



WESTMINSTER

April 17, 2013

Kevin Reidy
Office of Water Conservation and Drought Planning
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, CO 80212

City of Westminster
Department of
Public Works
and Utilities

2700 West 92nd Avenue
Westminster, Colorado
80031

703-688-2400
FAX 303-706-3927

Dear Mr. Reidy:

Please accept the City of Westminster's Water Conservation Plan (Plan) for approval. Westminster developed the Plan using information from the City funded Residential Water Demand Study and the recently completed Comprehensive Water Supply Plan. By combining both water demand and supply planning efforts, the City has developed a comprehensive, dynamic strategy designed to meet its build-out water needs.

City Council officially adopted the Water Conservation Plan by resolution, after a 60-day public comment period, at their meeting on March 25, 2013. A copy of both the public comment received and the resolution are included in the Plan.

Sincerely,

Michael B. Smith
Director of Public Works and Utilities

CITY OF WESTMINSTER WATER CONSERVATION PLAN



Photo courtesy of David Koski.

March 2013

Prepared by



WESTMINSTER

and



Aquacraft prints on recycled paper containing 100% post-consumer waste.



TABLE OF CONTENTS

ACKNOWLEDGEMENTS	3
EXECUTIVE SUMMARY	4
<i>Population</i>	4
<i>Future Demand</i>	5
<i>Conservation Goal</i>	5
<i>Conservation Program</i>	5
INTRODUCTION	6
PLAN PREPARATION, REVIEW, AND APPROVAL PROCESS	6
SERVICE AREA CHARACTERISTICS	8
WATER SYSTEM PROFILE	10
WATER SUPPLY	10
RECLAIMED WATER SUPPLY	10
WATER TREATMENT	11
ADEQUACY OF SUPPLY TO MEET FUTURE DEMAND	11
BASELINE WATER USE	13
2011 RESIDENTIAL WATER DEMAND STUDY	14
<i>Purpose and Goals</i>	14
<i>Methodology</i>	14
<i>Results</i>	15
Key Survey Findings	15
Water Use Analysis	17
Indoor Water Use and Conservation Potential	18
Outdoor Water Use and Conservation Potential	24
WATER COSTS AND PRICING	26
PROPOSED TREATED WATER PROJECTS	28
REVIEW OF CURRENT POLICIES AND PLANNING INITIATIVES	28
<i>Comprehensive Water Supply Plan</i>	28
<i>Other Westminster Plans and Initiatives</i>	28
POPULATION PLANNING AND PROJECTIONS	30
WATER CONSERVATION PROGRAMS AND MEASURES	31

CONSERVATION GOALS AND IDENTIFIED PROGRAMS AND MEASURES	31
CONSERVATION PROGRAM AND DEMAND FORECASTS.....	31
<i>Current Program</i>	31
Rebates for Water Efficient Clothes Washers	33
Municipal Code Requires Submetering	33
Water Loss Control and Water Pressure Management.....	33
Multifamily Toilet Retrofit Program	33
Commercial, Industrial, and Institutional Customers	34
<i>Estimated Savings from Current and Past Water Conservation Efforts</i>	35
Per Capita Changes 2000 – 2010	35
Residential Indoor Savings Estimate.....	35
Estimated Impact of Reclaimed Water System	36
<i>Proposed New Water Conservation Program Measures</i>	36
Leak Alert Notification.....	36
Informational Water Budget	37
Irrigation Audits.....	38
Improved Customer Water Use Feedback and Information	38
Summary of Current and New Conservation Program Measures	38
<i>Demand Forecast</i>	41
IMPLEMENTATION PLAN FOR WESTMINSTER CONSERVATION PROGRAM.....	43
<i>Monitoring and Evaluation</i>	43
<i>Future Conservation Plan Updates</i>	44
COMPLIANCE WITH STATE PLANNING REQUIREMENTS	45
WESTMINSTER COMPLIANCE	45
<i>Notice of Public Comment Period</i>	49
<i>Public Comments Received</i>	50
<i>Adoption of Water Conservation Plan</i>	52

ACKNOWLEDGEMENTS

Aquacraft gratefully acknowledges the following individuals for their assistance in completing this project:

City of Westminster

Stuart Feinglas

Mike Smith

Mike Happe

Josh Nims

Mary Jay Vestal

Aquacraft, Inc.

Peter Mayer, P.E.

Bill DeOreo, P.E.

Matt Hayden

Leslie Martien

Renee Davis, P.E.

EXECUTIVE SUMMARY

The City of Westminster (City or Westminster) has a long history of support for water conservation. City Council, in the past, has provided direction to Staff to implement effective inclining block water rates as well as a progressive tap fee structure designed to promote conservation by all water customers as well as developers and builders. Rebate incentives for conservation measures are used strategically to promote installation and retrofit of water efficient appliances. Education of students through Water Festivals and other means helps ensure that future generations maintain the focus on water conservation. The City has prepared this updated Water Conservation Plan to provide a roadmap for future water efficiency program implementation in Westminster.

The development of this Water Conservation Plan is a part of the City's overall Comprehensive Water Supply Plan (CWSP). The CWSP develops a strategy to meet the current and future water needs of the City in a truly integrated and interactive process. The CWSP uses projections of buildout water demand based on the City's Comprehensive Land Use Plan (CLUP) and compares this with the planned buildout yield of the City's water supply system to define a buildout water supply/demand gap. A key goal of the CWSP is to eliminate any identified supply gap in an appropriate timeframe for buildout of the City.

Population

Projecting buildout population uses data from several sources and creates a projection 25 to 30 years in the future. The data used for the projection is based on today's understanding of future conditions. Westminster's approach for population projections is conservative, using a higher density than projected in the City's current Comprehensive Landuse Plan based on regional trends. Decisions made today will affect the City's water supply in the future when water will be scarcer and options for increasing water supply more expensive and difficult. The Colorado Department of Local Affairs projects an average population increase within Jefferson and Adams counties from 2010 to 2040 of about 38%, roughly equivalent to the projections used in this plan.

At buildout, the City currently estimates it will provide water service to approximately 152,000 people within the City of Westminster and an additional 18,800 people outside the city limits for a total of 170,601 people. This represents an increase of about 38% over the 2010 population served.

Westminster acknowledges the variability of any buildout projection that assumes achievement of a hypothetical maximum population in the future. Experience has shown that buildout seldom, if ever, really occurs. Instead, cities adapt to new conditions and development realities as they grow to their urban boundaries. What is considered buildout in 2012 may not be considered buildout in 2040.

Future Demand

In conjunction with preparation of the CWSP, a baseline demand forecast starting from 2010 and going out to 2040 was prepared. This baseline forecast did not include the impact of water conservation of any kind, even passive water savings. Adjusted water demand in 2010 was 21,951 AF and under the baseline forecast has increased by 14,249 AF to 36,200 AF in 2040.

Using the baseline forecast prepared by the City, Aquacraft developed a demand forecast that includes the impact of the City's planned water conservation program measures. Under this forecast, it is estimated that water demand at 2040 will be reduced by 2,200 AF as result of passive and active water conservation measures. Further reductions will be realized as use of the City's reclaimed water system increases from 1,600 AF currently, to the buildout demand of 3,500 AF.

Conservation Goal

The City has identified that demand reductions accomplished by a combination of passive and active water conservation measures will reduce the water supply gap by approximately 2,200 AF in 2040. Given the high level of demand reductions already accomplished in Westminster (as documented through the residential analysis presented in this plan), a goal of conserving another 2,200 AF over the next 28 years (~79 AF per year) is realistically achievable. This goal will be re-evaluated on a regular basis, as Westminster intends to update the Water Conservation Plan every 7 years. This means that three additional plan updates will be completed before 2040, affording ample opportunity to update and refine the City's conservation program and goals as needed.

Conservation Program

The City has implemented water conservation measures since 1976. Most of the measures that have been implemented over the past 35 years are still part of the conservation program in 2012. Westminster has been a leader among Colorado utilities in promoting and implementing sensible water efficiency measures.

Westminster's water conservation program over the next seven years addresses all residential and non-residential demand sectors in the City and includes a set of innovative and effective water conservation measures. Some of these measures, such as Westminster's highly effective tap fee ordinance, have been developed and implemented over many years. Other measures, such as the proposed new informational water budget and leak reduction program that identifies leaks using advanced metering infrastructure (AMI), offer substantial opportunity for additional demand reductions.

INTRODUCTION

The City of Westminster (City or Westminster) has a long history of support for water conservation. City Council, in the past, has provided direction to Staff to implement effective inclining block water rates as well as a progressive tap fee structure designed to promote conservation by developers and builders. Rebate incentives for conservation measures are used to promote installation and retrofit of water efficient appliances. Education of students through Water Festivals and other means helps ensure that future generations maintain the focus on water conservation. The City has prepared this updated Water Conservation Plan to provide a roadmap for future water efficiency program implementation in Westminster.

The City has implemented comprehensive water conservation measures for more than 35 years, starting in 1976 when Westminster was one of the first municipalities in Colorado to:

- Implement an increasing block rate pricing structure for residential water users, and
- Modify the Municipal Building Code to require efficient plumbing fixtures in all new development.

This conservation plan continues the City's legacy of innovative and forward-thinking water planning and management.

Plan Preparation, Review, and Approval Process

The City's Water Conservation Plan was prepared by Aquacraft, Inc. Water Engineering and Management working in close coordination with Stuart Feinglas, Water Resources Analyst for the City, and the staff of the Westminster Utilities Planning and Engineering Division. Preparation of the conservation plan was funded in part by a Water Conservation Planning Grant from the Colorado Water Conservation Board (CWCB).

This conservation plan was prepared during the second phase of a two part study. Phase 1 involved conducting a detailed Residential Water Demand Study in Westminster that quantified how water is being used in the largest end uses category. The concept of conducting a Residential Water Demand Study in concert with preparation of a Water Conservation Plan enabled the City to include empirical data on existing demands and levels of efficiency in the Water Conservation Plan. Summary results from the Residential Water Demand Study are presented later in this plan document.

Westminster conducted a request for proposals (RFP) bidding process for these two projects and contracted with Aquacraft to conduct the Residential Water Demand Study and prepare the City's Water Conservation Plan.

Aquacraft prepared the conservation plan to both meet the needs and water savings goals of the City and to meet the statutory requirements for water conservation plans set out in Colorado Statutes Title 37 Water and Irrigation – Colorado Water Conservation Board (CWCB) and Compacts 37-60-126. These laws require a state approved water conservation plan for covered entities as a condition of seeking financial assistance from the CWCB.

The State requires the Conservation Plan be open for a 60-day public comment process prior to submission to the CWCB. The following 2 paragraphs will be finalized after the public comment process.

Once the Water Conservation Plan was fully reviewed by City staff and completed, the City conducted a 60 day public review process where the plan was posted on the City’s website along with notices that public comments are requested. Only one person commented during the 60-day period.

The final step was to obtain approval for the plan from the Westminster City Council.

Service Area Characteristics

Westminster is a growing suburban community within the South Platte Basin that offers a wide choice of housing, excellent schools, and public facilities. With direct access to major highways, Westminster's central location between Denver and Boulder puts it within easy reach of major business centers, retail centers, and a variety of entertainment and recreational facilities. Activities in Denver or Boulder are a 20-minute drive in either direction and the drive from Westminster to Denver International Airport takes approximately 30 minutes. Westminster's water service area, shown in Figure 1, includes Federal Heights and Shaw Heights.

Westminster is a residential community with a significant commercial and industrial sector.

Water deliveries in 2010, as shown in Figure 2, go largely to the residential sector (61.9%) with the commercial and industrial sectors accounting for about 11% of deliveries. The City has a number of large irrigated parks and non-irrigated open space area. Municipal water use accounted for 3.1% of total demand in 2010. Potable irrigation accounted for 9.9% of demand and reclaimed water (used for irrigation) accounted for 7.6% of demand.

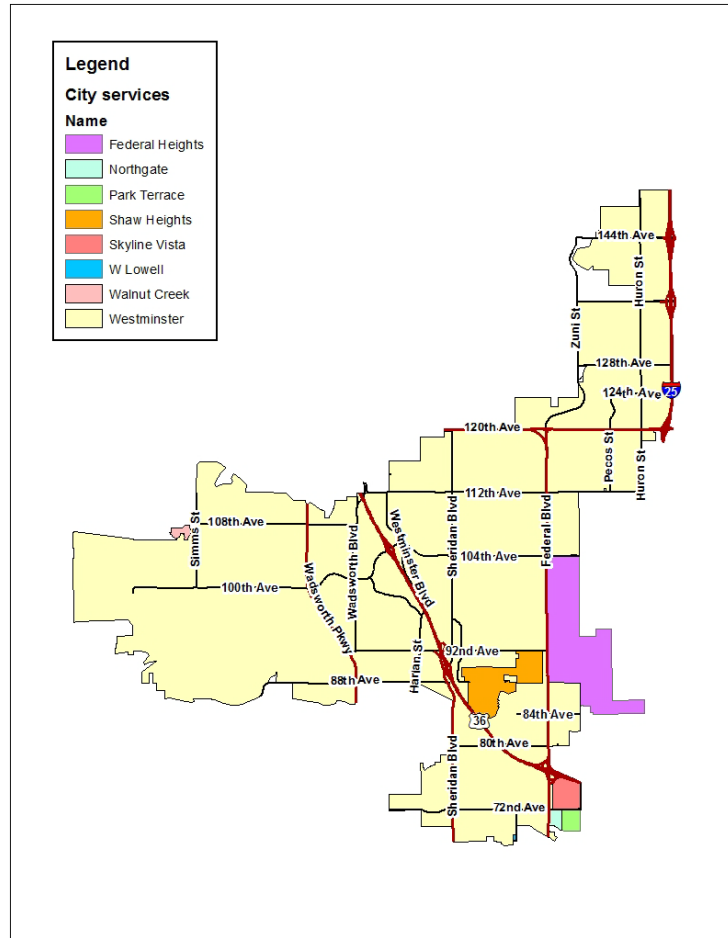


Figure 1: Westminster water service area

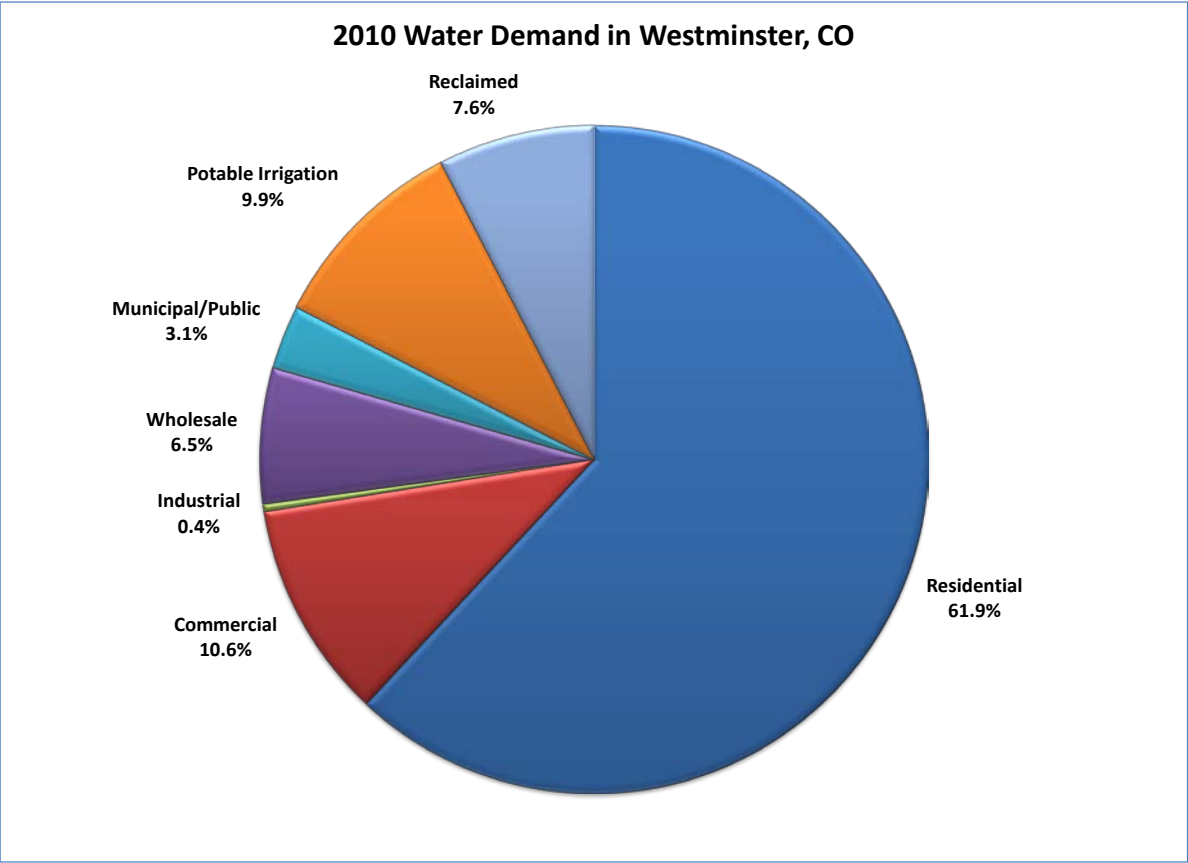


Figure 2: 2010 Westminster water deliveries by customer category

WATER SYSTEM PROFILE

The City of Westminster has invested considerable resources towards developing a water supply system that provides high quality, reliable, and sustainable raw water and reclaimed water supplies to meet the City's existing and future water demands. The implementation of the Comprehensive Water Supply Plan, including water conservation programs, will be required to maintain the reliability of the water supply system at buildout. The City's drinking water supply consists of surface water delivered to Standley Lake (Figure 3). The City provides a number of irrigation customers with reclaimed water, which is wastewater effluent that has been further treated and disinfected to provide a non-potable supply.



Figure 3: Standley Lake

Water Supply

The City currently owns and operates a water supply system centered on Standley Lake. Standley Lake receives water from a number of different sources including irrigation ditches that divert water from Clear Creek near Golden, water from Coal Creek, and water from Denver Water that is delivered from the West Slope through Denver's system into the City's water supply. The City's raw water system is designed to meet the full demand of the City in a drought equal to the most severe recorded drought that occurred during the years 1953 through 1956. This drought is estimated to have a recurrence interval of 75 - 100 years.

It is anticipated that at buildout, 87% of the City's water supply will come from the South Platte River Basin which has been identified as water short in the Statewide Water Supply Initiative (SWSI) recommendations and findings.

Reclaimed Water Supply

The City is able to complement its raw-water supply by reclaiming wastewater for use as an irrigation source, while preserving drinking water for human consumption. The City's Reclaimed Water Treatment Facility (Figure 4) provides secondary treatment to wastewater treated at the Big Dry Creek Wastewater Treatment Facility. Up to 6 million gallons per day can be treated and distributed to reclaimed water

customers through separate reclaimed water distribution mains. The City provides reclaimed water for irrigation purposes at golf courses, parks, commercial properties, right of ways, and common areas of home owners' associations. Currently, the City has 95 reclaimed water customers and 106 reclaimed water connections.

The City's reclaimed water program has operated since 2000. Developing reclaimed water is critical to meeting the City's growing water demands. At buildout, the City plans for reclaimed water to comprise more than ten percent of the City's total water supply, irrigating twenty-five percent of all irrigated areas within the City and saving 3,500 AF of potable water supply. The City, being a summer peaking utility, directly benefits in a reduction of peak potable water demand by supplying reclaimed water for irrigation to approved customers. Westminster's water reclamation program has been acclaimed by the U.S. Environmental Protection Agency and the State of Colorado for environmental stewardship.



Figure 4: City of Westminster Reclaimed Water Treatment Facility

Water Treatment

The City maintains two water treatment facilities designed to produce a total of 59 million gallons per day. Under current planning projections, this capacity should be sufficient to meet buildout demands. The Semper Water Treatment Facility is capable of treating 44 million gallons per day using conventional filtration technology. The Northwest Water Treatment Facility is capable of treating up to 15 million gallons per day using state-of-the-art membrane micro-filtration. Average daily water consumption for the City is currently 18 million gallons per day with a peak day of up to 44 million gallons per day.

Adequacy of Supply to Meet Future Demand

The City of Westminster has been proactive in pursuing water supply options including water purchases, reclaimed water, conservation, and projects designed to maximize water exchange potential and increase water supply. Current water supply along with planned supply projects, including 2,200 acre feet of water anticipated to be saved through conservation by buildout, have been identified in the City's Comprehensive Water Supply Plan to meet future water demands. The water supply identified in

the Comprehensive Water Supply Plan is sufficient to meet the future projected water demands of the City at buildout. In addition, the City's Public Works and Utilities, Community Development and Parks departments are working closely together to assure that water supply and water demand are included in decisions on future development and park projects. This coordination is occurring through the update of the City's Comprehensive Land Use Plan which will develop options for how the City may develop and allocate water supplies to meet water demands. The main objective of this effort will be to create a policy by which the City can maximize development flexibility while remaining within the City's water availability.

BASELINE WATER USE

Water use in Westminster has varied over the past seven years in response to the 2002 drought, wet conditions such as 2009, on-going water efficiency efforts, the economy, and other factors. Retail water deliveries from 2004 – 2010 are presented in Table 1 and shown as a bar graph in Figure 5. The average of annual retail deliveries over this seven year period was 19,573 AF, which means that 2010, with deliveries of 19,460 AF, was the most “average” year of the past seven. The largest percentage change in water use occurred in the municipal/public sector which has decreased usage and in the potable irrigation and reclaimed sectors which have seen increases since 2004.

Table 1: Retail water deliveries by Westminster, 2004 – 2010 (acre-feet)

	2004	2005	2006	2007	2008	2009	2010
Residential	11,592	12,544	13,522	12,705	13,060	11,343	12,056
Commercial	1,922	2,013	2,148	2,147	2,140	2,002	2,058
Industrial	80	82	105	96	69	63	73
Wholesale	1,305	1,309	1,405	1,359	1,343	1,288	1,271
Municipal/Public	892	1,063	951	906	705	461	605
Potable Irrigation	1,221	1,444	1,997	1,877	2,329	1,651	1,925
Reclaimed	679	753	1,263	1,130	1,430	1,155	1,474
Total	17,691	19,208	21,390	20,220	21,076	17,963	19,460

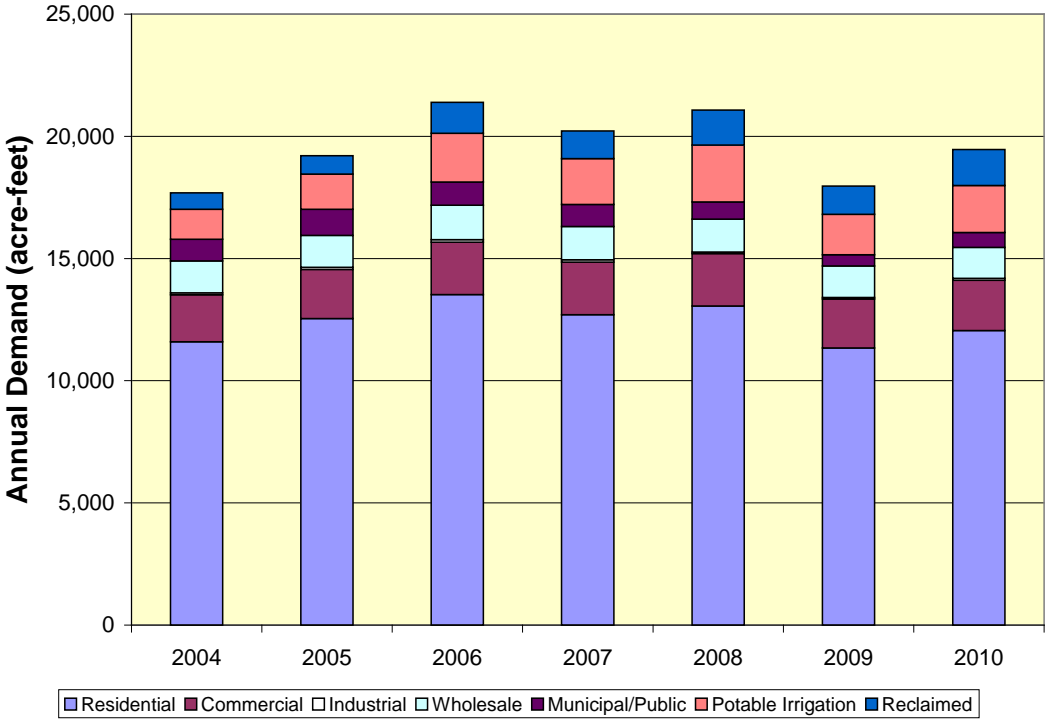


Figure 5: Retail water deliveries Westminster, 2004-2010 (acre-feet)

2011 Residential Water Demand Study

The residential sector in Westminster receives more than 63% of the annual retail water deliveries on average and is the sector most responsible for driving demand in the City up or down. To better understand water use in the residential sector, the City hired Aquacraft in 2010 to conduct a residential water use study. The research was completed in 2011 and the results are summarized here. The key findings from this study were used to help prepare this Water Conservation Plan.

Purpose and Goals

The purpose of the Residential Water Demand Study was to closely examine water use and water use patterns of the City, and specifically of the single-family residential customers in the City, to help inform demand forecasting and water conservation planning efforts. This study provides data on the water use patterns of single-family households in Westminster in 2011, and compares these demands against measurements made in Westminster in 1995 and 1999 and also against other recent end use studies.

The specific goals of the Residential Water Demand Study were to:

- Review Westminster's demand projections
- Assess the current penetration rates of conserving fixtures and measures
- Prepare realistic future demand and savings estimates for Westminster based on anticipated natural replacement rates and utility-sponsored conservation efforts
- Revise (as necessary) Westminster's demand projections and integrate the new forecast into the Water Conservation Plan and the City's Comprehensive Water Supply Plan (CWSP).

The concept of conducting a Residential Water Demand Study in concert with preparation of a Water Conservation Plan enabled the City to include empirical data on existing demands and levels of efficiency in the Water Conservation Plan.

Methodology

This study examined water demands in Westminster from both macro and micro perspectives. Annual demand across the City was studied, as well as detailed household-level demands. The research process was designed to inform the development of the City's updated Water Conservation Plan.

This study investigated both indoor and outdoor residential water use patterns in Westminster through a combination of billing data, surveys, and flow trace analyses. Household indoor uses measured in this study were compared against usage patterns measured in Westminster in 1995 and 1999 as well as the Residential End Uses of Water Study (AWWA 1999) and other more recent end use studies. The study also investigated relationships between household indoor use and key variables such as the number of

residents, the size of the household, and the types of fixtures and appliances present. Outdoor use was quantified both from the perspective of total annual use and application rate.

The following key steps were fundamental to the research process in this study:

1. Assemble customer data including -
 - a. Historic consumption data (from 2000 - 2010)
 - b. Utility customer information including customer category, name, address, phone number (for survey), date of account activation, etc.
 - c. Meter information including meter size
 - d. Historic conservation program participation information including participation date, program, rebate level (if applicable), etc.
 - e. Available demographic data
 - f. Account information including account start date, age of home or business, etc.
 - g. GIS coverage to determine irrigable area
 - h. Local climate and weather data to calculate irrigation requirements
2. Select representative sample of 1,000 single-family (SF) customers to receive survey
3. Design and implement customer survey
4. Select sample of 70 accounts for end use analysis
5. Collect and analyze two weeks of end use data for 70-account sample (61 useable data sets were obtained)
6. Prepare research database
7. Evaluate water use in Westminster

Results

Key Survey Findings

Key findings from the residential survey are bulleted below:

Landscape and Irrigation

- **Regular outdoor irrigation** - Most households in Westminster (90.6%) irrigate their outdoor landscape regularly during the irrigation season which typically runs from late April through early October.
- **Turf grass and mulch are the most common landscape materials** - Turf grass (of any variety) was the most common landscape material (90.9%) among the homes in this study followed by non-living ground cover such as mulch (70.1%), vegetable or flower garden (64.0%), non-native trees and shrubs (48.5%), and desert/native trees and shrubs (22.6%).
- **Automatic irrigation systems are the norm** - Of those who regularly irrigate, nearly 75% are equipped with an automatic irrigation system which amounts to 67.4% of all survey respondents. This suggests that about 2/3 of homes in Westminster are equipped with an in-ground irrigation system.
- **Irrigation timing is adjusted frequently** - Survey responses indicated that more than half of respondents adjust the timer on their irrigation system at least once per month.

- **No rain or soil moisture sensors** - Rain sensors and soil moisture sensors do not appear to be prevalent technologies in Westminster. None of the survey respondents reported having a rain sensor or soil moisture sensor.
- **A few hot tubs, fewer swimming pools** - Swimming pools are uncommon in Westminster. Only 0.8% of respondents reported having a swimming pool at home. Survey results indicate that 8% of respondents have an outdoor hot tub or spa.

Westminster Water Services

Respondents were asked their opinion about Westminster water services and pricing policies. Respondents indicated the extent that they agreed or disagreed with a number of statements. To evaluate their responses, a score was established for each ranking where: 2 = strongly agree, 1 = somewhat agree, -1 = somewhat disagree, -2 = strongly disagree, 0 = neutral or not applicable (NA) in some cases. The average score for each question was then calculated. A positive score indicates agreement and a negative score indicates disagreement.

- **Respondents liked Westminster's water services** - The strongest agreement was found in response to the statement, "The City of Westminster provides reliable water service" (1.71 average). Strong agreement was also found for the following statements, "Conservation of water is critical for the future of the City of Westminster" (1.49 average); "Water provided by the City of Westminster is safe to drink" (1.48 average); and "I conserve water because it is the right thing to do" (1.39 average).
- **Respondents were not aware of City rebate programs** - The strongest disagreement was found in response to the statement, "I am aware of rebates offered by the City of Westminster" (-0.50 average). No other statement received a negative score indicating a majority disagreement.

Drought Response

Survey respondents indicated which drought response measures they feel are most appropriate for Westminster.

- **Voluntary restrictions preferred** - Voluntary restrictions received the highest response (51.1%) followed by mandatory restrictions (37.3%). Other options received a substantially lower response rate.

Age and Size of Homes and Households

- The average respondent's home was built in 1982.
- The oldest surveyed home was built in 1940 and the newest was built in 2008.
- The average move-in year of survey respondents was 1995.
- The respondents indicated that their households have an average of 2.57 people (2.03 adults, 0.07 infants, 0.28 children, and 0.19 teenagers).
- An average of 0.67 adults stay at home during the day.
- The average home in this survey has 3.41 bedrooms.

Water Use Analysis

Annual Demands

The City of Westminster maintains records of water consumption going back more than ten years. For this study, only residential water demands from 2000 – 2010 were considered. Single-family household demands varied over this time due to a variety of factors including a significant drought in 2002-03. In 2010, residential demands accounted for 61.9% of all Westminster water deliveries (including wholesale and reclaimed). Key results are summarized here.

- **Average of 112.5 thousand gallons (kgal) per year** - The average per household annual water use during this time period was 112.5 kgal per year and the overall trend was a decline in per household water use.
- **Indoor/Outdoor Use** - From 2000 – 2010, Westminster residential customers used an average of 60.2 kgal per year for indoor purposes and 52.3 kgal per year for outdoor purposes.
- **More water used indoors annually** - In general, residential customers in Westminster tend to use more water indoors than outdoors over the course of the year. Looking only at consumption in 2010, residential customers in Westminster used 54.4% of their total annual water use indoors (non-seasonal) and 45.6% outdoors (seasonal). Since 2000, average non-seasonal (indoor) use has exceeded seasonal (outdoor) use every year except 2008.
- **Irrigation tracks changing weather** - City residents are clearly altering their irrigation patterns to match the prevailing weather conditions, which means they are paying close attention to the weather and the condition of their landscape.
- **Potential for increased outdoor use exists** - Outdoor water use cannot and will not decline indefinitely (unless climate conditions continue to become cooler and wetter from now on or people make permanent changes to the size and type of landscapes prevalent in the community). The results from this study suggest that if the climate conditions trend towards the hot and dry in the future, Westminster citizens will respond by increasing outdoor water use to maintain landscape quality.

Daily Household Use

During the data logging period, the 61 households in this study used an average of 148 gallons per household per day (gphd) and the median use was 138 gphd. The 2010 average daily non-seasonal water use across the entire residential sector in Westminster was 153.6 gallons per household per day. These results are not statistically different at the 95% confidence level, confirming the representativeness of the sample selected for this study. These results are presented in Table 2.

Table 2: Household water use statistics

Parameter	Average (gphd)	Std. Deviation	Sample Size (N)
Total logged use	148.1	76	61
Indoor logged use	138	132	61
Non-seasonal use for population (2010)	153.6	33.3	27,739

Even though the data logging effort was conducted in December and January, nominal “non-irrigation” months, there was still a small amount of outdoor use that was measured through the flow trace analysis effort. This is not surprising since winter watering of trees and some other plants is a recommended practice in Colorado, particularly during a dry winter such as 2010-11. It was found that approximately 10 gphd of water was going to outdoor uses during the logging period. The average indoor household use measured during the logging period was 138 gphd.

Indoor Water Use and Conservation Potential

Single-family households in Westminster are using water quite efficiently in 2011 and there is only a limited potential for additional water savings indoors in the future.

When water use in the Westminster sample was compared against water use found in the 1999 Residential End Uses of Water Study (REUWS) national sample, it was found to be significantly lower in household water use for toilets, clothes washing, faucets, other uses and leaks. Shower, bath and dishwasher use, however, was much the same.

In Westminster, the average indoor per household use was 138 gphd. In the 1999 REUWS, the average indoor per household use was 177 gphd. This means that the households in Westminster are using 22.3% less water indoors than this previous national sample.

Indoor Per Capita Use

Residents in Westminster used 55.4 gallons per capita per day (gpcd) in the 2011 study. Toilets were the largest end use (13.5 gpcd), followed by showers (12.3 gpcd), clothes washers (11.5 gpcd), faucets (7.9 gpcd), and leaks (7.2 gpcd). A comparison on the indoor per capita use measured in Westminster and the 1999 REUWS is presented in Table 3.

Compared with the baseline 1999 REUWS, residents in Westminster are using 22.3% less water indoors per capita. Measurable demand reductions have been achieved in toilet use, clothes washer use, faucet use and in leakage. Most of the other end uses are quite similar. This indicates that Westminster homes today are equipped with more efficient fixtures and appliances than typical homes in the late 1990s.

When indoor use for each study was normalized for a family of three, accounting for the non-linear nature of per capita demand, it was discovered that homes in Westminster use 30% less than the homes in the 1999 REUWS. Furthermore when normalized, the homes in Westminster used only 10% more water indoors than a group of high-efficiency homes Aquacraft recently studied for the U.S. Environmental Protection Agency (EPA). These high-efficiency homes were built to the EPA WaterSense

specification and were among the most water efficient homes Aquacraft has ever studied. This result indicates that while additional indoor demand reductions are likely, homes in Westminster have already achieved an impressive level of efficiency to date.

Table 3: Average per capita per day usage – Westminster (2011) and REUWS (1999)

	2011 Westminster Study (gpcd)	1999 REUWS (gpcd)
Sample Frame	Random Sample	Random Sample
End Use		
Toilet	13.5	18.5
Shower	12.3	11.6
Clothes washer	11.5	15.0
Faucet	7.9	10.9
Bath	0.7	1.2
Dishwasher	0.9	1.0
Leaks	7.2	9.5
Other	1.4	1.6
INDOOR TOTAL	55.4	69.3
Sample size (N)	61	1,188

Fixtures and Appliances

The flow trace analysis process allows for a detailed examination of water use by each type of fixture and appliance regularly used by single-family households. For this study, the analyses were focused on the efficiency level achieved to date in Westminster and the conservation potential for the future.

Toilets

Analysis of the flow trace data indicates that the average per household flush volume in the City is 2.68 gallons per flush (gpf) and the median is 2.41 gallons per flush.

In the Westminster end use study sample, 47.5% of the households had an average household flush volume below 2.2 gallons per flush. This represents the average of all toilet flushes in the homes, which includes homes with multiple toilets of various efficiency levels. Over 16% of the study homes had an average flush volume at or below 1.6 gallons per flush and 3.3% of the homes had an average flush volume below 1.3 gallons per flush (the high-efficiency level). On the less water efficient side, 26.2% of the study homes had an average flush volume greater than or equal to 3.5 gpf, 16.4% were above 4 gpf, and 3.3% were above 5 gpf. These results are shown in Figure 6.

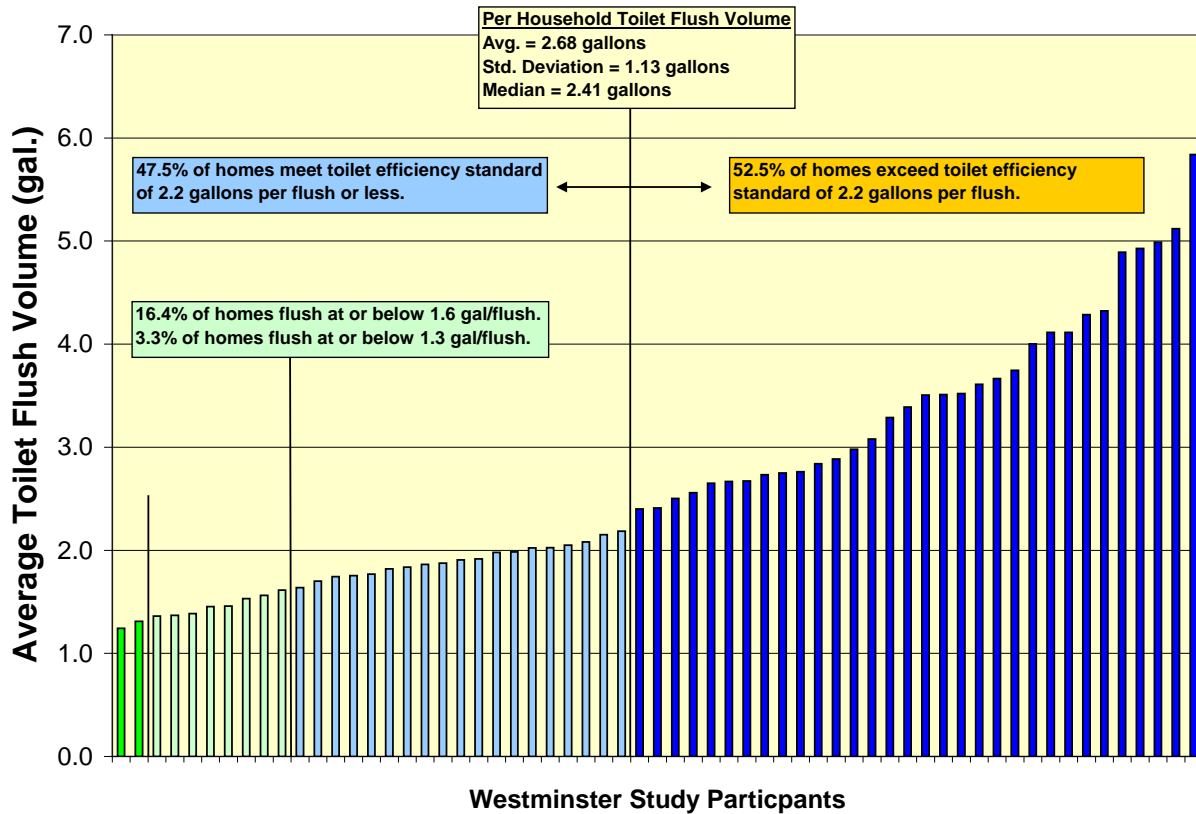


Figure 6: Average toilet flush volume for all study participants and toilet flush volume statistics

This study concludes that a high percentage of toilets in Westminster have been upgraded to ultra-low-flush toilets (ULFT). A ULFT is a toilet designed to use 1.6 gallons per flush. A high-efficiency toilet (HET) is designed to use 1.28 gallons per flush or less. About half of the residential customers have average flush volumes in the ULFT or better range, 25% of the homes appear to be fully equipped with ULFT or better toilets, and 44% have a mixture of ULFT or better and high volume toilets. On the other hand the data suggest that over 30% of the homes still were not equipped with any ULFT or better toilets at the time the data were collected in 2010.

Residents in Westminster flushed an average of 5.26 times per person per day which is quite similar to the flushing frequency found in numerous Aquacraft studies where flushing frequency has consistently been found to be between 5 and 6 flushes per person per day.

The “useful life” of a toilet fixture is somewhat of an unknown value in water efficiency literature. Conventional wisdom suggests that toilets are typically replaced every 25 years; however recent survey results (outside of Westminster) indicate that some people hang onto their old fixtures much longer. It is not uncommon to find the useful life of a toilet set at 40 or even 50 years. For the purpose of this

study and the Westminster Water Conservation Plan, a useful life of 40 years will be assumed for toilet fixtures.

A 40 year useful life suggests that about 2.5% of the older toilet fixtures in Westminster will be replaced each year. If all homes with an average flush volume greater than 2.2 gpf are put into the “older toilet fixture” category, then it is calculated that about 330 households per year will replace their toilets with new, efficient models.

Clothes Washers

Water used for clothes washing accounted for 20.8% of indoor use in this study. The average volume per load of laundry measured in this study was 31.9 gallons per load (gpl) and the median was 35.5 gpl. In the 1999 REUWS, the average clothes washer volume was 40.9 gpl, so the typical clothes washer in Westminster appears to be 22% more efficient than this previous national sample.

Today’s water efficient clothes washers use about 25 gpl or less, while older models use about 45 gpl. In Westminster, 35% of the laundry loads measured during this study used 25 gpl or less and 37% of the laundry loads used 40 gpl or more. The remaining 28% used between 25 and 40 gpl. As with toilets, there are a mixture of fixtures and appliances currently installed in Westminster households. While substantial water efficiency has already been achieved, there remain significant savings to be realized. These results are presented in Figure 7.

It is anticipated that homes in Westminster will continue to improve the efficiency of clothes washing in the coming years. Federal Department of Energy rules will ensure that in the future, only more water-efficient clothes washers will be available for sale in the US. The average useful life of a clothes washer is 14 years. The results from this study indicate that in the coming years up to 65% of the residential customers in Westminster could increase their water use efficiency for clothes washing.

A 14 year useful life suggests that about 7.1% of the clothes washers in Westminster will be replaced each year. It is becoming increasingly difficult to purchase a new clothes washer that uses more than 25 gpl because of steadily improving Department of Energy standards for washers. It is not unreasonable to assume that all new washer purchases in the coming years will be efficient models.

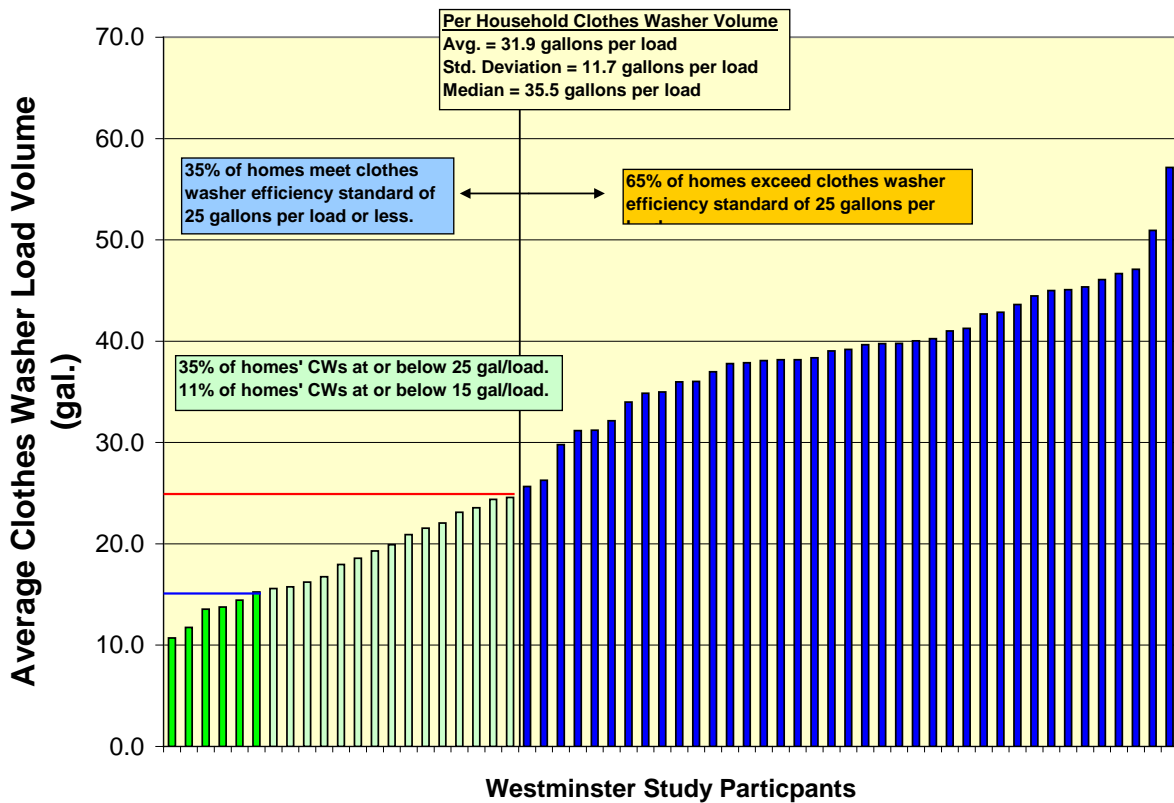


Figure 7: Average clothes washer load volume for all participants and load volume statistics

Showers

Showers are the second largest indoor end use (after toilets) accounting for 22.2% of the residential indoor demand. Participants in this study used an average of 12.3 gpcd for showering which was a little higher than the 11.6 gpcd found in the 1999 REUWS. There does not appear to have been any efficiency gains (or losses) in showering in Westminster over the past 15 years. Shower water use is essentially unchanged from what it was in the late 1990s to today.

Additional efficiency improvements from showering are hard to predict, but based on the results of this study, Westminster should not assume that the water use for showering will decrease in the future.

Faucets

Faucet use accounted for 14.3% of indoor use in Westminster, making it the fourth largest indoor end use. Study participants used an average of 7.9 gpcd for faucets during this study. This is 27.5% less than the 10.9 gpcd measured for faucet use in the 1999 REUWS.

Faucet flow rates in Westminster are substantially lower than were measured for the REUWS, but faucets are operating for longer periods of time in Westminster. This suggests some faucet uses are volume based. Residents in Westminster ran the faucet for an average of 10.1 minutes per person per day which was substantially longer than the 8.2 minutes per person per day measured in the REUWS. In Westminster, the average faucet flow rate was 0.9 gallons per minute (gpm), but in the 1999 REUWS the average faucet flow rate was 1.3 gpm.

Increased faucet use efficiency in Westminster will be challenging to achieve. It appears that typical faucet flow rates are already considerably lower than what was measured in the 1999 REUWS.

Additional faucet savings will likely only be available through modified behavior rather than technological efficiency improvements; although, it is possible that increased adoption of hands-free faucet devices could reduce faucet run times. No study has been able to document water savings from residential hands-free faucet devices to date.

Dishwashers

Dishwashers accounted for only 1.6% of indoor water use in Westminster. Study participants used an average of 0.9 gpcd for automatic dishwashing. This was quite comparable to the volume of water found for dishwashing in other recent end use studies.

An average dishwasher load used 6.4 gallons per load in Westminster. There are dishwashers on the market that use 5 gallons per load or less, but it appears that customers in Westminster have relatively efficient washers installed right now.

Leaks

In Westminster, leakage accounted for 13% of indoor water use. The study homes leaked an average of 16.8 gallons per household per day and 7.2 gallons per capita per day during the study period. It is likely that much of this leakage is going down the drain into the sewer system. Homes in the 1999 REUWS leaked an average of 9.5 gpcd, so the 7.2 gpcd leakage rate found in Westminster represents a 25% reduction in per capita leakage rates.

Leakage rates could be reduced in the future, but this is usually best accomplished through implementation of advanced metering infrastructure (AMI) which, if implemented properly, can provide leakage alerts to customers with unexpected or unexplained usage.

Outdoor Water Use and Conservation Potential

Single-family residential irrigators in Westminster appear to be well tuned in to prevailing weather conditions and to adjust their irrigation patterns accordingly when the weather becomes wetter or drier. The average irrigation application rate of the Westminster survey respondents changed dramatically in response to changes in weather. For example, 2009 was a cool and wet year comparatively and the average irrigation application rate in Westminster reached the lowest level of the decade – even lower than in 2004 in the drought response shadow. In 2010 when the irrigation requirement was substantially higher than 2009, the average irrigation application rate climbed.

The study sample households in Westminster applied substantially less water than was theoretically required for a turf grass landscape. On average this group applied 67.7% of the theoretical requirement from 2000 – 2010. If we allow for a 5% under-estimate of the actual irrigated areas the average would be about 73%—still substantially below the annual irrigation requirement. This indicates that many single-family residential irrigators in Westminster use substantially less water than might be expected based on the weather conditions.

Figure 8 shows the percent of the 2010 irrigation requirement that was applied by the end use study sample.

These results suggest that outdoor water conservation efforts in Westminster should be targeted at the relatively small percentage (12.9%) of customers who are applying more than 100% of the theoretical requirement. The City should also consider programs and regulations to help ensure that those customers who are currently irrigating at an efficient level continue this practice. Real potential for increased outdoor use exists in Westminster, particularly among customers who are currently manually irrigating but who could install an automatic irrigation system in the future. Manual irrigators include all customers who do not have an in-ground system with an automatic timer. Working to ensure that new landscapes and irrigation systems installed in Westminster in the future are as water efficient as possible can help manage and mitigate potential demand increases.

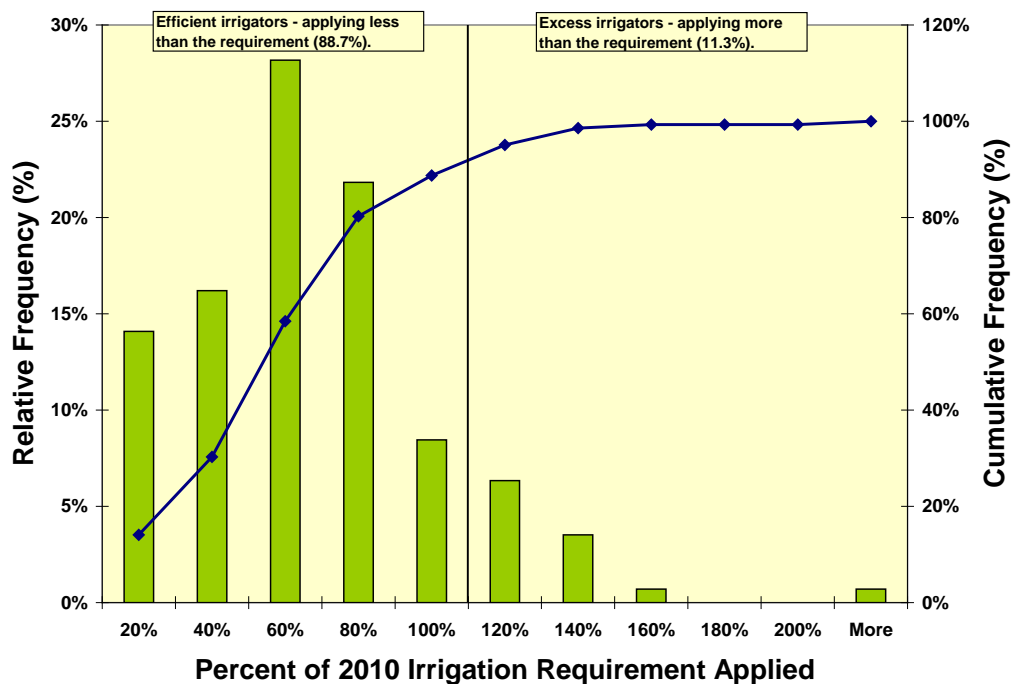


Figure 8: Histogram showing the percent of 2010 irrigation requirement applied by end use study sample (n=70)

There is not great potential to further reduce single-family residential outdoor water demands in Westminster. In this study group, the excess irrigation measured in 2010 only accounted for 3% of all outdoor demand. In other words, if the 12.9% of the study sample that applied more than 100% of the theoretical irrigation requirement (TIR) in 2010 reduced their use to exactly 100% of the TIR the savings would only amount to a 3% reduction in outdoor use.

By contrast, the level of under-irrigation in this sample of households is much more significant. If all households that applied less than the TIR in 2010 were to increase their irrigation application rate to match the TIR, outdoor use would be approximately 35% higher. It appears that the level of under-irrigation in Westminster is much more significant than the level of excess irrigation. The potential to increase outdoor demands, particularly among those currently manually irrigating, is far more significant than the potential for reducing outdoor demands. This is a finding with important implications for the City. Planning for the future of irrigation in Westminster includes expected increases in outdoor use among customers who are currently drastically under-irrigating. Customers who over-irrigate will be targeted for various outdoor efficiency interventions described below.

Single-family residential outdoor irrigation in Westminster has been at a relatively low average rate over the past 10 years, indicating that relatively few customers in Westminster over-irrigate. The City should be aware that outdoor use in Westminster could increase due to:

- Conversions of landscapes that are currently manually irrigated to automatic irrigation.
- Changes in customer preferences regarding plants and landscape materials.
- Hotter and drier climate conditions.

Water Costs and Pricing

The City of Westminster utilizes an inclining block rate water billing structure that encourages conservation by charging a higher rate the more water that is consumed. Details of the City’s rate structure, stormwater management and metering fees are presented in Table 4, Table 5, and Table 6.

Residential demand accounted for 62% of total demand in 2010. The City’s rate structure is particularly well designed for residential customers. Block 1 covers just the first 4,000 gallons of usage, which is a reasonable amount of water for indoor demand for a family of four. Block 2 is from 5,000 – 20,000 gallons of usage which is sufficient to irrigate 5,000 square feet of turf during the hottest month of the year. Block 3 is all usage greater than 20,000 gallons per month.

Table 4: Westminster water and sewer rates and rate structure (effective 1/1/2012)

	Inside City Limits	Shaw Heights	Outside City Limits
Residential Water	(per 1,000 gallons)		
1,000 - 4,000 gallons	\$2.38	\$2.61	\$2.97
5,000 - 20,000 gallons	\$3.93	\$4.32	\$4.91
More than 20,000	\$5.82	\$6.40	\$7.27
Multi-Unit, HOA & Residential Irrigation	\$4.88	\$5.36	\$6.10
Commercial (based on meter size)			
Block 1 - below Breakpoint (chart below)	\$4.88	\$5.36	\$6.10
Block 2 - above Breakpoint (chart below)	\$5.94	\$6.53	\$7.42
Reclaimed Water (based on meter size)			
Block 1 - below Breakpoint (chart below)	\$3.90	\$4.29	\$4.87
Block 2 - above Breakpoint (chart below)	\$4.74	\$5.21	\$5.92
Sewer Rates (January thru March water average)		(times average/month)	
Residential single-family	\$4.35	\$4.35	\$5.43
All others	\$4.86	\$4.86	\$6.07
New Residents (flat rate)	\$21.81	\$21.81	\$27.26

Meter Service Charges	(per month)		
Residential	\$6.67	\$7.33	\$8.33
Commercial and all others	Based on meter size	Based on meter size	Based on meter size
Miscellaneous Charges and Fees	(per month)		
Infrastructure Charge	\$4		
Late Fee	\$5	\$5	\$5
Return Check Fee	\$30	\$30	\$30

Table 5: Stormwater management fees (effective 1/1/12)

	Stormwater Management Fee (per month)
Single-family detached residential	\$3.00/mo. (Average impervious area for a home is calculated at 3,100 sq. ft.)
All other property (Commercial, apartments, townhomes, etc.)	\$0.97/mo./1,000 sq. ft. of impervious area. (Impervious area includes roofs, driveways, sidewalks, etc.)

Table 6: Monthly metering fees (effective 1/1/12)

Meter Size Breakdown Points (monthly fee)				
Meter Size	Inside City Limits	Shaw Heights	Outside City Limits	Block monthly use breakpoint (gal.)
5/8"	\$6.67	\$7.33	\$8.33	20,000
3/4"	\$10.58	\$11.63	\$13.22	30,000
1"	\$14.57	\$16.02	\$18.21	50,000
1-1/2"	\$22.99	\$25.28	\$28.73	100,000
2"	\$31.88	\$35.06	\$39.85	160,000
3"	\$65.20	\$71.72	\$81.50	350,000
4"	\$76.70	\$84.37	\$95.87	600,000
6"	\$118.89	\$130.77	\$148.61	1,250,000
Other sizes available on request				

PROPOSED TREATED WATER PROJECTS

The City of Westminster has no treated water supply projects planned for the coming years beyond standard maintenance of lines and infrastructure. It is estimated that current water treatment capacity of 59 mgd is sufficient to meet buildout demands. There are no identifiable treated water supply projects that could be delayed or cancelled as a result of future demand reductions achieved through conservation.

Review of Current Policies and Planning Initiatives

Comprehensive Water Supply Plan

The development of a Water Conservation Plan is a part of the City's overall Comprehensive Water Supply Plan (CWSP). The CWSP develops a strategy to meet the current and future water needs of the City in a truly integrated and interactive process. The CWSP uses updated projections of buildout water demand based on the City's Comprehensive Land Use Plan (CLUP) and compares this with an updated planned buildout yield of the City's water supply system to define a buildout water supply/demand gap. A key goal of the CWSP is to eliminate any identified supply gap in an appropriate timeframe for buildout of the City.

The CWSP is a portfolio intended to identify and meet the buildout water supply/demand gap by expanding some components of the City's existing water supply system, constructing some new capital projects, and capturing demand modifications and reductions. The CWSP components include water conservation efforts, expanding the reclaimed water system, water rights purchases, system improvements, and identifying other potential solutions to future needs.

Other Westminster Plans and Initiatives

The City of Westminster prepares and regularly updates the following plans:

- **Water System Master Plan** - Focused on the water distribution and treatment systems.
- **Sewer Master Plan** - Focused on the sewer collection and treatment systems.
- **Raw Water Infrastructure Master Plan** - Focused on the raw water delivery and reservoir systems.
- **South Westminster Non-Potable Water Supply Plan** - Focuses on the potential delivery of non-potable raw water to irrigation customers in south Westminster, freeing up higher quality water for potable demands.
- **Reclaimed Water Master Plan** - Focuses on the treatment, delivery, and potential customer identification and timing of connection for the reclaimed water system.

- **Parks Master Plan** - A master plan for City parks which is used to determine water application rates and potential future demands.
- **Drought Plan** - Details trigger points and projects for use during times of water shortages.

Additional plans mentioned in the comprehensive water supply section:

- **Water Supply Plan** - Determines the yield of the City's water portfolio
- **Comprehensive Land Use Plan** - Identifies the current developed and undeveloped lands and the uses for which they are approved.
- **Water Demand Plan** - Applies historic water use and predicted trends to existing and planned development to generate a buildout water demand.
- **Water Conservation Plan** – Sets out conservation program description and goals for the coming years. Developed in accordance with the Water Conservation Act of 2004 and to meet the provisions of Colorado Revised Statute Section 37-60-126.

POPULATION PLANNING AND PROJECTIONS

In 2010, Westminster provided treated drinking water to an estimated population of 123,647. This estimate includes customers in the Westminster, Shaw Heights, Federal Heights, and a small number outside of these municipal boundaries.

Projecting buildout population uses data from several sources and creates a projection 25 to 30 years in the future. The data used for the projection is based on today's understanding of future conditions. Westminster's approach for population projections is conservative, using a higher density than projected in the City's current Comprehensive Landuse Plan. Decisions made today will affect the City's water supply in the future when water will be scarcer and options for increasing water supply much more expensive and difficult. The Colorado Department of Local Affairs projects an average population increase within Jefferson and Adams counties from 2010 to 2040 of about 38%, roughly equivalent to the projections used in this plan.

Westminster bases its population forecasts on land use and density and frequently adjusts projections based on observed and planned changes. For example, a recent trend showing increased multifamily housing construction has lead city planners to increase their estimate of the anticipated density in some parts of Westminster, resulting in an increased buildout population forecast.

At buildout, the City currently estimates it will provide water service to approximately 152,000 people within the City of Westminster and an additional 18,600 people outside the city limits for a total of 170,600 people. This represents an increase of about 38% over the 2010 population served.

While Westminster uses these estimates for planning purposes, the City acknowledges the inaccuracy of any buildout projection that assumes achievement of a hypothetical maximum population in the future. Experience has shown that buildout seldom, if ever, really occurs. Instead, cities adapt to new conditions and development realities as they grow to their urban boundaries. What is considered buildout in 2012 may not be considered buildout in 2030.

WATER CONSERVATION PROGRAMS AND MEASURES

Conservation Goals and Identified Programs and Measures

The City of Westminster has identified a future water supply gap in 2040 of approximately 2,200 AF which is to be met through demand reductions accomplished by a combination of passive and active water conservation measures. Given the high level of demand reductions already accomplished in Westminster (as documented through the residential analysis presented earlier in this plan), setting an achievable goal of conserving another 2,200 AF over the next 28 years (~79 AF per year) makes sense. This goal will be re-evaluated on a regular basis as Westminster intends to update the water conservation plan every 7 years. This means that four additional plan updates will be completed before 2040 affording ample opportunity to update and refine the City's conservation program and goals as needed.

Conservation Program and Demand Forecasts

Westminster's water conservation program over the next seven years addresses all residential and non-residential demand sectors in the City and includes a set of innovative and effective water conservation measures. Some of these measures, such as Westminster's highly effective tap fee ordinance, have been developed and implemented over many years. Other measures, such as the proposed new informational water budget and leak reduction program that identifies leaks using advanced metering infrastructure (AMI), offer substantial opportunity for additional demand reductions.

Current Program

The City has implemented comprehensive water conservation measures since 1976. Most of the measures that have been implemented over the past 35 years are still part of the conservation program in 2012. Westminster has been a leader among Colorado utilities in promoting and implementing sensible water efficiency measures. In 1976, Westminster was one of the first municipalities to:

- Implement an increasing block rate water conservation pricing structure for residential water users.
- Meter and charge all water users including City parks and construction water users.
- Modify the Municipal Building Code to require low water plumbing fixtures in all new development.

All of these program measures are still in place in 2012.

Starting in 1976 and continuing through 2012, the City has implemented a series of additional water conservation measures. Arranged by customer category impacted, these conservation measures include:

Outdoor Conservation - Irrigation and Landscape

- Installation of two weather stations to collect evapotranspiration (ET) data that are utilized by the City's Parks Department in a computerized irrigation scheduling program that schedules irrigation at City parks, Legacy Ridge Golf Course and other City facilities.
- Installation of computerized irrigation controls at City Park and Legacy Ridge Golf Course that allow for automatic and remote control of irrigation to increase efficiency.
- Rain sensors on 90 percent of irrigation time clocks for City parks and City facilities that shut off irrigation during significant precipitation.
- Xeriscape Seminars offered for free through the Department of Parks, Recreation and Libraries.
- Irrigation audits offered through the Center for Resource Conservation
- "Garden in a box" landscaping program offered through the Center for Resource Conservation
- City Landscape Ordinance that includes landscape water budgets, required irrigation controllers, and required soil amendments

Conservation Information and Education

- Water Awareness presentations that are made to local elementary schools and displays at malls and public facilities during Water Awareness Week.
- Children's water festivals in local schools

City-Wide Measures, Codes, and Municipal Conservation

- Ongoing Utility Water Loss Control, Pressure Management, and Leak Detection Program
- Ongoing Meter Testing and Calibration Program.
- Reclaimed water program
- City Landscape Ordinance that includes landscape water budgets, required irrigation controller technologies, and required soil amendments
- Water waste ordinance in City Code
- Regular review and update of City's conservation-oriented water rates
- Tap fee structure encouraging built-in water efficiency in new construction
- City Growth Management Plan
- Municipal code requiring submetering
- City efficiency audits conducted by Siemens

Residential Indoor Conservation

- Rebates for water efficient clothes washers
- Multi-family toilet retrofit program

Commercial, Industrial, and Institutional Indoor Conservation

- Water recycling requirement for car washes
- Tap fee structure encouraging built-in water efficiency in new CII construction

More detailed descriptions of some of these ongoing water conservation programs and measures are provided below.

Rebates for Water Efficient Clothes Washers

Beginning in 2003 and continuing through 2011 the City has rebated 2,584 toilets and 1,345 washing machines in single-family and small multifamily projects, for a total of \$328,560 in rebates resulting in over 120 acre-feet of water saved at an average cost of \$2,725 per acre-foot saved—enough water to fully supply 280 single-family homes with their annual water needs.

Municipal Code Requires Submetering

- Since 1996 the Westminster municipal code has required all multifamily units which do not share a common hot water supply system to have individual submeters installed.
- Since 2006 all new townhome units must have individual water meters installed.
- Since 2006 all individual businesses in a complex must be submetered.
- Submetering places the responsibility and the ability to track water use with the water user. Studies have shown that water users who pay for their individual water use are more likely to use less water.

Water Loss Control and Water Pressure Management

The City implements an aggressive water loss control program that includes implementation of the AWWA Water Loss Audit methodology, meter testing, repair, and replacement, water main rehabilitation and replacement, and pressure management. The City uses acoustic water leak detection regularly with 2 City owned devices and contracts periodically with a leak detection company on specific zone projects. In 2011 water loss in the City was estimated to be 6.52% - which is one of the lowest levels of water loss achieved by the City over the past 20 years. The City is in the process of identifying pressure zones within the City where water pressures are higher than optimal. Reducing high pressures in these areas offer the opportunity to decrease water leakage on both the City and customer side of the meter. The proposed zones are prioritized with pressure in the oldest areas to be reduced first to maximize water savings. Reduced pressures decrease the possibility that new leaks will develop and lowers losses from existing leaks. Further water savings are achieved by reducing the flow from water use fixtures as they are used.

Multifamily Toilet Retrofit Program

In 2011, the City implemented a multifamily toilet rebate program. The program provided select multifamily complexes with high-efficiency toilets for one or two buildings with separate water accounts. The goal was to demonstrate savings so that the management of the complex would be

motivated to fund the replacement of the remaining inefficient toilets for the entire complex. Since multifamily complexes have specific budgetary and labor availability issues, the program was designed to provide the rebate at the time of purchase and allow for an extended installation period.

Many multifamily projects in Westminster were built prior to 1994 and have toilets that use 3.5, or more, gallons per flush. In 1994, Congress enacted water savings legislation requiring that toilets use no more than 1.6 gallons per flush. Current toilets use 1.28 gallons per flush while providing superior performance compared to toilets manufactured prior to 1994. Rebates were issued for 1.28 toilets that qualify for the EPA's WaterSense program, of which Westminster is a partner.

During 2011, the City funded rebates for the replacement of 289 toilets in 7 multifamily complexes. All toilets were purchased in 2011 and installations continue in 2012. It is anticipated that all toilets will be installed in the first quarter of 2012. Each toilet replaced was pre-inspected by City staff ensuring that only high water use toilets were replaced. After the installation is complete, a post inspection will occur.

The following is a summary of 2011's program accomplishments:

- The total cost of the rebates was \$24,080
- Estimated water savings is 8.85 acre-feet
- The cost per acre-foot of water saved is \$2,725
- Enough water is saved to supply 20.5 homes with their total water needs annually

Commercial, Industrial, and Institutional Customers

Submetering

Since 2006, a City ordinance has required that all new commercial units in Westminster that share a water meter must have submeters installed so that the water use from each business can be measured. Studies have shown that water users who have their water use metered and pay for this measured usage use less water on average (Mayer, et. al. 2004).

Water Recycling

All car washes built in Westminster since 1996 have been required to install recycling systems so that at least 50% of the annual wash water can be reused.

Tap Fee Ordinance

Westminster's innovative tap fee structure provides incentive for water conservation in new non-residential construction. Separate infrastructure and water resources fees are included within the total water tap fee. This provides an incentive for developers to reduce tap size and water requirements by installing water efficient fixtures and processes. The City calculates each tap size by the type and

number of fixtures installed. Changing fixtures to water saving units can reduce the total fixture units on the tap which can in many instances allow for a smaller tap to be installed saving thousands of dollars on the water and sewer tap fees. The water resources requirements of each non-residential tap are calculated independently of the tap size and a savings in water resources requirements can reduce the water resources portion of the water tap fee. Irrigation taps in Westminster are sized based on calculated water requirements using key data such as the irrigated area (square feet) and the anticipated water requirements of the landscape. Once the potential demands are estimated, then the City uses this information to determine the required service line and tap size to adequately serve the property. This provides a built-in incentive for new customers to install water conserving landscapes as a lower water requirement will result in a smaller system connection fee.

Estimated Savings from Current and Past Water Conservation Efforts

The City has documented the impact of current and past water conservation efforts through a variety of studies and analysis. Several of these savings estimates are described below. The City is working on an analysis to estimate the impacts of water conservation in Westminster since 1980, but this is not yet completed.

Per Capita Changes 2000 – 2010

A simple analysis of system-wide per capita use shows significant water savings were achieved in Westminster from 2000 – 2010. As shown in Table 7, over the ten year period from 2000 – 2010, the population in the City increased by 5.1%. Over that same time treated water deliveries were reduced by 11.4% resulting in a 17.8% reduction in per capita potable water produced. The results from the 2011 Residential Demand Study (discussed below) confirm that these changes in water use are largely due to both active and passive water conservation efforts. Replacing 1,474 acre feet of potable water demand with reclaimed water is included in the per capita demand reduction.

Table 7: Changes in water use in Westminster (2000 – 2010)

Year	Population	Water Delivered (AF)*	Per Capita Potable Water Produced at the Plant (gpcd)
2000	100,940	20,363	169
2010	106,114	18,034	139
% Change	5.1%	-11.4%	-17.8%

*Does not include reclaimed water

Residential Indoor Savings Estimate

Residents in Westminster used 55.4 gallons per capita per day (gpcd) according to results from the 2011 Westminster Residential Water Demand Study. A comparison on the indoor per capita use measured

in Westminster and the 1999 Residential End Uses of Water Study (REUWS) is presented earlier in this plan document in Table 3.

Compared with the baseline 1999 REUWS, residents in Westminster are using 22.3% less water indoors per capita. Measurable demand reductions have been achieved in toilet use, clothes washer use, faucet use and in leakage. Most of the other end uses are quite similar. This indicates that Westminster homes today are equipped with more efficient fixtures and appliances than typical homes in the late 1990s.

When indoor use for each study was normalized for a family of three, accounting for the non-linear nature of per capita demand, it was discovered that homes in Westminster use 30% less than the homes in the 1999 REUWS.

Estimated Impact of Reclaimed Water System

The City's reclaimed water system has had a significant impact on the City's raw water requirements. In 2010 the City delivered 1,474 AF of reclaimed water for irrigation purposes. This represents a net reduction in the amount of water the City would have been required to treat and deliver to meet current demands. 1,474 AF represents 8.1% of the treated water demand in 2010.

Proposed New Water Conservation Program Measures

The following new program measures will be added to Westminster's water conservation program portfolio in 2012 and beyond. The primary goal of these measures is to target high and inefficient water use and to focus limited conservation resources on the areas where significant demand reductions can be achieved.

Leak Alert Notification

Leakage on the customer side of the meter remains a problem for Westminster residents. Findings from the 2011 Residential Water Demand Study showed that leakage accounts for 13% of indoor use in Westminster homes. For a small number of high leakage properties, leakage may account for 40% of indoor demand or more. A leak alert notification system appears to be one of the best methods available for identifying potential leaks and notifying customers that a problem may exist.

Using the City's steadily expanding advanced metering infrastructure (AMI), customers with unanticipated water use (typically measured through hourly meter reads taken during the early morning hours) will be sent a simple "leak check alert" notification via email or the US Mail. The leak check alert will notify the customer of a possible leak and recommend courses of action to further investigate and remedy the situation.

This program will be implemented for all customers equipped with the necessary AMI meters. Westminster has designed a leak alert post card that informs the customer (in a friendly manner) that a leak may have been detected in their home. The post card also identifies the most likely source of indoor leaks (e.g. toilet flappers) as well as other possible leak locations. Using the AMI system, the City can perform on-going checks to determine if leakage has been abated in homes that have been alerted. The impact of the program can thus be monitored and quantified.

In the residential water demand study, it was found that 5% of the study homes had leaks that exceeded 100 gallons per household per day. If these leaks were to occur unabated, each house could leak more than 36,500 gallons per year. These are the customers who will be the focus of the leak alert notification.

Implementation target for 2012 -13: All customers.

Informational Water Budget

Landscape water budgets have been shown to be one of the most effective tools for establishing irrigation efficiency. Identified as Best Practice 7 in the Colorado WaterWise *Guidebook of Best Practices for Municipal Water Conservation in Colorado*, landscape water budgets provide essential information to help customer manage their outdoor water use through better understanding of consumption patterns and efficiency levels. Under this program, the City will develop landscape water budgets for as many customers as possible, but focused on dedicated irrigation accounts to start.

Westminster has excellent aerial imagery and GIS coverage for measuring landscape areas and establishing water budgets. The water budget will provide a reasonable estimate of expected water use at a site based on the irrigated area and landscape. Comparisons on actual consumption versus water budget estimate will be provided to customers as an informational email or letter in the US Mail. The water budgets will be tied to the City's water rate structure and will be for informational purposes only.

As currently envisioned, the comparison will show the customer how much water they actually used to irrigate the designated property versus an empirical estimate (i.e. water budget) of the volume of water required to irrigate the parcel efficiently. If a customer's water use is at or below the water budget then their irrigation use can be deemed efficient based on this analysis and the water budget may not appear on their utility bill. However, if the actual water use exceeds the water budget then improved water efficiency may be possible triggering the water budget section of the utility bill. While the City is considering using the utility bill for the informational water budget, billing system capabilities may require distribution of the information in a separate mailing or through the City's website. Most customers have no idea if they are irrigating efficiently or not and this program offers the opportunity to

inform and educate. Customers whose irrigation demand dramatically exceeds their water budget will be targeted for efficiency intervention. All customers will be able to use the City's online web resources to see their irrigation water use as well as leak alerts and other measures.

Implementation target for 2012 -13: All customers.

Irrigation Audits

Best Practice 10 in the Colorado WaterWise *Guidebook of Best Practices for Municipal Water Conservation in Colorado* calls for "irrigation efficiency evaluations" also known as irrigation audits. Performed by a trained auditor, irrigation audits provide on the ground evaluations (and often repairs) of automatic irrigation systems.

Under this program the City will offer free irrigation system audits to high water use customers targeted via the informational water budget and other statistical targeting methods or upon request. The irrigation system audits will be conducted by trained experts and will correct deficiencies in irrigation systems.

Implementation target for 2012 -13: 200 customers

Improved Customer Water Use Feedback and Information

The City will use AMI and GIS technology to provide customers with actionable information about water use and information on where efficiency improvements can be made. The City hopes to target this program at customers whose water use dramatically exceeds empirically derived expectations. This effort is closely linked with the informational water budget program described above. The ultimate goal is to develop a regular process for identifying what appears to be wasteful water use via monthly billing data, to alert customers about the potential situation, and then offer information and support to help them reduce their demand.

Implementation target for 2012 -13: 200 customers

Summary of Current and New Conservation Program Measures

Table 8 presents a summary of the water conservation program measures Westminster is implementing and plans to implement into the future.

Table 8: Summary of existing and new water conservation measures

Measure	Sectors Impacted	Description
Increasing block rate pricing structure	All	The City utilizes an inclining block rate water billing structure that encourages conservation by charging a higher rate the more water that is consumed.
Metering and billing all customers including construction sites	All	All customers regardless of type or size are metered and must pay for water based on the volume used.
Individual meters or sub meters required	Townhomes, Multifamily, Commercial	New customers in these categories must install individual meters or submeters in each unit.
Meter testing and calibration program	All	The City maintains a rigorous meter testing and calibration regime.
Since 1996 mandatory recycling at car washes	Commercial car washes	All car washes built since 1996 are required to recycle at least 50% of annual car wash water use.
Education and information	All	The City implements a variety of water and conservation education and information programs including: Water Awareness presentations at schools, Water Awareness Week, Xeriscape seminars, utility website, participation in Colorado Water Wise, bill stuffers and other informational brochures.
Landscape and irrigation regulations implemented in 2004	All new customers with a landscape.	The City requires an approved landscape plan, soil amendments, and an automatic irrigation system. A landscape architect reviews landscape plans. An Official Development Plan Inspector inspects amended soil and reviews irrigation system audits. New non single family landscapes have a maximum 15 gallons per square foot landscape water requirement and a maximum 50% turf area.
Leak alert notification	All applicable	New measure. Using the City’s steadily expanding advanced metering infrastructure (AMI) customers with unanticipated water use (typically during the early morning hours) will be sent a simple leak check alert notification via email or the US Mail. The leak check alert will notify the customer of a possible leak and recommend courses of action to further investigate and remedy the situation.
Informational water budget	All applicable	New measure. The City will develop landscape water budgets for as many customers as possible, but focused on dedicated irrigation accounts to start. The water budget will provide a reasonable estimate of expected water use at a site based on the irrigated area and landscape. Comparisons on actual consumption vs. water

Measure	Sectors Impacted	Description
		budget estimate will be provided to customers. Those that dramatically exceed their water budget will be targeted for efficiency intervention.
Improved Customer Water Use Feedback and Information	All applicable	New measure. The City will use AMI and GIS technology to provide customers with actionable information about water use and information on where efficiency improvements can be made. The City hopes to target this program at customers whose water use dramatically exceeds empirically derived expectations.
Irrigation audits	All applicable	The City will continue to offer free irrigation system audits to high water use customers targeted via the informational water budget and other statistical targeting methods or upon request. The irrigation system audits will be conducted by trained experts and will correct deficiencies in irrigation systems.
Irrigation efficiency improvements	Municipal	The City continues to upgrade and improve the efficiency of irrigation at parks and golf courses by installing ET weather stations, computer irrigation controls, and rain sensors. The City has implemented irrigation system conservation upgrade at sites on an ongoing basis which has produced significant water savings. The City pays for all water used for City parks and facilities.
Conservation-oriented tap fee structure	Non-residential	Separate infrastructure and water resources fees are included within the total water tap fee providing incentive to reduce tap size and water requirements by installing water efficient fixtures and processes.
Fixture and appliance rebates	Residential and commercial	The City has offered various rebates for water efficient toilets, clothes washers, and other fixtures and appliances. The City's rebate program is strategic and focuses on new and emerging product areas.
Utility water loss control	Utility & distribution system	Westminster conducts an annual system water audit using AWWA M36 methodology and auditing software. The most recent audit was completed in 2011. The City has an active system leak detection and repair program. In 2011 water loss was determined to be 6.52%, a low rate. Maintaining this low level and making small improvements are the fundamental goals for the City's program.

Demand Forecast

In conjunction with preparation of the City's CWSP, a demand forecast starting from 2010 and going out to 2040 was prepared. This baseline forecast did not include the impact of water conservation of any kind including passive water savings. Adjusted water demand in 2010 was 21,951 AF and under the baseline forecast has increased by 14,249 AF to 36,200 AF in 2040. The adjustment methodology is outlined below.

The baseline demand forecast was developed to anticipate the real potential for increased water demand in regions of the City that are currently using less water than expected. The baseline demand forecast includes the following elements:

- Weather adjusted historic water use for 1996-2010 at the water meter is used as a baseline current water demand.
- Outdoor and indoor average use is calculated individually by account. Outdoor use is adjusted for actual irrigation requirements. Current accounts without history in the full time period are averaged for the years of use that exist.
- Average historic unmetered water uses added in.
- Average historic raw water deliveries added in.
- Water use projected from current undeveloped areas, by development category, based on historic water use of similar developments built after 1995 by development category is added in.
- Current water use on undeveloped areas is subtracted as the current use will be replaced with the developed use.
- Average water loss 1996-2010 added in.
- The difference between historic vacancy rates and base level full occupancy vacancy rates are used to adjust average historic water use to full occupancy base level vacancy rates.
- Single-family outdoor water use is adjusted to 100% single-family for accounts that underuse below average. Average irrigation demand, based on 2011 residential water demand study, is 67% of required irrigation applied in single-family homes 2001-2010.
- Adjustment is made for identified redevelopment projects new water use.
- Adjustment is made for proposed projects that are not within a current land use category (higher density, etc)
- Use from underused large non-residential taps added in to reflect future business activity.

Using the baseline forecast described above and prepared by the City, Aquacraft developed a demand forecast that includes the impact of the City's planned water conservation program measures. Under this forecast it is estimated that demand at 2040 will be reduced by 2,200 AF as result of passive and active water conservation measures. Water savings estimates from Westminster conservation program measures are shown in Table 9. A chart showing the baseline forecast and forecast with conservation is presented in Figure 11.

Westminster updates its demand forecast on a regular basis and can make adjustments up or down as deemed justified by the observed demand patterns. The City incorporates periodic updates to

development categories in the Comprehensive Land Use Plan. Westminster intends to update their water conservation plan and savings forecast every seven years as required by statute.

Table 9: Water savings estimates for Westminster conservation program measures

Conservation Program Measure	Estimated Annual Water Savings (AF)	Estimated Water Savings at 2040 (AF)
Water loss control	5.4	150
Residential indoor savings from natural replacement of fixtures & appliances (<i>passive savings</i>)	53.6	1,500
CII indoor savings from natural replacement (<i>passive savings</i>)	5.4	150
Information and education	0.0	0
Leak alert program	7.1	200
Landscape and outdoor savings via audits, improved customer water use feedback, information oriented water billing, water budgets	7.1	200
Total	78.6	2,200

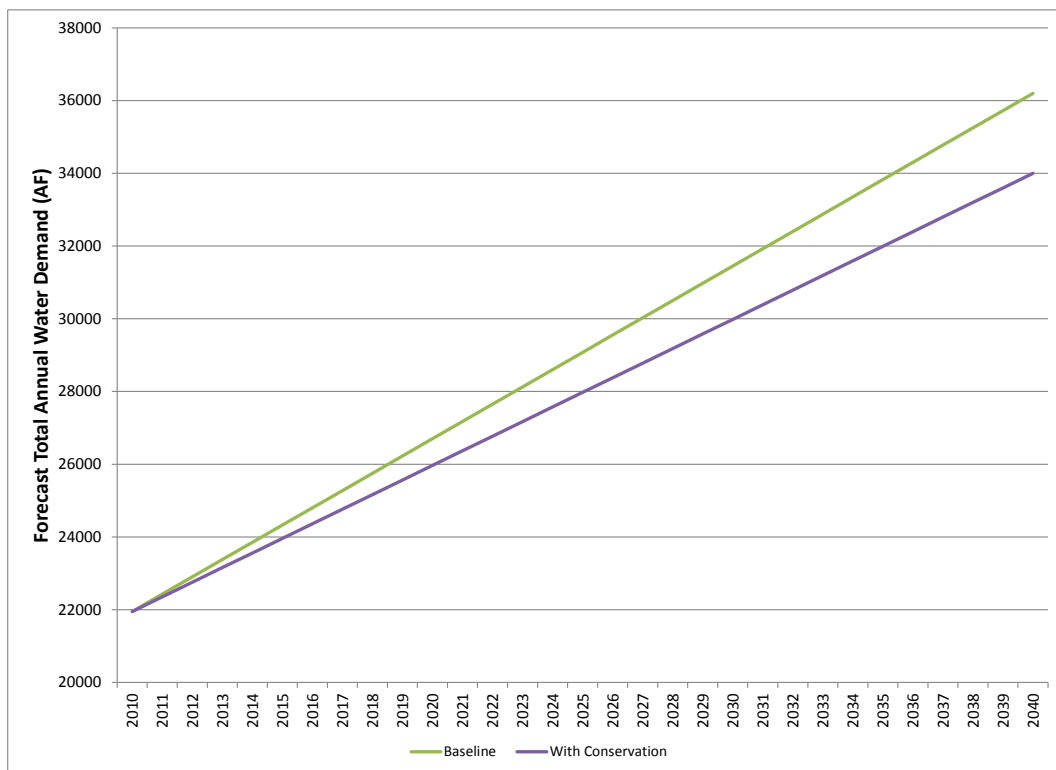


Figure 11: 2040 Westminster demand forecast, baseline and with conservation

Implementation Plan for Westminster Conservation Program

Stuart Feinglas, Water Resources Analyst for the City, also wears the hat of water conservation coordinator and is chiefly responsible for implementation of this plan. Mr. Feinglas has been successfully implementing the City's water conservation program for 11 years and is one of the most experienced conservation professionals in Colorado. The City will continue to work to budget money and pursue CWCB water efficiency grants to further its water conservation goals.

Monitoring and Evaluation

The City monitors water use on a monthly basis to identify trends early. Accounts are reviewed for high usage and no usage. Accounts showing unusual trends are flagged for further research and may receive notification if the usage is determined to be due to a problem. Monthly usage by account is downloaded into Excel spreadsheets where it is then aggregated in several ways including by customer class, general account type, specific account type, and meter type. Water production, reclaimed water production, raw water inflows, and sewer inflows are tracked daily. Population is tracked annually and used with consumption in various ways to calculate several per capita water demands. Weather data from the Lakewood Climate Station is used to generate monthly irrigation requirements for use in normalizing annual water use by account so that irrigation usage can be tracked and compared to past years as well as projected for future years. All identified water use from temporary meters and unmetered uses such as street cleaning are added to the City's water use totals. Annually, other data sources from flow meters and calibration results are reviewed to determine if a correction factor is required due to production metering errors. Indoor water use is calculated each year by averaging December, January and February usage by account.

Once collected the data is used to track total water use trends by sector and account type. Per capita usage is calculated for single family, residential only and total water use for the City. Unaccounted for water is calculated for both the potable and reclaimed water systems as well as for the total combined water distribution system through internal analysis and by using the AWWA Water Audit software. Additionally, raw water in compared to water delivered as the customer meter analysis is conducted.

In 2011 the City performed a Residential Water Use study to determine available conservation potential and better quantify irrigation demands. The full results are detailed earlier in the document under the section "2011 Residential Water Demand Study". Through data logging random homes water use in 10 second increments and using the Trace Wizard software the City was able to determine water use patterns and the type of water use fixtures, including water usage by fixture, in the home. Irrigated areas for the test properties were measured and categorized using GIS. The City hopes to update the residential study and possibly add other customer categories at intervals in the future.

Normalized water use data is aggregated by land use category to calculate water use by development type. The results are used, along with trend projections (population density per unit, units per acre, irrigated areas and other factors) and conservation goals, to develop buildout water use demand projections. Actual water use per year and any changes do development category demands are tracked and used to update projections, generally every 5 years.

Cost benefit ratios for conservation programs are calculated prior to designing a program to estimate savings and determine a required budget. If the ratio is within anticipated levels the program is chosen for implementation. When conservation programs are implemented the City tracks usage for all participants and periodically compares pre and post water use levels to verify savings and to propose modifications to the program. The new savings data are then used when designing future programs and calculating cost benefits as well as projecting conservation savings potential for buildout water demands.

The City has found that by collecting sufficient data up front and creating consistent models for analysis, reliable and verifiable results can be used in many ways from program design and evaluation to full integration of demand projections and conservation savings into the Comprehensive Water Supply Plan resulting in a truly integrated approach.

Future Conservation Plan Updates

The City plans to review and update this conservation plan every seven (7) years. The next update is scheduled to be completed in 2019.

COMPLIANCE WITH STATE PLANNING REQUIREMENTS

Colorado Revised Statute § 37-60-126 requires a covered entity to develop, adopt, make publicly available, and implement a water conservation plan that will encourage its domestic, commercial, industrial, and public facility customers to use water more efficiently. Key elements that must be considered in development of the plan are listed as follows:

1. Water-saving measures and programs including: (I) water-efficient fixtures and appliances; (II) water-wise landscapes; (III) water-efficient industrial and commercial water-using processes; (IV) water reuse systems; (V) distribution system leak identification and repair; (VI) information and education; (VII) conservation oriented rate structure; (VIII) technical assistance; (IX) regulatory measures designed to encourage water conservation; (X) incentives to implement water conservation techniques including rebates.
2. Role of conservation in the entity's supply planning.
3. Plan implementation, monitoring, review, and revision.
4. Future review of plan within 5-7 years.
5. Estimated savings from previous conservation efforts as well as estimates from implementation of current plan and new plan.
6. A 60-day minimum public comment period.

The following section of the plan details Westminster's compliance with this statute.

Westminster Compliance

The City of Westminster developed this conservation plan in order to comply with C.R.S. § 37-60-126. Each element of compliance is documented below.

1. Consideration of specific conservation measures -

(I) Fixture and appliances – Current and proposed program includes: Westminster operates a multifamily toilet replacement program and has offered rebates for toilets and clothes washers in recent years. Based on the results of the residential water demand study, it appears Westminster is making good progress towards the goal of full saturation of efficient toilets, clothes washers, faucets, and showers. New customers are incented to join the Westminster water system with efficiency built-in because of the City's tap fee structure that results in significant financial savings for new businesses that are efficient from the start. This tap fee

program, coupled with education and natural replacement has worked effectively to date and will be continued into the future.

(II) Water wise landscape – Current and proposed program includes: The City requires an approved landscape plan, soil amendments, and an automatic irrigation system. A landscape architect reviews landscape plans. New non single family landscapes have a maximum 15 gallons per square foot landscape water requirement and a maximum 50% turf area. An Official Development Plan Inspector inspects amended soil and reviews irrigation system audits. Westminster conducts between 200 – 220 irrigation water audits per year for customers targeted as high outdoor water users. The City continues to upgrade and improve the efficiency of irrigation at parks and golf courses by installing ET weather stations, computer irrigation controls, and rain sensors. The City also provides support for implementation of CRC’s “Garden-in-a-box” program.

(III) Commercial, Industrial and Institutional (CII) measures – Current and proposed program includes: Westminster has effectively mandated water efficiency in the CII sector through planning rules and regulations. The City’s tap fee structure is the single most important effort in this regard. Westminster’s tap fee structure incents new CII customers to install water efficient fixtures, appliances, and landscape during the initial construction phase by offering significantly lower connection charges for customers that implement efficiency measures. The City requires submetering in all new commercial units that share a common utility meter. Additionally, Westminster has important code requirements for water intensive businesses. For example, since 1996 all car washes in Westminster have been required to recycle their water. The City also has landscape regulations that apply to CII customers that help ensure new landscapes have the maximum opportunity for water efficiency.

(IV) Water reuse systems – The City has an extensive reclaimed water system and has established a goal of meeting more than 10% of total demand through reclaimed water at buildout.

(V) Water loss and system leakage reduction – Current program includes: Westminster conducts an annual system water audit using AWWA M36 methodology and auditing software. The most recent audit was completed in 2011. The City has an active system leak detection and repair program. In 2011 loss was determined to be 6.52%, a low rate. Maintaining this low level and making small improvements are the fundamental goals for the City’s program. The City is working to improve pressure management within the system to prevent leaks and maintains an active meter testing and replacement program.

(VI) Information and public education – Current program includes: The City implements a variety of water and conservation education and information programs including: Water Awareness presentations at schools, Water Awareness Week, Xeriscape seminars, utility website, participation in Colorado Water Wise, bill stuffers and other informational brochures. The City will develop landscape water budgets for as many customers as possible, but focused on dedicated irrigation accounts to start. The water budget will provide a reasonable estimate of expected water use at a site based on the irrigated area and landscape. Comparisons on actual consumption versus water budget estimate will be provided to customers. Those that dramatically exceed their water budget will be targeted for efficiency intervention. The City will use AMI and GIS technology to provide customers with actionable information about water use and information on where efficiency improvements can be made. The City hopes to target this program at customers whose water use dramatically exceeds empirically derived expectations.

(VII) Water rate structure – All customers regardless of type or size are metered and must pay for water based on the volume used. The City utilizes an inclining block rate water billing structure that encourages conservation by charging a higher rate the more water that is consumed. The City maintains a rigorous meter testing and calibration regime.

(VIII) Technical assistance – Using the City’s steadily expanding advanced metering infrastructure (AMI) customers with unanticipated water use (typically during the early morning hours) will be sent a simple leak check alert notification via email or the US Mail. The leak check alert will notify the customer of a possible leak and recommend courses of action to further investigate and remedy the situation.

(IX) Regulatory measures – Current program includes: Separate infrastructure and water resources fees are included within the total water tap fee providing incentive to reduce tap size and water requirements by installing water efficient fixtures and processes. The City requires an approved landscape plan, soil amendments, and an automatic irrigation system. A landscape architect reviews landscape plans. An Official Development Plan Inspector inspects amended soil and reviews irrigation system audits.

(X) Incentives – The City has offered various rebates for water efficient toilets, clothes washers, and other fixtures and appliances. The City’s rebate program is strategic and focuses on new and emerging product areas.

2. Role of conservation in Westminster supply planning.

The development of a Water Conservation Plan is a part of the City's overall Comprehensive Water Supply Plan (CWSP). The CWSP provides a strategy for meeting the current and future water needs of the city in a truly integrated and interactive process. The CWSP uses updated projections of buildout water demand based on the City's Comprehensive Land Use Plan (CLUP) and compares this with an updated planned buildout yield of the City's water supply system to define a buildout water supply/demand gap. A key goal of this planning effort is to eliminate any identified supply gap in an appropriate time frame for buildout of the City.

3. Plan implementation, monitoring, review, and revision.

Stuart Feinglas, Water Resources Analyst for the City, also wears the hat of water conservation coordinator and is chiefly responsible for implementation of this plan. Westminster has developed a careful plan implementation program along with monitoring mechanisms and scheduled review and revisions. Westminster monitors water demand monthly and assesses changes in demand on an annual basis. This plan will be updated every seven years.

4. Future review of plan within seven years.

The City intends to review and update the water conservation every seven years. The next review is scheduled to occur in 2019.

5. Estimated savings from previous conservation efforts and current plan.

Over the ten year period from 2000 – 2010, the population in the City increased by 5.1%. Over that same time treated water deliveries were reduced by 11.4% resulting in a 17.8% reduction in per capita potable water produced. The results from the 2011 Residential Demand Study (discussed below) confirm that these changes in water use are largely (if not entirely) due to both active and passive water conservation efforts.

7. Public comment period. The Westminster conservation plan approval process included the required 60-day comment period.

Notice of Public Comment Period

The following legal notice was published in the *Westminster Window* newspaper on Dec. 13, 2012:

**LEGAL NOTICE OF PUBLIC COMMENT
City of Westminster**

A sixty (60) day Public Comment Period will open for a proposed City of Westminster Water Conservation Plan on Friday, Dec 14, 2012 and run through Monday, Feb 11, 2013. The City of Westminster has developed the proposed water conservation plan to be submitted to the Colorado Water Conservation Board for State approval. The plan contains historic and current information on the City's water use and water systems as well as goals for identified future water conservation programs. The plan is available and comments may be submitted through the City of Westminster website: www.cityofwestminster.us

All comments must be received by Monday, February 11, 2013.

Published in the
Westminster Window
December 13, 2012
00028248

The public comment period ran for 60 days from Dec. 14, 2012 – February 11, 2013.

Additional proof of publication was provided by the Westminster Window and is shown below:

**WESTMINSTER WINDOW
PROOF OF PUBLICATION**

State of Colorado }
County of Adams }SS

I, Mikkel Kelly, do solemnly swear that I am the Publisher of the WESTMINSTER WINDOW; that the same is a weekly newspaper published in the County of Adams, State of Colorado, and has a general circulation therein; that said newspaper has been published continuously and uninterrupted in said County of Adams for a period of more than fifty-two consecutive weeks prior to the first publication of the annexed legal notice or advertisement; that said newspaper has been admitted to the United States mails as second-class matter under the provisions of the Act of March 30, 1923, entitled "Legal Notices and Advertisements," or any amendments thereof, and that said newspaper is a weekly newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado.

That the annexed legal notice or advertisement was published in the regular and entire issue of every number of said weekly newspaper for the period of 1 consecutive insertions; and that the first publication of said notice was in the issue of said newspaper dated December 13, A.D. 2012 and that the last publication of said notice was in the issue of said newspaper dated December 13, A.D. 2012.

In witness whereof I have hereunto set my hand this 13th day of December, A.D. 2012

Mikkel Kelly

Subscribed and sworn to before me, a notary public in the County of Adams, State of Colorado, this 13th day of December, A.D. 2012

Barbara Kay Stolte

Notary Public

My Commission expires October 12, 2016.

7380 Lowell Blvd. • Westminster, CO 80030

**BARBARA KAY STOLTE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 19874196221
MY COMMISSION EXPIRES 10/12/2016**

Public Comments Received

The following comments on the Water Conservation Plan were submitted to the City. The comments are reprinted below:

From G. Fonseca - Good idea, it's a shame to see the city parks being watered when it's raining or windy. By the way... That solar powered pump in Carol Butts park, is that for a solar powered irrigation system? If so that is a awesome system!

From G. Fonseca - Wait a sec.. Just thought of something: This could be a double edged sword... I signed up for the Home Energy Audit and got the insulation upgraded, We also put in High Efficiency Windows and even put in a Clean burning wood stove and took out all the old

fashioned light bulbs yet we done save anything on our gas or electric bill. We also replaced the old evaporative cooler with a brand new one a few years ago with the rebate from the water company. Let me guess, now I am going to be penalized for owning a evaporative cooler? Oh yea, and don't forget... I have a decent sized garden in my backyard. I don't know if I can afford any new "Conservation programs" at this time as the prior programs just ended up costing us money and we never saw a decrease in our utilities... This Conservation program really needs some extremely deep thought.

Adoption of Water Conservation Plan

The Westminster City Council officially adopted this water conservation plan on March 25, 2013. The resolution officially adopting the plan is presented below.

RESOLUTION

RESOLUTION NO. 13

INTRODUCED BY COUNCILLORS

SERIES OF 2013

Atchison – Winter

A RESOLUTION ADOPTING A WATER CONSERVATION PLAN FOR THE CITY OF WESTMINSTER, COLORADO

WHEREAS, the City of Westminster must design and implement a water supply and distribution system to meet expected buildout water demands; and

WHEREAS, City Council recognizes that the Comprehensive Water Supply Plan determined that water saved through conservation will be needed to meet buildout water supply needs; and

WHEREAS, the City of Westminster has developed a Water Conservation Plan designed to achieve water savings to meet buildout water demands; and

WHEREAS, the Conservation Plan was presented to the public through a 60-day public comment process; and

WHEREAS, all public comments submitted were included in the Plan; and

WHEREAS, pursuant to HB 04-1365, adopted on June 4, 2004, a State-approved plan will qualify the City for future funding opportunities offered by the Colorado Water Conservation Board, and the Colorado Water Resources and Power Development Authority for water and infrastructure projects; and


WHEREAS, it is City Council's intent to adopt a Water Conservation Plan designed to meet buildout water demands and submit it to the Colorado Water Conservation Board for approval.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF WESTMINSTER:

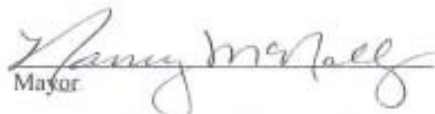
The City Council officially adopts the Water Conservation Plan attached hereto.

PASSED AND ADOPTED this 25th day of March, 2013.

ATTEST:



City Clerk



Mayor

APPROVED AS TO LEGAL FORM:



City Attorney's Office