ALPINE CITY

20 NORTH MAIN
ALPINE, UTAH 84004

PROJECT MANAGER, SHANE SORENSEN, CITY ADMINISTRATOR
20 NORTH MAIN
ALPINE, UTAH 84004
801-763-9862
ssorensen@alpinecity.org

WaterSMART Grant Application – Secondary Irrigation Municipal Metering Project

Prepared by

HORROCKS
ENGINEERS

Table of Contents

List of Tables

List of Figures

Abbreviations

Ac-ft	Acre-Foot
AMI	Advanced Metering Infrastructure
CUP	Central Utah Project
CUWCD	Central Utah Water Conservancy District
gpm	Gallons per Minute
kWh	kilowatt-hour

1.0 Technical Proposal and Evaluation Criteria

1.1 Executive Summary

January 18, 2017, Alpine City, Utah County, Utah

Alpine City proposes to install meters on their unmetered pressurized irrigation system to assist in water conservation. Meters will allow the City achieve conservation due to better public education and usage based billing. Water conservation is anticipated to be approximately 1,040 ac-ft on an annual basis. This will result in saving approximately 1,194,305 kWh of power utilized for pumping and allow for the conserved water to remain in the over-allocated ground water aquifer. This will also make possible additional extensions of beneficial dedications to in-stream flows from the City's Central Utah Project (CUP) allocation. This application to the Bureau of Reclamation's WaterSmart Grant program is for $1,000,000 out of a projected total cost of $2,514,587. An award of this grant to Alpine City will greatly enhance the City's ability to implement their water metering program and achieve their water conservation goals.

Construction will extend over two budget years starting from the date of grant award with the expenditures being roughly equal in each year.

This project is not located on a Federal facility.

1.2 Background Data

Alpine City is located in northern Utah County, of the State of Utah. Figure 1 in the Appendix A shows a map of the City and its pressurized irrigation system. The proposed project is to install meters in the previously un-metered pressurized irrigation system. Adjacent communities to Alpine City include Highland City to the south and west and Draper City to the northwest.

The primary water supply for the project is the Alpine Irrigation Company's water sources and water rights. Sources include Dry Creek, Fort Canyon Creek, Grove Spring Stream and misc wells. Water Rights include the State of Utah water right numbers 55-878, 1173, 1174, 1396, 1397, 1398, 1399, 1400, 1401, 6909, 6910, 6911, and 6913. These sources and water rights are made available to the City through an agreement between the City and the irrigation company. Supplemental sources and water rights include Alpine City owned resources. Sources include Box Elder Creek, Grove Spring Stream, School House Springs, Ranch Drive Well, 100 West Well, Carlisle Well, Healey Well, Busch Well, and 300 North Well. Water Rights include but may not be limited to the following: 55-740, 837, 1094, 1143, 1361, 4290, 4708, 5369, 5597, 5727, 5995, 6463, 6645, 6471, 6904, 6943, 7617, 7780, 8138, 8359, 8938, 9064, 9089, 9090, 9091 9092, 9093, 9563, 9633, and 9650. Alpine City also has available to the project 770 ac-ft CUP water from the Central Utah Water Conservancy District (CUWCD) and the Bureau of Reclamation.

In 2016 there was approximately 11,224 people in Alpine City with an estimated 1,600 acres of irrigated land which is primarily municipal landscape irrigation (1,300 acres) with some agricultural irrigation (300

acres). Agriculture irrigation consists primarily of fruit trees, alfalfa or pasture with misc other agricultural products. By 2032 it is projected that the project will serve approximately 15,608 people and 1,786 acres of municipal landscaping. It is projected that there will be a 1,717 gpm shortfall in source supply by 2032. The projected shortfall is even greater in periods of drought. In addition there is a concern that the ground water aquifer may not be able to meet the current level of production due to falling aquifer levels.

The City's pressurized irrigation system can be seen in Figure 1 in Appendix A. It consists of approximately 57.7 miles of distribution piping (2-30"), six (6) wells, three (3) equalization reservoirs (6.5 MG), four (4) pressure reducing stations, two (2) booster pump stations, and three (3) surface water intakes. There are approximately 2,420 separate users or lateral connections to the pressurized irrigation system.

This project does include energy efficiency elements. It is anticipated that the installation of pressurized irrigation meters and the associated billing structure and public education efforts will reduce water use and hence reduce the amount of water pumped from the North Utah County Aquifer.

In 1998 Alpine City entered into an agreement with Central Utah Water Conservancy District (CUWCD) to provide funding for the Alpine City Secondary Irrigation Project. This was through the Central Utah Project Completion Act Water Conservation Credit Program. While this work was not with the Bureau of Reclamation directly it was indirectly since the original Central Utah Project was under the direction of the Bureau and CUWCD is under the oversight of the Department of the Interior. Through this agreement the City turned over 875 ac-ft of its allocated water back to CUWCD and the Department of the Interior for in-stream flows to enhance the June Sucker recovery program. The City's remaining 770 ac-ft allotment was also dedicated to the recovery program for 5 years with mutually agreed 5 year extensions after that. Water conservation efforts from this project may allow for additional extensions of this to aid in the June Sucker recovery program. At some point in the future the water will be needed by Alpine City as it grows but until needed it could be utilized in the recovery program.

1.3 Project Description

Alpine City's proposed project is to install municipal secondary water meters in its pressurized irrigation system that serves approximately 2,420 connections. Along with the installation of meters the City will install advanced metering infrastructure (AMI) to allow for real time flow monitoring, automatic meter reading, and usage based billing. These will be new meters where none existing previously. They will individually meter each of the connections.

It is currently undetermined what the post rate structure will be but it is anticipated to include a base rate for all users and an escalating usage charge. The base rate and lower tier usage charges will be structured to fund the operation and maintenance of the system while the higher tier usage charges will be set to encourage conservation. The amount of water in the lower tier usage will be determined based upon the area irrigated, the time of year and the amount of water necessary to maintain healthy landscaping. The current pressurized irrigation rate structure is a simple $0.001112 per square foot of lot area per month.

Construction will extend over two budget years starting from the date of grant award.

1.4 Evaluation Criteria

1.41 Quantifiable Water Savings (25 Points)

Municipal metering of pressurized irrigation has been documented to encourage water conservation. There are several examples of water conservation achieved in Utah due to pressurized irrigation metering.

The first example is Weber Basin Water Conservancy District. They have been implementing a pressurized irrigation metering program in partnership with the Bureau of Reclamation, State of Utah, and Utah State University since 2011. Currently this metering program is not coupled with a usage based rate schedule but instead is utilized to help educate the systems users on how much water they are using and how to utilize the resource better. The District provided a secondary water metering report that details the program and water conservation achieved (see Appendix B). In this report they have documented a 23 percent reduction in use between 2012 and 2015.

Payson City in Utah County, Utah recently received a WaterSMART grant for the installation of pressurized irrigation meters in 2016. They have not had the meters installed for long enough to demonstrate the anticipated water conservation. In their WaterSMART application they described how they have installed approximately 25 test meters to help determine the water use compared to what is necessary to maintain healthy landscaping. They estimated that there was a potential of 0.31 ac-ft per users conservation within their system. They have estimated a 15 percent conservation can be achieved with the use of pressurized irrigation meters.

In 2016 Alpine City utilized 4,895 ac-ft of water in their pressurized irrigation system (2013-2016 average of 4,878). This was utilized on approximately 1,600 acres approximately 300 of which was agricultural in nature. Irrigated acreage is determined from a GIS analysis of their service area. A subset of residential lots was analyzed to determine an average irrigated acreage in typical lot sizes and this average was applied City wide to determine the full irrigated acreage. Assuming an equal division between residential and agricultural use per acre it is estimated that the average residential user applied 1.64 ac-ft of water on an average 0.54 acres of landscape. This amounts to 2.49 ac-ft per acre. Utah State University estimates it requires 2.06 ac-ft of water for turf irrigation in this area. There is a potential of 0.43 ac-ft per lot in water conservation for a total of 1,040 ac-ft.

Each year Alpine City meters the amount of water utilized in their pressurized irrigation system. They also maintain a record of the number of connections and approximate acreage irrigated. From this data the City can determine the approximate number of ac-ft utilized per acre.

It is proposed to measure the annual total water conservation achieved by subtracting the number of ac-ft utilized per acre from 2.49 which is the current usage per acre and then multiplying by the number of acres irrigated.

In addition the City can use individual meter data to verify conservation data determined from total usage data and tailor public education programs to the specific user and encourage water conservation by means other than cost.

The City has selected the Badger E-Series meter and register with Cellular Endpoint transmitter and Badger BEACON AMA Network.

1.42 Water Sustainability Benefits (25 Points)

The proposed project has two water sustainability benefits.

In-Stream Flow Benefits

In 1998 Alpine City entered into an agreement with CUWCD to provide funding for the Alpine City Secondary Irrigation Project. This was through the Central Utah Project Completion Act Water Conservation Credit Program. Through this agreement the City turned over 875 ac-ft of its allocated water back to CUWCD and the Department of the Interior for in-stream flows to enhance the June Sucker recovery program. The City's remaining 770 ac-ft allotment was also dedicated to the recovery program for 5 years with mutually agreed 5 year extensions after that. Water conservation efforts from this project may allow for additional extensions of this to aid in the June Sucker recovery program. At some point in the future the water will be needed by Alpine City as it grows but until needed it could be utilized in the recovery program. This program will extend the time before the water is needed and allow for continued in-stream flow enhancement.

Extensions of the in-stream flows come in an agreement between Alpine City and CUWCD. A copy of the latest agreement is included in Appendix C. The amount of water that could be committed by mutual agreement is 770 ac-ft. This water would increase flows in the Provo River below Jordanelle Reservoir to add in the June Sucker recovery program.

The June Sucker is a federally listed endangered species that is the focus of a multi-agency cooperative effort to coordinate and implement recovery actions. Both CUWCD and the Bureau of Reclamation are among the agencies involved in the effort. The stated goals of the program are to:

1. Recover the June Sucker to the extent that it no longer requires protection under the Endangered Species Act.
2. Allow for the continued operation of existing water facilities and future water development of water resources for human use.

Aquifer Benefits

Alpine City is in North Utah County, Utah and utilizes water from surface streams and the northern Utah County aquifer. Several other communities and agricultural interests utilize the same aquifer. The State of Utah Department of Natural Resources Division of Water Rights has developed a ground water management plan for northern Utah Valley. This was in response to several studies that show the amount of water allocated to users through water rights is much greater than available ground water recharge. In other words communities and people in North Utah County have the right to withdraw more water from the aquifer than is available to recharge the aquifer. This will eventually result in excess mining water from the aquifer and causing some users to lose water supply. Over the past 30

years or so the water table has dropped throughout the aquifer and could continue to drop with additional mining. This could cause tension and or conflict between water users. Currently there is an awareness of the concern among the aquifer's water users but not open conflict. In fact the communities in northern Utah County have formed the North Utah County Aquifer Association to jointly study and plan for their ground water needs. These communities include Alpine City, Highland City, Cedar Hills City, Pleasant Grove City, Lindon City, Orem City, American Fork City, Lehi City, Saratoga Springs City, and Eagle Mountain City and CUWCD. This association has completed a feasibility study of aquifer storage and recovery in the area and are actively pursuing implementing aquifer storage projects. They are currently helping to fund the USGS in updating their ground water model in northern Utah County to help in better joint management of the aquifer. The Alpine City project will allow the City to pump less water from the aquifer by the amount of water conservation achieved. This will not only cost the City less money annually but protect the aquifer resource for Alpine and the other users. Successful implementation of this project will encourage other neighboring communities to do the same.

Drought over the past 5 years has led to the lowering of water table in the aquifer as well as over-allocation. Water conservation in general and this project in specific will help aquifer water levels by leaving the conserved water in the aquifer.

1.43 Energy-Water Nexus (18 Points - 4 Points Subcriterion C.2)

The proposed Alpine City project will increase energy efficiency in water management by allowing less pumping of ground water. In 2016 Alpine City found it necessary to pump 1,841 ac-ft of water from its wells to meet the pressurized irrigation demand of its residents. This pumping cost approximately $201,396.75 in total and an average of $109.36 per ac-ft. This pumping consumed 2,114,760 kWh of power. It took an average of 1148.4 kWhs to pump an ac-ft of water.

Alpine City has 5 wells it uses to supplement surface water supplies for their pressurized irrigation system. Table 1 shows the wells and the amount of water pumped in 2016. It also shows the size of the pumps, flowrate, pumping costs, kWh usage, and expected savings from water conservation.

Table 1 Pressurized Irrigation Supply Wells

Well Name	Horsepower	Flow Rate	Current Use			Estimated Savings		
			2016 Volume Pumped	2016 Cost	2016 Power for Pumping	Volume Conserved	Cost Conserved	Power Conserved
	(HP)	(GPM)	(Ac-Ft)	($)	(kWh)	(Ac-Ft)	($)	(kWh)
Healey Well	600	3,100	698	$71,933	774,960	394	$16,829	437,657
Carlisle Well	300	1,150	243	$25,609	250,920	137	$10,437	141,706
Ranch Well	500	2,400	613	$52,662	612,760	346	$13,289	346,055
300 North Well	400	700	185	$29,866	303,800	104	$6,606	171,570
100 West Well	200	1,000	103	$21,326	172,320	58	$3,765	97,317
Busch Well	150	450	-	$0	-	-	$0	-
Totals			**1,842**	**$201,397**	**2,114,760**	**1,040**	**$50,926**	**1,194,305**

The energy saving estimates are from the point of diversion at the wells. There are no costs associated with treating the water. There are also no anticipated reduced miles driven as a result of this project.

1.44 Addressing Adaptation Strategies in a WaterSMART Basin Study (8 Points)

The project area is not part of a WaterSMART basin study.

1.45 Expediting Future On-farm Irrigation Improvements (8 Points)

It is not anticipated that this project will lead to any on-farm irrigation improvements.

1.46 Implementation and Results (8 Points)

The proposed Alpine City project is the result of years of planning. The following sections outline the various efforts leading to implementation of the project.

Project Planning

Alpine City has a water conservation plan (see Appendix D) that includes evaluating and testing pressurized irrigation meters that are suitable for secondary water in preparation for eventual meter installation. Their current pressurized irrigation master plan (Draft) includes a cost estimate and recommendation to install pressurized irrigation meters to encourage conservation. Alpine City Council has been presented the costs associated with meters, the potential water savings to be gained, potential long term system savings associated with conservation and are supportive of the metering effort.

During the past couple of years the City has been requiring new homes to install lateral connections that are meter ready in anticipation of wholesale meter installation. The original installations will need to

be modified to accept meters.

The City is also currently testing new automatic meter reading systems and advanced metering infrastructure that would be utilized with the pressurized irrigation meters. These systems are cell phone based technology that take meter readings on a daily basis. It is anticipated that the advanced metering system will help identify water leaks and help the City conserve more water.

Support and Collaboration

We believe there is widespread support for the project (see Appendix E). We also believe the project will help prevent a water-related crisis or conflict because it will ultimately reduce the ground water withdrawals in an over-allocated aquifer. When and if there is a future crisis or conflict Alpine City will be able to demonstrate they are doing their part to conserve and protect the aquifer. There is not currently frequent tension or litigation over water in the northern Utah County area but there is an awareness and concern for the future viability of the resource. As mentioned previously Alpine City and other water users in the area have organized the North Utah County Aquifer Association to jointly manage the aquifer. We believe that implementation of the project will encourage neighboring communities to implement their own pressurized irrigation metering projects as they see the benefits to their water systems and the aquifer.

Performance Measures

Detailed performance measures are identified in section 1.5 of this application. Alpine City will measure the water conservation achieved through metering by comparing water use per acre pre and post project implementation. They will also determine the number of kWhs of pumping saved by these conservation measures. Also, if mutually agreed upon, the number of ac-ft of water dedicated to in-stream flows will be recorded each year.

1.47 Additional Non-Federal Funding (4 Points)

It is estimated that the proposed project will cost $2,514,587 to complete. This grant application is for $1,000,000 which is approximately 39.8 percent of the project total. Construction will extend over two budget years. Alpine City will cover a minimum of $300,000 and potentially the remaining 60.2 percent of the project costs (see appendix F).

Alpine City is pursuing a low interest loan from the State of Utah Department of Natural Resources Division of Water Resources for the amount necessary to complete the project. The Division has recently approved a loan program specifically for municipal secondary water metering projects. If this loan is not available the City is prepared to self-fund the additional amount necessary to complete the project (see appendix F).

1.48 Connection to Reclamation Project Activities (4 Points)

The Bureau of Reclamation is a participant in the June Sucker Recovery Implementation Program on the Provo River. In 1998 Alpine City dedicated 875 ac-ft of its allocated Central Utah Project Bonneville Unit water to the recovery program in exchange for Central Utah Project Completion Act Water Conservation Credit Program funding. The City's remaining 770 ac-ft allotment was also dedicated to the recovery program for 5 years with mutually agreed 5 year extensions after that. Water

conservation efforts from this project may allow for additional extensions of this to aid in the June Sucker recovery program. At some point in the future the water will be needed by Alpine City as it grows but until needed it could be utilized in the recovery program.

1.5 Performance Measures

Alpine City's proposed project is to install municipal secondary water meters in its pressurized irrigation system that serves approximately 2,420 connections. These will be new meters where none exist previously. They will individually meter each of the connections. The project will include automatic meter reading and AMI to allow for usage based billing and user leak detection. It is currently undetermined what the post rate structure will be but it is anticipated to include a base rate for all users and an escalating usage charge. The base rate and lower tier usage charges will be structured to fund the operation and maintenance of the system while the higher tier usage charges will be set to encourage conservation. The amount of water in the lower tier usage will be determined based upon the area irrigated, the time of year and the amount of water necessary to maintain healthy landscaping. The current pressurized irrigation rate structure is a simple $0.001112 per square foot of lot area per month.

1.51 Performance Measure A.2.a Municipal Metering

In 2016 Alpine City utilized 4,895 ac-ft of water in their pressurized irrigation system. This was utilized on approximately 1,600 acres approximately 300 of which was agricultural in nature. Assuming an equal division between residential and agricultural use per acre it is estimated that the average residential user applied 1.64 ac-ft of water on an average 0.54 acres of landscape. This amounts to 2.49 ac-ft per acre.

Each year Alpine City meters the amount of water utilized in their pressurized irrigation system. They also maintain a record of the number of connections and approximate acreage irrigated. From this data the City can determine the approximate number of ac-ft utilized per acre.

It is proposed to measure the annual total water conservation achieved by subtracting the number of ac-ft utilized per acre from 2.49 which is the current usage per acre and then multiplying by the number of acres irrigated.

An additional benefit to metering individual connections is the City can compare the total water supplied to the system with the total metered out to users. This will allow the City to correct any unacceptable leakage or loss in the system. Without existing individual metering the City is unable to quantify the water conservation that could be achieved from this measure.

In addition the City can use individual meter data to verify conservation data determined from total usage data and tailor public education programs to the specific user and encourage water conservation by means other than cost.

1.52 Performance Measure B.2 - Increasing Energy Efficiency in Water Management

In 2016 Alpine City found it necessary to pump 1,841 ac-ft of water from its wells to meet the pressurized irrigation demand of its residents. This pumping cost approximately $201,396 in total and an average

of $109.36 per ac-ft. This pumping consumed 2,114,760 kWh of power. It took an average of 1148.4 kWhs to pump an ac-ft of water. It is estimated that the project will save approximately 1,194,305 kWhs of power for $50,926 in savings.

It is proposed to measure the annual energy efficiency achieved by multiplying the number of ac-ft conserved by average of kWhs per ac-ft to obtain the total kWhs conserved by the project.

1.53 Performance Measure C - Projects that Benefit Endangered Species and /or Critical Habitat
In 1998 Alpine City dedicated 875 ac-ft of its allocated Central Utah Project Bonneville Unit water to the June Sucker recovery program in exchange for Central Utah Project Completion Act Water Conservation Credit Program funding. The City's remaining 770 ac-ft allotment was also dedicated to the recovery program for 5 years with mutually agreed 5 year extensions after that. This water is utilized for in-stream flows. Water conservation efforts from this project may allow for additional extensions of this to aid in the recovery program. At some point in the future the water will be needed by Alpine City as it grows but until needed it could be utilized in the recovery program. The specific benefit to the June Sucker recovery effort of an ac-ft of water for in-stream flows has not been quantified.

It is proposed to measure the benefit to endangered species by reporting the annual amount of water dedicated to the June Sucker recovery effort. This amount would be equal to the lesser of the ac-ft conserved and the ac-ft dedicated to the recovery effort.

2.0 Environmental and Cultural Resources Compliance

- Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.
    - The project will consist of installing water meters on existing pressurized irrigation service laterals. Primarily this will consist of removing an existing irrigation access/valve box and replacing it with a slightly larger box, new fittings and an AMI meter. Work will not affect air, water, or animal habitat as it will only temporarily disturb only residential landscaping.
- Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?
    - USFWS's Information Planning and Conservation System (IPaC) website provides information regarding the occurrence of Endangered Species Act (ESA) species in an area based on a specific area of interest (AOI). The below table identifies the federally-listed species from an IPaC Official Species List which are known to occur in Utah County. The location of project features (proposed work) is within residential neighborhoods that are highly disturbed. No suitable habitat for these species exists within the proposed work areas. No threatened or endangered species will be impacted by the proposed project.

Federally-listed Threatened and Endangered Species in Utah County

Common Name	Scientific Name	State Status
Canada Lynx	*Lynx Canadensis*	Threatened
June Sucker	*Chasmistes liorus*	Endangered
Ute Ladies'- Tresses	*Spiranthes diluvialis*	Threatened
Jones Cycladenia	*Cycladenia humilis var. jonerii*	Threatened
Yellow-Billed Cuckoo	*Coccyzus americanus*	Threatened

- Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.
    - The project will only disturb existing residential landscaping, thus no wetlands or waters of the U.S. will be affected by the project.
- When was the water delivery system constructed?
    - The pressurized irrigation system was installed in 2000-2001.
- Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.
    - The project will install meters on existing pressurized irrigation service laterals. These laterals were constructed in 2000-2001 or later. No other modifications to the system will be required.
- Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.
    - There are three properties in Alpine listed on the NRHP: the Alpine City Hall, Alpine LDS Church Meetinghouse, and Moyle House and Indian Tower. Many other houses and buildings from the historic era are located in the city.
- Are there any known archaeological sites in the proposed project area?
    - A file search for archaeological sites showed seven within the city limits. None of these archaeological sites would be affected by the proposed project.
- Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?
    - The project will affect all residences in the city equally and will not have disproportionately high or adverse effects to any population.
- Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?
    - No, there are no known sacred sites or tribal land within the city limits. The project will not limit access to or use of any property.
- Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?
    - The project will disturb areas of existing residential landscaping. Introduction, existence, or spread of noxious weeds or invasive species is not expected.

3.0 Letters of Project Support

Attached to this grant application in Appendix E are letters of project support from Utah State Department of Natural Resources Division of Water Resources, Central Utah Water Conservancy District, Utah County Commission, and Alpine Irrigation Company.

4.0 Required Permits or Approvals

All appropriate approvals and permits for the project are under the jurisdiction of Alpine City. All Alpine City ordinances and procedures will be followed and obtained. In addition any applicable Utah State or Federal laws and regulations will be followed.

All work will be contained to City utility easements. Any other additional work necessary in City street rights-of-way will also fall under jurisdiction of the City. The contractor that is awarded the project will also be under and constrained to follow all necessary laws and regulations.

5.0 Official Resolution

Attached to this grant application in Appendix F is an official resolution from the Alpine City Council giving support to the project and committing to pay the balance of the project costs if the City is awarded this WaterSMART grant.

6.0 Project Budget

6.1 Funding Plan and Letters of Commitment

It is estimated that the proposed project will cost $2,514,587 to complete. This grant application is for $1,000,000 which is approximately 39.8 percent of the project total. Construction will extend over two budget years with expenditures being roughly equal each year. Alpine City will cover a minimum of $300,000 and potentially the remaining 60.2 percent of the project costs (see appendix F).

Table 2 below shows the breakdown in project funding sources.

Table 2 Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount
Non Federal Entities	
1. Alpine City	$300,000.00
2. Alpine City or State of Utah Division of Water Resources Loan	$1,214,586.51
Non Federal Subtotal	
Other Federal Entities	
1.	
2.	
Other Federal Subtotal	
Requested Reclamation Funding	**$1,000,000.00**

Alpine City is pursuing a low interest loan from the State of Utah Department of Natural Resources Division of Water Resources for the amount necessary to complete the project. The Division has recently approved a loan program specifically for municipal secondary water metering projects. If this loan is not available the City is prepared to self-fund the additional amount necessary to complete the project (see appendix F). This funding would come from reserve accounts.

Alpine City would like to include in its funding request the cost to prepare this WaterSmart Grant application prepared by a consultant in the amount of $13,290. This cost is incurred before the anticipated project start date.

6.2 Budget Proposal

Table 3 below shows the proposed budget for the project.

Table 3 Budget Proposal

Budget Item Description	Computation		Quantity	
	$/Unit	Quantity	Type	Total Cost
Salaries and Wages				
Shane Sorensen	$60.00	110	hr	$6,600.00
Jed Muhlestein	$40.29	110	hr	$4,431.90
Greg Kmetszch	$32.73	110	hr	$3,600.30
Fringe Benefits				
Shane Sorensen	$26.04	110	hr	$2,864.40
Jed Muhlestein	$21.92	110	hr	$2,411.20
Greg Kmetszch	$20.01	110	hr	$2,201.10
Travel - Not Anticipated				$0.00
Equipment - Not Anticipated				$0.00
Supplies and Materials				
Meter Reading Software	$4,900.00	1	LS	$4,900.00
Contractual/Construction				
Engineering Consultant - Horrocks Engineers	8%	1	LS	$181,173.30
Construction Contractor				
Mobilization	5%	1	LS	$93,775.00
AMI Meters	$310.00	2420	Each	$750,200.00
Box and fittings	$120.00	2420	Each	$290,400.00
Installation	$345.00	2420	Each	$834,900.00
Contingencies	15%	1	Each	$295,391.25
Construction Contractor Total				$2,264,666.25
Other				
Environmental and Regulatory Compliance	1%	1	LS	$22,646.66
WaterSmart Grant Application - Consultant		1	LS	$13,290.00
Total Direct Costs				$2,508,785.11
Indirect Costs				
Administrative and Clerical Costs		1	LS	$5,801.40
Total Estimated Project Costs				$2,514,587

6.3 Budget Narrative

6.31Salaries and Wages

Alpine City anticipates salaries and wages of City employees to be charged to the project in the amounts listed in Table 3. Shane Sorensen, P.E. is the City Administrator and will be the Program Manager for the project. Jed Muhlestein, P.E. is the City Engineer and Greg Kmetszch is the water department superintendent. All three City employees will be involved in implementing the project and anticipate spending approximately 10 percent of their time during design, construction and final reporting and evaluation. Salaries and wages are subject to increase annually by approximately 3% on July 1st as part of normal pay increases. Hours include time to prepare final project evaluation.

The City anticipates hiring a consultant to provide the majority of project design, inspection, and construction management services. These costs are identified in section 6.36 contractual.

6.32 Fringe Benefits

Alpine City anticipates fringe benefits of City employees to be charged to the project in the amounts listed in Table 3. The rates listed are existing fixed rates for each employee listed. Rates are subject to increase annually by approximately 3% on July 1st as part of normal pay increases.

6.33 Travel

No travel costs are anticipated.

6.34 Equipment

No Equipment Costs are anticipated.

6.35 Materials and Supplies

The only materials and supplies anticipated with this project are the automatic meter reading software and advanced metering technology. The City is currently evaluating two separate meter reading software options. The costs listed are a result of cost estimates prepared by the software supplier.

6.36 Contractual

Alpine City anticipates contracting with a consulting engineer to design lateral metering details, develop bid documents, assist the City in obtaining bids, and perform inspection and construction management services. The consulting engineer will be Horrocks Engineers who is the currently contracted utility engineer for Alpine City unless an RFP consultant selection is necessary. Preliminary cost estimates for design and construction management are based on a fixed percentage of construction costs for this application. These amounts will be refined if an award is received.

The meter installation will be performed by a construction contractor (or multiple contractors). Construction costs will include all materials and supplies necessary to install new meters on each lateral connection in the City. Construction contractor will be selected through a competitive bid process once project design is complete. Construction costs are estimated with an appropriate contingency factor included.

6.37 Environmental and Regulatory Compliance Costs

There are not anticipated to be any significant environmental and regulatory compliance costs see section 2.0. The cost estimated includes 1 percent in environmental and regulatory compliance costs.

6.38 Other Expenses

Other costs are not anticipated or included in this funding request.

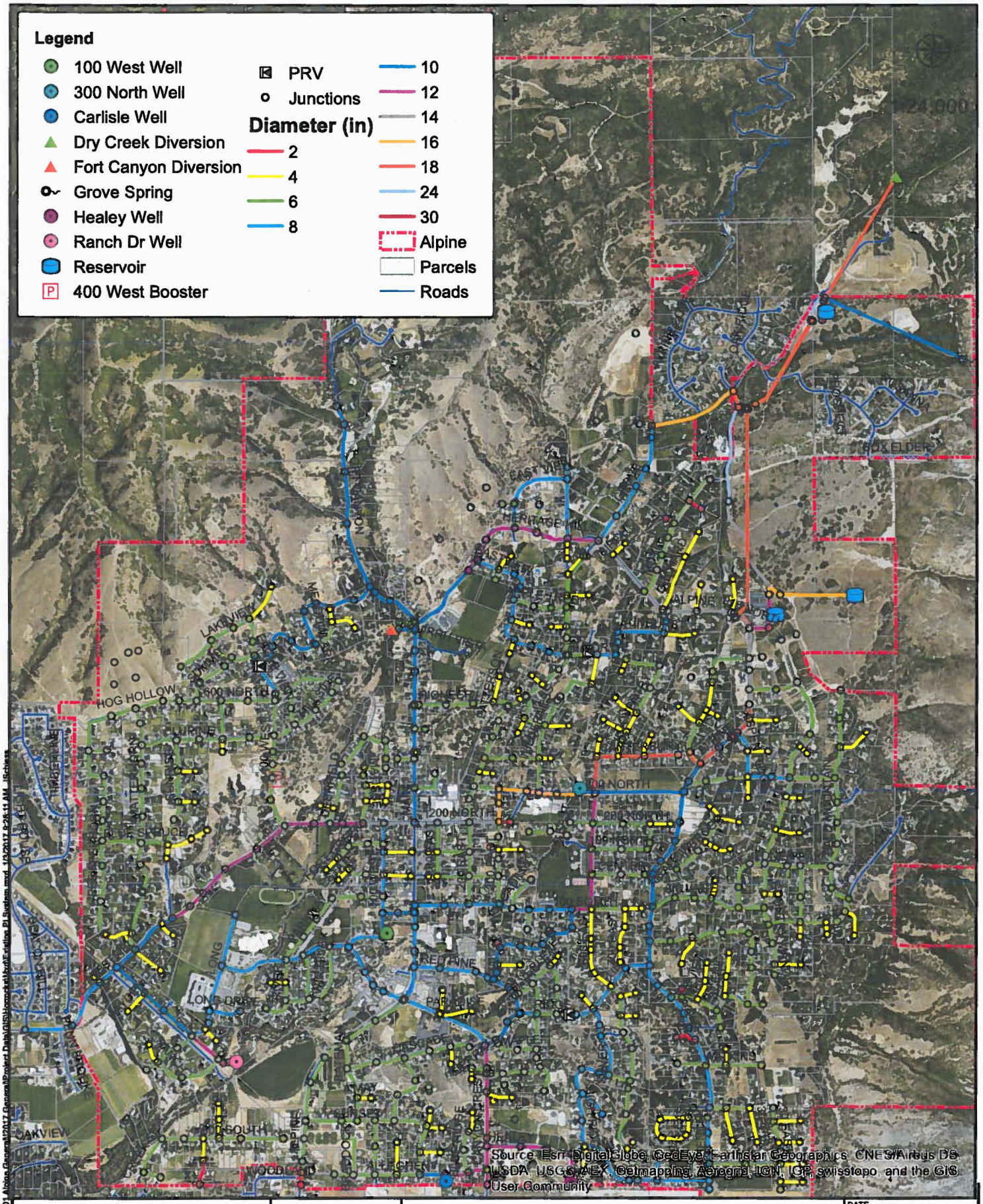
6.39 Indirect Costs

Indirect costs included in the project estimate are administrative and clerical personnel and coordination with the City's billing software supplier. It is estimated that total cost will be approximately the same as the water superintendent's wages and fringe benefits. It is unknown which administrative and clerical personnel will assist with the project therefore these costs are included in indirect costs. There are likely to be some minor direct charges by the City's billing software supplier and these are included in the estimate.

6.310 Total Costs

The total project cost is anticipated to be $2,514,587.

APPENDIX A – Existing Pressurized Irrigation System and Standard Details

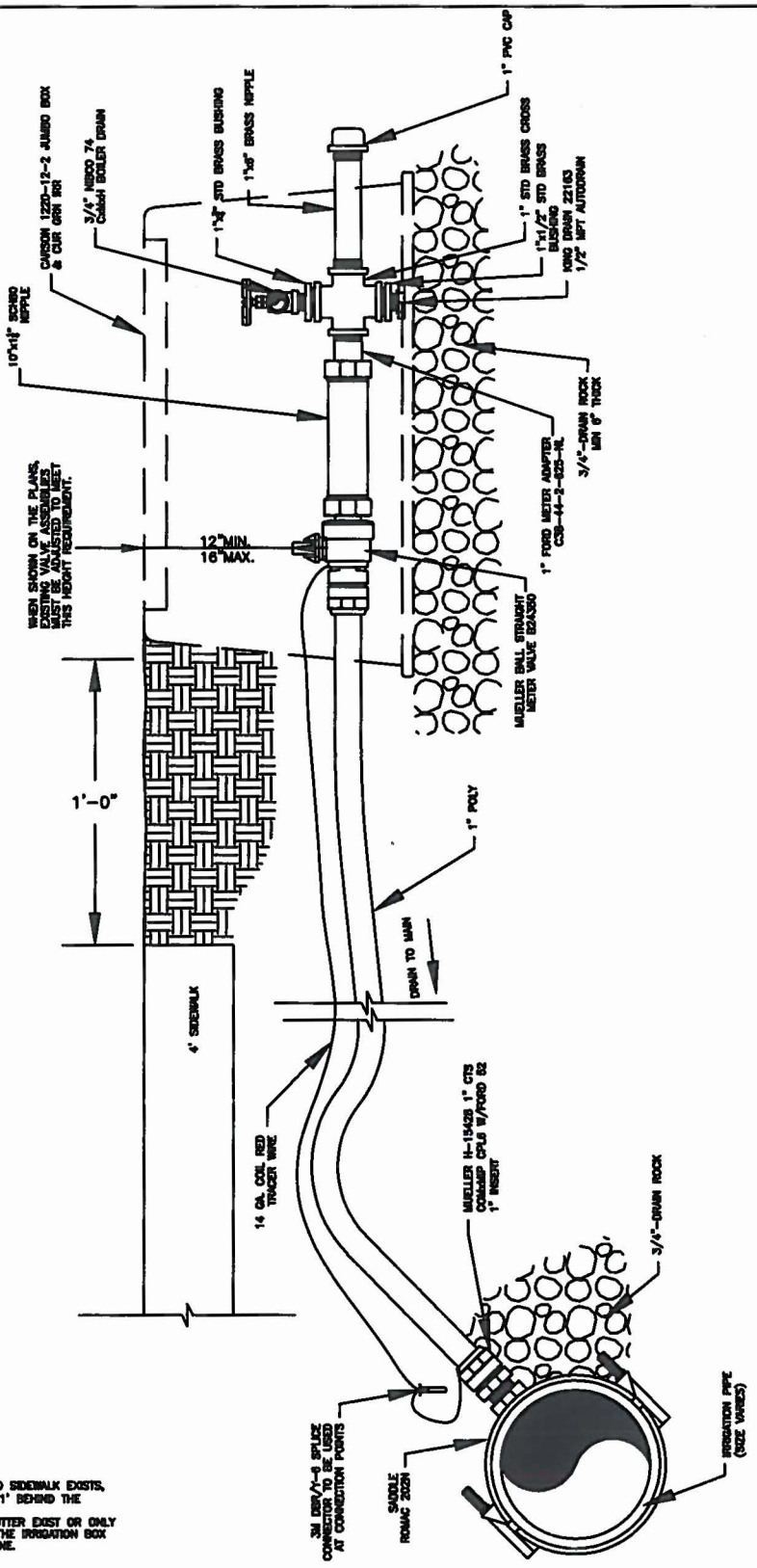


HORROCKS ENGINEERS

2162 West Grove Parkway
Suite #400
Pleasant Grove, UT
(801) 763-5100

Existing Pressurized Irrigation System

DATE 1/3/2017
DRAWN JES
Figure 1



NOTES:

1. WHERE COMBINATION CURB, GUTTER, AND SIDEWALK EXISTS, THE IRRIGATION BOX SHALL BE PLACED 1' BEHIND THE SIDEWALK.
   IN LOCATIONS, WHERE NO CURB AND GUTTER EXIST OR ONLY CURB AND GUTTER WITHOUT SIDEWALK, THE IRRIGATION BOX SHALL BE PLACED ON THE PROPERTY LINE.

STATEMENT OF USE

THIS DOCUMENT AND ANY ILLUSTRATIONS HEREON ARE PROVIDED AS STANDARD CONSTRUCTION DETAILS WITHIN ALPINE CITY. DEVEATION FROM THIS DOCUMENT REQUIRES APPROVAL OF ALPINE CITY, ALPINE CITY CORPRTATION CAN NOT BE HELD LIABLE FOR MISSUSE OR CHANGES REGARDING THIS DOCUMENT.

REVISION

NO.		BY	APRL	DATE

ALPINE CITY
ESTABLISHED 1850

CAD FILE: \Engineering\Standard Drawings\2015\PI CONNECTION 64.dwg

Pressurized Irrigation Distribution System

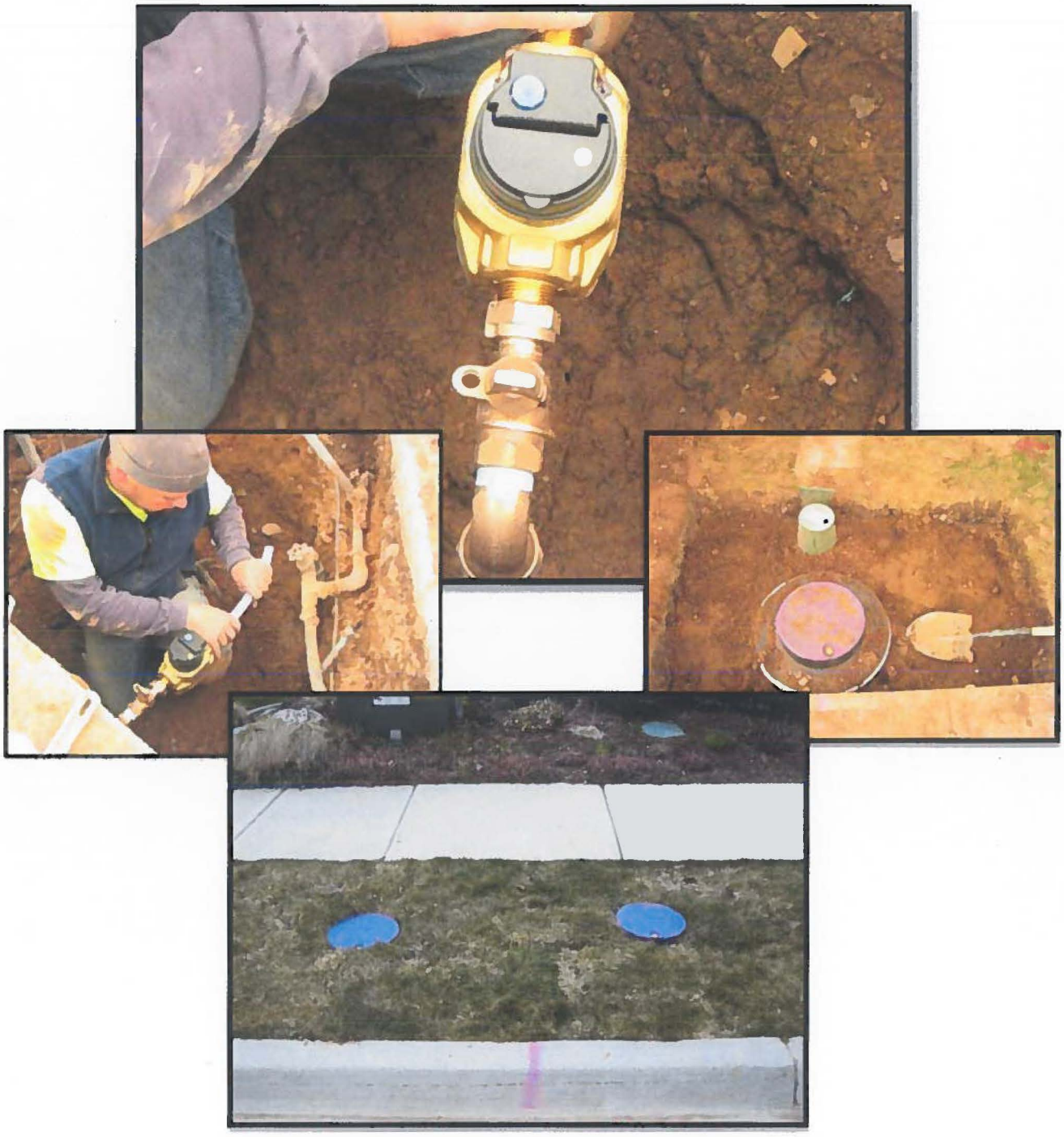
ALPINE CITY
20 NORTH MAIN
ALPINE, UT 84004

STANDARD DRAWING NUMBER: 23A

PLOT SCALE:	N.T.S.
DRAWN BY:	B.D.B.
DESIGN BY:	
CHECKED BY:	
ADOPTED DATE:	8/10/05

APPENDIX B – WBWCD Secondary Water Metering Report

Weber Basin Water Conservancy District
Secondary Water Metering Report
December 2015



Weber Basin Water Conservancy District
Secondary Water Metering Report

1. Meter Project Summary.

Weber Basin Water Conservancy District (District) has been studying and tracking data on meters for secondary water for the past several years. The first individual property meters were installed as test meters in 2006 to evaluate their effectiveness and verify if they could tolerate poor water quality, winter temperatures and other pressurized secondary water system related issues. The Elster Smart Meter was the selected meter and 30 meters were installed in various locations within the District's service area as test meters. These 30 meters were watched and tracked to evaluate performance for 3 full irrigation seasons. In 2010, it was determined that the meters would be successful and the District adopted a policy that all new secondary connections of the District would require the installation of a meter. Since 2010, the meter studies have continued with the adoption of additional meter types (there are now 4 types of meters in the field) and a total of 2,683 meters installed to date. It was also determined there was a need to purchase an electronic read system which has the capability of collecting data in hourly increments. The system chosen to meet the data needs and to be compatible with the various brands of meters was the Itron AMR system (using the 100W electronic radio transmitter or ERT).

In 2010, the District partnered with the Bureau of Reclamation to install 1,100 meters in the Uintah Bench and South Weber areas. This was the first large installation project for secondary water meters, so there was some question as to what the outcome of this project would be. Care was taken to ensure that cities and the neighborhoods affected were well informed and had opportunity to voice their concerns at city meetings and District sponsored open houses. Overall it could be said that things progressed smoothly and all concerns were addressed and resolved as they came up. After installation, there were a few challenges with software and the Itron units interacting with Elster's meter register. The issues were resolved with the help of Itron and Elster, but it was determined that the data for that first full year (2011) could be partially incorrect or compromised and would not be used in comparison with other data collected during the following years. Things began working properly, however since that time, the District has begun using the Sensus iPerl meter. This new meter is a true one inch meter and we have not had any issues with anything since its implementation. The Elster Smart Meter is still in place but is no longer being specified as an option for installation.

At the end of the 2015 irrigation season, the District now has 4 full years of irrigation data comprised of monthly consumption and hourly usage. Because new meters are being added every month, and for consistency purposes, the data being used for this report comes from a study group of 1,057 meters that have been in since 2010. However, a second study group is also set up and data from that group will be used in comparison with this first group as we have a few years of consistency with that group. In connection with this data, all metered users are receiving a water use statement each month letting them know their usage compared to their estimated need. The need is based on their parcel's landscape area using a historical 30 year average evapotranspiration value and irrigation system efficiency assumptions to determine

water need for their landscape area. More detail will be given on the system and how it all comes together in the body of this report.

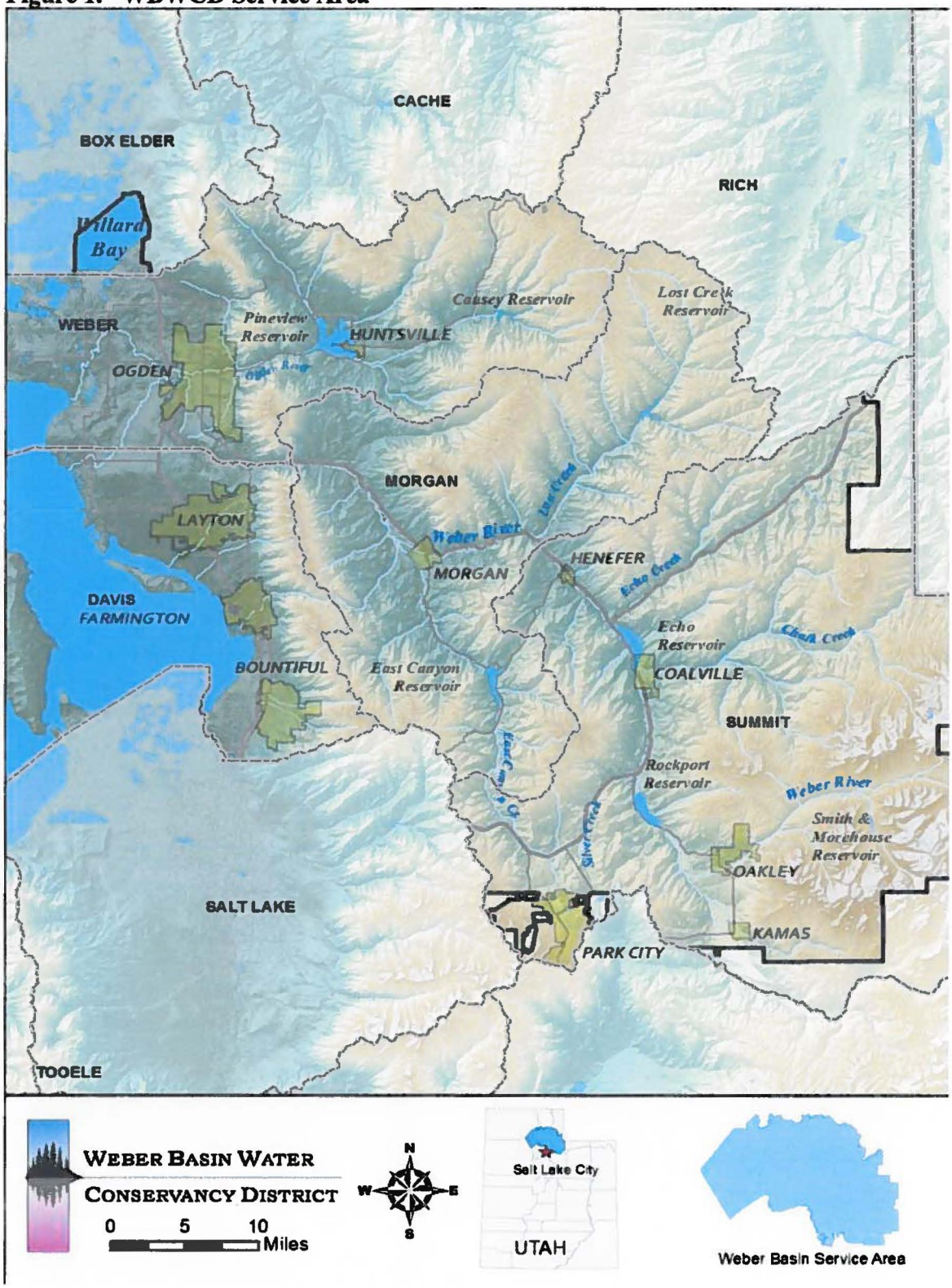
Overall, the metering is proving to be very effective with helping people know what they are using and how to adjust their usage down to meet the target need for their yard. The target need provides adequate and acceptable water for all users to maintain healthy turf and other landscape plant material while guiding users to eliminate waste and excess irrigation and to be accountable for their water. The potential conservation savings are large, and it is recommended that all secondary connections receive a meter and begin receiving help and education on how to reduce their landscape water needs. There will always be some ongoing issues of repair and replacement associated with any metering system, but over the last 4 irrigation seasons the results have been very positive with few setbacks. Some of the success of metering is being able to address the users' questions, gather and use quantifiable data on usage and conservation, and now being able to incorporate GIS and mapping technology to show on a larger scale where high use areas are and indicate which users may struggle to understand proper landscape water needs. The more information available the better we can analyze and implement programs and provide educational information to users which are cost effective and make the most sense for achieving desired water conservation goals and maintaining adequate water supply.

2. WBWCD Background

The Bureau of Reclamation began planning for the Weber Basin Project in 1942. Between 1952 and 1969, the Bureau of Reclamation constructed the original project consisting of reservoirs, canals, irrigation and drainage systems, and power plants. Weber Basin Water Conservancy District was created in June of 1950, by a decree of the Second District Court of Utah, under the guidelines of the Utah Water Conservancy Act. The District entered into a repayment contract with the United States Government in1952, which will be completed in 2034, to repay all of the original Weber Basin Project costs.

The Weber Basin Water Conservancy District is the legal agency representing the people of the five-county area of the project as shown below in Figure 1. The counties involved include Davis, Morgan, Summit, Weber, and part of Box Elder, which total a population of approximately 640,000 people and growing. That population is expected to double over the next 40 years and is going to require additional water supply and better management of the water supply currently available. The District administers the sale and delivery of project water and other water resources, operates and maintains the project facilities, and has contracted with the U.S. Government for repayment of reimbursable costs of the Weber Basin Project.

Figure 1. WBWCD Service Area



The Weber Basin Project was planned to conserve and utilize practically all of the excess flows of streams in the natural drainage basin of the Weber River, including the basin of the Ogden River, its principal tributary. Other areas encompassed are those lying between the west slope of the Wasatch Mountains and the east shore of the Great Salt Lake.

The District operates and maintains facilities for municipal potable and secondary irrigation needs providing approximately 225,000 acre feet of water annually to meet those needs. Of the total water delivered, 85,000 acre feet goes to municipal and industrial uses and 139,000 acre feet is delivered for irrigation needs of both agriculture and residential pressurized secondary irrigation systems. The District operates seven large storage reservoirs which store approximately 400,000 acre feet of the District's water, which is approximately a two years water supply for the current population.

Irrigation water for agriculture and municipal uses accounts for approximately 61% of Weber Basin Water Conservancy District's total water deliveries. Within the District's service area over 138,000 acre-feet of water is used to irrigate lands in five counties. In Utah it is estimated that approximately 60%-67% of all per capita water use is used to water landscapes which are primarily turf grass lawn. The District is committed to reducing water usage and has set a goal to reduce all water usage 25% by 2025 using the year 2000 as the base year.

One of the most promising areas identified to conserve water is by reducing irrigation usage for residential and urban applications in the landscape. Within the District's service area may exist the largest area of retail secondary water connections in the United States. The District has approximately 17,650 individual connections that are operated and maintained by the District, with many other irrigation companies and cities having tens of thousands of connections in their own retail areas throughout Davis and Weber Counties. This is water that is not treated but is in its own system directed to each property for the use of irrigating landscapes and gardens. Up until the last several years, this water has not been metered due to the difficulty with the meters currently on the market not being able to last with the poor water quality and the wear or plugging of the moving parts within those meters. This water has been allocated to properties based on property size and generally averages 1 acre foot per raw acre of property. However, the users have no way to know how much water they are using or when their allocation has been exceeded because there has been no metering of any kind in the past.

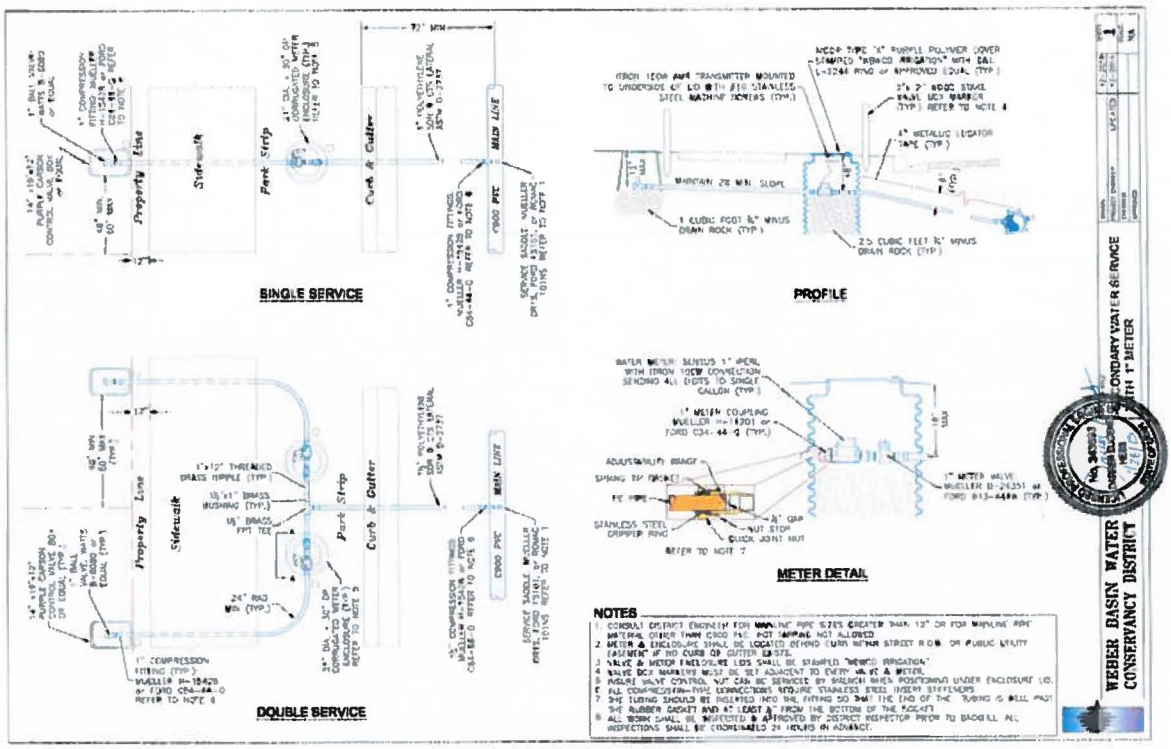
The District understands the importance of secondary water metering and the vital role metering will play in creating sustainable conservation. Goals for water use reductions will be achieved through usage accountability of the water currently being delivered. With a consistent study group of 1,057 meters with good data from 2012-1015, we have seen a reduction from an average use of .80 acre feet (AF) per connection down to .49 AF, which is a reduction of 39% over 4 years. This is meter data after a meter was installed. It is assumed and data is being gathered to show that unmetered connections do in fact use more than the .80 AF and many exceed allocation every year. More data will be made available as it is gathered. Effects of metering are continue to be seen with the meters now installed, and unlike drought messaging which creates a short term response, the meter will help users know what they use all the time to maintain the constant reduction rather than short term messaging or restriction response. The District will continue metering until all of its retail secondary connections have meters. It will take time and money to work through the system and install a meter on all existing connections.

3. Meter Project History

The District started metering individual properties in 2006 with a pilot study which included the installation of 30 Smart Meters (made by Severn Trent, later sold to Elster). The intent was to allow the District to monitor the effectiveness of the meters to see if they would work for secondary water systems. Some of the concerns included the ability of the meters to tolerate the conditions that exist in secondary systems and if they would read with accuracy the volume of water delivered. Secondary water connections are generally shallow, have the potential of being submerged for extended periods, and only have water through them for 6 months (no water during the winter season). These original 30 meters did not have capability for electronic reading but were read and monitored for 3 years to determine if they would provide a solution for accountability on every connection. The District has now replaced all of these meters so they can be read with all others and store data with the data collector. The data from these meters has shown that there is a lot of water being used, and it has shown that metering can work and will be an effective conservation tool to achieve long term savings and provide water for future growth needs.

To assist the District in this pilot meter study, the Utah Division of Water Resources joined as a partner to gather data and determine if the meters would be acceptable for secondary water systems. It was determined from the study that the Elster Smart Meter would be effective and be able tolerate poor water quality and provides accurate volume of water delivered. At the time, there were not many other options. It was determined that the District could move forward and commit to metering its secondary water connections on a larger scale beginning with the implementation of a policy that all new connections on Weber Basin's retail secondary system require a meter to be installed. A policy was created and adopted by the District's board of directors and took effect in 2010, with the full engineering drawings for specified installation and all other necessary information available for developers. The current meter installation specification is shown below as Figure 2.

Figure 2: Secondary Water Meter Installation Detail



This new policy did allow some choice in meters even though the smart meter was the only meter tested in the pilot study. The option available to developers was centered on using the Elster Smart Meter and Badger E Series with an Itron radio meter reading system to be used to read and gather usage data. The policy was developed at the same time that a larger project was being planned to install meters on existing connections, some of which would receive the Badger meters.

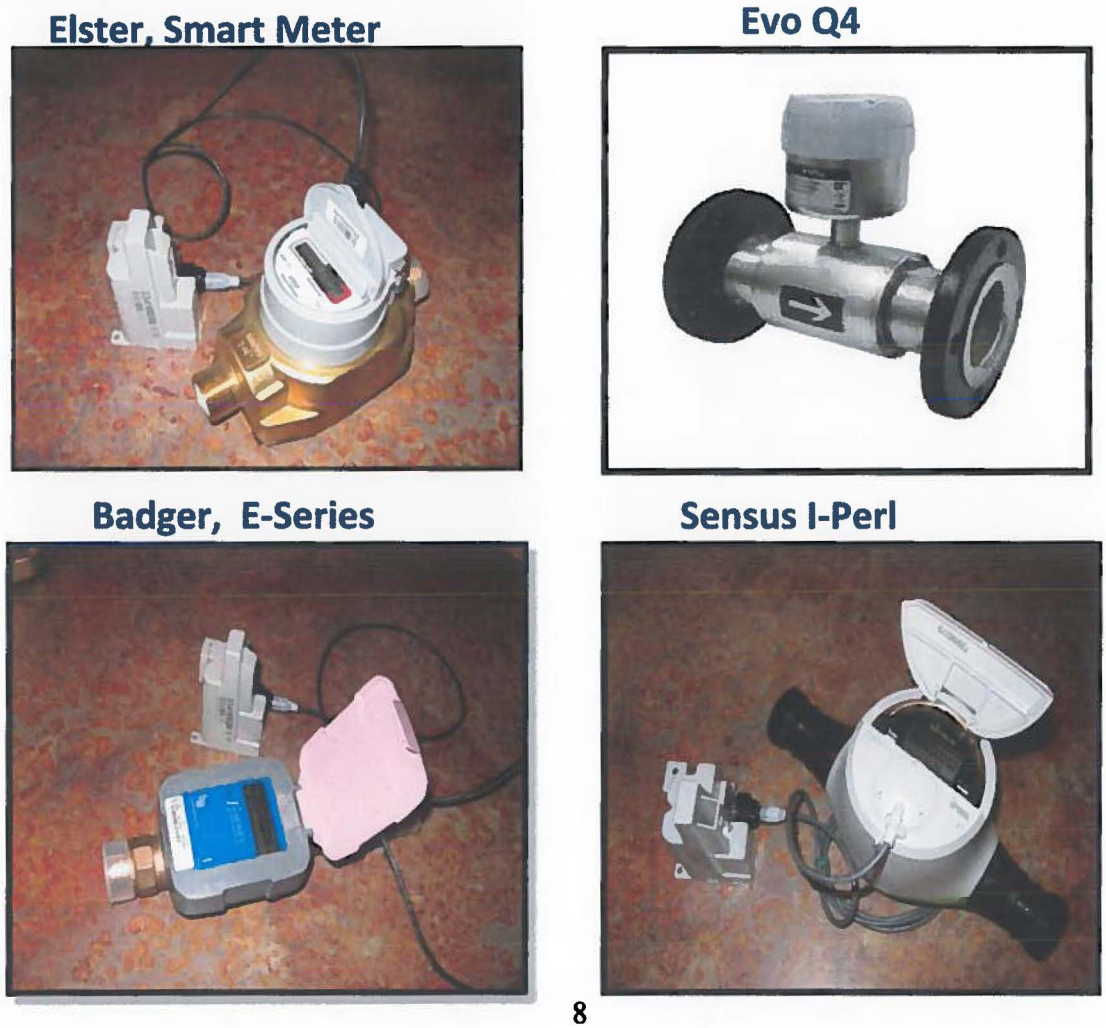
Since that time, the District has also been using and testing the Elster EvoQ4 and Sensus iPerl meters to determine if they will provide the reliability needed as well. All these meters have been produced and marketed with the ability to do what is needed in handling poor water quality, turbidity and no water in the pipes for half of the year. Itron was chosen as the read and data storage system because of its ability to be used with multiple brands and companies. The District is using several EvoQ4 meters on large connections because it is the only meter that can be used on connections larger than one inch diameter while still being cost effective. Other manufacturers have produced larger meters, but they are very costly. The District has now chosen to use the Sensus iPerl meter for all residential connections. This meter will be used until technology improves and other meters are introduced on the market and proven effective for this application. If it is determined that another meter can show effectiveness and affordability the District is willing to look at using other meters in the future. Below in Table 1, there is a comparison of each meter and the costs associated (all but labor to install it) to have an operational system.

Table 1. Meter Brands and Cost Comparisons

Meter Brand	Meter Cost	Cable	AMR - Itron 100W	Fittings	Enclosure (all parts)	Total
SmartMeter 3/4"	$158.00	included	$72.75	$120.00	$90.00	**$440.75**
Badger E Series 1"	$186.00	included	$72.75	$120.00	$90.00	**$468.75**
Badger E Series 1.5"	$484.00	included	$72.75	$120.00	$90.00	**$766.75**
Sensus I-PerlL 1"	$182.00	included	$72.75	$120.00	$90.00	**$464.75**
Evo Q 4 (4")	$1,977.00	$261.00	$72.75	$120.00	$90.00	**$2,520.75**
Evo Q 4 (2")	$1,526.00	$261.00	$72.75	$120.00	$90.00	**$2,069.75**

Photos of each of the meters are included here in Figure 3. Labor costs fluctuate and are not listed here because of the variability at the time of bidding. Our past experience indicates that labor to install is on average about equal to the cost of the meter components.

Figure 3. Meters Used in Weber Basin's Metering Projects



After installation there will be costs associated with the ongoing maintenance and operation of the system. These costs include time and materials for ongoing program operations, not including any meter or ERT replacement costs. The District has put together a cost breakdown of what it has taken to maintain and track meter usage so far. This work is at the heart of making a metering program successful. These costs will change as more meters are installed. It is likely the cost per meter would go down as more meters are installed due to the economy of scale and many portions of this work occurring regardless of the number of meters installed. Some costs will however increase such as paper, postage and time needed to prepare larger number of statements. Some of this can become more automated with equipment as the size of the project justifies cost to purchase such equipment. The operation cost estimations and calculations are shown below in Table 2, however, these costs will change as the number of meters in the system changes. From read time to time to process and the materials needed to get usage info to consumers will change as numbers increase.

Table 2. Costs of Maintaining Meters, Gathering Data and Providing Statements for Meter Study Group

Annual Meter Program Costs For Basic Ongoing Operation, No Physical Hardware

Average Employee wages and Benefits			$45.50					
Mileage allowance by IRS			$0.55					
	May	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Total**	**Cost**
Time for reading (in hours)	20	20	20	20	20	20	120	$5,460.00
Mileage of truck for meter reading	200	200	200	200	200	200	1200	$660.00
Time to generate reports (in hours)	4	4	4	4	4	4	24	$1,092.00
Maintenance of meters/amr's (ERT)(in hours)	8	8	8	8	8	8	48	$2,184.00
Printing cost (paper & ink, etc)	130	130	130	130	130	130	780	$780.00
Time to print, fold and stuff envelopes (hours)	8	8	8	8	8	8	48	$2,184.00
Postage cost	510	510	510	510	510	510	3060	$3,060.00
Time to respond to questions (hours)	8	5	3	3	3	4	26	$1,183.00
Update Meter Customer website (hours)	8	3	3	3	3	3	23	$1,046.50
Programming time for changes and bugs (meter software) (hours)	8	3	3	3	3	3	23	$1,046.50
Database maintenance / tracking development	8	2	2	2	2	2	18	$819.00
							Total	**$19,515.00**
Annual Cost per metered connection			**$15.01**					
Annual Cost Per Acre Foot Allocated (1401 af/allocated)			**$13.93**					
Annual Cost per Acre Foot Used (1004.8 af/delivered)			**$19.44**					

The pilot study provided the information needed for the District to proceed with a larger scale project and install 1,100 meters. With partial grant funding from Reclamation the District went forward with an installation project in the Uintah Bench area. The area was chosen because it is mostly built out, there are system limitations for delivery and there were larger trunk line meters installed for the area that could be used as comparisons to see if metering affected overall water delivery. The trunk line data will be used to compare usage once the entire Uintah Bench area is metered. It was determined that since this was the first experience with metering existing connections, there would need to be some public relations done to educate and address any questions and keep a positive image with secondary customers. The Langdon

Group was retained to handle the PR as a third party to help these meter recipients and cities where the meters would be installed to understand the goals, construction process, and why the District was metering. Meetings were held with the cities and city councils, open houses were done, and information was provided door to door to all those that would be receiving a meter. There was a website created with information and answers to common questions, and a phone hotline number was set up to address any concerns as the project proceeded.

The first 1,100 meters needed to be installed in the off season, so it was decided they would be installed in 2 phases with phase 1 to include portions of Washington Terrace and South Ogden. These areas were chosen due to some system limitations and pressure concerns as well as the varied location of both front and back yard connections. Phase 1 of the project began in the spring of 2011 with about 500 meters installed. It was planned that data for the entire 2011 irrigation season could be gathered. Phase 2 was completed in the spring of 2012 before irrigation water was turned on and included all of South Weber and additional portions of South Ogden, finishing the total 1,100 meters.

The data collection did begin the first year (spring of 2011) and included monthly reads and hourly consumption data for each connection. A report had been devised to provide the homeowner with their monthly value compared to a personalized need based on parcel size and historical weather data. An example of this first report is shown in Figure 4 below. This first report was a bit cumbersome to create because a database had not yet been created and a software program had not been purchased to put the data into any specific format (such as a billing format). The progression of the user statements is something that improved significantly over the 3 years since we have been providing them to the users. The main reason being that District staff was able to create and customize some software that would take the raw data, place it into our existing water contract system database then extract that data and put it into the format that we desired in a report.

Figure 4. 2011 Water Use Report Generated with Merge Files in Excel

WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-4494 • Fax (801) 544-0103

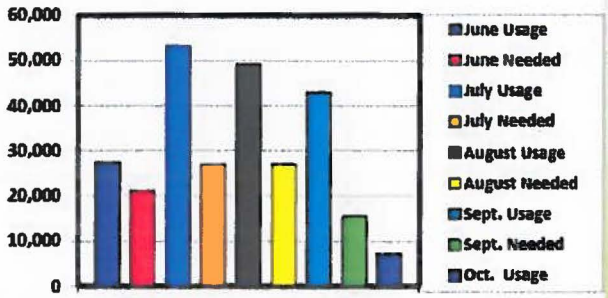
October 26, 2011

JAMES WOLD
1011 E 4775 S
OGDEN, UT 84403

Secondary Water Usage Statement

Account Number: 061980001W
Period of Usage: October 1 – October 15, 2011

Water Use Chart and Comparisons



Thank you for your cooperation with the secondary water meter project. We hope the usage information you received has been useful for you in managing your water usage.

Over the next several weeks, Weber Basin employees will be checking all metered connections to make sure everything is working properly. We will be correcting any problems that are found. Thank you.

Current Meter Read		Previous Meter Read		Days	Your Total October Usage	October water needs vary year to year and range from zero to several thousand gallons depending on lot size and weather. This year it has been cool and wet; minimal water was needed.
Date	Reading	Date	Reading			
10/15/2011	198021	9/30/2011	191049	16	6972	

*The average water needs listed on this statements are calculated based on lot size, historical local climate data, turf water needs, general landscape and soil characteristics for your area.

*For more information about the project or information about water conservation, please visit our website at www.weberbasin.com/conservation. If you would like to receive this report by email, please send your email address to drice@weberbasin.com

We would encourage you to visit Weber Basin's Learning Garden in Layton, or participate in free landscape classes, free water checks and other events. All classes and programs are free. Visit www.weberbasin.com/conservation for resources and conservation information.

*Questions or for help in reducing your outdoor water use, please contact Adam McKnight of our office at 801-771-1577.

Please drain and winterize your irrigation system to avoid freezing or damaging your pipes or the meters. Thank you.

After just the first couple of months of metering in Phase 1, there was an issue that came up where data for many connections was showing very low or even negative values compared to the prior month. It took some time and patience to figure out that the data logging AMR unit was interacting incorrectly with the meters and resetting the meter register. The District frustration associated with this problem as well as the end user concern over accurate values was very high but with the help of both Itron and Elster, all AMR units were replaced with a new units (testing in manufacturing labs identified a compatibility problem, and they resolved the issue and provided new equipment). The downside to this little setback was that the data for 2011 was deemed unreliable for accuracy of usage. Some of the data may have been correct, but there was enough uncertainty that it was decided to never use the 2011 data in any of the comparisons of metered water use.

In connection with the installation and again with help from Reclamation, an additional study related to secondary meters began with USU extension. It was done simultaneously with the install but focused on the behavioral and social science side to metering. The project was to evaluate and survey the users to determine how this meter would be perceived and to receive and gather feedback from end users regarding the information that they were provided about their water usage and their general perceptions of a meter installed on their connection. USU assisted the District in this effort and in developing surveys and determining an appropriate usage volume for each parcel based on fly over areal mapping and thermal imaging. Their work was connected with the project during the 2011 and 2012 irrigation seasons and provided good direction for the District to fine tune the reporting and evaluation of water need and the report provided to what it is today (more detail is discussed in the data section). The survey work from USU has been completed, and their full report can be provided upon request. It is not attached to this report due to the length of their report which also included the surveys and focus group questions and the processes to do these types of human behavior studies.

In the spring of 2013 the District installed 40 additional meters in South Ogden, this time trying the Sensus iPerl. The iPerl needed to be put to the test to see if it would also meet the District's requirements for quality and data collection. As of the completion of the 2015 irrigation season, there were no issues to report about the function of the meter, the collection of the data or other problems that were encountered with testing their meter in this project. This meter is now added to the approved meter for installation and included in the specifications of meters suitable for our desired outcomes.

There is now reliable data for 1,057 metered connections for four consecutive irrigation years. Additional meters have been installed ongoing since that time bringing the total to 2,683 individual property meters. We continue to use the 1,057 meters with consecutive years of data for analysis but have started a second data set of different metered connections that have only been in the ground for a couple of years. That data is being analyzed and will be used as a comparison to the first study group to measure effectiveness across demographics and areas. The District has been tracking and monitoring usage and providing water use information to all users that have a meter on their connection. Data and additional details from Phases 1 and 2 of the project are discussed below in the data section of this report.

4. Meter Data and Analysis

The data collected so far has been very informative and has helped the District continue to fine tune the information given to home owners. In addition, the data has provided the District the needed water usage information that has previously only been estimated and assumed due to the lack of detailed metering information. Current retail irrigation water is allocated at 3 acre-feet per acre and users are charged based on the allocated water to their parcel, not usage. Until meters were installed it was not known to what extent the end users stayed within their water allocation or to what extent they were exceeding what they pay for on individual basis. The overall water deliveries helped to estimate average residential use, but no specific detailed information was available. Several university studies and studies from water districts throughout the West have shown that the most effective way to reduce water usage is to have water use accountability and provide financial or other incentives to conserve water. The meters are beginning to give the District a more accurate and bigger picture on secondary water use which will be important for future policy decisions, future water development and how to proceed with conservation programs and water supply planning for the future.

The data is very important to the District in terms of total water delivered compared to water allocated for each parcel. Allocations have previously been determined by the parcel size (not irrigated area), but the allocation is now determined by parcel size minus 2,500 square feet for impermeable surfaces. The estimated need provided to homeowners through the metering project is based not on parcel size but area of landscape on that parcel. A map similar to those on Google maps is used and staff will zoom into that parcel and use GIS software to hand draw measurement lines around the parcel which excludes home, concrete (except sidewalk by street) and any other visual structures. The rest of the area is classified as landscape, and it is assumed the area is all turf and the estimated need is based on that area.

To effectively gather data and to determine how water is being used, it was decided that a system that can collect and store hourly data would be the most beneficial. The Itron 100W data logger with a radio read collection system was determined to meet this need since it is compatible with multiple meter manufacturers and can provide hourly data. Each unit, attached to the meter will gather and store hourly flow through the meter and keep up to 40 days of data in memory. After 40 days it is like a rolling log, the oldest data is replaced by new data. These 40 days of data logging provides the District the flexibility to read and gather the data each month with a few days to spare if a problem is noticed or if for some reason data collection is missed during normally scheduled read dates.

Hourly data has proven to be very effective for the District in the case of usage disputes. There have been a few cases where a user has called very concerned that the meter may be incorrectly reading usage. With a few direct questions about their normal watering habits, a comparison can be made to the hourly data, and verification made to see if what they claim matches the data collected. This process has helped to educate homeowners on usage and volume and has also been useful to find and correct a few meter problems where indeed a meter was not reading correctly or a leak in their system can be determined. Occasionally a site visit needs to be made and water run through a faucet into a bucket to compare and ensure meter accuracy. An example of hourly data in spreadsheet form is shown here below in Figure 5.

Figure 5. Example of Hourly Data Spreadsheet

Device Id	Current R ead	Date	10:00 AM	09:00 AM	08:00 AM	07:00 AM	06:00 AM	05:00 AM	04:00 AM	03:00 AM	02:00 AM	01:00 AM	12:00 AM	11:00 PM	10:00 PM	09:00 PM	08:00 PM	07:00 PM	06:00 PM	05:00 PM	04:00 PM	03:00 PM	02:00 PM	01:00 PM	12:00 PM	11:00 AM
33416894	642840	8/14/2013	0	327	0	0	0	0	492	58	0	0	0	0	1	595	767	63	0	1	93	0	0	2	1	0
33416894	644433	8/13/2013	0	237	0	0	0	0	504	60	0	0	0	0	0	595	758	64	0	0	0	0	0	0	0	0
33416894	644217	8/12/2013	1	0	0	136	0	0	510	61	0	0	0	0	0	615	779	66	0	0	0	0	0	0	0	0
33416894	642981	8/11/2013	1	0	0	164	1	0	0	0	0	0	0	0	0	0	0	0	316	0	0	0	0	115	33	0
33416894	641428	8/10/2013	0	1	0	0	0	0	509	60	0	0	0	0	0	613	808	66	0	136	23	0	0	0	126	279
33416894	638809	8/9/2013	0	0	308	177	0	0	522	61	0	0	0	0	0	641	824	63	0	0	0	0	1	0	0	0
33416894	638240	8/8/2013	0	0	0	0	0	0	522	60	0	0	0	0	0	636	806	64	1	38	0	0	0	0	0	1
33416894	634362	8/7/2013	0	0	0	0	0	0	522	60	0	0	0	0	0	640	804	64	0	87	0	0	0	1	0	0
33416894	631884	8/6/2013	0	809	0	0	0	0	484	55	0	0	0	0	0	576	732	176	83	0	0	0	0	0	0	0
33416894	629431	8/5/2013	0	0	0	1	0	0	499	56	0	0	0	0	0	587	744	60	0	0	0	0	0	0	19	43
33416894	627437	8/4/2013	0	0	301	0	0	0	472	53	0	0	0	0	0	532	708	53	423	47	0	0	0	0	0	4
33416894	625143	8/3/2013	0	0	0	0	0	0	474	54	0	0	0	0	0	550	715	127	1	0	0	1	0	0	0	1
33416894	623220	8/2/2013	10	10	101	156	0	1	458	51	0	1	0	0	0	533	771	151	1	113	0	11	0	0	0	1
33416894	621802	8/1/2013	0	0	0	1	0	0	455	51	0	0	0	0	0	531	694	53	0	0	0	1	0	0	0	0
33416894	619117	7/31/2013	0	56	4	0	0	0	468	51	0	1	0	0	0	530	684	53	1	0	0	0	0	0	0	0
33416894	617742	7/30/2013	0	0	47	0	0	0	452	50	0	0	0	0	0	492	649	53	3	0	0	0	0	0	19	35
33416894	615525	7/29/2013	0	0	0	0	0	1	471	54	0	0	0	0	0	561	743	53	0	1	0	0	0	0	0	0
33416894	613742	7/28/2013	0	0	0	0	0	0	416	47	0	0	0	0	0	490	635	46	0	0	0	0	0	0	0	1
33416894	611106	7/27/2013	0	0	0	0	0	0	372	40	0	0	2	1	1	433	446	332	58	25	0	0	2	1	1	13
33416894	610356	7/26/2013	0	0	6	103	0	0	239	26	1	0	0	0	0	250	213	91	0	0	34	1	0	0	0	0
33416894	609772	7/25/2013	0	0	0	1	0	0	149	12	0	1	0	0	11	210	135	103	0	0	0	0	0	0	0	0
33416894	608590	7/24/2013	0	0	0	0	0	0	317	32	0	0	0	0	0	479	779	134	0	0	0	0	0	0	0	0
33416894	606549	7/23/2013	0	0	0	0	0	0	306	34	0	0	0	0	0	603	766	37	0	0	0	0	0	0	0	0
33416894	604863	7/22/2013	0	0	21	171	0	0	313	34	0	0	0	0	0	623	792	33	40	0	0	0	0	0	0	0
33416894	602581	7/21/2013	0	62	307	13	0	0	317	34	0	0	0	0	0	264	120	0	0	0	0	0	0	0	0	0
33416894	601299	7/20/2013	0	0	119	0	0	0	339	34	0	0	144	0	0	615	744	37	0	1	0	0	0	0	0	0
33416894	598956	7/19/2013	0	1	432	31	0	0	342	34	0	0	0	0	0	273	0	0	0	48	1	0	0	0	0	0
33416894	597396	7/18/2013	0	224	0	3	0	0	360	34	0	0	0	0	0	0	219	39	0	0	0	0	0	0	0	0
33416894	596479	7/17/2013	0	280	0	0	0	0	332	34	0	0	0	0	0	0	0	7	0	0	0	0	20	0	0	0
33416894	595992	7/16/2013	0	0	0	0	0	0	331	31	0	0	0	0	0	678	782	36	0	0	0	0	0	0	0	0
33416894	593491	7/15/2013	0	0	30	3	0	0	342	39	0	0	0	0	0	707	829	64	0	0	0	0	0	0	0	0
33416894	591217	7/14/2013	0	37	0	336	203	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
33416894	590099	7/13/2013	0	0	0	0	0	0	337	60	0	0	0	0	0	725	841	219	474	0	0	0	0	0	0	0
33416894	587728	7/12/2013	0	0	0	0	0	0	344	58	0	0	0	0	0	274	37	0	0	0	0	0	0	0	0	0
33416894	586810	7/11/2013	0	0	0	0	0	0	354	58	0	0	0	0	0	716	842	66	3	3	15	8	15	8	6	6
33416894	584911	7/10/2013	7	446	33	0	0	0	316	55	0	0	0	0	0	253	0	0	0	0	0	0	0	0	0	0
33416894	583203	7/9/2013	0	0	28	69	0	0	499	54	0	0	0	0	0	681	708	53	184	106	0	0	0	0	0	0
33416894	580750	7/8/2013	0	0	67	0	0	0	327	35	0	0	0	0	0	705	844	63	0	0	0	0	0	0	0	0
33416894	578509	7/7/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
33416894	578300	7/6/2013	0	0	0	31	0	0	346	57	0	0	0	0	0	273	119	0	0	0	0	0	0	0	0	0

The data collected each month is brought back to the office and uploaded from raw form into a data base that was created and designed to be used for multiple features and format outputs and to assist the ease of creating water usage statements and data reports. The reading of the meters is broken into smaller manageable routes, usually by city boundaries to simplify and help manage the data and analysis. It takes staff about 12-16 hours to drive the entire District service area gathering the data (hourly data takes a little longer to gather than monthly values only) from the various metered areas. Since meters are being installed on new connections, there are small pockets of meters in areas all throughout the District's service area.

The data collected each month is analyzed and quality checked to ensure good data collection. A few reports in the Itron software are generated to assist in quality checking. Various tamper and code reports indicate if there was a problem on any meter. If a problem exists or is suspected, a site visit and manual check on the meter and the meter registry are done to see if a physical problem exists. The data is then used with District developed software to create user reports which are printed in color, a process which takes about 4 hours to complete with one printer. The processing done to have the documents ready for print is done overnight. It essentially creates a PDF file for each user statement which is then printed in batches. It should be mentioned that an e-mail option was provided to users, and there are approximately 300 statements that are not printed but generated in a digital format and e-mailed to users who have requested a paperless statement. An example of the first water use statement is shown in Figure

4 (page 12). New statements that the District is using are shown in Figures 6 and 7 below. Figure 6 below, shows the statement used in 2012 with the partnership between the District and USU, and Figure 7 shows the modifications and simplification that the District implemented at the beginning of 2013 and is still using to date. This format seems to be effective and simple enough for homeowners to understand and use effectively, modifications can and will be made as needed to ensure that the statement is providing the information a homeowner can use.

Figure 6. 2012 Meter Use Statement (USU Partnership Year)

EXAMPLE REPORT

WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-4494 • Fax (801) 544-0103

6/18/2012

May 16 through June 15, 2012

Account Number:

NAME
STREET ADDRESS
CITY, STATE ZIPCODE

SECONDARY WATER USE REPORT

For more information on interpreting your Secondary Water Use Report, refer to the double-sided information sheet sent with the May report or also available online at www.weberbasin.com/conservation

Landscape Water Use

Last Meter Reading	Current Meter Reading	Number of Days	Your Landscape Water Use	66,173 gal
35,227	101,400	31		

Landscape Water Need

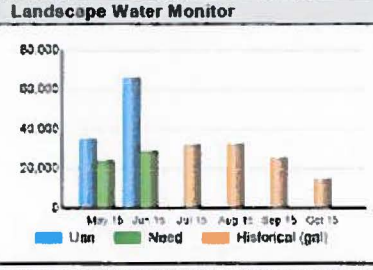
Landscaped Area (sq. ft.)	Turf LA (%)	Non-Turf LA (%)	Your Landscape Water Need	28,900 gal
7,798	46	54		

Landscape Water Management

Water use is:	when LIR is:	Your Landscape Irrigation Ratio (LIR)	= Landscape Water Use / Landscape Water Need	2.29
Efficient	less than 1			
Acceptable	between 1 and 2			
Inefficient	between 2 and 3			
Excessive	greater than 3			

400% 300% 200% 100% 0%

Landscape Water Monitor



Weather Data: May 16 - Jun 15

Period	Min	Mean	Max
2012			
ET (in)		6.51	
Precip. (in)		0.88	
Temper. (F)		63.15	
1982-2011			
ET (in)	4.50	5.65	6.54
Precip. (in)	0.01	1.99	5.85
Temper. (F)	52.53	56.52	63.11

The chart in this section graphs your landscape water use (blue bars) for each metered monthly period and compares it to the estimated landscape water need (green bars) for that same time period. For current and previous statement periods, blue and green bars provide a graphical representation of your landscape irrigation ratio (LIR). Future statement periods (reddish-brown bars) show projections of your landscape water need based on an historical 30-year (1982-2011) average ET.

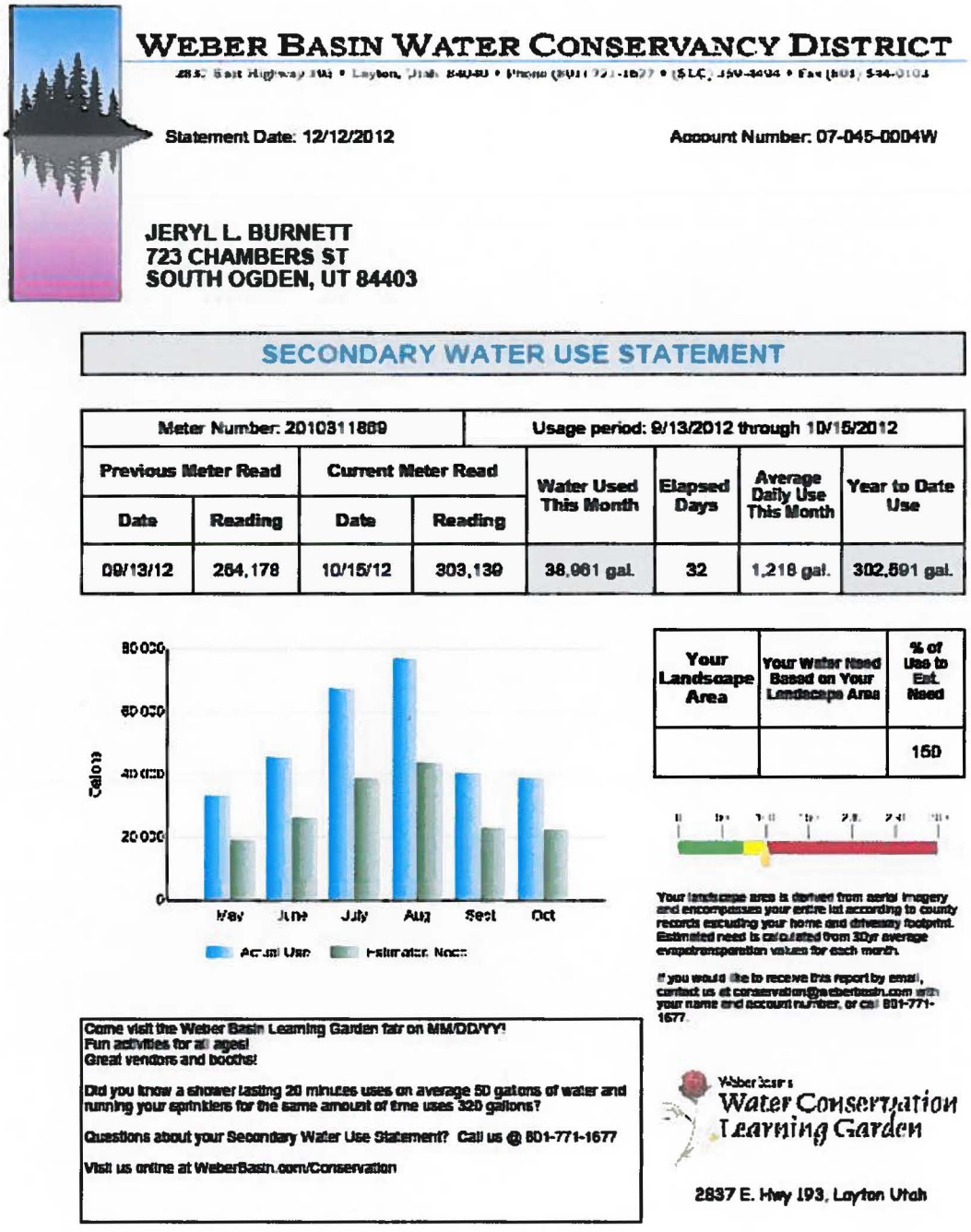
We encourage you to visit Weber Basin's Learning Garden at our Layton headquarters (address above) or participate in landscape classes, water checks, and other events. All classes and programs are free. For a full water conservation schedule, visit Weber Basin's website www.weberbasin.com/conservation

If you would like to receive this report by email or have questions about the meter project, please contact Dave Rice, Weber Basin's Water Conservation Coordinator, drice@weberbasin.com or (801) 771-1677.

If you have questions or comments about your Secondary Water Use Report or if you are willing to participate in a USU research focus group or interview, please contact Diana Glenn at the USU Urban Water Conservation Research Lab: diana.glenn@aggiemail.usu.edu or (435) 797-9654.

Developed from research at UtahStateUniversity

Figure 7. 2013 Sample User Statement Sent to Each Metered User



WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-3494 • Fax (801) 544-0103

Statement Date: 12/12/2012

Account Number: 07-045-0004W

JERYL L. BURNETT
723 CHAMBERS ST
SOUTH OGDEN, UT 84403

SECONDARY WATER USE STATEMENT

Meter Number: 2010311869				Usage period: 9/13/2012 through 10/15/2012			
Previous Meter Read		Current Meter Read		Water Used This Month	Elapsed Days	Average Daily Use This Month	Year to Date Use
Date	Reading	Date	Reading				
09/13/12	264,178	10/15/12	303,139	38,961 gal.	32	1,218 gal.	302,691 gal.

Your Landscape Area	Your Water Need Based on Your Landscape Area	% of Use to Est. Need
		150

Your landscape area is derived from aerial imagery and encompasses your entire lot according to county records excluding your home and driveway footprint. Estimated need is calculated from 30yr average evapotranspiration values for each month.

If you would like to receive this report by email, contact us at conservation@weberbasin.com with your name and account number, or call 801-771-1677.

Come visit the Weber Basin Learning Garden fair on MM/DD/YY!
Fun activities for all ages!
Great vendors and booths!

Did you know a shower lasting 20 minutes uses on average 50 gallons of water and running your sprinklers for the same amount of time uses 320 gallons?

Questions about your Secondary Water Use Statement? Call us @ 801-771-1677

Visit us online at WeberBasin.com/Conservation

Weber Basin's Water Conservation Learning Garden

2837 E. Hwy 193, Layton Utah

There is a lot of information that can be gathered from the data. The data is comprehensive, and there is hourly usage information for every meter which can be used for different reports and analysis. Since there isn't data to compare usage prior to meter installation to the current metered usage, the information presented here may indicate some prior behavior but it is impossible to tell. However, water use is likely decreasing in part because of more awareness and the educational campaigns, more media attention and other programs that have been implemented over the last several years that have helped users recognize their over use and change their behaviors.

Tables 3A through 3D below show data from a metered study group in a comparison between 2012 and 2015. Total usage and number of users exceeding water allocation to their property for this group, which includes 1,057 meters, is tracked over the four year period. It should be noted that the data for each city pertaining to the percent of estimated need is not weighted but represents the average of the city as whole. The totals in Table 4 have been weighted toward individual use. In instances where a meter fails and is replaced, the data continues to be collected, but the meter may not have recorded some usage during the period that it failed. A small amount of data could have been lost with a few of these meters. However, the District found no significant change in the data with the brief outages, so no adjustments for dead meters water uses or losses has been made for this group.

In Table 4 below, the data is from the same study group but the numbers are presented in total form and not by city areas. The difference in use between years is significant, and it is very difficult to identify the exact reason why the usage is different between each year due to many factors, which may include weather differences. It is clear however that usage is declining. There were varied weather conditions, and the media emphasis during different years could have brought more awareness to general public use which influenced behavior and water reductions from year to year. The relatively dry conditions over the last 4 years have brought a lot of media attention to water supply and water usage.

Table 3A. 2012 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	199.9	77.0	142	48	18%
South Ogden	292	251.9	155.0	228.6	91	148	81	28%
South Ogden Badgers	48	35.3	17.3	36.4	103	211	23	48%
South Weber	356	436.2	284.9	323.2	74	113	65	18%
South Ogden Ph. 2	98	86.8	64.0	85.8	99	134	43	44%
Totals	**1057**	**1069.7**	**662.2**	**874**	**83**	**136**	**260**	**25%**

Table 3B. 2013 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	162	62	115	16	6%
South Ogden	292	251.9	155.0	172.8	69	111	42	14%
South Ogden Badgers	48	35.3	17.3	25.7	73	148	11	23%
South Weber	356	436.2	284.9	249.8	57	88	18	5%
South Ogden Ph. 2	98	86.8	64.0	65.1	75	102	17	17%
Totals	**1057**	**1069.7**	**662.2**	**675.3**	**64**	**105**	**104**	**10%**

Table 3C. 2014 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	150.6	58	107	14	5%
South Ogden	292	251.9	155.0	162.2	64	105	43	15%
South Ogden Badgers	48	35.3	17.3	23.2	66	134	6	13%
South Weber	356	436.2	284.9	235.8	54	83	20	6%
South Ogden Ph. 2	98	86.8	64.0	58	67	91	10	10%
Totals	**1057**	**1069.7**	**662.2**	**629.9**	**60**	**98**	**93**	**9%**

Table 3D. 2015 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	124.8	48	88	4	2%
South Ogden	292	251.9	155.0	131.7	52	85	14	5%
South Ogden Badgers	48	35.3	17.3	19.9	56	115	3	6%
South Weber	356	436.2	284.9	192.8	44	68	10	3%
South Ogden Ph. 2	98	86.8	64.0	46.5	54	73	4	4%
Totals	**1057**	**1069.7**	**662.2**	**515.5**	**49**	**80**	**35**	**3%**

For the data set above, 1,057 connections that have had consecutive data for 2012 -2015 were used in the comparisons over the four years. In Table 4 below, the same data set is used and shows clearly that the study group has reduced consumption and is now using much less than the traditional allocation of 3 acre feet per acre. Users complying with the volume given them as the estimated need shows a significant improvement from 145% in 2012 to just 90% in 2015. However, each year has a fairly large standard deviation, meaning that the range of usage is quite large but still converging from one year to the next. Similar tendencies can be found on the

percent of allocation used. This data seems conclusive in showing that having a meter and receiving usage information promotes accountability and will cause behavior changes in usage to occur when users are given a target.

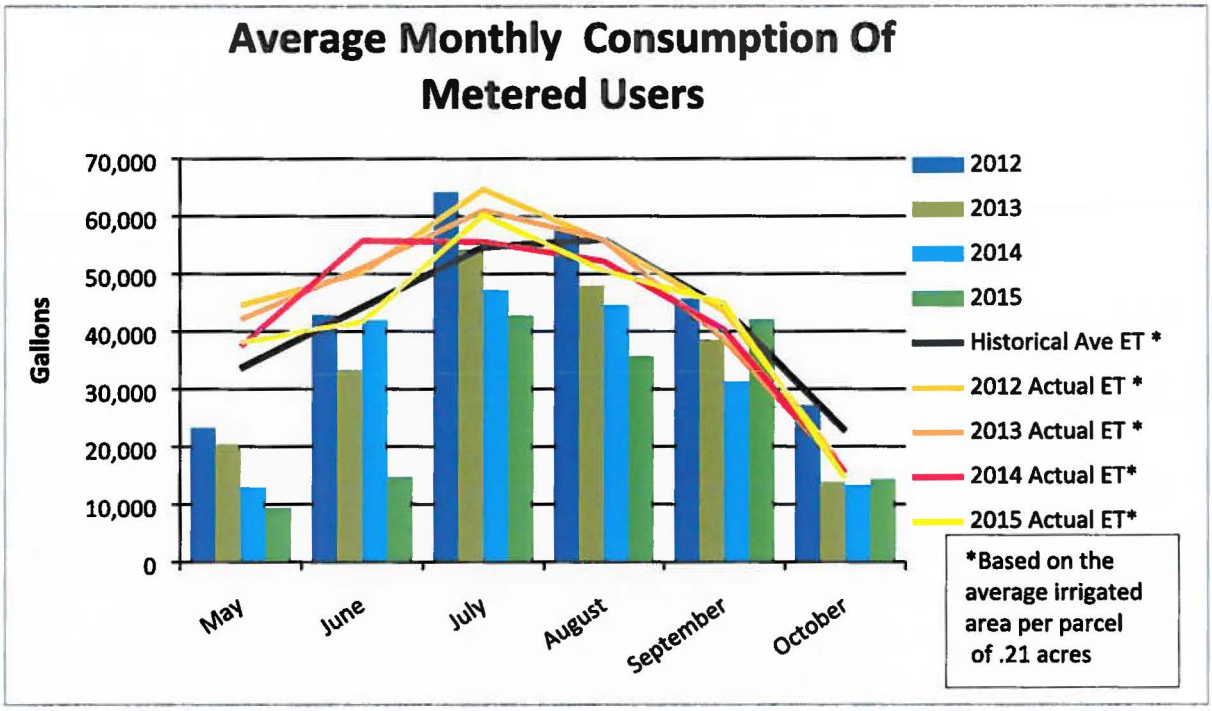
Table 4. 2012-2015 Water Use Comparison

	2012	2013	2014	2015
Used Gallons	284,912,371	220,146,962	205,346,968	168,066,551
Used AF	874	675.3	629.9	515.5
Gross Acreage	324.4	324.4	324.4	324.4
Used AF / Gross Acreage	2.69	2.08	1.94	1.59
Landscaped Area	225.3	225.3	225.3	225.3
Used AF/ Landscaped Area	3.9	3	2.8	2.3
Estimated Need (Gal)	215,886,557	215,886,557	215,886,557	215,886,557
Percentage Used / Est. Need (Weighted)	145.00%	117.40%	109.71%	90.24%
Average % Allocation Used (Weighted)	83.00%	64.00%	59.60%	50.18%
Average Allocation	1.0 AF	1.0 AF	1.0 AF	1.0 AF
Total Allocation	1074.0 AF	1074.0 AF	1074.0 AF	1074.0 AF

***This data includes 1,057 meters that have data for 2012, 2013, 2014, and 2015, with accurate landscape area. 2012 was adjusted to reflect an Oct. 1st shutdown.**

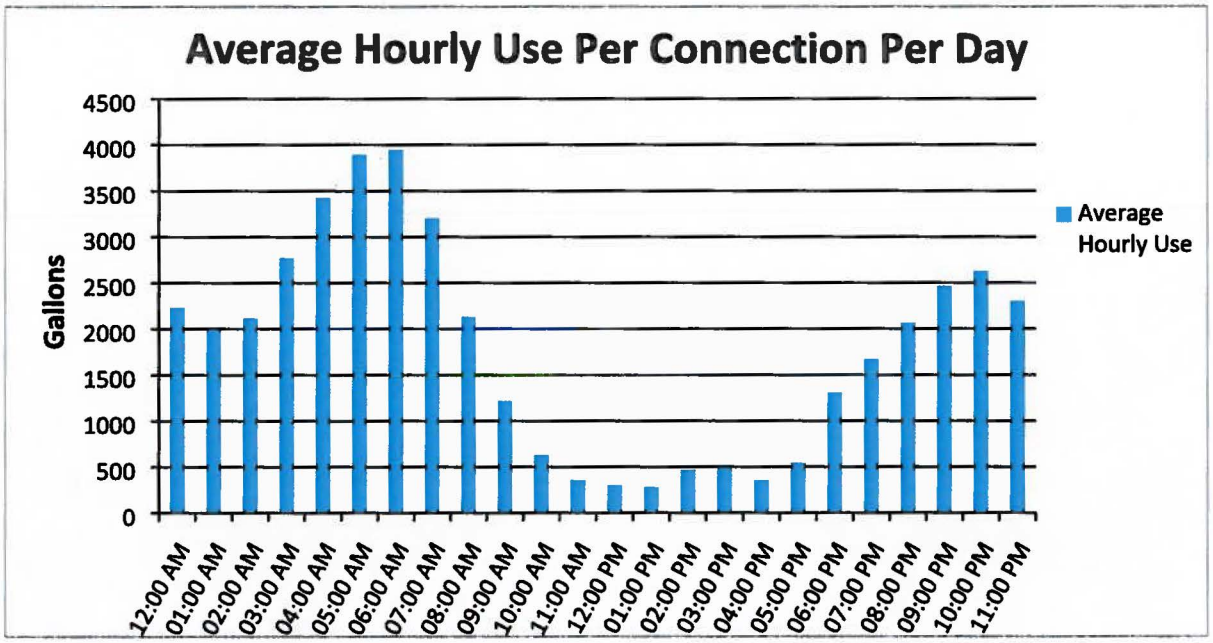
Chart 1 below illustrates the water use information shown in Table 4 in more of a graphical representation. It is clear the there is a reduction in use when comparing the four years of metered data. The historical average evapotranspiration (ETo) value is used in all reports to water users so that value is also shown here. The actual values are not much different from the historical, however for information purposes the actual ETo values are; 2012; 34.69 inches; 2013; 33.55 inches; 2014; 32.38 inches; and 2015; 31.54 inches. The historical 30 year average is 31.26 inches. This lower ET values from 2013 to 2015 could have and should have played some role in overall reduction in use over that same time. More analysis for weather will be done to determine its effect. This reduction in overall use does show that awareness and conservation messaging, even if it is drought messaging, does reach end users and they do respond. The continuation of data gathering, which will include figuring out a weather normalization process, will help the District know if sustainable changes are being made even when no drought messaging is present or there are no water restrictions in place during an irrigation year. The knowledge users have with their usage should help to sustain reasonable irrigation water use once habits are formed and compliance is achieved the first time.

Chart 1. 2012-2015 Average Monthly Consumption Comparison



To illustrate a significant conservation and policy messaging impact, Chart 2 below shows the average hourly use among all metered users. It is very clear that the policy of no watering between 10:00 am and 6:00 pm has been generally adopted among water users. There are still those that are not following the policy, but they are a small percentage of users. With meter data such as this, those who do not comply with policy or specific yearly messaging can be identified and encouraged to comply with incentives or disincentives. This is also a very useful chart in identifying system demand peaking which can facilitate the operation of the District facilities and distribution system that involves pumping, small reservoir levels, pipe sizing, etc.

Chart 2. Average Hourly Use in Gallons Among all Metered Water Users



All the information presented in this report is only a representation of the types of reports or analysis that can be created with metered secondary (landscape) water data. Another tool that can be used from the data collected by each meter is the creation of what is referred to as a heat map. In Figures 8, 9, 10 and 11 below, heat maps are used to show what can be done to visually show a good representation of how water use has changed in one of the metered areas during the four year time period. This kind of information makes it easy to quickly see the areas where water use may be an issue and may help in the future for conservation targeting programs.

These maps are useful tools in visually identifying patterns or problem spots where moderate or very high water use has occurred. These maps can be generated every month and used know where we might see over-usage later in the season due to early season use patterns or early season excessive use. The red indicates parcels where water use has exceeded the water allocation for that property. Yellow indicates use between 76% and 100% of allocation and green indicates water use that fits within allocations for the property at below 75%. These tools can assist the District in determining what factors may be part of water use trends. There could be soil issues, neighborhood expectations, issues within individual systems dealing with pressure causing poor sprinkler system uniformity and coverage. There could be various factors of demographics where the neighborhoods may consist of larger homes and naturally a higher income level where there is less concern over resources and more thought for curb appeal or there are high social pressures to ensure things look a certain way. It is likely that in the future the District will rely on usage data as illustrated in heat maps to use targeted programs to help educate users about proper water use for landscapes.

Figure 8. 2012 Heat Map for South Ogden Area

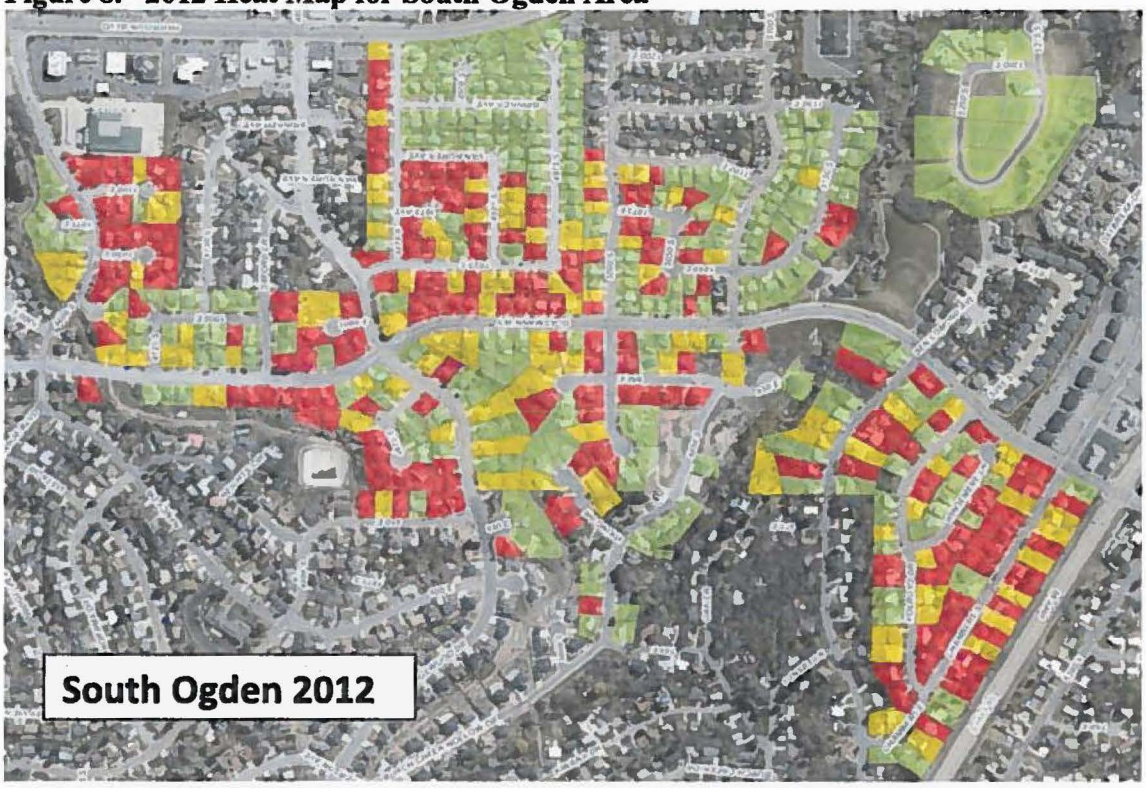


Figure 9. 2013 Heat Map for South Ogden Area

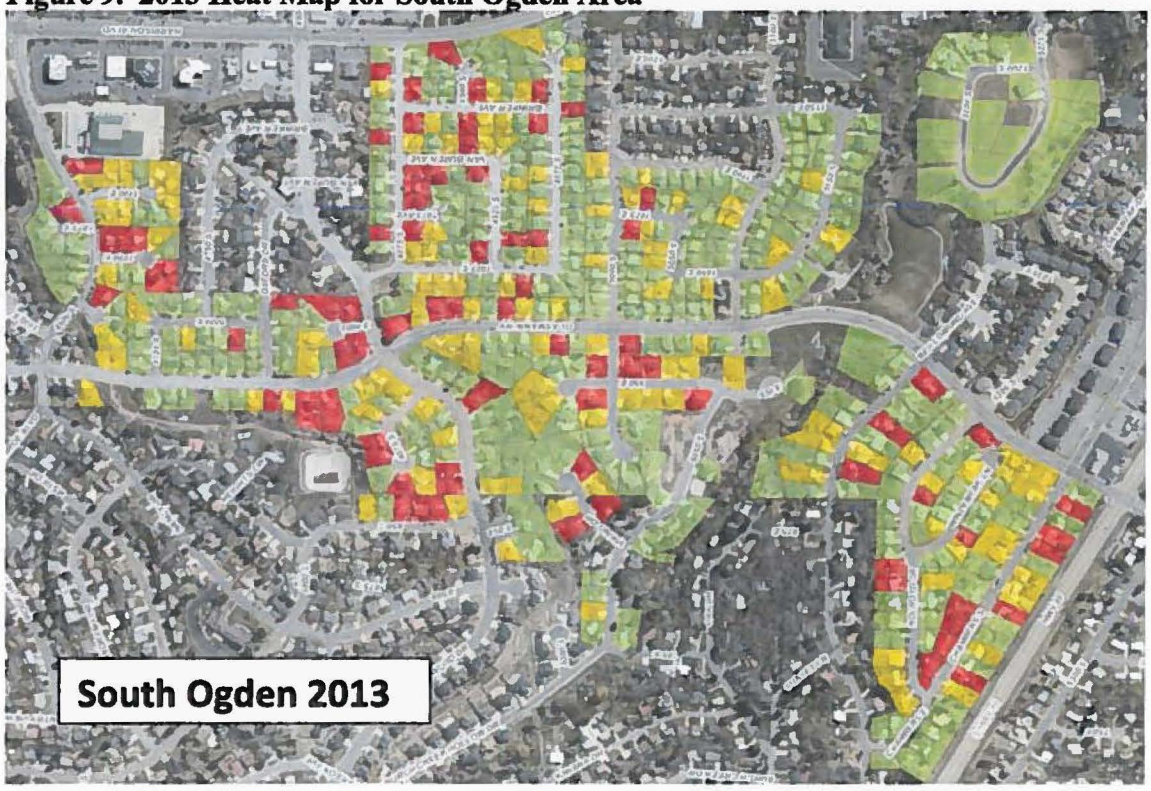


Figure 10. 2014 Heat Map for South Ogden Area

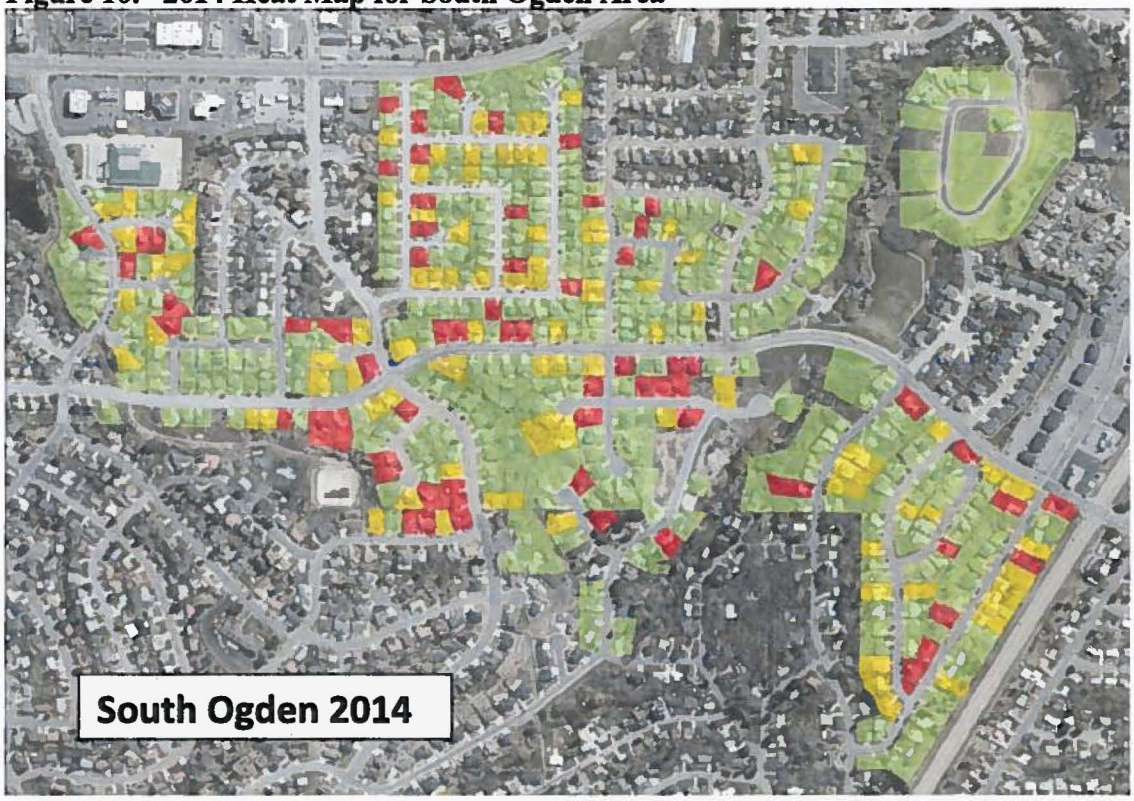
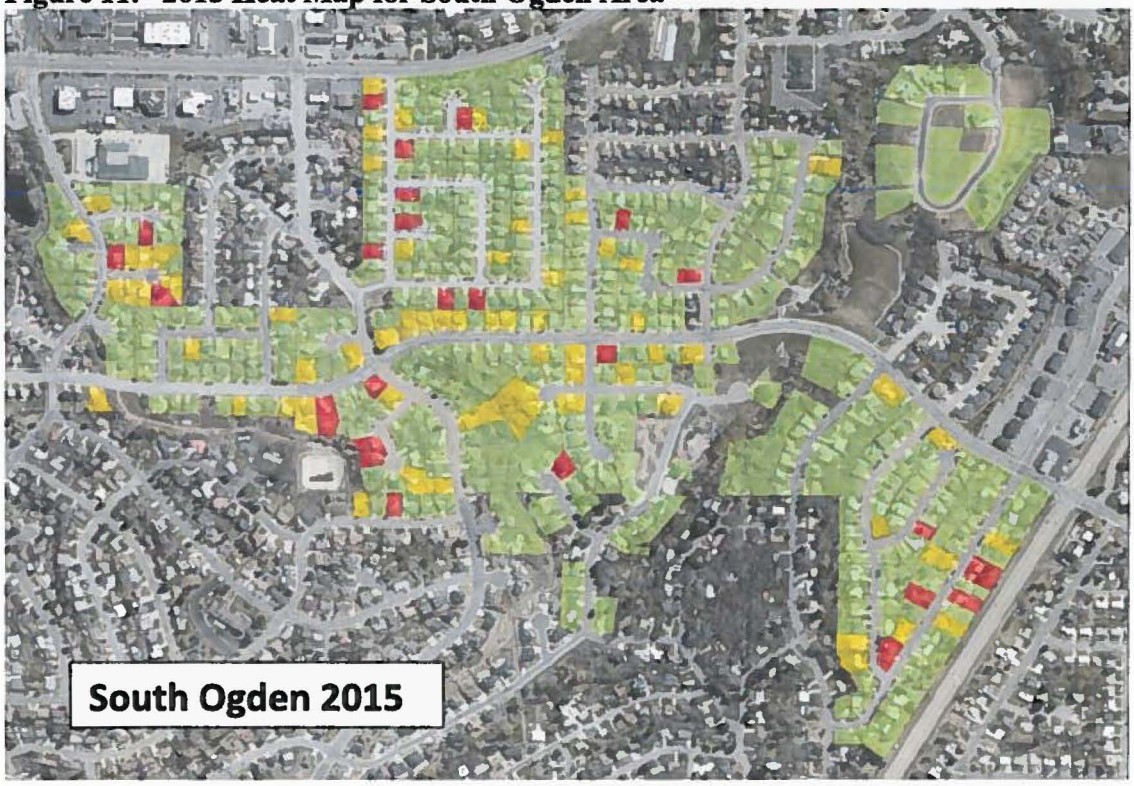


Figure 11. 2015 Heat Map for South Ogden Area



5. Customer Feedback and Perception and District Customer Service

The physical installation of meters is one piece of the overall project, easily defined by cost, time and exact specifications. The perception and response of District customers was somewhat unknown and very unpredictable at first, but as time passes, the feedback is becoming more positive in general. This section will focus on initial perception and the feedback gathered from District staff, the Langdon group and USU as they participated with us in the initial phases of meter installation.

As the District started the first large scale metering project, it was known there would be some learning along the way as well as adjustments. For the first project, it was determined to retain the Langdon Group as the District's PR representation and direct contact for public feedback, comment concern or other issues. The plan was established to go into the project with as much good public involvement, knowledge and input as possible to address, minimize, and resolve any concerns as the project progressed. The Langdon Group helped set up public open houses where maps, information about the meters, the install process and impacts could be discussed with concerned residents. They also assisted in the development of a meter website, creating a phone hotline, and the door to door information and questionnaire for those that would be receiving the meters. This was beneficial for the first round because of the newness of this type of project and the District's desire to remain in a positive light with its customers.

A few of the major concerns from customers that came immediately included the construction impacts, the potential for damaging established landscapes, and the fear of being charged high rates for secondary water once a meter was installed. An overarching question of why the District was doing this now and why their area was the first to be done came up in personal contacts with staff and the Langdon Group. All of these questions became the focus of the PR efforts to educate the public on conservation principles, user responsibility and accountability, and the assurance that water rates would not change in the near future until there was equity among all of Weber Basin's customers. The door to door contact and providing the recipients of the meter with good information and even a specific time window of when their meter would be installed (48 hour window) was helpful to ease anxiety and fear among many meter recipients.

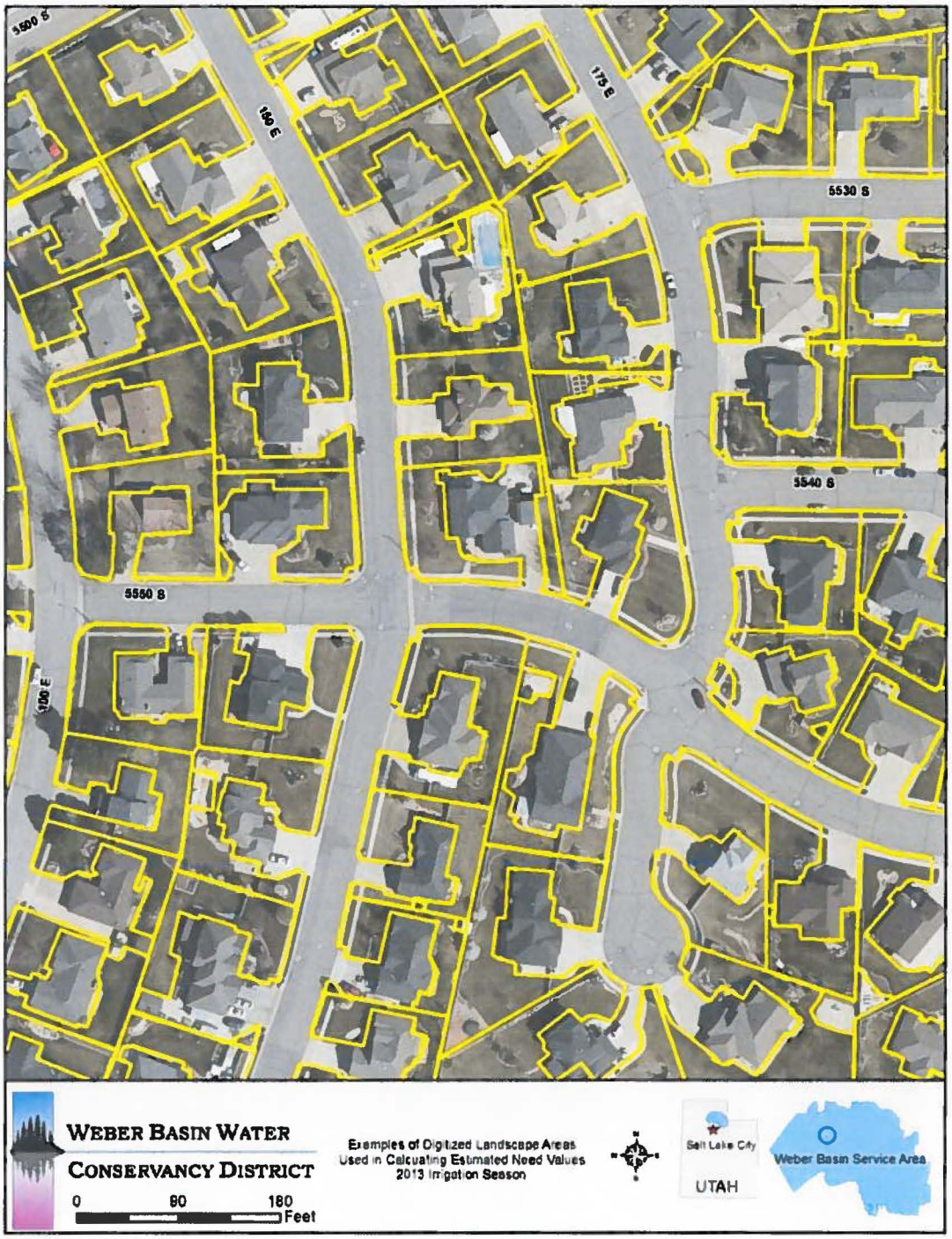
Once the meter was installed and usage information began to be provided, the questions changed from the concern over installation to the concern over accuracy, and the looming question of how much they would be charged for going over their estimated need. Some of this has remained over the years, but for the most part is no longer a concern except for those that may be just receiving a new meter. There still remains a sense of skepticism and distrust among many of the metered customers mostly because they struggle to understand the volumes of water that a sprinkler system uses. For most, the only comparison they have is their indoor use which may range between 8-10,000 gallons a month for the average household compared to the 40,000 -80,000 gallons a month of sprinkler irrigation depending on parcel size. When they receive their outdoor usage information on their statements and the value is in the tens of thousands, many can't believe that they would use such large volumes of water. Their perception is that they have small yards and run their sprinklers for relatively short irrigation cycles. Meter data shows that typical usage would include cycles that run for 2 or more hours and use up to 3,000

gallons per cycle or more. Because of the huge range in yard sizes, an average has not been calculated, but usage could be calculated by creating a sort group for properties of similar size to get average use by lot size. This type of information could also be useful to homeowners to help them know where they fit compared to those that irrigate an area of similar size.

During the installation of Phase 1, the District also contracted with USU on a social science research study. The focus was to assess how best to interact with water users during these types of transitions to ensure desired efficiency outcomes and accountability results. One area of focus was on the development of a report to share meter data with the users in a format to provide understanding of landscape water needs and the appropriateness of their own use. It also included analyzing the perceptions and behaviors of water users in connection with the information that they would receive about their usage. The study was intended to span 2011 and 2012 with comparisons of use over those two years using the data collected but providing somewhat different information to evaluate what type of information works best. However, with the data gathering problems encountered during 2011, the data from that season was not able to be used. The study was altered and more emphasis was placed on the meter statement development and the use of surveying and talking to those that would be interested in sharing their perspectives related to having a meter and the information they were receiving. It essentially became more of the social science study that focused on behavior and perception rather than actual water use data.

The USU study and the development of the secondary water use report provided users their monthly consumption value, a landscape water need based on area imagery (size of their lot and landscape area), the evapotranspiration and weather data for the same period, and how they did in comparison to how much their need was (based on lot size and weather info). No hourly irrigation information was provided to water users; however if they called to discuss their use and had concerns, their hourly data was available and could be discussed and explained over the phone. An example of the imagery used in 2013 with the digitization of landscape area is shown below in Figure 12. This process allows the District to get a much better idea of need and to help homeowners understand their need and be able to get water use to appropriately match that need.

Figure 12. Digitization for Landscape Areas on Metered Parcels House, Driveway and Other Structures Not Part of Irrigation Need



USU also conducted surveys and did a couple focus groups to gather feedback about the project and meter customer comfort level with the information being provided. The majority of responses echoed the initial sentiment in that they did not agree with what they were being told concerning their consumption and they did not think the estimates provided were adequate to maintain their property. There were those that loved what was being done and loved the information and even desired more technical and detailed reports, but this group was in the minority of those surveyed. Because of the length of the report and findings, a full copy of the USU report on their study will be made available upon request. The underlying issue that seemed to surface is that the general public using secondary water believe they are being conservative and efficient, but when given actual data on their usage they are shocked and disbelieve that they are high users. Many feel like they cannot reduce what they use without risk of losing the quality of their landscape, especially regarding green lawns.

The District now has several additional years of data since the USU and Langdon Group contracts. The District is still faced with ongoing public interaction; however, the metering has progressed smoothly with fewer and fewer concerns from metered customers. There is still the typical response during the first year on any metered connection, but most of the other items and concerns with metering are addressed smoothly with very little problem. The District has maintained positive customer service and support in every occasion when staff interacts with customers. These interactions have been through phone conversation, meter reading contact and maintenance interactions or by metered customers participating in other conservation programs such as the water check, free landscape classes or Learning Garden events. Each of these provides an opportunity for staff to be positive, help resolve questions or concerns and where needed, fix a problem.

Since the metering began, there have been new meters added on an ongoing basis. The information is entered into the database, and there are a couple of data sets that are now being managed so that the District will be able to make comparisons between different demographics of water users in different locations. The District will continue to keep study groups separated by when the meter was installed so that the comparisons can be consistent within that study group. The District will also continue to plan meter projects to install as many meters as possible each year as far as the budget allows.

Throughout the irrigation season many calls are fielded regarding water usage and the meters. All calls were fielded by District staff. Information and the data base technology created by District staff have allowed the tracking of calls, services, and any District interaction to a specific address. Not every call was logged into this system during the year, but it is anticipated that in the future, all types of calls can be logged then reports generated with the data from those calls which could assist staff with specific reports for each type of situation. It should be noted that the 2013 year was a good learning year for the District. Modifications were made to the user reports, the process for determining landscape area was simplified with adjustments being made to the calculation for the users "estimated need", and it became very obvious that the need for hourly data is critical in helping users understand and learn how to be more efficient and to resolve customer disputes over the accuracy of the meter reads. With just monthly values, there would be no way to resolve the issue of how often and how long they water and the determination if a meter needs to be tested for accuracy.

During the last four years of metering, District staff conducted all the relevant work related to the meter project. No outside consulting or other agreements were in place for the collection or analysis of meter user data. The fielding of calls and discussing of hourly data with each of water user was handled by staff as were the personal sight visits and any physical meter issues. Most of the calls are handled with a quick look at the data, and for the first couple years, every call was logged with date and time and the type of call and issues resolved. As the District continues to meter and now has a program in place for project management, all calls can now be logged and tracked for better recal of what issues occurred and how they were resolved. Calls with various questions or complaints mostly centered on the accuracy of the read data and the legitimacy of the estimated need that was being provided to them for "efficient use". This is not the total number of calls taken but those that were historically logged. It is estimated that the number of calls were at a minimum double the logged volume. Many of the calls were not logged because of the complexity of the water year and the call concerns that may or may not have dealt directly with the meter and the data. It should be noted that during the last four years there were water restrictions due to low water storage levels and warmer, drier conditions. During this time, door hangers were used as a means to reinforce the water use statements for those that were exceeding their estimated need by more than 200% in any given month. There have been fewer of these individuals each year. A specific message of water use being high on a bright orange "Water Violation" tag really got the attention of the high water users and resulted in many calls. The majority of the calls that were taken about water use and meter data resulted from the door hangers.

As the years have passed, adjustments have been made and much has been learned. In 2013, as each month passed it was apparent that many would exceed their allocation early in the season. It was determined that the highest of users would receive a personal visit by staff. The purpose of these visits was to inform them of the excessive use, show them their data and help where possible on scheduling or on providing other conservation education or services. Some of these visits resulted in staff helping them with their timers, or just explaining the use, which changed usage behaviors the following month. Most of these visits were accepted very well while a few did not appreciate a personal visit and basically accosted staff about how the meter is ridiculous, not accurate and an invasion to their rights or personal privacy. The concept of "big brother is watching" is fairly prevalent among metered users. This year of visiting did provide some experience about how people are reacting. Site visits are made each year as need is determined, but not for every parcel exceeding allocation. The District has found that there are those that refuse to accept and give any heed to the information and personal education provided relating to their water consumption for their yards, and they continue to be excessively high users, some exceeding their estimated need by over 300% and exceeding their allocation, sometimes by July of the irrigation season. These indifferent and high users are actually very few compared to most users.

There are many things that have been learned during the past 4 years of metering secondary connections on a larger scale. The following bullet points are some of the most significant.

- Customer service and information are critically important. Doing a meter project without good information will create doubt and mistrust with customers (which naturally exists but can be managed and turned into positive if treated properly).

- When metering secondary water, there will be many users that doubt the accuracy of the meter and the value of the information provided. Continue in a positive way to help the users learn that what you are providing is accurate. Internal checks can help make sure you are correct and acknowledge to them when errors or mistakes happen.
- There is about a 1% failure rate for the meter or other physical components. Any metering program has to plan for some bad meters and their quick replacement. Data adjustments when switching meters to provide continual accurate information is vital. Sometimes the customer will help to identify the issue. The technology continues to improve and if a fixed network is use, failures can be identified in any hour time window.
- It is difficult to determine what is most effective and what is minimally effective in doing these programs in connection with other conservation programs because there are always multiple actions and programs taking place at the same time. To isolate one thing and try to determine effectiveness is not a reality, hence you continue with the things that seem to be working until proven otherwise through experience.
- There may be some users that no matter how much information and education you provide, they will continue to use what they feel is right and will not comply with their proper use or stay within their allocation. Financial incentives/disincentives may be the only way to reach this group of users.
- The meters have shown both in numbers and visually on GIS mapping that the majority of people are responsible users and will respond to messaging and education when it is provided. Most people want to be responsible but they just haven't known how much water they have actually been wasting until they get a meter and begin to use the data to alter behavior patterns. The key is that most people will not give up landscape quality to save water. If they can achieve both, they are willing and able to do their part.
- Hourly data is a must to help users identify over-use in scheduling and in enforcing time of day or other water use restrictions. Without it, you have no basis to know if what you are providing is correct, and it is their word against yours if a dispute arises.
- A multifaceted approach is good to provide many means of understanding and tools for water users to interpret and use to their best abilities. Technology and many other tools are available, but keeping it simple and clear is the most useful for the general end user.

6. Recommendations

The experience Weber Basin has had in metering has provided new perspectives and insight into what it is going to take to meter secondary water users across the District's entire service area. The costs are very high, and the staff needs to read meters, maintain and replace meters, track data, deal with customer calls and inquiries and generate statements will increase over time as the number of metered users grows. There has been valuable data gained in relation to usage and the perspective of users in how they use their water and even the insight of

how some customers view it as their right to use water how and when they please. The efforts to educate will be ongoing as long as there continues to be the landscape style and level of expectation that we currently have for our home landscapes. The culture of the Weber Basin Service area has been up until now, a culture of cheap, all you can use water with little or no accountability. Changing this mindset will not come over night, but with the help of actual numbers for their consumption, it will make it easier for the District to change individual user behavior when all users have a meter.

It is the recommendation of District staff that the metering of users continues and if possible accelerates to accomplish the goal of all users being metered in a reasonable time table. If the current rate of installation were to continue, it would likely be more than 30 years before all of the District's existing connections are metered. The new connections won't be of concern as they will all be metered as growth happens. However, the meters are only rated to last for 20 years (battery life). The point will come where full meter replacement will need to occur before all secondary users have a meter. With that in mind, it would be recommended to budget for and seek additional grant funds to accelerate the meter installations to ensure that all users are metered before meter replacement would have to start.

There is a high conservation value in metering to gain valuable water use data and provide the means for users to begin to be accountable for their water use. As population continues to grow and water supplies remain the same with the compounding effect of drought cycles, metering will play a key role in future water supply and management. Metering provides a tool for tracking use, improving efficiency, determining problems and leaks, and if needed, the ability to increase water rates in a tiered structure to penalize those that will not otherwise use their water responsibly. There may be a need to have the high users pay for future water supply that will be costly to develop but driven by the high use and demand of irresponsible users. The meters can rightly justify changes in rates for high users as well as the need for future water supply due to responsible use among the majority as there will be an increasing need for additional water supply and development.

The District has determined that the Sensus IPerl meter is the main meter to be used on a one inch connection. But as time passes on, new and better products and technology may dictate something else. The IPerl has little to no effect on pressure and will meet the needs for data storage and collection currently desired. There are many types of data gathering systems as well. From touch pads on meter lids to higher end network systems where a data logger sends data to collectors which route that data to a computer in the office for instant access to data. We have chosen to use the Itron drive-by system which gathers that data from the data loggers on each meter as a staff member drives through the various neighborhoods. Over time and with the use of meters in the entire service area, it will likely become a necessity for the use of and the cost associated with installing a network type system. This will only become needed as the volume of meters dictates the cost justification in time, fuel and other component cost savings.

One additional item of note and recommendation is the reminder that every type of reading program needs software to get that data into the desired needed format to be useful. Whether it is billing software or other type of database software, it is important that this be an item of discussion for any metering program. The data is useless without the proper software to make the data useful and in the proper format. When beginning this process, the District did not

realize that a separate billing or report generating software would be needed. The District was fortunate enough to have a very good programmer on staff that was able to write code and was able to create a custom program for taking the data and converting it into a useable format for a statement for each water user and for other types or reports that are desired.

7. Conclusion

In conclusion, the metering of secondary water has many challenges and certainly costs. The District as the entity is charged with providing adequate water supply with increased demands and increased need for conservation and user accountability. That burden for water accountability should naturally be shared with the users of the water. The meter and the data gathered from metered connections on water use is the very tool which can bring knowledge to each water user and help them to become more accountable for the water they use. Metering essentially becomes a large scale and significant water supply project, with the potential of reducing water by 1 acre foot per acre per acre of landscaped area.

There may need to be policy changes and there will certainly be more education and programming to teach people about efficient and proper use of water in the landscape. In the future there may need to be changes made regarding the cost for secondary water and how that breakdown would be made and how billing for secondary water will be collected. Overall, the metering has been very successful. The data collected is invaluable and will provide the necessary information for the District to make wise policy decisions. Current water supply can be managed more effectively and future water supply projects and the timing of those projects to meet all water demands can be planned and constructed to meet real and projected need in a more efficient and effective manner.

APPENDIX C – Current In-stream Flow Agreement

CENTRAL UTAH WATER
CONSERVANCY DISTRICT

355 W. University Parkway
Orem, Utah 84058-7303
801.226.7100
www.cuwcd.com

May 19, 2016

Mr. Shane Sorensen, P.E.
Alpine City
20 North Main
Alpine, UT 84004

Subject: Extension No. 3 of Temporary Water Conveyance Alpine City Secondary Water Project

Dear Mr. Sorensen:

Enclosed is a fully executed original of the subject extension agreement.

We appreciate the opportunity to work with you on this matter. If you have any questions, please contact me at (801) 226-7119.

Sincerely,

Debbie Vanoy

Debbie Vanoy
Contract Administrator

Enclosures

EXTENSION No. 3 OF TEMPORARY WATER CONVEYANCE
ALPINE CITY SECONDARY WATER PROJECT

This Agreement made and entered into this 12th day of April, 2016, by and among the Central Utah Water Conservancy District, a water conservancy district organized and existing pursuant to Utah Code Ann. Section 17A-2-1401 *et. seq.*, of the State of Utah, herein referred to as ("DISTRICT"), and Alpine City, a political subdivision of the State of Utah, herein referred to as ("ALPINE").

WITNESSETH

WHEREAS, DISTRICT and ALPINE entered into an agreement in October of 1999 entitled "AGREEMENT BETWEEN THE CENTRAL UTAH WATER CONSERVANCY DISTRICT, AND ALPINE CITY TO PROVIDE FUNDING FOR THE ALPINE CITY SECONDARY IRRIGATION PROJECT – Agreement No. 802," herein referred to as ("AGREEMENT"); and

WHEREAS, Section 3 of the AGREEMENT allows for the extension of the original five-year period ending 2006, during which 770 acre-feet of water would be "turned over" to DISTRICT "...under mutual agreement of the parties" but for only successive on-year periods; and

WHEREAS, ALPINE and DISTRICT both desire to extend the period of temporary water "turn over" for an additional 5-year period during which 770 acre-feet of water would be "turned over" to District as provided therein.

NOW, THEREFORE, in consideration of the covenants and conditions contained herein, the parties agree as follows:

1. DEDICATION OF TEMPORARY WATER: The parties agree to extend the period of temporary water "turn over" as provisioned in AGREEMENT for a period beginning February 8, 2016, and ending December 31, 2020.
   a. VOLUME OF WATER: The volume of temporary water agreed to under this contract shall be 770 acre-feet per year.
   b. REPAYMENT CREDIT: DISTRICT shall credit ALPINE $112,621.00 per year towards their contractual repayment obligation during the five (5) year period outlined above.

2. INTEGRATION: Except to the extent amended hereby, the terms and conditions of the Agreement remain in full force and effect and are expressly ratified and confirmed by the parties. The amendment contained herein and the terms and conditions of the Agreement constitute the entire Agreement. Any further Amendments or modifications shall be in writing and signed by both parties to be effective. No other oral or written statements shall be construed as part of the Agreement.

IN WITNESS WHEREOF, this Agreement has been executed as of the day and year first above written by officers of the DISTRICT.

CENTRAL UTAH WATER CONSERVANCY DISTRICT

By: _____
Its: General Manager

Attest: _____

ALPINE CITY

By: _____
Its: Mayor

Attest: _____

Alpine City CORPORATE Seal Utah County, Utah

APPENDIX D – Alpine City Water Conservation Plan

Water Conservation Plan

NOVEMBER 2014

Table of Contents

"When the well is dry we know the worth of WATER"
–Benjamin Franklin

INTRODUCTION

As Alpine looks forward into the next two decades its sees a town of approximately 10,000 people growing to an estimated build-out population of 14,765 people. With this kind of growth there comes many challenges but with those challenges comes many opportunities. There has of late been concern over the future cost and availability of the water supply as demonstrated by the state legislature in the Water Conservation Plan Act (House Bill 418) passed in the 1998 session. Revisions to the bill were passed in 1999 (House Bill 153) and in 2004 (House Bill 71). The Act is codified as Section 73-10-32 of the Utah State Code. Alpine citizens and leaders, having foreseen the continued growth, have taken many steps to ensure that Alpine continues to have a sufficient supply of water for all of its needs. This water conservation plan is written to address any concerns of leaders and citizens of both Alpine City and the State of Utah.

DESCRIPTION OF THE CITY

Located in northern Utah County, and in the second driest state in the nation, Alpine has experienced significant growth in the last 10 years. The majority of the growth has taken place in the residential areas. In the last three years, the City has issued on average 38 building permits for new homes each year. There are approximately 4,775 acres within the Alpine City limits. Table 1 shows the zoning breakdown for the City and the percent of the total area in each zone.

Table 1 – Zoning Breakdown for Alpine City

Building Zone	Area (acres)	Percent of Total Area
TR-10,000 (1/4 acre residential)	306	6.41%
CR-20,000 (1/2 acre residential)	919	19.25%
CR-40,000 (1 acre residential)	2,360	49.42%
CE-5 (5 acre residential)	1,081	22.64%
BC (Business/Commercial)	96	2.01%
Sr. Housing Overlay	13	0.27%
Totals	**4,775**	**100.0%**

The current population of Alpine is estimated at 10,000 people. The most recent population projection from Moutainland Association of Governments shows Alpine reaching a build-out population of 15,514 people in 2032.

Alpine is a rural community that places a high value on open spaces. Many new developments are required to provide open space as a condition of approval. These developments occur primarily in the CR-20,000 and CR-40,000 zones. Through sound planning, many areas have

been protected through becoming dedicated open space. Alpine City currently has 533.5 acres of dedicated public open space and 586.5 acres of dedicated private open space.

Alpine City owns and operates two separate water systems. The culinary water system provides water for indoor use. Prior to the 2002 irrigation season, water for outdoor use was also provided through the culinary system. In the fall of 2000, the City began construction of a pressurized irrigation system. The purpose of constructing the pressurized irrigation system was to conserve culinary water and provide for more efficient use of the City's water resources. The new system enabled the City to use Alpine Irrigation Company shares that had been provided to the City to meet the water policy for new developments. In addition, the pressurized irrigation system removed water from open ditches which eliminated the losses of conveyance. Studies estimated that 50 percent of the water in open ditches was being lost to infiltration. Over 99 percent of the small farms and residences that used surface water from ditches have converted to using the pressurized irrigation system. There are a few homes and irrigated acreage that do not have the pressurized irrigation system available to them. The residential indoor and outdoor use for most of these homes is provided through the City's culinary water system. The irrigated acreage that cannot be served by the pressurized irrigation system continues to be served by the ditch system.

The Water Supply

Alpine City has three sources of water: springs, creeks and wells. The culinary water system relies primarily on Grove Spring. Two wells are also connected to the culinary water system. These wells add to the culinary water supply when the demand exceeds to capacity of the spring.

The pressurized irrigation system is supplied water from Dry Creek, Fort Creek, springs, and six wells. The system relies on the creeks and springs as long as the flow is available. As the irrigation season progresses and flows from the surface water sources subside, the wells are used to provide for the demand on the system.

Alpine City has rights to approximately 3,800 acre-feet of water, in addition to the Alpine Irrigation Company water rights that are used in the irrigation system. The Alpine Irrigation Company rights are defined by a decree. The irrigation company is entitled to different percentages of the total flow on dates defined by the decree.

Water Budget

Table 2 shows the amount of water delivered into the culinary water system and the metered outflows to end-users for the years 2012 to 2013.

Table 2 - City Water Budget – 2011 through 2013

Inflow (kgal)				*Outflow (kgal)*	*System Losses*
Year	*Wells*	*Springs*	*Total*	*Total*	*% Diff.*
2012	0	268,899	268,899	248,980	7.41%
2013	0	274,273	274,273	240,142	12.44%

Average unaccounted for losses from the system are around 9.93% for the two years of record. It is our opinion that these losses primarily are due to the following issues: worn out residential water meters, system leaks, and overflows from tanks.

CURRENT WATER CONSERVATION MEASURES AND PROGRAMS

Following are measures and programs that Alpine City has implemented to conserve water.

Pressurized Irrigation System

Prior to the construction and implementation of the City's pressurized irrigation system, some residents used surface irrigation from Alpine Irrigation Company ditches, while others use the culinary system to supply outdoor irrigation water. In addition, the small farms in the area were served by using surface irrigation and open ditches.

The City applied for and received a grant from the Central Utah Water Conservancy District (CUWCD) to aid in constructing the system. As a condition of receiving the grant, the City had to commit to meet certain water conservation goals. Table 3 lists the amount of water conserved for the last several years and the required conservation.

Table 3 – Water Conservation for CUWCD Grant

Year	Water Conserved (ac-ft)	Required Conservation (ac-ft)	Water Conserved Over Requirement (ac-ft)
2002[1]	2,379.39	2741	-361.61
2003	2,786.49	2750	-36.49
2004	3,581.96	2759	822.93
2005	4,683.25	2768	1915.25
2007	4,309.80	2741	1568.80
2008	4,945.52	2741	2204.52

2009	4,434.43	2741	1693.43
2010	4666.47	2741	1925.47
2011	4790.08	2741	2049.08
2012	4169.4	2741	1428.4
2013	4165.26	2741	1424.26
Totals	**49,464.69**	**30,205**	**14,634.04**

1 – a portion of the system was still under construction

The City's pressurized irrigation water system has master meters to determine the quantity of water used from each source. Individual residences are not metered. The City has implemented the following practices to encourage water conservation within the system:

Water Conservation Plan: For the years 2012 through 2014, Alpine City put into place a water conservation plan, including water restrictions, for pressurized irrigation system users. Figure 1 outlines that City's program for the 2014 irrigation season. The agricultural user's water restriction plan is shown in Figure 2. The restrictions allowed residential water users to irrigate three days per week between the hours of 7 p.m. to 7 a.m. The agricultural use restrictions varied depending on the crop and time of year. An enforcement plan was included with the plan, with warnings being given for first time offenders with fines following for initial offenses. The City Staff played a major role in enforcement. However, the City did hire some part time seasonal help to hang notices on the doors of first time offenders.

This program resulted in a significant decrease in the water consumed in the system. Restrictions did not start until mid-summer in 2012. It took some time to educate residents on the restrictions and the reasons why they were being implemented. In 2012, the City experienced their highest water use in the irrigation system in the last five years. However, from 2012 to 2013, the water use dropped by 1021.05 acre-feet or 16.5%. Water use in 2014 was 0.2% less than in 2014. Figure 3 illustrates the total water use for the last five years in our pressurized irrigation system.

Irrigation Water Meters: The City has started a pilot project, through a grant from the Division of Water Resources, where twenty-five smart meters were purchased and installed on the pressurized irrigation services at various homes throughout the City. The irrigation water use at these residences has been recorded each year. Ultimately, the City will determine the irrigated area for each of these lots and compare the water used each year to the amount of water that should be used. In addition, the City has installed meters on all of the City parks, schools, and churches. These meters are read on an annual basis to determine the water consumption during the irrigation season. If the water user is considered to be using more water than is necessary, they are contacted to discuss methods of reducing water consumption.

Public Awareness Program

The City periodically includes articles in the monthly newsletter providing information on water conservation, recommended irrigation requirements, low water use landscaping, and other helpful information. Residents are also encouraged to participate in the Central Utah Water Conservancy Districts' free water check program. Water conservation information is also made available to residents on the City's website.

FIGURE 1

Alpine City Water Conservation Plan – 2014

Public Notice/Education

- April Newsline - include outline of City's Water Conservation Program for 2014.
- Provide water conservation tips in Newsline through summer months.
- The City will encourage participation in the Slow the Flow Program.
- Additional educational material will be provided on the website.
- Prepare fact sheet for water restriction frequently asked questions.
- Education program for school children.

2014 Water Conservation/Restriction Program

- Public Education
- Agricultural Users: Meet with Alpine Irrigation Company and shareholders on March 19, 2014, to come up with restriction plan.
- Residential Users: Use of irrigation water will be allowed three days per week. Odd numbered addresses will be allowed to water Monday, Wednesday & Friday. Even numbered addresses will be allowed to water Tuesday, Thursday & Saturday. The time period allowed for residential water will be between the hours of 7 pm on the scheduled day for watering until 7 am the following day. This does not mean that residents should water for a 12 hour time period, but rather a reasonable amount of water can be used during this time period sufficient to provide for the needs of their landscaping. Smaller ¼ acre lots would irrigate less hours than larger 1 acre lots.
- City Parks and other Large Water Users (schools, churches, etc.): The City will coordinate a plan for irrigation of the parks/other facilities and with the other large water users. This plan will require watering during the day to balance the use in the system. Some parks may receive limited water on an as-needed basis through the week.
- Water use restrictions will go into effect on June 1, 2014, unless further notice is given.

Enforcement

- City staff does not feel that a water conservation/restriction program will be effective without enforcement.
- Enforcement will require staff time, taking away time spent on other projects.
- Proposed enforcement:
    - First Offense: Warning.
    - Second Offense: $50 fine, payment required to have PI valve unlocked.
    - Third and Future Offenses: $200 fine, payment required to have PI valve unlocked.

FIGURE 2

Memo

To: **Alpine Irrigation Company Ag. Users**
From: **Shane L. Sorensen, P.E.**
Public Works Director/City Engineer
Date: **March 19, 2014**
Subject: **Proposed Irrigation Plan for 2014 Drought Conditions – Ag. Users**

Following is the proposed irrigation schedule for the 2014 irrigation season for agricultural users. The plan is the same as last year with the exception of a 7 a.m. to 7 p.m. watering schedule instead of an 8 a.m. to 8 p.m. watering schedule for the time of the year that has restrictions.

Orchards/Pastures

- Present time until June 1: no restrictions, but use water reasonably.
- Beginning June 1 to September 1: Water users will be allowed to irrigate during the daytime from 7 a.m. to 7 p.m., 7 days per week.
- After September 20: No irrigation water will be available for pastures after this date.

Hay Operations

- Present time until July 24: no restrictions, but use water reasonably. This should allow for harvesting 2nd crop hay.
- Beginning July 25 to September 1: Water users will be allowed to irrigate during the daytime from 7 a.m. to 7 p.m., 7 days per week.
- After September 1: No irrigation water available after this date.

Residential water users will have the same restrictions as last year, with the adjustment of the 7 a.m. to 7 p.m. schedule.

The enforcement plan for these restrictions will be the same as the plan that has been implemented for residential users and is outlined as follows:

- First offense: Warning via a door hanger.
- Second offense: Pressurized irrigation service will be locked. Reconnection will require a $50 fee.
- Third and additional offenses: Pressurized irrigation service will be locked. Reconnection will require a $200 fee.

Thanks for your cooperation. Please contact Ron Devey at (801) 420-3102 if you have any questions.

Alpine City Public Works
20 North Main • Alpine, Utah 84004
Phone/Fax: (801) 763-9862
E-mail: ssorensen@alpinecity.org

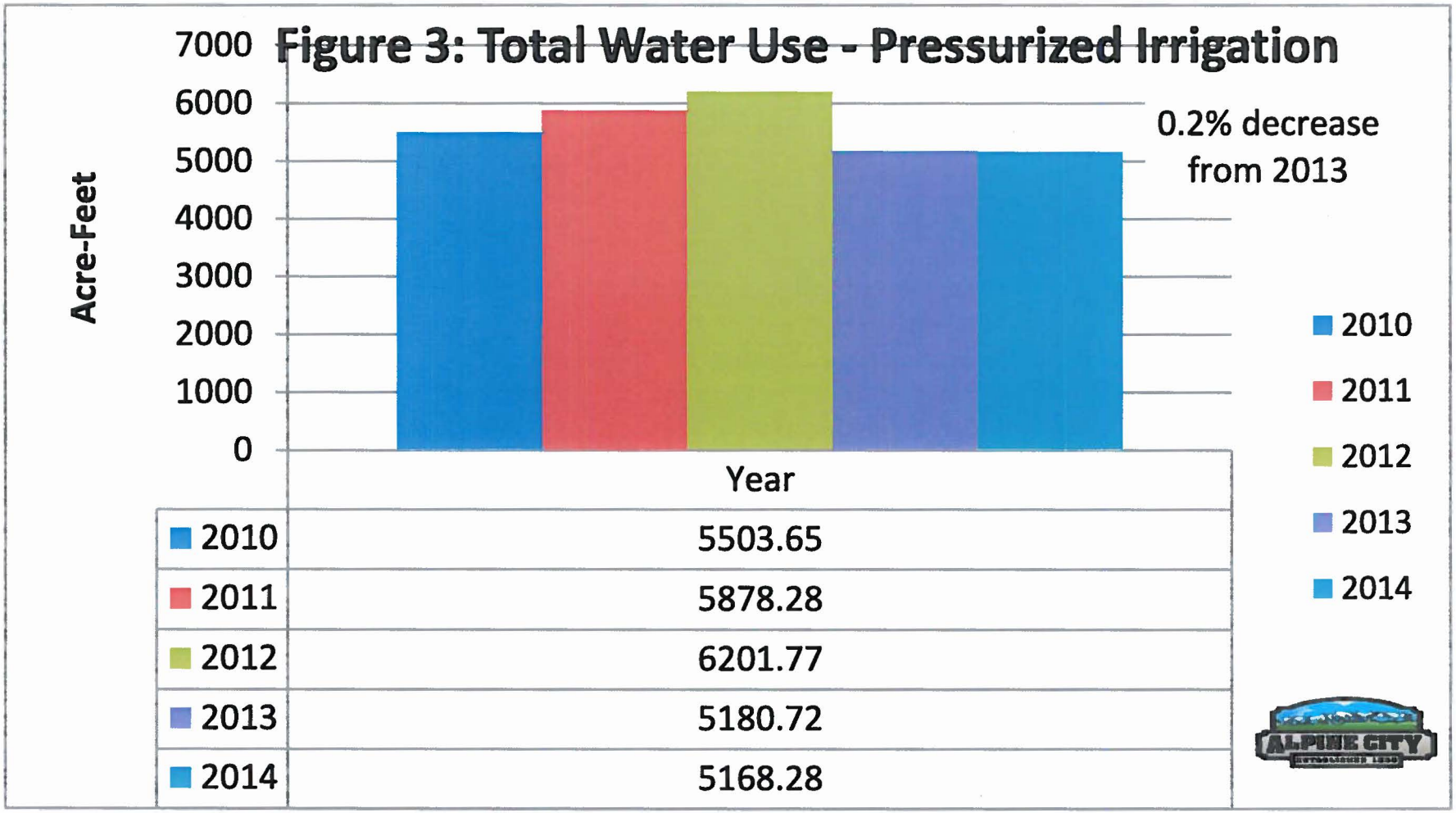


Figure 3: Total Water Use - Pressurized Irrigation
Acre-Feet
7000
6000
5000
4000
3000
2000
1000
0
0.2% decrease from 2013
2010
2011
2012
2013
2014
Year
2010 5503.65
2011 5878.28
2012 6201.77
2013 5180.72
2014 5168.28
ALPINE CITY

System Maintenance

The City used "state of the art" methods when constructing the pressurized irrigation system. With the system only being in its eighth year of operation, system losses should be very low.

The majority of the City's culinary water lines are ductile or cast iron pipe, however some PVC pipe has been installed in the system, especially in areas with corrosive soils. Most of the water leaks that the City repairs on a regular basis are deteriorated galvanized water services, but some water leaks have been due to corrosion of ductile iron water mains in areas with bad soils. A concerted effort has been made to budget for and replace the water mains with these issues. The City has also made it a practice to replace all galvanized water services with copper lines whenever a capital improvement project is constructed.

Current Water Rates

Designing an appropriate rate schedule is a complex task. Rate design is a process of matching the costs of operating the water system to the unique economic, political and social environments in which the city provides its service. The cost of delivering the service must be evaluated and understood. Each water system has unique assets and constraints. Based on the characteristics of the system, and past capital and operating costs, revenue requirements can be estimated. City staff has estimated the cost of providing water service and proposed a rate schedule designed to cover such costs. The rate schedule shown below has been adopted by Alpine City.

Culinary Water Rates:

Low Zone, Lambert Zone, Grove Zone Usage Rate:	
	$13.00 for the first 8,000 gallons used per month
	then, $2.00 per 1,000 gallons of water used from 8001 gallons to 10,000 gallons per month
	then, $3.00 per 1,000 gallons of water used from 10,001 gallons to 12,000 gallons per month
	then, $4.00 per 1,000 gallons of water used over 12,000 gallons per month
Box Elder Zone & Willow Canyon Zone Usage Rate:	
	$ 13.00 for the first 8,000 gallons used per month
	then, $.90 per 1,000 gallons of water used from 8,001 gallons to 60,000 gallons per month
	then, $1.40 per 1,000 gallons of water used from 60,001 gallons to 175,000 gallons per month
	then, $2.80 per 1,000 gallons of water used over 175,000 gallons per month

This rate schedule is designed to encourage conservation through an ascending block rate structure.

The rate structure for the pressurized irrigation system is based on lot size, and whether or not shares are owned. Following is a breakdown of the rate structure.

Pressurized Irrigation Water Rates:

Schedule A (residential, non-shareholder):	$0.001112 per s.f. of lot size
Schedule B (residential, shareholder):	$0.000618 per s.f. of lot size
Share Requirement (User must have 1 primary share or 3 secondary shares per acre to receive shareholder	

rate. If excess shares are available, the shareholder will receive a $5 credit each month for each primary share or for three secondary shares in excess of the requirement.)

Schedule C (agricultural, shareholder): $1.15 per share per acre
Share Requirement (User must have 1 primary share or 3 secondary shares per acre to receive agricultural shareholder rate. If excess shares are available, the shareholder will receive a $5 credit each month for each primary share or for three secondary shares in excess of the requirement. In addition, to be considered an agricultural user, a shareholder must meet the following criteria: acreage must have been irrigated historically with Alpine Irrigation Company Shares, the acreage must produce an identifiable agricultural product. If there is a residence included on the acreage, the home will be billed at the Schedule B rate structure for the landscaped area surrounding the home.)

WATER CONSERVATION CHALLENGES AND OPPORTUNITIES

Following are some of the challenges that our City faces in being successful in getting citizens to conserve water:

- The City's pressurized irrigation water is not metered at each connection. It is difficult to determine if a resident is using excessive amounts of water. In addition, the residents' bill for irrigation water remains the same regardless of water usage. The City has start a pilot project with smart meters to meter irrigation water use at 25 different homes in the City, however, it will take some time to get enough usage data to look at trends. A City-wide meter project is being considered with the current water master plan update that is currently in process.
- Homeowners have a propensity to plant and care for large areas of grass and other landscaping with high water requirements.
- Citizens lack information or understanding of information regarding landscape water requirements. Many residents do not know the water requirements to maintain a healthy landscape and common practices that can result in water savings indoors.
- Some residents understanding of a drought tolerant landscape is a landscape that is dull and unattractive.

Since the City's pressurized irrigation system is not metered at each lot, the City needs to put extra effort into a public education program that promotes water conservation. In addition, the City will continue to have water restrictions similar to those that have been put in place over the last three years. Based on usage data, the restrictions are working since the overall water use has been less than the consumption prior to the restrictions.

Even though the system is not metered, the City has conserved considerable amounts of water by practically eliminating surface irrigation through open ditches. In addition, the amount of irrigation required from wells has been drastically reduced by being able to make use of the untreated surface water sources.

WATER CONSERVATION GOALS

This section briefly describes water conservation goals that the City will strive to achieve. The following practices will be implemented by the City to help meet its goals. Descriptions of how Alpine City intends to address each selected item should generally include the types of information listed under each heading but other appropriate details in addition to or in place of those listed may be provided.

1. *Establishment of a Water Conservation Committee*
2. *Public Information and Education Program**
3. *Secondary System for Lawn and Garden**
4. *Leak Detection and System Maintenance/Repair Program**
5. *Promote Water Efficient Landscaping*
6. *Conservation Oriented Rate Structure**
7. *Shortage Management*
8. *Metering and Meter Testing, Calibration, and Replacement*
9. *Retrofit Devices*
10. *In Home Leak Detection and Water Use Management Assistance*

1. Establishment of a Water Conservation Committee

A technical advisory committee may be useful for evaluating water conservation measures and making recommendations concerning such measures to the local government. This committee could evaluate the success of water conservation measures currently in practice and consider the potential applicability of other practices for future application.

Decisions needing to be made:

- How many persons comprise the committee.
- How committee members are, or will be, chosen.
- Minimum length of service.
- Establish meeting schedule; monthly, weekly etc...
- Extent and limitations of the committee's authority and responsibility.
- Types of issues for which the committee will be responsible.

2. Public Information and Education Program*

Water conservation education is aimed at enhancing the awareness and understanding of water-related problems and is based on the premise that it will influence people to voluntarily use water more efficiently and cooperate with regulatory requirements. This

* Measures Alpine City is currently implementing

approach includes both public information and outreach to schools. It should address both long-term and short-term water use practices.

Decisions needing to be made:

- Details concerning the means that will be used to disseminate information.
- The type of information to be distributed.
- The audience to whom the program is aimed.

Some common public information media are:

- Direct mail, including bill stuffers.
- Personal contacts.
- Posters & brochures.
- Water efficiency contests and awards.
- Educational programs and projects for schools and organizations.
- Presentations and demonstrations.

3. Secondary System for Lawn and Garden*

Alpine City has constructed a City-wide pressurized irrigation system. The City will continue to require new developments to expand the existing system.

4. Leak Detection and System Maintenance/Repair Program.*

Much of the water processed by public suppliers never reaches any customer. It flows through leaks in the distribution system and seeps into the ground or is otherwise lost.

Information needed:

- Describe the distribution system, including size, quantity, age and condition of pipelines.
- Provide and estimate of the amount of water lost from the system both in actual volume and as a percentage of total daily throughput.
- Set goals for future leakage control.
- Describe leak control measures that have recently been or will be implemented.
- Develop a 10 year plan for replacing aging pipelines and those that have frequents leak issues, such as pipelines in areas with corrosive soils.

5. Promote Water Efficient Landscaping

During some months, water used for lawn and landscape may comprise more than half of the public water deliveries for many communities. Landscaping with low water use plants and site designs reduces the amount of water needed for irrigation. Such landscapes do not have to be barren, lacking in color, diversity or only consist of thorny desert plants.

---

* Measures Alpine City is currently implementing

Succulent plants and other popular ornamentals may be designed into a water wise landscape if placed in a location that does not require excess watering.

Things needing to be done:

- Include water wise landscaping as a major topic in public information and education programs.
- Adopt a policy of applying water efficient landscaping principles to newly landscaped or relandscaped public buildings, parks, and other sites.
- Monitor and evaluate the results of the water wise landscape information and education.
- Consider including water efficient landscape requirements in a landscaping ordinance

6. Conservation Oriented Rate Structure*

Alpine has an ascending block rate structure for the culinary water system that encourages water conservation. The City is also studying the feasibility of installing meters on the pressurized irrigation system. If meters were installed in the system, a conservation oriented rate structure would be put in place to encourage water conservation.

7. Shortage Management*

It is anticipated that water shortages may be expected to become more frequent as population of the region increases. Consumer demand for water must be curtailed during such times in order to avoid permanent damage to the resource. Local governments can be prepared for such events by enacting water shortage ordinances. A water shortage ordinance should concern practices that produce short-term reductions in water use to deal with temporary severe shortage problems. The City has issued orders for water restrictions for the last three years, and anticipates similar restrictions in the future.

8. Metering and Meter Testing, Calibration, and Replacement

Meters provide the basis for determining the system's income and allow managers to account for how much water passes through the system. Accurate measurement of flow volumes, both of distribution mains and at individual services, is critical to efficient operation of the supply system.

Information may describe the meter installation, testing or replacement program including such details as:

- Date the program was or will be initiated.
- Percentage of meters affected.
- Replacement frequency

---

* Measures Alpine City is currently implementing

- Average percentage of observed errors of used meters.
- Impacts of the program on apparent water usage.
- Evaluation of effectiveness of program (if already in place) or description of means by which program will be evaluated.

9. Retrofit Devices

Installation of water conserving devices in existing structures complements plumbing codes that require low water-use items in new structures. Retrofit requirements should usually be mandatory or devices be provided free of charge in order to achieve a high degree of compliance. Some localities require retrofit devices to be installed before ownership of a property can be transferred.

The program may:

1. Define a set of measures to consider.
2. Evaluate the impact that such measures would likely have on water demand.
3. Analyze the advisability of adopting those measures for their service areas.

10. In Home Leak Detection and Water Use Management Assistance

The utility or local government may provide a free technical assistance outreach program for locating leaks and identifying ways in which a resident or property owner might use water more efficiently. This program would provide staff who are experienced in leak detection and water conservation methods.

Information needed:

1. Design an assistance program to consider.
2. Evaluate the impact that the program would likely have on water demand;
3. Analyze the advisability of implementing the program in their service areas.

PROPOSED WATER CONSERVATION MEASURES AND PROGRAMS

Proposed Water Shortage Management

The city should have a contingency plan, which spells out climate and political realities related to water use during drought or other water supply shortages. Included here are conservation measures that may be implemented during times of emergency. They are as follows:

- Water city properties on a minimal watering schedule that minimizes watering during hot daylight hours. Some watering of City properties is performed during the day to reduce the peak demand on the system and to maintain operating pressures. If this coordination does not take place, the City's regulating reservoirs drain during the night and overflow

during the day. The surface water sources that are part of the City's system are not able to be turned on and off at will.

- Eliminate watering of city property in cases of severe shortages.
- Educate the public on the water supply situation.
- Instigate voluntary public conservation measures
- No residential outside watering from 7:00 a.m. to 7:00 p.m.
- Issue information to all customers on conservation procedures each can accomplish around their own property and within their own homes.
- Instigate mandatory public conservation measures.
- Instigate emergency conservation measures:
  - Strictly enforce all conservation policies with significant fines for non-compliance.
  - Physically restrict water supplies to (in order of priority).
    - All outside irrigation systems.
    - Park properties and other non-essential support facilities.
    - Commercial businesses, restricting largest users first.
    - Residential areas.
    - Any other "non-life support" areas, insuring water supplies to hospitals, hospices, all other health care facilities, and controlled designated area water supply facilities.
- Additional non-emergency water conservation measures.

Proposed Water Education Program

Outdoor Water Use:

- Water landscaping only as much as required by the types of landscaping, and the specific weather patterns of your area. In general, water in the early morning or late evening hours.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscaping, as well as wasting a significant amount of water.
- A single lawn sprinkler spraying five gallons of water per minute uses 50 percent more water in just one hour than the combination of 10 toilet flushes, two five-minute showers, two dishwasher loads, and one full load of laundry.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscaping so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.
- Keep your lawn well trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Indoor Water Use:

- About two thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom use. Following are suggestions for this specific area:
  - Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, etc. in the trash can.
  - Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak. If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.
  - Take short showers with the water turned up only as much as necessary. Turn the shower off while soaping up or shampooing. Install low flow showerheads and/or other flow restriction devices.
  - Do not let the water run while shaving or brushing your teeth. Fill the sink or a glass instead.
  - When doing laundry, make sure you always wash a full load or adjust the water level appropriately if your machine will do that. Most machines use 40 gallons or more for each load, whether it is two socks or a week's worth of clothes.
  - Repair any leak within the household. Even a minor slow drip can waste up to 15 to 20 gallons of water a day.
  - Know where your main shutoff valve is and make sure that it works. Shutting the water off yourself when a pipe breaks or a leak occurs will not only save water, but also eliminate or minimize damage to your personal property.
  - Keep a jar of water in the refrigerator for a cold drink instead of running water from the tap until it gets cold. You are putting several glasses of water down the drain for one cold drink.
  - Stopper the sink when rinsing vegetables, dishes, or anything else; use only a sink full of water instead of continually running water down the drain.

APPENDIX E – Letters of Project Support

GARY R. HERBERT
Governor
Spencer J. Cox
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Water Resources
Eric L. [illegible]
Division Director

January 13, 2017

Mayor Sheldon Wimmer
Alpine City
20 North Main
Alpine, Utah 84004

RE: Alpine City – Secondary Metering Project
Division of Water Resources – funding support letter/WaterSMART grant application

Mayor Wimmer:

We have been asked to provide this letter regarding available state funding for Alpine City for a pressurized secondary irrigation metering project. We understand this letter is to be submitted with the city's WaterSMART grant application package to the Bureau of Reclamation.

We acknowledge receipt of the city's application to the Board of Water Resources (Board) for financial assistance for this project. The purpose of the project is to install more than 2,400 meters on their secondary irrigation system.

We understand that Alpine City is applying for a $1,000,000 WaterSMART grant. If the Board commits funds to the project, it is anticipated the Board would provide about $1,700,000 in the form of loan. It is understood that construction is expected to begin in the fall of 2017 and possibly be phased over a few years.

The application has been approved by the local Board member for the area. It is anticipated that the project will be presented to the Board for funding consideration in the fall of 2017. Any Board action for the project will be subject to availability of funds, but we do not anticipate a shortage of funds at this time.

We look forward to continue working with you in the development of this project. Please contact me if you have any questions at 801-538-7266.

Thank you,

Marisa Egbert, P.E.
Funding Project Manager

DNR

1594 West North Temple, Suite 310, PO Box 146201, Salt Lake City, UT 84114-6201
telephone (801) 538-7230 • facsimile (801) 538-7279 • TTY (801) 538-7458 • www.water.utah.gov

Alpine Irrigation Co.

January 11, 2017

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
PO Box 25007
Denver, Colorado 80225

Dear Ms. Shah,

The Alpine Irrigation Company shareholders are served irrigation water through the Alpine City pressurized irrigation system. Our shareholders include both residential and agricultural users. Because our area has been in a drought, we have worked with the City to put water restrictions in place for the last several years. These restrictions have taught people that in most cases, they can get by with less water.

Alpine City is applying for a grant through the WaterSmart program to install individual meters throughout the pressurized irrigation system. The meters will allow City residents and shareholders to accurately apply water to their landscapes and farms, because for the first time they will have access to actual metered use. Through education, water users can learn what the actual water needs are of the area being irrigated. Saratoga Springs is a City near Alpine that implemented a meter program in their pressurized irrigation system. The results were a nearly 40 percent reduction in water use in their system.

As water users, we need to be more aware of water conservation so that the needs of a growing population can be met. Alpine Irrigation Company is writing this letter in support of the City's proposed project of installing meters on the pressurized irrigation system.

Sincerely,
ALPINE IRRIGATION COMPANY

RE Bennett

Roger Bennett, President

CENTRAL UTAH WATER
CONSERVANCY DISTRICT

355 W. University Parkway
Orem, UT 84058-7303
801.226.7100
www.cuwcd.com

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
PO Box 25007
Denver, Colorado 80225

Central Utah Water Conservancy District is committed to water conservation and a sustainable future. We recognize that water conservation programs are highly effective when they come directly from the cities and communities in our service area. One of these cities that has been striving to conserve water is Alpine City.

Alpine City is committed to reducing its water use and has been successful in their current practices and to continue improving water efficiency they are implementing a plan to meter their secondary water system. Recently we have seen some areas move to metering of secondary and irrigation water which has been very effective at reducing landscape water use. Areas such as Saratoga Springs have seen nearly 40% in water savings. By metering secondary water not only will Alpine have an accurate picture of landscape use but also can show end users the amount of water that is being used. This is not only a valuable tool for conservation but will be the best tool for managing water use in the future.

Central Utah Water Conservancy District has assisted in funding the current secondary water system in Alpine and is pleased to see them continue with their efforts to use it to not only conserve potable water but to conserve our overall water supply.

Rick Maloy
Water Conservation Manager

Utah County
HEART OF UTAH

Utah County Commission

Bill Lee

100 East Center
Suite 2300
Provo, UT 84606

Phone: 801-851-8135
Fax: 801-851-8146
www.utahcounty.gov

January 11, 2017

Bureau of Reclamation: Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
PO Box 25007
Denver, Colorado 80225

Dear Ms. Shah,

Utah County has experienced drought conditions and unprecedented growth for the last few years. Water is a precious and necessary commodity that will be required to sustain the growing population. It is apparent that water conservation will be required to stretch the water resources in our area.

We are pleased to hear that Alpine City is applying for the WaterSmart grant to install meters on their secondary irrigation water services. This will allow their residents to quantify the water they are applying to their landscape and become more educated about what the landscape irrigation requirements are. This information should reduce the amount of water being used for irrigation purposes. Saratoga Springs, another City in our County, installed meters on their irrigation services. They realized a nearly 40 percent reduction in their overall irrigation water service.

As a Utah County Commissioner, I fully support Alpine City's proposed meter project that will help conserve water in our area.

Sincerely,

William C. Lee
Utah County Commissioner

APPENDIX F – Official Resolution

RESOLUTION NO. R2017-02

A RESOLUTION OF THE GOVERNING BODY OF ALPINE CITY AUTHORIZING THE CITY TO SUBMIT A GRANT APPLICATION FOR POTENTIAL FUNDING OF CERTAIN IMPROVEMENTS TO THE CITY'S SECONDARY IRRIGATION SYSTEM THROUGH THE U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION's WATERSMART PROGRAM

WHEREAS, the City operates a secondary irrigation system that is not a metered system; and

WHEREAS, the City Engineer has recommended to the City Council that metering the system would help in encouraging water conservation by identifying excessive users and rewarding those that conserve water with lower water rates; and

WHEREAS, the Bureau of Reclamation has a program called WaterSmart that has water and energy efficiency grants available to qualifying entities to assist them in projects such as placing meters on unmetered water systems.

NOW THEREFORE BE RESOLVED by the Governing Body of Alpine City as follows:

1. The City Staff is hereby authorized and instructed to submit a qualifying grant application to the Bureau of Reclamation for funding for metering the secondary water system in the City in the form as attached in Exhibit A hereto.

2. That the City is hereby committed to the legal and financial obligations associated with receipt of any financial assistance to be awarded pursuant to the grant application.

3. That Shane Sorenson, City Administrator/engineer, is hereby identified as the official with the City with legal authority to enter into an agreement resulting from a successful application for this grant, and is specifically authorized to do so.

4. That the City does hereby commit to providing the amount of funding and/or in-kind contributions specified in the funding plan included in the funding plan portion of the grant application.

5. That Alpine City is hereby committed to work with the Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

6. This resolution shall take effect immediately upon passing.

Passed and dated this 12 day of January, 2017.

Mayor

Attest:

Recorder

Alpine City CORPORATE Seal Utah County