

# Asset Management Plan Summary Report Adopted May 2012



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## **EXECUTIVE SUMMARY**

Over the past several years, staff and consultants have made an effort to inventory and estimate future repair, rehabilitation and/or replacement costs for all of the District's major water system capital assets. These assets include, but are not limited to, pipelines and appurtenances, groundwater wells, storage tanks, and buildings and structures. These are critical water system components that help deliver safe drinking water to our customer's taps and support fire and emergency services. This infrastructure helps protect the public health, the environment, and economic activity; and contributes to a good quality of life. It is important that the District properly manage these assets going forward. As of the date of this report, staff estimates that it will cost approximately \$1.86 billion (in 2011 \$) over the next 100 years (2012 – 2111) to repair, replace and/or rehabilitate these assets. This estimated cost does not account for inflation.

Repair and replacement of aging water infrastructure is one of the most significant challenges facing the Sacramento Suburban Water District and water utilities in general throughout the United States. Asset management is a tool that can help water utilities adopt more advanced management methods that can reduce long-term costs and improve service to customers. For water utilities, asset management can be defined as “managing infrastructure capital assets to minimize the total cost of owning and operating them while delivering the service levels that customers’ desire.”

It would be ideal to have a single plan which encompasses all District assets; however, due to important priorities, limits on funding and resources, and the time necessary to produce such a single plan, it has been necessary to approach the asset management program systematically. In the past several years, District staff and/or consultants have prepared several separate asset management plans that address key District capital asset components. These various plans are listed below in chronological order based on when they were first completed and adopted by the Board of Directors.

- Water Meter Retrofit Plan
- Distribution Main Asset Management Plan (formerly known as Water Main Replacement Plan)

- Groundwater Well Facility Asset Management Plan
- 2009 Water System Master Plan
- Transmission Main Asset Management Plan
- Reservoir/Booster Pump Station Asset Management Plan
- Buildings and Structures Asset Management Plan
- 2012 SCADA Master Plan

Each of these reports includes estimated costs to repair, rehabilitate and/or replace the District's key water system facility assets. In most cases, the asset management plans included capital costs projected out 50 years. However, for the purpose of this summary report, costs have been extended out to 100 years (2012 – 2111). It must be emphasized that the farther into the future that a project is planned, the less specific and accurate the schedule and cost estimates will be. Most capital improvement program plans only look 5 or 15 years in to the future. In fact the District's *2009 Water System Master Plan* included a capital needs assessment covering only the period from 2010 through 2024 (15 years). To plan and provide cost estimates for work out to 100 years requires some major assumptions to be made. Although these assumptions are made based on actual experience and engineering judgment, there are most likely inaccuracies. Also, there could be any number of new laws and regulations that might affect priorities and air and water quality requirements well into the future. These are almost impossible to predict with any accuracy. However, this report provides estimated capital expenditures to the year 2111 using the best information available at the present time.

Note that none of the asset management plans include capital assets that are routinely included in the District's annual Operating Capital Budget (OCB). This budget typically includes such capital assets as computers and vehicles that have a much shorter life cycle and a much lower cost than the District's major infrastructure assets.

A summary of the 100 year capital cost projections for each asset category is provided in Table ES-1 below. Costs are in current day (2011) dollars and do not include inflation.

**Table ES-1. Estimated Capital Expenditures (2012 – 2111) (Costs in 2011 \$)**

<b>Asset Category</b>	<b>Estimated Capital Expenditures (2012 – 2111) (\$)</b>
Meter Retrofit Program	\$23,012,000
Meter Replacement and Repair Program	\$41,603,590
Distribution Main Replacements	\$1,100,000,000
Well Replacement	\$229,590,000
Transmission Main Asset Management Plan	\$87,422,512
Reservoir and Booster P.S. Asset Management Plan	\$25,860,000
Buildings and Structures Asset Management Plan	\$6,693,750
SCADA Master Plan	\$6,558,000
Other Capital Needs from <i>2009 Water System Master Plan</i>	\$32,975,000
Other Re-Occurring Annual Capital Costs (not included in asset management plans)	\$309,750,000
<b>Total</b>	<b>\$1,863,464,852</b>

As indicated, total capital costs over the next 100 years are estimated at approximately \$1.86 billion (again not factoring in inflation).

## INTRODUCTION/BACKGROUND

Water utilities throughout the United States are currently facing the challenge of extensive rehabilitation and replacement of aging and deteriorated water mains and other water system infrastructure. In 2011, the American Water Works Association (AWWA) published a new report on buried drinking water infrastructure<sup>1</sup>. As part of this study, AWWA estimates that the cost of replacing pipes that are at the end of their useful life will exceed \$1 trillion nationwide between 2011 and 2035 and will exceed \$1.7 trillion by 2050. Furthermore, a new report from the American Society of Civil Engineers (ASCE) indicates that replacement of aging water infrastructure will cost U.S. businesses \$147 billion over the next decade<sup>2</sup>. This report also indicates that unless new investments are made, by 2020 unreliable and insufficient water infrastructure will cost the average American household \$900 a year in higher water rates and lower wages.

The Sacramento Suburban Water District (District) is no different in this regard. Repair and replacement of aging water system infrastructure is one of the most significant challenges facing the District. Of particular concern to the District in terms of water system infrastructure are the older water distribution mains that date back prior to the 1950s or even earlier. Fortunately, an ongoing water main replacement program is underway to replace aging distribution mains that have outlived their useful life. Other water system assets are also aging and in need of replacement, including groundwater wells that are the primary source of the District's water supply.

Over the past several years, staff and consultants have made an effort to inventory and estimate repair, rehabilitation and/or replacement costs for all of the District's major water system capital assets. Capital assets are defined as real or personal property that have an estimated life of greater than one year. They include: land, land improvements, buildings, building improvements, machinery and equipment, vehicles, infrastructure (including water systems), leasehold improvements, and construction in progress (excluding projects from outside

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<sup>1</sup> Source: *Buried No Longer: Confronting America's Water Infrastructure Challenge*, American Water Works Association, 2011.

<sup>2</sup> Source: *Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure*, American Society of Civil Engineers, 2011.

developers). A capital asset is to be reported and, with certain exceptions, depreciated in the financial statements.<sup>3</sup>

None of the asset management plans that have been prepared to date include capital assets that are routinely included in the District's Operating Capital Budget (OCB). These assets would include computers, vehicles, equipment/tools, etc. Although these are capital assets with an estimated life of greater than one year, these types of assets are purchased primarily to meet operational requirements. By their nature, these assets have a much shorter life expectancy than infrastructure capital assets and they are replaced at a much lower cost. There is also generally no opportunity to rehabilitate these assets, they are purchased, they are used for their useful life and then they are surplus. Therefore, these operating capital assets are funded separately and are not part of this plan.

In general, the goal of an asset management plan is to meet a required or desired level of service in the most cost-effective way through the development, acquisition, maintenance, operation, rehabilitation and disposal of assets to provide for present and future customers. Asset management plans are intended to answer questions such as:

- How much money should the District spend to maintain an asset?
- What should be replaced versus maintained?
- What data should be collected to support the decision making process?
- How does the cost relate to levels of service?
- What is the likelihood or probability of an asset's failure?
- What is the consequence of an asset's failure?
- How is risk of failure of an asset managed?

It would be ideal to have a single plan which encompasses all District assets; however, due to important priorities and the time necessary to produce such a single plan, it has been necessary to approach the asset management program compartmentally, component type by component type. In the past several years, District staff and/or consultants have prepared various types of asset

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<sup>3</sup> Source: Governmental Accounting Standards Board (GASB) Statement #34.  
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management plans that address key District capital assets. These various plans are listed below in chronological order based on when they were completed and adopted by the Board of Directors.

- ✓ Water Meter Retrofit Plan - In September 2007, the Board of Directors adopted an updated *Water Meter Retrofit Plan* that provides staff with direction to equip each service within the District with a meter by 2025 as per Assembly Bill (AB) 2572 adopted in 2005. This plan was first adopted in February 2004 in response to the District's commitment to the Water Forum Agreement. **Note:** This plan is currently being updated.
  
- ✓ Distribution Main Asset Management Plan (formerly known as Distribution Main Replacement Plan) - In August 2011, the Board of Directors adopted an updated *Distribution Main Asset Management Plan* that prioritizes the replacement of water mains over the next few decades. This plan was first adopted in November 2005 and was later updated in January 2008. This plan identifies a work commitment potentially in excess of \$250 million over the next 15 to 20 years to replace aging water mains that have outlived their useful life.
  
- ✓ Groundwater Well Facility Asset Management Plan - In January 2009, the Board of Directors adopted a *Groundwater Well Facility Asset Management Plan* that provides a tool for staff to manage groundwater well assets into the future. The District currently owns and operates 88 active groundwater wells. This plan focuses on the drilled well and casing which is the most expensive portion of the entire well infrastructure and the most difficult to replace.
  
- ✓ Water System Master Plan (Brown and Caldwell) - The District hired Brown and Caldwell in 2008 to prepare a *Water System Master Plan*. Previous master plans prepared for the former Northridge and Arcade Water Districts in 1991 and 1995, respectively, were considered out of date and in need of being updated. The *Water System Master Plan* was adopted by the Board of Directors in July 2009. The master plan incorporated the District's previously completed asset management plans described

above. In addition to traditional master plan elements (existing and projected population, existing and projected water demands, etc.) the 2009 *Water System Master Plan* includes a capital needs assessment for the period of 2010 through 2024.

- ✓ Transmission Main Asset Management Plan – This plan looks at the District’s transmission mains which are 16-inches in diameter and larger. The District currently has over 53 miles of these larger pipelines which are used to move water throughout the District. This plan was finalized and adopted by the Board of Directors at the August 2011 Board Meeting.
  
- ✓ Reservoir/Pump Station Asset Management Plan – This plan inventories and evaluates the District’s water storage reservoirs and booster pump stations. The District currently has seven water storage tanks and/or reservoirs. This plan was finalized and adopted by the Board of Directors at the September 2011 Board Meeting.
  
- ✓ Buildings and Structures Asset Management Plan – This plan inventories the District’s buildings and other structures. The District currently owns and maintains 40 separate buildings or structures of various types, ages and condition. This plan was finalized and adopted by the Board of Directors at the November 2011 Board Meeting.
  
- ✓ SCADA Master Plan (Westin Engineering) – In 2011, the District hired Westin Engineering to prepare a Supervisory Control and Data Acquisition (SCADA) Master Plan. The District wanted an independent review and evaluation of the existing SCADA system in comparison to industry best standards, along with recommendations for upgrades and improvements. District staff also wanted a plan and schedule for equipping other sites with SCADA. The *SCADA Master Plan* was adopted by the District's Board of Directors at the February 2012 Board Meeting.

A summary description of the various asset management plans and/or master plans and their key findings and conclusions are described in more detail below.

## **METER RETROFIT PLAN**

The Board of Director's adopted an updated *Meter Retrofit Plan* in September 2007. This plan is an updated version of the original plan adopted in 2004. This *Meter Retrofit Plan* provides a plan and strategy for retrofitting the District's existing flat rate residential customers with water meters. The purpose and goals of this plan are:

- To promote water conservation in compliance with Water Forum objectives.
- To comply with Water Forum requirements for Best Management Practices (BMP's), including BMP # 4 on residential meter retrofits.
- To prioritize areas to be metered based on objective and defensible ranking criteria.
- To develop a realistic and phased approach to meter retrofits.
- To coordinate with the District's long-term capital improvement program.
- To provide customer outreach on meter retrofits and conserving water use.

Through execution of the Water Forum Agreement in 2003, the District originally agreed to install meters on all remaining residential services by 2030, or over the next 27 years. As of 2007, there were approximately 22,851 residential services not yet metered. [Note: as of December 2011, the number of unmetered services had been reduced to 16,862.] The majority of the District's commercial and multi-family housing accounts are already metered. In 2004, the District proposed to implement a 20-year installation program to complete meter retrofits in advance of the Water Forum commitment. The 20-year schedule also coincides with the expected life of a typical residential meter, allowing the meter retrofit program to smoothly transition into a meter replacement program over the long term. Then in 2005, Assembly Bill (AB) 2572 was adopted by the State of California that requires that all customers be equipped with a meter by 2025. The District was already working to complete meter installations prior to 2025. The 2007 plan revision updates the District's effort for the remaining 16 years of the program.

Obviously, with such a long program, there will be some customers metered well in advance of others. The *Meter Retrofit Plan* provides a basis for prioritizing the sequence in which remaining residential services will be metered. However, some flat rate residential customers will receive meters for reasons other than this plan. Such reasons include: voluntary metering,

when a customer requests a new larger water service, if a replacement water main is installed in the customer's neighborhood, and when the District completes service line repairs and/or replacement.

This plan also proposes that water meters be installed when backyard water mains (mostly located in the South service area) are replaced with new water mains located in the street or public right-of-way fronting the customer's homes. As part of installing these new mains, new water services will be installed which would include water meters. However, because of the large number of residential flat rate accounts (approximately 13,911) that are currently served by back yard water mains, and the length of time that it will take to replace these backyard mains, it is likely that water meters will need to be installed on back yard water services over the course of the proposed 20-year meter retrofit program. The District has a separate *Distribution Main Asset Management Plan* that prioritizes areas with backyard water mains receiving new water mains.

Several criteria were developed that are considered of importance in determining the priority for metering, including: (1) average water consumption, (2) front yard water mains, (3) back yard water mains, (4) size of lot, and (5) water main material type. To rank or prioritize the areas remaining to be metered, the areas with flat rate customers were divided up into 89 smaller regions, or service area "blocks," based on various commonalities (i.e., large percentage of larger lot sizes, etc.). The ranking criteria applied to the selected blocks were used to develop a ranking matrix for metering priority. As a result, a prioritization list was established for the blocks to be metered that is objective and defensible. Since dividing the flat rate customers into blocks, further division of the areas into smaller sub-blocks was required to obtain areas that equal the target number of customers to be metered each year. Based on the blocks and sub-blocks, the total number of regions now equals 126. As of January 1, 2007, 29 sub-regions had been metered.

The number of meters installed in any one year will be made up first of meters that are installed for reasons other than the meter retrofit plan (i.e., voluntary metering, etc). In addition, a certain number of meters will be installed each year as a result of planned main replacement projects. Finally, the remaining meters needed to meet the District's target will come from the

prioritization list included in the report. Due to uncertainties in the number of services located within the main replacement projects, smaller blocks (sub-blocks) will be used to combine with service replacement totals to reach target counts for the annual meter retrofit program.

As of September 2007, the total cost of the proposed 20-year meter retrofit project was estimated at \$26.9 million, including the cost of meter “drop-ins.” Drop-Ins are services that have been retrofitted for a water meter but a meter has not yet been installed. This does not include the cost of those meters that will be installed as part of planned main replacement projects.

Note that the *Water Meter Retrofit Plan* is currently in the process of being updated.

## **DISTRIBUTION MAIN ASSET MANAGEMENT PLAN**

The Board of Directors adopted a *Water Main Replacement Plan* in principle in November 2005. In January 2008, the Board adopted an updated plan. Then, in August 2011, the Board adopted another updated plan.

At the time the Plan was first adopted, it was anticipated that the *Water Main Replacement Plan* would be amended periodically in the future. In this current version, the title has been changed to *Distribution Main Asset Management Plan* to distinguish between this plan and the recently completed *Transmission Main Asset Management Plan*. It was recognized that new information would be made available in the future that might influence the ranking of project areas and the priority of need. In the 2008 version, the plan was updated to allow for the inclusion of information made available because of the completion of a hydraulic model that provided for an analysis of hydraulic issues that affected the prioritization of main replacement areas. This resulted in the addition of a new evaluation criterion, called “Hydraulic Factors.” In the 2011 update, the criteria “Risk of Failure” is included to assess hazards and risks associated with failing mains. Assessment of risk becomes more crucial in the prioritization of main replacements as mains age in locations where a break would greatly impact the community. It is important to track areas with a high risk of failure so that breaks with a high impact on the community can be addressed before an event occurs.

The purpose and goals of the *Distribution Main Asset Management Plan* are to:

- Provide a cornerstone for the District’s Asset Management Program.
- Provide a safe and reliable water distribution system.
- Provide a recommended water main replacement schedule for the first 10 years that could be adapted and modified to incorporate new technologies, management practices, and District needs.
- Prioritize main line replacement based on selected criteria, and respond to areas and sites with the highest need.
- Provide a direction and framework for future main replacement plans.

- Replace backyard water mains with water mains along the public right-of-way fronting customer's properties.
- Replace Outside Diameter Steel (ODS) and other water mains that have, in most cases, outlived their useful life.
- Coordinate work with the *Water Meter Retrofit Plan* by installing water meters along with the new main alignments.
- Coordinate work with the District's *Water Transmission Main Asset Management Plan*.
- Consider risk factors when prioritizing projects.
- Coordinate with the District's long term Capital Improvement Program (CIP).
- Coordinate with the Sacramento County pavement overlay projects.
- Replace undersized mains to meet fire flow requirements.

The *Distribution Main Asset Management Plan* is intended to be used as a tool for ongoing communication between the Board and staff to prioritize areas in need of water main replacement. Furthermore, it is to be used as a planning tool during annual capital improvement program (CIP) budget discussions with the Board. The Plan does not represent a financial commitment by the Board, other than those CIP funds already approved and adopted, but only provides a prioritization of main replacements for future planning. The Plan simply provides a direction and strategy for the replacement of the District's aging, deteriorating, and undersized water mains with an emphasis on the next 20 years.

For the purpose of the plan, a water main is defined as a distribution water pipe between 4" and 14" in diameter that provides water service to commercial and residential properties. There are currently over 649 miles of 4" to 14" water mains throughout the District as shown in Table 1 below.

**Table 1. Quantity of Distribution Mains in District by Type of Pipe**

<b>Main Type</b>	<b>Quantity (Miles)</b>	<b>% of System</b>
Asbestos Cement Pipe (ACP)	351	54
Ductile Iron Pipe (DIP)	83	13
Galvanized Steel (Galv.)	4	1
Mortar Lined Steel (MLS)	50	8
Outside Diameter Steel (ODS)	46	7
Poly Vinyl Chloride	88	14
Miscellaneous (cast iron, aluminum and PEP)	27	4
<b>Totals</b>	<b>649</b>	<b>100</b>

Two key elements will direct the path of main replacements for the next 20 years. They are the replacement of Outside Diameter Steel Pipe (ODS), and the relocation of backyard mains to the roadways in front of customer’s homes. There are approximately 137 miles of backyard water mains still remaining throughout the District. Sixty six (66) miles of the backyard mains are in the South Service Area (SSA) and serve older subdivisions constructed in the early 1950’s or earlier. The District currently has approximately 46 miles of ODS pipe in service, both in front yard and backyard mains. Thirty nine (39) miles of the backyard mains are made up with ODS pipe. This pipe type has the highest maintenance requirements of any distribution mains in service in the District. The integrity of these pipes has been weakened by deterioration of its coating and corrosion over time and it has proven to be unreliable.

The average useful life of water distribution mains (14 inches in diameter and below) is between 50 and 120 years depending on the pipe material, soil conditions, water quality, construction methods, and many other factors. Based on this information and a goal of the District to replace its distribution system over a 100 year interval, approximately 7 miles of water main lines per year would need to be replaced. This *Distribution Main Asset Management Plan* does not include discussion or recommendations for transmission mains (over 14 inches in diameter).

Transmission mains which have cathodic protection and are generally newer pipes within the Draft Asset Management Plan Summary Report

system will be monitored and addressed under the separate *Water Transmission Main Asset Management Plan*.

The *Distribution Main Asset Management Plan* proposes to relocate backyard water mains with new water mains located in the County streets or public right-of-ways, usually along the frontage of the properties served whenever practical. Coordination between the installation of new water meters and the construction of the new mains will benefit both water main replacement and the water meter retrofit programs. A new District water service will be installed in the public right of way from the new main line to the new water meter. The District will diligently attempt to meet with the property owner to discuss and agree upon a location for the new meter. If contact cannot be made, the meter will be placed within 3 feet of a property line and approximately 1 foot behind the walk or gutter. The new schedule 40 PVC in-tract service line will be installed from the meter box to a front hose bib whenever possible; otherwise the connection will be made at the existing customer in-tract service line at the rear or side yard. Additionally, new hydrants, valves, and other water system appurtenances will be installed with new water mains.

In this Plan, a “scoring” matrix has been constructed using several types of criteria to determine areas of highest need for main replacement. Criteria used to develop the scoring matrix included: type of pipe, age of pipe, location of pipe, leak history of the pipe, risk of failure and hydraulic factors (including fire hydrant spacing, hydrant type, and fire flow capability). Point values are assigned to the criteria and an analysis is completed. As a result of the analysis, identified evaluation areas are ranked in terms of priority for main replacement. While areas are assigned a total score and ranked for main replacement, actual projects and the sequencing of those projects may depend on project size, available budget, and other factors. One other significant factor that affects scheduling and sequencing is a County of Sacramento Ordinance that includes a moratorium which prohibits cuts in pavements on any streets within 3 years of being repaved. A project may move up on the priority list if the District knows the County is planning an overlay project in that area in the near future because it is prudent to install the new water main in a street or streets before they are overlaid prior to the moratorium taking affect.

Review and reassessment of the *Distribution Main Asset Management Plan* is recommended in 3-5 year intervals. Future information that would influence the ranking of project areas and the scoring matrix used in the Plan, include but are not limited to: improved recordkeeping systems, identification of new evaluation criterion, acquisition of new service areas, infrastructure failures, catastrophic events, and/or changes in District policies. It is also intended that this will be an adaptive and perpetual Plan in that areas where the water mains have been recently replaced will continue to be evaluated and ranked. Obviously, those areas with new water mains would then rank lowest on the priority list for replacement. However, over considerable time, those areas will again rise up on the priority list for replacement.

The District proposes to replace old, unreliable, and undersized water mains over the next 20 years or more at a minimum rate of 6 to 8 miles of new water mains per year. The total cost of main replacement in 2011 dollars is approximately \$1.2 to \$1.5 million dollars per mile of main replaced. This total cost includes administration, fees, environmental review, engineering services, construction, and inspection costs. This equates, dependant on total amount of main replaced, to \$144 to \$240 million over the next twenty years with no allowance for future increases in construction or material costs. The completion of 6 to 8 miles of main line per year will result in 120 to 160 miles of new mains in 20 years.

## **GROUNDWATER WELL FACILITY ASSET MANAGEMENT PLAN**

The Sacramento Suburban Water District (District) Board of Directors adopted the *Groundwater Well Facility Asset Management Plan* in principle on January 26, 2009.

The District currently operates 88 active groundwater wells that vary in age from 7 to 69 years, range in production capacity from 180 to 3,500 gallons per minute (gpm), and were constructed using different drilling methods to various total depths with 10-inch to 18-inch diameter blank casings and well screens. Because the groundwater wells are relied upon either partially when surface water is available or entirely when surface water is unavailable, the wells are considered to be one of the District's most valuable and important assets. This *Groundwater Well Facility Asset Management Plan* was developed to allow staff to better manage this vital asset. As it evolves, the plan will become a more valuable tool, through the monitoring and measuring of key well conditions and characteristics, and for use in scheduling well maintenance, replacement and destruction.

The goals of the *Groundwater Well Facility Asset Management Plan* are:

- To maximize the value of the investment of ratepayers dollars by extending asset life to its fullest cost effective term.
- To maintain groundwater well assets by developing a plan for long-term rehabilitation and/or replacement. The objective is to rehabilitate and/or replace groundwater wells as needed.
- To be able produce 100% of the District's total peak water demand, with a 15% safety factor, solely from groundwater wells.
- To develop an inventory or asset register of all of the District's groundwater wells and related assets.

The *Groundwater Well Facility Asset Management Plan* is not necessarily a well replacement plan although it can be used to assist in making planning decisions related to well replacement. However, as with the *Water Main Replacement Plan* and *Water Meter Retrofit Plan*, the *Groundwater Well Facility Asset Management Plan* uses a “scoring” matrix constructed using several types of criteria to determine groundwater wells (and therefore production capacity) with the greatest need for replacement. Criteria used to develop the scoring matrix include: 1) condition assessment (consisting of indirect criteria such as well age, type of construction, depth of annual/sanitary seal, well casing diameter, casing thickness, and whether the well has a history of sand production); 2) well performance (consisting of production capacity, pumping efficiency (in terms of electricity used per volume pumped) and specific capacity); and 3) water quality.

The *Groundwater Well Facility Asset Management Plan* focuses primarily on the actual drilled production well and well casing (the below ground components). The well itself is the most critical component of all of the facilities that make up a modern groundwater facility used for potable water production. The other facility assets (pump, motor, motor control center, etc.) are considered appurtenances of the well itself. In addition, the well is often the most expensive facility component, the most hidden, and the most difficult to repair and/or replace. Subsequent versions of this plan will address other well facility and production system assets.

The *Groundwater Well Facility Asset Management Plan* is perpetual in that all active groundwater wells are ranked in order of priority for replacement and it is designed to be updated in response to new and additional information. The plan is intended to be used as a tool for ongoing communication between staff and the Board of Directors regarding replacement of aging groundwater wells and associated assets. Review and assessment of the *Groundwater Well Facility Asset Management Plan* is recommended in 3-year intervals.

It should be noted however, that the District’s newer wells are in almost all cases larger in capacity than the older wells. To illustrate this point, Table 2 below shows the District’s active wells categorized by age. In addition, the total production capacity of the active wells in each age category has also been included. As indicated, thirty six (36) of the District’s 88 active groundwater wells were drilled 50 or more years ago. This represents approximately 40 percent

of the District's active groundwater wells. However, those wells only contributed 15.2% of the total groundwater production in 2005/2006/2007. Currently, 21.6 percent of the District's active groundwater wells are less than 20 years old but they also contribute 41 percent of the entire production capacity of all of the District's active wells.

**Table 2. Production Capacity of Active District Wells in Each Age Category<sup>4</sup>**

<b>Age of Well (Years)</b>	<b>Number of Active Wells in Age Category</b>	<b>Total Production Capacity of Active Wells in Each Age Category (gpm)</b>	<b>Percent Contribution to Total Groundwater Pumped 2005/2006/2007 (MG)</b>
50+	36 (40.9%)	25,015 (26.0%)	4,458.3 (15.2%)
40 – 49	17 (19.3%)	15,455 (16.1%)	3,471.4 (11.8%)
30 – 39	13 (14.8%)	2,530 (2.6%)	3,601.4 (12.3%)
20 – 29	3 (3.4%)	13,445 (14.0%)	313.8 (1.1%)
10 – 19	10 (11.4%)	18,690 (19.4%)	7,431.9 (25.3%)
0 - 9	9 (10.2%)	21,105 (21.9%)	10,107.8 (34.3%)
<b>Totals</b>	<b>88 (100%)</b>	<b>96,240 (100%)</b>	<b>29,384.6 (100.0%)</b>

Currently, the North Service Area (NSA) does not have sufficient groundwater capacity to meet the 1.15 times peak hour demand goal. Storage tanks and booster pumps are used to meet peak demands as necessary. The new Verner Well (#N36) has helped in this regard, providing an additional 1,500 gpm of production in the NSA in 2009. In addition, construction of the new Coyle Well (#N38) will be completed in 2012/2013 and this will add additional capacity to the NSA. The South Service Area does have sufficient capacity to meet the stated goal of 1.15 times peak hour demand with groundwater wells.

<sup>4</sup> Data in this table is accurate as of January 2009 when the *Groundwater Well Facility Asset Management Plan* was adopted by the Board of Directors.

## **WATER SYSTEM MASTER PLAN**

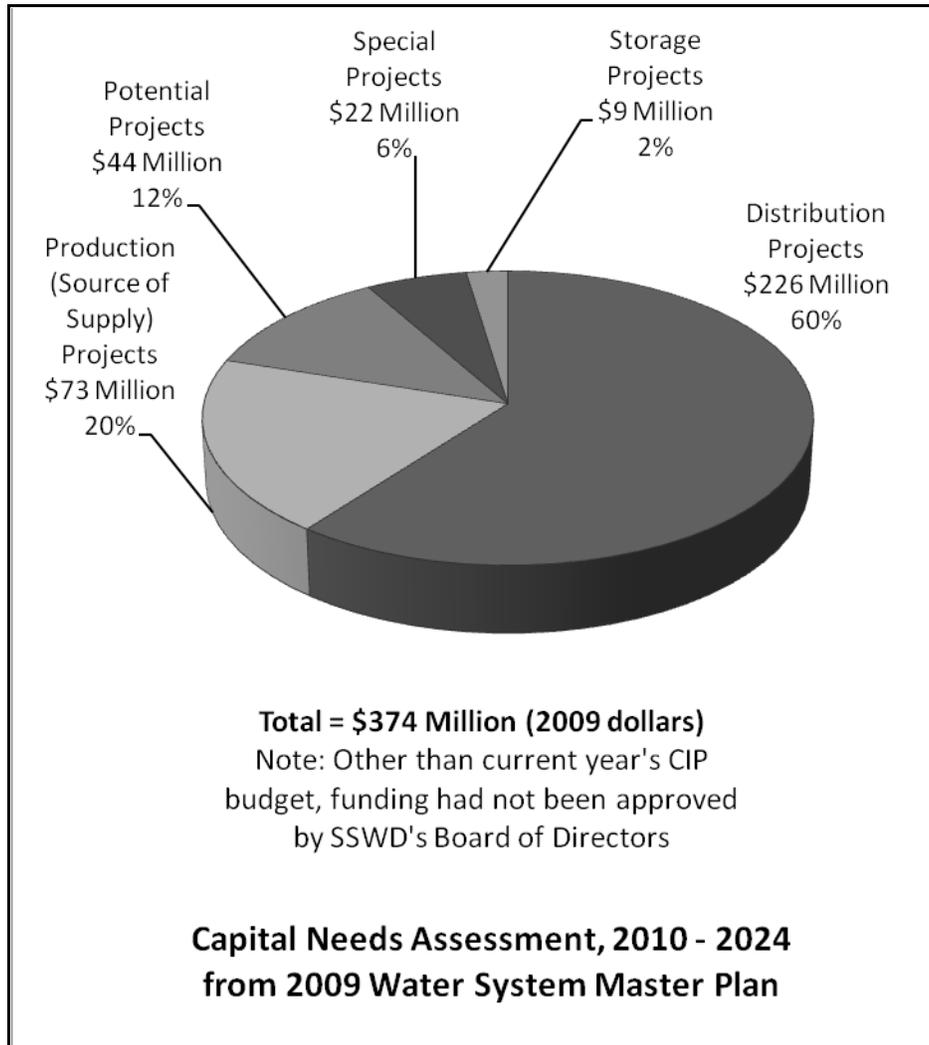
In 2008, following a qualification based selection process, Brown and Caldwell (B&C) was selected to prepare the District's *Water System Master Plan*. The most recent water system master plans for the former Northridge and Arcade Water Districts were completed in 1991 and 1995, respectively, and were considered to be outdated. The *Water System Master Plan* was adopted by the District's Board of Directors on July 20, 2009.

The *Water System Master Plan* includes a comprehensive assessment and description of the District's ultimate needs (to the year 2035) for water distribution, supply and treatment based on future population growth, land use, proposed water quality regulations, etc. The master plan also includes a capital need analysis which projects needs out to the year 2024. The master plan is intended to allow the District to better plan and budget for future facilities projects and capital improvements.

The *Water System Master Plan* is an important document that will be used by District staff and board members into the future. However, efforts will be made to keep it current with new information as it becomes available. Major updates to the *Water System Master Plan* are planned at approximately 5 year intervals.

The capital needs analysis covers a 15-year period from 2010 through 2024 and is intended to be used as a planning tool for the development of the District's capital improvement program and for future capital improvement program (CIP) budget discussions with the Board. In the report, the District's capital needs are divided into five project categories: production (source of supply), storage, distribution, special, and potential. Distribution main replacements are a large portion of the costs within the distribution projects categories. Most of the potential projects are funded by others. The estimated total cost of the capital projects identified in the master plan (for the period 2010 – 2024) is approximately \$374 million (in 2009 \$). The breakdown of the estimated total costs for all projects in each of the five categories is shown in Figure 1 below.

**Figure 1. Capital Needs Assessment, 2010 – 2024, from 2009  
Water System Master Plan**



However, the master plan does not represent a financial commitment by the Board, other than those CIP funds already approved and adopted. The capital needs analysis in the *Water System Master Plan* will be used for future planning and budgeting.

## **TRANSMISSION MAIN ASSET MANAGEMENT PLAN**

For this plan, attention was directed towards the District's larger (16" in diameter and larger) transmission mains. Pipelines 14" in diameter and smaller are covered in the separate *Distribution Main Asset Management Plan* (formerly known as the *Water Main Replacement Plan*). The purpose of the *Water Transmission Main Asset Management Plan* (WTMAMP) is to inventory the District's existing transmission mains in terms of size, type of pipe and age and to discuss a plan for monitoring and testing and potential repair, rehabilitation and/or replacement. This is the first attempt at identifying a program to address these larger pipeline assets in the long term. Fortunately, the District's transmission mains are generally newer pipes within the system and they typically have cathodic protection for corrosion control to further increase their life expectancy. However, they are also the largest and most expensive pipes to replace when the need arises.

The purpose and goals of the WTMAMP are to:

- Provide for a safe and reliable water transmission system.
- Inventory the District's existing transmission mains by size, type and age.
- Provide a preliminary plan for transmission main monitoring and condition assessment.
- Provide a preliminary plan for transmission main rehabilitation and/or replacement that can be adapted and modified to incorporate new technologies, management practices, and District needs.
- Provide a direction and framework for future plan revisions.
- Coordinate with the District's *Distribution Main Asset Management Plan* (formerly known as the *Water Main Replacement Plan*).
- Coordinate with the District's long term *Water System Master Plan* and Capital Improvement Program (CIP).
- Provide supporting information to address the District's capital reserves going forward.

Currently there are approximately 53 miles of water transmission mains within the District. A breakdown by type of pipe, length in feet/miles and percentage of pipeline material in service in the District is shown in Table 3 below.

**Table 3. Length of Transmission Mains by Size and Type of Pipe**

<b>Diameter</b>	<b>AC Pipe (Feet)</b>	<b>CCP (Feet)</b>	<b>CMLC Steel (Feet)</b>	<b>DIP (Feet)</b>	<b>PVC Pipe (Feet)</b>	<b>Total (Feet)</b>	<b>Percent of Total</b>
<b>16"</b>	3,480	0	10,226	59,984	3,062	<b>76,752</b>	27.3
<b>18"</b>	0	0	10,833	112	0	<b>10,945</b>	3.9
<b>20"</b>	0	0	678	3,030	0	<b>3,708</b>	1.3
<b>24"</b>	0	0	85,524	13,875	0	<b>99,399</b>	35.4
<b>30"</b>	0	0	30,569	50	0	<b>30,619</b>	10.9
<b>36"</b>	0	0	19,142	187	0	<b>19,329</b>	6.9
<b>48"</b>	0	40,033	0	0	0	<b>40,033</b>	14.3
<b>Total</b>	<b>3,480</b>	<b>40,033</b>	<b>156,972</b>	<b>77,238</b>	<b>3,062</b>	<b>280,785</b>	100.0
<b>Percent of Total</b>	1.2	14.3	55.9	27.5	1.1	100.0	

As indicated in Table 3, the majority of the District’s transmission mains are CMLC steel at 156,972 feet (29.7 miles) or 56 percent of all the District’s transmission mains. The second most prevalent type of pipe is DIP consisting of 77,238 feet (14.6 miles) or approximately 28 percent of the District’s transmission mains. The largest transmission mains are 48” diameter CCP which make up approximately 14 percent of the total footage. And finally, AC pipe and PVC pipe combined make up only 2.3 percent of all District transmission mains.

Fortunately, the majority (56.1%) of the transmission mains were constructed in the last 10 years and are still in excellent condition with a long useful life still remaining. And, approximately 80% of the transmission mains are less than 20 years of age. The District’s metallic transmission mains also generally include cathodic protection for protection from corrosion. The average useful life of the water transmission mains is estimated at between 70 and 120 years depending on the pipe material.

The reason that the majority of the transmission mains are newer pipes has to do with how the former Arcade and Northridge Water Districts were originally developed. As subdivisions were built in each district in the 1950's (or earlier), the developer was typically required to provide a small lot or a portion of a lot for the construction of a groundwater well. As more and more wells were constructed a distribution system was constructed that resembles a "spider web" configuration with the larger diameter pipes in the vicinity of the wells and decreasing in size further away from the wells. There was no backbone transmission main system. In the 1990's, as both former districts were pursuing conjunctive use opportunities, larger backbone transmission mains began to be constructed to move surface water throughout the District. The only exception is that the former Arcade Water District constructed a series of shallow infiltration wells along the American River in the 1960's and a fairly substantial transmission main system was constructed to move this surface water into the southeast portion of the District's South Service Area. These are the oldest pipes in the current transmission main system.

Due to the average age of this asset, the District, fortunately, has had very little opportunity to develop in-house rehabilitation and replacement costs. This report, therefore, relies on research information and water industry standards as a basis for developing cost information. Cost estimates are considered as "ballpark" because they are based on a set of industry assumptions in regards to pipe life expectancy, the ability to rehabilitate as opposed to replace the majority of the pipe when it reaches the end of its useful life, and the methods to be used for pipeline rehabilitation. Staff anticipates refining the assumptions and cost estimates going forward based on institutional and industry experience.

This WTMAMP is intended to be used as a tool for ongoing communication between the Board and staff to prioritize water transmission main assessment, rehabilitation or replacement. Furthermore, it is to be used as a planning tool during annual capital improvement program (CIP) budget discussions with the Board. This Plan does not represent a financial commitment by the Board, other than those CIP funds already in the District's approved budget.

Various future transmission mains are also planned within the District. If these planned future transmission mains are funded and constructed, they will add approximately 20 miles of additional transmission mains to the District's system.

Various methods are available for monitoring and testing the condition of the piping and performing condition assessments. Fortunately, the newer water transmission mains within the District were constructed to allow for electrical continuity between pipe sections. Test stations are available at various intervals to allow for the electrical continuity of the pipe and the pipe-to-soil (P/S) potential to be tested. The District has started a program to regularly test these transmission mains but more emphasis must be placed on this type of testing in the future. In addition, the District is considering an acoustic based testing method to perform condition assessment on other piping.

The majority of the District's older distribution mains (pipes 12" and smaller) that are being replaced are presently located in back and side-yard easements. The new replacement water mains are typically being installed within the public right-of-way, and the existing back and side-yard water mains are being abandoned in place. However, the majority of the District's transmission mains are already located within streets. As a result, their ultimate replacement becomes somewhat more complicated because their location is not changing. However, the fact that the transmission mains are in the preferred location (i.e., the street) allows for other opportunities to extend the life of the mains through repair and/or rehabilitation. This could include relining the mains or other rehabilitation alternatives.

Various alternatives are available for pipeline rehabilitation and/or replacement. One of the most common methods for large pipe rehabilitation is known as sliplining. In 2011 dollars, the cost for rehabilitation can range from approximately 30 percent to 50 percent of the cost of replacement. Rehabilitation can extend the service life of the pipe by an estimated 50 years. Transmission main replacement costs are estimated to range from \$1.1 million per mile for 16-inch diameter piping to \$4.0 million per mile for 48-inch piping.

Over the next 100 years (2012 – 2111), costs have been estimated to rehabilitate and/or replace the District's transmission mains and those in which the District owns capacity (SJWD and the City of Sacramento). These cost estimates assume that any transmission mains installed prior to 1985 will have an estimated service life of 70 years and any transmission mains installed in 1985 or later will have an estimated service life of 90 years. The life expectancy of these pipelines can of course vary greatly depending on many factors including construction methods, quality of pipe manufacturing, soil corrosivity, water quality, etc. Once the existing pipelines reach their estimated service life it is further estimated that 50 percent of the pipelines will be rehabilitated using localized repair and rehabilitation methods, 25 percent of the pipelines will be rehabilitated using the sliplining process, and 25 percent of the pipelines will be replaced. Based on these assumptions, it is estimated that the total cost to rehabilitate and/or replace existing transmission mains over the next 100 years is approximately \$87 million (in 2011 dollars). Based on an economic analysis, the present value of estimated future transmission main rehabilitation and/or replacement costs is approximately \$257 million.

Similar to distribution mains, one other significant factor that affects scheduling and sequencing of any transmission main replacement is a County of Sacramento Ordinance that includes a moratorium which prohibits cuts in pavements on any streets within 3 years of being constructed or repaved. Any transmission main replacement projects will have to be coordinated with the County of Sacramento's paving and overlay projects as it is prudent to install the new water main in a street or streets before they are overlaid and the moratorium takes effect.

Similar to the *Distribution Main Asset Management Plan*, it is anticipated that this WTMAMP will be amended periodically in the future. It is recognized that new information will be made available in the future that might affect the condition assessment and the need for repair and/or replacement. Review and reassessment of the WTMAMP is recommended in 3 to 5 year intervals. Future information that could change the plan include, but are not limited to: improved recordkeeping, information from leak detection surveys, information from condition assessment surveys and testing, infrastructure failures, catastrophic events, merger or consolidation with other water purveyors, and/or changes in District policies.

## **RESERVOIR AND BOOSTER PUMP STATION ASSET MANAGEMENT PLAN**

Another important component of the assets of the District are its reservoirs, tanks and booster pump stations. The purpose of this *Reservoir and Booster Pump Station Asset Management Plan* (RBPSAMP) is to inventory the District's existing reservoirs, storage tanks, and booster pump stations in terms of size, type, and age and to discuss a plan for maintenance, repair and/or potential replacement. The District currently owns and operates seven (7) water storage tanks/reservoirs of different types and capacities. The total storage capacity for all seven tanks/reservoirs is 15,925,000 gallons. Four (4) are elevated steel tanks and three (3) are ground level steel storage reservoirs. Three (3) of the water storage reservoirs have associated booster pump stations and the District also owns and operates two other independent booster pump stations.

The District's four elevated tanks were all constructed in the 1950's and are older assets. However, they can provide decades of many more years of service as long as they continue to be properly maintained. The District's three ground level reservoir tanks are newer assets that were constructed between 1999 and 2006 and have many decades of service life remaining. These newer reservoir tanks also have cathodic protection systems for corrosion control to further increase their life expectancy.

When the four elevated tanks reach the end of their useful life, they may not be replaced. These tanks are no longer being used as originally designed because current water system hydraulic characteristics have made them useful only with modifications or in extreme low pressure situations and other emergencies. In addition, for a mostly groundwater system like the one operated by the District, the groundwater basin itself acts as a large storage reservoir. As long as there is sufficient backup power at well sites to operate the wells in an emergency, this large underground storage reservoir is always available when needed.

This RBPSAMP is intended to be used as a tool for ongoing communication between the Board and staff to prioritize reservoir and tank repair, maintenance, improvements, and/or possible replacement. Furthermore, it is to be used as a planning tool during annual capital improvement

program (CIP) budget discussions with the Board. This Plan does not represent a financial commitment by the Board, other than those CIP funds already approved and adopted.

The purpose and goals of the RBPSAMP are to:

- Provide for a safe and reliable water supply.
- Provide adequate emergency storage for fire protection and other needs.
- Inventory the District's existing reservoirs/tanks and booster pump stations by capacity, type, size and age.
- Provide a preliminary plan for reservoir/tank and booster pump station repair, rehabilitation and/or replacement that can be adapted and modified to incorporate new technologies, management practices, and District needs.
- Coordinate with the District's long term Capital Improvement Program (CIP).

The average useful life of steel reservoir tanks can range from 75 to 100 years or longer providing that adequate preventive maintenance is performed on a regular basis. The booster pump stations themselves will have a similar life expectancy but the pumps/motors and electrical equipment will require replacement at more frequent intervals during the facility's lifespan.

The District is currently on a schedule where the tanks and reservoirs are being inspected and cleaned every 2 (reservoirs) to 5 years (elevated tanks). Spot coating repairs are made each time the cleaning and inspections are performed. In addition, the steel tanks and reservoirs are being completely re-coated (interior and exterior) every 15 years. This schedule is subject to change depending on the findings and recommendations from the regular tank cleanings and inspections. Complete tank and reservoir re-coatings are estimated to cost between \$300,000 (elevated tanks) and \$550,000 (ground level reservoirs).

Based on current cost information that was obtained for this report, it is estimated that the cost to replace a 5 MG storage reservoir and associated booster pump station is approximately \$8.7 million (2011 costs).

Similar to the District's other asset management plans, it is anticipated that the RBPSAMP will be amended periodically in the future. It is recognized that new information will be made available in the future that might affect the condition assessment and the need for repair and/or replacement. Therefore, review and reassessment of the RBPSAMP is recommended in 3 to 5 year intervals.

## **BUILDINGS AND STRUCTURES ASSET MANAGEMENT PLAN**

Previously discussed assets have included water meters, distribution mains, groundwater wells, transmission mains, and reservoirs/booster pump stations. This plan addresses the District's buildings and structures.

The purpose of this *Buildings and Structures Asset Management Plan* (BSAMP) is to inventory all of the District's existing buildings and other structures (car ports, etc.) in terms of type and age and to include a plan for required capital expenditures, primarily for roof replacement and painting. This BSAMP is intended to be used as a tool for ongoing communication between the Board and staff to prioritize building and structure maintenance, repair, and replacement. Furthermore, it is to be used as a planning tool during annual capital improvement program (CIP) budget discussions with the Board. This Plan does not represent a financial commitment by the Board, other than those CIP funds already approved and adopted.

The purpose and goals of the BSAMP are to:

- Inventory the District's existing buildings and structures by type, age, and condition.
- Provide a preliminary plan for necessary building and structure capital expenditures, primarily roof replacement and painting, which can be adapted and modified to incorporate new management practices and District needs.
- Provide direction and framework for future plan revisions.
- Coordinate with the District's long term Capital Improvement Program (CIP).

The District currently owns and maintains 40 separate buildings or structures of different types, ages and condition. Most of these are pump houses at well sites. The majority of the well site buildings are constructed of cement masonry units (CMU) or blocks. Some of the oldest buildings are well site pump houses that were constructed in the 1950's. Likewise, some of the newest buildings are also located at well sites. As long as they are properly maintained, the average useful life of a well constructed building can easily be 100 years or more.

The most expensive asset in terms of building/structure maintenance and repair is the roofs. Most roofs have a life expectancy of between 20 and 30 years. For this report, the District hired

a roofing expert to inspect and evaluate the condition of roofs on all buildings and structures. The consultant also estimated the cost to replace building roofs when they are in need of replacement and estimated their life expectancy after they are replaced.

Another significant building/structure maintenance item is painting. This report proposes a schedule where the buildings and structures will be re-painted or sealed (in the case of unpainted CMU block buildings) approximately every 15 years. This is the schedule for building exteriors. Building interiors will not require re-painting as frequently and costs for interior painting are assumed to come out of the District's annual O&M budget. As necessary, spot painting and/or repairs are made each time building inspections are performed. Complete building and/or structure exterior re-paintings are estimated to cost between \$5 and \$10 per square foot depending on the building size.

The estimated capital cost over the next 50 years for the largest capital cost items (roof replacement and exterior painting) necessary to properly maintain the District's existing buildings and structures is approximately \$3.3 million (in 2011 \$).

Note that prefabricated fiberglass enclosures are not included in this asset management plan. These types of enclosures are in place at numerous well sites and typically house chlorination and/or fluoridation equipment. Because they can be purchased "off the shelf" and have no foundation or roofing system, these enclosures are not included in this report. In addition, the District's concrete material storage bins, although technically structures, are also not included.

Similar to the District's other asset management plans, it is anticipated that the BSAMP will be amended periodically in the future. It is recognized that new information will be made available in the future that might affect the condition of the buildings/structures and the need for repair and/or replacement. Review and reassessment of the BSAMP is recommended in 5 to 7 year intervals.

## SCADA MASTER PLAN

The final component of this version of the District's asset management components is the Supervisory Control and Data Acquisition (SCADA) Master Plan. The District utilizes a SCADA system to monitor and control remote groundwater well facilities, surface water related facilities, and reservoir and booster stations. In 2011, the District contracted with Westin Engineering (Westin) to develop a *SCADA Master Plan*. The District wanted an independent review and evaluation of the existing SCADA system in comparison to industry best standards, along with recommendations for upgrades and improvements.

The *SCADA Master Plan* was developed through a series of site visits, stakeholder interviews, and structured workshops, with an emphasis on working closely with District staff to develop the plan. The master plan project also included the development of a number of SCADA System standards. The *SCADA Master Plan* outlines nine (9) recommended short-term projects to be executed in the next two years and five (5) longer-term projects planned over a six-year timeframe. Completing these projects will achieve the following four high-level strategies that collectively support the District's current and long-term SCADA system requirements.

- **Strategy 1 - Standardization:** Develop and apply the standards for a District-wide SCADA system that achieves consistent system operation, including effective alarm notification and unrestricted access to quality data that enables fact-based decision-making and business optimization.
- **Strategy 2 - SCADA Governance:** Establish the organization, policies, procedures, standards, and levels of service required to effectively manage the development and maintenance of SCADA system assets.
- **Strategy 3 - PLC Functionality:** Implement a Programmable Logic Controller (PLC) technology based on industry-standard programming and communications protocols to support more efficient development and maintenance of SCADA system functionality.
- **Strategy 4 - Communications Performance:** Implement the communications technology to

support reliable supervisory control and enhanced data acquisition for operations and maintenance of all active District facilities.

The *SCADA Master Plan* includes estimated costs for recommended short and long term SCADA projects. The estimated cost of these projects is approximately \$6.6 million. However, similar to the other asset management plans, the master plan does not represent a financial commitment by the Board, other than those CIP funds already approved and adopted. The Plan will be used as a planning tool during annual capital improvement program (CIP) budget discussions with the Board.

The recommended projects in the *SCADA Master Plan* are discussed in more detail below.

- Short-Term Projects: A number of short-term projects were identified which can be accomplished within 12 - 18 months. These short-term projects are designed to yield immediate improvements in system operations and to develop standards used in longer-term improvements. In the master plan, each project is provided with an Overview, Work Plan, Recommended Schedule/Duration, and Cost Opinion. An estimate of significant District staff involvement in each project is also provided.
- Longer-Term Projects: The recommendations defined in the system assessment phase were developed into an overall plan to improve the District's SCADA system. These improvements have been divided into a series of interrelated projects. In general, the longer-term projects can be implemented independently; however, some dependencies exist. In the master plan, each project is provided with an Overview, Prerequisites and Dependencies, Work Plan, recommended schedule/duration, and Cost Opinion. An estimate of significant District staff involvement in each project is also provided.
- Future Projects: Two projects, Integrated Business Solution and System Optimization, have been designated as future projects. The short-term and longer-term projects must be completed before there is a well enough defined scope to develop a budgetary estimate for these projects.

The *SCADA Master Plan* was adopted by the Board of Directors at the February 2012 Board Meeting. District staff intends to use the master plan as a guide for budgeting and planning for future SCADA System additions and enhancements.

## **OVERALL COST PROJECTIONS (2012 – 2111)**

Estimated capital costs for each category of assets have been estimated out 100 years, from 2012 through 2111. This was done whether the same time period was covered, or not, in the individual asset management plans.

Overall estimated costs from 2012 – 2111 are shown in Appendix A. A detailed description of the cost projection assumptions associated with each asset category is provided below.

### General Cost Assumptions

General cost estimating assumptions used as a basis for the District's asset management plans and for this summary report are as follows:

- Includes estimated costs for repair/rehabilitation/replacement of existing assets or existing planned assets only; does not include costs for future planned assets that have not yet been built (except for those projects identified in the *2009 Water System Master Plan*).
- Does not include changes in water quality regulations that would require the installation of new wellhead treatment equipment, etc.
- No major loss of production wells due to groundwater contamination.
- District boundaries and responsibilities remain the same as current.

### Meter Retrofit Program Cost Assumptions

The most accurate recent cost estimates for the District's meter retrofit program were included in the *2009 Water System Master Plan* as prepared by Brown and Caldwell. Specific meter retrofit cost assumptions are as follows:

- Estimated costs are from the *2009 Water System Master Plan*.
- Approx. 1,300 water meters to be installed per year until 100% of District customers are metered.
- Water meters are to be installed both as part of the annual meter retrofit program and as part of ongoing main replacement projects.

### Meter Repair and Replacement Program Cost Assumptions

Water meters used in domestic water systems typically have a life expectancy of 15 to 20 years. Therefore, water meters that were installed in the late 1980's/early-1990's are in need of replacement. Costs for meter repair and replacement were also included in the *2009 Water System Master Plan*. However, more recent information on meter replacement has been obtained from the District's Field Services Dept. and included in this summary report. Specific meter repair and/or replacement cost assumptions are as follows:

- Costs included in the *2009 Water System Master Plan* have been changed to reflect actual circumstances.
- Only the 5/8", 3/4" and 1" meters are assumed to be replaced; larger meters are rebuilt as needed using rebuilding kits which are purchased out of the District's O&M budget.
- Replacement costs for meters are for the meter only; meter transponders are replaced as needed out of the District's O&M budget.
- Replacement costs for meters are as follows: 5/8" - \$102 + sales tax; 3/4" - \$118 + sales tax; and 1" - \$178 + sales tax.

### Distribution Main Replacements Cost Assumptions

No specific costs were included in the *Distribution Main Asset Management Plan*. However, staff has a good base of costs for main replacements as this work has been ongoing for several years. Specific distribution main replacement cost assumptions are as follows:

- Service life of existing distribution mains is estimated at 100 years.
- One percent (or approx. 6-8 miles) of water mains to be replaced per year.
- Estimated average total cost is \$1.3 million per mile which includes design, bidding, construction services, County inspection and all related construction costs incl. new service lines, new meters, new fire hydrants, etc.

### Groundwater Well Replacement Cost Assumptions

The *Groundwater Well Facility Asset Management Plan* report itself did not actually include cost estimates for replacing wells going forward. However, information from this report was

used by Brown and Caldwell in estimating well replacement costs that were later included in the *2009 Water System Master Plan*. At the time, the capital needs analysis in the master plan only covered the period 2010 through 2024 and well replacement costs were included for this same period. For this summary report, Brown and Caldwell extended the well replacement costs out to the year 2111.

Specific well replacement cost assumptions are as follows:

- Assumed well life from original construction date is based on the assumptions from *2009 Water System Master Plan*. Well life from first replacement is based on assuming replacement in 60 years for non key wells and replacement in 50 years for key wells.
- Wells identified as key wells are based on Section 12. Infrastructure Reliability Plan from the *2009 Water System Master Plan*.
- The new Coyle Well (#N38) has been included with a construction date of 2013 and a replacement date of 2073.
- Well capacity of all replacement wells is 1,500 gpm at a minimum. If a well's original capacity was greater than 1,500 gpm, then the capacity of the replacement well is assumed equal to the original capacity.
- Each well replacement is based on a 3-phase cost: year 1=\$250,000 (includes land acquisition, environmental review and test hole engineering/drilling); year 2=\$400,000 (includes well design and drilling production well); and year 3=\$1,400,000 (includes building pump station and equipping well). The lost and replaced capacity shows up in year 3.
- Note that since a 1,500 gpm replacement capacity (at a minimum) is assumed for each new well, the total capacity by subarea usually increases by the time all wells have been replaced.
- Some wells are retired and are not replaced if there is sufficient capacity in the subarea in which it is located.

### Transmission Main Asset Management Plan Cost Assumptions

The *Transmission Main Asset Management Plan* projected transmission main rehabilitation and/or replacement costs out 100 years. These costs have been transferred directly to this summary report. Specific transmission main rehabilitation and/or replacement cost assumptions are as follows:

- Transmission mains installed prior to 1985 are assumed to have a service life of 70 years and transmission mains installed in 1985 are assumed to have a service life of 90 years.
- Once pipelines reach their useful life, it is assumed that 50% will be rehabilitated using localized repair and rehabilitation methods (“Method A”), 25% will be rehabilitated using the sliplining process (“Method B”) and 25% will be replaced.
- Method A pipeline rehabilitation is assumed to consist of various methods including joint welding rehabilitation, repair of internal corroded areas of pipeline, repair of internal corroded areas of pipe connections, installing an impressed current corrosion protection system and/or joint welding.
- Method B pipeline rehabilitation is assumed to consist of sliplining of the existing pipe. Sliplining is completed by installing a smaller, "carrier pipe" into a larger "host pipe", grouting the annular space between the two pipes, and sealing the ends. The most common material used to slipline an existing pipe is high density polyethylene (HDPE).

### Reservoir and Booster P.S. Asset Management Plan Cost Assumptions

The Reservoir and Booster P.S. Asset Management Plan included cost projections out 50 years to 2061. For this summary report, these costs were extended out 100 years to 2111. Specific reservoir and booster pump station repair and/or rehabilitation cost assumptions are as follows:

- The life expectancy of steel tanks that are properly maintained can exceed 100 years.
- Routine tank cleanings/inspections/spot repairs and pump/motor repair and maintenance would be included in the District's annual O&M budgets.
- Tank interiors and exteriors are scheduled to be re-painted every 15 years on average.
- Existing interior coatings would be sandblasted to bare metal before re-coating; existing exterior coatings would only be sanded to roughen existing surface prior to re-coating.

- 5 MG reservoirs (Antelope, Enterprise/Northrop and Watt/Elkhorn) are assumed to have either a new roof or floor installed as part of major rehabilitation work when they reach 75 years of age.
- The four elevated storage tanks (constructed in the 1950's/1960's) will not be replaced when they reach the end of their useful life.

### Buildings and Structures Asset Management Plan

The *Buildings and Structures Asset Management Plan* included cost projections out 50 years to 2061. For this summary report, these costs were extended out 100 years to 2111. Specific building and structure repair and/or rehabilitation cost assumptions are as follows:

- No consolidation of District's Administration Building and Corporation Yard facility/buildings.
- Costs are included for roof replacement and painting.
- Life expectancy of existing building roofs was estimated by DC Consulting Services.
- Replacement costs for new roofing and life expectancy for new roof were also estimated by DC Consulting Services.
- Building exteriors are scheduled to be re-painted approximately every 15 years.
- Building interiors will only require infrequent painting if at all and costs will come out of District's O&M budget.

### SCADA Master Plan

The SCADA Master Plan was just recently completed by Westin Engineering. Various short and long term projects are recommended in the master plan. Westin also developed cost estimates for the recommended projects. Specific SCADA cost assumptions are as follows:

- Costs are taken from *2012 SCADA Master Plan* as prepared by Westin Engineering.
- Costs are included for recommended short-term, long-term and future projects.

### Other Capital Needs from 2009 Water System Master Plan

As discussed previously in this report, the 2009 *Water System Master Plan* included a capital needs assessment covering the period from 2010 through 2024. In the master plan report, the District's capital needs are divided into five project categories: production (source of supply), storage, distribution, special, and potential. The estimated total cost of the capital projects identified in these five categories (for the period 2010 – 2024) is approximately \$374 million (in 2009 \$). However, in this report, the estimated capital costs for the capital replacement projects have been moved to their respective asset management cost category. For example, well replacement costs are included under the Groundwater Well Facility Asset Management Plan. In addition, the years 2010 and 2011 have already been completed so those costs are no longer included.

After moving capital replacement cost to their respective asset management plan category and those projects identified in the years 2010 and 2011, the remaining projects consist primarily of proposed capital improvements. Capital improvements, as opposed to capital replacements, are one time projects that result in new water system assets. The remaining capital improvement projects recommended in the water system master plan have a total estimated cost of approximately \$33 million (in 2009\$). Note: This does not include those projects in the “Potential Projects” category that are to be paid for by others and which have an estimated total cost of approximately \$42.5 million. The specific projects in this category are described below.

### Production

- **Additional Groundwater Wells to Meet Future North Area Demands (\$6,000,000 total)**
  - Assumes that three additional 1,500 gpm capacity wells are needed in the North Service Area to meet future demands. [Note that these wells are in addition to future replacement wells whose costs are included in the *Groundwater Well Facility Asset Management Plan* category.] Each well would have a three year completion period starting with property selection and acquisition, environmental review, and test hole engineering and drilling in Year 1; well design and drilling production well in Year 2; and building the pump station and equipping the well in Year 3.

### Storage

- **McClellan Storage Facilities (\$7,600,000 total)** – The proposed project consists of the construction of a 3 million gallon (MG) reservoir tank with booster pump station and related facilities that will provide additional water supply storage capacity and increase water supply availability and reliability for fire protection within the McClellan Business Park Service Area. The District already owns a 2 acre parcel for the proposed project on the west side of McClellan Business Park. It is assumed that the need for this project would be driven by development within the business park. The project duration would be two years. In the first year, engineering design, environmental review, and permitting would be performed. In the second year, the storage reservoir and booster pump station would be constructed. [This project has been identified as grant eligible and staff is pursuing these opportunities as they become available.]

### Distribution

- **North Service Area Pressure Zone Breaks (\$400,000 total)** – Two pressure zone breaks are proposed for the North Service Area (NSA). The first would be along Manzanita Avenue and the second would be along Walerga Drive, Keema Avenue, Oakhollow Court and Hillsdale Blvd. Each pressure zone break would consist of two pressure sustaining valves (PSV). The estimated cost does not include land acquisition.
- **34<sup>th</sup> Street McClellan Intertie (\$150,000 total)** – The proposed project would add a third intertie between the District's North Service Area (NSA) and the McClellan Business Park Service Area to be located at 34<sup>th</sup> Street. The project would consist of the installation of an intertie (pipeline connection), a flow meter, and backflow device. [Note: this project was partially constructed with the recent Freedom Park Drive improvements.]
- **McClellan Pipeline Improvements (\$2,000,000 total)** – The proposed project would upgrade pipelines within McClellan Business Park to meet current fire flow requirements. The project duration is assumed to be four years.

## Special Projects

- **Unidentified Future County of Sacramento Projects (\$6,240,000 total)** – There is uncertainty in the timing and extent of County of Sacramento improvement projects past the year 2016. Therefore, this project includes costs for the years 2017 through 2024 as related to water line relocation for roadway improvement projects and/or to avoid conflicts with County sanitary sewer and storm drain projects.
- **Groundwater Monitoring Wells (\$360,000 total)** – Three additional groundwater monitoring wells are proposed at a cost of \$120,000 per well. These monitoring wells would be used to monitor groundwater quality, groundwater levels, etc. It is assumed that the three monitoring wells would be located on the east side of the District’s South Service Area (SSA) to help monitor the progress of the Aerojet contamination plume.
- **Water System Master Plan Updates (\$900,000 total)** – Proposed updates to the 2009 *Water System Master Plan* are assumed every 5 years at a cost of \$300,000 each. These updates would occur in 2014, 2019 and 2024. [Note however, that staff is assuming that water system master plan updates will only occur every 10 years.]
- **Hydraulic Model Update and Calibration (\$225,000 total)** – It is assumed that the District’s hydraulic model will require regular updating and calibration. It is further assumed that this work will be performed three times and would occur in the year prior to the master plan updates (see above).
- **Conjunctive Use Program Analysis (\$440,000 total)** – This project would consist of groundwater modeling which is proposed to evaluate and quantify the affects of the District’s conjunctive use program on the groundwater basin and neighboring users. Under this option, the District would contract with Aquaveo to update and calibrate the existing Roseville and/or USGS Central Valley MODFLOW groundwater model to evaluate several alternative future conjunctive use scenarios (including changes in storage and the impacts and benefits to neighboring groundwater users). A budget of \$100,000 is assumed for the initial analysis/database and GIS/groundwater model development. A budget of \$60,000 is

assumed every fourth year for conjunctive use program analysis. In addition, \$40,000 is proposed in years prior to the conjunctive use program analysis to calibrate the groundwater model.

- **Urban Water Management Plan (\$150,000 total)** – An Urban Water Management Plan (UWMP) is required every 5 years, in years ending in 00 and 05, to comply with state law (the Urban Water Management Planning Act). Therefore, development of a UWMP is assumed in years 2015 and 2020.
- **SCADA Master Plan (\$150,000 total)** – This project has already been completed (in January 2012) but a budget of \$75,000 is assumed in 2015 and 2020 to update the SCADA Master Plan.
- **NSA Pressure Zone Break Pre-Design Study (\$100,000 total)** – This project would evaluate the cost effectiveness and provide a pre-design for the proposed North Service Area (NSA) pressure zone breaks.
- **North Watt Corridor Pipeline Improvements (\$5,500,000 total)** - This project would install 12,000 feet of new 12-inch diameter pipeline from Mountain Oak to Freedom Park Drive and along Freedom Park Drive between Watt Avenue and 32nd Street. [Note: the new pipeline section on Freedom Park Drive from Watt Avenue to 32nd Street has already been constructed.] It is assumed that the need for this project will be driven by development. A budget of \$900,000 is assumed for engineering design, environmental review, permitting, and construction management. A budget of \$4,600,000 is assumed for pipeline construction.
- **Fair Oaks Corridor Pipeline Improvements (\$2,760,000 total)** - This project would install 6,000 feet of new 12-inch diameter pipeline along Gibbons from Horton to Manzanita Avenue and along Manzanita Avenue from Gibbons to Windmill. It is assumed that the need for this project will be driven by development. A budget of \$460,000 is assumed for engineering design, environmental review, permitting, and construction management. A budget of \$2,300,000 is assumed for pipeline construction.

## Potential Projects

The projects in this category are assumed to be paid for, at least partially, by others either through obtaining grant funds or some other funding mechanism other than District ratepayers. However, the amount of grant funds that might be obtained is uncertain. These projects are also considered to be capital improvements and not capital replacements. Since these projects are dependent on other funding and have not been approved by the Board, the estimated project costs are not included in the capital cost projections in this report. If these “Potential Projects” are approved by the Board and constructed, these assets will then be folded into the individual asset management plans. These projects are described below. The estimated total cost of these projects is approximately \$42.5 million.

- **ACP/CTP Pump Back Improvements (\$2,000,000 total)** – This project would include construction of a pump station to transfer water from the District’s North Service Area (NSA) to either the San Juan Water District Family or to the City of Roseville. Both alternatives require a pump or pumps and above grade piping that ties into an existing distribution pipeline.
- **ASR Wells (\$2,000,000 total)** – This project would result in the construction of two aquifer storage and recovery (ASR) wells within the District. More analysis is needed.
- **Island Area Pipeline Improvements (\$600,000 total)** – The “island” area of the District is located in the South Service Area (SSA) west of the Business 80 freeway. This area generally has small diameter pipelines and there are very few pipelines that connect this area to the remainder of the SSA. Budget is included for pipeline improvements that will help to meet fire flow demands.
- **Sierra Oaks Subdivision Distribution System (\$16,000,000 total)** – The Sierra Oaks subdivision located within the South Service Area has over 300 parcels but only about 40 parcels are currently served by the public water system. The remainder of the homes in this area are served by private wells. This project would include design and construction of a distribution main system throughout the subdivision.

- **North Service Area Fluoridation (\$6,818,000 total)** – This project would install fluoridation equipment on 35 groundwater wells in the North Service Area (NSA). The project duration would be two years with design, environmental review, and permitting in Year 1 and construction in Year 2. Note that this cost assumes that San Juan W.D. would fluoridate their surface water supply at their Peterson WTP. [Funding would be provided by an assessment levied on the property owners within the area benefitting from the project.]
  
- **Arvin Area Conjunctive Use Program (formerly known as Indian River/Flaming Arrow Pipeline Project)(\$5,300,000 total)** – This project is designed to improve the transmission of surface water into the east half of the North Service Area (NSA) to increase the District’s ability to utilize surface water from PCWA when it is available. A pre-design report has already been prepared and a preferred pipeline alignment selected. A total of 2.1 miles of 16”/24” transmission main is proposed. The project duration is anticipated to be two years with design, environmental review and permitting in Year 1 and construction in Year 2.
  
- **Crestview Transmission Pipeline (\$2,000,000 total)** – This project consists of the approximately one mile of new 16-inch transmission pipeline. A budget of \$400,000 is included for engineering design, environmental review, permitting and construction management. A budget of \$1,600,000 is estimated for construction.
  
- **3 MG Verner Reservoir and Booster P.S. (\$5,000,000 total)** - The proposed project consists of the construction of a 3 million gallon (MG) reservoir tank with booster pump station and related facilities. The District already owns a 2.5 acre site for the proposed project, located within the urban setting of the City of Citrus Heights. This is the same site where the Verner Well (#N36) is located. The project duration would be two years. In the first year, engineering design, environmental review, and permitting would be performed. In the second year, the storage reservoir and booster pump station would be constructed.
  
- **Developer Related Distribution System Upgrades (\$1,300,000 total)** – This project is for District system improvements as related to developer projects to provide water service to a new development. Upgrades can include abandonment of redundant lines, upsizing of

developer required pipelines, and reconfiguration of service opportunities. A total of \$100,000 per year is assumed in years 2012 through 2024.

- **New Service Connections/Meters (\$1,500,000 total)** – This project consists of service connections and meters for developer projects.

#### Other Re-Occurring Annual Capital Costs

Each year the District has other ongoing capital needs that must be accounted for in long term asset management planning. These costs are currently not included in any of the specific asset management plans although they were included in the capital needs analysis in the *2009 Water System Master Plan*. Specific cost assumptions used in this report are as follows:

- **Water Supply Backup Power (\$100,000/year)** – The District owns and operates standby engine generators at key water system facilities to provide backup power in the event of an emergency when utility power is lost. Funds are included each year for a major engine overhaul and/or engine generator replacement (assumes one engine overhaul or engine replacement each year). [Note: this project will eventually be incorporated into the *Groundwater Well Facility Asset Management Plan*.]
- **Well Rehabilitation/Pump Station Improvements (\$840,000/year)** – These projects consist of ongoing well rehabilitation work and/or other well site improvements. This work can include pulling the pump/motor, video inspection of a well, pump repairs and/or replacement, motor repairs and/or replacement, well rehabilitation through chemical treatment or other methods, site and building improvements, and replacing other well site equipment and/or controls on an as-needed basis. [Note: this project will eventually be incorporated into the *Groundwater Well Facility Asset Management Plan*.]
- **SCADA RTU's/Communication Improvements/MCC Panels (\$100,000/year)** – Includes installing/replacing/upgrading remote terminal units (RTU), telemetry and communication improvements, and upgrading and/or replacing existing motor control center (MCC) panels at

well sites. [Note: this project will eventually be incorporated into either the *Groundwater Well Facility Asset Management Plan* or the *SCADA Master Plan*.]

- **Wellhead Treatment (\$150,000/year)** – Project to cover costs associated with needing to install new and/or replace existing wellhead treatment or chemical feed systems on an as-needed basis. [Note: this project will eventually be incorporated into the *Groundwater Well Facility Asset Management Plan*.]
- **Corrosion Control and Painting (other than reservoir tanks) (\$50,000/year)** – Transmission mains, hydropneumatic tanks, well site piping and corrosion control facilities are on a scheduled maintenance program for inspection, testing and recoating as necessary. Coating work is performed as necessary based on inspection results. A certain amount of work is planned each year. Also included are structural inspections of tanks on an as-needed basis. [Note: this project will eventually be incorporated into the *Groundwater Well Facility Asset Management Plan*.]
- **McClellan Improvements (\$100,000/year)** – Improvements required per agreement with McClellan AFB. This generally includes upgrading existing water services with meters and backflow devices, adding backflow devices to private fire sprinkler services, and upgrading existing fire hydrants. It is assumed that these annual costs will continue at the current funding level through 2016 and then be reduced to \$50,000/year for the years 2017 through 2021.
- **Water Related Street Improvements (\$200,000/year)** – Includes lowering/raising existing valve boxes before and after pavement grinding and overlays by the County of Sacramento, the City of Sacramento and/or the City of Citrus Heights. Typically the County and the City of Citrus Heights have two to four paving projects per year that will require valve boxes to be lowered and raised. This project also includes work identified by the District’s Preventative Maintenance (PM) crew including raising valve boxes, etc. Also includes water line relocation as necessary to avoid conflicts with County sanitary sewer and storm drain projects.

- **Large Meter Replacement (\$50,000/year)** – Consists of the replacement of old large (> 3”) water meters that have outlived their useful life. Assumes an average of 5 large meters will be replaced each year. Meter installations will also be upgraded to allow for testing and ease of maintenance. [Note: this project will eventually be incorporated into the *Meter Retrofit/Replacement Plan*.]
- **Distribution System Major Repairs (\$450,000/year)** – Consists of the repair of major main breaks which may include facility repair/replacement of collateral damage to the surrounding area (pavement, curb/gutter/sidewalk, etc.)
- **Distribution Main Extensions (\$750,000/year)** – Includes various small main replacement projects necessary to solve distribution system hydraulic issues including dead end mains and un-looped mains. May also include relocating District facilities to avoid grade conflicts with County of Sacramento improvements (storm drains, etc.). [Note: this project will eventually be incorporated into the *Distribution Main Asset Management Plan*.]
- **Fire Hydrant Replacement/Rehabilitation (\$100,000/year)** – The 2009 Water System Master Plan identified some areas with insufficient fire flow. This project brings these areas into compliance with minimum District and fire district standards, especially in those areas where main replacement projects are not scheduled for several years. Also includes repair and/or replacement of fire hydrants found to be inoperable by the District’s Preventative Maintenance (PM) crew.
- **Professional/ Special Services (\$300,000/year)** – Includes potential professional services for environmental review work, preliminary design, special studies, hydraulic modeling, surveying, etc.

Staff anticipates that as the ability to manage assets improves, the majority of the above costs can and will be folded into the individual asset management plans in the future. For example, large meter replacement can be included in the *Meter Retrofit/Replacement Plan*. The goal will be to incorporate all capital replacements and improvements into the various asset management plans going forward.

A summary of the 100 year capital cost projections for each asset category is provided in Table 4 below. Costs are in current day (2011) dollars and do not include inflation.

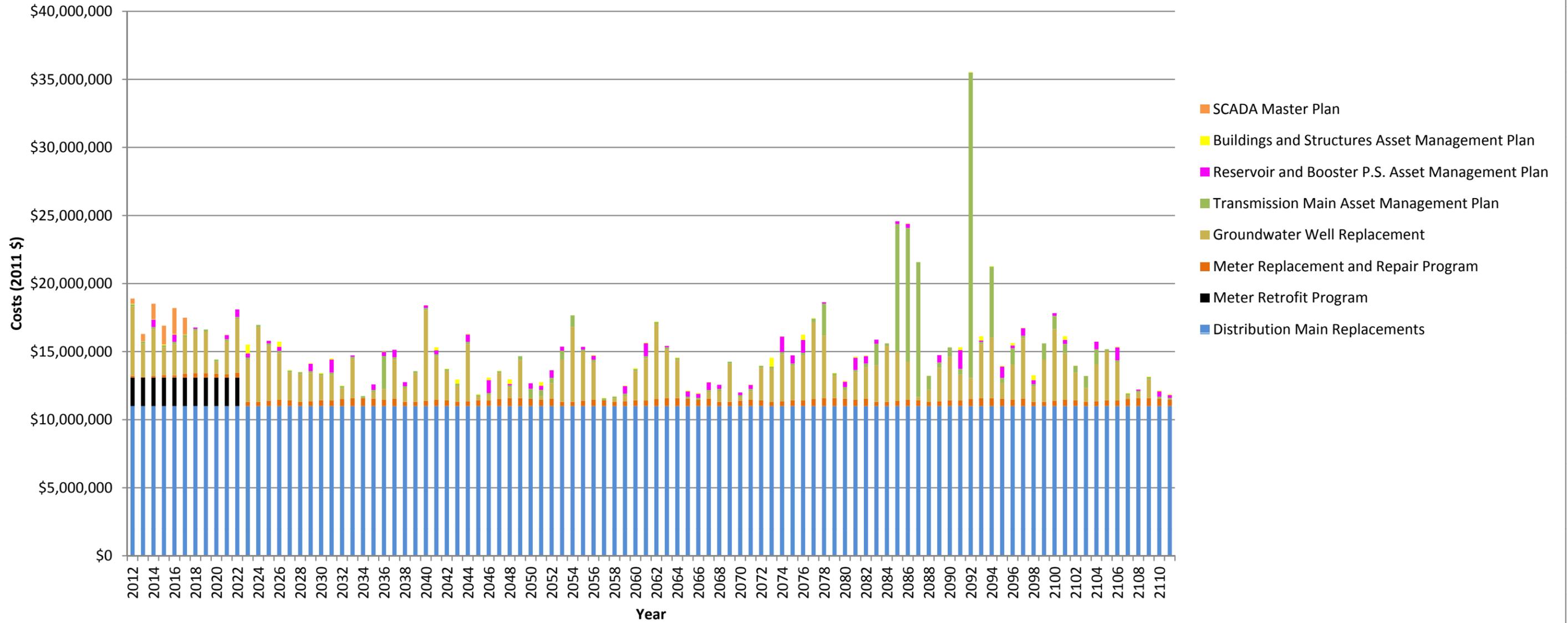
**Table 4. Estimated Capital Expenditures (2012 – 2111) (Costs in 2011 \$)**

<b>Asset Category</b>	<b>Estimated Capital Expenditures (2012 – 2111) (\$)</b>
Meter Retrofit Program	\$23,012,000
Meter Replacement and Repair Program	\$41,603,590
Distribution Main Replacements	\$1,100,000,000
Well Replacement	\$229,590,000
Transmission Main Asset Management Plan	\$87,422,512
Reservoir and Booster P.S. Asset Management Plan	\$25,860,000
Buildings and Structures Asset Management Plan	\$6,693,750
Other Capital Needs from <i>2009 Water System Master Plan</i>	\$32,975,000
Other Re-Occurring Annual Capital Costs (not included in asset management plans)	\$309,750,000
SCADA Master Plan	\$6,558,000
<b>Total</b>	<b>\$1,863,464,852</b>

As indicated, total capital costs over the next 100 years are estimated at approximately \$1.86 billion (again not factoring in inflation).

Figure 2 below shows the estimated annual expenditures for the period 2012 – 2111 (costs in 2011 \$).

**Figure 2. Estimated Capital Expenditures (2012 - 2111) (Costs in 2011 \$)**



## **ASSET MANAGEMENT PLAN UPDATES**

All of the District's various asset management plans will need to be reviewed and updated on a regular basis. These documents are a work in progress and more and better information will be available in the future to improve these plans. It is also recognized that new information will be made available in the future that might affect the asset inventories, condition assessments and the need for asset repair and/or replacement. Future information could include, but not be limited: improved recordkeeping systems, information from condition assessment surveys and testing, infrastructure failures, catastrophic events, merger or consolidation with other water purveyors, and/or changes in District policies. Review and reassessment of each of the individual asset management plans is recommended in at least 3 to 5 year intervals. A schedule showing projected timelines for review and updates of the various asset management plans is shown in Figure 3 below.

It is also recommend that this *Asset Management Plan Summary Report* also be reviewed and reassessed at 3 to 5 year intervals.

Figure 3. Schedule for Updating Asset Management Plans<sup>1,2</sup>

Asset Management Plan	Year																		
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Meter Asset Management Plan <sup>3</sup>	▲					▲						▲					▲		
Distribution Main Asset Management Plan			▲				▲					▲					▲		
Groundwater Well Facility Asset Management Plan		▲				▲				▲				▲				▲	
Transmission Main Asset Management Plan				▲					▲						▲				
Reservoir and Booster P.S. Asset Management Plan				▲					▲						▲				
Buildings and Structures Asset Management Plan					▲						▲					▲			
Water System Master Plan								▲										▲	
SCADA Master Plan											▲								
Asset Management Plan Summary Report					▲					▲						▲			

**NOTES:**

<sup>1</sup> This schedule is a guide as to when future plan updates will be made. The timing of planned updates has been adjusted so that no more than two are being worked on in any one year.

<sup>2</sup> Plans will be updated only if deemed necessary following staff review and a recommendation to the General Manager.

<sup>3</sup> Currently called the Meter Retrofit Plan. This plan will transition to a Meter Asset Management Plan and it will cover both meter retrofits and meter replacement.

## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations can be summarized from this report.

- This *Overall Asset Management Plan* summarizes the key findings in the other individual asset management plans and/or master plans that have been completed over the past several years.
- This *Overall Asset Management Plan* provides a tool for communication between the Board and Staff to identify assets in need of repair, rehabilitation and/or replacement.
- This *Overall Asset Management Plan* identifies probable capital costs associated with repair, rehabilitation and/or replacement of the District's water system facility assets but does not prescribe any funding mechanisms.
- Based on the current cost information that was obtained for this report, total capital costs over the next 100 years are estimated at approximately \$1.86 billion (not including inflation).
- This *Overall Asset Management Plan* will be reviewed and revised periodically as additional field and other information becomes available.

**APPENDIX A**  
**OVERALL COST PROJECTIONS (2012 – 2111)**

Date:

5/10/2012

Overall Asset Management Plan  
Estimated Capital Expenditures (2012 - 2111) (Costs in 2011 \$)

Asset Category	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Meter Retrofit Program	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$2,092,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Meter Replacement and Repair Program	\$131,027	\$53,676	\$113,533	\$178,472	\$168,670	\$287,964	\$331,048	\$332,342	\$275,838	\$227,608	\$359,329	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788	\$299,171	\$362,873	\$427,443
Distribution Main Replacements	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000
Groundwater Well Replacement	\$5,100,000	\$2,450,000	\$3,450,000	\$2,050,000	\$2,300,000	\$2,700,000	\$3,100,000	\$3,050,000	\$900,000	\$2,450,000	\$3,950,000	\$3,100,000	\$5,500,000	\$4,050,000	\$3,450,000	\$2,050,000	\$2,050,000	\$2,050,000	\$1,800,000
Transmission Main Asset Management Plan	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
Reservoir and Booster P.S. Asset Management Plan	\$0	\$0	\$550,000	\$0	\$550,000	\$0	\$100,000	\$0	\$0	\$300,000	\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0	\$0	\$550,000	\$0
Buildings and Structures Asset Management Plan	\$40,050	\$10,630	\$37,765	\$53,685	\$54,000	\$26,800	\$0	\$0	\$5,000	\$28,800	\$6,445	\$652,160	\$4,500	\$6,080	\$384,000	\$34,050	\$10,630	\$37,765	\$53,685
SCADA Master Plan	\$386,800	\$543,800	\$1,123,900	\$1,385,300	\$1,884,400	\$1,233,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Capital Needs from 2009 Water System Master Plan <sup>1</sup>	\$2,170,000	\$2,210,000	\$3,865,000	\$3,610,000	\$8,450,000	\$2,500,000	\$1,470,000	\$1,500,000	\$2,500,000	\$1,400,000	\$1,100,000	\$1,100,000	\$1,100,000	\$0	\$0	\$0	\$0	\$0	\$0
Other Re-Occurring Annual Capital Costs (Not Included in Asset Management Plans)	\$3,190,000	\$3,190,000	\$3,190,000	\$3,190,000	\$3,190,000	\$3,140,000	\$3,140,000	\$3,140,000	\$3,140,000	\$3,140,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000
<b>Total</b>	<b>\$24,259,877</b>	<b>\$21,700,106</b>	<b>\$25,572,198</b>	<b>\$23,709,457</b>	<b>\$29,839,070</b>	<b>\$23,130,564</b>	<b>\$21,383,048</b>	<b>\$21,264,342</b>	<b>\$20,062,838</b>	<b>\$20,788,408</b>	<b>\$22,297,774</b>	<b>\$19,706,227</b>	<b>\$21,156,937</b>	<b>\$18,897,944</b>	<b>\$18,829,253</b>	<b>\$16,739,838</b>	<b>\$16,599,801</b>	<b>\$17,240,638</b>	<b>\$16,521,128</b>

## NOTES:

<sup>1</sup> Does not include projects and costs from the "Potential Projects" category which are to be paid for through grants or funding other than District ratepayers.

2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$411,970	\$523,568	\$571,480	\$583,725	\$541,262	\$454,977	\$537,763	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788	\$299,171	\$362,873	\$427,443	\$411,970	\$523,568	\$571,480	\$583,725	\$541,262	\$454,977
\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000
\$1,900,000	\$800,000	\$2,900,000	\$0	\$500,000	\$800,000	\$2,900,000	\$1,000,000	\$2,100,000	\$6,650,000	\$3,200,000	\$2,150,000	\$1,200,000	\$4,200,000	\$250,000	\$400,000	\$1,900,000	\$800,000	\$2,800,000	\$0	\$250,000
\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$2,423,235	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$280,830	\$734,396	\$491,843
\$950,000	\$0	\$100,000	\$0	\$400,000	\$300,000	\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0	\$0	\$550,000	\$0	\$950,000	\$0	\$100,000	\$0	\$400,000	\$300,000
\$79,000	\$32,800	\$0	\$0	\$0	\$27,800	\$6,445	\$2,160	\$4,500	\$11,080	\$212,000	\$34,050	\$308,630	\$37,765	\$53,685	\$178,000	\$26,800	\$352,000	\$0	\$0	\$265,800
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000
\$17,580,970	\$15,596,368	\$17,811,480	\$14,823,725	\$15,681,262	\$18,096,012	\$18,234,208	\$15,856,227	\$16,656,937	\$21,502,944	\$18,407,253	\$16,839,838	\$16,047,801	\$19,390,638	\$14,971,128	\$16,179,970	\$16,690,368	\$16,063,480	\$17,754,555	\$15,765,658	\$15,852,620

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$537,763	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788	\$299,171	\$362,873	\$427,443	\$411,970	\$523,568	\$571,480	\$583,725	\$541,262	\$454,977	\$537,763	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788
\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000
\$1,150,000	\$3,100,000	\$5,500,000	\$3,600,000	\$2,800,000	\$0	\$250,000	\$400,000	\$2,150,000	\$3,100,000	\$5,500,000	\$3,600,000	\$2,800,000	\$0	\$0	\$500,000	\$800,000	\$2,800,000	\$250,000	\$650,000	\$2,400,000
\$392,559	\$657,168	\$853,411	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0	\$0	\$550,000	\$0	\$950,000	\$0	\$100,000	\$0	\$400,000	\$300,000	\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0
\$12,445	\$2,160	\$4,500	\$6,080	\$47,000	\$34,050	\$10,630	\$37,765	\$58,685	\$55,000	\$40,050	\$10,630	\$37,765	\$53,685	\$54,000	\$26,800	\$0	\$0	\$5,000	\$28,800	\$6,445
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000
\$16,732,767	\$18,463,395	\$20,760,348	\$18,447,944	\$17,842,253	\$14,689,838	\$14,799,801	\$15,590,638	\$16,876,128	\$18,756,970	\$20,303,618	\$18,522,110	\$17,661,490	\$15,234,947	\$15,048,977	\$15,854,563	\$15,654,067	\$17,352,437	\$15,096,864	\$15,674,053	\$17,062,233

2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$299,171	\$362,873	\$427,443	\$411,970	\$523,568	\$571,480	\$583,725	\$541,262	\$454,977	\$537,763	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788	\$299,171	\$362,873	\$427,443	\$411,970	\$523,568	\$571,480
\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000
\$2,450,000	\$3,450,000	\$2,550,000	\$3,350,000	\$5,650,000	\$4,600,000	\$1,650,000	\$650,000	\$2,050,000	\$2,300,000	\$2,700,000	\$4,100,000	\$3,600,000	\$2,800,000	\$250,000	\$900,000	\$2,450,000	\$3,200,000	\$1,900,000	\$1,550,000	\$4,000,000
\$150,000	\$150,000	\$150,000	\$150,000	\$254,241	\$2,357,316	\$173,029	\$204,509	\$150,000	\$287,728	\$1,566,070	\$196,280	\$9,372,095	\$9,835,340	\$9,908,986	\$1,023,201	\$384,345	\$677,842	\$421,214	\$22,432,431	\$150,000
\$0	\$1,150,000	\$600,000	\$950,000	\$0	\$100,000	\$0	\$400,000	\$900,000	\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0	\$0	\$550,000	\$0	\$1,380,000	\$0	\$100,000
\$652,160	\$4,500	\$6,080	\$384,000	\$34,050	\$10,630	\$37,765	\$53,685	\$79,000	\$32,800	\$0	\$0	\$0	\$27,800	\$6,445	\$2,160	\$4,500	\$11,080	\$212,000	\$34,050	\$308,630
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000
\$17,641,331	\$19,207,373	\$17,823,523	\$19,335,970	\$20,551,859	\$21,729,426	\$16,534,519	\$15,939,456	\$17,723,977	\$17,798,291	\$18,970,137	\$18,698,717	\$27,663,959	\$27,508,393	\$24,671,219	\$16,314,532	\$17,841,718	\$18,406,365	\$18,415,184	\$38,630,049	\$19,220,110

2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	Totals
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,012,000
\$583,725	\$541,262	\$454,977	\$537,763	\$314,067	\$312,437	\$401,864	\$455,253	\$415,788	\$299,171	\$362,873	\$427,443	\$411,970	\$523,568	\$571,480	\$583,725	\$541,262	\$454,977	\$41,603,590
\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$11,000,000	\$1,100,000,000
\$4,450,000	\$1,150,000	\$2,600,000	\$4,450,000	\$1,150,000	\$3,100,000	\$5,250,000	\$3,450,000	\$2,050,000	\$1,040,000	\$2,700,000	\$3,600,000	\$2,800,000	\$250,000	\$400,000	\$1,400,000	\$0	\$0	\$229,590,000
\$5,211,789	\$379,680	\$1,198,661	\$186,713	\$150,000	\$1,196,295	\$977,400	\$661,500	\$494,925	\$870,705	\$1,116,775	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$87,422,512
\$0	\$830,000	\$200,000	\$550,000	\$300,000	\$0	\$200,000	\$300,000	\$0	\$0	\$550,000	\$0	\$950,000	\$0	\$100,000	\$0	\$400,000	\$200,000	\$25,860,000
\$37,765	\$53,685	\$178,000	\$26,800	\$352,000	\$0	\$0	\$265,800	\$12,445	\$2,160	\$4,500	\$6,080	\$47,000	\$34,050	\$10,630	\$37,765	\$58,685	\$55,000	\$6,693,750
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,558,000
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$32,975,000
\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$3,090,000	\$309,750,000
\$24,373,279	\$17,044,627	\$18,721,638	\$19,841,276	\$16,356,067	\$18,698,732	\$20,919,264	\$19,222,553	\$17,063,158	\$16,302,036	\$18,824,148	\$18,273,523	\$18,448,970	\$15,047,618	\$15,322,110	\$16,261,490	\$15,239,947	\$14,949,977	\$1,863,464,852

## Overall Asset Management Plan

### Estimated Capital Expenditures (2012 - 2111) (Costs in 2011 \$)

#### General Assumptions:

- Includes estimated costs for repair/rehabilitation/replacement of existing assets or existing planned assets only; does not include costs for future planned assets that have not yet been built (except for those projects identified in the *2009 Water System Master Plan*).
- Does not include changes in water quality regulations that would require the installation of new wellhead treatment equipment, etc.
- No major loss of production wells due to groundwater contamination.
- District boundaries and responsibilities remain the same as current.

#### Specific Assumptions:

##### **Meter Retrofit Program**

- Costs are from the *2009 Water System Master Plan*.
- Approx. 1,300 water meters to be installed per year until 100% of District customers are metered.
- Water meters to be installed both as part of annual meter retrofit program and as part of ongoing main replacement projects.

##### **Meter Replacement and Repair Program**

- Costs included in *2009 Water System Master Plan* have been changed to reflect actual circumstances.
- Only the 5/8", 3/4" and 1" meters are assumed to be replaced; larger meters are rebuilt as needed using rebuilding kits which are purchased out of the District's O&M budget.
- Replacement costs for meters are for the meter only; meter transponders are replaced as needed out of the District's O&M budget.
- Replacement costs for meters are as follows: 5/8" - \$102 + sales tax; 3/4" - \$118 + sales tax; and 1" - \$178 + sales tax.

##### **Distribution Main Replacements**

- Service life of existing distribution mains is estimated at 100 years.
- One percent (or approx. 6-8 miles) of water mains to be replaced per year.
- Estimated average total cost is \$1.3 million per mile which includes design, bidding, construction services, County inspection and all related construction costs incl. new service lines, new meters, new fire hydrants, etc.

##### **Groundwater Well Replacement**

- Assumed well life from original construction date is based on the assumptions from *2009 Water System Master Plan*. Well life from first replacement is based on assuming replacement in 60 years for non key wells and replacement in 50 years for key wells.
- Wells identified as key wells are based on Section 12. Infrastructure Reliability Plan from the *2009 Water System Master Plan*.
- The new Coyle Well (#N38) has been included with a construction date of 2013 and a replacement date of 2073.
- Well capacity of all replacement wells is 1,500 gpm at a minimum. If a well's original capacity was greater than 1,500 gpm, then the capacity of the replacement well is assumed equal to the original capacity.
- Each well replacement is based on a 3-phase cost: year 1=\$250,000 (includes land acquisition, environmental review and test hole engineering/drilling); year 2=\$400,000 (includes well design and drilling production well); and year 3=\$1,400,000 (includes building pump station and equipping well). The lost and replaced capacity shows up in year 3.
- Note that since a 1,500 gpm replacement capacity (at a minimum) is assumed for each new well, the total capacity by subarea usually increases by the time all wells have been replaced.
- Some wells are retired and are not replaced if there is sufficient capacity in the subarea in which it is located.

##### **Transmission Main Asset Management Plan**

- Transmission mains installed prior to 1985 are assumed to have a service life of 70 years and transmission mains installed in 1985 are assumed to have a service life of 90 years.
- Once pipelines reach their useful life, it is assumed that 50% will be rehabilitated using localized repair and rehabilitation methods ("Method A"), 25% will be rehabilitated using the sliplining process ("Method B") and 25% will be replaced.
- Method A pipeline rehabilitation is assumed to consist of various methods including joint welding rehabilitation, repair of internal corroded areas of pipeline, repair of internal corroded areas of pipe connections, installing an impressed current corrosion protection system and/or joint welding.
- Method B pipeline rehabilitation is assumed to consist of sliplining of the existing pipe. Sliplining is completed by installing a smaller, "carrier pipe" into a larger "host pipe", grouting the annular space between the two pipes, and sealing the ends. The most common material used to slipline an existing pipe is high density polyethylene (HDPE).

##### **Reservoir and Booster P.S. Asset Management Plan**

- Routine tank cleanings/inspections/spot repairs and pump/motor repair and maintenance would be included in the District's annual O&M budgets.
- Tank interiors and exteriors to be re-painted every 15 years on average.
- Existing interior coatings would be sandblasted to bare metal before re-coating; existing exterior coatings would only be sanded to roughen existing surface prior to re-coating.
- 5 MG reservoirs (Antelope, Enterprise/Northrop and Watt/Elkhorn) to have either a new roof or floor installed as part of major rehabilitation work when they reach 75 years of age.
- The four elevated storage tanks (constructed in the 1950's/1960's) will not be replaced when they reach the end of their useful life.

##### **Buildings and Structures Asset Management Plan**

- No consolidation of District's Administration Building and Corporation Yard facility/buildings.
- Costs are included for roof replacement and painting.
- Life expectancy of existing building roofs was estimated by DC Consulting Services.
- Replacement costs for new roofing and life expectancy for new roof were also estimated by DC Consulting Services.
- Building exteriors are scheduled to be re-painted approximately every 15 years.
- Building interiors will only require infrequent painting if at all and costs will come out of District's O&M budget.

##### **SCADA Master Plan**

- Costs are taken from *2012 SCADA Master Plan* as prepared by Westin Engineering.
- Costs are included for recommended short-term, long-term and future projects.

##### **Other Re-Occurring Annual Capital Costs**

- Includes the following annual costs: Water Supply Backup Power (\$100,000); Well Rehab./Pump Station Improvements (\$840,000); SCADA RTU's/Comm. Improv./MCC Panels (\$100,000); Wellhead Treatment (\$150,000); Corrosion Control and Painting (other than reservoir tanks) (\$50,000); McClellan Improv. (\$100,000); Lowering/Raising Valve Boxes (\$200,000); Large Meter Repl. (\$50,000); Distribution System Major Repairs (\$450,000); Distribution Main Extensions (\$750,000); Fire Hydrant Repl./Rehab. (\$100,000); and Professional/Special Services (\$300,000). The McClellan Improv. costs are estimated at \$100,000/year for 2012 through 2016, \$50,000/year for 2017 through 2021, and then \$0/year thereafter.