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WaterSMART:
Water and Energy Efficiency Grants for FY 2013

Funding Opportunity Announcement # R13SF80003

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EXECUTIVE SUMMARY

Date, Applicant Name, City, County and State

- Date: **January 17, 2012**
- Applicant name: **Wellsville Mendon Conservation District (WMCD)**
- City, County, State: **Wellsville and Mendon, Cache, Utah**
- Project Manager
  - Name: **Zan Murray, P.E.**
  - Title: **Project Manager**
  - Telephone: **(435) 713-9514**
  - E-mail: **zpm@jub.com**
- Total requested WaterSMART funds: $183,000.00
  Total funded by WMCD: $187,035.29
  Total Project Costs: $370,035.29

Project Summary and Task Areas

The Wellsville Mendon Conservation District administers the operation and maintenance of two canals to serve shareholders, the Wellsville-Mendon Canal and the Pump Canal. As the canal ages there are areas that have begun to experience seepage issues. This project focuses on two areas, one on the lower canal and the other on the upper canal, which are experiencing seepage through the canal banks, causing damage to nearby property and wasting water.

This project will line 2,250 feet of the Wellsville-Mendon Canal with EPDM liner material, and pipe 1,800 feet of the Pump Canal with 15 inch Corrugated High Density Polyethylene (HDPE) pipe. This project will help the District achieve the goals of Task A - Water Conservation and Improved Water Management. Without this project, additional water is being released into the

canals to compensate for the seepage and evaporative losses along the open and unlined portions. Please see Attachment A for a project location map.

Task A – Water Conservation and Management

Through careful evaluation including recent completion of a water conservation plan, it has been determined that the best way to mitigate the seepage issues would be to pipe the problem section of the upper canal and install a canal liner on the problem section of the lower canal. In addition to the lining of these canal segments, the water conservation plan also outlined installing a meter at the end of the Wellsville-Mendon Canal to monitor flow over the end of the channel.

These water losses have required the WMCD to exceed its allotment of water. WMCD has rights to 10,700 acre-feet of water from the Hyrum Reservoir, but its current water usage is 12,538.50 acre-feet.

The Utah Division of Water Rights has recently installed a meter on the Canals to measure total water released from Hyrum Reservoir. This has increased the awareness of water used from the reservoir. To complement these meters, the District would like to install a meter at the end of the Wellsville-Mendon Canal to monitor flows over the end of the channel. By lining problematic portions of the canal, lost water can be conveyed to users rather than seeping into the ground. Metering the flow at the end of the Canal will also allow the District to better control the release of water into the Channel. These items will allow the District to manage the water longer through the season before exhausting their water rights from the reservoir.

Length of Time and Estimated Completion Date

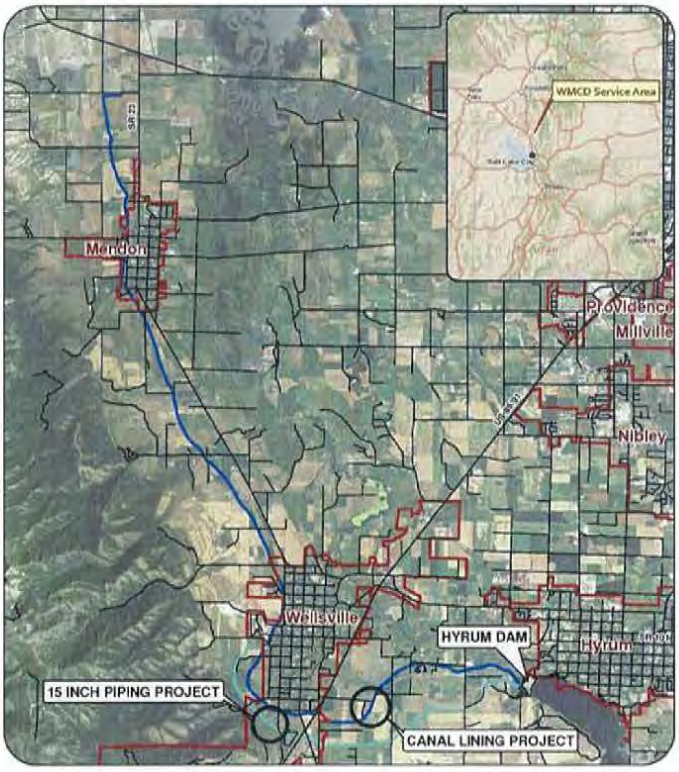
If awarded the WaterSMART Grant in September of 2013, environmental work for the project would be performed in the fall of 2013 followed by design in the winter of 2013. Bidding of the project is will be completed in the winter of 2014 and construction completed in July 2014.

Project Schedule *Milestone/Task*	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14
Sign WaterSMART contracts	■										
Environmental Document	■	■	■								
Project Design	■	■	■	■							
Bid					■						
Award						■					
Permitting							■				
Construction								■	■	■	
System in use											■

BACKGROUND DATA

The Wellsville Mendon Conservation District (WMCD) was created in 1933 to administer the operation and maintenance of two canals to serve shareholders in Wellsville and Mendon, Utah. These canals known as the Wellsville-Mendon Canal and Pump Canal were constructed as part of the Hyrum Dam project and were completed in 1935.

Projects such as clay banks, concrete lining, and EPDM liner have been implemented to different areas of the canals to mitigate these issues in the past as WMCD has made an effort to conserve and better manage water in the canals.



Geographic Location

The WMCD delivers water from the Hyrum Reservoir to shareholders in Cache County, Wellsville and Mendon via two canals. Wellsville and Mendon are small, residential and farming communities in southwest Cache County. Cache County lies between three northern branches of the Wasatch Mountains and borders Idaho on the north.

Please find full-sized maps of the project location in Attachment A.

Source of Water Supply, Water Rights, Current Water Users

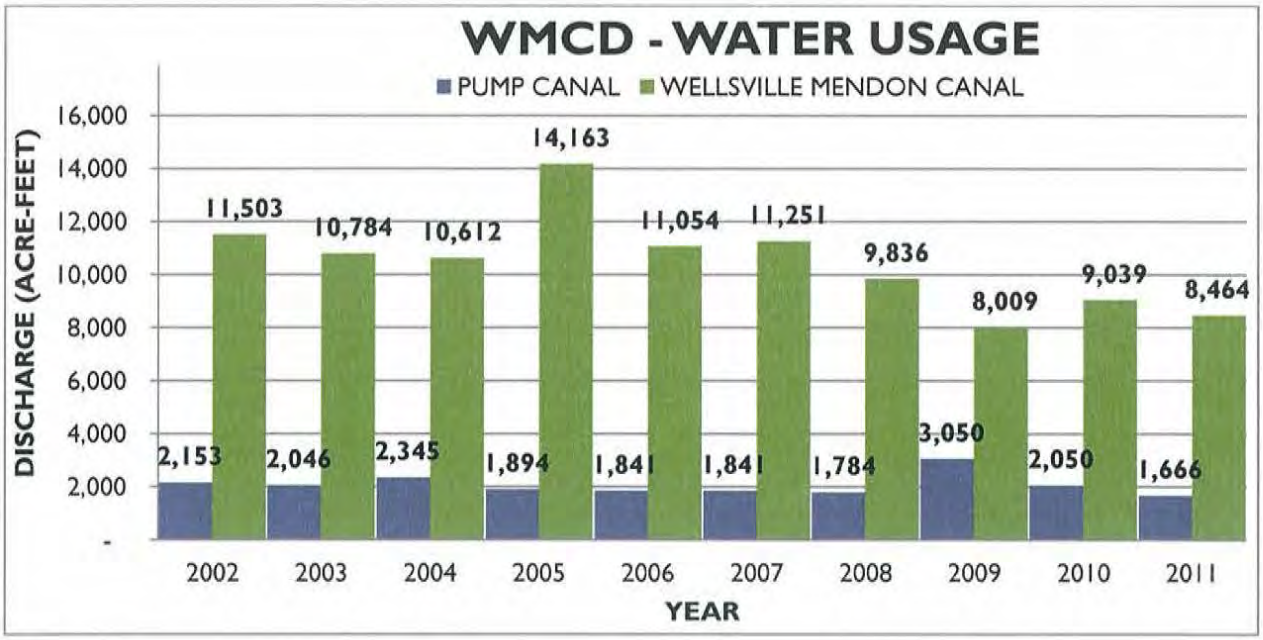
Source of water supply: The Hyrum Reservoir is the source of WMCD's water supply. The dam is located near the southwest corner of Hyrum City and creates a reservoir with a total capacity of 18,685 acre-feet, and a surface area of 480 acres. The Hyrum Dam outlet works has a capacity of 300 cfs, of which 113 cfs can be delivered through the Hyrum Feeder, Wellsville-Mendon, and Pump Canals for irrigation.

Water rights involved: The District has the right to 10,700 acres feet of the usable 14,800 acre-feet in Hyrum reservoir, the remainder of water in the reservoir is managed by the Hyrum Irrigation Company and the United States Department of the Interior Bureau of Reclamation. The District has always been able to receive its 10,700 acre-feet of water since the Hyrum Reservoir was built. Due to seepage losses in the Canals, the allotment of water does not always last until the end of the irrigation season (April 1 –October 31). The water distributed to the Canals is accounted for by a water meter located at the inlets of the Wellsville-Mendon and Pump Canal systems installed in 2011 by the Utah Division of Water Rights.

Current water uses: There are three main uses of WMCD water: irrigation, livestock, and secondary municipal. The major crops irrigated by the two canals consist of hay, alfalfa, and grains. There are many dairy farms and livestock facilities in the area that use the irrigated crops to feed their animals. Cache Valley remains one of the main dairy product suppliers in the state of Utah. There are multiple cheese factories in the valley that process the milk collected from the dairies. There are also many meat processing facilities that process livestock and produce meat products. Along with the agricultural use, residents of Wellsville and Mendon City use water for lawn and garden irrigation. The district has issued 7,300 acre- feet to shareholders on farmland, 1,700 acre- feet to homes in the towns. The remaining amount is distributed to Wellsville Irrigation Company.

Number of water users served: The Wellsville Mendon Conservation District has 7,794 water users.

Current and projected water demand: The table below shows the water usage over the last 10 years and the average water usage trends throughout the district. The total annual average water usage is 12,538.50 acre- feet. It should be noted that this is more than the water right of 10,700 acre-feet allocated to the District. The use of meters to better manage the water from the Reservoir will require the District to better manage its water resources; consequently the need to reduce seepage losses.



Projected water demand: WMCD needs every drop of water because their current allocation does not meet the needs of the agriculture user right now nor do they meet the recommended water standard set by the Utah division of Water Rights. UDWR indicates that the water duty of the land in this area is 18,900 acre-feet for irrigation purposes. This is a shortage of 7,200 acre-feet. They will always be short on water rights for the amount of land being irrigated this is why conservation is so important to the economic success of this area and the agriculture lands that drive this economic base. Water demand on the canals will remain constant at 10,700 acre-feet based upon the water rights being allocated to users.


Canal with 80 year old liner

Potential shortfalls in water supply: Utah is the second driest state in the nation experiencing significantly less precipitation than the rest of the United States. Droughts are a recurrent concern in our area. The water conserved will remain in the Hyrum Reservoir as a result of this project and can provide a buffer during especially dry years. The

agricultural water in the Wellsville Mendon area is absolutely vital to the livelihood of the community which is why it is so important to efficiently use the water supply. With the deteriorating condition of the clay liner, users of the canal are only able to receive water through a portion of the irrigation season. As the canal liner continues to fail, and water is not managed better in the canal, the time water is available during irrigation season will continue to decrease.

Water Delivery System

Pump Canal

The Wellsville-Mendon Pump Canal receives its water from the Wellsville Pumping Plant located below the dam. The canal terminates northwest of the town of Wellsville. The canal was constructed in 1934-35 and is operated and maintained by the Wellsville Mendon Conservation District under contract with the South Cache Water Users Association.

The Wellsville Canal is about 5.4 miles long and has an initial capacity of about 15 cfs. In 2007, approximately 0.5 miles of the canal, through US Highway 89 right-of-way, was replaced with reinforced concrete pipe. In addition, approximately 0.25 miles of canal through the Wellsville Ranch Estates subdivision was replaced with PVC pipe. The remaining 4.6 miles of canal consist of an open clay liner nearly 80 years old. The open canal sections have a bottom width of about 4 feet, side slopes of about 1.5:1, and a depth of about 1.5 feet. A meter has been installed recently at the head of the canal to measure the volume of water distributed from Hyrum Reservoir.

Wellsville-Mendon Canal

The Wellsville-Mendon Canal begins at the Wellsville Canal Pumping Plant and terminates north of Mendon. The 14-mile long canal, with an 89 cfs capacity, crosses the Little Bear River flood plain in a 48-inch diameter inverted siphon and delivers water to lands on the west side of Cache Valley. The canal was constructed in 1934-35 and is operated and maintained by the Wellsville Mendon Conservation District under contract with the South Cache Water Users Association.

Over the years, the canal has been lined with various types of lining material to stop seepage within the most significant water loss areas. In the fall of 1990 and spring of 1991, approximately 2.1 miles of the canal, beginning west of the Meridian Road, was lined with a clay liner. This lining reduced seepage losses for a few years but soon became ineffective. Seepage problems developed in the southwest part of Wellsville City in 1998, making it necessary to line an approximate 0.3 mile section of canal with a buried PVC membrane liner. In 2002, due again to high seepage losses, an approximate 1.5 mile portion of this reach of canal

was replaced with a 45-mil Ethylene Propylene Diene Monomer (EPDM) rubber membrane liner which remains in good repair today. This lining has successfully stopped seepage in this section of the canal. In 2006 and 2007, an additional 0.96 mile section of canal was lined with an exposed 45 mil EDMP rubber membrane liner. Approximately 0.14 miles of canal is concrete liner. Currently, approximately 2.9 miles of canal is lined with a membrane or concrete liner. The remaining approximately 11.1 miles of canal has the original clay liner which is nearly 80 years old. The open sections of the canal have a bottom width of about 6 feet, side slope of 1.5:1, and a depth of 3 feet. A meter has been recently installed at the head of the canal to measure the volume of water distributed from Hyrum Reservoir.

Photo 1 Areas of the canal are currently lined with a type of plastic liner

Relationship with Reclamation

The Wellsville-Mendon Canal is owned by the Bureau of Reclamation. The canal is fed by the Hyrum Reservoir which is also a Bureau of Reclamation facility. This project will directly contribute to the utilization of water from Hyrum Reservoir.

WMCD has worked successfully with the USBR on other projects, as well. In 2005, WMCD received $216,000 from a Water 2025 grant to line 5,000 feet of the lower canal. With the development of the 2025 project water was conserved and seepage losses were eliminated.

In July 2012, WMCD completed its Water Conservation Plan with funding from the Reclamation Water Conservation Field Services Program. The Plan identified the need to install more pipe and liner as conservation measures.

TECHNICAL PROJECT DESCRIPTION

The proposed project will install a 45 mil EPMD rubber liner in the Wellsville Mendon Canal for a length of 2,250 feet. The width of the liner will be 35 feet to extend from the top of bank on each side of the canal channel. To prepare the canal for liner installation, the canal surface will be grubbed of vegetation across the entire section. Any roots or protruding rocks will be removed from the surface to prevent puncturing of the liner. The liner will be placed on a non-

woven geotextile fabric for protection against sharp objects below. It will then be installed in the canal and attached to an existing concrete box culvert on the north end of the project and extended westerly to another canal crossing bridge. The liner will be attached to existing structures and turnout locations using batton strips, per the manufacturer's recommendations. Longitudinally the liner will be anchored in a trench along each side of the canal. This trench is approximately 12 inches wide and 12 inches deep along the top of each canal bank. After the liner is installed, the anchor trenches will be backfilled with native materials.

The project will also connect two piped sections of the Pump Canal. This will be done by installing 1,800 feet of 15" HDPE corrugated pipe between the existing pipes in the existing canal channel and connecting them with junction boxes. Cleanout boxes will be placed along the pipeline at approximately 400 foot spacing. After installation, the pipe will be backfilled with imported material and vegetated to prevent any erosion. There are no turnouts in this location of the canal.

The last portion of this project will be to install a meter at the end of the Wellsville-Mendon Canal. This meter will consist of a measurement device such as a ramp or Parshall flume and a recording device to measure the flow back into the river. The flow measurements will be transmitted to the Utah Division of Water Rights Offices and displayed on their website along with the flows into the Canal.

EVALUATION CRITERIA

Evaluation Criterion A - Water Conservation

A.1 Water Conservation

Subcriterion A.1 (a) - Quantifiable Water Savings

Describe the amount of water saved. Estimated amount of water to be conserved (acre-feet/year) as a direct result of this project.

744 acre-feet of water will be conserved per year with this project.

» What is the applicant's average annual acre-feet of water supply?

10,700 acre-feet

» Where is that water currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?

Water is seeping into the ground and spilling at the end of the canal.

» Where will the conserved water go?

Conserved water will be used to extend the number of days that water is in the canals thus extending the irrigation season for the WMCD users.

1. Canal Lining/Piping

» How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

The District this past irrigation season monitored seepage below the canal using a V-notch weir, for six weeks, to determine the amount of water being lost and where it is coming from. A flow measurement with a Pygmy meter was used to measure channel velocity at various depths and locations across the width of the channel. The velocity was then used to calculate the flow rate. Measurements and calculations are included in Attachment C.

» How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses.

All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

Ponding test were attempted however the test failed and no usable results were ascertained. The only seepage losses measured was from the six week monitoring.

» What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

Leakage is expected to be eliminated based upon the materials and installation techniques being used. The project areas will be tested to ensure that there is no leakage by performing on air-lance test on the liner and an air test on the pipe. They will be monitored for leaks and results documented.

» What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?

In the lined portion of the project: 2,200 feet of deteriorating liner is losing 298 acre-feet over .42 miles of canal. This is equivalent to a transit loss of 714 acre-feet per mile.

In the piping portion of the project: 1,800 feet of pipe is losing 149 acre-feet over .34 miles of canal. This is equivalent to a transit loss of 436 acre-feet per mile.

» How will actual canal loss seepage reductions be verified?

It is anticipated that the losses within the project area will be eliminated due to the materials and pipe being used. Flow measurements that have been taken before the project will be and compared with pre-project measurements and documented for verification.

» Include a detailed description of the materials being used.

The canal liner will be a rubber membrane made of Ethylene Propylene Diene Monomer (EPDM). The thickness will be 45 mm. All joints are seamed with a primer and seaming tape to provide a tight and durable seal. At connections with structures, a baton strip attached with expansion anchors to concrete will be gasketed and caulked to seal the connection. The EPDM liner will be placed over a non-woven geotextile to protect the liner. The pipe material will be corrugated High Density Polyethylene (HDPE) Pipe. The pipe has gasketed joints and is specified for gravity flow applications. Cleanout boxes and junction boxes will be pre-cast concrete with grates and grouted openings around the pipe.

3. Irrigation Flow Measurement: Irrigation flow measurement improvements can provide water savings when improved measurement accuracy results in reduced spills and over-deliveries to irrigators. Applicants proposing municipal metering projects should address the following:

» How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.

The Water Master estimates that 2-4 cfs flows over the end of the canal. If the amount of spill over were reduced by half there would be a savings of nearly 300 acre-feet over an irrigation season.

» Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?

No they are not measured.

» Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.

A ramp or parshall flume would be installed at the tail of the Canal with a level sensor to determine the height of water over the flume. Accuracy based upon these types of flumes is typically of 3-5% based on BOR design guidelines on flumes.

How will actual water savings be verified upon completion of the project?

The amount of spillover of the canal will be measured at the end of the season and compared against the estimated spillover at the completion of the project.

Subcriterion A.1 (b) - Improved Water Management

Describe the amount of water better managed. For projects that improve water management but which may not result in measurable water savings, **state the amount of water expected to be better managed, in acre-feet per year and as a percentage of the average annual water supply.** (The average annual water supply is the amount actually diverted, pumped, or released from storage, on average, each year. This does not refer to the applicant's total water right or potential water supply.) Please use the following formula:

$$\frac{\text{8,600 acre-feet better managed}}{\text{10,700 acre-feet in water supply}}$$

= 80.4%

8,600 acre-feet of water will be better managed due to the better control of water that is released from Hyrum Reservoir into the Wellsville-Mendon Canal.

Subcriterion No. A.2.—Percentage of Total Supply

Provide the percentage of total water supply conserved: State the applicant's total average annual water supply in acre-feet. Please use the following formula:

744 acre-feet conserved
10,700 acre-feet in average annual water supply

= 7%

Subcriterion No. A.3.—Reasonableness of Costs

Please include information related to the total project cost, annual acre-feet conserved (or better managed), and the expected life of the improvement. Use the following calculation:

$370,035.00Total Project Cost
481600
(8,600 acre-feet Better Managed x 56 year Improvement Life)

=.76

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.).

1. Expected life of the improvement

   EPDM Liner – 20 Years; HDPE Pipe 100 Years; Flume 50 Years; Measurement device 10 years. See Attachment D for specifications of the EPDM liner.00

2. Support for the expectation

The support for these expectations comes from manufacturer's warrantees, historic information and from the Army Corp. of Engineers manuals.

Evaluation Criterion C: Benefits to Endangered Species

The U.S. Fish and Wildlife Service identifies the following Threatened, Candidate and Endangered species in Cache County.

- Canada Lynx - Threatened
- Greater Sage Grouse - Candidate
- Least Chub - Candidate
- Ute Ladies' Tresses - Threatened
- Western Yellow-Billed Cuckoo - Candidate

While these species are not known to be in the direct project area, it is understood that any water that is conserved will benefit all species in the project area. An environmental assessment, including coordination with federal and state agencies, will be performed prior to the execution of the proposed project. This project will take place in the existing canal channel and is not expected to negatively affect any species.

Evaluation Criterion D: Water Marketing

Utah law does not currently allow for water marketing. There have been pilot programs initiated in different areas of the State, but no change in the law to date. This project will, however, conserve water making water available to market if the State laws to allow it in the future.

The Bear River Basin, where this project is located, was identified in the Utah State Water Plan as "one of the few areas in the state with a significant amount of developable water." But as growth continues in Box Elder, Weber, Davis and Salt Lake Counties, the Plan anticipates that "the Bear River water will eventually be developed to satisfy growing needs for areas within and outside the Basin." WMCD hopes to establish and conserve their water supply so they can be in a position to make the rest of the water available where it is needed around the state.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

- Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project. Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe the water supply or water management issue that this adaptation strategy will address.

  When we contacted Scott Blake and Jonathan Jones at the USBR Provo Office, they confirmed that they are not aware of a WaterSMART Basin Study that includes the WMCD service area.

Although this project area is not specifically included in a Reclamation Basin Study, it is included in the Utah State Water Plan "Bear River Basin Planning for the Future". This project will implement many of the water conservation measures outlined in that plan including:

- Outdoor conservation. The plan suggests using secondary systems to reduce the demand for more expensive culinary water. The secondary system installed as part of this project will reserve culinary water for indoor uses.
- Metering. Accurate measurement of water encourages conservation. This project will include system metering to measure usage.
- Identify water waste. The SOR was conducted to identify the water losses and now the measures will be taken to alleviate the losses.

Points may be awarded for projects that include other benefits to water supply sustainability.

- Will the project make water available to address a specific concern? For example:
  i. Will the project address water supply shortages due to climate variability and/or heightened competition for finite water supplies (e.g., population growth or drought)? Is the river, aquifer or other source of supply over-allocated?

  WMCD's current demand is exceeds its total water right. The total annual average water usage is 12,538.50 acre-feet; 1,838.50 acre-feet over the District's water right.

  Cache County has experienced significant growth over the last years seeing a 23.3% population growth since 2000. Much of this growth has been in the small rural areas surrounding Logan, including the Wellsville and Mendon areas. Water will need to be available to accommodate this growth while still making the water available for agriculture, which encompasses so much of the area's economy.

  Currently Mendon is experiencing culinary water shortages due to a lack of drinking water supply. Reducing seepage in the Wellsville – Mendon Canal will allow the residents of Mendon to use irrigation water for a longer time-period. Consequently this would reduce the need to use culinary water for lawn and garden use.

  ii. Will the project market water to other users? If so, what is the significance of this (e.g., does this help stretch water supplies in a water-short basin)?

  While Utah state law does not currently allow for water marketing. The Bear River Basin, where this project is located, was identified in the Utah State Water Plan as "one of the few areas in the state with a significant amount of developable water." But as growth continues in Box Elder, Weber, Davis and Salt Lake Counties, the Plan anticipates that

"the Bear River water will eventually be developed to satisfy growing needs for areas within and outside the Basin." WMCD hopes to establish and conserve their water supply so they can be in a position to make the rest of the water available where it is needed within their Basin.

iii. Will the project make additional water available for Indian tribes?

No.

iv. Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved? (e.g., will the project benefit an endangered species by maintaining an adequate water supply)? Are there endangered species within the basin or other factors that may lead to heightened competition for available water supplies among multiple water uses?

Impacts to Mendon's City culinary water supply will continue to grow if concerns with seepage from the canal are not addressed.

v. Will the project generally make more water available in the water basin where the proposed work is located?

Yes. This project is located in the Bear River Basin. By piping and lining the canal, less water will need to be released from the Hyrum Dam into the canals. Water that would have been lost to seepage and evaporation will therefore be able to remain in the Reservoir.

Does the project promote and encourage collaboration among parties?

Yes, by Wellsville Mendon Conservation District working to operate their canal system more efficiently, the communities of Wellsville and Mendon benefit from reduction in culinary water demand.

This project also has the support of the Utah Division of Water Rights. When WMCD purchases a meter for the spillover at the end of the canal, they have offered to install the meter as a $1,500 in-kind donation. The State Engineer's office will then show the data from the meter on their website so it can be remotely accessed.

i. Is there widespread support for the project?

Yes, the communities of Mendon, Wellsville and Cache County are in support of the Project. See the attached letters of support.

ii. What is the significance of the collaboration/support?

A more efficient use of irrigation water will result in culinary water sources being conserved for higher priority purposes and reduce the strain on the municipalities' culinary water supply.

iii. Will the project help to prevent a water-related crisis or conflict?

Yes, there is a concern from property owners adjacent to the canals having crop loss due to excessive seepage from the canal. This concern has grown to a point near litigation. Preventing the seepage will resolve this conflict.

iv. Is there frequently tension or litigation over water in the basin?

In addition to the concerns of seepage causing crop damage from seepage create tension between property owners and the District.

v. Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

By making more secondary water available to users, culinary water can be reserved for indoor uses only. This allows the municipalities affected to better manage and conserve their culinary water.

Will the project increase awareness of water and/or energy conservation and efficiency efforts?

By making more secondary water available to users, culinary water can be reserved for indoor uses only. This allows the municipalities affected to better manage and conserve their culinary water.

i. Will the project serve as an example of water and/or energy conservation and efficiency within a community?

Other small, agricultural communities can look to Wellsville-Mendon as an example of effective water use and conservation. Despite the relatively small size of their service area, WMCD demonstrates that water conservation efforts can significantly contribute to the water supply in a large basin.

ii. Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?

By making available the water saved from seepage, people will be able to conserve that amount consequently extending the benefit of the resource.

iii. Does the project integrate water and energy components?
No

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1.—Project Planning

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, or other planning efforts done to determine the priority of this project in relation to other potential projects.

In July 2012, WMCD completed a Water Conservation Plan under the Bureau of Reclamation's Water Conservation Field Services Program. This plan identified areas where water could be saved and better used, specifically in lining and piping sections of the canal where losses are found. Relevant sections of this plan can be found in Attachment B.

(2) Identify and describe any engineering or design work performed specifically in support of the proposed project.

After completion of the Water Conservation Plan, in August of 2012, the District began to monitor flows and seepage from the canal to better understand the losses and impacts to surrounding property owners.

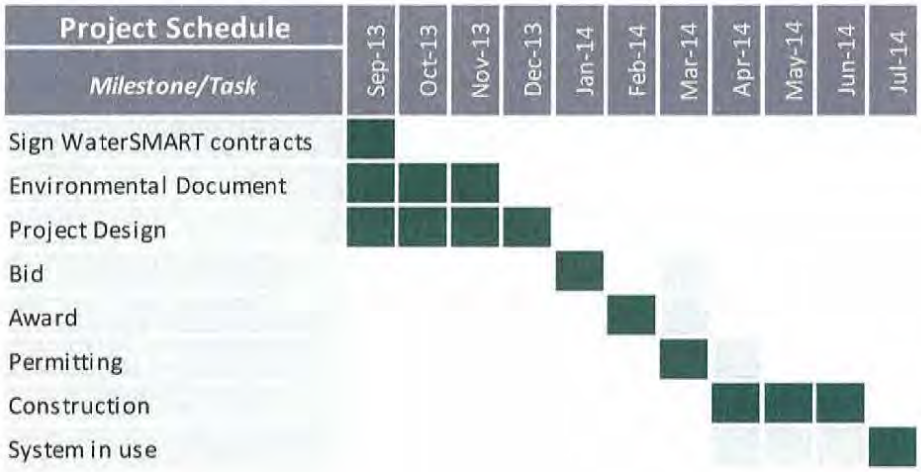
(3) Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).

The Water Conservation Plan identified many goals for the district to accomplish. One such goal was to eliminate seepage from the areas proposed in this project.

Subcriterion No. F.2.—Readiness to Proceed

Describe the implementation plan of the proposed project.

Work on the project will begin after funding awards are announced. The first item to complete will be the Environmental Assessment. This will include a historical and wetland clearance. We anticipate having the Bureau perform these tasks. After completion of the environmental work, design will be completed including preparation of plans and specifications for the project. The project will then be bid to contractors through a competitive process. Following the procurement of a contractor, construction will occur to be ready for operation in July of 2014.



Please explain any permits that will be required, along with the process for obtaining such permits.

It is expected that a Section 404 Permit will be required through the U.S. Army Corps of Engineers. This permit will be obtained through coordination with USACE during the environmental process.

A Utah Pollution Discharge Elimination Permit may be required as well. If so, this will be obtained by the contractor prior to construction.

Subcriterion No. F.3.—Performance Measures

To measure the performance of the lining and piping project, flow measurement prior to installation of the improvements. It will be assumed that there is no leakage in the segments after the work is complete due to performance tests that will be completed per the project specifications. Therefore the water savings will be equal to the water loss measured in the project areas.

After installation of the flume and Pygmy meter, the water spilling over the end of the canal will be computed for the year and compared against the estimated water savings based upon water master observations.

Evaluation Criterion G: Additional Non-Federal Funding

Non-Federal funding will come from the shareholders of the District. In order to extend the payback of the improvements, it is anticipated that a loan from the Utah Board of Water

Resources will be obtained. This funding by WMCD will amount to 51% of the project or $187,035.00

$187,035.00 Non-Federal Funding
$370,035.00 Total Project Cost

=51%

Evaluation Criterion H: Connection to Reclamation Project Activities

(1) How is the proposed project connected to Reclamation project activities?

The Wellsville-Mendon Canal is owned by the Bureau of Reclamation. The canal is fed by the Hyrum Reservoir which is also a Bureau of Reclamation facility. This project will directly contribute to the water available in the Hyrum Reservoir.

WMCD has worked successfully with the USBR on other projects, as well. In 2005, WMCD received $216,000 from a 2025 grant to line 5,000 feet of the Lower Canal.

In July 2012, WMCD completed its Water Conservation Plan with funding from the Reclamation Water Conservation Field Services Program. The Plan identified the need to install more piping and lining as conservation measures.

(2) Does the applicant receive Reclamation project water?

Yes. The Wellsville-Mendon Canal is fed by the Hyrum Reservoir, which is a Reclamation facility.

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

Yes. The Wellsville-Mendon Canal is owned by the Bureau of Reclamation and receives water from the Hyrum Reservoir, also a Reclamation facility.

(4) Is the project in the same basin as a Reclamation project or activity?

Yes. The project is located in the Bear River Basin which contains the Newton and Hyrum Projects, both Reclamation projects.

(5) Will the proposed work contribute water to a basin where a Reclamation project is located?

Yes. The project is located in the Bear River Basin which contains the Newton and Hyrum Projects, both Reclamation projects. The water conserved will remain in the Hyrum Reservoir.

PERFORMANCE MEASURES

Performance Measure No. A.: Projects with Quantifiable Water Savings

Performance Measure No. A.1.—Canal Lining/Piping

To measure the performance of the lining and piping project, flow measurement prior to installation of the improvements. It will be assumed that there is no leakage in the segments after the work is complete due to performance tests that will be completed per the project specifications. Therefore the water savings will be equal to the water loss measured in the project areas.

Performance Measure No. A.2.—Measuring Devices

Measuring Devices: b. Irrigation Metering

After installation of the flume and Pygmy meter, the water spilling over the end of the canal will be computed for the year and compared against the estimated water savings based upon Water Master's observations.

Environmental and Cultural Resources

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

Impacts will be those associated with piping and lining the existing canal. The proposed project improvements will take place primarily in the existing canal corridor. Best practices to prevent the spread of noxious weeds and dust control will be employed. The surface vegetation will be restored upon completion of the project.

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

The U.S. Fish and Wildlife Service identifies the following Threatened, Candidate and Endangered species in Cache County:

- Canada Lynx - Threatened
- Greater Sage-grouse - Candidate
- Least Chub - Candidate
- Ute Ladies' -tresses - Threatened
- Western Yellow-Billed Cuckoo - Candidate

There are no known sensitive species in the project area. Water conservation resulting from the project may have a beneficial impact on wildlife in the area. A full biological survey, including coordination with federal and state agencies, will be performed prior to the execution of the proposed project. This project will take place in the existing canal channel and is not expected to negatively affect any species.

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

Project improvements will be taking place in the existing canal corridor and are not likely to impact any wetlands that may exist in the area. A wetland survey and preliminary coordination with U.S. Army Corps of Engineer will occur prior to the execution of the project to determine if there are wetlands or jurisdictional waterways within or adjacent to the project area.

Measures, such locating staging areas outsides of sensitive areas and implementing erosion control methods, will be implemented to minimize impacts to sensitive areas.

(4) When was the water delivery system constructed?

The delivery was construction as part of the Hyrum Project which began in March 1934. Rehabilitation work was performed in 1977.

(5) Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

The liner will be attached to the existing box culverts and head gate structures using baton strips and expansion anchors. These structures were originally installed in 1935. Impacts to similar structures along the canal have been determined to have no adverse effect to cultural resources. No other significant changes to features of the system are anticipated to take place.

(6) Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

No. A cultural resource survey will be conducted prior to the execution of the proposed project, if necessary, to determine if there are any cultural resources in the project area.

(7) Are there any known archeological sites in the proposed project area?

No. A cultural resource survey will be conducted prior to the execution of the proposed project, if necessary, to verify that there are no known any archaeological resources in the project area.

(8) Will the project have a disproportionately high and adverse effect on low income or minority populations?

No. Implementation of the project would not have an adverse effect to human health or economic resources and would not disproportionately impact environmental justice populations.

(9) Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No. There are no known Indian Trust Assets or other tribal/cultural resources in the project area. Tribal coordination will take place during the environmental process.

(10) Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

Ground clearing activities associated with the project have the potential to introduce noxious weed and non-native species to the project area. Best management practices will be employed to prevent the spread of noxious weeds in the area. Surface vegetation will be restored upon project completion.

Required Permits or Approvals

It is expected that a Section 404 Permit will be required through the U.S. Army Corps of Engineers. This permit will be obtained through coordination with USACE during the environmental process.

A Utah Pollution Discharge Elimination Permit may be required as well. If so, this will be obtained by the contractor prior to construction.

Letters of Project Support

1-14-2013

Bureau of Reclamation
WaterSMART Program

To Whom It May Concern:

I am writing on behalf of Mendon City to express our support for the Wellsville Mendon Conservation District's application to line/pipe two segments of the canal. Mendon City and its residents and neighbors rely heavily on the Wellsville Mendon Canal to supply secondary water to homes and fields in and around town allowing the city to utilize its very limited culinary water resources for indoor use only. Any improvement to the canal that reduces or eliminates water seepage and losses means more efficient water distribution and usage. Similar projects have benefitted the downstream users in the past and the proposed project will provide additional benefits. It is our hope you will give the application serious consideration.

Sincerely

Jon Hardman, Mendon City – Councilman - Water

WELLSVILLE CITY CORPORATION
75 East Main
P.O. Box 6
Wellsville, Utah 84339
Phone: 435-245-3686
Fax: 435-245-7958

January 15, 2013

Bureau of Reclamation
Acquisition Operations Group
ATTN: Ms. Michelle Maher
Mail Code: 84-27810
P.O. Box 25007
Denver CO 80225

Dear Ms. Michelle Maher:

Wellsville City has become aware that Wellsville-Mendon Conservation District is applying for a grant from the Bureau of Reclamation to make improvements to their canal system to reduce the amount of their water losses.

Over the past several years Wellsville City has taken the position that we should do what is possible to conserve water, therefore we have replaced several miles of our culinary water lines.

We applaude Wellsville-Mendon Conservation District in their attempt to conserve and prevent the waste of water and would encourage the Bureau of Reclamation to assist them in this project by providing funding.

Sincerely,

Don Hartle
City Manager/Recorder

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Water Rights

KENT L. JONES
State Engineer/Division Director

January 15, 2013

To Whom It May Concern:

The Utah Division of Water Rights is pledging to assist JUB Engineers and the Wellsville Mendon Conservation District in installing a real-time automated measurement site on the Wellsville Mendon Canal. The Division of Water Rights is willing to install water measurement and automation equipment at the designated point on the canal. The Division of Water Rights is also willing to help maintain and ensure reliable accurate flow records from this measurement site. The data that is collected from the measurement site will be hosted and displayed at the Division of Water Rights website www.waterrights.utah.gov .

Sincerely,

Aaron Hunt P.E.
Automation Engineer

1594 West North Temple, Suite 220, PO Box 146300, Salt Lake City, UT 84114-6300
telephone (801) 538-7240 • facsimile (801) 538-7467 • TTY (801) 538-7458 • *www.waterrights.utah.gov*

UTAH DNR WATER RIGHTS

CACHE COUNTY
CORPORATION

M. LYNN LEMON
COUNTY EXECUTIVE/SURVEYOR

199 N. MAIN
LOGAN, UTAH 84321
TEL 435-755-1850
FAX 435-755-1981

Bureau of Reclamation
Acquisition Operations Group
Attn: Ms. Michelle Maher
Mail Code: 84-27810
P.O. Box 25007
Denver, Co 80225

January 15, 2013

Dear Ms. Maher

Cache County Corporation is involved in developing a water master plan. We appreciate the interest and emphasis the Bureau of Reclamation places in water development. We also thank the Bureau for its funding share in the water master plan development.

It has come to our attention that Wellsville Mendon Conservation District is making application for water conveyance facility improvements through the WaterSMART grants opportunity. Cache County supports the conservation of water through piping and lining of diversion works to improve water management. These types of improvements are necessary to ensure water availability now and into the future.

Thank you for your consideration of the Wellsville Mendon Conservation District application and support of the proposed water improvement project.

Sincerely,

M. Lynn Lemon
Cache County Executive

OFFICIAL RESOLUTION

RESOLUTION NO. 2012 - 1

WELLSVILLE-MENDON CONSERVATION DISTRICT

WHEREAS, The Wellsville-Mendon Conservation District must maintain, provide for, and service the Water System,

WHEREAS, The District is in need of canal lining and piping in the service area to conserve and better manage the water in its system.

WHEREAS, The District desires to obtain grant funding from the Bureau of Reclamation through the WaterSMART: Water and Energy Efficiency Grant Program

NOW THEREFORE, BE IT RESOLVED that the Board of Directors, agrees and authorizes that:

1. **The WaterSMART: Water and Energy Efficiency Grant application prepared by J-U-B Engineers, Inc. has been reviewed by the Board of Directors and supports the contents therein;**

2. **The Wellsville-Mendon Conservation District is capable of providing the amount of funding specified in the funding plan; and**

3. **If selected for a WaterSMART: Water and Energy Efficiency Grant, the District will work with the Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.**

DATED: Dec 18, 2012

Authorized Signature(s)

ATTEST:

Project Budget

FUNDING PLAN AND LETTERS OF COMMITMENT

(1) How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

Assessments will be used as matching funds for the project. Little in-kind services are expected to be rendered.

(2) Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs. Include:

(a) What project expenses have been incurred: Metering of seepage flows was performed in the fall of 2012. This included canal channel measurements and flow measurements of potential seepage water using a V notch weir. Also along with this WMCD will include the cost to prepare the WaterSMART grant application.

(b) How they benefitted the project: The seepage test information was able to aid in calculating seepage losses and pinpointing points of greatest leakage from the canal.

(c) The amount of the expense: Metering $7,089.00. Grant preparations $4,006.00

(d) The date of cost incurrence: Metering and measurements occurred in August – September 2012. Grant application preparations in December 2012 and January 2013

(3) Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

There are no other funding partners for the project. Shareholders will provide the matching funds and Utah Division of Water Resources will be requested to lend the District the matching funds with a payback schedule.

(4) Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards your 50 percent cost share unless otherwise allowed by statute.

There is no other Federal funding for the project.

(5) Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.

There is a request that will need to be made to the Board of Water Resources for a loan to secure the matching funds for the project. If the loan is not secured, the District will go out on the open market to acquire a loan.

Funding Sources	Funding Amount
Non-Federal Entities	
1. Wellsville-Mendon Conservation District	187,035
2.	
3.	
Non-Federal Subtotal	187,035
Other Federal Entities	
1.	
2.	
3.	
Other Federal Subtotal	
Requested Reclamation Funding:	183,000
TOTAL PROJECT FUNDING	$370,035.00

BUDGET PROPOSAL

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding	51%	$187,035
Reclamation Funding	49%	$183,000
Other Federal Funding		$
TOTALS	100%	$370,035

BUDGET NARRATIVE

Salaries and Wages

WMCD staff will not be performing the work associated with this project.

Fringe Benefits

Not applicable.

Travel

No travel will be required for this project.

Equipment

Equipment costs are shown in the cost estimate.

Materials and Supplies

Costs for materials and supplies are shown in the cost estimate.

Contractual

Engineering and construction will be performed on a contractual basis. WMCD's designated consulting engineer, J-U-B Engineers, has prepared the grant application, completed the Water Conservation Plan and has performed the preliminary engineering on this project. WMCD has worked with J-U-B for 11 years and have determined the firm to be qualified and their rates to be fair. Engineering cost $37,627.54. Construction Engineering cost $11,493.90

WMCD will bid the construction portion of the project according to their procurement procedures. The contractual costs shown are estimates for each of the components to furnish and install all the equipment. Generally, the low bidder will be selected based on a determination of acceptable qualifications. Construction costs $289,142.41

Environmental and Regulatory Compliance Costs

The environmental will be completed along with the design and will be complete and approved by BOR before and construction begins. The cost for the environmental compliance is 1% of the total cost of the project $13,108.96

Reporting

Reports will be prepared by the Project Engineer. The cost is estimated to be $5,048.20

Other Expenses

Costs for legal counsel and the Utah Board of Water Resources Administration have also been included in the cost estimate $13,614.28.

Total Costs

Total requested WaterSMART funds:	*$183,000.00*
Total funded by WMCD:	*$187,035.29*
Total Project Costs:	*$370,035.29*

BUDGET FORM

Budget Item Description		Computation		Total Cost
		Unit	Quantity	
Engineering				
Funding Applications				$4,006.64
Project Manager		$183.94/HR	4.0 HR	$735.76
Project Engineer		$128.08/HR	6.0 HR	$768.48
Funding Specialist		$62.56/HR	40.0 HR	$2,502.40
Preliminary Studies/Seepage Tests				$7,088.98
Project Manager		$167.22/HR	1.0 HR	$167.22
Project Engineer		$128.08/HR	1.5 HR	$192.12
Field Engineer		$81.08/HR	83.0 HR	$6,729.64
Survey and Easements				$6,047.44
Project Manager		$183.94/HR	4.0 HR	$735.76
Project Engineer		$87.58/HR	8.0 HR	$700.64
Licensed Surveyor		$122.17/HR	12.0 HR	$1,466.04
Survey Crew		$157.25/HR	20.0 HR	$3,145.00
Design Engineering				$20,484.48
Project Manager		$183.94/HR	12.0 HR	$2,207.28
Project Engineer		$130.65/HR	40.0 HR	$5,226.00
Design Engineer		$87.58/HR	80.0 HR	$7,006.40
CAD Technician		$79.60/HR	40.0 HR	$3,184.00
QC/QA		$177.90/HR	8.0 HR	$1,423.20
Clerical		$59.90/HR	24.0 HR	$1,437.60
Construction Observation				$11,493.90
Project Manager		$183.94/HR	8.0 HR	$1,471.52
Project Engineer		$130.65/HR	16.0 HR	$2,090.40
Construction Observer		$87.58/HR	60.0 HR	$5,254.80
Clerical		$59.90/HR	8.0 HR	$479.20
CAD Technician		$79.60/HR	8.0 HR	$636.80
Licensed Surveyor		$122.17/HR	4.0 HR	$488.68
Surveyor		$107.25/HR	10.0 HR	$1,072.50
MOBILIZATION				

Materials					
Bond		1.50%		$	3,915.00
Labor					
Senior Project Manager	1	$61.67/HR	8.0 HR	$	493.34
Truck Driver	1	$25.50/HR	8.0 HR	$	204.00
Equipment Operator	1	$47.30/HR	8.0 HR	$	378.43
Equipment					
Equipment Delivery Truck	1	$56.40/HR	8.0 HR	$	451.20
Delivery Truck Fuel	1	$3.50/Gal	100 Gal	$	350.00
SWPPP & Re-vegetation					
Materials					
Silt Fence	1	$2.40/FT	2,250 LF	$	5,400.00
Labor					
Senior Project Manager	1	$61.67/HR	10.0 HR	$	616.68
General Labor	2	$13.34/HR	10.0 HR	$	266.88
Equipment					
none					
Other					
Storm Water Permit	1	$1,200.00/LS	1 LS	$	1,200.00
Wellsville Mendon Lining Project Segment A					
Rough Grade Canal Surface					
Materials					
Imported Granular Material	1	$17.40/Ton	50 Ton	$	870.00
Imported Fill Material	1	$13.20/Ton	150 Ton	$	1,980.00
Labor					
Senior Project Manager	1	$61.67/HR	25.0 HR	$	1,541.70
General Labor	3	$13.34/HR	40.0 HR	$	1,601.28
Loader Operator	1	$47.30/HR	40.0 HR	$	1,892.16
Excavator Operator	1	$47.30/HR	40.0 HR	$	1,892.16
Equipment					
Front End Loader	1	$72.00/HR	40.0 HR	$	2,880.00
Excavator	1	$72.00/HR	40.0 HR	$	2,880.00
Pick-up Truck	2	$14.40/HR	40.0 HR	$	1,152.00
Other					
Front End Loader Fuel	1	$3.50/Gal	500 Gal	$	1,750.00
Excavator Fuel	1	$3.50/Gal	500 Gal	$	1,750.00
Pick-up Fuel	1	$3.50/Gal	75 Gal	$	262.50
Geotextile, EPDM Liner and Installation					
Materials					
EPDM Liner	1	$0.96/SF	49,875 SF	$	47,880.00
Geotextile	1	$0.24/SF	49,875 SF	$	11,970.00

Labor					
Senior Project Manager	1	$61.67/HR	30.0 HR	$	1,850.04
Skilled Labor	1	$25.50/HR	80.0 HR	$	2,040.00
General Labor	5	$13.34/HR	80.0 HR	$	5,337.60
Equipment					
Front End Loader	1	$72.00/HR	40.0 HR	$	2,880.00
Pick-up Truck	2	$14.40/HR	80.0 HR	$	2,304.00
Other					
Front End Loader Fuel	1	$3.50/Gal	500 Gal	$	1,750.00
Pick-up Fuel	2	$3.50/Gal	150 Gal	$	1,050.00
Turnout Construction					
Materials					
Head Gate	1	$480.00/EA	1 EA	$	480.00
Concrete	1	$102.00/CY	3 CY	$	306.00
Labor					
Senior Project Manager	1	$61.67/HR	12.0 HR	$	740.02
Skilled Labor	1	$25.50/HR	12.0 HR	$	306.00
General Labor	3	$13.34/HR	12.0 HR	$	480.38
Equipment					
Backhoe	1	$48.00/HR	12.0 HR	$	576.00
Pick-up Truck	2	$14.40/HR	12.0 HR	$	345.60
Compactor	1	$8.55/HR	6.0 HR	$	51.30
Other					
Backhoe Fuel	1	$3.50/Gal	150 Gal	$	525.00
Pick-up Fuel	2	$3.50/Gal	23 Gal	$	157.50
Compactor Fuel	1	$3.50/Gal	4 Gal	$	13.13
Terminal Anchor Trench					
Materials					
Concrete	1	$102.00/CY	4 CY	$	408.00
Labor					
Senior Project Manager	1	$61.67/HR	3.0 HR	$	185.00
General Labor	2	$13.34/HR	8.0 HR	$	213.50
Excavator Operator	1	$47.30/HR	8.0 HR	$	378.43
Equipment					
Excavator	1	$72.00/HR	4.0 HR	$	288.00
Pick-up Truck	2	$14.40/HR	4.0 HR	$	115.20
Compactor	1	$8.55/HR	4.0 HR	$	34.20
Other					
Excavator Fuel	1	$3.50/Gal	50 Gal	$	175.00
Pick-up Fuel	2	$3.50/Gal	8 Gal	$	52.50
Compactor Fuel	1	$3.50/Gal	3 Gal	$	8.75
Connect to Existing Box Culvert Bridge Structure					

Materials					
Batten Strip	1	$24.00/FT	30 FT	$	720.00
Labor					
Senior Project Manager	1	$61.67/HR	4.0 HR	$	246.67
General Labor	3	$13.34/HR	8.0 HR	$	320.26
Equipment					
Hand Tools	2	$10.00/HR	8.0 HR	$	160.00
Generator	1	$5.91/HR	8.0 HR	$	47.28
Pick-up Truck	2	$14.40/HR	8.0 HR	$	230.40
Other					
Generator	1	$3.50/Gal	10 Gal	$	35.00
Pick-up Fuel	2	$3.50/Gal	10 Gal	$	70.00
Wellsville Mendon Lining Project Segment B					
Rough Grade Canal Surface					
Materials					
Imported Granular Material	1	$17.40/Ton	30 Ton	$	522.00
Imported Fill Material	1	$13.20/Ton	75 Ton	$	990.00
Labor					
Senior Project Manager	1	$61.67/HR	20.0 HR	$	1,233.36
Skilled Labor	1	$25.50/HR	30.0 HR	$	765.00
General Labor	1	$13.34/HR	30.0 HR	$	400.32
Loader Operator	1	$47.30/HR	30.0 HR	$	1,419.12
Excavator Operator	1	$47.30/HR	30.0 HR	$	1,419.12
Equipment					
Front End Loader	1	$72.00/HR	30.0 HR	$	2,160.00
Backhoe	1	$48.00/HR	30.0 HR	$	1,440.00
Pick-up Truck	2	$14.40/HR	30.0 HR	$	864.00
Other					
Front End Loader Fuel	1	$3.50/Gal	375 Gal	$	1,312.50
Excavator Fuel	1	$3.50/Gal	500 Gal	$	1,750.00
Backhoe Fuel	1	$3.50/Gal	375 Gal	$	1,312.50
Pick-up Fuel	1	$3.50/Gal	56 Gal	$	196.88
Geotextile, EPDM Liner and Installation					
Materials					
EPDM Liner	1	$0.96/SF	28,875 SF	$	27,720.00
Geotextile	1	$0.24/SF	28,875 SF	$	6,930.00
Labor					
Senior Project Manager	1	$61.67/HR	20.0 HR	$	1,233.36
Skilled Labor	1	$25.50/HR	60.0 HR	$	1,530.00
General Labor	5	$13.34/HR	60.0 HR	$	4,003.20
Equipment					
Front End Loader	1	$72.00/HR	30.0 HR	$	2,160.00
Pick-up Truck	2	$14.40/HR	60.0 HR	$	1,728.00

Other					
Pick-up Fuel	2	$3.50/Gal	100 Gal	$	700.00
Connect to Existing Box Culvert Bridge Structure					
Materials					
Batten Strip	2	$24.00/FT	60 FT	$	1,440.00
Labor					
Senior Project Manager	1	$61.67/HR	4.0 HR	$	246.67
General Labor	3	$13.34/HR	16.0 HR	$	640.51
Equipment					
Hand Tools	2	$10.00/HR	16.0 HR	$	320.00
Generator	1	$5.91/HR	16.0 HR	$	94.56
Pick-up Truck	2	$14.40/HR	16.0 HR	$	460.80
Other					
Generator	1	$3.50/Gal	32 Gal	$	112.00
Pick-up Fuel	2	$3.50/Gal	32 Gal	$	224.00
Pump Canal Piping Project					
Fill Existing Canal					
Materials					
Imported Canal Fill Material	1	$14.40/Ton	1,800 Ton	$	25,920.00
Labor					
Senior Project Manager	1	$61.67/HR	5.0 HR	$	308.34
Loader Operator	1	$47.30/HR	20.0 HR	$	946.08
Equipment					
Front End Loader	1	$72.00/HR	20.0 HR	$	1,440.00
Pick-up Truck	1	$14.40/HR	10.0 HR	$	144.00
Other					
Pick-up Fuel	1	$3.50/Gal	20.0 CY	$	70.00
Front End Loader Fuel	1	$3.50/Gal	250 Gal	$	875.00
15 Inch ADS N-12 Pipe					
Materials					
15 Inch ADS N-12 Pipe	1	$13.20/FT	1800 FT	$	23,760.00
Labor					
Senior Project Manager	1	$61.67/HR	10.0 HR	$	616.68
General Labor	2	$13.34/HR	30.0 HR	$	800.64
Excavator Operator	1	$47.30/HR	30.0 HR	$	1,419.12
Loader Operator	1	$47.30/HR	30.0 HR	$	1,419.12
Equipment					
Excavator	1	$72.00/HR	30.0 HR	$	2,160.00
Front End Loader	1	$72.00/HR	30.0 HR	$	2,160.00
Pick-up Truck	2	$14.40/HR	30.0 HR	$	864.00
Compactor	1	$8.55/HR	30.0 HR	$	256.50
Other					
Excavator Fuel	1	$3.50/Gal	375 Gal	$	1,312.50
Front End Loader Fuel	1	$3.50/Gal	375 Gal	$	1,312.50

Pick-up Fuel	1	$3.50/Gal	56 Gal	$	196.88
Compactor Fuel	1	$3.50/Gal	19 Gal	$	65.63
Gravity Turnout					
Materials					
Precast Concrete Junction Box	1	$2,520.00/EA	2 EA	$	5,040.00
Imported Granular Material	1	$17.40/Ton	30 Ton	$	522.00
15 inch ADS N-12 Tee	1	$120.00/EA	2 EA	$	240.00
15 Inch Valve	1	$240.00/EA	2 EA	$	480.00
Labor					
Senior Project Manager	1	$61.67/HR	4.0 HR	$	246.67
General Labor	1	$13.34/HR	8.0 HR	$	106.75
Skilled Labor	1	$25.50/HR	8.0 HR	$	204.00
Equipment					
Backhoe	1	$48.00/HR	8.0 HR	$	384.00
Pick-up Truck	2	$14.40/HR	8.0 HR	$	230.40
Compactor	1	$8.55/HR	8.0 HR	$	68.40
Other					
Backhoe Fuel	1	$3.50/Gal	100 Gal	$	350.00
Pick-up Fuel	1	$3.50/Gal	15 Gal	$	52.50
Compactor Fuel	1	$3.50/Gal	5 Gal	$	17.50
Connect to Existing Pipe					
Materials					
Precast Concrete Junction Box	1	$2,520.00/EA	2 EA	$	5,040.00
Imported Granular Material	1	$17.40/Ton	30 Ton	$	522.00
Labor					
Senior Project Manager	1	$61.67/HR	4.0 HR	$	246.67
General Labor	1	$13.34/HR	8.0 HR	$	106.75
Skilled Labor	1	$25.50/HR	8.0 HR	$	204.00
Equipment					
Backhoe	1	$48.00/HR	8.0 HR	$	384.00
Pick-up Truck	2	$14.40/HR	8.0 HR	$	230.40
Compactor	1	$8.55/HR	8.0 HR	$	68.40
Other					
Backhoe Fuel	1	$3.50/Gal	100 Gal	$	350.00
Pick-up Fuel	1	$3.50/Gal	15 Gal	$	52.50
Compactor Fuel	1	$3.50/Gal	5 Gal	$	17.50
Junction Boxes					
Materials					
Precast Concrete Junction Box	1	$2,520.00/EA	4 EA	$	10,080.00
Imported Granular Material	1	$17.40/Ton	30 Ton	$	522.00
Labor					
Senior Project Manager	1	$61.67/HR	2.0 HR	$	123.34
General Labor	1	$13.34/HR	4.0 HR	$	53.38
Excavator Operator	1	$47.30/HR	4.0 HR	$	189.22
Loader Operator	1	$47.30/HR	4.0 HR	$	189.22

Equipment					
Excavator	1	$72.00/HR	4.0 HR	$	288.00
Front End Loader	1	$72.00/HR	4.0 HR	$	288.00
Pick-up Truck	2	$14.40/HR	4.0 HR	$	115.20
Compactor	1	$8.55/HR	4.0 HR	$	34.20
Other					
Excavator Fuel	1	$3.50/Gal	50 Gal	$	175.00
Front End Loader Fuel	1	$3.50/Gal	50 Gal	$	175.00
Pick-up Fuel	1	$3.50/Gal	8 Gal	$	26.25
Compactor Fuel	1	$3.50/Gal	3 Gal	$	8.75
Wellsville Mendon Outfall Meter Project					
Metering Station					
Materials					
Structural Concrete	1	$1,800.00/Ton	1 Ton	$	1,800.00
Water Meter and Equipment	1	$2,040.00/Ton	1 Ton	$	2,040.00
Labor					
Senior Project Manager	1	$61.67/HR	10.0 HR	$	616.68
Skilled Labor	1	$25.50/HR	40.0 HR	$	1,020.00
General Labor	1	$13.34/HR	40.0 HR	$	533.76
DWR Technician	1	$100.00/HR	15.0 HR	$	1,500.00
Equipment					
Backhoe	1	$48.00/HR	40.0 HR	$	1,920.00
Pick-up Truck	2	$14.40/HR	40.0 HR	$	1,152.00
Other					
Pick-up Fuel	1	$3.50/Gal	20.0 CY	$	70.00
Backhoe Fuel	1	$3.50/Gal	350 Gal	$	1,225.00
Construction Subtotals				**$**	**289,142.41**
ENVIRONMENTAL AND REGULATORY COMPLIANCE					
Environmental Study				$	13,108.96
Project Manager		$183.94/HR	2.0 HR	$	367.88
Environmental Scientist		$104.95/HR	80.0 HR	$	8,396.00
GIS Specialist		$63.46/HR	8.0 HR	$	507.68
Project Engineer		$128.08/HR	20.0 HR	$	2,561.60
Design Engineer		$87.58/HR	10.0 HR	$	875.80
Clerical		$40.00/HR	10.0 HR	$	400.00
REPORTING					$5,048.20
Project Manager		$183.94/HR	10.0 HR		$1,839.40
Project Engineer		$133.20/HR	10.0 HR		$1,332.00
Funding Specialist		$62.56/HR	30.0 HR		$1,876.80

OTHER				$	13,614.28
Legal Counsel		$10,000.00/LS	1	$	10,000.00
State BOWR Administration (1.25%)				$	3,614.28
TOTAL DIRECT COSTS				$	**370,035.29**
INDIRECT COSTS - _%					

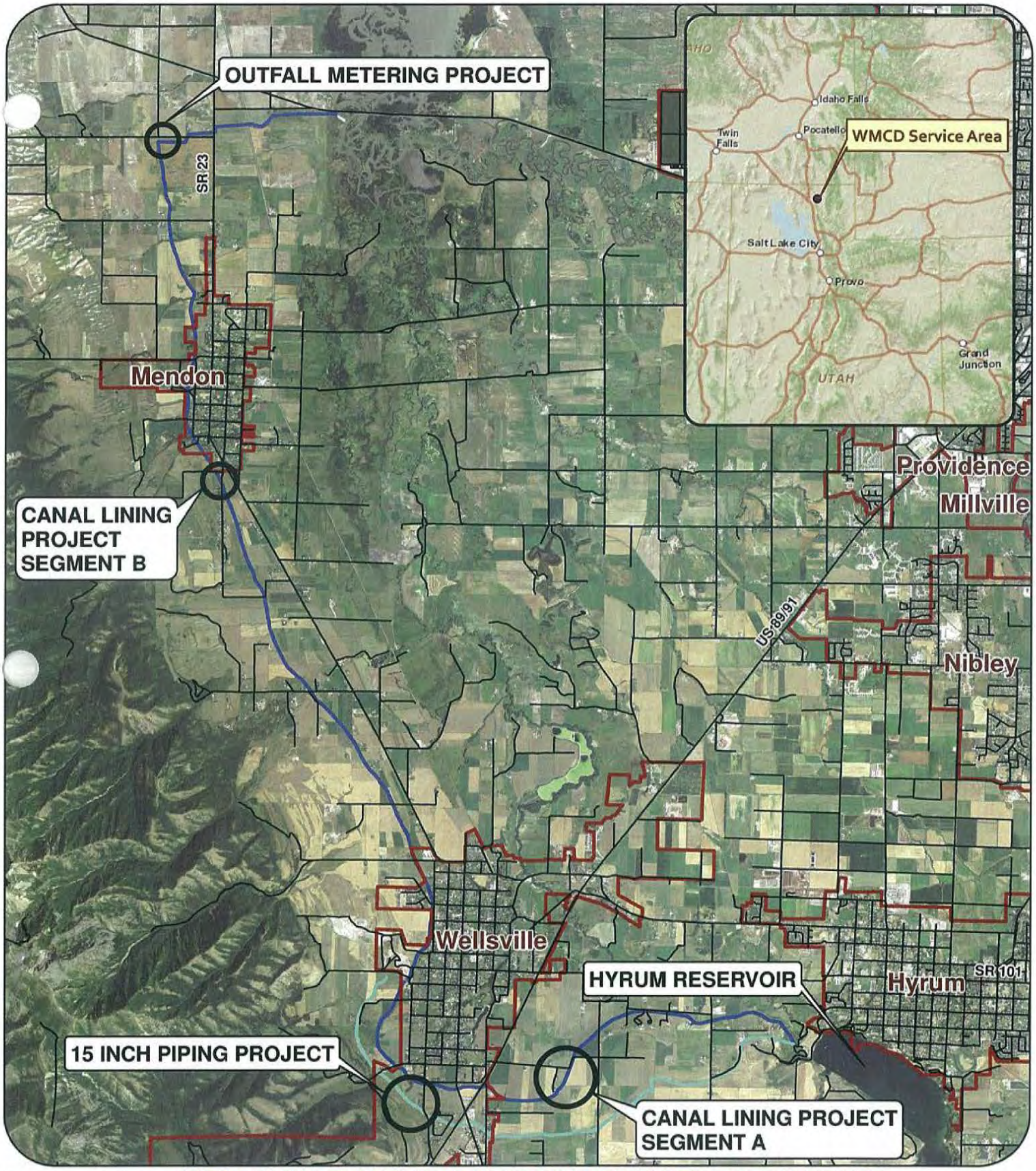
OMB Approval No. 0348-0041

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	$ 18,662.00	$ .00	$ 18,662.00
2. Land, structures, rights-of-way, appraisals, etc.	$ .00	$ .00	$ .00
3. Relocation expenses and payments	$ .00	$ .00	$ .00
4. Architectural and engineering fees	$ 37,628.00	$ .00	$ 37,628.00
5. Other architectural and engineering fees (Environmental)	$ 13,109.00	$ .00	$ 13,109.00
6. Project inspection fees	$ 11,494.00	$ .00	$ 11,494.00
7. Site work	$ .00	$ .00	$ .00
8. Demolition and removal	$ .00	$ .00	$ .00
9. Construction	$ 289,142.00	$ .00	$ 289,142.00
10. Equipment	$ .00	$ .00	$ .00
11. Miscellaneous	$ .00	$ .00	$ .00
12. SUBTOTAL *(sum of lines 1-11)*	$ 370,035.00	$ 0.00	$ 370,035.00
13. Contingencies	$ .00	$ .00	$ .00
14. SUBTOTAL	$ 370,035.00	$ 0.00	$ 370,035.00
15. Project (program) income	$ .00	$ .00	$ .00
16. TOTAL PROJECT COSTS *(subtract #15 from #14)*	$ 370,035.00	$ .00	$ 370,035.00

FEDERAL FUNDING		
17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.	Enter eligible costs from line 16c Multiply X 50.00 %	$ 370,035.00



Legend

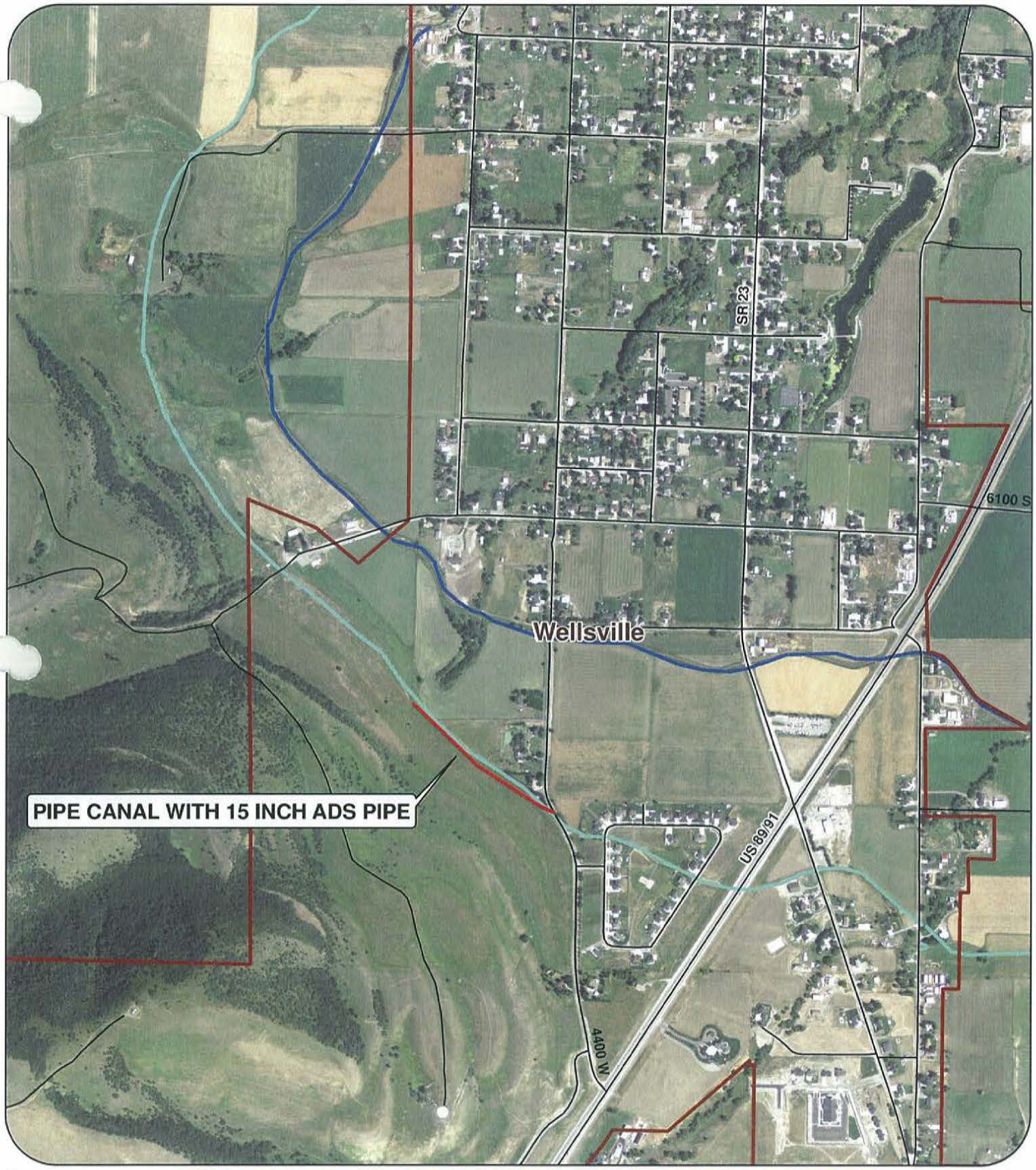
- Wellsville Mendon Canal
- Pump Canal
- City Boundaries

WELLSVILLE MENDON CONSERVATION DISTRICT

CANAL SYSTEM MAP

0 6,000 12,000 Feet

J-U-B ENGINEERS, INC.



Legend

- Wellsville Mendon Lower Canal
- Wellsville Mendon Upper Canal
- City Boundaries

WELLSVILLE MENDON CONSERVATION DISTRICT

CANAL PIPING LOCATION

0 1,000 2,000 Feet

J-U-B ENGINEERS, INC.

WELLSVILLE MENDON CONSERVATION DISTRICT

CANAL LINING LOCATION

Legend

- Wellsville Mendon Lower Canal
- Wellsville Mendon Upper Canal
- City Boundaries

0 1,000 2,000 Feet

J·U·B ENGINEERS, INC.

Location:	Lower @ 3200 W
Date:	6/21/2012
Time:	http://maps.google.com/maps?hl=en&ll=41.62694,-111.910838&spn=0.000889,0.002064&t=h
Weather:	Sunny
Notes:	

Station	1	2	3	4	5	6	7	Totals	% diff from 3pt
Left Depth (ft)	3.08	3.08	3.08						
Right Depth (ft)	3.08	3.08	3.08						
Width (ft)	2.3	2.3	2.3					7.0	
Area (ft^2)	7.19	7.19	7.19					21.58	
Indicator V (fps) @ .2d	**1.900**	**2.04**	**2.26**						
Counts @ .2d	41.00	48	47						
Time (s) @ .2d	21.00	23	20.3						
Calculated V (fps) @ .2d	1.906	2.036	2.255						
Indicator % diff from calc.	0%	0%	0%					0%	
Indicator V (fps) @ .6d	**2.370**	**2.32**	**2.42**						
Counts @ .6d	49.00	49	52						
Time (s) @ .6d	20.10	20.6	20.9						
Calculated V (fps) @ .6d	2.372	2.316	2.421						
Indicator % diff from calc.	0%	0%	0%					0%	
Indicator V (fps) @ .8d	**2.720**	**2.56**	**2.29**						
Counts @ .8d	70.00	55	47						
Time (s) @ .8d	25.00	20.9	20						
Calculated V (fps) @ .8d	2.720	2.559	2.288						
Indicator % diff from calc.	0%	0%	0%					0%	
q_i (cfs) w/ 1pt	17.07	16.66	17.42					51.1	-2%
q_i (cfs) w/ 2pt	16.64	16.53	16.34					49.5	2%
q_i (cfs) w/ 3pt	16.86	16.59	16.88					**50.3**	

Location:	Lower @ 200 E
Date:	6/21/2012
Time:	
Weather:	Sunny http://maps.google.com/maps?hl=en&ll=41.619502,-111.929757&spn=0.000889,0.002064&t=
Notes:	Downstream Side of Bridge

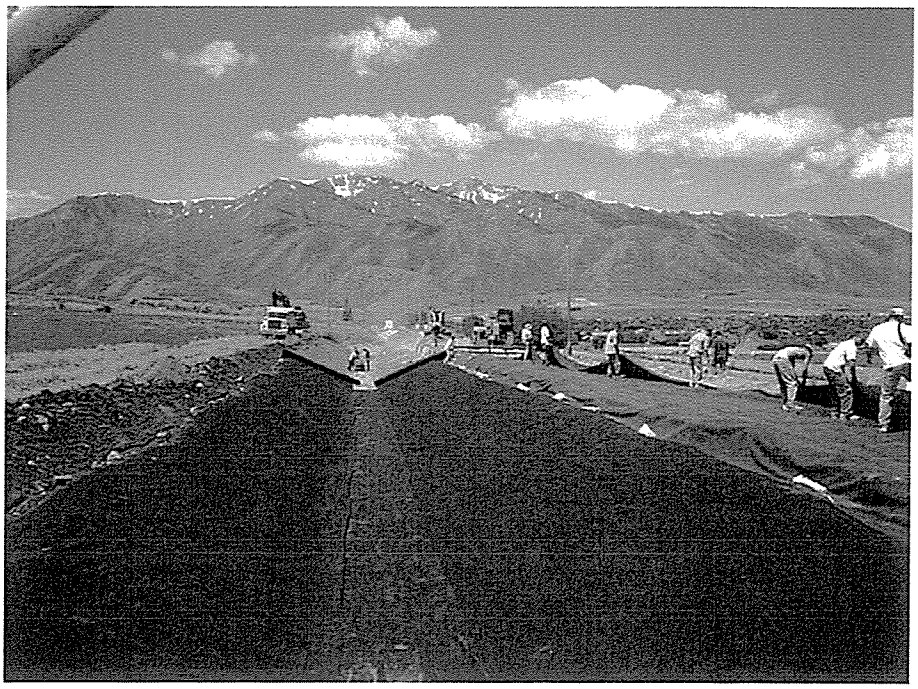
Station	1	2	3	4	5	6	7	Totals	% diff from 3pt
North Depth (ft)	2.92	2.92	2.92						
South Depth (ft)	2.92	2.92	2.92						
Width (ft)	2.2	2.2	2.2					6.5	
Area (ft^2)	6.32	6.32	6.32					18.96	
Indicator V (fps) @ .2d	**2.440**	**2.49**	**2.67**						
Counts @ .2d	50.00	51	55						
Time (s) @ .2d	19.90	19.9	20						
Calculated V (fps) @ .2d	2.444	2.493	2.672						
Indicator % diff from calc.	0%	0%	0%					0%	
Indicator V (fps) @ .6d	**2.460**	**3.08**	**3.11**						
Counts @ .6d	51.00	71	65						
Time (s) @ .6d	20.00	22.4	20.3						
Calculated V (fps) @ .6d	2.480	3.075	3.106						
Indicator % diff from calc.	1%	0%	0%					1%	
Indicator V (fps) @ .8d	**1.960**	**2.2**	**2.04**						
Counts @ .8d	40.00	45	49						
Time (s) @ .8d	19.90	19.9	23.4						
Calculated V (fps) @ .8d	1.962	2.203	2.042						
Indicator % diff from calc.	0%	0%	0%					0%	
q_i (cfs) w/ 1pt	15.67	19.43	19.63					54.7	-9%
q_i (cfs) w/ 2pt	13.92	14.84	14.90					43.7	13%
q_i (cfs) w/ 3pt	14.80	17.14	17.26					**49.2**	

Wellsville-Mendon Conservation District

Water Conservation Plan

July 2012

190 East 800 South
P.O. Box 70
Wellsville, Utah 84339
435-245-3795



1047 South 100 West
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jub.com

J·U·B ENGINEERS, INC.

EXECUTIVE SUMMARY

The Wellsville Mendon Conservation District, has been delivering water from Hyrum Reservoir to shareholders in Wellsville and Mendon via two canals since 1934. This water has been used for agricultural and residential purposes since that time. In order to promote water conservation and efficient use of this precious resource a water conservation plan was written in 1995. The 1995 conservation plan was updated in 2001. This conservation plan was put together in order to update the 2001 plan. This plan expands the scope of the previous plans by addressing maintenance of the current system, and setting goals to enhance water efficiency and conservation.

This plan outlines the rich history of the conservation district and highlights the original purpose of the builders; which was to deliver water to the farmlands on the south and west portion of Cache Valley. A water budget is then set forth to illustrate how much water is available for use and how much water is being used throughout the district. The existing conservation plan is then discussed.

Once the foundation of the history, water budget, and existing plan is in place, the updated report is built. To begin building the plan, the current issues facing the district are presented. These issues were discovered by having meetings, walking the canal, and interviewing the water master. Once the issues are discovered, goals are set to attempt to solve the issues. Candidate measures are then set forth to accomplish the goals.

Although many candidate measures are presented, most are not simple solutions to the issues. It is apparent that multiple candidate measures need to be implemented to solve certain issues. In order to organize the districts resources, the candidate measures are ranked and prioritized. Once the candidate measures are prioritized they are placed in an implementation plan. By following the implementation plan, the district will be able to continue to maintain the resource of the canal and increase their efficiency and water conservation.

The Emergency Response Plan sets forth guidelines on how to proceed in a drought situation. The district considered the 2001 plan and updated it as follows:

In case of draught, lawn and garden watering will be curtailed. Residents of Wellsville and Mendon will share the water on a 7-day rotation schedule. Water will be available to each community for a seven day period every other week. Agriculture irrigation will be monitored to discourage wasteful uses on over-watering. Also, in a dry year when the reservoir does not fill, all shares will be scaled back proportionally to the amount of water available.

5.2 Issues, Goals, and Candidate Measures

In order to determine the best approach to manage the District's system a comprehensive effort to gather information was conducted. Operational procedures were discussed to further the conservation efforts on delivery and maintenance. The team also met with the water master to overview annual maintenance and daily operation practices. A canal walk through was then conducted to see firsthand some of the issues and to inspect the canal in its entirety. Lastly, information from shareholders and community leaders was sought at a board meeting to help the team understand how the water is currently used. Through these activities the team was able to identify six issues; 1) lack of funds, 2) canal seepage and leaks, 3) storm water, 4) emergency protocol, 5) operation and maintenance, 6) water conservation. With these issues identified, the team examined, discussed, and prioritized each issue to determine which to focus on first. To aid in addressing these issues, six goals and eighteen candidate measures were considered.

Below, each issue is briefly described along with its corresponding goal and candidate measures. For each candidate measure the benefits and constraints of implementing that measure are explained. The benefits are ranked in three categories: water conservation (WC), operation and maintenance (O&M), and safety and liability (S&L). These rankings will help to identify which candidate measures would be most beneficial to implement. The constraints are also ranked to show the degree of effort required to overcome them. Constraints such as financial and shareholder approval were considered. The rankings for the constraints and benefits are: none, minor, moderate, significant. These values are assigned based upon the degree to which the candidate measure being implemented would achieve the benefit.

The issues are listed in priority of importance as determined by the District. Projected benefits and constraints are also listed with each issue.

ISSUE 1 – LACK OF FUNDS

The system is in constant need of maintenance and improvements. Built in 1934 a lot of the original infrastructure still exists and has met or exceeded its design life. After further investigation of the yearend financial statements, enterprise fund expenditures have exceeded revenues for at least the past four years. The company needs to find more revenue to keep up on the deteriorating infrastructure.

4.0 WATER BUDGET

4.1 System Inflows

The system inflow is measured at the head of the canal where it is diverted from Hyrum Reservoir. There are two canals in the Wellsville Mendon Canal District, the Wellsville Canal (Pump Canal) and the Hyrum-Mendon Canal (Wellsville-Mendon Canal).

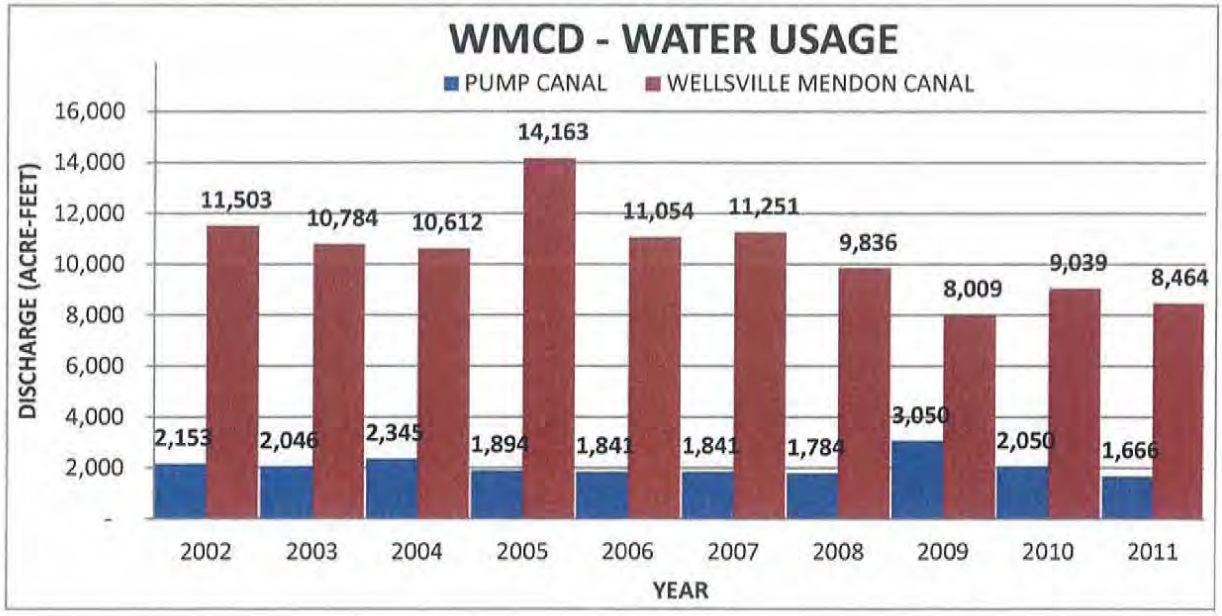
4.2 System Outflows

System outflows are dependent on the demand for water from the canal. This demand consists of the shareholders on the canal. The district has issued 7,300 acres feet to shareholders in farmland, 1,700 acres feet to homes in the towns. There are approximately 1,200 acre-feet extra but that is being lost through seepage from the canals.

4.3 Annual Water Budget

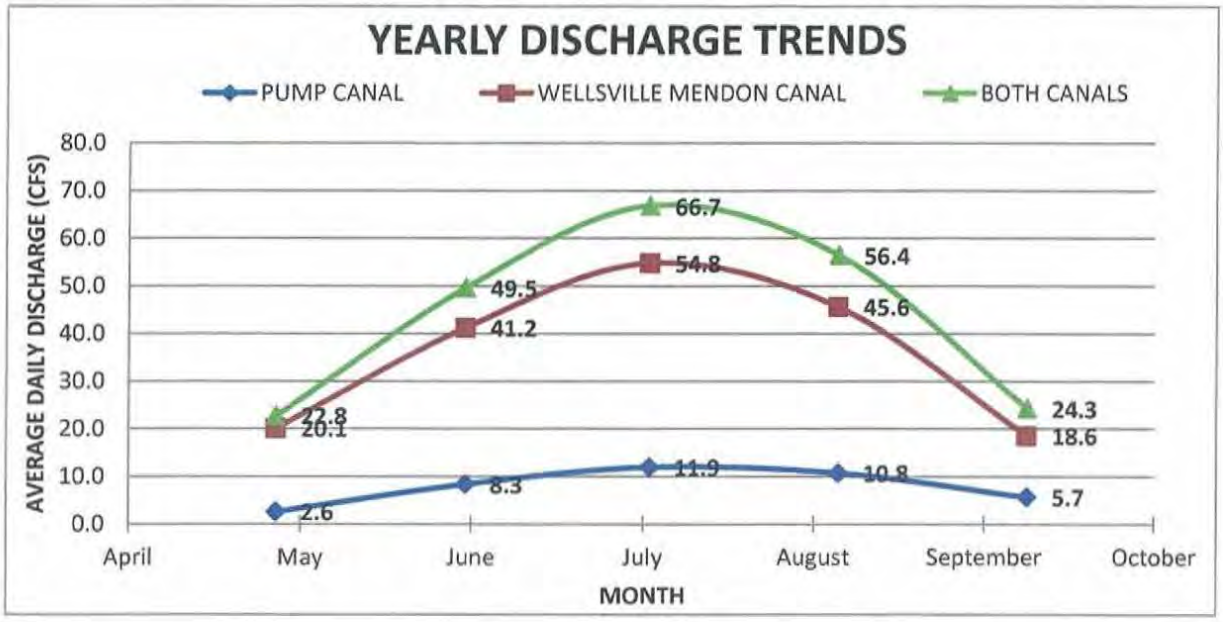
The annual water budget consists of the amount of water available to the system and the amount of water demanded by the system. Below are graphs showing the water usage over 10 years and the average water usage trends throughout the district.

Figure 4. 1: WMCD –WATER USAGE



Dvrtview river commisioner records viewer. (2012, July). Retrieved from http://www.waterrights.utah.gov/cgibin/dvrtview.exe?Modinfo=StationView&STATION_ID=2775&RECORD_YEAR=2012

Figure 4. 2: YEARLY DISCHARGE TRENDS



Dvrtview river commisioner records viewer. (2012, July). Retrieved from http://www.waterrights.utah.gov/cgibin/dvrtview.exe?Modinfo=StationView&STATION_ID=2775&RECORD_YEAR=2012

5.0 WATER MANAGEMENT

5.1 Existing Conservation Practices

The District's existing conservation plan was updated in 2001 prior to the 2002 Wellsville Mendon Canal lining project. Listed in the plan are some possible alternatives to improve the system and an emergency response plan.

Possible alternative to improving the system in the future include the following:

1. Encouraging all lawn and garden systems to be pressurized
2. Installing water meters on residential lawn and garden water lines and installing a progressive rate structure. This would conserve water, as users would tend to use less water in order to save money. This is an alternative that can be implemented in the future.
3. Boosting water conservation and low water use landscaping.
4. Improving management of water through better irrigation scheduling avoiding over watering.

Goal - Incrementally increase income and/or reduce expenses so that the reserve fund can be built up for future projects starting in 2013.

Candidate Measure 1- Investigate grant opportunities for future projects

Benefits: There are opportunities to receive money from the Bureau of Reclamation and other sources. The district has been very successful in the past when they have applied for these grants. *WC (Significant), O&M (Minimal), S&L (None)*

Constraints: Grant applications are fairly straight forward and inexpensive to research and submit. *Ranking (Minimal)*

Candidate Measure 2- Develop a capital improvements project list

A capital improvements project list is a prioritized list of improvement projects that the district would like to implement into the district in the future. The list would be prioritized in order of importance, assigned a dollar value, and given an estimated commencement and completion date.

Benefits: A capital improvements project list will act as a blue print to managing for future sustainability. The list will also act as an important tool in helping shareholders understand the needs and goals of the district. By developing the list now, the district will take a proactive approach in managing the canal system. *WC (Significant), O&M (Moderate), S&L (Minor)*

Constraint: There are no constraints associated with implementing this measure. *Ranking (none)*

Candidate Measure 3- Implement a steady rate increase to water users

The only source of income to the district is through share assessments. Great care and preparation needs to take place in order to inform the shareholders as to why their rates are going up. By presenting the capital improvements project list with a schedule of projects and costs the shareholders will be able to see what their money is going toward. The conservation plan should also be used to show the reasons why more revenue is needed.

Benefits: By incrementally increasing revenue the district will be able to better keep up on the maintenance of the canal and move toward improvement projects. By setting up a capital improvements project list the district will be able to zero in on certain projects and achieve them. *WC (Significant), O&M (Moderate), S&L (Minor)*

Constraints: Many of the shareholders of the WMCD are not used to seeing rates increase on the canal. Many believe that the canal is fine the way it is and doesn't need to be improved. Convincing the shareholders that the capital improvements project list are necessary projects may be very difficult. *Ranking (Significant)*

Candidate Measure 4- Charge for services that are now provide without a cost

The water master does many things during the year to assure adequate delivery of water to the shareholders. Many times he is called out to measure flow, shut a head gate, or try to solve a problem. Currently no charge to the shareholders is assessed for these services. Charging shareholders for special visits from the water master could provide another source of revenue.

Benefits: Additional revenue could go toward the capital improvements project list, or be put in the maintenance fund. *WC (Minor), O&M (Moderate), S&L (None)*

Constraints: It is unknown how often the water master has to make special visits to individual shareholders. Setting prices for different services and asking the shareholders to approve these changes could be impossible. It may also discourage interaction with the water master for operation of the system. *Ranking (Moderate)*

ISSUE 2 – CANAL SEEPAGE AND LEAKS

As the canal ages there are areas that have begun to experience seepage issues. Projects such as clay banks, concrete lining, and EPDM liner have been implemented to different areas of the canals to mitigate these issues. At the current time the board has focused in on two areas of concern that are related to seepage problem. These areas, both on the lower canal, are referred to as the Reed Jones section, and the Cobblestone section. Seepage has been confirmed at both of these areas.

> Goal - Remedy seepage issues in the Cobblestone, and Reed Jones Area beginning in 2016.

Candidate Measure 1- Further Investigate Seepage Areas

Both the Cobblestone and Reed Jones sections have been confirmed as having seepage issues. The leak at the cobblestone area is clearly from the canal and could be fixed with a lining or piping project. However, in the Reed Jones area it is unknown if the water seeping is from the canal or from springs around the canal. Periodic monitoring and documentation of the Reed Jones areas would help the district understand the severity of the seepage and help pinpoint the cause of the leak.

Benefits: Further investigation of each segment would aid in the districts prioritization of the capital improvement projects list. By understanding the severity of each seepage location, the district will be able to ensure that the weakest points of the canal get repaired first. *WC (Significant), O&M (Significant), S&L (Minor)*

Constraints: Seepage areas and leaks can be very complicated and can be tied to many different causes. Soil type and vicinity to natural springs makes pinpointing the cause or location of a seep difficult. *Ranking (Moderate)*

Candidate Measure 2- Line the canal at Reed Jones and Cobblestone locations

The district has had excellent success with the EPDM liner used in past projects. After being added onto the capital improvements project list and after careful financial planning, there will be enough funding to perform a lining project.

Benefits: After lining the canals, the seepage issues at these locations should disappear. Funds can then be shifted from preparing for these projects to other projects on the capital improvements project list. *WC (Significant), O&M (Moderate), S&L (Moderate)*

Constraints: Lining the canal at the Reed Jones location may not be the best alternative, especially if the excess water is coming from a spring and not from canal seepage. Before lining the Reed Jones section, considerable effort should be invested into determining the cause of the leak at this location. *Ranking (Moderate)*

ISSUE 3 – STORM WATER

Storm water entering the canal is of great concern. Not only does it erode away the banks as it enters, the district becomes liable for the water as soon as it flows into the canal. This liability not only deals with the quantity of water but also the quality. The fact that the canal eventually empties into the Little Bear River north of Mendon, raises concerns that the water flowing in the canal should be free of any contaminants. It is not feasible to monitor the quality of storm water entering the canal. There are two ways the storm water enters the canal; piped or sheet flow. Although sheet flow is a concern it would be infeasible to try and control this type of storm water entry. Piped storm water on the other hand is something that could be addressed. Currently there are two known piped storm water entry points along the lower canal. Both of these pipes belong to Cache County. These are located on 000 North Cache County Road and the Yonkville road both located north of Mendon.

Goal: Mitigate inflow of piped storm water into the canal within the next 2 years

Candidate Measure 1- Meet with Cache County to Discuss Storm Water Issues

As discussed above, there are only two known points of piped storm water entry; both of which belong to Cache County. It is imperative that the District and Cache County meet to negotiate how to reroute the storm water that enters the canal from the discharge pipes.

Benefit: By meeting with the County it will bring to their attention the issues that dumping storm water into the canal create. It will also provide a good brainstorming environment to help discover a suitable re-direction path. *WC (Minor), O&M (Moderate), S&L (Significant)*

Constraint: These storm water pipes have been discharging into the canal for several years. Previous attempts made by the District to remove the drainage pipe without the County's approval have failed. *Ranking (Moderate)*

Candidate Measure 2- Seek Funding Assistance from Cache County

As both pipes flowing into the canal belong to Cache County it makes sense to ask for assistance in routing them out of the canal. A partnership project with the County and the District could be arranged.

Benefit: By seeking County funds, the District would be able to focus their financial energy on other projects. *WC (Minor), O&M (Moderate), S&L (Significant)*

Constraint: If the County does not choose to participate with the funding, the District will have to use funds set aside for other projects to cover construction costs. *Ranking (Moderate)*

ISSUE 4 - EMERGENCY PROTOCOL

During the information gathering activities and issue discussions, it became apparent that the District would benefit from setting up a standard emergency protocol. Emergency's such as floods, canal breaks, and overflows are possible occurrences in the District. Having a standard emergency protocol, with emergency numbers and procedures, would enable the district to better handle these situations when they arise.

Goal: Develop an emergency operation and emergency protocol process by 2017

Candidate Measure 1- Develop an emergency protocol contact and procedure manual

With substantial flood events transpiring in Jan. 2012 it would be a good time to re-evaluate emergency operations. One way to get started would be to get representatives from Wellsville, Mendon, and Cache County to discuss the actions taken by the canal district during the recent flood. By having this meeting, representatives from the municipalities could voice their concern about the canal and offer suggestions on how the situation could have been handled better. Creating a binder or document for emergency situations would be the result of this meeting. This document would contain a contact list and how to proceed in a similar flood event.

Benefit: Implementing this measure would give the District peace of mind knowing that in an emergency situation there was a set plan and procedure. By organizing this procedure, time would be saved in an emergency; which would likely increase public safety. *WC (Minor), O&M (Moderate), S&L (Significant)*

Constraint: There are no emergency discharges between Wellsville and Mendon. This problem will only get worse as more housing developments take place. There are emergency discharges located in Wellsville and at the first syphon in Mendon. Currently the only way to get the water out of the canal between Wellsville and Mendon is to break the canal bank. This creates a major stumbling block in knowing how to proceed in an emergency. *Ranking (Significant)*

Candidate Measure 2- Establish an emergency corridor and restrict development within such

As previously stated, there are no emergency overflow channels between Wellsville and Mendon. By designating an emergency corridor, the District would have an area that they could break the canal and let the water flow, without causing structural damage to downhill buildings or homes. This area would be farmable land but would restrict building within this zone.

Benefit: By establishing an emergency corridor, the district would be able to quickly and orderly relieve any flood waters from the canal in this area. This would increase public safety for residence living below the canal. *WC (Minor), O&M (Moderate), S&L (Significant)*

Constraint: Acquiring easements from property owners through this area would be expensive and is contingent upon the land owner's cooperation. Finding the right place to designate this area may also be a challenge. *Ranking (Significant)*

ISSUE 5 – OPERATION & MAINTENANCE

The functionality of a canal largely depends upon operation and maintenance. The canals and corresponding infrastructure are beginning to deteriorate. This causes concern for seepage, leaks, and inefficient water delivery. Many improvement projects have been incorporated over time in an attempt to lengthen the lifespan of the canal. These projects include lining, new head gates, and new turnout pipes. Most of the maintenance procedures are performed by the water master who has a yearly routine as shown in Appendix A. Currently there is no formally documented maintenance procedure. Maintenance operations are performed based upon the water masters judgment and budget for that particular year. It would be of great benefit to formalize an operation and maintenance schedule. This would ensure that the funds are being used to their fullest extent and that the canals and infrastructure remain in a usable condition. There were five specific issues related to operation and maintenance identified during the information gathering activities: deteriorating turnout pipes, herbicide/de-mosser, rodent/deterioration holes in EPDM liner, flooding at the end of the canal.

Goal: Formalize canal operation and maintenance before the end of the water season

Candidate Measure 1- Develop a turnout replacement schedule

One of the main parts of the infrastructure that needs maintenance is the turn out pipes. Turn out pipes are the pipes that run through the canal bank and deliver the water to the shareholders. Although some of the turnout pipes have already begun to be replaced, there are many more that are deteriorating and in need of replacement.

Benefit: By replacing the turnout pipes, the canal company will be able to ensure reliable delivery to each individual water user. By establishing a list of turnout pipes and the order in which they will be replaced the district will be able to set aside funds each year and eventually replace all the turnout pipes. This will increase water delivery efficiency and water conservation in the system by eliminating the deteriorating pipes. *WC (Significant), O&M (Significant), S&L (Minor)*

Constraint: Depending upon budgetary numbers, it may take several years before all of the turnout pipes can be replaced. It will also be difficult to prioritize turnout pipe replacement. *Ranking (Minor)*

Candidate Measure 2- Find an alternative herbicide/de-mosser

Currently the District uses Cascade and Teton herbicide for moss control in the canals. The District has had some complaints and some issues with these chemicals. The herbicides don't kill the moss like previous products that are now off the market or carry very large insurance requirements.

Benefit: Finding an effective alternate herbicide would reduce the amount of moss in the canal and facilitate more efficient water delivery. *WC (None), O&M (Moderate), S&L (Minor)*

Constraint: Currently the Cascade and Teton products are the most commonly used products on the market. There are other products but they carry heavy insurance costs and may soon be off the market. The only other way to eliminate the moss would be to pipe the entire length of both canals. *Ranking (Significant)*

Candidate Measure 3- Monitor rodent/deterioration holes in EPDM liner

In the spring of 2011 there was some holes discovered in the EPDM lined section of the canal. These holes are cause of concern do to the potential of flooding if the water from the canal works its way underneath the liner. Holes may also present a seepage issue if left unpatched.

Pieces of the liner around the holes were cut and sent to the manufacture and tested for deterioration. The results came back with no notable deterioration. Research was also done to see if some type of rodent was causing the holes. This research ended with no conclusion. The

cause of the holes remains a mystery. It is recommended that the District implement a spring and fall walk through of the lined canal section to attempt to solve this issue.

Benefit: By monitoring in the spring and fall, the District will be able to pinpoint the time frame in which the holes are appearing. Once the time frame in which the holes are appearing is determined, measures can be implemented to eliminate the cause. Once the cause of the holes is managed, there will be less maintenance and holes to patch in the spring. *WC (Minor), O&M (Significant), S&L (Moderate)*

Constraint: The cause of the holes may be a combination of many things. Monitoring and research may need to occur for several seasons before any conclusion can be reached. *Ranking (Minor)*

Candidate Measure 4- Control flooding at the end of the canal

It was brought to the attention of the district that there are some black willow trees at the end of the canal that have become overgrown and have begun to clog the channel at the end of the lower canal. There needs to be some type of trimming schedule set up for these trees to reduce the damage to surrounding property owners caused by overflow water.

Benefit: By setting up a trimming schedule, the district will be able to reduce the amount of flooding at the end of the canal and maintain a reliable discharge point. *WC (Moderate), O&M (Moderate), S&L (Minor)*

Constraint: The trees are too large for the district to trim them using their own resources. They will need to hire someone to come in and do the work. This will require careful budgeting and planning. *Ranking (Minor)*

Candidate Measure 5- Develop an operation & maintenance manual

An operation and maintenance manual would include a schedule of events that need to take place throughout the year and their accompanying cost. The manual would also include key contact information.

Benefit: By developing a written schedule and standard procedures, the district can better forecast expenses. This will also aid in developing a more efficient operation, and water delivery system. By having a good operation and maintenance manual, one of the board members could run the canal if anything were to happen to the water master. *WC (Minor), O&M (Moderate), S&L (Minor)*

Constraint: The board members and water master have been running the canal for a long time. Setting up a formal document and procedures may seem mundane and of no worth. *Ranking (Minor)*

ISSUE 6- WATER CONSERVATION

Water conservation in the west has always been a high priority, and is the purpose of this plan. By implementing conservation efforts, the district will be able to lengthen the water season for its shareholders. There are many methods to conserve water. The district has discussed many of them and found a few that may work.

> Goal: Promote water conservation in the District by actively promoting water saving measures and projects

Candidate Measure 1- Conduct workshops and produce newsletters on water conservation and effective irrigation techniques

Educating farmers on effective irrigation and how much water a specific crop needs is very valuable information and can help conserve a lot of water. Home owners that use the water for garden and lawn irrigation could also benefit from plant water demand information. Training sessions and lectures could be sponsored by the district and all shareholders could be invited to attend. Annual or bi-annual newsletters could also be implemented to help spread the word and remind people to try and conserve.

Benefit: By spreading the word of water conservation, the shareholders will realize that they play an important part in the process. Each shareholder will become better educated and conserve water which will lengthen the water season. *WC (Significant), O&M (none), S&L (Minor)*

Constraint: A lot of the shareholders have been irrigating the same ways for many years. It will be a challenge to convince them to change the way that they operate. *Ranking (Minor)*

Candidate Measure 2- Place Canal meters downstream of the dam and at the end of the canal to monitor flow

Currently there are two main canal meters in the system. These are located at the head of the Wellsville canal and the head of the Wellsville-Mendon canal. There are no other meters throughout the system to monitor flow. Placing additional meters on the Wellsville-Mendon canal at three locations would be recommended. These locations would be on both sides of Wellsville, and at the end of the canal. It is also recommended that there be a meter placed at the end of the Wellsville Canal just before it enters the lower canal.

Benefit: Monitoring flow throughout the system will enable the water master to distribute the water more efficiently. When a request for water is received, it will be easier to know how much water is available for use. This will also help reduce the amount of water that is wasted and flows back to the river. *WC (Significant), O&M (Moderate), S&L (None)*

Constraint: Finding the funding for the meters would be the biggest constraint. Although the meters would produce accurate data, it may be difficult to convince the shareholders that they are necessary. *Ranking (Moderate)*

Candidate Measure 3- Meter each turn out

This measure would consist of inserting a meter in every head gate along the canal. Data would be read from these meters to determine how much water is actually being used.

Benefit: Placing a meter at each turn out would greatly increase the accuracy in determining how much water a shareholder uses during a given time period. By installing meters at each head gate, the district would be able to ensure that all shareholders are allowed the amount of water from their shares. By having their water metered, the shareholders will be much more inclined to conserve water. *WC (Significant), O&M (Moderate), S&L (None)*

Constraint: Implementation of this measure was attempted in the spring of 2007 but was voted down by the shareholders. *Ranking (Significant)*

Candidate Measure 4- Promote conversion from flood irrigation to pressurized irrigation

The majority of farmers in the WMCD use water through a pressurized irrigation system and apply it to their ground via a sprinkler system. There are also some home owners that use a pressurized system, but most use flood irrigation and ditches to convey and irrigate the land. Sprinkler irrigation is much more efficient and is the preferred alternative when it comes to water conservation.

Benefit: By converting from flood irrigation to pressurized irrigation the district will see some water savings and will be able to lengthen the water season. This will also facilitate easier water management with the water being transferred via pipes instead of ditches. Conveying the water via pipes instead of ditches also mitigates some of the drowning hazard that exists with open channel conveyance systems. *WC (Moderate), O&M (Moderate), S&L (Moderate)*

Constraint: Many of the residents in Wellsville and Mendon are shareholders in the canal. Multiple shareholders use water out of the same head gate and have water turns assigned to them. To be able to convert to a pressurized system, the residents would have to work together to construct their own pipe networks to carry the water from the head gate. It would be difficult to ask the residents to come together and come up with their own funds to accomplish the conversion. *Ranking (Significant)*

Table 5.2-1 summarizes the issues, goals, and candidate measures addressed.

CARLISLE'S GEOMEMBRANE

CARLISLE .045 and .060 GeoEPDM POND LINER

GENERAL

Carlisle's GeoEPDM Pond Liner is a nominal 45-mil and 60-mil thick non-reinforced Ethylene Propylene Diene Terpolymer (EPDM) based elastomeric waterproofing liner for use in recreational, commercial aquaculture and industrial water containment applications. The membrane is specifically formulated for long-term use in buried or exposed geomembrane applications. GeoEPDM Pond Liner has been formulated to be compatible with aquatic life. It is recommended that customers test GeoEPDM before use to ensure it is compatible with the specific aquatic species for the proposed application. GeoEPDM has a wide variety of applications including the lining of agricultural waste water containment, commercial and industrial reservoirs, catch basins, stormwater retention ponds, canals and aquaculture, including fish hatcheries.

INSTALLATION

Installation procedures vary as to the type of application employed and the specific job requirements. When installed correctly, it is difficult to find a more efficient water barrier. Surfaces on or against where GeoEPDM Pond Liner membrane is to be applied must be smooth, free of fins, sharp edges, loose and foreign materials, oil and grease. GeoEPDM can be easily repaired in the field by the owner without specialized tools or training. Consult current specifications and details for complete installation information.

FEATURES:

- Superb elongation and lay flat characteristics
- Excellent low temperature impact resistance
- Exceptional resistance to solar UV, ozone, and oxidation
- Low water vapor permeance and water absorption
- Quick seaming process - no specialized or expensive tools required
- 20 year material warranty available
- Large prefabricated panels available in custom sizing

GeoEPDM 45-mil sizes available:

Width : 5–50 feet	(1.5 - 15.2 meters)
Length: 50–200 feet	(15.2 – 61 meters)
Weight: 0.28 lbs/f^2	(1.37 kg/m^2)
Specific Gravity: 1.19 g/cc	

GeoEPDM 60-mil sizes available:

Width: 5–50 feet	(1.5 - 15.2 meters)
Length: 50, 100, 150 feet	(15.2, 30.5, 45.7 meters)
Weight: 0.37 lbs/f^2	(1.81 kg/m^2)
Specific Gravity: 1.19 g/cc	

CARLISLE'S GEOMEMBRANE

GeoEPDM Physical Property	Test Method	Minimum Properties English		Minimum Properties Metric	
		45 mil	60 mil	1.14 mm	1.52 mm
Thickness Tolerance	ASTM D412	45 mils ± 10%	60 mils ± 10%	1.14 mm ± 10%	1.52 mm ± 10%
Break Strength	ASTM D412	1305 PSI	1305 PSI	9.0 MPa	9.0 MPa
Break Elongation	ASTM D412	300%	300%	300%	300%
Tear Strength min.	ASTM D624	150 lbf/in	150 lbf/in	26.3 kN/m	26.3 kN/m
Puncture Resistance	ASTM D4833	30 lbs.	35 lbs.	125 N	155 N
Brittleness Temperature max.	ASTM D2137	-49 °F	-49 °F	-45 °C	-45 °C
Water Vapor Permeance max.	ASTM E96 (Proc. B or BW)	.1 perms	.1 perms	.1 perms	.1 perms
Resistance to Water Absorption after 7 d immersion @ 158 °F (°C), max.	ASTM D471	+8.0 % -2.0 %	+8.0 % -2.0 %	+8.0 % -2.0 %	+8.0 % -2.0 %
Resistance to Heat Aging (Properties after 670 hours @ 240° F (116° C)) 1. Tensile Break Strength 2. Elongation, ultimate min. 3. Tear Strength	ASTM D573 ASTM D412 ASTM D624	1205 PSI 200% 125 lbf/in	1205 PSI 200% 125 lbf/in	8.3 mPa 200% 21.9 kN/m	8.3 mPa 200% 21.9 kN/m
Multiaxial Elongation	ASTM D5617	100%	100%	100%	100%
Dimensional Stability 168 hrs, 212 °F (100 °C)	ASTM D1204	0.75% ±1.0%	0.75% ±1.0%	0.75% ±1.0%	0.75% ±1.0%
Ozone Resistance Condition after exposure to 100 pphm ozone in air for 168 hrs @ 140°F (40°C) sample under 50% strain)	ASTM D1149	No Cracks	No Cracks	No Cracks	No Cracks
Resistance To Outdoor (Ultraviolet) Weathering[1], Xenon-Arc, 10,080 kJ/m2 exposure @ 80°C (176°F) Black panel temperature, visual examination 7X magnification	ASTM G155	No Cracks	No Cracks	No Cracks	No Cracks
Toxicity to Fish	ASTM E729(96) (modified)	Passes	Passes	Passes	Passes
Whole Effluent Toxicity Testing	EPA 600/4-89/001 Method 1000	Tested	Tested	Tested	Tested
Shore A Durometer	ASTM D2240	60±10	60±10	60±10	60±10

[1]Approximately equal to 8,000 hours at 0.35W/m^2 irradiance.
A two week minimum lead time will be necessary when ordering Carlisle GeoEPDM that is certified to meet the ASTM D-7465 requirements for Type I sheeting.

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Carlisle SynTec