



2020

Water Conservation

Plan For

**George E. Whalen
VA Medical Center
Salt Lake City, Utah**

28 April 2020

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1.0 INTRODUCTION

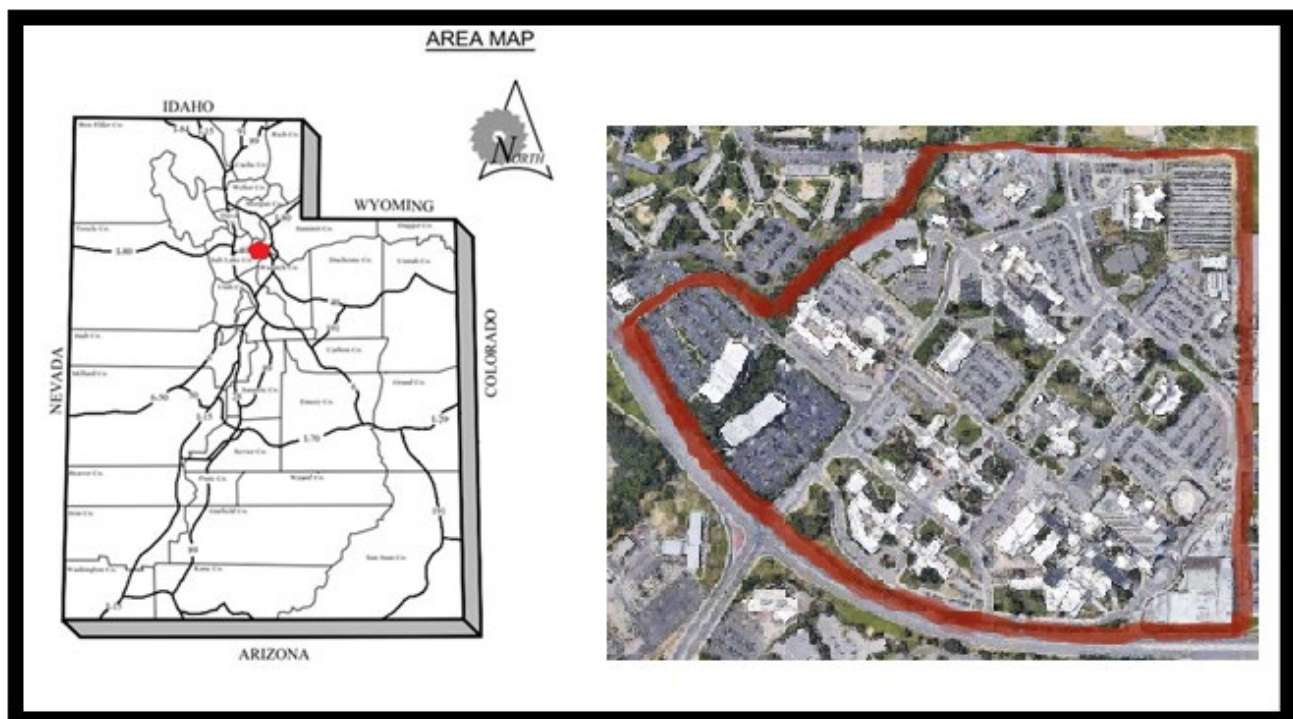
In response to the continual growth that the State of Utah has seen statewide, the VA Medical Center has become increasingly aware of the future cost and availability of a finite supply of water. Similar concerns have been demonstrated by the state legislature as shown by the Water Conservation Plan Act (House Bill 71) passed and revised in the 2004 legislative session (Section 73-10-32 Utah Code Annotated). This document constitutes the Water Conservation Plan for the George E. Whalen the VA Medical Center. It is intended to address the concerns of both the VA and the State of Utah.

2.0 BACKGROUND INFORMATION

The VA Medical Center is located in Salt Lake County. The George E. Wahlen Department of Veterans Affairs Medical Center is a mid-sized affiliated tertiary care facility with 121 authorized active beds. It is a teaching facility, providing a full range of patient care services, with state-of-the-art technology as well as education and research. Comprehensive health care is provided through primary care, tertiary care, and long-term care in areas of medicine, surgery, psychiatry, physical medicine and rehabilitation, neurology, oncology, dentistry, and geriatrics.

The VA Medical Center culinary water system provides water to approximately 5,000 Veterans, employees, contractors and visitors, in addition to several commercial facilities. The culinary water system supplies water for both indoor and outdoor use. A map of the area is shown below in Figure 2.1:

Figure 2.1: Area Map



The intent of this plan is to implement better management practices and conservation efforts which will aid in maintaining and conserving water resources. The VA Medical Center currently has a station policy for water and energy conservation and this plan includes that information.

The VA Medical Center understands the critical nature of maintaining and conserving water resources in order to meet the water needs of the future. As a result, the protection and maintenance of the VA’s water sources and distribution system is a top priority that is critical to providing the continuous water supply customers depend on.

There are currently no formal water conservation measures or education programs that have been implemented by the VA in the recent past. Additionally, there is no one currently fulfilling the role as the Water Conservation Coordinator for the facility. Conservation coordination will be accomplished by existing VA staff in coordination with the water system operator.

2.1 Culinary Water Connections

There are currently 24 connections on the system. This includes 23 institutional connections and 1 commercial connection.

All culinary water connections in the VA Medical Center are currently metered with radio read meters and are read monthly.

Although the VA does utilize a separate unmetered irrigation water system, approximately 35% of the residential and commercial connections use culinary water for outdoor watering.

3.0 EXISTING RESOURCES

3.1 Existing Water Right

The water rights that are owned by the VA Medical Center for culinary water use are listed below in Table 3.1

Table 3.1: VA Medical Center Water Right Summary

Loa Town Water Rights Summary					
W.R. #	Current Change Application	Uses	Status	Flow (cfs)	Quantity (ac-ft)
95-424	a17821	Municipal	Certificated	0.58	
		Domestic			67.5
		Irrigation - 1/4 Acre			112.5
95-4100	a40278	Municipal	Approved	0.322	233.15
Total				0.902	413.15

It should be noted that Table 3.1 represents a cursory review of the water rights on record with the Utah Division of Water Rights.

3.2 Existing Sources and Distribution Facilities

3.2.1 VA Medical Center Sources

The culinary water system is supplied by Salt Lake City Corp. The total source capacity for the VA Medical Center is virtually unlimited due to 36" Salt Lake City Corp mains.

3.2.2 Existing Distribution System

The distribution system is sourced by Salt Lake City Corp via 36" mains [though only one connection is active at a time. The system has booster pumps and backflows for the main hard water loop. There are typical 12" looped mains on campus.

3.2.3 Water Storage Tank

The VA Medical Center has only one pressure zone. The current pressures in the VA Medical Center water system range from the incoming line at approximately 60 psi which is boosted to approximately 90 psi. The pressures under peak instantaneous demands are unknown. The facility has one 10,000 gallon storage tank on the 6th floor of Building 1. This is mainly for pressure regulation.

The available fire flow in the system is 1,100 gpm.

4.0 CURRENT AND FUTURE WATER USE

4.1 Projected Growth Rates

It is reasonable to assume that the VA Medical Center will continue to grow. An annual growth rate of 3.00% will be used for the purposes of this Water Conservation Plan.

Table 4.1 shows the projected population for the VA Medical Center using an annual growth rate of 3.00%.

Table 4.1: Projected VA Medical Center Population

Year	Projected Population
2018	5,000
2021	5,400
2023	5,800
2025	6,150

4.2 Equivalent Residential Connections (ERC's)

One ERC is defined as the amount of culinary water required by an average residential connection. According to the Utah Division of Drinking Water, the average indoor residential demand is 400 gpd per residential connection, or approximately 12,000 gal/month. Because an ERC relates to the amount of water required for the average residential connection, use of this term allows commercial, institutional, or other large water users to be equated to a residential connection. ERC's are factored into calculations for impact fees, user rates, and other analyses as required for design purposes.

A review of the water usage from the commercial connections currently on the system was performed to determine the equivalent ERC value to assign to the commercial connections. The average commercial indoor water use is approximately 100,368 gallons per month per connection, or approximately eight and a half times the usage of a typical residential connection. Commercial connections will therefore be assigned an equivalent ERC multiplier value of eight and a half.

Table 4.2 shows the number of connections for each usage category along with its associated ERC value.

The number of culinary water ERC's expected at the end of the planning period can be calculated using the compound interest formula and inserting the projected growth rate, the existing number of culinary water ERC's, and the 20-year planning period for the culinary water system.

The projected number of ERC's for the 20-year planning period is calculated using the compound interest formula as follows: $F = \text{Connections} \times (1 + \text{rate})^{20 \text{ years}}$ where F is the projected number of connections and the rate of growth is 1.00% per year.

Total Residential ERC's: $F = 310 \text{ ERC's} \times (1 + 0.01)^{20} = 378 \text{ ERC's}$

The projected number of ERC's for each category is shown in Table 4.3.

Table 4.2: ERC Equivalents per Connection Category

Current ERC's			
Category	Connections	ERC/Connection	Total ERC's
Residential	310	1	310
Commercial	10	8.5	85
Total			395

Table 4.3: Projected ERC's by Category

20 Year Projected ERC's			
Category	Connections	ERC/Connection	Total ERC's
Residential	378	1	378
Commercial	12	8.5	102
Total			480

4.3 Present Water Use and Future Water Needs

As noted previously, all the culinary water connections on the VA Medical Center water system are metered with radio read meters.

The billing summary for January 2015 to January 2016 showed that a total of 43,635,120 gallons were metered during this period. The usage is summarized by connection type in Table 4.4 below.

Table 4.4: Annual Estimated Usage

Year	M-GSF	KBTU/SF	Water Gal/SF
2007	1,135	213	94
2010	1,135	224	74
2015	1,400	178	68
2017	1,400	171	68
2025	1,600	134	44

It should be noted that approximately 35% of the culinary connections for the VA Medical Center use culinary water for outdoor watering. The average daily use per residential connection is 273 gpd, and the average residential per capita use is 150 gpcd. The overall average daily use per ERC for the system (total usage divided by total ERC's) is 303 gpd.

As part of the Culinary Water Master Plan the water rights for the VA Medical Center water system were calculated based on the requirements stated in the Rules. The required water rights represent the average annual demand on the system using the State's recommended quantities for indoor use (400 gal/ERC/day) and outdoor use (1.17 ac-ft/irrigated acre). The calculated water right requirement is 219 ac-ft, or approximately 71,361,369 gal/year. The

VA Medical Center is using approximately 27,726,249 gallons less than the estimated average annual demand using the State's values for indoor and outdoor usage.

The projected number of ERC's at the end of the 20-year study period is 480. If the average daily water usage per ERC remains the same at 303 gal/ERC/day, the total system water usage in 20 years will be 53,085,600 gal/year. In comparison, the 20-year projected annual system water demand using the State's estimated values for indoor and outdoor water use would be 264 ac-ft, or 86,024,664 gal/year.

4.4 Water Budget

VA's culinary water system is supplied by two culinary wells. The Town's current culinary water rights total 413.15 ac-ft. As noted in Section 4.3, the total estimated annual water usage for the period of January 2015 to January 2016 was 134 ac-ft. It should be noted that this usage only represents the metered water in the culinary water system and does not include the unmetered culinary water that is used to irrigate the VA parks and cemetery. As calculated in the VA Medical Center Culinary Water System Master Plan 2016, the 20-year projected required water right for the VA Medical Center is 264 ac-ft. The VA Medical Center has sufficient municipal water rights to cover the projected system requirement.

5.0 WATER CONCERNS, CONSERVATION GOALS AND SOLUTIONS

5.1 Concerns Identified

A concern related to the culinary water system for the VA Medical Center is the water distribution system. There are many main lines throughout the system that are still 4" thin walled plastic pipe. A few of the Town's hydrants are fed by these small 4" lines. Being able to provide adequate fire protection is a concern to VA.

Another concern related to the culinary water system for the VA Medical Center is to be vigilant as the water system is expanded and increased demands are placed on it. This will ensure that the system maintains the capacity to provide for the system wide demands. An important item of system maintenance and management will be to maintain a current hydraulic model for the system as growth occurs to ensure that the system has the capacity to support the growth.

Although conservation is encouraged through a higher overage rate, no other conservation practices are currently in place.

The most effective measure for implementing this conservation plan will be public outreach and education. The population served may lack understanding of landscaping water requirements, efficient water use habits, and practices. Water users may not know how much water is required to maintain healthy landscaped areas and how to consistently use water efficiently outdoors. Most water use practices, whether for indoor use or irrigation are based on convenience rather than plant needs and water supply considerations.

5.2 Conservation Goals and Solutions

The VA's current average residential water usage is 150 gpcd, and the current combined (residential and commercial) average usage is 212 gpcd. The 2010 statewide average per capita culinary water usage was approximately 167 gpcd. It is noted that the commercial usage in Loa is disproportionately higher per connection than the residential usage and represents nearly 30% of the total system usage. It is also noted that 35% of VA's culinary water connections use culinary water for outdoor irrigation.

The VA recognizes the importance of conserving its limited water resources and acknowledges that the growth that may be experienced in the near future will place a higher demand on the water that is currently available. The VA Medical Center also recognizes that the State of Utah Division of Water Resources has established a goal to reduce per capita water usage in the state by 25% between the year 2000 and 2025. The VA is currently promoting water conservation within the system. As noted previously, the average residential water usage in the VA Medical Center is 150 gpcd. The Utah Division of Water Resources goal for the statewide residential usage is 125 gpcd, which represents the targeted 25% reduction. As such, the VA is committed to maintaining an average water usage of 150 gpcd or less as the VA continues to grow.

In order to maintain this goal, the VA Medical Center will implement the following measures:

1. Monitor use patterns to detect leaks. The VA Medical Center will continue efforts in monitoring water meters on a regular basis. This will improve the chances of finding leaks as they occur.
2. Begin a public education program. The VA Medical Center will send an inexpensive periodic public education flyer to the population served. It is believed that if people are continuously exposed to water conservation messages, they will improve their water conservation habits. The flyer will provide recommendations for using water responsibly and will discourage practices that result in wasted water.
3. Maintain a financially stable water system with conservation in mind. The VA Medical Center is interested in considering a tiered rate structure for the residential water usage on the system. The VA will need to investigate this approach more thoroughly prior to implementing any changes but has set the goal to discuss this option in VA Council within the next year.
4. Establish emergency water conservation contingency plans. The water conservation contingency plan for implementation due to severe drought or other system supply shortages is outlined in section 6.0 below
5. Encourage the use of high efficiency fixtures and watering. The VA Medical Center will encourage the installation of water efficient fixtures in homes and low water use landscaping in yards for both new construction and retrofit of existing structures.

The VA Medical Center realizes that effective goals must be measurable. While the effectiveness of the measures listed above would be difficult to measure on an individual basis, the VA Medical Center recognizes that the combined effectiveness of the measures can be assessed by comparing overall system usage data, and per capita usage data on an annual basis. The VA Medical Center will therefore review the usage data on an annual

basis to determine if progress is being made toward the water conservation goal previously discussed.

5.3 Education Program Information

The following information on efficient outdoor and indoor water use will be disseminated periodically as a one-page conservation mailing (also included in Appendix A).

Efficient Outdoor Water Use:

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
- Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.
- Keep your lawn well-trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Efficient Indoor Water Use:

- Approximately two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom water use. Following are suggestions for this specific area:
- Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
- If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.
- Install water efficient fixtures whenever possible for retrofits and during new construction.

6.0 CULINARY WATER CONSERVATION CONTINGENCY PLAN

The following water conservation contingency plan is adopted as part of this plan:

Level 1 – Normal Years – In this condition there is currently plenty of culinary water available for normal purposes.

- Encourage voluntary public water conservation measures (i.e. only watering during the cooler parts of the day).
- Mail information on conservation measures, which can be used outside as well as inside.

Level 2 - 75% of Normal Required Supply – In this condition, it is difficult to keep the water tanks full during the daylight hours if people are using culinary water for outdoor purposes.

- Educate the public about the water supply shortage and request cooperation using local public service radio announcements and local newspapers and posted public flyers.
- Enact emergency rate increase to double all overage tiers.
- Enact mandatory public conservation measures.
- Enforce outside watering restrictions, including watering times and quantities.

Level 3 - 50% or Less of Normal Required Supply – In this condition, it is difficult to maintain tank levels during the full 24-hour day.

- Warn the public about water supply shortage and request continued cooperation using local newspapers advertisements and posted public flyers.
- Enact emergency rate increase to quadruple all overage tiers.
- Strictly enforce all conservation policies with stiff fines for non-compliance.
- Physically restrict water supplies to (in order of priority):
 1. All outside irrigation systems.
 2. Parks and other non-essential support facilities.
 3. Commercial users, restricting the largest, non-animal life support users first.
 4. Residential areas
 5. Commercial animal life support users.
 6. Any other non-life support areas, ensuring water supplies to hospitals, hospices, and all other health care facilities, and controlled designated area water facilities.

7.0 IMPLEMENTING AND UPDATING THE WATER CONSERVATION PLAN

This Water Conservation Plan shall be adopted by the VA Medical Center. The VA Medical Center will have responsibility to coordinate the water conservation program goals and coordinate the education program. All VA staff, and members of the population served have the duty and responsibility to report general waste of water, and to conserve water wherever possible.

This Water Conservation Plan will be revised and updated as required to meet changing conditions and needs.

APPENDIX A:

WATER CONSERVATION MESSAGE

THE VA MEDICAL CENTER WATER CONSERVATION MESSAGE

ENERGY NOTICE FOR POSTING [from policy 138-05]

Energy Conservation Program

Quick simple layout of Executive Order 13834, EPAAct 2005 and VA MOU for Energy Management.

- Reduce energy usage 25% (btu/sqft) from 2015 baseline by 2025
- Reduce water usage 36% from 2007 baseline by 2025
- Use renewable energy - Maintain 7.5% of the total electricity consumption
- Sustainability - 15% of VA Capital Assets Building Inventory to meet the sustainability guiding principles
 - Integrated Design Principles
 - Optimize Energy Efficiency and Use of Renewable Energy
 - Protection and Conservation of Water
 - Enhancement of indoor environmental quality
 - Reduction of Environmental Impacts of Material

Be a part of the Movement

- Practice Good Conservation at Home & at Work
- Review the Station Policy 138.05 for the Issues
- Participate and Potentially Receive Awards for Suggestions
- It's Good for the Environment, Economy, National Security, & the Future