Step 6 – Evaluate and Select Conservation Measures and Programs

The savings goals, for the three use categories (Residential, Commercial and Institutional) are to reduce the use by 0.40%, per year. Table 6.1 illustrates the savings goals:

Table 6.1 – St. Charles Mesa Water District Water Conservation Savings Goals

Year	Res. Usage Ac.-Ft.	Residential Water Savings Goal Ac.-Ft.	Comm. Usage Ac.-Ft.	Commercial Water Savings Goal Ac.-Ft.	Inst. Usage Ac.-Ft.	Institutional Water Savings Goal Ac.-Ft.
2010	1,767	7.1	266	1.1	118	0.5
2011	1,847	14.5	278	2.2	124	1.0
2012	1,926	22.2	290	3.3	129	1.5
2013	1,945	29.9	293	4.5	139	2.0
2014	1,964	37.8	295	5.7	131	2.6
2015	1,984	45.7	298	6.9	133	3.1
2016	2,004	53.7	301	8.1	134	3.6
2017	2,022	61.8	304	9.3	135	4.2
2018	2,043	70.0	307	10.5	137	4.7
2019	2,064	78.3	310	11.8	138	5.3
2020	2,085	86.6	314	13.0	139	5.8
2021	2,106	95.0	317	14.3	141	6.4
2022	2,127	103.5	320	15.6	142	7.0
2023	2,147	112.1	323	16.9	144	7.5
2024	2,169	120.8	326	18.2	145	8.1
2025	2,189	129.6	329	19.5	146	8.7
2026	2,210	138.4	332	20.8	148	9.3
2027	2,231	147.3	336	22.2	149	9.9
2028	2,252	156.3	339	23.5	151	10.5
2029	2,273	165.4	342	24.9	152	11.1
2030	2,294	174.6	346	26.3	153	11.7

6.1 Create Combinations of Measures and Programs

In order to offset the potential loss of revenue caused by initial implementation of demand side measures, the replacement of the existing individual meters shall be top priority. This will allow the coincidental implementation of some of the demand side measures. For the fiscal years 2010through 2020 the replacement of all of the older individual meters shall take place. This will coincide with the customer water audits, pilot programs and efficient irrigation and landscaping programs.

Commencing in the year 2010, the customers who are targeted for meter replacement shall receive written notification regarding the timing of the meter replacement. Each customer shall be given the option of receiving a Water Meter Monitor, with the new meter installation. This device is approximately the same size as a television remote controller, and allows the customer to track water usage. The Monitor has several features, including a leak detection alarm, which is outlined in detail on page 9 of the Design Manual.

In addition to the Water Meter Monitor, the customers who receive new meters shall be encouraged to participate in any or all of the Demand Side Programs and Measures. These customers who receive new meters shall be targeted for the other Demand Side Measures, so that the District can keep an accurate accounting of potential water savings.

6.2 Costs and Water Savings of Conservation Options

The following Table 6.2 is from Worksheet 6-2: Comparison of Benefits and Costs of the Conservation Measures and Programs

Table 6.2 St. Charles Mesa Water District Comparison of Benefits and Costs of the Conservation Measures and Programs

Line	Conservation measure/program [a]	Total cost for the measure/ program [b]	Anticipated annual water savings in gallons [c]	Cost of water saved by the measure ($/gallon)[d]	Net benefit of implementing the measure/ program [e]
1	Installation of 10 LF Toilets/Year	-$12,000.00	11,695	-$0.0051	$23,160.72
2	Installation of 10 LF Urinals/Year	-$12,000.00	3,600	-$0.0167	$15,435.54
3	Installation of 20 LF	-$6,000.00	13,140	-$0.0011	$31,079.42
4	Installation of 20 LF Kitchen	-$6,000.00	7,300	-$0.0021	$19,933.01
5	Installation of 20 LF Bathroom	-$6,000.00	3,650	-$0.0002	$145,330.09
6	Install 10 efficient washing	-$22,000.00	8,500	-$0.0129	$30,111.68
7	Replace all Res. Meters w/Radio Read	-	4,000,000	-$0.0024	$8,645,894.1
8	Low Water Use Landscapes	-	25,000	-$0.0210	$257,715.78
9	Installation of 20 Rain Sensors/Year	-$6,000.00	100,000	-$0.0002	$196,863.14
10	Leak Detection and Replacement of	-	1,500,000	-$0.0300	$1,043,147.3
11					
12	Total Demand Side Measures		172,885		$719,629
13					
14	Total Supply Side Measures		5,500,000		$9,689,042

Table 6.3 – St. Charles Mesa Water District "Out of Pocket" Costs of Conservation Measures and Programs

Conservation Measure / Program	Rebate	Admin.	# / Year	Total Cost (Annual)	Program Life (Years)	Total Program Cost
Low Flush Toilets	$50.00	$10.00	10	$600.00	20	$12,000.00
Low Flush Urinals	$50.00	$10.00	10	$600.00	20	$12,000.00
Low Flow Showerheads	$10.00	$5.00	20	$300.00	20	$6,000.00
Low Flow Kitchen Faucets	$10.00	$5.00	20	$300.00	20	$6,000.00
Low Flow Bathroom Faucets	$10.00	$5.00	20	$300.00	20	$6,000.00
Efficient Washing Machines	$100.00	$10.00	10	$1,100.00	20	$22,000.00
Low Water Use Landscaping	$0.10	$0.05	10,000	$1,500.00	20	$30,000.00
Rain Sensors	$10.00	$5.00	20	$300.00	20	$6,000.00
TOTAL				**$5,000.00**		**$100,000.00**

6.3 Benefits and Costs of Conservation Options

The following Table 6.4 is from Worksheet 6-3: Selection of Conservation Measures/Programs and Estimate of Water Savings:

Table 6.4 – St. Charles Mesa Water District Selection of Conservation Measures and Programs and Estimate of Water Savings

		Primary criteria for selecting or rejecting the conservation measure/program for implementation	Estimated reduction in demand for selected measures/programs (gallons per day) [a]	
Line	Measure/Program		Average-day demand	Maximum-day demand
1	LF Toilets		320	641
2	LF Urinals		99	197
3	LF Showerheads		720	1,440
4	LF Kitchen Faucets		400	800
5	LF Bathroom Faucets		4,000	8,000
6	Washing Machines		233	466
7	Radio Read Residential Meters		109,589	219,178
8	Low Water use Landscapes		1,370	2,740
9	Rain Sensors		5,479	10,959
10	Leak Detection		4,110	8,219
11				
12				

Total			126,320	252,640

6.4 Define Evaluation Criteria

As stated in section 5.3, the main evaluation criteria is the financial impact on the Water District. District revenues fluctuate annually, and monthly, based mainly on weather and seasonal fluctuations. Periodic budget shortfalls occur during "wet" periods, which are unpredictable. In the past, the District has managed to overcome these shortfalls by retaining some capital reserves and by offsets during dry periods. However, due to an increase in the drainage infrastructure projects, which are performed in areas where the District has a CIP project, these capital reserves have been reduced.

Any measure or program, which would reduce District revenues, particularly during a period when revenues are already down, could result in serious economic consequences.

Therefore, the top priority for implementation shall be the elimination of non-revenue water. All other measures and programs shall be done in conjunction with, but supplementally, to demand side measures.

6.5 Select Conservation Measures and Programs

The following Conservation Measures and Programs have been selected for implementation:

Supply Side Conservation Measures and Programs

1. Radio Read Meters: The District shall be replacing all of the outdated or inefficient meters. This process shall take place over a 10-year period, commencing in 2010. It is estimated that approximately 15%-19% of all treated water is not being accounted for. A significant reduction shall decrease production costs and improve efficiency. In addition, this measure should encourage customers to conserve, as they will have to pay for all water consumed.
2. Leak Detection and Replacement of Mains: The District shall contract the services of a leak detection contractor, annually. The oldest mains in the system shall be targeted for leak detection and repair. This had previously been performed on a complaint basis.

The above listed Water Conservation Measures and Programs shall be implemented on a varied, but limited scale. The 5 highest Institutional users shall be targeted for all measures and programs, because they are the largest water consumers. The Commercial and Residential users shall be targeted based on the installation of new radio read water meters.

Water Reuse or Recycling was not considered as part of this plan. This is due to the fact that the majority of the District's raw water supply is subject to the State of Colorado Water Law. Therefore, any raw water diverted in Priority, may only be used once and must be released so that the next user, in priority, can utilize the water.

The St. Charles Mesa Water District has penalties for customers who irrigate during periods of mandatory outdoor watering restrictions. Fortunately, the District has never had to implement mandatory restrictions. On the one occasion when voluntary restrictions were enacted, the customers complied with such a degree, that mandatory restrictions were not enacted.

The Tap Fees (Table 1.4a) and Water Rates (Table 1.4b) are a result of an Analysis performed by Integrated Utilities Group, Inc. (IUG), in 2005-2006. The Tap Fees and Water Rates were determined based on the evaluation of the Plant Investment Fee (PIF), the value of the existing utility, and the cost of the Capital Improvement Plan (CIP). The value of the existing infrastructure was analyzed by the Original Cost (OC), Net Book Value (NBV), Replacement Cost Less Depreciation (RCLD) and Full Replacement Cost (RCN). The full Analysis is on file at the District Office.

Demand Side Conservation Measures and Programs

1. Low Flush Toilets: The District will provide a $50.00 rebate for the first 10 customers, annually, who wish to install a Low Flush Toilet which meets the 1.28 gallon per flush requirement (WaterSense specified fixtures). This program shall be restricted to those customers who are served by one of the three sanitation districts.
2. Low Flow Urinals: The District will provide a $50.00 rebate for the first 10 customers, annually, who installs a Low Flow Urinal which meets the 0.5 gallons per flush requirement (WaterSense specified fixtures). This Measure is targeted at commercial customers (mainly public facilities and food service establishments).
3. Low Flow Showerheads: The District shall provide a $10.00 rebate for the first 20 customers, annually, who purchase and install low flow showerheads which meet the 1.75 gallon per minute flow rate (WaterSense specified fixtures).
4. Low Flow Kitchen Faucets: The District shall provide a $10.00 rebate for the first 20 customers, annually, who purchase and install low flow kitchen faucets which meet the 1.5 gallon per minute flow rate (WaterSense specified fixtures).
5. Low Flow Bathroom Faucets: The District shall provide a $10.00 rebate for the first 20 customers, annually, who purchase and install low flow bathroom faucets which meet the 1.5 gallon per minute flow rate (WaterSense specified fixtures).
6. Efficient Washing Machines: The District shall provide a $100.00 rebate for the first 10 customers, annually, who purchase and install efficient clothes washing machines which have a water factor of 6 or less. The water factor is the amount of gallons per cubic foot per load.
7. Low Water Use Landscapes: The District shall provide a $1.00 per square foot rebate, up to 10,000 square feet, annually, to customers who wish to replace all or a portion of their existing lawns with Low Water Use Landscaping.

Table 6.5 – St. Charles Mesa Water District Approximate Annual Cost to Irrigate 1,000 square feet of lawn.

Month	Frequency	Volume (Gallons)	Cost
March	3	336	$1.01
April	6	672	$2.02
May	8	896	$2.69
June	10	1,120	$3.36
July	12	1,344	$4.03
August	10	1,120	$3.36
September	8	896	$2.69
October	6	672	$2.02
November	2	224	$0.67
Totals	65	7,280	$21.84

Table 6-5 assumes that 1-inch of water shall be applied, per watering; the cost of the water is 0.003 cent per gallon and a 25% loss due to evaporation and runoff. A landscape which requires no water at all, shall see a savings of $21.84 per 1,000 square feet of area, annually. A low water use landscape, which requires some watering, will see between 50% and 70% reduction in the above savings

8. Rain Sensors: The District shall provide a $10 rebate to the first 20 customers, annually, who purchase and install a rain sensor on their automated irrigation systems.

   The following Table 6.6 is a summary of the projected savings from the installation of 1 rain sensor applied to a 1-acre lawn:

Table 6.6 – St. Charles Mesa Water District Rain Sensor

Month	Frequency	Depth (1"/App.) ft.	Volume (Gallons)	Cost	Rainfall in.	Rainfall ft.	Depth (1"/App.) ft.	Volume (Gallons)
March	3	0.25	101,822	$305.46	0.97	0.08	0.17	68,899
April	6	0.50	203,643	$610.93	1.25	0.10	0.40	161,217
May	8	0.67	271,524	$814.57	1.49	0.12	0.54	220,953
June	10	0.83	339,405	$1,018.22	1.33	0.11	0.72	294,264
July	12	1.00	407,286	$1,221.86	2.04	0.17	0.83	338,047
Aug.	10	0.83	339,405	$1,018.22	2.27	0.19	0.64	262,360
Sep.	8	0.67	271,524	$814.57	0.84	0.07	0.60	243,014
Oct.	6	0.50	203,643	$610.93	0.64	0.05	0.45	181,921
Nov.	2	0.17	67,881	$203.64	0.58	0.05	0.12	48,196
TOTAL		5.42	2,206,133	$6,618.40	11.41	0.95	4.47	1,818,871
TOTAL	For a 1 acre lot with rain sensor savings in gallons							387,261
TOTAL	For a 1 acre lot with rain sensor savings in dollars							$1,162

The above Table 6.6 is based on the following Table 6.7:

Table 6.7 – St. Charles Mesa Water District Average Rainfall for Pueblo, CO

Month	Precip.	Precip.
	in.	ft.
January	0.33	0.03
February	0.26	0.02
March	0.97	0.08
April	1.25	0.10
May	1.49	0.12
June	1.33	0.11
July	2.04	0.17
Aug.	2.27	0.19
Sep.	0.84	0.07
Oct.	0.64	0.05
Nov.	0.58	0.05
Dec.	0.39	0.03
TOTAL	12.39	1.03