ENGINEERING AND OPERATIONS COMMITTEE MEETING
Tuesday, October 16, 2018 at 3:30 p.m.

CALL TO ORDER

PLEDGE OF ALLEGIANCE

PUBLIC COMMENTS

Items Not on the Agenda: Members of the public are invited to address the Board on 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.

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. Developer Project Status Report
2. Mesa Water and Other Agency Projects Status Report
3. Water Quality Call Report
4. Committee Policy & Resolution Review
5. Water Operations Status Report

ACTION ITEMS:
None

PRESENTATION AND DISCUSSION ITEMS:
Items recommended for approval at this meeting may be agendized for approval at a future Board meeting.

6. Fiscal Year 2018 Water Loss Audit
7. Mesa Water Reliability Facility Zone of Influence
8. 2018 Fall ACWA/JPIA H.R. LaBounty Safety Awards

REPORTS:
10. Directors' Reports and Comments

INFORMATION ITEMS:

11. I-405 Widening Project

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.

ADJOURNMENT
<table>
<thead>
<tr>
<th>FILE NO.</th>
<th>PROJECT ADDRESS</th>
<th>PROJECT DESCRIPTION</th>
<th>PROJECT NOTES/STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILE NO.</td>
<td>PROJECT ADDRESS</td>
<td>PROJECT DESCRIPTION</td>
<td>PROJECT NOTES/STATUS</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FILE NO.</td>
<td>PROJECT ADDRESS</td>
<td>PROJECT DESCRIPTION</td>
<td>PROJECT NOTES/STATUS</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>C0024-17-01</td>
<td>1989 Orange</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 3/27/17. Fees paid and permit issued on 4/25/17. Site visit on 10/30/17, and again on 5/30/18; homes currently under construction. Meter installed on 6/21/18. Flow thru check on 7/12/18. Project in process of closing. (10/9/18)</td>
</tr>
<tr>
<td>C0027-17-01</td>
<td>231 Flower Street</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 3/23/17. Fees paid and permit issued on 4/21/17. Site visit on 10/30/17, and again on 5/30/18; no progress to report. Site visit on 8/20/18 and 9/25/18 with no activity. (10/9/18)</td>
</tr>
<tr>
<td>FILE NO.</td>
<td>PROJECT ADDRESS</td>
<td>PROJECT DESCRIPTION</td>
<td>PROJECT NOTES/STATUS</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>C0029-17-01</td>
<td>127 23rd St.</td>
<td>4 Single Family Homes</td>
<td>Plans received and plan check fees paid on 5/12/17. Fees paid and permit issued on 8/3/17. Awaiting call for initial inspections. Service installed on 2/8/18. Meters installed and locked on 2/15/18. Awaiting call for backflow testing to complete project. Spoke to property owner on 10/10/18, construction will be done by the end of 2018 to test flowthru system. (10/10/18)</td>
</tr>
<tr>
<td>C0035-18-01</td>
<td>146 18th Street</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 8/8/17. Fees paid and permit issued on 9/21/17. Meters installed and locked on 10/20/17. Site visit on 1/9/18; Awaiting call for backflow testing to complete project. (10/9/18)</td>
</tr>
<tr>
<td>C0039-18-01</td>
<td>172/174 Costa Mesa Street</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 8/22/17. Fees paid and permit issued on 8/29/17. Awaiting call for initial inspections. Construction to start in October. (10/9/18)</td>
</tr>
<tr>
<td>C0040-18-01</td>
<td>365 Costa Mesa Street</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 8/22/17. Awaiting final fee payment. Site check on 8/20/18 and 9/25/18 to verify progress and house is currently being built. (10/9/18)</td>
</tr>
<tr>
<td>FILE NO.</td>
<td>PROJECT ADDRESS</td>
<td>PROJECT DESCRIPTION</td>
<td>PROJECT NOTES/STATUS</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------</td>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>C0042-18-01</td>
<td>335 &amp; 337 16th Place</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 10/26/17. Final fees paid on 8/8/18. Site visit on 8/20/18 to verify that work had not been started without our knowledge; contractor still grading the area. (10/9/18)</td>
</tr>
<tr>
<td>C0044-18-01</td>
<td>276 E 19th Street</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 1/21/18. Awaiting final fee payment. (10/9/18)</td>
</tr>
<tr>
<td>C0048-18-01</td>
<td>235 Baker</td>
<td>Commercial Building</td>
<td>Plans received and plan check fees paid on 2/15/18. Fees paid and permit issued on 4/13/18. Site visit on 8/20/18 to verify no work had been done without our knowledge; no construction happening at all. (10/9/18)</td>
</tr>
<tr>
<td>C0049-18-01</td>
<td>428 E 17th</td>
<td>Restaurant</td>
<td>Plans received and plan check fees paid on 1/26/18. Fees paid and permit issued on 5/4/18. Pressure test on 5/25/18. Shutdown for tee cut-in on 6/5/18. One fire service is active, the other is stubbed to property. Awaiting call for fireline pressure test and samples. Water service manifold stubbed to property. Pressure test and Bac-T tests done on 9/7/18, 9/11/18 and again on 9/13/18. (10/9/18)</td>
</tr>
<tr>
<td>C0052-18-01</td>
<td>302 Cabrillo</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 2/26/18. Fees paid and permit issued on 5/7/18. Awaiting initial calls for inspections. (10/9/18)</td>
</tr>
</tbody>
</table>
## DEVELOPER PROJECT STATUS REPORT

<table>
<thead>
<tr>
<th>FILE NO.</th>
<th>PROJECT ADDRESS</th>
<th>PROJECT DESCRIPTION</th>
<th>PROJECT NOTES/STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0054-18-01</td>
<td>3505 Cadillac Unit O-101</td>
<td>Commercial Building</td>
<td>Plans received and plan check fees paid on 5/7/18. Fees paid and permit issued on 5/22/18. Tapping sleeve, and hot tapping done on 5/2/18. Thrustblock placement inspections on 5/2/18, 6/6/18, and 7/9/18. Pressure test done on 7/9/18. Fireline turned on 9/12/18. (10/9/18)</td>
</tr>
<tr>
<td>C0056-18-01</td>
<td>2033 Republic Ave</td>
<td>Single Family Home Service &amp; Meter Upgrade</td>
<td>Plans received and plan check fees paid on 6/19/18. Comments returned for second plan check review on 7/26/18. Awaiting owners next submittal. (10/9/18)</td>
</tr>
<tr>
<td>C0058-18-01</td>
<td>585 &amp; 595 Anton Blvd.</td>
<td>Apartment Complex</td>
<td>Plans received and plan check fees paid on 6/8/18. Currently in plan check. Meeting scheduled with owner on 9/12/18 to go over questions they have. Plans approved to perform demolition for grading only at this time; construction plans are being reviewed. (10/9/18)</td>
</tr>
<tr>
<td>C0059-18-01</td>
<td>365 Esther St</td>
<td>Single Family Home Meter Upgrade</td>
<td>Plans received and plan check fees paid on 8/2/18. Awaiting final payment of fees. (10/9/18)</td>
</tr>
<tr>
<td>C0060-19-01</td>
<td>3505 Cadillac Ave Unit F-9</td>
<td>Commercial Building New Fire Line</td>
<td>Plans received and plan check fees paid on 7/23/18. Currently in plan check and awaiting information from owner to proceed. (10/9/18)</td>
</tr>
</tbody>
</table>
Project Title: OC-44 Replacement and Rehabilitation Evaluation and Cathodic Protection Study

File No.: M 2034

Description: Evaluate potential repair and replacement options

Status: The Habitat Mitigation and Monitoring Plan (HMMP) has been updated by Michael Baker (former RBF) to reflect the USACE’s process and submitted to Mesa Water for review on 1/8/16. Once the HMMP is revised and approved (1/19/16) it will be forwarded to all agencies, including the Coastal Commission. Draft 1602 Streambed Permit obtained on 12/18/15. Final 1602 Streambed Permit pending CDFW will be issued while HMMP is accepted. U.S. Army Corps of Engineers’ 404 permit received on 2/10/16. Revised HMMP sent to CCC for review and approval. Project is pending CCC’s approval at an upcoming hearing. On 2/29/16, a meeting with Fletcher Jones Motorcars, City of Newport Beach, MBI (former RBF), and City of Huntington Beach was held to discuss issues associated with proposed construction activities. Traffic Plan prepared and submitted to the City of Newport Beach for approval on 6/29/16. Per request of CCC a dewatering plan was prepared and submitted for approval. Mesa Water staff, MBI and CCC met on 10/6/16 and discussed mitigation conditions. Project approved at CCC Public Hearing on 12/7/16. MBI is working on finalizing the HMMP and construction plans and will submit them to CCC. Staff met with MBI on 5/1/17 and discussed comments after reviewing the draft final HMMP. New proposed mitigation criteria received from CCC on 7/5/17 reducing mitigation requirements from 1.6 acres to 0.66 acres. Coastal Development Permit for Construction is anticipated in December, 2017. The project re-start meeting was held on 9/7/17. On 10/30/17 met with City of Newport Beach and City of HB to discuss permit requirements and project access. Met w/Fletcher Jones, Skender Construction, City of HB, MBI to discuss access to the site and scheduling on November 21, 2017. Reviewing the 100% Design Plans & Specs (received on 11/28/17) along with the Pipeline Design Schedule, Construction Monitoring Treatment Plan (CMTP), and proposal for Natural Resources/Regulatory Services during construction activities. Bid solicitation is scheduled for late January 2018. Project sent out to bid on January 30, 2018. Pre-bid meeting held on 2/15/18. Construction bid solicitation was cancelled due to ongoing coordination issues for the final Coastal Development permit. Project was deferred to FY20. On 8/1/18, Orange County Public Works issued a one-year extension to the previously issued Encroachment Permit. The Caltrans Encroachment Permit extension application is under review as of 8/13/18. The CCC extended the permit a year without hearing. MBI moved forward with the amendment to reduce mitigation. The updated information was forwarded by MBI to CCC in the week of August 6, 2018. The CCC hearing is expected in November 2018. (10/4/18)
Project Title: Well Automation and Rehabilitation

File No.: MC 2101

Description: Rehabilitate all clear water wells and add remote control SCADA capabilities

Status: Construction activities began at Well 5 on October 3, 2016 with demolition and well rehabilitation beginning in the first week. Video of Well 5 showed scale on the louvers, and potential failure of an unused sounding tube and a small area of the louvers potentially requiring swage patches. Repair completed on November 29, 2016. Well 5 rehabilitation resumed on December 3, 2016. Well 5 chemical facility pad has been constructed and is awaiting a weather forecast of 8 days with no predicted rain to apply the chemical-resistant coatings to the concrete. Well 5 pumping development began on January 4, 2017, and produced fine sand at pumping rates above 1100 gpm. Repairs were made to Well 5, and test pumping performed in February showed acceptable well production over 2500 gpm with manageable sand. Construction is substantially complete at the Well 5 site. A start up planning meeting was held on March 29, 2017. Well 5 is running as needed and producing good quality water. Well 7 rehabilitation is complete, The Well 7 pump was installed the week of August 28, 2017, and Well 7 is operational and good quality water. Construction of the Well 3 chemical facilities was begun in July 2017. The concrete for the Well 3 chemical facilities is cured and coated, and the chemical tanks and canopy are currently being installed. Well 3 rehabilitation is complete and test pumping achieved over 1600 gpm. Construction at Well 9 began in October with relocation of the backup generator and chemical facilities construction. Coating of the Well 9 chemical facilities was completed in December, and the chemical tanks and canopy are installed. Witness testing for the new pumps for Wells 3 and 9 was completed January 2018, and pumps were installed the week of June 4. Construction at Well 3 and Well 9 is substantially complete. Flushing and chlorination of Well 3 and Well 9 were conducted during in July 2018. Well 3 initial startup was on July 17, 2018. Well 9 initial startup was on July 30, 2018. Well 3 and Well 9 have completed their seven-day tests. Work at Well 1 began on August 13, 2018. Well 1 site demolition is complete. The video of Well 1 showed a biofilm. Well 1 has received brushing and airlifting of fill material. Acid wash is scheduled for late October.
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: Extraction of six sections of ACP and two sections of CIP are in process for 2017 destructive testing. ACP samples were sent to WSP Canada for destructive testing. Results were received on August 1, 2017. CIP samples will be sent to McWane Ductile’s lab in Ohio for destructive testing. Results were received on June 30, 2017. A Request for Qualifications for consulting services for the Pipeline Integrity Testing Program was released in May 2017. Four Statements of Qualifications were received and a recommendation for contract award to HDR was approved by the E&O Committee on July 20, 2017. ACP test results were received on July 31, 2017. Results have been analyzed, and were presented at the November Committee meeting. Average ACP total useful life is expected to be approximately 142 years. A process for determining when a pipeline has reached the end of its useful life and how much of the pipeline to replace was implemented. One 8” ACP line in Harbor Boulevard from Wilson to 19th Street was recommended for replacement. Kickoff meeting for a close interval survey of the 12” Cast Iron Pipe in 19th Street was held on December 28, 2017, and the Consultant has completed the field work. The report is expected in April 2018. Operations staff has collected four ACP pipe samples during valve replacement projects, and one during an AC mainline repair. The samples have been sent to a laboratory for remaining wall thickness measurements, and the reports show that while they have lost structural thickness, the remaining useful life is still 35 - 53 years. The mainline break sample showed the smallest remaining useful life and shortest total useful life of any AC sample. Additional AC pipe samples from valve replacements are being collected. Echologics performed three miles of non-destructive wall thickness measurements during the week of February 12, 2018. A report of the results was received in March 2018. All non-destructive and destructive test data were added to GIS in April and May 2018. The mainline break map in GIS is currently being updated. A comprehensive review of cathodic protection test stations was performed in April and May 2018. The report and recommendations was received on June 20, 2018, and recommendations are being reviewed. Five AC pipe samples and nine soil samples collected during valve replacements in 2018 were delivered by the contractor and sent to labs for pipe wall thickness measurements and soil corrosivity analysis. Results show that the expected total useful life of AC pipe is approximately 138 years. The next Echologics pipeline testing is scheduled to occur in early 2019. (10/8/18)
**Project Title:** Mesa Water Main Office HVAC Study  
**File No.:** MC 2171  
**Description:** Evaluate the existing HVAC system and provide recommendations for improved efficiency and operations of the system.  
**Status:** Mesa Water has contracted with Goss Engineering Inc. to perform this study. Kick off meeting was held January 13, 2016. Goss Engineering performed a field survey of both main campus buildings over the course of three days. Draft report with results and recommendations was reviewed by staff. The final report was delivered on June 30, 2016 and was reviewed by staff for completeness. Staff presented the findings and recommendation to the Board of Directors at the July E&O Committee Meeting. Board approved contract to move forward with the design of a complete Variable Refrigerant Flow system. Contract has been executed and returned to Goss Engineering. Project kick-off and notice to proceed was issued on November 30, 2016. 50% drawings have been delivered for review and comments received. Stakeholder meeting was held on February 2, 2017 to provide comments for the new VRF system 50% design. 90% design drawings and specifications were submitted for Mesa Water review on March 10, 2017. Mesa Water managers met with the Consultant to discuss construction phasing. Roof design has been reviewed by Mesa Water and the consultant. Request for proposals for providing Construction Management during construction was sent out to nine consultants on 8/15/18. Three proposals received on 8/28/18. Held interviews with all three proposers on 9/4/18. Jett Construction Management’s (JCM) approach appeared to be the most comprehensive given their proposed project staff and HVAC and roof construction experience. Bid set documents for construction have been finalized and sent out to bid on 9/6/18. Three bids were received on 10/4/18. (10/4/18)

**Project Title:** Croddy and Chandler Wells and Pipeline Project  
**File No.:** M18-113  
**Description:** Design, documentation, and permitting for 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:** Tetra Tech has been contracted to complete the design, documentation, and permitting for the Croddy and Chandler Wells and Pipeline Project. Initial data request sent to Tetra Tech on September 7, 2017. Met with Division of Drinking Water regarding well locations on September 20, 2017. Preliminary hydrological evaluation received on September 29, 2017. Board approved demolition of existing structures and dedicated well facility with option to evaluate long-term lease potential as market conditions dictate at both sites at November 2017 E&O. Butier Engineering has been contracted to provide Construction Management Services. Preliminary Design Report (PDR) for the distribution pipeline was reviewed and returned on March 6, 2018. Well site layouts were presented to the Board in May. DDW waiver for 50-foot control zone is currently being drafted. The revised PDR for the pipeline and the well sites was received in June 2018. A workshop to discuss review comments was held on August 14, 2018. 50% design is scheduled for submittal in December 2018.
<table>
<thead>
<tr>
<th>Project Title: Santa Ana Pressure Reducing Station Refurbishment Project</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>File No.:</td>
<td>M17-002A</td>
</tr>
<tr>
<td>Description:</td>
<td>The work will involve replacement of three (3) butterfly valves, one (1) existing pressure relief valve, precast concrete discharge structure, reconfiguring four (4) Cla-Val control valves, general refurbishments to the vault interior, and site work.</td>
</tr>
<tr>
<td>Status:</td>
<td>Mesa Water has contracted with Michael Baker International to perform the design of the project. The design was completed in late January 2018 and the bid package was sent out to bid on February 8, 2018. Pre-bid meetings and site walk were held on 2/20/18 and 3/6/18, respectively. Three bids were received on March 13, 2018. Staff has recommended that the construction contract be awarded to J.R. Filanc, Inc., as the lowest bidder. E&amp;O Committee recommended awarding contract to J.R. Filanc, Inc. on March 20, 2018 and Board approved it on April 12, 2018. The contract was finalized (5/1/18) and signed on 5/3/18. The kick-off meeting was held on May 21, 2018. Electrical work and shutdown is scheduled for 10/15/18. In preparation for the shutdown Filanc is working on completing the upfront work of the shutdown.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Title: Meter Technology Evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>File No.:</td>
<td>MC 2248</td>
</tr>
<tr>
<td>Description:</td>
<td>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.</td>
</tr>
<tr>
<td>Status:</td>
<td>Mesa Water is preparing a Technical Memo which would include information of the existing aging metering technology in comparison with proposed new meter reading solutions. The draft Memo will be ready in mid-November, 2018.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Title: Reservoir 1 &amp; 2 Chemical Systems Design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>File No.:</td>
<td>M18-117</td>
</tr>
<tr>
<td>Description:</td>
<td>Improve disinfection and mixing in both reservoirs to improve water quality and minimize nitrification.</td>
</tr>
<tr>
<td>Status:</td>
<td>Final Design Contract awarded to Hazen &amp; Sawyer on February 14, 2018. 50% design report received on July 17, 2018. Design review workshop took place in September 2018.</td>
</tr>
</tbody>
</table>
Water Quality Call Report
September 2018

Date: 9/4/2018
Source: Email/Visit
Address: 2358 Harbor Blvd. #101
Description: Customer emailed stating “the water taste like chlorinated pool water and after showering, the bathroom smells like a public pool.”

Outcome: Customer did not leave a phone number so an email was sent back to the customer explaining that chlorine residuals were checked in the distribution system and at the well sites. All results are under the state and federal maximum allowable level. Customer requested to have the water checked although she will not be home. Staff took a sample outside the apartment complex and chlorine residual was within normal range. No chlorine odor was detected in the water and the finding was communicated to customer.

Date: 9/5/2018 & 9/13/2018
Source: Phone
Address: 910 Liard Place
Description: Customer inquired twice regarding the pH of the water.

Outcome: With both calls, the customer was provided with the range and average pH values. An Annual Water Quality Report was dropped off to the customer. Customer was satisfied.

Date: 9/10/2018
Source: Phone
Address: 2051 Meadow View
Description: Customer wants to know the metal levels of her water.

Outcome: Explained to customer about the Annual Water Quality Report and the data in the water quality tables. Offered to provide customer a list of local drinking water laboratories should she want to pursue sampling the water in her home.
Date: 9/13/2018  
Source: Phone  
Address: 1884 Placentia  
Description: Customer wants to know the hardness level in grains per gallon.  
Outcome: Provided customer with the range and average hardness levels. Customer was satisfied.

Date: 9/13/2018  
Source: Phone  
Address: 3017 Warren Ln.  
Description: Customer was curious why the water has been soft lately.  
Outcome: Explained to customer that the water hardness levels vary from one source to another. Both of the deep aquifer wells, which have softer water, have been operating simultaneously during the recent weeks and customer was noticing the softer water. Customer appreciated the explanation.

Date: 9/18/2018  
Source: Phone  
Address: 702 Randolph  
Description: Customer wants to know the chlorine residual levels in the water.  
Outcome: Provided customer with the range and average chlorine residuals from the Annual Water Quality Report. Customer will call back if he has more questions.
<table>
<thead>
<tr>
<th>Policy Name</th>
<th>Resolution No.</th>
<th>Date Adopted</th>
<th>Revision Schedule</th>
<th>Last Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules and Regulations for Water Service</td>
<td>1514</td>
<td>07/12/18</td>
<td>Review and update as needed</td>
<td>07/12/18</td>
</tr>
<tr>
<td>Standard Specifications and Standard Drawings</td>
<td></td>
<td>05/03/18</td>
<td>Review and update as needed</td>
<td>05/03/18</td>
</tr>
<tr>
<td>Urban Water Management Plan</td>
<td>1477</td>
<td>06/09/16</td>
<td>Review and update as required every 5 years</td>
<td>06/09/16</td>
</tr>
</tbody>
</table>
## Water Operations Status Report

### July 1, 2018 - September 30, 2018

**Operations Department Status Report**

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Wk Unit</th>
<th>Plan Days</th>
<th>Act Days</th>
<th>Plan Qty</th>
<th>Act Qty</th>
<th>Plan Cost</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01 - HYDRANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD-0101 - HYDRANT MAINTENANCE</td>
<td>HYDRANTS</td>
<td>44</td>
<td>12</td>
<td>880</td>
<td>223</td>
<td>$17,771</td>
<td>$4,408</td>
<td></td>
</tr>
<tr>
<td>WD-0102 - HYDRANT PAINTING</td>
<td>HYDRANTS</td>
<td>3</td>
<td>0</td>
<td>110</td>
<td>0</td>
<td>$1,468</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>WD-0103 - HYDRANT REPAIR</td>
<td>HYDRANTS</td>
<td>13</td>
<td>3</td>
<td>15</td>
<td>3</td>
<td>$4,222</td>
<td>$1,028</td>
<td></td>
</tr>
<tr>
<td><strong>Program 01 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$23,461</td>
</tr>
<tr>
<td><strong>02 - VALVES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD-0201 - DISTRIBUTION VALVE MAINTENANCE</td>
<td>VALVES</td>
<td>31</td>
<td>23</td>
<td>625</td>
<td>458</td>
<td>$12,848</td>
<td>$9,119</td>
<td></td>
</tr>
<tr>
<td>WD-0202 - NIGHT VALVE MAINTENANCE</td>
<td>VALVES</td>
<td>7</td>
<td>0</td>
<td>52</td>
<td>0</td>
<td>$2,985</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Program 02 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$15,833</td>
</tr>
<tr>
<td><strong>03 - METERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD-0301 - NEW METER INSTALLATION</td>
<td>METERS</td>
<td>7</td>
<td>6</td>
<td>48</td>
<td>65</td>
<td>$15,828</td>
<td>$29,706</td>
<td></td>
</tr>
<tr>
<td>WD-0302 - RAISE REPLACE METER BOX</td>
<td>BOXES</td>
<td>3</td>
<td>3</td>
<td>15</td>
<td>4</td>
<td>$2,481</td>
<td>$1,203</td>
<td></td>
</tr>
<tr>
<td>WD-0303 - METER LEAK INVESTIGATION/REPAIR</td>
<td>INV/REP</td>
<td>10</td>
<td>11</td>
<td>78</td>
<td>69</td>
<td>$2,889</td>
<td>$4,890</td>
<td></td>
</tr>
<tr>
<td>WD-0305 - ANGLE STOP/BALL VALVE REPLACE</td>
<td>REPLACE</td>
<td>18</td>
<td>22</td>
<td>37</td>
<td>43</td>
<td>$11,012</td>
<td>$8,259</td>
<td></td>
</tr>
<tr>
<td>WD-0306 - LARGE METER TEST/REPAIR - C</td>
<td>TESTS</td>
<td>6</td>
<td>1</td>
<td>30</td>
<td>5</td>
<td>$2,529</td>
<td>$552</td>
<td></td>
</tr>
<tr>
<td><strong>Program 03 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$34,739</td>
</tr>
<tr>
<td><strong>04 - MAIN LINES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD-0401 - MAIN LINE REPAIR</td>
<td>REPAIRS</td>
<td>31</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>$14,239</td>
<td>$2,462</td>
<td></td>
</tr>
<tr>
<td>WD-0402 - AIR VAC MAINTENANCE/REPAIR</td>
<td>REPAIRS</td>
<td>7</td>
<td>0</td>
<td>41</td>
<td>1</td>
<td>$2,605</td>
<td>$84</td>
<td></td>
</tr>
<tr>
<td>WD-0403 - UNIDIRECTIONAL FLUSHING</td>
<td>FEET</td>
<td>0</td>
<td>0</td>
<td>92363</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Program 04 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$16,844</td>
</tr>
<tr>
<td><strong>05 - SERVICE LINES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD-0501 - SERVICE LINE REPAIR</td>
<td>REPAIRS</td>
<td>14</td>
<td>16</td>
<td>5</td>
<td>9</td>
<td>$5,952</td>
<td>$6,470</td>
<td></td>
</tr>
<tr>
<td><strong>Program 05 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5,952</td>
</tr>
<tr>
<td><strong>06 - CAPITAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAP AV - CAPITAL AIR VACUUM REPLACE</td>
<td>AIR VACS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CAP BI - CAPITAL BYPASS &amp; METER INSTALL</td>
<td>REPLACE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CAP FH - CAPITAL HYDRANT UPGRADE</td>
<td>HYDRANTS</td>
<td>35</td>
<td>40</td>
<td>5</td>
<td>5</td>
<td>$28,502</td>
<td>$29,149</td>
<td></td>
</tr>
<tr>
<td>CAP LM - CAPITAL LARGE METERS</td>
<td>METERS</td>
<td>16</td>
<td>6</td>
<td>37</td>
<td>24</td>
<td>$43,342</td>
<td>$13,126</td>
<td></td>
</tr>
<tr>
<td>CAP MV - CAPITAL MAINLINE VALVE REPLACE</td>
<td>VALVES</td>
<td>29</td>
<td>43</td>
<td>5</td>
<td>9</td>
<td>$22,008</td>
<td>$19,402</td>
<td></td>
</tr>
<tr>
<td>CAP SL - CAPITAL SERVICE LINE REPLACE</td>
<td>SERVICES</td>
<td>10</td>
<td>21</td>
<td>2</td>
<td>4</td>
<td>$4,902</td>
<td>$8,098</td>
<td></td>
</tr>
<tr>
<td>CAP SM - CAPITAL SMALL METERS</td>
<td>METERS</td>
<td>30</td>
<td>21</td>
<td>379</td>
<td>253</td>
<td>$36,215</td>
<td>$30,035</td>
<td></td>
</tr>
<tr>
<td>CAP SS - CAPITAL SAMPLE STATION REPLACE</td>
<td>STATIONS</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Program 06 TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$134,969</td>
</tr>
<tr>
<td><strong>VACANT POSITIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$231,798</td>
</tr>
</tbody>
</table>

**Actual Cost**

- $4,408
- $9,119
- $4,890
- $552
- $2,462
- $84
- $0
- $19,402
- $8,098
- $30,035
- $0
- $168,974
MEMORANDUM

Dedicated to Satisfying our Community’s Water Needs

TO: Engineering and Operations Committee
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: October 16, 2018
SUBJECT: Fiscal Year 2018 Water Loss Audit

RECOMMENDATION

Receive the presentation.

STRATEGIC PLAN

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

PRIOR BOARD ACTION/DISCUSSION

At its May 17, 2016 meeting, the Engineering and Operations (E&O) Committee received an information item entitled, “Water Loss Update.”

BACKGROUND

California Senate Bill No. 555 requires urban retail water suppliers to perform an annual water audit using the American Water Works Association’s (AWWA) Free Water Audit Software, version 5.0. The water audit must be validated by a third party certified Water Audit Validator. The validated water audit must be submitted to the State Department of Water Resources by October 1st of each year. Mesa Water District’s (Mesa Water®) Fiscal Year 2018 Water Loss Audit is included as Attachment A.

DISCUSSION

The annual water loss audit starts with a water balance for water that entered the distribution system (water supplied) and water that reached customer meters (water consumed). The difference between water supplied and water consumed is considered water loss. The water loss is further classified and adjusted by production meter and customer meter accuracy testing, estimates of authorized consumption but unmetered water uses, estimates of water theft, and estimates of billing errors. Water losses are characterized as Apparent (or unavoidable) Losses or Real Losses. An example of an Apparent Loss is billing errors, and an example of a real loss is a main line break. Costs are applied to the losses, and a total cost impact is calculated for evaluation. Operations data is also used to normalize the water losses to system pressure and number of connections. To compare urban systems (more than 3000 customers) on the same scale, the Infrastructure Leakage Index (ILI) is calculated as a ratio of the actual water loss to the theoretical minimum water loss given the system pressure, length of main lines, and number of connections based on industry standards.

For each input to the water loss audit, the validity of the input is scored by the third party water audit validator based on criteria in AWWA M36 Water Audits and Loss Control Programs, Fourth Edition. A final data validity score is an output of the AWWA Free Water Audit Software. It is a weighted calculation based on inputs, and normalized to a 100-point scale. The algorithm for the
weighting and normalization is proprietary. A data validity score of 51 or higher indicates actionable data for setting goals and strategies for water loss improvement.

**Fiscal Year 2018 Water Loss Audit Results**

Table 1 summarizes Mesa Water's Water Loss Audit Key Performance Indicators (KPI), and compares Mesa Water's Fiscal Year (FY) 2018 performance to aggregated data from 294 Water Loss Audits submitted in 2017. Of the water produced by Mesa Water, only 2.96% is attributed to real losses from breaks and background leakage, and is considered the actual loss from leaking infrastructure. State statistics on real water loss percentages are not available for comparison. Rather than comparing agencies on percentage of real loss, the State standard for comparing real loss is normalized to gallons of real loss per connection per day. For FY 2018, Mesa Water’s real loss was calculated to be 18.17 gallons per connection per day, which is among the best performing 15% of agencies. Mesa Water’s Infrastructure Leakage Index (ILI) of 1.03 puts Mesa Water and its data validity score of 78 as among the best in the State. The ILI is approaching the theoretical minimum of 1, and the Data Validity Score indicates valid, actionable data that can be used for setting water loss targets and benchmarking.

<table>
<thead>
<tr>
<th><strong>KPI</strong></th>
<th><strong>Target</strong></th>
<th><strong>FY18 Mesa Water</strong></th>
<th><strong>2017 State Mean</strong></th>
<th><strong>2017 State Minimum</strong></th>
<th><strong>2017 State Maximum</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Loss (as percent of water supplied)</td>
<td>Low</td>
<td>2.96%</td>
<td>State Data Not Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Loss (Gal/connection/day)</td>
<td>Low</td>
<td>18.17</td>
<td>38.2</td>
<td>11.15</td>
<td>172.4</td>
</tr>
<tr>
<td>Infrastructure Leakage Index (ILI)</td>
<td>Low</td>
<td>1.03</td>
<td>2.4</td>
<td>1.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Data Validity</td>
<td>High</td>
<td>78</td>
<td>60</td>
<td>37</td>
<td>89</td>
</tr>
</tbody>
</table>

**Planning for Fiscal Year 2019 Water Loss Audit**

The third party Water Loss Audit validator did not make any recommendations for improvements to Mesa Water's Water Loss program. Two changes implemented by Mesa Water may further reduce real losses and improve data validity:

1. **Pressure Controls**: Upgraded pressure monitoring at the reservoirs will reduce the potential for pressure surges and line breaks, which are a main source of real losses.

2. **Source Water**: Data validity was reduced approximately two points for FY 2018 by Mesa Water’s use of CM-2 and OC-14 for In-Lieu Water for approximately 25% of the water supplied. Metropolitan Water District of Southern California’s lack of volumetric meter
testing limits the data validity grade to 5 out of 10. Mesa Water’s robust meter testing program and operational controls over water supply allow for a higher score.

FINANCIAL IMPACT

In Fiscal Year 2019, no funds are budgeted for Water Loss Audits; no funds have been spent to date.

ATTACHMENTS

Attachment A: Fiscal Year 2018 Validated Water Loss Audit
Level 1 Validation Certificate

This document verifies that the Level 1 Validation process was completed. The session details and audit review outcomes are included here.

This certificate is required for submission – alongside the Level 1 validated water audit software file – to the California Department of Water Resources.

Call Date: 9/24/2018

Water Supplier

Supplier Name: Mesa Consolidated Water District

Supplier Participants: Karyn Igarr

Key Audit Metrics

<table>
<thead>
<tr>
<th>Data Validity Score:</th>
<th>78</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI:</td>
<td>1.03</td>
</tr>
<tr>
<td>Real Loss:</td>
<td>18.17 gal / conn / day</td>
</tr>
<tr>
<td>Apparent Loss:</td>
<td>10.58 gal / conn / day</td>
</tr>
<tr>
<td>Non-Revenue Water as Percent of Cost of Operating System:</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

Validator

Validator: Reinhard Sturm,
Water Systems Optimization

Validator Qualifications: Water Audit Validator Certificate from the AWWA California Nevada Section

Certification Statement by Validator

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit.

Level 1 Validation – Water Supplier Confirmation
This document confirms participation in and endorsement of the Level 1 Validation as completed.

This acknowledgement is required for submission – alongside your Level 1 validated water audit software file – to the California Department of Water Resources.

Water Supplier Name: Mesa Water District

Water Supplier Public Water System ID: CA30100004

Water Audit Period: July 1, 2017- June 30, 2018

Water Audit & Water Loss Improvement Steps

Steps taken in the audit period timeframe to increase data source accuracy, reduce real losses, and/or reduce apparent losses, as informed by the water audit.

As part of the water loss audit program, Mesa Water District realized the importance of accurately measuring the production from the Mesa Water Reliability Facility (MWRF) water treatment plant at the point that it enters the distribution system. The MWRF accounts for approximately 25% of Mesa Water production. In FY 2018, Mesa Water District implemented a tank drop test to volumetrically test the MWRF distribution flow meter accuracy. This improvement has increased the accuracy in Mesa Water's production volumes.

Certification Statement by Water Supplier Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, Water Audits and Loss Control Programs, Manual M36, Fourth Edition and in the Free Water Audit Software version 5.

Executive Name (print): Paul Shoenberger, PE

Executive Position: General Manager

Signature: 

Date: Click or tap here to enter text.
AWWA Free Water Audit Software v5.0

The spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M86 Manual for Water Audits for detailed guidance on the water auditing process and targeting loss reduction levels.

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

- Name of Contact Person: Karyn Igar
- Email Address: karyni@mesawater.org
- Telephone | Ext.: 949.967.5452
- Name of City / Utility: Mesa Water District
- City/Town/Municipality: Costa Mesa
- State / Province: California (CA)
- Country: USA
- Start Date: 07/2017
- End Date: 06/2018
- Audit Preparation Date:
- Volume Reporting Units: Acre-feet
- PWSID / Other ID: CA30100004

The following guidance will help you complete the Audit

- All audit data are entered on the Reporting Worksheet
  - Value can be entered by user
  - Value calculated based on input data
  - These cells contain recommended default values

Use of Option (Radio) Buttons:
- Pont: 0.25%
- Value: [ ]

Select the default percentage by choosing the option button on the left.

To enter a value, choose this button and enter a value in the cell to the right.

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page:

- Instructions
- Reporting Worksheet
- Comments
- Performance Indicators
- Water Balance
- Dashboard
- Grading Matrix
- Service Connection Diagram
- Definitions
- Loss Control Planning
- Example Audits
- Acknowledgements

If you have questions or comments regarding the software please contact us via email at: wic@awwa.org
### AWWA Free Water Audit Software: Reporting Worksheet

#### Water Audit Report for: Mesa Water District (CA30100001)

**Reporting Year:** 2018  
**7/2017 - 6/2018**

Please enter data in the white cells below. Where available, metered values should be used. If metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades.

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

#### WATER SUPPLIED

<table>
<thead>
<tr>
<th>Source</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume from own sources</td>
<td>9,210.000</td>
</tr>
<tr>
<td>Water imported</td>
<td>7,905.902</td>
</tr>
<tr>
<td>Water exported</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**WATER SUPPLIED:** 17,120.866 acre-ft/yr

#### AUTHORIZED CONSUMPTION

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billed metered</td>
<td>16,075.808</td>
</tr>
<tr>
<td>Unbilled metered</td>
<td>46,200.000</td>
</tr>
<tr>
<td>Total</td>
<td>214,237.000</td>
</tr>
</tbody>
</table>

**AUTHORIZED CONSUMPTION:** 16,336.245 acre-ft/yr

#### WATER LOSSES (Water Supplied - Authorized Consumption)

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Losses</td>
<td>602.740</td>
</tr>
</tbody>
</table>

**Apparent Losses:** 293.384 acre-ft/yr

**WATER LOSSES:** 802.740 acre-ft/yr

#### NON-REVENUE WATER

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-revenue Water</td>
<td>1,063.178</td>
</tr>
</tbody>
</table>

**Total Non-revenue Water:** 1,063.178 acre-ft/yr

#### SYSTEM DATA

- **Length of mains:** 328.4 miles
- **Number of active AND inactive service connections:** 24,925
- **Service connection density:** 78 con./mile main
- **Are customer meters typically located at the curbside or property line?** Yes
- **Average length of customer service line:** 80.0 ft
- **Average operating pressure:** 80.0 psi

#### COST DATA

- **Total annual cost of operating water system:** $25,422,972
- **Customer retail unit cost (applied to Apparent Losses):** $3.86
- **Variable production cost (applied to Real Losses):** $529,10

#### WATER AUDIT DATA VALIDITY SCORE:

**YOUR SCORE IS: 78 out of 100**

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score.

#### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1. Water imported
2. Billed metered
3. Unauthorized consumption
AWWA Free Water Audit Software: System Attributes and Performance Indicators

Water Audit Report for: Mesa Water District (CA30100004)
Reporting Year: 2018 - 7/2017 - 6/2018

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 78 out of 100 ***

System Attributes:
- Apparent Losses: 295.384 acre-ft/yr
- Real Losses: 507.357 acre-ft/yr
- Water Losses: 802.740 acre-ft/yr
- Unavoidable Annual Real Losses (UARL): 494.28 acre-ft/yr
- Annual cost of Apparent Losses: $496,663
- Annual cost of Real Losses: $300,406 Valued at Variable Production Cost

Performance Indicators:
- Financial:
  - Non-revenue water as percent by volume of Water Supplied: 6.2%
  - Non-revenue water as percent by cost of operating system: 3.7%
  - Real Losses valued at Variable Production Cost
- Operational Efficiency:
  - Apparent Losses per service connection per day: 10.58 gallons/connection/day
  - Real Losses per service connection per day: 18.17 gallons/connection/day
  - Real Losses per length of main per day*: N/A
  - Real Losses per service connection per day per psi pressure: 0.23 gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL): 507.36 acre-feet/year
- Infrastructure Leakage Index (ILI) [CARL/UARL]: 1.03

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline
## AWWA Free Water Audit Software: Water Balance

### Water Audit Report for: Mesa Water District (CA30100004)

#### Reporting Year: 2018 | Data Validity Score: 78

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own Sources (Adjusted for known errors)</td>
<td>9,233,084</td>
<td>Water Exported: 0.000</td>
</tr>
<tr>
<td>System Input</td>
<td>17,138,986</td>
<td>Authorized Consumption: 16,336,245</td>
</tr>
<tr>
<td>Water Supplied</td>
<td>17,138,986</td>
<td>Billed Authorized Consumption: 16,075,808</td>
</tr>
<tr>
<td>Water Losses</td>
<td>802,740</td>
<td>Unbilled Authorized Consumption: 260,437</td>
</tr>
<tr>
<td>Water Imported</td>
<td>7,905,902</td>
<td>Apparent Losses: 295,384</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real Losses: 507,357</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Billed Water Exported: 0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revenue Water: 15,075,808</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-Revenue Water (NRW): 1,063,178</td>
</tr>
</tbody>
</table>

**Revenue Water**

- Billed Metered Consumption (water exported is removed): 16,075,808
- Billed Unmetered Consumption: 0.000
- Unbilled Metered Consumption: 46,200
- Unbilled Unmetered Consumption: 214,237

**Systematic Data Handling Errors**

- Leakage on Transmission and/or Distribution Mains: Not broken down
- Leakage and Overflows at Utility's Storage Tanks: Not broken down
- Leakage on Service Connections: Not broken down

AWWA Free Water Audit Software v5.0

Water Balance 1
## Water Loss Control Planning Guide

### Water Audit Data Validity Level / Score

<table>
<thead>
<tr>
<th>Functional Focus Area</th>
<th>Level I (0-25)</th>
<th>Level II (26-50)</th>
<th>Level III (51-70)</th>
<th>Level IV (71-90)</th>
<th>Level V (91-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Data Collection</td>
<td>Launch auditing and loss control team; address production metering deficiencies</td>
<td>Analyze business process for customer metering and billing functions and water supply operations; identify data gaps</td>
<td>Establish/review policies and procedures for data collection</td>
<td>Refine data collection practices and establish as routine business process</td>
<td>Annual water audit is a reliable gauge of year-to-year water efficiency standing</td>
</tr>
<tr>
<td>Short-term loss control</td>
<td>Research information on leak detection programs; Begin flowcharting analysis of customer billing system</td>
<td>Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak surveys, unauthorized consumption, etc.</td>
<td>Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring</td>
<td>Refine, enhance or expand ongoing programs based upon economic justification</td>
<td>Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation</td>
</tr>
<tr>
<td>Long-term loss control</td>
<td>Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.</td>
<td>Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.</td>
<td>Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management</td>
<td>Continue incremental improvements in short-term and long-term loss control interventions</td>
<td></td>
</tr>
<tr>
<td>Target-setting</td>
<td>Establish long-term apparent and real loss reduction goals (+10 year horizon)</td>
<td>Establish mid-range (5 year horizon) apparent and real loss reduction goals</td>
<td></td>
<td></td>
<td>Evaluate and refine loss control goals on a yearly basis</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>Preliminary Comparisons - can begin to rely upon the infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)</td>
<td>Performance Benchmarking - ILI is meaningful in comparing real loss standing</td>
<td></td>
<td></td>
<td>Identify Best Practices/Best in class - the ILI is very reliable as a real loss performance indicator for Best in class service</td>
</tr>
</tbody>
</table>

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.
Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities in gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.  

**Note:** This table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

---

### General Guidelines for Setting a Target ILI  
**without doing a full economic analysis of leakage control options**

<table>
<thead>
<tr>
<th>Target ILI Range</th>
<th>Financial Considerations</th>
<th>Operational Considerations</th>
<th>Water Resources Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 - 3.0</td>
<td>Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.</td>
<td>Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.</td>
<td>Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.</td>
</tr>
<tr>
<td>&gt;3.0 - 5.0</td>
<td>Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.</td>
<td>Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.</td>
<td>Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term planning.</td>
</tr>
<tr>
<td>&gt;5.0 - 8.0</td>
<td>Cost to purchase or obtain/treat water is low, as are rates charged to customers.</td>
<td>Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.</td>
<td>Water resources are plentiful, reliable, and easily extracted.</td>
</tr>
<tr>
<td>Greater than 8.0</td>
<td>Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Less than 1.0    | If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist.  
a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. 
b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data. | | |

AWWA Free Water Audit Software v5.0

Loss Control Planning
### General Comment:

This document notes the data for Mesa Water District for FY 2018 Water Loss Audit comes from, Mesa Water serves a population of approximately 108,000, mostly in the City of Costa Mesa, including some areas of the City of Newport Beach, and John Wayne Airport in Orange County. Mesa Water® primarily uses groundwater to meet demands. However, in FY2018, Mesa Water participated in Orange County Water District's program to use Met water “in lieu” of pumping groundwater to meet approximately 45% of demand. Groundwater is pumped from Orange County Water District's clear water aquifer from Wells 1, 3, 5, 7, and 9. Water is also pumped from the deeper, amber-tinted aquifer from Wells 6 and 11. The color molecule is removed via nanofiltration at the Mesa Water® Reliability Facility (MWRDF). “In Lieu” water was brought into Mesa Water's system through the MWDOC/Met via connections OC-44, OC-14 and CM2. Mesa Water and Huntington Beach share ownership of the OC-44 line. In FY16 and FY17, Mesa Water did not import through OC 44 and it is not included in the water balance. In FY18, Mesa Water used OC-44 for “In Lieu” water using our connections at Mesa, Fair & Newport, and Fair & Fairview. Mesa Water® also maintains two water storage reservoirs. An overview of the Mesa Water® system is attached - see Mesa Water® Atlas Index 100.pdf.

### Audit Item

<table>
<thead>
<tr>
<th>Volume from own sources</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uploaded spreadsheet: Mesa Water® FY18 Water Production. Mesa Water® develops an annual Run Plan for water supply to meet demands at the lowest supply cost from three sources: clear groundwater wells (1,3,5,7,9), amber water wells (6, 11), and Imported Water. Wells 3 and 9 were off-line most of the year for rehabilitation and automation. OCWD operates the groundwater basin and limits the percent of demand Mesa Water® can meet with clear ground water. In 2017, the limit was 75%. Each month, Mesa Water calculates production from each source and tracks against the Run Plan. The production data comes from production well flow meters, which are totaled. The change in totalizers from midnight on the 1st of the month to 23:59:59 on the last day of the month is calculated. This data is entered monthly on the Run Plan. Mesa Water® operates two storage reservoirs. The change in reservoir volume from July 1, 2017 to June 30, 2018, is calculated on the Tank Levels tab. The reservoirs have level sensor transmitters, and the area of the reservoirs is known from as-built drawings. Note that the Mesa Water Production Duty Operator check the SCADA readings for reservoir levels and well flows literally 7 times a day. Issues with flow meters, level sensors, and other instrumentation is flagged and addressed. An example PDO checklist is included.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vol. from own sources: Master meter error adjustment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesa Water® tested production meters that account for 94% of Mesa Water® own source production. Wells 3 and 9 were offline after October 1, 2017 for the remainder of the fiscal year and were meters were not tested. Meter accuracy for Well 1 and the MWRDF was performed by Pump Check using a pitot tube. Meter accuracy for Wells 5 and 7 was performed in house using a Fuji Porta-Flow ultrasonic flowmeter. The literature for the Porta-Flow claims an accuracy of +/- 1.5% for the flow velocity and pipe diameter for these wells, and the validation score reflects the meter accuracy within 3% of the of the test method accuracy. See Mesa Water FY18 own Sources Flow Meas Volumetrics.pdf.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water imported</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesa Water® participated in the “In lieu” water program using import stations CM-2, OC-14, and Mesa Water turnouts from OC-44. Mesa has a website with totalizer data that was used to compare Mesa Water meters for CM-2 and OC-14. Mesa Water uses our own flowmeters and totalizers at the OC-44 stations at Mesa, Fair &amp; Newport, and Fair &amp; Fairview. This is summarized on FY2018 Water Production, imported tab.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water imported: master meter error adjustment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Met doesn’t calibrate its meters, but does adjust the span on its transmitters. Mesa Water® checked our CM-2 and OC-14 flow totals against Met’s totalizer database, and found that these flow totals were in agreement within 1%. Mesa Water® used a third party to perform volumetric calibration with a pitot tube, and all meters were within 1%. These are uploaded as Mesa Water FY18 Import Meter Volumetrics.pdf. Instrument spanning was also performed and uploaded as Mesa Water calibrations.pdf.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Water exported | Not applicable |</p>
<table>
<thead>
<tr>
<th>Audit Item</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water exported: master meter error adjustment</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Billed metered</strong></td>
<td>See spreadsheet Mesa Water FY18 Billed metered and Mesa Water FY18 Usage Summaries. One account (Segerstrom Farms (734 AF)) is billed by our finance department rather than Customer Service and are included in total. Mesa Water uses a combination of radio reads and manual meter reads. The read to bill process is described in the file Mesa Water®_ meter read process.pdf. Meters are read either monthly or bimonthly. For the FY2018 water loss audit, the reads that include consumption from two fiscal years are parsed into just FY2018 consumption by calculating the average daily consumption and multiplying by the number of billing days in FY18. The total presented is the sum of all potable water meters. Recycled water volume is subtracted. Billed metered also includes meters on hydrants used to supply construction water.</td>
</tr>
<tr>
<td><strong>Billed unmetered</strong></td>
<td>There are no billed, unmetered accounts.</td>
</tr>
<tr>
<td><strong>Unbilled metered</strong></td>
<td>The only unbilled, metered customer accounts are for Mesa Water®'s own facilities. We meter ourselves for water loss, but we don't send ourselves a bill.</td>
</tr>
<tr>
<td><strong>Unbilled unmetered</strong></td>
<td>Default value used. See Mesa Water®_FY2018 unbilled unmetered build up doc for documentation for this calculation.</td>
</tr>
<tr>
<td><strong>Unauthorized consumption</strong></td>
<td>Default value used. Mesa Water®'s service area is a dense, urban area of only 18 square miles. Mesa Water® has 36 district vehicles covering the district area on a daily basis. Unauthorized use of water would be noticed and stopped. One instance in FY18 was the City of Costa Mesa Parks filling Tinkle Pond from an unmetered hydrant rather than from the Parks metered connection. This was estimated at 50 gpm for 10 minutes, or 600 gallons. During an inspection of a construction development, unmetered water use was noted and the developer's water supply was turned off and locked. Photos of these thefts are saved in Water Loss folder. The Water Theft Reporting Form (uploaded) is used to consolidate customer reports of potential theft, estimate losses, and record actions. No customer calls about theft were recorded in FY2018. Mesa Water meter readers look for bypassed or tampered meters during their routes. If found, tampering notes are added to the account entry in the billing database. Meter tampering is specifically prohibited in Mesa Water®'s Rules and Regulations for Water Services, Section 3.6.3 (uploaded). If these are found, the customer is billed based on their average use for the billing period, and fixed per our Water Rate sheet. The consumption is included in the billed metered.</td>
</tr>
<tr>
<td><strong>Customer metering inaccuracies</strong></td>
<td>Mesa Water replaces customer meters once they have been in service for 15 years. The attached Mesa Water® FY18 Customer Meter Replacements and Mesa Water® Customer Meter Replacements FY16FY17FY18 shows the planned and actual meter replacements for three fiscal years. Customer meter tests summaries are uploaded as _Mesa Water® Customer meter test results.xls. In the past three years, 570 small meters, 80 large meters, and 23 compound meters have been volumetrically tested for accuracy. Small meter accuracy is 98.6%; large meter is 98.8%; compound meters are 98.2%. FY2018 consumption was 91.5% on small meters and 8.5% on large meters. The consumption-weighted accuracy is 98.7%, or 1.3% inaccurate. Meters that are identified as stuck are replaced. The stuck meter log is attached.</td>
</tr>
<tr>
<td><strong>Systematic data handling errors</strong></td>
<td>Default value used. Mesa Water® has a well-defined procedure for finding and correcting systematic data handling errors—see Mesa Water® Meter Reading Process.pdf. This robust process includes data field checks and reports that highlights errors before the bills are sent. In FY2018, Mesa Water revised 123 entries on over 179,000 bills sent. The net change in consumption was 3477 units (8AF) of water; however, the reporting worksheet does not take a negative number. See Mesa Water® VoidedBillUsage.xls.</td>
</tr>
<tr>
<td><strong>Length of mains</strong></td>
<td>Using GIS, we calculate total length of active potable water pipeline, including hydrant laterals and excluding recycled water lines, put the resulting lengths into a spreadsheet and added up to 1733718.7 feet. Divide by 5280 ft/mile=328.4 miles.</td>
</tr>
<tr>
<td>Audit Item</td>
<td>Comment</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Number of active AND inactive service connections:</strong></td>
<td>GIS was used to verify the number of connections as follows: Find those connections that are on water mains. Query for active water main lines and fittings connections owned by Mesa Water®. Select by location those connections that intersect with the mainline layer. Export those selected connections to a new connections layer. Find those connections that are on laterals. Select by location those new connections that intersect the Lateral layer. Export those selected connections to a new connections layer. Determine the type of lateral connections. Spatial join the new connections from step 2 to Lateral layer. Result from FY17 is 24,816 connections. 112 new connections were added in FY2018 = 24928.</td>
</tr>
<tr>
<td><strong>Average length of customer service line:</strong></td>
<td>NA. Meters are in public right of way.</td>
</tr>
<tr>
<td><strong>Average operating pressure:</strong></td>
<td>See attached Mesa Water_average day pressure.pdf for a narrative of how the hydraulic model was used to determine average pressure at all model nodes. Mesa Water® system is one pressure zone.</td>
</tr>
<tr>
<td><strong>Total annual cost of operating water system:</strong></td>
<td>The FY18 Budget included $26,437,723 for operating expenses. Audited financial data for operating the water system is documented annually by a third party. The annual fiscal year audit occurs in September, and the audit report is available in October. Mesa Water® will provide the FY2018 Comprehensive Audited Financial Report (CAFR) once it is available in October. Mesa Water® maintains a AAA bond rating will all three rating agencies, demonstrating systematic financial controls.</td>
</tr>
<tr>
<td><strong>Customer retail unit cost (applied to Apparent Losses):</strong></td>
<td>See Mesa-Water-Rates.pdf. Mesa Water® uses a flat rate for water in accordance with Prop 218.</td>
</tr>
<tr>
<td><strong>Variable production cost (applied to Real Losses):</strong></td>
<td>See Mesa Water®FY 18 variable productions costs.doc and .xls for a summary of variable production costs. Production costs are tracked and documented in the CAFR and audited by an independent auditor annually. The FY2018 CAFR is expected to be available in October 2018.</td>
</tr>
</tbody>
</table>
The graphic below is a visual representation of the Water Balance with bar heights proportional to the volume of the audit components.

**Water Audit Report for:**
**Mesa Water District (CA30100004)**
**Reporting Year:** 2018
**Data Validity Score:** 78

**Total Volume of NRW = 1,063 acre-ft/yr**

- **Water Exported**
- **Water Exported** (Authorized Consumption)
- **Water Exported** (Billed Auth. Cons.)
- **Water Exported** (Unbilled Auth. Cons.)
- **Water Exported** (Apparent Losses)
- **Water Exported** (Real Losses)
- **Water Exported** (Volume From Own Sources)
- **Water Exported** (Unbilled metered (valued at Var. Prod. Cost))
- **Water Exported** (Unbilled unmetered (valued at Var. Prod. Cost))
- **Water Exported** (Unauth. consumption)
- **Water Exported** (Cost. metering inaccuracies)
- **Water Exported** (Syst. data handling errors)
- **Water Exported** (Real Losses (valued at Var. Prod. Cost))
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Phil Lauri, PE, District Engineer
DATE: October 16, 2018
SUBJECT: Mesa Water Reliability Facility Zone of Influence

RECOMMENDATION

Receive the presentation.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.

PRIOR BOARD ACTION/DISCUSSION

At its December 17, 2013 meeting, the Engineering and Operations (E&O) Committee requested an analysis of how water produced by the Mesa Water Reliability Facility (MWRF) influences the distribution system.

At its February 18, 2014 meeting, the E&O Committee received a presentation entitled “MWRF Zone of Influence Analysis.”

At the September 18, 2018 meeting, the E&O Committee requested that the MWRF Zone of Influence modeling work be presented at the next E&O Committee Meeting.

DISCUSSION

Mesa Water District (Mesa Water®) serves its customer demands from five active clear water wells, two reservoirs, and the MWRF, which treats water produced from the deep, amber-tinted aquifer through a nanofiltration process to remove color and odor. All water produced by Mesa Water is safe, high quality water that meets all primary and secondary standards set by the Division of Drinking Water. The purpose of this presentation is to show the service areas that are primarily served by MWRF water and the areas that are primarily served by well water.

Operational Characteristics

Mesa Water’s system is built with great operational flexibility to meet its changing water demands. In summer, when demands are higher, staff operates the MWRF at its full design capacity to produce 6,000 gallons per minute. Full MWRF capacity requires utilization of both deep-aquifer wells and primary nanofiltration treatment trains. In winter, when demands are lower, staff operates the MWRF at less than half its capacity, using one well and one primary treatment train. The amount of water produced by the MWRF has a relative zone of influence within the distribution system based on several key operational criterion. This criterion includes the number of clear wells that are operating, which reservoir is operating in the lead position and the seasonal demand requirements.

Mesa Water’s clear water wells are located in the northern part of the service area (north of the 405 freeway). The clear water wells maintain sufficient pressure to deliver water throughout the
service area to the south; thus, most of the water produced by the MWRF is pushed to the south. Reservoir 1 (located in the southwest part of the service area) and Reservoir 2 (located in the southeast part of the service area) provide approximately 29 million gallons of storage for peak demand periods. Reservoirs 1 and 2 are operated to maintain a designated system pressure with one reservoir in the lead position and the other being filled or used in a backup support position.

Influence of Transmission Pipelines

Two primary pipelines in the system affect the MWRF operational zone of influence. The 24-inch transmission pipeline that runs along Conway Avenue carries MWRF water southeast of the MWRF towards the area of Baker and Fairview. The 30-inch transmission line along the Santa Ana River carries water produced by the clear wells to the south and west portions of the service area.

MWRF Operational Scenarios

Mesa Water’s hydraulic model was run under ten conditions to capture the MWRF zone of influence under various operational scenarios. Scenarios modeled a 48-hour duration except when the active reservoir could not keep up with system demand due to a lack of sufficient supply (Scenarios 5 and 10). Scenarios 1 - 5 represent an average winter day with a demand of 12,404 gallons per minute (gpm) and scenarios 6 - 10 represent a maximum summer day demand of 20,467 gpm. This operational range represents the average and maximum seasonal demands experienced throughout Mesa Water’s system. During the winter, the MWRF is run on one well and one nanofiltration train with a minimum production of 2,400 gpm. During the summer, the MWRF is run at its full capacity of 6,000 gpm. These scenarios also account for running all five clear water wells versus running just the three most cost efficient wells, or running no wells at all, as well as cycling which of the two reservoirs is actively pumping water into the distribution (“active”) system verses taking in water that exceeds system demands (“filling”).

Under Scenario No. 1 - winter average day conditions with no wells running, MWRF water predominates from Baker Street to City Hall, and from Orange Coast College to Newport Boulevard. The contribution of the MWRF zone of influence west of Harbor Boulevard, east of Newport Boulevard, north of Baker Street, and southwest of City Hall is reduced to less than 10%.

Under Scenario No. 5 - winter average day conditions with no wells running, MWRF water predominates from the north part of the service area to the Paularino Flood Control Channel. The contribution of the MWRF zone of influence south of Adams Avenue and west of Bristol Street, and in the vicinity of the Mesa Verde Country Club is reduced to less than 10%.

Under Scenario No. 9 – summer maximum day conditions, the MWRF zone of influence has the greatest influence from Gisler Avenue to Wilson Street and from the Mesa Verde subdivision to Newport Boulevard. The contribution of the MWRF zone of influence west of Mesa Verde Drive West and east of Newport Boulevard is reduced to approximately less than 20%.
Table 1 demonstrates typical operational scenarios experienced throughout a typical annual demand cycle:

### Table 1. Hydraulic Model Scenarios

<table>
<thead>
<tr>
<th>Scenario No.</th>
<th>Demand Condition</th>
<th>Total Demand (gpm)</th>
<th>MWRF Production (gpm)</th>
<th>Active Wells</th>
<th>Reservoir 1 Status</th>
<th>Reservoir 2 Status</th>
<th>Scenario Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Winter Average Day</td>
<td>12,404</td>
<td>2,400</td>
<td>1,3,9</td>
<td>Active</td>
<td>Filling</td>
<td>48 Hours</td>
</tr>
<tr>
<td>2</td>
<td>Winter Average Day</td>
<td>12,404</td>
<td>2,400</td>
<td>1,3,9</td>
<td>Filling</td>
<td>Active</td>
<td>48 Hours</td>
</tr>
<tr>
<td>3</td>
<td>Winter Average Day</td>
<td>12,404</td>
<td>2,400</td>
<td>All</td>
<td>Active</td>
<td>Filling</td>
<td>48 Hours</td>
</tr>
<tr>
<td>4</td>
<td>Winter Average Day</td>
<td>12,404</td>
<td>2,400</td>
<td>All</td>
<td>Filling</td>
<td>Active</td>
<td>48 Hours</td>
</tr>
<tr>
<td>5</td>
<td>Winter Average Day</td>
<td>12,404</td>
<td>2,400</td>
<td>None</td>
<td>Filling</td>
<td>Active</td>
<td>30 Hours</td>
</tr>
<tr>
<td>6</td>
<td>Summer Maximum Day</td>
<td>20,467</td>
<td>6,000</td>
<td>1,3,9</td>
<td>Active</td>
<td>Filling</td>
<td>48 Hours</td>
</tr>
<tr>
<td>7</td>
<td>Summer Maximum Day</td>
<td>20,467</td>
<td>6,000</td>
<td>1,3,9</td>
<td>Filling</td>
<td>Active</td>
<td>48 Hours</td>
</tr>
<tr>
<td>8</td>
<td>Summer Maximum Day</td>
<td>20,467</td>
<td>6,000</td>
<td>All</td>
<td>Active</td>
<td>Filling</td>
<td>48 Hours</td>
</tr>
<tr>
<td>9</td>
<td>Summer Maximum Day</td>
<td>20,467</td>
<td>6,000</td>
<td>All</td>
<td>Filling</td>
<td>Active</td>
<td>48 Hours</td>
</tr>
<tr>
<td>10</td>
<td>Summer Maximum Day</td>
<td>20,467</td>
<td>6,000</td>
<td>None</td>
<td>Filling</td>
<td>Active</td>
<td>20 Hours</td>
</tr>
</tbody>
</table>

Staff will provide a presentation of each of the above scenarios at the upcoming E&O Committee meeting.

**FINANCIAL IMPACT**

None.

**ATTACHMENTS**

Attachment A: Scenarios 1, 5 and 9 Maps
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Tracy E. Manning, Water Operations Manager
DATE: October 16, 2018
SUBJECT: 2018 Fall ACWA/JPIA H.R. LaBounty Safety Awards

RECOMMENDATION

Receive the presentation.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.
Goal #3: Be financially responsible and transparent.
Goal #5: Attract and retain skilled employees.

PRIOR BOARD ACTION/DISCUSSION

None.

BACKGROUND

Mesa Water District (Mesa Water®) maintains a robust safety program which is in full compliance with the Division of Occupational Safety and Health (Cal/OSHA) requirements.

Mesa Water has developed and implemented 24 core environmental health and safety programs, including the Injury and Illness Prevention Program (IIPP). The IIPP is the District’s umbrella program for all applicable Cal/OSHA regulatory programs and complies with requirements found in Cal/OSHA Safety Orders CCR Title 8, §3203 and CCR Title 1509.

The process for ensuring that all Mesa Water employees comply with the rules and regulations and maintain a safe work environment includes the following:

- Training workers on the provisions and requirements of the IIPP
- Evaluating the safety performance of all workers
- Recognizing employees who perform safe and healthful work practices via the Safety Recognition Program

To help ensure open communication to and from all departments and staff members regarding employee safety, Mesa Water maintains a Safety Ambassador Group consisting of members from multiple departments including managers, supervisors, and staff. The Safety Ambassadors meet monthly, bringing safety concerns or suggestions from staff in their departments, and taking information discussed in the meetings back to their peers.

One critical role performed by the Safety Ambassadors is the review of all safety suggestions and their outcomes. Suggestions can be made to Safety Ambassadors, Managers, Supervisors, the Safety Coordinator, or via safety suggestion boxes in each of the two lunchrooms. Annually, the Safety Ambassadors review all safety recommendations for the year and select one employee for the outstanding accomplishment of creating a safer workplace. The individual is presented with the R. Michael Healey Annual Safety Award during the Mesa Water Employee Recognition Event.
DISCUSSION

The Safety Ambassadors received 30 safety suggestions in Fiscal Year 2018. Suggestions ranged from banners impeding visibility when exiting the premises to an uncovered electrical box at a remote site, and 28 of the 30 suggestions have been fully implemented or resolved. Of these, two stood out as meeting the nomination criteria for the Association of California Water Agencies Joint Powers Insurance Authority’s (ACWA/JPIA) H.R. LaBounty Safety Award Program. This award is presented by ACWA/JPIA to individuals or groups who implement significant safety improvements to prevent occupational injuries or illnesses. Award winners will be announced at the November 26, 2018 ACWA/JPIA Board of Directors’ meeting.

The first safety suggestion (Attachment A) submitted for review addressed a concern about potential falls when accessing a valve in an 18-foot-deep vault. The valve is operated from ground level by turning an 18-foot-long valve key. Staff were concerned about the potential to slip and fall into the vault. Multiple suggestions for remedy were considered, with the final implementation consisting of a removable mesh netting that prevents falls while still allowing access to the valve. As the material is removable, it also allows for easy vault access when repairs are needed.

The second safety suggestion (Attachment B) submitted for review addressed a concern about the potential for slips and strains when crew truck beds were accessed. Existing bumper step-ups on these trucks were 18-24 inches in height, which could lead to strains or slips. The suggestion was to add hand-holds and bolt-on 8-inch steps to allow for easier access. Frequent users were consulted to identify the pros and cons of a variety of models available. Consensus led to the installation and testing of a step with semi-rigid rubber sides and a steel step. This model allows some flexibility in the event the steps are struck, but also provides stability and rigidity when in use. After a successful three-month testing period, the four remaining crew vehicles were outfitted with the same steps. While no injuries had been reported previously, this implementation significantly reduces risk to staff.

Each of these two suggestions engineer the elimination of a potential hazard and are potentially applicable to a broad range of ACWA/JPIA members at a reasonable cost (~$1,600 per remedy).

FINANCIAL IMPACT

None.

ATTACHMENTS

Attachment A: H.R. LaBounty Safety Awards Nomination Form, “MWRF Drain Vault Safety Improvements”
Attachment B: H.R. LaBounty Safety Awards Nomination Form, “Truck Bed Access Improvements”
Nomination Deadlines:

Fall Awards: September 30, 2018
Spring Awards: February 28, 2019

Agency: Mesa Water District

Project/Initiative Title: Mesa Water Reliability Facility (MWRF) Drain Vault Safety Improvements

Employee/Department/Committee Nominated:

Name(s): Bob Mitchell, Tyler Jernigan, Stephen Hershey, Darryl Hopkins, Mark Pelka

Job Title/Department: Water Operations (Production), Engineering
Nomination Summary

Write a brief summary of your project/initiative. Clearly state the problem/hazard recognized by the nominee and the specific reasons that they initiated corrective action.

The Water Production team raised a concern during Mesa Water's Monthly Safety Ambassador's meeting. In particular, a reservoir drain vault at the Mesa Water Reliability Facility (MWRF) presented a fall hazard. The vault is approximately 20 feet deep, and production staff use a manual key to access a valve at the bottom of the vault. Production staff stand over an uncovered vault lid, and rotate the key by walking the perimeter of the vault opening. The operators were concerned about possibly falling into the vault while performing this task.

Describe the specific actions taken to resolve the problem(s) or challenge(s). Share the best practices that made this initiative successful for the agency and its impact.

A variety of options were reviewed, including cutting and welding a small key hole in the vault. The engineering team, in conjunction with the operations team and on site safety consultants, ultimately decided a fall protection net was the best option for Mesa Water. The ideas were presented to the production staff for feedback, prior to installation. The engineering team engaged a vendor to source and install the appropriate fall protection net. The total final cost was $1,600.

State whether the hazard was reduced with engineering controls, introduced a new administrative or work procedure, or relied on personal protective equipment to solve the problem.

The fall hazard for the Mesa Water Production Team was eliminated with the use of engineering controls. The hatch safety net is light weight and is easily retractable. When closed, it provides fallthrough protection, great visibility for inspections and access for limited maintenance in the work area below. The net can be easily unhooked to permit full access into the confined space.

Describe any extraordinary circumstances that made this nominee's safety accomplishments significant. Describe whether the nominee influenced safety in the workplace, encouraged employee participation in safety efforts, obtained organizational “buy in” to implement the solution.

This safety accomplishment shows how that hazard recognition and communication process is working successfully at Mesa Water. Staff had an open forum to share their feedback, and the concerns promptly addressed. In addition, this project highlights the collaborative effort between operations and engineering departments to eliminate a serious workplace hazard.
This project addressed the JPIA Commitment to Excellence Program for slips/trips/falls - falls from heights.

☐ Office/Field Ergonomics

☐ Vehicle Operations

☒ Slip/trip/falls – falls from heights

☐ Other:

List and attach any supporting materials that you feel are important for the reviewers to gain a complete picture of the nomination. Digital photos, supporting documentation, sample forms, etc.

Nominated by: Tracy Manning, Water Operations Manager

Signature:  

(Type Name)  

Date: 9/27/18

General Manager: Paul Shoeninggerer  

(Type Name)  

Date: 9/27/18

Please email this form with supporting documents and digital photos to tlofing@acwajpia.com.
Drain Vault Safety Improvements

Potential Hazard:
There is potential for an operator to fall into the vault when using a manual key to access a valve at the bottom of the approximately 20 feet deep vault.
**Solution:**
Installation of the hatch safety net provides fallthrough protection while allowing visibility for staff to access the valve at the bottom of the vault.
Nomination Deadlines:

Fall Awards: September 30, 2018
Spring Awards: February 28, 2019

Agency: Mesa Water District

Project/Initiative Title: Truck Bed Access Improvements

Employee/Department/Committee Nominated:

Name(s): Dustin Burnside

Job Title/Department: Water Operations
Nomination Summary

Write a brief summary of your project/initiative. Clearly state the problem/hazard recognized by the nominee and the specific reasons that they initiated corrective action.

The water operations teams frequently access the bed of their large work vehicles to load and unload equipment and supplies. In many cases these truck beds are many feet off of the ground with no hand holds or steps to access other than the bumper. Mesa Water Board Vice President Fred Bockmiller, while on site for a safety luncheon, identified a possible hazard with the height of truck bed access. Director Bockmiller shared his ideas and concerns with Mesa Water staff at that time.

Mesa Water staff enaged the resources of on site safety consultants to evaluate any regulatory considerations and best practices for the specific hazard. Mesa Water Production Supervisor Dustin Burnside researched step options for the back of the vehicles to determine which type of step would be functional once installed on the trucks. The steps needed to be flexible yet durable so they would not be accidentally damaged. He ultimately reached out to the company who supplies the body of the trucks and purchased 10 sets of flexible rubber and steel steps and hand holds. Prior to installation, Dustin and his manager, Tracy Manning (Water Operations Manager), requested feedback from all of the Operations team regarding the proposed changes. All team members had an opportunity to share their inputs.

Vehicles for the Mesa Water Operations team were retrofitted with the flexible rubber and steel steps and the hazard was eliminated on all applicable trucks. The total cost for the retrofit was $1,650. Following the installation, no concerns have been presented to the team during the monthly Safely Ambassadors meetings. While no injuries or near misses were reported before the steps were installed, the risk of ergonomic injury has been greatly reduced.

The ergonomic risk factors associated with repetitive awkward postures and forceful exertions have been eliminated through the use of engineering controls.

State whether the hazard was reduced with engineering controls, introduced a new administrative or work procedure, or relied on personal protective equipment to solve the problem.

The ergonomic risk factors associated with repetitive awkward postures and forceful exertions have been eliminated through the use of engineering controls.

Describe any extraordinary circumstances that made this nominee’s safety accomplishments significant. Describe whether the nominee influenced safety in the workplace, encouraged employee participation in safety efforts, obtained organizational “buy in” to implement the solution.

Though no injuries or near misses had been reported due to accessing the truck, Mesa Water Management and Staff took the safety suggestion seriously-- taking an observation through to implementation, with buy in from the entire operations team. This highlights Mesa Water's commitment to safety.

Describe whether the project/initiative addressed a hazard or exposure included in the JPIA Commitment to Excellence Program.

Since the most frequent and costly losses come from vehicle, infrastructure, construction, employment practices, ergonomic, and fall claims, the JPIA’s focus is on encouraging and assisting its members to
implement programs and practices that can prevent these types of claims. By installing the vehicle steps Mesa Water took proactive steps to reduce worker injuries from poor ergonomics associated with climbing into the trucks as well as reduced risks of fall hazards from the back of the trucks.

☒ Office/Field Ergonomics

☒ Vehicle Operations

☐ Slip/trip/falls – falls from heights

☐ Other:

List and attach any supporting materials that you feel are important for the reviewers to gain a complete picture of the nomination. Digital photos, supporting documentation, sample forms, etc.

See attached photos of the flexible rubber and steel steps and hand holds.

Nominated by: Tracy Manning, Water Operations Manager

Signature: (Type Name) Date: 9/27/18

General Manager: Paul Shoenberger (Type Name) Date: 9/27/18

Please email this form with supporting documents and digital photos to tlofing@acwajpia.com.
Potential Hazard:
The height of the truck beds pose the risk of ergonomic injury as staff access the bed of their large work vehicles to load and unload equipment and supplies.

Solution:
Installation of the flexible rubber and steel steps and hand holds provide staff easier access to get on and off the bed of the truck. The risk of ergonomic injury has been greatly reduced.
REPORTS:

9. REPORT OF THE GENERAL MANAGER:
REPORTS:

10. DIRECTORS’ REPORTS AND COMMENTS:
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: October 16, 2018
SUBJECT: I-405 Widening Project

RECOMMENDATION

This item is provided for information only.

STRATEGIC PLAN

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

PRIOR BOARD ACTION/DISCUSSION

At its July 19, 2016 meeting, the Engineering and Operations (E&O) Committee received a verbal update on the scope of the I-405 Widening Project and impacts to the Fairview Road crossing relocation.

At its October 13, 2016 meeting, Mesa Water District’s (Mesa Water®) Board of Directors (Board) approved the execution of a Preliminary Engineering Agreement with the Orange County Transportation Authority (OCTA), and directed staff to proceed with the OCTA led approach for the Fairview water main relocation.

At its October 12, 2017 meeting, the Board approved the execution of the Utility Agreement with OCTA for the I-405 Crossing at the Santa Ana River Pipeline Relocation Project.

BACKGROUND

OCTA, in cooperation with The California Department of Transportation (Caltrans) is widening the San Diego Freeway (I-405) between State Route 73 (SR-73) and Interstate 605 (I-605). This $1.9 billion project includes adding one regular lane in each direction from Euclid Street to I-605 and two toll lanes in each direction from SR-73 to I-605. The general purpose lane portion of the project is a Measure M (Orange County’s half-cent transportation sales tax) project and will be funded by a combination of local, state, and federal funds, with the express lanes financed and primarily paid for by those who choose to pay a toll and use the 405 Express Lanes.

On April 27, 2015, the OCTA Board of Directors voted to utilize Measure M funds and maintain local control of the project. OCTA is the responsible agency and the project sponsor with Caltrans assuming ownership at project completion. As OCTA is acting on the behalf of Caltrans, all agreements and forms are Caltrans standards. The I-405 Widening Project is a design-build contract.

Impacts to Mesa Water: The I-405 widening project will impact adjacent cities and utility companies including water, power, gas, sanitary sewer, storm drain, and petroleum. OCTA has structured their solicitation for bids to include all wet utilities as part of the widening project and require dry utility relocation by the individual utility companies. Mesa Water has a total of five
water mains that cross I-405, connecting the Mesa Water well field to the rest of the distribution system. Based on the current vision for the project, one Mesa Water main is affected as part of the project: the Fairview Road/ I-405 overcrossing. The Fairview Road crossing is a 12-inch asbestos concrete pipe (ACP) installed in 1966 under I-405 and east of the existing Fairview Road Bridge. This pipeline is to be relocated into the new overcrossing. In a previous design iteration, Mesa Water's 24-inch concrete mortar lined and coated pipe (CMLC), located over the Santa Ana River from Suburbia Park northeast across I-405, was also affected. However, this facility is not affected in the final design.

Prior Rights: In order to receive financial compensation from OCTA’s for utility relocation, an agency must provide proof of prior rights. This includes as-built drawings showing a crossing existed before I-405 was built, easements, or proof that the line was relocated due to a prior Caltrans project within the last ten years. Mesa Water staff completed an exhaustive search of Mesa Water records, as-built drawings, Caltrans records, and City of Costa Mesa records, and worked with a consultant to complete a title search. This research has determined that prior rights were established for the Santa Ana River water main through an easement in Suburbia Park. However, prior rights could not be proven for the Fairview Road water main as it is believed that the line was installed to support the development of the Mesa Water well field in the early 1960s after the 1953 opening of the I-405. Mesa Water, along with the City of Seal Beach and West Orange County Water Board, is one of three agencies unable to establish prior rights on the seventeen bridge crossings that will be improved.

DISCUSSION

Proposed Relocation: The final design by OCTA’s design-builder includes abandoning the existing 12-inch ACP line in place, per CalTrans standards, and constructing a new 12-inch CMLC welded steel pipe within a steel casing in a cell on the west side of the Fairview Road Bridge. Preliminary and final design documents have been reviewed by Mesa Water staff and TetraTech, who was retained as Mesa Water’s design review consultant. Final design approval is anticipated in November 2018. Construction of the Fairview Bridge portion of the project is expected to start early in Calendar Year 2019. A temporary water line will be constructed as part of the Fairview Bridge Project to provide uninterrupted service for Mesa Water customers.

Cost Estimate: The pre-design estimate of the Fairview Pipeline relocation cost is approximately $1.2M. Once the final design is approved, OCTA will provide a construction cost estimate for Mesa Water and TetraTech to review. The final cost estimate, along with a Utility Agreement with OCTA for design and construction services, will be brought to a future E&O Committee meeting for consideration of approval. The approved cost amount will be billed by OCTA to Mesa Water upon completion of construction, anticipated to occur early in Fiscal Year 2020.

FINANCIAL IMPACT

In Fiscal Year 2019, no funds are budgeted for the Fairview Pipeline Relocation; $8,165 has been spent to date.
ATTACHMENTS

None.