF and Wells 1 and 5, the need to purchase water from MWD is reduced in emergency scenarios. Adding new clear wells and equipping them with electric motor driven pumps and diesel engine standby generators, further decreases the need to purchase imported water, and increases Mesa Water's production capacities by installing facilities that are highly reliable from an energy drive standpoint and relatively easy to maintain.

Reliable operation of the reservoirs is necessary to meet peak daily demand. To enhance the reliability of the existing reservoir booster stations BC recommends replacing the end-of-life equipment, three natural gas engine driven pumps at Reservoir 1 and four natural gas engine driven pumps at Reservoir 2, with electric motor driven pumps. The electric jockey pumps at both Reservoirs 1 and 2 should also be replaced with electric motor driven pumps to provide the full range of operating flows from the facilities. To provide standby power, BC recommends the installation of diesel engine driven generators with the capacity to provide power to the entire reservoir from a single unit. Generators of the sizes necessary to accomplish this are standard and very reliable. With regular monthly operational testing and annual load testing, diesel engine driven standby generators are the best option for providing power in emergency conditions for critical facilities. Diesel fuel storage tanks should be installed at each facility with a diesel engine driven standby generation for short duration power outages. The generator sizes and capacities, along with the storage tank capacities, are shown in Table 11-1.

An important consideration for the selection of new equipment is the life span of the equipment selected. Electric motors very often have a useful life of 40 years with relatively little maintenance required when compared to reciprocating engines. Reciprocating engines require large maintenance budgets to remain operational as they age, as Mesa Water has experienced with the engines that are currently installed. The lifecycle costs of installing electric motors in place of the natural gas engine powered pumps shows a capital savings considering other electrical upgrades that are necessary to implement the recommendation after 20 years of operation. Additionally, the selection of electric drivers offers the flexibility of adding or supplementing utility or standby power with other sources in the future such as solar power and battery storage systems which would offer operational advantages such as on-site electricity generation which could be used during long duration power outages in case of a regional emergency as well as the ability to peak shave demand. While, neither of these technologies are recommended for deployment at this time due to footprint requirements or cost, the use of these technologies may be feasible in the future and the use of electricity would allow their installation. An important consideration is the life span of the equipment selected.

Several modifications are recommended at the clear wells to reduce the need to purchase water from MWD in emergency scenarios. Since Well 1 has a connection for a portable backup generator, it is recommended that Mesa Water considers purchasing a portable backup generator and semitruck. Well 5 has a natural gas engine-driven pump and backup propane tank installed and is nearing its end of useful life. Once Well 5 reaches the end of its useful life, it is recommended that the natural gas engine driven pump be replaced with an electric motor driven pump and backup diesel generator – allowing it to take advantage of the benefits previously listed as well as having a common equipment type across all of the clear well sites. Wells 3, 7, and 9 currently have electric motor-operated pumps and 350 kW backup diesel engine generators installed, and do not require any upgrades. Table 11-1 summarizes the recommended upgrades and estimated capital costs. Refer to TM-3 for further evaluation of the Well 1 portable backup generator and centralized diesel fuel storage.

Table 11-1. Recommended Upgrades

Site	Existing		Recommended		
	Primary	Backup	Primary	Backup	Capital Cost
Reservoir 1 BPS	(3) 137 hp natural gas engines	(2) natural gas engine generators; (1) 1,200 gal propane tank	(3) 150 hp electric motors with VFDs	(1) 1,000 kW diesel engine generator; (1) 2,000 gal diesel fuel tank[1,4]	$2,074,000~~$1,045,000~~
Reservoir 2 BPS	(4) 369 hp natural gas engines	(1) natural gas engine generator; (1) 1,200 gal propane tank	(4) 400 hp electric motors	(1) 2,000 kW diesel engine generator; (1) 3,000 gal diesel fuel tank[2,4]	$3,114,000~~$1,755,000~~
Well 1	(1) 400 hp electric motor	Connection for portable generator	No upgrades necessary	(1) Portable backup generator and semi-truck	~~$500,000~~$630,000[5]
Well 5	(1) 450 hp natural gas engine	(1) 1,150 gal horizontal propane storage tank	(1) 600 hp electric motor	(1) 600 kW diesel engine generator; (1) 1,000 gal diesel fuel tank	$~~$1,500,000~~2,700,000[6]
Centralized Bulk Diesel Fuel Storage	N/A		(2) 30,000 gal bulk diesel fuel storage tanks		$6,650,000~~$3,500,000~~[5]
MWRF	(2) 400 hp well pumps; (3) 350 hp high lift pumps; (2) 250 hp nanofiltration feed pumps; (4) 100 kW CIP tank heaters; (3) 40 hp product transfer pumps; (2) 30 hp degasifier blowers; (3) 30 hp CO2 booster pumps	See Section 5	No upgrades necessary	(1) 2,500 kW diesel engine generator; (1) 4,000 gal diesel fuel tank[3,4]	$1,710,000~~$950,000~~

1. *Average estimated fuel consumption of 73 gal/hr. Referenced Caterpillar C-32 and Cummins QST30-G5. Fuel tank is rounded up to next standard size.*
2. *Average estimated fuel consumption of 138 gal/hr. Referenced Caterpillar 3516C DITA and Cummins QSK60-G6. Fuel tank is rounded up to next standard size.*

3. *Average estimated fuel consumption of 175 gal/hr. Referenced Caterpillar 3516C and Cummins QSK60-G19. Fuel tank is rounded up to next standard size.*
4. *Capacity is designed for 24 hours of runtime at maximum fuel consumption.*
5. *Refer to TM-3 for further discussion.*
6. *Includes drilling new well and installing electric motor-operated pump, VFD, switchgear, and backup diesel generator.*

Potential locations for the diesel engine generators were determined from available space; however, siting and footprint constraints should be further analyzed during preliminary design. Figure 11-1 shows the proposed location of the 1,000 kW backup diesel engine generator and 2,000 gal horizontal diesel fuel storage tank at Reservoir 1. The approximate dimensions are 6.5 ft by 5.5 ft for the generator without sound enclosure and 64-inch diameter by 12 ft for the onsite storage tank.

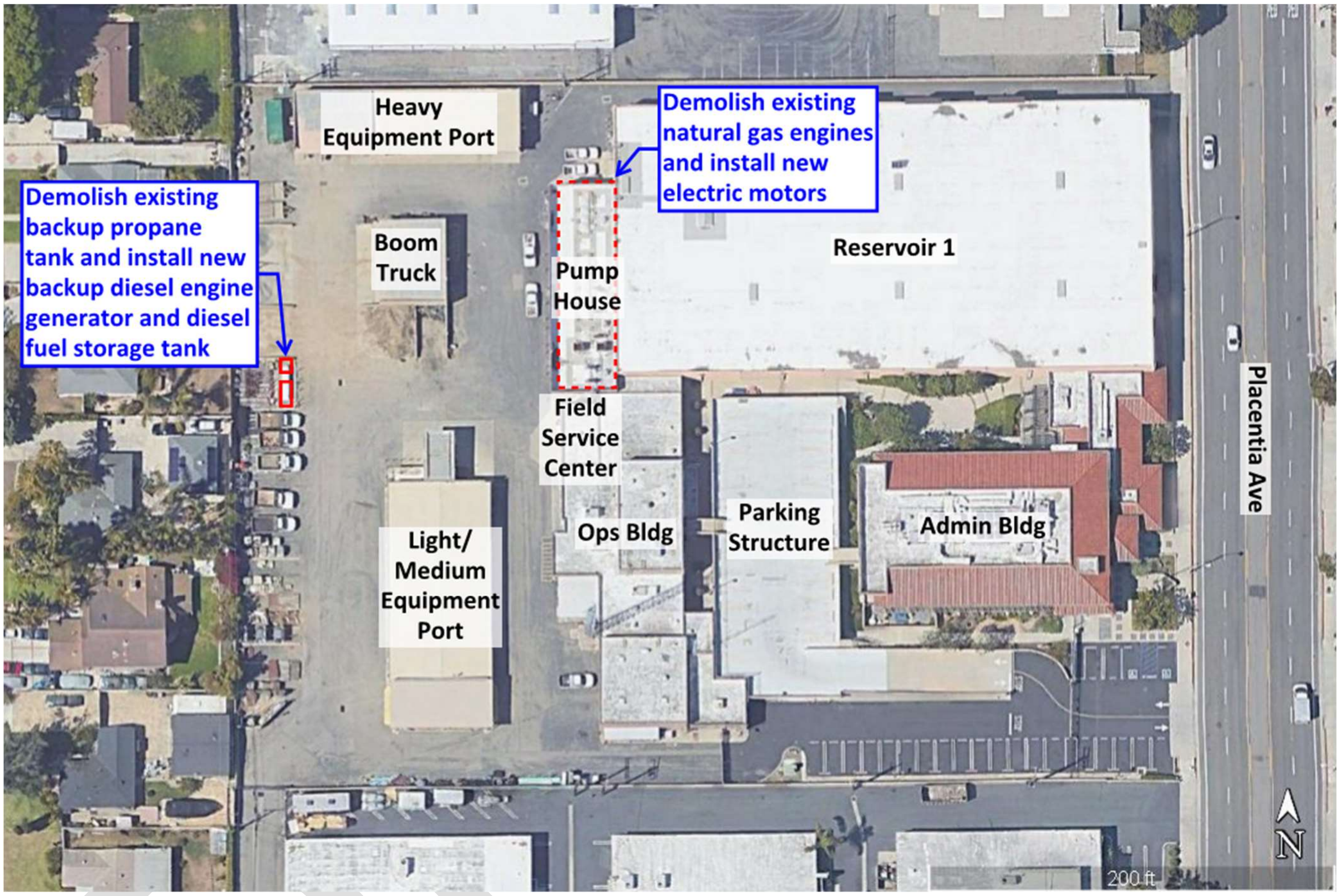


Figure 11-1. Reservoir 1 Proposed Diesel Fuel Supply

Figure 11-2 shows the proposed location of the 2,000 kW backup diesel engine generator and 3,000 gal horizontal diesel fuel storage tank at Reservoir 2. The approximate dimensions are 25 ft by 8.5 ft for the generator without sound enclosure and 64-inch diameter by 18 ft for the onsite storage tank.

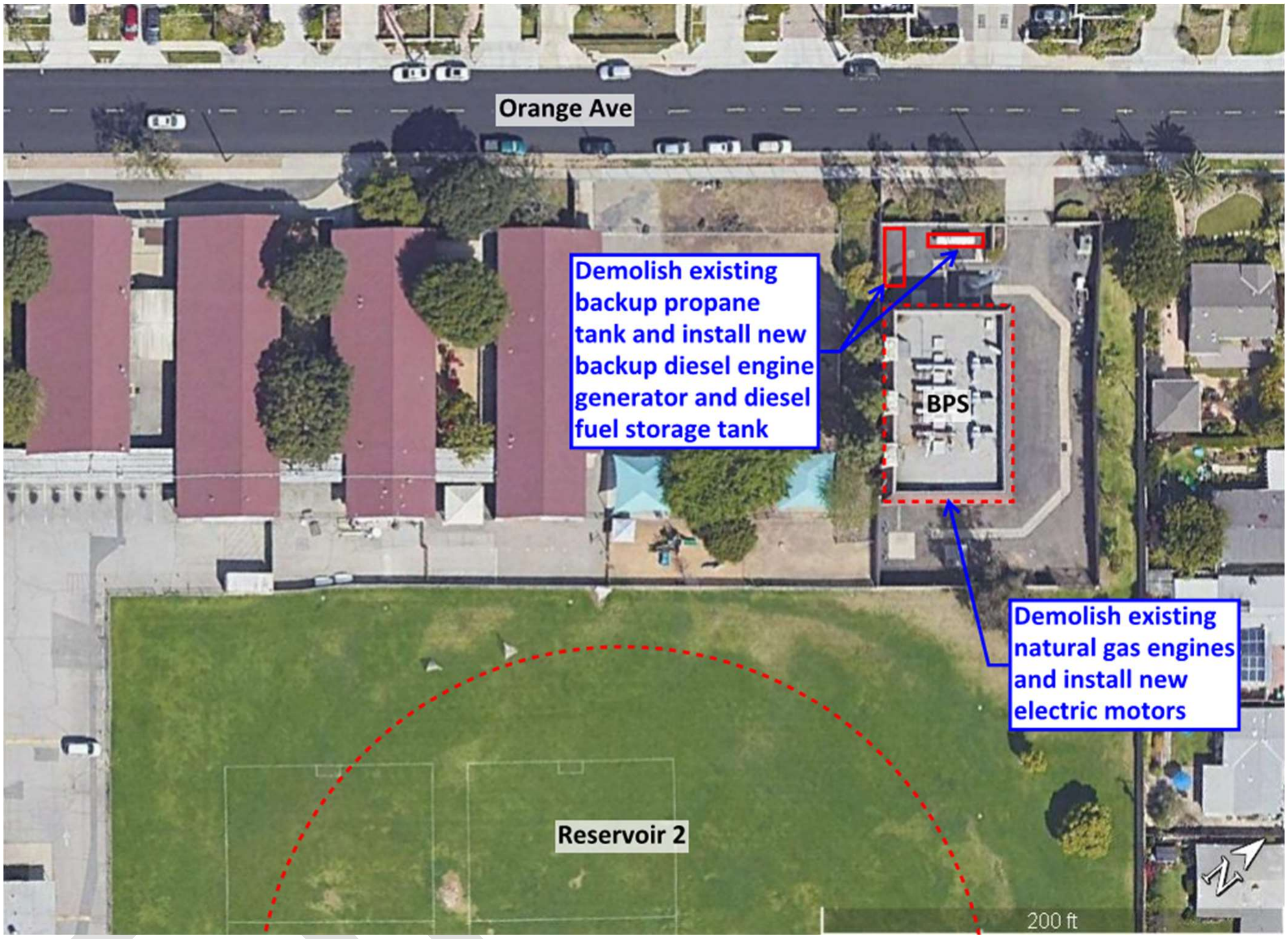


Figure 11-2. Reservoir 2 Proposed Diesel Fuel Supply

11.1 Bulk Fuel Storage

In addition to the fuel storage tanks installed at each Mesa Water facility with an operating standby generator, Mesa Water should ~~install a~~further evaluate the feasibility of centralized or decentralized bulk diesel fuel storage tank(s) during preliminary design. The bulk storage tank would allow Mesa Water to enhance the reliability and flexibility of backup supplies by providing the ability to transfer fuel to facilities facing longer outage durations in event of long emergencies without reliance of outside vendors or utilities. The flexibility afforded by bulk storing fuel is not possible utilizing natural gas driven engines since transportation of gaseous fuels is difficult by truck. Diesel fuel, in any storage system, should be tested twice per year and polished annually depending on the results of testing. If ~~BC recommends~~ bulk diesel fuel storage tanks are constructed, BC recommends that it could sustain operations for 10 days, which should be sufficient to provide enough reserve to make it through major regional emergencies and would be available before most electricity generation and distribution is back online. ~~To provide a total of 10 days of operational capacity, the volume should be 60,000 gallons and 70,000 gallons, respectively.~~ BC recommends that the 2020 demands are used as the basis for diesel fuel storage capacity, which requires a total storage volume of~~and that two 30,000 gallon tanks be installed~~60,000 gallons. A centralized storage configuration would likely result in two 30,000 gallon tanks whereas a decentralized storage strategy would require smaller volume tanks located adjacent to operating facilities. The ultimate configuration and storage capacity would be determined during preliminary design. The fuel polishing cost would be reduced to approximately $8,000 annually with costs increasing with inflation.

References

EIA, U.S. Energy Information Administration, https://www.eia.gov, 2020

Integrated Energy Policy Report, California Energy Commission, 2013.

Integrated Energy Policy Report, California Energy Commission, 2019.

Mesa Water FY19 Water Supply Report, Mesa Water District, 2019.

Mesa Water FY20 Water Supply Report, Mesa Water District, 2020.

Renewable Portfolio Standard Annual Report, California Public Utilities Commission, 2019.

Reservoir 1&2 Pumps, Controls, and Chemical System Assessment Project, Mesa Water District, 2017.

SCAQMD Certified ICE-Emergency Generators, South Coast Air Quality Management District, 2020.

SCE, Southern California Edison, https://www.sce.com, 2020

SCE Annual System Reliability Report, Southern California Edison, 2019.

SoCalGas, Southern California Gas Company, https://www.socalgas.com, 2020

Southern California Catastrophic Earthquake Response Plan, California Office of Emergency Services, 2010.

Water Master Plan Update, Mesa Water District, 2014.

Technical Memorandum No. 3

Prepared for: Mesa Water District

Project Title: Water Supply, Energy, and Supply Chain Reliability Assessment

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Technical Memorandum No. 3

Subject: Emergency Supply Chain Reliability and Disruption

Date: February 11, 2021

To: Phil Lauri, General Manager, Mesa Water District

From: Adam Zacheis, PhD., P.E., Project Manager, Brown and Caldwell

Copy to: Andrew Wiesner, P.E., Principal Engineer, Mesa Water District

Prepared by: ____

Jon D. Ganz, P.E., Brown and Caldwell

Reviewed by: ____

Adam Zacheis, Ph.D., P.E., Brown and Caldwell

Table of Contents

List of Figures

List of Tables

Abbreviations

ACP	asbestos cement pipe
AF	acre-feet
APSA	Aboveground Petroleum Storage Act
AST	abveground storage tank
BC	Brown and Caldwell
Cal OES	California Office of Emergency Services
CSWRCB	California State Water Resources Control Board
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ESCRDA	Emergency Supply Chain Reliability and Disruption Assessment
gal	gallon
gpm	gallons per minute
HMI	human-machine interface
HP	horsepower
I/O	input/output
kW	kilowatt
Mesa Water	Mesa Water District
mgd	million gallons per day
MHz	Megahertz
MWD	Metropolitan Water District of Southern California
MWRF	Mesa Water Reliability Facility
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OPLAN	Southern California Catastrophic Earthquake Response Plan
P&ID	Process and Instrumentation Diagram
PLC	programmable logic controller
PVC	polyvinyl chloride
RTU	remote terminal unit
SCA	Supply Chain Analysis
SCADA	Supervisors Control and Data Acquisition
SLD	single line diagram
SPFA	Single Points of Failure Analysis
TM-3	Technical Memorandum No. 3
UPS	uninterruptible power supply
UST	underground storage tank
VDC	volts direct current

Section 1: Introduction

Mesa Water District (Mesa Water) engaged Brown and Caldwell (BC) to conduct a Water Supply, Energy, and Supply Chain Reliability Assessment with the following objectives:

1. Evaluate existing water supply capacities relative to meeting 115% of all demand seasons using local groundwater resources;
2. Evaluate existing Mesa Water energy supply capacities, types, and backup capabilities relative to ensuring reliable groundwater supplies can be pumped and distributed during normal and emergency operations;
3. Identify water supply and energy reliability gaps (from Objectives Nos. 1 and 2) and provide recommended solutions;
4. Evaluate Mesa Water's Supply Chain system relative to emergency readiness;
5. Identify Supply Chain system reliability gaps (from Objective No. 4) and provide recommended solutions.

1.1 Purpose

Technical Memorandum No. 3 (TM-3) is one of the components of Mesa Water's overall assessment of water supply, energy, and supply chain reliability. The purpose of TM-3 is to perform an Emergency Supply Chain Reliability and Disruption Assessment (ESCRDA) to determine Mesa Water's ability to respond to a local or regional emergency event and to provide recommendations that support the reliable and safe delivery of water to its customers. For this purpose, TM-3 focuses on the following ESCRDA tasks:

- Perform Supply Chain Analysis (SCA) of typical materials and services used during routine operation;
- Perform Single Points of Failure Analysis (SPFA) for each core production facility;
- Conduct GAP analysis, with recommendations towards mitigation, for core production facilities after application of emergency scenarios;
- Evaluate suitability of storage at production facilities to accommodate the necessary equipment and parts needed during emergency scenarios;
- Evaluate diesel fuel storage needed to supply backup power during emergency scenarios.

1.2 Related Memoranda

TM-3 relies, in part, on information included in the following TMs developed by BC as part of Mesa Water's overall assessment of water supply, energy, and supply chain reliability:

- **TM-1 – Water Supply Reliability Assessment.** Evaluates existing water supply capacities relative to meeting 115% of all demand seasons using local groundwater resources.
- **TM-2 – Energy Supply Reliability.** Assesses Mesa Water's energy supply (i.e., electric, natural gas, propane) reliability, evaluates regulatory and permitting compliance concerns associated with these supplies, forecasts future supply costs, and recommends best available equipment technologies for replacement of end-of-life equipment.

Section 2: Background

Mesa Water operates five (soon to be seven) groundwater clear wells, two reservoirs, an advanced nanomembrane treatment plant treating water from two amber-tinted groundwater deep wells, and turnout stations to deliver imported water from the Metropolitan Water District of Southern California (MWD). Mesa Water distributes produced groundwater or imported water through approximately 317 miles of pipeline varying in size from 4-inch to 42-inch diameter. Approximately 75% of Mesa Water's distribution system is asbestos cement pipe (ACP) and the larger transmission pipelines are steel pipelines.

2.1 Groundwater Wells

Mesa Water's five (5) clear water wells (Wells 1, 3, 5, 7 and 9) and two (2) deep wells (Wells 6 and 11) operate in conjunction with one another to supply water from the Orange County Groundwater Basin (Basin) to Mesa Water's service area. Each well site includes one extraction pump with a backup power source, as follows:

- Well 1 pump is driven by an electric motor and has a connection for a portable generator.
- Wells 3, 7 and 9 pumps are driven by electric motors and each have onsite diesel engine backup generators.
- Well 5 pump is driven by a natural gas engine and has an onsite 1,150-gallon liquefied petroleum gas (LPG) storage tank.
- Wells 6 and 11 pumps, located at the Mesa Water Reliability Facility are driven by electric motors but are not on back-up power.

All sites include chemical management systems that allow real-time chemical dosing and feedback control functionality. Disinfecting chemicals used onsite include 12.5% sodium hypochlorite and 19% aqueous ammonia. Mesa Water recently upgraded and modernized all of its well sites to include real-time connectivity, control, monitoring, and alarming via its Supervisory Control and Data Acquisition (SCADA) system.

In addition to the wells described above, Mesa Water is planning to construct two additional clear wells, Wells 12 and 14, that will each include a pump driven by an electric motor, an onsite diesel engine backup generator, and chemical management system.

2.2 Reservoirs

Mesa Water owns and operates two (2) reservoirs that provide pressure-sustaining control throughout the distribution system. Both reservoirs are primarily served by natural gas Waukesha engine-driven pumps. In addition, Reservoir 1 has two electric jockey pumps to address the lower flow ranges during normal diurnal low flow periods. Each reservoir includes an onsite 1,150-gallon liquefied petroleum gas (LPG) storage tank that provides backup power to the engine-driven pumps and to an onsite natural gas generator. The generators supply local power to the reservoir control systems and, at Reservoir 1, the Administration Building at Mesa Water's Main Headquarters.

2.3 Mesa Water Reliability Facility

Mesa Water owns and operates the Mesa Water Reliability Facility (MWRF), an 8.6 million gallon per day (mgd) advanced nanomembrane treatment plant that treats amber-tinted groundwater from the Basin's deep aquifer. The MWRF is highly automated and contains redundant instrumentation and control functionality throughout most of the plant. The MWRF only contains backup generation to power the MWRF Administration

Building, along with the Supervisory Control and Data Acquisition (SCADA) system to allow plant shut-down in the event of a power failure, including the flushing of nanofiltration membranes.

2.4 Imported Metered Turnouts

Mesa Water owns three (3) metered turnouts (OC-44, CM-2, and OC-14) that feed imported water from MWD into the Mesa Water distribution system. The OC-44, comprised of three (3) sub-turnouts owned and operated by Mesa Water, is fed from the East Orange County Feeder No. 2, and is shared with the City of Huntington Beach.

2.5 Documentation Review

Table 2-1 summarizes the reference information provided by Mesa Water that was used to develop TM-3. Additional reference information is documented in footnotes within this document.

Table 2-1. Reference Information

Reference No.	Reference	Description
1	Emergency Operations Report to Board of Directors (May 2015)	Overview of Mesa Water's system water demands, water supply and storage capacities, and emergency back-up capabilities and protocols.
2	2017 Reservoir 1&2 Pumps, Controls, and Chemical System Assessment Project	Report that includes the latest condition assessment of Reservoirs 1 and 2, prepared by Hazen and Sawyer.
3	Production System Operations Plan (PSOP)	Plan that provides detailed guidance, monitoring and reporting requirements, and responsibilities for performing operational tasks related to Mesa Water's production and storage facilities.
4	Well Record Drawings	Record drawings for Wells 1, 3, 5, 7 and 9.
5	Well Automation Control Strategies	Control strategies (Section 17100) that provide typical control strategies for well sites.
6	Reservoir Record Drawings	Record drawings for Reservoirs 1 and 2.
7	MWRF Record Drawings	Record drawings for MWRF and Finished Water Systems.
8	Network Overview Drawings	Overview of SCADA and radio communication network.
9	Spare Parts Master Lists	Master Lists for 1) well sites and 2) water quality analyzers.
10	Emergency Interconnection Study	Report prepared by RBF Consulting to 1) inventory emergency interconnections between the distribution systems for the Irvine Ranch Water District, City of Newport Beach, City and Santa Ana, and Mesa Water; and 2) quantify the availability of water supply from each agency under various scenarios.
11	Water Atlas Book	Map book depicting Mesa Water's distribution system and schematic layout of OC-44 sub-Turnouts 2, 4 and 5.

Section 3: Supply Chain Analysis (SCA)

A supply chain is a network that manufactures and distributes a good or service that fulfills a demand. A key indicator of a healthy, functioning supply chain is its resilience or ability to continue fulfilling demand after a significant disruption. This section summarizes the approach and findings of an SCA performed for the typical materials and services used by Mesa Water during routine operations.

3.1 Approach

Mesa Water identified the materials and services considered critical to the routine operation of its core production facilities. The materials and services, along with the names of Mesa Water's suppliers and service providers, are summarized in Table 3-1.

To understand the reliability and potential disruptors to the supply chain for each manufacturer or service provider, three questionnaires were developed – each tailored to material suppliers, contractors or laboratories – and reviewed by Mesa Water. The questionnaires were shared with each of the suppliers and service providers listed in Table 3-1, and responses were either captured during a telephone conversation or in an email. Table 3-1 reflects those suppliers and service providers that responded to the questionnaires. The questionnaires and responses are included as Attachment A.

Table 3-1. Supply Chain Analysis – Materials and Services

Type	Product	Supplier	Response Received
Material			
Chemical	19% Aqueous Ammonia	Hill Brothers Chemical Company	Yes
Chemical	12.5% Sodium Hypochlorite	Northstar Chemical Company	Yes
Chemical	38% Sodium Bisulfite	Northstar Chemical Company	Yes
Chemical	25% Sodium Hydroxide	JCI Jones Chemicals, Inc.	Yes
Chemical	Carbon Dioxide	Linde (formerly Praxair)	Yes
Fuel	Diesel Fuel	Dion and Sons	No
Fuel	Propane (LPG)	Mutual Propane	No
Service			
Contractor	Pipeline	Paulus Engineering	No
Contractor	Pipeline	GCI Construction	Yes
Contractor	Pipeline	W.A. Rasic Construction Co., Inc.	Yes
Contractor	Electrical	Academy Electric	No
Contractor	Electrical	A.C. Pozos Electric Corp.	Yes
Contractor	Electrical	Leed Electric, Inc.	Yes
Contractor	Asphalt Paving	Ben's Asphalt	No
Contractor	Asphalt Paving	Copp Contracting	Yes
Laboratory	Water Quality Analyses	Weck Laboratories, Inc.	Yes

Laboratory	Water Quality Analyses	Truesdail Laboratories, Inc.	No
Laboratory	Water Quality Analyses	Orange County Water District	Yes

Based on the information received from the questionnaires, each manufacturer or service provider was assessed for exposure to risk – High, Medium or Low – based on the following factors:

- **Manufacturing Point of Origin.** Potential impacts to delivery based on distance, seasonal and geographical challenges (e.g., Rocky Mountains in winter), and political challenges (e.g., international trade disputes).
- **Emergency Manufacturing Capabilities During Emergencies.** Potential impacts to production capacity due to staffing or material shortages, inexperience in similar events, and lack of standard procedure.
- **Backup Delivery Protocols.** Potential impacts to delivery due to staffing shortages, accessibility challenges (e.g., roads closed, obstructions, damage), and priority assignments for essential service classifications.
- **Market Volatilities.** Impacts due to historical market volatility during emergency event.

The risk levels for each factor were defined as follows:

- High

  Probability of a failure in this category is likely given the physical constraints, practices or past history with the manufacturer or service provider.
- Medium

  Probability of a failure in this category is possible given the physical constraints, practices or past history with the manufacturer or service provider.
- Low

  Probability of a failure in this category is rare or unlikely given the physical constraints, practices or past history with the manufacturer or service provider.

Potential mitigation strategies for any factor designated with risk level of High or Medium are included in Section 3.3 – Recommendations.

3.2 Findings

Table 3-2 summarizes the risk levels assigned to each manufacturer or service provider, based on responses received from the questionnaires. In the cases of Dion and Sons (Diesel Fuel) and Mutual Propane (Propane), responses were not able to be obtained within the time allotted for the development of this TM. In these cases, a risk level of High was assumed until additional information can be obtained to downgrade this rating. Highlights from discussions with or responses from select and representative manufacturers or service providers are included below.

Table 3-2. Supply Chain Analysis – Risk Rankings						
Type	Product	Supplier	Manufacturing Point of Origin	Manufacturing Capability During	Backup Delivery Protocols	Market Volatilities
Material						
Chemical	19% Aqueous Ammonia	Hill Brothers Chemical Company	Low	Low	Low	Low
Chemical	12.5% Sodium Hypochlorite	Northstar Chemical Company	Low	Low	Low	Low
Chemical	25% Sodium Bisulfite	Northstar Chemical Company	Low	Low	Low	Low
Chemical	38% Sodium Hydroxide	JCI Jones Chemicals, Inc.	Low	Low	Low	Low
Chemical	Carbon Dioxide	Linde (formerly Praxair)	Low	High	Low	Medium
Fuel	Diesel Fuel	Dion and Sons	High	High	High	High
Fuel	Propane (LPG)	Mutual Propane	High	High	High	High
Service						
Contractor	Pipeline	W.A. Rasic Construction Co., Inc.	Low	Medium	Low	Medium
Contractor	Electrical	Leed Electric, Inc.	Medium	Medium	Medium	Medium
Contractor	Asphalt Paving	Copp Contracting, Inc.	Low	High	High	High
Laboratory	Water Quality Analyses	Weck Laboratories, Inc.	Medium	Low	Low	Medium
Laboratory	Water Quality Analyses	Orange County Water District	Medium	Medium	Medium	Medium

3.2.1 Hill Brothers Chemical Company

Hill Brothers Chemical Company (Hill Brothers) supplies Mesa Water with 19% aqueous ammonia from the City of Industry, CA. In its current purchasing contract, Hill Brothers acknowledges that Mesa Water is a top priority essential service provider and that all deliveries ordered pursuant to the contract shall be delivered within three business days of a given order.

3.2.1.1 Manufacturing Point of Origin

Anhydrous ammonia is purchased from Nutrien, a manufacturer in Canada, and railed in by California Ammonia Co. (CALAMCO), a large importer on the west coast. CALAMCO has the ability to store up to 70,000 tons of anhydrous ammonia at their Stockton, CA facility.

With multiple manufacturing points of origin, the risk level for this factor is designated as Low.

3.2.1.2 Emergency Manufacturing Capabilities During Emergencies

Hill Brothers owns and operates all of their equipment. While they can use third parties with whom they have long stemming relationships, it is preferred to use their own truck operators. They also own the rail cars that transport the anhydrous ammonia between the manufacturer and their two California facilities. In the event of a shortage/outage, Hill Brothers has maintained a commitment to prioritize utilities like Mesa Water.

Given the above, the risk level for this factor is designated as Low.

3.2.1.3 Backup Delivery Protocols

If the City of Industry facility struggles to meet demand in an emergency, Hill Brothers can send product from the San Jose facility to cover interruption and meet Mesa Water's needs. Historically, Hill Brothers has prioritized Mesa Water, understanding that their product is essential.

Given the above, the risk level for this factor is designated as Low.

3.2.1.4 Market Volatilities

Since the demand for ammonia is primarily driven in California by the agricultural industry, the market has historically been stable with slight to moderate growth. This was reinforced with stable production noted in the United States through Q4 2020.[1] This is confirmed by Hill Brothers anecdotal statements that they have never had a situation where they could not supply demand, even during the recent COVID-19 pandemic.

Given the above, the risk level for this factor is designated as Low.

3.2.2 Northstar Chemical

Northstar Chemical (Northstar) provides Mesa Water with sodium hypochlorite and sodium bisulfite from their chemical facility located in the City of Santa Fe Springs, CA. In its current purchasing contract, Northstar acknowledges that Mesa Water is a top priority essential service provider and that all deliveries ordered pursuant to the contract shall be delivered within three business days of a given order.

3.2.2.1 Manufacturing Point of Origin

Northstar sources sodium hypochlorite and sodium bisulfite from the following suppliers:

- Sodium Hypochlorite
  - Olin Chlor Alkali Products, Santa Fe Springs, CA
  - Hasa, Inc., Saugus, CA
  - JCI Jones Chemical, Inc., Torrance, CA
- Sodium Bisulfite
  - Thatcher Chemical, Stockton, CA
  - JCI Jones Chemical, Inc., Torrance, CA

Northstar also stores these chemicals in onsite bulk storage tanks at their Santa Fe Springs facility.

With multiple manufacturing points of origin, the risk level for this factor is designated as Low.

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[1] Mordor Intelligence, *Ammonia Market – Growth, Trends, and Forecast (2020-2025)*, https://www.mordorintelligence.com/industry-reports/ammonia-market.

3.2.2.2 Emergency Manufacturing Capabilities During Emergencies

Northstar maintains a Business Continuity Plan that outlines its capabilities and operational guidelines during an emergency. In addition, Northstar conducts weekly Operations calls and monthly Supply Chain team meetings to discuss any issues that have risen or may arise.

Given the above, the risk level for this factor is designated as Low.

3.2.2.3 Backup Delivery Protocols

If, for some reason, Northstar cannot receive chemicals from the sources listed above, there are backup Northstar distribution locations for both products in Modesto, CA, Sherwood, OR, and Tacoma, WA. There are also additional production facilities for these products in Northern California that serve as backups to the Southern California supply chain, if needed.

Given the above, the risk level for this factor is designated as Low.

3.2.2.4 Market Volatilities

Regarding sodium hypochlorite and sodium bisulfite, the market in the U.S. will continue to be driven by increasing demand from wastewater and water treatment facilities. This trend is likely to remain constant over the foreseeable future, thereby ensuring steady consumption for the product across North America. In light of the recent COVID-19 pandemic, one of the key sectors that reflected a large increase in sales was the sanitizer industry. Sodium hypochlorite is one of the key feedstocks consumed in formulating these hygiene and disinfectant products by companies globally.[2]

Given the above, the risk level for this factor is designated as Low.

3.2.3 JCI Jones Chemical, Inc.

JCI Jones Chemical, Inc. (JCI) supplies Mesa Water with sodium hydroxide from their facility in the City of Torrance, CA. Approximately 80% of JCI's chemical products, including sodium hydroxide, are transported by rail car.

3.2.3.1 Manufacturing Point of Origin

Industrially, sodium hydroxide is produced by electrolyzing brine or concentrated sodium chloride solution. JCI receives its supply of sodium hydroxide by rail from California, Texas, Oregon, and Canada. Additionally, JCI receives Japan-sourced sodium hydroxide through the Los Angeles Harbor.

With multiple manufacturing points of origin, the risk level for this factor is designated as Low.

3.2.3.2 Emergency Manufacturing Capabilities During Emergencies

To ensure day-to-day demand is met for Orange County, JCI is in constant communication with its rail service, ensuring "rail switches" occur as planned. JCI has a large fleet of delivery bulk tankers and strong ties with outside carriers to consistently provide deliveries on schedule.

Given the above, the risk level for this factor is designated as Low.

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[2] Grand View Research, *Sodium Hypochlorite Market Size, Share & Trends Analysis Report by Application (Cleaning & Disinfection, Bleaching, Chemical Manufacturing), By Region, and Segment Forecasts, 2020-2027*, June 2020, https://www.grandviewresearch.com/industry-analysis/sodium-hypochlorite-market.

3.2.3.3 Backup Delivery Protocols

In case of a regional emergency, JCI has a plan in place that sources product from other JCI locations as well as working in conjunction with other suppliers. If for any reason, a catastrophic event caused rail service to halt, JCI's Torrance facility has the ability to supply sodium hydroxide through the Los Angeles and Long Beach Harbors.

Given the above, the risk level for this factor is designated as Low.

3.2.3.4 Market Volatilities

U.S. supply of sodium hydroxide, also known as caustic soda, increased slightly during Q3 2020 as operating rates recovered from the sharp cutbacks during the COVID-19 pandemic response. Overall, production has recovered slowly, and the demand for water treatment purposes and for food preparation end-uses has held generally steady.[3]

Given the above, the risk level for this factor is designated as Low.

3.2.4 Linde (Formerly Praxair)

3.2.4.1 Manufacturing Point of Origin

Formerly Praxair, Linde supplies carbon dioxide to Mesa Water from either of two carbon dioxide plants owned and operated by Linde in the Cities of El Segundo and Long Beach, CA. The raw source comes from petroleum refining activities.

With multiple manufacturing points of origin, the risk level for this factor is designated as Low.

3.2.4.2 Emergency Manufacturing Capabilities During Emergencies

Currently, Linde does not have a plan for a regional emergency, but they will advise Mesa Water of any issues following such an emergency. A designation of High will be assigned until further information can be obtained to confirm or downgrade this rating.

3.2.4.3 Backup Delivery Protocols

In addition to the El Segundo and Long Beach facilities, Linde also owns plants in Benicia, CA and Price, UT. These plants are used from time to time to support Southern California with rail car and truck hauling.

Given the above, the risk level for this factor is designated as Low.

3.2.4.4 Market Volatilities

Historically, the demand for carbon dioxide has been consistently driven by beverage manufacturers and food producers. With the recent COVID-19 pandemic, demand for carbon dioxide has been volatile, with decreasing demand in large commercial operations being offset by a surging demand from smaller craft brewers.[4]

Given the above, the risk level for this factor is designated as Medium.

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[3] Independent Commodity Intelligence Services (ICIS), *Caustic soda prices, markets & analysis*, Q3 2020, https://www.icis.com/explore/commodities/chemicals/caustic-soda.

[4] IBIS World, *Carbon Dioxide Production Industry in the US – Market Research Report*, October 26, 2020, https://www.ibisworld.com/united-states/market-research-reports/carbon-dioxide-production-industry.

3.2.5 Pipeline (W.A. Rasic Construction)

To meet day-to-day demand for construction services, W.A. Rasic Construction (Rasic) maintains purchase agreements with various waterworks warehouses for supplies of materials. They are union signatory and are able to dispatch additional employees as required. Rasic owns the vast majority of their equipment which includes a fleet of more than 60 backhoes and is one of the largest privately-owned equipment fleets in Southern California.

To provide service during a regional emergency, Rasic maintain emergency after-hours on-call agreements with various water works warehouses for 24-hour ability to obtain pipe and fittings. Their local dispatch yard has a diesel fuel holding tank and pump that can fuel equipment in the event the system goes down to a certain extent. They stockpile some sand and aggregate to service small jobs in the event the quarries are shutdown. In the event of an emergency, customer needs are prioritized by proximity, ability to mobilize to location, and amount of revenue awarded to Rasic, as well as working history. Rasic predicts that Mesa Water can expect chaos during a regional emergency with contractors responding to those agencies they have worked with continually, serving the rest on a first-come, first-served basis. According to Rasic, there are not enough contractors in Southern California to repair every utility company's facilities simultaneously.

An area of concern for Rasic is the availability of pipe materials. Pipe materials are normally produced in Texas (plastic resin plants, ductile iron foundries, etc.) and there are no local manufacturers. The concern is that the collapse of freeway, rail, and other transportation could cut off access to these supplies. Rasic recommends that Mesa Water store diesel, aggregates, everyday pipe repair materials, and replacement pipe.

Given the above, the risk level for pipeline contractors is designated as Low and Medium across the identified factors.

3.2.6 Electrical (Leed Electric, Inc.)

To meet day-to-day demand for construction services, Leed Electric, Inc. (Leed) keeps tools updated, their fleet routinely maintained, and they keep qualified and responsive electricians on staff. Leed's line of business is specialty electrical construction in the water and wastewater market, and they have over 200 employees that are always available to serve in this market.

To provide service during a regional emergency, Leed has three layers of contacts that enable them to respond to customers accordingly. In addition, they always keep at least three electricians on standby from different areas (e.g., Los Angeles, Riverside, Orange County) to make sure someone will be able to respond to Mesa Water's emergency call. In addition, they own all of the equipment required for emergency calls.

An area of concern is when there are issues related to a sub-tier contractor or supplier to get additional services or material that may not be available during off hours. Examples include a variable frequency drive manufacturer to troubleshoot a high-level alarm, or if there is a need for a specialty replacement part, like a contactor.

To support Leed's work and ensure normal operation immediately following a regional emergency, Leed recommends that Mesa Water adhere to the following:

- Perform periodic maintenance on all equipment to ensure functionality.
- Store long lead time parts, in addition to general spare parts, for almost all equipment, regardless of lead time since most supply houses are closed after hours.
- Maintain a maintenance contract with at least two companies for each service to ensure guaranteed service.

Given the above, the risk level for electrical contractors is designated for all factors as Medium.

3.2.7 Asphalt/Paving (Copp Contracting, Inc.)

To meet day-to-day demand for construction services, Copp Contracting, Inc. (Copp) dedicates its forces to one project at a time. They own all their own equipment and are in close proximity to Mesa Water and its service area. In the event of an emergency, Copp will prioritize customers by "1st call, 1st served", with 100% dedication until the project is complete. This means that Mesa Water cannot rely on Copp for asphalt/paving repairs during an emergency and has a general risk level designation of High.

As an alternative to retaining an asphalt/paving contractor to repair street surfaces with permanent asphalt during an emergency response, it is recommended that Mesa Water store those materials needed to temporarily repair street surfaces. These materials include cold mix and traffic plates, both of which can be installed by a pipeline contractor, who will generally be more available and prepared to respond in an emergency. Once the emergency has passed, permanent repair can be scheduled at the convenience of Mesa Water.

3.2.8 Water Quality Analysis

Mesa Water performs several hundred water quality samples and analyses each month for performance and regulatory compliance. Mesa Water has a small water quality lab to perform general physical water quality tests but uses a certified commercial lab for all other compliance analyses. Most of Mesa Water's production sites are equipped with real-time chemical analyzers (e.g., chlorine, ammonia, etc.) to monitor and control chemical dosing and assist in support of compliance reporting. In the event of an emergency, Mesa Water would need to ensure that water quality compliance sampling is conducted, and water quality standards are being met.

3.2.8.1 Weck Laboratories

Weck Laboratories (Weck) uses a third-party courier company to pick up samples from Mesa Water and deliver to Weck Laboratories, located approximately 40 miles north, in the City of Hacienda Heights, CA. They have numerous chemicals and supplies that are kept in stock at all times to perform water quality testing. Weck relies on water and power for testing, and they have backup generators to power necessary equipment as a short-term measure.

To meet testing demand, Weck projects forward in ordering supplies to ensure there are adequate supplies on hand for the months ahead. During a regional emergency, Mesa Water can expect Weck to complete basic water quality testing, including microbiological analyses.

As a backup to Weck Laboratories, Mesa Water employs a second water quality laboratory, Truesdail Laboratories, Inc.

3.2.8.2 Orange County Water District

The Orange County Water District (OCWD) is a California special district that manages the groundwater basin beneath central and northern Orange County, California. OCWD schedules and collects Title 22 drinking water samples for Mesa Water groundwater sources. OCWD then delivers the samples to OCWD's state-certified drinking water laboratory located in the City of Fountain Valley or to outside contract labs that are located in the Orange County or Los Angeles areas.

In the event of an emergency, OCWD's Emergency Operation Center and Emergency Response Plan will be activated. The OCWD laboratory currently has startup/shutdown procedures for all instrumentation in the case of power failure. OCWD Risk and Safety Department is currently looking into obtaining back-up power supplies for the lab. OCWD Lab does not have back-up power or a generator at this time. OCWD keeps necessary testing chemical and materials on-hand to last at least 3 to 6 months.

In the event of a regional emergency, OCWD laboratory and sample collection staff are required to report to work when safe to do so. If power supplies are operating, access roads are clear, and the laboratory building is deemed safe to inhabit, then drinking water compliance samples will be collected and analyzed as normal. OCWD recommends that Mesa Water be in close communication with the Division of Drinking Water (DDW) during and immediately following an emergency. Depending on the extent of emergency and damage to OCWD facilities, Mesa Water should consider having a back-up laboratory available to collect and test Title 22 drinking water samples, in case the OCWD lab cannot operate in an emergency.

3.3 Recommendations

In general, the chemical suppliers, contractors, and laboratories utilized by Mesa Water exhibit resilient supply chains. Recommendations to reinforce Mesa Water's supply chain resiliency are listed below, categorized by risk:

HIGH

- **Diesel Fuel and Propane**: In the cases of Dion and Sons (Diesel Fuel) and Mutual Propane (Propane), responses were not able to be obtained within the time allotted for the development of this TM. In these cases, a risk level of High was assumed until additional information can be obtained, and it is determined whether the rating can be downgraded, or a mitigation measure is required. Given the resilience of the other supply chains, it is recommended that Mesa Water continue to reach out to these suppliers and service providers to complete their individual supply chain profiles.
- **Asphalt/Paving**: It is recommended that Mesa Water store cold mix and steel plates to temporarily repair street surfaces in the event of an emergency pipe repair. Both of these materials can be installed by a pipeline contractor, precluding the need to retain an asphalt/paving contractor during an emergency. Once the emergency has passed, permanent repair can be scheduled at the convenience of Mesa Water.

MEDIUM

- **Carbon Dioxide**: Linde did not provide information about their manufacturing capabilities during emergencies. As with the above companies, it is recommended that Mesa Water continue to reach out to Linde to complete their individual supply chain profile. As a contingency measure, it is recommended that a second supplier of carbon dioxide be identified to supply the demand at the MWRF. Alternatively, if carbon dioxide were not available, temporary sulfuric acid injection, via totes and temporary pumps, could serve the same purpose until the Carbon Dioxide supply is restored. Based on a permeate flow rate of 8.6 mgd, the anticipated dosage of 93% sulfuric acid would be approximately 280 gallons per day, which is equivalent to one tote per day.
- **Pipeline**: It is recommended that Mesa Water continue its practice of storing diesel, aggregates, everyday pipe repair materials, and replacement polyvinyl chloride (PVC) pipe. PVC pipe should be covered to avoid direct sunlight, which degrades PVC material.
- **Water Quality Laboratory**: It is recommended that Mesa Water identify a back-up laboratory to collect and test Title 22 drinking water samples, in case the OCWD lab cannot operate in an emergency.

Section 4: Single Points of Failure Analysis (SPFA)

A single point of failure is any non-redundant part of a system that, if it were to malfunction, would cause the entire system to fail. While an SCA focuses on the logistics of fulfilling operational demands for materials and services, an SPFA focuses on the components in equipment or a system. This section summarizes the approach and findings of an SPFA performed for each of Mesa Water's core production facilities.

4.1 Approach

The core production facilities identified by Mesa Water for an SPFA include:

- Wells 1, 3, 5, 7 and 9
- Reservoirs 1 and 2
- MWRF and Finished Water Systems
- Turnouts OC-44 (sub-Turnouts 2, 4 and 5), CM-2, and OC-14

BC approached the SPFA for each of the above core production facilities at a component level, as opposed to a system level. This allowed BC staff to perform an in-depth assessment of each of Mesa Water's core production facilities. To perform this component-level analysis, BC relied on the following documents:

- Record drawings
- Electrical single line diagrams (SLD)
- Process and Instrumentation Diagrams (P&ID)
- Network Diagrams
- Control Strategies
- Photographs of equipment installations

Similar to the classification approach used in the SCA, SPFA findings were assigned a criticality rating to identify single points of failure. The criticality ratings were defined as follows:

- High

  Failure of this system/equipment substantially impacts production; no redundant system/ equipment available

- Medium

  Failure of this system/equipment does not impact production – redundant system/equipment exists and is assumed to operate as intended

- Low

  Failure if this system does not impact production – no redundant system/equipment available

As shown in Figure 4-1, this classification system was used to annotate the record drawing SLDs and P&IDs to highlight potential single points of failure. Annotations were reviewed with Mesa Water in two workshops, on September 14 and 21, 2020, to confirm BC's understanding of production facilities and Mesa Water's operational approach. In addition, a separate meeting was held on September 21, 2020 to discuss Mesa Water's

SCADA network, control systems and communications architecture. Meeting minutes from these three meetings are included as Attachment B.

Once annotated and reviewed with Mesa Water, the criticality ratings were summarized in Criticality Summary tables, which identified preliminary mitigation measures that, when implemented, would allow the rating to be downgraded. Where appropriate, and as discussed with Mesa Water, recommendations to purchase spare parts stock to address components with no redundant system/equipment were allowed as an option to downgrade a criticality rating of High to Medium. These recommendations were captured on the Criticality Summary tables. An excerpt from a Criticality Summary table is shown in Figure 4-2.

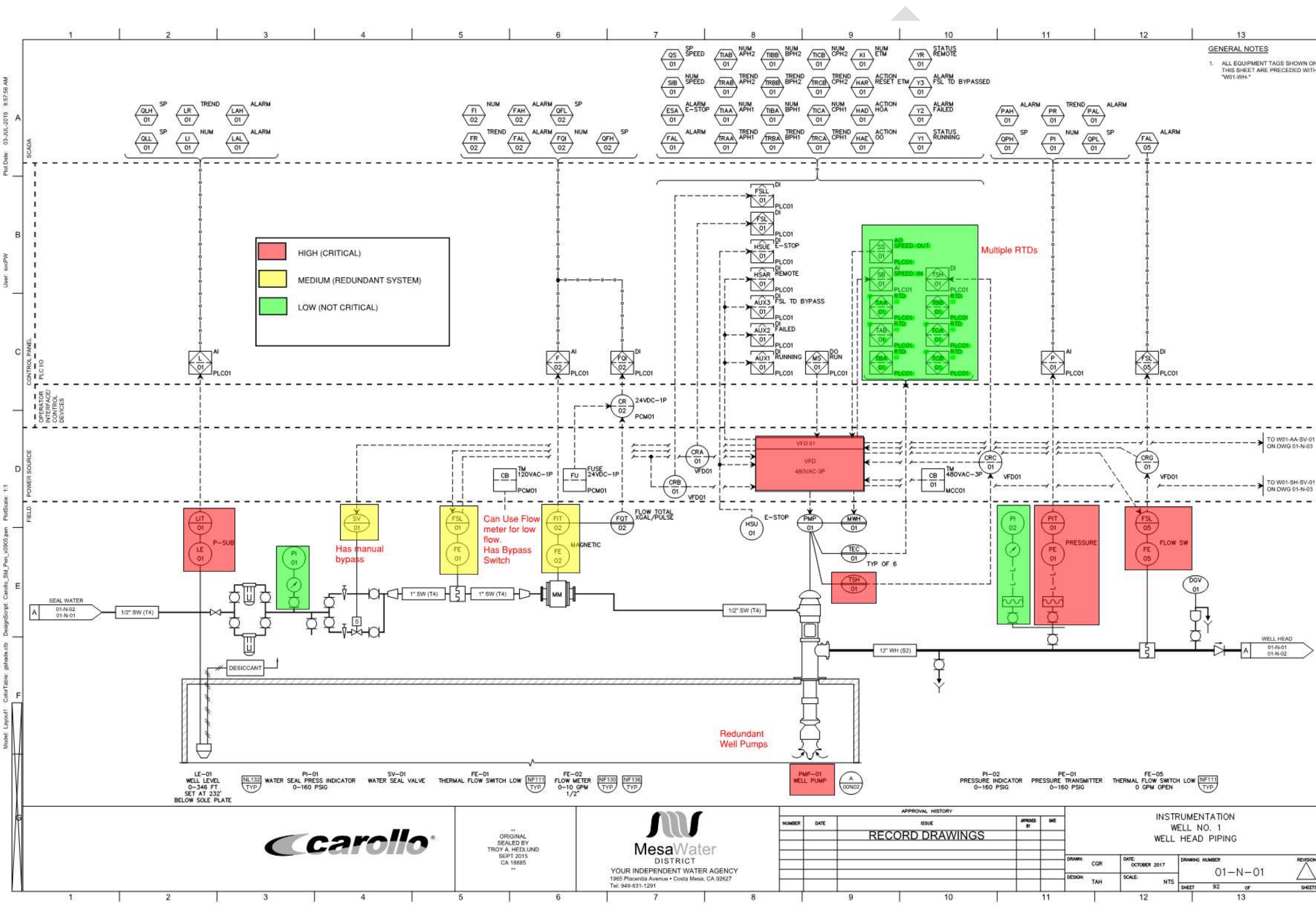

Figure 4-1. Example of Well 1 P&ID with Criticality Annotations

System	Equipment	Basis for SPF Rating	Criticality Score H	Criticality Score M	Criticality Score L	Recommended Spare Parts
Well Pump P&ID 01-N-01, 01-N-02						
[Electric]	PUMP, VERTICAL TURBINE					
	Motor, Electric	Pumping capacity from other Well Sites				
	Drive, Variable Frequency	Pumping capacity from other Well Sites				
	Level Transmitter	Indication Only				
	Seal Water Pressure Gauge	Indication Only				
	Seal Water Solenoid Valve	Manual bypass on Valve				
	Seal Water Flow Switch	Pump Shutdown				X
	Seal Water Flowmeter	Indication Only				
	Motor Temperature	Pump Shutdown				
	Discharge Pressure Gauge	Indication Only				
	Discharge Pressure Transmitter	Pump Shutdown				
	Discharge Flow Switch	Pump Shutdown				X
	Distribution Flowmeter	Use Pump Speed				
	Storm Drain Flowmeter	Use Pump Speed				
	Isolation Valve	Handwheel on valve				
	Chemical Injection Points	Warehouse Spares				X

Figure 4-2. Excerpt from Criticality Summary Table for Well 1.

4.2 Findings

SPFA findings for Mesa Water core production facilities are detailed in the following sections.

4.2.1 Wells

Mesa Water's five (5) groundwater clear wells operate in conjunction with one another to supply water from the Basin to Mesa Water's service area. Each well site includes one extraction pump with a backup power source, as summarized in Table 4-1. Table 4-1 also references the attachment where criticality summary tables and record drawing SLDs and P&IDs can be found. Due to the similarity in configurations, the Well 1 annotated SLDs and P&IDs serve as the basis for the SPFA for Wells 3, 7 and 9.

Table 4-1. Well Sites				
Site	Pump Type/Size	Rated Flow	Backup Power Source(s)	Reference Documents
Well 1	Vertical Turbine, 400 HP	2,300 gpm	Connection for portable generator (rental)	Attachment C
Well 3	Vertical Turbine, 300 HP	1,800 gpm	200 kW diesel generator; 426-gal subbase diesel storage tank	Attachment D
Well 5	Vertical Turbine, 450 HP	2,200 gpm	1,150-gal LPG storage tank	Attachment E
Well 7	Vertical Turbine, 300 HP	1,450 gpm	150 kW diesel generator; 333-gal subbase diesel storage tank	Attachment D
Well 9	Vertical Turbine, 300 HP	1,800 gpm	230 kW diesel generator; 426-gal subbase diesel storage tank	Attachment D

All sites include chemical management systems that allow real-time chemical dosing and feedback control functionality. Disinfecting chemicals used onsite include 12.5% sodium hypochlorite and 19% aqueous ammonia. Mesa Water recently upgraded its well sites to include real-time connectivity, control, monitoring, and alarming via its SCADA system. Section 4.2.5 includes an SPFA discussion of Mesa Water's network, controls and communications systems.

As indicated in the criticality summary tables, the following components were identified as single points of failure requiring mitigation:

- **Chemical Storage Tank**
  - Location(s): All well sites
  - System(s): Sodium Hypochlorite / Aqua Ammonia
  - Description: Failure of tank shuts down both chemical metering pumps.
  - Potential Mitigation: Install connection with valve for tote.
- **Containment Level Switch**
  - Location(s): All well sites
  - System(s): Sodium Hypochlorite / Aqua Ammonia
  - Description: Failure of switch shuts down both chemical metering pumps and closes valve at chemical storage tank.
  - Potential Mitigation: Install bypass switch at local control panel.
- **Main Breaker**
  - Location(s): All well sites
  - System(s): Electrical
  - Description: Failure of main breaker prevents energization of motor control center (MCC) from either primary or backup power sources.
  - Potential Mitigation: Install second feeder breaker with transfer switch.

In addition to the single points of failure identified above, the following items were identified as potential concerns during the SPFA:

1. Well 1 – Portable Generator: At Well 1, backup power during an emergency relies on the mobilization of a rental portable generator. While a rental generator may be available during local power outages, availability is less likely during a regional power outage or other event. It is recommended that a permanent backup power source be provided for Well 1, which is currently the largest production well for Mesa Water. It is recommended that a second electrical feeder, powered from a different substation than the one currently powering Well Site 1, be considered or Mesa Water proceed with the purchase of a truck-mounted portable generator system to mobilize the unit to the site. As an interim mitigation measure, a portable generator could be rented or leased until a decision is made and procurement is complete.
2. Solenoid Valves: The solenoid valves installed at the well sites do not appear to have manual overrides. Installation of solenoid valves with manual overrides would facilitate response to a failed solenoid valve by avoiding the need for an immediate response by an electrician. This would allow Mesa Water Operations staff to respond and then schedule an electrician to replace the solenoid valve on a non-emergency basis.
3. Instrumentation Switches: There were several instrumentation switches that could be bypassed at the local control panel by an Operator if override switches were added. This would facilitate response to a failed instrumentation switch by avoiding the need for an immediate response by an electrician. Instead, Mesa Water Operations staff could respond and then schedule an electrician to replace the switch on a non-emergency basis.

4.2.2 Reservoirs

Mesa Water owns and operates two (2) reservoirs that provide pressure-sustaining control and water supply throughout the distribution system. Both reservoirs are primarily served by natural gas Waukesha engine-driven pumps. In addition, Reservoir 1 has two electric jockey pumps available to address the lower flow ranges during normal diurnal low flow periods. Each reservoir includes an onsite 1,150-gallon LPG storage tank that provides backup power to the engine-driven pumps and to an onsite natural gas generator. The generators supply local power to the reservoir control systems and, at Reservoir 1, the Administration Building at Mesa Water's Main Headquarters. Section 4.2.5 includes an SPFA discussion of Mesa Water's network, controls and communications systems.

Mesa Water will be upgrading the pump and control system facilities at both Reservoirs 1 and 2. As such, a component-level SPFA was not considered to be necessary. It is anticipated that single points of failure will be evaluated and addressed during preliminary design of the proposed upgrades. However, during review of the Reservoir 1 facility, it was noted that the MCC that powers the two (2) 60-hp jockey pumps is served by a single main breaker. If this breaker were to fail, energization of the MCC by either primary or backup power would not be possible. It is recommended that Mesa Water incorporate a strategy that assigns pumps across multiple MCCs to mitigate against a single point of failure pre.

4.2.3 Mesa Water Reliability Facility

The MWRF is highly automated and contains redundant instrumentation and control functionality throughout most of the plant. The MWRF only contains backup generation to power the MWRF Administration Building. Section 4.2.5 includes an SPFA discussion of Mesa Water's network, controls and communications systems.

Annotated record drawing SLDs and P&IDs, along with a Criticality Summary table, are included as Attachment F. As indicated in the criticality summary tables, the following components were identified as single points of failure requiring mitigation:

- **Well Pump, Vertical Turbine**
  - System(s):
    - **Raw Water Feed**
  - Description: Failure of either Well 6 or 11 pump directly impacts MWRF production.
  - Potential Mitigation: Provide spare 400 HP motor for use at either well pump.
- **Nanofiltration Feed Pump, Vertical Turbine**
  - System(s):
    - Nanofiltration Feed
  - Description: Failure of single feed pump shuts down an entire process train.
  - Potential Mitigation: Provide spare parts pump.
- **Pressure Switch**
  - System(s):
    - Nanofiltration Feed
  - Description: Failure of pressure switch shuts down process train.
  - Potential Mitigation: Install bypass switch at local control panel.
- **Flow Switch**
  - System(s):
    - Nanofiltration Feed
  - Description: Failure of pressure switch shuts down process train.
  - Potential Mitigation: Install bypass switch at local control panel.
- **Chemical Storage Tank**
  - System(s):
    - Caustic Soda
    - Carbon Dioxide
    - Sodium Hypochlorite
    - Aqua Ammonia
    - Sodium Bisulfite
  - Description: Failure of tank shuts down critical process.
  - Potential Mitigation: Install direct connection with valve for tote or tank truck.
- **Containment Level Switch**

- System(s):
  - Caustic Soda
  - Sodium Hypochlorite
  - Aqua Ammonia
  - Sodium Bisulfite
- Description: Failure of switch shuts down both chemical metering pumps and closes valve at chemical storage tank.
- Potential Mitigation: Install bypass switch at local control panel.

- **Discharge Level Switch**
  - System(s):
    - Caustic Soda
    - Sodium Hypochlorite
    - Aqua Ammonia
    - Sodium Bisulfite
  - Description: Failure of switch on double containment piping system shuts down chemical metering pumps.
  - Potential Mitigation: Install bypass switch at local control panel.
- **Carbon Dioxide Heater**
  - System(s): Carbon Dioxide
  - Description: Failure of heater reduces gaseous carbon dioxide flow, which will eventually shut down the decarbonator process.
  - Potential Mitigation: Install redundant heater.
- **Product Transfer Pump, Vertical Turbine**
  - System(s):
    - Product Water
  - Description: Existing 2+1 (standby + duty) configuration provides 50% redundancy. Per Mesa Water, this is a critical system with long lead time for replacement pumps.
  - Potential Mitigation: Provide spare parts pump.
- **Main Breaker**
  - System(s): MWRF Electrical Systems
  - Description: Failure of main breaker prevents energization of Switchboard SWBD-2 and MCC-3.
  - Potential Mitigation: Install second feeder breaker with transfer switch.

In addition to the single points of failure identified above, the following items were identified as potential concerns during the SPFA:

1. Add a supervisor override for the Scale Inhibitor Storage Tank to allow the MWRF to continue operation without scale inhibitor. The MWRF can operate for periods longer than 30 days without scale inhibitor, which makes this system non-critical from a single point of failure perspective.

4.2.4 Turnouts

Mesa Water owns three (3) metered turnouts (OC-44, CM-2, and OC-14) that feed imported water from MWD into the Mesa Water distribution system. The SPFAs performed for these turnouts are detailed below. Section 4.2.5 includes an SPFA discussion of Mesa Water's network, controls, and communications systems.

4.2.4.1 OC-44

OC-44, comprised of three (3) sub-turnouts owned and operated by Mesa Water, is fed from the East Orange County Feeder No. 2, and is shared with the City of Huntington Beach. The locations of these turnouts – referred to as Sub-Turnouts 2, 4 and 5 – are shown in the Water Atlas sheets included as Attachment G.

As there were no record drawings for the OC-44 turnouts, the SPFA for these turnouts was performed using schematics included in the Water Atlas and photographs of the OC-44 sub-turnout structures provided by Mesa Water.

Based on the schematics and photographs, each of the OC-44 sub-turnouts includes a fully redundant metering line with backpressure valves and associated instrumentation, isolation valves, and flow meters. No single points of failure can be observed at any of these turnouts. Schematics and photographs showing the OC-44 sub-turnouts are included in Figures 4-3 through 4-8.

4.2.4.2 CM-2 and OC-14

For the CM-2 and OC-14 turnouts, the SPFA was performed using a mechanical record drawing, Drawing CM-394-4, provided by Mesa Water.

Based on Drawing CM-394-4, both CM-2 and OC-14 turnouts include the following typical elements:

- Single pipeline within a vault structure
- One (1) disc check valve
- One (1) Venturi flow meter
- One (1) plug valve

Each of the above elements were determined to be a single point of failure. It is understood that Mesa Water is considering upgrades at each of these turnouts. It is recommended that the configurations used for the OC-44 turnouts be used as a model for providing redundancy and eliminating potential single points of failure.

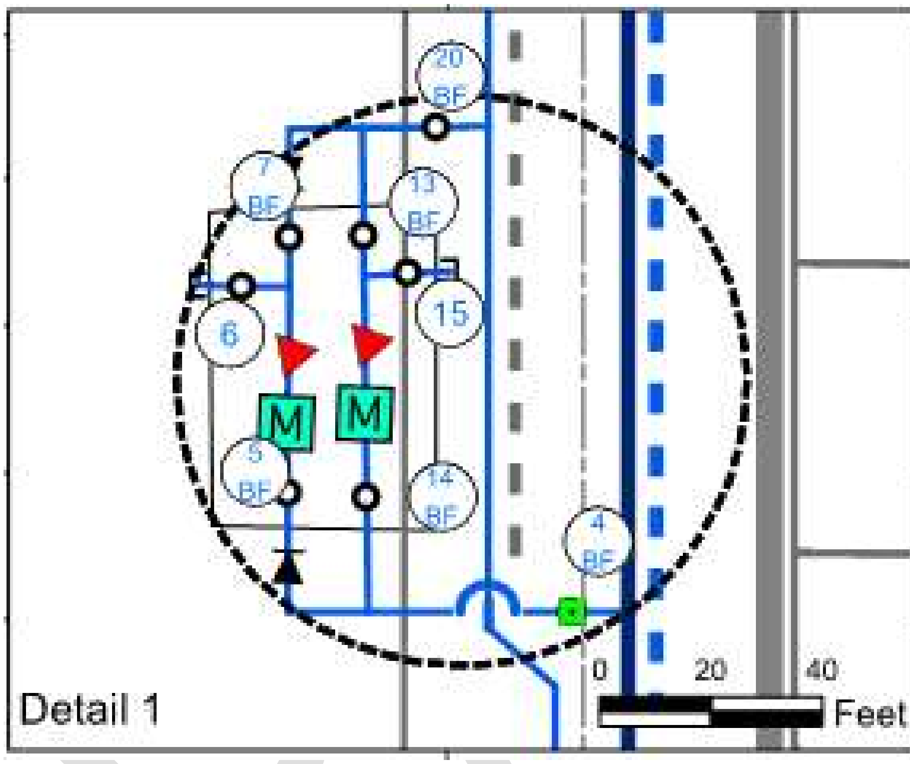

Figure 4-3. Water Atlas Schematic of OC-44, Sub-Turnout 2

Figure 4-4. Photograph of OC-44, Sub-Turnout 2

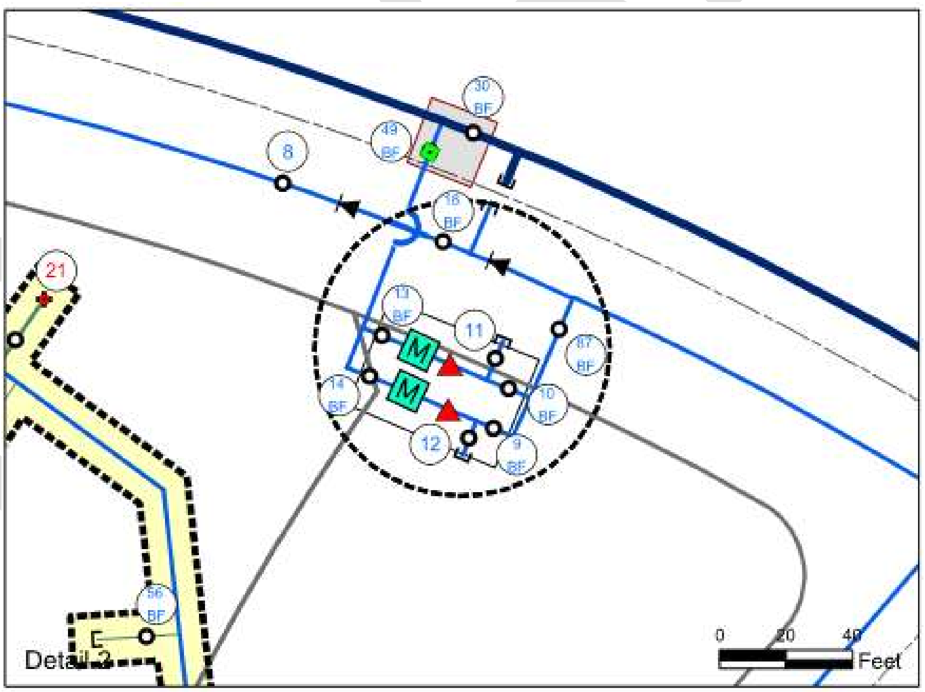

Figure 4-5. Water Atlas Schematic of OC-44, Sub-Turnout 4

Figure 4-6. Photograph of OC-44, Sub-Turnout 4

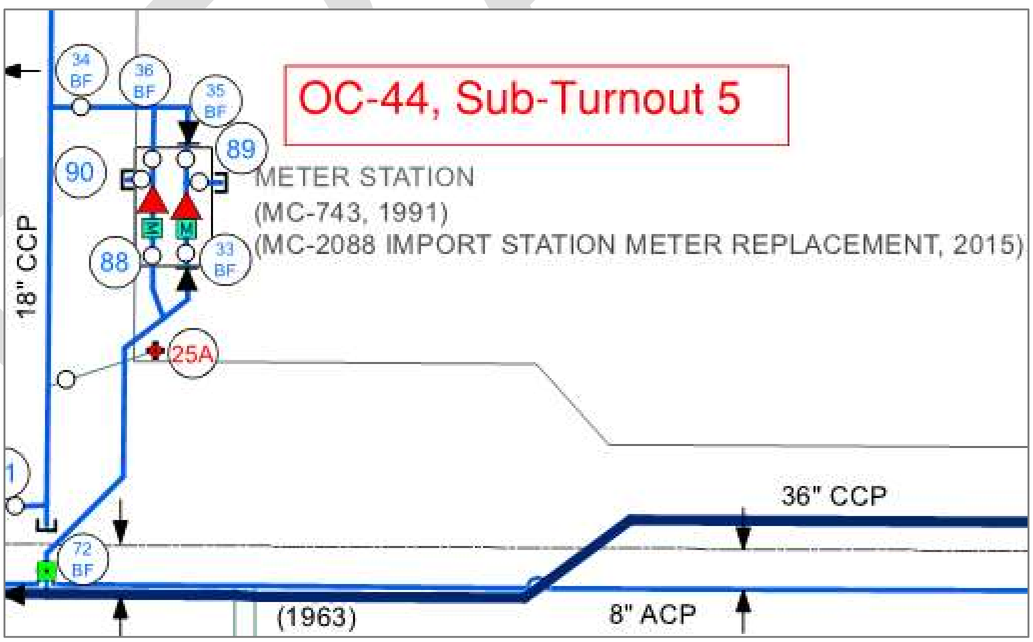

Figure 4-7. Water Atlas Schematic of OC-44, Sub-Turnout 5

Figure 4-8. Photograph of OC-44, Sub-Turnout 5

4.2.5 Network, Controls and Communications Systems

Due to the integrated nature of Mesa Water's network, controls and communications architecture, the SPFA findings have been consolidated for the core production facilities within this section.

4.2.5.1 Supervisory Control and Data Acquisition

As shown in the SCADA Network diagram, included as Attachment H, Mesa Water's SCADA system consists of 24 sites. Of these sites, 23 communicate via 900 or 450 MHz radios; the other, a Pressure Monitoring Station (Site 17), communicates via cellular modem due to radio signal reception challenges. The radio network includes radio towers at the Main Office, MWRF, and Reservoir 2 and uses redundant ring radio communication to transfer data between the Main Office, MWRF and Reservoir 2.

The well sites, import and export stations, pressure monitoring stations, and pressure reducing stations rely on line-of-sight communication with the Main Office, MWRF or Reservoir 2. In the event that radio communications between the radio towers and these sites is lost, Mesa Water loses its ability to remotely control and monitor these sites. Similarly, in the event that power or network communications are disrupted at Remote Terminal Units (RTU) 35A or 35B, located at the MWRF, or RTU 37, located at the Main Office, Mesa Water will lose remote control and monitoring capability.

There is a total of four Human-Machine Interface (HMI) terminals: one is located at the Main Office (EOC), two are at the Operations Center, and remaining HMI terminal is at MWRF. Operators also have laptops that allow SCADA access from an onsite network connection or from home.

Mesa Water utilizes Wonderware (Version 2014 R2) for their operating system. Both the MWRF and EOC operating systems are master operation systems. Each location has their own historian. As a matter of practice, programming changes are made first at MWRF and then the same change is made at EOC. The last command entered at either the MWRF or EOC HMI is the command that is implemented. Because the operators can control from the MWRF or EOC the operators must coordinate the starting and stopping of equipment. If the control at MWRF fails, the Main Office can control system wide operations. Both the Main Office and MWRF have redundant I/O servers. Historian functionality is duplicated at the Main Office and the MWRF terminals.

4.2.5.2 Programmable Logic Controllers

Mesa Water uses a mixture of programmable logic controllers (PLC) within their SCADA system as follows:

- Reservoirs 1 and 2 use two types of PLCs:
  - Allen-Bradley (A-B) CompactLogix PLCs are used for process data collection, control, and as RTUs.
  - Murphy 600 series PLCs are used for engine control and an additional Murphy 600 series PLC is used as a central controller and to communicate with the A-B CompactLogix PLCs.
- The MWRF uses Schneider Electric Modicon M-580 series for data collection and controls and A-B CompactLogix as an RTU.
- The well sites use A-B CompactLogix series for data collection, control and as RTUs.

The following are additional observations regarding Mesa Water's PLCs:

- Each PLC consists of a backplane, PLC controller, hardwired signal Input and Output (I/O) cards, communications card, and 24VDC power supply.
- All PLC controllers, I/O cards, communications cards, and 24VDC power supplies are considered to be single points of failure. Once a failure occurs, the affected process should be operated in manual until the component is replaced.
- Redundant/Hot Standby PLCs are not installed at any Mesa Water locations.
- Mesa Water is in the process of designing and constructing renovated Reservoir Facilities. The existing PLCs will be replaced under this project.
- Based on a review of I/O assignments on the record drawings for the Mesa Water Reliability Facility and Expansion Project, some I/O cards could be considered a single point of failure. I/O appears to be assigned by I/O description rather than equipment. This means that I/O assigned to duty and standby equipment may be on the same card. A failure of that I/O card would result in a failure of both duty and standby equipment.
- The Modicon M580 series will be supported for some time. Spares should be stocked to respond to PLC failures.
- The A-B PLCs are at the end of their service life. Mesa Water is planning to replace the A-B PLCs as part of the SCADA Metrics project.

Based on the above observations, the following recommendations relate to Mesa Water PLCs:

1. Modicon 580 series spare stock should be purchased.
2. For all sites that are scheduled for process upgrades, replace the A-B CompactLogix PLCs and I/O cards, communications cards and 24VDC power supplies. The existing A-B CompactLogix PLCs and I/O cards should be returned to Mesa Water to be refurbished and used as spares stock.
3. Assign duty and standby equipment to different I/O cards where possible.
4. Conduct a data communications radio study to select an operating and back up radio system.
5. As PLCs are replaced in the future, evaluate spare stock requirements and purchase spare parts as required.
6. Maintain an onsite copy, at either MWRF or EOC, of the latest PLC programs.

4.2.5.3 Uninterruptible Power Supply

The Uninterruptible Power Supply (UPS) installed at each site is used to power the PLCs and radio receivers. The Main Office (EOC) and MWRF each have a UPS (15-minute supply) and both sites have generators with automatic transfer switches to transition automatically to backup power.

All well sites, except for Well 1, have generators with automatic transfer switches. The well sites, import and export stations, pressure monitoring stations and pressure reducing stations each have 30-minute UPS power. All site PLCs and radio receivers are connected to the site UPS.

It is recommended that at least one spare UPS of each type should be available in the warehouse. When the UPS fails at a site, the warehouse spare should be installed and immediately replaced.

4.2.5.4 Communications Hardware

Radios used by Mesa Water are at the end of life and are no longer available from the manufacturer. Moving forward, Mesa Water has proposed that all new sites be provided a dual path radio system with both 900/450MHz radio receivers and 5G cellular or satellite communications.

As sites are upgraded with dual path radio systems, existing radios should be returned to Mesa Water and added to the warehouse spares. Spare dual path radios should be purchased.

4.3 Recommendations

Table 4-2 summarizes the recommendations generated from the above SPFA.

Table 4-2. Summary of SPFA Recommendations

Site / System	Recommendations
Well Sites - All	
Chemical Storage Tanks – Sodium Hypochlorite, Aqua Ammonia	• Install connection with valve for tote.
Containment Level Switch – Sodium Hypochlorite, Aqua Ammonia	• Install bypass switch at local control panel.
Solenoid Valves (General)	• For new projects, Install solenoid valves with manual overrides.
Main Breaker	• Install second feeder breaker with transfer switch.
Well Site 1	
Portable Generator Connection	• Install second electrical feeder, powered from a different substation than the one currently powering Well Site 1, or proceed with the purchase of a portable generator system and truck to tow the unit to the site.
Reservoirs 1 and 2	
Main Breaker	• Incorporate into upcoming Reservoir Upgrades a strategy that assigns pumps across multiple MCCs to mitigate against a single point of failure.
MWRF	
Nanofiltration Feed	• Provide spare pump. • Pressure switch – Install bypass switch at local control panel. • Flow switch – Install bypass switch at local control panel.

Table 4-2. Summary of SPFA Recommendations	
Site / System	Recommendations
Caustic Soda	• Storage tank – Install direct connection with valve for tote or tank truck. • Containment level switch – Install bypass switch at local control panel. • Discharge level switch – Install bypass switch at local control panel.
Carbon Dioxide	• Storage tank – Install direct connection with valve for tote or tank truck. • Heater – Install redundant heat exchanger.
Sodium Hypochlorite	• Storage tank – Install direct connection with valve for tote or tank truck. • Containment level switch – Install bypass switch at local control panel. • Discharge level switch – Install bypass switch at local control panel.
Aqua Ammonia	• Storage tank – Install direct connection with valve for tote or tank truck. • Containment level switch – Install bypass switch at local control panel. • Discharge level switch – Install bypass switch at local control panel.
Sodium Bisulfite	• Storage tank – Install direct connection with valve for tote or tank truck. • Containment level switch – Install bypass switch at local control panel. • Discharge level switch – Install bypass switch at local control panel.
Scale Inhibitor	• Add a supervisor override for the Scale Inhibitor Storage Tank to allow the MWRF to continue operation without scale inhibitor.
Main Breakers (SWBD-2, MCC-3)	• Install second feeder breaker with transfer switch.
Turnouts	
CM-2 and OC-14	• Incorporate redundancy into upcoming upgrades – use OC-44 turnout configurations as a model for providing redundancy and eliminating potential single points of fail-ure.
Network, Controls and Communication Systems	
PLC – Programming	• Maintain an onsite copy, at either MWRF or EOC, of the latest PLC programs.
PLC – Spare Stock	• Modicon 580 series spare stock should be purchased.
PLC – Spare Stock	• For all sites that are scheduled for process upgrades, replace the A-B CompactLogix PLCs and I/O cards, communications cards and 24VDC power supplies. The existing A-B CompactLogix PLCs and I/O cards should be returned to Mesa Water to be refurbished and used as spares stock.
PLC – I/O Allocation	• Assign duty and standby equipment to different I/O cards where possible.
UPS – Spare Stock	• Purchase one spare UPS of each type and stock in the warehouse. When the UPS fails at a site, the warehouse spare should be installed and immediately replaced.
Communications - Hardware	• As sites are upgraded with dual path radio systems, existing radios should be returned to Mesa Water and added to the warehouse spares. Spare dual path radios should be purchased. • Conduct a data communications radio study to select an operating and back up radio system.

Section 5: GAP Analysis (Routine Emergency Event)

5.1 Emergency Scenarios and Assumptions

In TM-1, three different emergency scenarios were evaluated as part of a GAP analysis. These scenarios contemplated a local or regional emergency event (e.g., earthquake, fires, flood, etc.) that lasted for 30 calendar days. The facilities operating in each of these emergency scenarios are summarized in Table 5-1.

Table 5-1. Operational Facilities by GAP Analysis Scenario

Mesa Water Facility	Scenario 2a – Emergency Condition 1	Scenario 2b – Emergency Condition 2	Scenario 2c – Emergency Condi-tion 3
Well 1	✓	✓	–
Well 3	✓	–	–
Well 5	–	✓	–
Well 7	✓	✓	–
Well 9	✓	✓	–
Well 12 (Future)	✓	–	✓
Well 14 (Future)	✓	–	✓
MWRF	–	✓	-
Reservoir 1	✓	✓	✓
Reservoir 2	✓	✓	✓
Metered Turnouts	–	–	–
GAP Deficiency	29%	26%	67%

Note:

1. *Refer to TM-1 for further information on which scenarios require regulatory action, importing water from MWD, or expanding infrastructure.*

The GAP analysis assumed that after the 30-day emergency, the capacities of each well returned to their baseline condition. The analysis also noted that the capacities of each available well were higher during the emergency condition than in the baseline condition since routine maintenance was assumed to be deferred.

To represent a worst-case scenario, the emergency conditions described in each scenario were applied to the month of August, when demands are typically highest. Maximum day (150%) demands were used for the entire duration of August. For all other months, 115% demand was used. In all three emergency scenarios, the gap between demand and supply in the month of August could not be met. This showed that current MWRF production is not enough to provide the necessary capacity if several clear wells are not operational and MWD imports are not available to supplement supply.

The above emergency scenarios were simulated under "ideal" conditions. That is, it was assumed that all equipment operated without failure and that sufficient consumables (i.e., fuel and chemicals) were available throughout the duration of the emergency event. Based on the Supply Chain and Single Points of Failure Analyses performed herein, the potential impacts of gaps between consumables supply and demand need to be considered.

5.2 Fuel Consumption

As previously described, with the exception of Well 1 and the MWRF, all Mesa Water core production facilities have onsite fuel storage to power onsite standby generators or directly supply onsite engine-driven pumps.

TM-2 recommends that backup power generation be provided by diesel engine-driven generators. Diesel fuel is supplied locally in California and delivered via truckloads. In the event of a natural disaster, the California Office of Emergency Services' (Cal OES) Southern California Catastrophic Earthquake Response Plan (OPLAN) states that roadways will be restored within 72 hours after a major event and that 75 percent of normal electrical capacity in Orange County would be restored within one to two days. For this GAP analysis, the OPLAN is considered optimistic and a "best-case" scenario. BC recommends using a more realistic period of 10 days when considering mitigation measures, such as a centralized diesel fuel storage tank.

Based on the above, a potential gap exists between the available runtime for equipment given onsite fuel storage and the anticipated 10-day period before roadways are restored after an emergency to allow fuel deliveries to resume. Table 5-2 summarizes the backup fuel capacity, estimated operating duration, and potential gap in operation at each existing facility over a 10-day period. Table 5-2 is based on information derived from an evaluation performed in TM-2.

Table 5-2. Available Backup Fuel Capacity

Facility	Backup Fuel Capacity	Estimated Operating Duration (hours)	Potential Gap in Operation (hours)[1]
Well 1	N/A (Connection for portable generator)	N/A	240
Well 3	200 kW diesel generator; 426-gal subbase diesel storage tank	15	225
Well 5	1,150-gal LPG storage tank	25	215
Well 7	150 kW diesel generator; 333-gal subbase diesel storage tank	12	228
Well 9	230 kW diesel generator; 426-gal subbase diesel storage tank	15	225
Well 12 (Future)	600 kW diesel generator; 1,000-gal diesel storage tank	24	216
Well 14 (Future)	600 kW diesel generator; 1,000-gal diesel storage tank	24	216
Reservoir 1	1,150-gal LPG storage tank	44	196
Reservoir 2	1,150-gal LPG storage tank	32	208

Table 5-2. Available Backup Fuel Capacity			
Facility	Backup Fuel Capacity	Estimated Operating Duration (hours)	Potential Gap in Operation (hours)[1]

[1] *Calculated by subtracting estimated operating duration from 240 hours, the total available operating hours over a 10-day period. Assumes that fuel tanks are full at start of event. For Well 1, which relies on a portable rental generator, it is assumed that a generator would not be supplied until Day 11.*

5.3 Chemical Consumption

As with fuel, a regional emergency has the potential to prevent truck deliveries of chemical for a 10-day period. Without certain chemicals, Mesa Water's core production facilities will be unable to reliably achieve water quality standards and will need to cease operation until chemical deliveries can resume. For each of these critical chemicals, Table 5-3 summarizes the onsite chemical tank volume, usable volume, estimated operating duration, and potential gap in operation at each existing facility. For this GAP analysis, it is optimistic to assume that the chemical tanks will be full at the time of the event. As such, it is recommended that the operating duration assume the tanks are one-third full.

Table 5-3. Available Chemical Capacity				
Chemical (Facility)	Tank Volume (gal)	Usable Volume @ 80% (gal)	Time Between Deliveries, Full (days)	Time Between Deliveries, ⅓ Full (days)
Well Sites – 1, 3, 5, 7, 9				
Sodium Hypochlorite	4,000	3,200	30	10
Aqua Ammonia	4,000	3,200	30+	10
Reservoirs 1 & 2				
Sodium Hypochlorite	350	280	30	10
MWRF				
Sodium Hypochlorite	6,570	5,256	6	2
Aqua Ammonia	2,000	1,600	8	2.7
Sodium Hydroxide (Caustic)	5,287	4,240	65	21.7
Carbon Dioxide	–	–	13.5	4.5

Source: Mesa Water District Production System Operations Plan

As indicated in Table 5-3, over a 10-day period there will be potential gaps in core production operation due to delays in deliveries of sodium hypochlorite, aqua ammonia and carbon dioxide. It should be noted that this analysis does not reflect the potential strength degradation of certain chemicals, like sodium hypochlorite, over a 10-day duration and with increases in storage temperature. As such, it is recommended that Mesa Water monitor the usage of these chemicals during an emergency.

Section 6: GAP Analysis (Identified Scenarios)

6.1 Emergency Scenarios and Assumptions

Using the demand and supply data identified in TM-1, a GAP analysis was performed to identify local water supply disparities under six regional emergency scenarios defined by Mesa Water. These scenarios have the following conditions in common:

1. Duration: 7, 14, and 30 calendar days as individual events.
2. Pipeline Breaks: 25 mainline breaks across associated small and large diameters
3. Natural gas supplies are unavailable
4. Electric supplies are unavailable
5. Reservoirs 1 and 2 are inoperable
6. MWRF is operable
7. MWD water (metered turnouts) is unavailable

For each of the durations identified in Item 1 above, the following sub-scenarios were evaluated:

1. Sub-Scenario A: Current condition of Mesa Water's back-up generation capacity and without having new Wells 12 and 14 constructed. Under this sub-scenario, the operating conditions of Mesa Water's core production facilities are as follows:
   a. Well 1 – Not available until rental portable generator mobilized.
   b. Wells 3, 5, 7 and 9 - Available on Day 1 and powered by onsite generators or LPG tanks.
   c. MWRF – Not available.
2. Sub-Scenario B: The recommendations from TM-2 have been implemented (filling in the back-up power capacity gaps) and new wells 12 and 14 have been constructed and are fully operational with back-up power capability. Under this sub-scenario, the operating conditions of Mesa Water's core production facilities are as follows:
   a. Well 1 – Portable generator mobilized and in operation on Day 2. The portable generator would be available for 24 hours before fuel depleted.
   b. Wells 3, 5, 7, 9, 12 and 14 - Available on Day 1 and powered by onsite generators.
   c. MWRF – Onsite generator would allow MWRF to operate on Day 1 and would be available for 24 hours before fuel depleted.
   d. Centralized Bulk Fuel Storage Depot and Fuel Tanker Truck – Provides sufficient fuel storage and means to refill onsite generator fuel tanks for up to 10 days.

The facilities operating in each of these emergency scenarios are summarized in Table 6-1.

Table 6-1. Operational Facilities by GAP Analysis Scenario

Mesa Water Facility	Scenario 1A – 7 Days	Scenario 2A – 14 Days	Scenario 3A – 30 Days	Scenario 1B – 7 Days	Scenario 2B – 14 Days	Scenario 3B – 30 Days
Well 1	✓	✓	✓	✓	✓	✓
Well 3	✓	✓	✓	✓	✓	✓

Table 6-1. Operational Facilities by GAP Analysis Scenario						
Mesa Water Facility	Scenario 1A – 7 Days	Scenario 2A – 14 Days	Scenario 3A – 30 Days	Scenario 1B – 7 Days	Scenario 2B – 14 Days	Scenario 3B – 30 Days
Well 5	✓	✓	✓	✓	✓	✓
Well 7	✓	✓	✓	✓	✓	✓
Well 9	✓	✓	✓	✓	✓	✓
Well 12 (Future)	Not Available	Not Available	Not Available	✓	✓	✓
Well 14 (Future)	Not Available	Not Available	Not Available	✓	✓	✓
MWRF	Not Available	Not Available	Not Available	✓	✓	✓
Reservoirs 1 and 2	Not Available	Not Available	Not Available	✓	✓	✓
Metered Turn-outs	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

6.2 Water Supply

In TM-1, the available water supply over a 30-day period was determined for each Mesa Water facility. Since this GAP analysis evaluates events with durations less than 30 days, the water supply capacity has been expressed as a daily average. The available water supply for the various durations identified in this GAP analysis are summarized in Table 6-2. Note that the capacities of each available well are higher during the emergency condition since routine maintenance is deferred.

Table 6-2. Available Water Supplies					
Source	Baseline Capacity (AF/month)	Emergency Capacity (AF/month)	Emergency Capacity (AF/day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)
Clear Wells					
Well 1	299	309	10.3	72.1	144.2
Well 3	208	215	7.2	50.4	100.8
Well 5	257	296	9.9	69.3	138.6
Well 7	169	175	5.8	40.6	81.2
Well 9	234	242	8.1	56.7	113.4
Well 12 (Future)	390	403	13.4	93.8	187.6
Well 14 (Future)	390	403	13.4	93.8	187.6
MWRF	807	807	26.9	188.3	376.6
Totals	**2,754**	**2,850**	**95.0**	**665.0**	**1,330.0**

To account for the potential gaps in available onsite fuel and chemical storage and the 10-day lag in delivery due to roadway closures, the resulting available production for each clear well and the MWRF, identified in Table 5-2, needs to be used to determine the available water supplies over 7-, 14- and 30-day periods.

6.2.1 Well 1

Well 1 has an emergency production capacity of 10.3 acre-feet per day (AF/day), on average. After losing power during a regional emergency, Well 1 is assumed to operate as follows:

- Sub-Scenario A:
  - Rental portable generator is required to be mobilized to allow operation. It is assumed that procuring and mobilizing a rental generator will not be feasible until Day 11 of the emergency response.
  - On Day 11, fuel and chemical deliveries will resume, and Well 1 will produce 10.3 AF/day.
- Sub-Scenario B:
  - Portable generator, owned by Mesa Water, will be mobilized to allow operation beginning on Day 2 of the emergency response. On Day 2, Well 1 will produce 10.3 AF/day.
  - The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-3. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-3. Available Water Supplies, Well 1

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Well 1 (Baseline)	10.3	10	72.1	144.2	309
Well 1 (Sub-Scenario A)	10.3	0	0	41.4	206
Well 1 (Sub-Scenario B)	10.3	9	61.8	133.9	298.7
GAP Deficiencies (A/B)	-0-	100% / 10%	100% / 14%	71.5% / 7.1%	33.3% / 3.3%

6.2.2 Well 3

Well 3 has an emergency production capacity of 7.2 AF/day, on average. After losing power during a regional emergency, Well 3 is assumed to operate as follows:

- Sub-Scenario A:
  - Onsite generator has fuel capacity to allow operation for approximately 15 hours (0.63 days).
  - Onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.

- ○ Over first 10 days, Well 3 will be limited by existing fuel inventory and available to produce only 4.5 AF, or 7.2 AF/day multiplied by 0.63 days.
  - ○ On Day 11, fuel and chemical deliveries will return to pre-emergency conditions, and Well 3 will produce 7.2 AF/day.
- Sub-Scenario B:
  - ○ Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.
  - ○ The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - ○ On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.
  - ○ Well 3 will produce 7.2 AF/day for 7-, 14- and 30-day scenarios.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-4. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-4. Available Water Supplies, Well 3

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Well 3 (Baseline)	7.2	10	50.4	100.8	215
Well 3 (Sub-Scenario A)	7.2	0.63	4.5	33.3	148.5
Well 3 (Sub-Scenario B)	7.2	10	50.4	100.8	215
GAP Deficiencies (A/B)	-0-	99.1% / 0%	91.1% / 0%	67.0% / 0%	30.9% / 0%

6.2.3 Well 5

Well 5 has an emergency production capacity of 9.9 AF/day, on average. After losing power during a regional emergency, Well 5 is assumed to operate as follows:

- Sub-Scenario A:
  - ○ Onsite LPG tank has fuel capacity to allow operation for approximately 25 hours (1.04 days).
  - ○ Onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - ○ Over first 10 days, Well 5 will be limited by existing fuel inventory and available to produce only 10.3 AF, or 9.9 AF/day multiplied by 1.04 days.
  - ○ On Day 11, fuel and chemical deliveries will return to pre-emergency conditions, and Well 5 will produce 9.9 AF/day.
- Sub-Scenario B:
  - ○ Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.

- The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
- On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.
- Well 5 will produce 9.9 AF/day for 7-, 14- and 30-day scenarios.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-5. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-5. Available Water Supplies, Well 5

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Well 5 (Baseline)	9.9	10	69.3	138.6	296
Well 5 (Sub-Scenario A)	9.9	1.04	10.3	49.9	208.3
Well 5 (Sub-Scenario B)	9.9	10	69.3	138.6	296
GAP Deficiencies (A/B)	-0-	98.9% / 0%	85.1% / 0%	64.0% / 0%	29.6% / 0%

6.2.4 Well 7

Well 7 has an emergency production capacity of 5.8 AF/day, on average. After losing power during a regional emergency, Well 7 is assumed to operate as follows:

- Sub-Scenario A:
  - Onsite generator has fuel capacity to allow operation for approximately 12 hours (0.5 days).
  - Onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - Over first 10 days, Well 7 will be limited by existing fuel inventory and available to produce only 2.9 AF, or 5.8 AF/day multiplied by 0.5 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions, and Well 7 will produce 5.8 AF/day.
- Sub-Scenario B:
  - Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.
  - The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.
  - Well 7 will produce 5.8 AF/day for 7-, 14- and 30-day scenarios.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-6. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-6. Available Water Supplies, Well 7					
Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Well 7 (Baseline)	5.8	10	40.6	81.2	175
Well 7 (Sub-Scenario A)	5.8	0.5	2.9	26.1	118.9
Well 7 (Sub-Scenario B)	5.8	10	40.6	81.2	175
GAP Deficiencies (A/B)	-0-	99.1% / 0%	92.9% / 0%	67.9% / 0%	32.0% / 0%

6.2.5 Well 9

Well 9 has an emergency production capacity of 8.1 AF/day, on average. After losing power during a regional emergency, Well 9 is assumed to operate as follows:

- Sub-Scenario A:
  - Onsite generator has fuel capacity to allow operation for approximately 15 hours (0.63 days).
  - Onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - Over first 10 days, Well 9 will be limited by existing fuel inventory and available to produce only 5.1 AF, or 8.1 AF/day multiplied by 0.63 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions, and Well 9 will produce 8.1 AF/day.
- Sub-Scenario B:
  - Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.
  - The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.
  - Well 7 will produce 8.1 AF/day for 7-, 14- and 30-day scenarios.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-7. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-7. Available Water Supplies, Well 9

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Well 9 (Baseline)	8.1	10	56.7	113.4	242
Well 9 (Sub-Scenario A)	8.1	0.63	5.1	37.5	167.1
Well 9 (Sub-Scenario B)	8.1	10	56.7	113.4	242
GAP Deficiencies (A/B)	-0-	99.2% / 0%	91.0% / 0%	66.9% / 0%	31.0% / 0%

6.2.6 Wells 12 and 14 (Future)

Wells 12 and 14 each have an anticipated emergency production capacity of 13.4 AF/day, on average. After losing power during a regional emergency, Wells 12 and 14 are each assumed to operate as follows:

- Sub-Scenario A:
  - As indicated in Section 6.1, Wells 12 and 14 are to be considered not available for this scenario.
- Sub-Scenario B:
  - Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.
  - The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 10 days.
  - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions.
  - Wells 12 and 14 will each produce 13.4 AF/day for 7-, 14- and 30-day scenarios.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-8. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-8. Available Water Supplies, Wells 12 and 14

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
Wells 12/14 (Baseline)	13.4	10	93.8	187.6	403
Well 12/14 (Sub-Scenario A)	-0-	-0-	-0-	-0-	-0-
Well 12/14 (Sub-Scenario B)	13.4	10	93.8	187.6	403
GAP Deficiencies (A/B)	100% / 0%	100% / 0%	100% / 0%	100% / 0%	100% / 0%

6.2.7 MWRF

The MWRF has an emergency production capacity of 26.9 AF/day, on average. After losing power during a regional emergency, the MWRF is assumed to operate as follows:

- Sub-Scenario A:

- As indicated in Section 6.1, the MWRF is to be considered not available for this scenario.

- Sub-Scenario B:
    - Onsite generator will remain in operation through first 10 days, with fuel deliveries from Mesa Water's Centralized Bulk Fuel Storage Depot.
    - The onsite chemical inventory at the time of the emergency, with tanks at one-third full, will support operation for up to 48 hours (2.0 days). After this, the MWRF would deplete its onsite storage of sodium hypochlorite, followed by aqueous ammonia.
    - Over first 10 days, the MWRF will be limited by existing chemical inventory and available to produce only 53.8 AF, or 26.9 AF/day multiplied by 2.0 days.
    - Due to chemical inventory limitations, the MWRF will not be available from Day 3 through Day 10.
    - On Day 11, fuel and chemical deliveries will return to pre-emergency conditions, and the MWRF will produce 26.9 AF/day.

When the above conditions are applied to 7-, 14- and 30-day periods after a regional emergency, the available water supply is as shown in Table 6-9. GAP deficiencies, in terms of percent less than potential emergency production, are also included.

Table 6-9. Available Water Supplies, MWRF

Source	Emergency Capacity (AF/day)	Availability (days/10-day)	Emergency Capacity (AF/7-day)	Emergency Capacity (AF/14-day)	Emergency Capacity (AF/30-day)
MWRF (Baseline)	26.9	10	188.3	376.6	807
MWRF (Sub-Scenario A)	-0-	-0-	-0-	-0-	-0-
MWRF (Sub-Scenario B)	26.9	2	53.8	161.4	591.8
GAP Deficiencies (A/B)	100% / 0%	100% / 80%	100% / 71.4%	100% / 57.1%	100% / 26.7%

6.3 Water Demand

As indicated in Section 5.1, to represent a worst-case scenario, the emergency conditions described in each scenario were applied to the month of August, when demands are typically highest. Maximum day (150%) demands were used for the entire duration of August. For 2020 flows, this results in a demand of 2,468 AF/month or 82.3 AF/day.

6.4 Results

Table 6-10 summarizes the results of the GAP analysis performed for all six scenarios, described in Table 6-1, using 2020 demands and the adjusted water supply for each facility identified in Section 6.2.

Table 6-10. GAP Analysis

	Scenario 1A	Scenario 2A	Scenario 3A	Scenario 1B	Scenario 2B	Scenario 3B

Scenario Duration (days)	7	14	30	7	14	30
Demand (AF/period) (1)	**576**	**1,152**	**2,468**	**576**	**1,152**	**2,468**
Emergency Capacity						
Clear Wells						
Well 1	0	41.4	206	61.8	133.9	298.7
Well 3	4.5	33.3	148.5	50.4	100.8	215
Well 5	10.3	49.9	208.3	69.3	138.6	296
Well 7	2.9	26.1	118.9	40.6	81.2	175
Well 9	5.1	37.5	167.1	56.7	113.4	242
Well 12 (Future)	-	-	-	93.8	187.6	403
Well 14 (Future)	-	-	-	93.8	187.6	403
MWRF	-	-	-	53.8	161.4	591.8
Totals (AF/period)	22.8	188.2	848.8	520.2	1,104.5	2,624.5
GAP Deficiency (AF/period)	*553.2*	*963.8*	*1,619.2*	*55.8*	*47.5*	*(157)*
GAP Deficiency (%)	*96.0%*	*83.7%*	*65.6%*	*9.7%*	*4.1%*	*0%*

1. August demand shown reflects max day (150%) demand applied throughout the entire month. 30-day emergency analysis performed for August.

As reflected in Table 6-10, there is a substantial deficiency in meeting the worst-case demand with only the clear wells in operation during an emergency (Scenarios 1A, 2A and 3A). This is clearly exacerbated by the gap in operation that occurs after individual well sites deplete their onsite fuel storage capacity and wait for the first deliveries following the reopening of roadways. In these scenarios, at the end of 30 days following a regional emergency, Mesa Water will have met approximately 35 percent of their peak demand.

However, as reflected in Scenarios 1B, 2B and 3B, with the implementation of the recommendations included in TM-2 (includes procurement of portable generator for Well 1 and construction of Centralized Bulk Fuel Storage Depot), additional capacity from future Wells 12 and 14, and operation of the MWRF, the gap between demand and available supply drops dramatically. In these scenarios, the gap is approximately 10% at the end of 10 days following a regional emergency, and continues to drop to approximately 4% after 14 days and is 0% at the end of 30 days,

Based on the above GAP analysis, the following observations can be made:

- The recommendation included in TM-2 to construct a Centralized Bulk Fuel Storage Depot and procure a Fuel Tanker Truck is critical in addressing a substantial portion of the demand during a regional emergency. Implementing this recommendation allows Mesa Water to refuel onsite generators for up to 10 days following a regional emergency, which further shores their supply chain by reducing their reliance on third parties.
- The recommendation included in TM-2 to construct back-up power facilities at MWRF has only a limited benefit. Following a regional emergency, the available chemical inventory at the MWRF becomes a limiting factor for MWRF operation. Regardless of onsite back-up power availability, the MWRF will not

be available after the onsite inventory of sodium hypochlorite is depleted. Considering the capital costs to construct onsite back-up power facilities and additional chemical storage facilities sufficient for 10 days, it would be more cost effective to construct one or two new clear wells to address the potential gap deficiency during an emergency.

Section 7: Storage and Spare Parts

7.1 Material Storage

As a result of the SCA and SPFA, a number of recommendations have been made to purchase spare parts stock to 1) mitigate potential risks to supply chains and 2) mitigate single points of failure by procuring components with no redundant system/equipment. These recommendations are summarized, with recommended quantities, in Table 7-1.

Table 7-1. Summary of Spare Parts Stock Recommendations

Description	Quantity	Notes	Storage Location (Warehouse)
Distribution System			
Pipe, PVC	15	• C900 (DR25), 20-ft joints, varies from 4”-42”	Pipe Racks
Pipe, Copper	15	• 10-ft lengths, small diameter	Pipe Racks
Repair Couplings	30	• Varies from 4”-42”, two (2) for each size PVC Pipe	Pallet Racks
Repair Clamps, ACP	20	• Varies from 4”-16”	Pallet Racks
Repair Clamps, Steel	10	• Varies from 4”-24”	Pallet Racks
Steel Plates	8	• For emergency street repairs	Outdoor Rack
Cold Mix	10	• 50-lb bags	Pallet Racks
Well Sites			
Bypass switch	10		Electrical Storage
Solenoid valve	6	• Includes manual bypass	Electrical Storage
MWRF			
Bypass switch	8		Electrical Storage
Solenoid valve	4	• Includes manual bypass	Electrical Storage
Vertical Turbine Pump, Nanofiltration Feed	1	• 3330 gpm @ 217’ TDH • 250 HP motor • Storage dimensions: 4’ x 4’ x 20’	Pallet, Floor
Vertical Turbine Pump, Product Transfer	1	• 4,000 gpm @ 22’ TDH • 40 HP motor • Storage dimensions: 4’ x 4’ x 25’	Pallet, Floor

Table 7-1. Summary of Spare Parts Stock Recommendations			
Description	Quantity	Notes	Storage Location (Warehouse)
Distribution System			
Pipe, PVC	15	• C900 (DR25), 20-ft joints, varies from 4”-42”	Pipe Racks
Pipe, Copper	15	• 10-ft lengths, small diameter	Pipe Racks
Repair Couplings	30	• Varies from 4”-42”, two (2) for each size PVC Pipe	Pallet Racks
Repair Clamps, ACP	20	• Varies from 4”-16”	Pallet Racks
Repair Clamps, Steel	10	• Varies from 4”-24”	Pallet Racks
Steel Plates	8	• For emergency street repairs	Outdoor Rack
Cold Mix	10	• 50-lb bags	Pallet Racks
Motor, Well 6/11	1	• 400 HP • Storage dimensions: 4’ x 4’ x 10’	Pallet, Floor
Electrical, Instrumentation and Control			
PLC, Modicon 580	2		**Electrical Storage**
PLC, Allen-Bradley CompactLogix	2		**Electrical Storage**
UPS	4	• At least one of each type	**Electrical Storage**
Dual path radios	4		**Electrical Storage**
Miscellaneous			
Forklift	1		**Warehouse Floor**
Pallet Jacks	2		**Warehouse Floor**

As noted by Mesa Water staff, there is little additional space for storage at existing facilities. Current spare parts stock is stored across facilities to enhance accessibility during an emergency. Since a number of spare parts require protection from direct sunlight (e.g., PVC pipe) or dry conditions with accessibility to power for space heaters (e.g., pumps, motors) or low dust environments (e.g., electronics, electrical equipment), it is recommended that a warehouse be constructed, sized at a minimum for the items identified in Table 7-1. As reflected in Figure 7-1, the recommended dimensions of the warehouse would be 80 feet by 80 feet, or approximately 6,400 square feet. This layout is conceptual and should be further evaluated to accommodate additional spare parts stock, as appropriate.

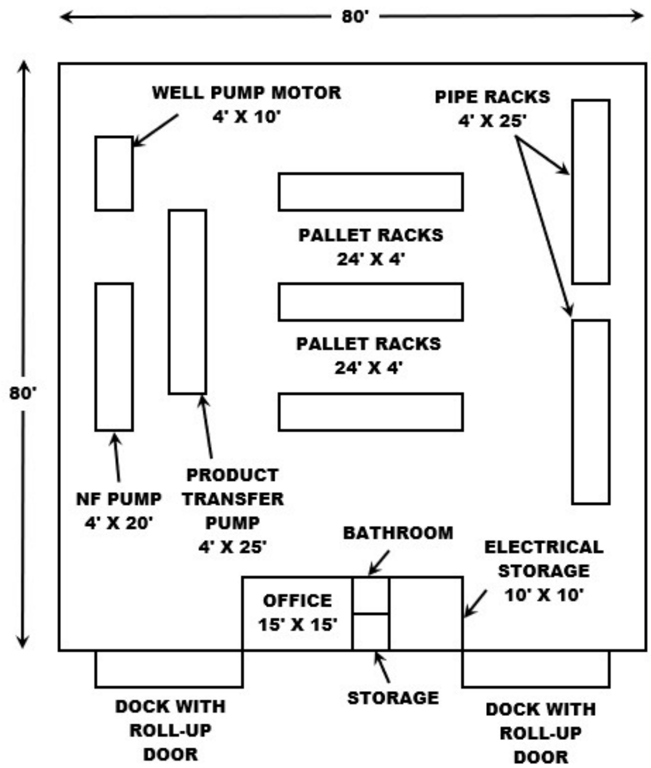

Figure 7-1. Conceptual Layout for Storage Facility

As previously indicated, there is little additional space for storage at existing facilities. If the above layout cannot be accommodated at an existing facility, then it could be located at either proposed Well Site 12 or 14. Additionally, it could be co-located with the diesel fuel tank storage, which was identified in TM-2 and is further discussed in Section 7.2.

In addition to constructing a warehouse for the spare parts stock recommended in this TM, it is recommended that Mesa Water consider investing in an inventory or asset management system that would be connected to purchasing functions, to facilitate replacement of parts as they are used and ensure critical spare parts remain in stock. Ultimately, the inventory system should be focused on consumables required for preventative maintenance and for spare parts needed to address critical equipment and instruments. This would allow Mesa Water to identify any excess inventory supply and better manage required storage space.

7.2 Diesel Fuel Storage

7.2.1 Storage Capacity

TM-2 recommends that backup power generation be provided by diesel engine-driven generators. Diesel fuel is supplied locally in California and delivered via truckloads. In the event of a natural disaster, the California Office of Emergency Services' (Cal OES) Southern California Catastrophic Earthquake Response Plan (OPLAN) states that roadways will be restored within 72 hours after a major event and that 75 percent of normal electrical capacity in Orange County would be restored within one to two days. BC recommends providing a centralized diesel storage tank with an operational capacity of 10 days, as the OPLAN may optimistic and a more practical period should be anticipated in the event of an emergency. Although greater storage capacity would provide additional reliability, greater fuel polishing costs would be incurred.

As summarized in Section 5.2, the clear wells are not currently equipped to provide 10 days (240 hours) of runtime at maximum fuel consumption. Reservoirs 1 and 2 are currently designed to provide 32 and 44 hours of runtime, respectively, at maximum fuel consumption, and the MWRF is not equipped with any backup supplies. If Mesa Water elects to provide back-up power at the MWRF, as is recommended in TM-2, additional storage capacity would be required. Per the discussion in TM-2, to achieve a total operational capacity of 10 days of runtime at all of Mesa Water's facilities, approximately two 30,000-gallon centralized diesel fuel storage tanks would need to be installed.

7.2.2 Regulatory and Operational Considerations

There are two types of storage tanks for diesel fuel: aboveground storage tanks (ASTs) and underground storage tanks (USTs). ASTs are simpler and less expensive to construct compared to USTs, which require excavation. If groundwater is encountered, then dewatering and thicker footings to counteract buoyant forces will significantly increase construction costs. ASTs have greater accessibility and allow for visual leak detection. USTs are advantageous for sites where there are space limitations.

Both types of storage tanks are regulated by federal and state-specific regulations. However, regulations are more stringent for USTs as they are one of the greatest sources of groundwater contamination. ASTs are primarily regulated by the Office of the State Fire Marshal under the Aboveground Petroleum Storage Act (APSA). The APSA applies to ASTs with storage capacities exceeding 1,320 gallons of petroleum, or tanks in underground areas with storage capacities less than 1,320 gallons. Federal regulations by the Environmental Protection Agency (EPA) under the Spill Prevention, Control, and Countermeasure (40 CFR Part 112) may also apply. USTs are regulated by the EPA under the 2015 Technical Standards and Correction Action Requirements for Owners and Operators of USTs (40 CFR Part 280) and the California State Water Resources Control Board (CSWRCB) under the UST Program. Regulations for both USTs and ASTs include material selection, containment requirements, and leak detection. USTs have an extensive permitting process, require regular inspections, and in some cases, require groundwater monitoring.

Diesel fuel is susceptible to microbial contamination if it is not regularly maintained. Microbial growth occurs on the fuel surface and results in the formation of biofilm. Microbial contamination is more likely to occur in humid or warm climates. Normal operation of diesel fuel storage tanks can also result in water or solids entering the storage tank and contaminating the fuel. Fuel polishing is typically performed on an annual basis, though the frequency will vary with environmental conditions. Failure to maintain the fuel will result in equipment operating at a reduced capacity, or potentially clogging. Fuel polishing is commonly performed as a service by third party vendors.

Because of state-specific diesel fuel specifications regulated by the California Air Resources Board, a majority of California's diesel fuel supply is refined locally. As discussed in TM-2, California's refining capacity for distillate has exceeded the sales of distillates for the last five years. Thus, availability of local diesel fuel supply is not a concern. Diesel fuel is delivered to storage sites by truck, with the loads ranging from 6 to 12 thousand gallons. Deliveries can potentially be compromised if a natural disaster prompts road closure.

Property acquisition will be necessary for the centralized diesel storage tank as future projects are planned to utilize the available space at Reservoir 1 and the MWRF. Each of the 30,000-gallon diesel fuel storage tanks are horizontal cylindrical type and have an outside diameter of approximately 11 feet and outside length of approximately 52 feet. Considering property and building line setbacks of 25 feet and access for a fuel truck and other maintenance vehicles, a minimum lot size of 85 feet by 120 feet, approximately 10,000 square feet, is anticipated to be required for the new fuel storage facility. If the site were to include a warehouse, as described in Section 7.1, then it is recommended to increase the lot size to a minimum of 165 feet by 120 feet, or approximately 20,000 square feet. Similar to Mesa Water District and Reservoir 1, the new facility would be zoned as General Industrial, which applies to drinking water infrastructure and backup supplies related to this usage.

New ASTs that are regulated by the APSA require a California Fire Code permit, which is obtained from the Orange County Fire Authority through a plan check process. The process includes an initial inspection by the Orange County Health Care Agency (OCHCA). In addition to enforcing the APSA, the OCHCA conducts routine inspections and collects annual fees for ASTs. The APSA also requires that a SPCC plan is prepared and implemented.

New USTs are regulated by the CSWRCB UST Program and require an operating permit, which is obtained from the CSWRCB through an application process. Required documents include as-built drawings, proposed monitoring program, and operator certifications. The monitoring program must include a non-visual monitoring method. If the highest anticipated groundwater level is less than 10 feet below the bottom of the tank, then groundwater monitoring must be implemented. Otherwise, the vadose zone can be monitored. As part of the permit conditions, the owner must maintain various monitoring and maintenance records. Like ASTs, the OCHCA enforces the UST Program and conducts routine inspections.

7.2.3 Costs

Based on a recent project that installed an above grade diesel fuel storage tank, the unit cost for a diesel fuel storage tank ranges from $28/gal to $35/gal. This range of unit costs is based on the following constructed elements and excludes soft costs (i.e., design, permitting, etc.) and a permanent fuel polishing system:

- Structure
  - Reinforced concrete pad with containment berms
  - Transfer pump pads (2 total)
  - Stair landing pad and elevated platform
  - Canopy
- Equipment
  - Transfer pumps (2 total)
  - Diesel fuel storage tank, double wall, carbon steel
  - Remote fill station
  - Leak detection and other appurtenances
- Mechanical
  - Process piping
- Electrical and instrumentation
- Ancillary Equipment
  - Diesel fuel tractor-trailer

At a unit cost of $30/gal, the estimated construction cost for two 30,000-gallon ASTs is approximately $1.8 million. This excludes soft costs (i.e., design, permitting, etc.) and the cost to acquire property. The cost for a diesel fuel tractor-trailer with approximately 8,000-gallon capacity is estimated to be $200,000.

Section 8: Recommendations

Table 8-1 summarizes the recommendations that mitigate or reduce the findings of this Emergency Supply Chain Reliability and Disruption Analysis and includes an associated cost for each item. Costs are in 2020 U.S. dollars and do not include escalation.

Table 8-1. Summary of Recommendations and Associated Costs				
Site / System	Recommendations	Quantity	Estimated Cost	Extended Cost
Well Sites - All				
Chemical Storage Tanks – Sodium Hypochlorite, Aqua Ammonia	• Install connection with valve for tote.	10	$15,000 (each connection)	$150,000
Containment Level Switch – Sodium Hypochlorite, Aqua Ammonia	• Install bypass switch at local control panel.	10	$3,000 (each switch)	$30,000
Solenoid Valves (General)	• For new Well 12 and 14 projects, install solenoid valves with manual overrides.	6	$2,000 (each valve)	$12,000
Main Breaker	• Install second feeder breaker with transfer switch.	1	$150,000	$150,000
Well Site 1				
Portable Generator Connection	• Procure truck-mounted portable generator system.	1	$630,000~~$500,000~~	$630,000~~$500,000~~
Reservoirs 1 and 2				
Centralized Diesel Fuel Tank with Diesel Fuel Tractor-Trailer	• Install two 30,000-gallon diesel fuel tank at new property to be acquired by Mesa Water (cost does not include property acquisition) • Diesel fuel tractor-trailer (8,000-gallon capacity) • Warehouse ($30/sf @ 6,400 sf) • Property Acquisition ($1.5 million)	1	$6,650,000~~$3,700,000~~	$6,650,000~~$3,700,000~~
MWRF				
Nanofiltration Feed	• Provide spare pump. • Pressure switch – Install bypass switch at control panel. • Flow switch – Install bypass switch at control panel.	1	$40,000 (total)	$40,000
Caustic Soda	• Storage tank – Install direct connection for with valve for tote or tank truck. • Containment level switch – Install bypass switch at control panel. • Discharge level switch – Install bypass switch at control panel.	1	$20,000 (total)	$20,000

Table 8-1. Summary of Recommendations and Associated Costs				
Site / System	Recommendations	Quantity	Estimated Cost	Extended Cost
Carbon Dioxide	• Storage tank – Install direct connection for with valve for tote or tank truck. • Heater – Install redundant heat exchanger.	1	$35,000 (total)	$35,000
Sodium Hypochlorite	• Storage tank – Install direct connection for with valve for tote or tank truck. • Containment level switch – Install bypass switch at control panel. • Discharge level switch – Install bypass switch at control panel.	1	$20,000 (total)	$20,000
Aqua Ammonia	• Storage tank – Install direct connection for with valve for tote or tank truck. • Containment level switch – Install bypass switch at control panel. • Discharge level switch – Install bypass switch at control panel.	1	$20,000 (total)	$20,000
Sodium Bisulfite	• Storage tank – Install direct connection for with valve for tote or tank truck. • Containment level switch – Install bypass switch at control panel. • Discharge level switch – Install bypass switch at control panel.	1	$20,000 (total)	$20,000
Scale Inhibitor	• Add a supervisor override for the Scale Inhibitor Storage Tank to allow the MWRF to continue operation without scale inhibitor.	1	$3,000	$3,000
Main Breaker	• Install second feeder breaker with transfer switch at SWBD-2 and MCC-3.	2	$250,000	$500,000
Network, Controls and Communication Systems				
PLC – Spare Stock	• Modicon 580 series spare stock should be purchased.	2	$20,000 (each PLC)	$40,000
PLC – Spare Stock	• A-B CompactLogix spare stock should be purchased.	2	$5,000	$10,000
PLC – I/O Allocation	• Assign duty and standby equipment to different I/O cards where possible.	N/A	N/A	N/A
UPS – Spare Stock	• Purchase one spare UPS of each type and stock in the warehouse. When the UPS fails at a site, the warehouse spare should be installed and immediately replaced.	4	$1,000 (each UPS)	$4,000

Table 8-1. Summary of Recommendations and Associated Costs				
Site / System	Recommendations	Quantity	Estimated Cost	Extended Cost
Communications - Hardware	• As sites are upgraded with dual path radio systems, existing radios should be returned to Mesa Water and added to the warehouse spares. Spare dual path radios should be purchased.	8	$1,500 (each dual path radio)	$12,000
			Total Cost:	$8,346,000$5,266,000
			Total Cost (Rounded):	$5,300,000$8,400,000

Attachment A: SCA – Questionnaires and Responses

- A1: Questionnaire - Supplier
- A2: Questionnaire - Contractor
- A3: Questionnaire - Laboratory
- A4: Phone Conversation Record – Hill Brothers Chemical Company
- A5: Email Response – Northstar Chemical
- A6: Email Response – JCI Jones Chemicals, Inc.
- A7: Email Response - Linde
- A8: Email Response – W.A. Rasic Construction Co., Inc.
- A9: Email Response – GCI Construction
- A10: Email Response – Leed Electric, Inc.
- A11: Email Response – A C Pozos Electric Corporation
- A12: Email Response – Copp Contracting, Inc.
- A13: Email Response – Weck Laboratories
- A14: Email Response – Orange County Water District

Attachment B: SPFA – Meeting Minutes

- B1: SPFA Workshop 1 – September 14, 2020
- B2: SPFA Workshop 2 – September 21, 2020
- B3: SCADA Workshop 1 – September 21, 2020

Attachment C: SPFA – Well Site 1

Attachment D: SPFA – Well Sites 3, 7 and 9

Attachment E: SPFA – Well Site 5

Attachment F: SPFA – MWRF and Finished Water System

Attachment G: SPFA – Metered Turnouts

Attachment H: SCADA Network

MEMORANDUM

Dedicated to Satisfying our Community's Water Needs

TO: Board of Directors

FROM: Marwan Khalifa, CPA, MBA, Chief Financial Officer

DATE: March 23, 2021

SUBJECT: Financial Auditor Selection

RECOMMENDATION

Recommend that the Board of Directors approve a one-year contract extension to Clifton Larson Allen, formerly White Nelson Diehl Evans LLP, to perform annual financial audit services for the fiscal year ending June 30, 2021.

STRATEGIC PLAN

Goal #3: Be financially responsible and transparent.

PRIOR BOARD ACTION/DISCUSSION

At its October 12, 2004 meeting, the Board of Directors (Board) adopted Resolution No. 1307 Establishing a Policy to Solicit Proposals for Outside Auditing Services Superseding Resolution No. 1226. Under Resolution No. 1307, at the discretion of the Board and upon conclusion of the initial three-year term, the Board may authorize up to two additional one-year renewals with the current firm. In addition, the policy imposed a limit of five consecutive annual audits by the same firm.

In April 2011, Mesa Water District (Mesa Water®) issued a financial audit Request for Proposals (RFP) and received proposals from three firms: Diehl Evans & Company, Mayer Hoffman McCann, and Lance, Soll & Lunghard. The Board selected Mayer Hoffman McCann (now Davis Farr) to perform annual financial audits from Fiscal Year (FY) 2011 to FY 2013 with options to renew for FY 2014 and FY 2015, which were exercised. Davis Farr completed five financial audits; the cost of the final year's financial audit was $25,700.

At its March 21, 2016 meeting, the Finance Committee reviewed Professional Auditing Services proposals from four firms and directed staff to agendize Financial Auditor Selection at the next Board Meeting.

At its April 14, 2016 meeting, the Board awarded a contract to White Nelson Diehl Evans LLP (WNDE) to perform annual financial audit services for fiscal years ending June 30, 2016, June 30, 2017 and June 30, 2018 with two optional one-year extensions.

At its April 18, 2016 workshop, the Board directed staff to agendize Financial Auditor Selection at a future Board meeting to reconsider the approved motion from the April 14, 2016 meeting.

At its May 19, 2016 meeting, the Board deferred Financial Auditor Selection to a future Finance Committee for further discussion.

At its June 20, 2016 meeting, the Finance Committee approved the scope of work within the existing Professional Auditing Services RFPs, developed a scope of work and budget to conduct a Fraud Audit, and awarded a contract to WNDE to perform annual financial audit services for fiscal years ending June 30, 2016, June 30, 2017 and June 30, 2018 with two optional one-year extensions.

At its June 8, 2017 meeting, the Board adopted Resolution No. 1501 Establishing a Policy for the Selection Process for the Appointment of General Legal Counsel and Independent Auditor, Superseding Resolution No. 1307.

At its April 11, 2019 meeting, the Board approved two additional one-year renewals with WNDE to perform annual financial audit services for the fiscal years ending June 30, 2019 and June 30, 2020.

DISCUSSION

Clifton Larson Allen (CLA), formerly WNDE, has completed the last five annual financial audits and preparation of the Comprehensive Annual Financial Report (CAFR) for fiscal years ending June 30, 2016, June 30, 2017, June 30, 2018, June 30, 2019, and June 30, 2020.

Due to COVID-19, a transition to a new auditor would be difficult while staff is working from home. Staff recommends that the Board approve a one-year contract extension to CLA to perform annual financial audit services for the fiscal year ending June 30, 2021. Once staff returns to the office full-time, a new RFP will be conducted to acquire a firm to perform the annual financial audit for the fiscal year ending June 30, 2022.

The table below shows the maximum fees for the fiscal year ending June 30, 2021:

Services	Cost
Audit	$30,050
Preparation of the CAFR	$ 4,060
Total	**$34,110**

FINANCIAL IMPACT

The requested funding of $35,000 will be budgeted in the proposed Fiscal Year 2022 Budget.

ATTACHMENTS

None.

REPORTS:

14. REPORT OF THE GENERAL MANAGER

REPORTS:

15. DIRECTORS’ REPORTS AND COMMENTS

There are no support materials for this item.