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Preliminary Engineering Report

Cooke City Water System PER

May 2026

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0 EXECUTIVE SUMMARY

0.1 Introduction

Cooke City is an unincorporated community located in south central Montana along US Highway 212 and surrounded by the Custer, Shoshone, and Gallatin National Forests. It is remote; accessible only by US Highway 212 ("Main Street") which connects the northeast entrance of Yellowstone National Park, just 4 miles east, to the junction with Chief Joseph Highway and the Beartooth Highway about 15 miles east. According to the 2019-2023 census data the 2023 population of Cooke City was 94 residents and 53 households. Per statistics from the National Park Service, between May and October of 2025, approximately 136,768 visitors to Yellowstone National Park drove through the northeast entrance and Cooke City. As visitation to Yellowstone National Park increases, more visitors are also relying on Cooke City's water and sewer facilities, which in turn is putting more strain on each system.

Cooke City's utilities are currently managed by two separate entities with no administrative overlap. The sewer system is managed by the Cooke Pass, Cooke City, Silver Gate Sewer District and the water system is managed by the Cooke City Water District.

As of 2025, Cooke City has been facing significant challenges regarding its water system infrastructure, primarily related to existing inadequacies leading to freezing, low pressure, restricted fire flow, stagnation and leakage of water. To address this issue, Cooke City Water District initiated preparation of a preliminary engineering report (PER) as part of its infrastructure improvement efforts.

The Cooke City Water District engaged the services of Triple Tree Engineering to complete the PER. This report documents the study, recommendations, and conclusions for enhancing the community's water system. The PER reviews the existing condition of the water system, identifies problems with the system and provides recommendations and funding strategies for water system improvements.

The study evaluates the needs of Cooke City along with analyzing both short-term and long-term plans. A summary of the existing facilities, need for the project, recommended improvements, costs, and funding strategies are presented in the Executive Summary.

0.2 Existing Facilities

The planning area for this PER is the limits of Cooke City in addition to two small corridors connecting the water storage tank and wells to the distribution system. The tank is located approximately 0.35 miles northwest of town and can be accessed via Miller Road. The tank is supplied by a well site located approximately 1/3 mile west of town on Highway 212. Exhibits of the existing water distribution system relative to the town are located in Appendix D.

0.2.1 *Water Supply*

Water is supplied to the Cooke City Water District system from three groundwater wells located approximately 1/3 of a mile west of town along Highway 212. Two of the wells are located on one site with the well house and are referred to as CCSW #1 and CCSW #2. The third well, CCSW #3, is located approximately 150' further east towards Silver Gate. All three wells are plumbed into an existing wellhouse. During a site visit in March of 2024, all three wells were cycled and together pumped in excess of 220 gpm.

The current water system has never required treatment. The water district is currently in good standing with water testing requirements mandated by the Safe Drinking Water Act and Montana DEQ.

The District is currently operating on a good standing water right, but the amount of water is temporarily set at 220 (total) gpm. The DNRC is working with the District to obtain 5 years of metered water use data before setting the amount of water available for use under the water right. In January 2024, the Water District filed an extension to complete the permit to appropriate water rights. Due to system leaks and inoperable water meters, the Water District was having a difficult time obtaining accurate readings on actual water usage. The Water District is working to get an accurate measurement of water usage before completing their water rights application. Cooke City's 2046 peak daily demand is estimated at approximately 28,000 gpd. The three wells in conjunction can produce approximately 250 gpm or 360,000 gpd. DEQ required that the system be analyzed with the largest well out of service; therefore, the system could provide 96,480 gpd with the largest well out of service. The wells have capacity to serve the projected population in 2046.

0.2.2 *Water Storage*

Prior to 2010, the Water District relied on two separate water tanks for its public water supply system. One tank was located east of town between the Soda Butte Spring (the town's original water source) and another 10,000 gallon galvanized water tank that was located northwest of town.

When the District built a new system in 2010, both existing tanks were abandoned and demolished. The 2010 project included installation of a new 150,000 gallon welded steel tank that is still in use today. Per original plans from Great West Engineering, the tank is lined and supported by a concrete foundation. The tank is equipped with an internal mixer that is currently not operational.

The water storage tank is inadequate for the fire flows required by the ISO, and the limitations of the community's distribution system hinder the possible flow. Although the tank cannot provide ISO Full Credit Condition, the operator, District, and current fire chief have indicated no concerns.

0.2.3 *Distribution System*

All well outlet pipes converge in a well house located south of Highway 212, approximately 1/3 mile west of Cooke City. From the well house, a singular outlet pipe ties into a 6" HDPE transmission main running east along Highway 212 to Cooke City. The transmission main caries water to a pressure reducing vault (PRV). The existing distribution main was built as part of the 2007 Beartooth highway project and finished during the 2010 water systems improvement project.

The existing PRV consists of a concrete manhole structure equipped with a lockable insulated access hatch and access ladder. Inside the structure, telemetry controls are wall mounted. A 10' antenna tower constructed of tubular steel is located next to the PRV for telemetry control communication between the PRV and well house. A single distribution main connects the PRV and the water storage tank.

Electronic pressure meters within the PRV calculate the water tank level and control supply of water from the wells to regulate the tank level.

Due to the elevation of the tank in relation to town, the water pressure is higher than desired. The PRV therefore reduces water pressure from upwards of 135 psi down to approximately 65 psi using mechanical "Cla" valves. Two master valves feed the distribution system from the tank. One regular pressure (low-flow) and one high pressure (high-flow). The lower pressure valve feeds the system during normal operation while the high pressure valve feeds the system during fire flow events.

From the PRV, water is distributed through a water main network to all system users. The distribution system to the town consists of a variety of water main types and sizes from various projects throughout the years. A 2002 PER written by Entranco indicated that the original water system was constructed in the 1950's and was added to in the 60's, 70's and 80's. At that time, the system consisted of 3", 4" and 6" AC and PVC pipes. The 2010 water system rehabilitation project replaced much of the system with 6" and 8" PVC and HDPE. Records show that some of the main within Highway 212 right-of-way was installed in 2007 as part of a Federal Highway Administration Project. A 2012 water main replacement project also replaced a section of water main in Broadway and Huston north of Main Street. In 2017 and 2018, all water meters were updated with advanced meter reading (AMR).

0.2.4 SCADA System

The well house contains three (3) Yaskawa variable frequency drives (VFDs) used to control the well pumps along with a central control panel. The control panel includes a RACO Verbatim Series VSS telemetry unit and a C-More operator interface terminal (OIT). Telemetry between system sites is currently accomplished through a licensed radio frequency system utilizing an omni-directional antenna at the well house.

The PRV vault contains a similar control panel configuration consisting of a Rhino power supply and an Automation Direct BRX PLC (Model BX-DM1E-10ER3-D). Communications at the PRV site are supported through a directional Yagi antenna.

At the water storage tank, there is currently no dedicated control panel or telemetry equipment installed. Tank level data is transmitted to the well house for display.

0.3 Need for Project

A summary of the system's existing problems are as follows:

- The existing control and telemetry systems are having reliability problems and other continual oddities.
- The water tank mixer is currently broken and in need of replacement.
- There is no permanent power to the water storage tank and needs to be installed to allow for a submersible water tank mixer.
- The broken fittings for the electrical conduits on the well heads require replacement.
- Dead-end mains with and without a flush hydrant are present within the system leading to freezing, low-pressure, restricted fire flow, stagnation and leakage of water.

The existing pumps and piping for the well house are currently in good operating condition. The fitting for the electrical conduit is broken and no longer connected to the well cap at two of the well heads which creates a potential pathway for contamination of the wells.

The water storage tank was installed in 2010 and is currently in good operating condition. The water tank mixer is currently broken and in need of repair or replacement. Without a functioning mixer a thick layer of ice has formed on top of the water in the tank and also creates the risk of stratification. Ice in the tank could lead to a tear in the tank liner ultimately creating the risk of leakage and contamination.

The existing distribution system consists of a variety of water main types and sizes from various projects throughout the years. Most of the system was replaced in 2007, 2010 and 2012 as part of water system rehabilitation projects. Some segments of the old main are still active in town with no record of when they were built and put into service. Dead end and aging mains exist throughout the distribution system. Currently, the distribution system experiences freezing, low-pressure, restricted fire flow, stagnation and leakage of water in areas of service with dead-end mains. An automated flush hydrant is still used on one section of main. The existing flush hydrant is estimated to waste up to 91,250 gallons of water per year.

0.4 Alternatives Considered

Various alternatives were considered to address the problems with the existing system and are as follows:

- Alternative 1 – No Action
- Alternative 2 – Additional Flush Hydrants
- Alternative 3 – Replace & Upsize Existing Mains
- Alternative 4 – Existing Water Main Looping

0.5 Selection of an Alternative

The above-mentioned alternatives were considered to address the problems with Cooke City's water system. A screening analysis comparing net present value and non-monetary factors were used to select the best alternative to correct system deficiencies. Costs considered in the net present value cost analysis include construction costs and contingency, engineering, and operations and maintenance. Some of the non-monetary factors considered in the selection of the alternative include environmental impacts, reliability, impacts to existing facilities, public acceptance, local economic affect, and public health and safety associated with the project.

0.6 Proposed Project

The recommended alternative to address the towns water system issues is **Alternative 4 – Existing Water Main Looping.** The total project cost with improvements is as follows:

- Phase I - $198,125
- Phase II - $1,319,804
- Contingency - $303,586
- Total Construction Cost - $1,821,515
- Engineering - $364,303
- Geotechnical Investigation - $30,000
- **Total Project Cost - $2,215,818**

The funding strategy is as follows:

- Phase I:
  - RRGL Grant - $125,000 (previously awarded)
- Phase II:
  - MCEP Grant - $750,000
  - RDG Grant - $500,000
  - Local Match - $10,000
  - SRF Loan - $XXX
  - SRF Loan Forgiveness - $XXX

1 PROJECT PLANNING

1.1 Location

The planning area for this PER is the Cooke City Water District limits, including corridors connecting the storage tank and wells to the distribution system. The tank is located approximately 0.1 miles northeast of the community. Cooke City is in Park County, along US Highway 212, at the northeast entrance of Yellowstone National Park. Cooke City is approximately 65 miles southeast of Red Lodge, and approximately 133 miles southeast of Bozeman, in Section 25, Township 9 South, Range 14, the tank is in Section 26, Township 9S, Range 14 E. The approximate latitude and longitude of Cooke City is 45°1’10” N and 109°56’ 04” W. An aerial photograph exhibit indicating the general location and layout of the town is included below.

Figure 1 Aerial Photo

1.2 Environmental Resources Present

Cooke City's history is deeply intertwined with its mining heritage, with past mining activities shaping land use and water quality. Efforts to reclaim sites like the former McLaren mine demonstrate Montana's commitment to environmental restoration. Despite its mining legacy, Cooke City's natural beauty attracts thousands of visitors annually, drawn by activities ranging from summer tourism to winter sports. Groundwater wells southwest of town provide plentiful, high-quality water, meeting potable standards without treatment. Managed by the US Forest Service, the surrounding land is protected to preserve its environmental integrity, balancing conservation with controlled resource extraction.

State and federally funded projects are subject to either the Montana Environmental Policy Act (MEPA) or the National Environmental Policy Act of 1969 (NEPA), or both. MEPA seeks to avoid or mitigate adverse impacts on the natural and human environment by mandating careful consideration of the potential impacts of any development assisted with state funds or approved by a state agency. NEPA establishes national policy, goals, and procedures for protecting, restoring, and enhancing environmental quality.

1.3 Population Trends

Cooke City is an unincorporated community and therefore is not formally documented by the US Census Bureau. The population of Cooke City has been steady for a decade with little to almost no growth. The population of Cooke City had an annual population change of 0.27% from the 2010 to 2020 census. Prior to the 2010 census, Cooke City was part of the Cooke City-Silver Gate CDP. This limited historical population data is specific to Cooke City. The census information is included in Appendix A.

Table 1: Population Trends

	Year	Population	Percent Change	Percent Change per Year
US CENSUS	2010	75	NA	NA
	2020	77	2.67%	0.26%
PROJECTED	2021	83	7.79%	5.23%
	2022	88	6.02%	6.91%
	2023	94	6.82%	6.42%
	2024	94	0.26%	3.54%
	2025	95	0.26%	0.26%
	2026	95	0.26%	0.26%
	2036	97	0.26%	0.26%
	2046	100	0.26%	0.26%

The following table summarizes Yellowstone National Park (YNP) visitor information through the northeast entrance and through Cooke City. Due to a tremendous flood year, the northeast entrance to the park was closed most of the 2022 season, causing a drop in visitors through the northeast entrance for that year.

Table 2: Visitors Through NE Entrance

Year	Traffic Count at NE Entrance	Percent Change
2015	104,688	N/A
2016	103,982	-0.67%
2017	101,522	-2.37%
2018	100,272	-1.23%
2019	108,240	7.95%
2020	99,470	-8.10%
2021	130,248	30.94%
2022	21,469	-83.52%
2023	121,415	465.54%
2024	133,229	9.73%
2025	136,768	2.66%

According to the 2019-2023 census data (required to be used to calculate target rates when applying for the MCEP program) the 2023 population is 94 people and 53 total households. The median household income is $41,750, and 57.1% of the population was at low to moderate income levels. The 2019-2023 ACS data is included in Appendix A. It is important to note that even though 2020 census data exists, it is a requirement that the most up-to-date data on the department of commerce website is used. When this PER was written, the Department of Commerce only had the 2019-2023 data for reference.

Cooke City is located at the northeast entrance of Yellowstone National Park, and nearly doubles in population every summer. This change brings more tourists and seasonal workers for the summer months and does not appear to be a factor in the year-round population of the town. The historical growth rate of 0.26% per year has been used to estimate the population of Cooke City in 2025, 2026, 2036 and 2046.

1.4 Community Engagement

The Water District has encouraged users to participate in the decision-making process of the project. The District holds board meetings on the third Tuesday of every month at 6 pm and encourages the public to join the meetings. Zoom and call-in options are also available for the public to access the meetings, making it easier.

The public hearing for this project was held on April 21st, 2026 to obtain public comments regarding the future needs of the community's water system. A draft of the PER was made available on the water district website prior to the public hearing for review. Notice was given about the meeting through district email, newsletter, website, and was posted around the community. The findings of the PER were discussed including details of the recommended alternative, corresponding cost estimates, possible funding sources, and potential rate increases. A resolution was passed to apply for MCEP funding.

Copies of publications and meeting minutes have been included in Appendix B.

2 EXISTING FACILITIES

2.1 Location Map

Schematics of the existing water system are included in Appendix D.

2.2 History

Cooke City is an unincorporated community located in south central Montana along US Highway 212 and surrounded by the Custer, Shoshone, and Gallatin National Forests. It is remote; accessible only by US Highway 212 ("Main Street") which connects the northeast entrance of Yellowstone National Park, just 4 miles east, to the junction with Chief Joseph Highway and the Beartooth Highway about 15 miles east. Cooke City was originally started as a mining town in the late 1800's and was officially platted as a town site around that time.

The community's utilities are currently managed by two separate entities with no administrative overlap. As outlined in a PER completed for the Sewer District in 2020 by Performance Engineering, the history of the Sewer District is as follows:

> *The District was formed in 1973 by the District courts as the Cooke City-Cooke Pass-Silvergate Sewer District. As the name indicates, the Sewer District encompassed not just the community of Cooke City but also Cooke Pass to the east and Silvergate to the west. Once the District was formed it appears that little was done in the way of formally operating as a formal entity. The creation of the District was driven by the desire to access federal funding for construction of a community wastewater system. The District engaged Morrison-Maierle (M-M) in the early 80s to review the existing wastewater conditions for the community and provide a recommendation for development of a community wastewater collection, treatment and disposal system. M-M recommended installing a community collection system with the construction of a community septic and drainfield to be managed by the District in a specified location. The recommendation included abandonment and reclamation of the on-site systems used for each lot. At the time M-M estimated the total construction costs to be between $400,000-$500,000 for the recommended community system. Formal funding was requested through the Department of Interior but the request was not funded. Upon denial of the funding request the Sewer District went dormant and has remained in that state until the summer of 2019.*

The Sewer District worked with Triple Tree Engineering on a design of a new project planned by a 2022 PER update completed by Triple Tree Engineering. The project utilized a community collection system and drainfield. Partial construction of the sewer collection system was installed the summer of 2025.

The Cooke City Water District history was mentioned in the same PER as follows:

> *The District has its organizational roots in a Water Users Association formed in 1947. The District incorporated in 1967, but only became active in 1985 in order to formalize the water supply and distribution system which predated modern regulations and practices. Open spring houses, subject to surface contamination, sourced the water for the community, and a strategically placed water tank provided varying pressure to the town's asbestos cement pipeline network. Flows dropped below basic service levels in the winter, and the pipes were undersized and unable to supply any sort of firefighting apparatus. The community accepted these limitations as a part of living in this remote and rugged environment. With the adoption of the Safe Drinking Water Act and its subsequent amendments, the District needed to make changes to ensure that it would continue to comply with the regulations by providing adequate, and potable water throughout the year. In the late 1990s, the written record indicates that the Montana Department of Environmental Quality (DEQ) directed the District to improve the system to ensure that the system was sanitary. The engaged consultant recommended improvements including the reconstruction of the spring houses, repairs to and upsizing of the water tank, and upsizing some of the water mains to provide fire flows for the community. Records and documents on file do not reveal the reasons why, but the USFS apparently declined to permit the proposed work at the existing sites, requiring instead that the District identify another source in a different location from the Soda Butte Campground, as well as abandoning the tank, and relocating the storage function elsewhere. That process increased the administrative and legal challenges associated with water (or sewer) facilities situated on public lands as several years passed as new well and tank sites were identified (again on USFS land) and leases were negotiated. The Water District now operates the newly installed community infrastructure which includes three supply wells, storage tank, and new distribution pipes. This project was completed in 2010 with modifications made to the pump station pumps and panels in 2018. The system is operational with a part-time operator and the District is managing the infrastructure and debt service as would be expected.*

At the time of this PER, this District is servicing debt from four prior infrastructure projects.

2.3 Water Demands

The Water District records the quantity of water used through advanced automatic meter reading (AMR) equipment. The meters automatically collect and transfer water usage data to an online "cloud". The data is then analyzed using algorithms to help locate possible leaks within each user's system. The meters were originally installed in 2017 and 2018 as an effort to identify water leaks and are reviewed regularly by District staff. Additionally, water flow meters are installed at the well house. The data between these junctions is also analyzed to identify leakage within the system between the structures prior to the distribution system.

The water demand in Cooke City varies greatly from month to month due to the tourism driven fluctuations in population. Due to these changes, an average demand is calculated over an entire year compensating for fluctuations throughout the varying seasons. The average demand over the years is calculated by first summing the usage over the last two years then dividing by the total number of days (730 days for two years). It is necessary to estimate future demands on the system to determine when improvements might be required. The future demand is also used when designing a new facility to ensure it will meet the demands of the system well into the future. In this case, a 20-year planning period has been utilized.

To project the future water demands it is important to understand how much water is used per person. The per capita average day water demand is calculated by dividing the average day water demand by the number of residents. To calculate the per capita average day water demand it is necessary to ensure that the correct demand is being compared to the correct population; therefore, the population of Cooke City over the last few years will be compared to the corresponding average day water demand. A summary of the water supplied to the distribution system broken down by month, a calculation of the average day demand, and average day per capita demand for the Water District is included in the following table.

Table 3: Cooke City Water Usage

MONTH	TOTAL WATER USED (gallons)	
	2024	**2025**
January	309,920	295,050
February	326,640	307,270
March	315,210	326,560
April	201,460	234,140
May	422,720	417,960
June	639,325	683,670
July	809,360	850,740
August	585,170	825,650
September	510,150	667,230
October	223,690	264,880
November	137,950	155,980
December	247,350	318,990
Yearly Total*	4,728,945	5,348,120
Avg Day Demand (gpd)	12,956	14,652
Avg Per Capita Day Demand (gpcd)	138	154

The variation in water usage throughout the year can be attributed to tourism during the summer and fall months. From May to November when the Beartooth Highway is open, water usage in Cooke City increases on average 145% in relation to the rest of the year. Influx of people during these periods will play a large role in sizing the system during the planning period of this PER. To project the average day demand in the year 2046, the average per capita day demand of 146 gallons per capita per day will be compared to the projected population.

Table 4: Cooke City Projected Average Day Demand

YEAR	PROJECTED POPULATION OF COOKE CITY	AVERAGE DAY DEMAND		
		GPCD	GPD	GPM
2026	95	146	13,873	10
2036	97	146	14,165	10
2046	100	146	14,603	10

In accordance with Montana Department of Environmental Quality (DEQ) Circular 1, the water source and treatment facilities must be designed for maximum day demand in the design year. Our design year is 2046. To ensure the source can accommodate the future demands, a peak day factor is used to estimate peak day, or maximum day demands. The peak day demand represents the day with the highest usage. The peak day factor is calculated by comparing the average day demand in any given year to the corresponding peak day demand for that year. The peaking factors have been summarized in the following tables.

Table 5: Cooke City Peaking Factors

DEMAND	TOTAL WATER USAGE	
	2024	2025
TOTAL (GALLONS)	4,728,945	5,348,120
AVG DAY DEMAND (GPD)	12,956	14,652
PEAK DAY DEMAND (GPD)	23,591	29,731
PEAKING FACTOR	1.82	2.03

An average peaking factor of 1.92 will be applied to the average day demand to provide the projected peak day demands.

Peak Day Demand = Average Day Demand X Peaking Factor
= 146 X 1.92
= 280 gpcd

The projected peak day demands for Cooke City are included in Table 6 below.

Table 6: Projected Cooke City Peak Day Demands

YEAR	PROJECTED POPULATION OF COOKE CITY	PEAK DAY DEMAND		
		GPCD	GPD	GPM
2026	95	280	26,600	18
2036	97	280	27,160	19
2046	100	280	28,000	19

Like the peak day demands, the peak hour demand represents the hour with the highest usage. The peak hour factor is defined in a similar way as the peak day factor, the ratio of the peak hour demand to the average hour demand. Since there is no available data to calculate the average hour demand a peak hour factor must be estimated. The peak hour factors generally range from 1.6 to 2 times the peak day demand. A peak hour factor of 2 times the peak day demand will be used to estimate the projected peak hour demands. The projected peak hour demands are included in the following table.

Table 7 – Projected Cooke City Peak Hour Demands

YEAR	PROJECTED POPULATION OF COOKE CITY	PEAK DAY DEMAND			PEAK HOUR DEMAND
		GPCD	GPD	GPM	GPM
2026	95	280	26,600	18	37
2036	97	280	27,160	19	38
2046	100	280	28,000	19	39

The water from the peak hour demand is not needed on a continual basis; any demand above the peak day demand is typically supplied by the storage facilities. As will be discussed later, Cooke City has adequate storage capacity.
The 2046 projected average and peak day demands for Cooke City are 14,603 gpd (10 gpm) and 28,000 gpd (19 gpm), respectively.

2.4 Evaluation of Existing Water Supply

2.4.1 Description of Existing System

Water is supplied to the Cooke City Water District system from three groundwater wells located approximately 1/3 of a mile west of town along Highway 212. Two of the wells are located on one site with the well house and are referred to as CCSW #1 and CCSW #2. The third well (CCSW #3) is located approximately 150’ further west towards Silver Gate. All three wells are plumbed into the existing wellhouse.

CCSW #1 was drilled in 2009 and reaches a depth of 105 feet below ground surface (bgs), featuring a 10-inch steel casing down to 84 feet bgs. The well employs a tight-wind stainless steel screen with 0.005 foot opening sizes from 81 to 84 feet bgs with 4.1% total perforated area. From 84 to 104 feet bgs is a continues stainless steel screen with openings sized 0.130 feet with 52.8% perforated area. The well was grouted with cement to a depth of 20 feet bgs. Per the well log, the static water level is 21.6 feet bgs. The well was pump tested just after it was drilled. The well was pumped at 42 gallons per minute (gpm) for 26.5 hours and the water level dropped a total 46.8 feet during the test. The well has been declared by DEQ to be for public water supply. The well log is included in Appendix E. CCSW #1 has a 5 hp pump. During a site visit in March, 2024, the well was cycled and pumped at approximately 38 gpm. CCSW #1 is at least 7 years old. Per the 2002 Performance Engineering PER, the pumps were replaced in 2018 when the newer controls were installed. The wells run on controls from pressure gauges at the PRV. Radio telemetry is used for communications from the PRV back to the well house.

CCSW #2 was drilled in 2009 and reaches a depth of 201 feet below ground surface (bgs), featuring a 10-inch steel casing down to 110 feet bgs. The well employs a tight-wind stainless steel screen with 0.005 foot opening sizes from 107 to 110 feet bgs with a 4.1% area of perforation. From 110 to 130 feet bgs, is a continuous stainless steel screen with openings sized 0.160 feet with 58% total area perforated. Per the well log, the static water level is 15 feet bgs. The well was pump tested after being drilled. The well was pumped at 270 gallons per minute (gpm) for 29 hours and the water level dropped a total 53.2 feet during the test. The well has been declared by DEQ to be for public water supply. The well log is included in Appendix E. CCSW #2 has a 7.5 hp pump. During a site visit in March, 2024, the well was cycled and pumped approximately 179 gpm consistently. CCSW #2 is at least 7 years old. Per the 2002 Performance Engineering PER, the pumps were replaced in 2018 when the newer controls were installed. The wells run on controls from pressure gauges at the PRV. Radio telemetry is used for communications from the PRV back to the well house.

CCSW #3 was drilled in 2009 and reached a depth of 220 feet bgs, featuring a 10-inch steel casing down to 185 feet bgs. The well employs a tight-wind stainless screen with 0.005 foot opening sizes from 182 to 185 feet bgs with 4.1% total perforated area. From 185 to 194 feet bgs is a continuous stainless steel screen with openings sized 0.120 feet with 50.8% perforated area. Per the well log, the static water level is 13.6 feet bgs. The well was pump tested after being drilled. The well was pumped at 35.5 gallons per minute (gpm) for 27 hours and the water level dropped a total 145.5 feet during the test. The well has been declared by DEQ to be for public water supply. The well log is included in Appendix E. CCSW #3 has 5 hp pump. During a site visit in March, 2024, the well was cycled and pumped approximately 29 gpm consistently. CCSW #3 is at least 7 years old. Per the 2002 Performance Engineering PER, the pumps were replaced in 2018 when the newer controls were installed. The wells run on controls from pressure gauges at the PRV. Radio telemetry is used for communications from the PRV back to the well house.

It is understood that, the current programming is set up for the wells to “cycle” or take turns when the system needs water. One cycle, only pump #2 will turn on and supply the town as needed. The next cycle, wells #1 and #3 will turn on together. This keeps the system from over using one certain pump. When needed for fire flows or high water use situations, all pumps will turn on to keep up with the demand.

As stated above, all well outlet pipes converge in a well house located on the same site and CCSW#1 and CCSW#2. The well house is comprised of CMU block walls with a wood framed and metal sheeted roof. The well house is heated and houses meters and electronic controls for all three wells. A diesel-powered generator is equipped on-site as backup power for the wells.

The current water system has never required treatment. The Water District is currently in good standing with water testing requirements mandated by the Safe Drinking Water Act and Montana DEQ. A copy of the most recently available Water Quality Report is available in Appendix H.

The District is currently operating on a good standing water right but, the amount of water is temporarily set at 220 (total) gpm. The DNRC is working with the District to obtain 5 years of metered water use data before setting the amount of water available for use under the water right. In January 2024, the Water District filed an extension to complete the permit to appropriate water rights. Due to system leaks and inoperable water meters, the Water District was having a difficult time trying to obtain accurate readings on actual water usage. The Water District is working to obtain accurate water usage data for the year before completing a water rights application.

Figure 2 -Pump House (Exterior)

Figure 3 -Pump House (Interior)

The District has a good water right for municipal use. Following is a summary of the water rights listed with the DNRC for the Cooke City Water District:

Table 8 – Summary of Water Rights

WATER RIGHT NUMBER	PURPOSE	POINT OF DIVERSION	FLOW RATE	UNIT	VOLUME (AC-FT)	PRIORITY DATE
43B 772-00	Municipal	Wells 1, 2, & 3	20	gpm	32.85	9/14/1933
43B 27244-00	Municipal	Wells 1, 2, & 3	200	gpm	36.15	4/16/1980

The District is currently using all three wells to provide water. The district currently has a water right for up to 220 gpm or 316,800 gpd total for all three wells. As stated above, the water right amount is temporary and pending five years of accurate metered water use data.

2.4.2 Capacity Assessment

As presented above, Cooke City's 2046 peak daily demand is estimated at approximately 28,000 gpd. Also, as presented above, the three wells in conjunction can produce approximately 250 gpm or 360,000 gpd. DEQ required that the system be analyzed with the largest well out of service; therefore, the system could provide 96,480 gpd with the largest well out of service. The wells have capacity to serve the projected population in 2046. Also, as presented above, Cooke City's 2046 yearly demand would be 5,330,095 gallons (2046 avg day demand times 365 days per year). The temporary water right includes approximately 22,487,100 gallons per year. Because the eventual water right will be based off of use data from the last five years, Cooke City has adequate water rights to service the projected population in 2046.

2.4.3 Condition Assessment

Per the 2020 Performance Engineering PER, the well pumps and controls were replaced in 2018. All other parts of the supply system are still the original from the 2007-2012 projects. Currently, the wells and controls are in good operating condition.

The well heads were not accessible during the time of this PER but, during a sanitary survey of the system conducted in 2024, it was recommended that well head 2 & 3 receive immediate repair. The fittings for the electrical conduits were broken and no longer connected to the well caps causing the conduit to pull away from the cap creating an opening into the well casing. It was determined by the DEQ that the broken fittings for the electrical conduits were determined to be a significant deficiency.

2.4.4 Regulatory Assessment

In 2024 the DEQ completed a Sanitary Survey Inspection of the Cooke City Water District. During the inspection the DEQ found two issues with the well heads that were classified as significant deficiencies. Per the report:

- *Item 1 (Type #1) The fitting for the electrical conduit on Well 2 N GWIC 251889 (WL005) was broken and was no longer connected to the well cap. As a result of the break the conduit has pulled away from the cap creating an opening into the well casing.*
  *******This was determined to be a significant deficiency.*******

- *Item 2 (Type #1) The fitting for the electrical conduit on Well 3 W GWIC 251907 (WL006) was broken and was no longer connected to the well cap. As a result of the break the conduit has pulled away from the cap creating an opening into the well casing.*
  *******This was determined to be a significant deficiency.*******

The 2024 Sanitary Survey Inspection report is included in Appendix C.

2.5 Evaluation of Existing Storage

2.5.1 Description of Existing System

Prior to 2010, the Water District relied on two separate water tanks for its public water supply system. One tank was located east of town between the Soda Butte Spring (the town's original water source) and another 10,000 gallon galvanized water tank that was located northwest of town.

When the District built a new system in 2010, both of the existing tanks were abandoned and demolished. The 2010 project included installation of a new 150,000 gallon welded steel tank that is still in use today. Per original plans from Great West Engineering, the tank is lined and is supported by a concrete foundation. The tank is fitted with a galvanized steel ladder for access through a locked hatch at the top of the tank. The ground elevation at the current tank is approximately 7884.5' per the original design plans dated 2010. The tank is approximately 32' high (as measured from the foundation to the edge of the roof) with a 30' diameter. The tank is equipped with an internal mixer that is currently not operational.

Figure 4 -150,000 Gallon Tank

2.5.2 *Capacity Assessment*

According to DEQ-1, 7.0.1, "The minimum allowable storage must be equal to the average daily demand plus fire flow demand". The existing tank was sized based on water use calculations in a 2002 PER completed by Entranco. The consultant in the 2002 PER recommended a water tank be installed with a capacity of 213,000 gallons. Though not documented clearly why, the engineering plans for the 2009-2010 water system project called for a tank with a 150,000 gallon storage capacity. It is believed that at the time of construction, funding limited the required tank size of the town but this was never confirmed. Per the Water District website and verified by the operator, a 150,000 gallon tank was actually installed.

The average day demand has been calculated above for a planning period of 20 years (2046); and is 14,603 gallons.

To determine the fire flow demand, we contacted the Insurance Services Office, Inc (ISO) area representative and obtained the results of the latest ISO analysis and testing that was completed in July of 2020. The test results are included in Appendix F.

According to the information presented in the ISO analysis, the largest needed fire flow is at the intersection of Eaton & Broadway and requires 1,750 gpm at 20 psi. The ISO also takes into account the number of hydrants available to determine if a flow-rate is feasible under the current system. According to the report, the actual flow possible with the storage available would be 976 gpm. For this report, the 1,750 gpm flow rate will be analyzed to calculate the required storage. According to the ISO, this flow rate will be required for two hours. Therefore:

Include Data from hydraulics model..

$$1{,}750\ gpm\ x\ 60\ minutes\ x\ 2\ hours = 210{,}000\ gallons\ for\ fire\ flow$$

$$210{,}000\ gallons\ (fire\ flow) + 14{,}603\ gallons\ (average\ day\ demand) \\ = 224{,}603\ gallons\ of\ required\ storage$$

Per the analyses above, the town's storage tank is inadequate for the fire flows required by the ISO. Limitations of the community's storage tank hinder the possible flow. Although the tank cannot provide ISO Full Credit Condition, the operator and the District have indicated no concerns with the tank.

The local fire chief was contacted regarding his position with the current system. The fire chief stated he had no concerns with the current operating system and a full storage tank.

2.5.3 Condition Assessment

As mentioned previously, the 150,000 gallon tank was erected in 2010. The tank's outer structure is currently in good operational condition and is showing no signs of leakage. The concrete foundation and drains are currently in good working order.

The tank is equipped with a solar-powered mixer to prevent ice build-up, stagnation, and stratification of the water in the tank. The mixer broke again during the winter of 2025 and is currently inoperable. The Water District is currently in the process of planning to replace or fix the existing mixer. It has been discussed that a submersible mixer may be a more suitable replacement compared to a mixer that sits on top of the water. Because a submersible mixer is installed within the tank, there would be less exposure to damaging situations or freezing and would be more effective at whole-tank mixing creating less risk of ice build-up, stagnation, and stratification. If a submersible mixer is selected, permanent power must be installed to the tank, as solar power couldn't produce the voltage necessary to run the mixer.

The perimeter fence around the existing tank has been fixed since the last DEQ Sanitary Survey Inspection in 2024 and is in good working condition.

The District operator is working on completing an operation and maintenance schedule and plans to visually inspect the tank once every year. It was believed that a tank inspection had been completed since installation by some of the district members.

2.5.4 Regulatory Assessment (if applicable)

In 2024 the DEQ completed a Sanitary Survey Inspection of the Cooke City Water District. During the inspection the DEQ found no significant issues with the tank but said the perimeter fence around the tank was in disrepair. Per the report:

> *…the fencing around the storage tank are in a state of disrepair and should be fixed to keep out unwanted trespassers, such as bison. Proper security measures are required to help protect vital infrastructure from damage which could lead to an inability to provide safe and adequate water to the public.*

The perimeter fence around the existing tank has been fixed since the 2024 DEQ Sanitary Survey Inspection and is in good working condition.

The 2024 Sanitary Survey Inspection report is included in Appendix C.

2.6 Evaluation of Existing Distribution System

2.6.1 Description of Existing System

As outlined in section 2.4, all well outlet pipes converge in a well house located south of Highway 212, approximately 1/3 mile west of Cooke City. From the well house, one singular outlet pipe connects to a 6" transmission main running east along Highway 212 to Cooke City. The transmission main then travels north on Montana Street, then east on Broadway Street, thence, north again on Republic Street until reaching a pressure reducing valve (PRV) vault at the intersection of Black Street and Republic Street. The existing distribution main was built as part of the 2007 Beartooth highway project and was finished during the 2010 water systems improvement project. The transmission main is constructed entirely of 6" DR9 HDPE pipe. All fittings including valves, bends, and tees consist of cast iron construction.

The existing PRV is constructed of a 8'x12'x8' concrete manhole structure. The structure is equipped with a lockable insulated access hatch, access ladder, 4" floor drain, and gas vent pipe. Inside the structure, telemetry controls are wall mounted. A 10' antenna tower constructed of tubular steel is located next to the PRV for telemetry control communication between the PRV and well house.

From that PRV, the water is pumped uphill to the town's 150,000 gallon storage tank through a single water main. From the storage tank, the system's water flows downhill back to the PRV. Electronic pressure meters are used within the PRV to calculate the amount of water in the storage tank. If the head pressure within the PRV calculates the water tank to be below a certain level, the system communicates to the pump house to turn on the pumps until the water tank is filled. Once full, the pumps are turned off and the system runs purely on hydrostatic head from the tank. The section of transmission main from the PRV to the tank is constructed of 8" DR18 PVC. All fittings including valves, bends, and tees consist of cast iron construction.

The PRV reduces system pressures from upwards of 135 psi down to approximately 65 psi using mechanical "Cla" valves. Two master valves feed the distribution system from the tank. One regular pressure (low-flow) and one high pressure (high-flow). The lower pressure valve feeds the system during normal operation while the high pressure valve feeds the system during a fire flow event.

From the PRV, the water is distributed through a water main network to all system users. The distribution system to the town consists of a variety of types and sizes of water main from a variety of projects throughout the years. A 2002 PER written by Entranco indicated the original water system was constructed in the 1950's and was added on to in the 60's, 70's and 80's. At that time, the system consisted of 3", 4" and 6" AC and PVC pipes. The 2010 water system rehabilitation project replaced much of the original system with 6" and 8" PVC. Records show that some of the water main within Highway 212 right-of-way was installed in 2007 as part of a Federal Highway Administration Project. A 2012 water main replacement project also replaced a section of water main in Broadway and Huston, north of Main Street. A schematic of the existing system is available in Appendix D.

In 2017 and 2018, the system pumps were updated with new programming. At the same time, all water meters were updated with advanced meter reading (AMR).

Table 9: Summary of Distribution Pipe

SIZE (in)	PIPE TYPE	STREET	YEAR INSTALLED	QUANTITY (ft)
6	PVC	MARTIN,SKUNK HOLLOW, BLACK	PRE-2007	1,319
6	HDPE	TRANSMISSION MAIN	2007, 2010	6,617
6	PVC	Multiple	2010, 2012	7,067
8	PVC	Multiple	2010	3,955

Some parts of the existing distribution system were not replaced as part of the 2010 project. Due to lack of records, installation date, size, and material of those sections is unknown. These sections of main are located on Martin Street and Skunk Hollow Road. Please see the schematic of the existing system included in Appendix D.

The distribution system consists of a single pressure zone. While water pressures are relatively consistent for most of the town, there have been complaints of low pressure at times of high use. It is believed that this is caused by large water users on single "dead-end" mains. Hotels, gas stations, or other commercial properties on the upstream end of the main are likely the cause of fluctuations in water pressure to properties downstream on the same main.

2.6.2 Capacity Assessment

To determine the fire flow demand, we contacted the Insurance Services Office, Inc (ISO) area representative and obtained results of the latest ISO analysis and testing that was completed in 2020. The test results are included in Appendix F. According to the information presented in the ISO analysis, the largest needed fire flow is at the intersection of Eaton & Broadway, requiring1,750 gpm at 20 psi. The ISO also takes into account the existing storage available to determine if a flow-rate is feasible under the current system. According to the report, the actual flow possible with the existing storage available would be 976 gpm.

Create a hydraulic model of the system (MCEP comment). Add information here.

2.6.3 Condition Assessment

According to the system's operator, the entire system is metered, and the meter's were replaced from 2017-2018. The operator is currently working on documenting an operation and maintenance schedule. The current schedule includes exercising valves and hydrants yearly, visual tank inspections, annual required maintenance to broken meters, and other such jobs as needed.

Most of the system was replaced with updated PVC and HDPE pipe in 2007, 2010 and 2012 but, some of the original system remains. Though not certain due to lack of records, it is believed the original system consists primarily of aging PVC pipe. Portions of the system that pre-dates the 2010 project are currently experiencing freezing problems due to lack of bury depth and dead-end mains.

A flush hydrant is installed on the end of the main at the southeast corner of the Water District boundary (Skunk Hollow Road). Per the operator, the flush hydrant runs on an electric timer system. Water wasted at the flush hydrant will be discussed later in this report. The flush hydrant is set to open at 4 am every day for 5 minutes. Assuming the hydrant is operating at 50 gpm, the current flush hydrant wastes approximately 250 gallons per day or 91,250 gallons per year. At this rate, the flush hydrant accounts for 2% of the total water usage in the entire system.

Replacement of these aging mains and flush hydrants is included in the Water District's future plans. Water becomes stagnant in long dead-end mains, and to improve water quality the mains require looping. Looping water mains also provides alternate paths for water to reach the same destination, allowing the operator flexibility to isolate specific areas for repairs while limiting service interruptions. Other benefits of looping include increased fire flow through smaller mains because water is supplied from two directions. Other than minor breaks and some dead-end mains the distribution system is in good operating condition.

2.6.4 Regulatory Assessment

In 2024 the DEQ completed a Sanitary Survey Inspection of the Cooke City Water District. During the inspection the DEQ found no significant issues with the existing distribution system.

The 2024 Sanitary Survey Inspection report is included in Appendix C.

2.7 Evaluation of Existing SCADA System

2.7.1 Description of Existing System

To summarize, the existing Cooke City water system consists of three (3) well pumps located within a well house, a pressure reducing valve (PRV) vault, and a water storage tank.

The well house contains three (3) Yaskawa variable frequency drives (VFDs) used to control the well pumps along with a central control panel. The control panel includes a RACO Verbatim Series VSS telemetry unit and a C-More operator interface terminal (OIT). The operator interface provides limited system visualization but does not currently allow operator setpoints or full operational control of the system. Telemetry between system sites is currently accomplished through a licensed radio frequency system utilizing an omni-directional antenna at the well house.

Figure 5 - Well House Controls

The PRV vault contains a similar control panel configuration consisting of a Rhino power supply and an Automation Direct BRX PLC (Model BX-DM1E-10ER3-D). Communications at the PRV site are supported through a directional Yagi antenna. The PRV vault primarily functions as a pressure control point within the distribution system.

At the water storage tank, there is currently no dedicated control panel or telemetry equipment installed. Tank level data is transmitted to the well house for display. However, the system presently lacks localized control or monitoring equipment at the tank site. A control panel and associated instrumentation are anticipated as part of future system improvements.

The existing system primarily controls the well pumps based on distribution system pressure rather than finished water storage tank level. Operators currently have limited visibility and functionality through the existing OIT, and the system does not provide adjustable setpoints, pump sequencing control, or direct VFD interaction through the interface.

2.7.2 Performance Assessment

Based on discussions with the Town operators and review of the existing system operation, the current control strategy has presented several operational challenges. The well pumps are presently controlled primarily from system pressure conditions rather than finished water storage tank level. This control method can lead to inefficient pump operation and reduced operational stability within the water system.

Operators have reported instances where the system pumps more water than is required to meet system demand, leading to overfilling within the water storage tank. Additionally, there have been reports of pumps operating for extended periods of time beyond what would typically be expected under normal demand.

Another reported concern is delayed or inconsistent tank level information displayed at the operator interface. This delay in tank level data can impact operational decisions and reduce the ability of operators to respond promptly to changing system conditions. The existing telemetry system currently appears to maintain communication between sites without significant communication loss. However, further analysis performed by MET indicates that alternative radio frequency options, such as 900 MHz spread spectrum radios, may provide improved reliability and flexibility depending on path conditions. Licensed frequency radios may still remain a viable option depending on final system design and communication requirements.

Operational visibility within the current system is limited. The existing interface does not provide operators with adjustable setpoints, direct VFD control, or flexible pump control strategies. Remote system access is also limited. While internet connectivity is available at the well house for monitoring purposes, operators currently have minimal ability to remotely control system functions.

Alarm notification capabilities are also limited due to infrastructure constraints within Cooke City. Cellular communication services are not reliably available within the town which significantly restricts typical SCADA alarm notification methods. Some limited landline infrastructure exists but may not support modern alarm notification platforms.

2.7.3 Condition Assessment

The existing control panels and instrumentation appear to be in suboptimal condition. Portions of the system have been upgraded over time. However, the upgrades have not been implemented consistently throughout the system. The current operator interface installation appears to have gaps within the panel enclosure where the OIT has been installed, which may affect the environmental protection of the panel.

Additionally, the Town currently does not have access to the existing PLC program code. The original programmers did not provided the source code, which limits the ability of operators or third-party integrators to modify or expand the system controls. This restriction significantly reduces the flexibility of the system and presents challenges for future upgrades or troubleshooting.

Expansion of the current control system would be difficult due to the limited access to programming, the current system architecture, and the mixture of hardware components installed throughout the system. As operational needs evolve, the existing system may not provide sufficient flexibility to accommodate future monitoring, control, or telemetry improvements.

2.8 Financial Status of Existing Facilities

The Cooke City Water District is currently serving four separate bonds for the rehabilitation projects that occurred over the past 15 years. The bond is set to expire in

2029. Currently, the Water District has no planned projects outside of this project. A summary of the Water District's income for the last three fiscal years is provided in the following table. A complete breakdown of the water system revenues, expenditures, debt service reserve, and rates are included in Appendix G.

Table 10 – Summary of Water Revenues

YEAR	WATER METER INCOME	Average
2023	$79,574.04	$75,885.30
2024	$71,381.00	
2025	$76,700.86	

New meters were installed in 2017-2018 to better track the system's water usage. The meters provided an immediate benefit to tracking leakage within the system. The new meters also helped the Water District update its billing system to a base fee + consumption cost. Prior to the meters, the District billed based on a base rate plus charges for extra use. The updated billing system has resulted in higher revenues.

The current water rates for the Cooke City Water District are established at a base rate of $39.39 for the first 5,000 gallons of metered water with a tier system for additional water used after that. Rates for additional use can be found below.

Table 11 – Current Water Use Rates

USAGE (GALLONS)	ADDITIONAL COST	COST UNIT
5001-10,000	$0.80	PER 100 GALLONS
10,001-25,000	$1.00	PER 100 GALLONS
25,001-40,000	$1.15	PER 100 GALLONS
40,001-50,000	$1.35	PER 100 GALLONS
Over 50,000	$1.50	PER 100 GALLONS

Base rate and additional use cost increases are planned to be adopted in May 2026. No increases beyond that date are currently planned. Because this project will occur after the proposed rate increase, an analysis was conducted to determine the approximate revenue from the implementation of the proposed increase. The proposed base rate will be increased to $49.39. The table below shows the new rate structure and increase in costs.

Table 12 – Proposed Water Use Rates

USAGE (GALLONS)	ADDITIONAL COST (50% INCREASE)	COST UNIT
3001-20,000	$1.10	PER 100 GALLONS
Over 20,000	$1.50	PER 100 GALLONS

Because the District bills on a tiered basis, the relationship between user rates and income of the District is not linear. For this reason, it was required to calculate the average income based on average water consumption per user per month. User billing was then calculated based on the new rates above. Revenue after the increase was calculated to be $102,244.08. Because the project will occur after the rate increase, this number will be used for calculations later in this report.

The community does not currently have a sanitary sewer base rate due to residents having individual septic systems and not being tied into a sanitary sewer system. Portions of the proposed sanitary sewer system were installed in 2025, but the system is non-operational. A 2022 PER update completed by Triple Tree Engineering estimated sewer base rates at the project's completion be based upon the Montana Department of Commerce target rates.

The target rate is used to determine if a municipality is contributing fairly based on comparisons to other communities throughout the state. To apply for grant funding from the Montana Department of Commerce, user rates after completion of the project must meet or exceed the target rates.

Target rates are calculated as a percentage of the median income for the municipality. The percentages of median income are approximately 0.9 percent of the median household income for wastewater only, 1.4 percent of the median household income for water only, or 2.3 percent of the median household income for water and wastewater combined. The median household income for Cooke City, according to the 2019-2023 census, was $41,750. According to the Montana Department of Commerce, target rates for Cooke City are as follows.

Table 13 – Target Rates

SYSTEM	MEDIAN HOUSEHOLD INCOME	PERCENTAGE	MONTHLY TARGET RATE
WATER	$41,750	1.4%	$48.71
WASTEWATER	$41,750	0.9%	$31.31
COMBINED	$41,750	2.3%	$80.02

The LMI information and target rate data is included in Appendix A.

The water target rates are based on equivalent dwelling units (EDUs); therefore, it is necessary to calculate the community's existing rates based on EDUs. A 3/4-inch water service is a typical water service, and is considered 1 EDU. The EDUs for each water service are calculated by comparing the area of the service line to the area of a ¾ inch service line.

Per conversations with the District, it is believed that all of the existing water service lines are the same size even for commercial businesses. It has been discussed in the past whether the service sizes needed to be increased, but nothing has been changed since then. The current operator agreed that all water service lines are ¾". A map created by Great West Engineering only showed one 2" water service to the Super 8 in town. For this reason, all users will have assumed ¾" water service size except for the Super 8 which will be a 2". The total commercial and residential EDU's for Cooke City are summarized in the following table.

Table 14 – Equivalent Dwelling Units

SERVICE SIZE (INCHES)	EDU'S PER SERVICE SIZE	RESIDENTIAL		COMMERCIAL		TOTALS	
		# OF SERVICES	# OF EDU'S	# OF SERVICES	# OF EDU'S	# OF SERVICES	# OF EDU'S
3/4	1	96	96	0	0	96	96
1	1.79		0		0		0
1.5	4		0		0		0
2	7.14		0	1	7		7
TOTALS		96	96	1	7	96	103

The 2025 revenue from metered water sales was $76,700.86 (Appendix G). Using the planned rate increases, the estimated revenue will increase to $102,244.08/year, providing an average monthly residential metered water charge of $8,520.34. The total number of EDU's in 2025 was 103; therefore, the water only rate per EDU is $82.72/EDU/month.

As discussed above, the Sewer District has installed portions of the proposed sanitary sewer system in the summer of 2025. Per a PER update completed by Triple Tree Engineering in 2022, the Sewer District plans on billing 150% of the target rate at the time of completion. The Sewer District must bill this rate as a stipulation to MCEP funding received for the sewer project. Assuming 150% of the current target rate, the sewer district will be billing $46.97.

"Commerce utilizes the combined rates for both water and wastewater systems in its target rate analysis. This helps to ensure that an applicant's need for financial assistance is not understated if either of the systems has high rates, even though the other system may have relatively low rates." The combined water and wastewater rate at the completion of the sewer project will be $129.69/EDU's/month. After the completion of the sewer project, the community will exceed the target rate for both water and sewer of $80.02/EDU's/month; therefore, the water district is eligible for grant funding through the Montana Department of Commerce.

2.9 Water/Energy/Waste Audits

There have been no official water, energy, or waste audits completed in recent years. The PWS-6 and Sanitary Survey Inspection reports are included in Appendix C.

Per the 2020 wastewater PER completed by Performance Engineering:

> *In 2017, the Cooke City Water District installed advanced automatic meter reading (AMR) equipment on every customer's meter. Consumption data is automatically collected and transferred to the data cloud where it is analyzed with algorithms to identify possible water system leaks. These reports are regularly reviewed by District leadership and investigated by staff. Customers are notified of leaks and reminded that they are financially responsible for all water which passes through their meter. Almost universally, customers promptly repair leaks. This common-sense approach has been hugely successful in reducing lost water with one customer cutting "consumption" from 2,200 gallons per day to 120 gallons per day.*

The Water District has continued to make a conscious effort to decrease water waste within the system for the last seven years.

3 NEED FOR PROJECT

3.1 Summary of Problems

Problems within the existing water system were discussed in Chapter 2. A summary of the problems are as follows:

- The existing control and telemetry systems are having reliability problems and other continual oddities.
- The water tank mixer is currently broken and in need of replacement.
- There is no permanent power to the water storage tank and needs to be installed to allow for a submersible water tank mixer.
- The broken fittings for the electrical conduits on the well heads require replacement.
- Dead-end mains with and without a flush hydrant are present within the system leading to freezing, low-pressure, restricted fire flow, stagnation and leakage of water.

3.1.1 Existing Water Supply

The existing well pumps were replaced in 2018 and are currently in good operating condition. The system controls were replaced around the same time. All existing piping for the well house is in good operating condition.

The 2024 Sanitary Survey Inspection report by DEQ noted the fitting for the electrical conduit was broken and no longer connected to the well cap at two of the well heads. As a result of the broken fitting the conduit has pulled away from the well cap creating an opening into the well casing. This conduit separation has created a potential pathway for contamination of the wells.

3.1.2 Existing Water Storage

The water storage tank was installed in 2010 and is currently in good operating condition. The water tank mixer is currently broken and in need of repair or replacement.
Because of a non-functioning mixer a thick layer of ice has formed on top of the water in the tank and also creates the risk of stratification. Ice that forms in a lined water tank can be very concerning because it can tear the liner and cause leakage. A tear could also create a potential pathway for contamination of the town's drinking water.

3.1.3 Existing Water Distribution System

The distribution system consists of a variety of pipes and sizes from various projects throughout the years. Most of the system was replaced in 2007, 2010 and 2012. Some segments of the original water main are still active in town with no record of initial service. Dead-end and aging water mains exist throughout the distribution system.
The distribution system experiences freezing, low-pressure, restricted fire flow, stagnation and leakage of water in areas of service with dead-end mains.
An automated flush hydrant was installed at the end of the water main along Skunk Hollow Road and is used to discharge stagnant water from the system along with circulating water in other parts of the system. The flush hydrant is set to open at 4 am every day for 5 minutes. Assuming the hydrant is operating at 50 gpm, the current flush hydrant wastes approximately 250 gallons per day or 91,250 gallons per year. At this rate, the flush hydrant accounts for 2% of the total water usage in the entire system.

3.2 Health, Sanitation & Security

Health and safety of the public is of the highest concern for any community water system. The Cooke City Water District has deficiencies within their water system that could compromise health and safety of the public. Improvements to the well heads and water storage tank are of highest priority because they create the biggest health risks.

3.2.1 Existing Water Supply

In 2024 the DEQ completed a Sanitary Survey Inspection of the Cooke City Water District. During the inspection the DEQ found issues with the well heads that were classified as significant deficiencies. The fittings for the electrical conduits were broken on two of the well heads. The electrical conduit was no longer connected to the well cap which has created an opening into the well casing.

The 2024 Sanitary Survey Inspection report is included in Appendix C.

3.2.2 Existing Water Storage

The water storage tank is a critical component of any water system. Any failure to the tank would result in a complete system shutdown, resulting in a public health and safety concern. The water tank is equipped with a solar-powered mixer to prevent freezing and stratification of the water in the tank. The water tank mixer broke again during the winter of 2025 and is inoperable. MT DEQ Circular-1 Section 7.0.6 Stored Water Age states the following:

> *Finished water storage designed to facilitate fire flow requirements and meet average daily consumption should be designed to facilitate turnover of water in the finished water storage to minimize stagnation and stored water age. Consideration should be given to separate inlet and outlet pipes, mixing, or other acceptable means to avoid stagnation and freezing. Poor water circulation and long detention times can lead to loss of disinfection, residual, microbial growth, formation of disinfectant byproducts, taste and odor problems, and other water quality problems.*

Because of a non-functioning mixer a thick layer of ice has formed on top of the water in the tank and also creates the risk of stratification. Ice that forms in a lined water tank can be very concerning because it can tear the liner and cause leakage. A tear could also create a potential pathway for contamination of the town's drinking water. The Water District is currently in the process of planning to repair or replace the existing mixer but does not have the necessary funds for the project.

In 2024 the DEQ completed a Sanitary Survey Inspection of the Cooke City Water District. During the inspection the DEQ found no significant issues with the tank but said the perimeter fence around the tank was in disrepair. Per the report:

> *…the fencing around the storage tank are in a state of disrepair and should be fixed to keep out unwanted trespassers, such as bison. Proper security measures are required to help protect vital infrastructure from damage which could lead to an inability to provide safe and adequate water to the public.*

The perimeter fence around the existing tank has been fixed since the 2024 DEQ Sanitary Survey Inspection and is in good working condition.

The 2024 Sanitary Survey Inspection report is included in Appendix C.

3.2.3 Existing Water Distribution System

Dead-end water mains exist throughout the distribution system. MT DEQ Circular-1 Section 8.2.4 states the following regarding dead ends:

> *a. … Dead ends must be minimized by using appropriate tie-ins whenever practical.*
> *b. Where dead-end mains occur, they must be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes…*

Eight dead-end water mains exist in the system, five of which are equipped with hydrants at the end of the main. The dead-end water main located at the southeast corner of the Water District boundary is equipped with an automated flush hydrant. The flush hydrant is an electronically operated valve which operates on a timer system. Freezing, low-pressure, restricted fire flow, stagnation and leakage occurred as a result of the dead-end mains.

3.3 Aging Infrastructure

The majority of the water system is relatively new. Major water system rehabilitation projects in 2007, 2010 and 2012 replaced most of the original system with new PVC pipe. Some segments of the main pre-dating the 2010 project still exist and are currently in operation. The exact date of construction is unknown, but it is assumed that these lines were installed in the mid 1980's during the community's last major water system project. The dead-end mains within the system are located in areas where the original system remains. Portions of the system that pre-dates the 2010 project are currently experiencing freezing problems due to lack of bury depth and dead-end mains.

3.4 System Operation and maintenance

The Water District contracts an independent part-time operator to operate and maintain the existing system. Currently the operator oversees all operation and maintenance of the system and is training two additional part-time operators to assist in the duties. Cooke City's water system is very well maintained. Some of the yearly operation and maintenance requirements include meter replacement, leak repairs, meter reading and exercising valves and hydrants.

The town is entirely metered and equipped with a radio read system which requires very little time to populate monthly meter readings required for billing purposes.

3.5 Reasonable Growth

The 2046 population is projected to be 100 based on census information over the last decade. However, the usage of the Cooke City water system is primarily dependent on the number of visitors the community will host throughout the year. Using the average rate of increase in visitors from 2015 to 2025, the expected number of visitors at the end of the planning period 2046 can be calculated. See Table 2 below.

Table 2 Continued – NE Entrance Visitors

Year	Park Visitors at NE Entrance	Percent Change
2015	104,688	N/A
2016	103,982	-0.67%
2017	101,522	-2.37%
2018	100,272	-1.23%
2019	108,240	7.95%
2020	99,470	-8.10%
2021	130,248	30.94%
2022	21,469	-83.52%
2023	121,415	465.54%
2024	133,229	9.73%
2025	136,768	2.66%
Average Increase Per Year		6.20%
2046	483,600	6.20%

Per the table above, visitation to the park through Cooke City is expected to more than triple by the end of the planning period. It would be unrealistic to assume that Cooke City's amenities would see such an increase in use by 2046. Limitations with the infrastructure (gas stations, restaurants, shops, hotels and rentals) will be the deciding factor, but it is worth noting that the system will be affected by these future demands.

Also, the Water District is planning to expand service to properties within the boundaries that are currently unserved. Existing concerns of low-pressure and freezing have kept the district from pursuing these connections. The long-term goal for the Water District is to serve all properties within the existing District boundary. These service additions will lead to increased revenue, a more consolidated water system, and a stronger cash-flow base to support the ever-increasing amount of tourism that many residents in Cooke City rely on for income.

4 ALTERNATIVES CONSIDERED

4.1 Summary of Problems

Problems within the existing water system were discussed in Chapter 2. A summary of the problems are as follows:

- The existing control and telemetry systems are having reliability problems and other continual oddities.
- The water tank mixer is currently broken and in need of replacement.
- There is no permanent power to the water storage tank and needs to be installed to allow for a submersible water tank mixer.
- The broken fittings for the electrical conduits on the well heads require replacement.
- Dead-end mains with and without a flush hydrant are present within the system leading to freezing, low-pressure, restricted fire flow, stagnation and leakage of water.

The current issues plaguing the distribution system have created reluctance within the Water District to accommodate additional users within its existing boundaries. While one of the District's long-term objectives is to extend services to more properties within the community, this goal is hindered by the prevailing problems within the system. Addressing and resolving these existing issues is essential to fulfill the District's expansion goals and meet the growing demand for water services within the community.

A preliminary examination of possible system alternatives allows a broad approach to ultimate selection, thus ensuring adequate consideration of all feasible alternatives. Following the preliminary screening process, selected alternatives undergo a more detailed analysis, with the most viable alternatives being subject to a detailed design analysis and cost estimate.

Development of optimized improvements to facilities can be a complex process. A preliminary consideration in this process includes the cost of the improvements, including initial and future capital costs and annual reliability and flexibility, and process energy and resource requirements. These factors must be considered together to determine the best alternative for fulfilling community goals.

Regardless of the selected alternative, certain improvements are necessary for system functionality. The following improvements will be included with the final alternative selection but have been excluded from the alternative analysis.

1. Complete replacement of the control and telemetry systems.
2. Replacement of the water storage tank mixer.
3. Installation of power to the water storage tank.
4. Replacement of the broken electrical conduit fittings on the well heads.

The following alternatives have been developed to address the problems with Cooke City's existing distribution system.

4.2 Alternative 1- No Action

Description

This alternative includes taking no action to address the existing problems with the distribution system. The existing system would continue to freeze as it has in the past. During times of high water demand, downstream properties will continue to experience low pressure. Also, existing system leaks and flush hydrants would continue causing unnecessary use of electricity, waste of potable drinking water, and exposing the system to possible contamination.

Design Criteria

No additional design requirements are necessary if no action is taken.

Map

A schematic of the existing system is included in Appendix D.

Environmental Impacts

There would be no additional environmental impacts from the no action alternative.

Land Requirements

This alternative would require no additional land acquisition for development.

Potential Construction Problems

No construction is required for this alternative.

Sustainability Considerations

Continued reliance on the existing dead-end mains will exacerbate water and energy waste. Dead-end mains, particularly those fitted with hydrants, require periodic flushing to remove stagnant water. One dead-end main, outfitted with an automated flush hydrant, is particularly problematic, leading to waste of thousands of gallons of potable water annually. Section 2.6 of this report highlights that this single flush hydrant alone is estimated to waste up to 91,250 gallons per year, equivalent to approximately 2% of the total water consumption within the entire system. Addressing these inefficiencies is critical to mitigate water and energy losses and enhance the overall sustainability of the water distribution system.

Cost Estimates

This alternative would not require additional infrastructure costs but would continue to impact the operation and maintenance costs caused by the existing dead-end mains.

4.3 Alternative 2 – Additional Flush Hydrants

Description

This alternative would include installation of flush hydrants on all dead-end mains within the existing system. The proposed hydrants would be similar to the existing flush hydrant located at the dead-end main on Skunk Hollow Road.

Design Criteria

The purpose of this alternative would be to satisfy MT DEQ Circular-1 Section 8.2.4.b which reads as follows:

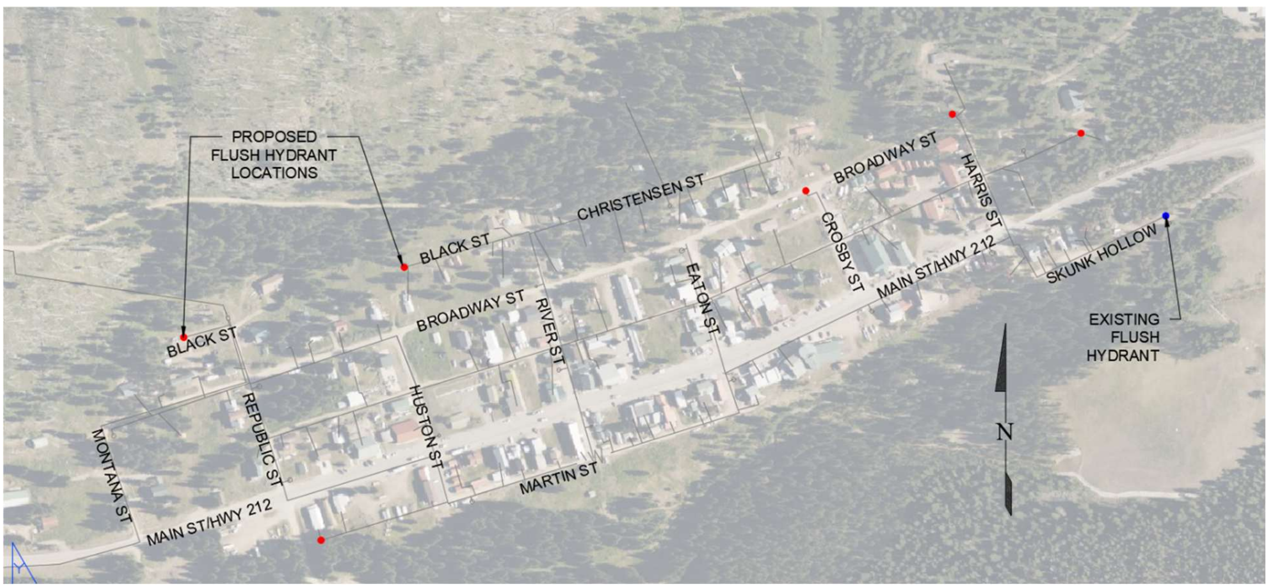
> *Where dead-end mains occur, they must be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes…*

Of the eight total dead-end mains located throughout the system, five are equipped with fire hydrants at the dead-ends of the main and one of those has a purpose-built flushing hydrant.

Map

Following is a schematic of this alternative.

Figure 6 – Alternative 2 Proposed Flushing Hydrants



Environmental Impacts

Adverse environmental impacts are not expected with implementation of this alternative. All work would be limited to the existing community right-of-way, and all work is in areas that have been previously impacted, constructed upon, and disturbed. We do not anticipate impacts to previously undisturbed areas, wetlands, or other areas of environmental concern.

Land Requirements

We do not anticipate the need for additional land for the implementation of this alternative. All work is limited to inside of existing right-of-way.

Potential Construction Problems

Cooke City faces several challenges due to its geographical and relative isolation. Firstly, being situated high in the Rocky Mountains, concerns about subsurface rock arise

whenever excavation is involved. While this alternative mainly focuses on areas already disturbed from previous projects, this concern cannot be entirely overlooked.
Secondly, Cooke City's remote location poses a significant challenge to construction efforts. Unlike projects in more populated areas, those working in Cooke City lack easy access to miscellaneous materials that may be needed throughout the construction process. Consequently, contractors must plan ahead and stockpile a diverse range of supplies to ensure uninterrupted progress. For this reason, construction costs within Cooke City can be considerably higher than expected. Special provisions will be made to account for this in the cost estimate.
Lastly, considering that the majority of Cooke City's economy hinges on summer tourism, the construction project will unavoidably overlap with the peak tourist season. With construction activities likely to cause disruptions, traffic congestion, noise, and dust, it is imperative for the contractor to prioritize minimizing inconveniences. While temporary disruptions are anticipated during construction, proactive communication and thorough preparation will be vital to ensure a welcoming environment for both residents and visitors during the busiest time of the year.

Sustainability Considerations

As explained in Alternative 1, dead-end mains fitted with hydrants, require periodic flushing to remove stagnant water. One existing dead-end main, outfitted with a flush hydrant, is sustainably problematic, leading to waste of thousands of gallons of potable water annually. Section 2.6 of this report highlights that this single flush hydrant alone is estimated to waste up to 91,250 gallons per year. If we apply the same amount of waste to an additional six flushing hydrants, the following additional waste is anticipated:

$$91{,}250\ gallons \times 6\ additional\ hydrants = 547{,}500\ additional\ gallons$$

That's over ½ million gallons of additional wasted water with the implementation of this alternative. Most importantly, this amount will be added on to what is already being lost in existing system leaks, existing flush hydrants, and private service leaks.

Cost Estimates

The following cost estimate has been established for comparison purposes to other viable distribution system alternatives. The cost estimate includes a 20% contingency and 20% engineering as well for total project costs. Mobilization has also been increased to 25% instead of 8% due to the location of the community.

Table 15 – Alternative 2 Cost Estimate

Alternative 2 Construction Cost Estimate						
Project		Item	Unit	Quantity	Unit Cost	Total
Alternative 2 Costs	General Requirements	General Requirements (assumed 25% mobilization, bond, insurance etc.)	LS	1	$22,186	$22,186
		Traffic Control	LS	1	$12,987.09	$12,987
		Total Cost				$35,173
	New Flush Hydrants	Flush Hydrant	EA	6	$10,822.58	$64,935
		Temporary Water	LS	1	$10,823	$10,823
		Total Cost				$75,758
Construction Cost						$110,931
20% Contingency						$22,186
Total Construction Costs						**$133,118**
Engineering (Assumed 20% of Total Construction)						$26,624
Total Project Cost (2029)						**$159,741**

The current flush hydrant experiences minimal to no operation and maintenance cost. Costs related to minor leak repairs and upkeep have been inconsequential for the District. Therefore, the operation and maintenance of additional flush hydrants will not be factored into the alternative.

4.4 Alternative 3 – Replace & Upsizing Existing Mains

Description

This alternative would include replacement of the existing dead-end mains in the alley between Main and Broadway, and Skunk Hollow Road with new larger diameter PVC. Due to the nature, location, and timing of the complaints, it is assumed that the low pressures are a product of high water demand in areas with dead-end mains. A larger main would alleviate low pressure during times of high water demand.
The replacement of the existing mains would also include installation of two flushing hydrants.

Design Criteria

The basis of this design would include up-sizing of dead-end mains to meet requirements of high water demands during the summer months. MT DEQ Circular-1 section 8.2.1 states:

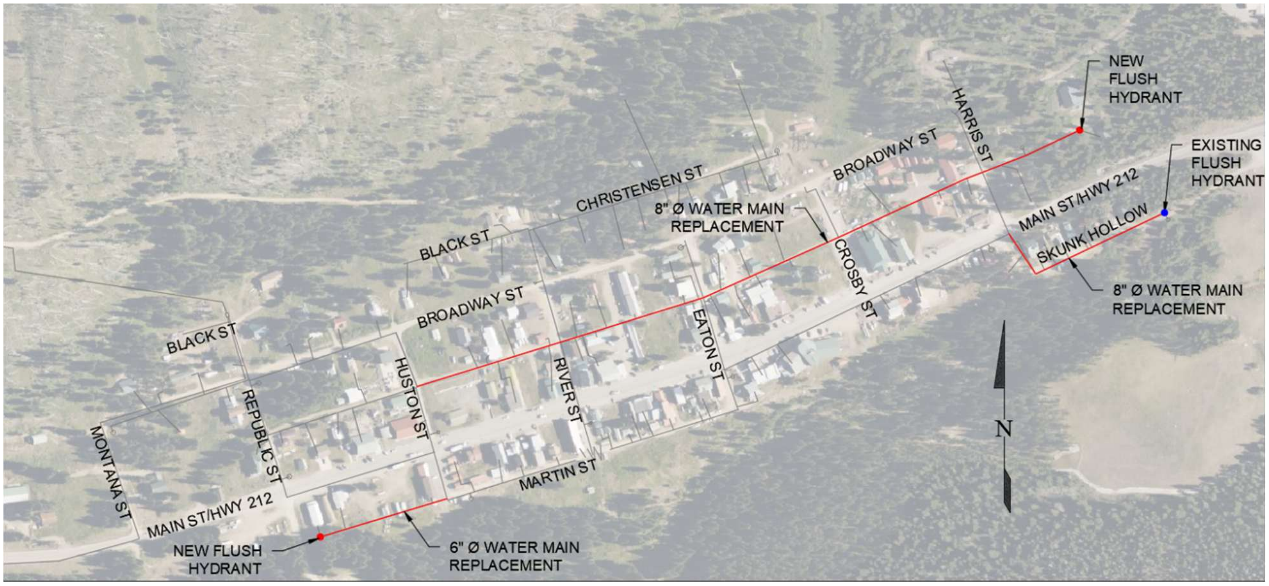
> *…The system must be designed to maintain a minimum normal working pressure of 35 psi. Minimum pressure under all conditions of flow (e.g. fire flows, hydrant testing, and water main flushing) must be 20 psi…*

The working pressure of the distribution system when complaints of low pressure were made were never measured, but it can be assumed that a normal working pressure of 35 psi or greater would not have resulted in complaints.

Map

Following is a schematic of this alternative.

Figure 7 – Alternative 3 Dead-End Main Replacement



Environmental Impacts

Adverse environmental impacts are not expected with the implementation of this alternative. All work would be limited to the existing community right-of-way and all work is in areas that have been previously impacted, constructed upon, and disturbed. We do not anticipate impacts to previously undisturbed areas, wetlands, or other areas of environmental concern.

Land Requirements

We do not anticipate the need for additional land for implementation of this alternative. All work is proposed within existing right-of-way.

Potential Construction Problems

Cooke City faces several challenges due to its geographical location. Firstly, being situated high in the Rocky Mountains, concerns regarding subsurface rock arise whenever excavation is involved. While this alternative mainly focuses on areas already disturbed from previous projects, this concern cannot be entirely overlooked.

Secondly, Cooke City’s remote location poses a significant challenge to construction efforts. Unlike projects in more populated areas, those working in Cooke City lack easy access to miscellaneous materials that may be needed throughout the construction process. Consequently, contractors must plan ahead and stockpile a diverse range of supplies to ensure uninterrupted progress. For this reason, construction costs within Cooke City can be considerably higher than expected. Special provisions will be made to account for this in the cost estimate.

Lastly, considering that the majority of Cooke City’s economy hinges on summer tourism, the construction project will unavoidably overlap with the peak tourist season. With construction activities likely to cause disruptions, traffic congestion, noise, and dust, it is imperative for the contractor to prioritize minimizing inconveniences. While temporary disruptions are anticipated during construction, proactive communication and thorough preparation will be vital to ensure a welcoming environment for both residents and visitors during the busiest time of the year.

Sustainability Considerations

Water mains that are being replaced will be fitted with flushing hydrants as required in MT DEQ Circular-1. As was highlighted in Section 2.6 of this report, the one existing flushing hydrant is estimated to waste approximately 91,250 gallons per year. If we apply that same amount of waste to the two additional flushing hydrants, the following waste is anticipated:

$$91{,}250\ gallons \times 2\ additional\ hydrants = 182{,}500\ gallons$$

An additional 182,500 gallons of additional wasted water is anticipated at the implementation of this alternative. Most importantly, this amount will be added to what is already being lost in existing system leaks, existing flush hydrants, and private service leaks.

Cost Estimates

The following cost estimate has been established for comparison purposes to other viable distribution system alternatives. The cost estimate includes a 20% Contingency and 20% engineering as well for total project costs. Mobilization has also been increased to 25% instead of 8% due to the location of the community as discussed above.

Table 16 – Alternative 3 Cost Estimate

Alternative 3 Construction Cost Estimate							
Project		Item	Unit	Quantity	Unit Cost	Total
Alternative 3 Costs	General Requirements	General Requirements (assumed 25% mobilization, bond, insurance etc.)	LS	1	$218,352	$218,352
		Traffic Control	LS	1	$27,056.44	$27,056
		Total Cost				$245,409
	Additional Work	Existing Water Main Removal	LF	3175	$28	$89,340
		Road Restoration	SY	3083	$38.96	$120,131
		Yard Restoration	SY	600	$16	$9,740
		Total Cost				$219,211
	New Water Main	8" C900 PVC Pipe	LF	2200	$128.79	$283,335
		6" C900 PVC Pipe	LF	975	$126.62	$123,459
		8"x6" MJ Cross	EA	3	$2,489	$7,468
		8" MJ Tee	EA	1	$2,056	$2,056
		8"x6" MJ Tee	EA	3	$2,273	$6,818
		8" MJ Gate Valve	EA	10	$4,870	$48,702
		6" MJ Gate Valve	EA	3	$4,058	$12,175
		Fire Hydrant	EA	3	$13,258	$39,773
		Total Cost				$523,786
	New Water Main Additional Work	Water Service Re-Connect	EA	40	$1,082	$43,290
		Existing Main Connection	EA	10	$3,463	$34,632
		Flush Hydrant	EA	2	$10,823	$21,645
		Existing Flush Hydrant Connection	EA	1	$3,788	$3,788
		Total Cost				$103,356
Construction Cost						$1,091,761
20% Contingency						$218,352
Total Construction Costs						**$1,310,114**
Engineering (Assumed 20% of Total Construction)						$262,023
Total Project Cost (2029)						**$1,572,136**

Because this alternative only replaces areas of existing water main, it is assumed that no additional operation and maintenance costs will be present to the Water District. Therefore, the operation and maintenance of additional flush hydrants will not be factored into the alternative.

4.5 Alternative 4 – Existing Water Main Looping

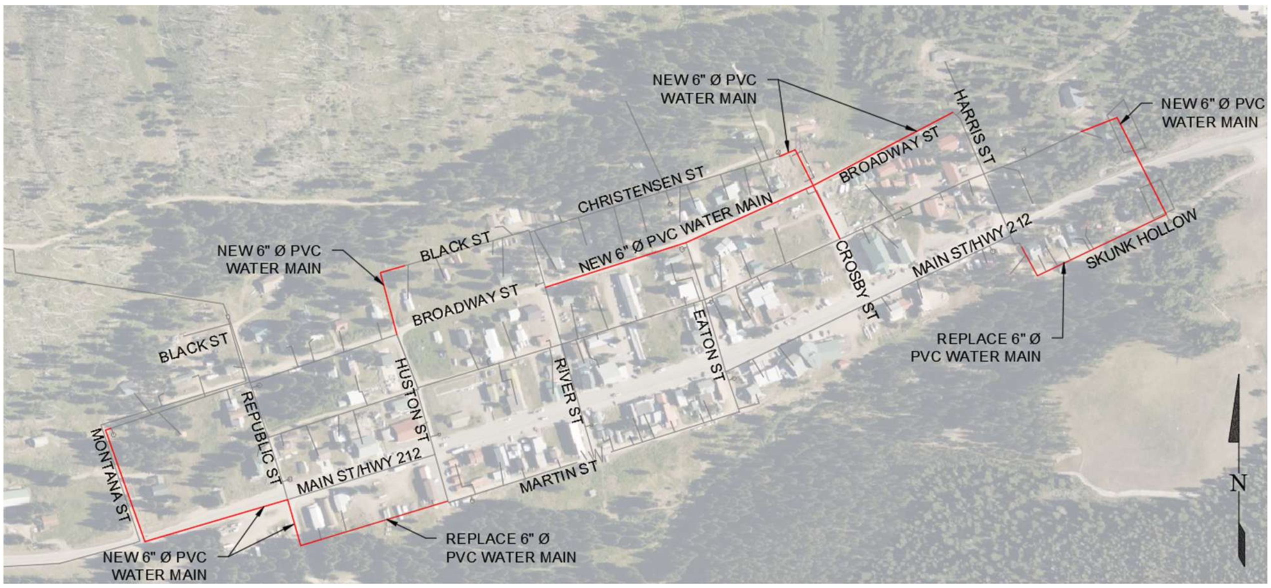
Description

This alternative includes construction of new water mains to loop the existing system, therefore eliminating dead-end mains. While many of the existing dead-ends are already equipped with tee fittings for potential tie-ins, new fittings will be installed where necessary. Additionally, gate valves will be installed to isolate sections of the mainline during construction activities. Furthermore, this alternative encompasses replacement of aging and shallow water mains in Skunk Hollow and Martin Street. The implementation of this alternative will necessitate land acquisition to facilitate the construction of the looping mains and connections.

Map

Following is a schematic for this alternative.

Figure 8 – Alternative 4 Existing Water Main Looping



Environmental Impacts

This alternative will require land acquisition along an existing property line for the Crosby Street Main. Both bordering lots are currently developed with residential structures. Because the lots are currently developed, no adverse environmental impacts are expected for that section of main. Other work for this alternative would be limited to existing community right-of-way in areas that have been previously impacted, constructed upon, and disturbed.

One section of water main on Martin Street borders an existing Zone A floodplain. This section of water main will require construction within the floodplain and a County floodplain permit will be required.

Land Requirements

This proposed alternative will require land acquisition for the northern most section of the proposed Crosby Street water main. Approximately 30' of utility easement will be required by at least one landowner. Based on discussions with the District, one of the current landowners would like to connect to the existing system and is likely to work with the District.

All other proposed sections of mainline are proposed for construction within existing right-of-way.

Potential Construction Problems

Cooke City faces several challenges due to its geographical location. Firstly, being situated high in the Rocky Mountains, concerns regarding subsurface rock arise whenever excavation is involved. Since almost all of the proposed project is located in areas without existing underground utilities, a geotechnical investigation will be required prior to construction.

Secondly, Cooke City's remote location poses a significant challenge to construction efforts. Unlike projects in more populated areas, those working in Cooke City lack easy access to miscellaneous materials that may be needed throughout the construction process. Consequently, contractors must plan ahead and stockpile a diverse range of supplies to ensure uninterrupted progress. For this reason, construction costs within Cooke City can be considerably higher than expected. Special provisions will be made to account for this in the cost estimate.

Lastly, considering that the majority of Cooke City's economy hinges on summer tourism, the construction project will unavoidably overlap with the peak tourist season. With construction activities likely to cause disruptions, traffic congestion, noise, and dust, it's imperative for the contractor to prioritize minimizing inconveniences. While temporary disruptions are anticipated during construction, proactive communication and thorough preparation will be vital to ensure a welcoming environment for both residents and visitors during the busiest time of the year.

The Skunk Hollow water main loop will have it's own set problems. Directional drilling and/or jack and bore will likely be required to cross Highway 212 and cross Miller Creek. Besides the complications of the jack and bore itself, these crossings will also require extra permitting during the design phase of the project. The Skunk Hollow section will also require a substantial amount of tree removal.

Sustainability Considerations

This alternative will replace the existing flushing hydrant and mitigate the need for additional flushing hydrants. As discussed earlier, the exiting flushing hydrant currently wastes approximately 91,250 gallons of water per year. This alternative would mitigate this water waste.

Regarding other alternatives, Alternative 2 is expected to waste a total of 665,750 gallons of water and Alternative 3 is expected to waste 273,750 gallons of water. Again, this alternative would have the most positive impact on water waste as it removes existing and mitigates the need for any new flushing hydrants.

Cost Estimates

The following cost estimate has been established for comparison purposes to other viable distribution system alternatives. The cost estimate includes a 15% Contingency and 20% engineering as well for total project costs. Mobilization has also been increased to 25% instead 8% due to the location of the community.

Table 17 – Alternative 4 Cost Estimate

Alternative 4 Construction Cost Estimate						
Project		Item	Unit	Quantity	Unit Cost	Total
Alternative 4 Costs	General Requirements	General Requirements (assumed 25% mobilization, bond, insurance etc.)	LS	1	$258,761	$258,761
		Easement Adquisition	LS	1	$25,000	$25,000
		Traffic Control	LS	1	$48,701.60	$48,702
		Total Cost				**$332,462**
	Additional Work	Existing Water Main Removal	LF	927	$28	$26,085
		Tree Removal	AC	0.4	$16,234	$6,494
		Gravel Road Restoration	SY	2789	$39	$108,659
		Asphalt Road Restoration	SY	167	$252	$42,028
		Yard Restoration	SY	1113	$16	$18,074
		Total Cost				**$201,338**
	New Water Main	6" C900 PVC Pipe	LF	4367	$126.62	$552,968
		6" MJ Tee	EA	4	$1,623	$6,494
		6" MJ 90° Elbow	EA	5	$1,299	$6,494
		6" MJ Cross	EA	1	$2,056	$2,056
		6" MJ Gate Valve	EA	16	$4,058	$64,935
		8"x6" MJ Cross	EA	1	$2,489	$2,489
		Total Cost				**$635,436**
	New Water Main Additional Work	12" Jack & Bore	LF	50	$1,623.39	$81,169
		Directional Drill (Pipe Included)	LF	50	$541.13	$27,056
		Water Service Re-Connect	EA	3	$1,082	$3,247
		Existing Main Connection	EA	11	$3,463	$38,095
		Total Cost				**$149,568**
Construction Cost						$1,318,804
20% Contingency						$263,761
Total Construction Costs						**$1,582,565**
Engineering (Assumed 20% of Total Construction)						$316,513
Geotechncial Investigation						$30,000
Total Project Cost (2029)						**$1,929,078**

While this alternative involves connecting new water main to the existing system, it is not anticipated to increase operation and maintenance costs for the District. Presently, maintenance expenses for the distribution system primarily revolve around flush hydrant inspection and upkeep, the exercising of system valves and fire hydrants, and rectification of existing water services. Notably, this alternative eliminates all flushing hydrants, excludes installation of new fire hydrants, and does not encompass introduction of new services. Although the District aims to integrate new users into this system in the future, new services are not included in the scope of this project.

5 SELECTION OF AN ALTERNATIVE

5.1 Life Cycle Cost Analysis

When comparing alternatives, the cost-effectiveness determined from the monetary present-worth analysis, is considered the single most important comparison parameter. This economic comparison includes estimated capital cost expenditures and annual operation and maintenance costs.

The cost estimates presented, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project and resulting feasibility will depend on actual site conditions, final project scope, and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of these factors, project feasibility, benefit/cost ratios, risk, and funding needs must be carefully reviewed prior to making specific financial decisions or re-establishing project budgets to help ensure proper project evaluation and adequate funding.

Economic evaluations of the alternatives require consideration of annual operation and maintenance costs as well as capital costs. Operation and maintenance expenses include labor, energy, process chemicals if any, maintenance materials and supplies, residuals disposal if any, etc. Labor estimates for new facilities are typically based primarily on published references or labor requirements at other facilities familiar to the engineer. Energy costs for new facilities are based on estimates of the average requirements for each unit process using local utility rates. Equipment maintenance costs for new facilities are based on a percentage of the initial equipment costs, dependent on the type of equipment and its use, or published references.

When comparing alternatives based on cost, it is important that the comparison include both capital costs and the difference in the present worth of the operation and maintenance costs. An alternative with a low initial capital cost may not be the most cost-efficient project if high monthly operation and maintenance costs occur with the alternative.

Salvage values are often included in present worth estimates, particularly where alternatives may be substantially different in nature (for instance one alternative involving substantial earthwork and one involving substantial mechanical work). The importance of the concept of salvage value is diminished when comparing mostly similar treatment elements.

The District currently invests time in general upkeep of the existing water distribution system. We do not expect a noticeable change in operation and maintenance associated with any of the alternatives described in section 4 of this report. For this reason, we have excluded present worth analysis of the savings from the cost estimates below.

The following table provides a summary of the anticipated costs associated with each alternative.

Table 18 – Present Worth Analysis

ALTERNATIVES	PROJECT COST
ALTERNATIVE 1 - NO ACTION	$0
ALTERNATIVE 2 - ADDITIONAL FLUSH HYDRANTS	$159,741
ALTERNATIVE 3 - REPLACE & UPSIZING EXISTING MAINS	$1,572,136
ALTERNATIVE 4 - EXISTING WATER MAIN LOOPING	$1,929,078

5.2 Non-Monetary Factors

The alternatives presented in this study can and must be compared in a variety of non-monetary ways. To provide structure and a methodology to this comparison, the alternatives will be compared on six broad criteria as listed below. The comparison and ranking of some of these criteria will result in only very subtle differences that must be considered in the overall evaluations.

- Environmental Impacts – What affect does the alternative have in terms of adverse impact to the environment?
- Reliability – Will the alternative be reliable both now and in the long term with respect to future potential requirements?
- Impacts to Existing Facilities – Will the alternative impact existing Cooke City facilities or the property and facilities of the residents?
- Public Acceptance - Will the alternative meet the needs of the residents and will the residents be receptive to the alternative?
- Local Economic Affect – What affect does the alternative have in terms of keeping money in the local economy through local capital purchase, construction spending, and/or employment of local citizens?
- Public Health and Safety – Will the alternative protect and enhance the health and safety of the Town's residents?

Each alternative is compared below within the framework of these criteria.

5.2.1 Environmental Impacts

The largest environmental factor for this project is water waste. The quantity of flushing hydrants per alternative is anticipated to have the largest impact on water waste. Each alternative will therefore be graded as such. The number of flushing hydrants per alternative is as follows:

1. Alternative 2 = 7 Flushing Hydrants
2. Alternative 3 = 3 Flushing Hydrants
3. Alternative 1 = 1 Flushing Hydrant
4. Alternative 4 = 0 Flushing Hydrants

The alternatives have been ordered inversely with reference to the number of flushing hydrants. Alternative 4 has the most positive environmental impact and Alternative 2 has the most negative environmental impact regarding water waste.

5.2.2 *Reliability*

When evaluating the reliability of each alternative for this project, we must consider two critical factors: the number of moving parts and the age of the system components. Moving parts encompass various elements such as valves, fire hydrants, flushing hydrants, and water services. The greater the number of moving parts introduced by an alternative, the higher the probability of system failure. Also, the age of the system components directly correlates with the likelihood of requiring repairs, with components installed before 2007 posing the greatest risk.

Alternative 1, being a no-action alternative, only considers the single existing flushing hydrant as a moving part, which currently operates with minimal additional operation and maintenance. However, it excludes aging water main replacement, rendering it one of the least reliable options. Alternative 2 significantly increases the number of moving parts without replacing any outdated water mains, making it the most unreliable option.

In contrast, Alternative 3 involves replacing all original aging water mains, improving the system's reliability in terms of age. Installation of new flushing hydrants presents both positive and negative impacts on system reliability, making Alternative 3 the second most reliable option. Alternative 4 addresses reliability concerns by replacing or abandoning all aging water mains but introduces additional hardware underground. The proposed underground hardware including gate valves and PVC pipe is expected to have minimal impact on operation and maintenance. Alternative 4 emerges as the most reliable alternative due to its comprehensive approach to system upgrades and minimal impact on overall operation and maintenance.

5.2.3 *Impacts to Existing Facilities*

With the exception of Alternative 1, all proposed alternatives positively affect the existing facilities of Cooke City. The two largest concerns regarding the District’s existing facilities are freezing issues and low-pressure complaints. All of the alternatives will address the freezing issues. Alternatives 3 and 4 will address the low-pressure concerns. Alternative 4 will require land acquisition from private residences.

5.2.4 *Public Acceptance*

The community will likely have concerns and questions regarding the alternatives. Is it worth the money? Will the alternative address the issues with the current system? Will the alternative help achieve the long-term goal of serving existing properties in the future? The only alternative that can answer yes to all of the above questions is Alternative 4.

5.2.5 *Local Economic Affect*

The largest consideration with respect to the economic effect of any alternative is the up-front cost in comparison to the long-term revenue. The cost of each alternative increases from 1 to 4 respectively. Only Alternative 4 will help the District increase revenue in the long-term by allowing residents the opportunity to install services to the distribution system.

5.2.6 *Public Health and Safety*

Quality of water can be affected by dead-end mains (stagnation). Though no issues have arisen from the existence of said dead-end mains, removal of them is considered a positive action in the eyes of the MT DEQ.

Alternative 1 is the only alternative that will not enhance the water quality in the system. Alternatives 2 and 3 have relatively the same level of positive influence on the health and safety of the community's water system. Alternative 4 has the highest level of positive influence on the health and safety of the community's water system as it would create loops in the system allowing the water to move and not become stagnant.

5.3 Comparative Summary

Using the monetary and non-monetary information presented above, a comparative summary evaluation and ranking of alternatives is presented in the table below. For each of the criteria discussed above, each alternative was assigned a ranking score from 1 to 4, with 4 being the most favorable and 1 being the least favorable. The ranking factors were then multiplied by the relative weight of importance assigned to each evaluation criteria. The weighted rank scores were then summed, resulting in a weighted rank total score, the greatest score indicating the highest ranking. The weighting of each criterion in descending order is as follows:

- Cost Effectiveness and Public Health and Safety - 6
- Environmental Impact and Reliability – 5
- Impacts on Existing Facilities – 4
- Public Acceptance and Local Economic Affect – 3

Table 19 – Alternative Comparative Summary

COMPARISON PARAMETER	PARAMETER WEIGHT	ALTERNATIVES			
		1	2	3	4
Cost Effectiveness					
Alternative Rank	6	4	3	2	1
Weighted Rank		24	18	12	6
Public Health and Safety					
Alternative Rank	6	1	2	3	4
Weighted Rank		6	12	18	24
Environmental Impacts					
Alternative Rank	5	1	2	3	4
Weighted Rank		5	10	15	20
Reliability					
Alternative Rank	5	1	2	3	4
Weighted Rank		5	10	15	20
Impacts to Existing Facilities					
Alternative Rank	4	1	2	4	3
Weighted Rank		4	8	16	12
Public Acceptance					
Alternative Rank	3	4	2	1	3
Weighted Rank		12	6	3	9
Local Economic Affect					
Alternative Rank	3	1	2	3	4
Weighted Rank		3	6	9	12
Weighted Rank Total		**59**	**70**	**88**	**103**

6 PROPOSED PROJECT

Alternative 4 "Existing Water Main Looping" is the recommended alternative to address the towns water system issues and help achieve future goals. The proposed project will include tying into existing dead-end water mains and looping back into the existing system. 6" PVC pipe will be utilized for all of the proposed water mains with cast iron fittings as needed. New gate valves will be installed at intersections to allow for isolation of segments in the system. Directional drilling and/or jack and bore will be required to loop the Skunk Hollow water main. Alternative 4 also includes replacement of sections of water main in Martin Street and Skunk Hollow.

In addition to Alternative 4, necessary improvements will be made for system functionality including complete replacement of the control and telemetry systems, replacement of the water storage tank mixer, power to the water storage tank and replacement of the broken electrical conduit fittings on the well heads. These improvements have been added to the cost of the recommended alternative.

6.1 Preliminary Project Design

The proposed project will take place throughout several locations in Cooke City. New water main will be installed in Montana Street, Huston Street, Black Street, Broadway Street, Republic Street, and on the east side of town crossing Highway 212.

Approximately 4,300 LF of new water main is proposed as part of this project. All new water main will be 6" PVC pipe. The proposed project will also replace aging water main installed prior to 2007 in Martin Street and Skunk Hollow. Approximately 1,000 LF of aging water main will be replaced by new water main.

Jack and bore is proposed for the Highway 212 crossing on the east side of Cooke City. The proposed jack and bore will utilize a 12" steel carrier pipe under the highway for approximately 50 feet. Directional drilling under Miller Creek will utilize 6" PVC with locking connections.

The proposed Miller Creek crossing will require a joint application for permitting the crossing. The work will require a 310 permit, SPA 124 permit, Section 404 permit, and 318 authorization.

6.2 Project Schedule

Before the project can be implemented, the funding must be in place. During the prior application/grant cycle the Cooke City Water District was awarded a $125,000 RRGL grant. The grant funding will be used for Phase I which will include the following improvements: the complete replacement of the control and telemetry systems, replacement of the water storage tank mixer, and power to the water storage tank. The proposed funding strategy for the current application/grant cycle includes an RDG and MCEP grant. The grant funding will be used for Phase II which will include distribution system updates as outlined in section 4.5 (Alternative 4). The RDG grant application is due May 15, 2026. The MCEP grant application is due May 19, 2026.

The community will not likely know until spring of 2027 whether their project has been funded. Upon securing all funding, the project start-up for the grant program is expected to be about a two-month process. The engineering could begin once a contract is completed between the grant agencies and the District, likely during the second or third quarter of 2027. DEQ review would likely take place in the winter of 2027 with approval anticipated by spring of 2028. Once DEQ approval is granted, the project would be advertised for bid early in 2028. It is anticipated for construction to begin in the spring of 2028 with an expected completion date in the fall of 2028. Due to the nature of the work and the location of Cooke City, it is very likely the construction extends into the spring and summer of 2029. The following table provides a summary of the expected schedule.

Table 20 – Project Schedule

TASK	QUARTERS, 2026				QUARTERS, 2027				QUARTERS, 2028				2029	
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ
Phase I														
Public Bid & Advertisements		X												
Project Construction			X	X										
Phase II														
Advertise for & Select Engineer	X													
Finalize PER		X												
Submit Funding Applications		X												
Legislative Action of Applications					X									
Grant Award							X							
Project Design							X							
Complete Project Design								X						
Submit Plans to DEQ								X						
Prepare Bid Documents									X					
Public Bid & Advertisements									X					
Open Bids & Examine Proposals									X					
Request Contr. Documents										X				
Select Contractor & Award Bid										X				
Conduct Pre-Const. Conference										X				
Notice to Proceed to Contractor										X				
Project Construction										X	X	X	X	X
Monitor Contractor										X	X	X	X	X
Labor Compliance Reviews										X		X		X

Hold Const. Progress Meetings										X	X	X	X	X
Final Inspection														X
Project Close Out														X
Submit Final Drawdown														X
Project Completion Report														X
Submit Record DWGs to DEQ														X

6.3 Permit Requirements

The project design will be submitted and approved by the Department of Environmental Quality (DEQ). The DEQ will require record drawings to be submitted once the project is completed.

The following design and permitting criteria would apply:

1. MT DEQ Circular 1 – Standards for Water Works
2. Montana Department of Transportation (MDT) – Utility Occupancy Permit
    a. Installing water main in and across Highway 212
3. Potential Floodplain Permit
4. USACE – Joint Application

The following projected water demands will be used as the basis for design:

- Average Day Demand 12 gpm (16,916 gpd)
- Peak Day Demand 20 gpm (28,635 gpd)

Prior to construction, the contractor will be required to obtain a Storm Water Pollution Prevention Plan (SWPPP) permit to meet storm water requirements.

6.4 Sustainability Considerations

One of the main purposes of this project is to eliminate the water waste of the existing water distribution system.

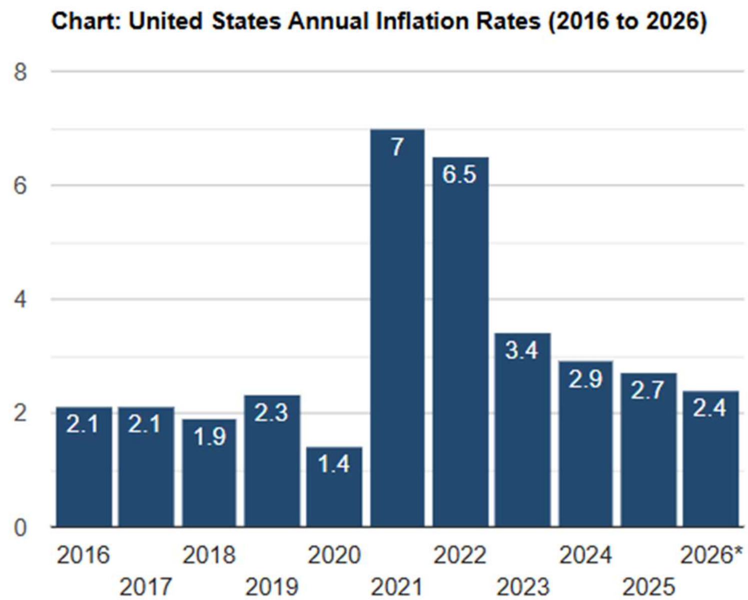
As discussed in section 2.6, the flush hydrant at the end of Skunk Hollow Road wastes approximately 91,250 gallons per year. The proposed project would eliminate the flush hydrant and the need to flush dead-end mains entirely.

6.5 Total Project Cost Estimate

Costs for each alternative were previously developed for comparison purposes. Independent of the alternative selected, certain expenses are required and have been added to the following cost estimate (i.e. grant administration, legal costs, personnel costs, office costs, etc). These costs have been incorporated into the following table.

Based on the above-mentioned schedule the project is anticipated to bid in 2028 with construction completed in 2029; therefore, we have included additional inflation costs through 2029. The following figure indicates the US annual rate of inflation over the last several years.

Figure 9 – US Annual Inflation (2016-2026)



Credit Photo Courtesy Of https://www.usinflationcalculator.com/inflation/current-inflation-rates/

We have used an inflation rate of 2.67% (2024-2026 avg US annual inflation rate) per year, which is the average rate of inflation over the last 3 years. The following table provides a total project cost including inflation based on construction in 2029.

Table 21 – Total Project Cost Estimate with Improvements

Total Project Cost Estimate with Improvements							
Project		Item	Unit	Quantity	Unit Cost	Total
Phase I	Improvements	Control and Telemetry Systems	LS	1	$115,000	$115,000
		Water Storage Tank Mixer	LS	1	$21,125	$21,125
		Power to Water Storage Tank	LF	1550	$40.00	$62,000
		Total Cost				**$198,125**
Phase II	General Requirements	General Requirements (assumed 25% mobilization, bond, insurance etc.)	LS	1	$258,761	$258,761
		Easement Adquisition	LS	1	$25,000	$25,000
		Traffic Control	LS	1	$48,702	$48,702
		Total Cost				**$332,462**
	Additional Work	Existing Water Main Demo	LF	927	$28	$26,085
		Clear & Grubbing (Timber)	AC	0.4	$16,234	$6,494
		Gravel Road Restoration	SY	2789	$39	$108,659
		Asphalt Road Restoration	SY	167	$252	$42,028
		Yard Restoration	SY	1113	$16	$18,074
		Well Head Conduit Fittings	LS	1	$1,000	$1,000
		Total Cost				**$202,338**
	New Water Main	6" C900 PVC Pipe	LF	4367	$126.62	$552,968
		6" MJ Tee	EA	4	$1,623	$6,494
		6" MJ 90° Elbow	EA	5	$1,299	$6,494
		6" MJ Cross	EA	1	$2,056	$2,056
		6" MJ Gate Valve	EA	16	$4,058	$64,935
		8"x6" MJ Cross	EA	1	$2,489	$2,489
		Total Cost				**$635,436**
	New Water Main Additional Work	12" Jack & Bore	LF	50	$1,623.39	$81,169
		Directional Drill (Pipe Included)	LF	50	$541.13	$27,056
		Service Re-Connect	EA	3	$1,082	$3,247
		Connection to Existing Main	EA	11	$3,463	$38,095
		Total Cost				**$149,568**
Phase I and II Construction Cost						$1,517,929
20% Contingency						$303,586
Total Construction Cost						**$1,821,515**
Engineering (Assumed 20% of Total Construction)						$364,303
Geotechncial Investigation						$30,000
Total Project Cost (2029)						**$2,215,818**

6.6 Annual Operating Budget

To formulate a financing plan for the water facility improvements, the estimated cost of the project and the sources of potential revenue available must be known. Capital is required to design and build the facilities. The necessary capital can come from cash reserves, federal and/or state grants and loans, or be borrowed from other sources. Generally, loans or borrowed capital are amortized in the form of bonds. The bonds are paid off a little each year at some stated interest rate and term, usually 20 to 40 years.

6.6.1 Income

The annual average water system revenue over the past 2 years was calculated previously at $74,040.93. Also, once the water system has been updated and can provide adequate distribution for an increased number of users, the average annual revenue will increase.

Pursuant to an election held on October 4, 2005, the Cooke City Silver Gate and Colter Pass Resort Area was established and a 3% resort tax was imposed on various items for a period of 20 years. For the last twenty years the Cooke City Water District has received $20,000 per year in revenue from the resort tax. The agreement expired when the term of the original resort tax expired on December 31, 2025. The community voted to extend the resort tax for an additional 20 years on May 7, 2024. The resort tax allocation for the District was approved by the Park County Commission on January 13, 2026 to be increased from $20,000 to $30,000 per year.

The District also claims a portion of the area's property taxes. Over the last two years, the District has received on average $34,645 in property tax revenue.

6.6.2 Annual Operation and Maintenance

The District's average annual water system operation and maintenance costs for the last three years are approximately $166,571.32. The District's financial information is included in Appendix G. This includes operations, administration, miscellaneous costs, accounting/collection, and debt service. Expenses for the last three fiscal years are summarized in the table below.

Table 22 – Expense Summary

YEAR	EXPENSES	AVERAGE
2023	$118,833.02	$166,571.32
2024	$198,380.60	
2025	$182,500.34	

6.6.3 Debt Repayment

The preliminary sources of funding available to local entities such as the community of Cooke City wishing to undertake large capital improvement projects for water facilities has typically been through federal and state financial assistance. These funds have traditionally been used to underwrite major portions of projects through the issuance of grants or loans that may be repaid at terms favorable to most communities. One of these programs requires a local matching share that is most often obtained by issuing local government bonds. Funding programs often require that funds be appropriated during sessions of Congress or the state legislature, and in most cases the appropriated funds are less than the amount requested. Some of the available funding sources for this type of project include an MCEP grant, RDG grant, and SRF loan. A summary including eligibility requirements for each of these programs can be found in Appendix G.

Montana Coal Endowment Program (MCEP)

MCEP is a state funded grant program administered by the Montana Department of Commerce. MCEP provides financial assistance to local governments for infrastructure improvements. MCEP provides grant funds of up to $500,000 for any project, with a maximum of 50% of the total project cost (up to $750,000 if rates exceed 150% of the target rate and up to $625,000 if rates exceed 125% of the target rate). The other 50% can come from numerous other sources including grants, loans, or cash. To be eligible for MCEP funds the established user rates must meet or exceed the target rate.

The target water and sewer rates and the current water and sewer rates per EDU were discussed above in Chapter 2. The water and sewer rates are $82.72 and $46.97 per EDU per month. The water and sewer target rates established by the MT Department of Commerce for the Cooke City Water District are $48.71 and $31.31 per EDU per month. Cooke City's current combined water and sewer rate is $129.69 per EDU per month which is 162% of the target rate; therefore, the Cooke City Water District qualifies for the MCEP grant of $750,000.

Reclamation and Development Grants (RDG)

RDG is a state program that is funded by interest income from the Resource Indemnity Trust (RIT) Fund and certain natural resource taxes and is administered by the Montana Department of Natural Resources and Conservation (DNRC). Grants of up to $500,000 are awarded for eligible projects including reclamation of mining or hazardous waste sites, drought planning and projects, high hazard dams, research and investigations of sites with threats to the environment or public health, and other crucial state needs. The Cooke City Water District will pursue a $500,000 RDG grant.

State Revolving Fund (SRF)

SRF provides low interest loans for both water and wastewater projects through the Drinking Water State Revolving Fund (DWSRF) and the Water Pollution Control State Revolving Fund (WPCSRF). The SRF program is administered by the Montana Department of Environmental Quality. Loans are offered at an interest rate of 2.50% for 20-30 years, though shorter loans can be obtained. The SRF program also offers principal forgiveness for their loans which is administered as funds are available. The Cooke City Water District will pursue an SRF loan to make up the difference between the total project cost and grant funding.

Grants and loans may not be available to cover all the projected costs. In this case, Cooke City's local share can be provided by loans secured by general obligation or revenue bonds, or cash provided by current rates. General obligation bonds for water system construction are generally retired by property taxes and are therefore recommended only when the improvements will result in increased property value or provide benefits in direct proportion to the value of the property. The mechanics of financing improvements under general obligation bonds are relatively simple. A cost estimate prepared by the engineer is used to determine the amount of the bond issue, an election is held, and if the issue is authorized by the voters, the bonds are offered for sale. The money for construction is obtained prior to the time the project is undertaken. This method of financing considers the improvements to be of general benefit to all property. This type of bond generally carries a lower interest rate than revenue bonds, thereby lowering user costs.

Revenue bonds are repaid solely from revenues derived from the system. There is generally no legal limitation on the amount of bonds that may be issued, but there is a practical limitation in that excessive offerings are not likely to attract bids from responsible buyers. Furthermore, to entice a bond buyer's interest in the market today, an attractive bond coverage factor of 125% is required. Interest rates are generally higher for revenue bonds. Higher interest rates along with required coverage factors will increase user costs.

In some instances, public systems are financed partly by general obligation bonds and the balance by revenue bonds. By properly apportioning the two, an equitable financing setup can often be created. In this manner, conditions are more favorable for the governmental body to finance the system while relieving, to some extent, the financial restrictions on the system, had it been entirely backed by revenue bonds.

The Cooke City Water District currently has four outstanding loans from prior projects totaling $1,141,426 in 2025 and is in good standing with payments.

The impact of the water rates from the proposed project can only be estimated because the exact effect on the existing water rates is dependent on the success of future grant and loan applications. The following table summarizes the funding strategy.

Table 23 – Funding Strategy

Item	Funding Source				Total
	MCEP	RDG	SRF LOAN	SRF FORGIVENESS	
Administration					
Personnel Costs	$1,000				$1,000
Office Costs	$1,000				$1,000
Grant and Loan Admin	$30,000				$30,000
Legal Costs	$3,500				$3,500
Audit Fees	$3,000				$3,000
Travel & Training	$500				$500
Loan Origination Fees					$0
Interim Interest					$0
Loan Reserves			$30,000		$30,000
Bond Counsel			$20,000		$20,000
Total Administrative	$39,000	$0	$50,000	$0	$89,000
Construction Related Activities					
Easement Acquisition			$12,500	$12,500	$25,000
Geotechnical Investigation			$15,000	$15,000	$30,000
Engineering Design	$136,000	$137,227			$273,227
Construction Engineering Services			$45,538	$45,538	$91,076
Construction	$500,000	$362,773	$216,016	$216,016	$1,294,804
Contingency	$75,000		$114,293	$114,293	$303,586
Total Construction Activity	$711,000	$500,000	$403,346	$403,346	$2,017,693
Total Project Budget	**$750,000**	**$500,000**	**$453,346**	**$403,346**	**$2,106,693**

To estimate the increase in user fees, the average water usage by each user per month must be considered. Then, the total cost of water is based upon the most up to date tier billing at the time of the project. This billing system was summarized in section 2.7 of this report.

Determining the extent of a rate increase hinges on the desired net income that the District aims to retain. Given that the District's income is intricately tied to water usage, which can fluctuate significantly, it underscores the need for an assessment. Balancing the financial needs of the District with the dynamic nature of water consumption requires a nuanced approach to setting rates that ensures sustainability while remaining responsive to changing demand patterns. Rate increases and the expected net income of the water district have been calculated and shown in the table below.

Table 24 – Rate Increase Calculations

% Rate Increase	Increase In Net Income	SRF Loan Payment	Projected Net Income
58%	$52,554	$53,629	$23,223
23%	$23,209	$23,014	$24,494

As shown above, an approximate 58% increase would be needed if no SRF forgiveness is awarded and a 23% increase in user rates would be needed if SRF forgiveness is awarded. For this report, it will be assumed that forgiveness will be awarded. The total increase in user fees is estimated to be $23,209 per year or $1,934.08 per month. The total number of EDU's is 103 as presented above. Therefore, the increase in fees would be approximately $18.78/EDU/month.

The current water rates for the Cooke City Water District are established at a base rate of $39.39 for the first 5,000 gallons of metered water with a tier system for additional water used after that. The current water use rates are outlined in Table 11. A 23% increase to the base rate and additional use rates would result in a new base rate of $48.45 for the first 5,000 gallons and a tiered billing system shown in Table 25 below.

Table 25 – Proposed Rate Increase

USAGE (GALLONS)	ADDITIONAL COST	COST UNIT	% Increase	Average Increase
5001-10,000	$0.98	PER 100 GALLONS	23%	23%
10,001-25,000	$1.23	PER 100 GALLONS	23%	
25,001-40,000	$1.41	PER 100 GALLONS	23%	
40,001-50,000	$1.66	PER 100 GALLONS	23%	
Over 50,000	$1.85	PER 100 GALLONS	23%	

7 Conclusions and Recommendations

Cooke City's utilities are currently managed by two separate entities with no administrative overlap. The two entities are the Cooke Pass, Cooke City, Silver Gate Sewer District and the Cooke City Water District. As of 2023, Cooke City has been facing significant challenges regarding its water system infrastructure. These challenges consist of freezing, low-pressure, restricted fire flow, stagnation and leakage of water. More recent challenges include the existing control and telemetry system having reliability problems and other continual oddities. The Cooke City Water District initiated preparation of a preliminary engineering report (PER) by Triple Tree Engineering as part of its infrastructure improvement efforts. This PER documents the study, conclusions, and recommendations for the District's water system.

It was found that immediate attention was needed for the well heads and water tank mixer. Looking at the larger picture, Cooke City's distribution system has multiple dead-end mains which are causing various problems for the District. Through a comprehensive analysis of various alternatives, it was determined that the most effective solution entailed installation of additional water mains to loop the system and eliminate the existing dead-ends.

It is recommended that the Cooke City Water District utilize this preliminary engineering report (PER) to proceed with grant funding applications as soon as possible.

Appendix A – Census Data

Appendix B – Public Hearing Information

Appendix C – DEQ Sanitary Survey Inspection Report

Appendix D – System Exhibits

Appendix E – Well Logs and Water Rights

Appendix F – ISO Hydrant Test Results

Appendix G – Financial and Funding Information

Appendix H – DEQ Water Quality Report

Appendix I – Environmental Checklist