

SOLANO IRRIGATION DISTRICT

TECHNICAL MEMORANDUM #2

**WATER SYSTEM CAPITAL IMPROVEMENT PROGRAM
CAPITAL REPLACEMENT CHARGE ANALYSIS**

SEPTEMBER 2014

I. BACKGROUND AND OVERVIEW

This Technical Memorandum is the second in a series describing the Solano Irrigation District's plans and options for funding the planned future replacement of Municipal and Industrial service areas' capital facilities.

The Solano Irrigation District (District) maintains two major categories of capital facilities that serve District customers.

The first category generally includes the Solano Water Project facilities that deliver water from Lake Berryessa to the District's Municipal and Industrial (M & I) service areas. Under the terms of the original federal funding used to build the Solano Water Project, the District is required to maintain a "rehabilitation and betterment" program and funding for these facilities. The District collects a General Assessment from property owners in the District to pay for rehabilitation and betterment projects. This General Assessment appears on property owners' property tax bill.

A second category includes the capital facilities that treat and/or deliver water from the Solano Water Project system to individual M & I service areas. The District has historically maintained these M & I service area capital facilities through an annual maintenance program, but the District has not previously established a funding mechanism to pay for the long term replacement of the M & I service areas' capital facilities (with the exception of one particular capital facility in Gibson Canyon, where a component of the water rates is allocated to the replacement of water treatment plant membranes).

In 2012, the District prepared a five-year Capital Improvement Program Schedule, preliminarily identifying costs and schedules for the replacement of M & I service areas' capital facilities.

In 2013, the District initiated a program to begin to fund the replacement of the M & I service areas' capital facilities. A Capital Replacement Charge ("CRC") was approved by the District Board of Directors. The CRC is currently \$10 per month for $\frac{3}{4}$ " services, increasing proportionately for larger services. The CRC appears on customers' water bills. The funds collected from the CRC are set aside in separate accounts for each M & I service area.

When the \$10 per month CRC was adopted, the District acknowledged that this amount was a "placeholder" until such time as the District could identify a longer term schedule and updated cost estimates for the replacement of the M & I service areas' capital facilities. The District has now prepared a ten-year Capital Improvement Program for each M & I service area. The Capital Improvement Program establishes the timing and cost of capital replacements considered necessary to ensure water quality and reliable delivery to M & I service area customers.

Public meetings were held by the District in June 2014 to present information to M & I service area customers on the District's planned future replacement of Municipal and Industrial service area capital facilities. This Technical Memorandum #2 provides a description of the schedule and cost for the replacement of the M & I service areas' capital facilities. It also identifies several options for rate structures within each M & I service area to fund the replacement of capital facilities. It is intended to provide additional information to M & I customers in public meetings held in September 2014.

SOLANO IRRIGATION DISTRICT MUNICIPAL AND INDUSTRIAL SERVICE AREAS

The District currently provides potable (drinking) and non-potable water to customers in many distinct geographic M & I service areas in Solano County. There are fourteen (14) M & I service areas included in the Capital Improvement Program, including public water systems (PWS) and non-public water systems (NPWS). The service areas are also classified as Industrial and Residential Service Areas, as follows:

Residential Service Areas:

- Blue Ridge Oaks NPWS
- Blue Ridge Oaks PWS
- Elmira PWS
- Gibson Canyon PWS
- Quail Canyon PWS
- Tolenas PWS

Industrial Service Areas:

- Allison/Ulatis NPWS
- Fairfield Corporate Commons NPWS
- North Cordelia NPWS
- North Village NPWS
- Nut Tree NPWS
- Paradise Valley NPWS
- Peabody PWS
- Stocking Ranch PWS

II. MUNICIPAL & INDUSTRIAL SERVICE AREAS' CAPITAL IMPROVEMENT PROGRAMS

Each individual M & I service area has its own unique water treatment facility, mechanical system and water delivery system. Exhibit A to this Technical Memorandum #1 provides the Capital Improvement Program identified for each M & I service area. The timing for capital replacement projects is based on industry standard estimates of useful lifetimes. Exhibit B also provides the estimated cost of replacing the capital facilities. The cost estimates are based on 2014 costs, escalated by 3.4% each year until the project construction year. The percentage cost increase is based on the Engineering News Record Construction Cost Index for years 2005 through 2014, which has been an average increase of 3.4% per year.

The total estimated cost for the replacement of capital facilities in the ten-year planning period is \$4,899,978 in all M & I service areas.

The capital replacement projects fall into the following general categories:

Condition Assessment

A condition assessment will be conducted in each M & I service area to review the existing condition of assets (pipelines, meters, pumps, valves, services, etc.) and to conduct tests to determine the expected remaining useful lives of the assets. Many factors affect useful lives. Some common factors include the reactivity of the soil to corrode metals, pressure and pressure transients, external loads, and the stability of the soils in the area. A condition assessment is an important step in confirming conditions and remaining useful lives of facilities, and ensuring long term sustainability of the water delivery system.

Meter Replacement

Meters are devices that measure the volume of water delivered to a customer. This is how the District measures and bills customers for water used.

The meters are RadioRead, which means that the meters send a radio signal to a District vehicle driving through the area. Based on District studies, the average schedule for meter replacement is every fifteen (15) years. The meters are planned to be replaced on this schedule, with every other replacement coinciding with a service replacement (as described below). Based on the future condition assessments, the meter replacement schedules may be revised.

Service Replacement

Service replacements include replacing the pipe between the main supply pipeline and the meter. The service saddles and meter yokes will be inspected during the replacement of the service pipelines, and will be replaced if necessary.

The industry standard average schedule for service replacement is every thirty (30) years. The services are planned for replacement on this schedule unless the condition assessment dictates a shorter or longer replacement schedule.

Hydrant Replacement

The District has wharf hydrants located throughout the District, used for flushing main pipelines and as a convenience for rural fire fighting. It is noted that there is no guarantee of fire flow or water being available at all times since water delivery is seasonal and systems are not designed to provide urban fire flows and emergency supplies.

For planning purposes, the District considers a seventy-five (75) year schedule to be acceptable. The hydrants will be planned for replacement on this schedule unless the condition assessment dictates a shorter or longer replacement schedule.

Pipeline Replacement

Pipelines are the way in which water is delivered to District public and non-public water system customers. The pipelines are typically buried in or near streets, or located within easements on customers' properties. Newer pipelines are typically constructed from PVC.

While the industry standard for PVC was forty (40) years, recent studies have shown that PVC pipe can be replaced on a seventy-five (75) year schedule. The pipelines are planned for replacement on this schedule unless the condition assessment dictates a shorter or longer replacement schedule.

SCADA Controls

SCADA stands for Supervisory, Control and Data Acquisition. SCADA controls allow remote monitoring and control of water plants. Most District facilities do not currently have SCADA controls; some high costs are attributed to the replacement of Program Logic Controllers (PLC's) that currently control the plants. Many plants, where a high cost is shown, have old PLC's that are no longer supported and can't be repaired, which will cause significant down time in the event of failure if proper planning is not followed for their replacement. The District is beginning to see many of the old PLC's experiencing failure.

The industry standard average schedule for SCADA equipment replacement is every fifteen (15) years. The equipment is planned for replacement on this schedule.

Pumping Plant Reconstruction

Pumping plants are some of the most complex facilities in the District and have the highest maintenance costs and relatively shorter useful lives, as compared with other District facilities, such as pipelines.

There are three components that will be assessed and scheduled for replacement in each pumping plant: mechanical, electrical and structural components. The industry standard average schedule for complete plant replacement is every fifty (50) years. The plants will be planned for replacement on this schedule unless the condition assessment dictates a shorter or longer replacement schedule.

Treatment Plant

Treatment plants are even more complex than pumping plants because of the filtration and chemical disinfection equipment required to meet drinking water quality standards.

Each of the components within the treatment plants will be planned for replacement based on industry standard average schedules for those components. These are very similar to pumping plants.

Membrane filters are planned to last ten (10) years, while proper maintenance can potentially extend that lifetime.

Brazelton Lateral Pipeline Replacement (Gibson Canyon PWS only)

This project replaces a pipeline that is overgrown with trees and has historic repeated leaks.

Pre-Treatment (Gibson Canyon PWS only)

This project installs pre-treatment of the incoming raw water to the membranes located within the treatment plant, which is a standard feature of modern plants. Pre-treatment is expected to increase the uptime of the membranes, helping to ensure water supply reliability during peak demand flows. This will become especially important as demands increase on the system. Pre-treatment may also help to extend the life of the membranes, or their productivity up to the point of failure.

Filter Upgrades (Nut Tree NPWS only)

This project will upgrade the filters and repair the leaking filter tanks. This project will ensure that the filtration system is in good working order and reduce water losses from the system.

Tank Replacement/Relining (Elmira PWS only)

This project is a rehabilitation of the existing steel water storage tank. The project scope includes cleaning the tank, sand blasting the interior coating and recoating the interior of the steel storage tank.

Chlorinator (Quail Canyon PWS only)

This project will add a needed redundant chlorinator system, because the current system does not afford a convenient way to add chlorine should the chlorinator system fail at the well. This was recently documented when the chlorinator pump failed without warning.

III. CAPITAL REPLACEMENT CHARGE FUNDING ANALYSIS

The District implemented a Capital Replacement Charge (“CRC”) “placeholder” in 2013. The current CRC is \$10 per month for ¾” services, increasing proportionately for larger services.

When the CRC rate was first adopted, the District indicated that additional analysis would be required to establish longer term rates that may be required to fully fund the replacement of existing capital facilities.

This Technical Memorandum #2 provides an analysis of the amounts and CRC rates required to fund the replacement of capital facilities in each M & I service area. Exhibit A provides the analysis.

In three M & I service areas, the \$10 per month CRC (¾” service) exceeds the amount required to fund the planned replacement of capital facilities. The analysis indicates that the District could reduce the current CRC in the following M & I service areas:

- North Cordelia NPWS
- Nut Tree NPWS (while still requiring minor internal loans)
- Peabody PWS

For the remaining M & I service areas, the District has prepared three alternative scenarios for funding the replacement of capital facilities:

1. A one-time rate increase in 2015. Overall, the one-time rate increases are set to fully fund the ten-year capital replacement program in each M & I service area. However, in this scenario, some M & I service areas would need “internal” loans from other District funds for some capital replacement projects, because sufficient funds would not be available in certain years in which capital projects are planned. Internal loans are assumed to be repaid at 5% interest per year on the outstanding balance. Loans are assumed to be repaid as quickly as funds within the borrowing M & I service area are available. All loans are repaid by the end of the ten-year period.

Internal loans during the ten-year period would total approximately \$836,100.

2. Five annual rate increases in 2015-2019. Overall, the five-year rate increases are set to fully fund the ten-year capital replacement program in each M & I service area. However, similar to the one-time rate increase scenario, some M & I service areas would need “internal” loans from other District funds for some capital replacement projects, because sufficient funds would not be available in certain years in which capital projects are scheduled. Internal loans are assumed to be repaid at 5% interest per year on the outstanding balance. Loans are assumed to be repaid as quickly as funds within the borrowing M & I service area are available. All loans are repaid by the end of the ten-year period.

Internal loans during the ten-year period would total approximately \$803,300.

3. Capital financing from an external source, with CRC rate increases as necessary to repay the loans, with interest which is assumed to be at 5%. Because some loans would occur near the end of the planning period, but would still have a ten-year debt service schedule, there would be a balance owed after the ten-year period in certain M & I service areas. However, the CRC rates in these M & I service areas in 2024 would be sufficient to pay annual debt service on the outstanding external loans in subsequent years.

External loans during the ten-year period would total approximately \$2,089,300. The principal amount outstanding among all M & I service areas at the end of 2024 would be approximately \$1,511,800.

As an exception to the above, the North Village NPWS analysis includes only the one-time and capital financing scenarios, as a five year annual rate analysis was not necessary.

As a further exception to the above, the District has prepared alternative scenarios for the Gibson Canyon PWS, taking into account three factors. First, in the June 2014 public meetings on the District's planned future replacement of M & I service area capital facilities, Gibson Canyon customers expressed interest in a "flat rate" CRC, in which all customers, regardless of meter size, would be charged the same CRC rate. Based on this input, the District has prepared the analyses for Gibson Canyon PWS assuming a flat rate for all customers.

Second, Gibson Canyon customers currently pay a "membrane replacement charge" on their water bills, which averages approximately \$9.02 per month (the actual charges will vary among customers, depending on water usage). This \$9.02 per month is included in the CRC rate analyses.

Third, Gibson Canyon customers pay an \$800 per parcel annual "assessment" to pay off loans used for the existing facilities. This assessment will end in 2017; the Gibson Canyon one-time rate increase scenario defers the rate increase until 2018, when the assessment payments are no longer required.

IV. SUMMARY

This Technical Memorandum #2 provides a description of the schedule and cost for the replacement of the Solano Irrigation District's Municipal and Industrial service areas' capital facilities. It identifies several options for rate structures within each Municipal and Industrial service area to fund the replacement of existing capital facilities.

This Technical Memorandum #2 is intended to provide additional information to M & I customers in public meetings to be held in September 2014. Solano Irrigation District staff will be available at the public meetings, and at District offices to answer any questions that customers may have regarding the planned replacement of water system capital facilities, and the potential Capital Replacement Charges that may be required to fund these projects.