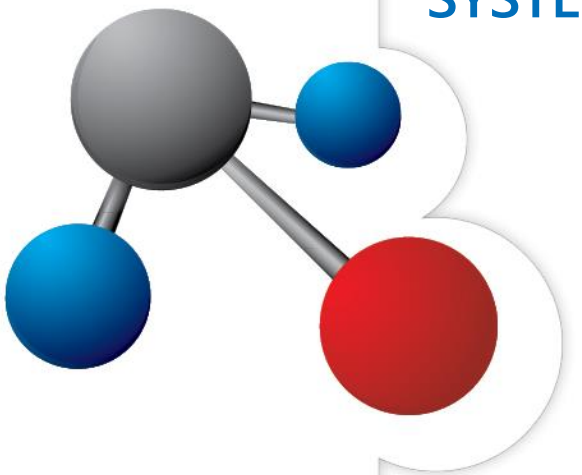
# DEER MOUNTAIN SANITARY DISTRICT WATER SYSTEM STUDY



## Prepared For

**Deer Mountain Sanitary District**

## *WATER SYSTEM STUDY*

**September 24, 2019**

*AE2S Project #: P14694-2019-000*

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# WATER SYSTEM STUDY

## Deer Mountain Sanitary District

## AE2S Project No. P14694-2019-000

## Prepared by:

**1560 Concourse Drive**
**Rapid City, South Dakota**
**57703**

**September 24, 2019**

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# WATER SYSTEM STUDY

## For

## Deer Mountain Sanitary District

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## Professional Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of South Dakota.

Name: Dustin Dale

Company: Advanced Engineering and Environmental Services, Inc. (AE2S)

Date: September 24, 2019 Registration Number: 12702

Prepared By:

Advanced Engineering and Environmental Services, Inc. (AE2S)

1560 Concourse Drive
Rapid City, SD 57703

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# APPENDICES

# 1. Introduction and Background

The Deer Mountain Sanitary District (DMSD) is located approximately three and one-half miles south of Lead, South Dakota and is located adjacent to U.S. Highway 14/85 in Lawrence, County. The DMSD was established by the residents to protect the best interest of for water service to permanent residents, seasonal residents, and rental properties within its boundaries.

The DMSD includes properties near the Deer Mountain/Mystic Minor Ski Resort within its boundaries. The water system serving these properties is known as the Deer Mountain/Union Resort water system and has a United States Environmental Protection Agency (EPA) identification number of 0549. The Deer Mountain/Union Resort water system was originally constructed, owned, and operated by Union Resort, LLC in 1978 when the ski resort was established. The ski resort has subsequently closed due to pending bankruptcy. Possession of all Union Resort property, debt, and the water system was acquired by Milan Investment Club, and the resort and surrounding property, including the water system, is currently for sale. The water system continues to be owned and operated by Milan Investment Club.

DMSD is managed by a board of directors comprised of residents of the District and is currently in discussions with the Milan Investment Club to potentially purchase or transfer ownership of the water system. All water service billing is currently invoiced by the Milan Investment Club. The Milan Investment Club has reportedly spent approximately $45,000 in 2017 and 2018 for debt, past-due salaries, and various improvements to the water system. It is estimated that the Milan Investment Club has recovered their expenses for the debt, past-due expenses, and improvements to the water system through rates charged to-date and may be willing to sell the water system to DMSD. If the water system is sold as its own entity, the Milan Investment Club could sell the Deer Mountain/Mystic Miner Ski Resort and other surrounding property as separate entities. Selling the water system as its own entity would enable the DMSD to become a public entity responsible for the ownership, operation, and maintenance of the water system. Discussions between DMSD and the Milan Investment Club are on-going.

## 1.1 Purpose and Scope

The DMSD was organized to represent the property owners served by the Deer Mountain/Union Resort/Mystic Minor Ski Resort water system. The water system has been and currently is under the ownership of Milan Investment Club who also owns the ski resort and some other vacant properties within the area. However, the DMSD is interested in ownership of the water system and converting the system from private ownership to a public entity. Prior to taking ownership, the DMSD would like a complete assessment of the system and a review of available alternatives including a do nothing alternative where the residents in the service area would continue to operate as today, a second alternative where the DMSD would take over ownership of the existing water system but would then do nothing to improve the existing water system, a third

alternative where the DMSD would take over ownership of the water system (public ownership) and continue to use the existing infrastructure with improvements, or a fourth alternative which would include regionalization, where the DMSD would construct a new distribution system while becoming a bulk water user from an adjacent water system. The DMSD secured the services of AE2S as a consultant to complete this water system study to evaluate the existing water system and identify the best alternatives for the DMSD.

## 1.2 System Funding

DMSD has applied for and received a Small Community Planning Grant, which provides funds in the amount of up to $8,000 to assist with the preparation of this water system study. The Water System Study will assist DMSD in determining appropriate actions moving forward, and to prepare the application and documentation required to secure additional funding for proposed improvements. Depending on the cost of the selected alternative and which alternative is ultimately selected, DMSD may apply for a Drinking Water State Revolving Fund (SRF) loan to pay for proposed improvements to the water system.

## 1.3 Planning Process

The planning process provides policymakers and the public with a detailed report on infrastructure needs and the recommended steps to meet those needs. Forward thinking and planning can establish priorities for the construction of necessary improvements within the context of a long-term plan to ensure compatibility and prudent management. DMSD recognizes that prudent management of annual operation and maintenance budgets, optimizing short-term capital improvement expenditures, and maximizing the benefits of long-term capital improvements require a consistent direction for the utility, which can be attained through proper planning. DMSD also recognizes the benefit of solid planning for the system and seeking out available resources in the way of local, state, and federal funding to assist the small water system in improving its infrastructure while at the same time keeping rates as low as possible for its users.

As the DMSD adopts and cycles through the planning process, some uncertainties and changes are to be expected as equipment and infrastructure can fail at inopportune times. The impacts of these changes can best be managed through a continued proactive planning approach and the prudent spending of available funds. Responding to future challenges will be most appropriately accomplished through a dynamic planning process that enables the DMSD to maintain a clear vision and consistent direction for the DMSD water system.

# 2. Existing System

The privately held water system serving the DMSD, Deer Mountain/Union Resort, consists of a raw water master meter,; two (2) pumps, two (2) in-line bag filters to remove sediment, and a sodium hypochlorite (chlorine) chemical feed system for disinfection. The master meter is connected to the raw water line that supplies Lead Deadwood Sanitary District. The other components are located in a water treatment building. Other distribution system assets include two (2) storage reservoirs with a total capacity of 70,000 gallons and distribution pipelines of 2-inch to 4-inch diameter pipe to provide service to the users. The water system currently serves 150 properties of which there are 17 full-time residential properties, 31 seasonal vacation properties, 63 rental properties, one bulk user (a resort). The water system also provides bulk water to Sugar Loaf Lodge. The Deer Mountain Ski Resort would also be considered a bulk user on the system since the water use for snow making machines could be considerable during winter months, however, the ski resort is currently closed and has been for several years and it is unknown if or when it may reopen. There are 42 properties within the district that are currently undeveloped and do not receive a water bill. Figure 2-1 outlines the general area served by the Deer Mountain Sanitary District (excluding the ski resort and the consecutive user) and the primary infrastructure including the water source (Lead-Deadwood Sanitary District), water treatment building, storage reservoirs (Tanks), and approximate service area of the District.

The water source for the existing system consists of two pumps drawing raw water from the Lead-Deadwood Sanitary District supply line east of Highway 227. Milan Investment Club has a contract with the Lead Deadwood Sanitary District. There is no limit on the amount of water that can be drawn from Lead Deadwood Sanitary District, but the rate is typically around 600 gpm. The supply line is adequate for serving the needs of system and there are no reports of water shortage. From the point of diversion, the water enters the water treatment building where the water is run through an in-line bag filter to remove sediment and particulate matter from the surface water source and then chlorinated with a sodium hypochlorite chemical feed system in compliance with SD DENR requirements. The water is then distributed throughout the water system including two reservoirs located next to each other at an elevation of approximately 6,200 feet. The reservoirs are each constructed of carbon steel and have a combined capacity of approximately 70,000 gallons. The distribution system consists primarily of 2-inch to 4-inch pipe. There are not any fire hydrants located within the water system as the water system does not provide for fire protection. Additionally, the system contains one booster station to provide service to homes towards the northern most reach of the system at 6,000 feet and above.

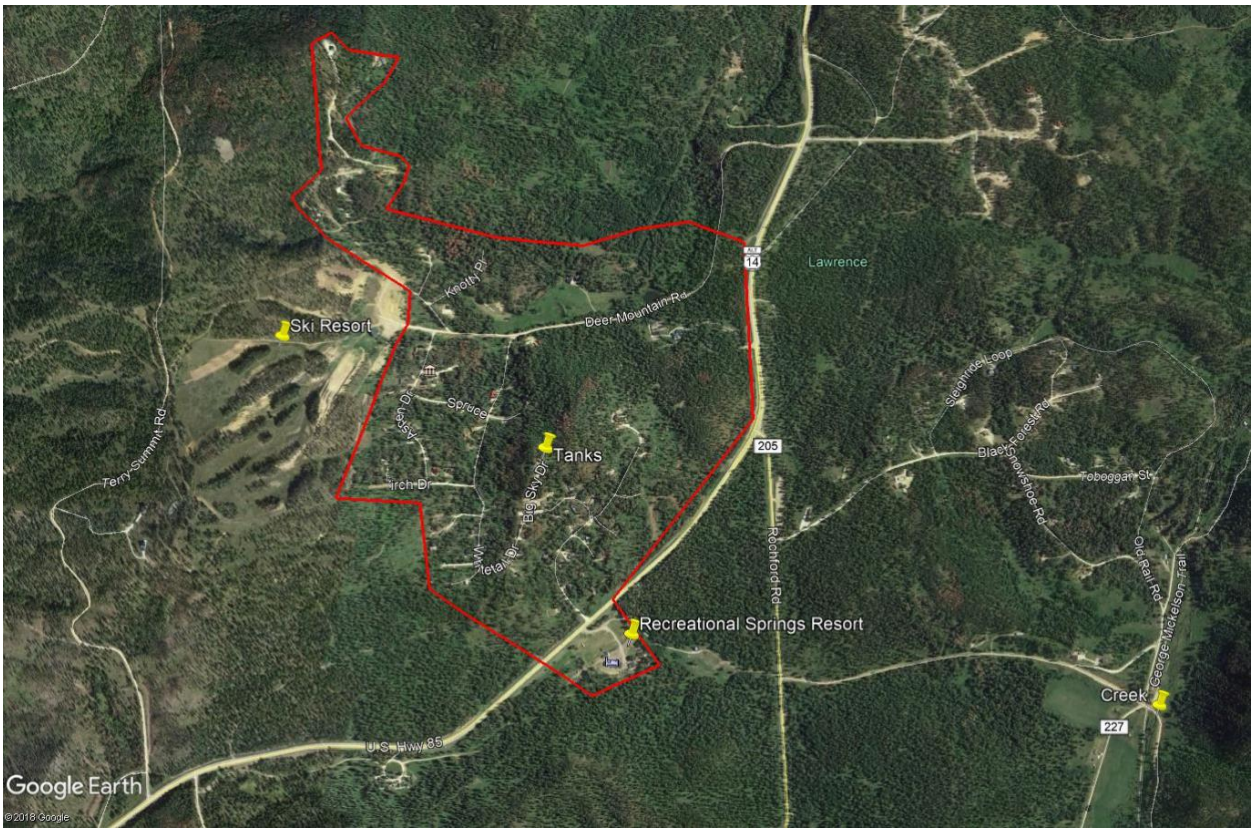


**Figure 2-1: Deer Mountain Sanitary District Vicinity Map**

## 2.1 Water Supply

Drinking water is supplied from two pumps which off of the LDSD raw water line, located east of Highway 227. The water supply is of very good quality as it is primarily collected natural spring water with seasonal snowmelt and rainfall runoff. The water source is periodically tested and there are not currently any concerns regarding the water quality. Appendix 1 includes a copy of the latest test results from a water sample collected and tested at the point of diversion in 2018, as well as a list of the monitoring and reporting requirements for the water system. As the testing shows, the water source has a low contamination risk and is of very good quality.

The maximum amount of water available from LDSD is not known as that contract is held with the Milan Investment Club. However, there are no reports of water shortage over the past 41 years that the system has been in operation. Thus, the water supply appears to be of adequate quality and quantity to continue to supply the system into the future.

Water from the LDSD is billed to the Milan Investment Club based on a flat rate and water use. The flat rate is based upon an equivalent resident rate (ERR). The ERR is set a $4.70 and is based upon usage of 307 residents (counting bulk users of DMSD as individual users). In addition to

the ERR, there is a charge of $0.48 per 1,000 gallons. The amount of water is not metered per residence and is based upon the master meter associated with the treatment building.

## 2.2 Water Treatment Building

The existing water treatment building is located near Whitewood Creek on private property owned by the Skvicalo family. The Skvicalo's have allowed the water treatment building to be located on their property for the past 41 years without any form of compensation and there are no reported issues or concerns. It would be prudent for the owner of the water system to secure the property where the water treatment building is located either by a lease agreement, an easement, or purchase of a small parcel of land to both protect the water system as well as the Skvicalo's.

The water treatment building was originally installed with the rest of the water system in 1978 and is in need of improvements or replacement. The existing and design capacity of the water treatment building is unknown. The structure is not very large as it only houses the water piping, two pumps, two in-line bag filters, a flow meter, a sodium hypochlorite (chlorine) chemical feed system, and a unit heater. There is not a backup generator or power source for the water treatment building. All of this equipment is approximately 41 years old with the exception of one of the pumps which was repaired by Milan Investment Club within the last two years.

Due to the age of the water treatment building and the fact that the equipment has reached the end of its intended service life, the most cost-effective solution would likely be to replace the water treatment building with a new building and equipment. Although this may not be prudent at this time, the recommendation would be to utilize funding towards a new treatment building versus vesting dollars into the existing The new water treatment building could be constructed adjacent to the existing structure and the switchover to the new water treatment building could occur seamlessly with no interruption of water service to customers.

## 2.3 Water Storage

Water from the water treatment building is pumped up to two ground storage tanks located near the top of the hill at the end of Big Sky Drive. The reservoirs stand on 0.7 acres of land owned by Milan Investment Club. The location is at an elevation higher than most of the customers in the water system, serving as a good location for the reservoirs to provide adequate pressure to most of the water system. The ground elevation at the reservoirs is approximately 6,200 feet above sea level. The reservoirs have a total capacity of 70,000 gallons. The reservoirs are constructed of carbon steel, are cylindrical stand-pipes, and stand next to each other on the site. The exact condition of the reservoirs is unknown and a thorough inspection would need to be completed both inside and out to determine the condition of the protective coatings,

carbon-steel wall thickness, roof and floor corrosion, sediment deposits in the tanks, foundation system, structural integrity, inlet and outlet piping, air venting, overflow protection, and valving. From casual observation, the exterior coatings appear to be a complete failure, integrity of the carbon steel wall thickness and possible corrosion pitting of the tank is highly likely. When an interior paint coating fails in a water reservoir, it typically begins as a tiny pinhole in the coating. Corrosion of the metal then begins and progresses until a substantial amount of metal has been corroded away causing a pit in the metal surface. A steel tank that has not been maintained may contain hundreds of these deep pits which can cause leaks and in severe cases, jeopardize the structural integrity of the tank itself. The pitting can be repaired by completely blasting the tank surface, welding to fill the pit/void areas, and then applying a quality epoxy coating to protect the surface. However, if the corrosion is very severe, it may be more economical to replace the tank than to repair it. At least one of the reservoirs has reportedly had leaks in the past which could be indicative of an on-going maintenance issue if the existing reservoirs are used as-is. Based on the limited amount of information available on the condition of the tanks besides the exterior appearance of complete coating failure, the appearance of minimal maintenance of the tanks over the past 41 years, and the reports of the tanks having had leaks, it is assumed for the purposes of this report that tank replacement will be required.

## 2.4 Distribution System

The distribution system consists of two pressure zones. The first, and largest zone, is fed by gravity from the two existing ground storage reservoirs. This pressure zone comprises the users from the elevation of the reservoirs which is approximately 6,200 ft, and below. There are approximately ten users located in the northwest area of the water system that are at an elevation above the water storage reservoirs. A booster pump station is utilized to raise the water pressure to serve the users in this pressure zone. The users in this higher pressure zone do not have any water storage reservoir as a means of stored water in the event of pump failure. The booster pump station does not have a back-up generator in the event of a power failure. The condition of the booster pump station is unknown.

The water system is reportedly comprised of 2-inch to 4-inch pvc with smaller service leads to each of the user connections. Drawings of the water system piping is not available so exact sizes and the location of the privately installed water system can only be estimated at this time. The pipe material has not been verified but has been a general acceptance based on best available information. The pipe sizes appear to be adequate to convey the desired water capacity to customers without issues such as reduced flow rates or pressures. There have been leaks in the distribution system in recent years that has caused water loss and repair expenses. Occasional leaks may occur in the distribution system, but excessive leaks may be indicative of a more serious underlying problem. It appears that many of the leaks that have occurred in the

distribution system have occurred due to cold weather and freezing of pipes. These leaks have been repaired in a timely fashion to minimize water loss.

## 2.5 Water Supply and Demand

According to data provided by DMSD President, Oz Enderby, Deer Mountain Sanitary District boundary contains 17 properties that are full-time residences, 31 properties that are seasonal residences, 63 properties that are rental properties, and one bulk user (Recreational Springs Resort). The Deer Mountain Ski Resort would be a second bulk user although it has been closed for several years.

The current water system does not have individual water meters at each residence but instead a single water meter at the water treatment building. The Milan Investment Club pays the Lead Deadwood Sanitary District based on the monthly water used by the entire system through the single meter. To date, the water supply has always been adequate for meeting the needs of the customers in the system. Determining water use by individual customers within the water system must be estimated and may or may not be accurate. The installation of water meters for each customer would be a significant improvement to the existing water system and water billing could then be based upon actual usage rather than a more general flat rate across the system or for various water user types.

### 2.5.1 Water Usage

Based on data provided by the Lead Deadwood Sanitary District, the existing water system uses approximately 1.2 to 2.4 million gallons per month and had a maximum use of 2.4 million gallons per month in July 2019. Water use in October 2018 was 1.65 million gallons, November was 1.57 million gallons, and December was 1.78 million gallons.

There are currently 46 properties within the total of 150 properties within the DMSD boundary that are undeveloped. If water demand is assumed to be similar to the current demand for the potentially developed properties, a future water demand increase of approximately 31% could be expected. Based on a peak demand of 2.4 million gallons per month currently, this would mean that a future peak water demand might be 3,136,000 gallons per month for a fully developed area. To be conservative, an estimate of 3.25 million gallons per month could be used as the future peak monthly water demand for a fully developed DMSD water system. This water use is equivalent to 108,000 gallons per day or 75 gallons per minute. The current peak water use of 2.4 million gallons per month is equivalent to approximately 80,000 gallons per day or 56 gallons per minute. It should be emphasized that this is only an estimate based on significant unknown assumptions and the actual future demand could be considerably different depending upon actual development and water use.

It is unknown how much water is used by the Deer Mountain Ski Resort for snow-making operations. Snow making operations occur at a time of year when seasonal vacation, rental, resort, and residential water demands are typically lower, but given the rental nature of this area during ski season, should not be assumed water demand to be significantly lower.

Based on data provided by snow making equipment suppliers, approximately 75,000 gallons of water are required to make 6-inches of snow that would cover a 200 foot by 200 ft area. If a ski run is approximately ¼ mile in length (1,320 ft), this would amount to needing 495,000 gallons of water to produce a layer of snow 6-inches thick and 200 ft wide along the run. If the water supply pipe is 4-inches in diameter from the water source to the ski resort, a maximum pipeline velocity of approximately 5 feet per second (fps) would be recommended. This would be equivalent to conveying up to approximately 200 gallons per minute (gpm) through the pipeline. At a water supply rate of 200 gpm, the ski resort could provide enough snow to cover a ¼-mile long run, 200 ft wide, and 6-inches in depth in approximately 41 hours. This is just to cover one ski run to a depth of 6-inches.

If the ski resort wishes to make snow, water use for snow making could be considerable. If snow making operations occur primarily at night, approximately 12 hours per day, water use could amount to 144,000 gallons per day. This is near double the peak day water demand by the entire water system during a hot July day (2.4 million gallons used per month would be equivalent to approximately 80,000 gallons per day).

The snow making water demand must be considered when sizing infrastructure for the water system if the ski resort is to use potable water for its snow making operations. It would also be advisable to carefully consider the water use agreement and negotiated water rate for this bulk user given the potential impact to the overall water system.

### 2.5.2 Infrastructure Needs

The existing water system infrastructure was originally constructed approximately 41 years ago and includes the water treatment building, pumps, filters, disinfection (chlorine) feed system, reservoirs, booster pump station, and distribution system piping. Most of this infrastructure is showing its age and is in need of significant improvements and/or replacement at this time.

The water treatment building does include a pump that was recently replaced but overall the building structure is in need of improvements. The process pumps, valves, flow meter, and piping could be evaluated for proper sizing for the current and anticipated future needs of the system and updated if deemed appropriate. The filtration system and treatment equipment could be evaluated to potentially reduce operation costs and maintenance.

The electrical equipment and HVAC equipment is outdated and inefficient compared to today's standards. There is not a back-up generator to power the water treatment building upon a power outage.

The water storage reservoirs appear to have significant corrosion present, have had leaks repaired in the past, and will require complete refurbishing or replacement to make them useful for another 40 years of service life.

The distribution system piping is reported to be 2-inch to 4-inch diameter pvc pipe. Several leaks in the distribution system have been repaired in the past throughout the distribution system.

Metering is not provided at each residence or water user so actual water use by each user is not known. This results in flat rate billing regardless of water use and only estimates can be used for the various water user types such as full-time residents, seasonal residents (vacation homes), rental properties, and bulk users (resorts).

# 3. Development of Alternatives

The goal of this water supply study is to evaluate the existing water system and to outline alternatives that will provide Deer Mountain Sanitary District with a water system that will best serve the users within its boundaries for the next 40 year planning horizon with a safe, reliable, and affordable manner. This can be accomplished by different means. These alternatives are further discussed in detail in the following paragraphs.

## 3.1 Private Ownership - Do Nothing

The Private Ownership - Do Nothing alternative would maintain the status quo and not make any improvements to the existing water system. Operation of the system would continue with the same operational strategy that has existed for the past 41 years. Users within the DMSD would receive their water from Milan Investment Club (or any future owner of the Deer Mountain Ski Resort). Milan Investment Club would continue to be responsible for the operation and maintenance of the water supply system for the customers and would process all water billing as it currently does. Milan Investment Club would also be responsible for making repairs or improvements to the existing water system, as it so chooses. Milan Investment Club could set water rates in any fashion it so choses for water users since it would be a privately owned and operated water system.

DMSD is facing significant challenges with aging infrastructure. The majority of the existing infrastructure in the water system was originally installed approximately 41 years ago. The existing water treatment building and the equipment it contains including the pumps, flow meter, filters, valves, and electrical equipment are in need of repair or replacement to ensure that the system can continue to serve the customers of the DMSD for another 40 years. The existing reservoirs have experienced leaks in the past and will likely continue to experience additional leaks that will require repairs.

Under a Private Ownership - Do Nothing alternative, ownership of the system will continue to be held by a private entity and not a public entity which is represented by the users and is accountable to the users of the water system. Water rates charged by a private entity likely would not be as transparent as a publicly held, maintained, and operated system. Also, a publicly held water system would be eligible for local, state, and federal grants and low interest loans to assist in improvements made to the system.

Improvements will need to be made to the pumps, water treatment building, and reservoirs. It would also be very desirable to install metering throughout the system and provide a more accountable and fair billing system for users. If ownership of the system continues to be privately held, the installation of flow meters for each consumer is not likely to occur simply due

to the cost. Instead, consumers will continue to be billed at flat rates based on consumer type (full-time residential property, seasonal property, rental property, or bulk user).

If little or no improvements are made to the current water system, the water users within the DMSD would be placed in a vulnerable position being dependent upon an aging and potentially very unreliable water system in the future. Pump failures and reservoir leaks could become more commonplace and more costly to repair in addition to potential water supply disruptions to complete the repairs. Because the Private Ownership - Do Nothing alternative addresses none of these concerns, it has been removed from further consideration.

## 3.2 Public Ownership - Do Nothing

The Public Ownership – Do Nothing alternative is very similar to the Private Ownership – Do Nothing alternative except that the DMSD would purchase the water system from Milan Investment Club. It is assumed that this purchase would be for the nominal fee since the water system is in need of many improvements. However, the cost of the water system is yet to be negotiated and at this time, it is unclear as to whether Milan Investment Club even wishes to sell the water system. The water system is potentially a valuable asset to the ski resort simply for the snow making use and the significant water usage cost if the ski resort was forced to actually pay a bulk user fee for water. Since the water system is an integral component of the ski resort for snow making operations, it may be desirable for Milan Investment Club to keep the water system and ski resort ownership as a single entity.

As stated in the Private Ownership – Do Nothing alternative above, any Do Nothing alternative does not address the needs of the system or ensure a safe, reliable, water system for the consumers within the DMSD into the future. If no infrastructure improvements are made, eventually failures will occur in the system and repairs could be very costly along with potential disruptions to water service. For this reason, the Public Ownership – Do Nothing alternative has been removed from further consideration.

## 3.3 Public Ownership - System-Wide Improvements

This alternate would consist of the DMSD taking over ownership of the water system and then making system-wide improvements, as necessary, for the operation and maintenance of the system. Improvements to the water system would likely include the replacement of the water treatment building and its infrastructure, replacement of the water storage reservoirs, replacement of the water distribution system piping, and installation of meters at each water user.

One of the first improvements would likely be the installation of meters throughout the system at each user connection to obtain reliable data as to the water used by each consumer. The metering could also then be used to improve the billing system and ensure that users are being

billed based on water usage and not simply a flat rate. Water metering could also be used to determine the extent of water loss (leakage) throughout the distribution system that never reaches an end-user. This may indicate a leak or the need for pipe replacement.

A second anticipated infrastructure improvement would likely include improvements to the water treatment building including replacement of the building, pumps, flow meter, bag filters, chlorine disinfection system, valves, process piping, HVAC, and electrical equipment as most of this infrastructure is over 40 years old. A new water treatment building could likely be constructed adjacent to the existing building and once it is complete and operational, the existing building could be removed from service.

Mentioned in Section 2.2, the land which currently houses the water treatment building is not owned by the Milan Investment Club or DMSD. The land that the new water treatment building, either the existing location or a new one, sits upon may be required to be owned by the DMSD, depending upon the funding source.

Improvements to the reservoirs would be addressed including either refurbishing the existing reservoirs or installing new reservoirs to replace them. The existing reservoirs would need to be inspected inside and out to thoroughly evaluate the condition of the reservoirs and the best action for moving forward. The cost for reconditioning the existing reservoirs would need to be compared to constructing a new reservoir either at the same location or at an alternative location.

Finally, improvements could be made to the distribution system, as needed, to minimize the potential for future leaks, water loss, and on-going operation and maintenance costs to repair leaks. Since the water distribution piping is buried, it is very difficult to determine the condition of the pipe and the need for replacement. Under this alternative, it may be feasible for DMSD to utilize the existing distribution system and lay out a plan for replacing segments of the piping in a budgeted and scheduled plan or as experience in operating and maintaining the system dictates which pipelines tend to have the most leaks or maintenance issues.

This alternate would place more control of the operation and maintenance of the system as well as the costs and timing for current and future improvements in the hands of the consumers as the DMSD represents the users. This alternative would also ensure that needed improvements to infrastructure are planned and implemented in a timely and cost-effective manner to best serve the users. For these reasons, this alternate is an alternative worth further consideration.

## 3.4 Regionalization

Regionalization would tie the existing DMSD distribution system into a regional water supply system and become a consecutive user. The Deer Mountain Sanitary District is adjacent to the Powder House Pass development. The DMSD could be connected onto the Powder House Pass

(PHP) water system as a consecutive user. Under the regionalization alternative, the existing water system piping could be connected to the PHP water system near the existing PHP Reservoir along Highway 85.

The existing PHP reservoir is at an approximate elevation of 5,975 ft. A pump station would need to be installed at the connection of the DMSD to the Powder House Pass reservoir and would house a system-wide flow meter (used to determine the total water purchased from the PHP water system) and pumps that would pump water from the PHP water system to the DMSD water system and up to a water storage reservoir. No water treatment equipment would be needed under regionalization such as filtration or chlorination since the water would already be filtered and disinfected by PHP. DMSD would also not be burdened with the regulatory requirements of providing filtration and disinfection of the water system as this would be solely the responsibility of PHP as the water provider.

After evaluating the DMSD, the highest elevation in the water system is at approximately 6,500 feet located in the northwest area of the water district. This would be the best location to site a water storage reservoir since the entire water district could then be served by gravity flow from the reservoir. The existing booster pump station could be eliminated saving considerable infrastructure, operation, and maintenance costs. Since it is assumed that the existing water storage reservoirs (at an elevation of approximately 6,200 feet) will required extensive reconditioning to continue their service life and have been plagued with leaks in the past, it is assumed for the purposes of this evaluation that a new reservoir site would be purchased by DMSD at an elevation of approximately 6,500 feet and a new 110,000 gallon reservoir would be constructed at that site. A 110,000 gallon reservoir is sized to provide approximately one day of water storage during peak water demand (approximately 3.2 million gallons used per month of estimated future peak water demand divided by 30 days per month). Thus, the entire DMSD could be ensured to have approximately one day of emergency water storage even during a prolonged power outage. During an actual power outage, water use would likely by reserved to the essentials, so one day of storage is likely conservative. The reservoir would provide nearly two days of water storage at the current peak water demand of approximately 2.0 million gallons per month (67,000 gallons per day).

From the water storage reservoir, water distribution piping could serve the residents and water users with a water meter installed at the point of connection to each water user. The new water distribution system piping would be designed to reduce the water loss in the system and costly repair work. The water metering would ensure accurate and fair billing for actual water use by each user.

To implement this regionalization alternative, there will need to be a period of transition as the new infrastructure is installed. In the interim period, the DMSD would need to continue to be served by the existing infrastructure. For the purposes of this water system evaluation, it is assumed that DMSD would be able to purchase the existing water system from Milan

Investment Club including the water intake system, water treatment building, water distribution system, and reservoirs located at the end of Big Sky Drive. Once the new infrastructure is in-place and operational, and the connection with Powder House Pass is complete, the existing infrastructure could be abandoned or removed from service.

Thus, under the regionalization alternative, DMSD could own the infrastructure of the water system but would purchase water from PHP at a metered and agreed upon rate. DMSD could also contract with the operators of the PHP water system to provide the staff to operate and maintain the infrastructure of the DMSD. The staff of the PHP water system currently provide for the operation and maintenance of the existing water system so this transition would be just a matter of signing a new agreement with PHP for operation and maintenance services of the DMSD water system.

Under this regionalization alternative, the Deer Mountain Ski Resort could become a seasonal bulk user on the DMSD water system and be billed accordingly. A water service agreement would need to be negotiated between DMSD and Milan Investment Club or any future owner of the ski resort for providing water service and the billing rate and terms of the agreement.

This alternative is a viable option as the customers within the DMSD would be owned by a public entity that represents their interests, has local, state, and federal funding programs available for reducing improvement expenses, and the customers could be ensured that the infrastructure will be operated and maintained in a cost-effective manner. The infrastructure within the system would be new and properly designed to provide the DMSD with safe, reliable water supply well into the future.

If this alternative is pursued by DMSD, a consecutive water user agreement will need to be negotiated with PHP.

Connection to the PHP system would need to be fully explored to determine what is required including pipeline routing, pumping, storage, and easements.

# 4. Evaluation of Alternatives

## 4.1 Private Ownership - Do Nothing

As explained in Section 3.1, this alternative was removed from further consideration.

## 4.2 Public Ownership – Do Nothing

As discussed in Section 3.2, this alternative was also eliminated for further consideration.

## 4.3 Public Ownership – System-Wide Improvements

Ownership of the existing water system by Deer Mountain Sanitary District and the implementation of improvements to the water system by DMSD is a viable option. DMSD would first need to take possession of the water system from Milan Investment Club. DMSD could then plan for improvements to the existing water system infrastructure in a methodical and cost-effective manner. DMSD could operate and maintain the existing water system infrastructure while improvements are made to upgrade or replace the system. This planned approach would ensure that DMSD would not overburden the property owners and users with the cost. By utilizing available funding mechanisms such as the South Dakota State Revolving Fund loan program (SRF), the costs could be spread out over 20 years or more. DMSD could also utilize a utility improvement fee charged to all DMSD property owners through Lawrence County taxes and the cost for the infrastructure improvements could be shared by all property owners who would benefit from the improvements within the water system.

Milan Investment Club currently has a contract to obtain raw water from the Lead Deadwood Sanitary District. Transfer of this water contract should just be a formality since it is just transferring the rights along with the water system, but the transfer of the water system should be made contingent upon completion of the contract transfer to the new owner under this alternative. Preliminary discussions with LDSD, the quantity of water may be capped with a new contract, the preliminary number discussed is 600 gpm for a total of 864,000 gallons per day, which will be sufficient for the DMSD. Along with the raw water contract being held by DMSD, the SRF program would require the land associated with the water treatment building be owned by the DMSD.

A new water metering system could be installed at each water user by the installation of metering pits at each property line to accurately meter water use and ensure equitable billing. The pumphouse could be replaced with a new building to house new pumps, piping, flow meter,

bag filters, and valves. A new water storage reservoir could be installed to replace the existing, aging, and deteriorating reservoirs. Property on which to locate the new reservoir would need to be secured. As mentioned above, a location near the highest elevation in the system would be preferred since then the entire DMSD could then be served by gravity from the new water storage reservoir. This gravity flow of the entire distribution system would ensure a water supply for the users even during brief periods of no power.

New distribution piping could be installed throughout the water system to replace aging and leak-prone water main and service lines on a scheduled and budgeted basis. The existing booster station that serves the water users at the higher elevations in the northwest area of the water system could be removed once the new reservoir is operational.

An estimated cost to complete the water system infrastructure improvements is given below. Several assumptions were needed to be made to provide a complete opinion of total probably project costs. These assumptions include:

- providing a pumping capacity from the surface water source of 65 gallons per minute (2.75 million gallons per month)
- replacing the existing water treatment building with a new building including the installing new water pumps, chlorine disinfection equipment, a flow meter, in-line filtration units, building heating, ventilation, and electrical equipment.
- constructing a new water storage reservoir with a total capacity of 110,000 gallons (approximately one day of storage at peak demand)
- installing water meters within meter pits at each user,
- completing distribution system piping improvements and other water system improvements on a scheduled and budgeted basis in the future, as needed.

A detailed cost estimate is provided in Appendix No. 1.

**Table 4-1: Estimated Public Ownership – System-Wide Infrastructure Improvements Cost**

| | |
|---|---|
| Improvements Construction: | |
| New Water Treatment Building & Equip. | $329,750 |
| New 110,000 Gallon Reservoir | $298,000 |
| New Water Meter Improvements | $57,500 |
| Distribution System Improvements | $528,500 |
| North Booster Station | $146,000 |
| Contingencies (25%) | $340,000 |
| Construction Subtotal | $1,700,000 |

| | |
|---|---|
| Legal, Administration, Engineering (25%) | $425,000 |
| Opinion of Total Probable Project Costs | $2,125,000 |

## 4.4 Regionalization

The Regionalization alternative consists of DMSD becoming a consecutive user on the Powder House Pass water system. DMSD would still own, operate, and maintain its water system infrastructure but water would be purchased from Powder House Pass through a single metered connection. This would remove all treatment requirements from DMSD since the water would already be treated by Powder House Pass. Operation and maintenance of the DMSD water system could be contracted with Powder House Pass staff as it currently is.

The regionalization alternative includes, first, the acquisition of the existing water system by DMSD from the Milan Investment Club. Powder House Pass' water agreement requires that serving any users outside of the Powder House Pass boundary requires LDSD approval. LDSD approval could include a ownership transfer of the existing contract with Milan Investment Club , or an increase to Powder House Pass' existing contract. Also, it is assumed that DMSD would purchase property at an elevation of approximately 6,500 feet for siting of a new reservoir. The DMSD could then own and operate the existing water system while new infrastructure is put in-place to replace the aging water system.

The new improvements would include:

- connection to the Powder House Pass water system
- a new pump station to pump water from the Powder House Pass water system into the DMSD water system and to the new reservoir
- a new 110,000 gallon reservoir to replace the aging reservoirs
- new water meters located in meter pits at each user in the water system

Once the new infrastructure is in-place and operational, the existing surface water source would no longer be needed. DMSD could then transfer their contract to Powder House Pass. The water treatment building would no longer be needed since finished water would be purchased from Powder House Pass. The aging reservoirs would be replaced by a single, new 110,000 gallon reservoir. The existing distribution system piping would be replaced and improved to reduce water loss and repair costs. The booster pumps that serve the water users at higher elevations to the north of the ski resort would no longer be needed once the new water storage reservoir was in-service and the entire DMSD could be served by gravity from the reservoir. DMSD could install water meters located within meter pits at each property line throughout its

water system at each customer connection to accurately account for water usage in the system and accurately bill users.

Under this regionalization alternative, the DMSD water system would be considered a consecutive user from the Powder House Pass water system and DMSD would purchase water at a bulk rate from Powder House Pass. DMSD would need to sign a consecutive user agreement with Powder House Pass to purchase water. A single meter at the connection to the Powder House Pass water system would be used for billing DMSD for water used. The bulk water cost would, in-turn, be billed to the users of DMSD depending on their actual water usage from each water user meter plus a base rate to cover operation and maintenance expenses.

Operation and maintenance of the DMSD water system could be performed by staff from Powder House Pass on a contracted basis as it currently is. The Milan Investment Club currently pays approximately $11,000 per month for Powder House Pass water system operation and maintenance, including staff, to maintain the water system. DMSD could sign a similar agreement with Powder House Pass for operation and maintenance services and be billed monthly along with the bulk water billing. Both of these monthly charges could be passed on to the consumers in the base water fee to cover these monthly expenses.

The main advantage of regionalization is that DMSD would own the water system and would have a reliable water service provider in Powder House Pass that can both provide water to the system as well as operate and maintain the water system on a contracted basis. DMSD would still represent the consumers of the water system and ensure that the water system is managed in a responsible manner to provide clean, safe, reliable drinking water to customers, maintain reasonable water rates, and provide a managing body that can provide guidance and planning of the system for future improvements. The DMSD would also be a public entity so they would be able to pursue public funding sources such as the South Dakota State Revolving Loan Fund (SRF) and other sources in an effort to secure public grants and/or low interest loans for the public water system which will ultimately save the customers money.

As part of a larger water user district, DMSD may lose direct control of water rates as they would be dependent upon the Powder House Pass water system. However, depending on the Powder House Board laws, interested residents of DMSD could potentially serve on the Powder House Pass board and have a say in the decision-making process.

As with the Public Ownership – System-Wide Improvements alternative, several assumptions were needed to be made to generate an opinion of total probable project costs. These assumptions are as follows: Powder House Pass water system has a watermain along US Highway 85 near Deer Mountain Road that is of sufficient size and capacity to convey up to approximately 65 gpm to DMSD, there would not be a connection fee to receive water from the Powder House Pass water system, DMSD will be able to install new 4-inch watermain along Deer Mountain Road to complete the water service connection, DMSD will be able to secure property

for a new water reservoir, and easements can be obtained for the construction and installation of the required infrastructure (pump station, reservoir, pipelines, and transmission/distribution system piping) for no or minimal cost.

An estimated cost to complete the water system infrastructure improvements is given below. Several assumptions were needed to be made to provide a complete opinion of total probably project costs. Additional assumptions include a pumping capacity of 65 gallons per minute (2.75 million gallons per month), a total reservoir capacity of 110,000 gallons (approximately one day of water storage at peak demand), and water meters installed at each customer. A detailed cost estimate is provided in Appendix No. 1.

**Table 4-2: Estimated Regionalization Cost**

| | |
|---|---|
| Regionalization: | |
| Pump Station | $289,500 |
| New 110,000 Gallon Reservoir | $298,000 |
| Water Meter Improvements | $57,500 |
| Water Distribution System Improvements | $528,500 |
| Contingencies (25%) | $294,000 |
| Construction Subtotal | $1,468,000 |
| Legal, Administration, Engineering (25%): | $369,000 |
| Opinion of Total Probable Project Costs | $1,837,000 |

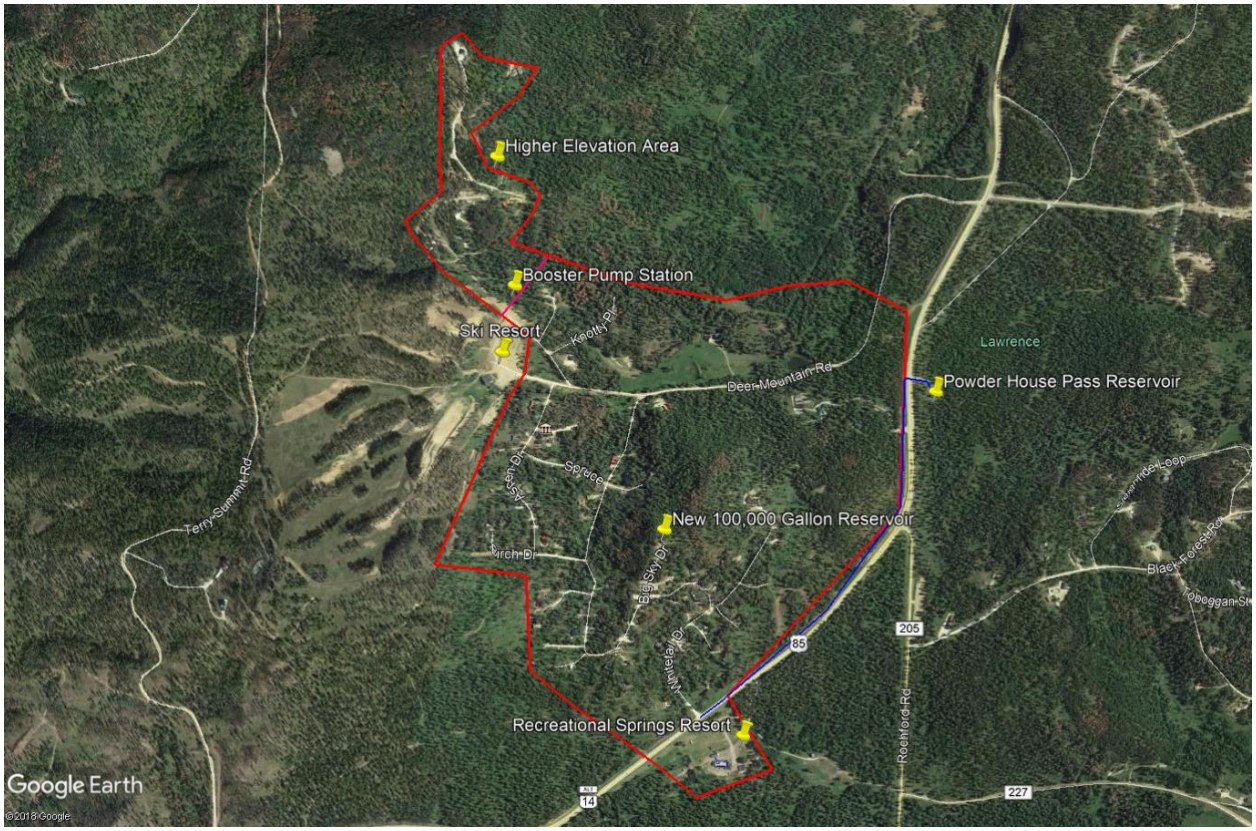


**Figure 4-1: Regionalization Map**

## 4.5 Conclusion and Recommendation

The above alternatives each have different advantages and disadvantages.

The goal of DMSD being responsible for the water to the users within their district, the most direct path is for DMSD to construct and operate their own system. This option may or may not be the lowest cost alternative as regionalization requires negotiations with other entities. It is recommended that negotiations continue with Powder House Pass and the Milan group to find a lower cost alternative.

It is recommended that the DMSD pursue available funding sources for the improvements to the water system and to extend the debt service over 30 years. The Drinking Water State Revolving Fund (SRF) loan program is an excellent funding mechanism for water projects. The debt service of the loan can then be repaid through a few different avenues, one is by incremental water rate surcharges and customers are not burdened with a significant up-front charge for improvements. A second method for paying for the cost for infrastructure improvements could also be to have each of the properties within the DMSD water system pay a Base Rate Charge based on the current assessed property value as all properties would benefit from the water system. It is understood that since DMSD is a public entity, it does have this taxing ability through Lawrence County, so this is an option. The available funding sources for improvements and the impacts on water rates could be presented to the users of the system, be opened for discussion and recommendations, and approved by the Board as a representative voice for the users.

Ultimately, it is believed that the water for DMSD water system will be more stable and secure than the way the current system operates. The water users will continue to have a safe, reliable, supply or drinking water. The infrastructure, once complete, will be updated to ensure a more reliable system and reduced operation and maintenance costs which will provide piece of mind, provide for fiscally responsible water rates, and serve the users well into the future. The DMSD Board will continue to be a representative board for the water system and provide direction for its operation, maintenance, planning, and be accountable to maintain water rates in an equitable, fair, and responsible manner.

# 5. Funding

## 5.1 Opinion of Total Project Cost

An Opinion of Probable Cost (OPC) has been developed for each of the proposed alternatives. These costs reflect a total probable cost based on current project concepts and current bidding conditions. Table 5.1 below presents a summary of the cost estimate for each proposed alternative. The Private Ownership - Do Nothing and the Public Ownership – Do Nothing approaches do not incur any costs, nor do they resolve any of the issues. Therefore, these alternatives were not estimated or included in the table. Additionally, the cost of obtaining ownership of the existing system is dependent upon negotiations with Milan Investment Club, that cost has not been included within the OPC.

## 5.2 OPC Description

Included in the OPC is consideration for construction including water system improvements as outlined above in Section 3.0. The OPC includes costs for professional services including engineering, legal, and fiscal related services. The OPC also includes costs for contingencies that are intended to provide flexibility within the project budget to account for project unknowns, price fluctuations, and bidding environment uncertainties. A detailed OPC for each alternate is included in the Appendix No. 1.

**Table 5-1: OPC Summary**

| TASK | WATER SUPPLY ALTERNATIVES COST SUMMARY | |
|---|---|---|
| | System-Wide Improvements | Regionalization |
| Construction | $1,360,000 | $1,174,000 |
| Contingencies | $340,000 | $294,000 |
| Engineering, Legal & Admin | $425,000 | $369,000 |
| **Total Probable Project Cost** | **$2,125,000** | **$1,837,000** |

## 5.3 Funding Approach

Currently there are a variety of available funding sources that will need to be considered for grant and loan monies for this project. Funding for these improvements may be available through a variety of low interest loan programs. One of the most common funding sources utilized by water systems and municipalities are the low interest loans available through the Drinking Water State Revolving Fund (DWSRF) loan program.

### 5.3.1 Low-Interest Loans

The DWSRF is a common option for funding municipal drinking water projects. The DWSRF program provides low interest loans for public water system improvement projects, for compliance with Safe Drinking Water Act regulation, and to protect public health. Under the DWSRF Program, loans are amortized up to 30 years. The anticipated interest rate for this program is typically between 2.0 to 3.5 percent. The program also mandates that the water system collect coverage equal to 10 percent of the annual debt service,O&M costs, and other expenses to the system. Additional program requirements for the receipt of DWSRF loan dollars include conducting an environmental review, adherence to the American Iron and Steel requirements, wage rate requirements, and disadvantaged business enterprise requirements.

## 5.4 User Impact

The ability for payment by DMSD is a matter of generating sufficient revenue to cover all existing and future costs, including the costs of the proposed project. DMSD, once established as the owner of the water system and generating revenue through water rates, would be self-supporting, and repayment of the loan dollars is assumed to be accomplished through a levied tax assessment on properties within their boundary.

### 5.4.1 Estimated Annual Debt Service Costs

The following calculation identifies the estimated Annual Debt Service Costs for Deer Mountain Sanitary District for any chosen alternative. The Annual Debt Service Costs are based on a payback period of thirty years and an assumed interest rate of three percent. The 2.75 percent interest rate includes interest on principal (2.25 percent) and administrative fees (0.5 percent).

DWSRF Loan: (A/P, 2.75 %, 30 yrs) = ($Project Cost x 0.0494) = $Annual Payment

The DWSRF program utilizes level debt service. For the purpose of this report, it is assumed that debt service will be repaid in equal annual payments, as shown above.

### 5.4.2 Estimated Annual Operations and Maintenance Costs

A preliminary estimate of the annual O&M costs associated with a proposed Deer Mountain Sanitary District Regionalization project would have been derived using a combination of the following cost estimates: mechanical and electrical costs, labor costs, maintenance allowance costs, and miscellaneous O&M costs.

The O&M costs for the proposed improvements would remain the same as existing since the proposed improvements simply update existing equipment. O&M of the system would remain relatively unchanged although manhours to operate and maintain the water system may decrease once newer equipment is installed. The installation of water meters at each water user

connection would likely result in an increase in operating costs to read monthly meter data, record and archive data, and maintain meter equipment. The benefit of the metering system and accuracy in billing is likely well worth the effort and expense of operating the metering system from a water user perspective.

Both the Public Owned – System-Wide Improvements alternative and the Regionalization alternative would not result in significant changes to the operation and maintenance of the water system infrastructure. Therefore, it is anticipated that the annual O&M costs for any selected alternative would remain near, or slightly less than, current levels.

### 5.4.3 Estimated Annual Coverage and Reserve Costs

If Deer Mountain Sanitary District intends to fund the estimated total project costs through a DWSRF loan and fund debt service for the loan through water system revenues, the DMSD will be required to provide 110 percent of the annual debt service, O&M costs, and other expenses to the system.

For the proposed water supply project DWSRF loan, it is estimated that the annual debt service would range from approximately $93,000 to $108,000, depending on the Alternative selected, and the required reserves would range from $9,300 to $10,800. The estimated total annual project debt cost based on the described funding approach is shown for each alternative in Table 5-2. The OPC is preliminary in nature and subject to change at this stage in development and may vary from the actual project cost. Because annual O&M costs are not anticipated to increase, it is anticipated that the existing coverage requirements will be increased by the total annual debt service and reserve amount only.

**Table 5-2: Total Annual Debt Service and Reserve**

| | **WATER SUPPLY ALTERNATIVES ANNUAL DEBT SERVICE & RESERVE** | |
|---|---|---|
| | **System-Wide Improvements** | **Regionalization** |
| Annual Debt Service | $108,000 | $93,000 |
| Annual Debt Service Reserve | $10,800 | $9,300 |
| **Total Annual Debt Service & Reserve** | **$118,800** | **$102,300** |

### 5.4.4 Rate Impact

According to DMSD President, Oz Enderby, Milan Investment Club currently charges for water at a single rate for all users of $100 per month. Since water usage is not metered within the

DMSD, it is not possible to provide a cost per 1,000 gallons of water used per customer. It is also unknown what the water rate fee structure is based upon or what the water fee covers.

Assuming the project is funded through the use of DWSRF loans, with an interest rate of 2.75 percent and a payback period of 30 years, Deer Mountain Sanitary District would need to cover the cost of the Total Annual Debt Service and Reserve through water rates. It is recommended that a revenue adequacy study be completed to ensure that enough revenue is being generated to cover regular O&M as well as the debt service. Assuming the System-Wide alternative is selected, the annual debt service and reserve cost would be $118,800 per year or $9,900 per month. This cost would need to be paid through water user rates. Since water use by residential, seasonal, rental, and bulk user properties is uncertain, it is unclear how this total debt service cost would be distributed.

The other alternate would require a greater rate increase because of its higher cost. The additional costs to cover the annual debt service and reserve for each alternative is shown in Table 5-3. For estimating purposes, it was assumed that no more than 10,000 gallons were used per month for each connection. It is also assumed that all of the project costs would be paid by a rate increase as the existing water rate is required for existing operations.

**Table 5-3: Total Annual Project Debt and Rate Increase Analysis**

| | RAW WATER SUPPLY ALTERNATIVES ANNUAL DEBT COVERAGE | |
|---|---|---|
| | System-Wide Improvements | Regionalization |
| Total Annual Debt Service and Reserve | $118,800 | $102,300 |
| Total No. of Water Accounts | 110 | 110 |
| Annual Cost per Account | $1,080.00 | $930.00 |
| **Monthly per Account** | **$90.00** | **$77.50** |

## 5.5 Funding Considerations

It is anticipated that the proposed improvements will be accepted for funding through the DWSRF Program once DMSD is the owner of the water system. The DWSRF provides below market rate loans for public water system improvements. The current water system is not a public water system so DMSD would need to take possession of the water system before DWSRF funding could be applied for.

The first step for obtaining a SRF loan is to place the project on the State Water Plan. Applications to the State Water Plan (SWP) are considered on a quarterly basis and must be

received by the Department before the first day of February, May, August, and October. A Preliminary Engineering Report or Facilities Plan must accompany the application.

DMSD is not expected to qualify for grant or principal forgiveness consideration, or a disadvantaged loan rate based upon medium household income (MHI). However, the DMSD may still qualify for grant or principal forgiveness if the minimum monthly water rate for a sanitary district is at least $55/mo. for the first 7,000 gallons of water used.

It recommended that the Deer Mountain Sanitary District apply to the DENR for inclusion on the SWP as soon as ownership of the water system is transferred in an effort to start the process towards seeking funding for the Project. Placement on the SWP does not obligate Deer Mountain Sanitary District in any way, it just places the Project on the funding list and scores the Project based on several different criteria.

The information that needs to be submitted includes a cover letter with an application and a Preliminary Engineering Report that contains the following items:

- Project owner name and name
- Name, address, telephone number, and email address for:
  - system representative
  - contact or engineering firm preparing documentation
- Population in the water system service area; projected population in 20 years
- Brief overall description of the current drinking water system
  - include source, treatment, storage and distribution categories
  - include age, condition, capability and capacity for major components
- Need for improvements
  - include existing and potential problems and system shortcomings
  - provide pertinent documentation
- Brief analysis of alternatives including summary cost estimates for each
- Alternative selected
  - provide reasons for selection and costs
  - adequately describe selected alternative
- Proposed project schedule
  - design, bidding, starting and completing construction, key dates
- Project area map
  - identify significant project components

## 5.6 Other Financial Considerations

It is important to note that the preliminary financial analysis completed in this section were based on the opinions of total probable project cost for each alternative. As such, it is not recommended that these financial analyses be used as the sole basis for utility fund budgeting.

Rather, it is recommended that a comprehensive Rate Study be completed to identify true cost of service to Deer Mountain Sanitary District so that an equitable share of the Project costs can be fairly allocated between each user class.

# 6. Implementation Schedule

Following is a tentative schedule for project implementation. The schedule assumes that Regionalization is selected, and Deer Mountain Sanitary District will pursue a DWSRF low interest loan.

**Table 6-1: Implementation Schedule**

| Task | Complete By |
|---|---|
| Submit State Water Plan Application | October 2019 |
| Funding Application Approval by the State | March 2020 |
| Project Design and Review | March to July 2020 |
| Bidding | August 2020 |
| Construction | August 2020 to November 2021 |
| Project Closeout | December 2021 |

# Appendix No. 1 – Detailed Opinion of Probable Construction Costs

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## Flow Meter Improvements

**May 9, 2019**

| | Quantity | Unit | Cost | Total |
|---|---|---|---|---|
| **Flow Meter Improvements** | | | | |
| General Conditions and Site Work | 1 | ls | $15,000 | $15,000 |
| Software, Training, Spare Equipment | 1 | ls | $15,000 | $15,000 |
| Flow Meters | 110 | ea | $250 | $27,500 |
| | | | **Flow Meter Improvements** | **$57,500** |
| | | | **15% Contigency** | **$ 5,750** |
| | | | **Flow Meter Improvements** | **$63,250** |

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## New Water Treatment Building

**May 9, 2019**

| New Water Treatment Building | |
|---|---|
| General Conditions and Site Work | $12,500 |
| Walls and Interior, Doors | $25,000 |
| Roof Structure | $4,000 |
| Roofing and Fascia | $15,000 |
| Interior Carpentry & Misc. (Chemical Room) | $2,500 |
| Painting | $2,500 |
| Site Piping, Site Restoration, Gravel | $15,000 |
| Structure Excavation & Backfill | $7,500 |
| Concrete: footings, pads, floor | $15,000 |
| Process Equipment | $80,000 |
| Miscellaneous mechanical plumbing and piping | $6,000 |
| Mechanical Systems | $25,000 |
| Electrical Mobilization & Bonding | $9,000 |
| Grounding | $2,500 |
| New LP/LP Transformer | $5,000 |
| Site wire and junction boxes | $1,500 |
| General Electric/Power | $2,500 |
| Lights | $2,000 |
| SPD | $1,250 |
| Unit Heaters | $4,000 |
| Instruments | $2,500 |
| SCADA Control/Instrumentation Work | $10,000 |
| Miscellaneous Conduits, Wiring and Electrical | $2,000 |
| Distribution Panel and Service | $2,500 |
| Emergency Generator | $75,000 |
| **New Water Treatment Building** | **$329,750** |
| **15% Contigency** | **$ 32,975** |
| **New Water Treatment Building Construction** | **$362,725** |

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## New 110,000 Gallon Reservoir

**May 9, 2019**

| **New 100,000 Gallon Reservoir Construction** | |
|---|---|
| General Conditions and Site Work | $12,500 |
| Excavation/Backfill | $20,000 |
| CIP Foundation Slab | $45,000 |
| CIP Walls | $120,000 |
| CIP Columns | $20,000 |
| CIP Elevated Slab and Beams | $55,000 |
| Access Hatches | $3,000 |
| Misc Metals | $7,500 |
| Water Tightness Test | $5,000 |
| Inlet/Outlet Piping | $15,000 |
| Land/Access/Road | $25,000 |
| **New 100,000 Gallon Reservoir** | **$328,000** |
| **15% Contigency** | **$ 32,800** |
| **New 100,000 Gallon Reservoir Construction** | **$360,800** |

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## North Booster Station

**May 9, 2019**

| **North Booster Station** | |
|---|---|
| General Conditions and Site Work | $10,000 |
| Precast Concrete Pit | $25,000 |
| Site Work, Restoration, Gravel | $7,500 |
| Structure Excavation & Backfill | $5,000 |
| Process Equipment | $16,500 |
| Pipe painting | $1,000 |
| Miscellaneous mechanical plumbing and piping | $1,000 |
| Mechanical Systems:  Unit Heaters, Sump Pumps | $5,000 |
| Electrical | $25,000 |
| Emergency Generator | $50,000 |
| **North Booster Station** | **$146,000** |
| | **$ 14,600** |
| **North Booster Station Construction** | **$160,600** |

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## Distribution System Improvements

**May 9, 2019**

| | Quantity | Unit | Cost | Total |
|---|---|---|---|---|
| **Distribution System Improvements** | | | | |
| General Conditions and Site Work | 1 | ls | $40,000 | $40,000 |
| 2-inch PVC Water Main | 11000 | lf | $6 | $66,000 |
| 2-inch Isolation Valves | 1 | ls | $25,000 | $25,000 |
| 2-inch Fittings | 1 | ls | $7,500 | $7,500 |
| 4-inch PVC Water Main | 30000 | lf | $8 | $240,000 |
| 4-inch Isolation Valves | 1 | ls | $100,000 | $100,000 |
| 4-inch Fittings | 1 | ls | $25,000 | $25,000 |
| Pressure Reducing Valves | 1 | ls | $25,000 | $25,000 |
| | | | **Distribution System Improvements** | **$528,500** |
| | | | **15% Contigency** | **$ 52,850** |
| | | | | **$581,350** |

# Opinion of Total Probable Costs

## Deer Mountain Sanitary District

## Main Pump Station

**May 9, 2019**

| **Main Pump Station** | |
|---|---|
| General Conditions and Site Work | $12,500 |
| Walls and Interior, Doors | $25,000 |
| Roof Structure | $4,000 |
| Roofing and Fascia | $15,000 |
| Interior Carpentry & Misc. (Chemical Room) | $2,500 |
| Painting | $2,500 |
| Site Piping, Site Restoration, Gravel | $15,000 |
| Structure Excavation & Backfill | $7,500 |
| Concrete: footings, pads, floor | $15,000 |
| Process Equipment | $39,750 |
| Miscellaneous mechanical plumbing and piping | $6,000 |
| Mechanical Systems | $25,000 |
| Electrical Mobilization & Bonding | $9,000 |
| Grounding | $2,500 |
| New LP/LP Transformer | $5,000 |
| Site wire and junction boxes | $1,500 |
| General Electric/Power | $2,500 |
| Lights | $2,000 |
| SPD | $1,250 |
| Unit Heaters | $4,000 |
| Instruments | $2,500 |
| SCADA Control/Instrumentation Work | $10,000 |
| Miscellaneous Conduits, Wiring and Electrical | $2,000 |
| Distribution Panel and Service | $2,500 |
| Emergency Generator | $75,000 |
| **Main Booster Station** | **$289,500** |
| **15% Contigency** | **$ 28,950** |
| **Main Booster Station Construction** | **$318,450** |