

# **Crosby Lodge**

**Water Conservation Plan**  
October 19, 2018

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STATE ENGINEER'S OFFICE

**Prepared for:**

**Crosby Lodge**  
30605 Sutcliffe  
Reno, NV 89510  
(775) 476-0401

**Prepared by:**

**John K. Williams**  
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363 Fairview Drive  
Carson City, NV 89701-3503  
(775) 841-4222

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## **Introduction**

The water supply in Nevada is a precious commodity and plays an important role in determining Nevada's future. Nevada is the one of the driest states in the nation as well as one of the fastest growing ones. Nevada's future, both from an economic and a quality of life view, depends heavily upon the wise management of the water supply.

Groundwater, in general, provides about 40 percent of the total water supply used in Nevada. In some areas, groundwater provides the entire water supply. Groundwater usage may vary considerably from year-to-year as it is sometimes pumped to supplement surface water sources.

Water use in Nevada can be classified as:

- Domestic (household, both indoor and outdoor) – Met by public supply or private supply (e.g. wells).
- Commercial (businesses) – Met by public supply or private supply (e.g. non-community systems).
- Industrial (manufacturing/construction) – Met by public supply or private supply (e.g. non-community systems).
- Thermoelectric (electric/fossil fuel/geothermal power generation) – Met by public supply in a minor fraction.
- Mining (mining processes) – Supply source varies widely from operation to operation and is dependent upon the mineral being recovered and the recovery process employed.
- Irrigation (land use) – Met by self-supplied or supplied by irrigation companies or districts.
- Livestock (farm needs) – Supply source varies.

While all classifications of water usages have shown an increase over the years, it has historically been irrigation water use which has accounted for the majority of the water use in Nevada.

It has been estimated that the domestic water use accounts for less than 15 percent of the water used in Nevada, but this is expected to rise to nearly 25 percent as the population increases (based upon existing water use patterns and conservation measures). It is expected that Nevada's population will become increasingly concentrated in its primary urban areas of Las Vegas (Clark County), Reno/Sparks (Washoe County) and Carson City, with varied spillover effects on neighboring counties.

It is vitally important that all residents understand the fundamental science of water, how it is managed in the state, and the issues affecting its management. Water education must become a priority and must include education of children as they are our future.

Because Nevada does not have a comprehensive state-wide conservation program, it is reliant upon the individual water suppliers for developing their own conservation programs. In 1991, Nevada enacted a law requiring adoption of conservation plans by water suppliers. Minimum standards for plumbing fixtures were adopted in 1991 (Assembly Bill 359) by Nevada and in 1992 minimum flow standards for plumbing fixtures were adopted by the federal government (National Energy and Policy Conservation Act).

Conservation is an essential part of ensuring adequate water supply as it is no longer feasible to develop new sources. It has proven to be a cost-effective way to reduce demands and/or to extend a given water supply. It can easily be pursued by all water users regardless of the water system type. Key to evaluating the program's effectiveness is the water use measurement (through meters and other measurement devices). Various conservation measures can be put into place and the achievement of the goals set with these measures is vital to combating the expected increase in water usage.

## **Statutory Requirements**

This water conservation plan was prepared for the Crosby Lodge in accordance with Nevada Revised Statute (NRS) 540. As outlined in NRS 540.141, the provisions of this plan must include:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan
- e. Schedule
- f. Evaluation Measurements
- g. Conservation Estimates

In addition to the provisions of the water conservation plan, listed above, NRS 540.141 also requires a rate analysis to be performed and included with the submittal.

This plan is being submitted to the Nevada Department of Conservation and Natural Resources (DCNR), Division of Water Resources (DWR) for review and approval prior to its adoption by the Crosby Lodge, as required by NRS 540.131.

This plan is available for inspection during normal business hours at the Crosby Lodge, 30605 Sutcliffe, Sutcliffe, NV, as well as on the Crosby Lodge website at [www.crosbylodge.com](http://www.crosbylodge.com).

This plan will conform to all public notice requirements as found in NRS 540.

This is the original Water Conservation Plan for the Crosby Lodge.

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, October 19, 2022.

## **System Description**

The Crosby Lodge is a privately-owned combined transient non-community (unmetered residential and transient) water system and has a current water operation permit, NV0000717. Water is provided to patrons of the Crosby Lodge. Facilities at the Crosby Lodge includes a general store, gift shop, gas station, bar, motel (five rooms), and an on-site residential house. The Crosby Lodge is not a water company, in the business of selling water to customers, and as such does not have any water customers. The Crosby Lodge is located at 30605 Sutcliffe, Sutcliffe, which is located in Washoe County.

The estimated population served in 2018 was more than 100 individuals. The Crosby Lodge estimates that it will not experience any changes in population served, on a yearly basis, through 2019. The State of Nevada, through its State Water Plan, estimates the population growth for Washoe County through 2019 to be 1.32% annually.

The water supply is from groundwater, not under the direct influence of surface water (e.g. protected wells) and no surface water or groundwater under the influence of surface water sources, located within the Pyramid Lake Valley Basin (#081) of the Truckee River Basin Hydrographic Region (#6). There is a total of one well (110 feet deep, producing about 35 g.p.m.) supplying the system and a total of one hydro-pneumatic storage tank (500 gallons).

The Crosby Lodge has been granted water rights in the total amount of 8.23 AF (2.68 MG) per year. Water rights are granted by Application #18329 which has been certified (Certificate #5427) for a maximum diversion rate of 0.278 c.f.s.

Water is pumped from the well into the hydro-pneumatic storage tank. Water is then distributed from the tank to the Crosby Lodge through water mains ranging in size from ¾-inch up to 1-1/2-inch (galvanized steel). Water is currently not treated.

The Crosby Lodge requires, at a minimum, a Grade 1 water operator (handled in-house). The water operator is required to perform monthly and yearly monitoring and testing of water quality. The Crosby Lodge does not have any outstanding water quality issues.

The last sanitary survey performed by the Washoe County Health District Environmental Health Services was completed on May 14, 2018 and showed one minor deficiency with the system that has been corrected as of this date.

The Crosby Lodge is a self-supplied water system and does have water customers. Because of this, water usage is not metered and a tiered rate usage fee is not applicable.

Wastewater collected from the service area is handled by several on-site septic systems.

## **Plan Provisions**

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, October 19, 2022.

The Crosby Lodge may, if economically feasible, appoint a staff member to oversee the conservation efforts and this staff member will be responsible for implementation of conservation programs, monitoring of water use, and will review/revise the conservation plan when needed.

In an effort to promote voluntary conservation and aid in Nevada's future, the Crosby Lodge will enact the voluntary conservation measures found in the *Conservation Measures* section. When more stringent measures are needed, the Crosby Lodge will enact the measures found in the *Contingency Measures* section. All measures can be found in Appendix A.

As required by NRS 540.141, the water conservation plan must include the following provisions:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan
- e. Schedule
- f. Evaluation Measures
- g. Conservation Estimates

Each provision is discussed below.

### **Public Education**

Public education is a key for cooperation with conservation efforts, so funding for public education is crucial. The Crosby Lodge recognizes this and will establish a conservation education program and corresponding budget, if economically feasible.

It is the goal of the Crosby Lodge to increase public awareness to conserve water and encourage conscious water use decisions not only at the Crosby Lodge but in all aspects of life (via reduction in lawn sizes, the use of climate-appropriate plants, and the use of drip irrigation).

The conservation education program includes education materials such as pamphlets, flyers, and posters. Educational pamphlets can be displayed at the Crosby Lodge and can be made available for public inspection. These should demonstrate how water conservation practices will provide

all water users with long-term savings. Education materials should also encourage reduction of lawn sizes, use of drip irrigation, use of climate-appropriate plants, conservation tips and techniques, and consultations with the local nursery (see Appendix B).

## **Conservation Measures**

In an effort to promote conservation and voluntarily conserve water, the Crosby Lodge is adopting water-use regulations to promote water conservation during non-emergency situations. These regulations include the following non-essential water use:

- 1) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
- 2) Use of water for washing aircraft, cars, buses, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose.
- 3) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 4) Use of water for outside plants, lawn, landscape, and turf areas on odd numbered days. Watering of plants, lawn, landscape, and turf areas are prohibited on Sundays and between the hours of 5 p.m. to 10 p.m.
- 5) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 6) Service of water to any bar patron except upon the request of the patron.

In the event these conservation measures are insufficient to control the water shortage, the Crosby Lodge may wish to implement the mandatory measures discussed in the ***Contingency Plan*** section below.

The Crosby Lodge also promotes the development of water conserving principles into the planning, development, and management of any new landscape projects. Visitors are encouraged to consult with the local nursery or perform an internet search on the availability of water conservation plants and how to renovate existing landscapes. Visitors are also encouraged to evaluate irrigation management systems using metering, timing, and water sensing devices.

At present, it is not viable for the Crosby Lodge to offer any incentives for water conservation. Instead, the Crosby Lodge has taken the initiative to repair or replace defective plumbing apparatuses with low-flow conservation-oriented ones. By its own initiative it is setting a good example and creating a good-will incentive.

## **Water Management**

The Crosby Lodge monitors water levels at the well and tank sites. The water levels have remained consistent through the years, despite changes in climate and system demands. The system is designed such that water levels in the hydro pneumatic tank will be adjusted



automatically when the tank's pressure reaches a particular set-point (turn on at 40 p.s.i. and shut off at 60 p.s.i.).

Working relationships with other local water purveyors are maintained to ensure adequate water supplies are available. Water can be diverted from Sutcliffe Mobile Park for use at the Crosby Lodge, if needed.

The Crosby Lodge is unable to monitor unaccounted for water losses because it does not have customers. There is no comparison to be made between production and customer usage.

The Crosby Lodge does not have a formal leak detection program. All leaks are repaired upon discovery.

The Crosby Lodge does not experience changes in pressure within the system due to changes in terrain (the terrain is flat).

The Crosby Lodge does not have a formal well head protection program. The well is located within a secured shed.

The Crosby Lodge does not have customers and therefore a customer metering program is not needed or required.

A capital improvement plan is not in place. Improvements or replacements are dealt with on a case-by-case basis.

The Crosby Lodge does not have a system for reusing of effluent. Effluent is treated on-site by septic systems.

Washoe County has adopted a Plumbing Water Conservation Ordinance which applies to structures which are renovated as well as all new construction. This ordinance is furnished to local suppliers and contractors. The Washoe County Building Department checks new construction, renovation, and expansions within Washoe County to ensure compliance with this ordinance.

### **Contingency Plan**

The objective of the contingency plan would be to manage the available resources to ensure continued supply of potable water during periods of drought or extended drought.

It is envisioned that voluntary conservation will be sufficient to ensure an adequate supply of water and reduce water usage. However, if a sustained drought (lack of precipitation) is encountered, it may be necessary to implement mandatory restrictions in order to ensure an adequate supply of water to meet essential needs.

The Crosby Lodge plans for drought response would be three (3) stages of drought response: (1) warning stage, (2) alert stage, and (3) emergency stage. The stages are describes as follows:

In Stage 1, the warning stage, the Crosby Lodge would increase monitoring of its water supplies on a more frequent basis and would begin creating public awareness of the water supply situation and the need to conserve. Conservation measures at this stage would be voluntary.

In Stage 2, the alert stage, the Crosby Lodge would call for wide-based community support to achieve conservation and implement water use restrictions. Conservation measures at this stage would be mandatory and violations would incur fines.

In Stage 3, the emergency stage, the Crosby Lodge would declare a drought and water shortage emergency and implement more stringent water use restrictions. Media relations would be activated in order to inform the water users and monetary assistance may need to be secured in an effort to mitigate the effects of the drought (e.g. federal funding assistance). Conservation measures at this stage would be mandatory.

When a drought is declared over, voluntary conservation measures (see *Conservation Measures* section) will be reinstated and water supplies would continue to be monitored.

## **Schedule**

All of the provisions listed will be place after the approval of this plan.

## **Evaluation Measurements**

Because the Crosby Lodge does not have water customers, it is impossible to determine the effectiveness of each plan element on an individual customer basis. However, the Crosby Lodge can evaluate the effectiveness of each plan element from the perspective of the whole system. In that regard, as a plan element is activated (e.g. mailing literature or declaring a drought stage), production figures will be compared to same-month historical data to estimate the plan element's effectiveness. This information will be utilized as a basis for any future water conservation plan revision and plan elements.

If there is a decrease in production as a result of a particular measure/incentive, that measure/incentive can be expanded or improved upon, if possible. If it is discovered that a particular measure/incentive is ineffective, it will be discontinued and a new one can then be implemented to take its place.

## **Conservation Estimates**

During the Stage 1 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 2.5 to 5% reduction in water use.

During the Stage 2 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 5 to 7.5% reduction in water use.

During the Stage 3 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 7.5 to 15% reduction in water use.

The estimated water savings for various end-user efforts can be found in Appendix C.

## **Rate Analysis**

The Crosby Lodge is not a water company, in the business of selling water to customers, and as such does not have paying customers. A rate analysis is not applicable in this case.

## **Appendices**

**APPENDIX A**  
**CONSERVATION MEASURES**

## **Stage 1 – Warning Stage**

1. The Crosby Lodge would increase monitoring of water supplies.
2. The Crosby Lodge would begin creating public awareness of the water supply situation and the need to conserve.
3. The Crosby Lodge would inform water users of voluntary conservation measures (non-essential water uses, listed below).

Non-essential water uses are:

- 1) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
- 2) Use of water for washing aircraft, cars, buses, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose.
- 3) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 4) Use of water for outside plants, lawn, landscape, and turf areas on odd numbered days. Watering of plants, lawn, landscape, and turf areas are prohibited on Sundays and between the hours of 5 p.m. to 10 p.m.
- 5) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 6) Service of water to any bar patron except upon the request of the patron.

## **Stage 2 – Alert Stage**

1. The Crosby Lodge would set conservation goals and call for wide-based community support to achieve those goals.
2. The Crosby Lodge would inform water users of mandatory conservation measures (non-essential water uses, listed in Stage 1 are now mandatory).

## **Stage 3 – Emergency Stage**

1. The Crosby Lodge would declare a drought and water shortage emergency and use media relations to supplement efforts to keep water users informed.
2. The Crosby Lodge would inform water users of prohibited water uses (non-essential water uses, listed in Stage 1 are now prohibited).
3. The Crosby Lodge would seek monetary assistance in an effort to mitigate the drought (e.g. federal funding).

**APPENDIX B**  
**PUBLIC EDUCATION MATERIALS**

There are several publications available for use at U.S. EPA website for general distribution (currently located at <http://epa.gov/watersense/pubs/index.htm#ideas>). These publications include such topics as:

- Simple Steps to Save Water,
- Ideas for Residences,
- Ideas for Commercial,
- Using Water Wisely In the Home,
- Outdoor Water Use in the US,
- Toilet Flush Facts,
- Watering Can Be Efficient,
- Irrigation Timers for the Homeowner, and
- Water Efficient Landscaping,

These publications can be utilized until the Crosby Lodge develops system-specific publications.

There are also numerous website that provide tips for conserving water. One of these is: <http://www.wateruseitwisely.com/100-ways-to-conserve/index.php>. Water users can be directed to this website for tips to conserve water.



Specific tips for landscaping that can be provided to the water users are listed below. During drought conditions outdoor watering restrictions may be imposed, and therefore some of the following tips will not apply.

## **Tips for Landscaping**

### Watering:

- Detect and repair all leaks in irrigation systems.
- Use properly treated wastewater for irrigation where available.
- Water the lawn or garden during the coolest part of the day (early morning is best). Do not water on windy days.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants which require smaller amounts of water more often. Check with the local nursery for advice on the amount and frequency of watering needed in your area.
- Set sprinklers to water the lawn or garden only—not the street or sidewalk.
- Use soaker hoses and trickle irrigation systems.
- Install moisture sensors on sprinkler systems.

### Planting:

- Have your soil tested for nutrient content and add organic matter if needed. Good soil absorbs and retains water better.
- Minimize turf areas and use native grasses.
- Use native plants in your landscape—they require less care and water than ornamental varieties.
- Add compost or peat moss to soil to improve its water-holding capacity.

### Maintaining:

- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise your lawn mower cutting height to cut grass no shorter than three inches—longer grass blades encourages deeper roots, help shade soil, cut down on evaporation, and inhibit weed growth.
- Minimize or eliminate fertilizing which requires additional watering, and promotes new growth which will also need additional watering.

### Ornamental Water Features:

- Do not install or use ornamental water features unless they recycle the water. Use signs to indicate that water is recycled. Do not operate during a drought.

**APPENDIX C**  
**END-USER WATER SAVINGS**

Here are just a few of the end-user water savings that could be realized:

### **Leaky Faucets**

**Issue:** Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

**Fix:** If you're unsure whether you have a leak, read your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak.

### **Leaky Toilets**

**Issue:** A leaky toilet can waste about 200 gallons of water every day.

**Fix:** To tell if your toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl without flushing, you have a leak.

### **Showering**

**Issue:** A full bath tub requires about 70 gallons of water, while taking a five-minute shower uses 10 to 25 gallons.

**Fix:** If you take a bath, stopper the drain immediately and adjust the temperature as you fill the tub.

### **Brushing Teeth Wisely**

**Issue:** The average bathroom faucet flows at a rate of two gallons per minute.

**Fix:** Turning off the tap while brushing your teeth in the morning and at bedtime can save up to 8 gallons of water per day, which equals 240 gallons a month!

### **Watering Wisely**

**Issue:** The typical single-family suburban household uses at least 30 percent of their water outdoors for irrigation. Some experts estimate that more than 50 percent of landscape water use goes to waste due to evaporation or runoff caused by overwatering.

**Fix:** Drip irrigation systems use between 20 to 50 percent less water than conventional in-ground sprinkler systems. They are also much more efficient than conventional sprinklers because no water is lost to wind, runoff, and evaporation. If the in-ground system uses 100,000 gallons annually, you could potentially save more than 200,000 gallons over the lifetime of a drip irrigation system should you choose to install it. That adds up to savings of at least \$1,150!

### **Washing Wisely**

**Issue:** The average washing machine uses about 41 gallons of water per load.

**Fix:** High-efficiency washing machines use less than 28 gallons of water per load. To achieve even greater savings, wash only full loads of laundry or use the appropriate load size selection on the washing machine.

### **Flushing Wisely**

**Issue:** If your toilet is from 1992 or earlier, you probably have an inefficient model that uses at least 3.5 gallons per flush.

**Fix:** New and improved high-efficiency models use less than 1.3 gallons per flush—that's at least 60 percent less than their older, less efficient counterparts. Compared to a 3.5 gallons per flush toilet, a WaterSense labeled toilet could save a family of four more than \$90 annually on their water bill, and \$2,000 over the lifetime of the toilet.

### **Dish Washing Wisely**

**Issue:** Running dishwasher partial full and pre-rinsing dishes before loading the dishwasher.

**Fix:** Run the dishwasher only when it's full and use the rinse-and-hold dishwasher feature until you're ready to run a full load. Pre-rinsing dishes does not improve cleaning and skipping this step can save you as much as 20 gallons per load, or 6,500 gallons per year. New water-saver dishwashers use only about 4 gallons per wash.

Estimated water savings from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-1):

Type	Estimated Usage (gpcpd)	Conservation Usage (gpcpd)	Savings (gpcpd)	Savings (%)
Toilet	18.3	10.4	7.9	43 %
Clothes Washers	14.9	10.5	4.4	30 %
Showers	12.2	10.0	2.2	18 %
Faucets	10.3	10.0	.3	3 %
Leaks	6.6	1.5	5.1	77 %

Benchmarks from selected conservation measures from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-4):

Category	Measure	Reduction of End Use (% or gpcpd)
Universal metering	Connection metering	20 %
	Sub metering	20 – 40 %
Costing and pricing	10% increase in residential prices	2 – 4 %
	10% increase in non-residential prices	5 – 8 %
	Increasing-block rate	5 %
Information and education	Public education and behavior changes	2 – 5 %
End-use audits	General industrial water conservation	10 – 20 %
	Outdoor residential use	5 – 10 %
	Large landscape water audit	10 – 20 %
Retrofits	Toilet tank displacement devices (for toilets using > 3.5 gallons/flush)	2 – 3 gpcpd
	Toilet retrofit	8 – 14 gpcpd
	Showerhead retrofit (aerator)	4 gpcpd
	Faucet retrofit (aerator)	5 gpcpd
	Fixture leak repair	0.5 gpcpd
	Governmental building (indoors)	5 %
Pressure management	Pressure reduction, system	3 – 6 % of total production
	Pressure-reducing valves, residential	5 – 30%
Outdoor water use efficiency	Low water-use plants	7.5 %
	Lawn watering guides	15 – 20 %
	Large landscape management	10 – 25%
	Irrigation timer	10 gpcpd
Replacements and promotions	Toilet replacement, residential	16 – 20 gpcpd
	Toilet replacement, commercial	16 – 20 gpcpd
	Showerhead replacement	8.1 gpcpd
	Faucet replacement	6.4 gpcpd
	Clothes washers, residential	4 – 12 gpcpd
	Dishwashers, residential	1 gpcpd
Water-use regulation	Hot water demand units	10 gpcpd
	Landscape requirements for new developments	10 – 20 % in sector
	Greywater reuse, residential	20 – 30 gpcpd