

# Water Efficiency Grant Report Pagosa Water and Sanitation District





## Introduction

This Report summarizes the implementation of the Water Efficiency Grant provided to the Pagosa Area Water & Sanitation District (hereafter the "District" or PAWSD) by the Office of Water Conservation and Drought Planning (hereafter the "Office") of the Colorado Water Conservation Board (CWCB) in 2010. The Grant was provided to the District for the specific purpose of supporting local efforts to implement the PAWSD Water Conservation Plan, created in 2008 and reviewed and approved by the Office in early 2009. For this particular project, the Grant funding was used to support the following local efforts:

- Focused Community Outreach
- Selected Commercial and Institutional Facility Audits
- Replacement of Inefficient Fixtures in Audited Facilities
- Data Collection and Reporting

Each of these specific activities is discussed in the report; as is a presentation of key findings and recommendations.

Please note that it is the intention of both the District and the CWCB to support the implementation of meaningful water conservation in the PAWSD service area. To this point, the project was focused on creating sustainable water demand reductions in those customer facilities targeted by this effort. Audits, fixture replacements and data collection tasks were therefore executed to achieve and verify permanent water savings in commercial and institutional facilities to the extent practical.

Given that the conditions for some portion of the PAWSD customer base changed between the time that the grant application was submitted to the Office for consideration and the time that grant funding was awarded to the District, some modifications to the scope of work were warranted to complete implementation efforts. All modifications to the scope that occurred as a result of changing conditions in the PAWSD are identified and discussed in the Report. Noteworthy is that none of the changes in the conditions encountered during execution of the grant funded project compromised the ability of PAWSD to stimulate improved water use efficiency with its targeted customer basis.

### Acknowledgements

PAWSD and the project team wish to acknowledge the contributions of the owners and staff of all the businesses and institutions that allowed the audit and fixture replacement teams to visit, collect data and install new fixtures in each of the targeted buildings. Without the support and cooperation of these individuals, none of the permanent water savings associated with this project could be realized. Those organizations and institutions that supported this project include the following:

- Town of Pagosa Chamber of Commerce, Library, and Clerk's Office
- Pagosa Lakes Property Owners Association (PLPOA) Recreation Center
- Lodging- Best Western Oak Ridge Lodge and Restaurant, First Inn of Pagosa, Pagosa Inn and Suites, Pinewood Inn and The Spa Motel
- Restaurants- Boss Hogg's, Higher Grounds, JJ's, Kip's, Ramon's and Tequila's

## **Specific Tasks Performed**

## **Community Outreach**

The community outreach efforts conducted as a portion of this project included only about 6% of the grant funds; however this task was vital in communicating with the customers and community serviced by PAWSD. The District utilized funding from the Grant supplemented by matching funds from PAWSD to do the following:

- Upgrade and expand the scope of the District's website;
- Obtain and distribute Project Planet information to local hotels; and
- Design, print and distribute "Catch the Wave" decals, stickers and stamps.

In the performance of the project, the following metrics were achieved.

Table 1 Summary of Com	nmunity Outreach Efforts	
Task	Metric	Number
Update and Expand Website	Number of Visits	293
Obtain and Distribute Project Planet Materials	Number of Establishments	8
Print and Distribute Catch a Wave Materials		
Stickers for Children	Number	200
Decals for Businesses	Number of Establishments	14

The PAWSD website was expanded to include the "Catch a Wave" website.¹ This website is used to promote local water conservation measures and programs, provide information regarding other District conservation programs (e.g., rebates), and generally provide information to interested individuals. Since the site was established in April 2010, it has been visited on a daily basis. The District tracks the number of hits, the length of the visits, and the origin of the connection as a means of identifying new content needs, linkages (see Appendix A), and the overall value of the website to the PAWSD water conservation efforts .

The District's Project Planet distribution efforts, which consists chiefly of printed materials that encourage responsible use of room linens, were incorporated into the operations of 8 local hotels, including 4 of those that received fixture replacements<sup>2</sup>. The 8 local hotels represent about 75% of the hotel lodging capacity in the PAWSD service area.

Another printed messaging campaign that was funded by or in association with this project included creating, producing, distributing and installing signage in every room in each facility that received replacement fixtures. These signs (examples of which are provided in Appendix B) were developed to

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<sup>&</sup>lt;sup>1</sup> http://www.catchthewaveandsave.com

<sup>&</sup>lt;sup>2</sup> The fifth hotel that received fixture replacements under this project already had Project Planet in place from previous PAWSD efforts.

educate and make guests and other facility users aware of the water-saving fixtures and their impact on reducing water use and creating energy savings, specific to each facility.

The District's award-winning "Catch the Wave" messaging program<sup>3</sup> is also publicized through the effective distribution of stickers and decals. The stickers are popular with school aged children who receive them at various local cultural events. The decals and stickers are also provided to those businesses and organizations that participate in the Smart Water Audits.

Finally, the District published three articles in the local newspaper (the Pagosa Sun) describing the Smart Water Audit program, extolling its benefits and describing its successes.

### **Audits and Fixture Replacements**

The intent of the project, as described in the Grant application, was to utilize audits <u>conducted prior</u> to the Grant to target the replacement of fixtures in those previously audited establishments, and to use audits <u>conducted during</u> performance of this Grant to target the replacement of fixtures in newly audited facilities. For this reason, the exact number of replacement fixtures (i.e., toilets, urinals, showerheads and faucet aerators) to be installed were only estimated in the grant application. It was only after the all of the audits were completed, and business and facility owners were consulted to receive their approval, were the final counts of replacement fixtures firmly established.

Table 2 summarizes the audits conducted prior to and during execution of this project.

Table 2 Summary of W	ater Audits Conducted by the District
Prior to the Grant	<ul> <li>Boss Hogg's</li> <li>First Inn of Pagosa</li> <li>Junction Restaurant</li> <li>JJ's</li> <li>San Juan Motel</li> </ul>
During Execution of the Grant	<ul> <li>Best Western Hotel and Restaurant</li> <li>Chamber of Commerce</li> <li>Higher Grounds</li> <li>Kip's</li> <li>Town Library</li> <li>Pagosa Inn and Suites</li> <li>Pinewood Inn</li> <li>Ramon's</li> <li>PLPOA Recreation Center</li> <li>The Spa</li> <li>Tequila's</li> </ul>

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<sup>&</sup>lt;sup>3</sup> The District received the Pagosa Chamber of Commerce 2011 Leadership in Green Business Award for its Catch the Wave and Smart Water Audit Programs.

As indicated in the Grant Scope of Work, the Smart Water Audits were used to identify opportunities for improving facility-based water use efficiency. The audit involved reviewing past and current water use data for each audited facility, and collecting site-specific data characterizing facility-specific water use. Data that was collected during the audits included:

- Number, use and flow rate from each sink faucet
- Number and flow rate from each showerhead
- Number and estimated flush volume for each toilet and urinal
- Number and serial number of all kitchen and laundry facility appliances that use water (e.g., washing machines, laundry extractors, ice machines, steam tables, dish washing machines, etc.)
- Swimming pool, hot tub and Jacuzzi use and water replacement rates
- Outdoor irrigation uses (e.g., irrigated area, sprinkler system timing)
- Other water uses

The data collected from each facility was compared and contrasted with monthly, seasonal and annual water rates to configure and calibrate a facility-specific water model which was used to estimate water use for each subject fixture that may be a candidate for replacement. In this way, an estimate of water savings and costs for each candidate fixture could be developed to support decision-making by the District in the allocation of Grant supported replacement fixtures.

Appendix C contains the results of the individual facility audits conducted as part of the Grant funding, including the location, the data collected, and the water model developed to evaluate site-specific water use and identify candidates for fixture replacement.

Based on the observed need, owner acceptance and interest, the availability fixtures, and the coordination of facility needs with local installation teams, replacement fixtures were installed in a total of 14 facilities – including hotels/motels, restaurants, and other institutions. A summary of the installed fixtures by facility is provided in Table 3.

The specific fixtures that were used to replace the inefficient old fixtures are as follows:

- Showerheads- A total of 254 Caroma 1.5 gallon per minute (gpm) stainless steel, vacuum assisted low-flow showerhead fixtures were installed.
- Faucet aerators- A total of 304 USA Landlords dual-threaded 0.5 gallon per minute (gpm) stainless steel, low-flow faucet aerator were installed in bathroom and kitchen hand-wash sinks.
   These faucet aerators were not deemed appropriate for other applications (e.g., pot and pan sinks, kitchen gallery sinks, etc.).
- Toilets- A total of 32 Caroma SyndeySmart dual-flush, EPA WaterSense approved 1.28/0.7 gallon
  per flush (gpf) toilets were installed. About one half of these toilets were handicapped
  (meaning that the base porcelain unit was 30-inches high) and one-half were regular toilets; all
  used the same dual-flush device. It is anticipated from experience that these toilets would
  average about 0.9 gpf accounting for the mixture of 0.7 and 1.28 flushes.
- Urinals- A total of 13 Caroma H2ZeroFlush, EPA WaterSense approved, waterless urinals were installed.

**Table 3 - Water Fixture Retrofits per Facility** 

		<u> </u>	quipment			<u>Da</u>	tes of Instal	lations in 20	<u>)10</u>
<u>Location</u>	Shower*	Faucet*	Toilets	Toilets	Urinals	Shower	Faucet	Toilets	Urinals
Motels			(handicap)	(regular)					
Best Western	78	80	2	2	1	30-Mar	30-Mar	12-Apr	12-Apr
First Inn	32	33	0	0	0	29-Mar	29-Mar		
Pagosa Inn and Suites	87	110	0	0	0	31-Mar	31-Mar		
Pinewood Inn	25	25	0	0	0	29-Mar	29-Mar		
The Spa	20	20	2	2	1	30-Mar	30-Mar	16-Mar	16-Mar
Other									
Boss Hogg's	0	5	3	2	3		30-Mar	28-Apr	28-Apr
Chamber of Commerce	0	3	2	1	0		30-Mar	23-Mar	
Higher Grounds	0	2	2	0	1		31-Mar	22-Apr	22-Apr
JJ's	0	1	2	2	2		30-Mar	23-Apr	23-Apr
Kip's	0	3	0	2	1		30-Mar	6-Apr	6-Apr
Town Library	0	3	0	0	1		30-Mar		13-Apr
Ramon's	0	4	2	2	1		30-Mar	8-Apr	8-Apr
PLPOA Rec Center	12	9	0	0	2	30-Mar	30-Mar		26-Apr
Tequila's	0	6	2	2	0		30-Mar	16-Apr	

<sup>\*</sup>Each facility received 2 to 3 replacement faucet aerators and showerheads for maintenance purposes.

### **Water Savings**

The installation of the high-efficiency fixtures in the 14 facilities listed in Table 3 have unquestionably reduced current water use demand for those uses impacted by the retrofitting. In other words, every new dual-flush toilet uses less water per flush than its predecessor. Similarly, all new showerheads allow less water to flow in a minute than the older, less efficient showerhead. Therefore, real savings are occurring assuming that the same water use behaviors are taking place.

Unfortunately, measuring the actual water use reduction is not as simple as might otherwise be expected, for at each facility the replacement fixtures represent only a fraction of current water use. In addition, there may be other water uses at each facility that were not reported or captured within the audit framework. In addition, water use behaviors may not be truly constant, therefore, a comparison of expected water saved (based on the facility-specific water models developed) and the actual measured water savings is not necessarily congruent. Nonetheless, it is clear that water use reductions have occurred at every facility with installed retrofits. It is also clear that the water savings are generally consistent with those predicted with a few exceptions.

Table 4 presents the water-model based estimated water savings for each of the facilities that received replacement fixtures and the actual change in monthly water use prior to and after the fixtures were replaced based on comparing May through December water use for the years 2009 and 2010, respectively. The data used to calculate the actual water savings is presented in Appendix D.

Table 4 - Estimated and Measured Average Monthly Water Savings per Facility

Facility	Estimated Average Indoor Monthly Water Savings (gallons)	Measured Average Indoor Monthly Water Savings (gallons)
Lodging Facilities		
Best Western	37,990	47,250
First Inn	40,683	28,625
Pagosa Inn and Suites	28,624	5,125
Pinewood Inn	16,044	6,875
The Spa	57,367	32,625
Restaurants and Other Facilities		
Boss Hogg's	11,315	12,875
Chamber of Commerce	No meters in place prior to 2010,	so no comparison could be made
Higher Grounds	4,905	-4,000
JJ's	5,659	45,250
Kip's	5,879	8,375
Town Library	1,260	19,000
Ramon's	6,207	-1,625
PLPOA Rec Center	15,063	3,250
Tequila's	4,736	4,125
Total	235,732	207,750

The expected water savings, based on the results of the audits and the related water models, were about 8.7 acre-feet; whereas the actual savings measured were about 7.7 acre-feet<sup>4</sup>, or about 90% of the initial estimate.

The reasons for the differences between the estimated and measured water savings may be influenced by many different factors including:

- Differences in the number of lodgers and/or facility users.<sup>5</sup>
- Differences in the normal uses of water within a facility.<sup>6</sup>
- Differences in the estimated and actual number of uses and/or length of use of each replaced fixture in the facility.

<sup>&</sup>lt;sup>4</sup> The replacement value of 7.5 acre-feet of water for PAWSD is about \$150,000 (at \$20,000 per acre-foot). The cost of this saved water was about \$9,000 per acre-foot using the combination of the Water Efficiency Grant and PAWSD funds and resources.

<sup>&</sup>lt;sup>5</sup> Information on Lodger Tax Revenue was collected from the Town to characterize trends in tourism visits and therefore facility use. Generally these data indicate that for the area, tourist visits have increased each year by about 5% since 2007. These data are included in Appendix E.

<sup>&</sup>lt;sup>6</sup> A leak was discovered in Pagosa Inn and Suites in November 2010 and is suspected in Higher Grounds. Removing the influence of the suspected leak in Pagosa Inn and Suites would show a measured water savings of 12,000 to 15,000 gallons per month more than is indicated in Table 4. Other changes to fixture use or water use could include such occurrences as increased kitchen and/or laundry use, for example. Note that outdoor water use at the Town Library decreased from 2009 to 2010 contributing to the measured volume of reduced water use at that location.

Other noteworthy observations are as follows:

- Lodger use at the various hotels is impacted by tourist visits. Lodger tax information provided by the Town of Pagosa Springs for the period from 2007 through 2010 indicates that tourism visits were up about 5% per year over this time period. Pagosa Inn and Suites and Pinewood Inn appear to have been significantly impacted by higher occupancy rates in 2010 versus 2009; whereas the Best Western may have had somewhat fewer lodgers in 2010 compared to 2009.
- By the same line of reasoning, Boss Hogg's did not have a substantial increase of customer visits in 2010 as compared to 2009; whereas, customer visits to Higher Grounds, Ramon's, JJ's and the PLPOA Recreation Center were likely higher in 2010 as compared to 2009.
- JJ's was found to have a leak in 2009 associated with its water cooled ice machine which appears to have been repaired based on the 2010 follow-up audit. Repairing this leak would create a savings of about 40,000 gallons per month.
- As indicated earlier, the Town Library reduced outdoor water use from 2009 to 2010 after a portion of the facility's Xeriscape landscaping had been established.
- No specific amount of saved water was estimated associated with the distribution of the Project Planet information which helps to educate lodgers and influence housekeeping staff at motels and hotels regarding not laundering towels and other linens unless needed.<sup>7</sup>

Each business keeps records of customer visits for monthly reporting of revenue and sales records; however this data was not collected in association with this project. It may be of value to collect this data at some point in the future if needed to better characterize current and future water demand.

## **Modifications to the Scope**

As previously indicated, the scope of work contained in the grant application included estimates on the number of audits, and the number of replacement fixtures that would be installed as a result of those audits. However, between the time of the grant application submittal and the grant award some circumstances changed (for example, one of the hotels audited prior to the grant application withdrew from participation in the fixture replacement program). In addition, conditions predicted at the time of the application were not entirely consistent with the conditions found during project execution. For these reasons, some of the original scope was revised to account for conditions encountered during execution of the project.

The key differences between the proposed scope and the executed scope are listed below:

 The original scope called for retrofitting 5 facilities that were previously audited and 10 new facilities. During execution of the projects, two of the facilities audited prior to the grant

<sup>&</sup>lt;sup>7</sup> One outcome of the audits related to learning that housekeeping staff may collect unspoiled towels and other linens to create or "make-up" full loads for the 50 pound washing machines operated by many of the local motels and hotels, especially at times of low room occupancy. For this reason, it is suspected that the effectiveness of the Project Planet campaign is greater when room occupancy rates increase and laundry "make-up" loads are unnecessary.

- withdrew from the program. Therefore only 3 facilities that were audited prior to the grant remained to participate in the fixture replacement portion of the project.
- The original scope called for auditing 10 new facilities; including 5 hotels and 5 restaurants. To make up for the missing participants identified in the preceding bullet, and a lack of involvement from some expected hotels, additional project participants were sought and engaged. In the end, 4 new hotels, 4 new restaurants, and 3 institutional facilities were audited and chose to participate in the fixture replacement program. Therefore, one additional audit was performed beyond those that were contained in the original scope.
- The changes also occurred with regard to the number of fixtures that were replaced as shown in Table 5.

Table 5 – Summary o	f Modifications to the Numbe	r of Replacement Fixtures Installed
Fixture	Original Scope	Modified Due to Field Conditions
Showerhead	313	254
Faucet Aerators	393	304
Toilets	33	32
Urinals	19	13

The ramifications of these changes were not significant in the performance of the project. The intent of the project was successfully completed in that large water users were assisted in reducing their water demand and permanent water savings are being realized by the District. The reduced number of installations did reduce the cost of the project to the District; however, other costs related to coordinating and conducting additional Smart Water Audits and related tasks increased project costs. In addition, the data collection and analysis tasks were more intensive than originally expected. Therefore, overall project costs remain essentially the same between the original grant application and execution of this project.

### **Conclusions and Recommendations**

The Water Efficiency Grant awarded to PAWSD was put to use to implement components of the District's approved Water Conservation Plan. As a result of the Grant funded project, the District was able to increase outreach to the community that it serves and measurably decrease water use in 14 businesses and institutions in the PAWSD service area including numerous local tourist related businesses (e.g., restaurants and motels/hotels).

Total measured water savings over a single year associated with the installed replacement fixtures are expected to be in the range of 7.5 acre-feet, with a value of about \$150,000 to the District (in replacement water costs). Water savings were expected to be greater than this; however, local influences including a greater influx of tourists into the PAWSD service areas in 2010, as compared to 2009, impacted the actual savings. Nonetheless, water savings were measured at 12 of the 14 facilities that received replacement fixtures. It is suspected that the observed higher water use at the two facilities that did not have measurable reductions were in response to higher customer visits and/or use of the facilities (one is a restaurant and one is a coffee shop).

The cost of the water savings varied dependant on a number of factors; however, it was generally found that placing showerheads and faucet aerators were by far the most cost-effective means to creating permanent water use reductions. For this reason, the cost per acre-foot of water savings achieved at the hotels was substantially less than the cost per acre-foot realized at restaurants and other facilities. The most cost effective fixture replacement efforts were at four of the five hotels<sup>8</sup> as indicated in Table 6.

Table 6 – Estimated Cost per Acre-Foot	to Replace Inefficient Fixtures by Facility
Location	Cost per AF
Hotels	
Best Western <sup>8</sup>	\$ 14,600
First Inn	1,154
Pagosa Inn and Suites	690
Pinewood Inn	2,099
The Spa	1,336
Other	
Boss Hogg's	6,006
Higher Grounds	5,744
JJ's	15,076
Kip's	5,404
Town Library	8,962
Ramon's	8,445
PLPOA Rec Center	2,465
Tequila's	8,873

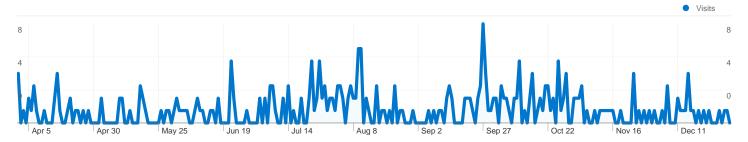
<sup>&</sup>lt;sup>8</sup> Costs to reduce water demand at the Best Western were skewed in comparison to the other hotels, since the Best Western has a restaurant and bar on the premises. The costs for fixture replacement in the Best Western hotel was estimated to be about \$3,000 per AF; versus about \$17,000 per AF in the restaurant and bar area.

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Based on the results of this project, there are a number of possible improvements that may be valuable to other organizations working to install water efficient fixtures into public and/or commercial facilities. These recommendations include the following:

- Establish an agreement with the business owner and/or facility administrator that allows for the explicit tracking of customer and/or site use over time, such that water use can be correlated to site use; and therefore, changes in site use can be incorporated in verifying the impact and effectiveness of implemented water conservation measures and programs.
- Audits are critical tools in evaluating and characterizing water use in facilities that receive fixture upgrades. Without audits, water use patterns and particulars involving characterizing future savings is substantially compromised.
- Involving the facility owner and/or manager in the audit process enhances the value and use of the audit now and into the future (as water use patterns change).

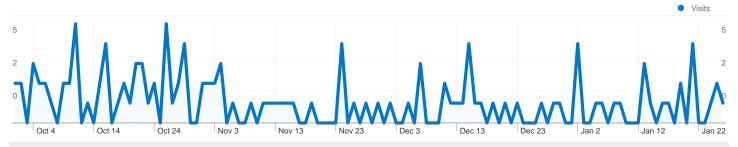
# Appendix A Catch the Wave Website Traffic Information



# This custom dimension resulted in 293 Visits via 154 days

New tab			
Visits 293 % of Site Total: 100.00%	<b>00:0</b> Site Av		
Day		Visits	Avg. Time on Page
Monday, September 27, 2010		8	00:03:06
Tuesday, August 10, 2010		6	00:00:00
Wednesday, August 11, 2010		6	00:00:26
Tuesday, June 22, 2010		5	00:00:36
Friday, July 23, 2010		5	00:01:24
Monday, July 26, 2010		5	00:02:15
Monday, October 11, 2010		5	00:00:50
Tuesday, October 26, 2010		5	00:00:26
Thursday, April 1, 2010		4	00:00:24
Friday, April 16, 2010		4	00:00:00
			1 - 10 of 154

# **Traffic Sources Overview**

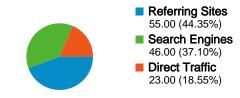


## All traffic sources sent a total of 124 visits

18.55% Direct Traffic

44.35% Referring Sites

37.10% Search Engines



# **Top Traffic Sources**

Sources	Visits	% visits
google (organic)	40	32.26%
google.it (referral)	26	20.97%
(direct) ((none))	23	18.55%
pawsd.org (referral)	17	13.71%
bing (organic)	4	3.23%

Keywords	Visits	% visits
save the colorado	4	8.70%
unquenchable glennon	3	6.52%
math sprinkler	2	4.35%
sprinkler mat	2	4.35%
2030 technology that will	1	2.17%

# **Appendix B**

**Example Signage Used to Highlight Fixture Replacements** 

# Together... Making a Difference

By using the High-Efficiency Water Fixtures in this room, together we are helping our community.



AND TO REDUCE  $CO_2$  emmisions by  $\frac{3}{4}$  tons



Thank You



# Together... Making a Difference

By using the High-Efficiency Water Fixtures in this facility, together we are helping our community.



# HELPING TO SAVE 60,000 gallons of water

(every year, or enough water to fill 15 swimming pools)

AND TO REDUCE  $CO_2$  emmisions by 10 tons
(every year)





# **Appendix C**

# **Smart Water Audit Reports for Each Facility**

This Appendix contains the results of the Smart Water Audits for each of the facilities that received fixture replacements, except the Chamber of Commerce. The Chamber was excluded from this appendix since an analysis of the Chamber's past water use was not possible given that the facility was not metered until the early part of 2010. Therefore, a water model could not be prepared and water savings could not be estimated for the Chamber. The results of the Smart Water Audit for each facility are presented herein. To this point, this appendix includes the following for each facility:

- A one page summary about the audit and its findings;
- A spreadsheet model of the water use in the facility including an estimate of water and related energy savings associated with potential fixture and appliance replacements;
- A graph of monthly water use in the facility prior to the audit (these data were used to configure and calibrate the water use model); and
- A graph of the monthly water use in the facility prior to and after the fixture retrofits.

Smart Water Audits which are documented in this appendix include the following facilities:

### Lodging

- Best Western
- First Inn of Pagosa Springs<sup>1</sup>
- Pagosa Inn and Suites
- Pinewood Inn
- The Spa

### Other

- Boss Hogg's<sup>1</sup>
- Higher Grounds
- JJ's<sup>1</sup>
- Kip's
- Town Library
- Ramon's
- PLPOA Recreation Center
- Tequila's

<sup>&</sup>lt;sup>1</sup> All audits were completed in April 2010 except those identified by this footnote, which were completed in December 2008 as part of the pre-grant application data collection effort.



# **SMART WATER Audit Report**

## **Best Western Hotel**

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 158 Hot Springs Blvd in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

The Best Western Hotel uses water in a manner consistent with motels throughout Colorado. Similar to many hotels built before 1993, Best Western Hotel has sinks, showers, and toilets that have not been updated with water efficient fixtures that are currently available in the marketplace. However, The Best Western does utilize air cooled ice makers which help to reduce water use.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Best Western included the following assumptions:

- Best Western indicated that they use a hose for minimal outdoor irrigation; therefore, outdoor irrigation was assumed to be 20 gallons per maximum day and 6 gallons per day on average.
- The pool uses 300 gallons on a maximum water demand day and 100 gallons on an average water demand day.

The Best Western Restaurant has two areas that were retrofit with new high-efficiency fixtures – the rooms and the restaurant area. In the restaurant area, two sink faucet aerators located in the men's and women's bathrooms were replaced along with toilets and a urinal in the same restrooms. The faucet aerators in these locations used about 3.25 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$67 dollars per year per sink. The four restaurant toilets used, on average, about 2 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.90 gallons per flush, were installed at a cost of \$1,508 with an estimated total water savings of 17,000 gallons annually. One urinal was also replaced with a Water Sense approved waterless urinal at a cost of \$396 and is estimated to have a total water savings of 3,650 gallons annually.

In the Best Western Hotel, each room was equipped with a showerhead that averaged three gallons per minute. 78 new low flow showerheads, which use 1.5 gallons per minute, were installed at a cost of \$3,354. It is estimated that a total water and energy savings of approximately \$95 per year per shower should be realized from this replacement, resulting in a payback period of about 6 months. In addition, 78 three gallon per minute sink faucet aerators were replaced with 0.5 gpm aerators, at an initial cost of about \$516. It is estimated that the Hotel will realize a total cost savings of approximately \$539 per year from these updated faucets, resulting in a payback period of just under a year.

In total, 80 sink faucet aerators, 78 showers, four toilets and one urinal in Best Western Hotel and Restaurant were updated at a cost of \$5,787. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$8,400 will result from these changes, saving about 450,000 gallons of water and 71,000 kilowatt hours of energy.



# Maximum Use Calculation

			Der use				banletotal	buu	
	number	hot	ploo	total		uses/day hot	ploo	total	
Typical Room (1 king, 2 Queen)		78				•			
	Toilet (Rebuild 30/yr)	78		1.6	1.6 gpf			250	250
	Shower	78	2.4	9.0	3 gpm		2.246	295	2.808
	Sink	78	1.5	1.5	3 gpm	0.3 minutes	35	35	70
Kitchanatta - Managara Anartmant									
Medicine - Managers Aparament	Toilet	- +		9	1.6 anf	3 fliches		Ľ	Ľ
	Shower		2.4	9:0	. ago		24	o (c	, Ç
	Sink	-	1.5	1.5	3 gpm	0.5 minutes	; =	· –	3 -
Doo! Bothroom (4005)									
Pool bathroom (1965)	H			9	9			ç	Ç
				0.0	1.6 gpl	o liusries		2 0	2 "
	Shower		2.4	9.0	3 gpm	3 minutes		7 .	<b>5</b> 7 (
	Sink	-	1.5	1.5	3 gpm		-	-	m
Bar Bathroom									
Dai Daillooill	-	c		,	4			ç	4
	Mens	7		9.	1.6 gpf	15 riushes	•	84	848
	Womens	2		2.5	2.5 gpf	15 flushes		75	75
	Urinal	-		-	1 gpf	15 flushes		15	15
	Sink Women	<del>-</del>	1.5	1.5	3 gpm	2.3 minutes	က	က	7
	Sink Men	-	1.75	1.75	3.5 gpm	4.5 minutes	80	80	16
			ļ				i c	i	
Bar Sink		7	1.75	1.75	3.5 gpm	10 minutes	ફ	ફ	0
Kitchen Sink		-	1.75	1.75	3.5 apm		22	21	42
Kitchen Sink		-	3,25	3,25	6.5 apm	90 minutes	293	293	585
Kitchen Sink		-	2.5	2.5	5 gpm	45 minutes	113	113	225
					i				
Other									
Washing Machine (Unimac)UC30BNZOU600030 Restauran	OU600030 Restauran	-			18 g/use	2 use	18	18	36
Washing Machine (Unimac)VW50PVC	UZ Restaurant	-	6		18 g/use		18	18	36
Washing Machine (Maytag, Commercial) Customer use	al) Customer use	2		12	24 g/use	5 use	120	120	240
Ice Machine (Ice of Matic) Bar Use		-			17.8 gp100#			18	18
Ice Machine (Scottsmen) CM250AE-IE		-			17.8 gp100#	1 100# Ice		18	18
Ice Machine (Monitowoc) 0y0604A		-			17.8 gp100#			18	18
Pool (Fill manual) Heavy Use Days (3days/wk max)	ays/wk max)	-			300.0 g/use	0.4 use		129	129
SPA Hot Tub (Friday:Saturday)		<del>-</del>	24		30 g/use		9	2	80
DishWashing Machine (Eco lab) E5200	00	4			20 g/use	3 use	•	240	240
Steam Table		-			7.79 gpuse	1 daily		80	80
Steam Table		-	•		13.09 gpuse	1 daily		13	13
Outdoor Irrigation		-			20 g/use	1 use		20	20
							2,949	2,101	5,051 max day
							observed		
									-
							observed		5,033 max day

# Average Use Calculation

number		ploo		total	uses/day hot	ploo	total	
	78							
Toilet (Rebuild 30/yr)	78		1.6	1.6 gpf	1 flushes		125	125
Shower	78	2.4	9.0	3 gpm	9.0 minutes	1,685	421	2,106
Sink	78	1.5	1.5	3 gpm		59	29	117
	-							
Toilet	-		1.6	1.6 gpf	3 flushes		2	5
Shower	-	2.4	9.0	3 gpm	8 minutes	19	2	24
Sink	-	1.5	1.5	3 gpm		2	2	ဧ
	-							
Toilet	-		1.6	1.6 gpf			2	2
Shower	-	2.4	9.0	3 gpm	6 minutes	14	4	18
Sink	-	1.5	1.5	3 gpm	1.5 minutes	2	2	2
	ď		,		3		G	C
Mens	7		1.6	1.6 gpt			32	32
Womens	5		2.5	2.5 gpf			20	90
Urinal	-		-	1 gpf	10 flushes	•	10	10
Sink Women	-	1.5	1.5	3 dbm		80	80	15
Sink Men	-	1.75	1.75	3.5 qpm	10.0 minutes	18	18	35
				5				
	7	1.75	1.75	3.5 gpm	8 minutes	28	28	99
	-	1.75	1.75	3.5 gpm		41	14	28
	-	3.25	3.25	6.5 qpm		211	211	423
	-	2.5	2.5	5 gpm	65 minutes	163	163	325
Washing Machine (Unimac)UC30BNZOU600030 Restauran	-	6	6	18 g/use	1 use	6	6	18
estaurant	-	6	6	18 g/use	1 use	o	6	18
stomer use	2	12	12	24 g/use	3 use	72	72	144
	-		17.8	17.8 ap100#	1 100# Ice		18	18
	-		17.8	17.8 gp100#	1 100# Ice		18	18
	-		17.8	17.8 gp100#	1 100# Ice		18	18
	-		100	100 q/use			43	43
	-	24	9	30 a/use		9	2	00
	4	О	20	20 d/use			240	240
	-		7.79	7.7921875 gpuse		,	00	00
	-		13,09	13.090875 apuse	1 daily		13	13
	-		20	20 g/use	0.3 use		7	
						2.318	1.614	3.932 avg day
						observed		

Savings
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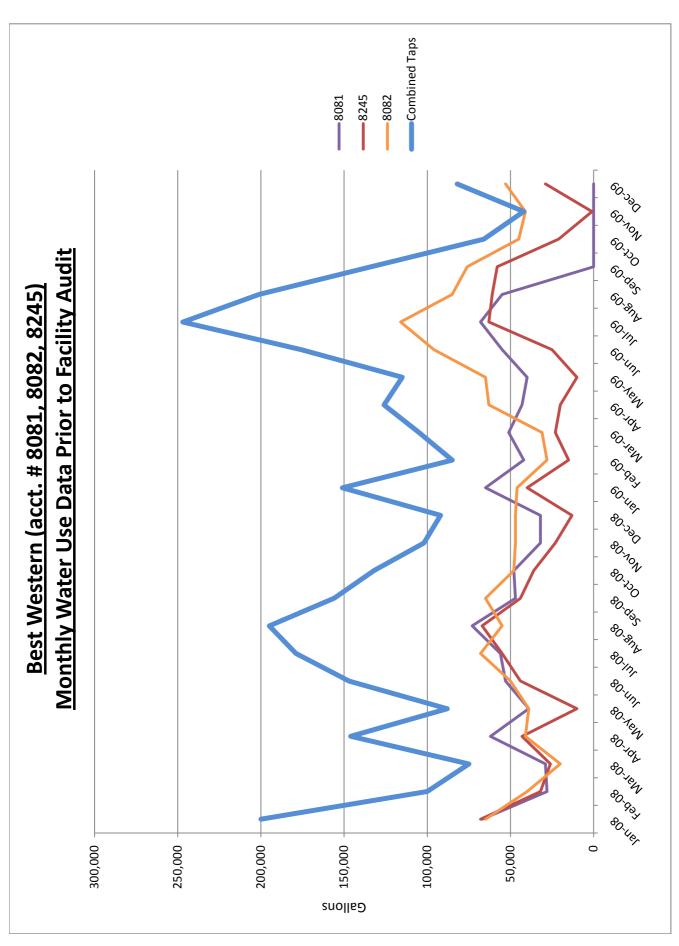
			ber use	se			subtotal gpd	pc		Savings		
	number	hot	ploo	total		uses/day hot	pioo	total			ploo	total
lypical Room (1 king, 2 Queen)		8/										
	Toilet (Rebuild 30/yr)	78		1.6	1.6 gpf	2 flushes		250	250		,	
	Shower	78	1.2	0.3	1.5 gpm	12 minutes	1,123	281	1,404	1,123	281	1,404
	Sink	28	0.25	0.25	0.5 gpm	0.3 minutes	9	9	12	29	58	29
					i							
Kitchenette - Managers Apartment		-										
	Toilet	-		1.6	1.6 apf	3 flushes		2	ιΩ			
	Shower	-	2.4	9.0	3 dbm	10 minutes	24	9	30			
	Sink	-	1.5	1.5	3 gpm	0.5 minutes	-	-	-			
					5							
Pool Bathroom (1985)		_										
()	Toilet	_		1.6	1.6 apf	6 flushes		10	10			
	Shower	_	2.4	0.6	3 apm	3 minutes	7	2	0			
	Sink	-	1.5	1.5	3 dbm	0.9 minutes	-	-	ı m			
					5					,		
Bar Bathroom												
	Mens	0		60	Jun 6 0	15 flushes		27	27		2	27
	Womens	10		500	Jun 6 0	15 flishes		27	27		48	48
	2 ecirl	1 ←		9 0	- Jac			ì.	ì,		4	5 4
	O III I			0 10	100 0		•		,		2 (	2 4
	Sink Women		0.25	0.25	0.5 gpm				- (	nı	ומ	; ه
	Sink Men	-	0.25	0.25	0.5 gpm	4.5 minutes	-	_	2	7	_	14
									i	,		
Bar Sink		7	1.75	1.75	3.5 gpm	10 minutes	35	32	70			
									:			
Kitchen Sink		_	1.75	1.75	3.5 gpm	12 minutes	21	21	42	,		
Kitchen Sink		-	3.25	3.25	6.5 gpm	90 minutes	293	293	585			
Kitchen Sink		-	2.5	2.5	5 gpm		113	113	225			
Other												
Washing Machine (Unimac)UC30BNZOU600030 Restauran	OU600030 Restauran	-	<b>о</b>	6	18 g/use		18	18	36		,	
Washing Machine (Unimac)VW50PVQUZ Restaurant	2UZ Restaurant	-	6	6	18 g/use		18	18	36			
Washing Machine (Maytag, Commercial) Customer use	ial) Customer use	2	12	12	24 g/use		120	120	240			
Ice Machine (Ice of Matic) Bar Use		-		17.8	17.8 gp100#	1 100# Ice		18	18		,	
Ice Machine (Scottsmen) CM250AE-IE	ш	-		17.8	17.8 gp100#			18	18	,		
Ice Machine (Monitowoc) 0y0604A		-		17.8	17.8 gp100#	1 100# Ice		18	18			
Pool (Fill manual) Heavy Use Days (3days/wk max)	days/wk max)	-		300	300.0 g/use	0.4 use		129	129			
SPA Hot Tub (Friday:Saturday)		-	24	9	30 g/use	0.3 use	9	2	80			
DishWashing Machine (Eco lab) E52000	00	4	0	20	20 g/use	3 use		240	240			
Steam Table		-		7.79	7.79 gpuse	1 daily		80	Φ			
Steam Table		-		13.09	13.09 gpuse	1 daily		13	13		,	
Outdoor Irrigation		-		20	20 g/ise	) ISB		20	20			
				ì	in the second		1,787	1.698	3.485 max day	1.162	404	1.566
							povrasdo		151 000 max month			
							observed		5.033 max day			
									,			

# Average Use Water Savings

Serial control carried	2		ooi rou	93			ddia	eribtotal god		Socioce		
	number	þot	ploo	total		uses/day hot	ploo	total		hot	cold	total
Typical Room (1 king, 2 Queen)												
	Toilet (Rebuild 30/yr)	28		1.6	1.6 gpf	1.0 flushes		125	125			
	Shower	78	1.2	0.3	1.5 gpm	9.0 minutes	842	211	1.053	842	211	1.053
	Sink	78	0.25	0.25	0.5 gpm	0.5 minutes	10	10	20	49	49	86
					i							
Kitchenette - Managers Apartment		-										
	Toilet	-		1.6	1.6 gpf	3.0 flushes		2	c)			
	Shower	-	2.4	9.0	3 gpm	8.0 minutes	19	2	24			
	Sink	-	1.5	1.5	3 gpm	1.0 minutes	2	2	ဇ			
Pool Bathroom (1985)		-										
	Toilet	-		1.6	1.6 gpf	3.0 flushes		2	c)			
	Shower	-	2.4	9.0	3 gpm	6.0 minutes	14	4	18			
	Sink	-	1.5	1.5	3 gpm	1.5 minutes	2	2	2			
					i							
Bar Bathroom												
	Mens	2		6.0	Jap 6.0	10.0 flushes		18	18		14	14
	Womens	١٥		60	Jun 6 0	100 flushes		: 82	3 6		32	33
	Cirl	1 -		9	1000			2	2		4 5	4 5
	O C	- ,		0 10	ldb 0 g	10.0 ilusries	. `	. `			2 9	2 ;
	Sink Women	_	0.25	0.25	0.5 gpm		_	_	, co	. و	٥	5
	Sink Men	-	0.25	0.25	0.5 gpm		m	m	2	15	12	30
Bar Sink		2	1.75	1.75	3.5 gpm	8.0 minutes	28	28	26			
2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		,	1 75	75	1	000	*	7	G C			
Kitchen Onk			0.70	2.73	5.5 gpm	65.0 minutes	4 50	4 7	423			
Kitchen Sink			3.23	3.23	0.5 gpm	650 minutes	163	163	423 325			
NICHEL SHIR		-	6.5	6.7	ilidh c	can IIII oco	201	3	323			
Other												
Washing Machine (Unimac)UC30BNZOU600030 Restauran	U600030 Restauran	-	6	6	18 g/use	1.0 use	6	6	18			
Washing Machine (Unimac)VW50PVQUZ Restaurant	JZ Restaurant	-	6	6	18 g/use	1.0 use	o	6	18			
Washing Machine (Maytag, Commercial) Customer use	) Customer use	2	12	12	24 g/use		72	72	144			
loe Machine (Ice of Matic) Bar Use		-		17.8	17.8 gp100#			18	18			
Ice Machine (Scottsmen) CM250AE-IE		-		17.8	17.8 gp100#	1.0 100# Ice		18	18			
Ice Machine (Monitowoc) 0y0604A		-		17.8	17.8 gp100#			18	18			
Pool (Fill manual) Off Days		-		100	100 g/use			43	43		,	
SPA Hot Tub (Friday:Saturday)		-	24	9	30 g/use	0.3 use	9	7	80		,	
DishWashing Machine (Eco lab) E52000		4	0		20 g/use			240	240			
Steam Table		-		7.79 7	7.7921875 gpuse	1.0 daily		80	80			
Steam Table		-			3.090875 gpuse			13	13			
Outdoor Irrigation		-			20 g/use			7	7		,	
,					)		1.405	1.278	2.683 avg day	912	337	1.249
							observed		102,875 avg month			
									38 days at avg			
							observed	_	3,429 avq day			

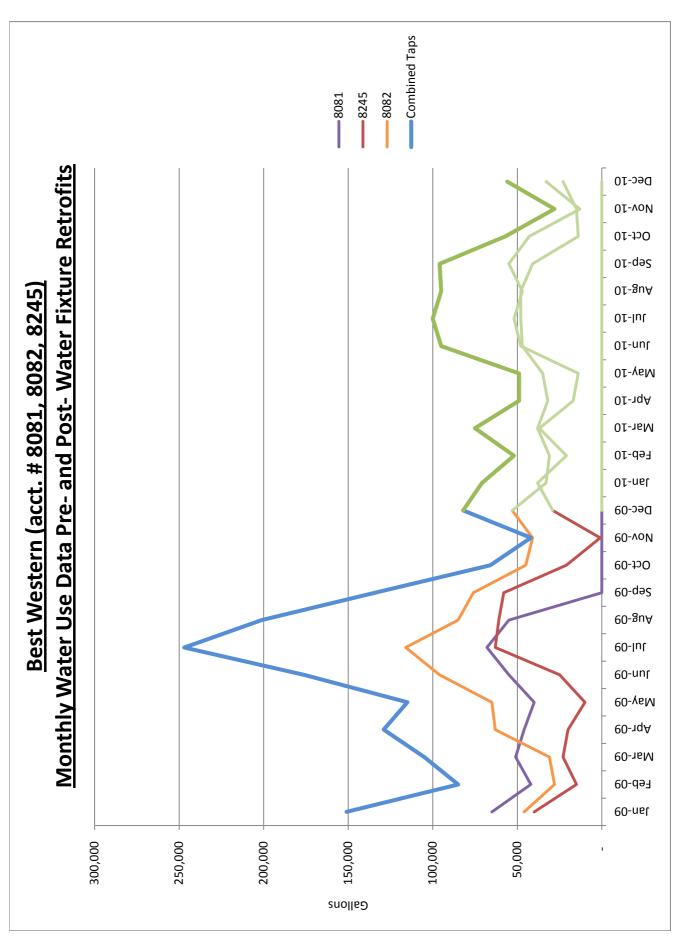
# sts to Implement

	number Hardware	Hardware Installation T	Total P	Payback	Water Savings (gpy) Energy	Energy Savings (kWhr)	Total Cost Savings/yr	ngs/yr	Total Cost Savings/yr/fixture
<b>Hotel:</b> Shower Sink	78 \$ 33 78 \$ 2	3 \$ 10 \$ 2 \$ 5 \$ 5 \$	3,354 516 3,870	0.45 yrs 0.96 yrs	384,345 35,588	65,758 3,805	<i></i>	7,426 539 7,965	96 29
	AF Savings: 1.29	9 \$/AF:	↔	3,003	Replacement Water Cost*: \$	38,662	Avoided Cost**:	€	3,989
Restaurant: Sink	2 8	2 &	13	0.06 yrs	15,513	1,659	€9	235	\$ 118
Toilet	4 \$ 282	2 \$ 95 \$	1,508	10.95 yrs	16,790		€	138	\$ 34
Urinal	1 \$ 31	<del>⇔</del>	396	13.23 yrs	3,650		€ 6	30	\$
		⊕	5,787		455,885	71,222	9 49	8,368	
	AF Savings: 0.11	1 \$/AF:	↔	17,376	Replacement Water Cost*: \$	3,310	Avoided Cost**:	↔	342
					* Calculation based on \$30,000 per AF		** Calculation based on \$9.50/ 1000 gal	od on \$9.50/ 1000	Cal



\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model

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\* Water fixture retrofits were installed March 30, 2010 and April 12, 2010

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# **SMART WATER Audit Report**

# First Inn of Pagosa

### Overview

PAWSD working with Great Western Institute and Environmental Dimensions, conducted a SMART WATER Audit of this facility at **260 East Pagosa** in Pagosa Springs on December 8, 2008. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

First Inn uses water in a manner consistent with motels throughout Colorado, especially those with indoor pools and hot tubs. Similar to many motels built before 1993, First Inn had sinks, showers, and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for First Inn included the following assumption:

• First Inn indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property

Based on the 2008 audit, the following fixture replacements occurred in 2010. The 33 sink faucet aerators found in each of the motel suites and the main floor restroom, used about 2.2 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$8 dollars per year per sink. This savings results in a payback period of just over ten months.

The 32 motel showers, on average, used about four gallons of water per minute. New low flow showerheads, which use 1.5 gallons per minute, were installed at a total cost of \$1,376 with an estimated total water savings of 476,000 gallons annually. With these savings, the payback period for the installation of the shower heads should be about two months

In total, 33 sink faucet aerators and 32 showerheads in First Inn Motel were updated at a cost of \$1,594. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$11,000 will result from these changes, saving about 488,000 gallons of water and 104,000 kilowatt hours of energy.



# Table 2 - Summary of Current Water Use and Potential Water Savings First Inn Motel Audit

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	ì		720	3,840	95		16	е	99			415	320	88	2	09	10	635 max day	69,000 max month	30 days at max	5,633 aver day
	total			768 3,			16	-				130	160		2	09	10	2,036 5,	169,		5,0
subtotal gpd	cold		•	3,072	48		•	-	33	•		285	160					3,599	observed		observed
	hot																				
	uses/day		9 flushes	30 minutes	1.35 minutes		10 flushes	1.5 minutes	30 minutes			5 loads	8 loads	5 100#	1 daily	1 daily	1 daily				
			2.5 gpf	4 gpm	2.2 gpm		1.6 gpf	1.67 gpm	2.2 gpm			83 gpl	40 gpl	17.8 gp100#	1.50 gpd	pdb 09	10 gpd				
esi	total		2.5	0.8	1:1		1.6	0.835	1.1					17.8							
per use	ploo		0	3.2	1.1		0	0.835	1.1			22	20								
	hot		32	32	32		-	τ-	-			-	-	-	-	-	_				
	number		Toilets	Showers	Sinks		Toilet	Sink	Kitchen Sink			Washer/Extractor Commercial	omer								
		Rooms				Lobby					Other	Washer/Extra	Laundry Cust	Ice Machine	Pool	Hot Tub	Sanna				

Average Use Calculation

			ber use	se				subtotal gpd		
	number	hot	ploo	total		uses/day	hot	ploo	total	
Rooms										
	Toilets	32	0	2.5	2.5 gpf	3 flushes		0	240	240
	Showers	32	3.2	0.8	4 gpm	18 minutes		1843.2	460.8	2304
	Sinks	32	77	1:	2.2 gpm	0.45 minutes		16	16	32
Lobby										
	Toilet	-	0	1.6	1.6 gpf	5 flushes		0	80	æ
	Sink	-	0.835	0.835	1.67 gpm	0.75 minutes		0.63	0.63	1.25
×	Kitchen Sink	-	1.1	<del>[</del> :	2.2 gpm	10 minutes		11	7	22
Other										
Washer/Extractor Commercial	nmercial	-	22	26	83 gpl	3 loads		171	78	249
Laundry Customer		-	20		40 gpl	4 loads		80	80	160
Ice Machine		_	0		17.8 gp100#	2 100#		0	35.6	35.6
Pool		_	0		1.5 gpd	1 daily		0	1.5	1.5
Hot Tub		-	0	09	pdb 09	1 daily		0	9	09
Sauna		-	0		10 gpd	1 daily		0	10	10
								2,122	1,001	3,123 avg day
								observed		93,167 avg month
										30 days at avg
								observed		3,106 avg day

Page 1 of 3

# Table 2 - Summary of Current Water Use and Potential Water Savings First Inn Motel Audit

Maximum Use Savings Calculation

			per use	е				subtotal gpd			Savings			
	number	hot	ploo	total		uses/day	hot	ploo	total	al		cold t	total	
Rooms														
Toilets	.,		0	2.5	2.5 gpf	9 flushes			720	720				
Showers	.,	32	1.2	0.3	1.5 gpm	30 minutes		1,152	288	1,440	1,920	480	2,400	
Sinks	.,		0.25	0.25	0.5 gpm	1.35 minutes		17	7	22	37	37	73	
Lobby														
Toilet		_	0	1.6	1.6 gpf	10 flushes			16	16				
Sink		-	0.25	0.25	0.5 gpm	1.5 minutes		0	0	-	-	-	2	
Kitchen Sink		_	1.1	1.1	2.2 gpm	30 minutes		33	33	99				
Other														
Washer/Extractor Commercial		_	22	56	83 gpl	5 loads		285	130	415				
Laundry Customer		-	20	20	40 gpl	8 loads		160	160	320				
Ice Machine		-	0	17.8	17.8 gp100#	5 100#			88	88				
Pool		-	0	1.5	1.5 gpd	1 daily			2	2				
Hot Tub		_	0	09	pd6 09	1 daily			09	09				
Sauna		_	0	10	10 gpd	1 daily			10	10				
								1,641	1,519	3,160 max day				
								observed		169,000 max month				
										53 days at max				
								observed		5,633 aver day				

Rooms	2.5 gpf 1.5 gpm 0.5 gpm 1.6 gpf 0.5 gpm 2.2 gpm	uses/day hot 3 flushes 18 minutes 0.45 minutes 5 flushes 0.75 minutes	cold	240 173 4	240 864 7	hot cold	tota .	
Toilets 32 0 Showers 32 1.2 Sinks 32 0.25 Toilet 1 0.25 Kitchen Sink 1 1.1	2. 1.6 0.5 0.5 0.5 0.5 0.5	3 flushes 18 minutes 0.45 minutes 5 flushes 0.75 minutes	· 66 · · · · · · · · · · · · · · · · ·	240 173 4	240 864 7	- 1		
Tollets 32 0 Showers 32 1.2 Sinks 32 0.25  Tollet 1 0.25 Kitchen Sink 1 1.1	2.5 1.5 0.5 1.6 0.5 0.5 2.2	3 flushes 18 minutes 0.45 minutes 5 flushes 0.75 minutes	691	240 173 4	240 864 7	1 152		
Showers 32 1.2 Sinks 32 0.25 Toilet 1 0.25 Kitchen Sink 1 1.1	1.5 0.5 1.6 0.5 2.2	18 minutes 0.45 minutes 5 flushes 0.75 minutes	691	173	864 7	1 152		
Sinks 32 0.25  Toilet 1 0  Sink 1 0.25  Kitchen Sink 1 1.1	0.5 1.6 0.5 2.2	0.45 minutes 5 flushes 0.75 minutes	4	4	7	15.	288	1,440
Toilet 1 0 Sink 1 0.25 Kitchen Sink 1 1.1	1.6 0.5 2.2	5 flushes 0.75 minutes	,			12		24
Toilet 1 0 Sink 1 0.25 Kitchen Sink 1 1.1	1.6 0.5 2.2	5 flushes 0.75 minutes						
Sink 1 0.25 Kitchen Sink 1 1.1  ommercial 1 57	0.5	0.75 minutes		80	80			
Kilchen Sink         1         1.1           ommercial         1         57           1         20	2.2		0	0	0	0	0	-
ommercial 1 57	i	10 minutes	Ε	7	22			
20 mmercial 1 57								
1 20	83	3 loads	171	78	249			
	40	4 loads	80	80	160			
0	17.8	2 100#		36	36			
1 0	1.5	1 daily		2	2			
1 0	pdb 09	1 daily		09	09			
1 0	10	1 daily		10	10			
			957	701	1,658 avg day			
			observed		93,167 avg month			
			observed		56 days at avg 3,106 avg day			

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Page 2 of 3

# Table 2 - Summary of Current Water Use and Potential Water Savings First Inn Motel Audit

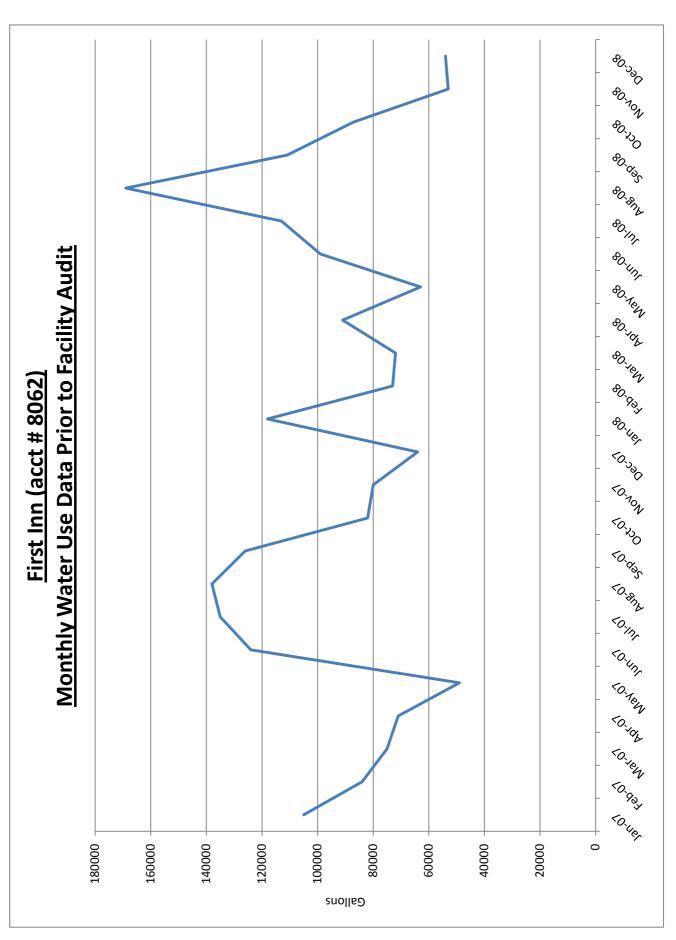
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4 4	2000
4 4	2

Costs to Implement			
	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr Total Cost Savings/yr/fixture
Shower	32 \$ 33 \$ 10 \$ 1,376 0.12 yrs	525,600 112,407	9
סווואפ	\$ 1,594	534,855 114,386	\$ 200 \$ 0
	AF Savings: 1.64 \$/ AF: \$ 971	Replacement Water Cost*: \$ 49,242	Avoided Cost**: \$ 5,081
		* Calculation based on \$30,000 per AF	** Calculation based on \$9.50/ 1000 gal

Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy

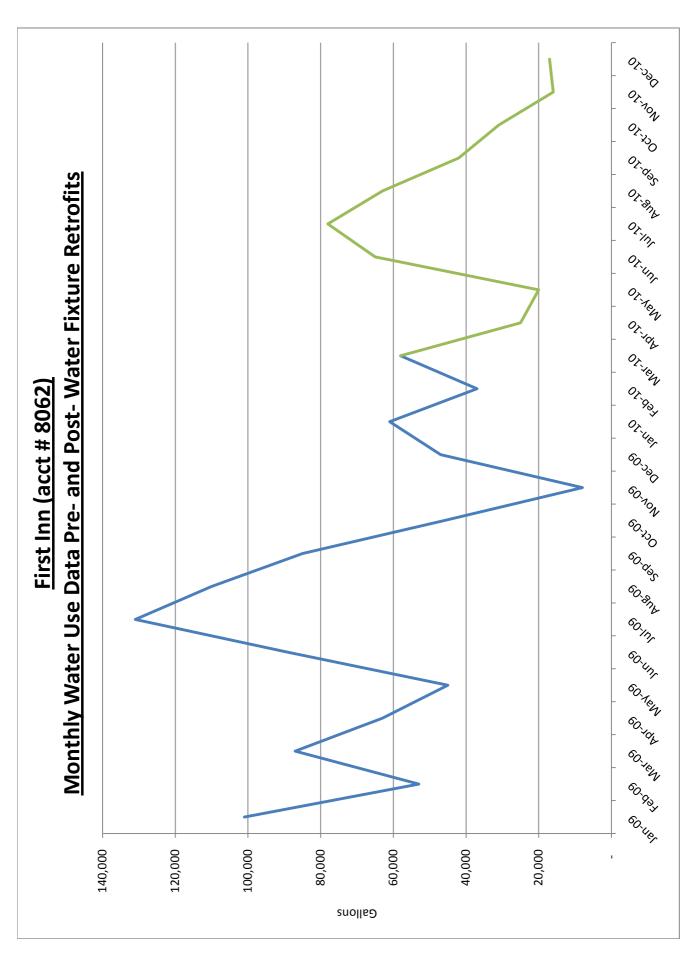
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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model

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\* Water fixture retrofits were installed March 29, 2010

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# **SMART WATER Audit Report**

## Pagosa Inn and Suites

## Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 519 Village Dr in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

Pagosa Inn and Suites uses water in a manner consistent with hotels throughout Colorado, especially those with indoor pools and hot tubs. Similar to many hotels built before 1993, Pagosa Inn and Suites had sinks, showers, and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Pagosa Inn and Suites included the following assumption:

Pagosa Inn and Suites indicated that they do not have any outdoor irrigation; therefore, no
evaluation was performed to characterize outdoor water use for this property

The 110 sink faucet aerators found in each of the hotel suites and the public restroom, used about 2.2 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$244 dollars per year. This savings results in a payback period of about three years.

The 87 hotel showers, on average, used about three gallons of water per minute. New low flow showerheads, which use 1.5 gallons per minute, were installed at a total cost of \$3,741 with an estimated total water savings of about 327,000 gallons annually. With these savings, the payback period for the installation of the shower heads should be just over six months

In total, 110 sink faucet aerators and 87 showerheads in Pagosa Inn and Suites were updated at a cost of \$4,468. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$10,000 will result from these changes, saving about 343,500 gallons of water and 58,000 kilowatt hours of energy.



# Maximum Use Calculation

			Der IISe	a				publipadi and			
	unu	number hot	ploo	total	э 	uses/day	hot	ploo	total	E	
Handicap Room		7									
	Toilet	7		3.5	3.5 gpf	2 flushes			49	49	
	Shower	7	2.4	9.0	3 gpm			252	63	315	
	Sink	7	<del>[</del> :	1.7	2.2 gpm	0.30 minutes		2	2	2	
Twicel Boom (2 Oueses/ 1 King)		20									
ypical (Section   Mily)	Toilet	8 62		9.1	1.6 apf	2 flushes			189	189	
	Shower	20	2.4	9.0	3 dpm	10 minutes		1,416	354 #	### #####	
	Sink	26	1:1	1:1	2.2 gpm			19	19	39	
Suites (King Bed)		6									
	Toilet	6		1.6	1.6 gpf	2 flushes			29	29	
	Shower	6	2.4	9.0	3 gpm	10 minutes		216	54	270	
	Sink	18	1.7	1.1	2.2 gpm			9	9	12	
	Kitchen Sink	တ	1.5	1.5	3 gpm			89	89	135	
	Jacuzzi	6	72	18	esn/b 06	0.8 use		518	130	648	
Series (C) estimos		ď									
Carres (Gaeer)	Toilet	o (c		4	1.6 anf	2 fluchas			0	4	
	Shower	တ	2.4	9.0	3 apm	10 minutes		144	36	180	
	Sink	12	1.	-	2.2 gpm			. 4	4	00	
	Kitchen Sink	9	1.5	1.5	3 gpm	5 minutes		45	45	06	
	Jacuzzi	9	72	18	esn/6 06			346	98	432	
Family Suite (2 Queen. 1 King)		Ŋ									
(6	Toilet	2		1.6	1.6 qpf	2 flushes			16	16	
	Shower	S.	2.4	9.0	3 gpm			180	45	225	
	Sink	10	<del>[</del>	1.1	2.2 gpm			ю	ღ	7	
	Kitchen Sink	2	1.5	1.5	3 gpm	5 minutes		38	38	75	
	Jacuzzi	2	72	18	asn/b 06	0.8 use		288	75	360	
Family Suite (2 Queen, 1 King)		-									
	Toilet	7		1.6	1.6 gpf	2 flushes			9	9	
	Shower	← (	2.4	9.0	3 gpm			36	თ ·	45	
	Sink	N I	- ·	<del>-</del>	2.2 gpm			- 6	- 6	- }	
	Nitchen Sirik Jacuzzi	o <del>-</del>	2.5	<u>.</u> 6	3 gpm	S IIIIIIIIII C		9 % 22 %	8 <del>1</del>	6 62	
		-	į	2	) )			8	!		
Public Bathroom											
	Mens	ᠸ,		3.5	3.5 gpf	10 flushes			32	32	
	Worlieris	- +		ç. Ç. <del>L</del>	3.5 gpl	10 flushes			3 0	S C	
	Mens Sink	- <del>-</del>	1.75	1.75	3.5 gpm			2		; =	
\$	Womens Sink	-	1.75	1.75	3.5 gpm			4	4	80	
Kitchen Sink		-	-	-	2 gpm	15 minutes		15	15	30	
Other		•			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7			7	ā	
Les Machine (Hoshizaki) KM 320 MAH		- 0			16.0 g/use	4 use			40 6	\$ <del>5</del>	
Pool (Fill w/ Hose 15 min/day)		1 ←			5.0 dpm	15 minutes			75	75	
SPA		-	2.4		3 gpm	minutes					
Washing Machine (Commercial) Kenmore Model 11	Te Model 11	2	28.5	28.5	esn/6 29	3 use		171	171	342	
Outdoor Irrigation				20	50 g/use	- nse					
								3,872	1,969	5,841 max day	
								naviason		30 days at max	- }
								observed			<u> </u>
								5 9 9 9 9 9			

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# Average Use Calculation

Sheet   Colored   Sheet   Sh	Handicap Room Typical Room (2 Queen/ 1 King) Suites (King Bed)		7 7 7		3.5	3.5 gpf	flushes	iot				
Total	Handicap Room Typical Room (2 Queen/ 1 King) Suites (King Bed)		~ ~ ~ ~		3.5	3.5 gpf	flushes	!				
Stroke	Typical Room (2 Queen/ 1 King) Suites (King Bed)	Toilet	7	Č	3.5	3.5 gpf				29	29	
Shower	Typical Room (2 Queen/ 1 King) Suites (King Bed)	č	7		90	5				00		
State   2	Typical Room (2 Queen/ 1 King) Suites (King Bed)	Shower		7.4		3 apm	9 minutes		151	30	189	
Total Start	Typical Room (2 Queen/ 1 King) Suites (King Bed)	Sink	7	7:	7:	2.2 gpm	0.18 minutes		-	-	m	
Stroke   Sign	Suites (King Bed)		29									
Shower         59         2.4         0.6         3 gpm         6.5 minutes         12         2.9         1.1         1.2 gpm         6.5 minutes         1.2         2.9         1.2         1.2         2.9         1.1         1.2 gpm         6.5 minutes         1.2         1.0         1.2	Suites (King Bed)	Toilet	20 2		1.6	1.6 gpf				113	113	
Stock   Stoc	Suites (King Bed)	Shower	26	2.4	9.0	3 gpm			920	230		
Total State   9	Suites (King Bed)	Sink	29	<del>-</del> -	<del>.</del> .	2.2 gpm			12	12	23	
Totalet   9			6									
Shower Since 1 9 2.4 0.6 3 gpm		Toilet	6		1.6	1.6 gpf				17	17	
Fig. 1		Shower	၈	2.4	9.0	3 gpm			140	32	176	
Communication   Communicatio		Sink	18	<del>-</del>	<del>.</del> .	2.2 gpm			4	4	7	
Tollet	Ä	itchen Sink	o	1.5	5.5	3 gpm			27	27	24	
Tollet   6		Jacuzzi	თ	72	18	esn/b 06			162	41	203	
Shower Sink   Color	Suites (Queen)		œ									
Strick   6   12   11   11   11   11   11   11		Toilet	ေဖ		1.6	1.6 apf				12	12	
Kitchen Sink         12         3 gpm         C18 minutes         1         2         9         1         2         2         4         4         4         4         4         4         4         4         4         4         4         4<		Shower	9	2.4	9.0	3 gpm			94	23	117	
Kitchen Sink         6         15         15         3 gpm         2 minutes         18         18         3 gpm         2 minutes         18         18         3 gpm         10 minutes		Sink	12	1.1	1.1	2.2 gpm			2	2	2	
Toliet	Ÿ	itchen Sink	9	1.5	1.5	3 gpm			18	18	36	
Toilet   5   1.6   1.6 gpt   1.2 flushes   1.8   1.5   1.5 gpm   9 minutes   1.8   1.5		Jacuzzi	9	72	18	esn/b 06			108	27	135	
Total	amily Suite (2 Queen, 1 King)		2									
Shower         5         24         0.6         3 gpm         0.9 minutes         108         27         135           Kitchen Sink         5         1.5         1.5         1.6         1.6 gpf         1.2 litushes         2         2         4         4           Shower         1         2.4         0.6         3 gpm         0.25 use         0.25         90         1.5         1.4         4		Toilet	2		1.6	1.6 gpf				10	10	
Kitchen Sink         10         1.1         2.2 gpm         Unit minutes         15         1.0         1.1         1.2         Instered         1.7         1.1         1.2         Instered         2.2         1.1         1.1         2.2         2.2         1.1         1.2         Instered         2.2		Shower	υ į	2.4	9.0	3 gpm			108	27	135	
Tollet   2		Sink Sink	5 r	- t	- u	2.2 gpm			ν <del>Έ</del>	ν. Έ	4 ¢	
Tollet   2	Ž	Jacuzzi	o co	72	<u>5</u> &	esn/b 06			06	23	113	
Tollet 2 1.6 1.6 gpf 1.2 flushes 5 2 5 5 27 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Suity Suite (2 C) coins											
Shower         1         24         0.6         3 gpm         9 minutes         22         5         27           Sink         2         1.1         1.2 gpm         0.18 minutes         16         16         16         17           Mens         1         7.2         18         90 g/use         0.25 use         18         1	alling Saite (2 Queen, 1 Ning)	Toilet	- ~		91	1.6 apf				4	4	
Kitchen Sink         2         11         1.1         2.2 gpm         0.18 minutes         0         0         0         1         1         2         3 ggm         2         minutes         1         1         5         3 ggm         2         minutes         1		Shower	ı <del>-</del>	2.4	9.0	3 gpm			22	· w	27	
Kitchen Sink         5         1.5         1.5         3 gpm         2 minutes         15         15         3 gpm         2 minutes         15         3 gpm         3 flushes         1         18<		Sink	2	1.	1.1	2.2 gpm			0	0	-	
Mens         1         72         18         90 g/use         0.25 use         18         5         28         28         28         28         28         28         28         28         28         28         28         28         28         28         28         28         3         7         4         48	Ÿ	itchen Sink	2	1.5	1.5	3 gpm			15	15	30	
Mens         1         3.5 gpf         6 flushes         -         18         8 <td></td> <td>Jacuzzi</td> <td>_</td> <td>72</td> <td>18</td> <td>esn/6 06</td> <td></td> <td></td> <td>18</td> <td>S.</td> <td>23</td> <td></td>		Jacuzzi	_	72	18	esn/6 06			18	S.	23	
Mens         1         3.5 gpf         6 flushes         -         18	Oublic Bathroom											
Womens Invested Sink         1.55         3.5 gpt 3 gpt 3 gpt 3 gpt 3 gpt 3 gpt 3 gpt 4 gpt 3 gpt		Mens	Ψ,		3.5	3.5 gpf				18	18	
Mens Sink         1         1.75         1.75         3.5 gpm         2 minutes         3         7         4		womens			5.5 -	3.5 gpr				ω α α	χς α α	
Womens Sink 1 1.75 1.75 3.5 gpm 1 minutes 2 2 4  Womens Sink 1 1.75 1.75 3.5 gpm 15 minutes 15 15 30  The state of the sta		Mens Sink	· <del>-</del> ·	1.75	1.75	3.5 gpm				က	. ~	
1 1 2 gpm 15 minutes 15 minutes 15 minutes 15 minutes 2 2 100# ce 2 154	Moi	omens Sink	-	1.75	1.75	3.5 gpm			2	2	4	
1 16 16 gluse 3 use - 48 48 48 2 100# log - 71 71 71 71 8 gp100# 2 100# log - 75 75 75 75 75 75 75 75 75 75 75 75 75	Kitchen Sink		-	-	<del>-</del>				15	15	30	
1 16 16 g/use 3 use - 48 48 48 18 17.8 gpt0d# 2 100#lce - 771 771 771 771 771 771 771 771 771 7	Other											
To 1.5 glyllour 2 Tourites - 75 75 75 75 75 75 75 75 75 75 75 75 75	Dishwasher		← (		16	16 g/use	3 use			48	48	
To the Model 11 2 28.5 28.5 3 gpm minutes	ce Macillie (nosilizaki) Kwi 320 MATI Pool (Fill w/ Hose 15 min/dav)		v <del>-</del>		o rc	17.0 gp 100#	2 100# Ice 15 minutes			75	75	
2 28.5 28.5 57 g/use 2.7 use 154 164 308 2.0 g/use - use 2.04 1,157 3,241 96,960 96,96	SPA		· <del>-</del>	2.4	9.0	3 dpm	minutes				2 .	
20 20 g/use - use 2,084 1,157 3,241 2,080 96,980 96,980 96,980 96,980 96,980 97.2	Washing Machine (Commercial) Kenmore	Model 11	2	28.5	28.5	esn/6 25			154	154	308	
1,157 3,241 observed 96,960 observed 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Outdoor Irrigation				20	20 g/use						
96,960 30 3 232										1,157	3,241 avg d	<u>.</u>
9 232									opserved		96,960 avg m	onth
									000000			ravg

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# Maximum Use Water Savings

6			per us	9		subtotal apo				Savings		
:	number	hot	ploo	total	- 	uses/day hot	ploo	total	_	hot cold	total	
Handicap Room	ţdio F		c	4	900	c double		Ç	9			
	Shower		5 5	0.00	3.5 gpl	2 idales 15 minutes	126	8 E	158	126	32	158
	Sink		0.25	0.25	0.5 gpm	0.3 minutes	-	4 -	5 -	2	1 0	4
		;										
Typical Room (2 Queen/ 1 King)		20	c	9	1.6 anf	2 flishes		180	180			
		20 8	1.2	0.3	1.5 gpm	10 minutes	708	177	885	202	177	885
		29	0.25	0.25	0.5 gpm	0.3 minutes	4	4	6	15	15	30
Suites (King Bed)		6										
	Toilet	6	0	1.6	1.6 gpf	2 flushes	•	29	29			
	Shower	<b>о</b> :	1.2	0.3	1.5 gpm	10 minutes	108	27	135	108	27	135
	Sink	<b>∞</b> ∘	0.25	0.25	0.5 gpm	0.3 minutes	← 8	- 8	e 1	2	ις	თ
EX.	cnen Sink Jacuzzi	ກ ຫ	c: 22	<del>ა</del> . გ	3 gpm 90 g/use	5 minutes 0.8 use	518	130	135 648			
		c										
Suites (Queen)		9 4	c	4	900	0 (10)		ç	6			
	Shower	ی ه	0 6	o e	1.6 gpl	2 ilushes 10 minutes	, 2	<u>σ</u> – <u>σ</u>	<u> </u>	. 6	, 2	, 6
		2 2	0.25	0.25	0.5 gpm	0.3 minutes	i <del>-</del>	<u>-</u>	2 2	i w	<u>.</u> ო	9 0
Kit		9	1.5	1.5	3 gpm	5 minutes	45	45	06			
		9	72	18	esn/b 06	0.8 use	346	98	432			
Family Suite (2 Queen, 1 King)		2										
		2	0	1.6	1.6 gpf	2 flushes	•	16	16		,	
		20	1.2	0.3	1.5 gpm	15 minutes	06	23	113	06 °	23	113
***		ا ا	0.25	0.25	0.5 gpm	0.3 minutes	- %	- 00	2 2	n	m	o.
	Jacuzzi	വറ	72	<u>.</u> 6	90 g/use	0.8 use	288	72	360			
Family Suite (2 Queen 4 Kind)		+										
diniy date (4 edder, 1 mig)	Toilet	- 8	0	1.6	1.6 gpf	2 flushes		9	9			
	Shower	_	1.2	0.3	1.5 gpm	15 minutes	18	5	23	18	2	23
	Sink	2 1	0.25	0.25	0.5 gpm	0.3 minutes	0 8	0 8	0 }	-	<del>-</del>	-
X	Kitchen Sink Jacuzzi	o ←	1.5	ಕ. ಹ	3 gpm 90 g/use	5 minutes 0.8 use	28 85 80 85	% <del>1</del>	72			
					6							
Public Bathroom	Mens	<del>-</del>	0	3.5	3.5 apf	10 flushes		35	35			
	Womens	<b>-</b>	0	3.5	3.5 gpf	15 flushes		53	53			
•	Urinal	<u>.</u>	0	-	1 gpf	10 flushes		10	10			
M Won	Mens Sink Womens Sink		0.25 0.25	0.25	0.5 gpm 0.5 gpm	3 minutes 2.25 minutes			N F	90	იო	ი ►
Kitchen Sink		-	<del>-</del>	-	2 gpm	15 minutes	15	15	30			
Other Dishwasher		-	0		16 g/use	4 use		64	64			
Ice Machine (Hoshizaki) KM 320 MAH		2	0		17.8 gp100#	4 100# Ice	•	142	142			
Pool (Fill w/ Hose 15 min/day)		<del>.</del> .	0 7	ຍວ	5 gpm	15 minutes		75	75			
Machine (Commercial) Kenmore	11	- 0	γ. ας 4 ας		3 gpm	o IIIIIdes	171	171	3/13	•		
Outdoor Irrigation	-	۰ 0	0		20 g/use	o nse		-	75 .			
,					,		2,715	1,653				
							observed		176,000 max month			
							payrasdo		5 867 max day			

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Average ese mater earnings			SHIPPU	98			subtotal and				Savings		
	unu	number hot	ploo	total		uses/day	hot	ploo	total	<u> </u>	hot cold	total	
Handicap Room	:	7											
	Toilet Shower Sink		0 1.2 0.25	3.5 0.3 0.25	3.5 gpf 1.5 gpm 0.5 gpm	1.2 flushes 9 minutes 0.18 minutes		0 75.6 0.315	29.4 18.9 0.315	29 95 1	92 1	° 6 –	95 2
Typical Room (2 Queen/ 1 King)	Toilet Shower Sink	20 20 20 20 20 20	0 1.2 0.25	1.6 0.3 0.25	1.6 gpf 1.5 gpm 0.5 gpm	1.2 flushes 6.5 minutes 0.18 minutes		0 460.2 2.655	113.28 115.05 2.655	113 575 5	- 460 9	. <del>1.</del> 9	- 575 18
Suites (King Bed)	Toilet Shower Sink Kitchen Sink Jacuzzi	0 0 0 <del>6</del> 0 0	0 1.2 0.25 1.5 72	1.6 0.3 0.25 1.5	1.6 gpf 1.5 gpm 0.5 gpm 3 gpm 90 g/use	1.2 flushes 6.5 minutes 0.18 minutes 2 minutes 0.25 use		0 70.2 0.81 27 162	17.28 17.55 0.81 27 40.5	17 88 2 54 203			, <sup>88</sup> , ,
Suites (Queen)	Toilet Shower Sink Kitchen Sink Jacuzzi	0 0 0 <u>7</u> 0 0	0 1.2 0.25 1.5 72	1.6 0.3 0.25 1.5	1.6 gpf 1.5 gpm 0.5 gpm 3 gpm 90 g/use	1.2 flushes 6.5 minutes 0.18 minutes 2 minutes 0.25 use		0 46.8 0.54 18 108	11.52 11.7 0.54 18 27	12 59 13 135	. 4 4 7	. 2 2	. 65 4
Family Suite (2 Queen, 1 King)	Toilet Shower Sink Kitchen Sink Jacuzzi	ი ი ი 2 ი ი	0 1.2 0.25 1.5 72	1.6 0.3 0.25 1.5	1.6 gpf 1.5 gpm 0.5 gpm 3 gpm 90 g/use	1.2 flushes 9 minutes 0.18 minutes 2 minutes 0.25 use		0 45 1 54 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9.6 13.5 0.45 15 22.5	10 68 80 13 13	. <sub>48 6</sub>	, <del>1</del>	, 8° °, ,
Family Suite (2 Queen, 1 King)	Toilet Shower Sink Kitchen Sink Jacuzzi	- 0 + 0 40 +	0 1.2 0.25 1.5 72	1.6 0.3 0.25 1.5	1.6 gpf 1.5 gpm 0.5 gpm 3 gpm 90 g/use	1.2 flushes 9 minutes 0.18 minutes 2 minutes 0.25 use		0 70 0 0 00 8 12 4 13 6	3.84 2.7 0.09 15	4 4 0 6 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	, <del>L</del> o , , ,	, e o	, <del>, , , , , , , , , , , , , , , , , , </del>
Public Bathroom	Mens Womens Urinal Mens Sink Womens Sink		0 0 0 0.25 0.25	3.5 3.5 1 0.25 0.25	3.5 gpf 3.5 gpf 1 gpf 0.5 gpm 0.5 gpm	5 flushes 8 flushes 8 flushes 2 minutes 1 minutes		000	17.5 28 8	28 8 8	m ov	60	 4
Kitchen Sink		<del>-</del>	~	~	2 gpm	15 minutes		15	15	30			,
Other Dishwasher Lee Machine (Hoshizaki) KM 320 MAH Pool (Fill w/ Hose 15 min/day) Washing Machine (Commercial) Kermore Model 11 Outdoor Irrigation	re Model 11	T 0 T T 0 O	28.5 0 0 0	16 17.8 5 0.6 28.5 20	16 g/use 17.8 gp100# 5 gpm 3 gpm 57 g/use 20 g/use	3 use 2 100# Ice 15 minutes 0 minutes 2.7 use 0 use		0 0 0 153.9 1,344 observed	48 71.2 75 75 153.9 0 955 96	48 71 75 0 0 308 2,300 avg day 96,960 avg month 42 days at avg 3,232 avg day			
Shower	ΩU	mber Hard	number Hardware Installation 87 \$ 33.00 \$ 10.00	₩	Total Pay Back		Water Savings (gpy)	Energy Savings (kWhr) 7.405 56.016	(kWhr) 56.016	Total Cost Savings/yr \$ 6.326	ta	Cost Savings/yr/fixture 73	xture
Bathroom Sink		110 \$	1.61	9 99	L 88		345	16,087 343,492	1,720 57,736	\$ 244	<b>↔</b>	2 2	

\*Calculation based on \$30,000 per AF \*\* Calculation based on \$9.507 1000 gal

Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy

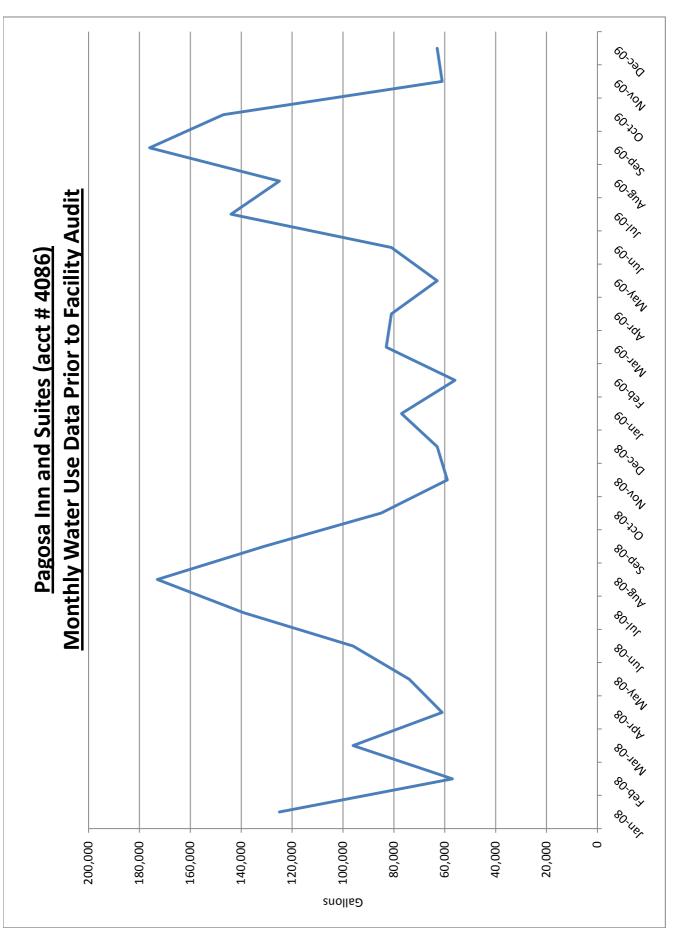
Avoided Cost\*\*:

Replacement Water Cost\* : \$

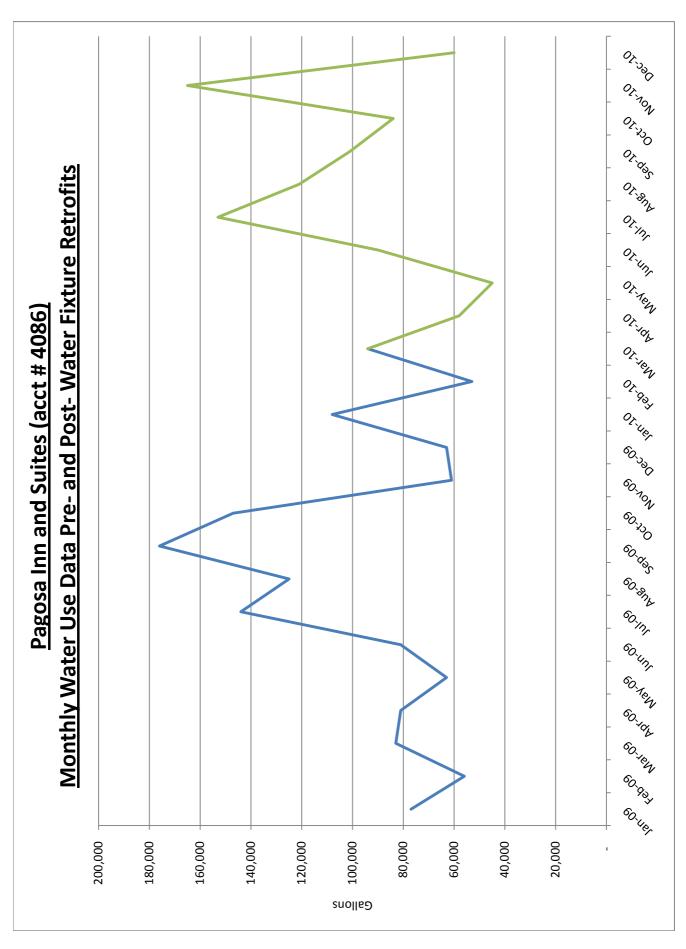
\$/AF:

1.05

AF Savings



\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 31, 2010



## **SMART WATER Audit Report**

## Pinewood Inn

## Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 157 Pagosa St in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

Pinewood Inn uses water in a manner consistent with hotels throughout Colorado. Similar to many hotels built before 1993, Pinewood Inn had sinks, showers, and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Pinewood Inn included the following assumption:

- Pinewood Inn indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property
- Pinewood Inn also indicated that the rooms including a kitchen unit are usually the first rooms to be filled, therefore, the water demand table shows those rooms with a high average volume

The 25 sink faucet aerators found in each of the hotel suites used about 2.7 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$50 dollars per year per sink. This savings results in a payback period of about two months.

The 25 hotel showers, on average, used about 4.2 gallons of water per minute. New low flow showerheads, which use 1.5 gallons per minute, were installed at a total cost of \$1,075 with an estimated total water savings of about 140,000 gallons annually. With these savings, the payback period for the installation of the shower heads should be about four months

In total, 25 sink faucet aerators and 25 showerheads in Pinewood Inn were updated at a cost of \$1,240. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$4,300 will result from these changes, saving about 192,000 gallons of water and 41,000 kilowatt hours of energy.



## Maximum Use Calculation

				1	1				
	number	hot 12	ploo	total		uses/day hot	ploo	tol	total
	toilet	12	0	1.6	1.6 gpf	1.5 flushes	0	28.8	28.8
ds	shower	12	4.8	1.2	e gpm	7 minutes	403.2	100.8	504
	sink	12	1.5	1.5	3 gpm	2.225 minutes	40.05	40.05	80.1
		00							
	toilet	00	0	1.6	1.6 gpf	3 flushes	0	38.4	38.4
sh	nower	00	2	0.5	2.5 gpm	20 minutes	320	80	400
	sink	80	1.25	1.25	2.5 gpm	4.45 minutes	44.5	44.5	89
		2							
	toilet	2	0	1.6	1.6 gpf	4 flushes	0	32	32
.hs	nower	2	2	0.5	2.5 gpm	20 minutes	200	20	250
	sink	Ŋ	1.25	1.25	2.5 gpm	4.6 minutes	28.75	28.75	57.5
kitchen sink	n sink	2	2	0.5	2.5 gpm	10 minutes	100	25	125
	toilet	3	0	2.5	2.5 gpf	5 flushes	0	37.5	37.5
sh	nower	3	3.2	0.8	4 gpm	30 minutes	288	72	360
	sink	3	1.1	1.1	2.2 gpm	6.75 minutes	22.275	22.275	44.55
kitchen sink	n sink	1	1.2	0.3	1.5 gpm	35 minutes	42	10.5	52.5
		1	0	17.8	17.8 gp100#	2 100#	0	35.6	35.6
		1	21	21	42 gpc	3 cycles	63	63	126
		1	21	21	42 gpc	1.5 cycles	31.5	31.5	63
Dishwasher (residence)		1	0	1.2	1.2 gpc	1 cycles	0	1.2	1.2
							1,583	742	2,325 max day
							observed		70,000 max month
									30 days at max

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	number	hot	ploo	total		uses/day hot	cold	tol	total
Single Unit		12							
	toilet	12	0	1.6	1.6 gpf	1.2 flushes	0	23.04	23.04
	shower	12	4.8	1.2	e gpm	4.5 minutes	259.2	64.8	324
	sink	12	1.5	1.5	3 gpm	2.18 minutes	39.24	39.24	78.48
Double Unit		∞							
	toilet	∞	0	1.6	1.6 gpf	1.5 flushes	0	19.2	19.2
	shower	∞	2	0.5	2.5 gpm	8 minutes	128	32	160
	sink	00	1.25	1.25	2.5 gpm	2.225 minutes	22.25	22.25	44.5
Kitchen Unit		ιn							
	toilet	Ŋ	0	1.6	1.6 gpf	3 flushes	0	24	24
	shower	Ŋ	2	0.5	2.5 gpm	15 minutes	150	37.5	187.5
	sink	Ŋ	1.25	1.25	2.5 gpm	4.45 minutes	27.8125	27.8125	55.625
	kitchen sink	23	2	0.5	2.5 gpm	5 minutes	20	12.5	62.5
Residence									
	toilet	3	0	2.5	2.5 gpf	2.5 flushes	0	18.75	18.75
	shower	3	3.2	0.8	4 gpm	21 minutes	201.6	50.4	252
	sink	3	1.1	1.1	2.2 gpm	6.375 minutes	21.0375	21.0375	42.075
	kitchen sink	1	1.2	0.3	1.5 gpm	25 minutes	30	7.5	37.5
Other									
Ice Machine		1	0	17.8	17.8 gp100#	1 100#	0	17.8	17.8
Laundry (motel)		1	21	21	42 gpc	2 cycles	42	42	84
Laundry (residence)		1	21	21	42 gpc	1 cycles	21	21	42
Dishwasher (residence)		1	0	1.2	1.2 gpc	1 cycles	0	1.2	1.2
							992	482	1,474 avg day
							observed		44,364 avg month
									30 days at avg
							observed		1.479 avg day

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			ber use					subtotal gpd			Savings			Ī
	number	hot	cold	total		uses/day	hot	ploo	total		hot	ploo	total	
Single Unit		12												
	toilet	12	0	1.6	1.6 gpf	1.5 flushes		0	28.8	28.8		0		0
	shower	12	1.2	0.3	1.5 gpm	7 minutes		100.8	25.2	126				378
	sink	12	0.25	0.25	0.5 gpm	2.225 minutes		6.675	6.675	13.35				6.75
3 3 3														
Double Unit	tellion.	xo o	c	,	, c	C. C		c	* 00			c	c	•
	shower	0 00		T:0	1.0 gpl	20 minutes		193	30.4	30.4		128	° 6	160
	sink	o ∞	0.25	0.25	0.5 gpm	4.45 minutes		8.9	6.8	17.8		35.6	35.6	71.2
Kitchen Unit		50 1	,	;					;	;				,
	tollet	ı, ıı	0 ;	1.6	1.6 gpt	4 flushes		0 0,5	32	32		0 8	0 %	0 0
	sink	חות	1.2 0.25	0.3	1.5 gpm	4.6 minutes		120	30	11.5		8 %	23	100
	kitchen sink	חנת	0.23	0.5	0.3 gpm	10 minutes		100	27.5	125		g c	67	p+ C
		,	4	3	200			0	2			•	•	•
Residence														
	toilet	3	0	2.5	2.5 gpf	2 flushes		0	37.5	37.5		0	0	0
	shower	e e	3.2	0.8	4 gpm	30 minutes		288	72	360		0 (	0 (	0
	SINK	η -	1.1	1.1	2.2 gpm	6.75 minutes		22.275	105	44.55		0 0	0 0	0 0
	KIICHEH SHIR	4	7.7	6.0	L'S gpill	samuur cc		747	10.3	52.5		0	0	0
Other														
Ice Machine		1	0	17.8	17.8 gp100#	2 100#		0	35.6	35.6		0	0	0
Laundry (motel)		1	21	21	42 gpc	3 cycles		63	63	126		0	0	0
Laundry (residence)		1	21	21	42 gpc	1.5 cycles		31.5	31.5	63		0	0	0
Dishwasher (residence)		1	0	1.2	1.2 gpc	1 cycles		0	1.2	1.2		0	0	0
								981		1,503 max day				
								observed		70,000 max month				
								postage		7 222 may day				
								200		(a)				
Average Use Calculation	ation													
	-		ber use					subtotal gpd			Savings			I
Single Unit	number	hot 12	ploo	total		uses/day	hot	ploo	total	=	hot	ploo	total	
	toilet	12	0	1.6	1.6 gpf	1.2 flushes		0	23.04	23.04		0	0	0
	shower	12	1.2	0.3	1.5 gpm	4.5 minutes		64.8	16.2	81		194.4	48.6	243
	sink	12	0.25	0.25	0.5 gpm	2.18 minutes		6.54	6.54	13.08		32.7	32.7	65.4
is I old or		o												
nonnie oliit	tollet	0 00	0	1.6	1.6 gpf	1.5 flushes		0	19.2	19.2		o	0	0
	shower	. 00	1.2	0.3	1.5 gpm	8 minutes		76.8	19.2	96		51.2	12.8	64
	sink	∞	0.25	0.25	0.5 gpm	2.225 minutes		4.45	4.45	8.9		17.8	17.8	35.6
Nitchen Offic	tollet	n Lr	c	16	1.6 anf	3 flushes		O	2.4	24			c	0
	shower	ını	1.2	0.3	1.5 gpm	15 minutes		06	22.5	112.5			15	75
	sink	2	0.25	0.25	0.5 gpm	4.45 minutes		5.5625	5.5625	11.125		22.25	22.25	44.5
	kitchen sink	Ŋ	2	0.5	2.5 gpm	5 minutes		20	12.5	62.5			0	0
Residence														
	toilet	3	0	2.5	2.5 gpf	2.5 flushes		0	18.75	18.75		0	0	0
	shower	e	3.2	0.8	4 gpm	21 minutes		201.6	50.4	252		0	0	0
	sink	m ·	1.1	1.1	2.2 gpm	6.375 minutes		21.0375	21.0375	42.075		0 0	0 0	0
	Kitchen sink	-	1.2	0.3	I.5 gpm	25 minutes		30	ç;	37.5		0	0	0
Other														
Ice Machine		1	0	17.8	17.8 gp100#	1 100#		0	17.8	17.8		0	0	0
Laundry (motel)		. 1	21	21	42 gpc	2 cycles		42	42	84		0 (	0 (	0
Laundry (residence)		Į.	21	21	42 gpc	1 cycles		21	21	42		0	0	0
Dishwasher (residence)		1	0	1.2	1.2 gpc	1 cycles		0 ,	1.2	1.2		0	0	0
								observed		44.364 avg month				
										47 days at avg				
								observed		1,479 avg day				

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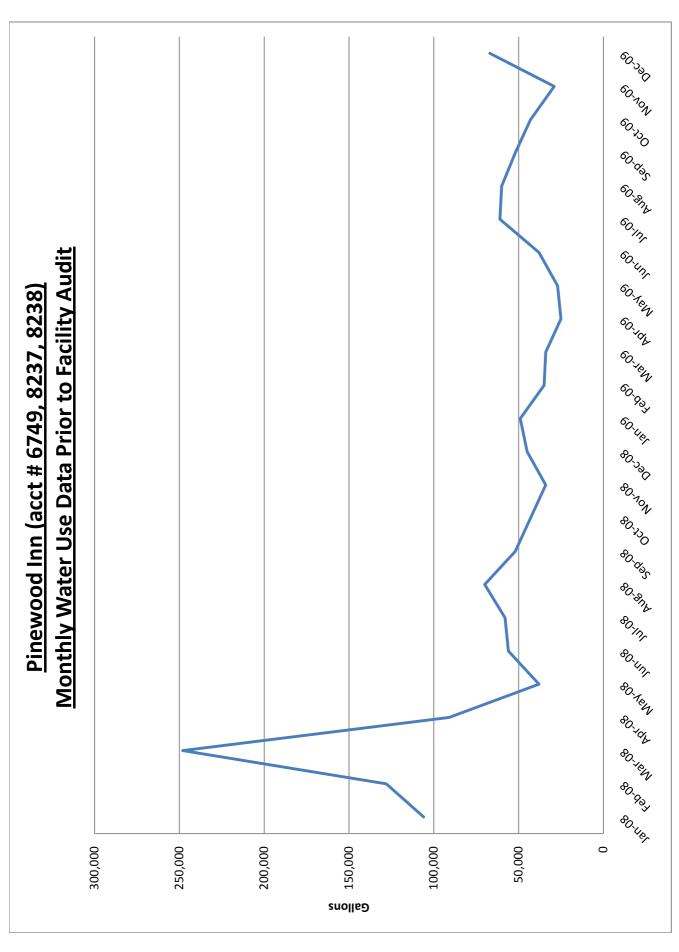
## Costs to Implement

	number Hardware In		Total Pay Back	Water Savings (gpy)	Energy Savings (kWhr)	Total Cost Savings/yr	ıgs/yr	Total Cost Savings/yr/fixture
wer	25 \$ 33 \$ 10 \$		0.35 yrs	139,430	29,819	\$	3,082	\$ 123
	25 \$ 1.61 \$	5 \$ 165	0.14 yrs	53,108	11,358	s	1,174	\$ 47
		\$ 1,240		192,538	41,177	\$	4,255	
	AF Savings: 0.59	\$/ AF:	\$ 2,099	Replacement Water Cost*:	17,726	Avoided Cost**:	; \$ 1,829	,829
				* Calculation based on \$30,000 per AF	. AF	** Calculation b	** Calculation based on \$9 50/ 1000 gal	<u></u>

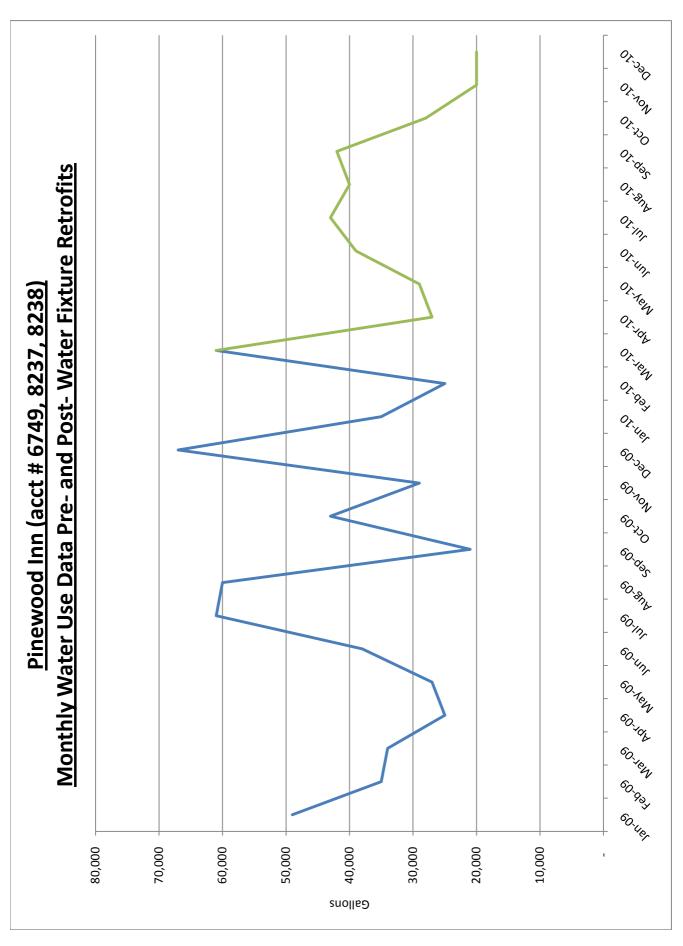
Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed on March 29, 2010



## **SMART WATER Audit Report**

## The Spa

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 317 Hot Springs Blvd. in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

The Spa uses water in a manner consistent with resorts throughout Colorado. Similar to many facilities built before 1993, the Spa had sinks, showers, and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for the Spa included the following assumption:

- The Spa indicated that they do have some outdoor irrigation by hose during summer months. In order to account for account for indoor water use only, an expected average monthly outdoor water use was estimated based off of the irrigation area, and deducted from the average monthly water use
- The maximum monthly water demand value was not adjusted since it occurred during a winter month, excluding any outdoor water use

The 20 sink faucet aerators found in each of the hotel suites, the Spa bathroom, Salon and Laundry room used, on average, about 2.55 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$143 dollars per year per sink. This savings results in a payback period of about 3 weeks.

The 20 hotel showers, on average, used about three gallons of water per minute. New low flow showerheads, which use 1.5 gallons per minute, were installed at a total cost of \$860 with an estimated total water savings of about 524,000 gallons annually. With these savings, the payback period for the installation of the shower heads should be about 4 weeks.

The four toilets replaced in the Spa, on average, used 1.6 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$1,508 with an estimated total water savings of about 33,000 gallons annually. With these savings, the payback period for the installation of the toilets is estimated to be about 6 years. Additionally, one urinal was replaced with a Water Sense approved waterless urinal at a cost of \$396 with a payback period estimated to be about 2.5 years. It is estimated that the urinal replacements will have a total water savings of about 20,000 gallons annually.

In total, 20 sink faucet aerators, 20 showerheads, four toilets and one urinal in The Spa were updated at a cost of \$2,896. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$15,000 will result from these changes, saving about 700,000 gallons of water and 140,000 kilowatt hours of energy.

## Maximum Use Calculation

total use
0.5 2.5 gpm 30.0
3 gpm
0.5 2.5 gpm 45.0
2 gpm 3 gpm
1.6 1.6 gpf 16.0 0.8 4 gpm 60.0
3 gpm
9
0.5 2.5 gpm 25.0
2 gpm
1 gpf
0.3 1.5 gpm 300.0 0.45 2.25 gpm 300.0
2.5 gpm
2.5 gpm
1.6 1.6 gpt 20.0 1.5 3 gpm 3.0
1.6 1.6 gpf 12.0
2.5 gpm
1.6 1.6 gpf 5.0 0.75 1.5 gpm 0.8
3.5 3.5 gpf 2.0
iidh o
0.4 2 gpm 15.0
24 g/use
20 40 g/use 5.1.
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320 320 gpd -
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## Average Use Calculation

	rodonic	ţ	per use	0+0+	-		***************************************	subtotal gpd	\$		
Room (1 Queen)	5	4	200		,	oco/day	2	5	9		
	Toilet	- 4	0		1.6 apf	6.0 flushes			38	38	
S	Shower	4	2		2.5 apm	30.0 minutes		240	09	300	
	Ni.	4			2 apm	8.5 minites		34	34	89	
Kitche	Kitchen Sink	4	2.4	- 90	and S	10.0 minutes		5 %	2.5	120	
Room (1 Queen w/ pull out couch)		2									
	Toilet	2	0	9.1	1.6 gpf	9.0 flushes			59	29	
u)	Shower	2	2		2.5 gpm			144	98	180	
	Sink	2	-		2 gpm			15	15	29	
Kitche	en Sink	2	2.4		3 gpm	10.0 minutes		48	12	09	
Boom (2 Original)		α									
	tollor.	0 0	c	9	40.00				15.4	16.1	
o	Chouse	0 0		0.0	1.0 gpl	12.0 Ildalies		, ,	504	101	
J	o lowel	0 0	2 4	0.0	t gpm			1,440	307	000,1	
	≦ 5	0		<u>.</u>	illdfi c			0	0	233	
Salon											
	tollet		C		1.6 anf				24	24	
3.	shower		0 0	5.0	2.5 gpm	20.0 minutes		40	10	50	
-	sink		1 ←		2 dom			2 00	2 00	15	
	É	-			2				,	2 .	
SPA Bathroom											
	Men	c	0		1.6 anf				SO	80	
>	Women	۷ «	o c	5 4	1.0 gp				8 2	168	
	irinal	· -			dg t	55.0 flushes			5 15	0 4	
modS	Shower Men	- ~			15 apm			630	3 22	288	
Shower Women	Vomen	20			1.5 gpm			630	2 2 2 2 2 2	788	
	Wen Wen	۷ ر			15.5 gpm			8	8 6	000	
S AUG	Sink Women	۰ د	1.25	1.25	2.5 gpm	5.3 minutes		13 8	3 8	9 00	
		1			- A			₽.	2 ,	2 .	
Laundry										,	
Î	toilet	_	0	1.6	1.6 apf	15.0 flushes			24	24	
	Sink	_	1.5	1.5	3 gpm	2.3 minutes		က	e		
Home (3 People full time)											
Full Bath											
	Toilet	_	0	9.1	1.6 gpf	9.0 flushes			14	14	
Č	Sink	<b>.</b>	7.5	1.5	3 gpm			= =	<del>1</del> 2	22	
en.	Shower	_	N	0.5	Z.5 gpm	45.0 minutes		06	53	113	
Half Bath											
	Toilet	_		1.6	1.6 apf				9	9	
	Sink	_	0.75	0.75	1.5 gpm	0.6 minutes		0	0	-	
: :											
Half Bath			(	ı					. '	, '	
Sink (Drins, cant true)	rollet		0 0	o. o	3.5 gpl	z.u riusnes - minirtes			` '	,	
	ć.		o	þ							
Kitcher	Kitchen Sink	-	1.6	0.4	2 gpm	10.0 minutes		16	4	20	
										•	
Other		,	ç	ç				, ;	, 5	, (	
Washing Machine (HE Kenmore)			12	12	24 g/use	1.0 use		12	12	24	
Washing Machine (Speed Onesza) SC40MNZYI 40	1001		0 6	20	40 g/use			8 8	8 8	160	
DishWashing Machine Maytag (home)			20	2 4	14 g/use			8.	8 ~	201	
Outdoor Irrigation w/ hose			0 319.79138	9138 319.7	319.7914 gpd	- day					
RV 8 Spaces w Yard Spigots		∞		c)	5 gpm	- minutes					
								3,567	1,801	5,368 avg day 161 225 avg month	
										30 days at avg	
								observed		5,374 avg day	

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## Maximum Use Water Savings

Maximum Ose Marci Cavings		ľ	001.101			pas storquis				Coningo		
	number	hot	cold total		uses/day	Subtotal gpd	cold	total		hot	ld total	 
Room (1 Queen)	•											
Shower	let 6	0 (	9.1	1.6 gpf	8.0 flushes		0 777	51.2 36	51.2	, 90	. 8	130
Jawoii S		2.1	0.35	IIIdb c			1 0	9 0	18.4	9 80	5 C	2 2
Kitchen Sink	₹ . 4	2.4	0.6	3 gpm	20.0 minutes		192	48	240	3 ,	3 ,	3 ,
	c											
Toilet		c	16	16 anf	12.0 flushes		C	38.4	38.4			
Shower	Ver 2	1.2	0.3	1.5 apm	45.0 minutes		108	27	135	72	18	06
Auis		0.25	0.25	0.5 apm			6.9	6.9	13.8	21	21	4
Kitchen Sink		2.4	9.0	3 gpm			96	24	120			
Toilet		c	16	1.6 anf			c	204.8	2048			
neworks.		12	0.3	1.5 dpm			576	144	720	960	240	1 200
ZW.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S	. e	0.25	0.25	0.5 gpm	18.4 minutes		36.8	36.8	73.6	184	184	368
				i								
Salon									;			
toilet	et .	0 ;	1.6	1.6 gpf	20.0 flushes		0 ;	35	32		. '	. :
shower		1.2	0.3	1.5 gpm	25.0 minutes		30	7.5	37.5	20	വ	52
SINK	¥	0.25	0.25	0.5 gpm	10.0 minutes		2.5	2.5	o	20	<b>20</b>	15
SPA Bathroom												
	Men	c	1 25	1.25 anf	37 O flushes		C	92.5	92.5		90	90
Women	1 60	0 0	6	Jub 60			o C	135	135		105	105
leuin		0	0	o ap			0	0	3 0		75	75
Shower Men		1.2	0.3	1.5 apm			1080	270	1350		2 .	2 .
Shower Women		1.2	0.3	1.5 apm			720	180	006	360	06	450
Sink Men		0.25	0.25	0.5 apm			8.4	8.4	16.8	8	8	29
Sink Women		0.25	0.25	0.5 gpm	7.5 minutes		3.75	3.75	7.5	15	15	30
Laundry		•					•		6			
tollet		0 0	9.1	1.6 gpt	20.0 flushes		0 10	32	32			,
	-	0.25	67.0	mdg c.o			0.75	0.73	Č.	4	4	0
Full Bath												
	let 1	0	1.6	1.6 gpf	12.0 flushes		0	19.2	19.2			
Sink	<del>ا</del>	1.5	1.5	3 gpm	13.8 minutes		20.7	20.7	41.4			
Shower	er 1	2	0.5	2.5 gpm	45.0 minutes		06	22.5	112.5			
Half Bath												
	ţa.	C		1.6 anf			O	œ	α			
Sink	, <del>,</del> ,	0.75	0.75	1.5 gpm	0.8 minutes		0.5625	0.5625	1.125			
Half Bath Toilet	1	c	ď	2 F G G F	odaille 0 c		-	^	7			
Sink (Drips, cant turn on)	- t-	0	90	mdb 0	- minutes		0	. 0	. 0			
				i								
Kitchen Sink	<del>ب</del>	1.6	0.4	2 gpm	15.0 minutes		24	9	30			
Other			:	;			:	:				
Washing Machine (HE Kenmore)		27 02	12	24 g/use	1.0 use		100	7 2	200			
Washing Machine (Sheed Oheeza) SC40MNZY140001		2 6	200	40 g/use			001	8 5	200			
DishWashing Machine Maytag (home)		0	54	14 g/use	1.0 use		0	3 4	41			
				0								
Outdoor Irrigation w/ hose		0	319.79138 31	319.7914 gpd	- day		0	0	0			
RV 8 Spaces w Yard Spigots	00	0		5 gpm	- minutes		0 000	_	0			
							3,362	1,0/,	5,062 max day			
							DDA 19600		46 days at max			
							observed		7.733 max day			

GREAT WESTERN INSTITUTE

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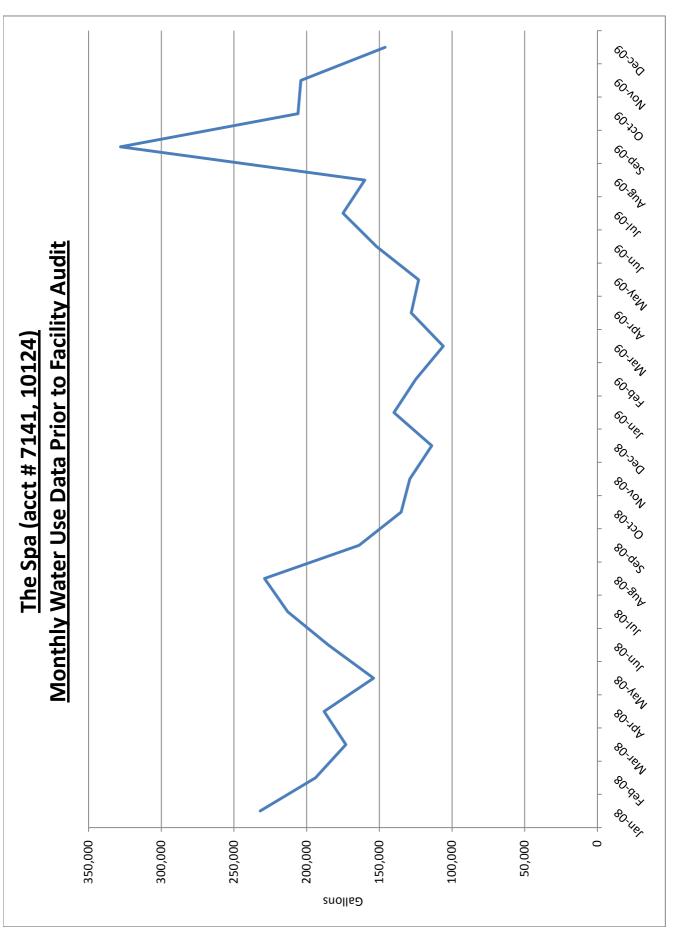
## Average Use Water Savings

Figure   Marie   Mar	March   Marc				n Jec n	Se			subtotal and				Savings		
Triangle   1	Think		number	hot	ploo		1	uses/day	hot	ploo	total		hot	cold	total
State   1	State   Stat	oom (1 Queen)		4.	•					•					
The color of the	The control of the		Shower	4 4	0 21	9.1	1.6 gpt 1.5 gpm			144	38.4 36	38.4	, 96	- 24	120
State   1	Signature Sink   4		Sink	4	0.25	0.25	0.5 gpm			8.5	8.5	17	26	56	51
The control of the	The control of the		Kitchen Sink	4	2.4	9.0	3 gpm			96	24	120	•	•	•
Sheet   2	Single   2	om (1 Queen w/ pull out couch)		2											
Figure 1944   2	Section Signature   Color		Toilet	2 0	0 ;	9.0	1.6 gpf			0 98	28.8	28.8	. 4	. **	,
Figure Six   2	National Silvin		Sink	۷ ٥	2, 0	0.55	gpm			3 675	3,675	7 35	2 %	4 +	2 6
The Table Bills of the Control of th	Total Signature		Kitchen Sink	7 7	2.4	9.0	3 gpm			48	12	90			1,
Total Figure 1	This is a 10 to 15 to 15 to 15 to 10 to 15	om (2 Queen)		00											
Shower   S	Shower   S	(1)	Toilet	, φ	0	1.6	1.6 gpf	12.0 flushes		0	153.6	153.6		•	
Second Column   1	State   Stat		Shower	8	1.2	0.3	1.5 gpm	48.0 minutes		460.8	115.2	576	292	192	
Figure   1	Figure   F		Sink	80	0.25	0.25	0.5 gpm	9.8 minutes		19.6	19.6	39.2	86	86	
Figure   1	Part	uo													
With Man (Window)         1         CEA (LOS)         CEA (LOS) <t< td=""><td>  Showing   1   10   12   12   12   12   12   12</td><td></td><td>toilet</td><td><del>.</del> .</td><td>0 (</td><td>1.6</td><td>1.6 gpf</td><td>15.0 flushes</td><td></td><td>0 7</td><td>24</td><td>24</td><td>. *</td><td></td><td></td></t<>	Showing   1   10   12   12   12   12   12   12		toilet	<del>.</del> .	0 (	1.6	1.6 gpf	15.0 flushes		0 7	24	24	. *		
When states were all and states and states were all and states and were all and states and were all and states and were all a	When survey with a survey of the survey of the survey with a su		sink		0.25	0.25	0.5 gpm	7.5 minutes		1.875	1.875	3.75	9	4 9	
Wein Viniting With With Miles         1	Wind Processing Windows         2         0         1.25         0.15         0.25         0.25         0.15         0.25         0.15         0.15         0.15         0.15         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14         0.25         0.14 <td>A Bathroom</td> <td></td>	A Bathroom													
Without Including the state of the	Showther   1		Men	2	0	1.25	1.25 gpf			0	62.5	62.5		18	
Show with a 1 to 2 to 2 to 3 to 3 minutes a series and state of 1 to 2 to 3 to 3 minutes a series and without a series and with a 1 to 2 to 3 to 3 minutes and without a series and with a series and without a series and with a series and with a series and without a series and with a series and with a series and without a se	Shower Man 1 1 2 0 2 15 para 150 makes 800 mak		Women	e .	0	6.0	0.9 gpf			0	94.5	94.5	•	74	
Show With Warmary   2	Show Women   2		orinal	<del>-</del> (	0 (	0 0	0 gpf			0 0	0 2	0		22	
Sink Main         2         0.25         0.5 gipm         120 minutes         120 minutes         2         22 minutes         2         22 minutes         2	Sink Main         2         0.25         0.5 gpm         120 minutes         2         3         4         3         4	-	Shower Women	n c	7 6	5.0	1.5 gpm			630	105	525	210	. 23	
Sink Women         2         0.25         0.55 pm         5.3 minutes         5.2         5.25         5.25         5.25         11         11           Sink         1         0.25         0.25 pm         1.50 flushes         1.50 flushes         1.60 pm         1.50 flushes         1.60 pm         1.50 flushes         1.60 pm         1.50 flushes         1.60 pm         1.60 pm         1.50 flushes         1.60 pm         1.60 pm <td>  Sink Woman   2 0.25 0.25 ppm   5.3 minutes   2.625 5.25 5.25 5.25   1.1 minutes   1.0 minutes   1.</td> <td></td> <td>Sink Men</td> <td>7</td> <td>0.25</td> <td>0.25</td> <td>0.5 gpm</td> <td></td> <td></td> <td>9</td> <td>9</td> <td>12</td> <td>24</td> <td>24</td> <td></td>	Sink Woman   2 0.25 0.25 ppm   5.3 minutes   2.625 5.25 5.25 5.25   1.1 minutes   1.0 minutes   1.		Sink Men	7	0.25	0.25	0.5 gpm			9	9	12	24	24	
Total	Totalet   1		Sink Women	2	0.25	0.25	0.5 gpm			2.625	2.625	5.25	11	1	
Uniet         1         0         1.65         fil gipd         1.50 flushes         0.6625         0.6224         1.24         3	Sink   1   0.0   1.6   1.6 pt   1.50 fluidises   0.6625   0.624   1.22	ndry													
Toliet	Tollet 1 6 16 90 flushes 110.05 SNA 110.05 S		Sink		0 25	1.6	1.6 gpf 0.5 gpm	15.0 flushes		0.5625	24 0.5625	24		,	
Tollet	Toilet   1   15   15   15   15   15   15   15	ne ( 3 People full time)	Š	-		9	200							•	
Total	Sink Dips. cantum on)   1   15   15   15   15   15   15   15	Bath	t T	•	c	9	9	900		c	7	7			
Shower   1   2   0.5   2.5 gpm   450 minutes   90   22.5     Tollet	Shower         1         2         0.5         2.5 gpm         4.0 flushes         90         2.5 5           Sink (Drips, cant tum on)         1         0.75         1.6 gpf         4.0 flushes         0         6.4         6.4           Sink (Drips, cant tum on)         1         0.75         3.5 gpf         2.0 flushes         0         0         6.4           Sink (Drips, cant tum on)         1         1.6         0.4         2 gpm         1.0 minutes         0 <td< td=""><td></td><td>Sink</td><td></td><td>1.5</td><td>. t.</td><td>3 gpm</td><td>7.4 minutes</td><td></td><td>11.025</td><td>11.025</td><td>22.05</td><td></td><td></td><td></td></td<>		Sink		1.5	. t.	3 gpm	7.4 minutes		11.025	11.025	22.05			
Toliet Toliet 1 0.75 0.75 1.5 gpm 0.6 minutes 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	Toilet   1   0   1.6   1.6 gpf   0.6 minutes   0.45   0.		Shower	-	7	0.5	2.5 gpm	45.0 minutes		06	22.5	112.5			•
Tollet   1 0.75 0.75 1.5 gpm	Tollet	Bath													
Tollet   1   0   3.5   3.5 gpf   2.0 flushes   0   0   0   0   0   0   0   0   0	Tollet   1   0   3.5 gpf   2.0 flushes   0   0   0   0   0   0   0   0   0		Toilet Sink		0.75	1.6 0.75	1.6 gpf 1.5 gpm	4.0 flushes 0.6 minutes		0 0.45	6.4	6.4 0.0			
Tollet   1   0   3.5   3.5 gpf   2.0 flushes   0   0   0   0   0   0   0   0   0	Tollet   1   0   3.5 gpf   2.0 flushes   0   0   0   0   0   0   0   0   0	Bath													
Sink (Dilbs, sant unit of)	Sink (Dilbs, santutin or)   1		Toilet		0 0	3.5	3.5 gpf			0 0	<b>~</b> 0	۲.		•	•
Kitchen Snik         1         1.6         0.4         2 gpm         10.0 minutes         16         4           C40/MNZYU60001         1         12         24 g/use         10 use         80         80         80           C40/MNZYU40001         1         20         20         40 g/use         4.0 use         80         80         80           g (home)         1         20         20         40 g/use         0.5 use         0         7           g (home)         1         0         14 g/use         0.5 use         0         0         7           g (home)         1         0         14 g/use         0.5 use         0         0         0           g (home)         1         0         15 gpm         - minutes         0         0         0	Kitchen Sink   1   16   0.4   2 gpm   10.0 minutes   16   4   4   4   4   4   4   4   4   4	Sink (Dilk	ps, cant turn on)	-	>	>	ndb o	- minutes		0	0	0			
ore)         1         12         14         24 g/use         10 use         12	12 12 24 g/use 1.0 use 12 80 80 80 80 80 80 80 80 80 80 80 80 80		Kitchen Sink	-	1.6	0.4	2 gpm			16	4	20	•		•
Octob         1         12         12         24 g/use         10 use         10 use         12	Ore         1         12         12         24 g/use         10 use         12	ŭ													
20	20	shing Machine (HE Kenmore)	7000	<b>-</b> -	12	12	24 g/use			12	12	24	•	•	•
3 (home) 1 0 14 14 gluse 0.5 use 0 7 7 9 19 19 19 19 19 19 19 19 19 19 19 19 1	3 (home) 1 0 14 14 gluse 0.5 use 0 7 7 0 1 1 0 319.79138 319.7914 gpd - day 0 0 0 0 0 0 8 0 5 gpm - minutes 2.242 0.981791 0.0861791 0.0861791 0.0861791 0.0861791 0.0861791	shing Machine (Onlinac) OC40MNz 100 shing Machine (Speed Queeza) SC40M	MNZYU40001		8 8	20 70	40 g/use			80	08	160			
1 0 319,79138 319,7914 gpd - day 0 0 0 0 8 0 18,000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0 319,79138 319,7914 gpd - day 0 0 0 0 0 0 0 0 0 0 0 8 0 0 15 gpm - minutes 0 2,242 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	hWashing Machine Maytag (home)		-	0	14	14 g/use			0	7	7	•	٠	•
2,242 1,191 - Illinois 2,242 1,191 Observed 1,191	2.242 1.191 cbserved observed	door Irrigation w/ hose		- ∘		.79138 319.	7914 gpd	- day		00	0 0	00	•	•	
observed	observed	o spaces wiraid spigors		0		n	uidh c	- minutes		2.242	1.191	3.432 ave day			
											-	161,225 avg month			
												47 days at avg			

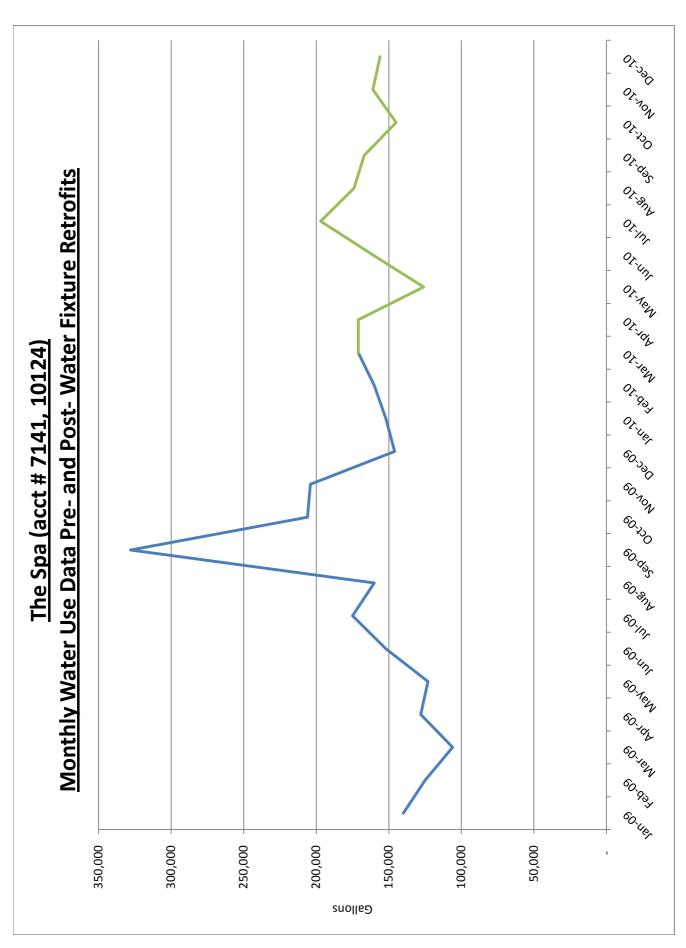
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4	2
4	250
č	3

Costs to Implement			
	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr Total Cost Savings/yr/fixture
Toilet	4 \$ 282 \$ 95 \$ 1,508 5.54 yrs	33,215	\$ 272 \$ 68
Urinal	1 \$ 311 \$ 85 \$ 396 2.41 yrs	20,075	\$ 165 \$ 165
Shower	33 \$ 10 \$ 860	523,593 111,978	\$ 11,572 \$ 579
Bathrom Sink	\$ 5 \$ 132 0.05	129,548 27,706	\$ 2,863 \$ 143
	\$ 2,896	-	\$ 14,872
	AF Savings: 2.17 \$/AF: \$ 1,336	Replacement Water Cost*: \$ 65,039	Avoided Cost**: \$ 6,711
		* Calculation based on \$30,000 per AF	** Calculation based on \$9.50/ 1000 gal

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 16, 2010 and March 30, 2010



## **SMART WATER Audit Report**

## Boss Hogg's Restaurant

### Overview

PAWSD working with Great Western Institute and Environmental Dimensions, conducted a SMART WATER Audit of this facility at 157 Navajo Trail in Pagosa Springs on December 9, 2008. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

Boss Hogg's Restaurant uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, Boss Hogg's Restaurant had sinks and toilets that had not been updated with EPA WaterSense certified water efficient fixtures that are currently available in the marketplace. Boss Hogg's Restaurant does, however, utilize a pre-rinse spray nozzle that was provided by PAWSD 3 to 4 years ago. In addition, the Boss Hogg's Restaurant also utilizes air cooled ice makers (versus water cooled) which help to reduce water use.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Boss Hogg's Restaurant included the following assumptions:

- Boss Hogg's Restaurant indicated that they do not have any outdoor irrigation; therefore, no
  evaluation was performed to characterize outdoor water use for this property
- The five swamp coolers on average use about 88 gallons of water per maximum water use day, and 14 gallons of water on an average water use day.

Based on the 2008 audit, the following fixture replacements occurred in 2010. The five sink faucet aerators in the men's and women's bathrooms used about 2.5 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$65 dollars per year per sink. This savings results in a payback period of about one month.

The five restaurant toilets, on average, used about 2.4 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$1,885 with an estimated total water savings of about 87,000 gallons annually. With these savings, the payback period for the installation of the toilets is estimated to be about 3 years. Additionally, three urinals were replaced with Water Sense approved waterless urinals at a cost of \$1,188 with a payback period of five years. It is estimated that the urinal replacements will have a total water savings of 28,000 gallons annually.

In total, five sink faucet aerators, five toilets and three urinals in Boss Hogg's Restaurant were updated at a cost of \$3,106. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$1,300 will result from these changes, saving about 135,000 gallons of water and 1,300 kilowatt hours of energy.



Table 2 - Summary of Current Water Use and Potential Water Savings Boss Hoggs Restaurant Audit Summary

## Maximum Use Calculation

Umask         men         2         1.6 gpt         17 flushes         17 flushes         5 d sept         50 flushes         5 d sept         50 flushes         5 d sept         5 d sept         5 d lushes         5 d sept         6 d sept	numt	number	hot	per use cold	total		nses/day	hot	subtotal gpd cold	total	
women         2         3.5 gpf         50 flushes         -         350         350         350         unised women         -         350         350         350         350         unised women         -         40 </th <th></th> <th></th> <th>7</th> <th>0</th> <th>1.6</th> <th>1.6 gpf</th> <th>17 flushes</th> <th></th> <th></th> <th>54</th> <th>54</th>			7	0	1.6	1.6 gpf	17 flushes			54	54
unisex         1         6 gpf         25 flushes         -         40         40           men         2         1.125         2.25 gpm         6.3 minutes         -         100         100           women         3         1.25         2.25 gpm         7.5 minutes         28         28         56           women         3         1.25         2.5 gpm         7.5 minutes         28         28         56           unisex         1         1         2 gpm         3.75 minutes         720         180         900           unisex         1         1         5 gpm         90 minutes         720         180         900           3         1.736         0.434         2.17 gpm         10 minutes         52         13         65           1         4         1         5 gpm         45 minutes         52         13         65           2         4         1         5 gpm         45 minutes         5         10         10           3         1.736         0         1.78         1.78 gpt00#         45 minutes         5         10         10           2         4         1         5 gpm         <	>		2	0	3.5	3.5 gpf	20 flushes			320	350
men 2 1.125 1.25 2.25 gpm 6.3 minutes women 3 1.25 1.25 gpm 7.5 minutes 2.8 mi	ر	ınisex	_	0	1.6	1.6 gpf	25 flushes			40	40
men     2     1.125     1.25 by monitores     6.3 minutes     14     14     28       women     3     1.25 c.5 gpm     7.5 minutes     28     28     28     56       unisex     1     1     2 gpm     3.75 minutes     28     28     56       3     1.736     0.434     2.17 gpm     10 minutes     52     180     90       3     1.736     0.434     2.17 gpm     10 minutes     52     13     65       1     21     21 gpm     45 minutes     52     13     65       1     21     21 gpcycle     45 minutes     42     45     225       1     21     21 gpcycle     150 cycles     -     107     107       1     0     1.2 gpcycle     150 cycles     -     440     440       5     0     88     88 gpd     1 daily     -     440     450       1     0     1.2 gpcycle     150 cycles     -     440     450       5     0     88     88 gpd     1 daily     -     440     450       0     0     1.2 gpcycle     1 daily     -     440     450       0     0     1.2 gpcycle     1 dai			e	O	1.33	1.33 apf	25 flushes			100	.100
men         2         1,125         2.25 gpm         6.3 minutes         1         4         28         28         5         5         5         6         6         6         6         6         6         6         6         7         6         7         6         7         7         7         7         7         7         7         8         8         8         8         9 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>100</td> <td></td> <td></td> <td>,</td> <td>: ,</td> <td></td>						100			,	: ,	
men         2         1.125         2.25 gpm         6.3 minutes         14         28         28         28         56         56         56         56         56         56         57.5 minutes         28         56         56         56         56         56         56         56         56         56         56         56         57         56         57	ıks										
women         3         1.25         1.25 gpm         7.5 minutes         28         28         56           unisex         1         1         2 gpm         3.75 minutes         4         4         8         8         90           2         4         1         5 gpm         90 minutes         720         180         900           3         1.736         0.434         2.17 gpm         10 minutes         52         13         65           1         4         1         5 gpm         45 minutes         52         13         65           2         0         17.8         17.8 gp100#         3 100#         -         -         -         -           2         0         17.8         17.8 gp100#         150 cycles         -         107         107         107           1         0         12         12 gpcycle         150 cycles         -         440         440         440           5         0         88         8g gpd         1 daily         -         440         1,597         2,633           0         0         12         1         1,404         1,597         2,633			•	.125	1.125	2.25 gpm	6.3 minutes		14	14	28
unisex 1 1 1 2 gpm 3.75 minutes	×			1.25	1.25	2.5 gpm	7.5 minutes		28	28	56
2 4 1 5 gpm 90 minutes 7-7 180 900 900 900 900 900 900 900 900 900 9	د	ınisex	_	-	-	2 gpm	3.75 minutes		4	4	88
2 4 1 5 gpm 90 minutes 720 180 900 900 900 900 900 900 900 900 900 9											
3 1.736 0.434 2.17 gpm 10 minutes 5 5 13 65 13 65 14 2 12 14 5 gpm 45 minutes 180 45 22 180 45 22 180 17 8 17.8 gp100# 3 100# - 107 107 107 107 107 107 107 107 107 107			2	4	-	5 gpm	90 minutes		720	180	006
3 1.736 0.434 2.17 gpm 10 minutes 52 13 65 13 65 1 1 65 1 1 4 1 5 gpm 45 minutes 180 180 225 225 225 22 17.8 gpt00# 3 100# - 10.0 1.2 1.2 gpcvcle 150 cycles 5 0 88 gpd 1 daily 1.640 dbserved 2.637 0bserved 2.637 0bserved 2.638									,		
1 4 1 5 gpm 45 minutes 180 45 225  1 21 21 42 gpl 2 loads 42 42 84  2 0 17.8 gp100# 3 100# - 107 107 107 107 107 107 107 107 107 107	wash Sink			.736	0.434	2.17 gpm	10 minutes		52	13	65
1 21 21 42 gpl 2 loads 42 42 84 42 84 17.8 gp100# 3 100# - 107 107 107 107 107 107 107 107 107 107			_	4	-	5 gpm	45 minutes		180	45	225
1 21 21 42 gpl 2 loads 42 42 7 18 42 gpl 2 loads 100# 17.8 17.8 gpri00# 3 100# 100# 100# 100# 100# 100# 100#											
1 21 21 42 gpl 2 loads 42 42 84 22 84 22 84 22 84 22 84 3 100# 3 100# - 107 107 107 107 107 107 107 107 107 107											
2 0 17.8 gp100# 3 100# - 107 107 107 107 107 107 107 107 107 107	onse		_	21	21	42 gpl	2 loads		42	42	84
1 0 1.2 1.2 gpcycle 150 cycles - 180 180 180 5 0 88 gpd 1 daily - 440 440 440 1 daily 1,040 1,040 1,597 2,637 79,000 observed 79,000 cycles 1,597 2,637 2,637 cycles 1,597 2,5			2	0	17.8	17.8 gp100#	3 100#			107	107
5 0 88 88 gpd 1 daily - 440 440 440 5637 1,040 1,597 2,637 2,637 9,000 observed 79,000 2,633			_	0	1.2	1.2 gpcycle	150 cycles			180	180
1,597 2,637 observed 79,000 30 observed 2,633	er		2	0	88	pdb 88	1 daily			440	440
observed 79,000 30 observed 2,633									1,040	1,597	2,637 max day
30 2,633									observed		79,000 max month
									observed		30 days at max 2,633 max day

## Average Use Calculation

			peruse	e				subtotal and		
io F	number	r hot	cold	total	İ	uses/day	hot	ploo	total	
3000	men	2	0	1.6	1.6 gpf	15 flushes		0	48	48
	women	7	0	3.5	3.5 gpf	40 flushes		0	280	280
	unisex	<del>-</del>	0	1.6	1.6 gpf	20 flushes		0	32	32
Urinals		က	0	1.33	1.33 gpf	20 flushes		0	80	80
Bathroom Sinks										
	men	2	1.125	1.125	2.25 gpm	5.25 minutes		12	12	24
	women	က	1.25	1.25	2.5 gpm	6 minutes		23	23	45
	nnisex	-	-	← 0	2 gpm	3 minutes		т	က	9
Kitchen Sink		2	4	· <del>-</del>	5 gpm	75 minutes		009	150	750
Kitchen Handwash Sink		က	1.736	0.434	2.17 gpm	10 minutes		52	13	92
Bar Sink		<del>-</del>	4	← ⊂	5 gpm	30 minutes		120	30	150
Other				•						
Laundry In-House		_	21	21	42 gpl	2 loads		42	42	84
Ice Machine		2	0	17.8	17.8 gp100#	2 100#		0	71	71
Dishwasher		-	0	1.2	1.2 gpcycle	150 cycles		0	180	180
Swamp Cooler		2	0	4	14 gpd	1 daily		0	20	20
								851	1,033	1,885 avg day
								observed		56,583 avg month
								observed		30 days at avg 1,886 avg day

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Table 2 - Summary of Current Water Use and Potential Water Savings Boss Hoggs Restaurant Audit Summary

imum Use Savings Calculation	Savings	
Use Savings	imum Use Savings	⊆
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101al 30.6 30.6 30.6 30.6 22.5 22.5 22.5 3.15 3.15 6.3 3.75 7.5 180 900 13.02 65.1 45 225 42 440 440 440 440 440 440 440 440 79,000	Maximum Use Savings Calculation	vings car	culation									•		
Mark Sink   Mark Sink Sink Sink Sink Sink Sink Sink Sin				ber 1	asr				subtotal gpd				Savings	
ks         men         2         0         0.9 gpf         17 flushes         0         90		numbe	эr hot	ploo			uses/day	hot	ploo	tota	-	hot	cold total	-
men         2         0.9 gpf         0.9 gpf         55 flushes         0         30.6 gpf         30.6 gpf         55 flushes         0         90	Toilets													
women         2         0         0.9 gpf         50 flushes         0         99         90		men	2	0	6.0	0.9 gpf	17 flushes		0	30.6	30.6	•	54	54
to this ext of the control of the co	,	vomen	2	0	6.0	0.9 gpf	50 flushes		0	06	06		260	260
1		unisex	-	0	6.0	0.9 gpf	25 flushes		0	22.5	22.5		18	18
wash Sink         2         0.25         0.25 observed         6.3 minutes         6.3 minutes         3.15 observed         8.175 observed           women         3         0.25         0.25 open         7.5 minutes         5.625         5.625         17.25           unisex         1         1         1         5 gpm         3.75 minutes         720         180         90           wash Sink         3         1,736         0.434         2.17 gpm         10 minutes         52.08         13.02         65.1           vase         1         2         1         5 gpm         45 minutes         52.08         13.02         65.1           vase         1         2         1         42 gpl         2 loads         0         180         196.8           r         1         2         1.2         1.2 gpc/des         150 cycles         0         440         440         440           r         5         0         88         88 gpd         1 daily         1007         1007         1007         79,000         26,900	Urinals		က	0	0	0 gpf	25 flushes		0	0	0		100	100
men         2         0.25         0.5 gpm         6.3 minutes         6.3 minutes         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         6.625         7.5         7.5           unisex         1         1         1         1         2         4         1         5 gpm         90 minutes         720         180         900           wash Sink         3         1,736         0.434         2.17 gpm         10 minutes         52.08         13.02         65.1           uuse         1         4         1         5 gpm         45 minutes         52.08         13.02         65.1           uuse         1         21         42 gpl         2 loads         2 loads         0         166.8         106.8           r         1         21         12 gpc/de         150 cycles         0         440         440           r         5         0         88         88 gpd         1 daily         1007         1007         1162         2169           r         1         5         0         1 daily <td>Bathroom Sinks</td> <td></td>	Bathroom Sinks													
women         3         0.25         0.5 gpm         7.5 minutes         5.625         5.625         17.2           unisex         1         1         1         1         5 gpm         90 minutes         720         180         900           wash Sink         3         1.736         0.434         2.17 gpm         10 minutes         52.08         13.02         65.1           suse         1         2         4         1         5 gpm         45 minutes         42.08         13.02         65.1           nuse         1         2         4         4         4         45 minutes         42.08         106.8         106.8         106.8           nuse         1         2         4         17.8 gpt/ode         3 100#         0         180         180         180           r         2         0         17.8 gpt/ode         15 ovices         0         180         180         180         180           r         5         0         88         88 gpd         1 daily         1007         1167         79,000           noserwed         1         1         1         1         1         1         1         1 <td< td=""><td></td><td>men</td><td>2</td><td>0.25</td><td>0.25</td><td>0.5 gpm</td><td>6.3 minutes</td><td></td><td>3.15</td><td>3.15</td><td>6.3</td><td>=</td><td>7</td><td>77</td></td<>		men	2	0.25	0.25	0.5 gpm	6.3 minutes		3.15	3.15	6.3	=	7	77
unisex         1         1         2 gpm         3.75 minutes         3.75         3.75         7.5           wash Sink         3         1,736         0.434         2.17 gpm         10 minutes         52.08         13.02         65.1           use         1         4         1         5 gpm         45 minutes         52.08         13.02         65.1           use         1         2         45 minutes         50.08         13.02         45         225           use         1         2         45 minutes         65.08         180         45         225           use         1         2         45 minutes         66.1         45         225           use         1         2         45 minutes         66.1         45         180           use         1         2         45 minutes         66.1         45         180           use         1         2         45 minutes         66.1         180         180           use         1         1         45 minutes         100         180         180           use         1         1         1         1         1         1         1	,	vomen	က	0.25	0.25	0.5 gpm	7.5 minutes		5.625	5.625	11.25	23	23	45
1,736   0.434   2.17 gpm   10 minutes   52.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   55.08   13.02   13.0		unisex	-	-	-	2 gpm	3.75 minutes		3.75	3.75	7.5			
wash Sink         3         1,736         0.434         2.17 gpm         10 minutes         52.08         13.02         65.1           ouse         1         4         1         5 gpm         45 minutes         180         45         225           x         1         21         42 gpl         2 loads         0         106.8         106.8         106.8           x         0         17.8         17.8 gpt/ode         150 cycles         0         180         180         180         180         180         190           x         0         88         88 gpd         1 daily         1 daily         1007         1007         1162         2169           x         0         88         92 days         1 daily         1007         1007         159,000         283	Kitchen Sink		2	4	-	5 gpm	90 minutes		720	180	006			
1 4 1 5 gpm 45 minutes 180 45 25  ouse 1 21 21 42 gpl 2 loads 42 42 84  2 0 17.8 gp100# 3 100# 0 106.8 106.8 106.8  1 0 1.2 1.2 gpcycle 150 cycles 0 180 180 180 180  r 5 0 88 88 gpd 1 daily 1007 1162 2169  observed 79,000  35  observed 2 25  obse	Kitchen Handwash Sink		8	1.736	0.434	2.17 gpm	10 minutes		52.08	13.02	65.1	•		
ouse         1         21         21         42         42         84         84         84         84         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         180         180         180         180         180         180         180         180         140         140         440         440         440         440         440         440         440         440         440         79,000           1007         0         0         0         0         0         0         0         0         79,000           36         0         0         0         0         0         0         0         36           36         0         0         0         0         0         0         0         36           36         0         0         0         0         0         0         36           36         0         0         0         0         0         0         36           36         0         0         0         0	Bar Sink		-	4	-	5 gpm	45 minutes		180	45	225			
buse         1         21         21         42 gpl         2 loads         42         84         84         84         84         88         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         106.8         140         440         440         440         440         440         440         440         440         440         440         440         440         440         440         450         600         600         600         79,000         36 <td>Other</td> <td></td>	Other													
2 0 17.8 gp100# 3 100# 0 106.8	Laundry In-House		<b>-</b>	21	21	42 gpl			42	42	84			
1 0 1,2 1,2 gpcycles 150 cycles 0 180 180 180 180 180 180 180 180 180 1	Ice Machine		2	0	17.8	17.8 gp100#			0	106.8	106.8			
r 5 0 88 98 gpd 1 daily 0 440 440 440 440 440 1007 1162 2169	Dishwasher		-	0	1.2	1.2 gpcycle			0	180	180			
1007 1162 2169 observed 79,000 79,000 36	Swamp Cooler		2	0	88	88 gpd			0	440	440			
79,000 36 2.633									1007	1162	2169 max day	34	435	468
36									observed		79,000 max month			
2.633											36 days at max			
0000									observed					

## Average Use Savings Calculation

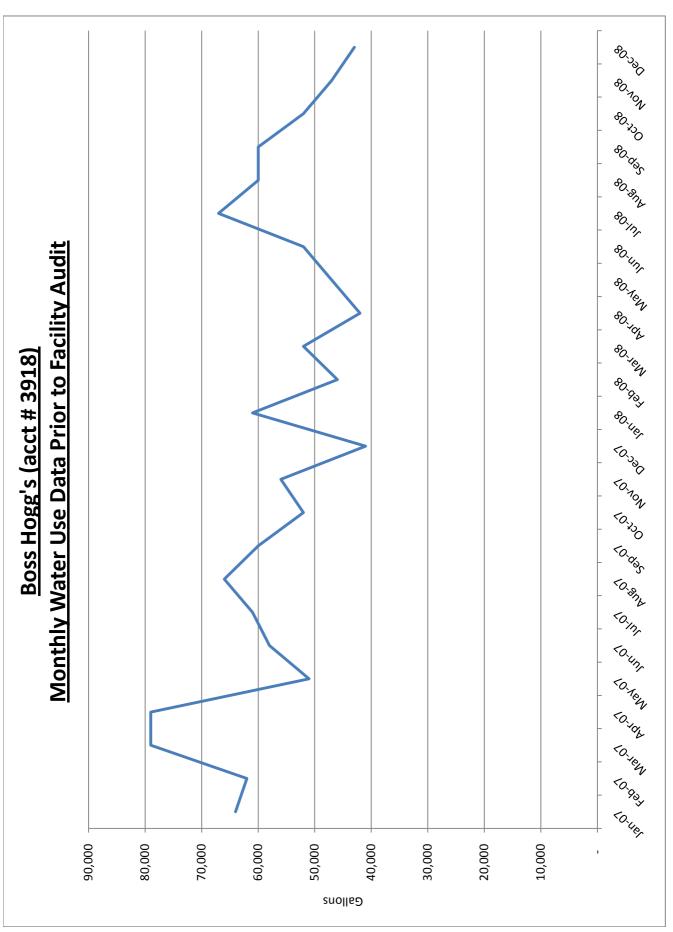
	tal		21	208	14	80		18	36										377			
Savings	total		73	208	4	80		တ	18	,		,							320			
Sav	cold							6	18										27			
	hot				•							•	•		•							
	total		27	72	18	0		5.25	o	9	750	65.1	150		84	71.2	180	02	1,508 avg day	56,583 avg month	38 days at avg	1,886 avg day
	_		27	72	18	0		2.625	4.5	က	150	13.02	30		45	71.2	180	2	683			
subtotal gpd	ploo		0	0	0	0		2.625	4.5	ო	009	52.08	120		42	0	0	0	824	observed		opserved
	hot		shes	shes	shes	shes		ıutes	intes	ıutes	ıutes	utes	ıutes		qs	#	les	Á				
	uses/day		15 flus	40 flushes	20 flus	20 flushes		5.25 mir	6 mir	3 minutes	75 minutes	10 minutes	30 mir		2 loa	2 100#	150 cyc	1 dai				
			0.9 gpf	0.9 gpf	0.9 gpf	0 gpf		0.5 gpm	0.5 gpm	2 gpm	5 gpm	2.17 gpm	2 gpm		42 gpl	17.8 gp100#	1.2 gpcycle	14 gpd				
•	total		6.0	6.0	6.0	0		0.25	0.25	-	-	0.434	-		71	17.8	1.2	14				
ber use	ploo		0	0	0	0		0.25	0.25	-	4	1.736	4		21	0	0	0				
	number hot		7	7	-	က		2	က	-	7	ო	-		<b>~</b>	2	_	2				
	numbe		_	_	×			_	_	×												
		Toilets	men	women	unise	Urinals	Bathroom Sinks	iem	women	unise	Kitchen Sink	Kitchen Handwash Sink	Bar Sink	Other	Laundry In-House	Ice Machine	Dishwasher	Swamp Cooler				

Table 2 - Summary of Current Water Use and Potential Water Savings Boss Hoggs Restaurant Audit Summary

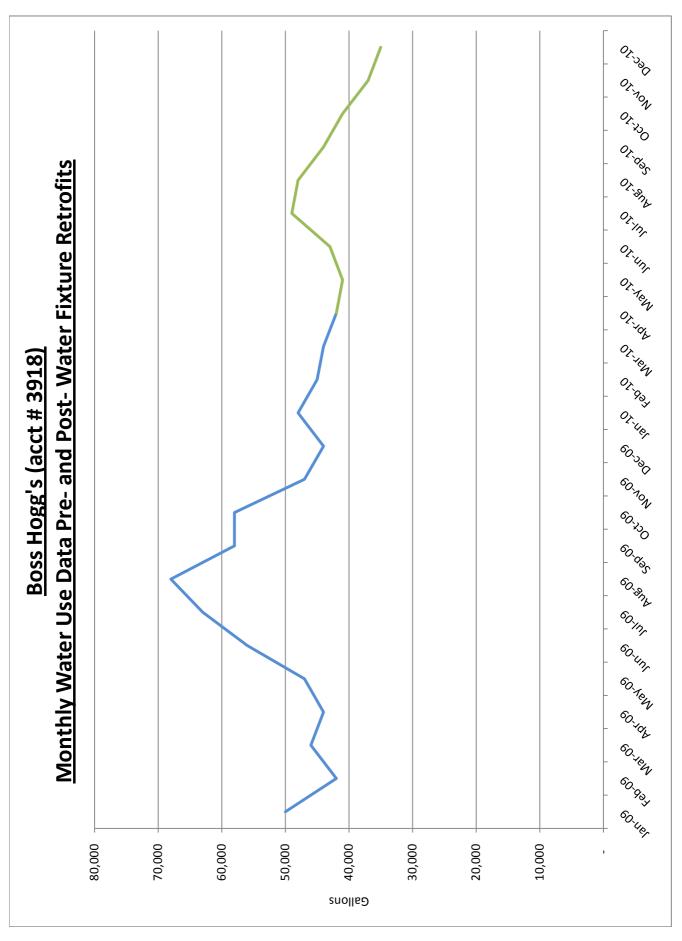
## Costs to Implement

	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr Total Cost Savings/yr/fixture
Toilet	5 \$ 282 \$ 95 \$ 1,885 2.63	87,480	\$ 717 \$ 143
Urinals	3 \$ 311 \$ 85 \$ 1,188 5.04	28,728	\$ 236 \$ 79
Bath Sinks	5 \$ 1.61 \$ 5 \$ 33 0.10	19,575 2,542	\$ 326 \$ 65
	\$ 3,106	135,783 2,542	\$ 1,279
	AF Savings 0.42 \$/AF: \$ 7,454	Replacement Water Cost*: \$ 12,501	Avoided Cost**: \$ 1,290
		* Calculation based on \$30,000 per AF	** Calculation based on \$9.50/1000 gal

Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy



\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 28, 2010



## **SMART WATER Audit Report**

## **Higher Grounds Cafe**

## Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 189 Talisman Dr # A in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

The Higher Grounds Cafe uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, the Higher Grounds Cafe has sinks and toilets that have not been updated with water efficient fixtures that are currently available in the marketplace. The Higher Grounds Cafe does utilize a pre-rinse spray nozzle that was provided by PAWSD 3 to 4 years ago.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Higher Grounds included the following assumption:

• Higher Grounds indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property

The two sink faucet aerators in the men's and women's bathrooms used about 2.25 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$50 dollars per year per sink. This savings results in a payback period of four months.

The two restaurant toilets, on average, use about 2.5 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$754 with an estimated total water savings of about 35,000 gallons annually. With these savings, the payback period for the installation of the toilets should be about five years. Additionally, one urinal was also replaced with a Water Sense approved waterless urinal at a cost of \$396 with a payback period of about four years. It is estimated that the urinal replacements will have a total water savings of about 13,000 gallons annually.

In total, two faucet aerators, two toilets and one urinal in Higher Grounds Cafe were updated at a cost of \$1,163. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$500 will result from these changes, saving about 59,000 gallons of water and 2,400 kilowatt hours of energy.

look for

Maximum Use Calculation													
-	number	to d	per use	tota	]	lises/day	subtotal gpd	tota	ĺ				
Toilets		2	0	2.5	2.5 gpf	8 flushes	0	290	290				
Urinals	••	н	0	1	1 gpf	60 flushes	0	09	09				
Bathroom Sinks	.,	2 1	1.125	1.125	2.25 gpm	17.7 minutes	39.825	39.825	79.65				
Kitchen Sinks		1	4	1	5 gpm	180 minutes	720	180	006				
Kitchen Handwash Sink	.,	2	1	1	2 gpm	120 minutes	240	240	480				
Other													
Ice Machine		1	0	17.8	17.8 gp100#	9 100#	0	160.2	160.2				
Dishwasher		T	0	1.2	1.2 gpcycle	50 cycles	0	09	. 09				
							1,000	1,030	2,030 max day 61,000 max month				
									30 days at max				
Average Use Calculation							observed		2,033 max day				
			per use				subtotal gpd						
Toilets	number	hot 2	cold 0	total 2.5	2.5 gpf	uses/day hot 30 flushes	cold 0	total 150	150				
Urinals		н	0	1.2	1.2 gpf	30 flushes	0	36	36				
Bathroom Sinks	.,	2 1	1.125	1.125	2.25 gpm	9 minutes	20.25	20.25	40.5				
Kitchen Sinks		н	4	1	5 gpm	100 minutes	400	100	200				
Kitchen Handwash Sink	.,	2	н	1	2 gpm	90 minutes	180	180	360				
Other													
Outer Ice Machine		1	0	17.8	17.8 gp100#	5 100#	0	88	68				
Dishwasher		1	0	1.2	1.2 gpcycle	25 cycles	0 %	30	30				
							observed	600	36,250 avg month				
							payrasho		30 days at avg				
Modimus I co Motor Society							DAIDEGO		1,400 day day				
			ber use				subtotal gpd			Savings			
Toilets	number	hot 2	ploo 0	total 0.9	0.9 gpf	uses/day hot 58 flushes	0 O	total 104.4	104.4	pot	cold 0	total 185.6	185.6
Urinals	••	н	0	0	0 gpf	60 flushes	0	0	0		0	09	09
Bathroom Sinks	.,	2	0.25	0.25	0.5 gpm	17.7 minutes	8.85	8.85	7.71		30.975	30.975	61.95
Kitchen Sinks		1	4	1	5 gpm	180 minutes	720	180	006		0	0	0
Kitchen Handwash Sink	.,	2	н	1	2 gpm	120 minutes	240	240	480		0	0	0
Other													
Ice Machine Diehwasher		e e	0 0	17.8	17.8 gp100#	9 100#	0 0	160.2	160.2		0 0	0 0	0 0
Zigi wasi ki		4	,	4	1.4 aprepara		696	753	1,722 max day		>	,	>
							observed		61,000 max month				
							observed		2,033 max day				

Page 1 of 2

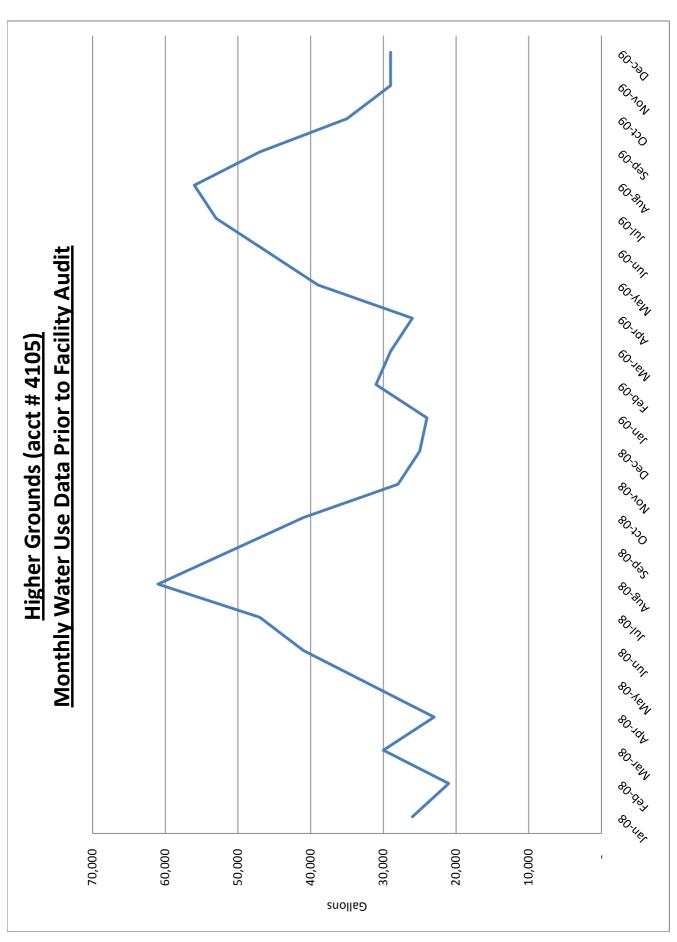
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			ber use	ev.						Savings			Ī
	number	hot	ploo	total		uses/day h		totai		hot	cold	total	
Toilets		2	0	6:0	0.9 gpf	30 flushes		54	54		0	96	96
Urinals		1	0	0	0 gpf	30 flushes	0	0	0		0	36	36
Bathroom Sinks		2	0.25	0.25	0.5 gpm	9 minutes	4.5	4.5	6	15.7	15.75	15.75	31.5
Kitchen Sinks		1	4	1	5 gpm	100 minutes	400	100	200		0	0	0
Kitchen Handwash Sink		2	1	1	2 gpm	90 minutes	180	180	360		0	0	0
Other													
Ice Machine		1	0	17.8	17.8 gp100#	5 100#	0	88	68		0	0	0
Dishwasher		1	0	1.2	1.2 gpcycle	25 cycles	0	30	30		0	0	0
							285	458	1,042 avg day				
							observed		36,250 avg month				
									35 days at avg				
							opserved		1,208 avg day				

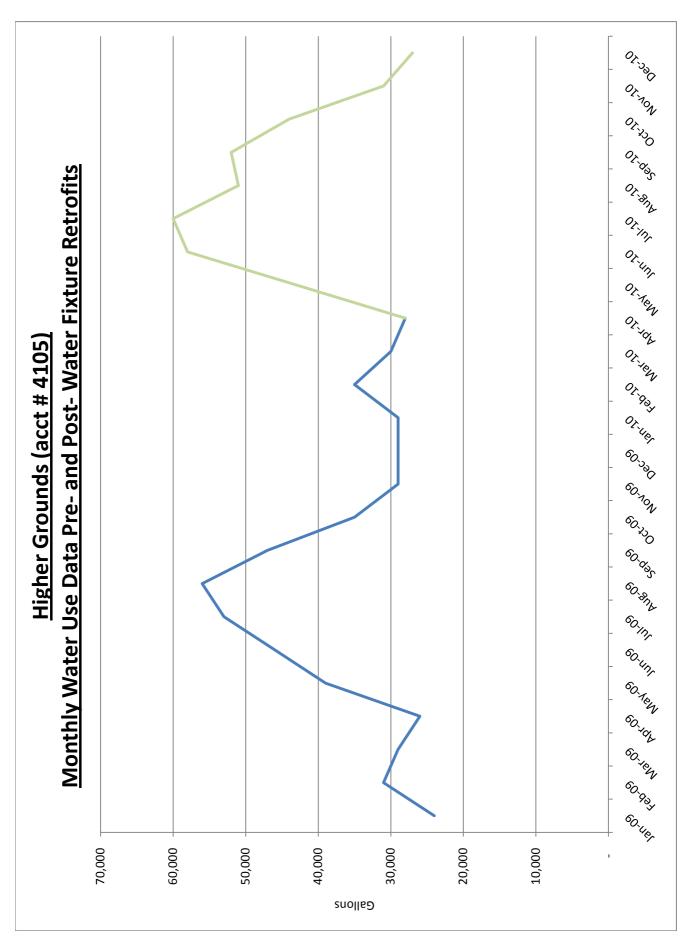
	number	number Hardware Installation Total	Installation	Total	Pay Back	Water Savings (gpy)	Energy Savings (kWhr)		Total Cost Savings/yr		Total Cost Savings/yr/fixture	5/yr/fixture
		2 \$ 282	\$ 65 \$	754	5.32 yrs	34,560	0		\$	283	\$ 142	
		1 \$ 311 \$	\$ 85 \$	396	3.73 yrs	12,960	0		s	106	\$ 106	
room sink		2 \$ 1.61	\$ 5	13	0.28 yrs	11,340		2,425	ş	93	\$ 46	
			∽	1,163		28,860	0		\$	483		
	AF Savings:	0.18	`\\$	\$/ AF: \$	6,440	Replacement Water Cost*: \$		5,419	Avoided Cost**:	\$	559	

"Calculation based on \$9.50/, 1000 gail
Cost Savings Assumptions: \$8.50/1000 gail - cost of water and sewer, \$0.065/kwh cost of energy

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 31, 2010 and April 22, 2010



## **SMART WATER Audit Report**

## JJ's Restaurant

### Overview

PAWSD working with Great Western Institute and Environmental Dimensions, conducted a SMART WATER Audit of this facility at 356 East Pagosa in Pagosa Springs on December 9, 2008. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

JJ's Restaurant uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, JJ's Restaurant had sinks and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace. JJ's Restaurant does, however, utilize a pre-rinse spray nozzle that was provided by PAWSD 3 to 4 years ago.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water model table for JJ's included the following assumptions:

- JJ's indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property
- During the SMART WATER Audit, a leak associated with the ice machine was found. This leak was
  assumed to be two gallons per minute on a maximum water use day, and one gallon per minute on an
  average use day.<sup>1</sup>

Based on the 2008 audit, the following fixture replacements occurred in 2010. The two sink faucet aerators in the men's and women's bathrooms used about 2.25 gallons of water per minute (gpm). One of these aerators were replaced with a 0.5 gpm aerator at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately about \$9 dollars per year per sink. This savings results in a payback period of about nine months.

Four restaurant toilets, on average, use about 1.6 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$1,508 with an estimated total water savings of about 50,000 gallons annually. With these savings, the payback period for the installation of the toilets is estimated to be about four years. Additionally, two urinals were replaced with a Water Sense approved waterless urinals at a cost of \$792 with a payback period of about five years. It is estimated that the urinal replacements will create a total water savings of about 18,000 gallons annually.

In total, one sinks, four toilets and two urinals in JJ's Restaurant were updated at a cost of \$2,307. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$560 will result from these changes, saving about 68,000 gallons of water and 70 kilowatt hours of energy.

<sup>&</sup>lt;sup>1</sup> This leak was not addressed by Great Western Institute during the SMART WATER Audit. If fixed, 525,000 gallons of water per year may be saved on average, saving about \$1,500 in annual water costs.



Table 2 - Summary of Current Water Use and Potential Water Savings JJs Restaurant Audit

Maximum Use Calculation										
	number	hot	per use cold	etotal		uses/day hot	subtotal gpd cold	total		
Toilets men women		- 2	00	3.5	3.5 gpf 2.55 gpf	23 flushes 50 flushes		81 255	81 255	
kitchen bathroom		-	0	3.5	3.5 gpf	12 flushes		- 45	- 42	
Urinals		8	0	1.25	1.25 gpf	40 flushes		100	100	
Sinks men women		- 0	0.25	0.25	0.5 gpm 0.5 gpm	9.45 minutes 7.5 minutes	0.4	0 4	 	
kitchen bathroom		-	<del></del>	7:	2.2 gpm	1.8 minutes	. 2	, 2	. 4	
Kitchen Sinks		ဇ	4	<del>-</del>	5 gpm	100 minutes	1,200	300	1,500	
Bar Sinks		7	3.2	8.0	4 gpm	45 minutes	288	- 22	360	
Other			į	;			;	:	:	
Laundry In-House Ice Machine		- 2	۲۰ °	21	42 gpcycle 17.8 ap100#	4 loads 4 100#	¥ '	84 <del>1</del>	168 142	
Dishwasher		ı <del>-</del>	0	1.2	1.2 gpcycle	90 cycles		108	108	
Steamtable I FAK (associated with ice machine)			00	2 12	2 gpuse	1 uses		2.160	2.160	
		-	<b>)</b>	2	) )		1,580	3,354	4,934 max day	
							observed		148,000 max month 30 days at max	
							observed		4,933 max day	
Average Use Calculation										
	-		ber use				subtotal gpd			
control P	number	hot	cold	total		uses/day hot	pioo	total		
men		- 2	00	3.5 2.55	3.5 gpf 2.55 gpf	15 flushes 25 flushes	00	52.5 127.5	52.5 127.5	
kitchen bathroom		-	0	3.5	3.5 gpf	6 flushes	0	21	21	
Urinals		7	0	1.25	1.25 gpf	20 flushes	0	20	50	
Sinks men women		- 2	0.25	0.25	0.5 gpm 0.5 gpm	5.25 minutes 3.75 minutes	1.3125 1.875	1.3125 1.875	2.625 3.75	
kitchen bathroom		-	7:	1:	2.2 gpm	0.9 minutes	0.99	0.99	1.98	
Kitchen Sinks		8	4	-	5 gpm	70 minutes	840	210	1050	
Bar Sinks		7	3.2	8.0	4 gpm	30 minutes	192	48	240	

Page 1 of 3 GREAT WESTERN INSTITUTE

84 712 54 2 1440 3.201 avg day 96,042 avg month 30 days at avg 3,201 avg day

42 71.2 54 2 1440 **2,122** 

42 0 0 0 0 1,078

2 loads 2 100# 45 cycles 1 uses 1440 minutes

42 gpcycle 17.8 gp100# 1.2 gpcycle 2 gpuse 1 gpm

21.2 2.1 2 2 1

20000

Other
Laundry In-House
Ice Madnine
Dishwasher
Steamtable
LEAK (associated with ice machine)

observed observed

## Table 2 - Summary of Current Water Use and Potential Water Savings JJs Restaurant Audit

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			0011100					Last Charles				open coo		
			es nse			•		suptotal gpd				S		
Toilete	number	hot	ploo	total		uses/day	hot	cold	total	Ĭ.	hot	cold	total	
mem	•	_	0	6.0	0.9 gpf	23 flushes		0	20.7	20.7		09	09	
women	• •	2	0	6.0	0.9 gpf	50 flushes		0	06	06		165	165	
kitchen bathroom	•-	_	0	6.0	0.9 gpf	12 flushes		0	10.8	10.8		31	31	
Urinals	. •	8	0	0	0 gpf	40 flushes		0	0	0	,	100	100	
Sinks														
mem		1 0.25		0.25	0.5 gpm	9.45 minutes	2.3	2.3625	2.3625	4.725	•			
women	••	2 0.2		.25	0.5 gpm	7.5 minutes		3.75	3.75	7.5				
kitchen bathroom	•-	0.25		0.25	0.5 gpm	1.8 minutes		0.45	0.45	6.0	2	2	က	
Kitchen Sinks	.,	e	4	-	5 gpm	100 minutes	-	1200	300	1500	•			
Bar Sinks		2 3.2		8.0	4 gpm	45 minutes		288	72	360	•			
Other														
Laundry In-House	•	1 21				4 loads		84	84	168	•		,	
Ice Machine	. 4	7	0	17.8	17.8 gp100#	4 100#		0	142.4	142.4	•			
Dishwasher	,-	_			1.2 gpcycle	90 cycles		0	108	108	•			
Steamtable	,-	_	0	2	2 gpuse	1 uses		0	2	2	•			
LEAK (associated with ice machine)	•=	_	0	2	2 gpm	0 minutes		0	0	0		2,160	2,160	
							1,6	1,579	836	2,415 max day				
								observed		148,000 max month				
								payaedo		61 days at max 4 933 max day				
										1,000				

Average Use Savings Calculation

		39	83	16	20			2			_			,	140				
	total	0	8	ю	0			_	·	·									
Savings	ploo	Ř	83	16	20	,		•	•	٠	•	•	•	•	1,440				
				٠				-	٠	٠									
	hot																		
•		13.5	45	5.4	0	2 625	3.75	0.45	1050	240	28	71.2	54	2	0	1,572 avg day	96,042 avg month	61 days at avg	3,201 avg day
	total	13.5	45	5.4	0	1 3105	1.875	0.225	210	48	42	71.2	54	2	0	495			
subtotal gpd	ploo	0	0	0	0	1 2125	1.875	0.225	840	192	42	! <b>0</b>	0	0	0	1,077	observed		Daviason
	hot								10	10					"				
	uses/day	15 flushes	25 flushes	6 flushes	20 flushes	5 25 minute	3.75 minutes	0.9 minutes	70 minutes	30 minutes	o speci	2 100#	45 cycles	1 uses	0 minute				
		90.9 gpf	0.9 gpf	0.9 gpf	0 gpf	A 0	0.5 gpm	0.5 gpm	5 gpm	4 gpm	42 opeyele	17.8 gp100#	1.2 gpcycle	2 gpuse	1.5 gpm				
	total	6.0	6.0	6.0	0	25	0.25	0.25	-	8.0	2	17.8	1.2	2	1.5				
ber use	ploo	0	0	0	0	Ķ	0.25	55	4	3.2	7	. 0	0	0	0				
	hot					Ċ	3 6	0.25		6)									
		_	7	-	7	+	- 2	-	ო	7	-	. 2	_	~	_				
	number	men	women	kitchen bathroom		uo w	women	kitchen bathroom	inks		9 S C C C C C C C C C C C C C C C C C C	ne u	Je	<u>o</u>	LEAK (associated with ice machine)				
	Toilets				Urinals	Sinks			Kitchen Sinks	Bar Sinks	Other	Ice Machine	Dishwasher	Steamtable	LEAK (as				

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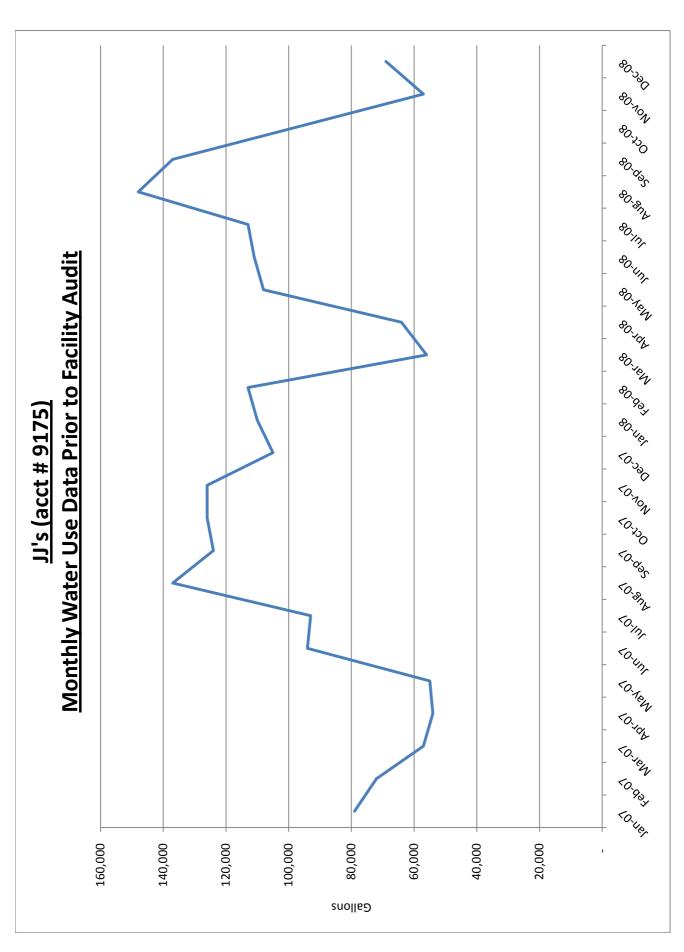
# Table 2 - Summary of Current Water Use and Potential Water Savings JJs Restaurant Audit

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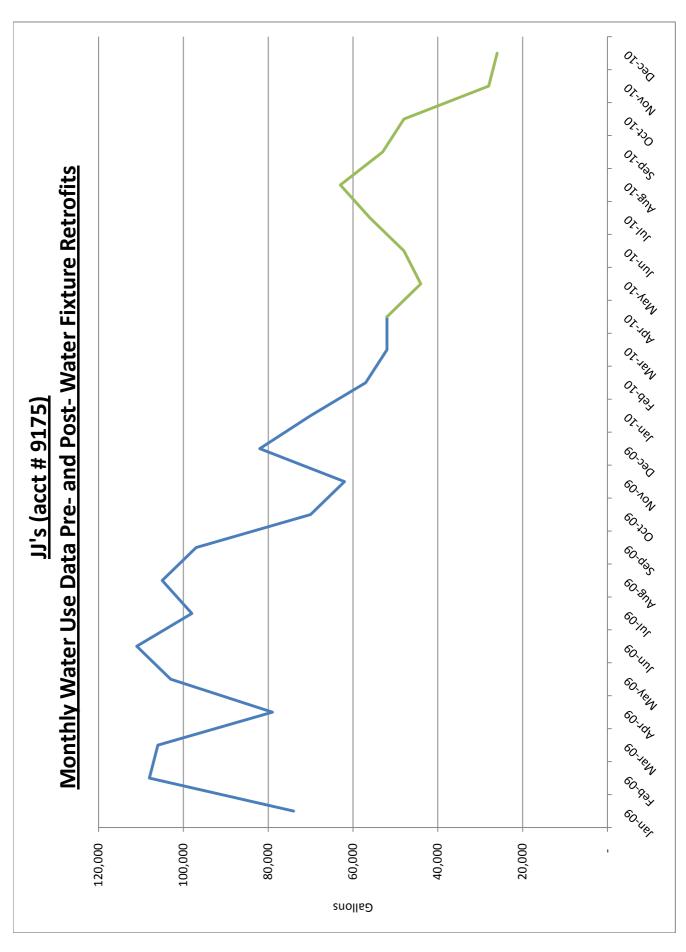
	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr Total Cost Sa	Total Cost Savings/yr/fixture
Toilet		- 49,356	\$ 405 \$ 101	
Urinals		- 18,000	\$ 148 \$ 74	
Bath Sinks	5	551 72	6 8	
	\$ 2,307	67,907	\$ 561	
	AF Savings: 0.21 \$/AF: \$ 11,088	Replacement Water Cost*: \$ 6.252	Avoided Cost**: \$ 645	
		* Calculation based on \$30,000 per AF	** Calculation based on \$9.50/ 1000 gal	_

Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sew er, \$0.065/kwh cost of energy

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\*Monthly water use data for two years prior to the facility audit. this data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 23, 2010



## **SMART WATER Audit Report**

## Kip's Restaurant

## Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this restaurant at 121 Pagosa St. in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

## Water Use Summary

Kip's Restaurant uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, Kip's Restaurant had sinks and toilets that had not been updated with EPA Water Sense certified water efficient fixtures that are currently available in the marketplace. Kip's Restaurant does, however, utilize an air cooled ice machine, which helps to reduce water use.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Kip's Restaurant included the following assumption:

• Kip's Restaurant indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property

The three sink faucet aerators in the men's and women's bathrooms and the kitchen hand-wash sink used, on average, 3 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$185 dollars per year per sink. This savings results in a payback period of about 2 weeks.

The two restaurant toilets, on average, use about 2.55 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$754 with an estimated total water savings of about 25,000 gallons annually. With these savings, the payback period for the installation of the toilets is estimated to be about 4 years. Additionally, one urinal was replaced with a Water Sense approved waterless urinal at a cost of \$396 with a payback period of about 5 years. It is estimated that the urinal replacements will have a total water savings of 9,000 gallons annually.

In total, three sink faucet aerators, two toilets and one urinal in Kip's Restaurant were updated at a cost of \$1,170. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$800 will result from these changes, saving about 70,000 gallons of water and 4,000 kilowatt hours of energy.

look for

Table 2 - Summary of Current Water Use and Potential Water Savings Kips Bar Audit Summary

_
alculatio
Use (
Maximum

			per use					subtotal gpd		
c	number	hot	cold	total		uses/day	hot	cold	total	
Mens Womens				3.5	1.6 gpf 3.5 gpf	15 flushes 40 flushes			24 140	24 140
Mens	-			-	1 gpf	35 flushes			35	35
Mens Womens		2.5	<b>←</b> r∪	1 2.5	2 gpm 5 gpm	7.5 minutes 6 minutes		30	30	60 120
	2		4	-	5 gpm	50 minutes		400	100	200
Kitchen Handwash Sink	-	•	_	-	2 gpm	15 minutes		15	15	30
	-	1.5	2	1.5	3 gpm	30 minutes		45	45	06
Other Ice Machine (Manitowoc Series 800 - JYO804A)	<del>-</del>		,	17.8	17.8 gp100#	2 100# Ice		- 550 observed	36 <b>485</b>	36 1,035 max day 31,000 max month 30 days at max
								observed		1,033 max day

Average Use Calculation

			per use	9				subtotal gpd		
17.0	number	hot	cold	total		uses/day	hot	ploo	total	al
lollets	Mens	-		1.6	1.6 gpf	10 flushes			16	16
	Womens	<del>-</del>		3.5	3.5 gpf	24 flushes			84	84
Urinals	Mens	-		-	1 gpf	25 flushes			25	25
Bathroom Sinks	Mens	-	-	-	2 gpm	5.25 minutes		21	21	42
	Womens	-	2.5	2.5	5 gpm	3.6 minutes		36	36	72
Kitchen Sinks		7	4	-	5 gpm	25 minutes		200	20	250
Kitchen Handwash Sink		-	-	-	2 gpm	3.5 minutes		4	4	7
Bar Sinks		-	1.5	1.5	3 gpm	20 minutes		30	30	09
Other Ice Machine (Manitowoc Series 800 - JYO804A)	- JYO804A)	<del>-</del>		17.8	17.8 gp100#	1.2 100# Ice		291 observed	21 <b>287</b>	21 <b>577 avg day</b> 17,320 avg month
								observed		30 days at av. 577 avg day

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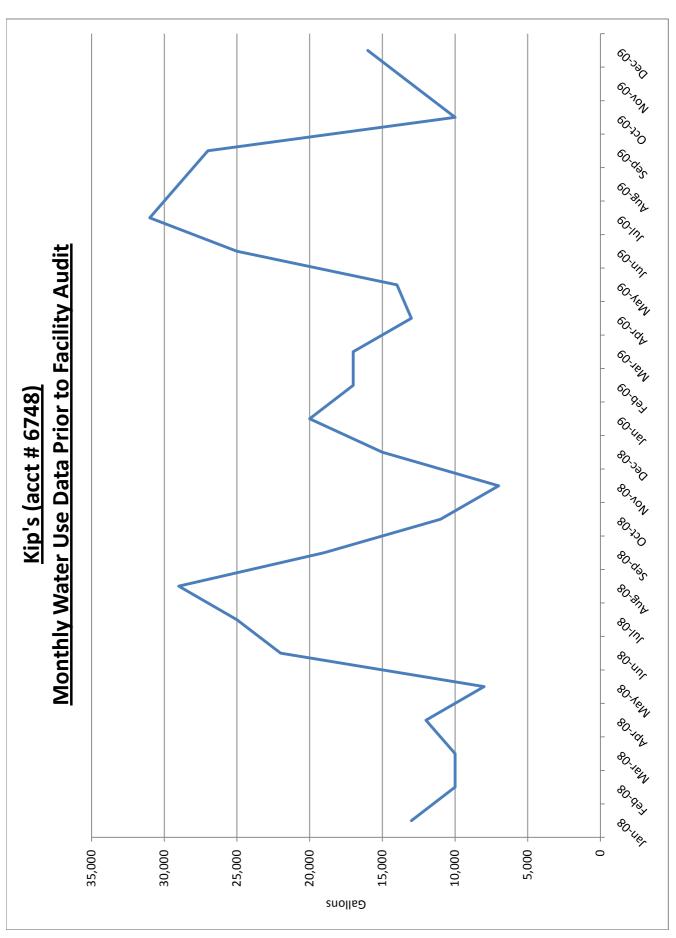
Maximum Use Water Savings	ď												
	number	hot	per use cold	total	esn	uses/day	hot	subtotal gpd cold	total		Savings hot cold	ld total	_
Tollets	Mens	<del>-</del> -		6.0	0.9 gpf	15 flushes			4 6	4,		<del>-</del> 5	<del>-</del> 5
SW.	womens	-			u.s gpr	40 musnes			કુ	SO SO		40 '	5 '
C cial													
	Mens	<b>-</b>		0	0 gpf	35 flushes						35	35
Bathroom Sinks													
	Mens	-		0.25	0.5 gpm	7.5 minutes		8	80	15	23	23	45
3M	Womens	-	0.25 0.		0.5 gpm	6 minutes		9	9	12	54	54	108
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		c	•	,		1		000	9	C			
Michell Sinks		7	4	_	indb c	samuu oc		004	3	006			
Kitchen Handwash Sink		-	0.25 0.	0.25	0.5 gpm	15 minutes		4	4	8	, <del>E</del>	, <del>E</del>	23
						;		!	!	;			
Bar Sinks		_	1.5	1.5	3 gpm	30 minutes		45	45	06			
radio													
Ice Machine (Manitowoc Series 800 - JYO804A)	304A)	_	+	17.8 17	17.8 gp100#	2 100# Ice				36			
					i			462 observed	247	710 max day	88	237	325
										44 days at max			
								observed		1,033 max day			

## Average Use Water Savings

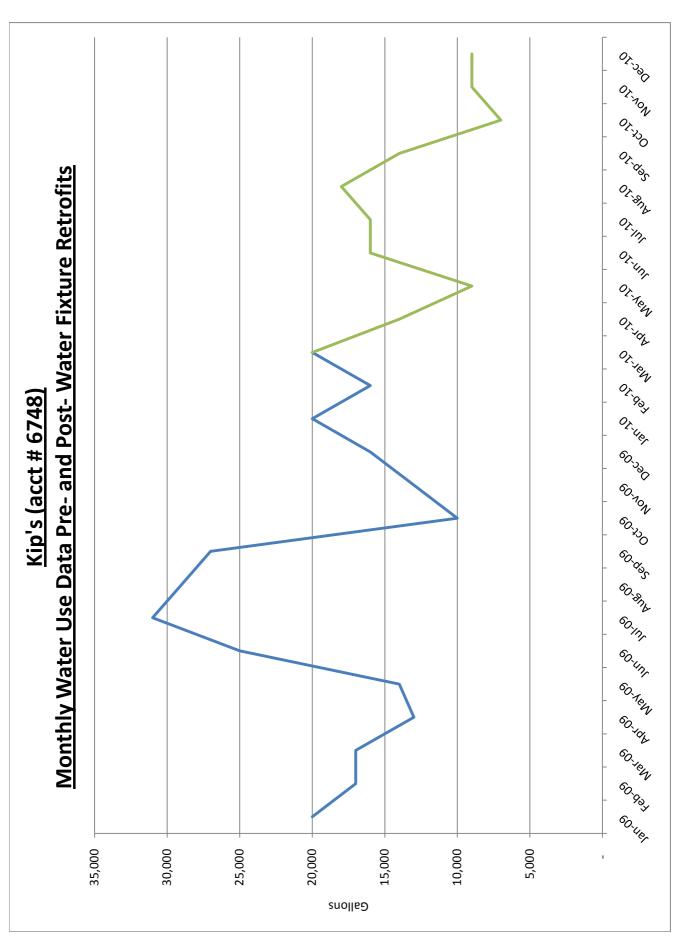
06:								-					
			per use	Ф				subtotal gpd			Savings		
	number	hot	cold	total		uses/day	hot	ploo	total		hot cold	d total	=
Lollets	SL	-		6.0	0.9 gpf	10 flushes			6	6		7	7
Womens	SL	_		6.0	0.9 gpf	24 flushes			22	22		62	62
												,	
												,	
Urinals												,	
Mens	SL	_		0	0 gpf	25 flushes		•				52	25
Bathroom Sinks													
	SL	_	9.25	0.25	0.5 gpm	5.25 minutes		5	2	11	16	16	32
Womens	SL	_	0.25	0.25	0.5 gpm	3.6 minutes		4	4	7	32	32	92
Kitchen Sinks		2	4	<b>-</b>	5 gpm	25 minutes		200	20	250			
Kitchen Handwash Sink		-	0.25	0.25	0.5 gpm	3.5 minutes		-	-	2	က	က	2
Bar Sinks		_	1.5	1.5	3 gpm	20 minutes		30	30	09			
												,	
Other													
Ice Machine (Manitowoc Series 800 - JYO804A)	2	_		17.8	17.8 gp100#	1.2 100# Ice			21	21			
								240		381 avg day	51	145	196
								observed		17,320 avg month			
								1		45 days at avg			
								opserved		577 avg day			

## Costs to Implement

costs to implement				
	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr Total Cost Savings	/yr/fixture
Toilet	_		\$ 205 \$ 10	12
Urinals	1 \$ 311 \$ 85 \$ 396 5.37 yrs	- 0006	\$ 74 \$ 7	74
Sinks		36,558 3,909	S	ξ.
	\$ 1,170		\$ 833	
	AF Savings: 0.22 \$/ AF: \$ 5,404	Replacement Water Cost*: \$ 6,495	Avoided Cost**: \$ 670	
		* Calculation based on \$30,000 per AF	** Calculation based on \$9.50/ 1000 gal	



\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 6, 2010



### **SMART WATER Audit Report**

### **Town Library**

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 811 San Juan Street in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

The Library uses water in a manner consistent with public buildings throughout Colorado. Similar to many of public facilities built before 1993, the Library had sinks and toilets that had not been updated with EPA Water Sense certified water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for the Library included the following assumption:

• The Library indicated that they have outdoor irrigation during peak summer months in order to help establish a recently installed xericscape on the property. In order to isolate indoor water use, the maximum and average water use values were derived from the winter months of 2008 and 2009 only. This method assumes consistent monthly water demand.

The three sink faucet aerators in the men's, women's and staff's bathrooms used, on average, 3 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$70 dollars per year per sink. This savings results in a payback period of about one month.

In addition, one urinal was replaced with a Water Sense approved waterless urinal at a cost of \$396. It is estimated that the urinal replacement will have a total water savings of about 3,200 gallons annually with a payback period of about 15 years.

In total, three sinks and one urinal in the Library were updated at a cost of \$416. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$200 will result from these changes, saving about 15,000 gallons of water and 1,500 kilowatt hours of energy.



Table 2 - Summary of Current Water Use and Potential Water Savings Library Audit Summary

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		racc	go			published and		
	number hot	ot cold	total	_	uses/day hot	ploo	total	
Toilets								
			9.1	1.6 gpf	5 flushes		ωί	ω (
Staff			6. <del>6</del> .	1.6 gpf			5 6	5 0
Urinals	~		1.5	1.5 gpf	8 flushes	•	12	12
Bathroom Sinks Mens Womens Staff		<del>د. د. د.</del> د د د	<del>4</del> 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	3 gpm 3 gpm 3 gpm	2 minutes 4 minutes 1 minutes	12 24 5	12 24 5	23 48 11
Sink in Library	<b>-</b>	1.5	1.5	3 gpm	3 minutes	ĸ	2	o
Drinking Fountain	<b>~</b>	0	80	8 g/day	1 daily		80	œ
Break Room Sink	<b>~</b>	1.5	1.5	3 gpm	5 minutes	∞	80	15
Other Dishwasher (kenmore) Energy Star 665.1601	<del>-</del>		17.8	17.8 g/cycle	0.5 uses		6	ø
Irrigation/Outdoor								
						53 observed observed	112	166 max day 5,000 max month 30 days at max 167 max day
Average Use Calculation		Der	Se			Subtotal and		
mnu	umber hot	ot cold	total		uses/day hot	cold	total	
Mens Womens Staff			6. 1. 6. 6. 6.	1.6 gpf 1.6 gpf 1.6 gpf	4 flushes 6 flushes 6 flushes		o 10	9 0 0 0
Urinals	<del>-</del>		1.5	1.5 gpf	6 flushes	•	o	o
Bathroom Sinks Mens Womens Staff		2: T.	<u> </u>	3 gpm 3 gpm 3 gpm	2 minutes 1 minutes 1 minutes	ത ശ ശ	മവര	2 7 7
Sink in Library	-	1.5	1.5	3 gpm	3 minutes	ഹ	2	0
Drinking Fountain	-	0	80	8 g/day	1 daily		80	80
Break Room Sink	-	1.5	1.5	3 gpm	4 minutes	9	9	12
Other Dishwasher (kenmore) Energy Star 665.1601	<del>-</del>		17.8	17.8 g/cycle	0.5 uses		6	თ
Irrigation/Outdoor								
						30 observed	83	112 avg day 3,300 avg month 29 days at avg
						observed		110 avg day

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Table 2 - Summary of Current Water Use and Potential Water Savings Library Audit Summary

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Maximum Osc Water Oavings											
		۵	ber use			subtotal gpd			Savings		
	number	hot co		total	uses/day hot	ploo	total		hot	cold to	total
Toilets											
Mens	_		1.6	1.6 gpf	5 flushes		80	80			
Womens	_		1.6	1.6 gpf	8 flushes		13	13			
Staff	_		1.6	1.6 gpf	6 flushes		10	10			
Flushmate?											
Urinals											
Mens	_		0	0 gpf	8 flushes		•			12	12
Bathroom Sinks											
	_	0.25	0.25	0.5 gpm	2 minutes	7	7	4	10	10	20
Womens	-	0.25	0.25	0.5 gpm	4 mintues	4	4	80	20	20	40
Staff	_	0.25	0.25	0.5 gpm	1 minutes	-	-	2	2	2	6
Sink in Library	-	1.5	1.5	3 gpm	3 minutes	rc 2	S	თ			
Drinking Fountain	-	0	8	8 g/day	1 daily		80	œ			
Break Room Sink	-	1.5	1.5	3 gpm	5 minutes	∞	80	15			
Other Dishwasher (kenmore) Energy Star 665.1601	-		17.8	17.8 g/cycle	1 uses		o	б	, ;	. :	. :
Irrigation/Outdoor									£.	94	<del>.</del>
						19	99	85 max day			
						observed		5,000 max month			
								59 days at max			
						opserved		167 aver day			

### Average Use Water Savings

			esn Jed				subtotal gpd			Savings		
	number	hot	ploo	total		uses/day hot	ploo	total		hot	ploo	total
Toilets												
	Mens	<b>-</b>		1.6	1.6 gpf			9	9			
Woi	Womens	<b>-</b>		1.6	1.6 gpf	6 flushes		10	10			
	Staff	<b>-</b>		1.6	1.6 gpf	6 flushes		10	10			
Flushmate?	nate?											
Urinals												
	Mens	<b>-</b>		0	0 gpf	e flushes					6	6
Bathroom Sinks												
	Mens	_		0.25	0.5 gpm	2 minutes	2	2	8	80	80	15
Wol	Womens	_	0.25	0.25	0.5 gpm	1 mintues	_	-	2	2	2	0
	Staff	-		0.25	0.5 gpm	1 minutes	<b>-</b>	-	2	2	2	6
Sink in Library		-	1.5	1.5	3 gpm	3 minutes	c,	5	0			
Drinking Fountain		_	0	œ	8 g/day	1 daily		80	80			
Break Room Sink		-	1.5	1.5	3 gpm	4 minutes	9	9	12	•		
Other Dishwasher (kenmore) Energy Star 665.1601	70	-		17.8	17.8 g/cycle	1 uses		o	თ	, †	, 6	, ¢
Irrigation/Outdoor										=	07	7
							14 observed	99	<b>70 avg day</b> 3,300 avg month			
							observed		47 days at avg 110 avg day			

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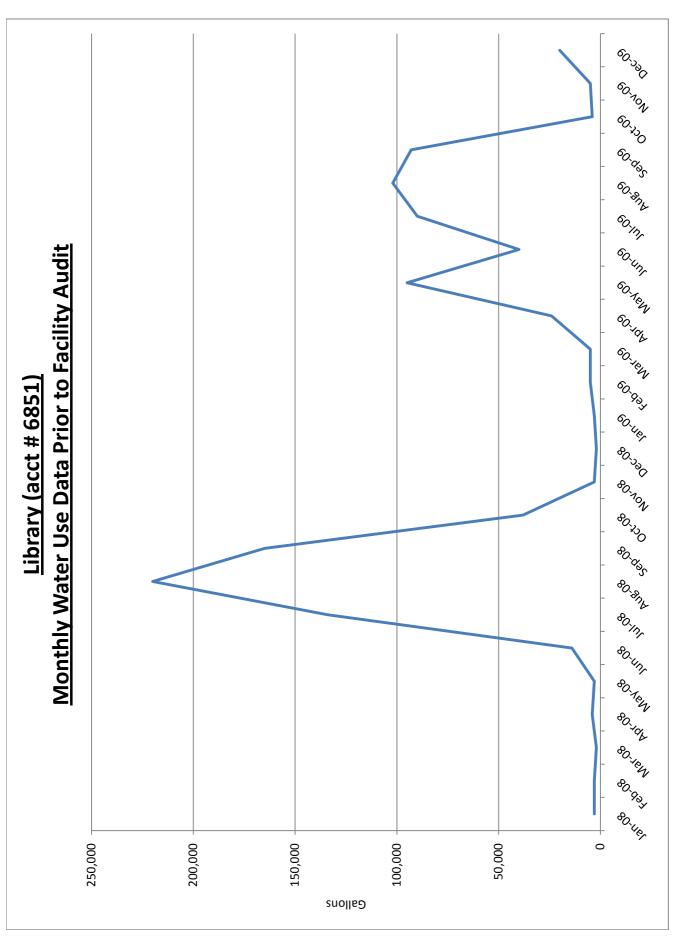
# Table 2 - Summary of Current Water Use and Potential Water Savings Library Audit Summary

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1 (4)	2
4 0	
4 6	2
40.40	2
40.40	2
1 04 040	2
1 04 040	2
1 04 0400	2
1 04 0400	2
1 04 0400	2

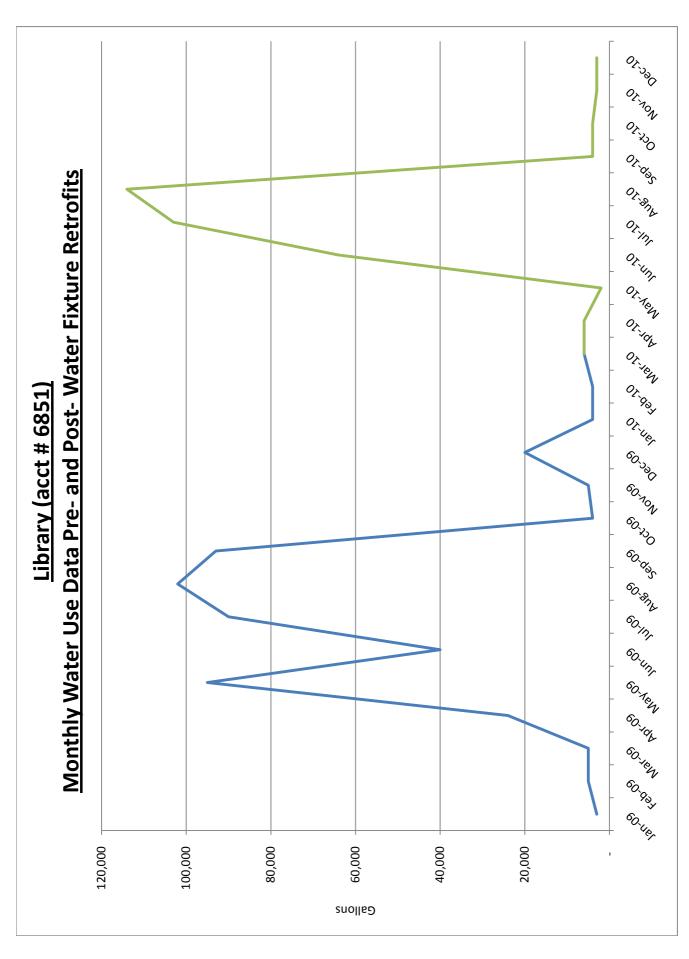
Costs to Implement			
	number Hardware Installation Total Pay Back	Water Savings (gpy) Energy Savings (kWhr)	Total Cost Savings/yr
Urinal	396		s
Bath Sinks	3 \$ 1.61 \$ 5 \$ 20 0.10 yrs	11,880 1,543	\$ 198 \$ 66
	\$ 416		\$ 224
	AF Savings: 0.05 \$/AF: \$ 8,982	Replacement Water Cost*: \$ 1,392	Avoided Cost**: \$ 144
		* Calculation based on \$30.000 per AF	** Calculation based on \$9.50/ 1000 gal

Carculation 1885.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 13, 2010



### **SMART WATER Audit Report**

### Ramon's Restaurant

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 56 Talisman Drive. in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

Ramon's Restaurant uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, Ramon's Restaurant had sinks and toilets that had not been updated with EPA Water Sense certified water efficient fixtures that are currently available in the marketplace. Ramon's Restaurant does, however, utilize a pre-rinse spray nozzle that was provided by PAWSD 3 to 4 years ago, which helps to reduce water use.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Ramon's Restaurant included the following assumption:

• Ramon's Restaurant indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property

The four sink faucet aerators in the men's and women's bathrooms used, on average, 3.1 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$165 dollars per year per sink. This savings results in a payback period of two week.

The four restaurant toilets, on average, use about 2.55 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$1,508 with an estimated total water savings of about 27,000 gallons annually. With these savings, the payback period for the installation of the toilets should be about 7 years. Additionally, one urinal was replaced with a Water Sense approved waterless urinal at a cost of \$396 with a payback period of less than 7 years. It is estimated that the urinal replacements will have a total water savings of about 7,200 gallons annually.

In total, four faucet aerators, four toilets and one urinal in Ramon's Restaurant were updated at a cost of \$1,930. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$950 will result from these changes, saving about 74,000 gallons of water and 5,100 kilowatt hours of energy.

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# Table 2 - Summary of Current Water Use and Potential Water Savings Ramons Restaurant Audit Summary

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number         hot         cold         total         t	Maximum Ose Calculation		beruse	0				subtotal and	
s         1         3.5 gpf         18 flushes         -         63         63         88           s         1         1.6 gpf         1.6 gpf         18 flushes         -         29         29         29           s         1         1.6 gpf         1.6 gpf         25 flushes         -         29         29           s         1         1.2 gpm         2.7 uses         14         14         27           s         1         1.5 gpm         2.7 uses         48         48         48           s         1         1.5 gpm         3.75 uses         48         48         48           s         1         1.5 gpm         3.75 uses         48         48         48           s         1         1.5 gpm         3.75 uses         15         48         48           s         1         1.5 gpm         15 minutes         14         28         14           s         1         2.5 gpm         4.5 minutes         14         4         4           s         1         1.5 gpm         4.5 minutes         14         14         14           s         1         2.5 gpm         3.74 gpuse	equnu		cold		sn			5	
8       3.5 gpf       25 flushes       -       88       88         1       1.6       1.6 gpf       1.8 flushes       -       29       29       29         8       1       1.6       1.6 gpf       25 flushes       -       29       29       29         8       1       1.6       1.6 gpf       25 flushes       -       35       29       29         8       1       1.2       2.5 gpm       2.7 uses       14       14       14       27         8       1       2.5 gpm       7.55 uses       38       48       48       48       75         8       1       1       2 gpm       3.75 uses       14       4       48       48       75         9       1       1       2 gpm       3.75 uses       14       4       48 </td <td>Upstairs -Mens</td> <td>-</td> <td></td> <td>3.5</td> <td>3.5 gpf</td> <td>18 flushes</td> <td></td> <td>63</td> <td>63</td>	Upstairs -Mens	-		3.5	3.5 gpf	18 flushes		63	63
s         1         1.6 gpf         18 flushes         -         40         40           s         1         1.6 gpf         25 flushes         -         40         40           s         1         1.6 gpm         35 flushes         -         36         25           s         1         1.25         2.5 gpm         2.7 uses         14         14         14           s         1         1.5 gpm         3.75 uses         48         48         48         95           s         1         1.5 gpm         3.75 uses         14.140         285         14.25           s         4         1         5 gpm         15 minutes         11.140         285         14.25           s         1         2.5 gpm         15 minutes         15 minutes         38 sp         38 sp         38 sp           s         1         1.5 gpc/m         2.10 gpc/m	Upstairs - Womens	-		3.5	3.5 gpf	25 flushes		88	88
s         1         1.6 gpf         25 flushes         -         40         40           s         1         1.25         2.5 gpm         2.7 uses         14         14         27           s         1         1.5         1.5         2.5 gpm         2.7 uses         14         14         14         27           s         1         1.5         1.5         3 gpm         7.95 uses         48         48         75         75           s         1         1         2.5 gpm         7.5 uses         14,40         285         1,425         30           3         4         1         5 gpm         15 minutes         1,140         285         1,425         75           2         1.5         1.5         3 gpm         45 minutes         1,46         285         77           2         1.5         1.5 gpc/de         2 100# loe         -         -         89         28           1         1         2.5 gpc/de         2 uses         -         -         10         10         10           1         1         2.5 gpc/de         2 uses         -         -         -         -         - <t< td=""><td>Downstairs - Mens</td><td>-</td><td></td><td>1.6</td><td>1.6 gpf</td><td>18 flushes</td><td></td><td>29</td><td>29</td></t<>	Downstairs - Mens	-		1.6	1.6 gpf	18 flushes		29	29
s 1 1.25 1.25 2.5 gpm 2.7 uses 38 14 14 27 5 5 gpm 3.75 uses 38 48 48 48 5 5 gpm 3.75 uses 48 48 48 5 5 gpm 3.75 uses 48 48 48 5 5 gpm 1.440 285 1	ownstairs - Womens	-		1.6	1.6 gpf	25 flushes		40	40
s         1         1.25         2.5 gpm         2.7 uses         14         14         17           s         1         2.5         2.5 gpm         3.75 uses         48         48         48         95           s         1         1         2 gpm         3.75 uses         48         48         95         95           3         4         1         5 gpm         95 minutes         1,140         285         1,425           1         2.5         2.5         5 gpm         45 minutes         38         38         75           2         1.5         3 gpm         45 minutes         136         135         270           1         1.5         1.5         3 gpm         45 minutes         38         38         38           1         1.5         1.5         3 gpm         45 minutes         136         136         142           1         1         1         2.5         1.5         3 gpm         4 minutes         38         38         38           1         1         1         1         1         1         1         1         1         1         1         1         1 <th< td=""><td>Downstairs - Mens</td><td>-</td><td></td><td><del>-</del></td><td>1 gpf</td><td>35 flushes</td><td>•</td><td>35</td><td>35</td></th<>	Downstairs - Mens	-		<del>-</del>	1 gpf	35 flushes	•	35	35
s         1         2.5         2.5         5 gpm         3.75 uses         38         38         75           s         1         1.5         1.5         3 gpm         7.95 uses         48         48         48         48         75           s         1         2 gpm         3.75 uses         46         1.40         2.5         2.85         1.425           1         2.5         2.5         5 gpm         45 minutes         38         38         75           2         1.5         3 gpm         45 minutes         38         38         75           2         1.5         3 gpm         45 minutes         38         38         75           2         1.5         1.5 gpcycle         240 cycles         240 cycles         -         89         289           1         3.74         3.74 gpuse         1 daily         1426         1.216         10         10           1         3.74         3.74 gpuse         1 daily         1426         1.216         1.2000	Upstairs -Mens	-	1.25	1.25	2.5 gpm	2.7 uses	41	4	27
s         1         1.5         1.5         3 gpm         7.95 uses         48         48         48         48         48         48         48         48         48         30         48	Upstairs - Womens	-	2.5	2.5	5 gpm	3.75 uses	38	38	75
s 1 1 2 gpm 3.75 uses 15 15 30 14.40 285 1.525 30 14.25 30 14.40 285 1.425 30 14.25 2.5 5 gpm 15 minutes 38 135 1.35 2.70 2.5 1.5 1.5 3 gpm 45 minutes 38 135 1.35 2.70 2.40 cycles 2.40 cycles 2.40 2.40 2.40 cycles 2.40 2.40 2.40 2.40 2.40 2.40 2.40 2.40	Downstairs - Mens	-	1.5	1.5	3 gpm	7.95 uses	48	48	95
3         4         1         5 gpm         95 minutes         1,140         285         1,425           1         2.5         2.5 gpm         15 minutes         38         38         75           2         1.5         1.5 gpm         45 minutes         135         135         75           1         1.5         1.5 gpm         240 cycles         240 cycles         10         10           1         5 gpm         2 uses         146         126         10         10           1         3.74 gpuse         1 daily         1426         1216         264           1         3.75 gpm         2 uses         10 upserved         12000	ownstairs - Womens	-	-	-	2 gpm	3.75 uses	15	15	30
2.5 2.5 gpm 15 minutes 38 38 75 15 15 15 15 minutes 45 minutes 135 135 135 135 135 135 135 135 135 135		е	4	-	5 gpm	95 minutes	1,140	285	1,425
2 1.5 1.5 3 gpm 45 minutes 135 135 270 270 270 270 270 270 270 270 270 270		-	2.5	2.5	5 gpm	15 minutes	38	38	75
1 178 178 gp100# 5 100# (ce - 89 89 89 89 89 89 89 89 89 89 89 89 89		2	1.5	1.5	3 gpm	45 minutes	135	135	270
1 0 12 1.2 gpcycle 240 cycles . 288 288 288 288 288 288 289 1 1 5 5 gpm 2 uses . 10 10 10 11 3.74 3.74 gpuse 1 daily . 4426 1,216 2,642 3.79,000 0bserved 79,000 79,000 1 3.30	es 800 - JYO804A)	-				5 100# Ice		68	68
5 gpm 2 uses - 10 10 10 10 10 3.74 gpuse 1 daily - 4 4 2.642 1,426 0.2642 79,000 30 observed 79,000 30 30 observed 2 633	•	-	0			240 cycles		288	288
3.74 gpuse 1 daily . 4 4 4 5.43 1,426 1,216 2,643 79,000 9.00 1,000 9.00 9.00 9.00 9.00 9.00 9.00 9.00		-				2 uses		10	10
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79,000							1,426	1,216	2,642 max day
30									79,000 max month
							sqo	Prved	30 days at max 2.633 max day

### Average Use Calculation

Tables Live States Alers				per use	6				subtotal gpd		i
Downstairs - Menes         1         3.5         3.6 gpf         7 flushes         7         7 flushes         2         25	H H	number	hot	ploo	total			hot	ploo	total	
Downstairs - Mores   1	lonets	Upstairs -Mens	-		3.5	3.5 gpf	7 flushes			25	25
Downstairs - Mens         1         1.6         1.6 gpf         10 flushes         1         1.6 gpf         1.6 gpf         10 flushes         1         1.6 gpf         1.6 gpf         1.6 gpf         1.6 gpf         1.6 gpf         1.6 gpf         2.0 flushes         2         2.0 flushes         2         2.0 gpm         2.2 uses         5         11         2.2 uses         5         11         2.2 uses         5         11         2.2 uses		Upstairs - Womens	-		3.5	3.5 gpf	15 flushes			53	53
Downstairs - Womens 1 1.6 1.6 gpf 18 flushes - 29 29 29 20 20 Minutes		Downstairs - Mens	-		1.6	1.6 gpf	10 flushes			16	16
Downstairs - Mens         1         1 gpf         20 flushes         -         20         20           om Sinks         Upstairs - Mens         1         1.25         1.25         2.5 gpm         1.05 uses         5         5         11           Lownstairs - Mens Isinks         1         1.25         2.5 gpm         4.5 uses         27 uses         28 unintes         28 unintes         28 unintes         28 unintes         28 unintes         29 unintes         29 uses         29 unintes         20 unintes		Downstairs - Womens	-		1.6	1.6 gpf	18 flushes			29	59
Downstairs - Mens         1         1.25         1.25         2.5 gpm         1.05 uses         5         5         11         4.5 spm         2.5 spm         2.5 uses         5         5         4.5 spm         4.5 uses         2.7 uses         2.7 uses         2.7 spm         2.7 uses	Urinals	Downstairs - Mens	-		-	1 gpf	20 flushes			20	20
Updates of Treats         Updates of Treats         Countries         25         5 gpm         45 uses         27         27         54           Downstairs - Mens also - Montacins - Mo	Bathroom Sinks	Hactoire Mane		20.25	4 70	т 25	4 OF		ч	u	7
Downstairs - Mens         1         1.5         1.5         3 gpm         4.5 uses         2.7 uses         11         11         11         12         2 gpm         2.7 uses         11         11         11         11         11         11         11         11         11         11         11         11         12<		Upstairs - Womens		2.5	2.5	5 gpm	2.25 uses		23	23	45
Obowrstalf's - Womens         1         1         2 gpm         27 uses         11         12           1 Sjphs         62 minutes         744         186         930           1 Handwash Sink         1         2.5         2.5         5 gpm         5 minutes         75         75         15           1 ks         1.5         1.5         1.5         3 gpm         25 minutes         75         75         150         150           1 sher (Autochlor A5)         1         1         1.2         374 gpuse         100 cycles         -         53         53         53           Table         1         0         1.2         120 gpc/des         -         -         4         4,680         -         -         5         5         5         - <td></td> <td>Downstairs - Mens</td> <td>-</td> <td>1.5</td> <td>7;</td> <td>3 gpm</td> <td>4.5 uses</td> <td></td> <td>27</td> <td>27</td> <td>54</td>		Downstairs - Mens	-	1.5	7;	3 gpm	4.5 uses		27	27	54
Sinks   Sinks   Sinks   Sinks   Sinks   Sink   Sinks   Sink   Sinks		Downstairs - Womens	-	-	<del>-</del>	2 gpm	2.7 uses		11	7	22
Handwash Sink 1 2.5 2.5 5 gpm 5 minutes 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15	Kitchen Sinks		က	4	-	5 gpm	62 minutes		744	186	930
ks         2         1.5         1.5         3 gpm         25 minutes         75         75         75         150           chine (Mantiowoc Series 800 - JYO804A)         1         17.8	Kitchen Handwash Sink		-	2.5	2.5	5 gpm	5 minutes		13	13	25
Chine (Manitowoc Series 800 - JYO804A) 1 17.8 gp100# 3 100# Ice . 53 53 53 sher (Autochlor A5) 1 0 1.2 gpcycle 100 cycles . 12 gp 5 5 5 5 5 5 gpm	Bar Sinks		2	1.5	1.5	3 gpm	25 minutes		75	75	150
120 120 120 120 120 120 120 120 120 120	Other Ice Machine (Manitowoo	Series 800 - JYO804A)				17.8 dp100#	3 100# Ice			23	53
1 5 5 gpm 1 uses . 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Dishwasher (Autochlor,	A5)	<b>-</b>	0		1.2 gpcycle	100 cycles			120	120
e 1 3.74 3.74 gpuse 1 daily - 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 663 1,556 1,55	Mop Closet		-			5 gpm	1 uses			2	2
897 663 1,560 observed 663 46,680 observed 7,550	Steam Table		-			3.74 gpuse	1 daily		•	4	4
46,680 30 1,556									897	993	1,560 avg day
30									observed		46,680 avg month
									observed		30 days at avg 1,556 avg dav

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# Table 2 - Summary of Current Water Use and Potential Water Savings Ramons Restaurant Audit Summary

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Maxillium Use Water Savings											ĺ		
			ber use	•				subtotal gpd			Savings		
- For the state of	number	hot	ploo	total	ysn	uses/day	hot	ploo	total		hot cold	d total	_
Upstairs - Mens Upstairs - Womens	ens ens			6.0	0.9 gpf 0.9 gpf	18 flushes 25 flushes			16 23	16 23		47	47
Downstairs - Mens Downstairs - Womens	sue sue			6.0 6.0	0.9 gpf 0.9 gpf	18 flushes 25 flushes			16 23	16 23		<u>ಬ</u> ಹ	6 6
Urinals Downstairs - Mens	SUE	<b>←</b>		0	0 gpf	35 flushes						35	35
Bathroom Sinks Upstairs -Mens Upstairs - Womens	SUE		0.25 0.25	0.25	0.5 gpm 0.5 gpm	2.7 uses 3.75 uses		w <b>4</b>	ω 4	യവ	11 48	£ 8	22 68
Downstairs - Mens Downstairs - Womens	sue		0.25 0.25	0.25	0.5 gpm 0.5 gpm	7.95 uses 3.75 uses		8 4	8 4	16 8	04 1	4 <del>L</del>	80
Kitchen Sinks		ო	4	-	5 gpm	95 minutes		1,140	285	1,425			
Kitchen Handwash Sink		-	0.25	0.25	0.5 gpm	15 minutes		4	4	80	34	8	89
Bar Sinks		2	1.5	5:	3 gpm	45 minutes		135	135	270			
Other Ice Machine (Manitowoc Series 800 - JYO804A) Dishwasher (Autochlor A5)	æ		0	17.8	17.8 gp100# 1.2 gpcycle	5 100# Ice 240 cycles			88 288	89 288			
Mop Closet Steam Table					5 gpm 3.74 gpuse	2 uses 1 daily			<del>6</del> 4	10			
					i			1,297	910	2,207 max day	129	306	436
								observed		79,000 max month 36 days at max 2,633 max day			

### Average Use Water Savings

			ber use				subtotal gpd			Savings		
io F	number	r hot	cold	total	ä	uses/day hot	cold	total			cold t	total
lonets	Upstairs -Mens	-		6.0	0.9 gpf	7 flushes	,	9	9		18	18
	Upstairs - Womens	-		6.0	0.9 gpf	15 flushes		41	14		39	39
	Downstairs - Mens	-		6:0	0.9 gpf	10 flushes	,	o	o		7	7
	Downstairs - Womens	-		6.0	0.9 gpf	18 flushes	ı	16	16		13	13
Urinals	Downstairs - Mens	-		0	0 gpf	20 flushes		,	,		8	20
Bathroom Sinks	Upstairs -Mens	-	0.25	0.25	0.5 apm	1.05 uses	-	-	2	4	4	∞
	Upstairs - Womens	-	0.25	0.25	0.5 gpm	2.25 uses	2	2	2	20	20	4
	Downstairs - Mens	-	0.25	0.25	0.5 gpm	4.5 uses	S	2	ō	23	23	45
	Downstairs - Womens	-	0.25	0.25	0.5 gpm	2.7 uses	ю	ဇ	2	∞	80	16
Kitchen Sinks		ю	4	-	5 gpm	62 minutes	744	186	930			
Kitchen Handwash Sink		-	2.5	2.5	5 gpm	5 minutes	13	13	25			
Bar Sinks		7	5:1	1.5	3 gpm	25 minutes	75	75	150			
Other	VANOO OO OO OO OO				400,000	9 400# 100		č	S			
Dishwasher (Autochlor A5)	(1000)		0	5 5	1.2 apcycle	100 cycles	•	120	120			,
Mop Closet		-			5 apm	1 uses		2	2			
Steam Table		-			3.74 g/use	1 daily		4	4			,
					,		842	511	1,353 avg day	22	152	207
							observed		46,680 avg month			
									34 days at avg			
							paylasgo		1,556 avg day			

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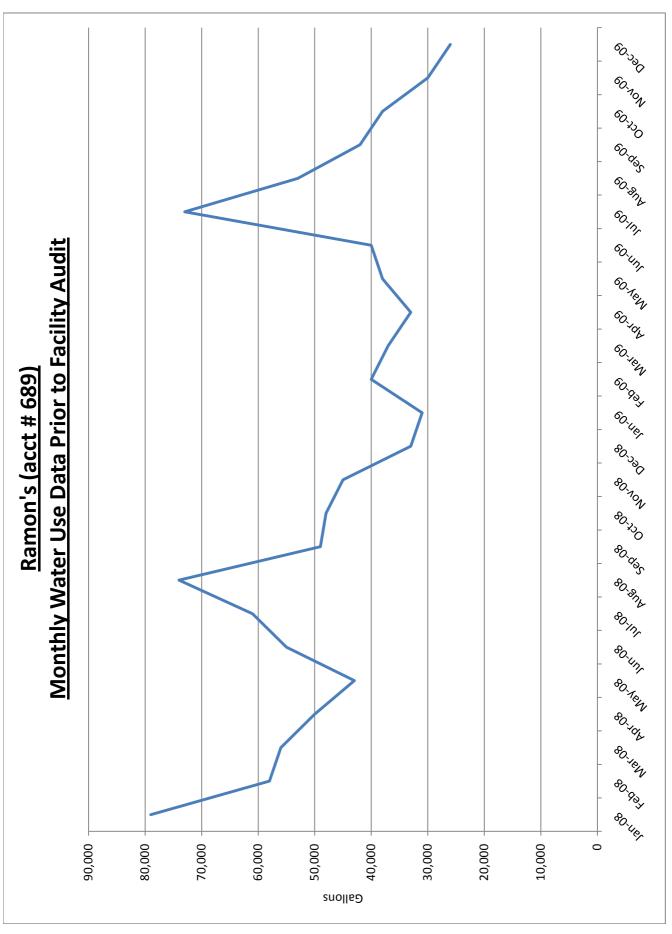
# Table 2 - Summary of Current Water Use and Potential Water Savings Ramons Restaurant Audit Summary

Costs to implement	number Hardware Installation Total Pav Back	Water Savings (gov) Fnergy Savings (kWhr)	Total Cost Savings/vr Total Cost Savings/vr/fixture
Toilet	4 \$ 282 \$ 95 \$ 1,508	27.648	7
Urinals	85 \$ 396	7,200	\$ 59
Bath Sinks	4 \$ 1.61 \$ 5 \$ 26 0.04 yrs	39,636 5,147	\$ 660 \$ 165
	\$ 1,930	74,484 5,147	\$ 945
	AF Savings: 0.23 \$/AF: \$ 8,445	Replacement Water Cost*: \$ 6,857	Avoided Cost**: \$ 708
		* Calculation based on \$30 000 per AF	** Calculation based on \$9.50/ 1000 gal

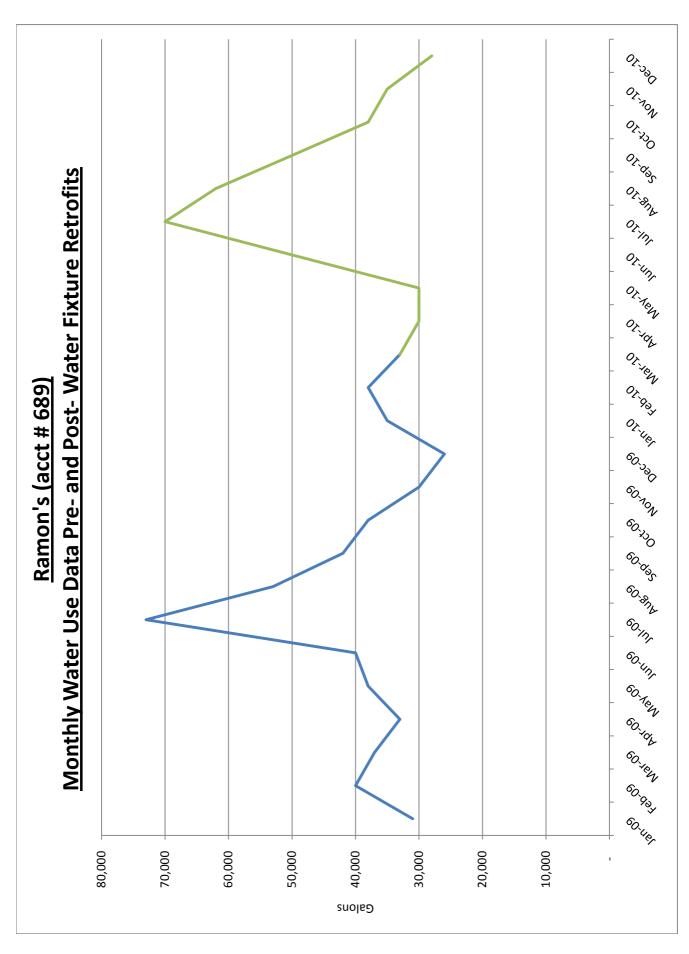
Cost Savings Assumptions: \$8.50/1000 gal - cost of water and sewer, \$0.065/kwh cost of energy

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 8, 2010



### **SMART WATER Audit Report**

### **PLPOA Recreation Center**

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 230 Port Ave # A. in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

The Recreation Center uses water in a manner consistent with public facilites throughout Colorado. Similar to many buildings built before 1993, the Recreation Center had sinks, showers, and toilets that had not been updated with water efficient fixtures that are currently available in the marketplace.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for the Recreation Center included the following assumption:

• The Recreation Center indicated that use lake water for outdoor irrigation during summer months; therefore, no evaluation was performed to characterize outdoor water use for this property

The 9 sink faucet aerators found in the men's, women's and family bathrooms used, on average, about two gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$211 dollars per year per sink. This savings results in a payback period of about two weeks.

The 12 facility showers, on average, used about 2.2 gallons of water per minute. New low flow showerheads, which use 1.5 gallons per minute, were installed at a total cost of \$516 with an estimated total water savings of 38,160 gallons annually. With these savings, the payback period for the installation of the shower heads should just under one year.

Two urinals were also replaced with a Water Sense approved high efficiency waterless urinal at a cost of \$792 with a payback period of about five years. It is estimated that the urinal replacements will have a total water savings of 18,000 gallons annually.

In total, nine faucet aerators, twelve showerheads and two urinals in the Recreation Center were updated at a cost of \$1,367. From the water demand model, it is estimated that a total annual water and energy cost savings about \$2,600 will result from these changes, saving about 180,000 gallons of water and 18,000 kilowatt hours of energy.



Table 2 - Summary of Current Water Use and Potential Water Savings PLPOA Rec Center Audit Summary

Maximum Use Calculation	culation	Avg 315 people daily	sople daily							•			
				esn Jed						subtotal gpd			
e e e e e e e e e e e e e e e e e e e		number	hot	ploo	total		uses/day	-	hot	ploo	total		
lollets	Mens		7		1.6	1.6 gpf		flushes			48	48	
	Womens		4		1.6	1.6 gpf	25	flushes			160	160	
	Family Bathroom		2		1.6	1.6 gpf	10	flushes		,	32	32	
Urinals	Mens		8		~	1 gpf	25	flushes			20	20	
Bathroom Sinks	Mens		0	•	<del>-</del>	2 dbm		minutes		107	107	213	
	Mens		ı <del></del>	1.5	1.5	3 gpm		minutes		40	40	08	
	Womens		4	-	<del>-</del>	2 gpm		minutes		200	200	400	
Fan	nily Bathroom Sink (1)		-	-	<b>←</b>	2 gpm	8	minutes		е	e	S	
Fan	Family Bathroom Sink (2)		-	-	-	2 gpm		minutes		က	က	c)	
Laundry Room Sink			7	2.4	9.0	3 gpm	00	minutes		38	10	48	
Mop Sink Closet			-	0	2	5 gpm	2	sesn			10	10	
Showers	Mens		ო	-	-	2 gpm	23	minutes		69	69	138	
	Mens		<del>-</del>	0.75	0.75	1.5 gpm	23	minutes		17	17	35	
	Womens		m d	1.5	2.5	3 gpm		minutes		104	104	207	
	Womens Family Shower		ი <del>-</del>	ر. د د	1.75	mdg c		minutes		52 15	25	- F	
	Family Shower			· -	-	2 gpm		minutes		2 0	9 0	20	
Other Modeing (Whitehood WITME22005)	Coccontra		,	c	c	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-	Ç.		9	90	c.F	
Drinking Fountain	(a) 44 - 440020000			o	, «	280/0 0/dav	+ +			8.	3 «	ī œ	
Swimming Pool			<b>.</b>		750	750 g/day	-	daily			750	750	
										693	1,722	2,414 max day	
										observed		72,000 max month	
										observed		30 days at max 2,400 max day	

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Table 2 - Summary of Current Water Use and Potential Water Savings PLPOA Rec Center Audit Summary

### Average Use Calculation

			ber use	Ф				subtotal gpd		
Toilote	number	hot	ploo	total	ĺ	uses/day	hot	cold	total	
9000	Mens Womens	0.4		9:1.	1.6 gpf 1.6 gpf	10 flushes 12 flushes			32	32
	Family Bathroom	7		1.6	1.6 gpf	5 flushes		ı	16	16
Urinals	Mens	8		~	1 gpf	25 flushes		,	20	20
Bathroom Sinks	Mens	7	<del>-</del>	~	2 gpm			93	93	187
	Mens Womens	- 4	<del>1</del> .5	<del>.</del> 6.	3 gpm 2 gpm	6 minutes 6 minutes		35 96	35 96	70 192
	Family Bathroom Sink (1) Family Bathroom Sink (2)				2 gpm 2 gpm	1 minutes 1 minutes		<del>-</del> -	<del>-</del> -	е е
Laundry Room Sink		7	2.4	9.0	3 gpm	5 minutes		24	9	30
Mop Sink Closet		~	0	S	5 gpm	1 uses			ß	2
Showers	Mens	ď	-	-	on C	15 minutes		45	45	06
	Mens	· <del>-</del>	0.75	0.75	1.5 gpm			; =	; =	23
	Womens	ოო	1.5	1.5	3 gpm	15 minutes		94	94	135
	Family Shower	· <del>-</del>	5.7.	5.5	3 apm			5 2	12	24
	Family Shower	-	-	-	2 gpm			80	80	16
Other Washing Machine (Whirlpool) WTW5320SQ)	pool) WTW5320SQ)	<del>-</del>	o	o	18 g/use	2 uses		18	81	36
Drinking Fountain				8.00	8.00 g/day	1 daily			80 0	0 00
Swimming Pool		_		067	750 g/day	1 daily		. ;		067
								446		1,812 avg day
								nexinen		30 days at avg
								observed		1,813 avg day

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Table 2 - Summary of Current Water Use and Potential Water Savings PLPOA Rec Center Audit Summary

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	9699								1 - 1 - 1 - 1 - 1						
		mbar	ţ	asn Jac	totot	1	/ap/sosii	pot pot	Subtotal gpd	letot		Savings	Plos	lotot	
Toilets			2	3	100			5	2	2		Ē	2	50	
	Mens		2		1.28	1.28 gpf	15 flushes			38	38			10	10
	Womens		4		1.28	1.28 gpf	25 flushes			128	128			32	32
	Family Bathroom		2		1.28	1.28 gpf	10 flushes			56	26	•		9	9
Unnals															
	Mens		2		0	0 gpf	25 flushes							20	20
Bathroom Sinks															
	Mens		2 0.		0.25	0.5 gpm	13 minutes		27	27	53	80		80	160
	Mens		1 0	0.25	0.25	0.5 gpm	7 minutes		7	7	13	33		33	29
	Womens		4		0.25	0.5 gpm	13 minutes		20	20	100	150		150	300
	Family Bathroom Sink (1)		1		0.25	0.5 gpm	3 minutes		-	<b>-</b>	-	2		2	4
	Family Bathroom Sink (2)		1	0.25	0.25	0.5 gpm	3 minutes		-	τ-	-	2		2	4
Laundry Room Sink			2	2.4	9.0	3 gpm	8 minutes		38	10	48				
												•			,
Mop Sink Closet			_	0	2	5 gpm	2 uses			10	10	•			
i												•			
Showers															
	Mens		3		0.75	1.5 gpm	23 minutes		52	52	104	17		17	32
	Mens				0.75	1.5 gpm	23 minutes		17	17	35				
	Womens			0.75	0.75	1.5 gpm	23 minutes		52	52	104	52		52	104
	Womens		3 0.		0.75	1.5 gpm	23 minutes		52	52	104				
	Family Shower		1		0.75	1.5 gpm	10 minutes		80	80	15	80		80	15
	Family Shower		1 0.		0.75	1.5 gpm	10 minutes		80	80	15	3		3	S
č												•			
Caper							•								
Washing Machine (W.	Washing Machine (Whirlpool) WTW5320SQ)		_	6		18 g/use	4 use		36	36	72				
Drinking Fountain			_			8 g/day	1 daily				∞				
Swimming Pool			_	Ψ.	1,500	1,500 g/day	1 daily			1,500	1,500			(220)	(120)
									346		2,374 max day	346		306)	40
									observed		72,000 max month				
											30 days at max				
									observed		2,400 max day				

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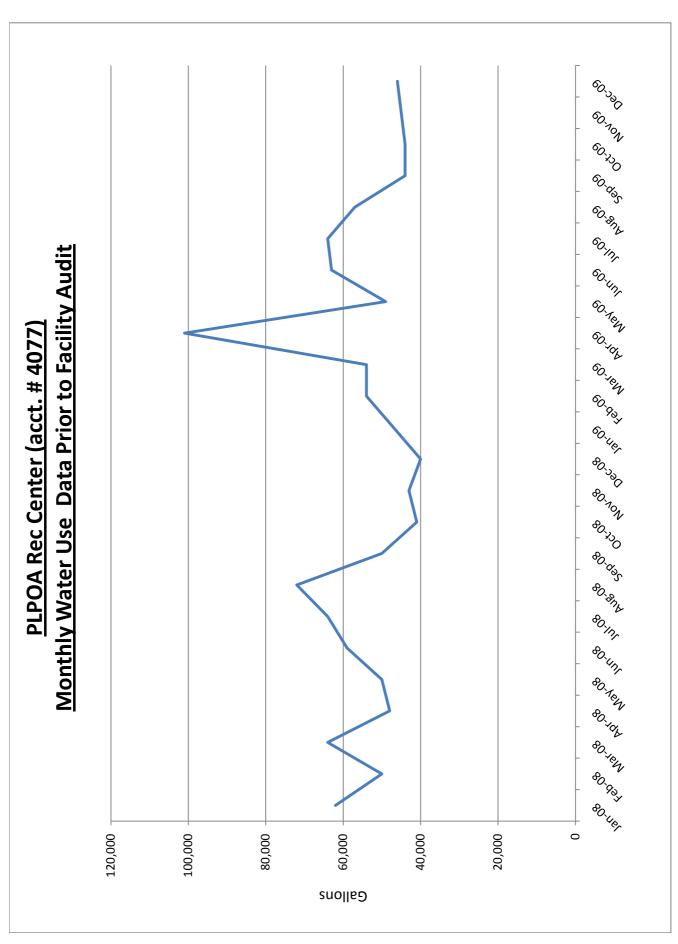
# Table 2 - Summary of Current Water Use and Potential Water Savings PLPOA Rec Center Audit Summary

### Average Use Water Savings

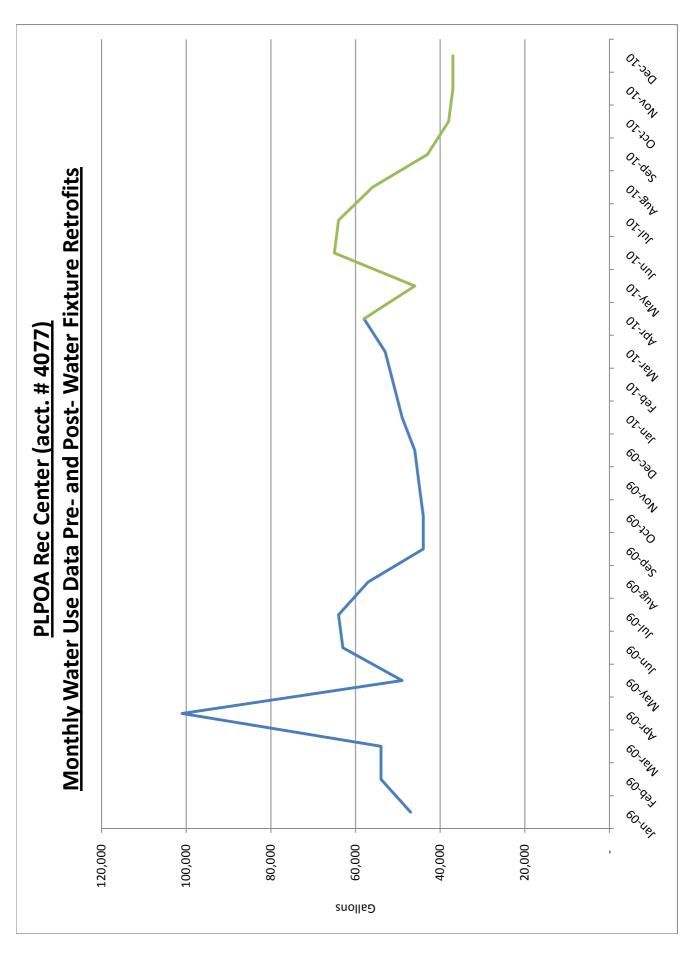
Average Use Water Savings	er Savings												
			per use					subtotal gpd		vő	Savings		
Toilete	number	hot	cold	total		uses/day r	hot	cold	total	Ĕ	ot cold	total	
9000	Mens Womens	0.4		1.28	1.28 gpf 1.28 gpf	10 flushes 12 flushes			26 61	26 61		9 12	9 21
	Family Bathroom	7		1.28	1.28 gpf	5 flushes	•		13	13	,	8	က
Urinals	Mens	7		0	0 gpf	25 flushes				,		50	20
Bathroom Sinks	Mens Mens Womens	0 ← 4	0.25 0.25 0.25	0.25 0.25 0.25	0.5 gpm 0.5 gpm 0.5 gpm	12 minutes 6 minutes 6 minutes		23 6 24	23 6 24	47 12 48	28 29 29	70 29 72	140 144 144
Far Far	Family Bathroom Sink (1) Family Bathroom Sink (2)		0.25 0.25	0.25	0.5 gpm 0.5 gpm	1 minutes 1 minutes		0 0	00				2 2
Laundry Room Sink		2	2.4	9.0	3 gpm	5 minutes		24	9	30			
Mop Sink Closet		<del>-</del>	0	S	5 gpm	1 uses	•	,	ω	5			
Showers	Mens Mens Womens	ო ← ო	0.75 0.75 0.75	0.75 0.75 0.75	1.5 gpm 1.5 gpm 1.5 gpm	15 minutes 15 minutes 15 minutes		34 34 34	34 11 34	8 23 88 8 3 88	t ' <sub>\$8</sub>	= ˈ ¥	, 23 68
	Womens Family Shower Family Shower	<b>ω</b> ← ←	0.75 0.75 0.75	0.75 0.75 0.75	1.5 gpm 1.5 gpm 1.5 gpm	15 minutes 8 minutes 8 minutes		34 6 6	4£ 0	68 12 12	9 7		. 5 4
Other Washing Machine (Whirlpool) WTW5320SO) Drinking Pourtain Swimming Pool	ol) WTW5320SQ)		Ø	9 8.00 750	18 g/use 8.00 g/day 750 g/day	2 uses 1 daily 1 daily		220 observed observed observed	18 8 750 <b>1,065</b>	36 8 750 <b>1.285 avg day</b> 54,400 avg month 42 days at avg 1,813 avg day		304	527

### Costs to Implement

Uninal         2 \$ 311 \$ 85 \$ 792         537 yrs         148         \$         148         \$           Shower         12 \$ 33 \$ 10 \$ 516         0.89 yrs         38,160         -7,372         \$         52         \$           Sinks         9 \$ 1,61 \$ 5 \$ 9         0.03 yrs         12,629         \$		number Hardware Installation Total Payback	Water Savings (gpy) Energy Savings (kWhr)	ngs (kWhr)	Total Cost Savings/yr	vings/yr	Total Cost	Total Cost Savings/yr/fixture
12 \$ 33 \$ 10 \$ 516 0.89 yrs 38,160 4,137 9 8,161 \$ 5 \$ 59 0.03 yrs 124,590 13,508 13,508	Urinal	٥.	18,000		8	148	s	74
9 \$ 1.61 \$ 5 \$ 59 0.03 yrs 124.590 13.508 13.508	Shower	<b>~</b>	38,160	4,137	69	582	s	48
\$ 1,367 17,645 17,645 0.55 \$/AF: \$ 2,465 Replacement Water Cost*: \$ 16,641 **Calculation based on \$30,000 per AF	Sinks	\$	124,590	13,508	69	1,900	ss	211
0.55 \$/AF: \$ 2,465 Replacement Water Cost*: \$ 16,641		\$ 1,367	180,750	17,645	မာ	2,629		
		0.55 \$/AF: \$	Replacement Water Cost*: \$	16,641	Avoided Cost** :	69	717	
			* Calculation based on \$30,000 per AF		** Calculation ba	sed on \$9.50/ 1000	) gal	



\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 26, 2010



### **SMART WATER Audit Report**

### Tequila's Restaurant

### Overview

PAWSD working with Great Western Institute conducted a SMART WATER Audit of this facility at 439 San Juan St. in Pagosa Springs on March 29, 2010. The SMART WATER Audit was conducted as part of the District's demonstration audit project, whereby a small group of selected local businesses volunteered to help PAWSD develop a commercial audit program intended to assist local businesses improve water use efficiency and in doing so, reduce water and energy operational costs.

### Water Use Summary

Tequila's Restaurant uses water in a manner consistent with restaurants throughout Colorado. Similar to many restaurants built before 1993, Tequila's Restaurant had sinks and toilets that had not been updated with EPA Water Sense certified water efficient fixtures that are currently available in the marketplace. Tequila's Restaurant does, however, utilize a pre-rinse spray nozzle that was provided by PAWSD 3 to 4 years ago. In addition, the Tequila's Restaurant also utilizes air cooled ice makers which help to reduce water use.

A water demand model was created to estimate maximum and average daily water uses per existing fixture and to project the annual water savings that may be realized with the installment of new Water Smart fixtures. The water demand model for Tequila's Restaurant included the following assumption:

• Tequila's Restaurant indicated that they do not have any outdoor irrigation; therefore, no evaluation was performed to characterize outdoor water use for this property

The six sink faucet aerators in the men's, women's, and kitchen bathrooms used, on average, 2.6 gallons of water per minute (gpm). These aerators were replaced with 0.5 gpm aerators at a cost of about \$7 per sink and are estimated to have a water and energy savings of approximately \$100 dollars per year per sink. This savings results in a payback period of about 4 weeks.

The four restaurant toilets, on average, use about 1.8 gallons per flush. New Water Sense approved high efficiency dual-flush toilets, which use on average 0.9 gallons per flush, were installed at a total cost of \$1,508 with an estimated total water savings of about 17,000 gallons annually. With these savings, the payback period for the installation of the toilets should be about 11 years.

In total, six sinks and four toilets in Tequila's Restaurant were updated at a cost of \$1,548. From the water demand model, it is estimated that a total annual water and energy cost savings of about \$800 will result from these changes, saving about 57,000 gallons of water and 5,200 kilowatt hours of energy.



Table 2 - Summary of Current Water Use and Potential Water Savings Tequila's Audit Summary

Maximum Use Calculation										
	number	hot	per use cold	etotal	ĺ	uses/day	hot	subtotal gpd cold	total	
Toilets Mens Womens	s s	- 2		2.5	2.5 gpf 1.6 gpf	25 flushes 50 flushes			ස ම	63 180
Kitchen Bathroom	_	-		1.6	1.6 gpf	20 flushes			32	32
Urinals Mens	σ	-		0.5	0.5 gpf	75 flushes			88	38
Bathroom Sinks Mens Womens	s so	00			2 gpm 2 gpm	15 minutes 7.5 minutes		120 60	120 60	240 120
Kitchen Sinks		2	4	-	5 gpm	180 minutes		1,440	360	1,800
Kitchen Handwash Sink		-	0.75	0.75	1.5 gpm	20 minutes		15	15	00
Kitchen Bathroom Sink		-	ю	т	e gpm	3 minutes		ō	6	18
Bus Station		-	-	-	2 gpm	150 minutes		150	150	300
Mop Sink		-	0	2	5 gpm	2 uses			10	10
Bar Sink		2	-	-	2 gpm	45 minutes		06	06	180
Bar Hand Sink		2	7	7	4 gpm	15 minutes		09	09	120
Other Ice Machine (Manitowoc Series QD1003W) Dishwasher (Ecolab ES2000) Steam Table			0	17.8 1.2 8.73	17.8 gp100# 1.2 gpcycle 8.73 gpuse	6 100# lce 200 cycles 1 daily		1,944 observed observed	107 240 9 <b>1,522</b>	107 240 9 3-66 max day 105,000 max month 30 days at max 3500 max day
Average Use Calculation										
	number	hot	per use cold	e total		uses/day	hot	subtotal gpd cold	total	
Mens Womens	s s	- 2		2.5	2.5 gpf 1.6 gpf	10 flushes 15 flushes			22 48	25 48
Kitchen Bathroom	_	-		1.6	1.6 gpf	15 flushes			24	24
Urinals Mens	ø	-		0.5	0.5 gpf	25 flushes			13	13
Bathroom Sinks Mens Womens	so so	0 0			2 gpm 2 gpm	5.25 minutes 2.25 minutes		42 18	42 42	28
Kitchen Sinks		8	4	-	5 gpm	98 minutes		784	196	086
Kitchen Handwash Sink		-	0.75	0.75	1.5 gpm	8 minutes		9	9	12
Kitchen Bathroom Sink		-	е	е	e gpm	2.25 minutes		7	7	14
					,			!		

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53 1,672 avg day 50,160 avg month 30 days at avg 1,672 avg day

observed

3 100# Ice 100 cycles 1 daily

17.8 gp100# 1.2 gpcycle 8.72725 gpuse

17.8 1.2 8.73

Other Ice Machine (Manitowoc Series QD1003W) Dishwasher (Ecolab ES2000) Steam Table

Bar Hand Sink

Bus Station Mop Sink Bar Sink

90 120 40

8 8 2

60

30 minutes

1 uses

5 minutes

2 gpm 4 gpm

45 minutes

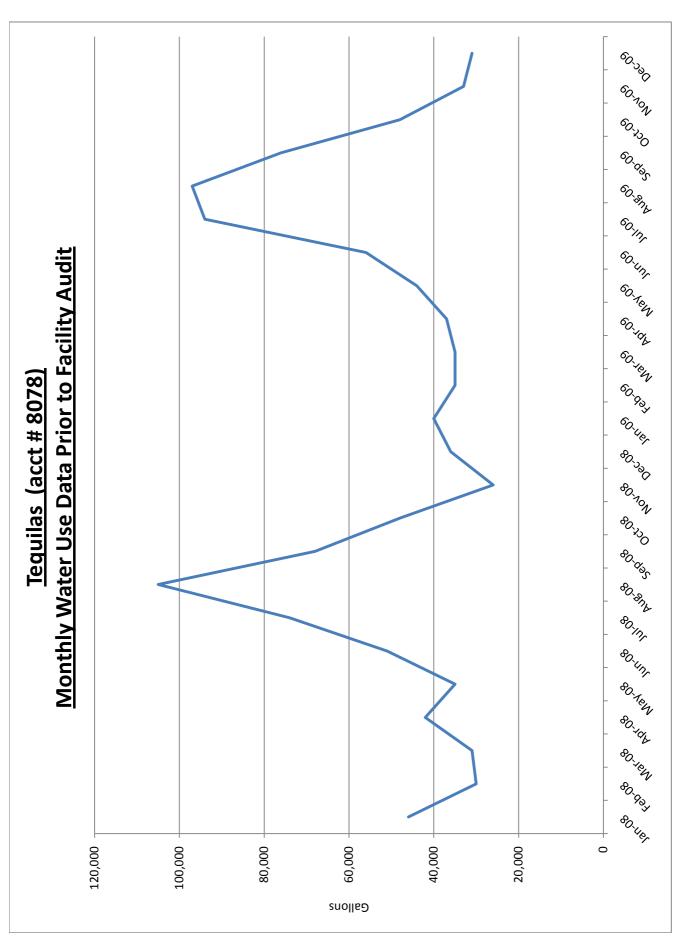
2 gpm 5 gpm

### Table 2 - Summary of Current Water Use and Potential Water Savings Tequila's Audit Summary

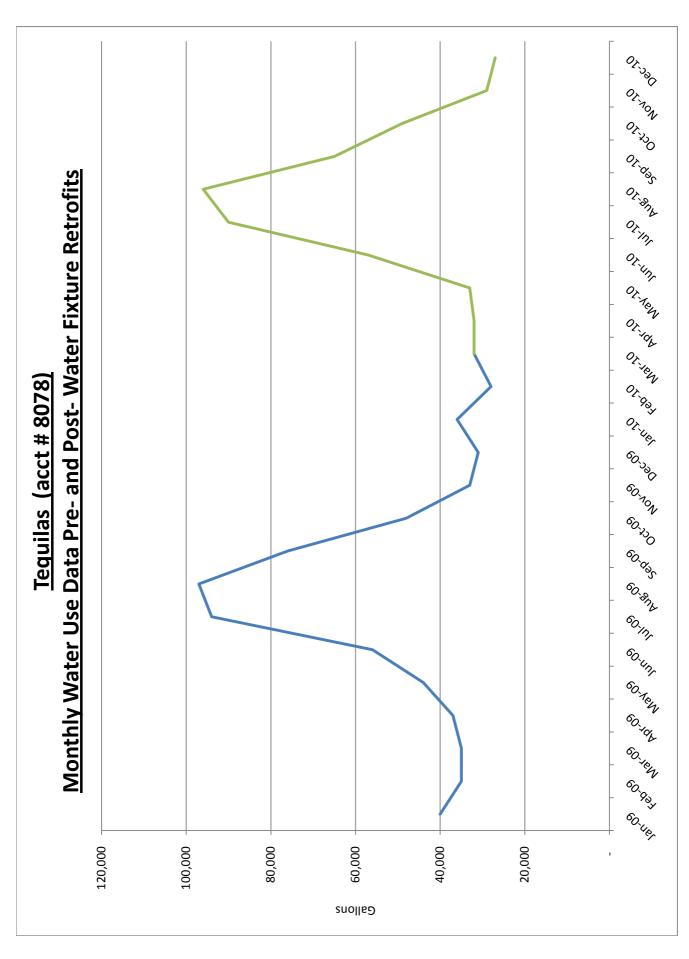
Maximum Use Water Savings												
mnu Talisas	number	hot	per use cold total		uses/day	hot	subtotal gpd cold	total		hot	cold to	total
Mens	7 7		6:0	0.9 gpf 0.9 gpf	25 flushes 50 flushes			8 8	23 90		40 02	40 70
Kitchen Bathroom	-		6.0	0.9 gpf	20 flushes			18	18	٠	41	14
Urinals	-		0.5	0.5 gpf	75 flushes			88	8			
Bathroom Sinks Mens	7	0.25	0.25	0.5 gpm	15 uses		30	93	09	6	06	180
Womens	2	0.25	0.25	0.5 gpm	7.5 uses		15	15	30	45	42	06
Kitchen Sinks	2	4	-	5 gpm	180 minutes		1,440	360	1,800			
Kitchen Handwash Sink	-	0.25	0.25	0.5 gpm	20 minutes		2	S.	10	10	10	20
Kitchen Bathroom Sink	-	0.25	0.25	0.5 gpm	3 minutes		-	-	2	80	00	17
Bus Station	-	-	-	2 gpm	150 minutes		150	150	300		•	,
Mop Sink	-	0	ω	5 gpm	2 uses			10	10		,	
Bar Sink	7	-	-	2 gpm	45 minutes		06	06	180		,	
Bar Hand Sink	2	2	2	4 gpm	15 minutes		09	09	120			
Other Ice Machine (Manitowoc Series QD1003W) Dishwasher (Ecolab ES2000) Steam Table		0	17.8 1.2 8.73	17.8 gp100# 1.2 gpcycle 8.73 gpuse	6 100# lce 200 cycles 1 daily			107 240 9	107 240 9	!		
							1,791 observed observed	1,244	3,035 max day 105,000 max month 35 days at max 3,500 max day	153	277	431
Average Use Water Savings			er use				Subtotal and			Savinds		
Toilets	number	hot o	cold total		uses/day	hot	ploo	total		hot	cold to	total
Momens	7 7		0:0 0:0	0.9 gpf 0.9 gpf	10 flushes 15 flushes			9	9 27		16 21	16 21
Kitchen Bathroom	-		6:0	0.9 gpf	15 flushes			14	41		, <del>E</del>	, <del>F</del>
Urinals	-		0.5	0.5 gpf	25 flushes			13	13			
Bathroom Sinks Mens Womens	0 0	0.25	0.25	0.5 gpm 0.5 gpm	5.25 minutes 2.25 minutes		11	11	21	8 4	32 1	63
Kitchen Sinks	7	4	-	5 gpm	98 minutes		784	196	086			
Kitchen Handwash Sink	-	0.25	0.25	0.5 gpm	8 minutes		2	2	4	, 4	4	. &
Kitchen Bathroom Sink	-	0.25	0.25	0.5 gpm	2.25 minutes		-	-	-	9	9	12
Bus Station	-	-	-	2 gpm	45 minutes		45	45	06			
Mop Sink	-	0	9	2 gpm	1 uses			ß	cs.			
Bar Sink	2	-	-	2 gpm	30 minutes		09	09	120			
Bar Hand Sink	7	7	2	4 gpm	5 minutes		20	70	40			
Other Ice Machine (Manitowoc Series QD1003W) Dishwasher (Ecdab ES2000) Steam Table		0	17.8 1.2 8.73	17.8 gp100# 1.2 gpcycle 8.72725 gpuse	3 100# Ice 100 cycles 1 daily			120 9	53 120 9			
							927 observed observed	288	1,514 avg day 50,160 avg month 33 days at avg 1,672 avg day	ß	103	158
Costs to Implement	nimber	Hardware	nstallation	Total Pav Back		Water Savings	(any) Fneray Savings	(kWhr)	Total Cost Saving	L L	Total Cost Sa	vings/vr/fixture
Tollet Bath Sinks	4 9	\$ 282 \$	& & 00 01 02 03	1,508 10.75 39.66 0.06 1,548			17,100 39,735 56,835	5,159 5,159	မာ မာ	140 661 801	\$ 35 \$ 110	5.
AF:	AF Savings:	0.17	°/\$	\$/AF: \$ 8,873		Replacement V	Replacement Water Cost*: \$	5,233	Avoided Cost**:	\$ 540		
						* Calculation b	* Calculation based on \$30,000 per AF	or Or Change	** Calculation bas	Calculation based on \$9.50/ 1000 ga	gal	

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\*Monthly water use data for two years prior to the facility audit. This data was used to configure and calibrate the water model



\*Water fixture retrofits were installed March 30, 2010 and April 16, 2010

### **Appendix D**

Facility Monthly Water Use Data Prior to and After Fixture Replacements were Installed

		Vanuary	arv	Febr	February	March	5	April	=	Mav		June		vlut		August		September	- Gr	October		November		December		Annual Water Use May- Dec		Average Savings per Month	Annual
acility	Acct #(s)	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	5009	2010	2009	2010	5000	2010	2009	10	2009	010	2009 2	010	2009 20	10	5009	2010	(gallons)	(gallons)
he Spa	7141, 10124*	140,000	152,000	125,000	160,000	106,000	171,000	128,000	171,000	123,000	126,000	152,000	162,000	230,000	197,000	160,000	174000	328,000 1	167,000 2	206,000 1	145,000 2	204,000 16	161,000 14	146,000 15	156,000 1,5	1,549,000 1,	1,288,000	32,625	391,500
est Western	8082, 8081, 8245*	151,000	71,000	85,000	52,000	105,000	75,000	126,000	49,000	75,000	49,000	176,000	95,000	179,000	100,000	146,000	95,000	134,000	91,000	000'99	27,000	42,000	28,000 13	131,000 5	9 000'95	949,000	571,000	47,250	567,000
inewood Inn	8237, 6749, 8238*	49,000	35,000	35,000	25,000	34,000	61,000	26,000	27,000	27,000	29,000	38,000	39,000	61,000	104,000	000'09	40,000	52,000	42,000	43,000	28,000	29,000	50,000 6	67,000 2	20,000 3:	377,000	322,000	6,875	82,500
agosa Inn and Suites	4086	77,000	108,000	26,000	53,000	83,000	94,000	81,000	58,000	63,000	45,000	81,000	90,000	144,000	153,000	125,000	121,000 1	176,000 1	101,000 1	147,000	84,000	61,000 16	165,000 6	9 000'89	8 000'09	860,000	819,000	5,125	61,500
irst Inn	8062	101,000	61,000	53,000	37,000	87,000	58,000	63,000	25,000	45,000	20,000	89,000	65,000	131,000	78,000	110,000	63,000	85,000	42,000	46,000	31,000	8000	16,000 4	47,000 1	17,000 54	561,000	332,000	28,625	343,500
equilas	8078	40,000	36,000	35,000	28,000	35,000	32,000	37,000	32,000	44,000	33,000	26,000	57,000	94,000	000'06	97,000	000′96	76,000	65,000	48,000	49,000	33,000	29,000	31,000 2	27,000 4:	479,000	446,000	4,125	49,500
kamons	689	31,000	35,000	40,000	38,000	37,000	33,000	33,000	30,000	38,000	30,000	40,000	20,000	73,000	70,000	53,000	62,000	52,000	20,000	38,000	38,000	30,000	35,000 2	26,000 2	28,000	350,000	363,000	(1,625)	(19,500)
thamber	8079	0	0	0	0	0	0	0	0	0	29,000	0	138,000	0	108,000	28,000	82,000	000'89	74,000	20,000	15,000	3000	1,000	2,000	1000	93,000	91,000	250	3,000
ibrary	6851	3,000	4,000	5,000	4,000	2,000	6,000	24,000	000'9	95,000	2,000	40,000	64,000	000'06	103,000	102,000	114,000	93,000	4,000	4000	4,000	2000	3,000 2	20,000	3000	449,000	297,000	19,000	228,000
s,dj;	6748	20,000	20,000	17,000	16,000	17,000	20,000	13,000	14,000	14,000	000'6	25,000	16,000	31,000	16,000	29,000	18,000	27,000	14,000	10,000	7000	13,000	9000	16,000	9,000	165,000	98,000	8,375	100,500
ligher Grounds	4105	24,000	29,000	31,000	35,000	29,000	30,000	26,000	28,000	39,000	43,000	46,000	58,000	53,000	000'09	26,000	51,000	47,000	52,000	35,000	44,000	29,000	31,000 2	29,000 2	27,000 3:	334,000	366,000	(4,000)	(48,000)
LPOA Rec Center	4077	47,000	49,000	54,000	51,000	54,000	53,000	101,000	28,000	49,000	46,000	63,000	000'59	64,000	64,000	57,000	26,000	44,000	43,000	44,000	38,000	45,000	37,000 4	46,000 3	37,000 4:	412,000	386,000	3,250	39,000
oss Hogg's	3918	50,000	48,000	42,000	45,000	46,000	44,000	44,000	42,000	47,000	41,000	26,000	43,000	63,000	49,000	000'89	48,000	28,000	44,000	58,000	41,000	47,000	37,000 4	44,000 3	35,000 4	441,000	338,000	12,875	154,500
s.	9175	74,000	70,000	108,000	57,000	106,000	52,000	79,000	52,000	103,000	44,000	111,000	48,000	98,000	26,000	105,000	63,000	97,000	53,000	70,000	48,000	62,000	28,000 8	82,000 2	26,000 7:	728,000	366,000	45,250	543,000

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### **Appendix E**

**Town of Pagosa Lodger Tax Revenue Data** 

### Appendix E: Lodging Tax Revenue Data for the Town of Pagosa

ኍ	26,847
\$	12,700
	19,278
Ś	34,441
¢	40,571
Ş	34,204
Ş	36,758
\$	24,487
\$	23,836
\$	35,091
\$	22,904
\$	20,543
\$	33,516
\$	15,879
\$	20,590
¢	31,804
ر ک	43,728
Ş	45,728
\$	36,391
\$	36,500
\$	25,776
\$	14,866
\$	31,652
\$	23,544
\$	17,002
\$	31,216
Ś	12,500
¢	19,276
ر د	29,041
<u>&gt;</u>	
\$	44,693
\$	42,822
\$	32,363
\$	22,041
\$	16,232
\$	31,934
\$	24,228
\$	19,360
¢	29,925
¢	15,186
ې د	13,160
Ş	21,949
\$	32,622
\$	50,124
	42,307
\$	35,610
\$	25,764
\$	19,815
\$	35,482
Ś	27,295
Ś	21,960
¢	34,928
ې د	
Ş	15,765
\$	21,049
\$	37,304
\$	51,892
¢	41,714
ጉ	
\$	
\$	41,333
\$ \$ \$	41,333 28,858
\$ \$ \$	41,333
	\$

Jan-06 \$

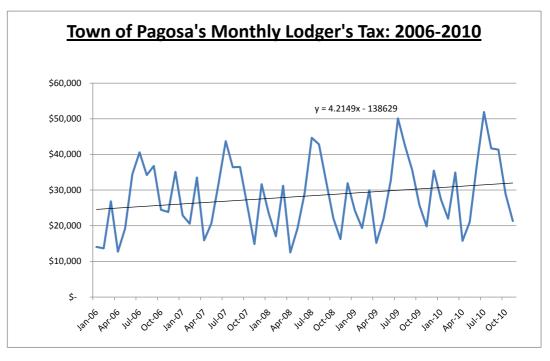
Feb-06 \$

Mar-06 \$

14,059

13,668

26,847



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