P.O. Box 468
320 Sixth Avenue
Ouray, Colorado 81427

970.325.7211
Fax 970.325.7212
www.cityofouray.com

Mr. Kevin Reidy
Water Conservation Technical Specialist
Colorado Water Conservation Board
1313 Sherman Street, Room 718
Denver, CO 80203

Re: Ouray Water Efficiency Grant Application

Dear Mr. Reidy,

The City of Ouray (City) has developed and adopted a Water Efficiency Plan to guide the effective and dependable use of its water resources, and now the City is ready to take the first steps towards implementing the highest priority water saving measures identified in the Plan.

The City has compiled existing technical, location, and operational data on the water measurement locations in the City, creating a Water Measurement Plan (see Appendix B of the enclosure). Based on this Plan, the City is requesting financial assistance from the CWCB to implement measurement improvements at several locations.

Attached is the City of Ouray Water Measurement Implementation Project Grant Application, including a resolution from the City Council demonstrating the City's commitment to long-term water conservation. The application includes required background information on the City, and a scope of work, timeline and budget for completion of the plan. The total project budget is $66,714. The total grant request for Ouray is $49,964. The City of Ouray will provide $16,750, 25% of the total cost, through in-kind and cash contributions.

Thank you in advance for your time and consideration in our request.

Sincerely,

The City of Ouray

Patrick Rondinelli, City Administrator

Enclosure: City of Ouray Water Measurement Implementation Project Grant Application

cc: Ben Wade, Water Conservation Coordinator, Colorado Water Conservation Board

City of Ouray
Water Efficiency Grant Application

Prepared for:

Mr. Kevin Reidy, Colorado Water Conservation Board
1313 Sherman Street, Room 718
Denver, CO 80203

Wright Water Engineers, Inc.

March 2015

051-036.110

TABLE OF CONTENTS

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FIGURES

APPENDICES

City of Ouray
Water Efficiency Grant Application

INTRODUCTION

The City of Ouray (City) is located on the Upper Uncompahgre River in Ouray County, Colorado at an elevation of approximately 7,800 feet (see Figure 1). The City is predominately in Section 31, Township 44 North, Range 7 West of the New Mexico Principal Meridian. The City provides treated water to a service area of approximately 615 acres, encompassing the City as well as three subdivisions outside of the city limits (see Figure 2). The City also provides raw water to the Mineral Farms Subdivision, which has its own water treatment and distribution system. In addition, the City uses water for irrigation, recreation and geothermal purposes.

On September 15, 2014, the City of Ouray adopted a Water Efficiency Plan with the following goals:

1. *Better water use data collection and monitoring* through development of a plan to improve monitoring of the main components of system infrastructure in order to document water uses and non-revenue water.
2. *Assess costs for system operations* based on the data from system measurement devices (Goal 1) and other considerations.
3. *Decrease system losses* by implementing measures to help to detect and track system losses.
4. *Public awareness and acceptance* of water conservation and support for water efficiency activities.

The Water Efficiency Plan was approved by the Colorado Water Conservation Board (CWCB) on September 29, 2014 (Appendix A).

The City immediately began to implement the high-priority measures in its Water Efficiency Plan. Specifically, the City has worked with consultants and staff from several City departments to prepare a Water Measurement Plan. The plan details current and proposed measurement and SCADA-connected locations, existing measurement capabilities, data analysis capabilities and

desired improvements to the system. The Water Measurement Plan also prioritizes the proposed improvements and additions based on staff operational needs, budget considerations and City growth plans. The Water Measurement Plan is intended to be implemented in phases, as funding allows, and to be continually updated as improvements are made and the City's needs evolve. The Water Measurement Plan aims to provide a foundation of implementing subsequent water conservation measures, support the City's water rights, help to meet legal obligations for maintaining measurements, and improve system efficiency. The City is seeking a Water Efficiency Grant from the CWCB to fund implementation of Phase One of the Water Measurement Plan. The current Water Measurement Plan is included as Appendix B.

The Phase One Implementation of the Water Measurement Plan Project (Project) focuses on Supervisory Control and Data Acquisition (SCADA) improvements to enable the City to create a baseline of water supply and usage data and to track water supply and usage at water sources, improving data on the City's water supply sources, and improving measurement of wastewater flows that are important to City operations and planning, permitting and water rights. Phase One implementation of the Water Measurement Plan supports **all** of the Water Efficiency Plan goals.

The City of Ouray's Resolution to adopt the Water Efficiency Plan and commitment to implementation of water conservation measures is provided in Appendix C. The City's adopted Water Efficiency Plan - Proposed Implementation and Monitoring Plan is provided in Appendix D.

APPLICATION SUBMITTAL REQUIREMENTS

1.0 Contact Information of Entity Seeking Grant

Patrick Rondinelli, City Administrator
City of Ouray
P.O. Box 468
Ouray, CO 81427
T: (970) 325-7060
F: (970) 325-7212
Email: rondinellip@ci.ouray.co.us

2.0 Selected Firms to Assist in Project (Project Team)

Wright Water Engineers, Inc.
1666 N. Main Ave. Suite C
Durango, CO 81301
T: (970) 259-7411
F: (970) 259-8758

Timber Line Electric and Control Corporation
17591 Highway 8
P.O. Box 793
Morrison, CO 80465-0793
T: (303) 697-0440
F: (303) 697-0450

2.a Wright Water Engineers, Inc.

Wright Water Engineers, Inc. (WWE) assisted the City in developing the Water Efficiency Plan and the Water Measurement Plan and regularly works on water resources issues for the City. WWE specializes in water resources engineering, including: water and wastewater treatment, water quality, hydrology, water rights, stormwater management, low impact development, best management practices, utility master planning, rate studies, water supply feasibility studies, and water conservation. WWE has worked with the City for nearly ten years and is familiar with the City's unique water rights, hot springs and water systems challenges. Individuals from WWE that will be involved in the Project include Peter Foster, Ryan Huggins, Trevor Downing, and Sheila Berger.

Peter Foster, Vice-President, is a Professional Engineer registered in the states of Colorado, Arizona, and New Mexico. Ryan Huggins is a Water Resources Consultant with a B.A. Degree in Earth and Environmental Science. Trevor Downing is a Geologist with a B.S. Degree in Geology and a GIS certification. Sheila Berger has a B.A. degree in Geology and a M.Ed. in Education.

Mr. Foster will serve as the Project Manager for completion of the Water Measurement Plan, and the remaining WWE team will work together with the Project team to complete Project Implementation (as described in more detail in Section 4 and Appendix E).

2.b Timber Line Electric and Control Corporation

Timber Line Electric and Control Corporation (Timber Line) will assist with technical expertise in the implementation of the Project. Their involvement will include:

- Purchasing and installing hardware and software upgrades on City's system
- Writing data reporting functions for all existing SCADA meters, per City's needs
- Developing training and support documentation
- Providing training and support to City staff

Timber Line is a privately-held, Colorado corporation that provides instrumentation and field control service primarily to rural water and sanitation districts. Currently, Timber Line's customer base includes over 150 municipalities and special districts in four states as well as clients in the mining, skiing and power distribution industries. Timber Line has worked with the City on its existing measurement devices and SCADA system and is familiar with the current operations.

Kim Evezich, Administrative Manager, will be the Project Manager for Timber Line responsible for managing their scope of work and ensuring that tasks are being completed according to designated timelines, as well as delivering progress reports to WWE and the City.

Lee Smith is Timber Line's technician responsible for installing measurement devices, developing software and system connectivity, and performing software quality testing. Other Timber Line staff may assist the Project as needed.

2.c City of Ouray

Individuals from the City of Ouray that will assist in the Project include: Patrick Rondinelli, Dennis Erickson, and additional staff as needed. Patrick Rondinelli is the City Administrator for Ouray. He will act as the primary contact for the City. Dennis Erickson is the Public Works Director for the City of Ouray. He will work with WWE and Timber Line to identify measurement locations, identify hardware and software needs, define water use data collection requirements, develop a meter monitoring and database program, and guide Project implementation efforts. Additional staff will provide information and on-site assistance to

Timber Line and WWE, as needed, to complete the Water Measurement Plan and implementation.

3.0 Entity Information

3.a Retail Water Delivery

The City does not meter individual taps and instead relies on Equivalent Residential Units (EQRs) to account for water use. Based on typical industry values, average daily household water use is approximately 350 gallons per household per day. Therefore, one EQR represents a single family home with an estimated water demand of 350 gallons per day. See Section 3.a.ii. for further discussion of EQRs.

3.a.i Historical Water Delivery

Based on population data from the Colorado Department of Local Affairs (DOLA), the City's 2010 population was approximately 1,000 people. A summary of the City's population from 1990 through 2010 is provided in Table 1. The average annual population increase over the 21 year period is 2.3 percent. In addition to City residents, the City provides bulk water to four subdivisions outside city limits, which are not included in the population values. The City is a tourist destination and serves many non-residents, which are reflected in the lodging and restaurant EQRs.

A 2011 EQR survey of all taps served by the City found that there were 1,338 EQRs. At a rate of 350 gallons per day per EQR, the total system demands in 2011 were approximately 171 million gallons per year, or 525 acre-feet per year (AF/yr). Based on the estimated 2.3 percent historical population growth rate and the 2011 EQR survey, the calculated water demand for the past five years has increased from 501 AF/yr. to 549 AF/yr. A detailed estimate of historical potable water demands is provided in Table 2.

3.a.ii Water Use by Sector

Based on an EQR survey of taps performed by the City of Ouray in 2005, the City provides treated water to the following customer categories: single family homes, multi-family homes, irrigation, lodging, city offices, churches, restaurants, and retail and office space. Table 3 and

Figure 3 provide an approximate breakdown of EQRs by sector. Single family and multi-family homes represent the highest water demand for the City, at a combined 71 percent of the EQRs. Single family homes are considered one EQR; the remaining categories are assigned an EQR value based on estimated water use.

The City also provides water for a variety of uses that are not included in any EQR category and thus is considered "non-revenue" water. These non-categorized uses include water for dust suppression and cleaning City streets, for filling and cooling the Hot Springs Pool as needed, and for the irrigation of the City parks.

The non-potable water for the micro-hydro plant and the Ouray Ice Park are measured at the storage tank meters and can be separated from the treated water that enters the distribution system.

3.a.iii Water Sources

The City's primary water source, Wehawken Spring, is located in the Canyon Creek drainage (see Figure 2). Wehawken Spring provides water for both non-potable and potable uses. Treated Wehawken Spring water is used as the main drinking source throughout the service area. Geothermal water for the Ouray Hot Springs Pool is derived from numerous water rights for springs and wells located in and around the City (see Figure 1). The City has additional surface and storage water rights that can be used to provide water supply as needed and as physically available. A detailed list and amount of water rights is provided in Table 4.

3.b Background Characterizing Local Water System

3.b.i Per Capita Water Use

Because individual meter data is not available, WWE has estimated single family residential water use as total water demand of all customer sectors divided by the total number of occupied households. Based on demographic information on the number of occupied households in the City of Ouray, for the past six years the average daily single family residential water use was 408 gallons per house per day (see Table 2). This is higher than the estimated 350 gallons per household per day industry standard. The recently-adopted Water Efficiency Plan aims to reduce

these demands, beginning with the development and implementation of a Water Measurement Plan.

3.b.ii Population

As discussed in Section 3.a.i, based on demographic data from DOLA the City's 2010 population was approximately 1,000 people and the average annual population growth rate is 2.3 percent. Using this historical growth rate, the City's population is currently estimated to be 1,096 and is projected to grow to 1,376 over the next ten years (see Table 1).

3.b.iii Estimated Water Savings Goals

The purpose of the Water Efficiency Plan for the City of Ouray is to improve water management and cost efficiency. However, before quantified water savings goals can be estimated, baseline usage data must be collected. The focus of this Project is to enable the City collect and analyze this baseline data. This data may be used to prioritize future water efficiency measures and to track future water savings through efficiency measures.

3.b.iv Estimated Water Savings Over Past Five Years

The City developed and recently adopted its Water Efficiency Plan in September, 2014. Prior to developing this plan, the City implemented the following conservation efforts:

- During the 2012 drought period, the City issued a resolution requesting citizens to curtail using water for irrigation uses
- Periodic increases to water rate
- Development and implementation of a Capital Improvement Plan (Boyle Engineering Corp., 2003)
- Periodic educational bill stuffers

Due to the lack of meter data and SCADA data analysis capabilities, the effects on water demands of these activities cannot be quantified.

3.b.v Adequacy and Reliability of Water System

The CWCB prepared the Statewide Water Supply Initiative (SWSI) in 2004 to identify current and future water needs to the year 2030 and to examine water supply projects that will help to meet future demands. In 2010, the CWCB updated the SWSI to consider future water demands to the year 2050, to identify non-consumptive needs in each major basin, to assess available water supply in Colorado, and to discuss identified projects to further meet future demands.

The 2004 SWSI identifies a water supply gap of 150 acre-feet per year by the year 2030 for the City of Ouray. The report states, "Approximately 25 percent of increased demand may require augmentation based on potential downstream calls" (Colorado Water Conservation Board, 2004). While the 2010 SWSI report does not specifically address the City, the report does identify a 300 acre-foot per year water supply gap for Ouray County by the year 2050 (Colorado Water Conservation Board, 2010).

During very dry years, the City's water supply is susceptible to curtailment by senior water rights. In 2012, Ouray's water supply was called out by downstream senior water users. As a result, the City had to prepare and operate under an Emergency Substitute Water Supply Plan. In addition, the CDWR requested that Ouray prepare a plan of augmentation to protect its water supply in the future. The City is currently in the process of seeking a decree for its Augmentation Plan, Case No. 13CW3072.

As new measurement devices (i.e. meters and flumes) and data collection systems (i.e., SCADA) are available to the City, future water use records will provide more accurate water supply estimates that can help identify potential reliable yield and operations issues for the City.

3.c Use of Grant Monies

The City is seeking a Water Efficiency Grant from the CWCB to fund the Phase One implementation of the Water Measurement Plan, which is one of the highest-priority water efficiency measures detailed in its recently-adopted Water Efficiency Plan (shown in Appendix D). The City's Water Efficiency Plan goals are discussed in Section 1. This Project will contribute to the Water Efficiency Plan goals as discussed below:

1. *Better Water Use Data Collection and Monitoring.* The City has prepared a current inventory of the City's data collection and monitoring needs. The Project will begin implementation of software, hardware and water system management measures based on the inventory that will directly contribute to this goal.
2. *Assess Costs for System Operations.* The Project will fund new system meters and collection of data on the main system infrastructure. These capabilities will help the City track usage, changes, and effects of improvements to the system. The City will use this data in conjunction with water system operational cost data to estimate the incremental cost for treating and delivering water. This information will be important foundation for the proposed update to the Capital Improvement Plan, a measure recommended in the Water Efficiency Plan.
3. *Decrease System Losses.* This Project includes increased system metering, automating water supply data reporting, and facilitation of closer system management, all of which will help to identify leaks and other non-revenue uses. Overall, this information will help the City to track losses and target infrastructure needing improvements.
4. *Public Awareness and Acceptance.* The grant will fund collection of baseline data and data reporting that will show usage and trends over time. This information may be used as a basis for public presentations at City Council meetings and may also be used in educational outreach efforts, as appropriate. The presentations and outreach are part of the City's Water Efficiency Plan and are not directly funded by this grant.

3.d Calculating Water Savings During Project Implementation

Implementing the Project to establish a baseline of water use is necessary before water savings can be quantified. The work completed in this Project will enable the City to monitor the water savings as a result of further conservation measures in the future.

4.0 Scope of Work

The City, WWE, and Timber Line have developed a Water Measurement Plan through review of existing data, meetings, and site visits. Based on the Water Measurement Plan, the team has identified the highest priority measures and costs for implementation which include installing

primary measurement devices, connection of existing measurement locations to the City's SCADA system, and improving the SCADA system's ability to support the City in managing its water resources and meeting its water quality reporting obligations.

The Project will be completed within a year of a Water Efficiency Grant award. The detailed Scope of Work for the Project is provided in Appendix E. The Project timeline is provided in Appendix F.

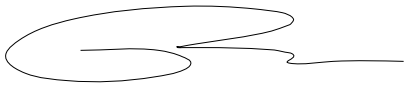
5.0 Budget and Commitment of Resources

The total Project cost is $66,750. The City of Ouray is requesting a grant amount of $50,000 (75 percent of the total Project cost). The City will contribute $2,750 in cash and $14,000 in the form of in-kind services – a total of 25 percent of the total Project cost. The detailed Project budget is provided in Appendix G. A detailed list of equipment and material specifications is included in Appendix H.

As previously noted, on September 15, 2014, the City Council of the City of Ouray approved a resolution that confirmed the benefits of long term water conservation and committed the City to implementation of the City's Water Efficiency Plan. A copy of the resolution is provided in Appendix C.

6.0 Signing Authority

Patrick Rondinelli, City Administrator, has signing authority on behalf of the City of Ouray to commit the organization's resources to fulfill the tasks presented in this grant request.



April 8, 2015

Signature **Date**

City Administrator

Title

Tables

Table 1
City of Ouray Population Estimates
City of Ouray Water Efficiency Grant

Historical Population

Year	(1) Population	(2) Annual Percent Increase or Decrease
1990	644	--
1991	659	2.3%
1992	684	3.8%
1993	694	1.5%
1994	742	6.9%
1995	779	5.0%
1996	806	3.5%
1997	780	-3.2%
1998	782	0.3%
1999	799	2.2%
2000	820	2.6%
2001	832	1.5%
2002	849	2.0%
2003	860	1.3%
2004	883	2.7%
2005	890	0.8%
2006	898	0.9%
2007	939	4.6%
2008	972	3.5%
2009	978	0.6%
2010	1,001	2.4%
Average		**2.3%**

Projected Population

Year	(3) Estimated Population
2014	1,096
2015	1,121
2016	1,147
2017	1,173
2018	1,200
2019	1,228
2020	1,256
2021	1,285
2022	1,315
2023	1,345
2024	1,376

Notes:

1) Based on data from the Colorado Department of Local Affairs.
DOLA website www.dola.colorado.gov: accessed on August 21, 2014.

2) (Current year's population / previous year's population) - 1, as a percentage.

3) Current year population and future growth based on City of Ouray historical average annual growth rate of 2.3%

Table 2
City of Ouray Historical Water Use and Per Capita Demand
City of Ouray Water Efficiency Plan

Historical Retail Water Delivery

Year	(1) EQRs	(2) Gallons per Year (in millions)	(3) Acre-Feet
2009	1,279	163	501
2010	1,308	167	513
2011	1,338	171	525
2012	1,369	175	537
2013	1,400	179	549

Average Daily Per Capita Water Demand

Year	(4) Total Water Demand (AF)	(5) Single Family Household Water Demand (AF)	(6) Number of Occupied Households	(7) Single Family Residential Water Demand (AF per house)	(8) (GPD per house)
2009	501	200	443	0.45	404
2010	513	205	458	0.45	400
2011	525	210	462	0.45	406
2012	537	215	465	0.46	412
2013	549	220	469	0.47	418
Average	**525**	**210**	**459**	**0.46**	**408**

Column Notes:

1) Based on 2011 survey of EQRs and 20-year average historical population growth of 2.3% as estimated by the US Census Bureau and Colorado State Demographer (Table 1).

2) Based on an assumed single-family residential (= 1 EQR) demand of 350 gallons per day

3) [Column (2) x 1,000,000] / 325,851 gallons per acre-foot

4) See Historical Retail Water Delivery Table, Column (3) above

5) Column (4) x 40%. See Table 2: single family water demands are 40% of total water demands.

6) Based on data from the Department of Local Affairs. Values for 2011 through 2013 based on average annual growth rate of 2.3% (See Note (1)).

7) Column (5) / Column (6).

8) [Column (7) x 325,851 gallons per acre-foot] / 365 days per year.

Table 3
Total EQRs by Customer Category
City of Ouray Water Efficiency Grant

Category	Percentage of Total Water Demand Based on 2005 Survey
Single Family Homes	40%
Multi-Family Homes	31%
Irrigation	14%
Lodging	5%
City Offices	4%
Churches	3%
Restaurants	2%
Retail and Office Space	2%

Notes:

Based on 2005 EQR Survey.

Table 4
Water Rights Inventory
City of Ouray Water Efficiency Grant

Water Right Name	Adjudication Date	Appropriation Date	Administration Number*	Case Number	Use	Decreed Diversion Rate (CFS)	Decreed Storage Volume (AF)	Comments
Oak Creek Supply Line	12/6/1904	10/1/1881	11597.00000	CA1254	Fire, Domestic, Storage	5.2	--	
Oak Creek Reservoir	12/6/1904	10/1/1881	11597.00000	CA1254	Fire, Domestic, Storage	--	0.79	
Oak Creek Alt Point Wehawken Spring and Creek	12/6/1904	10/1/1881	11597.00000	W-1208	Fire, Domestic, Storage	--	--	Alternate Point of Diversion for 5.2 cfs; limited to the flow available at the Oak Creek point of diversion
Wehawken Creek	12/6/1904	4/15/1895	14427.00000	CA1254	Fire, Domestic, Storage	3.816	--	
New Reservoir	12/6/1904	7/1/1889	14427.00000	CA1254	Fire, Domestic, Storage	--	2.25	
Wehawken Spring	12/6/1904	7/1/1889	16541.00000	CA1254	Fire, Domestic, Storage	3.816	--	
Red Mountain Ditch	3/21/1966	8/22/1945	34932.00000	CA1751-B	Irrigation	6.0		
Total	**--**	**--**	**--**	**--**	**--**	**12.832**	**3.04**	**--**

Notes:
*The administration numbers are estimated based on the appropriation dates of the water rights and the State Engineer's Order No. 2014-1. These will be confirmed by the Division Engineer.
All water rights are Absolute.

Hot Springs Pool Geothermal Water Supply

Structure Name	Adjudication Date	Appropriation Date	Administration Number	Case Number	Use	Decreed Diversion Rate (CFS)	Type
Radium Ditch and Pipeline No. 222	6/19/1926	7/14/1877	27184.10057	CA1791, 82CW320	Geothermal	8.2	Absolute
Radium Spring Wastewater Pipeline	12/31/1981	5/1/1981	47968.00000	81CW133, 96CW148	Municipal, Commercial, Industrial, Domestic	0.15	Absolute
Minion Spring No.1	12/31/1987	12/6/1987	50378.00000	87CW311, 09CW93	Commercial, Domestic, Geothermal	0.02	Conditional
Minion Spring No.2	12/31/1987	12/6/1987	50378.00000	87CW311, 09CW93	Commercial, Domestic, Geothermal	0.04	Conditional
Minion Spring No.3	12/31/2008	11/12/2008	58025.00000	08CW159	Commercial, Recreation, Fishery, Geothermal	0.03	Conditional
Minion Spring No.4	12/31/2008	11/12/2008	58025.00000	08CW160	Commercial, Recreation, Fishery, Geothermal	0.05	Conditional
Minion Spring No.5	12/31/1987	12/24/1987	50396.00000	87CW311, 09CW93	Municipal, Domestic, Geothermal	0.04	Conditional
Minion Spring No.6	12/31/1987	12/24/1987	50396.00000	87CW311, 09CW93	Commercial, Domestic, Geothermal	0.02	Conditional
Minion Spring No.7	12/31/1987	11/12/1987	50354.00000	87CW311, 09CW93	Commercial, Domestic, Geothermal	0.05	Conditional
Minion Spring No.8	12/31/1987	12/24/1987	50396.00000	87CW311, 09CW93	Commercial, Domestic, Geothermal	0.03	Conditional
Peg Spring No.1	12/31/2008	11/12/2008	58025.00000	08CW161	Commercial, Recreation, Fishery, Geothermal	0.01	Conditional
Vinegar Hill Spring	12/31/1988	5/1/1987	50403.50159	88CW176	Recreation, Fishery, Geothermal	2.00	Conditional
OX-2	12/31/1988	2/9/1987	50403.50088	88CW134, 13CW32	Recreation, Fishery, Geothermal	1.11	Absolute
OX-6	12/31/1988	2/9/1987	50403.50088	88CW134, 13CW32	Recreation, Fishery, Geothermal	0.22	Conditional
Total						**11.97**	

Notes:
All Minion Springs, Radium Spring and Wastewater Pipeline, Peg Spring, and Vinegar Hill Spring and other hot springs structures not specified in this table are considered part of the Radium Ditch and Pipeline No. 222 Water Right which has a total Absolute right of 9.95 cfs for industrial, fishery, domestic, storage and geothermal uses (8.2 cfs specifically for geothermal use).

The City of Ouray owns 100% of these water rights.

Figures

Legend

Water Measurement Locations

- Red Mountain Ditch POD (GPS Location)
- Mineral Farms Pump Station (GPS Location)
- Water Tanks (GPS Location)
- Wehawken Spring Collection Box (GPS Location)
- Wastewater Treatment Plant (influent, GPS Location)
- Wastewater Treatment Plant (effluent, GIS Location)
- Bachelor Switch (Panoramic Heights & Whispering Pines, GIS Location)
- Wehawken Creek (Decreed Location)
- Oak Creek Supply Line POD (GIS and Survey Location)
- Oak Creek (West) Reservoir (GIS and Survey Location)
- Rivers (NHD)
- Red Mountain Ditch
- Weehawken Pipeline
- Approximate City Boundary

N
W E
S

1 inch = 4,000 Feet

0 4,000 Feet

Uncompahgre River

Canyon Creek

Red Mountain Creek

Document Path: P:\051-036\100 - Ouray Conservation Grant\Mapping\MXD\Figure 2 - Ouray Water Measurement.mxd

Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

OURAY COUNTY, CO

WATER MEASUREMENT LOCATIONS - AREA VIEW

PRIVILEGED AND CONFIDENTIAL INFORMATION

CITY OF OURAY

PROJECT NO. 051-036.100

FIGURE 1

Legend

Water Measurement Locations

- RADIUM WWP (Decreed Location)
- OX-2 (GPS Location)
- OX-6 (GPS Location)
- Peg Spring #1 (GPS Location)
- Vinegar Hill Spring (Decreed Location)
- Minion Spring No 1 (Decreed Location)
- Minion Spring No 2 (Decreed Location)
- Minion Spring No 3 (GPS Location)
- Minion Spring No 4 (GPS Location)
- Minion Spring No 5 (Decreed Location)
- Minion Spring No 6 (Decreed Location)
- Minion Spring No 7 (Decreed Location)
- Minion Spring No 8 (Decreed Location)
- Radium Ditch and Pipeline No. 222 (Headgate per Claim Map)
- Radium Ditch and Pipeline No. 222 (per Claim Map)
- Fish Pond (GIS Location)
- Water Valves and PRVs (per water system map)
- Oak Creek (West) Reservoir (GIS and Survey Location)
- Oak Creek Supply Line POD (GIS and Survey location)
- Micro Hydro Power Plant (GPS Location)
- Water Tanks (GPS Location)
- Ouray Water Distribution System
- Weehawken Pipeline

Locations Not Shown on Map:
- Pool Inflow
- Hydrant Used for Pool Filling
- Pool Outflow
- Manganese Spring
- Wiesbaden
- Wiesbaden Hillside

N
W E
S

1 inch = 400 Feet

0 400 Feet

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Document Path: P:\051-036\100 - Ouray Conservation Grant\Mapping\MXD\Figure 1 - Ouray Water Measurement.mxd

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OURAY COUNTY, CO

WATER MEASUREMENT LOCATIONS - CITY VIEW

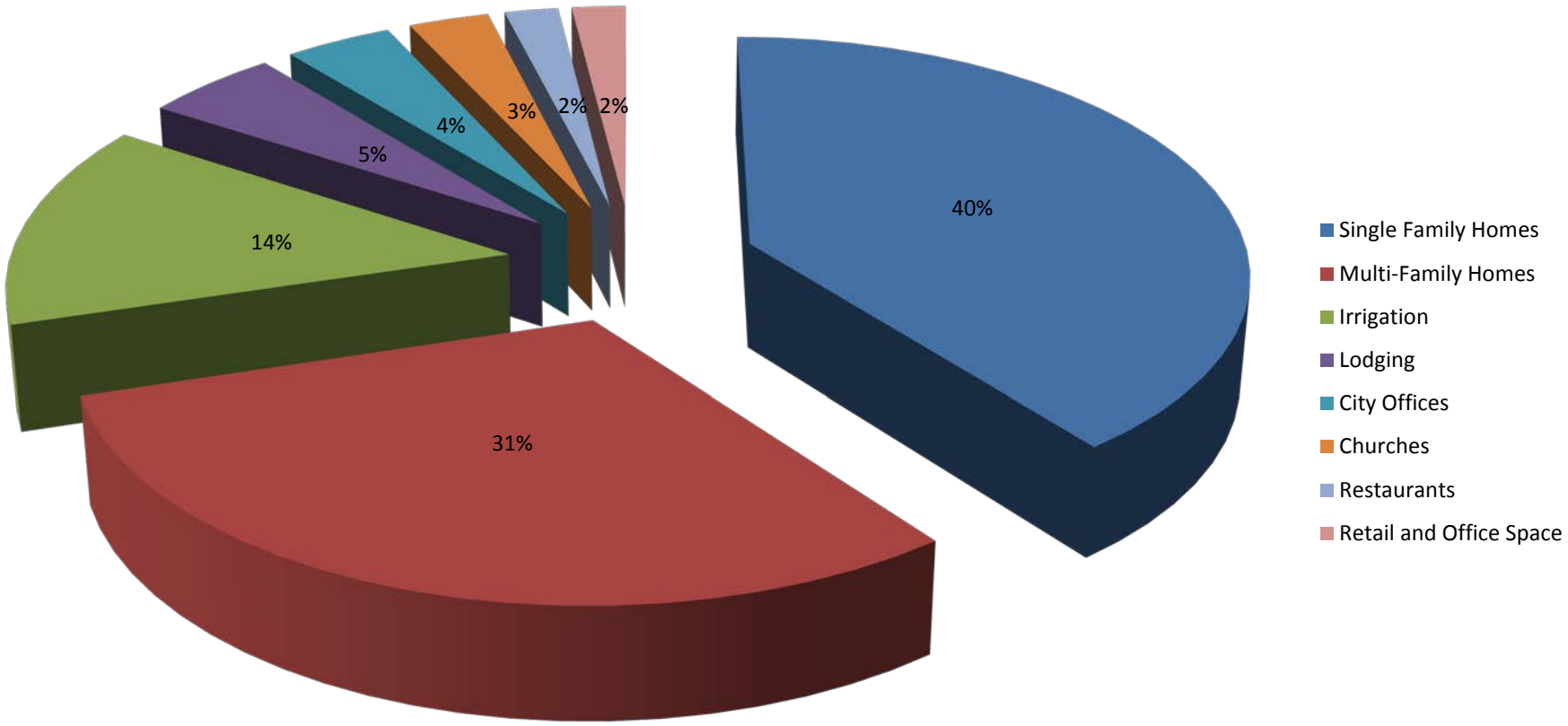
PRIVILEGED AND CONFIDENTIAL INFORMATION

CITY OF OURAY

PROJECT NO. 051-036.100

FIGURE 2

Figure 3
Total EQRs by Customer Category
City of Ouray Water Efficiency Grant Application
September 2014



Appendices

Appendix A

CWCB

Approval Letter

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

1313 Sherman Street, Room 721
Denver, CO 80203

September 29, 2014

Patrick Rondinelli
City of Ouray
P.O. Box 468
Ouray, CO 81427

Dear Mr. Rondinelli:

On September 17, 2014, the Colorado Water Conservation Board (CWCB) received a locally adopted Water Efficiency Plan from the City of Ouray for review and approval. The CWCB has determined the Plan to be in accordance with §37-60-126 and the CWCB's Guidelines for the Office to Review Water Conservation Plans Submitted by Covered Entities. The Plan is hereby ***approved*** and Ouray may proceed with its implementation.

The Plan will be kept on file at the CWCB and shall be accessible to the public through our website and the Water Resource Information Center. The Plan will also be made available to the Colorado Water Resources & Power Development Authority and the Finance section within the CWCB should you apply for a loan from either agency.

As Ouray begins implementing the efficiency measures outlined in the Plan, please know that the CWCB staff will be available to provide technical and financial assistance.

Thank you again for all your efforts in developing a Water Conservation Plan. Should you have any questions or need additional assistance, please feel free to contact Kevin Reidy at 303-866-3441 ext 3252.

Sincerely,

Rebecca Mitchell

Rebecca Mitchell
Section Chief, CWCB Water Supply Planning

cc: Ann Morgenthaler, City of Ouray
Peter Foster, Wright Water Engineers
Ryan Huggins, Wright Water Engineers
Mike Brod, Colorado Water Resources & Power Development Authority
Kirk Russell, Colorado Water Conservation Board

Appendix B

City of Ouray

Water Measurement Plan

APPENDIX B - Table 1
Water Measurement Summary
City of Ouray

	Structure	Measurement Need	Current Measurement Ability	Proposed New or Upgraded Equipment for Measurement	Priority for Measuring
Hot Springs	OX2 (geothermal well)	Water Level (depth), Flow and pumped Volume, temperature, conductivity, pH	Twice per week recording by staff of flow, water level, temperature, conductivity, and pH (see Wiesbaden Agreement). Measurements are automated and in SCADA system	May need to determine if there is a ballpark spring entering OX2 line	Medium
	OX6 (geothermal well)	well head pressure, flow and pumped volume if used in the future, Temperature, Conductivity, pH	Twice per week measurements taken by staff of wellhead pressure, water level, temperature, conductivity, and pH (see Wiesbaden Agreement)	Automation of water quality measurements	Low
	Box Canyon Line near pool	Natural Flow available to pool Temperature, Conductivity, pH, alkalinity, calcium hardness	Measured by observation once per month for flow, temperature, conductivity and pH note existing weir is not good location for installing automated measuring devices	Survey of the Box Canyon Line as-built location and hydraulic analysis of pipeline needed in order to design appropriate metering automation of water quality measurements to be evaluated	Medium
	Box Canyon Line near Manganese Spring	Natural Flow available to pool Temperature, Conductivity, pH	Measured by observation once per month for flow, temperature, conductivity and pH note existing weir is not good location for installing automated measuring devices	Potential measurement at Manganese Spring input to pipeline to be evaluated after survey and metering near pool completed; automation of water quality measurements to be evaluated	Low
	Box Canyon Line at source	Natural Flow available to pool Temperature, Conductivity, pH	Measured by observation once per month for flow, temperature, conductivity and pH note existing weir is not good location for installing automated measuring devices	Potential flume at source of Box Canyon Line to be evaluated after survey and metering near pool completed; Automation of water quality measurements to be evaluated	Low
	Pool Pumped Volume of Hot Water Supply	Flow, temperature, pH, residual Chlorine	gpm - instantaneous read-out from in-line meter; temperature, pH, residual Chlorine measured by staff three times per day	Primary water quality measurement devices Determine if existing meter can be connected to SCADA	Medium
	Water Quality in 3 pool sections	temperature, pH, residual Chlorine	Temperature, pH, residual Chlorine measured by staff three times per day	Primary water quality measurement devices	Low
	Pool use from City Water Supply	Flow into pool from hydrant	Can observe hydrant use instantaneously on SCADA	Totalizing flow meter to be connected to hydrant when filling the pool.	Low
	Fish Pond	Flow, temperature, conductivity, pH	Once per month, field measurements taken by staff of flow, temperature, conductivity, and pH	Automation of water quality measurements	Low
	Radium Ditch and Pipeline No. 222 (Pool Outflow to River)	Flow into river from pool outfall and excess flows from Box Canyon Line and OX2	18" Parshall flume - measure by observation; new ultrasonic recorder and datalogger may be required Water Quality taken by pool staff when backwashing, taken by Public Works for DMS permit reporting monthly	Add flow transmitter to pool effluent location and connect to SCADA system Future work may include feasibility of installing water quality measurement device and logger	High
	City Hot Springs Monitoring Program: Fish Pond, 8 Minion Springs, OX wells in Box Canyon	Flow, temperature, conductivity, pH	Once per month, field measurements taken by staff of flow, temperature, conductivity, and pH	Primary flow or water quality measurement devices	Low
	Wiesbaden Monitoring Locations: (Wiesbaden outfall (radium wastewater pipeline), Wiesbaden Hillside (Fellin), Wiesbaden Rear Cave, Wiesbaden Reservoir Spring, OX2, OX6	Flow, temperature, conductivity, pH	Field measurements taken by staff of flow, temperature, conductivity, and pH. Wiesbaden outfall, caves, and reservoir monitored weekly, Fellin Spring monitored every two weeks, OX2 and OX6 twice per week	Water quality metering at some or all locations to be evaluated; Chart recorder at Wiesbaden outfall; to assist in compliance with Wiesbaden Settlement Agreement	Low
Water Distribution and Treatment System	Storage Tank Influent from Source	Flow Water Quality (grab samples sent to lab)	FIT-100 Meter on inflow line Turbidity meter on inflow line Chlorine measured when leaving the tank - automatically adjust based on outflows (every other month raw water quality sample (per Reg 85) for nutrients- send to Grand Junction Labs)	None	NA
	Storage Tank overflow back to stream	Flow	Metered - shows real time data but not totalized data	None	NA
	Storage Tank Effluent into Water Distribution System	Flow	FIT-101 Meter	None	NA
	Flow into Microhydro/Ice Park Line	Flow	FIT-102 Meter	None	NA
	Storage Tank Heights	Water levels in tanks	Metered Measures instantaneous height in tanks	None	NA
	Bachelor Switch (i.e. Panoramic Heights and Whispering Pines subdivisions)	Flow	None	Meter on line	Medium
	Mineral Farms Subdivision	Flow	Subdivision has meter on its pumps, no records kept by the City	Meter on line	Medium
	WWTP Influent	Flow Water Quality (grab samples sent to lab)	WWTP Influent: 6" Parshall Flume Chart recorder (not used), totalizing flow meter read-out used to calculate monthly flows, field measurements at flume as needed	Upgrades to data logger to be compatible with SCADA and connection to SCADA via telemetry	High
	WWTP Effluent	Flow Water Quality (grab samples sent to lab)	WWTP Influent: 3" Parshall Flume Chart recorder (not used), totalizing flow meter read-out used to calculate monthly flows, field measurements at flume as needed Staff does monthly grab samples for WQ (oil/grease, TDS, E.coli, BOD, TSS) - send out to Lab (neotrip). Currently monitor at effluent box April - October and outflow pipeline November through March.	Upgrades to data logger to be compatible with SCADA and connection to SCADA via telemetry	High
	Meters at PRVs in Water Distribution System	Flow Automation so can adjust pressure in different zones from SCADA controls and remotely	None	Meter at PRVs - remote automation	Low
	Distribution System at Junction between East and West Side (at 3rd Street Bridge)	Flow	None	Meter on line	Low
Decreed Water Supply Sources	Red Mountain Ditch	Flow in the Ditch as measured at the watershed divide Bypassed Flow remaining in Red Mountain Creek	2-ft Parshall Flume Concrete weir at headgate (improvements may be needed to calibrate for bypass flows)	Digital data logger (TruBlue Pressure Transducer in existing stilling well) to keep continuous records of RMD Diversions. Digital data logger and rate the diversion dam so that bypassed flows can be measured and data recorder.	High
	Wehawken Spring Collection Box	Total flow to system and bypassed to stream	None	Primary measuring device and data logger for water going into pipeline to distribution system and for water bypassed to creek (method TBD)	Medium
	Wehawken Creek	Measure flows at decreed point of diversion	None	Method to be determined	Low
	Oak Creek	Measure flows at decreed point of diversion	None	Method to be determined	Low

APPENDIX B - Table 2
Supervisory Control and Data Acquisition (SCADA) Water Data Reporting Summary
City of Ouray

Structure		SCADA need	Alarm Parameters	Reporting Interval	Current SCADA Abilities
System-wide Operations and SCADA	Existing SCADA hardware and software	Ability to record and display data from multiple measurement locations			Displays instantaneous flows Data is logged on central system, not at individual meters
	Telemetry System Analysis	Utilize the existing licensed UHF or a new UHF to send more data via telemetry			Ouray has a licensed UHF (4 - 20 milliamps) for transmitting data
	Remote Access for additional users	Ability for different staff to access SCADA display remotely			None; 1 central computer in Parks building
	Notifications and Alarms	Alarms sent out based on trigger levels at various locations			Existing alarms: storage tanks height, storage tank inflow, city line inflow, hydro/ice park inflow
	SCADA data reporting	Create programs in historian/excel that automatically generate reports and reduce staff time requirements			No reporting capabilities
	System Monitoring Protocol	Comprehensive protocol of meter maintenance, monitoring, data reporting, system backup once SCADA upgrades are made			Currently reporting for state requirements done by city staff members and water quality protocol per agreement requirements. Meter maintenance as needed/as funding available
Hot Springs	OX2 (geothermal well)	Already connected: reporting functions needed	TBD by pool staff/Public Works	Daily for all parameters	Connected to main SCADA system Automated weekly shut off and turning on, monitors flow rate, temperature, pH, conductivity and wellhead pressure
	OX6 (geothermal well)	Connection to main SCADA system	None	Daily for all parameters if well is added	None
	Box Canyon Line near pool	Connection to main SCADA system	None	Daily for all parameters when device is added	None
	Box Canyon Line near Manganese Spring	Connection to main SCADA system	None	Daily for all parameters if device is added	None
	Box Canyon Line at source	Connection to main SCADA system	None	Daily for all parameters if device is added	None
	Pool Pumped Volume of Hot Water Supply	Connection to main SCADA system	TBD by pool staff	Hourly for all parameters (have to store data for audit requirements), instantaneous read on SCADA screen	None
	Water Quality in 3 pool sections	Connection to main SCADA system	TBD by pool staff	Hourly for all parameters (have to store data for audit requirements), instantaneous read on SCADA screen	None
	Pool use from City Water Supply	Use of a totalizing flow meter at the hydrant when adding water to the pool; no SCADA connection needed	None	None	None
	Fish Pond	Connection to main SCADA system	Flow Rate threshold that would indicate flooding	Daily	None
	Radium Ditch and Pipeline No. 222 (Pool Outflow to River)	Connection to main SCADA system	None	Hourly	None
	City Hot Springs Monitoring Program: Fish Pond, 8 Minion Springs, OX wells in Box Canyon	Connection to main SCADA system	None	Daily for all parameters	None
	Wiesbaden Monitoring Locations: (Wiesbaden outfall (radium wastewater pipeline), Wiesbaden Hillside (Fellin), Wiesbaden Rear Cave, Wiesbaden Reservoir Spring, OX2, OX6	Connection to main SCADA system	None	Daily for all parameters	None
Water Distribution and Treatment System	Storage Tank Influent from Source	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	Connected to main SCADA system via telemetry Totalizing function on SCADA screen Modify frequency of data transmission to SCADA
	Storage Tank overflow back to stream	Connection to main SCADA system			
	Storage Tank Effluent into Water Distribution System	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	Connected to main SCADA system via telemetry Totalizing function on SCADA screen Modify frequency of data transmission to SCADA
	Flow into Microhydro/Ice Park Line	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	Connected to main SCADA system via telemetry Totalizing function on SCADA screen Modify frequency of data transmission to SCADA
	Storage Tank Heights	Connection to main SCADA system	Changes in height of storage	Daily for all parameters	Connected to main SCADA system via telemetry Totalizing function on SCADA screen Modify frequency of data transmission to SCADA
	Bachelor Switch (i.e. Panoramic Heights and Whispering Pines subdivisions)	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	None
	Mineral Farms Subdivision	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	None
	WWTP Influent	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	None
	WWTP Effluent	Connection to main SCADA system	TBD by Public Works staff	Daily for all parameters	Circular chart recorders. Effluent recorder calibrated in May 2014
	Meters at PRVs in Water Distribution System	Connection to main SCADA system Automation so can adjust pressure in different zones from SCADA controls and remotely	TBD by Public Works staff	None	None
	Distribution System at Junction between East and West Side (at 3rd Street Bridge)	Connection to main SCADA system	TBD by Public Works staff	None	None
Decreed Water Supply Sources	Red Mountain Ditch	No SCADA connection recommended at this time; Potentially evaluate telemetry connection in the future	None	None	None
	Wehawken Spring Collection Box	None	TBD by Public Works staff	Daily	None
	Wehawken Creek	None	None	None	None
	Oak Creek	None	None	None	None

APPENDIX B - Table 2
Supervisory Control and Data Acquisition (SCADA) Water Data Reporting Summary
City of Ouray

Structure		Proposed SCADA equipment or upgrade	Priority for SCADA (low, medium, high)
System-wide Operations and SCADA	Existing SCADA hardware and software	Upgrade to system (including FUI and capacity to add additional devices), software purchase (including Excel), writing programs to generate reports	High
	Telemetry System Analysis	Evaluate proposed measurement locations ability to transmit on existing UHF	Medium
	Remote Access for additional users	Add 1 Web space license that can be used by multiple staff (not concurrently). Requires coordination and approval from City's IT department	Medium
	Notifications and Alarms	Potential alarms to add: Pump in pool vault, WWTP influent, WWTP effluent, pool outfall, bachelor switch, Wehawken creek, filter building, pool water quality, mineral farms, and PRVs. (work may include float switches and for running wires and conduit and connected it to telemetry)	Medium
	SCADA data reporting	Set up to generate daily reports on flow, turbidity, pH, temperature and conductivity at as many locations as feasible given existing primary devices	High
	System Monitoring Protocol	Lay out protocol for all current and new monitoring locations and identify staff responsibilities to ensure monitoring upgrades are compatible with staff resources	Medium
Hot Springs	OX2 (geothermal well)	Reporting for Water Quality functions	High
	OX6 (geothermal well)	Connection to SCADA system of meter if/when well pumped in the future; connection of water quality metering if added	Low
	Box Canyon Line near pool	Connection to SCADA system of new primary flow and water quality measuring devices	Medium
	Box Canyon Line near Manganese Spring	Connection to SCADA system of meter and water quality measurements	Low
	Box Canyon Line at source	Connection to SCADA system of flume and water quality measurements	Low
	Pool Pumped Volume of Hot Water Supply	Connection to SCADA system of meter and water quality measurements	Medium
	Water Quality in 3 pool sections	Connection to SCADA system of water quality measurements	Low
	Pool use from City Water Supply	None	Low
	Fish Pond	Connection of water quality metering if added	Low
	Radium Ditch and Pipeline No. 222 (Pool Outflow to River)	Connection to SCADA system - can be hardwired to Parks building	High
	City Hot Springs Monitoring Program: Fish Pond, 8 Minion Springs, OX wells in Box Canyon	Potential future connection to SCADA	Low
	Wiesbaden Monitoring Locations: (Wiesbaden outfall (radium wastewater pipeline), Wiesbaden Hillside (Fellin), Wiesbaden Rear Cave, Wiesbaden Reservoir Spring, OX2, OX6	Potential future connection to SCADA	Low
Water Distribution and Treatment System	Storage Tank Influent from Source	Ability to access remotely to manage system Ability to collect historical data and generate reports	High - included in the SCADA recommendation
	Storage Tank overflow back to stream	Ability to access remotely to manage system Ability to collect historical data and generate reports	High - included in the SCADA recommendation
	Storage Tank Effluent into Water Distribution System	Ability to access remotely to manage system Ability to collect historical data and generate reports	High - included in the SCADA recommendation
	Flow into Microhydro/Ice Park Line	Ability to access remotely to manage system Ability to collect historical data and generate reports	High - included in the SCADA recommendation
	Storage Tank Heights	Ability to access remotely to manage system Ability to collect historical data and generate reports	High - included in the SCADA recommendation
	Bachelor Switch (i.e. Panoramic Heights and Whispering Pines subdivisions)	Connection to SCADA system May be hardwired to the proposed telemetry station at WWTP	Medium
	Mineral Farms Subdivision	Connection to SCADA system	Low
	WWTP Influent	Connection to SCADA system via new powered telemetry station	High
	WWTP Effluent	Connection to SCADA system via new powered telemetry station	High
	Meters at PRVs in Water Distribution System	Connection to SCADA system	Low
	Distribution System at Junction between East and West Side (at 3rd Street Bridge)	Connection to SCADA system	Low
Decreed Water Supply Sources	Red Mountain Ditch	None	Low
	Wehawken Spring Collection Box	Connection to SCADA system using solar powered telemetry	Medium
	Wehawken Creek	Digital data recorder. SCADA connection not necessary at this time.	Low
	Oak Creek	Digital data recorder. SCADA connection not necessary at this time.	Low

Appendix C

City of Ouray

City Council Resolution

RESOLUTION NO. 10 (Series 2014)

A RESOLUTION BY THE CITY COUNCIL OF THE CITY OF OURAY ADOPTING A WATER EFFICIENCY PLAN

WHEREAS, on May 19, 2014, the Ouray City Council was presented with a draft water efficiency plan created by City staff and Wright Water Engineers, Inc.; and

WHEREAS, the City is committed to water resources sustainability and water conservation; and

WHEREAS, the City of Ouray understands the needs and benefits of long term water conservation measures and is committed to implementation of the Water Efficiency Plan; and

WHEREAS, a Water Efficiency Plan is a valuable tool to implement sustainability through responsible water management and conservation measures; and

WHEREAS, the City Council of the City of Ouray desires to approve a Water Efficiency Plan and submit said Plan to the Colorado Water Conservation Board for approval; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF OURAY, COLORADO, THAT THE WATER EFFICIENCY PLAN AS PRESENTED FOR USE BY THE CITY BE ADOPTED AND UTILIZED AS THE PRIMARY RESOURCE FOR WATER EFFICIENCY IN THE CITY OF OURAY.

ADOPTED this 15th day of September, 2014, by the Ouray City Council.

CITY OF OURAY, COLORADO

By Pamela J. Larson
Pamela J. Larson, Mayor

ATTEST:

Kathy Elmont
Kathy Elmont, City Clerk

Appendix D

City of Ouray's

Water Efficiency Plan Appendix F – Proposed Implementation and Monitoring Plan

Appendix C

Appendix F
City of Ouray Water Efficiency Plan
Proposed Implementation and Monitoring Plan

Selected Water Efficiency Activities	Period of Implementation	Implementation Actions	Milestone Deadlines	Total Budget	Entity/Staff Responsible for Implementation	Entity/Staff Responsible for Data Collection	Schedule of Data Collection	Coordination and Public Involvement	Additional Comments
Water Rate Adjustments	10 years	Annual Budget Item	Annual City Budget Approval	2 percent increase on existing rates and $3,500 of staff effort	City Administrator			Public comment during Council adoption of budget	City policy is to propose a 2% rate increase every year. This percent increase may be adjusted annually based on that years budget considerations.
Control of Apparent Losses (Develop Water Measurement Plan)	1 year	Develop water measurement plan; Identify meters to be purchased and have budget approval	1 year	$45,000	City Administrator Public Works Director Consultant/Supplier	Public Works Director Assistance as needed from consultants	Review Measurement Plan as it is being implemented.	Public Comment during budget process	Resources will be put into developing a comprehensive measurement plan that captures all of the locations that require measurement and integrating them into the City's SCADA system to facilitate regular reporting and review of water use. Controlling losses will reduce system operational costs by reducing the amount of water treated and delivered into the system. The amount of losses and costs of operations may be compared to estimate savings once baseline loss data is available.
		Create meter monitoring and database program	1 year		Public Works Director	Public Works Ditector	Biannually	public input during presentations and budget process	
Control of Apparent Losses (Implementation of Water Measurement Plan)	10 years	Installation of measurement devices per Measurement Plan and evolving water management needs	Annually	$150,000	City Administrator Public Works Director Consultant				City will have on ongoing process to seek funding and staff availability to implement measurement device improvements and installations based on the Measurement Plan. The measuring devices will help improve system management and overall water resources management.
System Wide Water Audits	8 years (beginning once meters are in place)	bi-annual data entry and review	bi-annual once meters in place	$31,500	Public Works Director	Public Works Director	January and June		Monitoring will begin once meters are installed. At installation, the City's database for meter records will be revised to incorporate new data and analyze results to help to identify un-metered water and losses which will reduce operational costs without reducing revenues.
		annual reporting of data and analysis as a City Council presentation	annual once meters are in place		Public Works Director	Public Works Director	Meeting before budget process	public input during presentations and budget process	
Leak Detection Study	2 years	Obtain funding and contract approval from City	1 year	$18,500	City Administrator Public Works Director				Results of study will be used to identify losses in the meter data and to direct replacement and repair program. The results of the study can be used to estimate losses to the system and the reduction in the amount of water needed in the system.
		Conduct leak detection study	2 years		Public Works Director Contractor	Public Works Director	Once during leak detection study		
Water Line Replacement Program	10 years	annual budget item and contract approval	Annual City Budget Approval	$2,416,000	City Administrator Public Works Director			Public Comment during budget process	Line replacement will coincide with system metering and savings from reduced losses may be identified in the meter data.
		City staff and contractor complete line replacements	Annually		Public Works Director Contractor				
Capital Improvement Plans	2 years (CIP affects funding plan for all other measures)	Obtain funding and contract approval from City	1 year	$18,750	City Administrator Public Works Director			Public Comment during budget process	CIP update may identify thresholds water volume that would require new infrastructure (such as storage or treatment facilities). The costs from the CIP can be used to estimate savings from reducing system losses and overall demands through conservation.
		City staff and consultant complete CIP updates	2 years		Public Works Director Consultant				
		City staff integrate into annual budget process each year	Annually after 2 years		City Administrator Public Works Director			Public Comment during budget process	
Bill Stuffers	10 years	city staff prepare flyers and include in billing notices	Annually	$6,500	Community Development Coordinator			Public will receive flyers	Flyers to include City staff contact information
Newspaper Articles	10 years	city staff work with local newspaper quarterly	Quarterly	$5,600	Community Development Coordinator			Public audience through local newspaper	Articles to include City staff contact information
Web Pages and Social Media	10 years	city staff incorporate water conservation issues into existing social media and web page presence	Quarterly	$9,800	Community Development Coordinator			Social media provides opportunity for 2-way communications	
City Demonstration Activities and Public Presentations	10 years	City install water conservation features (landscape, fixtures, etc.)	when retrofits or new work is being undertaken	$7,100	Public Works Director Community Development Coordinator			The City's conservation measures will be publicly visible	
		Public presentations at City Council meetings	Bi-annually		Public Works Director Community Development Coordinator			Public audience at Council Meetings	This measure will help to provide information to decision makers on conservation issues and the City's Water Conservation Plan implementation
Customer Water Use Workshops and Landscape Design and Maintenance Workshops	10 years	City sponsored workshop for residents	Every three years	$3,667	Public Works Director Community Development Coordinator			Public participation and feedback	

Total Cost for Implementation of All Proposed Measures: $2,715,917

Notes:
All measures selected for implementation are included (see Appendix E)
Deadlines are based on time from the approval of the Water conservation Plan. For example '1 year' is 1 year from the time the plan is approved
Data collection is only for system-wide meters and the leak detection study. Future updates to the plan may consider more extensive monitoring once system baseline data is available.
For cost estimate basis, see Appendix E2: Cost and Water Savings Calculations for Efficiency Measures

Appendix E

Scope of Work

APPENDIX E
SCOPE OF WORK

Task 1: Implementation of SCADA Upgrades to City's Existing System and Install Measuring Devices

Description: The City of Ouray ("City") will work with Timber Line to install the software and hardware to enable water flow measurement and water quality measurement at the identified highest priority locations.

Steps to be Performed in this Task:

1. Complete the following technical work on the City's hardware and software:
    a. SCADA program upgrade to enable additional measurement locations
    b. SCADA configuration for City's planned uses
    c. Program software to enable automated generation of reports based on SCADA data
2. Connect the Hot Springs Pool discharge measurement location to the SCADA system
    a. Install a new flow meter
    b. Connect new flow meter to the SCADA system
3. Connect the wastewater treatment plant influent and effluent flumes to the SCADA system
    a. Install new flow meters on the influent flume and the effluent flume
    b. Install and program hardware and software for data logging, SCADA connection via radio, power supply, and other necessary steps to establish the remote data collection and transmission station

Deliverables:

- Improved SCADA operations and ability automate reports on historical SCADA data
- SCADA-connected flow monitoring at Hot Springs Pool discharge locations
- SCADA-connected flow monitoring at the wastewater treatment plant influent and effluent locations

Task Responsibility: Timber Line Electric and Control Cooperation

Funding Source: $36,209 from CWCB, $7,875 of in-kind contributions from the City

Task 2: Install measurement devices on Red Mountain Ditch

Description: Install digital flow measurement devices on the Red Mountain Ditch flume and at the headgate bypass.

Steps to be Performed in this Task:

1. Purchase, installation, and calibration of flow meters and data logger at the Red Mountain Ditch bypass weir and at the parshall flume

Deliverables:

- Functional digital flow measurement device and data loggers for diversions in Red Mountain Ditch and bypass in Red Mountain Creek

Task Responsibility: WWE with assistance from City staff

Funding Source: $5,336 from CWCB, $1,925 of in-kind contributions from the City

Task 3: Update Water Measurement Plan

Description: Update the Water Measurement Plan based on the implementation of Tasks 1 and 2

Steps to be Performed in this Task:

1. Update Water Measurement Plan spreadsheet with details of devices and SCADA upgrades completed in Tasks 1 and 2

2. Work with Project Team to identify new high-priority measures for next phase of implementation

Deliverables:

- Updated Water Measurement Plan

Task Responsibility: City staff with assistance from WWE

Funding Source: $7,615 from CWCB, $2,750 of payment of consultant fees by the City, and $3,745 of in-kind contributions from the City

Task 4: Reporting to CWCB

Description: Provide 50%, 75%, and 100% completion reports to the CWCB

Steps to be Performed in this Task:

3. Submittal of reports as follows:
    - 50% Progress Report on September 15, 2015.
    - 75% Progress Report on November 15, 2015.
    - Final Report on May 20, 2016.
4. Communication with CWCB project manager on any modifications to the project scope or timeline.

Deliverables:

- Progress reports at 50%, 75% and 100% Project completion.

Task Responsibility: WWE

Funding Source: $804 from CWCB, $455 of in-kind contributions from the City

Appendix F

Project Timeline

APPENDIX F
City of Ouray Water Efficiency Grant Application
Water Measurement Plan Project Timeline[(1)]

Task	June 2015	July 2015	Aug 2015	Sept 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016
Task 1: Implementation of SCADA Upgrades and Measuring Devices	Begin June 9					End November 30						
Task 2: Install Measuring Devices on Red Mountain Ditch	Begin June 9					End November 30						
Task 3: Refine Costs and Establish Priorities for Next Steps							Begin December 1				End April 30	
Task 4: Reporting to CWCB				50% Progress Report Sept. 30		75% Progress Report Nov. 30						Final Report May 30

(1) Timeline is based on completion dates or time period from the Notice to Proceed. This schedule may be adjusted based on grant award date or if weather conditions delay installation of measuring devices.

Appendix G

Project Budget

APPENDIX G
City of Ouray Water Efficiency Grant Application
Water Measurement Plan Project Budget

Task	Sub-Task	City of Ouray (In-Kind)						City of Ouray (In-Kind)	Wright Water Engineers, Inc.									Total WWE Labor and Expenses	Timber Line					Total Timber Line Labor and Expenses	Equipment and Materials	Project Total	City of Ouray Cash or Consultant Fee Contribution	CWCB Grant Request
		City Administrator		Public Works Director		Other City Staff			Senior Consultant		Eng. Designer II		Eng. Tech I		Eng. Tech III		Travel and Expenses		Manager		Technician		Travel and Expenses					
		$35		$35		$35			$198		$105		$92		$81				$114.90		$114.90							
		Hours	Subtotal	Hours	Subtotal	Hours	Subtotal		Hours	Subtotal	Hours	Subtotal	Hours	Subtotal	Hours	Subtotal			Hours	Subtotal	Hours	Subtotal						
Task 1: Implementation of SCADA Upgrades and Measuring Devices	SCADA program upgrade to enable additional measurement locations	1	$35	20	$700	25	$875	$1,610	0	$0	0	$0	0	$0	0	$0	$0	$0	6.5	$746.85	22.5	$2,585.25	$292	$3,624.10	$653	$5,887	$0	$4,277
	SCADA configuration for City's planned uses and Program software to enable automated generation of reports based on SCADA data	1	$35	20	$700	25	$875	$1,610	0	$0	0	$0	0	$0	0	$0	$0	$0	3.0	$344.70	40.0	$4,596.00	$1,788	$6,728.70	$241	$8,580	$0	$6,970
	Install a new flow meter and connect new flow meter to the SCADA system	1	$35	20	$700	25	$875	$1,610	0	$0	0	$0	0	$0	0	$0	$0	$0	0.0	$0.00	17.5	$2,010.75	$1,924	$3,934.75	$2,724	$8,269	$0	$6,659
	Install new flow meters on the WWTP influent flume and the effluent flume	1	$35	20	$700	25	$875	$1,610	0	$0	0	$0	0	$0	0	$0	$0	$0	0.0	$0.00	12.0	$1,378.80	$286	$1,664.40	$4,089	$7,363	$0	$5,753
	At WWTP, install and program hardware and software for data logging, SCADA connection via radio, power supply, and other necessary steps to establish the remote data collection and transimssion station	1	$35	20	$700	20	$700	$1,435	0	$0	0	$0	0	$0	0	$0	$0	$0	3.0	$344.70	46.5	$5,342.85	$1,790	$7,477.55	$5,072	$13,985	$0	$12,550
Task 2: Install Measuring Devices on Red Mountain Ditch	Purchase, installation, and calibration of flow meter and data loggers at the Red Mountain Ditch bypass weir and at the parshall flume	5	$175	20	$700	30	$1,050	$1,925	6	$1,188	6	$630	14	$1,288	0	$0	$80	$3,186	0.0	$0.00	0.0	$0.00	0.0	$0.00	$2,150	$7,261	$0	$5,336
Task 3: Refine Costs and Establish Priorities for Next Steps	Update plan spreadsheet with details of devices and SCADA upgrades completed in Tasks 1 and 2	7	$245	25	$875	20	$700	$1,820	7	$1,386	20	$2,100	14	$1,288	5	$405	$80	$5,259	0.0	$0.00	0.0	$0.00	0.0	$0.00	$0	$7,079	$2,500	$2,759
	Work with Project Team to identify new high-priority measures for next phase of implementation	5	$175	25	$875	25	$875	$1,925	7	$1,386	24	$2,520	6	$552	8	$648	$0	$5,106	0.0	$0.00	0.0	$0.00	0.0	$0.00	$0	$7,031	$250	$4,856
Task 4: Reporting to CWCB	Submittal of 50%, 75%, and 100% reports and communication with CWCB project manager on progress	3	$105	5	$175	5	$175	$455	1	$198	5	$525	0	$0	1	$81	$0	$804	0.0	$0.00	0.0	$0.00	0.0	$0.00	$0	$1,259	$0	$804
Total		**25**	**$875**	**175**	**$6,125**	**200**	**7,000**	**$14,000**	**21**	**$4,158**	**55**	**$5,775**	**34**	**$3,128**	**14**	**$1,134**	**$160**	**$14,355**	**12.5**	**$1,436.25**	**138.5**	**$15,913.65**	**$6,079.60**	**$23,429.50**	**$14,929**	**$66,714**	**$2,750**	**$49,964**

City's Total Contribution (% of Total Project)	**25%**

Appendix H

Equipment and Materials

APPENDIX H
City of Ouray Water Efficiency Grant Application
Equipment and Materials Information

Task	Equipment or Materials	Costs		
		Unit Cost	Quantity	Total cost
Task 1: Implementation of SCADA Upgrades and Measuring Devices	Motorola ACE with radio, I/O modules, power supply, and necessary wiring hardware, with antenna and mast.	$5,072.30	1	$5,072.30
	Ultrasonic flow transmitters	$2,044.36	2	$4,088.72
	Siemens flow transmitter	$2,724.01	1	$2,724.01
	Mixed I/O module and associated hardware	$653.36	1	$653.36
	MS Excel	$241.00	1	$241.00
	Task Total			**$12,779.39**
Task 2: Install Measuring Devices on Red Mountain Ditch	TruBlue 555 Datalogger Pressure Transducer	$645.00	2	$1,290.00
	TruBlue Datalogger Interface Cable, polyurethane, 15 ft.	$236.50	2	$473.00
	USB to Hirose Communication Cable	$100.00	2	$200.00
	2" vented locking dock well cap for weir transducer	$60.00	1	$60.00
	Lockbox for equipment housing	$20.00	2	$40.00
	Hardware for installation at both sites	$87.00	1	$87.00
	Task Total			**$2,150.00**
Total Equipment and Material Costs				**$14,929.39**

Note: There are no equipment or material costs for Tasks 3 or 4.

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