Bureau of Reclamation WaterSMART Program
Small Scale Grants FY 2024

Powder Mountain Water and Sewer Improvement District

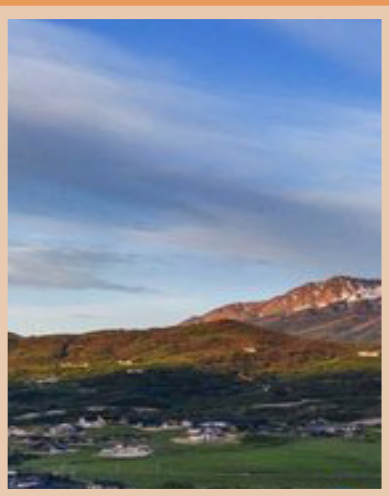
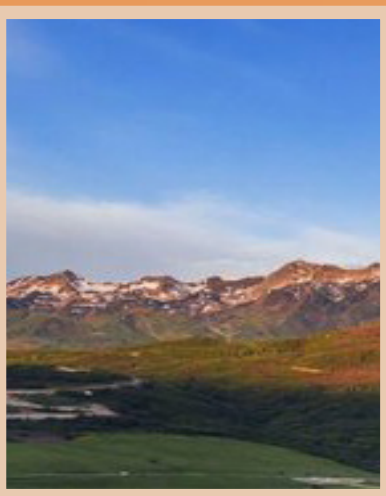
System-Wide Radio Read Meter Project

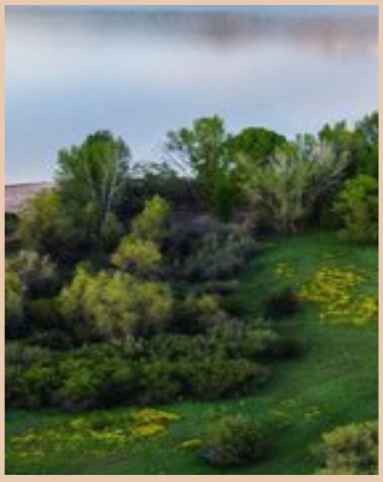
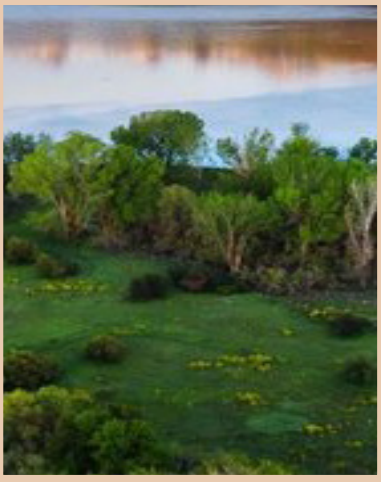
Applicant Contact:

Roy Watts, District Manager
298 24th Steet, Ste. 150
Odgen, UT 84401
801-510-2093
rwatts@pmwsid.org

Project Manager:

Greg Seegmiller, P.E.
466 N. 900 W.
Kaysville, UT 84037
801-547-0393
gseegmiller@jub.com


Technical Proposal and Evaluation Criteria 1
Executive Summary 1
Applicant Information 1
One Paragraph Project Summary 1
Project Timeline 1
Federal Facility 1
Project Location 1
Technical Project Description 2
Evaluation Criteria 3
Evaluation Criterion A – Project Benefits 3
Evaluation Criterion B – Planning Efforts Supporting the Project 8
Evaluation Criterion C – Project Implementation and Results 9
Evaluation Criterion D – Nexus to Reclamation 10
Evaluation Criterion E – Presidential and Department of the Interior Priorities 10
E.1.5.2. Sub-criterion No. E2. Disadvantaged or Underserved Communities 11
Sub-criterion No. E.3. Tribal Benefits 12
Budget Narrative 12
Environmental and Cultural Resources Compliance 12
Required Permits or Approvals 13
Overlap or Duplication of Effort Statement 13
Conflict of Interest Disclosure Statement 13
Uniform Audit Reporting Statement 13
Certification Regarding Lobbying 13
Letters of Support for the Project 13

Attachments

Attachment A: Project Map
Attachment B: Water Master Plan Pages
Attachment C: Water Conservation Plan Pages
Attachment D: Culinary Water System Impact Fee Facility Plan Pages
Attachment E: Letter of Support

Technical Proposal and Evaluation Criteria

Executive Summary

Date: July 6, 2024

Applicant Name: Powder Mountain Water and Sewer Improvement District

City, County, State: 298 24th Street, Ste 150
Ogden, UT 84401-1431
Weber and Cache Counties

Applicant Category: Category A: Water District

Requested Reclamation Funding: $100,000 Total Project Costs: $220,550

One Paragraph Project Summary

Provide the location of the project, work that will be carried out, any partners involved, expected benefits and how those benefits relate to the water management issues you plan to address

The Powder Mountain Water and Sewer Improvement District (PMWSID or District) Radio Read Meter Project will install five electromagnetic insertion meters, horizontal blow heaters, and SCADA capabilities along the main culinary water distribution system. There is currently only two meters along the 48,000 LF of main distribution line. The limited data points have resulted in delayed leak detection because of the difficulty in locating a leak or break. As a result, the system has experienced significant water losses and anticipates a reduction in water loss by 49 percent as a result of the project. This proposed project aims to improve water management and efficiency by enabling real-time leak detection, enhancing water conservation efforts, and providing a data-driven decision-making process. The meters align with PMWSID's Water Conservation Plan, Culinary Water System Impact Fee Facility Plan, and Water Master Plan's priority goals to monitor actual water usage and build a database for future reference.

Project Timeline

State the length of time and estimated completion date for the proposed project including the construction start date (month/year

Assuming an agreement is in place with Reclamation by May 2025, the proposed project will begin as soon as snow melts in May/June 2025 and will continue through October of 2026. The meters, heaters, and SCADA equipment will be installed during the spring, summer, and fall months when the existing meters are not covered in snow. All components of the project will be completed within the two-year allowance.

Federal Facility

Is the proposed project located on a Federal facility?

The project is not located on a Federal facility.

Project Location

Provide detailed information on the proposed project location or project area including a map showing the geographic location

The Powder Mountain Water and Sewer Improvement District is located mostly in Weber County, Utah. There is a small portion located in Cache County. PMWSID sits at 8,900 feet elevation, received over 500 inches of snow annually, sits within the Weber Basin watershed. PMWSID is approximately 8 miles from the town of Eden, 13 miles from Huntsville, and 20 miles from Odgen. The project is located at 111° 45'49"W, 41° 22'18"N. See Attachment A: Project Map.

Technical Project Description

Provide a comprehensive description of the technical aspects of your project, including the scope of work to be accomplished and the approach for the on-the-ground project. This description should provide detailed information about the project materials and equipment including what is currently installed and a description of the upgrade being made. Include in your description the necessary site preparation, removal of materials, motorized and rotating equipment required for installation, site laydown and mobilization areas, and areas impacted by construction.

PMWSID's culinary water distribution system has limited storage, long distribution lines, and meters. There are often undetected leaks, breaks caused by freezing, and long delays in finding and/or repairing problems.

The culinary water system is comprised of four storage tanks and a pipe networking system. There are four main culinary water storage tanks: Timberline Tank (60,000 gallons), Timberline Tank #2 (20,000 gallons), Hidden Lake Tank (415,000 gallons), and Ski Patrol Tank (80,000 gallons). This equals a total of 575,000 gallons of tank storage. With the required amount of water held in the tanks to address fire suppression and emergencies (180,000 gallons) there is 315,000 gallons available for culinary use. The main distribution lines are very long, 48,000 LF, and currently there are only two meters to monitor the entire system. See Figure 1: Project Detail Map.

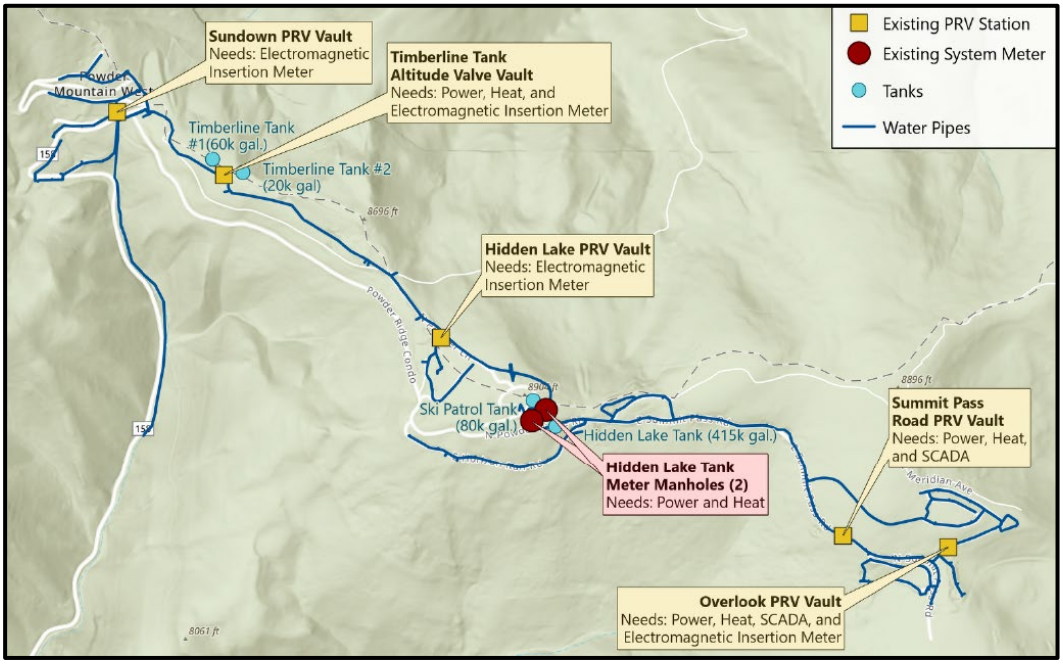


Figure 1: Project Map

Significant Water Loss

PMWSID conducted a Culinary Water System Impact Fee Facility Plan in 2021. The study found that unmetered water losses in 2017 and 2018 were very high, 59 and 73 percent of water lost through leaks, discharges required to mitigate water rights and sheared off HDPE service tap assemblies. See Figure 2: Culinary Water Loss Assessment, 2021. Current assessments have been estimated at a water loss of 49 percent.

Year	System Demand[1] (gallons)	Connections Metered Use (gallons)	Un-Metered Discharges (gallons)	Percent Un-metered
2017	7,749,933	3,163,983	4,585,950	59%
2018	7,708,476	2,097,612	5,610,864	73%

1. Calculated from metered flows at Hidden Lake Well and water storage volume changes.

Figure 2: Culinary Water Loss Assessment, 2021

The proposed System-Wide Radio Meter Project will address the efficiencies and water loss in the culinary system through installation of the following:

- **Electromagnetic Insertion Meters:** These non-intrusive meters will be installed in existing straight pipe, both upstream and downstream of the meter location, to measure water flow rate without interrupting service. They work by inducing a small current in the water, which interacts with the Earth's

magnetic field to generate a voltage proportional to the flow rate. The electromagnetic insertion meter will be installed as a hot tap while the system is pressurized. As each vault and manhole has a different layout, the electromagnetic insertion meter provides the ease of using only one product and the flexibility of adapting to each manhole/vault.

- **Horizontal Heat Blowers:** These will be installed within the PRV vaults to prevent freezing during cold weather conditions. By strategically placing the blowers, they will maintain a consistent temperature within the vault protecting the sensitive equipment from freezing.

- **SCADA System:** A SCADA system will be implemented to provide centralized monitoring and control of the entire culinary water distribution system. The EM meters will transmit data on water flow rates to the SCADA system. Supervisors can monitor this data in real-time, allowing for quick identification and response to leaks or abnormal flow patterns. Additionally, the SCADA system can be programmed to automatically control the operation of the horizontal heat blowers based on temperature readings within the PRV vaults.

The electromagnetic insertion meters, heat blowers, and SCADA capabilities will be installed into six locations along the 48,000 LF main culinary distribution line, as follows: See Attachment A and Figure 1: Project Map.

- ✓ **Sundown PRV Vault** – An electromagnetic insertion meter will be installed into the vault. This vault already has heat and SCADA.
- ✓ **Timberline Tank Altitude Valve Vault** – The project will add power, a horizontal heat blower, SCADA, power, and an electromagnetic insertion meter to this vault.
- ✓ **Hidden Lake PRV Vault** – An electromagnetic insertion meter will be installed into the vault. This vault already has heat and SCADA.
- ✓ **Hidden Lake Tank Meter Manholes**– The project will install heat and power to these two manholes.
- ✓ **Summit Pass Road PRV Vault** – This vault already has an electromagnetic insertion meter. The project will install a horizontal blow heater, power, and SCADA.
- ✓ **Overlook PRV Vault** – The project will install an electromagnetic insertion meter, power, a horizontal blow heater, and SCADA to this vault.

Evaluation Criteria

Evaluation Criterion A – Project Benefits

Benefits to the Category A Applicant's Water Delivery System*: Describe the expected benefits to the Category A applicant's water delivery system. Address the following:*
Clearly explain the anticipated water management benefits to the Category A applicant's water supply delivery system and water customers.

This proposed project aims to improve water management and efficiency by enabling real-time leak detection, enhancing water conservation efforts, and providing for a data driven decision-making process providing the following benefits:

Real-Time Leak Detection

- Real-time data from meters can pinpoint the exact location of leaks within the system along the more than 48,000 LF of waterline, saving time and resources during repairs. Frozen pipes and deep snowpack are some of the issues that have occurred. See Figure 3: Exploded Pipe Due to Freezing and Figure 4: Digging to Find a Leak. Early detection of leaks through real-time data

minimizes water loss by an estimated 49 percent, reducing time and effort wasted on finding the source.

- In addition to pressure and flow, SCADA can be integrated with advanced sensors that detect specific water quality parameters and other inefficiencies in the water usage. PMWSID implements a stringent rule that does not allow outdoor watering use.
- SCADA sensors can provide real-time alerts for changes in water quality that might indicate lead contamination, such as increased levels of acidity or corrosion.

Figure 3: Exploded Pipe Due to Freezing

Enhancing Water Conservation Efforts

- Meters directly contribute to water conservation by making individual water use visible.
- When people see how much water they're using, they're more likely to adopt water-saving practices such as planting native landscaping and using less water.
- SCADA complements this by providing a broader picture of water use across the entire system and can pinpoint zones with consistently high pressure, allowing for adjustments to reduce unnecessary water loss.
- Real-time data on pressure and flow rates helps identify areas of waste and opportunities for system optimization.
- PMWSID's Conservation Plan includes actionable items that help preserve this precious resource for the environment and future generations. PMWSID's conservation goal is to reduce their water usage by ten percent over the next ten years.

Figure 4:Digging to Find a Leak

Data Driven Decision-Making Process

- Combined data from meters and sensors provides a holistic view of the system, enabling informed decisions on infrastructure maintenance and upgrades.
- SCADA data can be analyzed to understand consumption patterns, identify areas for targeted conservation efforts, and minimize future water losses.

✓ Understanding water needs and efficient use patterns provides transparency for both water providers and consumers, fostering a sense of accountability for water use. PMWSID implements a modified rate structured system.

Explain the significance of the anticipated water management benefits for the Category A applicant's water delivery system and customers. Consider:

- *Are customers not currently getting their full water right at certain times of year?*

Because the project is on the culinary water distribution system, PMWSID ensures that the customers have a reliable culinary water supply. PMWSID understands the responsibility they hold as the first water users to the region and has taken steps to ensure their system is efficient to benefit all users. PMWSID has extremely stringent water use requirements as part of their Water Conservation Plan. The Plan outlines the following efforts:

✓ No outdoor watering allowed.
✓ Landscape is limited to native plants only that require minimal water.
✓ Requiring low-flow fixtures in new construction.

- ✓ Active Water Education Program.
- ✓ Meter replacement and leak detection projects.
- ✓ Modified rate structured system.

- *Does this project have the potential to prevent lawsuits or water calls?*

Because the PMWSID sits at the top of the mountain, they are the first user of the limited water resources. The springs, wells, and snowpacks supply the water to the District, then water to the lower elevation communities. There has been some contention in the region as some secondary users fear that poorly managed water will result in not receiving their water. The proposed project is a step in ensuring a strong future for all water users. PMWSID hold exchange water rights in Pineview Reservoir through Weber Basin Water Conservancy District. Through more efficient water management, the likelihood of PMWSID pulling water from Pineview Reservoir drops significantly. PMWSID realizes that by focusing on conservation and efficiency, they will have a critical impact on the reliability of water for others and will continue to take measures to work collaboratively with Powder Mountain Ski Resort and neighboring communities to ensure that all receive their water.

- *What are the consequences of not making the improvement?*

Unaccounted for Water Loss: PMWSID can't accurately measure total water production and consumption without metering. The system currently experiences up to 49 percent losses. The system has only two meters for the 48,000 LF of pipe, making it extremely difficult and time consuming to identify leaks and breaks in the system. This precious resource, especially during Utah's dry periods with reduced snowpack, is simply wasted.

Inefficient Allocation: Blind allocation of water resources can lead to inequitable distribution, especially when PMWSID is the first user of the resource. Without data on usage patterns, some areas might receive more water than necessary, while others experience shortages.

Delayed Emergency Response: Leaks and breaks can go undetected for extended periods without real-time monitoring. Extreme winter weather, which is the peak season for usage, and the time it takes to dig down below steep snowpack contribute to delays repairs, leading to further water loss, infrastructure damage, and potential contamination risks.

Increased Costs: Unidentified leaks can significantly increase water production costs for PMWSID caused by delay response times, and massive water losses. Additionally, delayed repairs due to slow leak detection can result in higher repair costs down the line.

- *Are customer water restrictions currently required?*

No. Culinary water customers are not restricted in their indoor water usage.

***Broader Benefits**: Describe the broader benefits that are expected to occur as a result of the project. Consider:*

- *Will the proposed project increase collaboration and information sharing among water managers in the region? Please explain.*

The Powder Mountain Water & Sewer Improvement District (PMWSID) in Utah, recognizing the state's arid climate, is taking a crucial step towards water security with a new metering and SCADA system for its culinary water distribution system. While the project may seem localized, it represents a significant investment in a more sustainable water future for the entire district. Here's how PMWSID's metering and SCADA system will ensure responsible water management:

- ✓ **Enhanced Data-Driven Decisions:** The SCADA system will collect real-time data on water usage throughout the distribution network. This data empowers PMWSID to identify leaks,

pinpoint areas of high consumption, and make informed decisions about water allocation and infrastructure improvements.

- ✓ **Targeted Conservation Efforts:** With precise meter data, PMWSID can identify areas where water conservation measures are most effective. This allows for targeted conservation campaigns, leak detection initiatives, and potential adjustments to water pressure in specific areas, leading to reduced overall water use.
- ✓ **Improved System Efficiency:** SCADA provides real-time monitoring of the entire distribution system. This allows PMWSID to identify operational inefficiencies, optimize pumping schedules, and address pressure fluctuations quickly. With delayed response times due to deep snowpack and travel times, real-time monitoring will impact efficiency greatly.
- ✓ **Transparency and Public Engagement:** The ability to access water usage data can empower residents and businesses within the PMWSID to make informed choices about their water consumption. Public awareness campaigns can be tailored based on specific usage patterns, leading to a culture of responsible water use within the community.
- ✓ **Planning for Growth:** As Powder Mountain continues to develop, the SCADA system will provide PMWSID with the tools to manage water demands proactively. The district can ensure water security for a growing community by understanding current usage patterns and anticipating future needs.

This investment in metering and SCADA technology demonstrates PMWSID's commitment to responsible water management and paves the way for a sustainable water future for Powder Mountain.

- *Is the project in an area that is experiencing, or recently experienced, drought or water scarcity? Will the project help address drought conditions at the sub-basin or basin scale? Please explain.*

The U.S. Drought Monitor, https://droughtmonitor.unl.edu/, shows that as recently as since 2021, Weber and Cache Counties experienced extreme drought conditions. See Figure 5: Recent Extreme Drought in Project Area.

- Heat.gov National Integrated Heat Health Information System (NIHHIS) calculated the historic number of days the project area experienced extreme heat. Weber County had four days per year in the entire 1976-2005 range and is projected to experience 32 days **per year** in 2050. That equates to less than two extreme heat days per year in the 1976-2005 range, with an estimated annual increase of 229 percent by 2050! See Figure 6: Temperature Projection for Extreme Heat 2050.

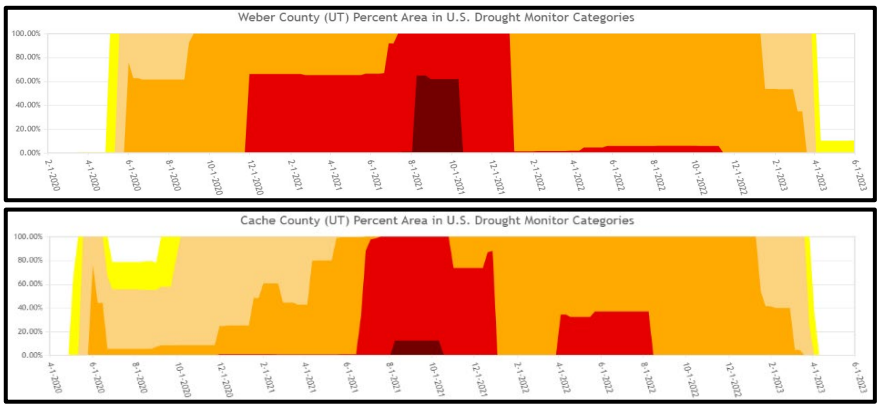


Figure 5: Recent Extreme Drought in Project Area

- The EPA's Environmental Justice Screening and Mapping Tool, shows that census tract 0100 falls within the 90-95th percentile for wildfire risk. See Figure 7: EPA Environmental Justice Screening Tool-Wildfires.
- The FEMA National Risk Index ranks census tract 210102 as Very High, 99.3, for the risk of wildfires. See Figure 8: FEMA National Risk Index for Wildfires.

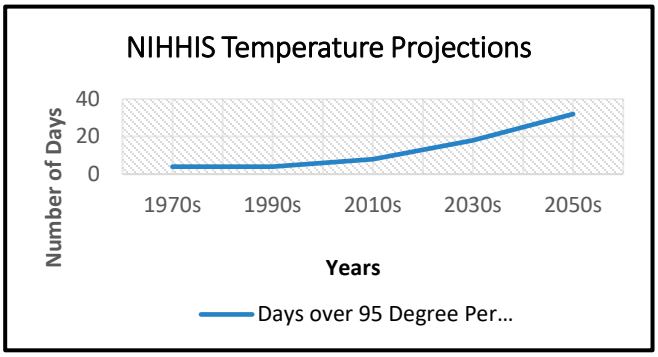


Figure 6: Temperature Projections for Extreme Heat 2050

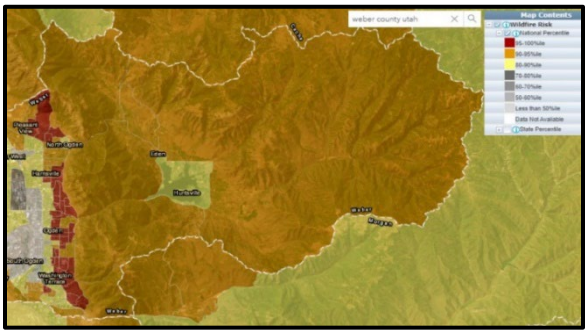


Figure 5: EPA Environmental Justice Screening Tool-

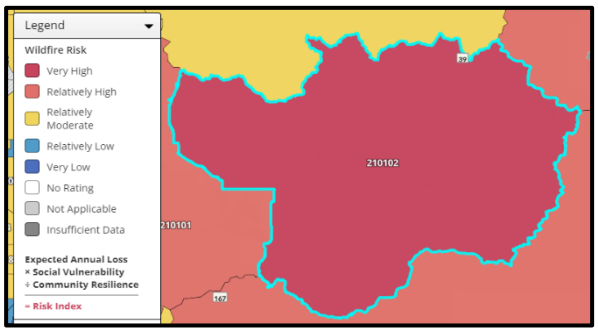


Figure 6: FEMA national Risk Index for Wildfires

- ***Will the project benefit species (e.g., federally threatened, or** endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please explain.*

The project includes a closed culinary water system. The impact to wildlife species is not a direct impact, only benefits are through regional improvements to water management. These improved efficiencies impact wildlife and habitats through more water remaining in Pineview Reservoir.

- *Will the proposed project positively impacts/benefit various sectors and economies within the applicable geographic area (e.g., impacts to agriculture, environment, recreation, and tourism)? Please explain.*

- An efficient water distribution system will benefit the environmental and economic health of the area. The project will specifically impact the following sectors:

Economic Impacts

PMWSID service area includes the Powder Mountain Ski Resort, the largest ski resort in North America. With nearly 8,500 acres of skiable terrain, the resort sees an annual snowfall of over 500 inches. And in 2023, Powder Mountain Ski Resort brought in $4.7 billion in revenue.

Tourism Impacts

The State of Utah's Travel and Tourism report, 2023 shows how large the impact tourism has in the state and the region through:

  - Utah skier days was up 21.8 percent (2021-2022)
  - Hotel accommodation tax revenue was up 15.6 percent in Weber County (2021-2022)
  - Hospitality-related employment was up 44 percent (2022-2023)
  - Travel and tourism (direct and indirect) employment was up 17 percent (2021-2022)

Environmental Sustainability

Powder Mountain Ski Resort, like PMWSID, has taken data-driven measures to protect the limited water in the West. The resort retains 80 percent of its Weber Basin acreage as open space, employs a full-time Ecosystem Specialist, has minimal grooming to the land, has planted over 5,000 trees, and put over 1,400 acres into a conservation easement.

- *Will the project complement work being done in coordination with NRCS in the area(e.g., the area with a direct connection to the districts water supply)? Please explain.*

  The proposed project location is not directly connected to an NRCS area.

Evaluation Criterion B – Planning Efforts Supporting the Project

Plan Description and Objectives: *Is your project supported by a specific planning document or effort? If so, describe the existing plan. When was the plan developed? What is the purpose and objective of the plan?*

PMWSID has focused on the importance of an efficient water system for many years. Their planning efforts outline the need for the ability for real-time monitoring and response time through the following planning documents:

- ✓ PMWSID's Master Plan, 2019 evaluated the existing culinary system's source capacity and storage capacity. PMWSID created five recommendations based on the results of this study. The proposed project supports recommendation #1 of "monitor actual water usage and build a database for future reference" through the efficient management of the distribution system and the addition of SCADA to build the database. See Attachment B: Water Master Plan Pages.
- ✓ The District's Water Conservation Plan, 2017 identifies "Meter replacement and leak detection" as a primary required effort. See Attachment C: Water Conservation Plan Pages.
- ✓ The District's Culinary Water System Impact Fee Facility Plan, 2021 outlines the need for a "District wide radio read meter system". See Attachment D: Culinary Water System Impact Fee Facility Plan Pages.

Plan Development: *Who developed the planning effort? What is the geographic scope of the plan?*

PMWSID collaborated with Talisman Civil Consultants to develop the Water Master Plan, Gibson Engineering to develop the Culinary Water System Impact Fee Facility Plan, and CRS Engineering to develop the Water Conservation Plan. All planning efforts have also included collaboration with Weber and Cache Counties and with Weber Basin Water Conservancy District. The geographic scope of the plan is the entire existing PMWSID service area. See Attachment A: Project Map.

Support for the Project: *Describe to what extend the proposed project is supported by the identified plan. Consider:*

- *Is the project identified specifically by name and location in the planning effort?*

  All the planning documents evaluate the existing conditions, sources, storage capacity, growth, and insufficient pressure zones. The Plans aim to ensure that the system will have adequate capacity to meet peak instantaneous and peak day demands, while considering fire flow requirements and sustainability. Metering and SCADA projects are focal points of all the Plans. The makeup of the Plans does not include capital improvement project lists.

- *Is this type of project identified in the planning effort? Explain whether the proposed project implement a goal, objective, or address a need or problem identified in the existing planning effort?*

  The recommendations that were outlined as part of the Water Master Plan, the Water Conservation Plan and the Culinary Water System Impact Fee Facility Plan all specify types of projects with specific outcomes. The proposed project is the type of project that will result in fulfilling the highest priority action of monitoring water usage and building a database for management.

- *Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to other potential projects/measures.*

  The three Plans that the proposed project aligns with all had similar priorities to provide adequate capacity to meet peak instantaneous demands as well as peak day demands, while considering fire flow requirements and sustainability.

Evaluation Criterion C – Project Implementation and Results

- *Describe the implementation plan for the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.*

Once an agreement is in place with Reclamation and a Categorical Exclusion has been completed, PMWSID will install the blow heaters, meters, and SCADA at the six locations along the main water distribution line. It is unlikely that any work will be completed between November and March due to extreme winter weather on the mountain. The project will be completed within the two-year allotted timeframe.

Milestone/Task	Start and End Schedule
Sign WaterSMART contracts	March 2025 - May 2025
Categorical Exclusion prepared and approved by Reclamation	April 2025 - June 2025
Materials procurement	April 2025 – July 2025
Meters, Heaters, and SCADA installation first year Meters, Heaters, and SCADA installation second year	June 2025 – October 2025 April 2026 – October 2026
Final report and project close-out	November 2026 – January 2027

- *Describe any permits and agency approvals that will be required along with the process and timeframe for obtaining such permits or approvals.*

No additional permits or approvals will be required to proceed with the project. All installation of meters, heaters, and SCADA equipment will take place within the existing pipe and vaults. The impacts will be minimal with limited ground disturbance within the existing rights-of-way.

- *Identify and describe any engineering or design work performed specifically in support of the proposed project. What level of engineering design is the project currently?*

The proposed project does not require additional design work. The project includes installation of equipment within existing vaults. The project will only require utilizing standard drawings and specifications previously developed. PMWSID staff will be used to complete the implementation work.

- *Does the applicant have access to the land or water source where the project is located? Has the applicant obtained any easements that are required for the project?*

PMWSID owns the rights-of-way for the locations of the proposed project. PMWSID will work with the community to minimize impacts from project installation.

- *Identify whether the applicant has contacted the local Reclamation office to discuss the potential environmental and cultural resource compliance requirements for the project and the associated costs. Has a line item been included in the budget for costs associated with compliance?*

Environmental costs associated with the proposed project are included in the budget and are calculated based on previous metering projects of similar size. The local Reclamation office has not been contacted to discuss the project, but it is anticipated, based on previously completed projects of similar size and scope, that the proposed project will be cleared under a categorical exclusion environmental document. The project will take place within existing rights-of-way and pre-disturbed areas.

Evaluation Criterion D – Nexus to Reclamation

- *Is the proposed project connected to a Reclamation project or activity? If so, how? Please consider the following:*

The proposed project has a connection to the Reclamation project, Pineview Reservoir. PMWSID holds exchange water rights through Weber Basin Water Conservancy District in Pineview as shown in Figure 9: Exchange Water Rights.

Exchange Water Rights		
Exchange Application	**Base Rights**	**Acre-Feet**
E467	35-6124	4
E1273	35-6712	30
E4803	35-12099	100
	Total	**134**

- *Does the applicant have a water service, repayment, or operations and maintenance(O&M) contract with Reclamation?*

No. PMWSID has no water service, repayment, or operations and maintenance contract with Reclamation.

- *If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means?*

Per a water rights settlement agreement approved by the State Engineer, the District must discharge water from the Hidden Lake Well to the Bear River Drainage to mitigate impacts related to the exchange of Pineview Reservoir water rights to the District's Hidden Lake Well. Mitigation typically occurs between June 15th and October 15th as the Bear River Water Commissioner requested.

- *Will the proposed work benefit a Reclamation Project area or activity?*

The project will benefit the Pineview Reclamation Project by better managing their water. Improved monitoring of their water use will reduce the likelihood that PMWSID will need to pull water from Pineview Reservoir in the future.

Evaluation Criterion E – Presidential and Department of the Interior Priorities

E.1.5.1. Sub-criterion No. E1. Climate Change

Points will be awarded based on the extent the project will reduce climate pollution; increase resilience to the impacts of climate change; protect public health; and conserve our lands, waters, oceans, and biodiversity. Address the following as relevant to your project. Please describe how the project will address climate change, including:

- *Please provide specific details and examples on how the project will address the impacts of climate change and help combat the climate crisis.*

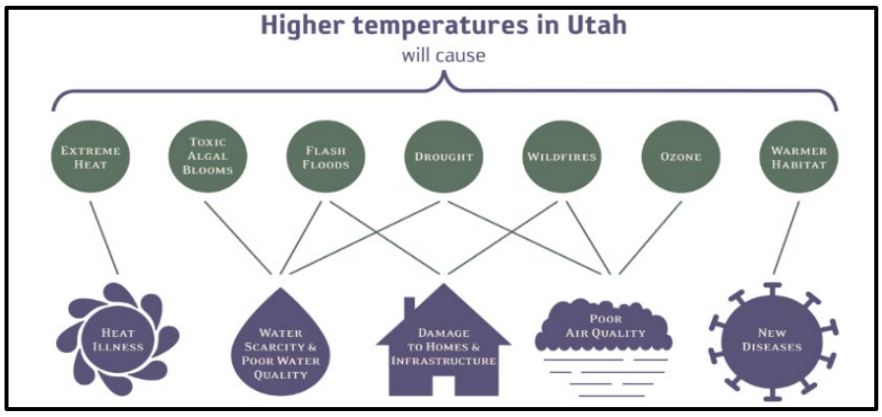


Figure 10:Higher Temperatures in Utah

In March 2020, the Division of Water Resources developed the "Climate Change, Water Resources, and Potential Adaptation Strategies in Utah." https://nhmu.utah.edu/climate-of-hope/climate-change-utah. Page 3 of this report under the title "Historical Temperature Change" indicated that the average temperature in the western U.S. and Utah increased by about 2.5°F over the last century. There has also been a rise in winter temperature (January) of about 1°F in the recent decade. This data does not

include the 2021 and 2022 years, which were noted to be the hottest years on record in the summer and winter months. Over the last 50 years, Utah temperatures have risen at about twice the global average. A few degrees increase may not sound like much, but a hotter climate in our region has many ripple effects. We are already experiencing trends of increasing drought, wildfires, flash floods, and extreme heat waves. Often, these ripples intersect and reinforce each other. Their impacts on our communities and our health can really add up.

Utah winters used to be longer; the average time between the first freeze in the fall and the last freeze in the spring is about 37 days shorter today than in the 1930s. Winter temperatures are warmer too, and shorter. Warmer winters are causing more of Utah's precipitation to fall as rain rather than snow and decreasing our average mountain snowpack. The project area receives an astonishing 500 inches of snow annually. A warmer climate is also causing a cascade of changes that worsen air and water quality, damage homes and infrastructure, and create favorable conditions for new diseases. Figure 10: Higher Temperatures in Utah show some of the health challenges caused by Utah's changing climate. Higher temperatures make the environmental health threats we face more frequent and intense. Some threats, like wildfires and flash floods, are dangerous to the people directly in their paths and have secondary impacts on broader community health, like poor air and water quality.

- *Does this proposed project strengthen water supply sustainability to increase resilience to climate change? Does the proposed project contribute to climate change resiliency in other ways not described above?*

Implementation of the proposed project will result in improved water management and efficiency. As extreme drought and limited water resources continue, water management and conservation practices are even more critical. The project will help an efficient system with real-time data reporting that will result in immediate responses to emergencies and better long term water management planning.

E.1.5.2. Sub-criterion No. E2. Disadvantaged or Underserved Communities

Will the proposed project serve or benefit a disadvantaged or historically underserved community? If applicable, describe how the project benefits those disadvantaged or underserved communities identified using the tool. For example, does the project increase reliability of water supplies, improve water quality, provide economic growth opportunities, improve or expand public access to natural areas or recreation, or provide other benefits in a disadvantaged or underserved community?

According to the CEJST, the census tract within the project area not designated as Historically Disadvantaged. See Figure 11: CEJST Census Tract 0102.

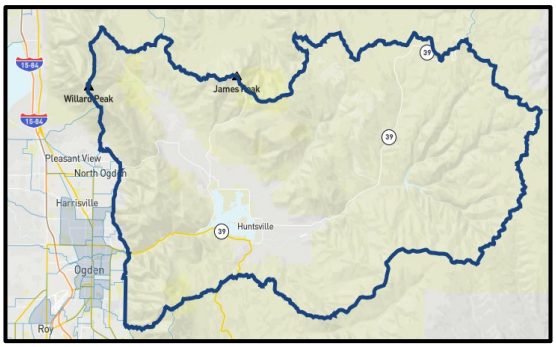


Figure 11: CEJST Census Tract 0102

But it does fall within the 90th percentile threshold for the following disadvantages:

- The expected population loss rate is due to fatalities and injuries resulting from natural hazards each year.
- Abandoned mine land.

And is near the 90th percentile threshold for the following disadvantages:

- Projected flood risk to properties from floods, tides, rain, riverine and storm surges within 30 years
- Projected wildfire risk to properties from fuels, weather, humans, and fire movement in 30 years.

It is important to note that PMWSID holds exchange water rights in Pineview Reservoir, through Weber Basin Water Conservancy District, which serves over 700,000 designated Historically Disadvantaged residents within their service area. Impacts to the PMWSID water supply impact the reliability of water

to these disadvantaged communities. The proposed project will help Weber Basin Water Conservancy District and PMWSID water users understand their water use and is anticipated to improve water management and efficiency. Any water conserved due to enabling real-time leak detection, enhancing water conservation efforts, and providing for a data-driven decision-making process, will reduce the likelihood of PMWSID pulling water from Pineview Reservoir and impacting the disadvantaged communities in the area.

Sub-criterion No. E.3. Tribal Benefits

will be awarded based on the extent to which the project will honor the Federal government's commitments to Tribal Nations.

- *Does the proposed project directly serve and/or benefit a Tribe? Will the project improve water management for a Tribe? Does the proposed project support Tribal resilience to climate change and drought impacts or provide other Tribal benefits such as improved public health and safety by addressing water quality, new water supplies, or economic growth opportunities? Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?*

The project does not directly serve and/or benefit a Tribe. The project does not support Tribal resilience to climate change, drought impacts, or other benefits. The proposed project does not support Reclamation's Tribal trust responsibilities or other activities with a Tribe.

Budget Narrative

Table 1 - Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount	Funding Status
Non-Federal Entities		
PMWSID	$120,550	Planned for FY2025 Budget
Requested Reclamation Funding	$100,000	
Total Project Cost	**$220,550**	

See Attached BOR Budget Detail and Narrative Form

Environmental and Cultural Resources Compliance

- *Will the proposed project impact the surrounding? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts. Will the proposed project impact the surrounding environment (e.g. soil, (dust), air, water (quality and quantity), animal habitat? Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.*

All earth-disturbing work will be within the existing rights-of-way and will be minimal. Impacts to air, water, or animal habitat is anticipated to be minimal. PMWSID will be mindful in taking any reasonable steps to minimize impact to the surrounding environment.

- *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?*

PMWSID is unaware of any impacts concerning threatened or endangered species in the proposed project area.

- *Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"? If so, please describe and estimate any impacts the proposed project may have.*

PMWSID is unaware of any wetlands or other surface waters inside the proposed project boundaries.

- *When was the water delivery system constructed?*

The PMWSID culinary water distribution system was constructed in 1980s.

- *Will the proposed project result in any modification of or effects to, individual features of an irrigation system*

The proposed project will result in any modifications to the irrigation distribution system. The addition of the meters, heaters, and SCADA equipment will sit within the existing vaults and will not impact or modify the individual features.

- *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question. Are there any known archeological sites in the proposed project area? Will the proposed project have a disproportionately high and adverse effect on low income or minority populations? Will the proposed project limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands? Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*

- A cultural resource inventory will be completed as part of the submitted environmental document. There are no buildings in the project area.
- PMWSID is unaware of any known archeological sites in the project area.
- The proposed project does not have a disproportionately high impact to these populations.
- The proposed project does not impact any Tribal lands.
- The proposed project does not contribute to the above conditions. No outside soil or foliage will be introduced to the project area.

Required Permits or Approvals

No permits or approvals are required to implement the proposed project.

Overlap or Duplication of Effort Statement

There are no current or proposed overlap or duplication of efforts at the time of submission, in neither Federal nor non-Federal funding.

Conflict of Interest Disclosure Statement

There are no actual or potential conflicts of interest at the time of submission. PMWSID will take appropriate steps to avoid conflicts of interest with respect to financial assistance agreements and disclosure of any conflicts of interest in accordance with 2 CFR 1402.112.

Uniform Audit Reporting Statement

PMWSID has not expended $750,000 or more in Federal award funds in a year and has not been required to submit a Single Audit.

Certification Regarding Lobbying

See attached Signed Certificate Regarding Lobbying Form.

Letters of Support for the Project

Please see Attachment E: Letters of Support. Letter of support is from Weber Basin Water Conservancy District.

WEBER BASIN WATER CONSERVANCY DISTRICT

2837 EAST HIGHWAY 193 • LAYTON, UTAH • PHONE (801)771-1677 • SLC (801) 359-4494 • FAX (801) 544-0103

Scott W. Paxman, PE
General Manager/CEO

July 2, 2024

Roy Watts, District Manager
Powder Mountain Water and Sewer Improvement District
298 24th Street, Ste 150
Ogden, UT 84401

Dear Mr. Watts,

Weber Basin Water Conservancy District is pleased to support your effort to meter Powder Mountain and Sewer Improvement District's (the District) culinary water system through funding from the Bureau of Reclamation's WaterSMART Small-Scale Water Efficiency Projects program. Meters and the proposed SCADA technology will allow the District to collect real-time water flow data and transmit it to the District through a software system to improve data analytics and water management. The project will also help the District increase efficiency in the distribution system by improving leak detection and water conservation efforts.

Weber Basin understands that the proposed project supports Powder Mountain Water and Sewer Improvement District Water Master Plan's top priority recommendation to monitor water usage and to build a database for future reference. We understand and appreciate the importance of metering projects to improve system efficiency and the impact on your system's resilience to the ongoing extreme drought conditions being felt across the state of Utah.

The Weber Basin Water Conservancy District is committed to improving the efficiencies of our water distribution systems through the integration of enhanced technologies and proactive system assessments. This project will progress this mission forward. Weber Basin is committed to assisting the District in achieving an elevated level of engagement using software and technology.

We strongly support your grant application and appreciate the advancements it will make in drought resiliency and water supply for Powder Mountain Water and Sewer Improvement District and other stakeholders across the region.

Sincerely,

Scott W. Paxman, PE
General Manager
Weber Basin Water Conservancy District

1.0

Summit Powder Mountain

Culinary Water Master Plan

Powder Mountain Water and Sewer Improvement District

Water Conservation Plan

December 2017

Prepared by

CRS ENGINEERS
Answers to Infrastructure®

Table of Contents

Executive Summary ..... Page ii

Introduction ..... Page 1

Historic Use and Future Projections ..... Page 2

Conservation Efforts and Goals ..... Page 4

Implementing and Updating the Water Conservation Plan ..... Page 7

Tables

1. Table 1 – Population Projections ..... Page 2
2. Table 2 – Demands and Projections ..... Page 4
3. Table 3 – Water Saving Alternatives for Common Household Activities ..... Page 4
4. Table 4 – Current Culinary Water Rates and Revenue ..... Page 9

Appendices

1. Appendix A – Water Conservation Plan Ordinance ..... Page 8

Executive Summary

As of July 2017, the District serves approximately 120 water connections. Approved zoning changes and master planned developments will add as many as 2,800 new connections in the coming years. With severely limited resources, the District will be required to develop several new water sources to meet the growing demands. With the extreme increases in proposed connections, the District will have to be vigilant in its conservation efforts to limit the number of new sources and capital needed.

Existing policies, such as disallowing outdoor irrigation from the water system, has allowed the district to maintain a relatively low per capita usage rate. Additional efforts of education, building ordinances, and landscaping requirements will allow this usage rate to remain low with respect to the state average, but will not eliminate the need for several additional water sources. The District will also consider implementation of tiered rate structures as necessary if other efforts do not produce the desired results.

Historical Use and Future Projections

The service area of PMWSID has always contained relatively few residents. After decades of service, there are still less than 300 residents in the area, only about 20% of which are full time residents. The properties in the area are mainly recreational residences which likely contributes to the low historical usage in the area. While daily use during ski season far exceed the 300 residents, this transitory population can have a significant impact on water use during winter months. Water use data and projection numbers were derived from the District's Water Master Plan completed in 2017.

Inventory of Water Resources

Powder Mountain's water system is comprised of 4 water tanks for storage totaling 572,000 gallons and approximately 35,000 linear feet of installed waterline. The majority of the water lines are 4-inch diameter, with several segments of 8 and 6-inch lines. New lines are being installed at larger diameters in specific areas to meet future growth plans. The system operates with two pressure zones, one fed by the Timberline tanks and one fed by the Hidden Lake tanks. These two zones are tied together through a PRV at the Timberline tanks.

The current inventory of water resources includes a single well named the Hidden Lakes Well. There are however, two new planned wells that will be coming online soon. It is anticipated that the two new wells, the Cobabe Well and the Bloomington Well, will meet demands for the near future with additional sources being needed as development occurs.

Historical Use

Using historical reporting to the Division of Water Rights, the average daily usage per connection is provided in Table 1. As can be seen in the table, average water use has been approximately 121 gallons per connection per day. Active connections prior to 2015 are estimated as the final number was verified in 2017 for only 2015 and 2016 numbers. These numbers were used to establish a baseline for water use in the system. Average water use is 120 gallons per connection per day (gcpd) with the highest use being in 2013 at 177 gcpd and 176 gcpd in 2016. During both of these high years, significant leaks were found and repaired in the system, so the true use is likely nearer to the 120 gpcd average.

Conservation Efforts and Goals

Powder Mountain Water and Sewer Improvement District has several restriction and regulations in place to limit water use and eliminate wasteful uses. One of the primary challenges to these efforts is that the District does not have any legislative power and relies on Weber County to pass and enforce proper zoning ordinances, development standards and building codes to enable some of the District's needed conservation goals. The District will continue to participate in the County's plan review process as well as be involved with the planning commission to promote this effort as much as possible. Based on the current and future efforts outlined below, the District plans to reach it's goals over the next 10 years.

Current Efforts

Currently, PMWSID has one primary restriction on connections to the water system to promote conservation. This restriction is that no outdoor irrigation is allowed on the system. Due to the limited water resources on the top of the mountain, this restriction is critical to the successful application of this conservation plan. Due to this restriction, the District works with the County to limit landscaping to only native plants that will not require irrigation.

Future Efforts

As the District moves to the future, additional efforts will be required to not only maintain but decrease the District's average water usage. The District will work with the County to require low flow fixtures in new construction. Additional efforts that have been considered include:

1. Active Water Education Program: The District will use available materials from Weber Basin Water Conservancy District and others to involve residents in the conservation effort. As more residents move into the area, additional efforts to promote community outreach will be employed.
2. Meter Replacement and Leak Detection: The District's current system is outdated and in many areas inadequate for future use. As the District undertakes to update its infrastructure we will also actively work to detect and repair any leaks in existing piping. This effort could significantly decrease the overall use numbers. The District will actively employ this method of conservation.
3. Fixture Replacement Program: The District has considered fixture replacement programs for existing customers. Because of the projected growth and recent construction, most of the connections meet more stringent low flow standards and this program would be limited in its effect. It is unlikely that the District will employ this effort to the low cost: benefit ratio.
4. Modified Rates: The District has recently approved more aggressive water rates, but still operates on a flat monthly rate for its customers. As growth continues to put more strain on the system, the District will re-evaluate the benefits of a tiered rate structure. It is likely that this method will not be employed within the next 10 years.

Water Conservation Goals

At the current time, average water use in the District is 120 gpcd. The District's conservation goal is to reduce that number by 10% over the next 10 years. This means reaching an average water use of 108 gpcd or less by 2027. The progress will be monitored on an annual basis during preparation of the annual water use report to the Division of Water Rights.

Evaluating Success

Throughout the implementation of this plan, the Distirct will evaluate if additional measures need to be used or if this plan needs to be modified. During the annual evaluation of water use, average use per connection will be reported to the Board for their consideration.

1.1 PURPOSE & SCOPE

The Summit Powder Mountain Water Distribution System Master Plan is intended to be a working document that will serve as a guide for the continued development of the Summit Powder Mountain Development. The purpose of this document is to provide information that can be utilized to design key aspects of the Summit Powder Mountain water distribution system to ensure that the system will have adequate capacity to meet peak instantaneous demands as well as peak day demands with fire flow requirements during existing and build out conditions.

Because this is a working document all infrastructure sizing presented in this document is preliminarily based on the best information available at this time. Each new/proposed phase should review their own infrastructure based on their product type to ensure demands for peak day, peak instantaneous and fire flows are satisfied. Concurrently, this Master Plan should be kept updated with the latest information.

1.2 METHODOLOGY

The hydraulic model was developed using Bentley WaterGEMS. The parameters used to evaluate the present and future capacity requirements of the water distribution system are based on R309-510 of the State of Utah Administrative Code for Public Drinking Water Systems. Parameters are as follows:

a. A minimum pipe diameter of 8" is required for all water mains serving fire hydrants. A minimum residual pressure of 20 psi must be maintained at all points in the system during the peak day plus fire flow demands. 40 psi is to be maintained during peak day, demands and 30 psi is to be maintained during peak instantaneous demands.
b. Source sizing per R309-510-7 is defined as 800 gallons per day per connection (gpd/c) for homes and 150 gpd for multi-family units/lodging. 800 gallons per day is an equivalent residential connection (ERC)
c. The requirement for the peak day demand for outdoor use will be omitted from the analysis. Irrigation/outdoor use is not planned for Powder Mountain to justify a demand reduction per R309-510-5.
d. The distribution system must be capable of meeting the peak instantaneous indoor demands. Peak instantaneous outdoor demand will be omitted for the same reasons stated in paragraph c above. R309-510 does not define a peaking factor for indoor demand. Rather, it recommends that it be the equation outlined in R309-510-9 (1) (a) where N is the number of ERC's as follows:

$$Q=10.8 \times N^{0.64}$$

However, this equation is based on the peak instantaneous demand for a single pipeline. An alternative approach was used where a peaking of 3 was applied to the demands to simulate peak instantaneous demand. This factor is referenced in the water distribution section of the *"Civil Engineering Reference Manual 11th Edition"* by Michael R. Lindeburg.

e. Storage facilities must have a capacity of 400gal/ERC for indoor single family residential and 75 gal/ERC for multi-residential/ lodging per average day demand outlined in R309-510-8.
f. 2,000 gpm for both multi residential and residential units and 250,000 gallons have been provided for fire suppression as required by the local fire authority.
g. The maximum velocity allowable in a pipeline is 10 feet per second.

1.3 DESIGN ASSUMPTIONS

The Powder Mountain Resort has two types of demands; indoor, and fire flow. The existing indoor demands and storage requirements were calculated by applying the Utah State Division of Drinking Water (DDW) demand and storage standards to the existing development. This was achieved by determining an equivalent residential connection (ERC) per square foot for each building type, such as hotel, single family, commercial, etc. The ERCs were developed by using Department of Drinking Water (DDW) standards.

Table 1 below shows the different building types with the calculated demands (GPD/ERC). Demands were assigned utilizing the DRR1 master land use plan, where single family parcels were assigned 1 ERC, and mixed use/multi use parcel demands were calculated as "High Density ERCs" based on their respective area and DRR1 development data. Parcels were assigned unique labels within the model. An exhibit showing the parcel labels can be find in Appendix D. Tables showing ERC calculations can be found in Appendix A2.

The indoor peak instantaneous demand was calculated by using a 3x peaking factor outlined in *"2.0 Methodology"*. Required storage was determined by multiplying the number of ERCs by 400gal/unit and 75gal/unit for residential and multi-residential /lodging respectively. Fire flows and storage requirements were assumed for master planning purposes to require a maximum fire flow 2,000 gpm and maximum storage of 250,000 gallons. However, it is important to note that the fire flow requirement may be greater depending on building size and type.

TABLE 1

Landuse	ERC/Unit	GPD/Unit	GPD/ERC	Fireflow (GPM)	Avg Room Size (SF)
Residential	1.00	800	800	2000	N/A
Residential/Multi Family/Hotel Lodging	0.19	150	800	2000	1000.00
Amenity	0.19	150	800	2000	5000.00
Hotel	0.19	150	800	2000	1000.00
Condo Hotel	0.19	150	800	2000	1000.00
Condo	0.19	150	800	2000	1000.00
Townhouse	0.19	150	800	2000	1000.00
Nest	0.19	150	800	2000	N/A
Bungalow/Cabin	0.19	150	800	2000	N/A
1/3-1 Ac	1.00	800	800	2000	N/A
1-2 Ac	1.00	800	800	2000	N/A
3-6 Ac	1.00	800	800	2000	N/A
7-10 Ac	1.00	800	800	2000	N/A
10+ Ac	1.00	800	800	2000	N/A

1.4 ANALYSIS

1.4.1 Existing Conditions

Hidden Lake Storage
The Hidden Lake storage tanks are the highest and largest storage tanks at Powder Mountain Resort at an elevation of 8,900 feet. There are two storage elements at Hidden Lake; The "Old" Hidden Lake tank and the "New" Hidden Lake tank.

The Old Hidden Lake tank has approximately 60,000 gallons of storage. This tank feeds a smaller 7,500-gallon pressure tank and is pressurized by a 1.5 hp 25-46 gpm pump that supplies the Ski Patrol, Ticket Office and Lodge at Hidden Lake Summit. The Old Hidden Lake Tank has been omitted from this analysis assuming it serves only the older portion of the system.

The New Hidden Lake Tank was built as part of Phase 1 of the Summit Powder Mountain Master Plan. It has a storage capacity of approximately 415,000 gallons and is meant to service the Phase 1 and subsequent master planned developments. There is 250,000 gallons of volume allocated for fire suppression, leaving 165,000 gallons, or 412 ERCs of storage capacity (400gpd/ERC) available within the New Hidden Lake Tank. The old and the new tanks are connected by a 10" line and work together to maintain pressure and flow for peak day, peak instantaneous and peak day demand with fire flow.

1.4.2 Existing Pipe Network

The existing pipe network can be thought of as two separate networks working in conjunction to provide water service to Powder Mountain:

- Old Network
- New Network

The Old Network is the network established during the early development of Powder Mountain. This includes the Cobabe, Panter, and Sundown pump houses, The Timberline storage tanks, the Timberline pump house and the Old Hidden Lake storage tank. The pipe infrastructure of the Old Network is made up of 4" and 6" lines. Like the Old Hidden Lake Tank, the Old Network that stems from it has been omitted from this analysis.

The New Network was recently developed during Phase 1 of the Summit Master Plan and is composed of the New Hidden Lake storage tank with water being sourced by the Hidden Lake Well. The pipe infrastructure of the New Network currently extends from the New Hidden Lake tank to the saddle and Summit Village and is composed of an 18" backbone line, and minimum 8" lines to satisfy R309-510.