Operations Committee Meeting - May 1, 2019

1. Agenda Packet
   Documents:

   190501 AGENDA PACKET.PDF
SWEETWATER AUTHORITY
OPERATIONS COMMITTEE

AGENDA

DATE: Wednesday, May 1, 2019
TIME: 10:00 a.m.

1. CALL MEETING TO ORDER AND ROLL CALL.

2. ITEMS TO BE ADDED, WITHDRAWN, OR REORDERED IN THE AGENDA.

3. PUBLIC COMMENT.
   Opportunity for members of the public to address the Committee. (Government Code Section 54954.3).

4. ACTION AGENDA.
   The following items on the Action Agenda call for discussion and action by the Committee. All items are placed on the Agenda so that the Committee may discuss and take action on the item if the Committee is so inclined, including items listed for information.
   A. Recommendation to Issue Notice to Proceed for Phase 2 Work in FY 2018-19 for Distribution System Remote Terminal Unit Evolution Project
   B. Water Efficiency Incentive Program (Information Item)
   C. Continued Discussion on Current Main Replacement Prioritization

5. CLOSED SESSION.
   At any time during the regular session, the Committee may adjourn to closed session to discuss real property matters within the attorney-client privilege, subject to the appropriate disclosures. (Government Code Section 54956.8).

6. NEXT MEETING DATE: Wednesday, May 15, 2019 at 10:00 a.m.

7. ADJOURNMENT.

This agenda was posted at least seventy-two (72) hours before the meeting in a location freely accessible to the Public on the exterior bulletin board at the main entrance to the Authority’s office and it is also posted on the Authority’s website at www.sweetwater.org. No action may be taken on any item not appearing on the posted agenda, except as provided by California Government Code Section 54954.2. Any writings or documents provided to a majority of the members of the Sweetwater Authority Governing Board regarding any item on this agenda will be made available for public inspection at the Authority Administration Office, located at 505 Garrett Avenue, Chula Vista, CA 91910, during normal business hours. Upon request, this agenda will be made available in appropriate alternative formats to persons with disabilities, as required by Section 202 of the Americans with Disabilities Act of 1990. Any person with a disability who requires a modification or accommodation in order to participate in a meeting should direct such request to the Board Secretary at (619) 409-6703 at least forty-eight (48) hours before the meeting, if possible.

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A Public Water Agency
Serving National City, Chula Vista and Surrounding Areas
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TO:            Governing Board (Operations Committee)
FROM:          Management
DATE:          April 26, 2019
SUBJECT:       Recommendation to Issue Notice to Proceed for Phase 2 Work in FY 2018-19 for Distribution System Remote Terminal Unit Evolution Project

SUMMARY
The FY 2018-19 Budget includes the Distribution System Remote Terminal Unit (RTU) Evolution Project to upgrade 42 RTUs at 41 locations throughout the Authority’s distribution system. A copy of the budget write-up for this project is attached for ease of reference.

This multi-year project began in FY 2017-18 with a study to define the scope of the work. Work in FY 2018-19 focused on the design of the project. The scope included two phases of work in FY 2018-19: (1) SCADA design and development of functional specifications, and (2) testing and procurement of long-lead panel components. The work was divided into these two phases to allow for the scope of the work to be better defined before the testing and panel component procurement activities were initiated. Implementation of the Phase 2 work in FY 2018-19 allows for the testing to proceed and procurement of components that have a long delivery time. This will result in a more efficient project completion in FY 2019-20.

The Authority utilized the services of a consultant to complete the SCADA design and development of functional specifications at a cost of $469,670. The attached budget excerpt shows the total funding authorization amount of $939,600. The purpose of this request is to authorize the consultant to proceed with Phase 2 work in the amount of $469,930 as established in the FY 2018-19 Budget.

PREVIOUS BOARD ACTION(S)
July 25, 2018    Board approved the services of Enterprise Automation for the Distribution System RTU Evolution Project in the amount of $469,700,
June 13, 2018   Board adopted Resolution 18-12: Adopting a Budget for the Fiscal Year 2018-19
Memo to: Governing Board (Operations Committee)  
Subject: Recommendation to Issue Notice to Proceed for Phase 2 Work in FY 2018-19 for Distribution RTU Evolution Project  
April 26, 2019  
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**FISCAL IMPACT**

The requested authorization matches funds allocated in the FY 2018-19 Budget.

**POLICY**

The requested authorization to issue a Notice to Proceed to Enterprise Automation exceeds the General Manager’s $75,000 authorization limit, thus requiring Governing Board Approval.

Strategic Plan Goal 1: Provide high quality water that meets regulatory requirements.

- Objective WQ6: Maintain and improve the Supervisory Control and Data Acquisition (SCADA) system for all treatment and distribution facilities as defined in the SCADA Master Plan.
  - 001.01 Conduct a study to analyze the replacement of all Remote Terminal Units (RTU) with the existing distribution system, URDS, and County sewer facilities that are connected to the URDS, as recommended in the SCADA System Master Plan
  - 001.02 Replace the RTUs as recommended in the study

**ALTERNATIVES**

1. Issue a Notice to Proceed to Enterprise Automation, Irvine, CA, for Phase 2 work in FY 2018-19 for the Distribution System RTU Evolution Project in the amount not to exceed $469,930.

2. Carry funds over to FY 2019-20 and Issue a Notice to Proceed to Enterprise Automation, Irvine, CA, for Phase 2 work in FY 2019-20 for the Distribution System RTU Evolution Project in the amount not to exceed $469,930.

3. Direct staff not to complete Strategic Plan Work Plan Goal 1: Provide high quality water that meets regulatory requirements, Objective WQ6, Maintain and improve the Supervisory Control and Data Acquisition (SCADA) system for all treatment and distribution facilities as defined in the SCADA Master Plan.

**STAFF RECOMMENDATION**

Staff recommends that the Governing Board issue a Notice to Proceed to Enterprise Automation, Irvine, CA, for Phase 2 work in FY 2018-19 for the Distribution System RTU Evolution Project in the amount not to exceed $469,930.

**ATTACHMENT(S)**

Excerpt from Board approved FY 2018-19 on Distribution System RTU Evolution Project.
SWEETWATER AUTHORITY
FY 2018-19 CAPITAL INVESTMENT BUDGET

Project Title

DISTRIBUTION SYSTEM RTU EVOLUTION PROGRAM

Recommendation

Upgrade 42 Remote Terminal Units (RTU) at 41 locations throughout the Authority's distribution system.

Estimated Cost

<table>
<thead>
<tr>
<th>FY 2018-19 Budget Request</th>
<th>Total Project Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,271,400</td>
<td>$3,264,400</td>
</tr>
</tbody>
</table>

Discussion

The Authority commissioned a master plan to evaluate the needed improvements to the Supervisory Control and Data Acquisition (SCADA) system, which was completed in 2011 and updated in 2014. The SCADA systems at the Perdue Water Treatment Plant, the Richard A. Reynolds Desalination Facility, and the National City Wells have been updated as recommended in the SCADA Master Plan. However, the 41 sites in the water distribution system contain 42 RTU control systems and electrical hardware that were originally installed in 2001. This equipment is reaching the end of its service life and upgrades are necessary to maintain reliable operation of these critical water system components. The facilities included in the distribution system that require control system upgrades include booster pump stations and ground storage tanks, along with the RTUs associated with Loveland Dam, the County of San Diego's wastewater pump station adjacent to Sweetwater Reservoir, the Perdue Radio Cabinet, and the Otay 2-1 Tanks Radio Repeater Cabinet.

The Distribution System RTU Evolution Program will replace the programmable logic control (PLC) code in all RTUs, generally following the programming standards established for the recently completed wells associated with the Desal Expansion project. These modifications will upgrade the PLCs to standard tested function blocks. The SCADA Integrator will create functional specifications for all RTUs, program the RTUs to the new standard, make changes to SCADA software, design, and fabricate new RTUs (consisting of subpanels or complete RTUs, and RTU doors, as applicable), and fully test and commission the new hardware and software. The work of a construction contractor, selected via competitive bid, generally involves; replacement of all Distribution RTUs (subpanels or complete RTUs, and RTU doors, as applicable); painting of existing RTU cabinets that will remain; installation of new antenna masts at six (6) remote sites to improve radio communication performance; replacement of antennas and feed systems at select sites; and, due to National Electric Code issues in the Valve Building at the Judson Tank, complete replacement of the electrical system with a new pad-mounted RTU located outside of the Valve Building.
SWEETWATER AUTHORITY
FY 2018-19 CAPITAL INVESTMENT BUDGET

Discussion of Carryover

The FY 2017-18 Expense Budget included funds for the development of a study to define the improvements required to implement the RTU Evolution Program. The initiation of the study was delayed significantly in FY 2017-18 due to the extensive support required by the Authority’s consultants on the Richard A. Reynolds Desalination Facility Expansion project. As a result, approximately $30,000 of effort is anticipated to carry over to FY 2018-19.

Summary of Cost Estimate

<table>
<thead>
<tr>
<th>Total Project Cost</th>
<th>$3,264,400</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Spent in Prior Fiscal Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-17 Estimate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposed FY 2018-19 Budget Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of RTU Evolution Study (1)</td>
</tr>
<tr>
<td>Electrical Design and Bidding (2)</td>
</tr>
<tr>
<td>SCADA Design, Functional Specs, and Configuration (3)</td>
</tr>
<tr>
<td>SWA Engineering and WQ Labor</td>
</tr>
<tr>
<td>Proposed FY 2018-19 Budget</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projected Cost for Future Fiscal Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-20</td>
</tr>
</tbody>
</table>

(1) Funds carried over from FY 2017-18 Expense Budget in the amount of $30,000.
(2) Electrical Design by existing on-call consultant (Timberline Engineering).
(3) SCADA Integration Planning and Design by existing on-call consultant (EA).

Engineering
# 2019-2020 Conservation Incentives

## Sweetwater Authority Programs

The following financial incentives are only available to Sweetwater Authority (Authority) customers and are designed to complement the regional programs provided by the Metropolitan Water District and the San Diego County Water Authority. The proposed FY 2019-20 Expense Budget includes $49,000 for conservation device incentives and $20,000 for grant programs.

<table>
<thead>
<tr>
<th>All Customers</th>
<th>Authority Cost/Total Available</th>
<th>Maximum Incentive</th>
</tr>
</thead>
</table>
| 1 **Single-Source Gray Water Retrofit**  
*Limited to laundry-to-landscape diversion systems. Post-installation inspection required.* | $750  
10 customers | $75 per retrofit |
| 2 **Rain Sensor Coupon**  
*Retrofit for existing irrigation controller* | $450  
18 customers | $25 per sensor |
| 3 **Free Sprinkler (in-ground irrigation) Nozzles**  
*Program suspended by third-party administrator in 2018: minimal funding budgeted in anticipation of program relaunch* | $300  
60 nozzles | $5 per nozzle |
| 4 **Leak Repair Campaign - Fix a Leak Campaign**  
*Coordinated with EPA’s Fix a Leak Week* | $7,500  
100 customers | $75 per repair rebate |
| 5 **Carwash Reimbursement**  
*Carwash must be within the Authority’s service area and recycle water. Maximum 4 washes per account per year* | $5,000  
500 customers | $10 per carwash |
| 6 **Flume (usage monitoring) Device Pilot Program**  
*Sensor strapped to the water meter provides customers with leak detection & real-time water usage via a mobile app* | $5,000  
50 customers | $100 per device |
| 7 **Grant - Savings Through Efficiency Program (STEP)**  
*Direct install of 300-600 valves inspections repair/replacements of pressure regulating valves*  
($35,000 match funding provided through MWD MAAP) | $35,000 | $70,000 |

The Authority provides the following conservation-related services at no charge to customers:

- Water Use Audits – the Authority is reimbursed through CWA’s WaterSmart Landscape program for performing audits which meet specific criteria
- High-bill Investigations
- Low Flow Shower Heads
- Shut-off Nozzles (handheld)
- Toilet Leak Detection Tablets
- California Wild Flower Seeds
- Workshops – landscape, laundry gray water retrofit, composting, device demos, etc.
- Education Programs
- The Water Conservation Garden
- Administration Building Demonstration Landscape
- Professional Landscape Designs / Ideas – via the Water Conservation Garden and websites
Regional Programs
The following financial incentives are available to all San Diego residents through the Metropolitan Water District’s (MWD) SoCal Water Smart and San Diego County Water Authority WaterSmart programs. Device rebates amounts are based on the value of water saved over the life of the device, and subject to the following:

- Paid on a first come, first served basis
- Subject to total available funding
- No greater than the purchase price of the device, when applicable
- Limited to MWD pre-approved devices

### Residential Customers

<table>
<thead>
<tr>
<th></th>
<th>Maximum Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High-Efficiency Clothes Washer (HECW)</td>
</tr>
<tr>
<td>2</td>
<td>Premium High-Efficiency Toilet (PHET) $40 per unit</td>
</tr>
<tr>
<td>3</td>
<td>Rotating (Irrigation) Sprinkler Nozzle Minimum 30 per home $2 per nozzle</td>
</tr>
<tr>
<td>4</td>
<td>Rain Barrel (2) per customer $35 per barrel</td>
</tr>
<tr>
<td></td>
<td>Cistern depending on size $250-$350</td>
</tr>
<tr>
<td>5</td>
<td>Weather Based Irrigation Controller (WBIC)</td>
</tr>
<tr>
<td></td>
<td>WBIC less than one acre $80 per device</td>
</tr>
<tr>
<td></td>
<td>WBIC one acre or larger $35 per station</td>
</tr>
<tr>
<td>6</td>
<td>Soil Moisture Sensor</td>
</tr>
<tr>
<td></td>
<td>WBIC less than one acre $80 per device</td>
</tr>
<tr>
<td></td>
<td>WBIC one acre or larger $35 per station</td>
</tr>
<tr>
<td>7</td>
<td>Turf Replacement Up to 5,000 sq. ft. (additional SDCWA funds pending) $2.00 Sq. ft.</td>
</tr>
</tbody>
</table>

### Commercial/Industrial/Institutional Customers

<table>
<thead>
<tr>
<th></th>
<th>Maximum Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weather Based Irrigation Controller (WBIC)</td>
</tr>
<tr>
<td></td>
<td>Upgrades to existing equipment that enables functionality as a WBIC may qualify for incentives provided they meet program terms and conditions. $35 per station</td>
</tr>
<tr>
<td>2</td>
<td>Turf Replacement Up to 50,000 sq. ft. $2.00 Sq. ft.</td>
</tr>
<tr>
<td>3</td>
<td>Large Rotary Nozzles Minimum 8 sets (2 each) per site required $13 per set</td>
</tr>
<tr>
<td>4</td>
<td>Rotating Nozzles for Pop-up Spray Heads Retrofits Minimum 15 units per site required $2 per nozzle</td>
</tr>
<tr>
<td>5</td>
<td>Soil Moisture Sensor System Rebates are not available for both the Soil Moisture Sensor System and a WBIC if purchased together, or if sensor system is added to a previously rebated WBIC $35 per station</td>
</tr>
<tr>
<td>6</td>
<td>In-Stem Flow Regulators (Irrigation) Minimum 25 units per site required $1 per regulator</td>
</tr>
<tr>
<td>7</td>
<td>Plumbing Flow Control Valves 10 Minimum $5 per valve</td>
</tr>
<tr>
<td>8</td>
<td>Premium High-Efficiency Toilet Tank or Tankless $40</td>
</tr>
<tr>
<td>9</td>
<td>Zero Water Urinal (ZWU) ZWU units must replace existing urinals flushing at 1.5 gpf or greater $200 per unit</td>
</tr>
<tr>
<td>10</td>
<td>Ultra-Low Water Urinal (ULWU) Rebates are for matching bowls and flushometer valves. Valves flush at &lt;0.125 gpf and must replace existing urinals flushing at 1.5 gpf or greater $200 per unit</td>
</tr>
<tr>
<td>11</td>
<td>Cooling Tower ph Controller (PH-CTC)</td>
</tr>
<tr>
<td>12</td>
<td>Cooling Tower Conductivity Controller (CTCC) $625</td>
</tr>
<tr>
<td>13</td>
<td>Dry Vacuum Pump Maximum 2 Horsepower (HP) motor $125 per .05 HP</td>
</tr>
<tr>
<td>14</td>
<td>Connectionless Food Steamers $485 per compartment</td>
</tr>
<tr>
<td>15</td>
<td>Ice-Making Machines (air cooled) $1000</td>
</tr>
<tr>
<td>16</td>
<td>Laminar Flow Restrictors 10 Minimum $10 per restrictor</td>
</tr>
<tr>
<td>17</td>
<td>Water Savings Incentive Program (WSIP) Provides financial incentives for customized water efficiency projects including process improvements and high-efficiency equipment installations Varies by project</td>
</tr>
</tbody>
</table>
TO:                Governing Board (Operations Committee)
FROM:             Management
DATE:             April 26, 2019
SUBJECT:          Continued Discussion on Current Main Replacement Prioritization

SUMMARY
This item is provided per Director Martinez's request.

The Authority has updated the Water Distribution System Master Plan (Master Plan) approximately every five years since the initial Master Plan was developed in 1979. The most recent update of the Master Plan is the 2015 version which, for the first time, incorporated the asbestos cement (AC) pipe material into the analysis.

The next revision of the Master Plan is scheduled to occur in FY 2020-21, as indicated in the FY 2019-20 Strategic Plan Work Plan, with an anticipated completion date of June 2021. This anticipated completion date is dependent upon timely receipt of the 2020 Census data, which will be a key component in the population projection section and the resulting water demand projections.

Attached for reference are the 2015 Master Plan Chapter 1, Summary and Recommendations, and the Pipeline Replacement Fact Sheet.

PREVIOUS BOARD ACTION(S)
October 12, 2016    Governing Board approved the 2015 Water Distribution System Master Plan

Pipeline improvement projects in FY 2017-18 and FY 2018-19 have been approved and funded by the Governing Board based on the prioritization of pipeline projects listed in the 2015 Master Plan.

FISCAL IMPACT
PAYGO funding for Capital projects is approximately one-half the amount recommended in the 2015 Master Plan. Deferred pipeline replacement and installation costs beginning in FY 2024-25 were presented to the Board at its April 26, 2019 meeting, as part of the draft Twenty-year Capital Investment Projection.
Memo to: Governing Board (Operations Committee)
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POLICY
Strategic Plan Goal 6: Provide efficient and effective administrative systems and procedures in accordance with best management practices

- Objective AE2: Conduct master planning of major infrastructure (including Information Systems) to promote innovation, ensure sustainability, and reliability and effectively plan and allocate Authority resources
  - 001.00 Update the Water Distribution System Master Plan, to include the incorporation of asset management tools and practices

CONCLUSION
This item is for information only.

ATTACHMENT(S)
1. 2015 Master Plan, Chapter 1, Summary and Recommendations
2. Sweetwater Authority Pipeline Replacement Program Fact Sheet
CHAPTER 1

SUMMARY AND RECOMMENDATIONS

This Water Distribution System Master Plan (Master Plan) presents an evaluation of the transmission, pumping, storage and distribution pipeline network, and recommends additions and/or replacement of facilities to meet anticipated demands through the year 2040.

The previous master plan was the Sweetwater Authority Water Distribution System Master Plan Update, dated October 2011. Sweetwater Authority (Authority) has routinely re-assessed the system starting with the first Master Plan completed after acquiring the system from California American Water Company in 1977. Updates occurred in 1985, 1989, 1993, 2002, 2007, and most recently in 2011. Data through 2015 was considered in this update.

This Master Plan does not evaluate the supply and treatment facilities owned and operated by the Authority. The Robert A. Perdue Water Treatment Plant (Perdue Plant), Richard A. Reynolds Desalination Facility (Desal Facility), and the National City Wells provide all the treated water supplied. The Authority's approach is to have the 30 mgd Perdue Plant serve as the primary water production facility to meet the majority of the system's maximum day demand. Typically, the Authority treats local runoff collected in Sweetwater and Loveland Reservoirs and can supplement this supply with raw water from the aqueduct system owned and operated by the San Diego County Water Authority (SDWCA). In addition to the raw water connection there is a connection to the SDCWA's treated water aqueduct pipeline which can supply the Authority's treated water delivery system.

Summary
A summary of this 2015 Water Distribution System Master Plan follows:

1. Population. Population projections have been developed on the basis of the San Diego Association of Governments (SANDAG) Series 13 Regional Growth
2. **Forecast.** Compared with the previously used Series 12 forecast, the current forecast incorporates growth elements (e.g., redevelopment) from the National City and Chula Vista general plans. Those elements were counted separately in the previous Master Plan, as they were not incorporated in the Regional Growth Forecast available at that time. In comparing the adjusted projections of the previous Master Plan and the current Series 13 projections used in the current Master Plan, it can be seen that projections are in general agreement through 2020. Beyond 2020, the current projection tracks slightly lower than previously, with a 2035 population projection of 213,907 in the current Master Plan, compared with 228,863 previously. The 2040 population projection in the current Master Plan, representing the end of the current planning window, is 222,966.

In order to improve the accuracy of the projected populations, it is critical to understand the locations where population increases are anticipated to occur within the Authority’s distribution system. Population projections were developed for each pressure zone within the distribution system, as presented in Chapter 3 of this Master Plan. As shown by that analysis, most of the projected population growth is expected to occur within the Gravity zone located in National City and western Chula Vista, where the majority of redevelopment infill is expected to occur. Between 2015 and 2040 a total population increase of 34,670 is anticipated within the Authority’s service area, of which 31,641, or 91 percent, is expected to occur within the Gravity zone.

2. **Projected Demands.** Annual demands have continued to drop significantly since the most recent peak demand in 2000, as a concerted effort at water conservation resulted in decreased consumption throughout the region. In 2015, the annual use of water in the service area was 19,234 acre-feet (ac-ft), which was similar to the demand that existed in the early-1970s. At projected growth rates, annual demand in 2040 is forecast to be 26,226 ac-ft. A comparison to the annual water production of 25,840 ac-ft in 2000 illustrates the low projected rate of increase in production.
The Authority maintains substantial historical operating data through its Ampla software, which provides logged SCADA data from the various distribution system facilities. This data is available to determine zone-specific water demand data and establish demand peaking factors, which are a key driver in the sizing of proposed facilities. The analyses of demands and peak factors by pressure zone are further described below.

Population and per capita consumption data was used in projecting overall 2040 demands. While an overall per capita consumption rate of 105 gpcd was used system-wide, zone specific per capita consumption data was also established for purposes of developing demand projections by zone. In developing peak factors, three representative demand years were selected for detailed analysis: 2006 was selected as a pre-drought year; 2012 was selected to represent an average year; and, 2015 was selected to represent a sustained drought condition. The data was analyzed by pressure zone to determine average and maximum day demands and establish corresponding peak factors. In combining the demand projections with the established peak factors, the ultimate maximum day demand projections were developed for each pressure zone, for subsequent use in identifying potential upgrades to meet ultimate water demands.

3. **Land Use.** The Authority serves water to approximately 18,600 acres (29 square miles) within its boundaries, not including Authority-owned land around Sweetwater Reservoir. Roughly 96 percent of this land has been developed. Based on projected land uses, approximately 1,000 acres of land is expected to be affected by development, of which approximately 65 percent is to come from the conversion of vacant or agricultural lands. The balance is to come from a reduction in public lands. Detailed figures are presented in Chapter 3 of this Master Plan. Land use or zoning within the Authority’s service area is established in the General Plans of the City of Chula Vista, City of National City, and County of San Diego.
4. **Pumping and Storage.** Each of the pumped pressure zones was examined to assure that pumping capacity and storage volumes were adequately sized to meet design criteria. The recommended design criteria for pump stations in this Master Plan are consistent with the previous Master Plan and are more stringent than have been used in the past. Specifically, the criteria considers the pump station capacity available if the largest pump is out of service for maintenance or replacement.

In general, the capacities of pump stations in zones with a storage tanks are adequate, primarily because fire flows in these areas are provided from water in storage and the pump stations are tasked with meeting only maximum day demands. However, zones without storage (e.g., Hydro zones) which are required to provide for peak hour demands plus fire flows, were found to be deficient for their inability to meet fire flow demands. This is primarily due to the lack of backup pumping capacity, as all but one of the existing Hydro pump stations would meet fire flow capacity if all pumping units were running. The addition of pumping capacity is recommended for all Hydro pump stations. A summary of pump station recommendations is provided in Table 5-13.

Existing storage volumes were found to be adequate in most pressure zones. Construction of additional capacity is recommended for the Central-Wheeler and Bonita Highlands zones, with proposed storage increases of 0.80 million gallons (MG) and 0.75 MG, respectively. Future storage deficiencies shown for the Morris-Claire Vista and O.D. Arnold zones have not resulted in recommendations for additional storage, in light of declining water demands and the availability of adequate storage in those zones today. Demand monitoring over the next few years is recommended to better ascertain the need for additional storage to accommodate future demand growth.

5. **Transmission and Distribution Pipeline Replacements.** There are 388 miles of transmission and distribution pipelines in the water system. The Authority maintains an inventory of all piping by age, size (diameter), and type of material.
The previous Master Plan included a Metallic Main Replacement Program which evaluated 34 miles of steel water mains within the system. In that evaluation, individual segments of steel pipe in the metallic main inventory were evaluated on the basis of physical condition and risk factors (e.g., diameter, age, leak history, etc.) to develop a priority list for the replacement of steel mains. In this current Master Plan, the pipeline evaluation has been expanded to provide a comprehensive analysis of all 388 miles of water mains in the distribution system, including all pipe material types (e.g., steel, PVC, asbestos cement, and negligible amounts of copper). This expanded evaluation is aided by the use of the Authority’s upgraded all-mains water distribution system model, InfoWater by Innovyze, and its related Arc-GIS-based asset integrity management and capital planning software, InfoMaster.

The approach taken in this Master Plan is to identify the top 100 pipeline replacements. These top 100 replacement projects, which are recommended for replacement in the next 10 years, constitute 19.2 miles of pipelines. The top 100 replacements are primarily steel pipelines, with only three asbestos cement (AC) pipeline segments identified for replacement as a result of their leak history. A significant portion of the listed replacements, totaling approximately 8.5 miles, are transmission pipelines with a diameter larger than 20-inches. Included in this listing is the 36-inch transmission main along Bonita Valley, which is among the highest priority transmission mains due for replacement. A detailed listing of pipeline replacements is provided in Table 5-10.

6. **Master Plan Pipeline Improvements.** In addition to the pipeline replacement program summarized above, a Master Plan Pipeline Improvements program is presented, which includes a listing of recommended pipeline projects selected to address system performance issues within the distribution system. Collectively, these pipeline projects address specific flow, velocity, and/or pressure issues, as well as improve fire flow capacity, system reliability/redundancy. This program includes 13.9 miles of new pipeline installations that are recommended for
implementation over the next 10 years. A detailed listing of Master Plan pipelines is provided in Table 5-11.

Summary of Construction Cost

Detailed lists of system improvements are presented in Chapter 6. A series of tables present recommended construction projects to improve the capacity and reliability of the system. Four groups of projects are presented:

- Major Immediate Needs (Phase 1 and 2)
- Pipeline Replacements
- Master Plan Improvements – Pipelines, Pumps, and Storage Requirements
- Other System Improvements

Table 1-1 summarizes the total cost anticipated for each of these groups of projects.

Table 1-1. Total Anticipated Cost for Water Distribution System Projects

<table>
<thead>
<tr>
<th>Project Group</th>
<th>Reference Table</th>
<th>Estimated Capital Cost</th>
<th>Projected Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Immediate Needs (Phase 1 and 2)</td>
<td>6-2</td>
<td>$41,880,000</td>
<td>$2,140,000</td>
</tr>
<tr>
<td>Pipeline Replacements</td>
<td>6-3</td>
<td>13,430,000</td>
<td>1,340,000</td>
</tr>
<tr>
<td>Master Plan Improvements</td>
<td>6-1, 6-4</td>
<td>22,450,000</td>
<td>2,240,000</td>
</tr>
<tr>
<td>Other System Improvements</td>
<td>6-1</td>
<td></td>
<td>1,080,000</td>
</tr>
<tr>
<td>Total Estimated Capital Cost</td>
<td></td>
<td>$77,780,000</td>
<td></td>
</tr>
<tr>
<td>Total Estimated Annual Cost</td>
<td></td>
<td></td>
<td>$6,800,000</td>
</tr>
</tbody>
</table>

Recommendations

Following is a summary of the general and specific conclusions and recommendations for this study:

1. Implement the project to replace the critical portions of the 36-inch diameter transmission main in Bonita Valley.
2. Construct remaining water storage tanks to comply with storage requirements at the Central-Wheeler and Bonita Highlands zones.

3. Upgrade the Hydro zone pump stations to increase pumping capacities and meet design criteria.

4. Continue the replacement of undersized and poor condition water mains on a regular program. Re-evaluate the program annually, maintain the asset integrity management and capital planning program, and keep the analysis up to date.

5. Continue to prepare a new water distribution system master plan every ten years, and an interim master plan update every five years.
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WATER PIPELINE REPLACEMENT PROGRAM FACTS

Overview: In 1977, Sweetwater Authority (Authority) acquired the existing water system with pipeline infrastructure dating back to 1888. The extent of maintenance and replacement of older or failing pipelines by the previous 11 water system owners was unknown. However, upon acquisition of the system, it was apparent that water reliability suffered based on the fact the pipeline system had nearly 200 leaks per year.

The Authority immediately recognized the need to improve water reliability and availability. As a result, a Water Distribution System Master Plan (Master Plan) was developed to manage and improve the aging infrastructure. Since its inception, the Master Plan has been updated multiple times to reflect the most current conditions. Two of the programs included in the 2015 Master Plan are the Pipeline Replacement Program and the Master Plan Pipeline Program, which complement each other.

Pipeline Replacement: The Pipeline Replacement Program originally outlined a plan for the replacement of cast-iron and steel pipelines of multiple sizes. Some steel pipelines requiring replacement dated back to 1888. Most of the cast-iron pipelines were installed without lining or protective coating during the World War I and II eras. To date, all cast-iron pipelines have been removed from the system and a selection of older steel pipelines remain as the last metallic mains identified for replacement. The Master Plan includes a listing of pipeline replacement priorities across all material types including asbestos cement, the most abundant pipe material within the system.

Master Plan Pipelines: Land use ordinances from local jurisdictions impact domestic and fire flow requirements, resulting in the need to deliver higher volumes of water. To meet these requirements, the Master Plan outlines the water pipeline upgrades or additions to improve the water delivery to the system. In this plan, new pipe installations are identified to improve water pressure, flow, and circulation, and to increase reliability to Authority customers. With these improvements, the system is able to effectively and reliably deliver peak water demands, as well as adequately meet fire flow requirements. Most of the replacement or new pipes in this program are 12 inches in diameter or larger.

Material: Pipe material preference for the water system has changed over time. At the turn of the 19th century, the preferred material was steel. During the World War I and II eras, cast-iron was the primary choice. Mid-century, between 1950 and 1980, asbestos cement pipe was primarily used. Currently, the Authority typically constructs large diameter pipelines (24 inches and larger) with steel, and smaller diameter pipelines with polyvinyl chloride (PVC).
Program Replacement and Funding: The Governing Board (Board) recognizes the need to approve funding for pipeline replacements. This is generally done on an annual basis in concert with the annual budget process involving other maintenance and capital projects. Staff presents to the Board the highest priority pipelines based on the latest approved Master Plan. The Master Plan addresses the need to assure domestic and fire flow needs are met based on the future build out of the service area as well as the useful life of pipelines. Replacements are scheduled with the intent to maximize the useful life of the pipelines, prior to failure, in order to avoid costly repairs and damage to streets and property. The typical pipeline project ranges from 8 to 12 inches in diameter and approximately 1,200 feet in length. However, in some cases a single pipeline replacement project can be substantial in size and length resulting in higher costs. Due to the higher costs, the Board may consider acquiring funds via bonding in-lieu of funding through annual operating funds.

The Authority has been diligent in pipeline replacements within its fiscal constraints. An example of the benefit of its diligence is the replacement of all 95 miles of cast iron pipelines that existed in the system when it was acquired in 1977. The last segment of cast iron was replaced in 2011. The main leak chart below shows the results of the replacements, where there are now fewer than 10 leaks per year versus nearly 200 in 1977. Deferring pipeline replacements until failure occurs will result in a reversal of the trend shown on the chart and in higher costs.

Current Water System: The Authority water system currently includes approximately 400 miles of pipeline. Approximately 72 percent of the pipes are 8-inch diameter or smaller. The majority of the pipeline system, approximately 235 miles of pipe, is asbestos cement pipe (ACP), most of which was installed between 1950 and 1980.

Asbestos cement pipe is included in the evaluation of replacement priorities in the current Master Plan. However, given its continuing reliability and longer service life compared to other more critical pipes in the system, steel pipe continues to be the highest priority pipeline replacement category. Future Master Plan updates will reflect shifts in replacement priorities as the distribution system continues to age and as the importance of replacing asbestos cement pipeline grows.