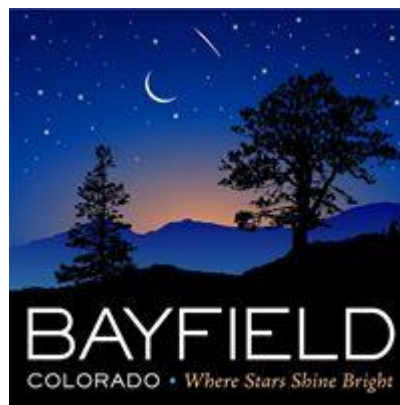


WATER MASTER PLAN

September 2018



TOWN OF BAYFIELD

Water Master Plan Update

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TABLE OF ACRONYMS

| ABBRV | DESCRIPTION |
|--------------|--|
| ADD | Average Daily Demand |
| AF | Acre-Feet |
| ANSI | American National Standards Institute |
| CIP | Capital Improvement Program |
| CPDWR | Colorado Primary Drinking Water Regulations |
| CDPHE | Colorado Department of Public Health & Environment |
| CT | Contact Time |
| cfs | Cubic Feet Per Second |
| DBPP | Disinfectant Byproduct Precursors |
| D/DBP | Disinfectants / Disinfectant By-Products |
| EU | Equivalent Unit |
| ERT | Equivalent Residential Tap |

| ABBRV | DESCRIPTION |
|--------------|---|
| GAC | Granulated Activated Carbon |
| GMF | Granular Media Filtration |
| gpcd | Gallons per Capita per Day |
| gpd | Gallons per Day |
| gpm | Gallons per Minute |
| HAA | Haloacetic Acids |
| HRT | Hydraulic Retention Time |
| IGA | Intergovernmental Agreement |
| LAPLAWD | La Plata Archuleta Water District |
| LSI | Langlier Stability Index |
| LCR | Lead and Copper Rule |
| LT1ESWTR | Long-Term 1 Enhanced Surface Water Treatment Rule |
| LT2ESWTR | Long-Term 2 Enhanced Surface Water Treatment Rule |
| MCC | Motor Control Center |
| MCLG | Maximum Contaminant Level Goal |
| MCL | Maximum Contaminant Levels |
| MDD | Maximum Daily Demand |
| MPA | Microscopic Particulate Analysis |
| MRDL | Maximum Residual Disinfectant Levels |
| MG | Million Gallons |
| MGD | Million Gallons Per Day |
| MSDS | Material Safety Data Sheet |
| ND | Not Detected |
| NR | Not Requested |
| NSF | National Sanitation Foundation |
| NTU | Nephelometric Turbidity Unit |
| O&M | Operations and Maintenance |
| PHD | Peak Hourly Demand |
| PLC | Programmable Logic Controller |
| PWSID | Public Water System Identification |
| SCADA | Supervisory Control And Data Acquisition |
| TDH | Total Dynamic Head |
| THMs | Trihalomethanes |
| TTHM | Total Trihalomethane |
| TOC | Total Organic Carbon |
| UV | Ultraviolet |
| VFD | Variable Frequency Drive |
| WQCD | Water Quality Control Division |
| WTP | Water Treatment Plant |

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1. EXECUTIVE SUMMARY

This Master Plan has been prepared for the Town of Bayfield (Town) to assist in evaluating the existing infrastructure and regulations associated with the Town's supply of potable water. The review includes water rights associated with supply of raw water for treatment, raw water storage, the treatment processes, pumping capacities, and the distribution piping and storage tanks. Future population growth and related impacts to needs of the water system are included to provide a prediction of capital needs within the planning period.

Ultimately, the usefulness of a Master Plan is tied to the reliability of planning decisions made using information contained in the Master Plan. It is recommended that this Master Plan be updated every five years and appropriate sections revised annually since the quality of the data and information within the Master Plan becomes progressively obsolete once the Master Plan has been published.

The physical components of the system are well sized and are predicted to be well suited to meet the water supply needs over the 20-year planning period. Several capital improvement recommendations related to the physical infrastructure are included in this report, however none are deemed critical in the next five years.

The most pressing concern identified in the report is the availability of municipally allocated water rights. User demand is projected to exceed the currently available municipal rights within the next five years. Converting the remaining 1.869 cfs irrigation right on the Los Pinos Ditch is believed to be the best first step to increase municipal raw water supply rights. The remaining irrigation rights on the Schroeder Ditch may also be worth consideration for municipal transfer if they are not fully utilized.

Although the remaining capital recommendations are not anticipated to become critical needs until the end of the planning period; this delay in expected capital requirements allows time for planning and execution of the improvements before they negatively impact system performance. Several sections of piping are identified for replacement due to age and dependability concerns, other sections are predicted to become sources of pressure loss in the system due to future flow rates. Each section is discussed individually in Section 8.

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2. INTRODUCTION AND OBJECTIVES

This update to the Town's Water Master Plan has been prepared to assess the existing water systems owned and operated by the Town, and to help in preparation for future growth. All existing components related to supply of potable water are reviewed for their respective ability to meet current and future (20-year) operating conditions. The development of this report includes an assessment of the raw water supply, treatment processes, and distribution conveyance and storage systems. The Town's WaterGEMS hydraulic model has been updated and calibrated to match existing conditions; the anticipated 20-year build-out model has also been updated. All major water supply systems were reviewed and discussed in the following sections and recommendations on capital improvements are included following the system analysis.

2.1. APPROACH

The methodology used to develop required information for this Master Plan includes the following:

- 1) Review of the Town's historic and projected population data to estimate water usage projections for the Town's current and predicted service area.
- 2) Update of the Town's hydraulic model to simulate the existing conditions.
- 3) Development of a hydraulic model to simulate the system using the projected population in 2038, and identify improvements required to maintain adequate service pressures consistent with future growth projections.
- 4) Assessment of future water infrastructure requirements; covering the raw water supply, treatment plant, and distribution system.
- 5) Identification of proposed system improvements for use in a capital improvements plan.

Section 3.0 presents a summary of existing water supply and treatment facilities, and regulated treatment requirements. Section 4.0 discusses future water supply requirements based on current water usage and Town population records and growth projections. Section 5.0 of this report evaluates the current and estimated future raw water supply requirements. Section 6.0 presents a review of the water distribution model. In Section 7.0, the various system components are evaluated, including raw and finished pumping systems, distribution system storage tanks, pumps, piping, and the treatment facility. System components recommended for inclusion in the capital improvements plan are presented in Section 8.0.

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3. DESCRIPTION OF EXISTING WATER SYSTEM

3.1. SERVICE AREA

The Bayfield Public Works Department maintains and operates a potable water distribution system providing service primarily to Town residences. The service area also extends to a few limited residences outside the incorporated limits of the Town. Growth during the 20 year planning period is predicted to occur along the eastern edge of the existing service boundary, with the major growth area located north of Hwy 160. Figure 1 (shown on page 7) depicts the current and predicted service boundaries for the planning period.

The Town also provides wholesale water to a consecutive system operated by the La Plata Archuleta Water District (LAPLAWD). Negotiations with LAPLAWD lead to a long term prediction of the Town's service area and this predicted boundary was formalized as part of the IGA; Figure A (Appendix A) shows the current and predicted boundary as agreed to under the IGA. The consecutive system operated by LAPLAWD effectively increases the land area where water produced by the Town is distributed; The LAPLAWD service area map is also included in Appendix A.

3.2. WATER SUPPLY FACILITIES

The water supply facilities owned by the Town of Bayfield include two surface water intake and conveyance systems, and a raw water storage reservoir. The Pine (Los Pinos) River supplies raw (source) water to the existing reservoir; there are two existing options for providing water to the reservoir: 1) the Los Pinos Ditch and 2) the Los Pinos Raw Water Pump Station. Figure 2 (shown on page 8) identifies the location of the existing raw water facilities.

3.2.1. LOS PINOS DITCH

The Los Pinos Ditch Company was formed in 1945, with the primary goal of providing water for local agricultural uses. Water is diverted from the Los Pinos River into the ditch intake system approximately 1.5 miles north of the Water Treatment Plant (WTP). The Town of Bayfield has an agreement with the Los Pinos Ditch Company to convey up to 0.9 cfs of municipal water through the ditch. A manual 24-inch wide gate controls the rate of diversion from the ditch to the reservoir. A 9-inch Parshall flume and ultrasonic flow sensor are used to measure the flow of water through the reservoir intake structure; the data from the ultrasonic device is recorded in the SCADA system. The reservoir intake structure (used to convey water from the ditch into the reservoir) was replaced as part of a WTP expansion project in 2016.

3.2.2. LOS PINOS PUMP STATION

In 1997, the Town installed an intake system that collects water directly from the Los Pinos River and conveys it to the reservoir, without use of the upstream ditch intake for conveyance. The intake system includes a below grade horizontal infiltration gallery and piping system, manhole-type intake structure, pump house with wet well, and an overflow pipe to allow unused water to return to the river. The vertical turbine pumps and related electrical and controls were upgraded in 2016. The new pumps are VFD controlled and provide the capability to convey flow rates varying from 100 gpm up to approximately 1.5 MGD.

The pump station system is a valuable means of collecting and conveying raw water when the ditch is unavailable for use by the Town. Ditch availability can be affected by maintenance needs and also by water rights restrictions during times of drought. This has become a shared use facility between the Town and LAPLAWD, see Section 7.6 for more discussion.

3.2.3. RAW WATER RESERVOIR

The existing raw water storage reservoir was constructed in 1977 and supplies water into the WTP by gravity flow. During the 2016 WTP expansion, a reservoir bypass pipe was constructed that allows conveyance of raw water to the WTP without use of the reservoir. The jurisdictional

classification was unknown to the state dam regulators until applications for a planned expansion were submitted during design for the 2016 WTP upgrades project; the reservoir expansion project is still awaiting completion. The existing reservoir holds approximately 9.8 MG (30 acre-feet), has a surface area of 2.1 acres, and a maximum depth of 20 feet; 5 ac-ft of the storage capacity are allotted to LAPLAWD through the IGA.

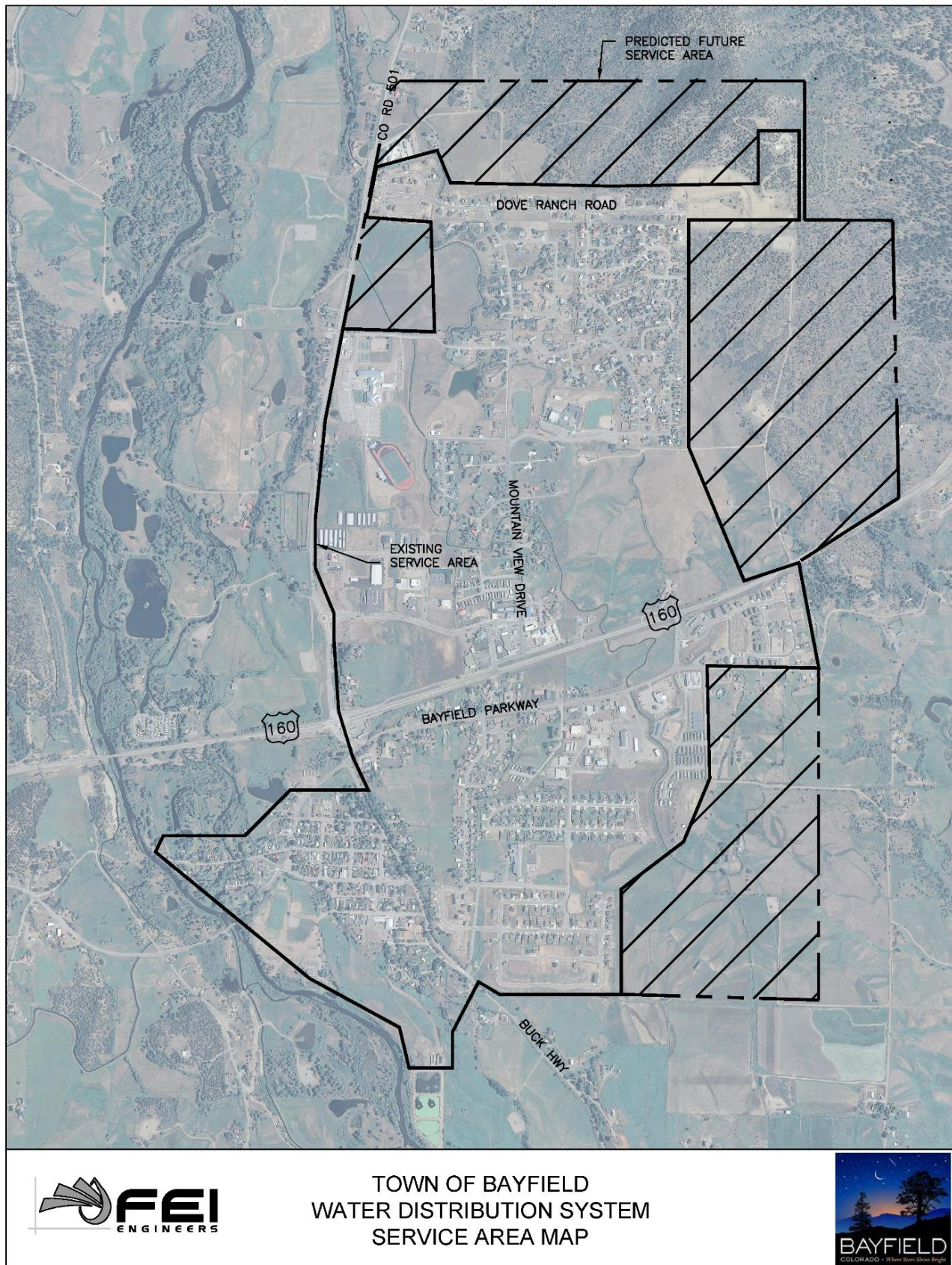
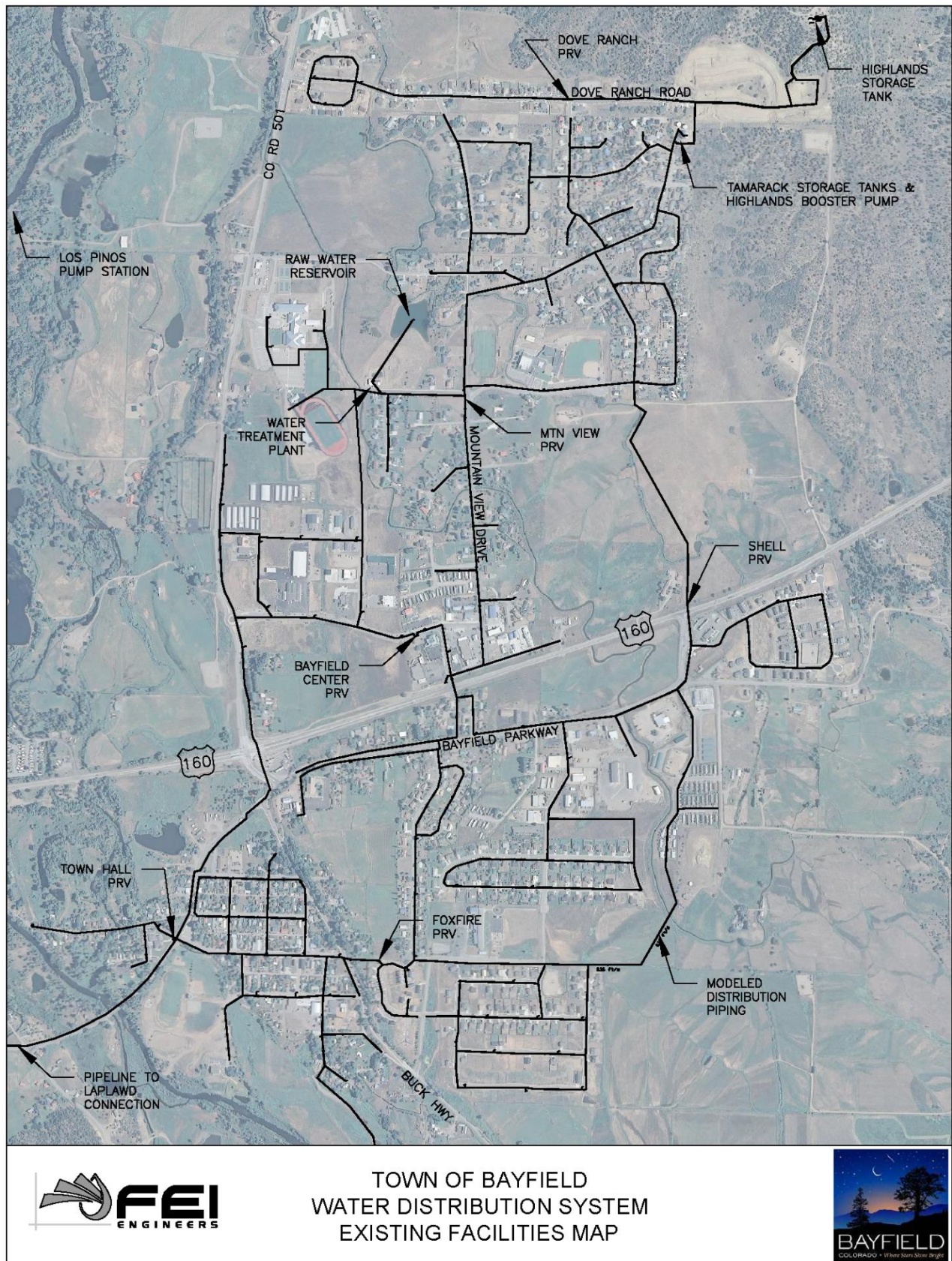
Figure 1. Service Area Map

Figure 2. Existing Facilities Map

3.3. TREATMENT PLANT

The oldest portions of the existing treatment plant were originally installed in 1977, correlating with the reservoir construction. All the original equipment has been replaced; only the building and original clear well tankage remain in use. A 0.5 MGD Trident filtration unit was installed in the original building structure in 1995. A subsequent construction project, in 2003, expanded the building structure and installed two 0.5 MGD Actifloc units; this expansion included a new blower room, chemical systems, and additional clear well volume. The Actifloc expansion connected the older masonry building with a prefabricated metal building. At completion of the 2003 project, the WTP was rated to produce up to 1.5 MGD of potable water.

The 2016 WTP expansion project added a new below-grade clear well and treatment building adjacent to the older WTP structure. This expansion increased the rated capacity of the WTP to 2.5 MGD, and provides planned space for expansion to 3.5 MGD. The 2016 project added chlorine dioxide as a pre-oxidant, a new 1 MGD Actiflo and filter train (with space provided for a future train), 0.5 MG clearwell, UV disinfection, high service pump station, and a backwash water recovery system. The SCADA system was also upgraded to allow control of all existing treatment units from a central location.

Two of the pumps in the original clear well were rebuilt as part of the 2016 project and they are now used to move filtered water from the older structure into the new 0.5 MG clear well. The new clear well is now the primary disinfection contact tank, and the older clear well is used as intermediate storage for filtered water (no disinfection credit is applied from the older combined clear well despite the continued dosing of chlorine before water enters this tank).

3.3.1. CHEMICAL SYSTEMS, PRE-FILTRATION

3.3.1.1. CHLORINE DIOXIDE

The 2016 WTP expansion project included the installation of a chlorine dioxide system. The system includes a generator and liquid sodium chlorite storage; gaseous chlorine is provided to the generator from the adjacent chlorine room. Chlorine dioxide is a commonly used pre-oxidant for potable water pre-treatment; it oxidizes iron and manganese and also reduces the potential formation of disinfection byproducts. The generator mixes water, chlorine gas, and liquid sodium chlorite in a low pressure reaction chamber to create the chlorine dioxide solution. A small tank on the generator skid provides storage of the concentrated solution before the solution is dosed into the raw water. The chemical injection point is located upstream of where piping divides to supply raw water into each WTP building, this allows the chlorine dioxide to be dosed ahead of all existing treatment trains. The delivery rate is flow paced so a fixed concentration is provided no matter how many (or few) filters are operating at a given time.

3.3.1.2. COAGULANT

Coagulants are commonly used to destabilize and agglomerate small particles that may otherwise pass through a filter. As part of the 2016 project, a bulk storage tank was installed in the new WTP building, providing the ability to receive tanker loads of coagulant; a transfer pump was also installed to convey coagulant to the day-use tanks in the older building. All four treatment trains at the Bayfield WTP are currently dosing an aluminum chlorohydrate solution; EC-309 is marketed by Southern Water Consultants (the Safety Data Sheet and NSF certification are included in Appendix B). The rate of coagulant demand varies seasonally and individually for the different filter trains; each train has a dedicated coagulant dosing pump which is flow paced through the SCADA system.

3.3.1.3. POLYMER

Polymer dosing is unique for each treatment train. There are two different polymers currently in use at the WTP. Each polymer is a variety of polyacrylamide; this class of polymers is limited by NSF regulations to dosing at concentrations of less than 1 mg/L. The polymers are purchased dry and made into a solution as needed. There are three polymer batch tanks in

use: 1) for the Trident filter, 2) a second is shared by the two Actifloc units, and 3) the newer Actiflo train has a dedicated polymer tank.

The Trident unit operates in a direct filtration mode and uses a non-ionic polymer of medium molecular weight. The operations staff has tested various polymers and found the Trident unit provides the best water quality using the LT20 product supplied by Magnafloc.

The Actifloc and Actiflo treatment units are classified as conventional filtration treatment units; these units coagulate, flocculate, and settle solids before the filtration step. Magnafloc LT22 is a cationic (positively charged) high molecular weight polymer that is currently in use for each of these three filters.

3.3.2. PRETREATMENT AND FILTRATION

3.3.2.1. TRIDENT UNIT

The Trident filtration unit has been in service since 1995. U.S. Filter was the original patent holder for this design, which is now owned by WesTech. The Trident design includes an upflow clarifier followed by a multimedia filter bed. These units are designated as direct filtration by the CDPHE, which can impact testing and reporting requirements. The Trident unit at the Bayfield WTP is rated for a maximum flow rate of 347 gpm (0.5 MGD).

The filter was rebuilt in 2017 to include a new underdrain system which allows an air scour step in the backwash cycle. The intent of this change is to improve the cleaning efficiency of the backwash cycle and potentially lead to improved filter run times.

3.3.2.2. ACTIFLOC UNITS

Two Actifloc units were installed during the 2003 construction project. The Actifloc design was originally developed by Kruger and has changed ownership several times in its history; the current patent holder for this design is Veolia Water. The Actifloc design utilizes a rapid mix chamber for chemical dispersion, sand ballasted flocculation, a high-rate settling stage, cyclone-based sand recovery process, and a multimedia filter bed. The Actifloc units are classified as conventional filtration by the CDPHE. Each Actifloc unit is rated for a maximum throughput of 347 gpm (providing a combined capacity of 1.0 MGD).

3.3.2.3. ACTIFLO UNIT

The Actiflo process train was installed as part of the 2016 WTP expansion project. Aside from design improvements, the process components are identical to the older Actifloc units with the exception that the multimedia filter is detached and in a physically separate tank. It is also classified as conventional filtration. This process train is rated for a maximum flow rate of 694 gpm (1.0 MGD).

3.3.2.4. FILTRATION FOR DISINFECTION (REMOVAL) CREDIT

The Bayfield WTP utilizes a multi-barrier approach to exceed the required disinfection removal/inactivation requirements for potable water treatment; filtration is the primary treatment process of the overall disinfection (removal) strategy. There are differing removal credits achieved for the direct and conventional filtration treatment processes; Trident unit (direct) versus the Actiflo and Actifloc units (conventional). The disinfection removal/inactivation credits achieved and required are summarized in Table 1 (on page 12).

3.3.3. DISINFECTION SYSTEMS

3.3.3.1. CHLORINE DIOXIDE

The CDPHE regulations allow for disinfection (inactivation) credit from chlorine dioxide dosing,

however, it is not implemented at the Bayfield WTP. The Bayfield WTP currently doses chlorine dioxide at a rate suitable for prevention of disinfection byproduct formation. A higher dosage and frequent testing and monitoring would be required to utilize chlorine dioxide as part of the calculated disinfectants (inactivation) at the Bayfield WTP. It is documented here as a potential disinfection process, but not a recommendation.

3.3.3.2. CHLORINE GAS

Chlorine gas is the primary (residual) disinfectant for the Bayfield WTP. Water leaving each filter is injected with a chlorine solution before entering the respective clear well. The rate of chlorine injection is flow paced to the measured flow for each filter unit. The chlorine dosing equipment is based around Capital Controls NXT series, portions of the system were installed in 2010, with additional equipment added to meet the needs of the 2016 WTP expansion project.

The chlorine room was relocated during the 2016 WTP expansion project and is now adjacent to the new chlorine dioxide room. Each of these rooms have a separate entrance from the exterior of the building and were built to meet the current applicable safety requirements for their respective chemical hazards.

3.3.3.3. CLEAR WELL

Disinfection (inactivation) with chlorine is dependent on both concentration and time. The long contact time required for chlorine inactivation of *Cryptosporidium*, *Giardia* and viruses is achieved in clear well tanks. The regulations impacting contact time have changed significantly over the lifespan of the WTP. When the older Trident and Actiflo clear wells were built, the concept of a mathematical log calculation for removal/inactivation was not yet in practice; at that time the standard was to achieve 30 minutes of contact time.

Due to the limited credit allowed under current regulations, the older clear wells are no longer included in the plant's disinfection calculations. Baffling in the existing clearwells ranges from poor to average, resulting in baffling factors of 0.3 to 0.5. The log credits potentially achieved by the older clearwell have been calculated as 0.15 log for *Giardia* and *Cryptosporidium*, and 4.7 log for virus inactivation (using an assumed pH of 7.0 and residual of 1.0 mg/L). These credits are not used in the current disinfection approach but are documented for future use, if needed.

The 2016 WTP expansion project included the construction of a 500,000 gallon clear well which is designed to meet the chlorine contact needs of the facility up through the future expansion to 3.5 MGD capacity. The newer clear well was designed to achieve a baffling factor of 0.7, thereby maximizing the CT efficiency in relation to clear well volume.

3.3.3.4. ULTRAVIOLET DISINFECTION SYSTEM

UV disinfection provides a significant inactivation credit for *Giardia* and *Cryptosporidium* in a very small footprint. The 2016 WTP expansion added a UV reactor capable of providing a 2-log inactivation of *Cryptosporidium* and a 3-log inactivation of *Giardia* at the planned future capacity of 3.5 MGD. The construction layout includes space for a future UV reactor; therefore, providing redundant disinfection capacity once the future expansion is constructed.

3.3.3.5. SUMMARY OF OVERALL DISINFECTION (REMOVAL/INACTIVATION) ACHIEVED

Table 1 (on following page) lists the total disinfection (removal/inactivation) achieved by each treatment process used for calculating the overall disinfection at the Bayfield WTP. The multibarrier approach to disinfection allows the Bayfield treatment process to exceed the minimum requirements set forth by the State Health Department.

Table 1. Summary of Overall Disinfection Required and Achieved

| Description | Direct Filters (Trident) | | | Conventional Filters (Actiflo & Actifloc) | | |
|---|-----------------------------|----------------------------|------------------|--|----------------------------|------------------|
| | Giardia Credits | Cryptosporidium Credits | Virus Credits | Giardia Credits | Cryptosporidium Credits | Virus Credits |
| Filtration (<i>removal</i>) | 2 | 2 | 1 | 2.5 | 2.5 | 2 |
| Chlorine Contact (<i>inactivation</i>) | 1.2 | 1.2 | 27 | 1.2 | 1.2 | 27 |
| Ultraviolet (<i>inactivation</i>) | 3 | 2 | 0 | 3 | 2 | 0 |
| Total log credits achieved (<i>removal and inactivation</i>) | 6.2 | 5.2 | 28 | 6.7 | 5.7 | 29 |
| Log Credits Required | 3 | 3 | 4 | 3 | 3 | 4 |

3.3.4. BACKWASH RECOVERY PROCESS

The 2016 WTP expansion project removed the backwash pond and replaced it with a pair of tanks and pumping system dedicated to backwash water recovery. This system uses a high-rate sedimentation process for the separation of the solids and decant water resulting from each filter backwash cycle. The solids are collected with a “trac-vac” system and wasted as liquid discharge into the Town’s sewer system. The decant water is returned to the raw water storage reservoir and recycled into the treatment process. This process provides a more efficient use of the raw water supply and sends the mostly aluminum based sludge solids to the wastewater treatment process where they can help improve sludge settling in the WWTP process.

3.3.5. SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM

The existing supervisory control and data acquisition (SCADA) system was installed in 2011. It was expanded during the 2016 WTP expansion project to include all the new treatment processes. The system relies on separate programmable logic controllers (PLC) for each major treatment train; the Actifloc units share a PLC while the Trident and Actiflo/filters have dedicated PLCs. Several other treatment units have their own PLCs that relay data to the central SCADA system; these include the automated strainer, chlorine dioxide system, and backwash recovery systems. The central SCADA interface is based on the RSView software package and allows the operations team to remotely monitor and control the treatment facility.

The SCADA system includes the following functionality:

- Electronic hand-off-auto operation for all actuated valves and pumps.
- User-adjustable settings for process control functions; including backwash, filter-to-waste, and flush, as appropriate for each treatment unit.
- User-adjustable settings for alarm limits.
- Turbidity, head loss, and timer control for automatic backwash initiation, as well as, a manual backwash sequence initiation button.
- Recording of individual filter turbidity data.

The SCADA system also contains an alarm dialer to alert staff if any monitored process variables stray outside the user adjustable limits. The callout list is also adjustable allowing for rotation of the primary and secondary contacts. Most major process parameters have alarms settings; including equipment failure alarms, individual filter water turbidity, finished water turbidity, finished water chlorine residual, low storage tank level, and loss of raw water flow.

3.3.6. TREATED WATER QUALITY REQUIREMENTS

As medical knowledge and technological capability change our understanding of pathogens and the ability to prevent harm; the EPA continues to develop new regulations to address drinking water quality. The following sections discuss the applicable portions of the Federal Safe Drinking Water Act (SDWA); each of the listed rules will be summarized below:

- Long Term 1 Enhanced Surface Water Treatment Rule (LT1).
- Long-Term 2 Enhanced Surface Water Treatment Rule (LT2).
- Stage 1 and Stage 2 Disinfectant and Disinfection By-Products Rules.
- Filter Backwash Recycling Rule.
- Lead and Copper Rule.
- Total Coliform Rule.

3.3.6.1. LONG TERM 1 ENHANCED SURFACE WATER TREATMENT RULE

The Long Term 1 Enhanced Surface Water Treatment Rule (LT1) became active in 2002. This rule requires systems using surface water or Groundwater Under Direct Influence (GWUDI) to comply with strengthened filtration requirements. The following LT1 conditions apply:

- Systems serving fewer than 10,000 persons must achieve a 2-log removal of *Cryptosporidium*.
- Systems using alternative filtration systems (other than conventional, direct, slow sand or diatomaceous earth systems) must meet specific State-established combined effluent turbidity requirements.
- Systems must develop a disinfection profile unless observed DBP concentrations are less than 0.064 mg/L for TTHM and 0.048 mg/L for HAA.
- Systems significantly changing disinfection practices must develop a disinfection inactivation benchmark for the existing practice and consult with the State before implementing changes.
- Finished water reservoirs (and storage tanks) must be covered.
- Unfiltered systems must comply with updated watershed control requirements including addition of *Cryptosporidium* as a pathogen of concern.

3.3.6.2. LONG TERM 2 ENHANCED SURFACE WATER TREATMENT RULE

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) further addresses the acute risk of exposure to microbial pathogens found to naturally occur in the water supply. The LT2 rule supplements the requirements of the SDWA and the LT1 Rule to strengthen the protection of drinking water from pathogens. Among its applicable requirements for systems serving fewer than 10,000 persons are:

- Systems must conduct initial source water monitoring for *E. coli* or *Cryptosporidium*.
- Subsequent *Cryptosporidium* monitoring is required if *E. coli* levels exceed 10/100 milliliters (mL) for lake and reservoir sources or 50/100 mL for flowing stream sources.
- Based on monitoring data, water sources will be classified into specific bins identifying whether additional treatment and control methods are required to remove and inactivate *Cryptosporidium*, and the level of additional log removal and inactivation is required.
- Systems required to implement additional treatment and/or control techniques to meet additional log removal/inactivation requirements may utilize a "microbial toolbox" consisting of select treatment and control options.

During 2008 and 2009, the Town completed testing required for classification within the LT2 Rule. This resulted in a Bin 1 classification, meaning the system has no additional removal/inactivation requirements in the treatment process and no additional monitoring requirements for *Cryptosporidium*. A second round of required testing was completed in 2017 and confirmed the Bin 1 classification.

3.3.6.3. STAGE 1 AND STAGE 2 DISINFECTANT AND DISINFECTION BY-PRODUCTS RULES

The Disinfectant and Disinfection By-Products (DBP) Rules were implemented in two stages beginning in 1998. The Stage 1 and Stage 2 DBP Rules provide protection of public health through the regulation of disinfection by-products (DBP). Long-term risks (associated with chronic exposure) are managed by providing treatment to reduce the potential of forming DBPs.

Stage 1 was promulgated in December 1998 and supersedes the 1979 regulations regarding total trihalomethanes (TTHM). Maximum contaminant levels (MCL) for DBP concentrations were established for specific disinfection by-products including individual trihalomethanes (THM), haloacetic acids (HAA), chlorite and bromate. In addition, maximum residual disinfectant levels (MRDL) were established for chlorine, chlorine dioxide, and chloramines.

Stage 2 was promulgated in January 2006 and builds upon the requirements of the Stage 1 Rule. The main requirements of the Stage 2 Rule are increased monitoring of THM and HAA at specific locations within the distribution system. Compliance with the Stage 2 Rule requires completion of a distribution system evaluation and establishment of standard sampling sites at representative locations throughout the system.

The Town completed the Initial Distribution System Evaluation (IDSE) during the same time frame as the LT2 testing, and the sampling sites for computing the required locational running annual averages (LRAA) have been selected. For systems serving fewer than 50,000 persons, both the LT2 and Stage 2 Rule monitoring requirements became effective in October 2013.

3.3.6.4. FILTER BACKWASH RECYCLING RULE

The Filter Backwash Recycling Rule (FBRR) requires monitoring and reporting of recycle practices to reduce the risk of impacting treatment process performance and to help prevent pathogens from passing through treatment processes and into the finished drinking water in concentrations that may increase the acute health risks to customers. The FBRR applies to all facilities that recycle water from filter backwash, thickener supernatant, or dewatering processes.

Systems recycling these fluid streams are required to retain the following information:

- List of recycle flows and the frequency they are returned.
- Average and maximum filter backwash flow rates and backwash duration.
- Typical filter run length and summary of how length is determined.
- Type of treatment provided for recycle flow.
- Data on equalization and/or treatment units; typical and maximum hydraulic loading rates; type of treatment chemicals used and average dose and frequency of use; and frequency at which solids are removed.

3.3.6.5. LEAD AND COPPER RULE

The Lead and Copper Rule requires water suppliers to monitor lead and copper concentrations at customer taps and to control corrosion in the distribution system if necessary. Several

models (i.e. Langlier Index) have been developed to evaluate water for its tendency to be a scale forming corrosive. In general, scale forming waters are not associated with lead and copper issues; however, corrosive waters do tend to cause elevated levels of lead and copper. Treatment techniques are typically used to maintain finished water pH above levels that are considered to be corrosive. Such techniques may include the addition of a basic chemical to finished water to prevent corrosive water leaching of lead and copper in customers piping.

3.3.6.6. TOTAL COLIFORM RULE

The Total Coliform Rule established a maximum contaminant level goal (MCLG) of zero for total coliform, which are considered representative of the bacteria population within the distribution system. Total coliform is used as a gross surrogate for evaluating overall treatment effectiveness. Compliance with this rule requires regular testing at various points around the distribution system.

3.4. DISTRIBUTION SYSTEM

The Town of Bayfield currently has approximately 21 miles of water distribution lines that supply drinking water to the Town's residents. The distribution system is organized into five geographic pressure zones. The pressure zones are separated by booster pumps and/or pressure reducing valves that regulate appropriate downstream discharge pressure. There are four tanks in use at two locations in the distribution system.

Operational control of the various facilities is based on tank levels in the distribution system. If the Highlands concrete tank reaches a low level set point, the booster pump adjacent to the Tamarack tanks will start and convey water until the Highlands concrete tank reaches its high level set point. If the Tamarack tanks reach their low level set point, the clear well pumps at the treatment facility will start and convey water until either the clear well reaches a low level set point or the steel tanks are filled to their high level set point.

3.4.1. PIPELINES

Portions of the Bayfield distribution system pre-date the 1977 construction of the reservoir and WTP. Prior to that time, a small treatment facility was located at the end of North Street, to the west of the current Town Hall location. Materials of choice for piping installation have changed over time; some older areas still contain asbestos reinforced concrete (AC) piping; there are also limited areas of steel piping in service. The majority of piping, and the currently preferred piping material, is polyvinyl chloride (PVC). Pipe sizes range from 4 inch up to 14 inch; 6 and 8 inch piping are the most common sizes throughout the distribution system.

3.4.2. STORAGE FACILITIES

There are four active potable water storage tanks in the Bayfield distribution system, providing a total storage capacity of 1.75 MG. Three of the tanks are located at the Tamarack site and filled directly from the WTP high service pumps, while the fourth is filled by a booster pump located adjacent to the other three tanks. Table 2 (on following page) lists each tank and its respective capacity. Figure 2 (shown on page 8) shows the locations of the two tank sites.

A 0.25 MG above-grade welded steel tank was constructed on Tamarack Drive as part of the same project that created the WTP and storage reservoir in 1977. A second tank of the same size was built adjacent to the first in 1989, raising the total storage capacity to 0.5 MG. In 2007, a third tank was constructed at this site (a 1.0 MG above-grade glass-lined bolted steel tank) creating a total storage capacity of 1.5 MG. Each of the two 0.25 MG tanks were recoated in 2011. The three tanks at the Tamarack site all share the same water surface elevation and provide 1.5 MG of storage that can flow directly to three existing pressure zones.

The fourth tank is a partially buried concrete structure providing 0.25 MG of storage that can flow

by gravity to feed two existing pressure zones. The Highlands tank is filled by a booster pump located at the Tamarack tank site.

Table 2. Finished Water Storage Capacity

| Finished Water Storage Tank | Total Capacity (MG) |
|--|----------------------------|
| Tamarack East Welded Steel Tank (constructed 1989) | 0.25 |
| Tamarack West Welded Steel Tank (constructed 1977) | 0.25 |
| Tamarack Bolted Steel Tank (constructed 2007) | 1.0 |
| Highlands Concrete Tank (constructed 2010) | 0.25 |
| Total Storage Capacity | 1.75 |

3.4.3. PUMP STATION

The Tamarack tank site also houses a pump station used to supply water to the Highlands tank for consumption in the two pressure zones located along Dove Ranch Road. Before the 2010 tank construction, this pump station operated as a direct pressure booster for the Dove Ranch distribution area; in the current configuration it refills the concrete tank through a dedicated pipeline. A single Berkeley centrifugal pump is installed; it is rated for a duty point of 400 gpm at 260 feet of total dynamic head (TDH).

3.4.4. INTERCONNECTIONS WITH OTHER SYSTEMS

The Town of Bayfield has an agreement to supply treated water to the La Plata Archuleta Water District (LAPLAWD), they are the only existing consecutive system. An Intergovernmental Agreement (IGA) has been signed between the Town and the LAPLAWD. This IGA includes the now completed expansion of the existing water treatment facility, future expansion of the raw water storage reservoir, interconnection between the two distribution systems, and sharing of distribution system facilities.

Under the IGA certain components are designated as Joint-Use-Facilities to be shared by both LAPLAWD and the Town. These include the existing raw water pump station, existing raw water intake from the Los Pinos Ditch, existing raw storage reservoir, treatment facility, and areas of the distribution system (see Appendix C for more detail within the IGA). The impacts of this IGA on the existing system will be evaluated further in Sections 6.0 & 7.0 below.

4. WATER SUPPLY REQUIREMENTS

4.1. POPULATION PROJECTIONS AND GROWTH AREAS

The majority of growth within the Town of Bayfield is expected to be concentrated to the east of existing neighborhoods. Currently developed residential areas are almost completely infilled, less than 5% of existing residential properties are uninhabited. A map of anticipated growth areas is included above as Figure 1.

The 2018 Comprehensive Plan contains the most recent prediction of future population growth; it shows an annual growth rate close to 3.5% for the current period (2015 through 2020), decreasing over time to approximately 1.5% by 2035.

4.1.1. 20-YEAR PLANNING PERIOD

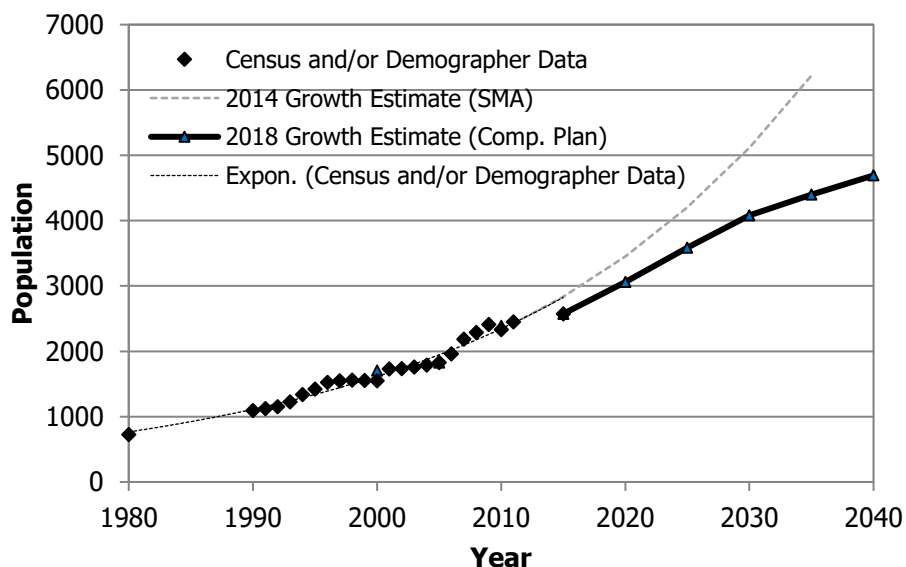
The 20-year planning period extends into 2038. The 2018 Comprehensive Plan lists population predictions out to 2045. The previous iteration of the Water Master Plan (2014) used a population prediction produced by Souder Miller & Associates (SMA). Figure 3 shows both the SMA population estimate and the newer prediction from the Comprehensive Plan. The more recent work predicts a population of approximately 4,400 people in 2035, this is significantly lower than the previous estimate that predicted more than 6,200.

4.1.2. COMPARISON OF RECORDED VERSUS PREDICTED GROWTH RATES

The Town of Bayfield was incorporated in 1910, with an initial population of 227 people. The population has tripled over the following 70 years; the 1980 census showed 1,549 people. The last census was completed in 2010 showed a population of 2,333; more recent estimates predict a current population of approximately 2,800.

Figure 3 depicts both the recorded and predicted population for the Town of Bayfield. National Census Data is included for the four previous U.S. Census cycles (1980, 1990, 2000, and 2010). State demographer estimates are included for the years between US census cycles. The predicted future population projections are based upon the 2018 Comprehensive Plan growth estimates.

Figure 3. Town of Bayfield Historical and Predicted Future Population



4.1.3. SPECIFIC AREAS OF CONCENTRATED GROWTH

The existing subdivisions within the Bayfield service area are largely built out. Clover Meadows is currently planning to move forward with their planned Phase 7 development; this is anticipated to add 123 residences to the system. Future development is predicted to be east of CR 501 and mostly to the north of Hwy 160. The land north of Dove Ranch Road is expected to become a medium density (single family) development area. The land adjacent to the new elementary school is also likely to be developed; a mix of medium and higher density developments is anticipated for this area.

The most concentrated areas of medium growth are projected to be immediately north of Dove Ranch Road, eventually migrating east of the existing end of Mesquite Street. Additional medium density growth is also anticipated to the Southeast of the current service area, adjacent to the existing Mesa Meadows and Clover Meadows subdivisions. For more detail see the Future Land Use Map located in Appendix A.

4.1.4. LAND USE

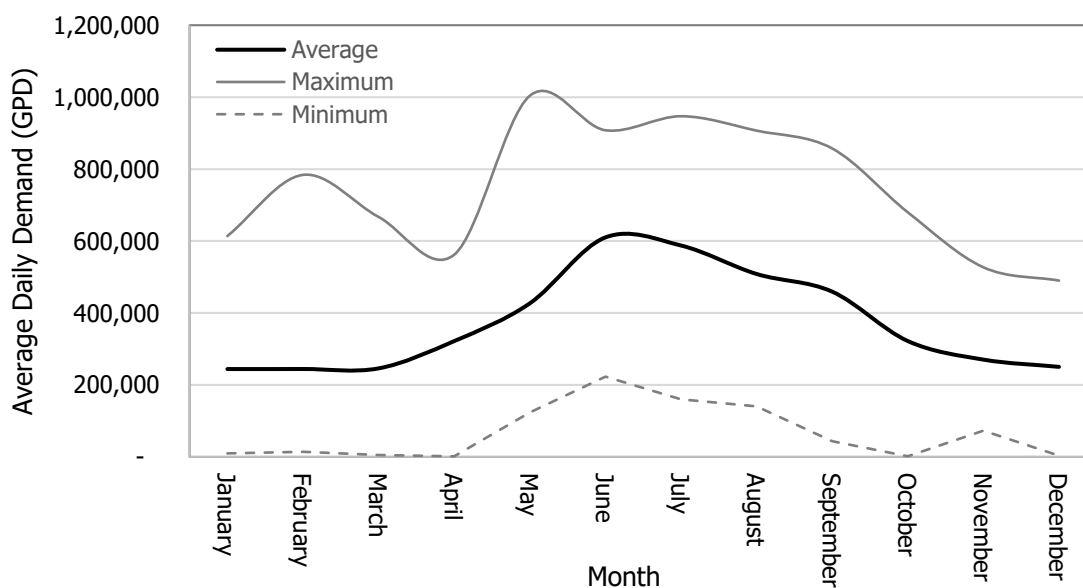
The predominant zoning type in the Town is residential. Less than 10 percent of incorporated areas are designated as commercial. Future growth is projected to continue within the existing pattern towards residential zoning with sufficient commercial development to provide for the major needs of local residents. For visual reference see the Bayfield Future Land Use Map (developed by RG & Associates) located in Appendix A.

4.2. HISTORICAL WATER USE

4.2.1. ANNUAL WATER PRODUCTION

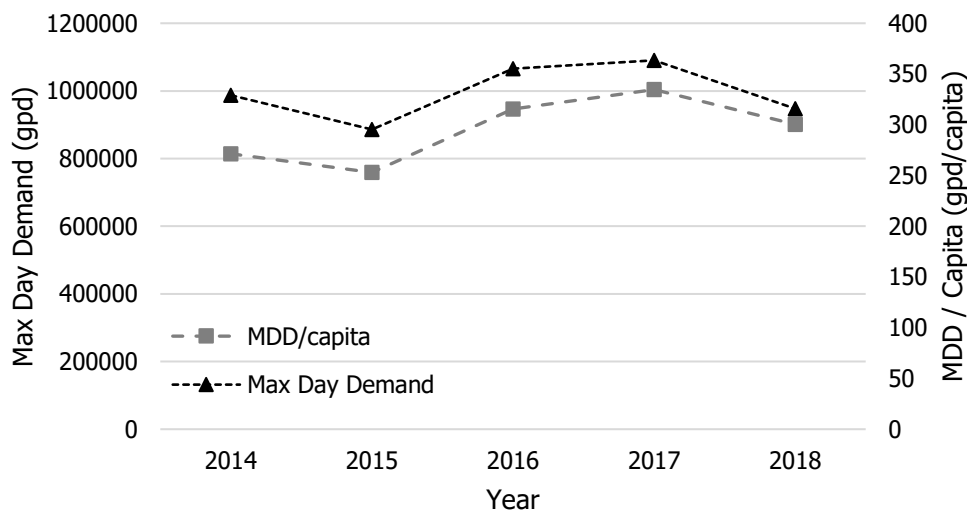
There is a significant difference between the average water demand during the summer and winter months; there is little to no irrigation during the winter. During the previous four years, the average daily use during winter months is approximately 0.25 MG (this is slightly down from 0.28 MG from the 2014 Master Plan). The summer time average demand is 0.6 MG for June and July (which matches the peak demand from the 2014 report). Figure 4 shows the average day demand (ADD) and maximum day demand (MDD) for each month; data shown is the average for the years 2014 through 2017.

Figure 4. Average Daily Water Demand per Month (Jan 2014 – Jun 2018)



The maximum daily demand for each year is typically experienced during June or July. Over the previous four years, the MDD usage has averaged 0.88 MG (Figure 5 on following page); this is unchanged from the average MDD determined during the 2014 Master Plan. The 2016 and 2017 peak days were very close to 1.0 MG.

Figure 5. Annual Maximum Day Demand



4.2.2. HISTORICAL CONNECTIONS

Historical population data and future growth predictions are summarized above in Section 3. Table 3 summarizes the current and predicted future number of service taps in relation to population estimates; the number of billed accounts reflects the number of billed meters in March 2018. The existing ratio between population to billed services is 2.67, which is down from the 2014 calculation of 2.77; bringing it closer to the national average of 2.5. The 2038 prediction uses the national average to predict future service connections.

Table 3. Population and Billed Accounts Prediction

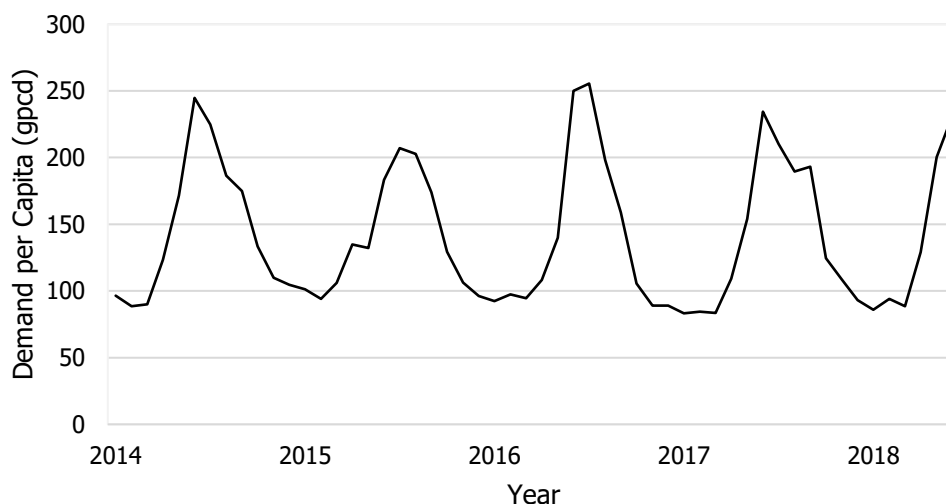
| Description | Existing Service Area (2018) | Future Service Area (2038) |
|-----------------|------------------------------|----------------------------|
| Population | 2,850 | 4,580 |
| Billed Accounts | 1,067 | 1,832 |

4.2.3. CURRENT POPULATION AND PER CAPITA WATER USAGE

The most recent federal census was completed in 2010 and recorded a population of 2,333 people in the Town of Bayfield. Population estimates included in the Town's 2018 Comprehensive Plan have been used to develop the population estimates in use for Figure 6 (on following page).

The annual average usage per capita has reduced slightly since the 2014 Master Plan; the previous study showed an average of 160 gallons per capita per day (gpcd), while more recent data shows 141 gpcd. The winter months (October through April) show a long-term average of 102 gpcd, while the summer months (May through September) reveal an average consumption rate of 194 gpcd.

Recent data has also been reviewed to determine the maximum daily demand; during the study period the MDD averaged 336 gpd/capita.

Figure 6. Average Daily Demand per Capita

4.2.4. WATER LOSSES

The Town distribution system shows a good track record of low water losses. A strict comparison of water production to billing records would indicate an overall average water loss of 12.2%. This does not however account for known, unmetered consumption that include uses for hydrant flushing, jet rodding, fire department testing, and line breaks. After estimating the quantity of the unmetered usage, the average water loss reduces to 10%.

4.3. WATER DEMAND PEAKING FACTORS

Peaking factors and average demand calculations provide a means to estimate future water usage based on projected population growth. Average demand per capita is projected to be fairly consistent with time, allowing estimation of future water use as a linear relation to population growth. Average daily demand (ADD) can then be used to calculate maximum daily demand (MDD) and peak hour demand (PHD) by the application of peaking factors. These factors are multipliers used to adjust ADD and provide estimates of MDD or PHD flow rates. The peaking factors are best developed for each system based on recorded water usage rates. For this study, peaking factors have been developed using records spanning a five year period.

The ADD during the study years, 2014 through 2017, has been 0.37 MGD. The average of maximum days during the period, MDD, is 0.75 MGD. This reveals a MDD:ADD peaking factor of 2.0. Published studies show a national range of 1.5 to 3.0 for MDD peaking factors. The 2014 Master Plan found a peaking factor of 2.3; the lower gpcd usage rate is impacting peak demand estimates. MDD usage is the standard engineering reference for sizing water treatment plants; sizing implications will be discussed below in Section 7.

Peak Hour Demands are harder to quantify than ADD or MDD usage; the latter two can be directly measured through water plant production, while the former would require extensive monitoring throughout the distribution system. An approximation of PHD can be made using the hydraulic model of the system. Based on modeled data, the current PHD is estimated to be approximately 1.5 MGD. The estimated PHD is 3.7 times the average ADD. Published literature indicates the ratio of PHD/ADD ranging from 2.5 to 5.0. PHD consumption rate is commonly used to determine minimum sizing of distribution system components. Table 4 (on following page) summarizes the peaking factors determined for the Bayfield water system.

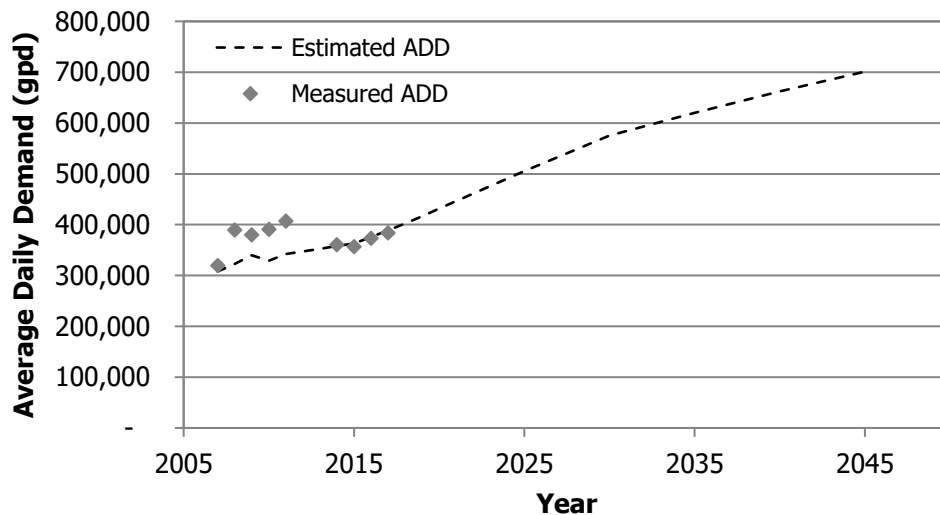
Table 4. Summary of Peaking Factors

| Description | Multiplier |
|----------------------------|------------|
| Average Daily Demand (ADD) | 1.0 |
| Maximum Daily Demand (MDD) | 2.0 |
| Peak Hour Demand (PHD) | 3.7 |

4.4. PROJECTED FUTURE WATER DEMAND

Future water demand predictions combine the demand data and peaking factor estimates with estimates of future population growth. Predictions of future water demand are critical to planning infrastructure growth in order to maintain dependable water service. The population growth estimate used in this study was first presented in the 2018 Comprehensive Plan that was developed by RG & Associates.

The population estimate for 2018 shows 2,853 persons in the service area. The population is predicted to increase to 4,583 persons by 2038. Figure 7 presents the measured and estimated ADD usage through the planning period; the 2038 ADD is predicted to be 0.65 MGD.

Figure 7. Estimated Average Daily Water Demand

The measured MDD has varied between 0.8 and 1.0 MGD over the previous ten years. The estimated MDD in 2038 is 1.6 MGD. Figure 8 (on following page) presents the measured and predicted MDD usage during the 20-year planning period. The MDD predictions utilize the peaking factor developed in Section 4.3 and the ADD estimate presented above.

Figure 8 also includes an estimate of MDD demand with the LAPLAWD connection. The 2013 LAPLAWD Conservation Plan lists a demand estimate of 0.864 MGD in 2030. This estimate has been scaled down by 40% per year for the years 2020 and 2025, and scaled up by 2% per year beyond 2030. This growth estimate was developed before the LAPLAWD began drawing water from the Town and should be revisited again in a few years, once the LAPLAWD has become more established and has enough data to accurately revise this estimate. If the current estimate holds true, the MDD demand may exceed 2.5 MGD by 2030; potentially leading to a WTP upgrade driven by LAPLAWD rather than Town growth.

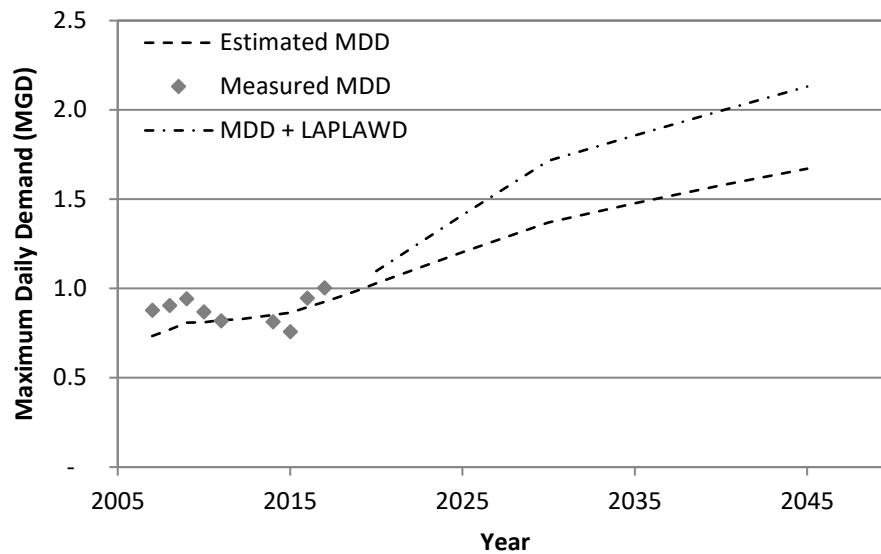
Figure 8. Estimated Maximum Daily Water Demand

Figure 9 presents the predicted PHD water usage. This figure is utilizing the peaking factor presented in Section 4.3 to adjust the ADD estimate presented in Figure 9. Peak hour demand in 2038 is predicted to be close to 2.4 MGD. The PHD estimates presented below depict Town water demands only, as this information is intended for use in sizing Town infrastructure. Table 5 lists the current and predicted future water demands based on seasonal variations and the peaking factors developed above.

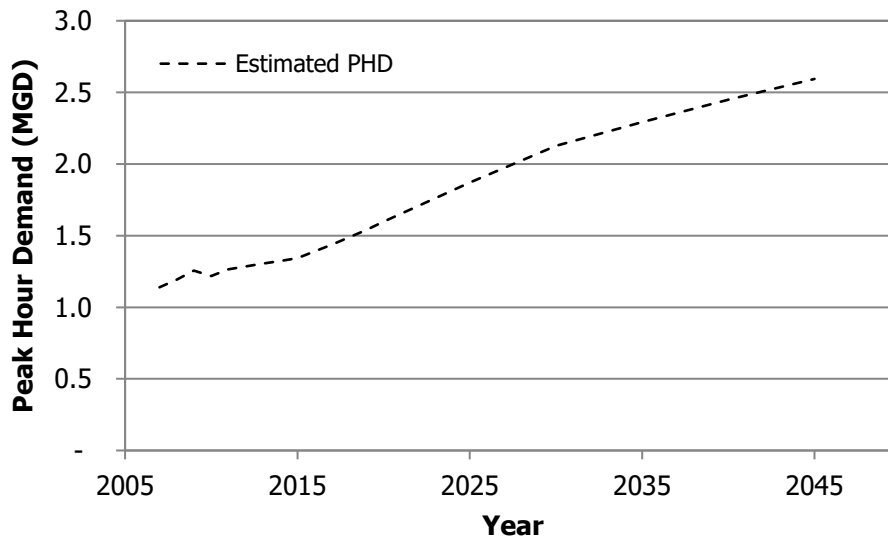
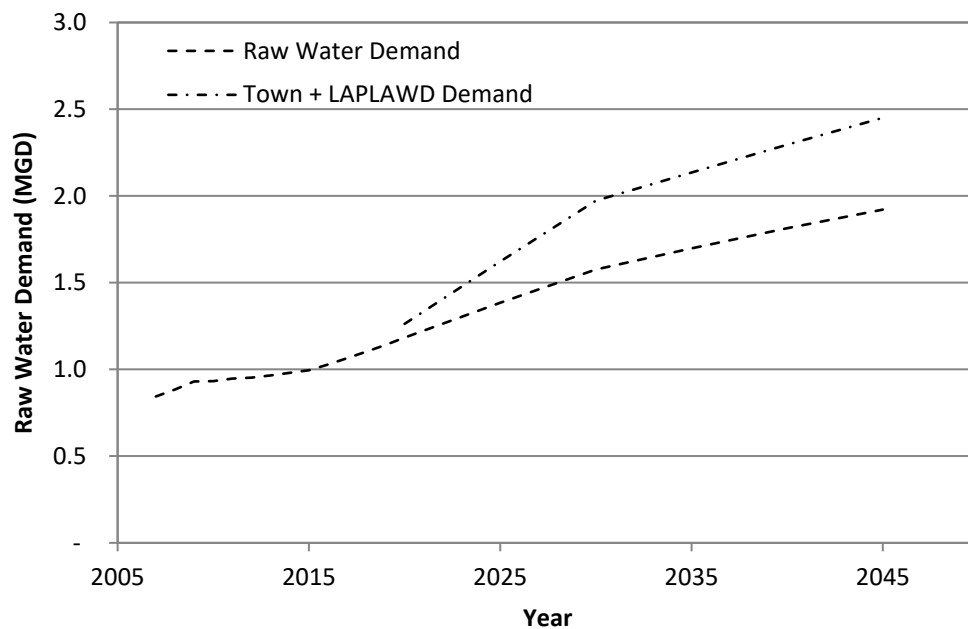
Figure 9. Estimated Peak Hour Demand

Table 5. Projected Water Distribution Demand

| Description | Existing Service Area (2018) | Future Service Area (2038) |
|--|------------------------------|----------------------------|
| Average Daily Demand (ADD, 141 gpcd) | 0.4 MGD | 0.65 MGD |
| Winter Average Daily Demand (102 gpcd) | 0.29 MGD | 0.47 MGD |
| Summer Average Daily Demand (194 gpcd) | 0.55 MGD | 0.89 MGD |
| Maximum Daily Demand (MDD, 2.0·ADD) | 0.8 MGD | 1.3 MGD |
| Peak Hour Demand (PHD, 3.7·ADD) | 1.5 MGD | 2.4 MGD |

Raw water demand is projected to be 15 percent higher than distribution demand due to filter backwash requirements, and other minor uses within the treatment facility; an estimate of MDD raw water demand is presented in Figure 10. An estimate of total raw water demand, including LAPLAWD, is included and is based on the growth estimate discussed above.

Figure 10. Estimated Raw Water Demand

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5. EXISTING RAW WATER SUPPLY

The raw water supplied to the Bayfield WTP is conveyed via the Pine River. Two existing options provide the capability to move water into the raw storage reservoir. The Los Pinos Ditch and the Los Pinos Pump Station each draw water directly from the river and can convey water to the reservoir. The Pine River originates at the Vallecito Reservoir; the Town also purchased storage rights in Vallecito. The most recent summary of Town water rights was completed by Wright Water Engineers in 2003, this document is included under Appendix D.

5.1. SURFACE WATER SOURCES

The Town of Bayfield owns two separate surface water rights, each derived from the Pine River. The Town also holds storage capacity within Vallecito Reservoir. Both surface water rights are conveyed primarily through irrigation ditches that run adjacent to the Town water treatment plant; each ditch derives flow from the Pine River. The Los Pinos Ditch provides the bulk of the Town's rights, while the Schroeder Ditch conveys the remainder. See the Pine River Irrigation District (PRID) agreement in Appendix E, and the Los Pinos Ditch company agreement in Appendix F for more detail on existing raw water storage and conveyance contracts.

In addition to using adjacent ditches to convey water, the Town also owns the Los Pinos Pump Station. This pump station draws water from the Pine River and can supply water to the reservoir or directly to the WTP via the reservoir bypass piping. The Pump Station is permitted as an optional means to convey the Town's municipal permitted water rights.

5.2. WATER RIGHTS FOR SURFACE WATER SOURCES

The municipal rights owned by the Town may be conveyed by means of the respective ditches or using the Los Pinos Pump Station. The Pump Station is permitted to convey the full 1.8 cfs municipal right at any time that higher priority rights are not taking precedence.

The IGA with LAPLAWD includes provisions for the transfer of LAPLAWD water rights to be conveyed by the Los Pinos Ditch; this transfer has not yet been completed.

The Town holds a Priority 4 Right to 2.869 cfs of water from the Los Pinos Ditch; 1.0 cfs of this right has been transferred to municipal use, the remaining 1.869 cfs is currently limited to irrigation uses but is in the process of transferred to municipal usage. The Los Pinos Irrigating Ditch Company imposes approximately 15-20 percent water loss on all rights, to make up for losses within the ditch itself. Due to this loss, the Town's 1.0 cfs municipal right to Los Pinos Ditch water is reduced to not more than 0.85 cfs. This right can only be exercised via the Los Pinos Pump Station when its water cannot reasonably be carried through the Ditch, such as when the Ditch is being cleaned or repaired, when the Town has a legitimate need to pump water through the Pump Station for maintenance, for water quality, when the ditch is subjected to freezing such that it cannot carry the Town's water, other legitimate reasons related to the treatment of the water, or as the Ditch Company otherwise agrees in writing.

An additional Priority 12 Right to 1.737 cfs is conveyed by the Schroeder Ditch; 0.785 cfs of this right has been transferred to municipal use, the remaining 0.952 cfs is limited to irrigation uses. There is no existing means to convey water from the Schroeder Ditch to the raw water reservoir (the Schroeder Ditch Company uses 15 percent for water loss which includes evaporation and ground saturation); the municipal rights on the Schroeder Ditch currently can only be exercised via the Los Pinos Pump Station. The Town has purchased a pump system of appropriate size for conveying water from the Schroeder ditch into the reservoir; design and approval of the Schroeder Ditch Pump Station has not yet been completed.

The Town holds several other water rights that are currently limited to irrigation uses but could potentially be transferred to municipal in the future. Two separate decrees for Priority 2 water rights are held on the Bean Ditch; Case 97CW79 established 0.25 cfs in 1997, and a quit claim deed from 1997 provides another 0.5 cfs, for a total of 0.75 cfs help in the Bean Ditch. In 2001 an additional 0.5 cfs of Catlin Ditch water

right was transferred to the Town; this is a Priority 33 level water right.

Town has a third party contract with PRID for 90 acre feet (30 AF – Leased and 60 AF –Standby) of storage water annually. The 30 AF is available each year if the town's water rights fall out of priority. The 60 AF is also available annually; however, once standby water is converted to leased water, the water is leased for the duration of the contract. A copy of the Third Party Contract for Lease of Pine River Project Water is in Appendix E.

The water quality of the Pine River is considered good. With treatment, Pine River can supply drinking water that meets drinking water Maximum Contaminant Levels (MCLs) and other drinking water standards established by the U.S. Environmental Protection Agency and enforced by the Colorado Department of Public Health & Environment (CDPHE). Table 6 summarizes the typical raw water quality parameters.

In November 2004, CDPHE published a Source Water Assessment Report for the Town of Bayfield's drinking water supply. (Available at: <https://drive.google.com/file/d/0B0tmPQ67k3NVeExkckFkSF9kSDQ/view>). The report concluded that the susceptibility of the Town's drinking water source was in the range of moderate to moderately high.

Table 6. Typical Raw Water Quality

| Parameter | Typical Range of Analytical Results |
|---|-------------------------------------|
| Total Organic Carbon (TOC) (mg/L) | 1.25 to 1.5 |
| pH | 7.0 - 7.75 |
| Alkalinity (mg/L as CaCO ₃) | 50 to 250 |
| Turbidity (NTU) | 0.5 - 100 |
| Specific Ultraviolet Absorption (SUVA) (L/mg-m) | 2.0 - 3.0 |
| Temperature (°C) | 4-12 |
| Total iron (mg/L) | 0 - 0.3 |
| Total manganese (mg/L) | 0 - 0.05 |
| Hardness (mg/L as CaCO ₃) | 100 - 200 |

6. HYDRAULIC MODEL

Computer based hydraulic models are commonly used to aid in analysis and design of distribution systems. Every major component in the distribution system, from pumps and pipes to valves and tanks, can be represented in a model. Pumps can be modeled based on actual output capacity curves, pipes and valves assigned head-loss factors and set to be open or closed, and tanks can be set to accurately reflect volume equalization and pressure maintenance effects. A properly calibrated model is an excellent resource for evaluating existing system conditions and planning for future improvements.

A model of the Town of Bayfield's potable water distribution system has been developed using Bentley's WaterGEMS computer program; the previously developed model was updated and re-calibrated as part of this study. Digitized models of real world distribution systems are limited by the accuracy of the data used to build and calibrate them. The attached Pressure Zone Elevation figure (Figure B, Appendix A) shows the tanks, pumps, and pressure zone interconnects that are included in the model.

6.1. HYDRAULIC MODEL CONDITIONS

The WaterGEMS model has been developed using survey data collected by Pinnacle Surveying on behalf of the Town. An accurate survey is an exceptional data source for a hydraulic model; the relative distances and elevations between the system components is critical for calibrating the model to measured data. All distribution system components have been represented as accurately as possible; the modeled storage tanks reflect actual storage volumes and working elevations, the various pumps are modeled based on the factory pump curves, and pressure control valves are set to reflect current operating set points.

User demands within the model are distributed based on current records and predictions of future growth usage and locale. The water demand in the model was developed using recent WTP production records and predictions of future demand presented in Section 4.4. Hourly variations in user demands are based on a diurnal curve, developed from measured sewer flows in the Bayfield collection system. This diurnal curve allows for evaluation of predicted peak hourly demands and the associated peak velocities within the distribution system.

6.2. HYDRAULIC MODEL CALIBRATION

To provide reasonable predictions of future conditions, a hydraulic model must be calibrated to reflect the existing system. Calibration of the model involves comparing measured pressures and flow rates in the actual distribution system to those represented in the computerized hydraulic model. Any model is limited to the data from which it is built, and the calibration accuracy based on that data. A properly calibrated model is not a finished product, but a work in progress; it must be updated with the current changes to the physical system that the model represents. The previously developed WaterGEMS model has been revised to reflect changes made to the distribution system since the last master plan was completed, and the calibration has also been updated.

The model calibration is based on the Town's fire hydrant flow testing records. The Town Public Works Department conducts the hydrant flow tests and submits the data to the local fire protection district for their records. The testing records provide three data points for each hydrant, all of which are useful for calibrating the computer model; each data point is a different pressure reading. The first data point is static pressure, which is the pipeline pressure recorded with the test hydrant closed. The remaining two points are recorded with the hydrant open to provide maximum flow and relay the residual pressure remaining in the pipeline while the hydrant is flowing, and the pitot pressure is that recorded outside the hydrant using a standard pitot gauge (which provides a measure of the flow rate). The static pressure is useful for initial calibration to ensure the modeled water surface elevation in the storage tanks reflect that observed during the hydrant testing. The residual pressure and flow rate are used to determine head losses within the distribution system; the combination of these two data points helps assess the internal friction of the pipes in the system.

A minimum standard for calibration was determined through literature review (Walski, Journal for Water

Resource Planning & Management, ASCE, vol. 109, issue 4). The average and maximum deviation between modeled and measured data is desired to be within 5 and 15 feet respectively; this is a reasonable expectation for calibration when using a higher quality data set (such as the Town's survey). Lower quality data would be cause for a reduced expectation of calibration accuracy. The computer model has been calibrated in comparison to the Town's hydrant flow testing records, using an average of data collected during 2017 and 2018; previous data was not included due to pipe replacement and diameter changes made in the distribution system during 2016. The Town maintains approximately 160 fire hydrants throughout the distribution system; each was evaluated for consistency of measurements over the two year averaging period. Twenty five hydrants (distributed throughout the system) showing the most consistent pressure readings were selected to use for calibrating the model. Measured hydrant data is presented along-side the calibration results in Appendix G.

The first step in model calibration is to achieve accuracy under a static scenario. The static pressures measured during hydrant testing are used as a comparison to see how accurately the model reflects those measurements; it is reasonable to assume that all normal user demands were in place at the time of measurements, making this easy to approximate in a computerized model. The static calibration using all 25 hydrants achieved a differential of 5.6 feet (2.4 psi) on average and 13.8 feet (6 psi) maximum in comparison to measured data.

The second phase of calibration utilizes the data collected during hydrant flow testing. This step simulates opening a hydrant to ensure the hydraulic model can accurately reproduce the measured data. This is a more challenging calibration step, as velocity and friction losses become a significant factor of the system. As calibrated, the residual pressure using all 25 hydrants shows 5.2 and 14.5 feet for average and maximum differentials. (Refer to Appendix G for more detail on the calibration data.)

7. WATER SYSTEM ANALYSIS

The following review of major system components will utilize the information presented in Sections 3 through 6 (above). The existing systems were discussed in Section 3. Current and predicted potable water supply requirements are reviewed in Section 4, and the raw water supply needs are detailed in Section 5. Finally, Section 6 presents the development and calibration accuracy achieved within the computerized hydraulic model. All analyses presented below are the result of the cumulative understanding developed through the previous sections of this report.

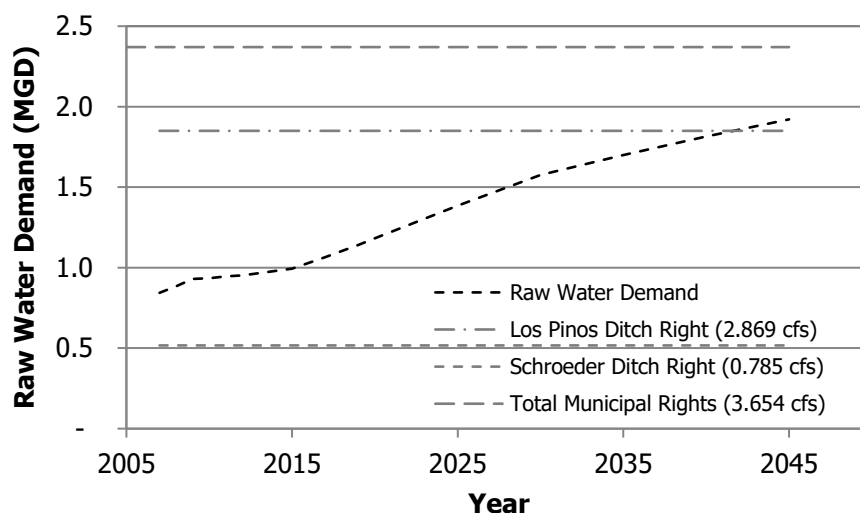
The IGA between the Town and LAPLAWD has established a list of Joint Use Facilities and further defined an allotment of 0.75 MGD of treatment capacity to LAPLAWD. Using the 0.75 MGD as a ratio of the total proposed treatment capacity of 2.5 MGD for the WTP Improvements Project indicates a 30/70 split (LAPLAWD/Town) in allotment of Joint Use Facility capacity. While the 30/70 split is not specifically defined in the IGA, it is used in the following evaluations to provide a capacity baseline available to the Town. This ratio is only applied to evaluation of the IGA defined Joint Use Facilities.

7.1. SURFACE WATER SUPPLY EVALUATION

Raw water supply requirements are typically based on the MDD distribution demand plus the losses associated with filter backwash and other associated treatment plant uses; these losses are estimated to be 15 percent of total WTP production. Figure 11 depicts the raw water demand estimate and the existing municipal water rights for the Town (the Los Pinos water right shown reflects the full conversion to municipal rights which is currently being negotiated).

The IGA with LAPLAWD states that each party shall be responsible for delivering their respective share of raw water required at the treatment plant. LAPLAWD's 2013 Water Management and Conservation Plan indicates the LAPLAWD holds a lease for 200 AF of water from the PRID, and a conditional right for up to 7.5 cfs on the Pine River (near Pine River Canal); this water is stored in the Vallecito Reservoir. The LAPLAWD's raw water needs are not included in the evaluation or Figure 11.

Figure 11. Comparison of Projected Raw Water Demand and Existing Water Rights



The current municipal right of 1.8 cfs is sufficient to supply the MDD raw water needs of the WTP through approximately 2022. The Town needs to have additional, municipally allocated, water rights within the next few years. Additional rights on the Los Pinos Ditch are currently being converted to municipal use and are expected to be available before 2020.

7.1.1. LOS PINOS DITCH WATER RIGHTS

The Town holds water rights and additional conveyance allowances within the Los Pinos Ditch. The total water right is for up to 2.869 cfs, the Town also pays for an additional conveyance allowance for up to 4 cfs. The Los Pinos Ditch is currently imposing a 10% reduction in flow rights versus water rights to cover losses within the ditch. The ditch losses reduce the currently available municipal flow to 0.9 cfs (from the full 1.0 cfs municipal right). The Town's water rights on the Los Pinos Ditch may be transferred via gravity using the reservoir intake flume or by the Los Pinos Pump Station.

A conversion of all the Town's Los Pinos Ditch water rights to municipal use is currently in progress; this will provide up to 1.85 MGD (2.869 cfs). This is predicted to meet the MDD water supply needs of the Town throughout the planning period (raw demand in 2040 is estimated at 1.8 MGD).

7.1.2. SCHROEDER DITCH WATER RIGHTS

An additional 0.785 cfs (0.52 MGD) of existing municipal water right may legally be conveyed via the Schroeder ditch; however, the only existing means to transfer this right is through the Los Pinos Pump Station. Installation of a smaller pump station along the ditch and adjacent to the WTP could allow access to this right at a lower electrical expense.

Converting the remainder of the currently held Town water rights for the Schroeder Ditch, from irrigation to municipal use, could provide an additional 0.952 cfs (0.62 MGD) (NOTE: This does not account for the loss during the transition from irrigation to municipal or imposed water loss). A portion of the additional total would still be Priority 12 and subject to calls from senior rights holders. For non-drought conditions, while the full allotted rights are in priority, the combination of the existing municipal and converted irrigation raw water supply is projected to be sufficient to provide for Town needs for the foreseeable future.

7.1.3. PINE RIVER INTAKE

The Pine River Pump Station relies on a buried intake array to convey water into the wet well for pumping to the WTP. The pumps and controls were replaced as part of the 2016 WTP project and are expected to be able to meet the needs of the system throughout the planning period. The flow rate provided by the intake system is dependent on river level; at times of low river flow, the pump station can be limited to a fraction of the pumping capability. The intake array is currently under investigation to review options for improving the flow capacity during times when there is a low level in the river.

7.1.4. SURFACE WATER INTAKE FLUME

The intake flume between the reservoir and Los Pinos Ditch was replaced as part of the 2016 WTP Expansion project. The 9-inch parshall flume and flow control gate provide for accurate control and measurement of the water entering the reservoir; this flume size is considered accurate within 3 to 5 percent at flow rates up to 8 cfs. An ultrasonic level sensor also measures the flow through the flume and relays the data to the central SCADA system. The new intake flume can also divert flow around the reservoir through a bypass pipe, allowing for reservoir draining and maintenance.

7.1.5. RAW WATER RESERVOIR

The existing 30 ac-ft raw water reservoir is planned for expansion through the IGA with LAPLAWD. The planned expansion will provide a total capacity of 60 ac-ft (at the planned spillway elevation). The increased storage capacity will help alleviate fluctuation in supply due to ditch or pump station maintenance, or other temporary losses of raw water conveyance.

7.2. TREATMENT CAPACITY ANALYSIS

The WTP is currently rated to produce up to 2.5 MGD of treated water. The Town MDD usage in 2040 is estimated to be 1.6 MGD; with LAPLAWD, the total demand is estimated to be 2.6 MGD. The next WTP

expansion may be needed at the end of the 20-year planning period, in 2038.

The IGA between the Town and LAPLAWD includes a capacity allocation for the expansion completed in 2016. The Town's share is 0.25 MGD, providing a total WTP capacity for the Town of 1.75 MGD. The remaining 0.75 MGD of capacity is allocated to the LAPLAWD; their 2013 Conservation Plan indicates the LAPLAWD may outgrow their allotted capacity before 2030 unless they develop a new treatment source. The LAPLAWD Conservation Plan is included as Appendix H. Maintaining the capacity allocations may lead to a WTP expansion before the total capacity is exceeded; the 2016 WTP Expansion project included space for a planned expansion for an additional 1.0 MGD of WTP capacity.

7.3. DISINFECTION CAPACITY ANALYSIS

The existing multibarrier disinfection (removal/inactivation) systems (in use) are sized to meet the future 3.5 MGD WTP capacity. The new clearwell and UV reactor are designed to meet existing regulations at the full WTP capacity.

7.4. PRESSURE ZONE ANALYSIS

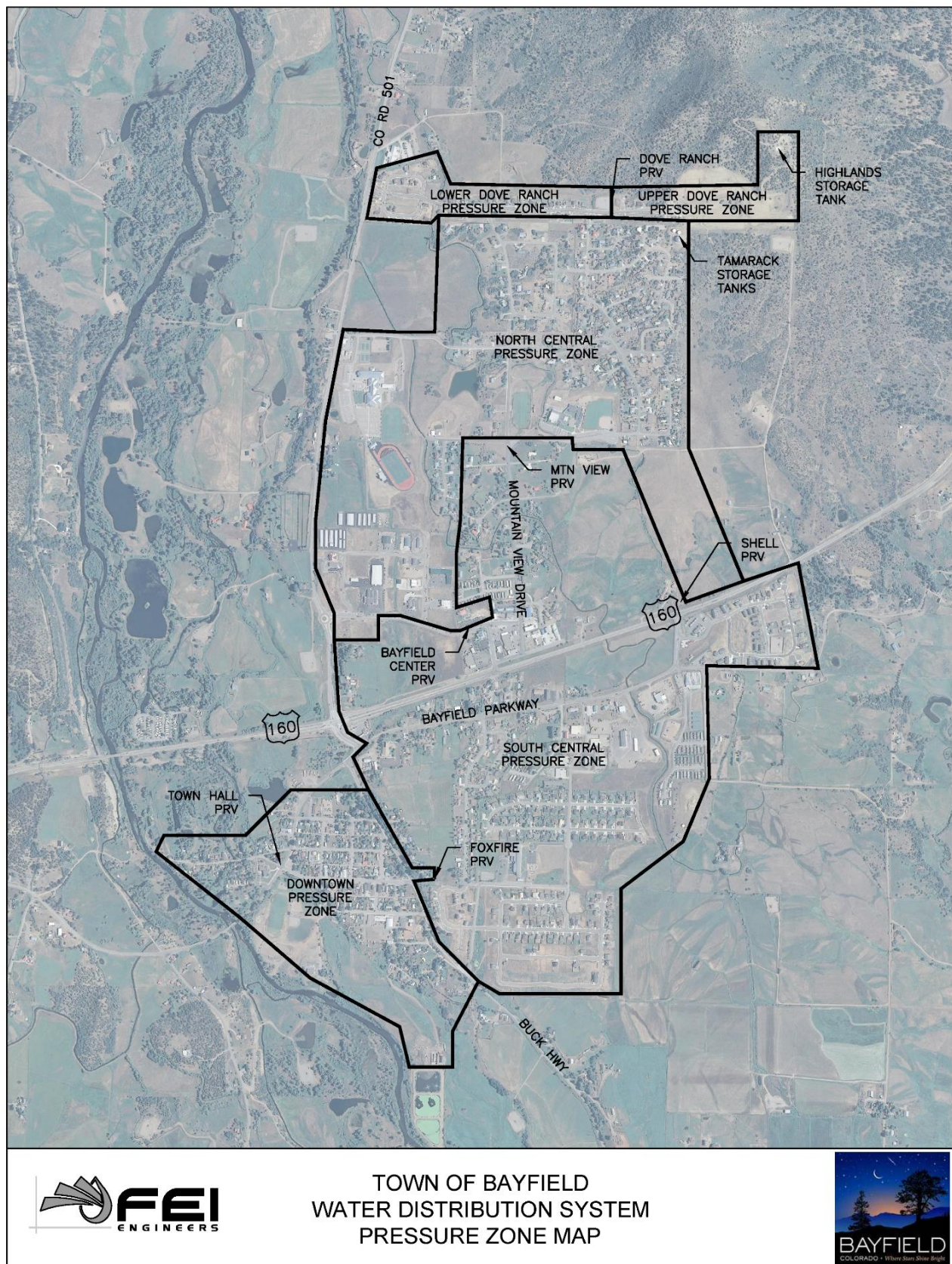
The existing distribution system is divided by six pressure reducing valves (PRV) and one booster pump, to form five pressure zones. Two zones are located along Dove Ranch Road and provided water from the Highlands Tank. The North Central Pressure Zone contains the WTP and Tamarack storage tanks. Three PRVs divide the North Central Zone from the South Central Pressure Zone. Two more PRVs provide separation between the South Central Zone and the Downtown Pressure Zone. Figure B (Appendix A) shows the hydraulic grade and service elevations of each pressure zone and Figure 12 (on following Page) provides a map of the pressure zones.

The Upper Dove Ranch Pressure Zone represents the highest service elevation in the existing distribution system. It is pressurized by the 0.25 MG Highlands Tank. The service elevations range from 7,394 to 7,153 feet. The Dove Ranch PRV Station divides the Upper and Lower Dover Ranch Pressure Zones. The lower zone has service elevations ranging from 7,292 to 7,017 feet.

The North Central Pressure Zone contains 1.5 MG of storage volume, provided by the three tanks on Tamarack Street. The WTP is also located in this zone and pumps water as needed to refill the Tamarack tanks. The connection to the LAPLAWDs system is also in this pressure zone, although it is fed by a high-pressure pipeline that passes through the South Central and Downtown pressure zones. The Highlands Booster Pump is also located in this zone, adjacent to the Tamarack Tanks. The North Central Pressure Zone has service elevations ranging from 7,181 to 6,973 feet. There is a limited area of low service pressure where houses have been built too close in elevation to the tanks, this affects houses within approximately 1/5 mile of the Tamarack Tank site.

Three PRVs located on Mountain View Drive, North of the Shell Station, and on Bayfield Center Drive provide a reduction in pressure between the North and South Central Pressure Zones. The PRV on Bayfield Center Drive was previously buried and was discovered after the last update to the Master Plan. The Mountain View and Shell PRVs are installed at similar elevations (7,010±3 feet), while the one on Bayfield Center Drive is approximately 35 feet lower in elevation (6,975 feet); the elevation difference can lead to uneven flow balancing between the three control valves. The service elevations in this zone range from 7,292 to 7,017 feet.

The Downtown Pressure Zone is separated from the remaining distribution zones by two PRV stations. Historically, only the PRV located on Foxfire Road provided water to the downtown area; this PRV separates the South Central Zone from the Downtown Zone. A second PRV was installed on the high-pressure pipe feeding LAPLAWDs system; this PRV went into service in 2015 and provides a pressure reduction between the North Central Zone and the Downtown Zone. Service elevations in the downtown area range from 7,073 to 6,850 feet.

Figure 12. Pressure Zone Map

7.5. STORAGE CAPACITY ANALYSIS

The Town currently has a total storage capacity of 1.75 MG. A typical design factor for sizing storage requirements (not including fire flow needs) is to plan for at least 25 percent of the MDD as equalization storage capacity. Based on the 25 percent of MDD criteria, the future storage requirement is 0.44 MG; therefore, the existing storage capacity is projected to be sufficient throughout the 20-year planning period.

In the Town's 2005 Comprehensive Plan, a goal of developing and maintaining a two-day storage capacity was established. Completion of the 1 MG steel and 0.25 MG concrete tanks (in 2007 and 2008 respectively) achieved that goal temporarily. The recorded MDD usage for 2017 was 1.0 MGD, the averaged MDD for the past four years is 0.88 MGD. The Town currently has approximately two-day storage capacity under MDD conditions and is expected to have less in the immediate future. If the comparison is made to average demands, the Town is predicted to have two days of storage for ADD usage throughout the planning period.

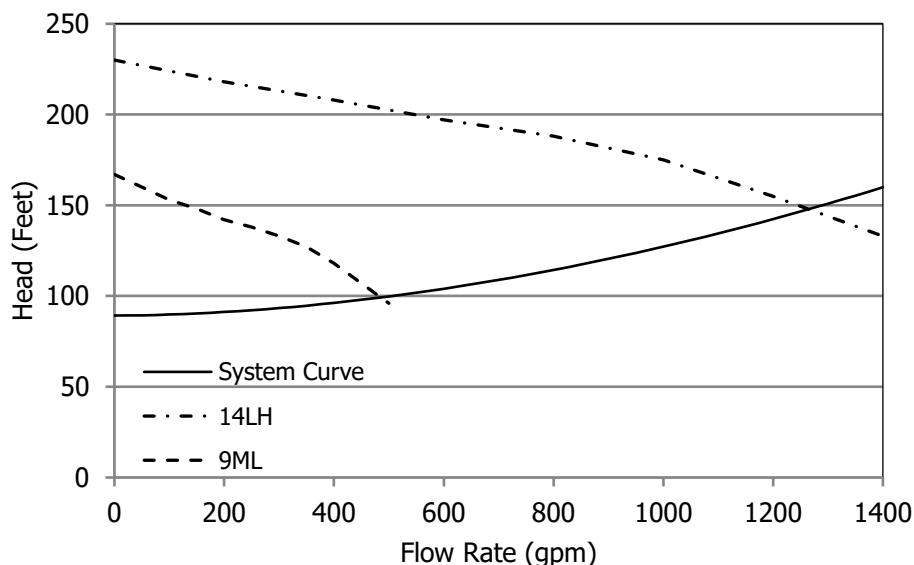
7.6. PUMPING CAPACITY ANALYSIS

7.6.1. RAW WATER PUMPING

The Los Pinos Pump Station is located adjacent to the Pine River; the pumps and controls were replaced during the 2016 WTP Expansion project. The pumping system is now capable of moving approximately 1,200 gpm (2.67 cfs) into the reservoir; this is sufficient to meet peak Town raw water demands through 2030. The pumping limit based on current municipal water rights is 800 gpm (1.8 cfs or 1.15 MGD); as noted in the water rights discussion, the water rights based pumping limit will soon be increased to 2.37 MGD.

Conveyance of raw water for LAPLAWD water rights is currently restricted to pumping from the river; none of their water rights are expected to be transferred to ditch conveyance. This may eventually impact the share of use between the Town and LAPLAWD, and potentially lead to a need to increase capacity at the pump station

Figure 13. Raw Water System and Pump Curves

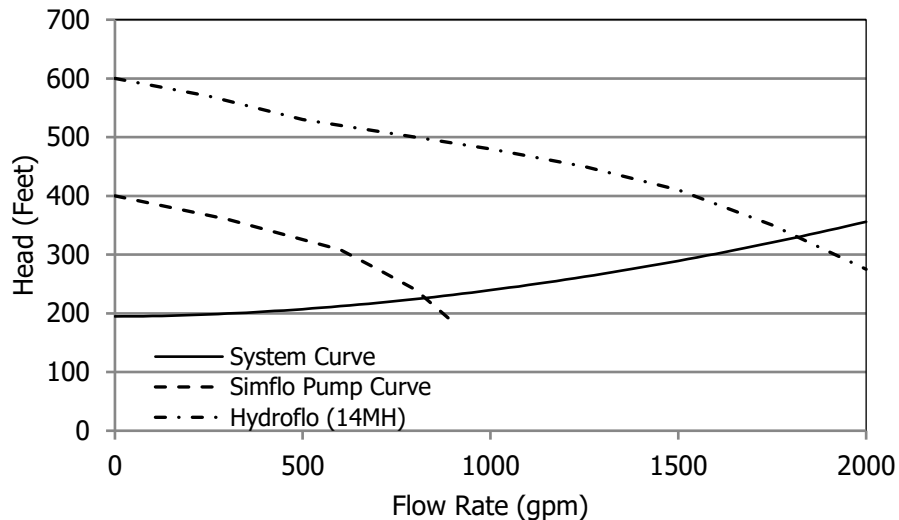


7.6.2. FINISHED WATER PUMPING

There are three vertical turbine pumps installed in the new clear well to move finished water into the distribution system. The two Hydroflo pumps have matching pump curves and were installed during the 2016 WTP Expansion project; the third pump is a Simflo model that was originally

installed in the old clear well in 2003 and then transferred for use in the new system. Figure 14 shows the system and pump curves for the existing finished water system.

Figure 14. Finished Water System and Pump Curves

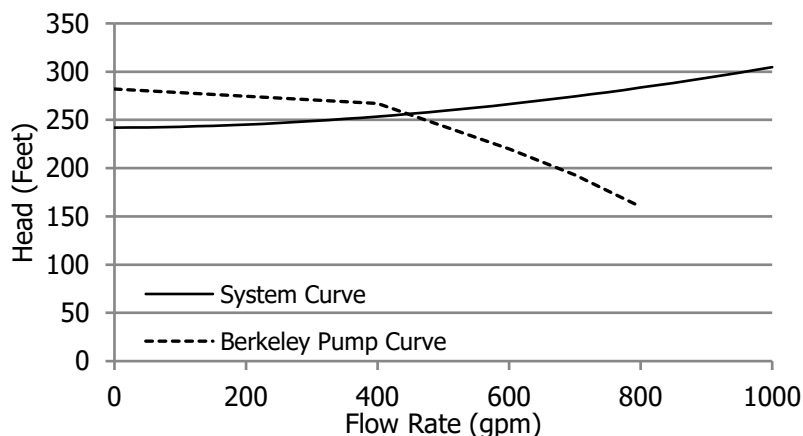


The new finished water pump system will convey the full 2.5 MGD capacity of the existing facility. Based on the IGA with LAPLAWD, the Town's 70 percent allotment of this capacity is 1.75 MGD; Town MDD demands are not projected to exceed this capacity during the planning period. The LAPLAWD demand projections should be revised before the end of the planning period; current projections show the combined demand exceeding the 2.5 MGD capacity near the end of the 20-year planning period.

7.6.3. DISTRIBUTION BOOSTER PUMPING

The Highlands Booster Pump Station is located adjacent to the three steel tanks on Tamarack Street. It provides added pressure to fill the Highlands Tank, which in turn provides pressure to the two pressure zones located along Dove Ranch Road. Existing daily demand on this system is approximately 0.025 MGD and future user demand is projected to reach approximately 0.24 MGD (167 gpm). The existing pump can convey approximately 450 gpm and is sized to meet the predicted future demands. System and pump curves for the Highlands Booster Pump Station are presented in Figure 15 (on following page).

Figure 15. Booster Pump Station System and Pump Curves



7.7. DISTRIBUTION SYSTEM ANALYSIS

The distribution system piping is predicted to be of adequate size and configuration to convey the peak hour water demands throughout the planning period. There are areas that should be considered for replacement due to age of the components and to prevent potential future capacity limitations. The most notable section is the 6-inch asbestos reinforced concrete piping along Mountain View; this is one of the oldest pipe sections in the system and is one of only three pathways for water to flow from the Tamarack tanks to the South Central and Downtown Pressure Zones.

Future buildout of the system is predicted to lead to higher velocities and potentially unacceptable head loss in the distribution system. Two sections of 10-inch piping may become velocity limited in the future; these are (1) the pipe connection at the Tamarack tank site, and (2) the piping along Lakeside Drive between the WTP and Mountain View. The revised population growth estimate shifted the predicted time of this limitation to beyond 2040.

Several other limited areas of the distribution system have been identified for targeted replacement due to undesirable materials (galvanized steel and low quality PVC). These will be discussed in Section 8 (below) with the other recommended capital improvements.

7.8. FIRE FLOW CAPACITY ANALYSIS

The Town has adopted the International Fire Code (IFC) which defines minimum flow rates and pressures based on building size and classification. There is a general minimum of 1,000 gpm for one hour for residential structures less than 3,600 sq. ft. All modeled hydrants were evaluated using this residential minimum.

The analysis of fire flow capacity was completed using the computerized distribution system model. Within the model, only four hydrants fail to meet the IFC minimum standard. The lowest fire flow, as modeled, was at a hydrant on Cholla Street, which showed a flow of over 600 gpm. In general, the hydrants that failed to meet the IFC minimum were on small diameter mains in older parts of town and/or close in elevation to the storage tanks. All hydrants were able to provide flow for more than 2 hours which is in excess of the 1 hour minimum. A pumper type fire engine may be sufficient to provide the needed head to extract up to 1,000 gpm at all hydrants.

7.9. WATER LOSS EVALUATION

Town staff reports an average water loss rate of 10 percent, and 2017 records show a very low 6% rate of unaccounted water. The Town experiences a low rate of water loss which is within acceptable standards. Targeted replacement of older and lower quality piping sections is appropriate to help maintain the currently low rate of water loss.

7.10. WATER QUALITY COMPLIANCE STRATEGY

The combined efforts of management and operations staff at the Bayfield WTP have resulted in an excellent track record of producing water that meets regulated water quality standards. Changes made to both regulatory requirements (MPA testing was eliminated) and the treatment process over the past five years have improved the ability to meet regulatory requirements and helped alleviate seasonal quality issues. Pre-oxidation with chlorine dioxide is now a regular practice. This chemical helps prevent seasonal taste and odor issues, and breaks down organic carbon to prevent formation of disinfection byproducts. The upgraded disinfection systems will assist in maintaining compliance with water quality standards throughout the life of the WTP.

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8. ITEMS FOR INCLUSION IN THE CAPITAL IMPROVEMENTS PLAN

8.1. RECOMMENDED IMPROVEMENTS

The following presents the recommended capital improvements that were identified through discussions with Town staff, development of the hydraulic model, and review of the sections above. Figure 16 (on page 40) identifies the locations of these recommended improvements. The only critical component to address in the next five years are Town water rights; the other recommendations are intended for future planning.

8.1.1. WATER INTAKES

8.1.1.1. LOS PINOS PUMP STATION INTAKE

The Intake array at the Los Pinos Pump Station is currently under review. Pending the outcome of that analysis, appropriate steps should be taken to maximize the capability of the river water intake system.

The raw water demands associated with LAPLAWD's water supply may force an upsizing of capacity at the Los Pinos Pump Station. This could potentially impact both the intake and pumping systems. Further review of this item should be conducted pending completion of the intake evaluation and any updates to LAPLAWD's growth estimates.

8.1.1.2. SCHROEDER DITCH

The Town owns a pump system that could be installed to convey water from the Schroeder Ditch, adjacent to the WTP, into the raw water reservoir. This could provide beneficial redundancy for raw water conveyance and provide a potential electrical savings over pumping the lower elevation at the Pine River.

8.1.2. TREATMENT CAPACITY

The Town's existing treatment capacity allotment of 1.75 MGD is expected to meet the needs of the MDD usage throughout the planning period; the MDD in 2040 is expected to be approximately 1.6 MGD. Depending the rate of growth within the LAPLAWD, a WTP expansion may be required to maintain capacity before it becomes mandated by Town water usage.

Estimates of MDD and raw water demand for the LAPLAWD, presented in Section 4.4, were established by Harris Engineering before the LAPLAWD began serving water to customers. The LAPLAWD's MDD usage and growth estimates should be reviewed and revised.

8.1.3. PUMPS

All existing pump systems are expected to meet the system needs throughout the 20-year planning period. The raw water pumps at the Los Pinos Pump Station were replaced in 2016; the upgraded capacity exceeds 1.5 MGD. The finished water pumps were replaced as part of the same project; the new pumps capacity is approximately 3 MG.

8.1.4. PIPING

The existing distribution system pipes are sufficiently sized to convey peak flows throughout the planning period; though some areas are expected to become velocity limited shortly thereafter. Several other areas of piping have been identified for targeted replacement due to age or dependability concerns.

Town water demands are predicted to create head loss impacts to the piping at the Tamarack Tank site and near the WTP. Each of these sections are 10-inch PVC and represent the sole connection for the distribution system in their respective locations. These pipe sections are not predicted to create undesirable head loss due to Town demands until after 2040. Considering the critical nature of these pipe sections to the Town's water service, it may be best to install parallel pipes using hot

tap techniques; this would allow for continuous service while preventing a future system limitation.

There are several sections of asbestos reinforced concrete (AC) piping that remain in service throughout the distribution system. It is recommended that all AC piping in the system be replaced over time; the Town has begun prioritizing pipe replacement so that work on these sections is completed in advance of other public works expenses (i.e. repaving roadways). Due to good levels of looping in most areas of the distribution system, these sections of predominately 6-inch AC piping are not expected to become sources of head loss but should be replaced to maximize dependability.

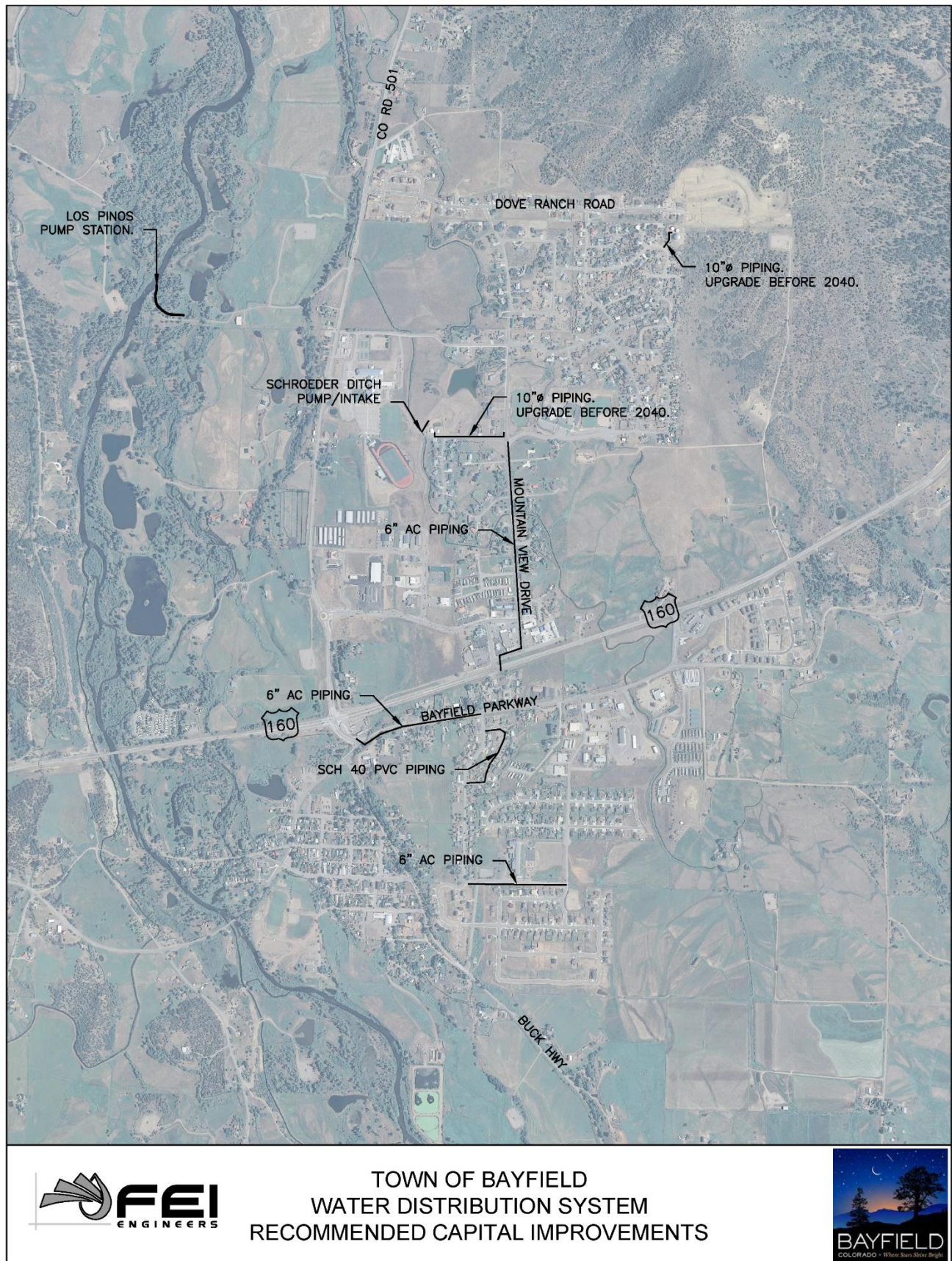
There are several sections of piping included on the CIP list for targeted replacement. Each targeted section is identified on Figure 16 (on page 40), which shows the locations of all recommended capital improvements. The identified piping sections include:

- AC piping along Mountain View Road, South of the PRV Station.
- AC piping crossing under Highway 160 between Colorado Drive and Bayfield Parkway.
- AC piping along Mustang Drive between Mesa Avenue and Clover Drive.
- AC piping along Bayfield Parkway between Clover Drive and County Road 501.
- Schedule 40 PVC along Los Pinos Drive.
- 10-inch PVC along Lakeside and near the Tamarack tank site.

Table 7. Capital Improvements Summary

| Description | Recommended Completion | Planning Level Cost Estimate¹ |
|---|-------------------------------|---|
| River Intake, address capacity at low river levels | 2020 | TBD |
| Solarbee (or similar mixer) for Raw Water Reservoir | 2020 | \$40,000 |
| Bayfield Parkway AC piping replacement ² | 2022 | \$495,000 |
| PRV Station at Bayfield Parkway & CR 501 ² | 2022 | \$75,000 |
| Schroeder Ditch Pump Installation | 2022 | \$135,000 |
| Mountain View AC Piping replacement | 2023 | \$462,000 |
| Hwy 160 Crossing AC piping replacement | 2023 | \$90,000 |
| Mustang Drive AC piping replacement | 2023 | \$188,500 |
| Los Pinos Drive piping replacement | 2023 | \$181,250 |
| Lakeside Drive piping capacity expansion | 2035 | \$148,500 |
| Tamarack tank site piping capacity expansion | 2035 | \$33,000 |

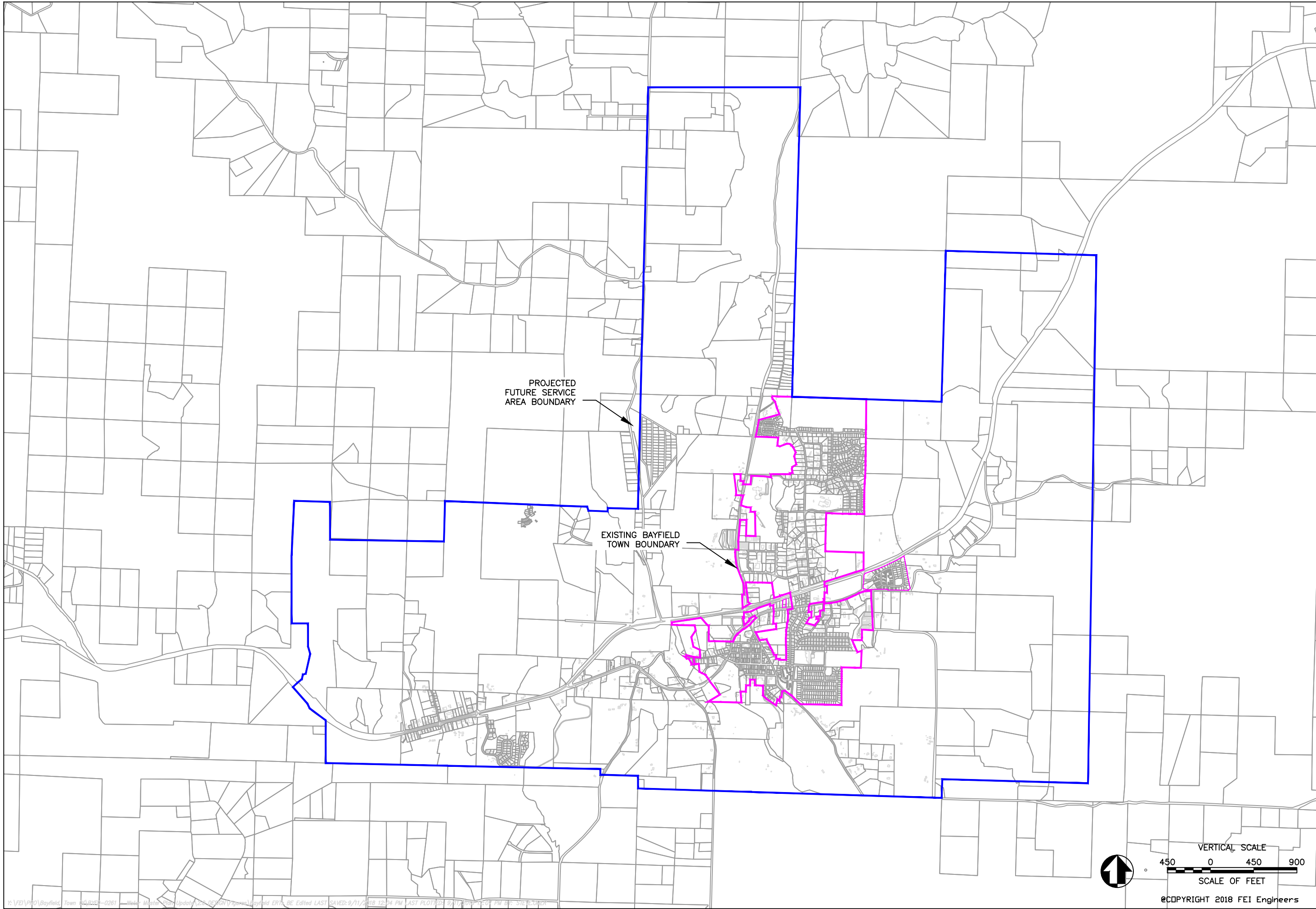
1. Planning level cost estimates cover construction expenses only. Costs associated with engineering design, state approval, planning etc. are not included.
2. Pipe replacement and PRV installation along Bayfield Parkway would enhance looping in the Town system and help prepare for LAPLAWD water distribution towards Archuleta County.

Figure 16. Recommended Capital Improvements

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Report Figures

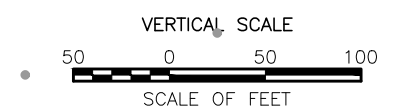
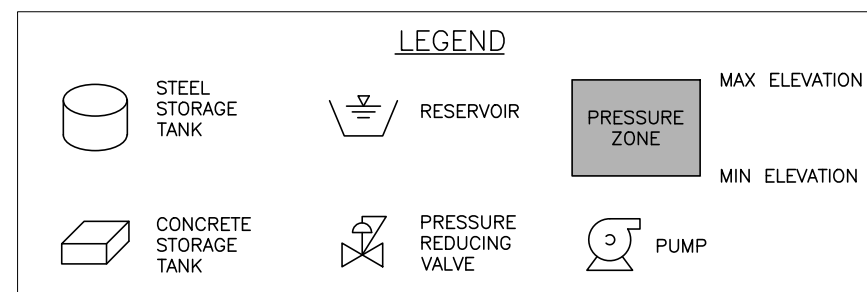
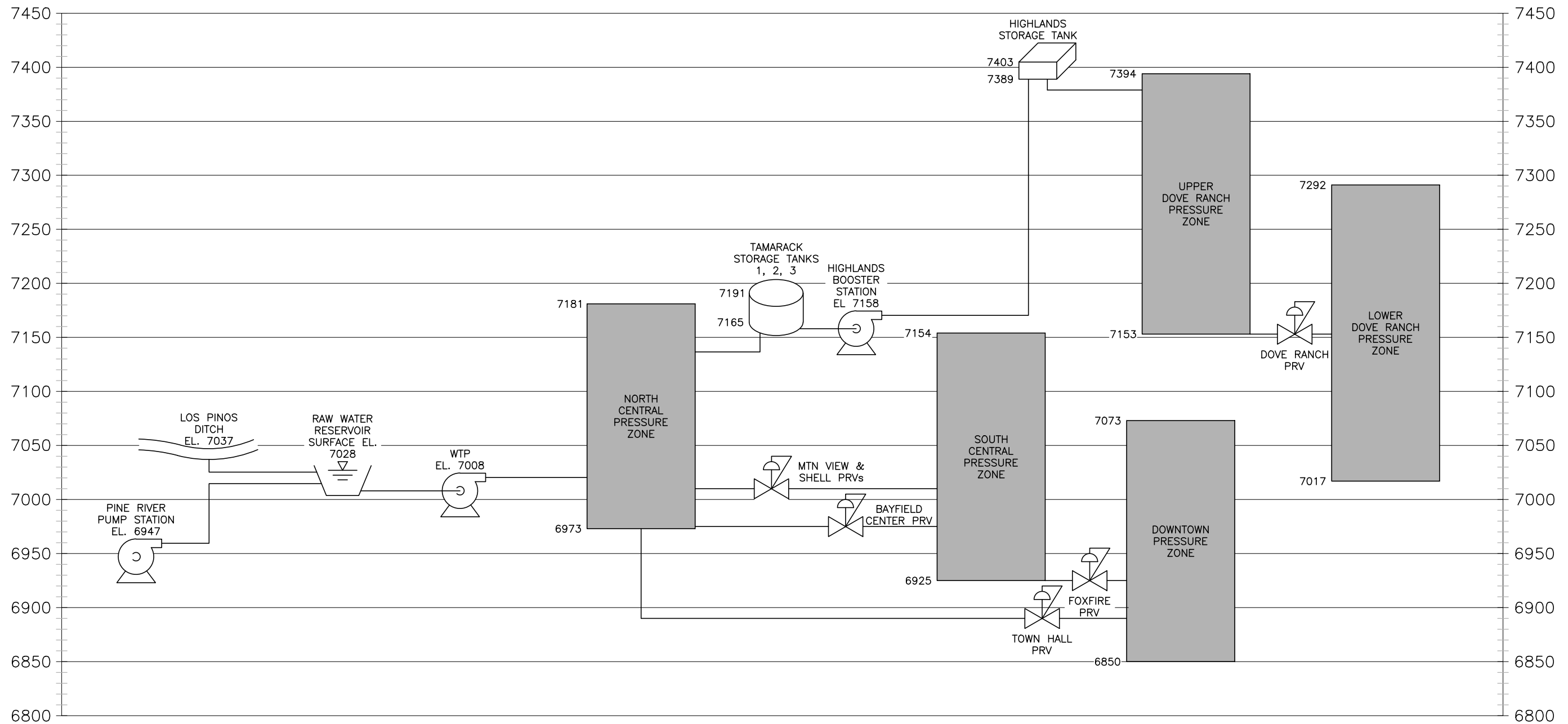
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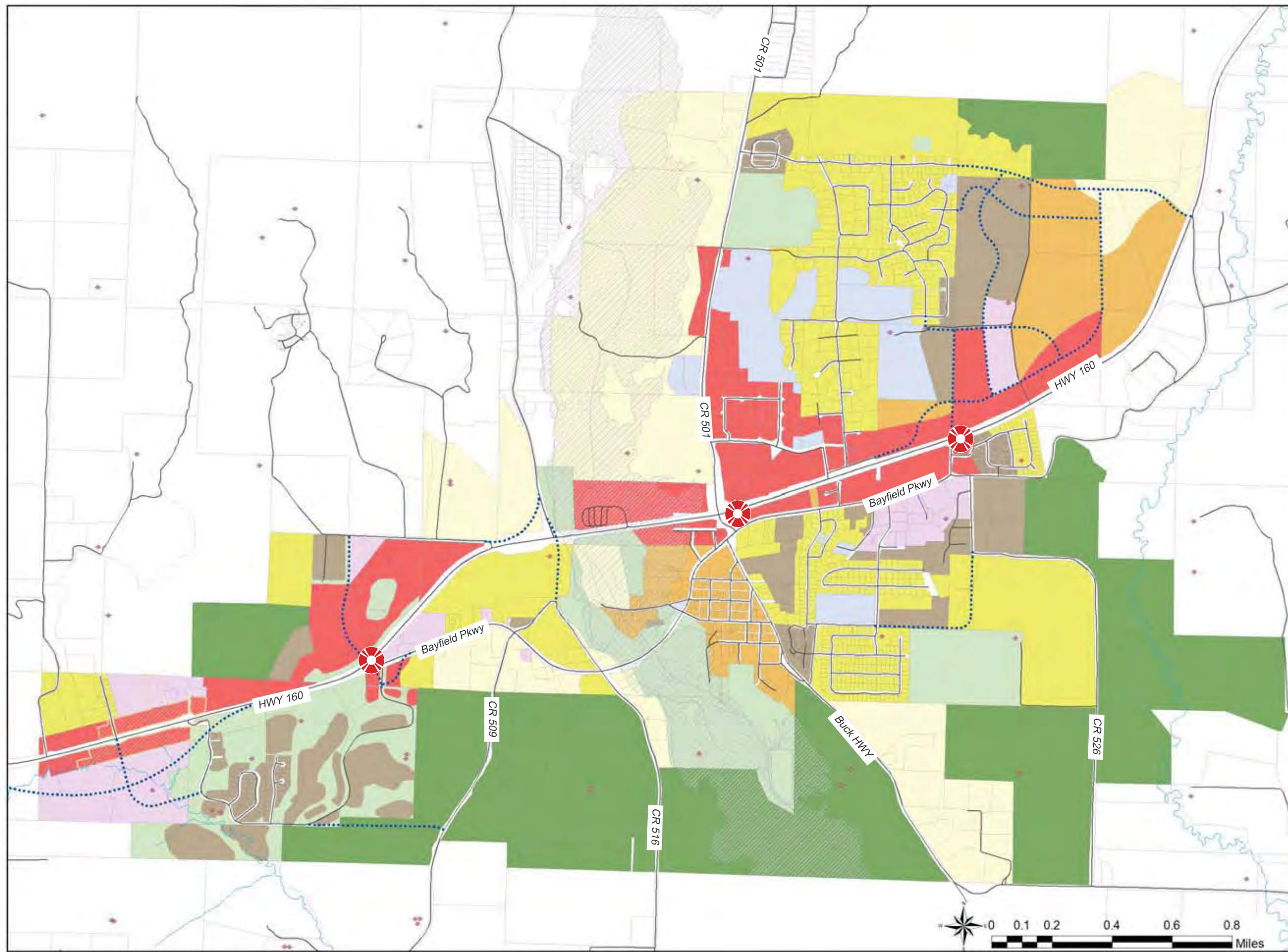


TOWN OF BAYFIELD
WATER DISTRIBUTION SYSTEM
PROJECTED FUTURE SERVICE AREA

FIGURE A

VERTICAL SCALE
450 0 450 900
SCALE OF FEET
©COPYRIGHT 2018 FEI Engineers





DRAFT

**BAYFIELD
FUTURE LAND USE
MAP**

THIS MAP IS A GENERAL REPRESENTATION OF THE
FUTURE LAND USE MAP AS ADOPTED BY TOWN BOARD ON
XXXX XX, 2019

Primary Gateway and Median Enhancements

Current Town Limits

Future Roads

Permitted Wells

100 yr Floodplain

Future Land Use Classifications:

Employment / Light Industrial

General Commercial

Mixed Use

High Density Residential

Medium Density Residential

Low Density Residential

Rural Agriculture

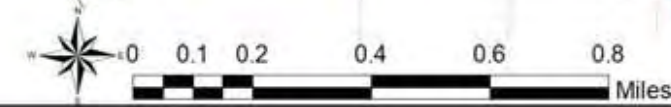
Open Space / Parks

Community Service

Gem Village Business District



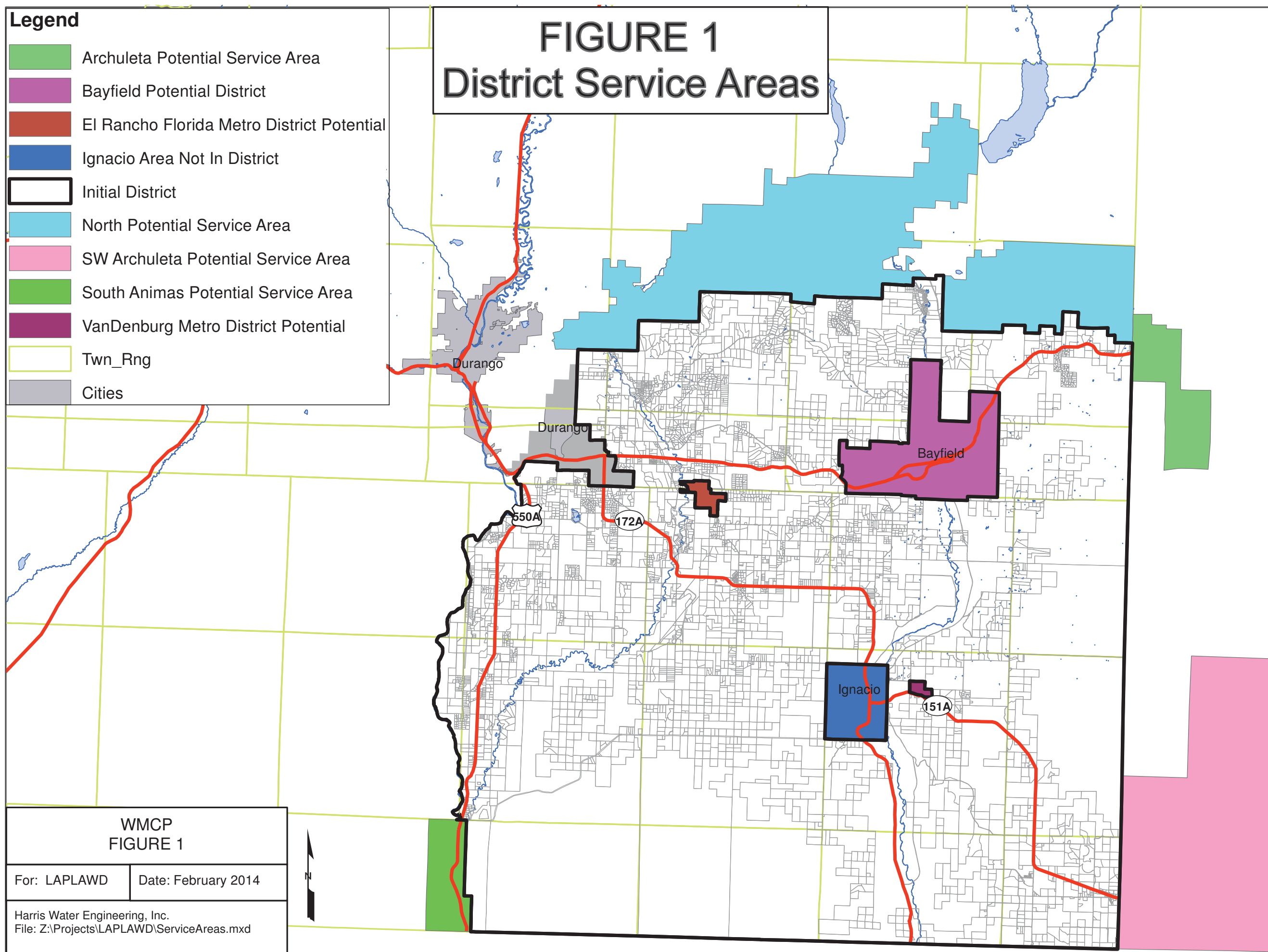
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COLORADO • Where Stars Shine Bright



Legend

- Archuleta Potential Service Area
- Bayfield Potential District
- El Rancho Florida Metro District Potential
- Ignacio Area Not In District
- Initial District
- North Potential Service Area
- SW Archuleta Potential Service Area
- South Animas Potential Service Area
- VanDenburg Metro District Potential
- Twn_Rng
- Cities

FIGURE 1 District Service Areas



WMCP
FIGURE 1

For: LAPLAWD

Date: February 2014

Harris Water Engineering, Inc.
File: Z:\Projects\LAPLAWD\ServiceAreas.mxd



Chemical SDS and NSF Records

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NSF/ANSI STANDARD 60

Drinking Water Treatment Chemicals - Health Effects

Southern Water Consultants, Inc.

DBA General Chemical LLC

1008 Cedar Lake Road

Decatur, AL 35601

United States

800-272-1055

256-350-6133

[Visit this company's website](#)

Facility : Decatur, AL

Aluminum Chlorohydrate[AL]

Trade Designation

EC-309HB

EC-309HBS

Product Function

Coagulation & Flocculation

Coagulation & Flocculation

Max Use

250 mg/L

250mg/L

[AL] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.

Polyaluminum Chloride[AL]

Trade Designation

EC-309

EC-309 MBS

EC-309SB

Product Function

Coagulation & Flocculation

Coagulation & Flocculation

Coagulation & Flocculation

Max Use

175 mg/L

147mg/L

200mg/L

[AL] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.

Polyaluminum Chlorosulfate[AL]*Trade Designation*

EC-309S

Product Function

Coagulation & Flocculation

Max Use

200mg/L

[AL] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.

Number of matching Manufacturers is 1

Number of matching Products is 6

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NSF/ANSI STANDARD 60

Drinking Water Treatment Chemicals - Health Effects

BASF Australia Ltd.

6-8 Donaldson Street North
Wyong NSW 2259
P.O. Box 482
Australia
61 2 4350 3200

Facility : Wyong, Australia

Poly (Diallyldimethylammonium Chloride)(pDADMAC)

| <i>Trade Designation</i> | <i>Product Function</i> | <i>Max Use</i> |
|--------------------------|----------------------------|----------------|
| Magnafloc® LT405 | Coagulation & Flocculation | 50mg/L |
| Magnafloc® LT410 | Coagulation & Flocculation | 33mg/L |
| Magnafloc® LT425 | Coagulation & Flocculation | 25mg/L |
| Magnafloc® LT505 | Coagulation & Flocculation | 50mg/L |
| Magnafloc® LT510 | Coagulation & Flocculation | 37mg/L |
| Magnafloc® LT525 | Coagulation & Flocculation | 25mg/L |
| Magnafloc® LT605 | Coagulation & Flocculation | 50mg/L |
| Magnafloc® LT610 | Coagulation & Flocculation | 37mg/L |

BASF Corporation - Water Solutions (formerly Ciba Corporation)

2371 Wilroy Road
Suffolk, VA 23439

United States
757-538-3700

Facility : # 3 Canada

Polyacrylamide[PC]

| <i>Trade Designation</i> | <i>Product Function</i> | <i>Max Use</i> |
|--------------------------|----------------------------|----------------|
| Magnafloc LT27AG | Coagulation & Flocculation | 1mg/L |

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

NOTE: All Listed products from this facility are NSF Certified, whether or not they bear the NSF Mark.

Facility : # 6 USA

Polyacrylamide [PC]

| <i>Trade Designation</i> | <i>Product Function</i> | <i>Max Use</i> |
|--------------------------|----------------------------|----------------|
| Magnafloc 523 | Coagulation & Flocculation | 1mg/L |
| Magnafloc LT20 | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT22 | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT22S | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT25 | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT27 | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT27AG | Coagulation & Flocculation | 1 mg/L |
| Magnafloc LT340 | Coagulation & Flocculation | 1mg/L |
| Magnafloc LT7922S | Coagulation & Flocculation | 1mg/L |

[1] These products should not be used in constructing wells in highly porous formations such as cavernous limestone.

These products are designed to be flushed out prior to using the system for drinking water. Before being placed in service, the well is to be properly flushed according to the manufacturer's use instructions.

Certification of these products is based on a well drilling model with the following assumptions:

The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level. The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity. The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm in diameter (10 in.). The amount of drilling fluid removed from the well during construction is equal to the combined volumes of the casing, the screen, and the bore hole annulars around the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

NOTE: All Listed products from this facility are NSF Certified, whether or not they bear the NSF Mark.

BASF ZETAG 4100 (FL'Y MAGNAFLOC 10, LT25, LT20)

PRODUCT DISTRIBUTED BY / PRODUIT DISTRIBUÉ PAR

Brenntag Canada Inc.
43 Jutland Road.
Toronto, Ontario
M8Z 2G6
(416) 259-8231

WHMIS Number: 00061491
Index: HCl0346/11A
Effective Date: 2011 January 10
Date of Revision: 2011 January 10
Website: <http://www.brenntag.ca>

EMERGENCY TELEPHONE NUMBERS / EN CAS D'URGENCE

Toronto, ON (416) 226-6117
Edmonton, AB (780) 424-1754

Montréal, QC (514) 861-1211
Calgary, AB (403) 263-8660

Winnipeg, MB (204) 943-8827
Vancouver, BC (604) 685-5036

This document consists of an MSDS in English and French.

Le présent document comprend une fiche signalétique en anglais et en français.

WHMIS Classification / Symbol: Not regulated



Classification / symbole SIMDUT : Non réglementé

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

**LIRE LA FICHE SIGNALÉTIQUE EN ENTIER POUR UNE ÉVALUATION COMPLÈTE DES DANGERS QUE
REPRÉSENTE CE PRODUIT**

Safety Data Sheet

ZETAG® 4100

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(30504541/SDS_GEN_CA/EN)

1. Product and Company Identification

Use: flocculation agent

Company

BASF Canada Inc.
100 Milverton Drive
Mississauga, ON L5R 4H1, CANADA

24 Hour Emergency Response Information

CANUTEC (reverse charges): (613) 996-6666
BASF HOTLINE: (800) 454-COPE (2673)

2. Hazards Identification

Emergency overview

This product has no known adverse effect on human health.

Caution - Slippery when wet!

Avoid dust formation.

Wear protective clothing.

State of matter: solid

Colour: off-white

Odour: odourless

Potential health effects**Primary routes of entry:**

Eyes

Skin

Inhalation.

Ingestion.

Chronic toxicity:

Carcinogenicity: None of the components in this product at concentrations greater than 0.1% are listed by IARC; NTP, OSHA or ACGIH as a carcinogen.

Reproductive toxicity: No data for product. No effects anticipated

Genotoxicity: The chemical structure does not suggest such an effect.

Signs and symptoms of overexposure:

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

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3. Composition / Information on Ingredients

Not WHMIS controlled.

4. First-Aid Measures

General advice:

Remove contaminated clothing.

If inhaled:

If difficulties occur after dust has been inhaled, remove to fresh air and seek medical attention.

If on skin:

Wash thoroughly with soap and water.

If in eyes:

Wash affected eyes for at least 15 minutes under running water with eyelids held open.

If swallowed:

Rinse mouth and then drink plenty of water. Check breathing and pulse. Place victim in the recovery position, cover and keep warm. Loosen tight clothing such as a collar, tie, belt or waistband. Seek medical attention. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Note to physician

| | |
|------------|---|
| Treatment: | Treat according to symptoms (decontamination, vital functions), no known specific antidote. |
|------------|---|

5. Fire-Fighting Measures

| | | |
|----------------------------|--------------------|--------------------|
| Flash point: | | not applicable |
| Autoignition: | 350 °C | |
| Lower explosion limit: | | not applicable |
| Upper explosion limit: | | not applicable |
| Flammability: | No data available. | |
| Self-ignition temperature: | | No data available. |

Suitable extinguishing media:

dry powder, foam

Unsuitable extinguishing media for safety reasons:

water jet

Additional information:

If water is used, restrict pedestrian and vehicular traffic in areas where slip hazard may exist.

Hazards during fire-fighting:

carbon oxides, nitrogen oxides

The substances/groups of substances mentioned can be released in case of fire. Very slippery when wet.

Protective equipment for fire-fighting:

Wear a self-contained breathing apparatus.

Further information:

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

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6. Accidental release measures

Personal precautions:

Use personal protective clothing.

Environmental precautions:

Do not discharge into drains/surface waters/groundwater.

Cleanup:

Spilled product which becomes wet or spilled aqueous solution create a hazard because of their slippery nature. Avoid raising dust.

For small amounts: Pick up with suitable appliance and dispose of.

For large amounts: Contain with dust binding material and dispose of.

7. Handling and Storage

Handling

General advice:

Breathing must be protected when large quantities are decanted without local exhaust ventilation. Handle in accordance with good industrial hygiene and safety practice. Forms slippery surfaces with water.

Storage

General advice:

Store in unopened original containers in a cool and dry place. Avoid wet, damp or humid conditions, temperature extremes and ignition sources.

8. Exposure Controls and Personal Protection

Personal protective equipment

Respiratory protection:

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.

Hand protection:

Chemical resistant protective gloves

Eye protection:

Safety glasses with side-shields.

General safety and hygiene measures:

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Wearing of closed work clothing is recommended. Wear protective clothing as necessary to minimize contact. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

| | | |
|------------------|--------------------|--|
| Form: | powder | |
| Odour: | odourless | |
| Odour threshold: | No data available. | |
| Colour: | off-white | |
| pH value: | 6.5 | (1 %(m), 25 °C) |
| Melting point: | | The substance / product decomposes therefore not determined. |
| Boiling point: | | not applicable |
| Vapour pressure: | | The product has not been tested. |

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| | | |
|----------------------|-------------------------------|--------------------------------|
| Bulk density: | approx. 700 kg/m ³ | |
| Viscosity, dynamic: | 25 - 49 mPa.s | (0.5 % (m), 25 °C) (DIN 53019) |
| % volatiles: | | not determined |
| Solubility in water: | | Forms a viscous solution. |

10. Stability and Reactivity

Dust explosivity characteristics:

K_{st}:

Conditions to avoid:

Avoid extreme temperatures. Avoid humidity.

Substances to avoid:

strong acids, strong bases, strong oxidizing agents

Hazardous reactions:

The product is not a dust explosion risk as supplied; however the build-up of fine dust can lead to a risk of dust explosions.

Stable under normal conditions.

No hazardous reactions known.

Decomposition products:

No hazardous decomposition products if stored and handled as prescribed/indicated.

Corrosion to metals:

No corrosive effect on metal.

Oxidizing properties:

not fire-propagating

11. Toxicological information

Acute toxicity

Oral:

Type of value: LD₅₀

Species: rat

Value: > 2,000 mg/kg (OECD Guideline 401)

Irritation / corrosion

Skin:

Species: rabbit

Result: non-irritant

Method: OECD Guideline 404

Eye:

Species: rabbit

Result: non-irritant

Sensitization:

Result: Non-sensitizing.

Other Information:

The product has not been tested. The statements on toxicology have been derived from products of a similar structure and composition.

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12. Ecological Information

Fish

Acute:
static
Oncorhynchus mykiss/LC50 (96 h): > 100 mg/l
(under static conditions in the presence of 10 mg/L humic acid)

Aquatic invertebrates

Acute:
Daphnia magna/LC50 (48 h): > 100 mg/l

Environmental mobility:

Information on: Anionic polyacrylamide
Assessment transport between environmental compartments:
Adsorption to solid soil phase is expected.

Other adverse effects:

The product has not been tested. The statements on ecotoxicology have been derived from products of a similar structure and composition.

13. Disposal considerations

Waste disposal of substance:

Dispose of in accordance with local authority regulations.

Container disposal:

Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

14. Transport Information

Land transport

TDG

Not classified as a dangerous good under transport regulations

Sea transport

IMDG

Not classified as a dangerous good under transport regulations

Air transport

IATA/ICAO

Not classified as a dangerous good under transport regulations

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15. Regulatory Information

VOC content:

not determined

Federal Regulations

Registration status:

Chemical DSL, CA released / listed

Not WHMIS controlled.

**THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR
AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.**

16. Other Information

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

MSDS Prepared by:

BASF NA Product Regulations

msds@basf.com

MSDS Prepared on: 2011/01/10

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Due to the merger of CIBA and BASF Group all Material Safety Data Sheets have been reassessed on the basis of consolidated information. This may have resulted in changes of the Material Safety Data Sheets. In case you have questions concerning such changes please contact us at the address mentioned in Section I.

END OF DATA SHEET

Fiche de données de sécurité

ZETAG® 4100

Date de révision : 2011/01/10

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1. Identification du produit et de la société

Utilisation: agent flocculant

Société

BASF Canada Inc.
100 Milverton Drive
Mississauga, ON L5R 4H1, CANADA

Information 24 heures en cas d'urgence

CANUTEC (reverse charges): (613) 996-6666
BASF HOTLINE: (800) 454-COPE (2673)

2. Identification des dangers

Aperçu - Urgence

Ce produit n'est associé à aucun effet négatif connu sur la santé de l'homme.

Attention - Glissant lorsque mouillé!

Eviter la formation de poussières.

Porter des vêtements de protection.

état de la matière: solide

Couleur: blanchâtre

Odeur: inodore

Effets possibles sur la santé**Voie d'exposition primaire:**

Yeux

Peau

Inhalation.

Ingestion

toxicité chronique:

cancérogénicité: Aucun des composants de ce produit qui sont présents à des concentrations supérieures à 0.1% ne sont répertoriés comme carcinogènes par IARC, le NTP, OSHA ou ACGIH.

toxicité pour la reproduction: aucune donnée sur le produit. Pas d'effets anticipés

Génotoxicité: La structure chimique ne laisse pas présumer un tel effet

Signes et symptômes de surexposition:

Les principaux symptômes et effets connus sont décrits dans l'étiquette (voir section 2) et/ou en section 11., A ce jour, aucun autre symptôme ou effet important n'est connu.

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3. Composition / Information sur les ingrédients

Non contrôlé par le SIMDUT

4. Premiers secours

Indications générales:

Retirer les vêtements souillés.

Lorsque inhalé:

En cas de malaises dus à l'inhalation des poussières: apport d'air frais, secours médical.

Lorsque en contact avec la peau:

Laver à fond avec de l'eau et du savon.

Lorsque en contact avec les yeux:

Laver à fond à l'eau courante pendant au moins 15 minutes en maintenant les paupières écartées.

Lorsque avalé:

Se rincer la bouche et boire de l'eau abondamment. Vérifier la respiration et tâter le pouls. Placer la victime dans la position de sécurité, la couvrir et la maintenir au chaud. Enlever les vêtements susceptibles de serrer, tels que collier, cravate ou ceintures. Consulter un médecin. Ne jamais faire vomir ou faire avaler quelque chose par la bouche, si la personne blessée est inconsciente ou souffre de crampes.

Indications pour le médecin

| | |
|-------------|---|
| Traitement: | Traitement symptomatique (décontamination, fonctions vitales), aucun antidote spécifique connu. |
|-------------|---|

5. Mesures de lutte contre l'incendie

| | | |
|----------------------------------|-----------------------------|-----------------------------|
| Point d'éclair: | | non applicable |
| Auto-inflammation: | 350 °C | |
| Limite inférieure d'explosivité: | | non applicable |
| Limite supérieure d'explosivité: | | non applicable |
| Inflammabilité: | Pas de données disponibles. | |
| Température d'auto-inflammation: | | Pas de données disponibles. |

Moyens d'extinction recommandés:

poudre d'extinction, mousse

Moyens d'extinction contre-indiqués pour des raisons de sécurité:

jet d'eau

Indications complémentaires:

Si l'eau est utilisée, limiter la circulation des piétons et des véhicules dans les zones où il peut y avoir danger de glisser ou de dérapage.

Dangers lors de la lutte contre l'incendie:

oxydes de carbone, oxydes d'azote

Les substances et les groupes de substances cités peuvent être libérés lors d'un incendie. Très glissant si humide.

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Équipement de protection contre l'incendie:

Porter un appareil respiratoire autonome.

Autres informations:

Le danger dépend des produits et des conditions de combustion. L'eau d'extinction contaminée doit être éliminée conformément aux réglementations officielles locales.

6. Mesures à prendre en cas de dispersion accidentelle

Mesures individuelles de prévention:

Utiliser un vêtement de protection individuelle.

Mesures de protection de l'environnement:

Ne pas rejeter dans les canalisations d'égout/les eaux superficielles/les eaux souterraines.

Nettoyage:

risque de glissade en cas de renversement accidentel d'une solution aqueuse de produit ou de produit devenu humide. Éviter le dégagement de poussières.

Pour de petites quantités: Ramasser à l'aide d'un moyen adapté et éliminer.

Pour de grandes quantités: Ramasser à l'aide d'un matériau liant les poussières et éliminer.

7. Manipulation et stockage

Manipulation

Indications générales:

En cas de transvasement de quantités importantes sans dispositif d'aspiration : protection respiratoire. Respecter les mesures de prudence habituellement applicables lors de la mise en oeuvre des produits chimiques. Formation de dépôts glissants en présence d'eau.

Stockage

Indications générales:

À conserver dans l'emballage d'origine non ouvert dans un endroit frais et sec. Éviter les conditions humides ou mouillées, les températures extrêmes et les sources d'allumage.

8. Contrôle de l'exposition et protection individuelle

Équipement de protection individuelle

Protection respiratoire:

Porter un masque à filtre de particules / pour vapeurs organiques certifié NIOSH (ou équivalent).

Protection des mains:

Gants de protection résistant aux produits chimiques

Protection des yeux:

Lunettes de sécurité avec protections latérales.

Mesures générales de protection et d'hygiène:

Respecter les mesures de prudence habituellement applicables lors de la mise en oeuvre des produits chimiques. Veiller à la bonne aération des locaux. Le port d'un vêtement de travail fermé est recommandé. Porter des vêtements de protection au besoin pour réduire le contact. Respecter les mesures de prudence habituellement applicables lors de la mise en oeuvre des produits chimiques.

Fiche de données de sécurité

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9. Propriétés physiques et chimiques

| | | |
|------------------------|-----------------------------|---|
| Etat physique: | poudre | |
| Odeur: | inodore | |
| Seuil olfactif: | Pas de données disponibles. | |
| Couleur: | blanchâtre | |
| Valeur du pH: | 6.5 | (1 %(m), 25 °C) |
| Point de fusion: | | Ne peut être déterminé, la substance/le produit se décomposant. |
| Point d'ébullition: | | non applicable |
| Pression de vapeur: | | Le produit n'a pas été testé. |
| Densité apparente: | env. 700 kg/m3 | |
| Viscosité dynamique: | 25 - 49 mPa.s | (0.5 %(m), 25 °C) (DIN 53019) |
| % volatil: | | non déterminé |
| Solubilité dans l'eau: | | Forme une solution visqueuse. |

10. Stabilité et réactivité

Explosibilité des poussières:

Kst:

Conditions à éviter:

Eviter les températures extrêmes. Eviter l'humidité.

Produits à éviter:

acides forts, bases fortes, oxydants puissants

Réactions dangereuses:

A l'état de livraison, le produit n'est pas explosible; cependant l'accumulation de poussières fines peut entraîner un risque d'explosion.

Stable dans des conditions normales

Pas de réactions dangereuses connues.

Produits de décomposition:

Aucun produit de décomposition dangereux, si les prescriptions/indications pour le stockage et la manipulation sont respectées.

Corrosion des métaux:

Non corrosif pour le métal.

Propriétés oxydantes:

non comburant

11. Informations toxicologiques

Toxicité aiguë

Par voie orale:

Type de valeur: DL50

espèce: rat

Valeur: > 2,000 mg/kg (Ligne directrice 401 de l'OCDE)

Irritation / corrosion

Peau:

espèce: lapin

Résultat: non irritant

Méthode: Ligne directrice 404 de l'OCDE

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Oeil:

espèce: lapin
Résultat: non irritant

Sensibilisation:

Résultat: non sensibilisant

Autres informations:

Le produit n'a pas été testé. Les informations toxicologiques proviennent de produits de structure ou de composition analogue.

12. Informations écologiques

Poissons

Aigu:
statique
Oncorhynchus mykiss/CL50 (96 h): > 100 mg/l
(sous des conditions statiques en présence de 10 mg/L d'acide humic)

Invertébrés aquatiques

Aigu:
Daphnia magna/CL50 (48 h): > 100 mg/l

Mobilité dans l'environnement:

Données relatives à : 2-Propenoic acid, sodium salt, polymer with 2-propenamide
Evaluation du transport entre les compartiments environnementaux:
Une adsorption sur la phase solide du sol est attendue.

Effets nocifs divers:

Le produit n'a pas été testé. Les données concernant l'écotoxicologie proviennent de produits de structure ou de composition analogue.

13. Considérations relatives à l'élimination

Élimination du produit:

Éliminer conformément aux prescriptions des autorités locales.

Élimination des emballages:

Jeter dans une installation agréée. Recommander l'écrasement, le perçage ou d'autres moyens pour empêcher toute utilisation non autorisée des conteneurs utilisés.

14. Informations relatives au transport

Transport terrestre

TDG

Produit non dangereux au sens des réglementations de transport

Fiche de données de sécurité

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Transport maritime

IMDG

Produit non dangereux au sens des réglementations de transport

Sea transport

IMDG

Not classified as a dangerous good under transport regulations

Transport aérien

IATA/ICAO

Produit non dangereux au sens des réglementations de transport

Air transport

IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Informations réglementaires

Teneur en VOC:

non déterminé

Règlements fédéraux

Status d'enregistrement:

produit chimique DSL, CA non bloqué / listé

Non contrôlé par le SIMDUT

Ce produit a été classé selon les critères du Règlement sur les produits contrôlés et la fiche signalétique contient toute l'information prescrite par le Règlement sur les produits contrôlés.

16. Autres informations

Nous soutenons les initiatives de la charte mondiale de la Gestion Responsable. Nous agissons positivement sur la santé et la sécurité de nos employés, clients, fournisseurs et voisins ainsi que sur la protection de l'environnement. Notre engagement dans le cadre du Responsible Care est total que ce soit pour commercer, opérer nos unités de production de façon sûre et responsable pour l'environnement, aider nos clients et fournisseurs à utiliser correctement nos produits. Nous voulons minimiser l'impact sur la société et l'environnement de nos activités de production, stockage, transport ainsi que l'impact de nos produits lors de leur utilisation et de leur traitement en fin de vie.

FS rédigée par:

BASF NA Product Regulations

msds@basf.com

FS rédigée le: 2011/01/10

ZETAG® 4100 est une marque déposée de BASF Canada ou BASF SE

Du fait du rachat de CIBA par le groupe BASF, toutes les Fiches de Données de Sécurité ont été réévaluées sur la base d'informations consolidées. Cela a pu conduire à des changements significatifs de nos Fiches de Données de Sécurité. Si vous aviez des questions concernant ces changements, vous pouvez nous contacter à l'adresse indiquée en section 1.

FIN DE LA FICHE DE DONNÉES DE SÉCURITÉ



Material Safety Data Sheet

OSHA / ANSI Z400.1-2004 Compliant

MSDS date: 02-Feb-2006

NFPA Rating: Health: 1 Flammability: 1 Instability: 0
HMIS Rating: Health: 1 Flammability: 1 Physical Hazard: 0 Personal Protection: B

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: MAGNAFLOC LT22S
Product Number: 8357920
Chemical Family: Copolymer of a quaternary acrylate salt and acrylamide.
Intended Use: Flocculant
Manufacturer/Supplier: Ciba Specialty Chemicals Corporation
2301 Wilroy Road
Suffolk, VA 23434
8:30am - 5pm Phone Number: 1-757-538-3700
MSDS Request Line (voicemail): 1-800-431-2360
Customer Service/Product Information 1-800-322-3885

Emergency 24-Hour Health/Environmental Phone: 1-800-873-1138

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Signal Word: CAUTION!
Physical Form: Granular Powder
Color: White
Odor: None
Health: Contact causes eye irritation.
Physical Hazards: Slip hazard when wet, Refer to MSDS Section 7 for Dust Explosion information. .

OSHA Hazardous Substance: This material is classified as hazardous under OSHA regulations.
Primary Route(s) of Entry: Eyes, Inhalation, Ingestion, Skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS

| Components | CAS Number | Weight % |
|--|------------|----------|
| Ethanaminium, N,N,N-trimethyl-2-[(1-oxo-2-propenyl)oxy]-, chloride, polymer with 2-propenamide | 69418-26-4 | 85-90 |
| Hexanedioic acid | 124-04-9 | 3-6 |

4. FIRST AID MEASURES

- Eyes:** Immediately flush the eye(s) with lukewarm, gently flowing water for 15 minutes or until the chemical is removed. Get immediate medical attention if irritation persists.
- Skin:** Wash off immediately with soap and plenty of water. Get medical attention if irritation occurs. If clothing is contaminated, remove and launder before reuse.
- Inhalation:** Remove to fresh air, if not breathing give artificial respiration. If breathing is difficult, give oxygen and get immediate medical attention.
- Ingestion:** Do not induce vomiting. If vomiting occurs naturally, have casualty lean forward to reduce the risk of aspiration. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

- Fire Fighting Measures:** The product becomes slippery when wet. Restrict pedestrian and vehicular traffic in areas where slip hazard may exist.
- Suitable Extinguishing Media:** Carbon dioxide, dry chemical or foam.
- Unsuitable Extinguishing Media:** The product becomes slippery when wet.
- Fire Fighting Equipment:** Wear self-contained breathing apparatus and protective suit.
- Unusual hazards:** Dust in sufficient concentration can result in an explosive mixture in air. Handle to minimize dusting and eliminate open flame and other sources of ignition.
- Hazardous Combustion Products:** Burning may produce oxides of carbon or nitrogen.

6. ACCIDENTAL RELEASE MEASURES

- Cleanup Instructions:** Sweep up and shovel into suitable containers for disposal. Avoid dust formation. Wear suitable protective equipment. Should not be released into the environment.

7. HANDLING AND STORAGE

- Handling:** As with all industrial chemicals, use good industrial practices when handling. Avoid eye, skin, and clothing contact. Do not inhale. Do not taste or swallow. Use only with adequate ventilation.
- Storage:** Keep containers tightly closed in a cool, well-ventilated place.
- Explosion Hazards:** Avoid creating dusty conditions. Risk of explosion if an air-dust mixture forms.

For Industrial Use Only

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines:

| Components | OSHA PEL | OSHA STEL | ACGIH TWA | ACGIH STEL | Ciba/ Manufacturer IEL: |
|------------------------------|----------|-----------|---------------------|------------|-------------------------------|
| Hexanedioic acid 124-04-9 | | | 5 mg/m ³ | | |

Table Footnote:

Blank cells in above table indicate no data available.

Personal Protective Equipment

| | |
|------------------------------------|--|
| Eye/Face Protection: | Wear safety glasses or goggles to protect against dust particles. |
| Skin Protection: | Wear chemical resistant gloves and protective clothing. |
| Respiratory Protection: | Use NIOSH approved respirator as needed to mitigate exposure. |
| Engineering Controls: | Work in well ventilated areas. Do not breathe dust. Local exhaust/ventilation recommended. |
| Other Protective Equipment: | Eye wash station and safety shower should be available in immediate work area. Select additional protective equipment based upon potential for exposure. |

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|--|
| Physical Form: | Granular Powder |
| Color: | White |
| Odor: | None. |
| Freezing/Melting Point: | Not determined |
| Solubility in water: | Soluble, solubility limited by viscosity |
| Vapor Density: | Not applicable |
| Vapor Pressure: | Not applicable |
| Density: | Not determined |
| Specific Gravity: | 0.8 - 1 |
| pH: | ~ 3.3 (1 % solution) |
| Percent Volatile: | None expected above trace levels. |
| VOC: | Not applicable |
| Partition Coefficient (Octanol/Water): | Not determined |
| Decomposition Temperature: | Not determined |
| Flammability Limits in Air: | |
| Flash point: | Not applicable |
| Test Method (for Flash Point): | Not applicable |

10. STABILITY AND REACTIVITY

| | |
|-----------------------------|---|
| Stability: | Stable. |
| Conditions to Avoid: | Avoid static discharges and sources of ignition. Avoid high temperatures. Avoid wet and humid conditions. |
| Incompatibility: | Strong oxidizing agents. (may degrade polymer) |

Hazardous Decomposition Products:

No decomposition expected under normal storage conditions.

Possibility of Hazardous Reactions:

Product has a high minimum ignition energy; however, dust may be ignited under some conditions.

11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity:

Not determined.

Acute Dermal Toxicity:

Not determined

Acute Inhalation Toxicity:

Not determined.

Eye Irritation:

Not determined.

Skin Irritation:

Not determined.

Skin Sensitization:

Not determined

Carcinogenicity (IARC; NTP; OSHA; ACGIH):

None of the components in this product at concentrations greater than 0.1% are listed by IARC; NTP, OSHA or ACGIH as a carcinogen.

Carcinogenicity Studies:

Not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

Mutagenicity:

No data for product. No effects anticipated.

Reproductive Toxicity:

No data for product. No effects anticipated.

Teratogenicity:

Not determined. No effects anticipated.

Neurotoxicity:

Not determined

Subacute Toxicity:

Not determined

Subchronic Toxicity:

Not determined

Chronic toxicity:

Not determined

Absorption / Distribution / Excretion / Metabolism:

Not determined

Additional Information:

Not determined

12. ECOLOGICAL INFORMATION

Toxicity to Fish:LC50 18 mg/l 96 hour (Rainbow trout) (under static conditions in the presence of humic acid)
LC50: 3000 mg/L 96-hour, (Menidia beryllina)**Toxicity to Invertebrates:**LC50 2800 mg/L 48 hour (Daphnia magna) (under static conditions in the presence of humic acid)
LC50 200 mg/L 96 hour (Mysid shrimp)

Toxicity to Algae: Not determined

Toxicity to Sewage Bacteria: Not determined

Activated Sludge Respiration Inhibition Test: Not determined

Biochemical Oxygen Demand (BOD): Not determined

Chemical Oxygen Demand (COD): Not determined

Total Oxygen Demand (TOD): Not determined

Biodegradability: Based on the results of 28-Day Biodegradability assay, this product is not readily biodegradable (< 20% after 28 days).

Bioaccumulation: Not determined

Additional Environmental Data: This product contains cationic polymer(s) that may be toxic to aquatic organisms when tested in pure (distilled) water. Toxicity is greatly reduced by particles in natural water.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with local, state, provincial and federal regulations.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (DOT):

Not regulated for this mode of transport.

International Maritime Dangerous Goods (IMDG):

Not regulated for this mode of transport.

International Air Transportation Authority (IATA):

Not regulated for this mode of transport.

15. REGULATORY INFORMATION

Federal Regulations

OSHA Hazardous Substance: This material is classified as hazardous under OSHA regulations

Clean Air Act - Hazardous Air Pollutants (HAP): This product contains the following Hazardous Air Pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

| Components | CAA Section 112 Statutory Hazardous Air Pollutants |
|-------------------------------------|--|
| 2-propenamide 79-06-1 (0-0.05 %) | Listed. |

Clean Air Act - Volatile Organic Compounds (VOC): This product contains the following SOCM Intermediate or Final Volatile Organic Compounds (VOC), as defined by the U.S. Clean Air Act Section 111 (40 CFR 60.489).

| Components | CAA Section 111 Volatile Organic Compounds |
|------------------------------|--|
| Hexanedioic acid 124-04-9 | Listed. |
| 2-propenamide 79-06-1 | Listed. |

Clean Air Act - Ozone Depleting Substances (ODS): This product neither contains, nor was manufactured with, a Class I or Class II ozone depleting substance (ODS), as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A+B).

Clean Water Act - Priority Pollutants (PP): This product does not contain any priority pollutants listed under the U.S. Clean Water Act Section 307 (2)(1) Priority Pollutant List (40 CFR 401.15).

Resource Conservation and Recovery Act (RCRA): Not a hazardous waste under RCRA (40 CFR 261.21).

SARA Section 302 Extremely Hazardous Substances (EHS): This product contains the following component(s) regulated under Section 302 (40 CFR 355) as Extremely Hazardous Substances.

| Components | Section 302 Extremely Hazardous Substances (EHS) |
|-------------------------------------|--|
| 2-propenamide 79-06-1 (0-0.05 %) | Listed. |

SARA Section 304 CERCLA Hazardous Substances: This product contains the following component(s) regulated under Section 304 (40 CFR 302) as hazardous chemicals for emergency release notification ("CERCLA" List).

| Components | Section 304 CERCLA Hazardous Substances | CERCLA Reportable Quantity |
|--------------------------------------|---|----------------------------|
| Hexanedioic acid 124-04-9 (3-6 %) | Listed. | 5000 LBS |
| 2-propenamide 79-06-1 (0-0.05 %) | Listed. | 5000 LBS |

SARA Section 311/312 Hazard Communication Standard (HCS): This product is regulated under Section 311/312 HCS (40 CFR 370). Its hazard(s): Acute (immediate) health hazard.

SARA Section 313 Toxic Chemical List (TCL): This product does not contain any components reportable under Sec 313 (40 CFR 372).

TSCA Section 8(b) Inventory Status: All component(s) comprising this product are either exempt or listed on the TSCA inventory.

TSCA Section 5(e) Consent Orders: This product is not subject to a Section 5(e) Consent Order.

TSCA Significant New Use Rule (SNUR): This product is not subject to a Significant New Use Rule (SNUR).

TSCA Section 5(f): This product is not subject to a Section 5(f)/6(a) rule.

TSCA Section 12(b) Export Notification: This product does not contain any component(s) that are subject to a Section 12(b) Export Notification

State Regulations

California Proposition 65: This product contains the following component(s) currently on the California list of Known Carcinogens and Reproductive Toxins.

| Components | California Proposition 65 |
|--------------------------|---------------------------|
| 2-propenamide 79-06-1 | Carcinogenic. |

Pennsylvania Right-To-Know: This product contains the following component(s) which are subject to Pennsylvania Right-to-Know disclosure requirement.

| Components | CAS Number | Pennsylvania Right-to-Know |
|--|------------|----------------------------------|
| Hexanedioic acid | 124-04-9 | Listed. Environmental hazard. |
| 2-propenamide | 79-06-1 | Listed. Environmental hazard. |
| Water | 7732-18-5 | Not Listed. |
| Ethanaminium, N,N,N-trimethyl-2-[(1-oxo-2-propenyl)oxy]-, chloride, polymer with 2-propenamide | 69418-26-4 | Not Listed. |

International Regulations

Chemical Weapons Convention (CWC): This product does not contain any component(s) listed under the Chemical Weapons Convention Schedule of Chemicals.

Domestic Substance List (DSL) Status: All components either exempt or listed on the DSL.

16. OTHER INFORMATION

Reason for revision: Section(s) revised: 3,8

Disclaimer: The information contained herein is based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to such data or information. The user is responsible for determining whether the product is suitable for its intended conditions of use.

**1.3 MATERIAL DATA
SAFETY SHEET**

**SOUTHERN WATER CONSULTANTS, INC.
P.O. BOX 1230
DECATUR, AL 35602
(256) 350-6133**

EMERGENCY TELEPHONE: CHEM-TEL (800) 255-3924

DATE ISSUED: 01/01/2011

SECTION 1 - CHEMICAL PRODUCT IDENTIFICATION

PRODUCT NAME: **EC-309**

NSF Certified

DESCRIPTION: inorganic aluminum salt

MUL in potable water: 250 mg/L

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

| <u>CHEMICAL NAME</u> | <u>%</u> | <u>CAS No.</u> |
|--------------------------|----------|----------------|
| Aluminum chloride, basic | 20-45 | 1327-41-9 |

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: clear to slightly hazy liquid with no odor.

EFFECTS OF OVEREXPOSURE - ACUTE

EYES: Contact with eyes causes severe irritation.

SKIN: Contact may cause mild skin irritation.

INGESTION: May cause mild irritation of intestinal tract.

INHALATION: Not a likely route of entry.

EFFECTS OF OVEREXPOSURE - CHRONIC

not available

PRIMARY ROUTE OF ENTRY: SKIN

SECTION 4 - FIRST AID MEASURES

EYES: Flush with plenty of water for at least 15 minutes. Call a physician if irritation persists.

SKIN: Wash thoroughly with soap and water. Remove and wash contaminated clothing before reuse.

INGESTION: DO NOT INDUCE VOMITING. Drink promptly a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

INHALATION: Move immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician.

PHYSICIANS NOTE: Aluminum soluble salts may cause gastroenteritis if ingested. Treatment includes the use of demulcents.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASHPOINT: not flammable

FLAMMABILITY: n/a

AUTOFLAMMABILITY: n/a

EXPLOSIVE LIMITS:

LOWER: n/a

UPPER: n/a

EXPLOSION HAZARD: none

EXTINGUISHING MEDIA: Use media appropriate to base cause of fire.

EXTINGUISHING MEDIA WHICH MUST NOT BE USED: none

SPECIAL EXPOSURE HAZARDS IN FIRE: Keep containers cool by spraying with water if exposed to fire.

SPECIAL PROTECTIVE EQUIPMENT FOR A FIRE: Self-contained breathing apparatus should be worn.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

ENVIRONMENTAL PRECAUTIONS: Avoid runoff into storm sewers and ditches which lead to waterways.

METHODS FOR CLEANUP: Absorb spill with inert material, then place in a chemical waste container. Do not flush to waste treatment facility or water courses.

SECTION 7 - HANDLING AND STORAGE

HANDLING: Avoid contact with skin, eyes and clothing.

STORAGE: Keep from freezing. Store in a cool, well-ventilated area.

SECTION 8 - EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING CONTROLS: General ventilation is recommended. Eyewash and safety shower stations must be located in the immediate area.

EXPOSURE GUIDELINES: not established

PERSONAL PROTECTION EQUIPMENT:

RESPIRATORY: NIOSH-approved self-contained breathing apparatus for exposure to levels above limits.

HAND: Rubber gloves and boots.

EYE: Chemical goggles which are splash and dust proof or face shield.

SKIN: If clothing is contaminated, wash skin and launder clothing.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE, COLOR AND ODOR: clear to slightly hazy liquid.

PH as is: 1 - 3

BOILING POINT: 212°F

FLASH POINT: none

VAPOR PRESSURE: not determined

SPECIFIC GRAVITY: 1.29 – 1.34

SOLUBILITY IN WATER: complete

VISCOSITY: not determined

FREEZING POINT: 15°F

SECTION 10 - STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION: will not occur

CHEMICAL STABILITY: stable

CONDITIONS TO AVOID: temperature extremes

MATERIALS TO AVOID: alkali and strong oxidizers. Caustic materials will precipitate aluminum hydroxide.

HAZARDOUS DECOMPOSITION PRODUCTS: none under normal storage conditions

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY: LD50: Oral LD50 Rat: >2000 mg/kg
IRRITANCY: mild skin irritant
SENSITIZATION: not determined
SUB-ACUTE, SUB-CHRONIC AND PROLONGED TOXICITY: no information available
EMPIRICAL DATA ON EFFECTS ON HUMANS: no information available

SECTION 12 - ECOLOGICAL INFORMATION

PERSISTENCE IN THE ENVIRONMENT: Not determined
BIOLOGICAL OXYGEN DEMAND: Not determined
CHEMICAL OXYGEN DEMAND: Not determined
AQUATIC TOXICITY
Not determined
OTHER INFORMATION: Discharge of this product must be in accordance with all federal, state, local or other applicable laws and regulations.

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose in accordance with local, state, provincial and federal authorities.

SECTION 14 - TRANSPORTATION INFORMATION

DOT SHIPPING NAME: corrosive liquid, acidic, inorganic, n.o.s.
UN Number: UN3264
DOT HAZARD CLASS: 8
PACKING GROUP: III

SECTION 15 - REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA): All components of this product are listed in the Toxic Substances Control Act inventory.
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA): Reportable Quantity - NA
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA Title III) - Section 311 Hazard Categories:
Acute Health: No
Chronic Health: No
Fire: No
Sudden Release of Pressure: No
Reactive: No
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA Title III) - Section 311:
Components of this product subject to reporting: none

SECTION 16 - OTHER INFORMATION

HMIS RATINGS

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0 PPE: B

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the best opinion on the subject as of the date on this sheet. However, no warranty, guarantee or representation, expressed or implied, is made by Southern Water Consultants, Inc., as to the correctness or sufficiency of this information or to the results to be obtained from the use thereof.

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JOINT-ACTION INTERGOVERNMENTAL AGREEMENT
BY AND BETWEEN
TOWN OF BAYFIELD WATER ENTERPRISE, COLORADO
AND
LA PLATA ARCHULETA WATER DISTRICT

This Joint-Action Intergovernmental Agreement (“Agreement”) is executed this 31st day of July, 2012, by the **TOWN OF BAYFIELD WATER ENTERPRISE, COLORADO**, an enterprise formed and operated by a statutory town and political subdivision of the State of Colorado (“**Town**”), and the **LA PLATA ARCHULETA WATER DISTRICT**, a quasi-municipal corporation and political subdivision of the State of Colorado (“**District**”) (Town and District being singularly referred to as “Party” and jointly referred to as “Parties”).

RECITALS

A. The Town is a statutory town and political subdivision of the State of Colorado operating pursuant to Title 31, C.R.S.

B. The District is organized and operated pursuant to the provisions of Article 1, Title 32, C.R.S., lawfully authorized to provide water treatment and water distribution services within its Service Area, which boundaries are located within La Plata County, Colorado.

C. The Board of County Commissioners of La Plata County has determined the need for a rural water treatment and distribution system (“**District Water System**”) in southeast La Plata County and has approved the District’s Service Plan for financing, constructing and operating the District Water System.

D. The District has adopted a Master Plan which identifies the highest priority for the District to begin delivering treated water to its customers as being a partnership with the Town to treat water to serve both the Town and District in a manner that will result in lower capital costs and lower operating, maintenance and repair (“**OMR**”) costs to their respective customers.

E. The Town has an existing Water Treatment Plant (“**WTP**”) with a design capacity of 1.5 million gallons per day (“**MGD**”) and has identified its need for additional future treatment capacity.

F. The District Master Plan estimates the District’s need for approximately 0.75 MGD of treatment plant capacity in partnership with the Town to provide service to a portion of the District’s customers through approximately the year 2030.

G. A Feasibility Study was completed by Briliam Engineering in August of 2011 (“**2011 Study**”) for the Town and the District concerning the expansion of the capacity of the Town’s water treatment plant for the future operation and use of the Town and the District, finding that the existing WTP site can be expanded to accommodate an additional 2.0 MGD of capacity, of which 1.0 MGD was recommended initially, and that both the Town and the District will realize significant capital and OMR cost savings from such an expansion.

H. The Town and the District propose to initially develop 1.0 MGD of additional treatment capacity by expanding the Town’s WTP from the existing 1.5 MGD design capacity to 2.5 MGD design capacity.

I. The Town and the District will each be operating a Public Water System (as hereinafter defined) during the term of this Agreement. The purpose of this Agreement is to establish the basis for sharing costs of construction; making provision for financing the expansion of the WTP, if necessary; and making provision for engineering, design and construction of new Joint Use Water Facilities (as hereinafter defined and identified).

J. Pursuant to Section 29-1-203, C.R.S., the Parties desire to establish an agreement to provide for design, engineering and financing of the WTP expansion and new Joint Use Water Facilities, and operation, maintenance, repair and replacement of new and existing Joint Use Water Facilities during the term of this Agreement.

K. Pursuant to section 18(2)(a) of article XIV of the Colorado Constitution, political subdivisions of the State of Colorado are encouraged to contract with one another to provide any function, service, or facility lawfully authorized to each of the contracting units, including the sharing of costs, the imposition of taxes, or the incurring of debt.

L. Expansion of the WTP and construction and operation of all Joint Use Water Facilities will serve a public purpose and will promote the health, safety, security and general welfare of the taxpayers, residents and visitors of the Parties and the State of Colorado.

NOW THEREFORE, IN CONSIDERATION of the above recitals, the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby mutually acknowledged, the Parties agree as follows:

AGREEMENT

ARTICLE I. MUTUAL COMMITMENTS

1.1 Joint Venture. The Parties agree to establish their relationship as a joint venture in recognition of the existence of:

- A. Their joint interests in the property to be expanded (WTP) or built (as extensions of the Town's existing water distribution system); and
- B. This express agreement to share in the cost savings or losses of the joint venture; and
- C. Their actions and conduct showing joint cooperation in the venture and a common purpose.

The Parties agree to designate the property of the joint venture as the “**Joint Use Water Facilities.**” Each Party is authorized to insure its interest in the Joint Use Water Facilities separately or through a single policy issued to both Parties insuring against property damage or loss and general liability. Disclosure of the existence of the joint venture shall be made to every insurance carrier. Nothing contained in Section 1.1 defining the relationship as a joint venture shall act to alter the rights and obligations of the Parties as to the ownership, operation or other shared use of the WTP and other Joint Use Water Facilities as specifically set forth elsewhere in this Agreement.

1.2 Joint Use Water Facilities. The Joint Use Water Facilities are shown on Exhibit A and include: Los Pinos Pump Station and pipeline, raw water storage reservoir, water treatment plant (WTP), water transmission pipeline from the WTP to the storage tanks, pipeline from the WTP to the District's transmission pipeline, distribution pipeline from the storage tanks to the District's transmission pipeline, the District's transmission pipeline(s) within the Town's Service Area, treated water storage tank(s), and other Joint Use Water Facilities that may be included in the future. This Agreement provides for the shared use of Joint Use Water Facilities, but the Parties agree that any facilities that are owned by the Town prior to the execution of this Agreement or that are constructed thereafter at the sole expense of the Town shall remain the separate property of the Town, and the District shall not be deemed to have acquired any interest in such facilities unless such facilities are designated as Joint Use Water Facilities in the manner herein provided.

New Joint Use Water Facilities may be added to Exhibit A from time to time during the term of this Agreement. Such additions shall be initiated administratively upon the written recommendation(s) of the Town Manager and the General Manager of the District. Any provisions mutually agreed to concerning a specific Facility such as, but not limited to, guaranteed capacity or special cost sharing arrangements shall be included in the description of the addition to Exhibit A. Such additions to Exhibit A shall be approved by the respective Boards of the Parties as an amendment of this Agreement as provided by Section 9.2. After such an addition is so approved, Joint Use Water Facilities shall include all such Facilities as described in Exhibit A at the time of execution of this Agreement and all additions made thereafter for all purposes of this Agreement, including OMR Costs.

- 1.3 Purpose. This Agreement shall provide for construction of additional capacity to treat and produce Finished Water from the WTP and to construct the necessary infrastructure to convey Finished Water to the District's Service Area; and for sharing of expenses between the Parties for operation, repair, replacement, and maintenance of all Joint Use Water Facilities operated by the Town.
- 1.4 Conveyance of Finished Water for the District. The Town and the District shall cooperate in determining how best to convey the District's share of Finished Water from the WTP to the various locations from which the District will serve its customers. The conveyance facilities may utilize District-only pipelines, the Town's distribution system, if capacity is available, and/or joint pipelines. To the extent the Town's system needs to be improved to convey District water, the costs of such improvements shall be paid by the District, subject to approval of such improvements by the Town. The first connection is planned to be a pipeline from near the WTP extending west along Bayfield Parkway. The District expects to require additional connections extending north, east, and southeast from Bayfield in the future.

ARTICLE II. DEFINITIONS

- 2.1 Consecutive System. "**Consecutive System**" is a public water system that receives some or all of its Finished Water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems. The District shall be considered a Consecutive System as defined in the Colorado Primary Drinking Water Regulations ("**CPDWR**"). As a Consecutive System, the District shall be subject to the monitoring and reporting provisions of the CPDWR and the District shall be responsible for meeting all applicable provisions of the CPDWR for the development and maintenance of a public water system.

- 2.2 Finished Water. “**Finished Water**” is water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment may be necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).
- 2.3 Public Water System. “**Public Water System**” means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Such term includes:
- A. Any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system.
 - B. Any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system.
- 2.4 Water Facilities. “**Water Facilities**” means any one or more works and improvements used in and as a part of the collection, treatment, or distribution of water for the beneficial uses and purposes for which the water has been or may be appropriated, including, but not limited to, uses for domestic, municipal and industrial purposes and including construction, operation, and maintenance of a system of raw and clear water and distribution storage reservoirs, deep and shallow wells, pumping, ventilating, and gauging stations, inlets, tunnels, flumes, conduits, canals, collection, transmission, and distribution lines, infiltration galleries, hydrants, meters, filtration and treatment plants and works, all pumping, power, and other equipment and appurtenances, all extensions, improvements, remodeling, additions, and alterations thereof, and any and all rights or interests in such works and improvements.
- 2.5 Wholesale System. “**Wholesale System**” is a public water system that treats source water as necessary to produce Finished Water and then delivers some or all of that Finished Water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more Consecutive Systems. The Town shall be considered a Wholesale system as defined in the CPDWR. As a Wholesale Sytem, the Town shall be responsible for meeting all applicable provisions of the CPDWR up to the point where the Finished Water (treated drinking water) from the Wholesale System enters the Consecutive System (master meters).

**ARTICLE III.
DELIVERY OF RAW WATER**

- 3.1 District Obligations. The District shall be responsible for delivery of sufficient quantities of raw water to the WTP to provide its share of the treated water production. The District expects to obtain its raw water from the Pine River Irrigation District (“**PRID**”) through releases from Vallecito Reservoir to the Los Pinos Ditch or the Town’s Los Pinos Pump Station. The Town conveys its raw water to the WTP in the same manner. Each Party shall be separately responsible for paying PRID and Los Pinos Ditch Company for that Party’s costs of raw water delivered from Vallecito Reservoir.
- 3.2 Los Pinos Ditch Company. The District and Town shall be individually responsible to coordinate with the Los Pinos Ditch Company to convey each entity’s raw water to the WTP; however, District and Town agree to cooperate in discussions with Los Pinos Ditch Company concerning any improvements the Company may require to the Los Pinos Ditch.
- 3.3 Conveyance Losses. Conveyance losses from Vallecito Reservoir to the diversion headgate at either the Los Pinos Ditch and/or Los Pinos Pump Station shall be assessed by the Division of Water Resources. Conveyance losses within the Los Pinos Ditch shall be assessed by the Los Pinos Ditch Company. There shall be no conveyance losses assessed when using the Los Pinos Pump Station and pipeline to make deliveries to the Town’s Storage Reservoir for raw water. Deliveries of the District’s raw water to the Town’s Storage Reservoir shall include sufficient amounts to offset any conveyance losses so assessed. If necessary, the District shall install measuring devices at either the Los Pinos Ditch headgate or at the Town’s Storage Reservoir sufficient to permit accurate measurement of the amounts of the District’s raw water being delivered for treatment at the WTP. If additional measuring devices are required, the Parties agree to cooperate to design and locate measuring devices in proximity to the Town’s measuring devices to allow for accurate and simple measurement and control of the flows of each Party.
- 3.4 Storage Losses. There will also be raw water losses associated with evaporation and seepage from the Town’s raw water reservoir. The District shall bear a portion of these losses based on the percentage of treated water used by the District as determined in the “OMR Cost” section of this Agreement. Delivery of the District’s raw water to the Storage Reservoir for treatment shall include sufficient amounts to offset such storage losses.
- 3.5 Town Obligations. The Town shall act as the District’s agent in placing orders for raw water from PRID. The Town shall utilize its direct flow water rights and the PRID water contracted by each entity in the most efficient and effective manner to minimize the raw water cost for both Parties.

ARTICLE IV.
EXPANSION OF BAYFIELD WATER TREATMENT PLANT

- 4.1 Joint Use of Existing Capacity. Until the expansion of the WTP is completed and operational, Town agrees to allow the District to utilize the unused portion of the Town's existing water treatment plant capacity by the Town supplying Finished Water from the existing WTP to the District as necessary and feasible to serve the District's new water service customers as its water distribution system is constructed and extended in La Plata County. In addition, Town agrees to allow the District to utilize its pipeline distribution system and treated water storage facilities until the Town's daily water production for distribution to the Town's water customers exceeds 1.05 MGD for a period of one week. At least three (3) year's prior written notice to the District by the Town shall be required that capacity will no longer be available in a specific facility (e.g. water distribution or storage).
- 4.2 WTP Expansion. The Bayfield WTP which includes related facilities such as the reservoir, back wash pond and similar improvements shall be expanded to a design treatment capacity of approximately 2.5 MGD, which treatment capacity shall be allocated between the Town (1.75 MGD) and the District (0.75 MGD). The expanded Bayfield WTP shall continue to be owned, staffed and operated by the Town. The cost of the 1 MGD WTP expansion, estimated to be \$5,082,000 in the 2011 Study, shall be paid in full by the District. As compensation to the Town for the use of existing Town facilities, 0.25 MGD of additional design capacity shall be dedicated to the Town while the remaining 0.75 MGD of additional design capacity shall be reserved for the District. Such costs shall include engineering, design, permitting, construction, construction management and observation, and testing, if any. This expansion of WTP capacity shall include a building of sufficient size to allow future expansion(s) to add as much as 1.0 MGD of additional treatment capacity, thus allowing total treatment plant capacity to increase to approximately 3.5 MGD. The initial expansion of treatment plant capacity shall only include treatment equipment sufficient for an additional 1.0 MGD. WTP construction shall be completed and the expanded WTP shall be on-line within two (2) years of the date of execution of this Agreement, unless both parties mutually agree to extend the date of completion. In the event that the District has not transferred funds in the amount of the contract award for the WTP expansion, plus 10% contingency, into a restricted District account and made a contract award for the construction of the expanded WTP within two years after the date of execution of this Agreement, the Town shall have the right to terminate this Agreement.

4.3 District Obligations.

- A. In recognition of the fact that the District is agreeing to pay 100% of the cost of the WTP Expansion as herein provided, the Town and District shall designate the District as the Owner's Representative for construction of the WTP expansion. Final plans and specifications for the WTP expansion shall be subject to approval of the Town and District. Once approved, the District shall be responsible to bid the Project in accordance with the Special District Act or it may utilize the Integrated Project Delivery provisions (design-build) of the Special District Act, CRS 32-1-1801, et. seq. The Town and the District shall mutually designate and approve the Contractor and the terms of the Construction Contract for the WTP expansion. District and Town agree to cooperate in jointly selecting a Consultant Engineer to design the WTP expansion and to supervise all aspects of construction for the Town and the District, including approval of all progress and final payments.

District shall be solely responsible to pay all fees and charges payable to the Consultant Engineer for the WTP expansion. All change orders recommended by the Consultant Engineer shall be approved by the Town and the District in a timely manner. In the event of any conflict between the Town and the District concerning any change order recommended by the Engineer, which has not been approved by the District, the Town may elect to approve such change order and pay all costs attributable thereto or the Town and the District may agree to share the costs attributable to such change order in their mutual best interests; however, the Town, as the WTP owner, shall have final determination of any change order.

Town shall coordinate with the District in a timely manner to approve the plans and specifications, the Contractor and the Construction Contract, and any change orders recommended by the Engineer for the WTP expansion, which approvals shall not be unreasonably withheld and, if approval by the Town is delayed for more than thirty (30) days, such approval shall be deemed to have been granted.

- B. As the Owner's Representative, the District shall be responsible for day to day management of construction, payment of expenses of construction and for all professional services required for the WTP expansion, including engineering, design, construction observation and testing services. As the Owner's Representative, the District shall be solely responsible for payments due to the Contractor from District funds. The District shall transfer funds in the amount of the contract award for the WTP expansion, plus 10% contingency, into a restricted District account upon the acceptance by the Town and District of the WTP expansion contract bid,

that shall be used exclusively for payment of the District's obligations for the WTP expansion project. Any funds remaining in the restricted account upon completion and acceptance of the project shall remain the property of the District. Upon completion of the WTP expansion and before acceptance of the project, the Town and District shall jointly approve the WTP expansion as constructed and shall advise the Consultant Engineer and the Contractor of any final punch list items that require completion. The Parties agree to require a two year warranty in the Construction Contract which shall be in favor of the District as Owner's Representative and the Town as the Owner of the WTP. Upon completion and acceptance of the WTP expansion by the Town and the District, District shall assign and convey ownership of all of the WTP improvements for which it has paid all of the costs to the Town, free and clear of all liens and encumbrances, by Bill of Sale, subject to its interest in the expanded design capacity and its rights to receive Finished Water from the WTP.

- 4.4 Future Expansions of Treatment Capacity. Should additional treatment capacity be required by either Party in the future, up to a total plant design capacity of 3.5 MGD, the cost of such additional expansion of treatment capacity shall be shared by the Parties based on the amount of additional treatment capacity allocated to each Party. Either Party may unilaterally request future expansion of the treatment capacity of the WTP if that Party is prepared to bear all the costs associated with the expansion, with the understanding that the expanded treatment capacity will still be shared by both Parties, and that reimbursement to the paying Party for a negotiated portion of the expanded treatment capacity will be provided when the capacity is required. Each Party shall be guaranteed a minimum of 25% of the future expanded capacity, unless otherwise negotiated. Should additional treatment capacity be required by either Party which would make the total design treatment capacity of the WTP greater than 3.5 MGD, the Parties agree to negotiate in good faith to expand the WTP and to determine the allocation of the costs of such expansion and how the costs of such expansion shall be paid. Nothing contained herein shall limit the Town from unilaterally making expansions to the Town's WTP design treatment capacity in excess of 3.5 MGD at the Town's expense at any time.
- 4.5 District's Unused Treatment Capacity. District does not expect to immediately use all of the treatment capacity allocated to it after the expansion of the WTP is complete and the expanded WTP is fully operational. District's demand is expected to increase as its water distribution system is built out and customers are added. During this period, District agrees to permit the Town to utilize any portion of the District's allocation of treatment capacity that is not utilized on a daily or seasonal basis at no cost to the Town, provided that such treatment capacity up to the amount of the District's full allocation thereof (0.75 MGD) shall

always be available to the District as its demand increases throughout its system. The timing and amount of expansion beyond 2.5 MGD, whether for the entire plant, or the Town's allocation or the District's allocation, shall follow the criteria utilized by the Colorado Water Quality Control Division.

ARTICLE V. WATER TREATMENT PLANT OPERATIONS

5.1 Town Obligations.

A. Town shall be solely responsible for payment of all costs of staffing, including salaries and benefits paid to its employees and licensed operators at the WTP and for its administrative expenses incurred in billing the District for treated water deliveries. Town shall also be solely responsible for its treatment costs, including chemicals, testing, reporting and all other requirements of its permit. These costs shall be included in the calculation of the uniform volume rate.

B. Town shall develop an OMR budget annually for its Water Enterprise in consultation with the District. OMR shall include direct personnel, overhead administration, materials, supplies, equipment, chemicals, and repairs, replacements and maintenance costs less than \$10,000 per item.

Planned major replacements, repairs or maintenance for Joint Use Water Facilities by the Town in excess of \$10,000 shall be included in the annual Water Enterprise budget and the Town shall invoice the District on a pre-arranged schedule for its share of the major replacement, repair or maintenance costs for Joint Use Water Facilities based on the proportionate use of those Facilities. The Town shall notify the District of emergency major replacements or repairs, as soon as practical, followed by an invoice for the District's share of such expenses. The District shall have 60 days from the receipt of invoice to pay the Town.

C. The Town shall be responsible for providing water at the District master meter(s) as required by Section 5.3.A that meets all applicable Colorado Department of Public Health and Environment ("CDPHE") water quality standards. In the event of a boil order by CDPHE due to the quality of water provided by the Town, as the sole remedy, the District shall not be charged for water delivered to it during such period. The District shall be responsible for water quality monitoring and testing after the master meters.

5.2 Costs of Operations, Maintenance and Replacement (“OMR Costs”).

- A. District agrees to pay for its share of the OMR Costs by paying for the Finished Water delivered for use by the District on a monthly basis, consistent with the Town’s monthly billing process. Metering equipment shall be installed and maintained at the District’s expense to measure volumes of Finished Water delivered to the District each month and this figure shall be used to calculate the District’s share of OMR Costs.
- B. The OMR costs to be charged to the District by the Town shall be determined annually for the succeeding calendar year. The Town and District shall jointly agree to the percentage of the Water Enterprise budget that is allocable to the WTP and the Joint Use Water Facilities for each budget year. The allocable amount shall be divided by the amount of water produced at the WTP during the prior year to determine the cost per thousand gallons. The OMR costs that the District pays to the Town shall then be assessed based on the volume of water used by the District, including water losses, and the cost per thousand gallons. The volume rate shall be adjusted annually based on the previous year’s reconciliation of budget to actual expenditures. The District agrees that the minimum monthly payment shall be \$400 per month commencing upon the execution of this Agreement. These monthly payments shall not include costs associated with major repair, replacement or maintenance of Joint Use Water Facilities or equipment, which shall be paid separately to the Town by the District as provided in Section 5.1.B.

5.3 District Obligations.

- A. The District shall install master meters on all District pipelines after the last Town served customer and before the first District served customer. Town and District shall each have the opportunity to read all meters which serve as measuring points for delivery of Finished Water to the District. If the meter(s) are located at the WTP and there is no mixing of the District’s Finished Water with other Finished Water in the Town’s water distribution system, this meter reading(s) shall be used to determine the volumes of Finished Water delivered to the District. If District water is mixed with other Finished Water in the Town’s water distribution system for delivery to the District at some point or points removed from the WTP, system water losses shall be added to the meter reading(s). Either the District or the Town may evaluate or measure water losses in the delivery system for consideration by the other party in determining the proper amount attributable to system losses. Unless otherwise agreed, the system loss shall be deemed to be 10% for the purpose of determining the volumes of treated water delivered to the District. The meters shall have an accuracy

which is consistent with the industry average for the type of meter used. District shall provide a meter accuracy certification for all meters to the Town, at minimum, on an annual basis.

- B. The payment of the OMR Costs by the District to the Town shall be paid monthly based upon the measured volume from all master meters, plus the agreed upon percentage for water losses within the distribution system. These monthly payments shall not include costs associated with major repair, replacement or maintenance of Joint Use Water Facilities or equipment, which shall be paid separately to the Town by the District as provided in Section 5.1.B.
- C. District agrees to implement water use restrictions if the Town has implemented water use restrictions within its Service Area.

- 5.4 Grants and Loans. Town and District agree to cooperate to apply for any grants and loans that may be identified by either Party that could be used to fund the construction of any WTP expansion or other Joint Use Water Facilities identified in this Agreement.

ARTICLE VI. FINISHED WATER TRANSMISSION PIPELINES

6.1 District Obligations.

- A. The District shall design, engineer and construct at its sole expense, from a location near the WTP along County Road 501, Bayfield Parkway to County Road 509, a new Finished Water transmission pipeline with a minimum diameter of fourteen inches (14”) which shall be and remain the separate property of the District. The District agrees to allow the Town to utilize 304 gpm of peak capacity in and to interconnect with this new transmission pipeline for so long as this Agreement remains in effect. In the construction of this transmission pipeline, Town will permit the District to utilize an existing sleeve under Highway 160 at County Road 501 for the installation of this pipeline. In the event the District uses the existing sleeve and the Town ever requires a sleeve at this location for the construction of its own pipeline in the future or upon termination of this Agreement, District shall pay the costs to install a new sleeve of equivalent diameter as close as possible to the existing sleeve for Town’s use.
- B. As part of the build out of its water distribution system, District also plans to construct the following facilities within the Bayfield Service Area:

- (i) A transmission pipeline from Bayfield Parkway south along County Road 509 through the Bayfield Service Area;
- (ii) A transmission pipeline from the County Road 509/Bayfield Parkway intersection west along Bayfield Parkway then along Highway 160 through the Bayfield Service Area;
- (iii) A transmission pipeline from an interconnect near the WTP south to County Road 526 and then south through the Bayfield Service Area to County Road 523;
- (iv) A transmission pipeline from the 14-inch transmission main, north along County Road 501 through the Bayfield Service Area;
- (v) A pipeline north along County Road 502 through the Bayfield Service Area;
- (vi) A transmission pipeline east along County Road 526 and Highway 160 through the Bayfield Service Area; and
- (vii) A treated water storage tank north of the treatment plant.

The District shall allow the Town to utilize capacity and Town may interconnect with any of these facilities, to the extent that the full capacity therein is not required by the District. The District shall provide the Town at least three (3) years prior written notice if such capacity will no longer be available in a specific facility (e.g. water distribution or storage). The District will also allow the Town to cost share in any of these facilities to increase the capacity of any particular facility if the Town desires to secure guaranteed capacity therein for its future needs. The Town shall be solely responsible for all costs associated with any interconnections and service to Town customers that utilize these transmission pipelines.

- C. District shall design and construct all new Joint Use Water Facilities and all District facilities within the Bayfield Service Area in conformance with the Town's Infrastructure Design Standards and meeting or exceeding the Town's Construction Specifications.
- D. District shall utilize the same water meter manufacturer as used by the Town as its supplier for any master meters that are required.
- E. District facilities within Town rights-of-way or platted utility easements which are not Joint Use Water Facilities shall be relocated at the District's sole expense if necessary for road reconstruction or improvement.

- 6.2 Town Obligations. Except as otherwise provided in Section 6.1.A, Town shall make timely determinations of its needs for capacity in any District facilities and shall make any requests for guaranteed capacity in writing at least 60 days prior to the date the District will finalize its construction design for any particular facility for purposes of bidding the contract for construction of that component, provided that the Town is given six months' notice by the District of its intent to construct such new facility. Any request for guaranteed capacity shall include a commitment by the Town to pay for the incremental increase in the cost of the project to add the requested capacity to the District's facility for construction. Upon completion of the facility in which the Town has requested guaranteed capacity, Town shall pay to the District the amount determined to be the incremental increase in the cost of the project to add the requested capacity to the District's facility for the Town.

ARTICLE VII.

TERM OF AGREEMENT; TERMINATION OF AGREEMENT

- 7.1 Initial Term. The Initial Term of this Agreement shall be 20 years commencing August 1, 2012 and ending July 31, 2032; provided, however, that in the event either Party fails to make an annual appropriation of funds necessary for it to perform its obligations hereunder, either Party may terminate this Agreement upon prompt notice to the other Party with such termination to be effective as of the last day of the then-current year. Provided, however, the District shall not be allowed to use a non-appropriation of funds as a basis for termination of this Agreement if, thereafter, the District appropriates funds for the purpose of producing Finished Water itself or for purchasing Finished Water from a third-party to serve the customers that it expects to serve from the WTP, or the Town shall not be allowed to use a non-appropriation of funds as a basis for termination of this Agreement if the Town appropriates funds for the purpose of using the WTP capacity constructed by the District to sell Finished Water to a third party in place of the District. The term of the Agreement shall automatically renew and be extended beyond the Initial Term for additional terms of five years each at the expiration of the Initial Term and each extended term, unless written notification of termination is given by either Party at least 60 days prior to the end of the Initial Term or any extended term. The Town and District agree to jointly review the terms and provisions of this Agreement every five years to evaluate its effectiveness, the first review to be commenced on or about January 1, 2017 or at such other time as may be mutually agreed to by the Parties.
- 7.2 Termination of Agreement.
- A. If the Town terminates this Agreement, District shall have a minimum of five years from the date of receipt of notice of termination from the Town

to design, construct and make operational alternate water treatment facilities. During such period, the Town shall continue to provide Finished Water to the District upon the terms and provisions herein provided. Once provision of Finished Water to the District by the Town is discontinued, Town shall reimburse the District for the depreciated value of the expansion(s) of the WTP paid for by the District during the Initial or extended terms of the IGA and thereafter the District shall have no interest in the WTP or in any other Joint Use Water Facilities constructed by the Town. The Town, through its Water Enterprise, shall reimburse the District for the depreciated value, using straight line depreciation and a 25 year useful life for such improvements to or expansion(s) of the WTP, such amount to be paid to the District using financing approximating the lowest rate for which the Town is then eligible from the Colorado Water Resources and Power Development Authority, or upon such terms as may be mutually agreed upon by the Parties.

- B. If the District terminates this Agreement, except as otherwise agreed by the Parties in writing at that time, all Joint Use Water Facilities solely paid for and constructed by a Party, shall become and/or remain the sole and absolute property of that Party. Upon such termination by the District, the WTP shall remain the sole property of the Town. The Town shall have a minimum of three years from the date of receipt of notice of termination from the District to design, construct and make operational any alternate water distribution facilities it is required to replace as a result of such termination. Except for those facilities in which the Town has acquired guaranteed capacity, District shall reimburse the Town for the depreciated value of any other Joint Use Water Facilities for which the Town cost shared, based on the amount of cost share using straight line depreciation and a 50 year useful life for such Facilities, such amount to be paid to the Town using financing approximating the lowest rate for which the Town is then eligible from the Colorado Water Resources and Power Development Authority, or upon such terms as may be mutually agreed upon by the Parties.
- C. Subject to the notice requirements set forth in Section 7.2.A and excluding those District facilities in which the Town has acquired guaranteed capacity as provided in Section 6.2, in the event this Agreement is terminated by either Party, the Town shall no longer have a right to any capacity, nor to interconnect with any of the other Joint Use Water Facilities solely constructed and paid for by the District, and the District shall no longer have a right to any capacity, nor to interconnect with the Joint Use Water Facilities paid for by the Town. The Town shall disconnect any interconnections of Town owned facilities from District owned facilities at

its sole expense and the District shall disconnect any interconnections of District owned facilities from Town owned facilities at its sole expense. District shall install a new sleeve of equal diameter to the existing sleeve, under Highway 160 at County Road 501 at District's sole cost, for use by the Town to replace any sleeve at that location that was used by the District.

7.3 Continuation of Water Service to Customers of the Town Being Served by or Who Could be served from Joint Use Water Facilities in the Event of Termination of this Agreement. In the event of termination of this Agreement, the District agrees to offer the Town the options identified below to continue service to Town customers who may be connected to or served from District transmission pipelines. Town may elect a different option for each District facility serving Town customers, but only one option shall apply to each such District facility.

- A. Once the District completes construction of its water treatment facility and is producing Finished Water which is being conveyed to District customers through the District's transmission pipelines as described in Sections 6.1.A and 6.1.B, District shall provide the Town the opportunity to purchase Finished Water from the District for delivery to the Town through any of these District facilities for resale to the Town's water customers through a master meter or master meters to be installed at the Town's expense, or through existing customer meters, to permit the Town to continue to provide water service to its customers from these District facilities at such fees and charges as the Town may impose. The District shall establish the rate at which its Finished Water shall be sold to the Town in a manner that is consistent with the process provided in Section 5.2 of this Agreement for Finished Water supplied to the District by the Town during the term of this Agreement. This option to purchase Finished Water produced by the District shall be exercised by the Town in writing delivered to the District at least 90 days prior to the date of termination of this Agreement.
- B. The Town may also elect, in its sole and absolute discretion, to have the District assume all obligations of the Town to serve any or all of its customers served from District facilities. Such water customers shall thereafter become customers of the District at such rates and charges as are established by the District. If the Town makes this election for any customer or customers, it also agrees not to oppose any Petition for Inclusion such customer may elect to file with the District, provided the District shall not require inclusion of the property as a condition to provide water service to such property under this Agreement. For those water customers who have already paid the applicable tap fees and other charges to the Town to connect to the Town's water service, whether they are then

receiving water service or not, the District agrees not to impose any additional tap fees for these property owners to become customers of the District. In the future, if the Town elects to resume or undertakes to provide water service to these customers from its own facilities, it shall also have the option to recover any customer that has been receiving water service from the District. If such customer has previously successfully petitioned for inclusion in the District, that customer may thereafter petition for exclusion from the District by paying all the costs of the exclusion proceeding as allowed by Part 5 of the Colorado Special District Act. Provided that the Town has executed a written commitment to thereafter provide water service to that customer, the District agrees to approve such petition for exclusion for any customer that will thereafter receive water service from the Town and the Town's separate water distribution facilities.

- C. Town and District agree that they will cooperate with each other to facilitate the continuation of water service from either the Town or the District to each and every customer who may connect to the facilities to be constructed pursuant to this Agreement. Town and District may mutually agree to some other provision or provisions for continuation of water service to these customers other than those provided in Section 7.3.A or 7.3.B, if appropriate.
- D. The Parties agree to cooperate with each other and the District agrees to take any reasonable steps to allow the Town to undertake and complete the annexation of any property within the Town's Service Area that is served by any District facility or Joint Use Water Facility should the Town request such cooperation.

ARTICLE VIII. COORDINATION

- 8.1 Town and District agree to coordinate as necessary to successfully implement the terms of this Agreement. The coordination items shall include, but not be limited to, the following:
 - A. Changes in the WTP that may affect the quality of Finished Water;
 - B. Raw water amounts and deliveries;
 - C. Major expenses associated with the Joint Use Water Facilities;
 - D. Interconnection of Town and District transmission pipelines;
 - E. Planning for major replacements;

- F. Annual WTP budget;
- G. Changes in WTP personnel;
- H. Problems the Town may experience in meeting water quality standards; and
- I. Annual meeting to coordinate all aspects of this Agreement.

ARTICLE IX. GENERAL PROVISIONS

- 9.1 Notices. All approvals, consents, notices, objections, and other communications (a “**Notice**” and, collectively, “**Notices**”) under this Agreement shall be in writing and shall be deemed properly given and received when personally delivered, or sent by overnight courier, or by emailed (pdf), or by registered or certified United States mail, postage prepaid, addressed to the other Party at the addresses as set forth below. Notices shall be deemed effective: (i) if personally delivered, when actually given and received; or (ii) if by overnight courier service, on the next business day following deposit with such courier service; or (iii) if by email (pdf), on the same day if sent before 5:00 P.M. Mountain Time, or on the next business day if sent after 5:00 P.M. Mountain Time; or (iv) if by registered or certified United States mail, postage prepaid, three (3) business days after mailed. All Notices shall be addressed as follows (or to such other address as may be subsequently specified by Notice given in accordance herewith):

To the Town:

Town of Bayfield
1199 Bayfield Parkway
P.O. Box 80
Bayfield, CO 81122

Attention: Town Manager

With a required copy to:

Dirk Nelson, Town Attorney
P.O. Box 496
Bayfield, CO 81122

To the District:

La Plata Archuleta Water District

255 Ute Street
P.O. Box 1377
Ignacio, CO 81137

Attention: General Manager

With a required copy to:

Collins, Cockrel & Cole, P.C.
390 Union Blvd., Suite 400
Denver, CO 80228-1556

Attention: David A. Greher
Eric C. Jorgenson


- 9.2 Amendments. This Agreement may be amended only by written document signed by the Parties.
- 9.3 Dispute Resolution. The Parties agree to attempt to resolve any dispute arising out of this Agreement through good faith negotiations between the Managers of the Parties who shall attempt to get authority from their respective Boards to resolve the dispute. No civil action with respect to any such dispute shall be filed by either Party until the matter has been subjected to mediation between the Parties as described herein. The Parties agree to continue to perform their respective obligations under this Agreement pending all attempts to resolve any dispute. If the dispute is not resolved between the Managers of the Parties within thirty days, then the Manager of each Party shall request that their respective Board appoint a committee of not more than two Board Members from each Party to engage in further negotiations to resolve the dispute. If either Party believes that further negotiations will not be fruitful, or following failed negotiations between the committee members, then either Party may request that the appointed committee members and the Managers of each Party engage in mediation with a single mediator mutually designated by the Parties through the committee at the earliest opportunity.
- 9.4 Severability. In the event that any of the terms, covenants or conditions of this Agreement or their application shall be held invalid as to any person, entity or circumstance by any court having competent jurisdiction, the remainder of this Agreement and the application in effect of its terms, covenants or conditions to such persons, entities or circumstances shall not be effected thereby.

- 9.5 Waiver. The waiver by either party of any breach by the other of any term, covenant or condition contained in this Agreement shall not be deemed to be a waiver of any subsequent breach of the same or other term, covenant, or condition.
- 9.6 Entire Agreement. This Agreement embodies the complete agreement between the Parties regarding the subject matter herein and supersedes all prior agreements and understandings, if any.
- 9.7 Section Headings. The section headings in this Agreement are inserted for convenience and are not intended to indicate completely or accurately the contents of the Sections they introduce, and shall have no bearing on the construction of the Sections they introduce.
- 9.8 No Third Party Beneficiaries. The Parties to this Agreement do not intend to benefit any person not a party to this Agreement. No person or entity, other than the Parties to his Agreement, shall have any right, legal or equitable, to enforce any provision of this Agreement.
- 9.9 Duly Authorized Signatories. By execution of this Agreement, the undersigned each individually represent that he or she is duly authorized to execute and deliver this Agreement and that the subject Party shall be bound by the signatory's execution of this Agreement.
- 9.10 Counterparts, Electronic Signatures and Electronic Records. This Agreement may be executed in two counterparts, each of which shall be an original, but all of which, together, shall constitute one and the same instrument. The Parties consent to the use of electronic signatures and agree that the transaction may be conducted electronically pursuant to the Uniform Electronic Transactions Act, § 24-71.3-101, *et seq.*, C.R.S. The Agreement and any other documents requiring a signature may be signed electronically by either Party. The Parties agree not to deny the legal effect or enforceability of the Agreement, solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Agreement in the form of an electronic record, a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature on the grounds that it is an electronic record or an electronic signature or that it is not in its original form or is not an original.

[Signature Page Follows]

EXECUTED as of the date first written above.

TOWN OF BAYFIELD WATER
ENTERPRISE, an enterprise formed and
operated by a statutory town and political
subdivision of the State of Colorado


By: 
Dr. Rick K. Smith, Mayor

Address: 1199 Bayfield Parkway
P. O. Box 80
Bayfield, CO 81122

Attest:


Kathleen S. Cathcart, Town Clerk

LA PLATA ARCHULETA WATER
DISTRICT, a Colorado special district and
political subdivision of the State of
Colorado

By: 
Richard T. Lunceford, Chairman

Address: 255 Ute Street, P. O. Box 1377
Ignacio, CO 81137

Attest:



Cheryl Lynn, Secretary

EXHIBIT A

To

Joint-Action Intergovernmental Agreement

**JOINT USE WATER FACILITIES
OF
TOWN OF BAYFIELD WATER ENTERPRISE
AND
LA PLATA ARCHULETA WATER DISTRICT (LAPLAWD)**

Raw Water Reservoir

Los Pinos Pump Station

Los Pinos Raw Water Conveyance Line

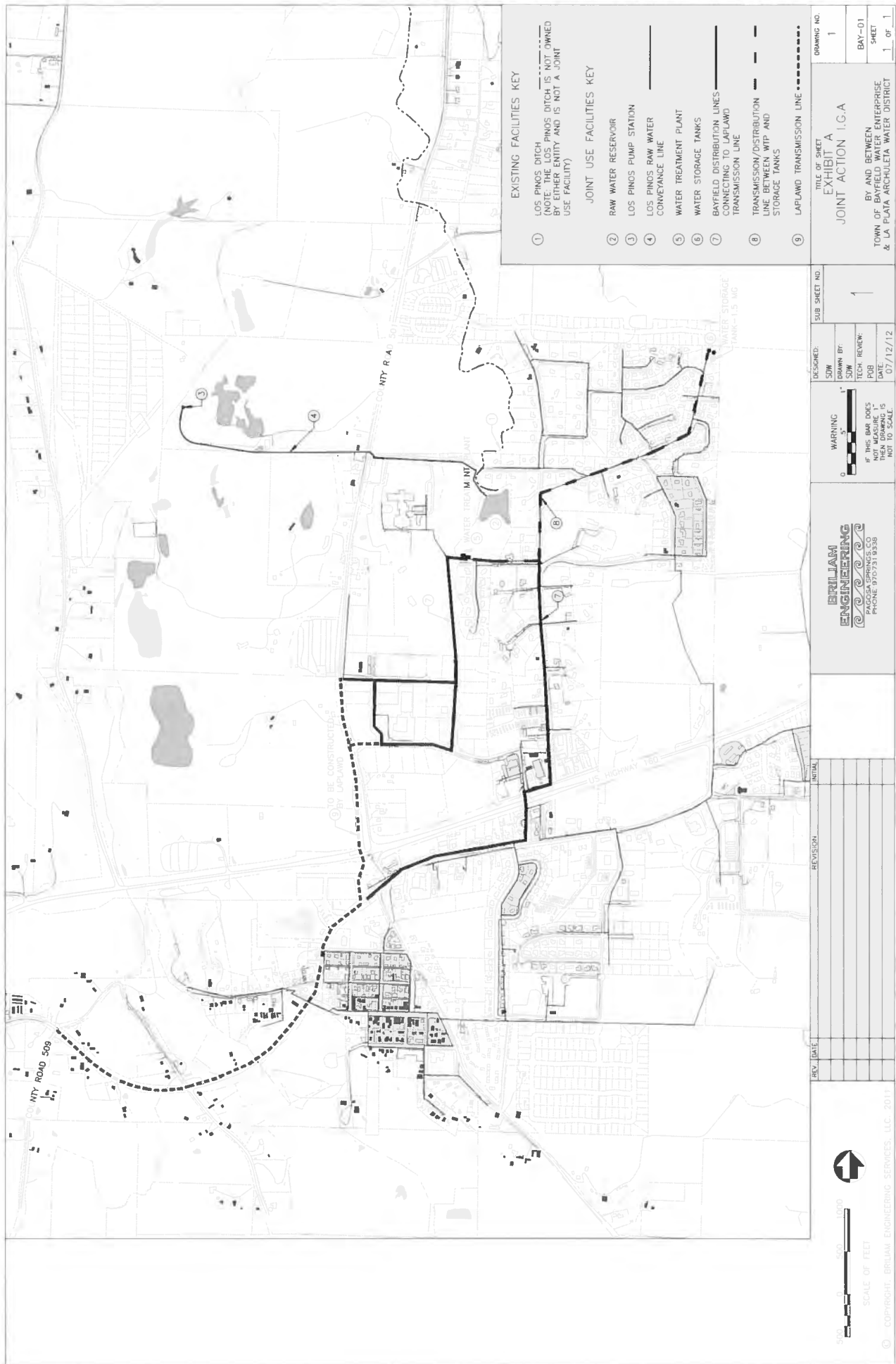
Water Treatment Plant

Water Storage Tanks

Bayfield Distribution Lines Connecting to LAPLAWD Transmission Line

Transmission/Distribution Line Between WTP and Storage Tanks

LAPLAWD Transmission Line



Water Rights Report (Wright Water Engineers)

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March 14, 2003

Via First-Class Mail

Town of Bayfield
C/O Brett Boyer, Town Manager
P.O. Box 80
Bayfield, CO 81122

Re: Preliminary Raw Water Supply and Demand Forecasting for the Town of Bayfield

Dear Mr. Boyer:

Wright Water Engineers Inc. (WWE) is pleased to provide you with a preliminary report on the Town of Bayfield's future water supply and demand estimates.

WATER SUPPLY

Direct Flow Water Rights

The Town of Bayfield (Town) derives its raw water supply from two surface water rights on the Los Pinos River and storage water from Vallecito Reservoir. The surface water rights include 2.26 cubic feet per second (cfs) of water in the Los Pinos Irrigating Ditch (priority 4) and 0.92 cfs of water in the Schroder (also spelled Schroeder in some decrees) Irrigating Ditch (priority 12). There is some discrepancy of the ownership of additional shares of Schroder Ditch water.

A list of water rights in the Los Pinos Basin, sorted by priority and with the water rights associated with the Town highlighted, is provided in Appendix A. The Los Pinos and Schroder Ditch water rights originally were decreed under Case No. 1248 for the irrigation of agriculture (see Appendix B). One cfs of the Los Pinos Ditch and 0.8 cfs of the Schroder Ditch were subsequently transferred from irrigation to municipal use with a decreed point of diversion at the Town's pumping station (see Case Nos. 1411-76 and 1412-76 in Appendix B). In Case No 96CW124, the Town has applied to change the point of diversion of the surface water rights to the new location of the pumping plant and transfer the remaining 1.26 cfs of the Los Pinos water right to municipal use (see Amended Application 96CW124 in Appendix B). When the surface water rights are in priority, the Town relies on these two direct flow rights for its raw water supply.

Vallecito Reservoir Storage Allotment

Vallecito Reservoir was decreed for 129,674 acre-feet (AF) of storage water, of which 108,062 AF of water is allocated for use on non-tribal project land. The 108,062 AF of non-tribal water is decreed to provide supplemental water for the irrigation of 38,866 acres "and for the purpose of supplying water to the inhabitants of the Towns of Bayfield and Ignacio, Colorado." When its

direct flow water rights are not in priority, the Town uses storage water from Vallecito Reservoir for its raw water supply. The Town owns 166.86 acres of land that is allocated storage water from Vallecito Reservoir. When the reservoir fills, the reservoir yields approximately 2.7 AF per irrigated acre, and the Town's storage allotment is 450 AF. During 2002, the reservoir did not fill and yielded 0.9 AF per acre. Thus, during a dry year, the Town's reservoir storage allotment may decrease to 150 AF (166.86 acres x 0.9 AF per acre). Information pertaining to the Town's reservoir allotment is provided in Appendix C.

Dry Year Water Supply

The 2002 "water year" (October 2001 through September 2002) is the driest water year on record for the Los Pinos River, and the region as a whole. Table 1 ranks 50 years of streamflow for the period 1951 to 2001 from the driest to the wettest based on the annual flow at the La Boca gauge. The final gauge results of the 2002 water year are not available and are not included in Table 1. As a conservative measure and for planning purposes, 2002 was chosen as a benchmark to calculate the Town of Bayfield's water supply yield during a very dry year.

Currently, approximately 180 cfs of water is required to meet senior water users (Southern Ute Tribe) located downstream of the Town. The Southern Ute Tribe has not put to use the full amount of its decreed allotment and the downstream call may increase to approximately 190 cfs over time. The call records for 2002 are provided in the "Call Analysis" located in Appendix E. A call record is a summary of the administration of the river and includes date of the call, the priority of the water right, and severity of the curtailment of junior water users on the stream.

In 2002, the Town's junior direct flow water right (Schroder P-12) became the "calling" water right on the Los Pinos River on May 23, 2002. The Schroder water right was curtailed on June 1st and did not come back into priority for an extended period of time until September 1st. The Town's senior direct flow right (Los Pinos P-4) was first curtailed on June 9th and did not come back into priority for an extended period of time until July 5th. The Town's relatively senior direct flow water rights were not in-priority for much of the summer of 2002. Storage water was needed to supplement the water supply.

Based on diversion records reported by the Colorado Division of Water Resources during the summer (May through September) of 2002, both direct flow water rights diverted 131 AF of water at the Town's pump station (see Diversion Records in Appendix D). This figure may be low due to no diversions during periods of poor water quality in the Los Pinos River resulting from the Missionary Ridge Fire. A review of the call records shows an additional 11 AF may have been diverted if the intakes were not shut down due to the post fire stormwater runoff. The direct flow rights in 2002 are estimated to have yielded approximately 142 AF of water from the river with a maximum diversion rate of 0.74 cfs.

When the direct flow rights were curtailed, reservoir storage was used to supplement the direct flow water rights. On June 9, 2002, the Town began using reservoir water. Extended reservoir releases ended on September 1st with 63 AF of reservoir storage used during the 2002 water year. Accounting for both storage water and surface water rights, the Town used approximately 193

AF of water during the May through September period. For the entire 2002 water year, the Town diverted 352 AF of water. From 1997 through 2001, the Town's average annual water diversion was 210 AF of water and the summer (May through September) diversion averaged 127 AF of water. Thus, during the 2002 water year, the Town diverted approximately 60 percent more water than the 1997-2001 average.

Future Supply

For purposes of this analysis, future water supply is based on all of the direct flow water rights owned by the Town, including 2.6 cfs Los Pinos and 0.92 cfs of Schroder. The future supply for a dry year is based on the 2002 call records applied to the 2.26 cfs Los Pinos water right and 0.92 cfs Schroder water right. The May through September dry year supply of water from direct flow water diversions from the river (no storage water) is 428 AF (see Appendix E, Page 7). It is important to note that 1.26 cfs of the Los Pinos Ditch and 0.12 cfs of the Schroder Ditch has not been transferred to municipal use. Transfer of these rights will need to occur before the Town can use them for municipal use.

A preliminary estimate of the potential consumptive use credits derived from Bayfield's share of the Schroder Ditch and Los Pinos Ditch are provided in Table 2. Potential consumptive use is the water that potentially can be consumed (evapotranspired) by the plants when sufficient water is available for irrigation. In order to avoid injuring downstream water users, only the water that was historically consumed during the irrigation of the agriculture can be changed to a new use and point of diversion. The total potential historic consumptive use credits that are in priority over the 2002 call record are estimated at 262 AF (see Appendix E, Page 7).

The estimate of the potential historic consumptive use credits is preliminary and would require additional work for a water rights filing in water court. Quantification of potential historic consumptive use credits available to the Town from the dry-up of irrigated acreage under the Los Pinos Ditch and Schroder Ditch is not a part of this scope of work.

WATER DEMAND

The measured raw water inflow into the water treatment plant is used for the water demand figures. The calculated water use per capita is provided in Table 3. The minimum water use over the 1997 through 2001 period was 84 gallons per capita per day (gpcd) occurring in February of 1999. The maximum water use was 370 gpcd in July of 2000.

A preliminary comparison was conducted of the treated water produced versus the amount of billed water and the flows measured into the wastewater treatment plant. The preliminary comparison between the water produced and the water measured for billing shows a substantial amount of unaccounted water (see Table 4, Column 4). The unaccounted for water includes but is not limited to: filter backwash water, unmetered water used, losses in the Town's distribution system, and meter errors. In the spring, April and May, the amount of water billed often exceeds the treated water. This is because the meters are not read during the winter months and winter

water use is estimated. When the meters are read in the spring, underestimates of winter water use are incorporated into the first actual meter reading in the spring. The comparison of water billed and measured inflows into the wastewater treatment plant shows that during periods of rainfall, the inflow to the sewer plant is affected by inflow and infiltration (I&I) of water into the wastewater collection system. During the winter months, when I&I at the wastewater treatment plant are lowest, the Town's winter potable water use (water billed) is estimated and not measured. In addition, the sewage collected by the wastewater treatment plant includes users that are not connected to the Town's drinking water system.

Given these discrepancies between the amount of water billed and the measured inflows into the wastewater treatment plant, return flow factors were not based on the Town's water use figures and are estimates from measurements in other towns. During the winter months, an estimated 85 percent of treated water returns to the river (see Table 3, Return Flow Factors). During the summer, when treated water is used for lawn and garden irrigation, an estimated 55 percent of the treated water returns to the river. During the shoulder months, April and November, an estimated 75 percent of the potable water used returns to the river. In order to fully assess the Town's water use and depletions to the river, WWE recommends that the Town increase the accuracy and record keeping of water production, billing, and, if possible, effluent generation.

Population

United States Census and Colorado Department of Local Affairs (Local Affairs) population estimates for Bayfield are provided in Table 5. Over the 1910 through 2000 period, the Town's annual average percentage population growth was 0.95 percent. Over the 1990 through 2001 period, Bayfield is estimated to have grown at a rate of 2.97 percent. The maximum annual growth rate for a 10-year period is 5.58 percent during the decade between 1970 and 1980. The maximum estimate of annual growth rate over the 1990 through 2001 period was 8.61 percent in 2001.

Population forecasts by Local Affairs for La Plata County are provided in Table 5. Over the 1990 through 2000 period, population estimates for Bayfield accounted for 3.95 percent of the population in the county. The population forecast for the Town is calculated by multiplying the County Forecast estimates by 3.95 percent. Future population growth estimates for the Town, based on the Local Affairs, County Forecast, and growth rates of 1 percent, 3 percent, and 5 percent, respectively, are displayed in Figure 1.

Future Water Demand

Water use records were available for the 1997 through 2002 period (see Table 3). Future water use is calculated by multiplying the maximum monthly per capita water use figures in Table 3, including per capita demand (Column 8), return flows (Column 10), and depletions (Column 11) by the population forecasts in Figure 1. Future water demand, return flow, and depletion forecasts are provided in Table 6. By using the six-year maximum monthly water use figures, the future forecast of water use in Table 6 should be conservative. As a comparison, the estimated demand based on the maximum per capita water use in 2000 is 420 AF for all three

population growth rates. The actual diversion of water by the Town in 2002 was 353 AF (see Appendix D).

FUTURE WATER NEEDS ANALYSIS

There are two methods for estimating the Town's future raw water supply needs: water supply to meet diversions of water by the Town (diversion basis) and the water supply required to augment future depletions of water from the Los Pinos River by the Town (depletion basis). The Town currently allocates Vallecito storage water on a diversion basis. To manage its water under a depletion basis, the Town may be required to operate under a decreed plan of augmentation.

Future Water Needs on a Diversion Basis

Future water needs on a diversion basis is estimated by subtracting Bayfield's future water supply from the future water demands. The Town's future water needs are estimated by subtracting the dry year water supply from the Schroder and Los Pinos ditchwater rights calculated in Appendix E and 150 AF of Vallecito Reservoir water from the future water demand presented in Table 3. If the future water demand estimates exceed the future dry year water supply, then additional water will need to be acquired by the Town.

Based on a preliminary analysis, the Town has a sufficient water supply for the near future (next 10 years) under the 1 percent and 3 percent population growth rates (see Table 7, Column 1 and 2). If the Town grows at a steady 5 percent growth rate, the Town will need an additional 14 AF of water by 2010 (see Table 7, Column 3). Based on the water demand forecast for the year 2050, using a 3 percent growth rate, approximately 626 AF of additional reservoir water would be needed to meet the future demand (see Table 7, Column 2 for 2050).

Future Water Needs on a Depletion Basis

The Town's future water needs on a depletion basis are estimated by subtracting the water depletion demands in Table 3 from the dry year historic consumptive use credits from the Los Pinos Ditch and Schroder Ditch water rights calculated in Appendix E and 150 AF of Vallecito Reservoir water. The results for all three growth rates are provided in Table 7.

If the Town uses storage water to augment depletions to the river, the Town would not require additional water until the year 2030 (Table 7, Column 6). Based on a 3 percent growth rate, if future reservoir releases are made to augment the Town's water depletions, approximately 109 AF of additional water would be required for a dry year in 2050 (see Table 7, Column 5 for 2050).

CONCLUSION

Since the Town is junior to between 180 cfs to 190 cfs of senior water users located downstream, it may be difficult for the Town to procure irrigation water rights that can protect the Town from a

downstream call for the entire irrigation season. Therefore, the ownership of Vallecito Reservoir water will always be an important and necessary asset in the Town's water portfolio. Therefore, WWE recommends the Town continue to contract for the storage water allocated to the Town's ownership of 167 acres of project land, providing a firm supply of 150 AF of water in a dry year. In order to assess the future water supply needs of the Town, WWE calculated a preliminary future water supply and water demand forecast. The future water needs are estimated on a diversion basis and a depletion basis. Given discrepancies in the Town's water use records and lack of quantification of the Los Pinos Ditch and Schroder Ditch historic consumptive use credits, the analysis is preliminary.

The Town currently is assessed for storage water that is diverted by the Town (diversion basis). If the Town continues to be assessed for storage water on a diversion basis and the Town grows at a steady rate over 5 percent, the Town may need additional water for diversions by the year 2010. If the Town grows at a 3 percent rate, then the Town will not need additional storage water until the year 2020 and will require 626 AF by the year 2050.

If the Town is assessed storage water on a depletion basis, the 150 AF of storage water will provide sufficient water supply out to the year 2030, if the Town grows at a steady 5 percent rate. The town has sufficient storage to meet estimated depletions out to year 2040 and through 2100 for 3 percent and 1 percent growth rates respectively. However, to operate on a depletion basis the Town may be required to operate under a decreed augmentation plan.

It is WWE's understanding that a preliminary cost estimate for storage water is \$110 per AF per year for water delivered on a diversion basis and \$220 per AF per year for water delivered to augment depletions by the Town (depletion basis). Based on a 3 percent growth rate, in 2050 the Town would be paying \$85,360 per year $((150 \text{ AF} + 626 \text{ AF}) * \$110)$ for water on a diversion basis. Based on the same 3 percent growth rate, the Town would be paying \$56,980 per year on a depletion basis. Thus, the Town could receive considerable savings by managing reservoir releases to offset depletions.

In order to increase the chance for a successful augmentation plan filing, the Town should have reliable estimates of its depletions to the river. Thus, the Town needs to increase its record keeping for water use including effluent production.

In addition to the Town keeping the Vallecito storage allocation for 167 acres of project land, WWE has the following recommendations.

RECOMMENDATIONS

1. File for a water right for the Town's municipal use during the non-irrigation season. Currently, the Town is able to divert water during the non-irrigation season because there is no call on the river. The Town is vulnerable to a change in stream calls, including calls placed by the Southern Ute Tribe, during the non-irrigation season. By filing for a water right for municipal use, the Town may solidify a priority for water use during the non-

irrigation season. As the Town waits to file for this water right, the priority becomes more junior.

2. Investigate and determine the Town's ownership of Schroder Ditch water. Collect and keep the certificates of share ownership. Keep records pertaining to the historical use, including irrigation practices served by the water rights. Quantify and transfer the water rights to municipal use as soon as possible after they are transferred to the Town.
3. The Town needs to assert control over the wastewater effluent it generates. The Town needs to be able to control the location of the effluent discharge and the ability to use the effluent for exchange or as a source of return flow for an augmentation plan.
4. File for an augmentation plan using Vallecito Reservoir water and consumptive use credits derived from the Los Pinos Ditch and Schroder Ditch water rights as an augmentation source. As the Town collects additional surface water rights and reservoir acreage, the Town should quantify the consumptive use credits and incorporate them into a plan for augmentation.
5. If the Town is going to rely on storage water and consumptive use credits to offset depletions of water by the Town, then estimates of the Town's depletions need to be refined for an augmentation plan.
 - Investigate the discrepancy between the measured Town's diversions from the river, treated water, water billed and wastewater influent. Meter all water use so that sufficient records will be available for an augmentation plan.
 - Assess Town's ownership of the effluent treated and discharged by the Bayfield Sanitary District.
6. Develop additional sources of water including:
 - Groundwater. In addition to the areas pinpointed for exploratory drilling, the Town should investigate groundwater that is tributary to Beaver Creek.
 - Additional surface water rights, including assessing the possibility of purchasing Southern Ute water rights and surface water rights from annexing irrigated land.

Overall, WWE recommends the Town negotiate for a "process" to convert the project acreage that is accumulated by the Town during future annexations. Thus, as the Town grows, the allocation of reservoir water owned by the Town will grow as project irrigated land is annexed and retired. If it is financially and technically feasible, the Town should push for storage water to be allocated based on replacing depletions by the town.

Town of Bayfield
March 14, 2003
Page 8

Very truly yours,

WRIGHT WATER ENGINEERS, INC.

By _____
Eric A. Bikis, P.G.
Project Manager, Vice President

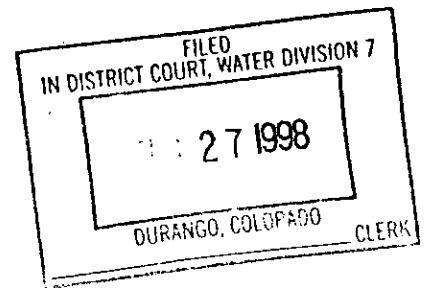
Peter R. Foster, P.E.
Project Engineer

RECEIVED
OCT 05 1998

WATER RESOURCES
STATE ENGINEER
6519

DISTRICT COURT, WATER DIVISION 7, COLORADO

CASE NO. 97CW79



RULING OF REFEREE

IN THE MATTER OF THE APPLICATION FOR WATER RIGHTS OF BAYFIELD
SCHOOL DISTRICT 10 JT-R, IN LA PLATA COUNTY.

Application filed: October 24, 1997

APPLICANT: Bayfield School District 10 Jt-R
24 Clover Drive
Bayfield, CO 81122-0258

NAME OF STRUCTURE: BEAN DITCH, SCHOOL DISTRICT ENLARGEMENT

POINT OF DIVERSION: On the left bank of the Little Pine River channel located in the NW1/4NW1/4SE1/4, Section 11, T34N, R7W, N.M.P.M., decreed in Case 1248 in 1934, to be at a point whence the center corner of Section 11, T34N, R7W bears N7°30'W 293 feet from which headgate said ditch runs in a general southeasterly direction

SOURCE: Pine River Drainage

TYPE OF USE: Irrigation of 15 acres from a pump station (Middle School Water Pump) located 850' North and 1650' West of the SE corner, Section 11, T34N, R7W, N.M.P.M.

AMOUNT OF WATER: 0.25 cfs ABSOLUTE

APPROPRIATION DATE: June 20, 1978

CONDITIONS: THE APPLICANT SHALL COMPLY WITH THE ORDERS OF THE DIVISION ENGINEER TO INSTALL NECESSARY MEASURING DEVICES, AND SHALL KEEP RECORDS AND MAKE REPORTS AS REASONABLY REQUESTED BY THE DIVISION ENGINEER.

OPERATION OF THE PUMP SHALL NOT CAUSE INJURY TO OTHER WATER USERS BY ABRUPT OR TEMPORARY CHANGES IN FLOW RATE DIVERSION AT THIS POINT OF DIVERSION.

CENTRAL FILES

dd

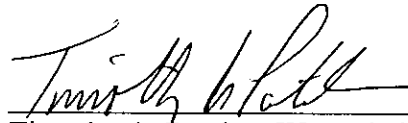
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RULING OF THE REFEREE
CASE NO. 97CW79
PAGE 2

The priority here awarded shall be junior to all priorities awarded in previous years. As between all rights adjudicated this calendar year, priorities shall be determined by historical dates of appropriation and not affected by the date of entry of this Ruling.

It is the Ruling of the Referee that the statements in the application are true and that the aforementioned water right is approved and granted the indicated priority.

DATED this 27th day of August, 1998.



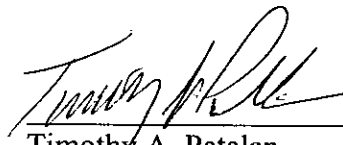
Timothy A. Patalan, Water Judge
acting as Water Referee

cc: K. Beegles (certified mail)
H. Simpson (certified mail)
Bayfield School Dist. 10 JT-R (certified mail)

JUDGMENT AND DECREE
CASE NO. 97CW79
PAGE 3

No protest was filed in this matter. The foregoing Ruling is confirmed and approved, and is made the Judgment and Decree of this Court.

DATED this *30th* day of *September*, 1998.



Timothy A. Patalan
Water Judge

cc: K. Beegles (3)
H. Simpson
Bayfield School Dist.

AGREEMENT

This agreement is entered this 5th day of December, 2001 between the Town of Bayfield, Colorado (hereafter the Town) and The Joe D. and Jane Ford Revocable Trust dated 11-12-70 and Alan R. Friedman (hereafter the Grantors).

The parties hereto acknowledge and agree as follows:

1. The Town is a statutory municipality under the provisions of the laws of the State of Colorado.
 2. The Grantors are the owner of 53/100 c.f.s. in the Catlin Ditch on the Pine River, which was adjudicated Ditch no. 9 in Water District no. 31, priority no. 33, which right was more specifically described in a deed recorded at reception no. 359079, La Plata County, Colorado.
 3. The Grantors desire to donate 50/100 c.f.s. in the above described Catlin Ditch to the Town, as a charitable donation to assist the Town in the operation of its governmental purposes. The Grantors agrees to convey the described water rights to the Town by Bargain and Sale Deed. The Grantors represent that the water rights are free and clear of liens and encumbrances.
 4. The above described water rights have historically been used on lands located in sections 9, 10, 11, 14 and 15, Township 35 North, Range 7 West, NMPM. The Town shall be required to undertake and pay the costs of any water court action to accomplish a change of water right to make the rights useable by the Town.
 5. The Town is the owner of certain water rights in the Los Pinos Ditch on the Pine River which have historically been used to supply the domestic water needs of the Town. The Town historically diverted a small amount of water in the Los Pinos Ditch through the winter months to supply water for the Town's domestic water requirements. The Town ceased those winter diversions at the time a new pumping plant was constructed on the river.
 6. Joe and Jane Ford through the Joe D. and Jane Ford Revocable Trust(hereafter the Fords)are the owners of Lot 29 of Wilmer Farms Subdivision. The Los Pinos Ditch passes through that lot. The Fords are also the owners of water rights in the Los Pinos Ditch Company.
 7. In exchange for the transfer of the Catlin Ditch rights to the Town, the Town agrees to take reasonable steps to divert a small amount of water through the Los Pinos Ditch during non-irrigation months in a fashion similar to the manner in which the Town had historically made diversions. It is the intent of the parties to maintain a small flow of water through a pond located on the Ford's property during non-irrigation months.
-

8. The parties agree that the Town must obtain the consent and cooperation of the Los Pinos Ditch Company to make the described winter diversions and the ditch must be dried out during the spring in order to allow regular maintenance of the ditch. The provisions of this agreement shall be subject to and subordinate to any rules and regulations of the Los Pinos Ditch Company and to any provisions imposed by the Colorado Division of Water Resources regarding the administration of diversions from the Pine River.
9. The Town agrees to use reasonable efforts to comply with the terms of this agreement. However, the Town cannot guarantee such deliveries due to conditions outside its control. The Grantors, the Fords and their successors hold the Town harmless and waive any claim for damages of any type related to or which in any way arise from this agreement.
10. Nothing contained herein shall require the Town to use or divert any of its existing direct flow or storage rights in any manner which could in any way impair or effect its ability to operate its municipal water system.
11. The provisions of this agreement shall be binding on and shall inure to the benefit of the successors and assigns of all parties.

TOWN OF BAYFIELD, COLORADO:

by: Brett Bayer
Town Manager

Grantors:

The Joe D. and Jane Ford Revocable Trust:

by: Joe D. Ford
Joe D. Ford, as Trustee

Alan R. Friedman
Alan R. Friedman

BARGAIN AND SALE DEED

THE JOE D. AND JANE FORD REVOCABLE TRUST DATED 11-12-70 and ALAN R. FRIEDMAN (Grantors),

Whose street address is: 1615 N. Mountain View Drive,
La Plata County, Bayfield, State of Colorado.

For the consideration of Ten and No / 100 (\$10.00) Dollars, in hand,
hereby SELL(S) and CONVEY(S) to

THE TOWN OF BAYFIELD, COLORADO, A COLORADO STATUTORY MUNICIPALITY,
(Grantee)

Whose street address is: P.O. Box 80,
La Plata County, Bayfield, State of Colorado.

The following described water rights which are located in the County of La Plata , and State of Colorado, to wit:

50/100 c.f.s. in the Catlin Ditch on the Pine River which was adjudicated Ditch No. 9 in Water District No. 31, Priority No. 33, which right was described in a Deed Recorded as Reception No. 359079, La Plata County.

with all appurtenances, free and clear of liens and encumbrances.

GRANTORS:

THE JOE D. AND JANE FORD REVOCABLE
TRUST DATED 11-12-70.

Dated 17th day of December, 2001

JOE D. FORD, TRUSTEE

STATE OF COLORADO }
COUNTY OF LA PLATA } ss.

Subscribed and sworn to before me in the County of La Plata, State of Colorado this _____ day of _____, 2001. By: JOE D. FORD, AS TRUSTEE FOR THE JOE D. AND JANE FORD REVOCABLE TRUST DATED 11-12-70 (Grantor)

My Commission expires 8-13-2004

Witness my hand and official seal

Das R. Fink

Notary Public

My Commission Expires 08/13/2004

Dated 10th day of December, 2001

ALAN R. FRIEDMAN

STATE OF Arizona }
COUNTY OF Pima } ss.

Subscribed and sworn to before me in the County of La Plata, State of Colorado this 10th day of December, 2001. By: ALAN R. FRIEDMAN (Grantor)

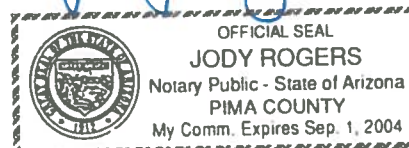
My Commission expires 9-1-2004



Witness my hand and official seal.

Joey Rogers
Notary Public

Notary Public

c:\Bayfield\Deed (Fords/Friedman).Bargain.sale, DWN / rik



| | |
|--|---|
| District Court, Water Division 7, La Plata County, Colorado Court Address: 1060 East Second Ave, #106 Durango, CO 81301 Telephone: (970) 247-2304 <hr/> CONCERNING THE APPLICATION FOR WATER RIGHTS OF THE TOWN OF BAYFIELD IN THE LOS PINOS RIVER OR ITS TRIBUTARIES IN LA PLATA COUNTY | DATE FILED: May 29, 2015 11:21 AM FILING ID: A750F014CFB79 CASE NUMBER: 2015CW3017 <div style="text-align: center;">   </div> <div style="text-align: center;">COURT USE ONLY</div> |
| Attorney: Douglas M. Sinor, #31148 Michael A. Kopp, #43204 Trout, Raley, Montano, Witwer & Freeman, P.C. Address: 1120 Lincoln Street, Suite 1600 Denver, CO 80203 Phone Number: (303) 861-1963 Fax: (303) 832-4465 E-mail: dsinor@troutlaw.com mkopp@troutlaw.com | Case Number: 2015CW____ Division: 7 Courtroom: |
| APPLICATION FOR CHANGE OF WATER RIGHTS, WATER RIGHT, AND APPROVAL OF PLAN FOR AUGMENTATION, INCLUDING EXCHANGE | |

1. Name, mailing address, email address and telephone number of Applicant:

Town of Bayfield
 P.O. Box 80
 Bayfield, CO 81122
clamay@bayfieldgov.org
 970-884-9544

2. General Overview of Application:

Applicant provides a water supply to the Town of Bayfield in the Los Pinos River basin. Uses include municipal, domestic, industrial, commercial, irrigation and other purposes. To help to ensure a reliable water supply for its current and future service area, the Town is seeking approval for alternate points of diversion for an existing water right, a change in use of an existing water right, and a Plan for Augmentation and Exchange.

First Claim for Relief (Alternate Points of Diversion)

3. Decreed water right for which alternate points of diversion are sought:

- a. Name of Structure: Bayfield River Pump Station
 - i. Original Decree: Case No. 03CW122, Water Division 7, May 13, 2005.
 - ii. Subsequent Decree (diligence): Case No. 11CW27, Water Division 7, March 29, 2013.
- b. Decreed Location of Structure:
 - i. UTM location from GPS data in Case No. 11CW27:

In NAD83, Zone 13 North: UTM Easting = 268559, Northing = 4125193.
 - ii. PLSS location based on UTM coordinates in Case No. 11CW27, converted to PLSS using Aquamap:

In the Southeast Quarter of the Northwest Quarter of Section 2, Township 34 North, Range 7 West, N.M.P.M., 2,317 feet from the North section line and 1,524 feet from the West section line. (See Exhibit 1).
- c. Source: Los Pinos River.
- d. Decreed Use: Municipal, domestic, industrial, commercial, irrigation, firefighting and evaporation from Town-owned ponds and reservoirs.
- e. Appropriation Date: September 1, 1997.
- f. Amount of Water: 4.0 cfs, conditional.
- g. Proposed Change: Applicant requests that the decreed water right be changed to allow two alternate points of diversion ("APOD") as follows:
 - i. Location of the Los Pinos Irrigating Ditch Headgate APOD (see Exhibit 2):
 - a. Per Case No. CA1248: the intake...is located on the left or east bank of Pine river...at a point whence the southeast corner of Section 23, Township 34 North, Range 7 West bears south 54-degrees 34-minutes east 3,456 feet...the headgate of said ditch is located in an old river channel or bed at a point whence SE corner of Section 23 Township 35 North Range 7 West NMPM bears South 81-degrees 56-minutes east 2,208 feet. This distance from the intake to the headgate is 1,675 feet.

- b. UTM in NAD83, Zone 13 North location based on the decreed location and UTM calculated in GIS:

(1) Intake: Easting = 268932, Northing = 4129592.759

(2) Headgate: Easting = 269170, Northing = 4129150.431.

- ii. Location of the Schroeder Irrigating Ditch Headgate APOD (see Exhibit 3):

- a. Per Case No. CA1248: The headgate of said ditch is located on the east (or left) bank of Pine River...at a point in the east half of the northeast quarter of Section 35, Township 35 North, Range 7 west NMPM, from which the southwest corner of said 80-acre tract of land bears south 13-degrees 30-minutes west 1702 feet.

- b. UTM in NAD83 Zone 13 North location based on the decreed location and UTM calculated in GIS: Easting = 269491, Northing = 4127161.778.

- iii. Amount of water to be changed: 4.0 cfs, conditional.

Second Claim for Relief (Change of Existing Water Right)

4. Change of Existing Irrigation Water Right:

- a. Name of Structure: Los Pinos Irrigating Ditch.
- b. Decree: CA1248, La Plata County District Court, Adjudication Date: 06/12/1934.
- c. Decreed Location of Diversion: See Section 3.g.ii, above (Exhibit 2).
- d. Source: Los Pinos River.
- e. Decreed Use: Irrigation.
- f. Appropriation Date: 03/01/1878.
- g. Amount of Water: 11.5 cfs absolute.
- h. Proposed Change:
 - i. Amount of water to be changed: 1.885 cfs: The Applicant's ownership of a total of 227.091 out of a total of 905.091 shares in the Los Pinos Irrigating Ditch is equal to 25.1 percent (or 2.885 cfs) of the total decreed water right of 11.5 cfs. In Case No. W-1411-76, the Applicant changed 1.0 cfs of the Los Pinos Irrigating Ditch water right to municipal use for the Town's use. This application seeks to change the remaining 1.885 cfs owned by the Town.

- ii. Proposed Uses: All municipal uses, irrigation, commercial, industrial, recreation, fishery, replacement of evaporation, fire protection, domestic, stock watering, augmentation, replacement, storage and exchange. Applicant claims the right to use, reuse, successively use and dispose of to extinction for the foregoing uses the amount of water historically consumed. Applicant will maintain the historical pattern of return flows, subject to section 4.h.iv below.
- iii. Historical Consumptive Use Quantification: Applicant has quantified the historical stream depletion credits associated with the historical irrigation use of the subject shares. In accordance with the allocation of water set forth by the Los Pinos Irrigating Ditch Company ("Company"), Applicant's analysis assumed 150.56 acres of historically irrigated land. The analysis assumed the pro rata share of historical river headgate diversions of natural stream flow attributable to irrigation use of the subject shares. To account for the 1.0 cfs attributable to Company shares that have already been changed by the Applicant to municipal uses, Applicant limited river headgate diversions in its analysis to diversions coded for irrigation and excluded any irrigation diversions over 10.5 cfs (see Exhibit 4). Ditch loss was assumed to be 10% based on information from the Company. Applicant assumed a 50% irrigation efficiency for flood irrigation of pasture grass. Applicant used a representative study period of 1980 to 2013. The study period was chosen because it begins with the period since the Applicant first changed Company shares to municipal use, diversion records are available, and it includes average, wet and dry years. Applicant calculated an average historical consumptive use of 1.26 acre-feet per acre (Exhibit 5). Net stream depletion credits are shown on Exhibit 6. Historical return flow patterns will be maintained. Applicant assumed a surface to ground water return flow ratio of 50/50, and assumed that ground water returns have reached steady state condition and accrue at a constant rate.
- iv. Appropriation of historical return flows. Applicant will replace historical return flows to the extent necessary to satisfy downstream calling water rights with priorities senior to the filing date of this application. Applicant claims the right to use, reuse, and successively use to extinction any historical return flows not necessary to satisfy water rights with a priority date senior to the filing date of this application.
- v. Place of Use:

Lands that are currently or may in the future be served by the Applicant. The Applicant's current service area is shown in Exhibit 7. The Town's shares also may remain in irrigation use under the Los Pinos system unless used by the Town for the changed uses.

vi. Point of Diversion:

The Applicant will continue to divert or take augmentation credit for its share water at the Los Pinos Irrigating Ditch Headgate, at the location described in Paragraph 3.g.ii, above, or at times when the ditch is unusable, the Applicant may divert its share water at the Bayfield River Pump Station, at the location described in Paragraph 3.b, above, as an alternate point of diversion.

Third Claim for Relief (Approval of Plan for Augmentation, Including Exchange)

5. Name of Structures to be Augmented:

- a. Los Pinos Irrigating Ditch:
 - i. Location of Structure: see First Claim above and Exhibit 2.
 - ii. Source: Los Pinos River.
- b. Schroeder Irrigating Ditch:
 - i. Location of Structure: see First Claim above and Exhibit 3.
 - ii. Source: Los Pinos River.
- c. Bayfield River Pump Station:
 - i. Location of Structure: See First Claim above and Exhibit 1.
 - ii. Source: Los Pinos River.

6. Water Rights to Be Used for Augmentation:

- a. The fully consumable portion of Los Pinos Irrigating Ditch Company changed shares as described in the Second Claim above, either by direct use or reuse and successive use of sewerage and nonsewerage return flows attributable to the changed shares.
- b. Fully consumable return flows associated with the water right decreed in Case No. 03CW122. To the extent necessary, Applicant claims the right to use, reuse and successively use to extinction return flows derived from use of the water right decreed to the Bayfield River Pump Station in Case No. 03CW122 for the purposes of augmenting depletions and replacing historical return flows under the Augmentation Plan claimed herein, with an appropriation date consistent with the filing date of this application, in the amount of 4.0 cfs, conditional.
- c. Additional sources that may be decreed or approved by the Division Engineer in the future, including water leased on a yearly or less frequent basis, to be used in the plan after the initial decree is entered if the use of said additional or alternative sources is part of a substitute water supply plan approved pursuant to § 37-92-308, C.R.S., or if such sources are decreed for such use. § 37-92-305(8), C.R.S. For example, if Vallecito Reservoir is decreed to provide augmentation water, Applicant may add such water as a replacement source in this Plan for Augmentation by providing notice

to the parties to this case, and such parties shall have the right to comment and/or object to the addition of such source under the retained jurisdiction of this Court.

7. Statement of Plan for Augmentation (including exchange):

- a. Overview: Applicant may operate the Plan for Augmentation in conjunction or combination with the requested change of water rights. When the Applicant's diversions at the structures listed in section 5 above are out of priority, the Applicant will offset out-of-priority depletions from these diversions with unused historical stream depletion credits or fully consumable sewer and nonsewer municipal return flows from the water rights described in paragraph 6 above. Applicant may also add additional augmentation sources to the Plan for Augmentation as they become available to the Applicant.
- b. Calculation of depletions: The amount of out-of-priority depletions and corresponding augmentation requirements will be calculated based on the monthly distribution of annual water use for indoor and outdoor use (based on data from the Town's water treatment plant), the monthly percentage of depletion based on the ratio of indoor to outdoor use, (assuming 95% return flows from indoor use and 20% return flows from outdoor use), and priority analysis based on stream administration (Exhibit 8).
- c. Augmentation water will be provided in the time, place and amount through stream depletion credits associated with the shares changed in this case, fully consumable municipal return flows, or through other augmentation sources that may be added to the Augmentation Plan (see Exhibit 9). Sewer and nonsewer municipal return flows accrue to the Pine River at or above the Ceanaboo Ditch headgate and at the Bayfield Wastewater Treatment Plant.
- d. Accounting: The Applicant will develop appropriate accounting procedures and provisions to incorporate into the final decree in this matter.

Fourth Claim for Relief (Conditional Appropriative Right of Exchange)

8. Name of Exchange: Bayfield Augmentation Exchange:

- a. Overview: Out-of-priority diversions made at the structures listed in Section 5 above will be replaced pursuant to the Augmentation Plan described above, including through use of fully consumable return flows that accrue to the Pine River at or above the Ceanaboo Ditch headgate and at the Bayfield Wastewater Treatment Plant.
- b. The Upstream Terminus of the exchange reach is the Los Pinos Irrigating Ditch Headgate. The Downstream terminus of the exchange is the Pine River immediately above the Ceanaboo Ditch headgate (see Exhibit 7).
- c. Exchange-To points:
 - i. Los Pinos Irrigating Ditch headgate.
 - ii. Schroeder Irrigating Ditch headgate.

- iii. Bayfield River Pump Station.
 - d. Exchange-From Points:
 - i. Town of Bayfield Wastewater Treatment Plant (see Exhibit 7).

Location based on Discharge Permit latitude and longitude, converted to UTM in Aquamap:
UTM NAD 83, Zone 13 North Easting: 269566.10, Northing: 4122105.23.
PLSS location based on UTM location converted using Aquamap:
In the Southeast quarter of the southeast quarter of Section 14, Township 34 North, Range 7 West, N.M.P.M., 833 feet from the south section line and 176 feet from the east section line.
 - ii. The furthest downstream point at which nonsewered municipal return flows from the Town accrue to the Pine River is immediately above the Ceanaboo Ditch headgate.

Location Description based on aerial imagery in GIS:
UTM NAD 83, Zone 13 North, UTM Easting: 270016.823, UTM Northing: 4121636.512.
 - e. Maximum rate of exchange: 4.0 cfs, conditional.
 - f. Appropriation:
 - i. Appropriation Date: the filing date of this application.
 - ii. How appropriation was initiated: Filing of this application, engineering and planning work associated with this application, together with the formation of the intent to appropriate as evidenced by this application.
 - g. In addition to complying with the terms and conditions in any decree to be entered in this case, Applicant shall use and operate the water rights and changes of water rights described herein in accordance with that Water Change Agreement between Applicant and the Los Pinos Ditch Company dated August 12, 2013, as it may be amended from time to time. The Applicant will obtain any additional rights or permissions necessary to operate the water rights and changes of water rights requested in this application.
9. Names and addresses of owners or reputed owners of the land upon which any new or existing diversion or storage structure, or modification to any existing diversion or storage structure is or will be constructed or upon which water is or will be stored, including any modification to the existing storage pool:

Ditch Companies to be Noticed of Application:

Los Pinos Irrigating Ditch Company
Attn: Tim Karl
P.O. Box 482
Bayfield, CO 81122

Schroeder Irrigating Ditch Company
Attn: Phyllis Ludwig
P.O. Box 647
Bayfield, CO 81122

Landowners to be Noticed of Application:

Los Pinos Irrigating Ditch:

Pine River Ranch, LLC
8449 Greenwood Dr.
Niwot, CO 80503

Conrad Ranch, Ltd.
1107 County Rd 505
Bayfield, CO 81122

Schroeder Irrigating Ditch:

Ronald and Shauna Ritz
2273 CR 501
Bayfield, CO 81122

Pine River Ranch, LLC
8449 Greenwood Dr.
Niwot, CO 80503

Bayfield River Pump Station:

Wilmer Family Trust
955 County Rd 501
Bayfield, CO 81122

WHEREFORE, Applicant respectfully requests:

- A. Approval of alternate points of diversion for an existing water right as requested in the First Claim.

- B. Approval of a change in use of an existing water right as requested in the Second Claim.
- C. Approval of the Plan for Augmentation, Including Exchange, including the right to use for augmentation and replacement return flows from the water right decreed to the Bayfield River Pump Station, as requested in the Third Claim.
- D. Confirmation of the Conditional Appropriative Right of Exchange as requested in the Fourth Claim.

DATED this 29th day of May, 2015.

TROUT, RALEY, MONTAÑO, WITWER &
FREEMAN, P.C

S/ Douglas M. Sinor

By: _____
Douglas M. Sinor, #31148
Michael A. Kopp, #43204

Attorneys for Applicant, Town of Bayfield

Pursuant to Rule 121, a printed or printable copy of the document bearing the original, electronic, or scanned signature is on file in the Office of Trout, Raley, Montañó, Witwer & Freeman, P.C.

**VERIFICATION AND ACKNOWLEDGMENT OF APPLICANT OR OTHER PERSON
HAVING KNOWLEDGE OF THE FACTS STATED IN THIS APPLICATION**

I, Peter R. Foster, P.E., being first duly sworn, hereby state that I have read this Application, that I have personal knowledge of the facts stated and, that I verify its contents to the best of my knowledge, information, and belief.

Peter R. Foster

Signature

5/21/15

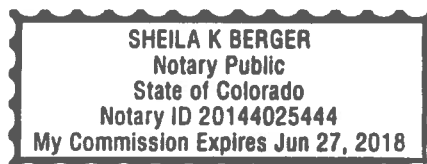
Date

The foregoing instrument was acknowledged before me in the County of La Plata, State of Colorado, this 21 day of May, 2015, by the person whose signature appears above.

My Commission Expires: 6/27/18

Sheila K Berger

Notary Public



15CW _____ - APPLICATION FOR CHANGE OF WATER RIGHTS, WATER
 RIGHT, AND APPROVAL OF PLAN FOR AUGMENTATION, INCLUDING
 EXCHANGE, IN LA PLATA COUNTY, COLORADO: 1. Name, mailing address, email
 address and telephone number of Applicant: Town of Bayfield, P.O. Box 80, Bayfield, CO
 81122, clamay@bayfieldgov.org, 970-884-9544. 2. General Overview of Application:
 Applicant provides a water supply to the Town of Bayfield in the Los Pinos River basin. Uses
 include municipal, domestic, industrial, commercial, irrigation and other purposes. To help to
 ensure a reliable water supply for its current and future service area, the Town is seeking
 approval for alternate points of diversion for an existing water right, a change in use of an
 existing water right, and a Plan for Augmentation and Exchange. **First Claim for Relief**
(Alternate Points of Diversion) 3. Decreed water right for which alternate points of
 diversion are sought: a. Name of Structure: Bayfield River Pump Station. i. Original Decree:
 Case No. 03CW122, Water Division 7, May 13, 2005. ii. Subsequent Decree (diligence): Case
 No. 11CW27, Water Division 7, March 29, 2013. b. Decreed Location of Structure: i. UTM
 location from GPS data in Case No. 11CW27: In NAD83, Zone 13 North: UTM Easting =
 268559, Northing = 4125193. ii. PLSS location based on UTM coordinates in Case No.
 11CW27, converted to PLSS using Aquamap: In the Southeast Quarter of the Northwest Quarter
 of Section 2, Township 34 North, Range 7 West, N.M.P.M., 2,317 feet from the North section
 line and 1,524 feet from the West section line. (See Exhibit 1). c. Source: Los Pinos River.
 d. Decreed Use: Municipal, domestic, industrial, commercial, irrigation, firefighting and
 evaporation from Town-owned ponds and reservoirs. e. Appropriation Date: September 1, 1997.
 f. Amount of Water: 4.0 cfs, conditional. g. Proposed Change: Applicant requests that the
 decreed water right be changed to allow two alternate points of diversion ("APOD") as follows:
 i. Location of the Los Pinos Irrigating Ditch Headgate APOD (see Exhibit 2): a. Per Case No.
 CA1248: the intake...is located on the left or east bank of Pine river...at a point whence the
 southeast corner of Section 23, Township 34 North, Range 7 West bears south 54-degrees 34-
 minutes east 3,456 feet...the headgate of said ditch is located in an old river channel or bed at a
 point whence SE corner of Section 23 Township 35 North Range 7 West NMPM bears South 81-
 degrees 56-minutes east 2,208 feet. This distance from the intake to the headgate is 1,675 feet.
 b. UTM in NAD83, Zone 13 North location based on the decreed location and UTM calculated
 in GIS: (1) Intake: Easting = 268932, Northing = 4129592.759 (2) Headgate: Easting = 269170,
 Northing = 4129150.431. ii. Location of the Schroeder Irrigating Ditch Headgate APOD (see
 Exhibit 3): a. Per Case No. CA1248: The headgate of said ditch is located on the east (or left)
 bank of Pine River...at a point in the east half of the northeast quarter of Section 35, Township
 35 North, Range 7 west NMPM, from which the southwest corner of said 80-acre tract of land
 bears south 13-degrees 30-minutes west 1702 feet. b. UTM in NAD83 Zone 13 North location
 based on the decreed location and UTM calculated in GIS: Easting = 269491, Northing =
 4127161.778. iii. Amount of water to be changed: 4.0 cfs, conditional. **Second Claim for Relief**
(Change of Existing Water Right) 4. Change of Existing Irrigation Water Right: a. Name of
 Structure: Los Pinos Irrigating Ditch. b. Decree: CA1248, La Plata County District Court,
 Adjudication Date: 06/12/1934. c. Decreed Location of Diversion: See Section 3.g.ii, above
 (Exhibit 2). d. Source: Los Pinos River. e. Decreed Use: Irrigation. f. Appropriation Date:
 03/01/1878. g. Amount of Water: 11.5 cfs absolute. h. Proposed Change: i. Amount of water to
 be changed: 1.885 cfs: The Applicant's ownership of a total of 227.091 out of a total of 905.091

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CASE NUMBER: 2015CW3017

shares in the Los Pinos Irrigating Ditch is equal to 25.1 percent (or 2.885 cfs) of the total decreed water right of 11.5 cfs. In Case No. W-1411-76, the Applicant changed 1.0 cfs of the Los Pinos Irrigating Ditch water right to municipal use for the Town's use. This application seeks to change the remaining 1.885 cfs owned by the Town. ii. Proposed Uses: All municipal uses, irrigation, commercial, industrial, recreation, fishery, replacement of evaporation, fire protection, domestic, stock watering, augmentation, replacement, storage and exchange. Applicant claims the right to use, reuse, successively use and dispose of to extinction for the foregoing uses the amount of water historically consumed. Applicant will maintain the historical pattern of return flows, subject to section 4.h.iv below. iii. Historical Consumptive Use Quantification: Applicant has quantified the historical stream depletion credits associated with the historical irrigation use of the subject shares. In accordance with the allocation of water set forth by the Los Pinos Irrigating Ditch Company ("Company"), Applicant's analysis assumed 150.56 acres of historically irrigated land. The analysis assumed the pro rata share of historical river headgate diversions of natural stream flow attributable to irrigation use of the subject shares. To account for the 1.0 cfs attributable to Company shares that have already been changed by the Applicant to municipal uses, Applicant limited river headgate diversions in its analysis to diversions coded for irrigation and excluded any irrigation diversions over 10.5 cfs (see Exhibit 4). Ditch loss was assumed to be 10% based on information from the Company. Applicant assumed a 50% irrigation efficiency for flood irrigation of pasture grass. Applicant used a representative study period of 1980 to 2013. The study period was chosen because it begins with the period since the Applicant first changed Company shares to municipal use, diversion records are available, and it includes average, wet and dry years. Applicant calculated an average historical consumptive use of 1.26 acre-feet per acre (Exhibit 5). Net stream depletion credits are shown on Exhibit 6. Historical return flow patterns will be maintained. Applicant assumed a surface to ground water return flow ratio of 50/50, and assumed that ground water returns have reached steady state condition and accrue at a constant rate. iv. Appropriation of historical return flows. Applicant will replace historical return flows to the extent necessary to satisfy downstream calling water rights with priorities senior to the filing date of this application. Applicant claims the right to use, reuse, and successively use to extinction any historical return flows not necessary to satisfy water rights with a priority date senior to the filing date of this application. v. Place of Use: Lands that are currently or may in the future be served by the Applicant. The Applicant's current service area is shown in Exhibit 7. The Town's shares also may remain in irrigation use under the Los Pinos system unless used by the Town for the changed uses. vi. Point of Diversion: The Applicant will continue to divert or take augmentation credit for its share water at the Los Pinos Irrigating Ditch Headgate, at the location described in Paragraph 3.g.ii, above, or at times when the ditch is unusable, the Applicant may divert its share water at the Bayfield River Pump Station, at the location described in Paragraph 3.b, above, as an alternate point of diversion.

Third Claim for Relief (Approval of Plan for Augmentation, Including Exchange) 5. **Name of Structures to be Augmented:** a. Los Pinos Irrigating Ditch: i. Location of Structure: see First Claim above and Exhibit 2. ii. Source: Los Pinos River. b. Schroeder Irrigating Ditch: i. Location of Structure: see First Claim above and Exhibit 3. ii. Source: Los Pinos River. c. Bayfield River Pump Station: i. Location of Structure: See First Claim above and Exhibit 1. ii. Source: Los Pinos River. 6. **Water Rights to Be Used for Augmentation:** a. The fully consumable portion of Los Pinos Irrigating Ditch Company changed shares as described in the

Second Claim above, either by direct use or reuse and successive use of sewer and nonsewer return flows attributable to the changed shares. **b. Fully consumable return flows associated with the water right decreed in Case No. 03CW122.** To the extent necessary, Applicant claims the right to use, reuse and successively use to extinction return flows derived from use of the water right decreed to the Bayfield River Pump Station in Case No. 03CW122 for the purposes of augmenting depletions and replacing historical return flows under the Augmentation Plan claimed herein, with an appropriation date consistent with the filing date of this application, in the amount of 4.0 cfs, conditional. **c. Additional sources that may be decreed or approved by the Division Engineer in the future, including water leased on a yearly or less frequent basis, to be used in the plan after the initial decree is entered if the use of said additional or alternative sources is part of a substitute water supply plan approved pursuant to § 37-92-308, C.R.S., or if such sources are decreed for such use. § 37-92-305(8), C.R.S.** For example, if Vallecito Reservoir is decreed to provide augmentation water, Applicant may add such water as a replacement source in this Plan for Augmentation by providing notice to the parties to this case, and such parties shall have the right to comment and/or object to the addition of such source under the retained jurisdiction of this Court. **7. Statement of Plan for Augmentation (including exchange):** **a. Overview:** Applicant may operate the Plan for Augmentation in conjunction or combination with the requested change of water rights. When the Applicant's diversions at the structures listed in section 5 above are out of priority, the Applicant will offset out-of-priority depletions from these diversions with unused historical stream depletion credits or fully consumable sewer and nonsewer municipal return flows from the water rights described in paragraph 6 above. Applicant may also add additional augmentation sources to the Plan for Augmentation as they become available to the Applicant. **b. Calculation of depletions:** The amount of out-of-priority depletions and corresponding augmentation requirements will be calculated based on the monthly distribution of annual water use for indoor and outdoor use (based on data from the Town's water treatment plant), the monthly percentage of depletion based on the ratio of indoor to outdoor use, (assuming 95% return flows from indoor use and 20% return flows from outdoor use), and priority analysis based on stream administration (Exhibit 8). **c. Augmentation water will be provided in the time, place and amount through stream depletion credits associated with the shares changed in this case, fully consumable municipal return flows, or through other augmentation sources that may be added to the Augmentation Plan (see Exhibit 9). Sewer and nonsewer municipal return flows accrue to the Pine River at or above the Ceanaboo Ditch headgate and at the Bayfield Wastewater Treatment Plant.** **d. Accounting:** The Applicant will develop appropriate accounting procedures and provisions to incorporate into the final decree in this matter. **Fourth Claim for Relief (Conditional Appropriative Right of Exchange)** **8. Name of Exchange: Bayfield Augmentation Exchange:** **a. Overview:** Out-of-priority diversions made at the structures listed in Section 5 above will be replaced pursuant to the Augmentation Plan described above, including through use of fully consumable return flows that accrue to the Pine River at or above the Ceanaboo Ditch headgate and at the Bayfield Wastewater Treatment Plant. **b. The Upstream Terminus of the exchange reach is the Los Pinos Irrigating Ditch Headgate. The Downstream terminus of the exchange is the Pine River immediately above the Ceanaboo Ditch headgate (see Exhibit 7).** **c. Exchange-To points:** **i. Los Pinos Irrigating Ditch headgate. ii. Schroeder Irrigating Ditch headgate. iii. Bayfield River Pump Station.** **d. Exchange-From Points:** **i. Town**

of Bayfield Wastewater Treatment Plant (see Exhibit 7). Location based on Discharge Permit latitude and longitude, converted to UTM in Aquamap: UTM NAD 83, Zone 13 North Easting: 269566.10, Northing: 4122105.23. PLSS location based on UTM location converted using Aquamap: In the Southeast quarter of the southeast quarter of Section 14, Township 34 North, Range 7 West, N.M.P.M., 833 feet from the south section line and 176 feet from the east section line. ii. The furthest downstream point at which nonsewered municipal return flows from the Town accrue to the Pine River is immediately above the Ceanaboo Ditch headgate. Location Description based on aerial imagery in GIS: UTM NAD 83, Zone 13 North, UTM Easting: 270016.823, UTM Northing: 4121636.512. e. Maximum rate of exchange: 4.0 cfs, conditional. f. Appropriation: i. Appropriation Date: the filing date of this application. ii. How appropriation was initiated: Filing of this application, engineering and planning work associated with this application, together with the formation of the intent to appropriate as evidenced by this application. g. In addition to complying with the terms and conditions in any decree to be entered in this case, Applicant shall use and operate the water rights and changes of water rights described herein in accordance with that Water Change Agreement between Applicant and the Los Pinos Ditch Company dated August 12, 2013, as it may be amended from time to time. The Applicant will obtain any additional rights or permissions necessary to operate the water rights and changes of water rights requested in this application. **9. Names and addresses of owners or reputed owners of the land upon which any new or existing diversion or storage structure, or modification to any existing diversion or storage structure is or will be constructed or upon which water is or will be stored, including any modification to the existing storage pool: Ditch Companies to be Noticed of Application:** Los Pinos Irrigating Ditch Company. Attn: Tim Karl, P.O. Box 482, Bayfield, CO 81122; Schroeder Irrigating Ditch Company, Attn: Phyllis Ludwig, P.O. Box 647, Bayfield, CO 81122; **Landowners to be Noticed of Application:** Los Pinos Irrigating Ditch: Pine River Ranch, LLC, 8449 Greenwood Dr., Niwot, CO 80503; Conrad Ranch, Ltd., 1107 County Rd 505, Bayfield, CO 81122; Schroeder Irrigating Ditch: Ronald and Shauna Ritz, 2273 CR 501; Bayfield, CO 81122; Pine River Ranch, LLC, 8449 Greenwood Dr., Niwot, CO 80503; Bayfield River Pump Station: Wilmer Family Trust, 955 County Rd 501, Bayfield, CO 81122. WHEREFORE, Applicant respectfully requests: **A.** Approval of alternate points of diversion for an existing water right as requested in the First Claim. **B.** Approval of a change in use of an existing water right as requested in the Second Claim. **C.** Approval of the Plan for Augmentation, Including Exchange, including the right to use for augmentation and replacement return flows from the water right decreed to the Bayfield River Pump Station, as requested in the Third Claim. **D.** Confirmation of the Conditional Appropriative Right of Exchange as requested in the Fourth Claim.

Legend



Bayfield River Pump Station POD from GPS Coordinates from 11CW27

PLSS



Sections



Quarter-Quarter Section Lines



1 inch = 1,000 feet

0 1,000 Feet

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CASE NUMBER: 2015CW301 Sec. 36



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P:\021-119\010\mapping\8.5X11 Bayfield Pump Station POD Locations 4-23-2014.mxd

WWE

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

LA PLATA COUNTY, CO

BAYFIELD RIVER PUMP STATION - POINT OF DIVERSION




SECTION 2, TOWNSHIP 34 NORTH, RANGE 7 WEST, N.M.P.M.

TOWN OF BAYFIELD, CO

PROJECT NO.
021-119.011

EXHIBIT
1

Legend

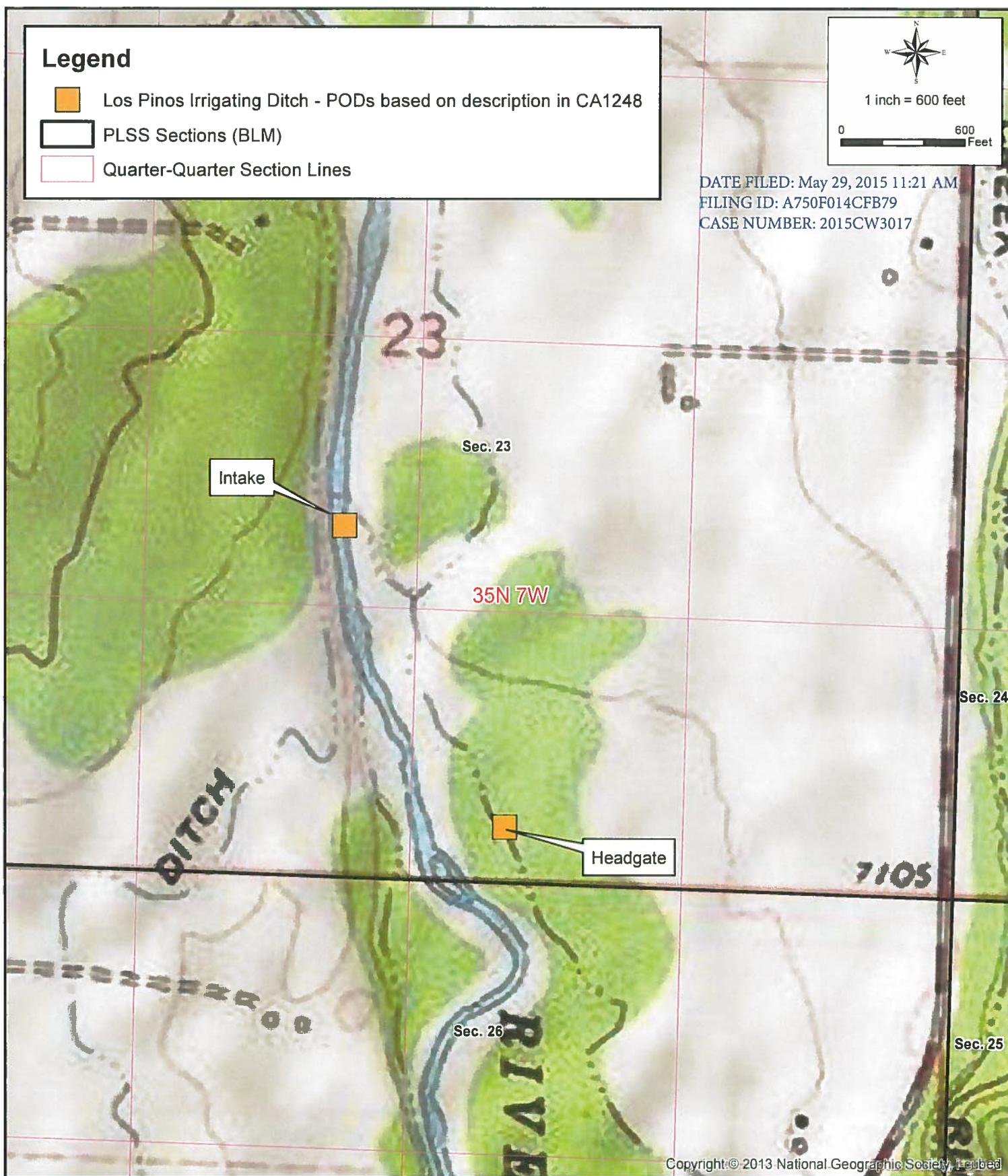
-  Los Pinos Irrigating Ditch - PODs based on description in CA1248
-  PLSS Sections (BLM)
-  Quarter-Quarter Section Lines



1 inch = 600 feet

0 600 Feet

DATE FILED: May 29, 2015 11:21 AM
FILING ID: A750F014CFB79
CASE NUMBER: 2015CW3017



P:\021-119\010\mapping\8.5X11 Bayfield Los Pinos POD Locations 4-23-2014.mxd

WWE

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

LA PLATA COUNTY, CO

LOS PINOS IRRIGATING DITCH POINTS OF DIVERSION

SECTION 23, TOWNSHIP 34 NORTH, RANGE 7 WEST, N.M.P.M.

TOWN OF BAYFIELD, CO

PROJECT NO.
021-119.011

EXHIBIT
2

Legend

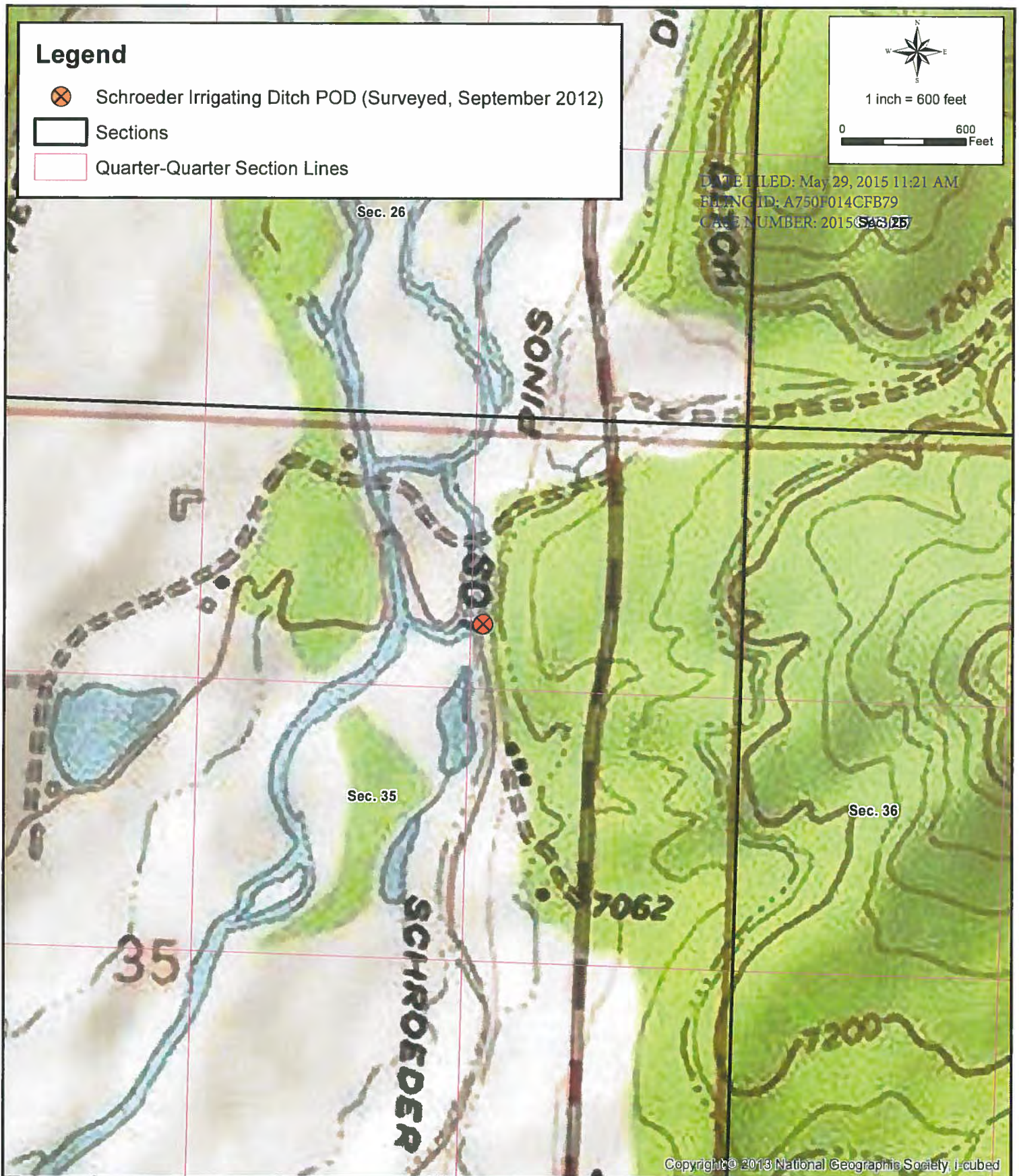
-  Schroeder Irrigating Ditch POD (Surveyed, September 2012)
-  Sections
-  Quarter-Quarter Section Lines



1 inch = 600 feet

0 600 Feet

DATE FILED: May 29, 2015 11:21 AM
FILED ID: A750F014CFB79
CASE NUMBER: 2015-06325



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P:\021-119\010\mapping\8.5X11 Bayfield Schroeder POD Locations 4-23-2014.mxd

WWE

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

LA PLATA COUNTY, CO

SCHROEDER IRRIGATING DITCH POINT OF DIVERSION
SECTION 35 TOWNSHIP 35 NORTH, RANGE 7 WEST, N.M.P.M.
TOWN OF BAYFIELD, CO

PROJECT NO.
021-119.011

EXHIBIT
3

Exhibit 4
Los Pinos Ditch Diversions, Limited to 10.5 cfs
Natural Streamflow for Irrigation Use
Town of Bayfield

DATE FILED: May 29, 2015 11:21 AM

FILING ID: A750F014CFB79

| Year | Values in Acre Feet | | | | | | | | | | | Total |
|----------------|---------------------|----------|----------|----------|----------|-----------|------------|------------|------------|------------|------------|--------------|
| | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | |
| 1980 | 0 | 0 | 0 | 0 | 0 | 0 | 161 | 625 | 645 | 645 | 581 | 2,735 |
| 1981 | 0 | 0 | 0 | 0 | 0 | 0 | 449 | 625 | 645 | 645 | 282 | 3,271 |
| 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 333 | 625 | 604 | 645 | 218 | 2,747 |
| 1983 | 0 | 0 | 0 | 0 | 0 | 0 | 312 | 625 | 645 | 541 | 458 | 2,950 |
| 1984 | 0 | 0 | 0 | 0 | 0 | 0 | 333 | 604 | 645 | 376 | 604 | 2,925 |
| 1985 | | | | | | 0 | 335 | 625 | 645 | 604 | 558 | 2,767 |
| 1986 | | | | | | | | | | | | |
| 1987 | | | | | | | | | | | | |
| 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 456 | 625 | 645 | 645 | 625 | 3,135 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 39 | 577 | 625 | 645 | 486 | 287 | 2,754 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 292 | 625 | 645 | 62 | 607 | 2,323 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 20 | 645 | 625 | 645 | 604 | 394 | 3,137 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 5 | 595 | 614 | 645 | 526 | 423 | 2,957 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 3 | 351 | 599 | 645 | 645 | 463 | 2,903 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 24 | 436 | 625 | 631 | 580 | 568 | 3,222 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 15 | 335 | 625 | 645 | 645 | 625 | 3,099 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 30 | 619 | 578 | 428 | 131 | 186 | 1,993 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 14 | 287 | 617 | 645 | 479 | 375 | 2,465 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 84 | 544 | 625 | 645 | 645 | 556 | 3,395 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 38 | 433 | 625 | 645 | 367 | 228 | 2,521 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 10 | 542 | 625 | 395 | 202 | 436 | 2,332 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 426 | 625 | 645 | 645 | 625 | 3,299 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 52 | 605 | 183 | 310 | 79 | 404 | 1,889 |
| 2003 | 0 | 0 | 0 | 0 | 0 | 0 | 358 | 625 | 192 | 465 | 496 | 2,318 |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 438 | 625 | 645 | 410 | 424 | 2,713 |
| 2005 | | | | | | | | | | | | |
| 2006 | 0 | 0 | 0 | 0 | 0 | 0 | 563 | 622 | 645 | 645 | 536 | 3,023 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 510 | 625 | 563 | 645 | 575 | 2,925 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 64 | 471 | 625 | 575 | 642 | 568 | 3,073 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 562 | 625 | 619 | 637 | 559 | 3,118 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 437 | 625 | 631 | 619 | 331 | 2,700 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 461 | 625 | 642 | 645 | 464 | 2,914 |
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 | 583 | 623 | 644 | 639 | 440 | 2,929 |
| 2013 | 0 | 0 | 0 | 0 | 0 | 327 | 550 | 621 | 644 | 618 | 311 | 3,070 |
| 2014 | 0 | 0 | 0 | 0 | 0 | 36 | 563 | 622 | 479 | 645 | 519 | 2,864 |
| Average | 0 | 0 | 0 | 0 | 0 | 24 | 455 | 607 | 593 | 525 | 471 | 2,818 |

Diversions are based on the CDSS Diversion records for natural streamflow (source = 1), which does not include any storage water, diversions for irrigation use only (use = 1) for the Los Pinos Irrigating Ditch. Diversions limited to 10.5 cfs based on the number of days water taken in each month and 1 cfs previously converted to municipal use.

All Non-Irrigation season diversions have been adjusted to ZERO.

Blanks indicate no data

Exhibit 5
Crop Historical Consumptive Use ¹
Town of Bayfield
Pro-Rata Irrigation Shares
All values in Acre-Feet

DATE FILED: May 29, 2015 11:21 AM
FILING ID: A750F014CFB79
CASE NUMBER: 2015CW3017

| Year | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Total |
|-------------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|
| 1980 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.0 | 50.4 | 52.1 | 52.1 | 28.2 | 6.3 | 202.0 |
| 1981 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 22.1 | 50.4 | 32.1 | 48.6 | 31.2 | 0.0 | 184.4 |
| 1982 | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 1983 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.2 | 45.6 | 52.1 | 43.7 | 26.6 | 12.9 | 206.2 |
| 1984 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.9 | 48.7 | 52.1 | 30.4 | 31.5 | 0.0 | 189.5 |
| 1985 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.1 | 50.4 | 52.1 | 48.7 | 13.2 | 0.0 | 191.5 |
| 1986 | | | | | | | | | | | | | |
| 1987 | | | | | | | | | | | | | |
| 1988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.6 | 49.4 | 52.1 | 31.0 | 30.6 | 11.2 | 210.9 |
| 1989 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.1 | 46.5 | 50.4 | 52.1 | 39.2 | 23.2 | 7.7 | 222.2 |
| 1990 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 23.5 | 50.4 | 52.1 | 5.0 | 6.6 | 7.4 | 145.1 |
| 1991 | | | | | | | | | | | | | |
| 1992 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 17.0 | 49.5 | 45.5 | 42.5 | 29.5 | 12.0 | 196.4 |
| 1993 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 28.4 | 48.4 | 52.1 | 10.7 | 27.9 | 7.7 | 175.2 |
| 1994 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 32.4 | 50.4 | 50.9 | 46.8 | 22.6 | 0.3 | 203.4 |
| 1995 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 10.4 | 48.3 | 52.1 | 49.8 | 35.8 | 16.8 | 214.5 |
| 1996 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | 49.9 | 46.7 | 34.5 | 10.6 | 15.0 | 0.0 | 159.1 |
| 1997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 23.1 | 49.8 | 48.3 | 38.7 | 16.4 | 3.8 | 181.3 |
| 1998 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.8 | 42.2 | 50.4 | 51.6 | 52.1 | 36.0 | 0.0 | 239.1 |
| 1999 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 23.8 | 50.4 | 46.5 | 3.9 | 18.4 | 15.0 | 158.0 |
| 2000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 43.7 | 50.4 | 31.9 | 16.3 | 35.2 | 0.0 | 178.3 |
| 2001 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 34.4 | 50.4 | 52.1 | 36.1 | 50.4 | 18.7 | 242.1 |
| 2002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.2 | 48.9 | 14.8 | 25.0 | 6.4 | 18.4 | 4.7 | 122.3 |
| 2003 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.9 | 50.4 | 15.5 | 37.5 | 27.9 | 14.7 | 174.8 |
| 2004 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.4 | 50.4 | 52.1 | 33.1 | 6.9 | 9.9 | 187.8 |
| 2005 | | | | | | | | | | | | | |
| 2006 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.4 | 50.2 | 52.1 | 52.1 | 10.4 | 0.0 | 210.2 |
| 2007 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.7 | 50.4 | 45.5 | 52.1 | 25.1 | 0.5 | 199.3 |
| 2008 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 28.9 | 50.4 | 46.4 | 44.9 | 39.7 | 10.4 | 225.8 |
| 2009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 33.6 | 49.7 | 49.9 | 51.4 | 30.3 | 3.5 | 218.3 |
| 2010 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.3 | 50.4 | 50.9 | 31.2 | 26.7 | 4.6 | 199.1 |
| 2011 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 37.2 | 50.4 | 51.8 | 31.2 | 37.2 | 6.2 | 213.9 |
| 2012 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 50.3 | 51.9 | 51.5 | 35.5 | 0.0 | 210.4 |
| 2013 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.5 | 44.4 | 50.1 | 52.0 | 49.9 | 25.1 | 0.0 | 238.8 |
| 2014 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.8 | 50.2 | 38.6 | 52.1 | 35.8 | 0.0 | 195.6 |
| Average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 30.0 | 47.0 | 45.0 | 35.5 | 25.7 | 5.6 | 190.2 |
| Unit HCU per Acre | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.20 | 0.31 | 0.30 | 0.24 | 0.17 | 0.04 | 1.26 |

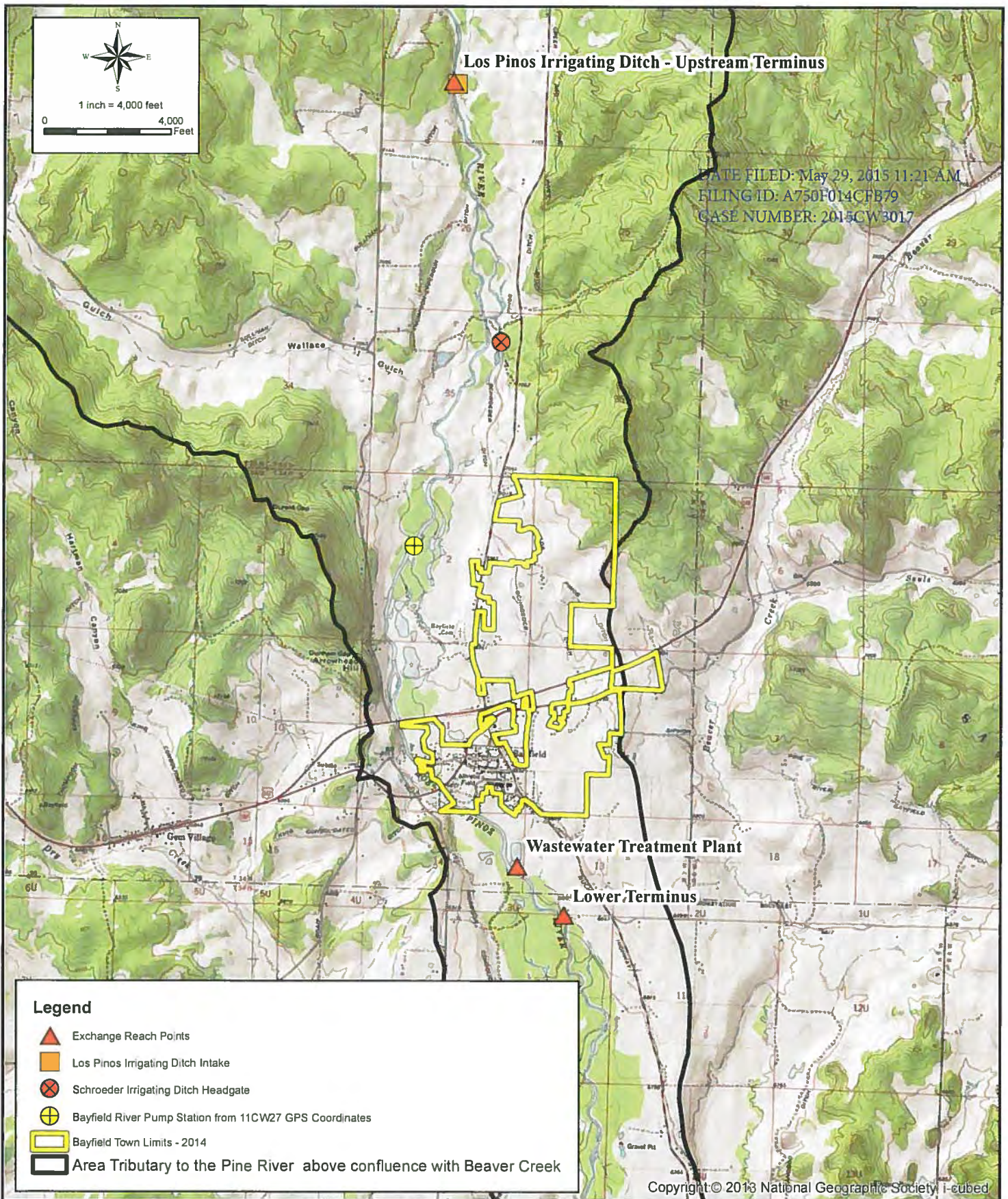
¹ If Max Irrigation Water Available is greater than Irrigation Water Requirement, then equal to the Irrigation Water Requirement. If Max Irrigation Water Available is less than the Irrigation Water Requirement, then equal to Max Irrigation Water Available.
Unit HCU per Acre equals Average HCU divided by 150.56 acres
Years missing Irrigation Water Requirement or Diversion Data are shown as blank and not included in the average values.

Exhibit 6 **Historical Stream Impact Analysis for Town of Bayfield's Irrigation Water in the Los Pinos Ditch** **Town of Bayfield**

| Month | Pro-Rata Diversions | Pro-Rata Farm Headgate Delivery | Crop HCU | Total Return Flows to Pine River below Pine River Canal | Total Return Flows to Pine River above Pine River Canal | Surface Water Return Flows to Pine River above Pine River Canal | Groundwater Return Flows to Pine River above Pine River Canal | Lagged Groundwater Return Flows to Pine River above Pine River Canal | Total Surface and Groundwater Return Flows to Pine River above Pine River Canal | Physical Net Obligations to Pine River above Pine River Canal | Historical Net Return Flow Obligations to Pine River above Pine River Canal |
|-----------|---------------------|---------------------------------|-------------|---|---|---|---|--|---|---|---|
| | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) | (acre-feet) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| January | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.46 | 9.46 | 0.00 | 9.46 |
| February | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.55 | 8.55 | 0.00 | 8.55 |
| March | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.46 | 9.46 | 0.00 | 9.46 |
| April | 4.27 | 3.85 | 1.39 | 0.40 | 2.06 | 1.03 | 1.03 | 9.16 | 10.19 | 0.00 | 6.34 |
| May | 81.72 | 73.54 | 30.02 | 7.13 | 36.40 | 18.20 | 18.20 | 9.46 | 27.66 | 45.88 | 0.00 |
| June | 109.00 | 98.10 | 47.09 | 8.35 | 42.65 | 21.33 | 21.33 | 9.16 | 30.49 | 67.61 | 0.00 |
| July | 106.46 | 95.82 | 45.01 | 8.32 | 42.48 | 21.24 | 21.24 | 9.46 | 30.71 | 65.11 | 0.00 |
| August | 94.35 | 84.91 | 35.50 | 8.09 | 41.32 | 20.66 | 20.66 | 9.46 | 30.12 | 54.79 | 0.00 |
| September | 84.54 | 76.09 | 25.73 | 8.25 | 42.11 | 21.06 | 21.06 | 9.16 | 30.22 | 45.87 | 0.00 |
| October | 27.29 | 24.56 | 5.63 | 3.10 | 15.83 | 7.92 | 7.92 | 9.46 | 17.38 | 7.18 | 0.00 |
| November | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.16 | 9.16 | 0.00 | 9.16 |
| December | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.46 | 9.46 | 0.00 | 9.46 |
| Total | 507.63 | 456.87 | 190.36 | 43.65 | 222.86 | 111.43 | 111.43 | 111.43 | 222.86 | 286.45 | 52.44 |

Notes:

- (1) Based on diversion records in Exhibit 4 and Bayfield's pro-rata share of Ditch ownership. Bayfield pro-rata irrigation diversions based on the total ownership in the ditch (227,091 shares out of 905,091 shares = 25.1%), multiplied by the entire water right (11.5 cfs x 25.1% = 2.88 cfs) minus the 1 cfs previously converted (2.88 cfs - 1.00 cfs = 1.88 cfs), divided by the total irrigation water (1.88 cfs / 10.5 cfs = 17.93% of total irrigation diversions).
- (2) Equals Column 1 x 90% to account for a 10% Ditch Loss
- (3) See Exhibit 5.
- (4) Equals (Column 2 - Column 3) x (24.66/150.56) based on the 24.66 acres of the Town's total 150.56 historically irrigated acres that are tributary to Beaver Creek
- (5) Equals Column 2 - Column 3 - Column 4.
- (6) Equals Column 5 x 50% surface water return flows.
- (7) Equals Column 5 x 50% groundwater return flows.
- (8) Equals Column 7 distributed evenly throughout the year. Aquifer test data yield a transmissivity of approximately 1,200 gpd per foot and the distance to the stream from the centroid of irrigated areas is approximately 3,900 feet. It is reasonable and conservative to model lagged depletions at a steady state (fully attenuated) given the low transmissivity and relatively long distance to the stream.
- (9) Equals Column 6 + Column 8
- (10) If Column 2 - Column 9 is greater than zero, then equals Column 2 - Column 9, otherwise equals zero.
- (11) If Column 9 - Column 2 is greater than zero, then equals Column 9 - Column 2, otherwise equals zero.



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Exhibit 8
Municipal Return Flows and Depletions as Percentages
Town of Bayfield

| Month | Average Diversions at Town Headgate or the Pine River Ditch (acres-feet) | Evaporation from Water Treatment Plant Operational Storage Pond (acres-feet) | Pondable Municipal Water Diversities | | |
|--|--|--|---|---|------------------------------|
| | | | Average Raw Water Treatment Plant Inflow (2004-2014) (acres-feet) | Pondable Outdoor Landscape Use (acres-feet) | Pondable Indoor (acres-feet) |
| | (1) | (2) | (3) | (4) | (5) |
| January | 25.33 | 0.10 | 25.34 | 0.00 | 25.34 |
| February | 23.84 | 0.28 | 23.35 | 0.00 | 23.35 |
| March | 25.04 | 0.58 | 24.46 | 0.00 | 24.46 |
| April | 27.55 | 0.67 | 26.88 | 1.78 | 24.90 |
| May | 42.75 | 1.31 | 41.54 | 18.64 | 24.80 |
| June | 59.25 | 1.50 | 57.75 | 32.85 | 24.80 |
| July | 48.25 | 1.55 | 53.70 | 22.80 | 24.80 |
| August | 48.00 | 1.55 | 49.45 | 24.75 | 24.80 |
| September | 40.73 | 1.66 | 38.07 | 14.77 | 24.90 |
| October | 32.35 | 0.73 | 31.63 | 6.73 | 24.90 |
| November | 28.49 | 0.38 | 28.10 | 0.00 | 28.10 |
| December | 25.48 | 0.15 | 25.34 | 0.00 | 25.34 |
| Annual Total | 423.88 | 9.88 | 423.18 | 124.42 | 288.77 |
| Average Indoor Monthly Delivery (November - March) | | | 24.38 | | |

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- Notes
- (1) Equals Column 3 + Column 2.
- (2) Equals 2.7 acre operational storage pond x gross evaporation rate of 3.48 feet per year.
- (3) From Town of Bayfield Water Treatment Plant monthly data, 2004 through 2014. The average monthly use in winter months (i.e., November through March) is used as indoor-use only. The irrigation season for bluegrass (i.e., lawns) is April through October which has supports indoor-only use from November through March.
- (4) Equals Column 3 - (Average Indoor Monthly Delivery). Outdoor use occurs April through October, zero water is for outdoor use November through March.
- (5) Equals Column 3 - Column 4.

| Month | Outdoor Return Flows to the Pine River below the Pine River Canal (acres-feet) | Indoor Return Flows (acres-feet) | Municipal Return Flows to Pine River above the Pine River Canal | | | |
|--------------|--|----------------------------------|---|--|--|--|
| | | | Outdoor Return Flows to Surface Water (acres-feet) | Outdoor Return Flows to Groundwater (acres-feet) | Largely Return Flows to Groundwater (acres-feet) | Total Largest Return Flows to Surface Water and Groundwater (acres-feet) |
| | (6) | (7) | (8) | (9) | (10) | (11) |
| January | 0.00 | 23.97 | 0.00 | 0.00 | 1.63 | 25.61 |
| February | 0.00 | 22.18 | 0.00 | 0.00 | 1.49 | 23.67 |
| March | 0.00 | 23.65 | 0.00 | 0.00 | 1.63 | 25.28 |
| April | 0.01 | 23.65 | 0.07 | 0.22 | 1.54 | 25.51 |
| May | 0.12 | 23.65 | 0.64 | 2.57 | 1.63 | 25.83 |
| June | 0.23 | 23.65 | 1.27 | 5.07 | 1.58 | 26.50 |
| July | 0.20 | 23.65 | 1.11 | 4.45 | 1.63 | 26.40 |
| August | 0.16 | 23.65 | 0.86 | 3.53 | 1.63 | 26.17 |
| September | 0.10 | 23.65 | 0.77 | 2.28 | 1.58 | 25.80 |
| October | 0.05 | 24.80 | 0.20 | 1.63 | 1.63 | 25.54 |
| November | 0.00 | 24.07 | 0.00 | 0.00 | 1.63 | 25.70 |
| December | 0.00 | 24.07 | 0.00 | 0.00 | 1.63 | 25.70 |
| Annual Total | 0.87 | 233.33 | 4.80 | 18.21 | 18.21 | 387.88 |

- Notes
- (6) Equals outdoor return flows from the portion of the Town's potable water supply area that is outside of the area tributary to the Pine River above the Pine River Canal. Currently equals 3.5% x Column 2 + a 20% return from, based on 35% of the Town's current service area that is in the Beaver Creek drainage area.
- (7) Equals Column 3 + 5% return flows from wastewater treatment plant.
- (8) Equals the portion of the Town's outdoor return flows from landscape irrigation (i.e., 50% outdoor irrigation efficiency), minus portion of landscape irrigation not tributary to the Pine River above the Pine River Canal and 20% of outdoor irrigation return flows tributary to surface water.
- (9) Equals (Column 4 x 20% - Column 7) x 80%. Based on 20% return flow from landscape irrigation (i.e., 60% outdoor irrigation efficiency), minus portion of landscape irrigation not tributary to the Pine River above the Pine River Canal and 80% of outdoor irrigation return flows tributary to groundwater.
- (10) Equals annual total of Column 8 evenly distributed through the year, based on hydrogeologic characteristics (see Exhibit 6, footnote 6).
- (11) Equals Column 7 + Column 8 + Column 10.

| Month | Total Municipal Depletions and Return Flows above the Pine River Canal | | | |
|--------------|--|--|--|--|
| | Total Net Water Depletions (acres-feet) | Total Net Return Flow Credits (acres-feet) | Percent of Total Headgate Diversions that are Net Depletions (%) | Percent of Total Headgate Diversions that are Net Return Flows (%) |
| | (12) | (13) | (14) | (15) |
| January | 0.00 | 0.27 | 0.0% | 1.1% |
| February | 0.00 | 0.28 | 0.0% | 1.1% |
| March | 0.17 | 0.00 | 0.7% | 0.7% |
| April | 2.25 | 0.00 | 8.2% | 0.0% |
| May | 18.82 | 0.00 | 39.3% | 0.0% |
| June | 32.75 | 0.00 | 55.3% | 0.0% |
| July | 28.85 | 0.00 | 52.2% | 0.0% |
| August | 22.64 | 0.00 | 46.0% | 0.0% |
| September | 18.63 | 0.00 | 38.3% | 0.0% |
| October | 6.81 | 0.00 | 21.0% | 0.0% |
| November | 0.11 | 0.00 | 0.4% | 0.0% |
| December | 0.00 | 0.27 | 0.0% | 0.9% |
| Annual Total | 124.53 | 8.42 | | |

- Notes
- (12) Column 1 - Column 11 is greater than zero, then equals Column 1 - Column 11, otherwise equals zero.
- (13) If Column 1 - Column 11 is less than zero, then equals Column 11 - Column 1, otherwise equals zero.
- (14) Equals Column 12 / Column 1.
- (15) Equals Column 13 / Column 1.

Exhibit 9

Example Operations under Change of Water Right and Plan for Augmentation

Town of Bayfield

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 CASE NUMBER: 2015CW3017

| Month | Historical Net Stream Depletion Credit | Percent of Total Diversions that are Net Depletions | Maximum Diversion under Change of Water Right and Plan for Augmentation* | | Total Depletions greater than Historical Net Stream Depletion Credits |
|--------------|--|---|--|----------------------|---|
| | (acre-feet) (1) | (%) (2) | (acre-feet) (3) | (average cfs) (4) | (acre-feet) (5) |
| January | 0.00 | 0.0% | 0.00 | 0.00 | 0.00 |
| February | 0.00 | 0.0% | 0.00 | 0.00 | 0.00 |
| March | 0.00 | 0.7% | 0.00 | 0.00 | 0.00 |
| April | 0.00 | 8.2% | 0.00 | 0.00 | 0.00 |
| May | 45.88 | 39.3% | 116.60 | 1.90 | 0.00 |
| June | 67.61 | 55.3% | 122.32 | 2.06 | 0.00 |
| July | 65.11 | 52.2% | 124.69 | 2.03 | 0.00 |
| August | 54.79 | 46.6% | 117.56 | 1.91 | 0.00 |
| September | 45.87 | 36.7% | 125.17 | 2.10 | 0.00 |
| October | 7.18 | 21.0% | 34.13 | 0.56 | 0.00 |
| November | 0.00 | 0.4% | 0.00 | 0.00 | 0.00 |
| December | 0.00 | 0.0% | 0.00 | 0.00 | 0.00 |
| Total | 286.45 | | 640.46 | | 0.00 |

Notes:

- (1) See Exhibit 6, Column 10.
 - (2) See Exhibit 8, Column 14.
 - (3) Equals Column 1 / Column 2.
 - (4) Equals Column 3 / number of days per month / 1.983
 - (5) Equals Column 3 x Column 2 - Column 1.
- * Note that diversions and return flows made under existing municipal water rights decreed in case numbers W-1411-76 and W-1412-76 are not included.

Rtn: Upon Recording Return to:
Town Clerk
Town of Bayfield
PO Box 80
Bayfield, CO 81122

Reception #: 1106998 Record Date: 01/15/2016 11:00 AM
of Page(s): 1 Rec Fee: \$11.00 Doc Fee: \$0.00
Tiffany Lee Parker, La Plata County Clerk mlk Trans # 48296

QUIT CLAIM DEED

THIS DEED ("Deed"), dated the 14th day of January, 2016, is between the BAYFIELD SCHOOL DISTRICT NO. 10-JT-R, a public school district and political subdivision of the state of Colorado hereinafter called "Grantor," and the TOWN OF BAYFIELD a municipal corporation and political subdivision of the state of Colorado, hereinafter called "Grantee."

WITNESSETH, That the Grantor, for ten dollars in hand paid and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby sell and quitclaim to the Grantee all water, water rights, and ditch rights, if any, appurtenant to the property situate, lying and being in the County of La Plata and State of Colorado, described as follows: A parcel of land located in the N1/2NE1/4 of Section 14 and in the SE1/4SE1/4 of Section 11 all in Township 34 North, Range West, New Mexico Principal Meridian, being more particularly described as follows:

Tract A of the BAYFIELD SCHOOLS-TOWN OF BAYFIELD BOUNDARY ADJUSTMENT PLAT, according to the plat thereof, filed for record under Reception Number 980736 on July 24, 2008 (the "Property").

Said parcel contains 24.34 acres, more or less.

Without limiting the foregoing, certain water, water rights, wells, well permits, ditches and ditch rights which may be appurtenant to the Property are more specifically described as follows:

(a) any and all rights to storage water from the Pine River Irrigation District (PRID), associated with approximately 21.8 acres of irrigable land; (b) any and all rights to water diverted in the Bean Ditch for irrigation and any enlargements or extensions thereto, decreed in CA1248, La Plata County District Court, June 12, 1934, the amount of which is believed to be 0.5 c.f.s.; (c) the rights decreed to the Harrison Well in the amount of 0.022 c.f.s., absolute, for domestic, garden and stock watering uses, Case W-690, District Court in and for Water Division No. 7, October 18, 1972, together with any well and well permit associated therewith; (d) The water well represented by permit number #14828; (e) the water rights decreed to the HARRISON-KIMBALL SPRING, in the total amount of 0.50 c.f.s. absolute for irrigation, fishery and stock uses, Case No. W-1737-77, District Court in and for Water Division 7, February 7, 1978.

TOGETHER with all and singular the hereditaments and appurtenances thereunto belonging, or in anywise appertaining, the reversions, remainders, rents, issues and profits thereof, and all the estate, right, title, interest, claim and demand whatsoever of the Grantor, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances.

The Grantor affirms that this Quit Claim Deed is executed and delivered pursuant to resolution duly adopted in accordance with and pursuant to Section 110(1)(e) of Article 32, Title 22, Colorado Revised Statutes, and that the water, water rights, and ditch rights, if any, herewith conveyed are surplus to the Grantor's needs and not in use for any governmental purpose of the Grantor.

IN WITNESS WHEREOF the Grantor has executed this deed on the date set forth above.

BAYFIELD SCHOOL DISTRICT NO. 10-JT-R

By:

Name and Title: Timothy Stumpf, Board President

As authorized by the Bayfield Board of Directors on January 12, 2016

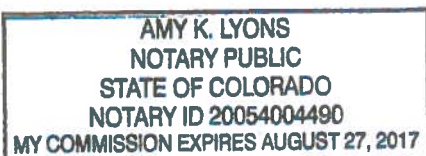
STATE OF COLORADO)
) ss.
COUNTY OF LA PLATA)

The foregoing was acknowledged before me by Timothy Stumpf, Board President, on behalf of the Bayfield School District No. 10-JT-R, on the 14th day of January, 2016.

WITNESS my hand and official seal.

My commission expires: August 27, 2017

Notary Public



PRID Agreement

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Acre-feet under Contract: 90

PINE RIVER IRRIGATION DISTRICT

THIRD-PARTY CONTRACT
FOR LEASE OF PINE RIVER PROJECT WATER

This Third-Party Contract is entered into this 16th day of January, 2008 among the Pine River Irrigation District, herein styled "District", a public corporation organized under the laws of the State of Colorado, the United States, acting through the Bureau of Reclamation, Department of the Interior, herein styled "Reclamation", pursuant to the provisions of Reclamation Act of 1902 (Act of June 17, 1902, 32 Stat. 388) and all acts amendatory and supplementary thereto, particularly the Act of February 25, 1920 (41 Stat. 451), and The Town of BAYFIELD, whose mailing address is P.O. Box 80 BAYFIELD, CO 81122 and whose property address is Within Town Limits, Bayfield, Colorado 81122 herein styled "the Third Party Contractor".

RECITALS

A. The District has entered into Contract No. 06-WC-40-710, dated March 16, 2007 (District Contract) with the United States of America (the United States), acting through the Secretary of the Interior, pursuant to the Reclamation Act of 1902 (Act of June 17, 1902, 32 Stat. 388) and all acts amendatory and supplementary thereto, particularly the Act of February 25, 1920 (41 Stat. 451), for 6,700 acre-feet of Pine River Contracted Water, herein styled "Contracted Water", stored in Vallecito Reservoir, a part of the Pine River Project (Project). The terms of the District Contract are incorporated into this Third Party Contract by this reference, and a copy is available from the District upon request,

B. The Act of February 25, 1920, authorizes Reclamation to enter into contracts to supply water from any project irrigation system for uses other than irrigation, upon such conditions of delivery, use, and payment as Reclamation may deem proper; Provided, that the approval of such contract by the water users' association or associations (the District) shall have been first obtained; Provided, that no such contract shall be entered into except upon a showing that there is no other practicable source of water supply for the purpose; Provided further, that no water shall be furnished for the uses aforesaid if the delivery of such water shall be detrimental to the water service for such irrigation project or to the rights of any prior appropriator; Provided further, that the moneys derived from such contracts shall be covered into the Reclamation Fund and be placed to the credit of the project from which such water is supplied.

C. Pursuant to Case No. 03CV300 dated June 28, 2004 in District Court, La Plata County, Colorado, Division 7, the District has the authority to lease water for the purposes of the District Contract.

D. The District Contract authorizes the District to lease up to 4,700 acre-feet of Contracted Water for municipal and industrial (M&I) purposes via Third Party Contracts, as defined by, and subject to, the terms and conditions of the District Contract. An initial 1,000 acre-feet of Contracted Water has undergone compliance with the National Environmental Policy Act (NEPA) and the 1920 Act for use in Third Party Contracts. Further NEPA compliance will be necessary prior to use of the remaining 3,700 acre-feet and shall be at the expense of the District or the Third Party Contractor.

E. The District is providing Contracted Water annually to the Third Party Contractor, as described in this Third Party Contract, for use as exchange water to the Pine River to permit out-of-priority diversions which would otherwise be curtailed by a call on the Pine River by senior water rights diverting water from the Pine River. This water is part of the initial 1,000 acre-feet of Contracted Water under compliance with NEPA and the 1920 Act, as stated in Part D above.

F. Contracted water will be diverted from the Pine River at the structure described as follows:
Type of Structure: domestic well commercial diversion pond pump
Other (describe) M&I Use Per Town of BAYFIELD surface area of pond _____
Permit # N/A Decree# W-1411, W-1412, 96CW24, 03CW122
The property where the water is to be used is located in the _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ of
Section _____ Township _____ (N/S) Range _____ (E/W)
Subdivision: _____
Lot No. _____ Parcel No. _____ Tax Account No. _____
Meter Location: located within Treatment Plant
Legal: Within Town Limits of BAYFIELD, CO 81122

G. Leased Water and Standby Water are defined in the District Contract, and may be herein collectively referred to as "Contracted Water".

AGREEMENT

In consideration of the mutual and dependent covenants contained herein, the parties to this Third Party Contract agree as follows:

1. This Third Party Contract shall become effective upon execution of the Third Party Contract by the District and Reclamation. This Third Party Contract is subject to the Act of June 17, 1902 (32 Stat. 388) and all acts amendatory thereof or supplementary thereto, particularly the Act of February 25, 1920 (41 Stat. 451), collectively known as the Federal Reclamation laws, applicable State law and is limited by the terms of the District Contract. In conflicts between this Third Party Contract and the District Contract, the District Contract governs.

2. The total amount of Contracted Water contracted for by the Third Party Contractor under this Third Party Contract is 90 acre-feet annually, initially in the amounts of 30 acre-feet of Leased Water and 60 acre-feet of Standby Water.
3. For the Contracted Water provided for under this Third Party Contract, according to the terms of the District Contract (Paragraph 6), the Third Party Contractor agrees to pay the District upon signing this Third Party Contract, and annually thereafter, as follows:
 - 3.1. 250.00 per acre-foot for Leased Water identified in Paragraph 2 to reimburse the District for annual operation and maintenance costs, system improvement costs, replacement costs, water conservation activity costs, and annual costs associated with the Project and administration of this Third Party Contract; plus,
 - 3.2. 40.00 per acre-foot for Standby Water identified in Paragraph 2; plus,
 - 3.3. A Federal charge, which is an annual charge based on 15 percent of the District's charges in effect for Leased Water and Standby Water, pursuant to the District Contract (Paragraph 5(a)(2)). This charge will be assessed for 40 years from the year that this Third Party Contract is executed.
4. Based upon the amounts in Paragraph 2 & 3 above, the total water cost paid by the Third Party Contractor upon signing this Third Party Contract, and prior to Contracted Water delivery shall be: \$ 11,385.00. The amount in paragraphs 3.1 and 3.2 reflect the District's rates for 2008 (Insert Year). The rates may be adjusted by the District as necessary to ensure costs identified in those paragraphs are recovered.
 - 4.1. On January 1 of each water year, which is November 1 through October 31, as defined in the District Contract, the District shall bill the Third Party Contractor the total water cost that is due upon receipt. In the event the total water cost is not paid by April 1, then this Third Party Contract may be terminated by the District, and the Division of Water Resources shall be notified of the termination. The District may adjust the annual charges with notice to the Third Party Contractor prior to the beginning of any water year.
 - 4.2. Prior to August 1 of each year the Third Party Contractor shall notify the District concerning the need for change of status of Standby Water to Leased Water. Standby Water that is changed to Leased Water shall remain Leased Water for the duration of this Third Party Contract.
 - 4.3. For payments collected from the Third Party Contractor, the District shall pay the United States the sum described in paragraph 3.3 herein, and shall retain the sums described in paragraphs 3.1 and 3.2 herein.
5. By signing this Third Party Contract, the Third Party Contractor acknowledges:
 - 5.1. That the Third Party Contractor has read and understands the District Contract, incorporated by reference into this Third Party Contract, and agrees to be bound by its terms;
 - 5.2. That Contracted Water contracted for under this Third Party Contract will be released from Vallecito Reservoir and delivered to the Pine River at the outlet works of Vallecito Dam upon request of the Division Engineer, Division of Water Resources. The Third Party Contractor recognizes that it cannot request scheduled releases from Vallecito Dam which would damage Project facilities;
 - 5.3. That the amount of Contracted Water contracted for by the Third Party Contractor under this Third Party Contract has been determined solely by the Third Party Contractor, and that the District makes no representation that the amount contracted for by the Third Party Contractor, as either Leased Water or Standby Water, is sufficient to meet the Third Party Contractor's requirements;
 - 5.4. That the total water cost to be paid annually by the Third Party Contractor under this Third Party Contract is due and payable in full, whether or not the Leased Water or Standby Water is actually released from Vallecito Reservoir;
 - 5.5. That the Third Party Contractor shall have no holdover of water storage in Vallecito Reservoir from water year to water year; therefore, any Contracted Water contracted for under this Third Party Contract which is not released by November 1 in each year shall be returned to the storage pool for Project use;
 - 5.6. That in the event Contracted Water available to the District under the District Contract is curtailed pursuant to the provisions of the District Contract, no liability shall attach to the District or the United States for such curtailment, even if said curtailment results in a reduction of the amount of Contracted Water released under this Third Party Contract;
 - 5.7. That, the right of the Third Party Contractor to use Leased Water, or have water on standby is based strictly on this Third Party Contract;
 - 5.8. That nothing in this contract is intended to create a water right to Contracted Water obtained pursuant to this contract, and the Third Party Contractor may not claim a water right based on any legal theory arising under State or Federal law, before any State or Federal judicial or administrative body based on the use of Contracted Water under this or any Third Party Contract;

5.9. That the Third Party Contractor agrees to establish and maintain records of receipt and use of Contracted Water acceptable to Reclamation and the Third Party Contractor shall provide these records in such form and at such time as Reclamation may reasonably require. Records obtained from the Division of Water Resources may be provided in lieu of the Third Party Contractor records;

6. The payment by the Third Party Contractor of the total water cost described in paragraph 4 herein is a requirement for continued Contracted Water delivery under this Third Party Contract. In the event that the Third Party Contractor's tendered payment is dishonored, the District shall not make Contracted Water available for the Third Party Contractor until the Third Party Contractor provides payment of the total water cost, plus interest at the rate one and one-half percent (1.5%) per month from the date of tender, in Good Funds (cash, electronic transfer funds, certified check or cashier's check).

7. This Third Party Contract may not be assigned, or the Contracted Water transferred, by the Third Party Contractor without the written consent of the District and Reclamation. Consent for the assignment or transfer is not guaranteed and is at the sole discretion of the District and Reclamation. Prior to any assignment or transfer, the Third Party Contractor shall notify the District in writing of the Third Party Contractor's intent to make such assignment or transfer. The notice shall include the name, address and telephone number of the person to whom the assignment or transfer will be made and an application for approval of the assignment or transfer. The District may, in its discretion, assess an administrative fee to record the assignment or transfer as a condition of approving the transfer. Any assignment of this Third Party Contract or transfer of the Contracted Water leased under this Third Party Contract without the consent and approval required by this paragraph shall be void.

8. In the event of failure by the Third Party Contractor to pay the total water cost due under the terms set forth in Paragraph 4 of this Third Party Contract the District may, at its option, continue payments to Reclamation on the Contracted Water by the time periods set forth in Article 6(d) of the District Contract or terminate this Third Party Contract and return the Contracted Water to storage. The District shall give written notice of termination to the Third Party Contractor, Reclamation, and the Division of Water Resources.

9. This Third Party Contract constitutes the entire and only agreement between the District, Reclamation, and the Third Party Contractor relating to the subject matter hereof. No subsequent modification of any of the terms of this Third Party Contract shall be valid, binding upon the parties, or enforceable unless made in writing and signed by the parties and Reclamation.

10. No guarantee is made by Reclamation or the District as to the quality of Contracted Water released under this Third Party Contract.

11. Any notice, demand, or request authorized or required by the Third Party Contract shall be deemed to have been given when mailed, postage prepaid, or delivered to: (a) the Pine River Irrigation District at 13029 County Road 501, Bayfield, CO 81122; (b) the Regional Director, Upper Colorado Region, Bureau of Reclamation, 125 South State Street, Room 6107, Salt Lake City, Utah 84138-1102; and (c) the Third Party Contractor, Town of Bayfield, Bayfield, CO 81122.

12. This Third Party Contract is subject to the determination by Reclamation that the Third Party Contract is in compliance with the Final Environmental Assessment and Finding of No Significant Impact (FONSI) completed for the District Contract, dated February 2007. If additional NEPA compliance is necessary, it shall be at the expense of the District or the Third Party Contractor.

IN WITNESS WHEREOF, the parties hereto have caused this Third Party Contract to be duly executed as of the day and year first written above.

Attest:

Christy Duman

Pine River Irrigation District

Bob Rein

By: ~~President~~ Superintendent

Attest:

Myones

(Third Party Contractor)

Justin Clifton

By: Justin Clifton, Manager

Approved:

Andrew

Office of the Regional Solicitor

THE UNITED STATES OF AMERICA

Armando

Regional Director
Upper Colorado Region

Los Pinos Ditch Agreement

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AMENDED AND RESTATED WATER CHANGE AGREEMENT

THIS AGREEMENT (Agreement) is entered into this 30 day of June, 2016, by and between the Los Piños Ditch Company (hereinafter the "Ditch Company"), whose address is Attn: Tim Karl, P.O. Box 482, Bayfield, CO 81122; and the Town of Bayfield (hereinafter the "Town"), whose address is Attn: Chris La May, Town Manager, P.O. Box 80, Bayfield, CO 81122 (collectively, the "Parties").

RECITALS

A. The Town is a shareholder in the Ditch Company and it receives water through the Los Piños Ditch ("Ditch") for municipal purposes. Based on the records of The Ditch Company, the Town currently owns 227.091 shares in the Ditch Company ("Town Shares") and the total number of shares issued by the Ditch is 905.091. On that basis, the Town is the owner of approximately 25.09% of the stock of the Ditch Company, and which stock represents approximately 2.885 c.f.s. of the water rights and capacity in the Ditch ("Town Share water"). If the Town acquires additional Ditch shares, and the Ditch Company approves said acquisition(s) through issuance of new stock certificate(s) to the Town for said shares, the Town Shares and associated capacity in the Ditch will then include such additional share(s) for purposes of this Agreement.

B. The Ditch Company operates, manages, and maintains the Los Pinos Ditch (the "Ditch") and evaluates water change requests.

C. The Town received a decree in Case No. 96CW124 (District Court, Water Division 7), which clarified the Town's right to divert 1.0 c.f.s. in the Ditch for municipal purposes on a year round basis, on the condition that the total diversions from the Los Pinos Ditch and the Schroder Ditch under the priority of those ditches during the winter months of November 1 of any year to May 1 of the following year under the priorities of those ditches shall not exceed a total of 145 acre feet. As part of that negotiated decree, the Town withdrew its request to convert an additional 1.26 c.f.s. in the Ditch to municipal, augmentation, and other uses (hereinafter, "municipal uses"), without prejudice, with the provision that the Town could file an action to change those rights to municipal uses in the future.

D. The Town has now acquired an additional amount of stock in the Ditch Company, and the Town desires to file a change application in Water Court to request that the Town's remaining shares in the Ditch be converted to municipal purposes in a manner approved by the Water Court and the Ditch Company.

E. The Town and the Ditch Company recognize that the Town's change of its shares to municipal use could impact the Ditch Company and its shareholders without protective terms and conditions in place to prevent injury, and the terms of this Agreement are designed to alleviate any impacts in a mutually beneficial manner.

F. The Town also was decreed the right to divert 0.8 c.f.s in the Schroder Ditch in Case No. 96CW124 (the "Schroder Decree") for year-round municipal purposes, and, in addition, the Town owns additional shares in the Schroder Ditch that have not been converted from irrigation to municipal uses. The Schroder Ditch Decree provided for an alternate point of diversion for the Schroder Ditch at the Town's pump on the Pine River as approximately shown on Exhibit A ("Bayfield Pump Station"), but the Town is not otherwise physically able to deliver water by gravity from the Schroder Ditch to the Town's water treatment plant. The Town desires to file an application with the Water Court to allow the Ditch to be an alternate point of diversion for the Town's additional Schroder Ditch water on terms approved by the Water Court and the Ditch Company.

G. The Ditch Company consents to the Town's proposed change of its Ditch Company shares to municipal use, the Town's proposed change of its Schroder Ditch water for diversion and carriage through the Ditch, and the Town's proposed change of its conditional Bayfield River Pump Station water right ("Bayfield Pump right"), decreed in Case No. 03CW122, to add the Ditch as an alternate point of diversion under the terms set forth herein, which are designed to ensure these changes do not cause injury to other shareholders and to provide certain benefits to the Ditch Company as outlined herein.

H. The Ditch Company and the Town previously entered an agreement regarding the Town's proposed change of its Ditch Company shares and Schroder Ditch water rights and the carriage of additional water in the Ditch, which agreement was executed August 12, 2013 ("Prior Agreement"). The parties intend to amend and fully restate the Prior Agreement herein.

NOW THEREFORE, in consideration of the terms and conditions of this Agreement, and other valuable consideration, the sufficiency of which is hereby acknowledged, the parties agree as follows:

AGREEMENT

1. Application to Change Town Shares. The Town shall be allowed to file an Application to Change its shares in the Ditch to municipal purposes with the Ditch as the primary point of diversion, and the Ditch Company consents to that application, provided the final Decree and related water engineering conform to the terms and conditions contained in this Agreement, contain appropriate administrative and accounting provisions, and contain appropriate provisions regarding the change of water right to prevent injury to the Ditch Company's water rights and its shareholders. The Ditch Company, in its discretion, may file a statement of opposition and enter its appearance in the case to ensure that the final Decree and related water engineering conform to the terms and conditions contained in this Agreement, contain appropriate administrative and accounting provisions, and contain appropriate provisions regarding the change of water right. If the Town acquires additional Ditch Company shares after filing said application, the Town shall be allowed to file further applications to change these shares in accordance with the terms of this Agreement.

2. Applications to Change Other Town Water. The Town shall be allowed to file an Application to Change that portion of its rights in the Schroder Ditch that has not already been changed to municipal use to municipal uses and to change the point of diversion of all of its Schroder Ditch water to the Ditch as an alternate point of diversion, subject to a maximum carriage flow of 4.0 c.f.s. as described in Section 8. The Town shall also be allowed to file an Application to add the Ditch as an alternate point of diversion for all or a portion of its Bayfield Pump right, subject to a maximum carriage flow of 4.0 c.f.s. as described in Section 8. The Ditch Company consents to these applications, provided the final Decrees and related water engineering conform to the terms and conditions contained in this Agreement, contain appropriate administrative and accounting provisions, and contain appropriate provisions regarding the change of water right to prevent injury to the Ditch Company's water rights and its shareholders. The Ditch Company, in its discretion, may file statements of opposition and enter its appearance in these cases to ensure that the final Decrees and related water engineering conform to the terms and conditions contained in this Agreement, contain appropriate administrative and accounting provisions, and contain appropriate provisions regarding the change of water right.

3. Ditch Losses and Carriage Flows. The Town shall be charged the same percentage of Ditch losses as those generally assessed to other shareholders in the Ditch, or other shareholders similarly situated along the Ditch. The Town shall be assessed ditch losses for all water it carries in the Ditch, such that the water the Town diverts at its headgate shall account for the assessed ditch losses. A ditch loss provision shall be included in the Town's change decrees for any water the Town wishes to carry through the Ditch. In the event it becomes feasible to do so in the future, as determined in the Company's sole discretion, the parties agree to cooperate with other shareholders to conduct an analysis to determine actual ditch losses to be applied to all shareholders in the ditch.

4. Use of Bayfield Pump Station. The Town's change decree for its Town Share water shall retain the Bayfield Pump Station as an alternate point of diversion. However, the Town shall use the Ditch as its primary diversion point for all of its Town Share water during the irrigation season and non-irrigation season, to the extent allowed by the Town's decrees. The Town shall only divert Town Share water through the Bayfield Pump Station when this water cannot reasonably be carried through the Ditch, such as when the Ditch is being cleaned or repaired, when the Town has a legitimate need to pump water through the Pump Station for maintenance, for water quality, when the ditch is subjected to freezing such that it cannot carry the Town's Share water, as otherwise required by the Town's decrees, and for other legitimate reasons related to the treatment of the water or other similar purposes, or as the Ditch Company otherwise agrees in writing. The Town shall provide the Ditch Company with notice prior to diverting its Town Share water through the Bayfield Pump Station, except in cases of emergency, in which case notice shall be provided as soon as reasonably practical.

5. Ditch Company Use of Town's Water. Any of the Town Share water carried through the Ditch but not needed to fulfill the Town's present needs may be used by the Ditch Company at no charge and allocated to its other shareholders as determined by the Ditch Company. Such use by the Ditch Company or its other shareholders is subject to the terms and conditions of the Town's

decrees. The Town shall provide the Ditch Company with written notice, prior to January 7th of each year or the date of the annual Ditch meeting, whichever is later, containing an estimate of the amount of the Town Share water the Town needs to divert from the Town's headgate, and the Town's remaining water will be the amount the Ditch Company can allocate to other shareholders as set forth herein, subject to the terms and conditions of the Town's decrees. If the Town later determines that it needs additional Town Share water after the notice required herein, it shall provide seven (7) days prior notice to the Ditch Company of the additional amount needed. The Town may then divert such additional Town Share water through its headgate, and the Ditch Company's use of Town Share water shall be reduced accordingly, subject to Section 3 and water availability. The Ditch Company agrees that the Town's Shares will remain the Town's property, subject to this Agreement, and that the Town's Shares will not be considered abandoned and ownership will not revert to the Ditch Company for non-use. However, all other provisions of the Ditch Company's organizational documents will continue to apply to the Town's Shares, including but not limited to the provisions relating to forfeiture of shares for non-payment of assessments, except that any water purchased by the Town from PRID shall not be subject to forfeiture.

6. Capital Improvement Fee. In the Prior Agreement, the Town agreed to pay the Ditch Company Twenty Five Thousand Dollars (\$25,000) as a capital improvement fee. The Town previously paid the Ditch Company \$18,750 in three installments of \$6,250.00 each in 2013, 2014, and 2015. The Town shall pay the remaining \$6,250 on or before the deadline for paying 2016 assessments. The funds shall be used by the Ditch Company for capital improvements and operating costs to benefit the Ditch and its shareholders, provided that 80% of such funds shall be used for capital improvements along the section of the Ditch from the main headgate at the Pine River to the Town's headgate from the Ditch.

7. Assessments for Town Shares. The Town shall continue to pay the Ditch Company regular, special and other assessments for its 1 c.f.s. (converted to an equivalent number of shares) of water in the Ditch that was previously converted to municipal use, at a rate equal to two (2) times the assessment rate paid by irrigation shareholders in the same or similar water quantity category ("Municipal Rate"). The Town shall pay standard assessment rates ("Irrigation Rate") on its remaining Shares until such time as the Water Court approves a decree changing the Town's Shares to municipal use, or until the Town is allowed to use, with approval of the Ditch Company and Division of Water Resources, its remaining Shares for any municipal uses (including irrigation) prior to obtaining a decree changing such water to municipal use. The Irrigation Rate is currently \$12.00 per share, which may change pursuant to the Ditch Company's bylaws. When the Town gets a decree to change its remaining Shares to municipal uses or when the Town gets approval from the Ditch Company and Division of Water Resources to use its other Shares for municipal uses, then the Town shall begin paying the Municipal Rate on all of its Shares used for municipal uses. Notwithstanding the foregoing provision, the Town shall pay Irrigation Rates on that portion of the Town Share water not used by the Town at all during the year and left in the ditch the entire year for use by the Ditch Company or other shareholders under the terms of Section 5. The Town shall not be assessed for its pro rata share of additional "free water" that is diverted into the Ditch when the Pine River is not on call. "Free water" is that amount of water diverted into the Ditch which is over and above the decreed water diverted through the Ditch.

8. Additional Space in the Ditch. The parties agree that the Town hereby reserves additional carriage space in the Ditch up to an amount not to exceed 4.0 c.f.s. over and above the Town's share ownership (currently 25.09% or 2.885 c.f.s.) to allow the Town to carry any water rights owned or leased by the Town for the Town's use and decreed or otherwise approved by Division of Water Resources for diversion at the Ditch headgate, or for the carriage of storage water for the Town's use. The Town shall pay the Ditch Company a minimum capacity reservation fee of \$8,000 per year, commencing upon execution of this Agreement, for the right to carry such additional water and for reserving space for such water, up to 4.0 c.f.s. Once the Town actually carries such additional water through the Ditch, or any portion thereof, the Town shall pay a carriage fee on such water at the equivalent of the Municipal Rate ("carriage fee") calculated by dividing the volume of all non-Share water the Town carries through the Ditch by the volume represented by a Ditch share, currently 0.0127 c.f.s. per share, to determine the amount of equivalent shares, and applying the Municipal Rate to such equivalent shares; provided that the Town shall pay the actual carriage fee or the minimum capacity reservation fee, whichever is higher. The minimum capacity reservation fee shall increase or decrease annually by the same percentage increase or decrease in the Municipal Rate, except that the minimum capacity reservation fee shall not decrease below \$8,000 per year. Future increases in the Municipal Rate shall not increase the minimum capacity reservation fee except to the extent such increases raise the Municipal Rate above the current rate of \$24.00 per share. The parties agree that to the extent the Town has any existing carriage rights as to 27 shares previously allocated to the Town, those rights are relinquished and are included within the 4.0 c.f.s. of additional carriage space described in this paragraph. The carriage of non-Share water shall not give the Town any additional voting rights in the Ditch Company. Such voting rights shall be determined solely by the Town's ownership of Town Shares. All Town water carried through the Ditch shall only be used by the Town to serve customers within the Town's water service area as it currently exists or may be expanded in the future. The Town shall not divert any water from the Ditch for the benefit of the La Plata Archuleta Water District ("Laplawd") or any other similar public rural water supplier with a regional or county-wide service area ("Outside Entities"), and the Town shall not allow Laplawd or any other Outside Entities to divert water from the Ditch, or use water that the Town diverts from the Ditch, except to the extent that Laplawd or other Outside Entities obtain written consent of the Ditch Company and pay any additional carriage fees to the Ditch Company for the carriage of such water.

9. Accounting. The Town shall perform daily accounting of its diversions from the Ditch (including flow rates), and shall report summaries of such diversions to the Ditch Company on a monthly basis, by the 7th day of each month for the preceding month, and on an annual basis by January 7th of each year for the preceding year. Also by January 7th of each year, the Town shall report to the Ditch Company the amount of water it intends to divert for the upcoming year, and the Town shall be assessed for such water in accordance with Sections 7 and 8. If the actual amount diverted by the Town exceeds the amount for which the Town was assessed pursuant to its report, the Ditch Company may invoice the Town, and the Town shall pay the Ditch Company the additional amount within thirty (30) days of the invoice. Additionally, the Town shall provide the Ditch Company with an accounting of the raw water it receives from or diverts for Laplawd or other Outside Entities and the treated water it supplies to Laplawd or other Outside Entities

sufficient to demonstrate that the Town has supplied treated water to Laplawd or other Outside Entities from its Pump Station at all times, except to the extent that Laplawd or other Outside Entities divert water through the Ditch with written permission of the Ditch Company. Such accounting shall show daily raw water diversions from the Pump Station; daily raw water diversions from the Ditch; daily treated water amounts supplied to Laplawd; daily treated water amounts supplied to the Town from Pump Station water and Ditch water; daily amounts of Pump Station water stored in the Bayfield reservoir for Laplawd and the Town, less pro rata reservoir seepage, evaporation and any water system losses; and daily amounts of Ditch water stored in the Bayfield reservoir for the Town, less pro rata reservoir seepage, evaporation, and any water system losses. Such accounting shall be provided to the Ditch Company on a monthly basis as set forth above.

10. Ditch Company Costs. In addition to any other fees required hereunder, the Town agrees to pay all of the Ditch Company's costs, including attorney and engineering fees, incurred in relation to completion of this Agreement (including all work prior to and including execution of this Agreement), and the Town's change of water right applications for its Town Shares, Schroder Ditch, Bayfield Pump right and any water applications to change additional Ditch Company shares subsequently acquired by the Town. The Town shall pay such costs of the Ditch Company to date upon execution of this Agreement. After the execution of this Agreement, the Town shall also pay any additional costs incurred by the Ditch Company in relation to the Town's water right applications referenced above, provided that the Town's obligation to pay such additional costs shall in no case exceed \$10,000 per year, commencing upon the execution of this agreement, plus filing fees. The Town shall pay such additional costs within thirty (30) days of the Ditch Company's submittal of invoices. Any invoices not paid when due shall incur a late fee of 10% of the amount due, and interest at the rate of 12% per annum until paid. To collect delinquent fees, the Ditch Company shall have all remedies set forth in its bylaws to collect delinquent assessments. Additionally, the Ditch Company shall have a lien on all Town Shares for any delinquent amount, which the Ditch Company may foreclose on pursuant to applicable law or bylaws. The Ditch Company may record a lien statement describing the amount owed and the Town Property to which the lien pertains. Upon mutual agreement in writing, the Town may provide additional reimbursement to the Ditch Company if the Ditch Company's participation in the Town's water applications at a level higher than \$10,000 per year is necessary to complete such water cases in compliance with this Agreement.

11. Water Court Approvals. The Town shall be responsible, at its expense, for obtaining Water Court approval of its proposed changes of the Town Shares and other water rights described herein. Except as may otherwise be agreed, the Town shall not implement its proposed changes until the Town obtains decrees from the Water Court or Substitute Water Supply Plans from the State Engineer's Office approving the changes. The Town shall submit its water applications and proposed decrees to the Ditch Company prior to filing with the Water Court, for the Ditch Company's review and approval pursuant to the terms of this Agreement. The Ditch Company shall respond to any document tendered by the Town for review within thirty days of delivery, and if it fails to do so, then the Town shall be free to submit that document to the Court.

12. Interruptions in Water Flow. The Ditch Company shall use reasonable efforts to maintain the Ditch and ensure the Town's water is delivered through the Ditch to the Town's headgate; provided, however, the Town acknowledges and agrees that water flow through the Ditch will be interrupted at least once annually, and more frequently as reasonably necessary, for maintenance, cleaning, and repairs. Additionally, the Town acknowledges and agrees that water flow in the Ditch may be interrupted or reduced by certain things outside of the Ditch Company's control, including but not limited to water availability, storms, floods, natural disasters, drought, acts of God, ice or snow build up, equipment or facilities breakdown, wash outs, administration of water rights under Colorado's priority system, and application of or change in federal or Colorado law. The Town agrees that the Ditch Company shall not be liable for any losses or damages incurred by the Town as a result of the Ditch Company's inability to deliver water due to any of these causes or circumstances outside its control, except for conditions attributable to the failure to reasonably maintain the Ditch or to the Ditch Company's negligence.

13. Term. The provisions of this Agreement related to the Town's Shares shall remain in effect in perpetuity, unless terminated earlier by mutual agreement of the parties, or as set forth in this Section. Except as set forth below, the provisions of this Agreement related to the carriage of water other than Town Share water shall remain in effect for an initial term of twenty (20) years. The term shall automatically renew and be extended beyond the initial term for additional terms of five (5) years each at the expiration of the initial term and each extended term, unless written notification of termination is given at least sixty (60) days prior to the end of the initial term or any extended term by either party. Upon notice of termination, the provisions of this Agreement related to the Town's non-Share water for which this Agreement has been terminated shall remain in effect for up to two (2) years to give the Town time to put in operation other means for delivery of its non-Share Water for which this Agreement has been terminated to the Bayfield treatment plant. If the Town is not able, through reasonable efforts, to complete its change cases for its Schroder Ditch or Bayfield Pump rights, the Town shall have the option, upon providing notice to the Ditch Company, to reduce the term of the additional carriage space in the Ditch set forth in Section 8 from 20 years to 10 years, and, after completion of the 10-year term, relinquish all or a portion of the 4.0 c.f.s. of additional carriage capacity identified in Section 8 and have the minimum capacity reservation fee identified in Section 8 reduced on a pro rata basis.

14. Default and Remedies.

In the event of a breach of this Agreement by the Town, the Ditch Company shall notify the Town of the breach in writing and provide the Town with thirty (30) days to cure the breach. If the Town does not cure the breach within such thirty (30) day period, the Ditch Company may, at its election and in its discretion, pursue any of the following remedies: 1) take any action lawfully authorized by its bylaws, articles of incorporation, or other organizational documents; 2) close the Town's headgate and refuse to deliver water to the Town until the breach is cured; 3) use any portion of the Town's water and/or deliver it to other shareholders during the period of breach; 4) terminate the Town's right to carry water other than Town Share water through the Ditch; and 5) pursue any legal or equitable remedies which it may have against the Town under this

Agreement or applicable law.

In the event of a breach of this Agreement by the Ditch Company, the Town shall notify the Ditch Company of the breach and provide the Ditch Company with thirty (30) days to cure the breach. If the Ditch Company does not cure the breach within such thirty (30) day period, or commence action toward the cure within thirty days and complete it within a reasonable time thereafter through the exercise of reasonable diligence, the Town may pursue any legal or equitable remedies which it may have against the Ditch Company under this Agreement or applicable law, including specific performance; provided, however, the Ditch Company shall not be liable for any consequential damages as a result of a breach of its obligations hereunder; and provided further that the Town may use its Pumping Plant when the Ditch is not capable of carrying the Town's water. A breach by the Ditch Company shall not in and of itself give the Town the right to move its water permanently out of the Ditch without a decree from the water court and the Ditch Company's consent, and the Town shall resume carrying its Town Share water in the Ditch after any Ditch Company breaches are cured, as set forth herein.

15. General Provisions

A. This Agreement shall run with the Town's Shares and any subsequently acquired Shares, Schroder Water, Bayfield Pump water, and property, and shall be binding on the parties, their heirs, successors, and assigns. This Agreement shall be recorded in the La Plata County Clerk and Recorder's Office.

B. The parties agree to execute all necessary documents to carry out the intent of this Agreement.

C. The governing law for this Agreement shall be Colorado law, and venue shall be in the Courts of La Plata County, Colorado.

D. If the Parties cannot agree on matters hereunder requiring mutual agreement, or if there should be other disputes under this Agreement, the Parties agree that they will first attempt to resolve the matter through informal negotiation and/or mediation. If such efforts do not resolve the dispute within thirty (30) days, the Parties may proceed with other action as they deem necessary. If, however, a dispute negatively affects the ability of a party to receive its water, or creates a safety issue, an imminent risk of damage to person or property, or an emergency situation, the requirements of this provision shall not apply. If a dispute leads to a breach of this Agreement by either party, the requirements of Section 14 shall apply.

E. Should litigation or other means of dispute resolution be necessary to enforce any term or provision of this Agreement, all expenses, collection fees, witness fees, court costs and attorney fees shall be paid by the non-prevailing party.

F. The failure of any party in either one or more instances to insist upon the performance of any covenants, terms, or conditions of this Agreement, or to exercise any right or

privilege conferred by this Agreement, or the waiver of any breach of any of the terms, covenants, or conditions of this Agreement, shall not be construed as thereafter waiving any such terms, covenants, conditions, rights, or privileges, but the same shall continue and remain in full force and effect, the same as if no such forbearance or waiver had occurred.

G. Should any provision herein be found or deemed to be invalid, this Agreement shall be construed as not containing such provision, and all other provisions which are otherwise lawful shall remain in full force and effect and, to this end, the provisions of this Agreement are declared to be severable.

H. This Agreement represents the entire and integrated agreement between the parties related to the subject matter contained herein, and supersedes all prior negotiations, representations, or agreements, either written or oral, including the Prior Agreement. This Agreement may be amended, repealed, or superseded only by a written instrument signed by the parties.

I. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Faxed and emailed signatures shall have the same force and effect as original signatures.

J. All notices required or permitted under this Agreement shall be in writing and shall be either personally served, sent by overnight courier service, first class mail postage prepaid, or by email or fax at such addresses and numbers the parties may provide to each other in writing. Any such notice shall be deemed effective when: (a) such notice is actually received, if notice is personally served; (b) one day following notice being delivered to an overnight courier service; (c) two days following the date of deposit in the United States mail; or (d) upon verification of transmission if sent by email or fax. A party's address may be changed by written notice to the other party; provided, however, that no notice of a change of address shall be effective until actual receipt of such notice. Notices to the parties shall be sent to the addresses set forth above, or such other addresses as the parties may designate from time to time by notice to the other party.

K. The parties certify that the individuals signing this Agreement have been duly authorized to sign this Agreement on behalf of their respective entities.

L. No person or entity other than the Town and the Ditch Company, or their successors and approved assigns, shall have any legal or equitable right to enforce any provision of this Agreement.

M. The Recitals set forth above are incorporated into this Agreement by reference.

N. The parties acknowledge that the Town is a local government entity that is subject to the provisions of Article X, Section 20 of the Colorado Constitution (TABOR), and, as such, any payment obligations of the Town are subject to the annual appropriation of funds to make such payments. However, nothing contained herein shall impair the rights of the Ditch Company to


declare a default or pursue its lawful remedies in the event of any non-payment by the Town.

EXECUTED on the date first set forth above.

LOS PINOS DITCH COMPANY

By 
Tim Karl, President

THE TOWN OF BAYFIELD

By: 
Name: Matthew Salke
Title: Mayor

County of La Plata

WITNESS my hand and official seal. My commission expires: 9/26/2019

Notary Public

AMY WITTE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20034032589
MY COMMISSION EXPIRES 9/26/2019

County of La Plata

WITNESS my hand and official seal. My commission expires: 9-26-2019

Notary Public

AMY WITTE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20034032589
MY COMMISSION EXPIRES 9/26/2019

Model Calibration Tables

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Model Calibration Table

| Hydrant ID | Location | Pressure Zone | Field Measured Data | | | | Hydraulic Model Calibration | | | |
|------------|---------------------------------------|---------------|---------------------|----------------|-------------|-----------------|-----------------------------|---------------------------------|----------------|-----------------------------------|
| | | | Static (psi) | Residual (psi) | Pitot (psi) | Flow Rate (gpm) | Static (psi) | Static Error ABS (PSI Δ) | Residual (psi) | Residual Error ABS (PSI Δ) |
| BK-1 | Park Street & Buck Highway | Downtown | 75.00 | 55.00 | 50.00 | 1186 | 70.8 | 4.20 | 51.8 | 3.20 |
| CM-1 | Colorado Drive & Highway 160 | Central | 75.00 | 65.00 | 60.00 | 1300 | 77.2 | 2.20 | 61.81 | 3.19 |
| CR-3 | CR 501 Middle of field | Tamarack | 102.50 | 70.00 | 59.00 | 1289 | 99.9 | 2.60 | 68.62 | 1.38 |
| CT-1 | Cactus Drive & Tamarack Drive | Tamarack | 45.00 | 41.00 | 32.50 | 957 | 41.8 | 3.20 | 37.1 | 3.90 |
| CU-1 | Bayfield Yard | Central | 75.00 | 55.00 | 55.00 | 1244 | 69 | 6.00 | 56.3 | 1.30 |
| CV-1 | Clover Drive (Fire Department) | Central | 70.00 | 55.00 | 50.00 | 1186 | 71.3 | 1.30 | 51.48 | 3.52 |
| DK-1 | 450 Dakota Drive | Central | 65.00 | 45.00 | 39.00 | 1048 | 68.4 | 3.40 | 38.72 | 6.28 |
| DR-2 | North Taylor Circle & Dove Ranch Road | Lower Dove | 112.50 | 81.50 | 62.50 | 1327 | 112.1 | 0.40 | 80.25 | 1.25 |
| DR-9 | 641 Dove Ranch Road | Upper Dove | 90.00 | 75.00 | 60.00 | 1300 | 91 | 1.00 | 74.9 | 0.10 |
| GD-2 | Bayfield Mobile Home Park | Central | 60.00 | 52.50 | 48.00 | 1163 | 62.1 | 2.10 | 50.1 | 2.40 |
| LV-3 | 629 Louisiana Drive | Central | 87.50 | 50.00 | 50.00 | 1186 | 89.9 | 2.40 | 48.65 | 1.35 |
| ME-3 | 328 Mesa Avenue | Central | 91.50 | 62.50 | 52.50 | 1216 | 91.5 | 0.00 | 65.5 | 3.00 |
| ML-4 | Mill Street & Buck Highway | Downtown | 77.50 | 52.00 | 48.00 | 1163 | 74.9 | 2.60 | 52.2 | 0.20 |
| MV-6 | 901 Mountain View Drive | Central | 62.50 | 43.00 | 44.00 | 1113 | 59.7 | 2.80 | 47.8 | 4.80 |
| MV-7 | Mountain View Drive & Lakeside Drive | Tamarack | 85.00 | 78.00 | 70.00 | 1404 | 81.7 | 3.30 | 75.78 | 2.22 |
| MW-1 | Meadows Circle (House #278) | Central | 82.50 | 55.00 | 50.00 | 1186 | 80.9 | 1.60 | 56.98 | 1.98 |
| MW-3 | 345 Meadows Circle | Central | 85.00 | 55.00 | 55.00 | 1244 | 82.6 | 2.40 | 54.02 | 0.98 |
| NO-3 | Pine Street & North Street | Downtown | 75.00 | 55.00 | 45.50 | 1132 | 77.8 | 2.80 | 59.5 | 4.50 |
| PW-1 | Shell Station | Central | 60.00 | 55.00 | 50.00 | 1186 | 58 | 2.00 | 57.25 | 2.25 |
| PW-5 | 1764 Highway 160B | Central | 85.00 | 30.00 | 30.00 | 919 | 86.9 | 1.90 | 30.24 | 0.24 |
| PW-9 | Cr.501 and Buck Hwy | Tamarack | 122.50 | 95.00 | 75.00 | 1453 | 126 | 3.50 | 95.15 | 0.15 |
| PW-10 | Bayfield Prk. & Mill St. (Town Hall) | Tamarack | 140.00 | 110.00 | 125.00 | 1876 | 141.9 | 1.90 | 110.75 | 0.75 |
| SO-4 | East Street & South Street | Downtown | 77.50 | 50.00 | 50.00 | 1186 | 80.6 | 3.10 | 53.9 | 3.90 |
| SX-1 | 305 Star Crossing | Central | 57.50 | 48.50 | 45.00 | 1126 | 59.5 | 2.00 | 48.3 | 0.20 |
| WL-3 | 815 Wilmer Drive | Tamarack | 51.00 | 40.50 | 40.00 | 1061 | 48.3 | 2.70 | 37.54 | 2.96 |

| | |
|-----------|---------|
| AVG PSI Δ | 2.46 |
| Avg FT Δ | 5.67336 |
| Max FT Δ | 13.86 |

| | |
|-----------|---------|
| AVG PSI Δ | 2.24 |
| Avg FT Δ | 5.1744 |
| Max FT Δ | 14.5068 |

LAPLAWD Conservation Plan

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June 12, 2014

La Plata Archuleta Water District

Water Management and
Conservation Plan

Harris Water Engineering, Inc.

La Plata Archuleta Water District

2013 Water Management and Conservation Plan

Executive Summary

La Plata Archuleta Water District (District) was established under Title 32 of the Colorado Revised Statutes by decree of the District Court on August 19, 2008 to serve the southeast portion of La Plata County. The District was formed to establish a rural domestic water system within its service area. The voters of the District have approved a 5 mil property tax levy and debt authorization up to \$25 million to assist in paying for the water system.

This Water Management and Conservation Plan (WMCP) will be a guiding document used by the District to develop best management practices for use by the District for the efficient management of its water resources. It will also be used by the District's customers for identifying practical means of conserving water. The WMCP will identify and discuss various options for the management of the District's water resources and for water conservation and select those that are appropriate for the District and its customers.

Developing the WMCP will aid the District and its customers in reducing water bills and developing a conservation ethic. The proposed conservation measures will result in minimizing the amount of water needed to meet demands.

The major goals described in the WMCP are to encourage per home water use (estimated 2.5 people per home) to be 200 gallons per day or less and to have 100% metering of all customers. Numerous potential water management and conservation measures were identified and evaluated for each goal. Many measures were selected to be implemented and have been appropriately prioritized according to their importance relative to the District's needs and the feasibility of implementing them.

The table found on page iii shows the high, medium and low priority measures. The time to implement each measure is also shown.

Once sufficient data of customers use is available it can be compared to data from similar domestic water providers to determine if the elements of the WMCP that have been adopted are successful

Background Data

The District currently encompasses an area that extends roughly from the Animas River east to the Archuleta County line and from the New Mexico border north roughly 22 miles. The towns of Bayfield, Ignacio and the City of Durango are not in the District. Additionally, areas outside of those town/city limits which are considered future service areas for the town/city were excluded from the District at its formation. Figure 1 is a map showing the extents of the District. There are also “Potential Service Areas” north and east (in Archuleta County) of the current District boundaries.

The District currently has a lease for 200 acre-feet (AF) of water from the Pine River Irrigation District (PRID) that operates Vallecito Reservoir, a U.S. Bureau of Reclamation (Reclamation) project on the Los Pinos River, in La Plata County, Colorado and expects to lease additional water from PRID in the future. PRID entered into Contract No. 06-WC-40-710 with Reclamation that provides for the lease of water for domestic purposes such as the District. The District is also currently negotiating with the Colorado Water Conservation Board to purchase up to 2,500 AF of the approximately 10,400 AF of water that the State of Colorado has acquired from Reclamation’s Animas La Plata Project, in La Plata County, Colorado.

The water provided by the District will be used primarily for municipal uses. The District anticipates that its maximum raw water demand could be up to 1,411 AF of water per year while serving up to 3,600 connections (taps) by the year 2030 (assuming 350 gallons per day per tap with an average household size of 2.5 people; per La Plata County planning code). The conservation measures identified and implemented as part of the WMCP are expected to reduce this amount by as much as 40% based on a conservation goal of 200 gallons per day per tap.

Currently, most residents of the District rely on individual or community wells and water hauling for their domestic water supply. In some parts of the District, property owners have no viable well or the quality of the water is such that they have to haul their water. Water conservation measures by agricultural irrigators have also impacted some of these wells. As irrigation practices have changed from flood irrigation to sprinklers, the recharge to many aquifers has decreased resulting in a lowering of the water table and a subsequent loss of production at many domestic water wells.

The District will require customers to disconnect house hold water piping from their wells or cisterns prior to connecting to the District’s facilities to eliminate the possibilities of cross contamination of the District’s water. The Colorado Division of Water Resources has decided that customers of the District have the right to retain their wells and use it for outside uses such as irrigation, so long as it is consistent with their well permit. The District will not monitor these outside uses as part of the WMCP.

Prioritized Measures and Implementation Schedule

| Priorities | Best Management Practices (BMP) | Implementation Date |
|------------------|---|------------------------------------|
| High | Metering (sec. 4.1) | No later than 2014 |
| High (completed) | Conservation Orientated Rate Structure & Tap Fees (sec. 4.2) | Completed 2012 |
| High | Unaccounted Water Monitoring (sec. 4.4) | No later than 2014 |
| High | Conservation Coordinator (sec. 4.5) | Begin immediately |
| High | Public Information & Education (sec. 4.7) | Begin immediately |
| Medium | Residential Water Audits (sec. 4.10) | Implement by 2015 |
| Medium | Water Restriction Policy (sec. 4.6) | Establish and adopt Policy by 2020 |
| Low | Billing System (sec 4.3) | TBD |
| Low | Replacement Programs for High Efficiency Fixtures & Appliances (sec. 4.9) | TBD |
| Low | Recommendations for New Construction (sec. 4.8) | TBD |

Acknowledgments

The La Plata Archuleta Water District Board of Directors thanks all who participated in the 2013 La Plata Archuleta Water District's Water Management and Conservation Plan. This report was prepared in cooperation with the U.S. Bureau of Reclamation, the Colorado Division of Water Resources, and District staff. Harris Water Engineering would like to especially thank Edward Tolen and Board of Directors of the District for their cooperation, patience and assistance in preparation of the Water Management and Conservation Plan.

This plan was partially funded by the U.S. Bureau of Reclamation Water Conservation Field Services Program through Grant Agreement Number R12AP40038. Ruth Swickard acted as the Grants Officer's Technical Representative for the U.S. Bureau of Reclamation. The La Plata Archuleta Water District Master Plan was referenced for estimated demands, design capacities, etc...

The plan was prepared by: Harris Water Engineering, Inc.
954 E. 2nd Avenue, Suite #202
Durango, Colorado 81301
970-259-5322

The La Plata Archuleta Water District welcomes any comments that may improve the utility of this report.

Please forward comments to: La Plata Archuleta Water District
P.O. Box 1377
Ignacio, Colorado 81137
970-563-0320

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Appendices

Appendix A – Figures

- #1 District Service Areas
- #2 Current Land Uses
- #3 Average Monthly Precipitation and Temperature
- #4 Water Sources Locations

Appendix B – Master Plan

- La Plata Archuleta Water District Master Plan November 2009

Appendix C – State Statutes

- C.R.S. 37-60-126 – Water conservation and drought mitigation drought mitigation planning – programs – relationship to state assistance for water facilities – guidelines – water efficiency grant program – repeal
- C.R.S. 37-97-103 – Water Metering Act
- HB 10-1051 – Concerning Additional Information Regarding Covered Entities’ Water Efficiency Plans

Appendix D – Board Policies

- Adoption of the Water Management and Conservation Plan
- Rate Structure Board Policy

Appendix E – Public Meetings Materials

- PowerPoint Presentation Handout (includes agenda and discussion materials)

Abbreviations and Definitions

AF – Acre-Feet
ALP – Animas La Plata Project
Avg – average
AWC – Animas Water Company
Board – La Plata Archuleta Water District Board of Directors
BMP – Best Management Practice
CCR – Consumer Confidence Report
cfs – Cubic Feet per Second
CDPHE – Colorado Department of Public Health and Environment
CDOT – Colorado Department of Transportation
C.R.S. – Colorado Revised Statutes
CWA – Clean Water Act
CWCB – Colorado Water Conservation Board
District – La Plata Archuleta Water District
EA – Environmental Assessment
EIS – Environmental Impact Study
gpd – Gallons per Day
LAPLAWD – La Plata Archuleta Water District
M&I – Municipal and Industrial
Master Plan – La Plata Archuleta Water District Master Plan November 2009
MCL – Maximum Contaminant Level
MGD – Million gallons per day
MWC – Montezuma Water Company
NEPA – National Environmental Protection Agency
OM&R – Operation, Maintenance and Replacement
PAWSD – Pagosa Area Water and Sanitation District
PRID – Pine River Irrigation District
PVC – polyvinyl chloride
Reclamation – United States Bureau of Reclamation
Service Plan – La Plata Archuleta Water District Service Plan September 2007
SMCL – Secondary Maximum Contaminant Level
SWCD – Southwestern Water Conservation District
SUIT – Southern Ute Indian Tribe
T&E Species – Threatened and Endangered Species
US FWS – U.S. Fish and Wild Service
USGS – United States Geological Survey
WIP – Water Information Program
WMCP – Water Management and Conservation Plan
WTP – Water Treatment Plant

1. Description of La Plata Archuleta Water District

1.1 Project History

The District is a special district organized pursuant to Article 1 of Title 32, Colorado Revised Statutes (C.R.S.). The District was formed by election in August of 2008 to finance, construct, operate and maintain a public water system in the southeastern portion of La Plata County and potential areas in southwest Archuleta County. The District boundaries are shown on Figure One in Appendix A. The District will operate the water system to provide essential, reliable and safe potable water and fire protection facilities and services. The water system and its facilities are described in this Water Management and Conservation Plan (WMCP) which will act as a “foundation and road map” for further management and conservation.

The District will strive to be water conservation leaders for the area. The WMCP will assist the District with helping customers understand their water use and teach them how to use their water efficiency. This is done by setting a block rate structure to discourage excessive water use (inside the home or outside irrigation), having a goal of 200 gallons per tap per day for an average household of 2.5 people, and other means necessary as further outlined in the WMCP.

The water system will ultimately utilize two water sources and two treatment plants. The water will be treated to Colorado Department of Public Health and Environment (CDPHE) Drinking Water Standards and delivered through a pipe distribution system to District water users. The system will be pressurized by multiple water storage reservoirs (tanks) and pressure boosting stations (pumps), while pressure reducing valves will be used as necessary. The pipelines will generally be sized to deliver 1,000 gallons per minute at most locations to satisfy fire flow requirements or the estimated 2060 peak demand, whichever is greater. Fire hydrants will be installed throughout the system at locations determined in cooperation with the local fire districts. The distribution pipelines will primarily be 8 inch diameter with diameters up to 18 inches for major trunk lines from the treatment plants. Water system facilities will include treated water storage tanks, water diversions, transmission and distribution lines, valves, connections and meters for homes and businesses, water loading stations and all necessary and incidental facilities customary in any community water distribution system.

The District’s voters passed a 5.0 mil levy in May of 2010 and further authorized the District to incur up to \$25 million in debt in November of 2011. Proceeds from the sale of the bonds will be used to construct the treatment plants and other facilities. Property tax revenues not required for debt service payments on the bonds will be used to fund pipeline construction on a “pay as you go basis” as well as for the administration and operation of the District. As customers connect to the system, service fees (including tap fees) will be used to fund the operation and administration of the District.

In 2011, the District and the Town of Bayfield jointly funded a study to assist in determining the feasibility of designing, constructing, and operating a Joint Water Treatment Plant (WTP) to serve the treated water demands of both entities. This feasibility study evaluated the expansion of the existing Bayfield WTP to serve the needs of both entities as compared to the District constructing its own WTP and the Town expanding their existing plant. The

feasibility study was the basis for the development of an inter-governmental agreement completed in 2012 between the District and Bayfield to expand and jointly utilize the Bayfield treatment plant. The District issued \$5 million in bonds in 2013 to enlarge the Town of Bayfield's water treatment plant, which will provide capacity to serve the District as well as provide additional capacity to the Town of Bayfield.

The District estimates its 2030 demand from the Bayfield WTP to be between 760,000 and 864,000 gallons per day (gpd). Bayfield estimates its increased demand in 2030 to vary between 136,000 and 280,000 gpd. The combined estimated total is about an additional capacity of 1 million gallons per day (MGD).

A cost comparison was made between constructing an enlargement of the existing Bayfield WTP by 1 MGD as compared to a new 1 MGD WTP and indicated a construction cost savings of approximately 50% with the joint WTP. This feasibility study recommended jointly expanding the existing Bayfield WTP. The recommended alternative will allow the District to focus on the construction of the distribution system while both the District and Bayfield to provide water to their customers in a more cost effective manner by reducing capital and operation, maintenance and replacement (OM&R) costs. The feasibility study is available on the LAPLAWD website (www.laplawd.org). Design of the treatment plant expansion began in late 2012 with construction expected to begin in early 2014. Construction should be complete by the end of 2014.

The District broke ground on the Phase 1A Pipeline in November of 2012. This first phase encompassed 740 linear feet of 8 inch diameter DR18 C-900 PVC pipe, 7,000 linear feet of 14 inch diameter DR18 C-905 PVC pipe and 900 linear feet of 12 inch diameter DR18 C-900 PVC pipe. Included in the distance is approximately 1,200 feet of boring and an open cut crossing of the Pine River. The pipeline crossing the river was installed adjacent to the Bayfield Parkway and County Roads 501 and 509. The work is located partially in La Plata County rights-of-way, but mostly within the Town of Bayfield's jurisdiction. This project was substantially completed in August 2013.

The District has also completed Phases 1B and 1C, which consisted of approximately 4.8 miles of 12-inch C-900 PVC pipe along county roads where District customers can be served. Phase 1D is currently under construction with completion expected by mid April 2014. This phase consists of approximately 2.8 miles of 12-inch C900 PVC pipe along County Road 510. The first connection for home service was made in January, 2014.

1.2 District Location and Physical Setting

The District is situated in the southeastern corner of La Plata County, to the south, southeast and east of Durango, Colorado. The eastern boundary of the District is the La Plata and Archuleta county line. The southern boundary is the Colorado state line. The western boundary is generally the Animas River. The northern boundary runs south of Durango's Potential Urbanizing Zone that includes Grandview, and then generally runs parallel to and north of the Highway 160 to the Archuleta County line. The District includes portions of the Southern Ute Indian Tribe's (SUIT) reservation within its boundaries.

The District has identified potential service areas in Archuleta County and plans to eventually extend into Archuleta County to serve properties along the Highway 160 corridor and near Arboles and Navajo Reservoir. The District has also identified potential service areas north of its current boundary and may eventually extend to serve properties along CR 240 or near Vallecito Reservoir. Please see Figure One in Appendix A.

The District is located within the Animas, Florida and Los Pinos (Pine) watersheds with the potential to expand into the Piedra River watershed. Lands within the District consist of hills, ridges, mesas and drainages, with elevations ranging from approximately 6,200 to 7,900 feet. The greatest portion of the land lies between elevations 6,300 and 6,800, with a slight slope to the south. Many rivers, creeks, and irrigation ditches (large and small) transect the area.

The current service area within the District encompasses land that has been agricultural ranches and farmland for over a century. The area has been gradually subdivided over the last three or four decades and is now a mixture of residential subdivisions, agricultural ranch and farm land, and some commercial properties which are mostly concentrated around the Durango/La Plata County Airport and the Gem Village area along Highway 160. Please see Figure 2 in Appendix A for the current land uses within the District boundaries. Although the area has been subdivided, it is still primarily an agricultural community with the subdivisions providing residences for persons working in Durango, Bayfield and Ignacio.

Agricultural uses occur on both private and tribal lands and include irrigated crop land and non-irrigated rangeland. Much of the non-irrigated lower elevation land is dryland with areas of pinion, sagebrush, other desert shrubs, and grasses used for grazing livestock. The higher elevation lands include Douglas fir, ponderosa pine, aspen and juniper oak woodlands. Irrigation is used primarily for grass hay, alfalfa and irrigated pasture, with a small amount of wheat, oats, and barley.

1.3 Enabling Legislation, Contractual Obligations & Organizational Structure

A set of decrees, contracts and agreements govern the District in addition to state statutes. The following is a summary of these documents. Document specifics have been summarized for the purposes of this report; however, full copies of the documents can be found in the Appendices.

The District is a quasi-municipal corporation and a political subdivision of the State of Colorado created pursuant to the Special District Act, Article 1 of Title 32, C.R.S., for the purpose of constructing, acquiring, installing, financing, operating and maintaining a public water system for an area consisting primarily of rural residential users within La Plata County. The District was organized on August 19, 2008, pursuant to an order and decree entered by the District Court in and for La Plata County, Colorado. Organization of the District was preceded by: 1) the adoption of a resolution by the La Plata County Commissioners approving a Service Plan for the formation of the District; and (2) approval of the District's formation by the eligible electors of the proposed District at an election held for that purpose in August 2008 and then by the decree of the District Court.

Following formation of the District in 2008, the District's property tax levy of 5 mills was approved by the voters of the District at an election held on May 4, 2010 (aka Tax Election).

The incurrence of debt in an aggregate principal amount not to exceed \$25,000,000 was approved by the electors of the District at an election held on November 1, 2011 (aka Debt Election).

District operations and administration are controlled by the District's Board of Directors (Board). The rights, powers, privileges, authorities, functions, and duties of the District are established by the Constitution and laws of the State of Colorado in general and the Special District Act in particular. Under the authority granted by such statutes, the District has the power to conduct the following activities:

- Enter into contracts and agreements;
- Sue and be sued;
- Incur indebtedness and issue bonds;
- Refund any bonds of the District without an election;
- Fix rates, tolls, or charges for services, programs, or facilities furnished by the District, and to pledge such revenues for the payment of any indebtedness of the District;
- Adopt and enforce regulations promulgated by the Board;
- Cause the levy and collection of ad valorem property taxes;
- Acquire, dispose of, and encumber real and personal property, and any interest in real property, including leases and easements;
- Have the management, control, and supervision of all the business affairs of the District, and the construction, installation, operation, and maintenance of the District improvements;
- And exercise the power of eminent domain for the condemnation of private property for public use.

Additionally, the District has the authority to provide the planning, design, financing, acquisition, construction, relocation, installation, enter into agreements with other parties, and perform operation/maintenance/replacement of a complete potable water system for domestic, commercial, and other public or private purposes. The water system may include:

- Transmission pipelines
- Distribution pipelines
- Water meters
- Water rights
- Treatment facilities
- Wells
- Fire hydrants
- Pumping facilities
- Storage tanks
- Water loading stations
- Reservoirs
- Lands and easements
- And all necessary, incidental, and appurtenant facilities.

The District is governed by a Board which, pursuant to State law, consists of five members. Directors are elected from director districts to assure that the directors represent a geographical distribution within the Service Area, but in accordance with State law, each of the Directors is elected by all of the voters within the entire District. In order to be eligible for nomination to the Board, prospective Board members must be electors of the District as defined by State law. Directors are elected to staggered four year terms of office at successive biennial elections. Vacancies on the Board are filled by appointment of the remaining directors, the appointee to serve until the next regular election, at which time the vacancy is filled by election for any remaining unexpired portion of the term. The directors hold regular meetings on the second Thursday of each month and, as needed, special meetings. Each director is entitled to one vote on all questions before the Board when a quorum is present. Pursuant to the State constitution, directors are limited to two terms in office unless the District's voters have approved a waiver or modification of this limit. To date the District's voters have not approved such a waiver.

Table 1 – Current Board Members

| Director District | Name and Office | Occupation | Length of Service | Current Term Expires (May) |
|--------------------------|-----------------------------|------------------------------|--------------------------|-----------------------------------|
| 1 | Currently Vacant | | | 2016 |
| 2 | Mark Williams, Treasurer | Ranching | 7 years | 2014 |
| 3 | Gregg Johnson | Agriculture & Transportation | 8 years | 2016 |
| 4 | Dan Lynn III, Vice Chairman | Retired | 8 years | 2014 |
| 5 | Dick Lunceford, Chairman | Farming | 8 years | 2016 |

The Board is responsible for the overall management and administration of the affairs of the District. The District currently employs a General Manager, a customer relations representative, and a construction inspector/system operator. The General Manager, Mr. Edward C. Tolen, is employed pursuant to the terms of an employment contract which is subject to annual appropriation and renewal.

Mr. Tolen was hired as the General Manager in September 2011. He has been involved in water resources for the past 23 years, primarily in the drinking water area. Prior to joining the District, Mr. Tolen worked for the Ute Water Conservancy District in Grand Junction from September 1995 to August 2011. The Ute Water Conservancy District is a domestic water provider that serves the rural and urbanizing areas of the Grand Valley, near Grand Junction, Colorado. Mr. Tolen was the District Engineer for eight years where he was responsible for a department of ten people involved in the surveying, design, construction contracting and inspection of new water mains and other related projects, as well as the District's Geographic Information System. He was also involved in permitting and coordinating projects with federal, state and local governmental entities. Prior to that, Mr. Tolen was a Project Engineer with the Ute Water Conservancy District responsible for the design, construction contracting and inspection of new water infrastructure projects.

Mr. Tolen is a registered Professional Engineer in Colorado, and earned his Bachelor of Science Degree in Civil Engineering from the University of Colorado in 1988 and a Masters of Business Administration from Mesa State College in 2005. He has been a member of American Water Works Association since 1988.

The District has retained Steven C. Harris of Harris Water Engineering, Inc., as its consulting engineer. Mr. Harris has been involved with the District for nearly 20 years, from the beginning when the plans for the District were just being conceived. He has been involved in all of the phases necessary to create the District. Harris Water Engineering prepared the District's Master Plan available on the District web site that is being used as the guide to develop the District facilities.

Mr. Harris is the President of Harris Water Engineering, Inc., which was formed in 1983 to provide general water resources consulting services in southwest Colorado. The firm provides services to a wide variety of governmental clients including: the District, the Southwestern Water Conservation District (SWCD), the Dolores Water Conservancy District, PRID, the San Juan Water Conservancy District, the Pagosa Area Water and Sanitation District (PAWSD), and the Town of Rico. The firm has been providing engineering services for 30 years regarding: domestic and irrigation water supplies, water rights, pipelines, reservoirs, and other water resources facilities and programs.

Mr. Harris has a Bachelor of Science in Civil Engineering and a Bachelor of Arts in Urban Studies from the University of Southern California. He has 41 years of experience in water resources engineering. He is presently on the Colorado Water Resources and Power Development Authority Board of Directors, the legislative appointee to the Southwest Roundtable, member of the Colorado Inter Basin Compact Commission (IBCC), and chair of the Club 20 Water Committee.

Accounting services to the District are provided by FredrickZink & Associates, Durango, Colorado. Legal services are provided by Collins Cockrel & Cole, P.C., Denver, Colorado.

2. Inventory of Water Resources

2.1 Climate

The Western Regional Climate Center maintains two weather stations within the District's boundaries (please see Figure One – District Boundaries). The period of record for temperature and precipitation is from 1948 to present. The precipitation data was used to prepare an average monthly precipitation and temperature graph shown as Figure 3 in Appendix A. The data shows the change in average temperature and precipitation over time has been minimal, however the changes to the extremes (maximum and minimum) of temperature and precipitation are more noticeable.

2.2 Conditional Water Rights

In addition to the stored water in Vallecito Reservoir and Lake Nighthorse, the District holds the following direct flow conditional water rights. Individually, or in combinations, these water rights can serve portions of the District or the entire District. The water rights may be used simultaneously, but cannot exceed a combined diversion of 15 cubic feet per second (cfs).

1. Animas River near Weasilskin Bridge, up to 15 cfs; case number 03CW102
2. Animas River and/or Florida River at Bondad, up to 15 cfs; case number 03CW102
3. Pine River near Pine River Canal, up to 7.5 cfs; case number 03CW119
4. Pine River 2 miles north of Ignacio, up to 7.5 cfs; case number 03CW119
5. Piedra River near Arboles, up to 5 cfs; case number 03CW103
6. The combined diversion at all locations cannot exceed 15 cfs

The District has evaluated alternative methods to provide water to meet the 2060 demand through a set of design parameters that includes: water supply/water availability; partnering opportunities, site locations and layouts; water quality and treatment issues; pumping heads; water costs; permitting; etc. The eight water source alternatives are summarized in the following sections followed by reasons for selection of the two alternatives as the preferred sources. For further detailed information for alternatives, including pros and cons for each, please reference the Master Plan attached in Appendix B; section IV *Alternative Sources of Water*. For a location map of the following water sources, please see Figure 4 in Appendix A.

2.2.1 Water Supply Options

1. Animas River Water Supply

The District holds the following water rights and water supplies that utilize the Animas River in some manner.

Alternative A - The Animas La-Plata Project (ALP) is the most upstream water source alternative the District considered when evaluating all potential water sources. The ALP source consists of utilizing water from Lake Nighthorse and building a treatment plant and storage tank on Reclamation property near Ridges Basin Dam. The District is also in discussion with the City of Durango to construct a joint treatment plant that utilizes Lake Nighthorse water. Due to the location of the treatment plant the Florida

Mesa would be served initially as the pipeline extends to the east.

The following two alternatives would utilize the District's conditional water rights on the Animas River for 15 cfs. There are two alternative diversion sites located along the Animas and Florida Rivers for this conditional water right (Animas River at Weaselskin Bridge, Animas River and/or Florida River at Bondad). By evaluating U.S. Geological Survey (USGS) daily stream flow data for the period of record, it was determined the Animas River has more than adequate flow from the physical and legal perspective to meet the District's 2060 water demands.

Alternative B – A direct diversion on property along the Animas River near Weaselskin Bridge would utilize the District's conditional water of 15 cfs. The water source consists of utilizing the District's water rights to obtain water from the Animas River from a direct river diversion, building a treatment plant and storage tank on private land, and initially serving the Florida Mesa.

Alternative C – The final Animas River alternative would be to utilize the Animas River and/or Florida River at Bondad. This water source consists of utilizing the District's water rights to obtain water from the Animas River and/or the Florida River, from a direct river diversion, building a treatment plant and storage tank on private land, and initially serving the Florida Mesa.

2. Los Pinos River Water Supply

The District holds conditional water rights on the Los Pinos (aka Pine) River of 7.5 cfs. There are two alternative diversion sites for this water right. By evaluating USGS daily stream flow data for the period of record, it was determined the Los Pinos River does not have adequate flow to satisfy the District's water demands. This water right would need to be used in conjunction with another supply to meet the District's water demands.

Alternative D – A joint treatment plant with the town of Bayfield would consist of utilizing water from Vallecito Reservoir, initially purchasing treated water and water storage from the Town of Bayfield, eventually building a joint treatment plant with the Town of Bayfield and extending pipelines from Gem Village south and west and/or south of Bayfield to Allison. This alternative has been implemented as the Los Pinos River water supply.

Alternative E – A group of collection gallery wells near the Pine River would be developed to utilize releases from Vallecito Reservoir, while a treatment plant and storage tank would be built on adjacent lands.

Alternative F – The final Pine River alternative would be to utilize a river diversion, with a treatment plant and storage tank built on private lands. The river diversion would be constructed in the Pine River about 3.5 miles south of the Highway 160 Bridge in Bayfield.

3. Piedra River Water Supply

The District holds a conditional water right on the Piedra River of 5 cfs. There is one diversion site along the Piedra River just upstream from Navajo Reservoir. By evaluating USGS daily stream flow data for the period of record, it was determined from the physical and legal perspective that it would meet the District's water demands, however the entire river would be diverted in dry years.

Alternative G – A direct diversion from the Piedra River, along with construction of a treatment plant and storage tank is the proposed alternative for the Piedra River water right. The river diversion would be constructed in the Piedra River at the Highway 151 Bridge at the north end of Navajo Reservoir near Arboles, in Archuleta County.

2.2.2 Preferred Water Sources

Project planning has indicated that obtaining water from the Animas and Pine River Basins would provide the best long-term secure supply. The Piedra River source will be considered when the water system is extended into Archuleta County. Approximately half of the water supply for the District would be provided from the Animas Basin and half from the Pine River Basin. The distribution system will be integrated so that either source can serve the entire system if necessary.

Although the District holds water rights on both the Animas and the Pine, the best sources of water are the ALP, Alternative A, and Bayfield, Alternative D, using water from Vallecito Reservoir. The District would either construct and operate a treatment plant at Ridges Basin Dam or construct a joint treatment plant with the City of Durango to treat water released through the dam to utilize water from Nighthorse Reservoir. The District will pay to expand the Town of Bayfield's water treatment plant by 1 MGD capacity to treat water released from Vallecito. Factors contributing to the selection of these two alternatives as the preferred water sources are summarized below.

1. Animas River Basin: The best source of water in the Animas River Basin is Lake Nighthorse by purchase from the Animas-La Plata Project (Alternative A). Contributing factors include:

- Water is provided from a large reservoir,
- The water quality is consistent from the reservoir,
- The cost is not finalized but appears to be a onetime purchase cost in the range of \$3,200 to \$3,700 per acre-foot of diversion, plus annual OMR costs,
- Releases from the reservoir are through a pipeline that should provide adequate pressure to operate the treatment plant,
- The land for the treatment plant and water tank are owned by Reclamation not requiring private land,
- The potential for a joint treatment plant with the City of Durango, similar to the arrangement with Bayfield, is possible because Durango will also utilize ALP water and construct a treatment plant to utilize the water,
- The water is at the highest elevation of any Animas River option, requiring the least pumping,
- Source is near the Florida Mesa which will have a large water demand,

- The endangered fish species clearances have already been obtained,
- The least amount of environmental permitting of any Animas River source,

The District will either pursue its own WTP at the base of Ridge's Basin Dam or a joint treatment plant with the City of Durango. An outlet works has already been constructed within the dam's structure. The outlet structure includes a 36 inch diameter steel pipe. City of Durango, SUIT and the Ute Mountain Ute Tribe paid the cost of construction for the outlet works and are members of the ALP Association. The District will make arrangements to use a portion of the outlet works with members of the ALP Association.

The District is in negotiations with Colorado Water Conservation Board (CWCB) to purchase a portion of the approximately 10,500 AF the CWCB Board has obtained. It is expected that the purchase price will be between \$3,200 and \$3,700 per AF. There will be annual O&M charges that are currently approximately \$10 per AF as a base cost plus additional charges for water actually utilized.

2. Pine River Basin: The best source of water in the Pine River Basin is Vallecito Reservoir and a joint treatment plant with Bayfield (Alternative D). Contributing factors include:

- Water is provided from a large reservoir,
- Bayfield will need to enlarge its treatment plant at about the same time the District needs a treatment plant,
- A joint plant saves money in both construction and operation for both entities,
- The District and Bayfield can share trunk pipelines from the treatment plant to service areas east and west of the Town (e.g. Gem Village),
- The District and Bayfield can share diversion facilities from the Pine River to the treatment plant, whether existing diversion facilities are adequate or new facilities are needed,
- PRID water is available for use within the Pine and Piedra River basins,
- Provides revenue to PRID; allowing PRID to offset some costs for irrigations;
- The water is at the highest elevation of any Pine River option, requiring the least pumping,
- The location is ideal for serving within the Pine River basin and the PRID area,
- Bayfield may have a small amount of treatment capacity to lease water prior to the new treatment plant in order for the District to begin to serve taps as soon as pipelines can be installed,
- Least environmental permitting of any Pine River source.

The District has entered into an Intergovernmental Agreement with the Town of Bayfield which provides that the District will pay all costs to expand the Town's WTP by 1 MGD of capacity and the Town will provide treated water to the District for at least twenty years, with the District paying the OM&R costs for that water. Together, water will be utilized from Vallecito Reservoir being delivered by PRID.

Water for District uses would be leased from PRID and diverted from the Pine River into a settling reservoir situated above and adjacent to the Town's treatment plant. The water

then gravity flows into the treatment plant where it undergoes treatment before being pressurized and delivered to District and Bayfield customers.

Currently, the treatment plant has a capacity of 1.5 MGD. The District will need 0.75 MGD to provide service to the District. The existing Bayfield treatment plant will be enlarged to a 2.5 MGD treatment plant (including an additional 0.25 MGD for the Town's needs). This will require a larger settling reservoir, additional treatment packages and additional storage tanks. Bayfield plans to serve Gem Village and surrounding areas. The District proposes to share the distribution line to these service areas, since the District's service area begins at these boundaries. By sharing the pipeline, the District has a means to deliver water outside of Bayfield's service area. The shared pipeline is 14 inches in diameter and constructed of polyvinyl chloride (PVC).

2.3 Water Quality

The Animas and Florida rivers serve as the current drinking water source for the City of Durango while the Pine River serves as the current drinking water sources for the Town of Bayfield and the SUIT. The water quality of the rivers is relatively good and the stream segments where the District diversions could occur meet the Colorado Water Quality Control Commission's Water Quality Standards for drinking water; however many contaminants do exist that require treatment to meet the State's Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs) for drinking water.

The Colorado Division of Wildlife and other agencies and volunteers collect data through the Riverwatch Program. This data is available through the Colorado Data Sharing Network. The data indicates that there are samples collected in the Animas, Florida and Pine Rivers that exceed the MCLs and SMCLs for various contaminants. The Animas has been found to have elevated levels of hardness as CaCO_3 , arsenic, iron, manganese and sulfate. The Florida has been found to have elevated levels of CaCO_3 , iron, and manganese. The Pine has been found to have elevated levels of CaCO_3 , aluminum, arsenic, iron and manganese.

Durango utilizes the Florida River as its primary source, with the Animas providing supplemental water during the summer season. Durango publishes a Consumer Confidence Report (CCR) as required by the CDPHE. The CCR lists the following contaminants found in the raw water, most of which were found in levels far below the MCL and SMCL and do not require treatment: coliform, radium, barium, fluoride, nitrate, turbidity, alkalinity, calcium hardness and total organic carbon. As the levels of these contaminants are below the MCLs and SMCLs, the only water quality parameter that Durango must address through treatment is the fluctuating sediment load and microscopic particulates that are found in all surface water sources. The Durango treatment plant filters the water and provides disinfection.

Bayfield utilizes direct flow water rights from the Pine River with a supplemental supply from Vallecito Reservoir. Bayfield published a CCR as required by CDPHE. The CCR lists the following contaminants found in the raw water, most of which were found in levels far below the MCLs and SMCLs and do not require treatment: barium, chromium, nitrate, nitrite, selenium, thallium, sodium, and total organic carbon. As the levels of these contaminants are

below the MCLs and SMCLs, the only water quality parameter that Bayfield must address through treatment is the fluctuating sediment load and microscopic particulates that are found in all surface water sources. The Bayfield treatment plant filters the water and provides disinfection.

A study conducted in 1988-1989 by the U.S. Department of the Interior, National Irrigation Water Quality Program, found elevated levels of harmful constituents in local area groundwater and surface water. The Pine River and its tributaries were sampled and concentrations of selenium (1 sample), manganese (25 samples) and mercury (1 sample) were found in excess of EPA drinking water regulations and 12 surface water samples contained levels of selenium in excess of EPA aquatic life regulations.

Seasonal fluctuations of sediment loads can provide challenges to surface WTPs. The Animas River has uncontrolled seasonal sediment fluctuations. The Pine and Florida Rivers have less seasonal variability due to on stream reservoirs (Lemon Reservoir on the Florida and Vallecito Reservoir on the Pine), but some tributaries to these rivers, below the reservoirs, do contribute seasonal sediment loads. Surface water from Lake Nighthorse will have reduced sediment loads because the sediment load from the Animas River is minimized by settling in the reservoir prior to release to the District's treatment plant.

2.4 Water Budget

The District's proposed water distribution system will be constructed using best management practices (BMPs) to minimize system losses and increase water use efficiency. All inflows and uses for the system will be measured. This information can be examined on a regular basis in order to properly detect losses and on a monthly basis to assess demands within the system. The water budget is a comparison of water inflows to water outflows and can serve as a tool for determining system operational efficiencies and identifying water demands.

To estimate future water usage within the District, surrounding areas with rural water systems were investigated. Three neighboring systems were identified to have similar customer basis, service area, and water supplies: Montezuma Water Company, Animas Water Company and PAWSD. The District's conservation goal of 200 gallons per tap per day will be compared to the surrounding systems day demands. This will provide the District with a better estimate of realistic demands. Please see Table 2 – Rural Water Systems Daily Demand for these comparisons.

Table 2 – Rural Water Systems Daily Demand

| | Winter Estimate | Spring Estimate | Units |
|-------|-----------------|-----------------|---------------------|
| MWC | (Jan) 135 | (Apr) 184 | gal per tap per day |
| AWC | 131 to 197 | 230 to 361 | gal per tap per day |
| PAWSD | (Jan avg) 242 | (Apr avg) 241 | gal per tap per day |

These comparisons indicate that water usage of 200 gallons per tap per day is achievable but will require additional measures than used by these neighboring water systems.

Montezuma Water Company (MWC) currently consists of about 5,141 service connections, providing service in three counties with over 200 hydrants, and 20 full-time employees. The

treatment plant has a capacity of 4 MGD. MWC serves mostly rural homes with only a few commercial taps (ie, a hotel, a campground and a Public Lands Building). Some customers' usage may include landscaping, supplemental irrigation water and supplemental winter stock water. MWC does not enforce a conservation orientated rate structure, but rather has a base rate (determined by meter size) of \$15.00 for 5/8" meters (\$36.00 for 3/4" meter) with an associated rate of \$3.85 per 1,000 gallons used. MWC supplied the District with the monthly delivery quantities for the month of January 2013 and April 2013. The average daily use per service connection is determined by the monthly quantities divided by days in a month and divided by number of service connections.

Animas Water Company (AWC) provides potable water from groundwater wells to their members in the Animas Valley north of Durango. AWC has been providing water for over 30 years and currently serves 1,106 customers. AWC serves mostly rural homes, with a portion of the homes using the water for irrigation too. AWC also serves the community of Dalton Ranch which consists of single family, estate homes and townhomes. AWC has a monthly service charge per equivalent unit of \$17 with an increasing block rate structure. AWC provided the District with monthly water usage quantities for single family homes, single family homes coupled with irrigation, and Dalton Ranch estimates.

PAWSD encompasses approximately 76 square miles in the San Juan Mountains of southwestern Colorado, and includes within its boundaries the Town of Pagosa Springs and unincorporated areas of Archuleta County. PAWSD has a monthly service charge per equivalent unit of \$23.50 with an increasing block rate structure.

Table 3 - Rate Structure Comparisons

| | Base Rates | Tier 1 (per 1,000 gallons) | Tier 2 (per 1,000 gallons) | Tier 3 (per 1,000 gallons) |
|-------------------------|---|------------------------------------|-------------------------------|-------------------------------|
| MWC (5/8" meter) | \$15.00 | \$3.85 per 1,000 gallons flat rate | | |
| AWC (per user) | \$17.00 | \$2.50 (0 to 20,000) | \$5.00 (20,001 to 30,000) | \$7.50 (over 30,000) |
| PAWSD (per service tap) | \$23.50 (includes first 2,000 gallons used) | \$4.22 (2,001 to 8,000) | \$8.43 (8,001 to 20,000) | \$10.59 (over 20,000) |
| LAPLAWD (per tap) | \$30.00 (includes first 2,000 gallons used) | \$6.00 (2,001 to 5,000) | \$10.00 (5,001 to 8,000) | \$15.00 (over 8,000) |

Table 3 compares the block rate structures for the surrounding areas rural water systems. Based on the Districts conservation goal of 200 gpd per tap a monthly water usage of about 6,000 gallons is expected. Table 4 displays the monthly water bills for each water system based on a set monthly usage to show bill comparisons. From this table, it is easy to see that LAPLAWD's rate structure is the most conservative.

Table 4- Monthly Water Bills

| | <i>Per 30 days, per tap</i> | | |
|---------|-----------------------------|----------|----------|
| | 200 gpd | 350 gpd | 500 gpd |
| MWC | \$38.10 | \$55.43 | \$72.75 |
| AWC | \$32.00 | \$43.25 | \$54.50 |
| PAWSD | \$40.38 | \$61.48 | \$99.41 |
| LAPLAWD | \$46.88 | \$115.50 | \$183.00 |

2.5 Legal, Institutional, & Environmental Considerations

District specific legal, institutional, and environmental factors could potentially affect the water sources and the associated water budget. The two water sources are Vallecito Reservoir through a contract with the PRID and Lake Nighthorse through purchase from the CWCB. A description of the legal, institutional, and environmental considerations associated with these sources is described in this section. Most components of the WMCP (majority of the management and conservation measures) can be implemented without legal or environmental compliance activities.

2.5.1 Legal Considerations of Water Sources

The District has a contract with the PRID for the lease of 200 AF of Pine River Project Water that was entered into on January 24, 2011. Pursuant to the Act of February 25, 1920 (41 Stat. 451) 6,700 AF of water stored in Vallecito Reservoir was deemed “Contract Water” under a contract between Reclamation and PRID (Contract No. 06-WC-40-710). Contract Water may be leased for purposes other than irrigation. The contract provides that “The District Contract authorizes the District (PRID) to lease up to 4,700 AF of Contract Water for municipal and industrial purposes... An initial 1,000 AF of Contract Water for use within the PRID Service Area has undergone compliance with National Environmental Policy Act (NEPA) and the 1920 Act for use in Third Party Contracts...” The 200 AF currently leased from PRID is part of the 1,000 AF that has had NEPA compliance. The PRID Service Area is defined in the contract as the “entire Pine River Basin, the lower Piedra River Basin, and portions of the Florida River Basin east of the Florida River”; water currently leased to the District from PRID will be used within the PRID Service Area. If the District uses PRID water outside of the Service Area or exceeds the initial 1,000 AF that has NEPA compliance, additional NEPA compliance will be necessary. The portion of the 1,000 AF that will be used by the District is expected to be adequate through at least 2030. The current plan is to utilize Lake Nighthorse water (described in this section) to serve areas in the District outside of the PRID Service Area.

PRID is in the process of obtaining a “refill decree” for Vallecito Reservoir to update the original decree from the 1930’s. Administration of water rights in Colorado has undergone numerous changes in the past 80 years including how domestic water is accounted. When the refill decree is completed, it will clear up any potential issues there may be with continued use of domestic water from Vallecito Reservoir.

The District is in the final stages of negotiating a contract with CWCB to purchase 2,500 AF of municipal and industrial (M&I) water in annual increments over a 40 year period

from Reclamation's ALP which includes Lake Nighthorse. CWCB purchased 10,460 AF of Project Water from Reclamation to be used for M&I purposes and is in turn in negotiations to sell 2,500 AF to the District. This water is available on demand from Lake Nighthorse.

2.5.2 Institutional Considerations

The District has entered into an Intergovernmental Agreement with the Town of Bayfield which provides that the District will pay all of the costs to expand the Town's WTP by 1 MGD of capacity and the Town will provide treated water to the District for at least twenty years. The Town's WTP currently has a capacity of 1.5 MGD. The expansion will provide 0.25 MGD for the Town's future use and 0.75 MGD for the treated water needs of the District. The WTP expansion is scheduled to be completed in 2014. The District is also constructing pipelines within the Town of Bayfield that will be used to improve the distribution of water within the Town and to deliver treated water to its distribution system within the District's Service Area.

The District is in the process of initiating negotiations with the City of Durango to fund construction of a new joint WTP using water from ALP. The City has already acquired an allocation of water from ALP. The District has developed preliminary plans to construct its own WTP but it is possible the City and District could work out an arrangement for one WTP and mainline water pipelines that would serve both entities. As with the Town of Bayfield the joint facilities will significantly reduce the construction and operation costs to both entities.

The SUIT has property scattered throughout the District which could utilize water from the District water system. The District and SUIT have had initial discussions for the District to provide water to SUIT land.

2.5.3 Environmental Considerations – Pipeline Environmental Compliance

Each portion of the LAPLAWD construction project may require environmental permitting and/or regulatory agency clearance. Whether a phase of construction requires environmental permitting initially depends upon the land ownership of the lands to be disturbed by the construction activity. The following summarizes the various environmental compliance scenarios that the LAPLAWD construction efforts may (or have) encountered:

1. If construction were to occur on Federal Lands (i.e. Bureau of Land Management, Tribal or US Forest Service)

Any action on Federal lands requires compliance with the NEPA. The level of analysis (Environmental Impact Statement [EIS] vs Environmental Assessment [EA]) is dependent upon the magnitude of potential impact to resources of concern. There are upwards of 15 types of resources of concern that need to be evaluated to determine if construction impacts are 'significant' or not. These resources can include: air quality, surface water, groundwater, soils and geologic resources, land use, flood plains, historic and cultural resources, aquatic and terrestrial biology, threatened and endangered species (and others dependent upon the land owning agency's needs). The

NEPA process requires close coordination with the land owning Federal agency. The NEPA documentation process can involve and require public notice, review and comment analysis. The NEPA process differs by Federal Agency; and the potential agencies LAPLAWD will work with include the Bureau of Land Management, Corps of Engineers, USDA Forest Service, Bureau of Indian Affairs, and Bureau of Reclamation.

The NEPA process requires inter-agency coordination for professional ‘clearances’ on resources of concern being evaluated as part of the EIS or EA process. For instance, the US Fish and Wildlife Service (US FWS) is deemed the overseeing agency to determine project impacts to Federal level species and habitats of concern (threatened and endangered species and their critical habitats [T&E species]). In response, the presiding Federal agency (the land owning agency) requests a Section 7 consultation with US FWS to determine if the NEPA EIS or EA analysis of project impacts to T&E species and their habitats is correct. This same type of inter-agency coordination occurs with other resources as follows; for cultural and historic resources - the Colorado State Historic Preservation Office is consulted; for aquatic and terrestrial biological resources – the Colorado Parks and Wildlife and/or the Colorado Natural Heritage Program is consulted; for farmlands and soils - the Natural Resource Conservation Service is consulted etc. The consulted agencies often provide documentation of their agreement/disagreement with the NEPA EIS or EA analysis. If the project is determined to cause no significant impact, then the project receives a ‘clearance’ from the consulting agency.

The NEPA process assumes all appropriate permits through all other applicable resource agencies would be acquired as part of the process. The potential permits would include:

❖ Federal Level

- Clean Water Act (CWA) – Section 404 compliance (dredge and fill operations in waters of the United States) – issued through the US Army Corps of Engineers
- CWA – Section 401 compliance (Water quality compliance to lands of tribal and federal concern) – issued by the Environmental Protection Agency.

❖ State Level

- CWA – National Pollution Discharge Elimination Permit – for the point of discharge of encountered waters as part of construction – issued through the CDPHE.
- CWA – National Pollution Discharge Elimination Permit – for the point of discharge of stormwater captured and routed as part of construction – issued through the CDPHE.

❖ County and City/Town Level

- Counties and even cities or towns have acquired the powers to enforce their own environmental permitting or compliance procedures. La Plata and Archuleta counties defer to the Federal

and State level permitting process. There are no compliance requirements beyond those overarching regulatory processes. Similarly, the Town of Bayfield and City of Durango have not enlisted any environmental procedures beyond the assumed Federal and State requirements.

2. *If construction were to occur on State Right of Way Lands (i.e. Colorado Department of Transportation)*

The Colorado Department of Transportation (CDOT) requires ‘Utility Corridor Permits’ for construction projects such as the LAPLAWD pipeline segments. The permit requires a comprehensive evaluation of construction project impacts to resources of concern that is synonymous to the NEPA EA process. CDOT has reviewing professionals in-house that review the documentation and provide an analysis of whether or not they agree with project impact findings. The CDOT Utility Corridor Permit requires that all other necessary permits (and inter-agency clearances as previously described) be acquired. These include the Federal level CWA permits where applicable, and the State level CWA permits as well.

3. *If construction were to occur on County Right of Way Lands (i.e. La Plata County)*

Since La Plata County does not require any environmental compliance above and beyond existing Federal and State regulations; the applicable compliance procedures are the same as the Federal and State level procedures previously described.

In summary, the LAPLAWD construction activities may include all or portions of the above environmental compliance procedures. These procedures assure that there would be minimal to no net adverse effect to resources of concern. The permit procedures often require on-site BMPs to control impacts and/or mitigation concurrent with construction to negate adverse effects real-time. It is LAPLAWD’s policy to comply with all environmental compliance procedures to assure no environmental harm occurs as a result of the District’s activities.

3. Water Demands

3.1 Forecasted Demands

The planning of the water system requires estimates and projections of water demands at various times in the future. Various types of water demand estimates are necessary including:

- Planning horizon
- Water accounting units
- Annual and Monthly distribution of water demand
- Facilities sizing criteria

The criteria for each of the various types of water demands are described and evaluated in the following subsections.

3.1.1 Planning Horizon

The criteria for each of the water demands is dependent upon how far into the future to plan which is referred to as the planning horizon.

1. Near term planning horizon of 2030. This date is based on construction commencing in the winter of 2012, with the majority of the system expected to be completed by 2030. During the period from 2012 to 2030, the number of connections each year will be dependent on the speed the pipelines are installed and the connection of homes. Generally, facilities that can be relatively easily increased in size (e.g treatment plant, pumps and water tanks) would be initially sized to meet the 2030 demand.
2. Long term planning horizon of 2060. The 2060 date was chosen to provide a 50-year planning horizon to size facilities that are not easily increased in size such as pipelines. 50 years is a common planning horizon and is often considered reasonable, such as in a recent Colorado Supreme Court decision indicating 50 years is a reasonable time frame to plan for water rights. From 2030 to 2060, the number of connections will largely depend on new growth in the area. New pipeline construction will be extensions from mainlines to new developments. The estimated water demand for the 2060 planning horizon will be used to determine how much raw water to secure and to size facilities that are not easily increased, such as trunk and distribution pipelines.

3.1.2 Water Accounting Units

An estimate of the water demand for each planning horizon is necessary to secure adequate water supply and properly size the facilities. The annual demand is determined based on the estimate of taps and water use per tap. The number of taps will increase over time as the water system is constructed, existing homes connect and new homes are built. There is significant variability (multiple demand scenarios) in estimating the number of taps that will be connected to the District water system at each planning horizon. Currently there are less than 20 tap connections to the water system.

The current La Plata County land use plans were used to develop a range of potential tap connections. How many taps will realistically be developed due to growth demand or changes in the land use plans is not known. The pattern of development within the District is also not known. The plans for the water system attempt to provide the infrastructure to

provide water no matter the amount needed or the development pattern. The demand scenarios were developed using the ArcMap software and La Plata County GIS coverages. The coverages used were the parcel coverage, Florida Mesa Planning District and Bayfield Planning District Land Use Classification. These coverages were used to find the number of existing parcels, and the minimum and maximum number of new parcels that could be expected to develop, as allowed by the planning district land use classifications. For a detailed explanation of the analysis used for the demand scenarios reference Appendix B – Master Plan; section II Water Demand. The various water demand criteria is determined based on a range of taps from 1,800 to 3,600 in 2030 and 4,000 to 10,000 in 2060.

The water usage per tap is also difficult to estimate because it varies based on the characteristics of each water system. Until the District has 5 to 10 years of actual usage records it is not possible to accurately estimate gallons per tap per day. Therefore a range of usage is used to provide a reasonable determination of the total amount of water needed to supply the system. La Plata County currently uses 350 gallons per home (assumed to be a tap) per day for planning purposes; further this is assumed to be at the raw water diversion. PAWSD has very accurate records for the past 14 years and when accounting for water conservation and drought reduction since 2002, indicates 260 gallons per tap per day measured at the treatment plant is reasonable for this area (this value also included some commercial usage and lawn irrigation). The District water system is primarily for domestic usage and not for outside lawns and gardens. For the planning horizon a range of water usage per tap of 200 to 350 gallons per tap per day measured at the raw water sources will be used, with a conservation goal being 200 gallons per tap per day.

3.1.3 Annual and Monthly Distribution of Water Demand

As indicated on Table 5 below, when combining the projected number of taps and the range of usage per tap, the 2030 annual water demand would range between approximately 400 and 1,400 AF. The 2060 annual water demand would range between 900 and 3,900 AF. This is an extremely wide range of potential annual water demand reflecting the difficulty in making estimates for a large, new water system.

Table 5 – Demand Scenarios

| Year | Taps (tap) | | Conservation Demand 200 gpd/tap (AF/YR) | | La Plata County Planning Demand 350 gpd/tap (AF/YR) | |
|------|---------------|--------|---|-------|--|-------|
| | Min | Max | Min | Max | Min | Max |
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2030 | 1,800 | 3,600 | 403 | 807 | 706 | 1,411 |
| 2060 | 4,000 | 10,000 | 896 | 2,240 | 1,568 | 3,921 |

The District is planning on securing a minimum raw water supply of at least 2,750 AF to meet a 2060 demand, with approximately 1,060 AF needed by 2030. Table 6 shows the number of taps that could be served using the reasonable annual demand estimate for the conservation use and the La Plata County use as compared to the projected minimum and maximum taps. This table indicates that the reasonable annual demand, as estimated

herein, is sufficient water to supply the projected number of taps at each usage rate.

Table 6 – Reasonable Annual Demand

| | Reasonable Annual Demand (AF) | Resulting taps Served @ 200 g/tap/d (tap) | Resulting taps Served @ 350 g/tap/d (tap) | Projected Tap Connections (tap) | |
|------|--|--|--|---------------------------------------|--------|
| Year | | | | Min | Max |
| 2012 | 0 | 0 | 0 | 0 | 0 |
| 2030 | 1,060 | 4,732 | 2,704 | 1,800 | 3,600 |
| 2060 | 2,750 | 12,275 | 7,014 | 4,000 | 10,000 |

The District will secure about half of the water from each of the two water sources; however, the ALP option is a onetime only opportunity to obtain water so 2,500 AF, more than half of the 2060 reasonable demand is planned to be acquired from ALP due to future limitations.

The water supply from Vallecito Reservoir is likely to be more flexible and may be able to be increased in the future; therefore, an arrangement to secure water gradually over 50 years might be established to meet actual demands. For example, only approximately 530 AF would be requested from Vallecito by 2030, if half of the supply were secured from each source. Currently, the District has a contract for 200 AF from Vallecito with the potential to obtain more in the future. Please reference section 2.5 for further description of the contract and purchase amounts.

3.1.4 Facilities Sizing Criteria

An estimate of the peak month, peak week and peak day demands are necessary to size the facilities, primarily the treatment plant, storage tanks, pump stations, and pipe distribution system.

The annual water demand will not be evenly distributed each month but is expected to be highest in the summer months and lowest in the winter months. Though the District will attempt to minimize outside water usage, there still may be higher summer demand than winter. Typically the highest summer demand month is June and/or July and is estimated at approximately 1.5 to 2 times the winter demand.

The monthly demand pattern was generated from local, surrounding water systems historic records and is presented below in Table 7. The peak month is typically around 12% of the annual water usage, therefore, in 2030, 127 AF of the annual 1,060 AF (2,700 taps using La Plata County's 350 gpd, see table 2) is delivered in June or July; similarly in 2060, 330 AF of the 2,750 AF (7,000 taps using La Plata County's 350 gpd, see table 2) is delivered in June or July.

Table 7– Monthly Demand Pattern

| | Percent of Demand per Month | AF Used per Month | Average cfs per Month |
|-----------|--------------------------------|----------------------|--------------------------|
| January | 6.5% | 69 | 1.12 |
| February | 6.5% | 69 | 1.24 |
| March | 6.5% | 69 | 1.12 |
| April | 8.0% | 85 | 1.43 |
| May | 9.5% | 101 | 1.64 |
| June | 12.0% | 127 | 2.14 |
| July | 12.0% | 127 | 2.07 |
| August | 10.0% | 106 | 1.72 |
| September | 8.5% | 90 | 1.51 |
| October | 7.5% | 80 | 1.29 |
| November | 6.5% | 69 | 1.16 |
| December | 6.5% | 69 | 1.12 |

The minimum combined initial capacity for the two treatment plants is 1.73 MGD (1,200 gpm or 2.68 cfs). The peak hour demands are met by storage tanks. The peak week demand was estimated based on the following information: average day demand during June is 2.14 cfs; The peak week is approximately 25% greater than the average day during the peak month; and the peak week demand for treatment plant sizing would be 2.14 cfs times 125% which is 2.68 cfs.

The distribution system sizing is also based on providing adequate fire flow. The District has contacted local fire protection districts to determine necessary fire flow and to request cooperation with any other joint issues. The Upper Pine River Fire Protection District, the Los Pinos Fire Protection District and the Durango Fire and Rescue Authority all serve within the District boundaries. The District hopes to have the input of the fire districts, not just for fire flow requirements, but also for fire hydrant placement. Initial conversations indicate that 500 gpm would meet the fire district's needs, with a preferred amount of 1,000 gpm to allow for fire hydrants to be utilized as "fill points". The District will design the distribution system to supply from storage tanks a 1,000 gpm flow at most locations; however there are a few high elevation points in the distribution system where this may be difficult.

3.2 Management Activities

To determine the effectiveness of the District's WMCP, a monitoring program is essential. A monitoring program will assist in identifying measures/practices that are successfully implemented or measures that need additional investigation of effort, as well as further opportunities for water management and conservation.

The District's General Manager has the responsibilities of the WMCP Coordinator and will be charged with initiating measures/practices and monitoring the program. When necessary, District Board and staff will refine issues and goals, add or delete measures/practices, adjust schedules, or refine budgets. The entire plan will be updated every five years.

4. Best Management and Conservation Practices

Candidate management and conservation practices are presented within this section. Please reference Table 10 – Prioritized Measures in Section 5 for further detail on Board approved measures with associated implementation timeframes.

4.0.1 State Statutes

A number of proposed measures are necessary to satisfy Colorado Revised Statutes. While the District may not meet the thresholds of each statute at this time (due to lack of customers served at this time), by being proactive with initial development of the District this will ensure statutes are satisfied in the future.

A large portion of the best management and conservation practices are a requirement of [C.R.S. 37-60-126] which addresses the requirement for covered entities to develop a water conservation plan in order to be eligible for State grant programs and provide moneys to aid water conservation planning. Covered entities are those that deliver 2,000 AF of water per year for municipal purposes. For a complete copy of the State Statute please reference Appendix C.

Colorado State Statute [C.R.S. 37-97-103] *Water Metering Act* is another governing State Statute that is necessary to satisfy. The statute requires that all water providers provide a metered water delivery and billing service. For a complete copy of the State Statute please reference Appendix C.

House Bill 10-1051 requires that water providers' efficiency plans include specific elements and the water provider annually reports to CWCB describing the year's water demands, services, and any planning implementations. For a complete copy of the State Statute please reference Appendix C.

Presented in the following subsections are the proposed management and conservation practices for the District's review. After receiving input from the public on each measure, the District will make final recommendations on which measures to pursue in the upcoming years. Please reference Section 5 – Priorities and Goal Setting for a list of the recommended measures.

4.1 Metering

Metering is fundamental to all water conservation efforts. The meter measures the customers' usage which is then used to bill the customer. Customers who pay for their actual usage typically consume less water. Below the meter options are described along with potential cost estimates and saving estimates.

4.1.1 No Meters

Colorado State Statute [C.R.S. 37-97-103] requires that all public water systems meter customer's water usage.

4.1.2 Basic Meters

The District has the option to choose from a variety of meters on the market today. A basic meter consists of a meter, and a register to quantify usage. Basic meters are visually read and will record actual flow, with flow towards the customer being positive and reverse flow (away from the customer) as negative flow. This makes it possible for customers to tamper with the meter and reduce the reading by turning the meter around so that it thinks any usage is reverse flow. The reported data allows the District to bill customers, based on their monthly usage, while providing customers with direct feedback on their water usage and generate water demand forecasts based on actual usage. In accordance with EPA regulations all meters shall be constructed of lead free materials and be NSF/ANSI 61 certified.

4.1.3 Advanced Meters

Although similar to a basic meter, the advance meter consists of a meter, electronic register and radio module transmitter. The transmitter allows the meter to be read from a handheld device, send to mobile radio receivers or to a fixed network system of radio receivers. The transmitter has an antenna that is typically mounted in the lid of a meter pit. Advanced meters have a variety of options when it comes to field data collection hardware: 1) walk by automatic meter reading; 2) mobile automatic meter reading with up to 72-channels receivable of data as the collector drives by meters; 3) fixed network automatic meter infrastructure which allows for remote read of all meters. In addition to all the basic meter characteristics, advance meters can also provide leak, tamper and reverse flow detection. The tamper and reverse flow detection makes it more difficult for customers to reduce their actual usage.

4.1.4 Smart Meters

Smart meters build off the foundation of basic and advanced meters, while incorporating additional features. In addition to basic meter reading, leak detection, tamper detection, and reverse flow detection, the meter also provides data logging. Smart meters are able to record usage data on a frequency basis down to minutes and can help detect leaks and enhance customer's ability to manage their water use. Smart meters have the same three options for field data collection as previously described. Smart meters typically are used in systems with a combination of automatic meter reading and automatic meter infrastructure.

4.1.5 Applicability/Implementation/Monitoring

The District will install a meter for every customer who purchases a tap. The District will read and maintain the meters on a regular schedule to ensure accuracy. The District will use a combination of automatic meter reading and automatic meter infrastructure. A meter replacement program is recommended to be initiated 10 years after the first meter installation to maintain, calibrate, and replace meters.

4.2 Conservation Orientated Rate Structure and Tap Fees

The District has implemented an increasing block rate structure. The District conducted a five part public input process to develop the rate structure and tap fees. The rate structure will discourage outside water use and is a major component of reaching the conservation goal of 200 gallons per tap per day. The tap fees are based on a onetime capital investment fee that

will be used not only to install a meter, but to recapture the costs for distribution system construction, treatment plant construction, raw water purchases, etc.

4.2.1 Adopted Policy

The District adopted a rate structure and tap fee on March 8, 2012. Please see Appendix D for the Board Policy.

4.2.2 Rate Structure

To develop a rate structure a series of public workshops were held. To determine the water sales charges for potential customers, District staff developed an excel workbook. The workbook provided a comparison of annual OM&R fund costs to potential annual income based on a set number of taps. The workshop allowed participants to input data for a number of customers, minimum monthly charge with associated gallons, and monthly usage costs as usage increases. Multiple iterations were conducted until the group came to a consensus on monthly rates that allowed the District to generate sufficient revenue to provide for the operation and maintenance of the District. The following water rates have been approved by the Board and are presented in Exhibit I of the District's Rules and Regulations.

Table 8 – Water Rates

| | Water Usage (gallons) | | |
|----------------|-----------------------|-------|---------------------------|
| | From | To | |
| Minimum Charge | 0 | 2,000 | \$30.00 |
| | 2,001 | 5,000 | \$6.00 per 1,000 gallons |
| | 5,001 | 8,000 | \$10.00 per 1,000 gallons |
| | 8,001 and greater | | \$15.00 per 1,000 gallons |

4.2.3 Tap Fees

Tap Fees were developed in a similar manner as the conservation orientated rate structure. To determine the tap fee (aka capital investment fee) for potential customers, District staff developed an excel workbook. The workbook displayed multiple data inputs (i.e., mill levy estimate, monthly water surcharges, capital expenditures, sources of District income, etc...) and how each input was dependent upon one another and their relationships with each other. The workshop group evaluated which data inputs were most important to them and conducted multiple iterations. The following tap fees have been approved by the District's Board and are presented in Exhibit I of the District's Rules and Regulations.

Table 9 – Tap Fees

| Meter Size | Fee |
|--|----------|
| 3/4" x 5/8" | \$5,550 |
| 1" | \$13,875 |
| 1-1/2" | \$27,750 |
| 2" | \$44,400 |
| Taps larger than 2" require Board approval | |

4.2.4 Applicability/Implementation/Monitoring

The rate structure has direct impacts on both the customer and District. Customers' fees are determined by the rate structure which provides the District with revenues. The District's most direct way to communicate with its customers is by regular billing service. The rate structure will be evaluated periodically to ensure the District is generating adequate revenues to cover OM&R costs.

4.3 Billing System

A billing system is an integral part of implementing a metering system. The billing system is a database that allows for the collection of meter reads and the automatic development of bills based on the adopted rate structure. The billing system stores the usage records of each individual customer so that a history of their usage can be developed. The billing system will also allow for the categorization of customers which provides for effective planning, implementation and evaluation of conservation measures. Customers will be categorized by single family residential, multi-family residential (with number of units per tap), or commercial water users. This will allow the District to target customers who have the greatest potential to save.

4.3.1 Applicability/Implementation/Monitoring

The District may request the customer to provide a brief description of their current water use at the time of connection to the system. Customer categorization will allow for analysis of long term trends between customer types, establish benchmarks for targeting conservation efforts and a better understanding of what their customers' needs are. The District will know who their customers are and understand what volume of water use constitutes "reasonable" or "typical" consumption for that type of customer. Customer categorization information will be maintained and updated on a regular basis.

4.4 Unaccounted Water Monitoring

Unaccounted water monitoring is the process of auditing a distribution system for unaccounted for water that includes real and apparent losses and evaluating the costs of those losses. Real losses, water treated but not paid for, are physical losses of water due to leaks, firefighting, unauthorized uses or other problems within the system. Apparent losses include meter inaccuracies, and data handling errors.

4.4.1 Applicability/Implementation/Monitoring

A water monitoring plan will be implemented immediately after the first customer connects to the system. The monitoring plan will use fundamental resources to conduct a utility water system audit. Because the District will be an efficient system and the water delivered to it will be metered, a comparison between the water purchased and the water sold can be made on a monthly, relatively real-time basis. Additionally, monitoring of storage tank levels and any sudden changes may be indicators of leaks in the system. The specifics of the plan will be outlined and defined by the District.

4.5 Conservation Coordinator

The general manager of the District will have the responsibilities and duties of the conservation coordinator. This includes responsibilities for planning and implementing water conservation efforts.

4.5.1 Fundamental Responsibilities

The fundamental responsibilities are to develop (or supervise) the District's WMCP; organize and direct implementation of the WMCP; track, monitor, and evaluate water conservation measures and practices.

4.5.2 Applicability/Implementation/Monitoring

The conservation coordinator role is to be in charge of water conservation planning and implementation.

4.6 Water Restriction Policy

The purpose of the policy would be used as a regulatory tool by the District. By adopting a Water Restriction Policy, the District could establish its intent to put its water resources to maximum beneficial use and demonstrate the importance of wise water stewardship in the community. The policy defines penalties for the deliberate waste of water. The Board and District staff would provide hands-on assistance and education on the importance of conservation. The staff would issue warnings and fines. The policy would be implemented in drought conditions to enforce District wide restrictions and protect the water supply.

4.6.1 Applicability/Implementation/Monitoring

The Board has already adopted the conservation orientated rate structure, a policy that intends to put the District in "drought mode" most of the time. The District is already curtailing outside water use, which is the most frequently used responses to drought. The restrictions are applied all the time by use of the rate structure but provisions could be developed to include ramp up conservation during times of prolonged or severe drought. The District will monitor and compare the customers' uses during the winter and summer months. If an extreme increased use is seen in the summer months, the District staff will work with the Board to implement a Water Restriction Policy to target these uses in times of prolonged or severe drought.

4.7 Public Information and Education

The primary elements are to communicate effectively the value of water by delivering consistent and timely messages. Measures to provide customers with timely information on their water consumption and alerts if irregular usage or leakage is detected will be utilized. It is in the District's best interest to raise awareness about conservation and water use. One means of making customers aware of irregular usage or potential leaks is by providing them a note on their individual bill.

One source of education and outreach is the Water Information Program (WIP). WIP is "a public information program sponsored by the water districts, organizations and agencies in the San Juan and Dolores watersheds of Southwestern Colorado. The purpose of the WIP is to provide information to the public and community on water topics and water related issues. (www.waterinfo.org)."

4.7.1 Applicability/Implementation/Monitoring

The District staff will coordinate with WIP to provide water conservation information and education programs. The programs will encompass social marketing, school education, public outreach and education, and other informational efforts aimed at water conservation.

4.8 Recommendations for New Construction (applicable to single-family and multi-family residences)

Water conservation measures can be built into new buildings which in turn can help slow the growth of new water demands. This measure describes water efficiency specifications that can be made voluntary for new residential development within the District's boundaries.

4.8.1 Indoor Efficiency Criteria

The District could request that all new homes joining the water system meet or exceed the EPA WaterSense specifications. The EPA WaterSense new home specifications include the following criteria.

- Leaks – No detectable leaks from any fixtures, appliances or equipment.
- Service Pressure – Maximum of 60 psi, pressure reducing valves may be necessary.
- Hot Water Delivery System – No more than 0.6 gallons of water shall be collected from a hot water fixture before hot water is delivered.
- Toilets – WaterSense labeled 1.28 gallons per flush.
- Bathroom faucets – WaterSense labeled 1.0 gallons per minute aerations.
- Kitchen sink faucets – Per 1992 EPA Standard faucets will have 2.2 gallons per minute maximum flow.
- Showerheads – WaterSense labeled 1.0 gallons per minute shower heads.
- Dishwashers – ENERGY STAR qualified.
- Clothes washers – ENERGY STAR qualified with water factor less than or equal to 6.0 gallons per cycle per cubic foot of capacity.
- Evaporative cooling systems – Maximum of 3.5 gallons per ton-hour of cooling. Blowdown based on time of operation. No once through/single pass systems.
- Water softeners – Self-regenerating water softeners shall meet NSF/ANSI 44 standard.
- Drinking water treatment systems – Must meet applicable NSF/ANSI standards.

4.8.2 Applicability/Implementation/Monitoring

This best practice allows for “built-in” indoor water efficiency in all new construction. New customers will benefit from reduced water bills, the water system benefits from reduced growth in demand, and scarce conservation program funds can be used towards existing customers' needs. The District lacks authority to promulgate these recommendations as rules and regulations.

4.9 Replacement Program for High-efficiency Fixtures and Appliances

The goal of this best practice is to increase installation rate of water efficient fixtures and appliances and remove inefficient and wasteful devices. Various means could be used to assist customers into replacing devices.

4.9.1 Programs

Some programs simply provided the water efficient hardware to the customer. A faucet and shower replacement program could be an example of this type of program. Rebates

and vouchers are another type of program that could encourage customers to replace inefficient devices.

4.9.2 Applicability/Implementation/Monitoring

The replacement program should initially target customers with homes most likely not to have efficient fixtures (homes built prior to 1994). The District's customers whose homes were built prior to 1994 could be targeted initially and this in turn could be useful in curbing demand.

4.10 Residential Water Audits

Residential water audits would identify water savings opportunities and educate customers on their water use. Audits could be offered to all customers but initially high volume customers should be targeted. Water audits could potentially reveal leaks and unintended water usage that customers are not aware of. These audits are an excellent way for the District to develop relationships with the customer beyond metering and billing.

4.10.1 Applicability/Implementation/Monitoring

This best practice is implemented with customers having high demands or experiencing unexpected spikes in usage. Typically customers' uses are compared based on customer class (i.e. similar meter size), if a customer's use is higher than expected for its class then they will be targeted. District staff may recommend to the Board the frequency of implementing water audits and determine which customers to target initially.

5. Priorities and Goal Setting

The management and conservation strategies discussed in the previous section (see section 4 – Best Management and Conservation Practices) will address the following goals of the District. To identify these goals, District staff presented an initial list to the Board. Further examination of the issues allowed the District to formulate goals. The District presented the complete list of issues and goals to the public for revision and input. The final goals were selected as priorities for the District.

5.1 Goal #1: Encourage per home water demand of 200 gpd per tap

Reducing per home (i.e. tap) water demand from La Plata County's current estimate of 350 gpd to 200 gpd will require implementation of water saving measures. All of the BMPs are aimed at meeting the 200 gpd conservation goal. Future annual updates and comprehensive revision of the WMCP will quantitatively determine the District's achievement of this long term goal.

5.2 Goal #2: 100% Metering

As a newly formed public water system, the District's goal is to meter every customer and monitor their uses. As each individual customer purchases a tap a meter pit shall be installed for said customer. The District will meter every tap purchased regardless of customer type.

5.3 Priority of Best Practices

The best practices are separated into three priority categories: high, medium, and low. The high priority best practices will be pursued with diligence to be completed based upon the noted schedules. The medium priority best practices will be scheduled after the high priorities. The low priority best practices will only be pursued after completion of the high and medium priority practices. Table 10 – Prioritized Measures can be found at the end of this section.

Table 10 – Prioritized Measures

| Priority | BMP | Description/Implementation |
|---------------------|--|---|
| High | Metering (sec. 4.1) | The District will install smart meters meeting the criteria of 4.1.4 for every customer who purchases a tap. The District will read and maintain the meters on a regular schedule to ensure accuracy. The District will use automatic meter reading to ensure the accuracy of the reads. A meter replacement program is recommended to be initiated 10 years after the first meter installation to maintain, calibrate, and replace meters. |
| High (completed) | Conservation Orientated Rate Structure & Tap Fees (sec. 4.2) | The Board held a five part public input process to develop rates and fees in the winter of 2011 to 2012. The Board adopted the policy on March 8, 2012; see Appendix D for policy. |
| High | Unaccounted Water Monitoring (sec. 4.4) | The monitoring plan will be the process of auditing the distribution system for unaccounted water including real and apparent losses and the evaluation of costs of these losses. |
| High | Conservation Coordinator (sec. 4.5) | The role of the Conservation Coordinator is the responsibility of the General Manager. Responsibilities include but are not limited to: water conservation planning and implementation. |
| High | Public Information & Education (sec. 4.7) | The District staff will utilize information developed by the Water Information Program in areas concerning water conservation information and education programs. The programs will encompass social marketing, school education, public outreach and education, and other informational efforts aimed at water conservation. The District will conduct public outreach and education as directed by the Board. |
| High | Billing System (sec. 4.3) | The billing system would store customer usage data, create bills based on the adopted rate structure and categorize customers to allow for effective planning, implementation and evaluation of conservation measures. |

| | | |
|--------|---|--|
| Medium | Residential Water Audits (sec. 4.10) | Residential water audits will identify water savings opportunities, educate customers on their water use, identify potential leaks and unintended water usages, and allow for relationships to develop between customers and District staff. The District staff will undergo training to conduct Water Audits based on EPA's watersense program. |
| Medium | Water Restriction Policy (sec. 4.6) | The Water Restriction Policy will be a policy specifically implemented as required by the Resolution Authorizing Joint Action Intergovernmental Agreement with the Town of Bayfield Water Enterprise. Which states "The District agrees to implement water use restrictions if the Town has implemented water use restrictions." The Board has already adopted a conservation orientated rate structure (see Appendix D – Rate Structure Board Policy) that is intended to put the District in "drought mode" most of the time. The District will monitor and compare the customers' uses during the winter and summer months. If an increased use is seen in the summer months, the District staff will work with the Board to implement a Water Restriction Policy to target these uses in times of prolonged or severe drought. |
| Low | Replacement Programs for High Efficiency Fixtures & Appliances (sec. 4.9) | The proposed program would allow for the District to provide rebates to the customer to be used towards purchases of the water efficient hardware. The rebate program goal would be to encourage installation of water efficient fixtures and appliances. At this time, no action will be taken to develop a rebate program. |
| Low | Recommendations for New Construction (applicable to single-family and multi-family residences) (sec. 4.8) | Water conservation measures can be built into new buildings which can help slow growth of new water demands. Regulations could either be mandatory (i.e. enforced by La Plata) or recommendations (i.e. suggestions made by the District to builders). At this time, no action will be taken to develop enforcement rules or recommendations. |

6. Implementation Schedule

The high priority BMPs will be pursued with diligence to be completed based upon the noted schedules. The medium priority measures will be scheduled after the high priority BMPs. The low priority BMPs may be pursued only after completion of the high and mediums BMPs. Table 11 – Implementation Schedule presents this timeline along with the anticipated budget allocations per practice.

Table 11 – Implementation Schedule

| BMP | Implementation Date | Anticipated Budget Allocation |
|---|------------------------------------|--------------------------------------|
| Metering (sec. 4.1) | No later than 2014 | paid by customers' tap fees |
| Conservation Orientated Rate Structure & Tap Fees (sec. 4.2) | Completed 2012 | No additional costs |
| Unaccounted Water Monitoring (sec. 4.4) | No later than 2014 | Currently incurred |
| Conservation Coordinator (sec. 4.5) | Begin immediately | Currently incurred |
| Public Information & Education (sec. 4.7) | Begin immediately | Currently incurred |
| Billing System (sec 4.3) | Begin immediately | Managed by existing staff |
| Residential Water Audits (sec. 4.10) | Implement by 2015 | Conducted by existing staff |
| Water Restriction Policy (sec. 4.6) | Establish and adopt Policy by 2020 | Not applicable |
| Replacement Programs for High Efficiency Fixtures & Appliances (sec. 4.9) | TBD | Not applicable |
| Recommendations for New Construction (sec. 4.8) | TBD | Not applicable |

7. Environmental Review

The selected BMPs differ in the amount of impact they will have on the environment, if any. Most components of the WMCP can be implemented without environmental compliance activities. Moreover, environmental permitting will be addressed for each adopted BMP deemed necessary prior to commencement of such action. Following, in Table 12 – Environmental Review is a summary of general environmental effects expected of various BMPs.

Table 12 – Environmental Review

| BMP | General Effects |
|---|---|
| Metering (sec. 4.1) | Minimal impacts during meter pit installation; permitting requirements during pipeline construction |
| Conservation Orientated Rate Structure & Tap Fees (sec. 4.2) | No Environmental Impact or permitting required. |
| Unaccounted Water Monitoring (sec. 4.4) | No Environmental Impact or permitting required. |
| Conservation Coordinator (sec. 4.5) | No Environmental Impact or permitting required. |
| Public Information & Education (sec. 4.7) | No Environmental Impact or permitting required. |
| Billing System (sec. 4.3) | No Environmental Impact or permitting required. |
| Residential Water Audits (sec. 4.10) | No Environmental Impact or permitting required. |
| Water Restriction Policy (sec. 4.6) | No Environmental Impact or permitting required. |
| Replacement Programs for High Efficiency Fixtures & Appliances (sec. 4.9) | No Environmental Impact or permitting required. |
| Recommendations for New Construction (applicable to single-family and multi-family residences) (sec. 4.8) | No Environmental Impacts and permitting is required by La Plata County. |

8. Adoption, Public Review and Approval of WMCP

7.1 WMCP Adoption

The District held a 30 day public comment period starting May 1, 2014 for the draft WMCP, as well as two public workshops during the development stages of the WMCP. The Board approved the WMCP on June 12, 2014. Appendix E contains the relevant public notices, meeting agendas and distributed materials.

7.1.1 Bureau of Reclamation Approval

The WMCP was submitted to prior to the June 30, 2014 due date. A 30 day comment period was held prior to submittal. Comments were incorporated as appropriate.

7.2 Public Review Process

The District held two public workshops to gather input from potential customers. The workshops were held on October 8, 2013 and November 12, 2013 at the District's office.

7.3 WMCP Review and Update

The conservation coordinator (a responsibility of the General Manager) is the designated point of contact for the WMCP. The General Manager will lead an annual review process of the District's activities as they pertain to the priorities of the WMCP. Results of the annual review process will be provided to the Board of Directors of the District. The annual review will outline the implementation of priorities, budget requirements to finance future year's priorities, and recommendations on additional actions necessary to further the District's water conservation goals.

The District plans to review and update this WMCP every five years. The next update is scheduled for 2019. The update will be guided by the annual reviews and public involvement by means of workshops and a 30 day comment period. The updated WMCP will be prepared by District Staff while working closely with the Board and allowing input by the public.