CRESCENTA VALLEY WATER DISTRICT

2700 FOOTHILL BOULEVARD
LA CRESCENTA, CALIFORNIA

Agenda for the Meeting of the Engineering Committee
of the Crescenta Valley Water District

To be held on

January 18, 2018 at 9:00 AM

Posted January 16, 2018 at 3:00 pm

Call to Order

Adoption of Agenda

Information Items

1. Status of Groundwater Wells and Well Capacity
2. Water Production Projections for FY 18/19
3. Automated Meter Infrastructure (AMI) – Presentation on status of CVWD's AMI Program
4. FY 17/18 CIP - Project Status:
    - Oak Creek Reservoir Rehabilitation Project
    - Well #2 Re-activation and Nitrate Treatment Plant Project
    - Brookhill Pipeline Project
    - Well 10 Rehabilitation Project
5. FY 18/19 CIP – Discussion on Preliminary FY 18/19 CIP Program

Public Comments

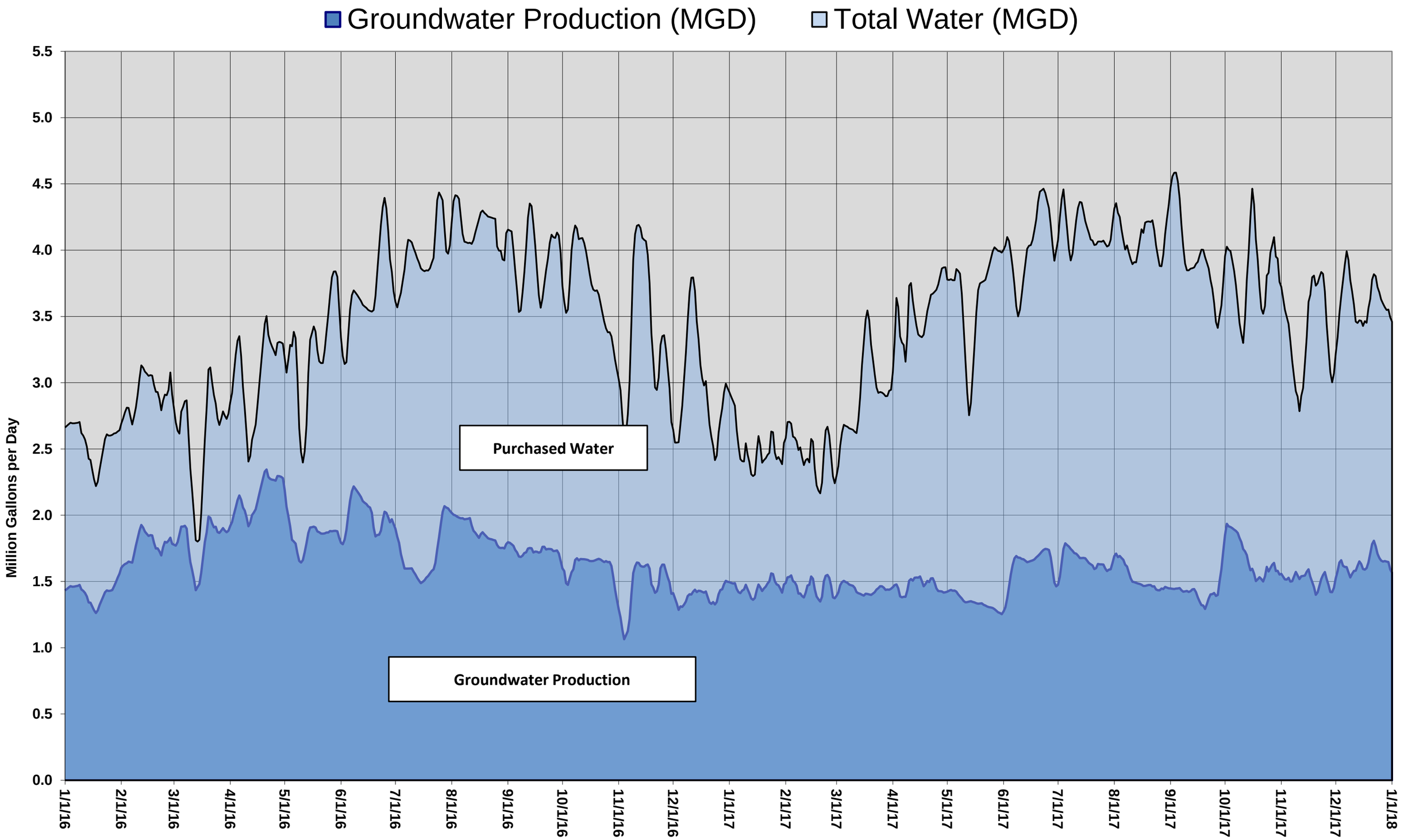
At this time, members of the public shall have an opportunity to address the Committee on items of interest that are within the subject matter jurisdiction of this Committee. This opportunity is non-transferable and speakers are limited to three (3) minutes each.

Committee Member's Request for Future Agenda Items

Next Engineering Committee Meeting – February 22, 2018

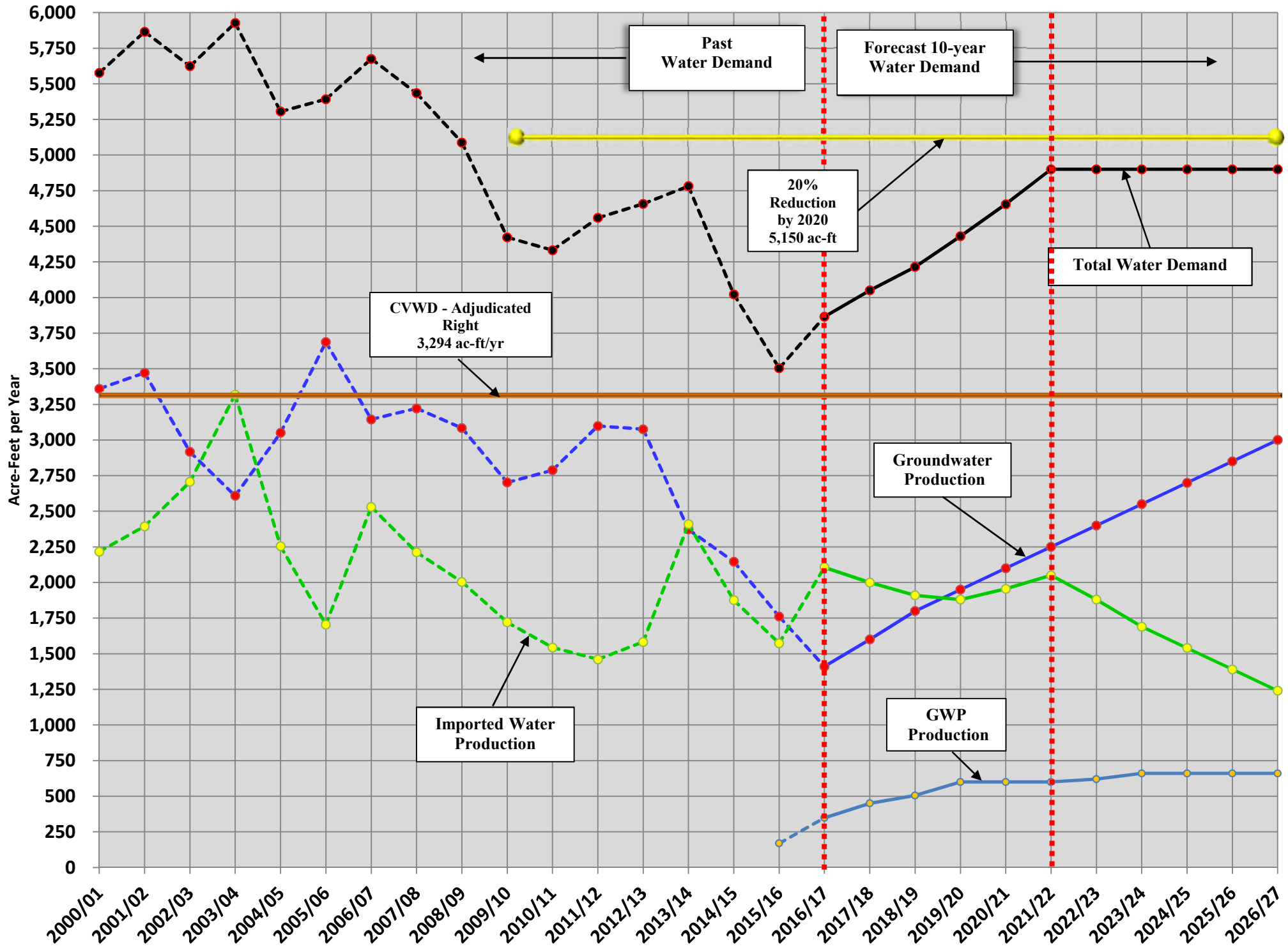
Adjournment

Water Production Chart 2016 - 2018



10-year Water Production Estimate
Based on:
Slow Recovery of Verdugo Basin
4% to 5% annual increase in water production over next 5 years
(Used for FY 17/18 Water Budget Projections)

Fiscal Year	Groundwater (ac-ft)	GWP (ac-ft)	FMWD (ac-ft)	Total Water Production (ac-ft)	Percent Increase or Decrease
2013/14	2,372	0	2,410	4,782	2.7%
2014/15	2,146	0	1,876	4,022	-15.9%
2015/16	1,761	169	1,573	3,504	-12.9%
2016/17	1,411	348	2,107	3,865	10.3%
2017/18	**1,600**	**450**	**2,000**	**4,050**	**4.2%**
2018/19	**1,800**	**505**	**1,910**	**4,215**	**3.9%**
2019/20	**1,950**	**600**	**1,880**	**4,430**	**4.9%**
2020/21	**2,100**	**600**	**1,955**	**4,655**	**4.8%**
2021/22	**2,250**	**600**	**2,050**	**4,900**	**5.0%**
2022/23	2,400	620	1,880	4,900	0.0%
2023/24	2,550	660	1,690	4,900	0.0%
2024/25	2,700	660	1,540	4,900	0.0%
2025/26	2,850	660	1,390	4,900	0.0%
2026/27	3,000	660	1,240	4,900	0.0%


Water Demand Projections - FY 00/01 to FY 26/27 - Update 7/11/17
Acre-Feet per Year
6,000
5,750
5,500
5,250
5,000
4,750
4,500
4,250
4,000
3,750
3,500
3,250
3,000
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250
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2000/01
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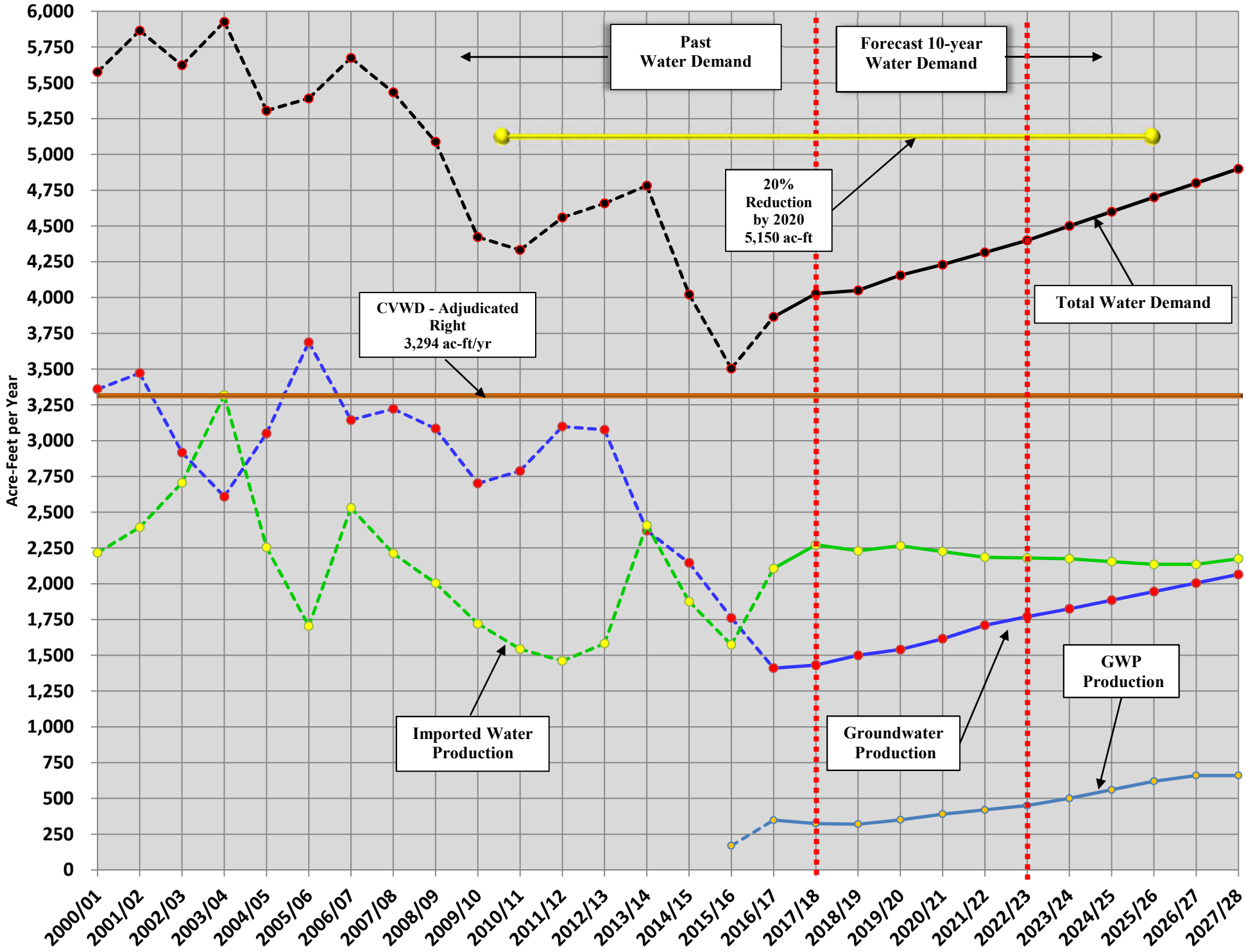
2017/18
2018/19
2019/20
2020/21
2021/22
2022/23
2023/24
2024/25
2025/26
2026/27
Past Water Demand
Forecast 10-year Water Demand
20% Reduction by 2020 5,150 ac-ft
Total Water Demand
CVWD - Adjudicated Right 3,294 ac-ft/yr
Groundwater Production
Imported Water Production
GWP Production

10-year Water Production Estimate
Based on:
Slight Recovery of Verdugo Basin
1% to 2% annual increase in water production over next 10 years
(Use for FY 18/19 Budget Projections)

Fiscal Year	Groundwater (ac-ft)	GWP (ac-ft)	FMWD (ac-ft)	Total Water Production (ac-ft)	Percent Increase or Decrease
2013/14	2,372	0	2,410	4,782	2.7%
2014/15	2,146	0	1,876	4,022	-15.9%
2015/16	1,761	169	1,573	3,504	-12.9%
2016/17	1,411	348	2,107	3,865	10.3%
Estimate 2017/18	***1,431***	***325***	***2,272***	***4,028***	***4.2%***
2018/19	**1,500**	**320**	**2,230**	**4,050**	**0.6%**
2019/20	**1,540**	**350**	**2,265**	**4,155**	**2.5%**
2020/21	**1,615**	**390**	**2,225**	**4,230**	**1.8%**
2021/22	**1,710**	**420**	**2,185**	**4,315**	**2.0%**
2022/23	1,770	450	2,180	4,400	1.9%
2023/24	1,825	500	2,175	4,500	2.2%
2024/25	1,885	560	2,155	4,600	2.2%
2025/26	1,945	620	2,135	4,700	2.1%
2026/27	2,005	660	2,135	4,800	2.1%

Water Demand Projections - FY 00/01 to FY 27/28 - Update 1/16/18



Automated Meter Infrastructure (AMI)

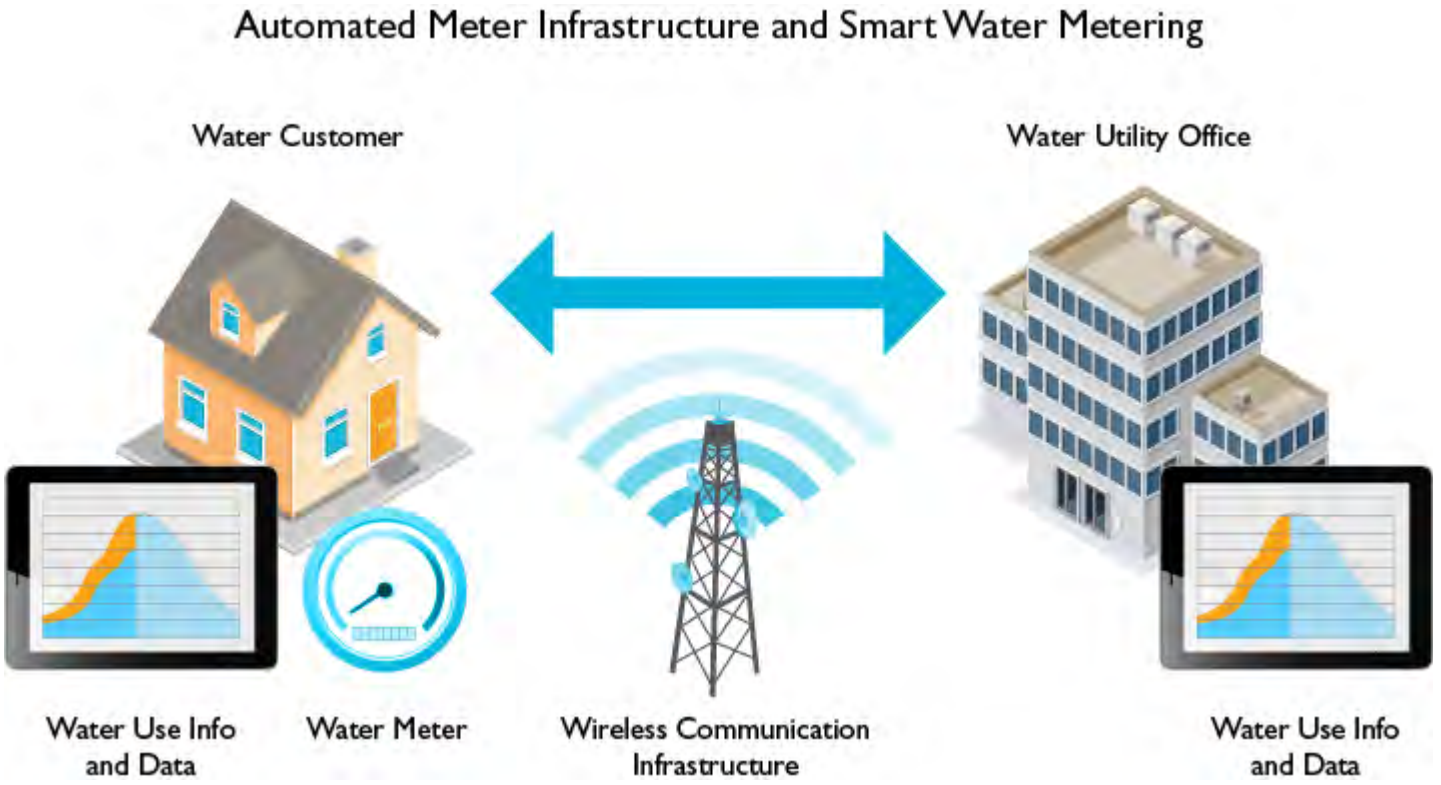
Crescenta Valley Water District

January 18, 2018

AMI - Goals

1. **Benefits to CVWD**
   a) Read meters on a monthly basis instead of every 2 months
   b) Increase cash flow with monthly billing for all accounts
   c) Real-time billing information & reduce estimating
   d) Re-purpose Water Meter Reader position to Utility Worker
   e) Water Budget Based Billing
   f) Overall Savings to District
2. **Customer Outreach**
   a) Communicate with customers about leaks or over/under water usage
   b) Customer ability to conserve through real-time water use
   c) Reduce billing disputes
   d) Information accessibility
3. **Customer Concerns**
   a) Loss of privacy
   b) Fear of Electronic Devices
4. **Water Loss**
   a) Actuate data to reduce water loss
   b) Ability to monitor tampering or theft
5. **Hydraulic Modeling & SCADA**
   a) Reduce power cost for pumping
   b) Determine where high flow areas are located and optimal locations for pipeline replacement
6. **Future Use**
   a) Remotely turn off meters
   b) Restricting water flow
   c) Acoustic water leak detection

AMI – Components



Smart Meters

Communication

Data Management System

AMI – Smart Meters

Meter Size	Total No. of Water Meters	No. of Water Meters replaced with Smart Meter	No. of Water Meters to be Replaced	No. of Water Services & Meters to be Replaced	No. of Water Services & Meters to be Replaced as part of Pipeline Project	Revised No. of Water Meters to be Replaced
3/4-inch	6,984	4,813	2,171	259	156	1,756
1-inch	830	381	449	2	0	447
1-1/2-inch	148	0	148	2	0	146
2-inch	65	14	51	1	0	50
3-inch	28	4	24	0	0	24
4-inch	2	0	2	0	0	2
Fire Services	105	0	0	0	0	0
Total	8,162	5,212	2,845	264	156	2,425

Note:

1. Fire Services not included in Water Meter Replacment Program

- Started Water Meter Replacement Program – Oct 2012
- Avg. replacement of 1,000 meters per year
- Replaced meters installed between 1976 and 2000
- Replaced meters within Zones 6 – 11
- Decrease in water loss from 11% to 7.5%
- Total Cost $915,000 over 6-years - $152,500/year (not including labor)

AMI – Smart Meters

1-1/2" to 4" Meter Replacement										
Meter Size	No. of Meters	Replacement Meter	Meter Company, Model & Size							
			Actaris 1.55	Invensys Invensys1.55	Master Master 1.55	Precision Precision 1.55	Rockwell Rockwell 1.55	Sensus Sensus 1.55	OMNI (Sensus) T2-1.55 (Turbo)	OMNI (Sensus) C2-1.55 (Compound)
1-1/2"	148	OMNI (Sensus) C2-1.55	8	63	5	11	12	32	6	10
			Actaris Actaris25	Invensys Invensys25	Octave (Master Meter) O2-2.5	Precision Precision25	Sensus Sensus25	Sensus C2-2.5		
2"	66	Octave (Master Meter) O2-2.5	3	5	14	27	9	8		
			Actaris Actaris35	Invensys Invensys35	Octave (Master Meter) O3.5	Precision Precision35	Sensus Sensus35	Sensus C2-3		
3"	28	Octave (Master Meter) O3.5	7	1	4	3	1	12		
			McCrometer McCrometer4.5	OMNI (Sensus) C2-4						
4"	2	Octave (Master Meter) O4.5	1	1						
Total	244									

- Clean & Survey Meter Boxes
- Determine if can be tied to AMI
- Replace Meter Box Lids
- Cost Estimate
- Schedule

AMI – Smart Meters

Meter Box Lids

- Survey – 16 different lids & sizes
- Need to Replace 7,637 meter lids
- Replace Lids with Radio Transceivers
- Metal Lids – Interfere with Radio?

Example of Survey of Existing Meter Box Lid Sizes and Manufacturers

ID No.	No. of Lids	Meter Box # or Model	Manuf.	Concrete Lid	Curve-shape Lid	Square-shape Lid	Lid covers all of Box	Lid fits inside Box	Metal Lid	Curve-shape Lid	Square-shape Lid	Lid covers all of Box	Lid fits inside Box
1	5	W3	J & R	1	0	1	0	1	4	0	4	0	4
2	6	W3-1/2	J & R	5	0	5	0	5	1	0	1	0	1
3	262	W-4.0	J & R	234	230	4	0	234	28	28	0	0	28
4	239	W-4-1/4	J & R	200	4	196	1	199	39	2	38	2	38
5	436	W5-1/4	J & R	412	4	408	2	410	24	0	24	9	15
6	110	W5-1/2	J & R	3	0	3	3	0	107	4	104	100	8
7	3	W6B	J & R	3	0	3	0	3	0	0	0	0	0
8	1	3	H & C	1	0	1	0	1	0	0	0	0	0
9	59	433	H & C	59	57	2	0	59	0	0	0	0	0
10	150	437	H & C	141	3	138	0	141	9	0	9	0	9
11	9	438	H & C	8	0	8	0	8	1	0	1	0	1
12	4	No. 3	Brooks	2	2	0	0	2	2	0	2	0	2
13	16	No. 36	Brooks	13	4	9	0	13	3	0	3	0	3
14	268	No. 37	Brooks	221	5	216	0	221	47	1	46	1	46
15	3	No. 38	Brooks	1	0	1	0	1	2	0	2	1	1
16	542	No. 33	Brooks	505	475	30	0	505	37	36	1	1	36
Total	2113			1809	784	1025	6	1803	304	71	235	114	192

AMI – Smart Meters

- Radio Transceiver
- Types
  - Sensus – 520M single port - $145/each
    - Reads additional data from IPERL Meter
    - Installed under meter lid
  - Aclara – MTU - $95/each
    - Reads basic data
    - Pit/vault installation under non-metallic lid or under metallic lid using through-the-lid remote antenna

AMI – Smart Meters

Steps to complete installation of Smart Meter

- Install ¾-inch & 1-inch meters in Zones 1 – 5
- Survey and Install 1-½ -inch to 4-inch meters
- Install New Meter Lids with Radio Transceivers
- Programing each Radio Transceiver

AMI – Communications

- **Fixed Area Network** – Communication network between water meter and CVWD
  - Fixed Area Network maintained by CVWD
  - Fixed Area Network maintained by Vendor
- **Collection of data – Radio or Cellular**
  - Propagation Study
    - Aclara
    - Sensus
  - Remote Collection devices
    - Sensus – 2 to 3 collectors, Sites - TBD
    - Aclara – 12 sites on Reservoirs
  - Radio – Frequency
  - Cellular – Data Plan
- **Storing data – Where? Cost?**
- **Access to data – How?**
- **Vendors**
  - Sensus – FlexNet – Annual Fee - $52,000/yr (1,500 portals)
    - M400 TGB Collector; FCC license;
  - Aclara – Star Fixed Network – Annual Fee - $65,000/yr
    - Data collector units – Lease; Cellular
  - Neptune – R900
  - ARAD Group – Dialog3G
  - Master Meter - Harmony

AMI – Data Management System

Data Management System Software

- **Vendors:**
  - Water Smart
  - Aqua Hawk
  - Sensus
  - Aclara
- **Access a Portal on website** :
  - Detailed analysis of their water use and money-saving recommendations
  - See what time of day water use occurs
  - Estimate gallons used per day
- **Alerts via text, email and/or voice for:**
  - Leaks
  - High or low water use
  - Customer set high water use triggers
  - Emergencies
- **Analytics and reporting water usage:**
  - Analysis customer data based on customer class
  - Use data for water budget based billing
  - Increase communications to customers
- **Billing**
  - Upgrade of Springbrook system
  - Vendors can provide billing services

AMI – Data Management System

Next Steps – Data Management

- Meet with Vendors
- Develop Scope of Work
- Determine Initial Cost for Budgeting
- Project Schedule
- Determine Annual Maintenance Cost

Next Steps - Utility Billing

- Meet with Springbrook to find out steps for monthly billing
- Determine Initial Cost for Budgeting
- Project Schedule
- Determine Annual Maintenance Cost
- Complete the middleware billing project to reduce Data pro costs

Next Steps - Water Budget Based Rates

- Bring in data from LA County
- Review methodology
- Project Schedule
- Project Costs

AMI – Pilot Study

- **Initial Set up & Cost**
  - Example from Sensus (Aqua Metric)
    - 500 Smart points – CVWD
    - M400 collection – no charge for 6 months
    - Communication link & cellular device – CVWD
    - Software Initial Cost - $46,000 for 1,500 customer portal
    - Other Costs - about $20,000
- **Advantage**
  - Set up for a pressure zone or control (Zone 11 with 283 meters or Control 1 with about 2,500 meters)
  - Determine location of data collectors
  - Initial start up on data management and coordinating with Springbrook
- **Disadvantage**
  - Study for 6-months
  - If after 6-months, either buy equipment/software or start over with another vendor

AMI – Go Live

Review different scenarios based on costs for equipment, software, integration, installation & project schedule to ***Go Live***

- Scenario 1 - January, 2019 (12 months)
- Scenario 2 - July 2019 (18 months)
- Scenario 3 - January 2020 (24 months)
- Scenario 4 - July 2020 (30 months)

AMI – Go Live

- **Scenario 1 – Go Live by January 2019**
  - Budget FY 18/19
  - Smart Meters – **By Oct. 2018**
    - Install ¾" & 1" meters – 2,203 meters (CVWD or Contractor)
    - Survey & install 1-½" to 4" meters – 244 meters (CVWD or Contractor)
    - Survey & install new lids & radio transceivers - 7,813 lids (Contractor)
    - Schedule replace laterals & pipelines over next 5-yrs – 420 meters
  - Fixed Area Network – **By Nov. 2018**
    - Choose Vendor & Scope of Work *(Apr 2018)*
    - Install Remote Collection devices (CVWD or Contractor) *(Oct 2018)*
    - Programing & integration *(Oct 2018)*
    - Testing & Training *(Nov 2018)*
  - Data Management System – **By Dec. 2018**
    - Choose Vendor & Scope of Work *(Mar 2018)*
    - Programing & integration *(Nov 2018)*
    - Upgrade Billing System *(Nov 2018)*
    - Testing *(Nov-Dec 2018)*
    - Training *(Dec 2018)*
  - Public Outreach – **By Aug. 2018**
    - Public Meetings & Input *(June 2018)*
    - AMI & Opt-out Policy – Board *(July 2018)*
    - Communication – Customers *(Aug 2018)*

Project Manager

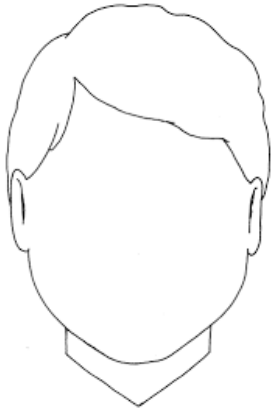
AMI – Go Live

- **Scenario 2 – Go Live by July 2019**
  - Budget FY 18/19
  - Smart Meters – **By April 2019**
    - Install ¾" & 1" meters – 2,203 meters; about 35 meters/week (CVWD)
    - Survey & install 1-½" to 4" meters – 244 meters (CVWD survey; Contractor Install)
    - Install new lids & radio transceivers - 7,813 lids (Contractor)
    - Schedule replace laterals & pipelines over next 5-yrs – 420 meters
  - Fixed Area Network – **By May 2019**
    - Choose Vendor & Scope of Work *(Oct 2018)*
    - Install Remote Collection devices (CVWD or Contractor) *(Mar 2019)*
    - Programing & integration *(Mar 2019)*
    - Testing & Training *(April 2019)*
  - Data Management System – **By June 2019**
    - Choose Vendor & Scope of Work *(Oct 2018)*
    - Programing & integration *(Mar 2019)*
    - Upgrade Billing System *(Mar 2019)*
    - Testing *(Apr 2019)*
    - Training *(May 2019)*
  - Public Outreach – **By Mar 2019**
    - Public Meetings & Input *(Nov 2018)*
    - AMI & Opt-out Policy – Board *(Feb 2019)*
    - Communication – Customers *(Mar 2019)*

Project Manager

AMI – Go Live

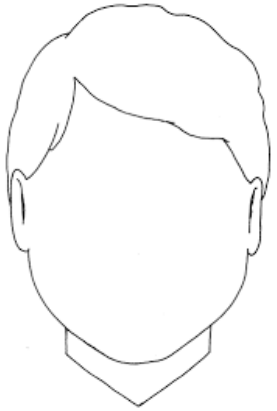
- **Scenario 3 – Go Live by January 2020**
  - Budget FY 18/19 & FY 19/20
  - Smart Meters – **By Oct 2019**
    - Install ¾" & 1" meters – 2,203 meters; about 25 meters/week (CVWD)
    - Survey & install 1-½" to 4" meters – 244 meters (CVWD)
    - Install new lids & radio transceivers - 7,813 lids (CVWD or Contractor)
    - Schedule replace laterals & pipelines over next 5-yrs – 420 meters
  - Fixed Area Network – **By Nov 2019**
    - Choose Vendor & Scope of Work *(Nov 2018)*
    - Install Remote Collection devices (CVWD or Contractor) *(Sept 2019)*
    - Programing & integration *(Sept 2019)*
    - Testing & Training *(Oct 2019)*
  - Data Management System – **By Dec. 2019**
    - Choose Vendor & Scope of Work *(Nov 2018)*
    - Programing & integration *(July 2019)*
    - Upgrade Billing System *(Aug 2019)*
    - Testing *(Sept 2019)*
    - Training *(Oct 2019)*
  - Public Outreach – **By Aug. 2019**
    - Public Meetings & Input *(Jan 2019)*
    - AMI & Opt-out Policy – Board *(Apr 2019)*
    - Communication – Customers *(Aug 2019)*



Project Manager by Committee

AMI – Go Live

- **Scenario 4 – Go Live by July 2020**
  - Budget FY 18/19 & FY 19/20
  - Smart Meters – **By April 2020**
    - Install ¾" & 1" meters – 2,203 meters; about 35 meters/week (CVWD)
    - Survey & install 1-½" to 4" meters – 244 meters (CVWD)
    - Install new lids & radio transceivers - 7,813 lids (CVWD)
    - Schedule replace laterals & pipelines over next 5-yrs – 420 meters
  - Fixed Area Network – **By May 2020**
    - Choose Vendor & Scope of Work *(Jan 2019)*
    - Install Remote Collection devices (CVWD or Contractor) *(Mar 2020)*
    - Programing & integration *(Mar 2020)*
    - Testing & Training *(April 2020)*
  - Data Management System – **By June 2020**
    - Choose Vendor & Scope of Work *(Jan 2019)*
    - Programing & integration *(Feb 2020)*
    - Upgrade Billing System *(Feb 2020)*
    - Testing *(Mar 2020)*
    - Training *(Apr 2020)*
  - Public Outreach – **By Mar 2020**
    - Public Meetings & Input *(Nov 2020)*
    - AMI & Opt-out Policy – Board *(Feb 2020)*
    - Communication – Customers *(Mar 2020)*



Project Manager by Committee

AMI – Preliminary Cost Estimate

Preliminary Cost Estimate For Implementation of AMI Program					
Smart Meters	**No of Meters**	**Cost/ Meter**	**Labor/ Meter**		**Total**
Smart Meters - 3/4" Meter	1,756	$165			$289,740
Smart Meters - 1" Meter	447	$240			$107,280
Smart Meters - 1-1/2" Meter	148	$1,000			$148,000
Smart Meters - 2" Meter	66	$1,700			$112,200
Smart Meters - 3" Meter	28	$3,500			$98,000
Smart Meters - 4" Meter	2	$5,000			$10,000
Subtotal					$765,220
Contingency				20%	$153,044
Smart Meters - Total	**2,447**				**$918,264**
Meter Lids & Radio Transceivers	**No of Meters**	**Cost/ Lid**	**Cost/ Collect**	**Labor/ Lid**	**Total**
Meter Lids - 3/4" & 1" Meters	7,393	$60	$145		$1,515,565
Meter Lids - 1-1/2" & 2" Meters	214	$100	$145		$52,430
Meter Lids - 3" & 4" Meters	30	$250	$145		$11,850
Subtotal					$1,579,845
Contingency				20%	$315,969
Meter Lids & Radio Transceivers - Total	**7,637**				**$1,895,814**

AMI – Preliminary Cost Estimate

Fixed Area Network	No. of Units	Cost/ Unit	Labor/ Unit	Annual Fee	Total
Vendor - Services for Programing & Integration					$115,000
License or Network Fee (Annual Cost)				$60,000	
Data Collection Units (1)	3	$35,000			$105,000
Data Hosting - Set up					$6,000
Other programing & testing					$10,000
Training					$5,000
Subtotal					$241,000
Contingency				20%	$48,200
Fixed Area Network - Total				**$60,000**	**$289,200**

Data Management System				Annual Fee	Total
Vendor - Services for Programing & Integration					$85,000
License or Network Fee (Annual Cost)				$40,000	
Upgrading Billing System					$7,500
Middleware					$9,500
Testing					$5,000
Training					$10,000
Subtotal					$117,000
Contingency				20%	$23,400
Data Management System - Total				**$40,000**	**$140,400**

AMI – Preliminary Cost Estimate

Crescenta Valley Water District

Preliminary Cost Estimate For Implementation of AMI Program

				Annual Fee	Total
Smart Meters - Total					$918,264
Meter Lids & Radio Transceivers - Total					$1,892,862
Fixed Area Network - Total				$60,000	$289,200
Data Management System - Total				$40,000	$140,400
Subtotal					$3,240,726
Contingency				20%	$648,145
AMI - Total				$100,000	$3,888,871

AMI – Preliminary Cost Estimate

Preliminary Cost Estimate For Improvements Not Included					
	No. of Laterals	**Avg. Cost/Lateral - Contractor**	**Avg. Cost/Lateral - Paving**	**Avg. Cost/ Lateral - Materials**	**Total Cost**
Replacement of Water Service Laterals	**264**	**$5,000**	**$2,500**	**$1,500**	**$2,376,000**
Block/Street	**Meters to be Replaced**	**Length**	**Contractor Cost**	**Cost/LF**	**Total Const. Cost**
2400/2500 Janet Lee	34	1,150	$339,250	$295.00	$469,800
2400/2500 Upper Terrace	27	1,000	$281,750	$281.75	$400,000
2400/2500 Frances	34	1,150	$339,250	$295.00	$466,500
2400/2500 Teasley	36	1,200	$354,200	$295.17	$484,000
3000 Alabama	25	800	$234,600	$293.25	$350,000
Pipeline Total	**156**	**5,300**	**$1,549,050**	**$292.27**	**$2,170,300**
Total					**$4,546,300**

AMI – Cost Analysis

Table 9 - Cumulative Gain in Revenue over 10-year Period										
Fiscal Year	**FY 2015-16**	**FY 2016-17**	**FY 2017-18**	**FY 2018-19**	**FY 2019-20**	**FY 2020-21**	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**	**FY 2024-25**
Water Projections	**4,100**	**4,200**	**4,300**	**4,400**	**4,500**	**4,700**	**4,800**	**4,900**	**5,000**	**5,200**
Commodity Charge - $/Kgal	**$6.10**	**$6.60**	**$7.09**	**$7.43**	**$7.43**	**$7.43**	**$7.43**	**$7.43**	**$7.43**	**$7.43**
Estimate % Shrinkage (current)	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Estimate Water Loss (current) (ac-ft)	328	336	344	352	360	376	384	392	400	416
Estimate Water Loss Revenue (current)($)	$652,005	$722,654	$794,789	$852,273	$871,642	$910,382	$929,752	$949,122	$968,492	$1,007,231
Estimate % Shrinkage with WMR	6%	5%	4%	4%	4%	4%	4%	4%	4%	4%
Estimate Water Loss with WMR (ac-ft)	246	210	172	176	180	188	192	196	200	208
Estimate Water Loss Cost Revenue WMR ($)	$489,004	$451,659	$397,394	$426,136	$435,821	$455,191	$464,876	$474,561	$484,246	$503,616
Gain in Water Use Recorded (ac-ft)	**82**	**126**	**172**	**176**	**180**	**188**	**192**	**196**	**200**	**208**
Gain in Revenue ($)	**$163,001**	**$270,995**	**$397,394**	**$426,136**	**$435,821**	**$455,191**	**$464,876**	**$474,561**	**$484,246**	**$503,616**

Payback Period		Payback Period	
Cumulative Gain in Revenue over 10-year P	**$4,075,838**	**Cumulative Gain in Revenue over 10-year Period**	**$4,075,838**
Cost to install AMR System without the 700 Yoke Assemblies	*$1,337,880*	**Cost to install AMR System with the 700 Yoke Assemblies**	*$6,700,000*
Cost to install AMI System	*$775,000*	**Cost to install AMI System**	*$775,000*
Total - Cost to install AMR/AMI System without the 700 Yoke Assemblies	**$2,112,880**	**Total - Cost to install AMR/AMI System with the 700 Yoke Assemblies**	**$7,475,000**
Payback Period (Years)	**5.2**	**Payback Period (Years)**	**18.3**

- Analysis done in 2015
- Needs to be updated with FY 17/18 data
- 10-yr period – 17/18 – 27/28

AMI – Summary

- Total Preliminary Cost Estimate does not include additional labor or contractors which will increase costs depending on scenario
- Scenario 1 – will be difficult and will need a designated project manager
- Scenario 2 – Possible to complete; maybe move go live date to Oct. 2019.
- Scenario 3 – Reasonable to complete on time
- Scenario 4 – Reasonable and will allow more time to work any problems.
- Need to update Cost Analysis with better approximation of water loss

Capital Improvement Project Program FY 17-18 Budget - Update 1/18/18	E-Job	Recorded FY 16/17	Carryover from FY 16/17 to FY 17/18	Budget FY 17/18	Total Project Budget FY 17/18	*Cost to date 7/1/17 - 12/31/17*	*Cost Committed - 1/01/18 - 6/30/18*	Cost Remaining for FY 17/18	Project Total Cost for FY 17/18	Carryover from FY 17/18 to FY 18/19
1. Water Supply										
A. Groundwater										
i. Well Rehabilitation										
Well 7 Rehabilitation		$ -	$ -							
Well 8 Rehabilitation	*E-979*	$ 44,385	$ -							
Well 5 Rehabilitation	*E-983*			$ 60,000	$ 60,000	$ 69,388	$ -	$ (9,388)	$ 69,388	$ -
Well 10 Rehabilitation	*E-987*			$ 85,000	$ 85,000	$ 4,177	$ 68,250	$ 12,573	$ 72,427	$ -
ii. New Wells										
Re-Activate Well 2 - Design		$ 101,394	$ -	$ 160,300	$ 160,300	$ 101,560	$ 58,740		$ 160,300	$ -
Re-Activate Well 2 - Construction		$ 189,960	$ 530,040	$ 880,000	$ 1,410,040	$ 254,797	$ 1,367,000	$ (211,757)	$ 1,621,797	$ 274,800
iii. Studies										
Update Water Well Replacement Study										
B. Imported Water										
Ocean View Chlorination St (Grant - Matching Funds)	E-733CS-2	$ 4,464								
Ocean View - Equip. (Grant - Matching Funds)	E-733CS-3	$ 40,567								
Ocean View - Elect (Grant - Matching Funds)	E-733CS-4	$ 30,356								
Ocean View - Final	E-733CS-5	$ 58,073	$ -	$ -	$ -	$ 13,394	$ 50,306	$ (63,700)	$ 63,700	$ -
C. Groundwater Basin Recharge										
Storm Water Recharge Study (Grant - Matching Funds)	*M-903A*	$ 54,286	$ -	$ -	$ -					
Stormwater Recharge Project - Design	*E-985*			$ -	$ -	$ 1,879	$ 34,321	$ (36,200)	$ 36,200	$ -
Stormwater Recharge Project - Construction										
WS Total		$ 523,485	$ 530,040	$ 1,185,300	$ 1,715,340	$ 445,195	$ 1,578,617	$ (308,472)	$ 2,023,812	$ 274,800
2. Water Storage										
A. Reservoir Rehabilitation										
i. Steel Reservoir Re-Coating/Roof/Vents Rehabilitation										
Oak Creek #1 & #2 - Roof/Air Vents/Recoat	*E-970*	$ 13,689	$ 306,310	$ 594,000	$ 900,310	$ 36,550	$ 944,850	$ (81,090)	$ 981,400	$ -
ii. Concrete Reservoir Rehabilitation										
iii. Corrosion Protection										
iv. Overflow & Drain System Upgrade										
B. Reservoir Water Quality										
i. Water Mixing System										
iv. Replace common inlet and outlet piping										
C. New Reservoir Water Storage										
WS Total		$ 13,689	$ 306,310	$ 594,000	$ 900,310	$ 36,550	$ 944,850	$ (81,090)	$ 981,400	$ -

Capital Improvement Project Program FY 17-18 Budget - Update 1/18/18	E-Job	Recorded FY 16/17	Carryover from FY 16/17 to FY 17/18	Budget FY 17/18	Total Project Budget FY 17/18	*Cost to date 7/1/17 - 12/31/17*	*Cost Committed - 1/01/18 - 6/30/18*	Cost Remaining for FY 17/18	Project Total Cost for FY 17/18	Carryover from FY 17/18 to FY 18/19
3. Water Distribution										
A. Pipeline Replacement										
Lower Pickens Canyon Crossing & Slope - 600 LF	*E-957*	$ 494,936	$ 60,000	$ -	$ 60,000	$ 76,986	$ 8,500	$ (25,486)	$ 85,486	$ -
4200 - 4400 Block - Penn - 1,450 LF	*E-972*	$ 214,527	$ 225,000	$ -	$ 225,000	$ 216,478	$ 8,500	$ 22	$ 224,978	$ -
2700 Block - Brookhill - 800 LF	*E-982*			$ 220,000	$ 220,000	$ 11,282	$ 264,280	$ (55,562)	$ 275,562	$ -
5100 Block of La Crescenta - 400 LF	*E-982*			$ 100,000	$ 100,000	$ 5,128	$ 120,130	$ (25,258)	$ 125,258	$ -
3000 Block of Brookhill - 800 LF	*E-982*			$ 220,000	$ 220,000	$ 11,282	$ 264,280	$ (55,562)	$ 275,562	$ -
3100 Block of Brookhill - 800 LF	*E-982*			$ 220,000	$ 220,000	$ 11,282	$ 264,280	$ (55,562)	$ 275,562	$ -
B. New Pipelines										
C. Booster Pump System										
i. Annual Pump /Motor Replacement										
Booster 12 at Markridge		$ 31,086	$ -							
Boosters - Encinal B & C				$ 45,000	$ 45,000	$ -	$ -	$ 45,000	$ -	$ -
ii. Pump Station Upgrade										
iii. VFD Pump Upgrade										
iv. MCC Replacement										
i. Water Surge Control										
ii. Street/Utility/ Meter Adjustment & Upgrade										
iii. Misc.										
Repairs to Ramsdell Mixing Station	*E-977*	$ 34,602	$ 51,000	$ -	$ 51,000	$ 42,633	$ 75,000	$ (66,633)	$ 117,633	$ -
WD Total		$ 1,037,650	$ 336,000	$ 805,000	$ 1,141,000	$ 375,071	$ 1,004,970	$ (239,041)	$ 1,380,041	$ -
4. Water Treatment										
A. Nitrate Removal										
i. Glenwood										
iii. Ordunio										
B. Chlorine Disinfection										
C. Convert to Chloramines										
F. MTBE Removal										
WT Total		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
5. Technology										
A. Automated Meter Information (AMI) System										
B. Supervisory Control and Data Acquisition (SCADA) System										
SCADA RTU Replace - Equipment & Integration	*E-939*	$ 140,054	$ 61,000	$ -	$ 61,000	$ 13,193	$ 75,000	$ (27,193)	$ 88,193	$ -
TECH Total		$ 140,054	$ 61,000	$ -	$ 61,000	$ 13,193	$ 75,000	$ (27,193)	$ 88,193	$ -

Capital Improvement Project Program FY 17-18 Budget - Update 1/18/18	E-Job	Recorded FY 16/17	Carryover from FY 16/17 to FY 17/18	Budget FY 17/18	Total Project Budget FY 17/18	*Cost to date 7/1/17 - 12/31/17*	*Cost Committed - 1/01/18 - 6/30/18*	Cost Remaining for FY 17/18	Project Total Cost for FY 17/18	Carryover from FY 17/18 to FY 18/19
6. Public Safety/Emergency Response										
A. Emergency Electrical Generators										
B. Water Storage										
Dunsmore/Pickens - Seismic Sensors & Valve Actuators	*E-976*	$ 71,886	$ 25,000	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -
SF/ER Total		$ 71,886	$ 25,000	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -
7. Facilities & Planning										
A. Main Office										
B. Glenwood Plant										
D. Reservoir Site Improvements										
F & P Total		$ 68,368	$ -	$ -	$ -					
Capital Improvement Projects - Total		$ 1,855,132	$ 1,258,350	$ 2,584,300	$ 3,842,650	$ 870,010	$ 3,603,437	$ (630,796)	$ 4,473,446	$ 274,800

Capital Improvement Project Program FY 17-18 Budget - Update 1/18/18	E-Job	Recorded FY 16/17	Carryover from FY 16/17 to FY 17/18	Budget FY 17/18	Total Project Budget FY 17/18	*Cost to date 7/1/17 - 12/31/17*	*Cost Committed - 1/01/18 - 6/30/18*	Cost Remaining for FY 17/18	Project Total Cost for FY 17/18	Carryover from FY 17/18 to FY 18/19
FY 17/18 Capital Improvement Project Summary										
1. Water Supply		$ 523,485	$ 530,040	$ 1,185,300	$ 1,715,340	$ 445,195	$ 1,578,617	$ (308,472)	$ 2,023,812	$ 274,800
2. Water Storage		$ 13,689	$ 306,310	$ 594,000	$ 900,310	$ 36,550	$ 944,850	$ (81,090)	$ 981,400	$ -
3. Water Distribution		$ 1,037,650	$ 336,000	$ 805,000	$ 1,141,000	$ 375,071	$ 1,004,970	$ (239,041)	$ 1,380,041	$ -
4. Water Treatment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
5. Technology		$ 140,054	$ 61,000	$ -	$ 61,000	$ 13,193	$ 75,000	$ (27,193)	$ 88,193	$ -
6. Public Safety/Emergency Response		$ 71,886	$ 25,000	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -
7. Facilities & Planning		$ 68,368	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Improvement Projects - Total		$ 1,855,132	$ 1,258,350	$ 2,584,300	$ 3,842,650	$ 870,010	$ 3,603,437	$ (630,796)	$ 4,473,446	$ 274,800
Budget Shortfall				$ (630,796)						
Well 2 Project - Transfer from MTBE Fund	E-956			$ 500,000						
Brookhill Pipeline - Transfer from Water Reserves	E-982			$ 175,000						
Oak Creek Rehab - Transfer from Water Reservices	E-970			$ 90,000						
Total				$ 765,000						
Revised Budget				$ 134,204						

Capital Improvement Project Program FY 18-19 Budget	Recorded FY 16/17	Carryover from FY 16/17	Projected FY 17/18	Carryover from FY 17/18	Budget FY 18/19	Forecast FY 19/20	Forecast FY 20/21	Forecast FY 21/22	Forecast FY 22/23
1. Water Supply									
A. Groundwater									
i. Well Rehabilitation									
Well 7 Rehabilitation	$ -								
Well 8 Rehabilitation	$ 44,385								
Well 5 Rehabilitation			$ 69,388	$ -					
Well 10 Rehabilitation			$ 72,427	$ -					
Well 7 Rehabilitation					$ 75,000				
Well 11 Rehabilitation					$ 75,000				
Well 14 Rehabilitation					$ 75,000				
Well Rehabilitation (2 Wells per year)						$ 150,000	$ 200,000	$ 200,000	$ 200,000
ii. New Wells									
Re-Activate Well 2 - Design	$ 90,601		$ 160,300						
Re-Activate Well 2 - Construction	$ 189,960	$ 530,040	$ 1,621,797	$ 274,800					
Well 18 (Sycamore House) - Design							$ 175,000		
Well 18 (Sycamore House) - Construction								$ 1,575,000	
iii. Studies									
Update Water Well Replacement Study						$ 100,000			
Pilot Hole Study (Drill 5 pilot holes)									$ 315,000
B. Imported Water									
Ocean View Chlorination St (Grant - Matching Funds)	$ 4,464								
Ocean View - Equip. (Grant - Matching Funds)	$ 40,567								
Ocean View - Elect (Grant - Matching Funds)	$ 30,356								
Ocean View - Final	$ 58,738		$ 63,700	$ -					
C. Groundwater Basin Recharge									
Storm Water Recharge Study (Grant - Matching Funds)	$ 61,862								
Stormwater Recharge Project - Design			$ 36,200	$ -	$ 150,000				
Stormwater Recharge Project - Construction						$ 1,500,000	$ 1,500,000	$ 500,000	
D. Recycled Water System									
i. Recycled Water									
ii. Membrane Bioreactor Technology									
WS Total	$ 520,933	$ 530,040	$ 2,023,812	$ 274,800	$ 375,000	$ 1,750,000	$ 1,875,000	$ 2,275,000	$ 515,000

Capital Improvement Project Program FY 18-19 Budget	Recorded FY 16/17	Carryover from FY 16/17	Projected FY 17/18	Carryover from FY 17/18	Budget FY 18/19	Forecast FY 19/20	Forecast FY 20/21	Forecast FY 21/22	Forecast FY 22/23
2. Water Storage									
A. Reservoir Rehabilitation									
i. Steel Reservoir Re-Coating/Roof/Vents Rehabilitation									
Oak Creek #1 & #2 - Roof/Air Vents/Recoat	$ 13,689	$ 306,310	$ 981,400	$ -					
Markridge - Roof/Air Vents/Recoat						$ 500,000			
Rosemont - Roof/Air Vents/Recoat							$ 500,000		
Eagle Canyon - Roof/Air Vents/Recoat								$ 600,000	
Edmund #2 - Roof/Air Vents/Recoat									$ 600,000
ii. Concrete Reservoir Rehabilitation									
Encinal Reservoir - Concrete Rehabilitation					$ 125,000				
iii. Corrosion Protection									
Cathodic Protection Inspection & Replacement							$ 110,000		
iv. Overflow & Drain System Upgrade									
Overflow/Drain System Assessment Study						$ 50,000			
B. Reservoir Water Quality									
i. Water Mixing System									
Reservoir Water Quality & Mixing System Study							$ 125,000		
iv. Replace common inlet and outlet piping									
Reservoir Piping Technical Study (included with WQ & Mix Study)							$ 50,000		
C. New Reservoir Water Storage									
Ocean View #2 Reservoir (Top of Ocean View) - Feasibility Study						$ 75,000			
WS Total	$ 13,689	$ 306,310	$ 981,400	$ -	$ 125,000	$ 625,000	$ 785,000	$ 600,000	$ 600,000
3. Water Distribution									
A. Pipeline Replacement									
2600 Block - Harmony Place - 450 LF	$ 47,080								
3900 Block - Park Place - 450 LF	$ 47,080								
3900 Block - Glenwood - 650 LF	$ 47,080								
2800 Block - Prospect & 4400 Block - Glenwood - 800 LF	$ 121,259								
Lower Pickens Canyon Crossing & Slope - 600 LF	$ 534,110	$ 60,000	$ 85,486						
4200 - 4400 Block - Penn - 1,450 LF	$ 176,460	$ 215,755	$ 224,978						
2700 Block - Brookhill - 800 LF			$ 275,562						
5100 Block of La Crescenta - 400 LF			$ 125,258						
3000 Block of Brookhill - 800 LF			$ 275,562						
3100 Block of Brookhill - 800 LF			$ 275,562						

Capital Improvement Project Program FY 18-19 Budget	Recorded FY 16/17	Carryover from FY 16/17	Projected FY 17/18	Carryover from FY 17/18	Budget FY 18/19	Forecast FY 19/20	Forecast FY 20/21	Forecast FY 21/22	Forecast FY 22/23
3200 & 3300 Blocks of Brookhill - 1,600 LF				$ -	$ 640,000				
2400 & 2500 Block of Janet Lee - 1,200 LF				$ -	$ 480,000				
Annual Pipeline Replacement - 3,000 LF						$1,250,000	$1,250,000	$1,500,000	$1,500,000
B. New Pipelines									
C. Booster Pump System									
i. Annual Pump /Motor Replacement									
Booster 12 at Markridge	$ 31,086								
Boosters - Encinal B & C			$ 45,000	$ -					
Boosters - Glenwood 32 & 33					$ 60,000				
Boosters - Paschall B						$ 75,000			
Boosters - Booster 26 at CH							$ 75,000		
Boosters - Ocean View B & Booster 25 at Markridge								$ 75,000	$ 75,000
ii. Pump Station Upgrade									
Upgrade Paschall Booster Station - Design & Construction					$ 75,000	$ 500,000			
Goss Canyon - New Booster Pump Station - Design & Construction							$ 75,000	$ 500,000	
iii. VFD Pump Upgrade									
iv. MCC Replacement									
MCC upgrade at Paschall - - Design & Construction					$ 75,000	$ 350,000			
MCC upgrade at Goss Canyon - Design & Construction							$ 100,000	$ 400,000	
MCC upgrade at Edmund #2									$ 100,000
D. Pressure Reducing Stations									
Pressure Reducing Station Preliminary Design Study							$ 25,000		
Upgrade PRS - Zone 4 to Zone 3								$ 45,000	
E. Miscellaneous Projects									
i. Water Surge Control									
Rehabilitation Surge Tank at Glenwood					$ 65,000				
Rehabilitation Surge Tank at Mills Plant									
Surge Analysis Study									$ 150,000
ii. Street/Utility/ Meter Adjustment & Upgrade									
iii. Misc.									
Repairs to Ramsdell Mixing Station	$ 34,602	$ 51,000	$ 117,700	$ 125,000					
Mills Plant - Aeration Tower Rehabilitation									
WD Total	$ 1,038,757	$ 326,755	$ 1,425,108	$ 125,000	$ 1,395,000	$ 2,175,000	$ 1,525,000	$ 2,520,000	$ 1,825,000

Capital Improvement Project Program FY 18-19 Budget	Recorded FY 16/17	Carryover from FY 16/17	Projected FY 17/18	Carryover from FY 17/18	Budget FY 18/19	Forecast FY 19/20	Forecast FY 20/21	Forecast FY 21/22	Forecast FY 22/23
4. Water Treatment									
A. Nitrate Removal									
i. Glenwood									
Replace Ion Exchange Resin at Glenwood								$ 500,000	
ii. Mills									
iii. Ordunio									
Replace Bio Remediation AroNite Media at Ordunio									$ 250,000
B. Chlorine Disinfection									
New Chlorination Station at Markridge Reservoir						$ 75,000			
Paschall & Pickens - New Chlorine Analyzer					$ 75,000				
Edmund #1 & Shields - Chlorine Analyzers							$ 40,000		
Goss Canyon #1 & #2 - Chlorine Analyzers								$ 40,000	
Cresta Hts #1 & #2 - Chlorine Analyzers									$ 50,000
C. Convert to Chloramines									
Conversion to Chloramination Disinfection Feasibility						$ 85,000			
D. New Federal and State Regulations									
E. Water Quality Studies									
F. MTBE Removal									
WT Total	$ -	$ -	$ -	$ -	$ 75,000	$ 160,000	$ 40,000	$ 540,000	$ 300,000
5. Technology									
A. Automated Meter Information (AMI) System									
Conversion of 3/4" & 1" meter					$ 240,000	$ 240,000			
Meter Box Lid Replacement & Radio Transceivers					$ 947,000	$ 947,000			
Conversion of Large Meters with Meter Box Lid & Radio Transceivers					$ 220,000	$ 220,000			
Install & Integration of AMR & Fix Area Network					$ 225,000	$ 229,000			
B. Supervisory Control and Data Acquisition (SCADA) System									
Wireless (Radio) Network for SCADA							$ 25,000	$ 25,000	
SCADA RTU Replace - Equipment & Integration	$ 139,955	$ 60,045	$ 88,193	$ -	$ 300,000	$ 400,000	$ 300,000		
C. Graphical Information System (GIS)									
TECH Total	$ 139,955	$ 60,045	$ 88,193	$ -	$ 1,932,000	$ 2,036,000	$ 325,000	$ 25,000	$ -
6. Public Safety/Emergency Response									
A. Emergency Electrical Generators									

Capital Improvement Project Program FY 18-19 Budget	Recorded FY 16/17	Carryover from FY 16/17	Projected FY 17/18	Carryover from FY 17/18	Budget FY 18/19	Forecast FY 19/20	Forecast FY 20/21	Forecast FY 21/22	Forecast FY 22/23
New Emergency Electrical Generator - Main Office					$ 75,000				
New Emergency Electrical Generator - Mills Plant								$ 150,000	
B. Water Storage									
Dunsmore/Pickens - Seismic Sensors & Valve Actuators	$ 71,886	$ 25,000	$ 25,000						
Ordunio - Seismic Sensors & Valve Actuators					$ 100,000				
Oak Creek #1 & #2 - Seismic Sensors & Valve Actuators						$ 125,000			
Encinal & Ocean View - Seismic Sensors & Valve Actuators								$ 125,000	
C. Security									
D. Miscellaneous									
SF/ER Total	$ 71,886	$ 25,000	$ 25,000	$ -	$ 175,000	$ 125,000	$ -	$ 275,000	$ -
7. Facilities & Planning									
A. Main Office									
Expansion with New Roof with Solar Panels						$ 150,000			
New Main Office Building - Design									$ 150,000
B. Glenwood Plant									
C. Mills Plant									
D. Reservoir Site Improvements									
Ordunio Reservoir - North Wall	$ 68,368								
Ocean View - Site Improvements					$ 100,000	$ 250,000			
Roof for Old Encinal - Storage Bldg					$ 175,000				
Pickens - Access Road Improvements							$ 100,000	$ 150,000	$ 350,000
Edmund #2 - Lower Access Road Improvements									$ 120,000
Goss Canyon - Site Improvements							$ 200,000		
Cresta Heights - Site & Road Improvements									$ 200,000
5. Misc. Properties									
6. District Planning									
F & P Total	$ 68,368	$ -	$ -	$ -	$ 275,000	$ 400,000	$ 300,000	$ 150,000	$ 820,000
Capital Improvement Projects - Total	$ 1,853,588	$ 1,248,150	$ 4,543,513	$ 399,800	$ 4,352,000	$ 7,271,000	$ 4,850,000	$ 6,385,000	$ 4,060,000