SECTION VII - CANDIDATE MEASURES

Water conservation, as defined in the U.S. Bureau of Reclamation's Guidebook, is "improved water management" or "more efficient water use". Good water management and conservation includes "protecting" as well as "conserving" – protecting the ability to deliver water by properly maintaining project facilities, rehabilitating old diversion and conveyance systems, and improving water measurement and accounting practices.

This section of the report identifies candidate measures for each of the goals identified in Section VI. Measures, activities, and tasks are all commonly used terms for actions that determine how a goal will be achieved. In this report, the term "candidate measure" is used. Each goal will have one or more candidate measures, as more than one might be required to achieve the goal. Following the description of the candidate measure are sections describing the anticipated "Projected Benefits", "Estimated Costs", and "Impacts or Constraints" associated with implementing the candidate measure. This information is carried over to Section VIII where each candidate measure is evaluated to determine which should be adopted for implementation. Please refer to Table 8-1 for a summary of the evaluation criteria.

Projected benefits include one or a combination of three elements. 1) "Water Conservation Efficiency" (WCE) is the degree to which implementation of the measure would improve the efficiency of the system and conserve water. 2) "Operation and Maintenance" (O&M) is the degree to which implementation would improve operation and maintenance efficiency or reduce costs. 3) "Safety and Liability" (S/L) is the degree to which implementation would affect the safety and/or liability of the structure.

Impacts or constraints are separated into two components. 1) "Environmental Impacts" (EI) is the degree to which implementation of the measure would impact environmental resources. This evaluation is preliminary and more analyses would be performed for each measure prior to implementation. 2) "Legal and/or Institutional Constraints" (L/IC) indicates the degree to which implementation would be contingent on agreements and/or approvals from others. Both of these components are rated separately. The rating criteria for both components ranges from a "-1" indicating a negative impact to a "3" which indicates a substantially positive impact or constraint. A "0" rating indicates no known impact or constraint, meaning the Association has full authority to proceed on its own without consultation or agreement with others.

Goal G-1: Bring Existing Diversion Dams and Other Project Structures to Current Standards

Most of the water diversion structures within the system were constructed over 40 years ago and are approaching, or have exceeded, their design life. Many of these facilities also lack the ability to adequately measure and distribute water. Furthermore, several structures also have safety concerns. Aging water facilities limit management opportunities. Bringing existing facilities into current standards will substantially improve the Company's ability to operate them in a more efficient and cost-effective manner.

Operating and maintaining the Company's structures is also very labor intensive for the water-master. Upgrading the structures, to incorporate more automated and easier reading devices, would assist the Company long term.

CM-1. Rehabilitate and Upgrade Diversion Structures

The Board of Directors has selected those diversion structures listed in Table 7-1 for rehabilitation. Rehabilitation will in some cases be extensive, to the point of reconstruction. The rehabilitation will ensure the proper function and structural integrity of the diversion structures. Rehabilitation will also include automation for remote operation, and the addition of flow measurement stations. Table 7-1 shows, for each measure, the degree of rehabilitation anticipated.

Each structure will require an individual design. In Table 7-2, the break down of the cost estimates for each structure can be found.

Table 7-1
Diversion Structure Rehabilitation

Name	Size	Str[1]	Auto[2]	Msrmt[3]	Priority
Chimney flume ditch diversion	S	3	Yes	Yes	1
Chimney pump pond diversion	S	3	Yes	Yes	2
Flat pond diversion	M	1	Yes	Yes	3
Crawford diversion	M	2	Yes	Yes	4
Oak Creek main diversion	L	1	Yes	Yes	5
Oak Creek high water diversion	L	2	No	No	6
Canal/City Creek high water diversion	M	3	Yes	Yes	7
Last Chance	M	3	Yes	Yes	8
Flat concrete ditch diversion	L	1	Yes	Yes	9
North fields pond transmission line inlet diversion	S	1	Yes	Yes	10
North fields pond transmission line east inlet diversion	L	1	Yes	Yes	11
1st & 2nd North pond high water ditch diversion (Oak Creek)	L	1	Yes	Yes	12
3rd,4th,5th, Chimney upper pond diversion	L	3	Yes	Yes	13
Pete Hansen Diversion	M	1	Yes	Yes	14
Chimney seeps diversion (Sherm's pond)	M	3	Yes	Yes	15
Point Ditch diversion – upper	M	2	Yes	Yes	16
Point Ditch diversion – lower	L	1	No	Yes	17

[1] Structural Improvements – "1" Minor, "2" Significant, "3" Major
[2] Add Automation – "Yes" or "No"
[3] Add Measurement – "Yes" or "No"

Projected Benefits

Rehabilitating the diversion structures would reduce operation and maintenance costs, extend facility life, improve safety, and greatly improve the accuracy of water measurement and distribution. These improvements would conserve water by reducing water lost to seepage and evaporation, and by delivering water more precisely and accurately to the users.
WCE: "+"; O&M: "+++"

Estimated Costs

Table 7-2
Diversion Structure Rehabilitation Costs

Name	Struct[1]	OnMsr[2]	ReMsr[3]	ReCtr[4]	Total [5]
Chimney flume ditch diversion	$6,000	$2,500	$4,000	$3,000	$15,500
Chimney pump pond diversion	$6,000	$2,500	$4,000	$3,000	$15,500
Flat pond diversion	$3,000	$2,500	$4,000	$3,000	$12,500
Crawford diversion	$6,000	$2,500	$4,000	$6,000	$18,500
Oak Creek main diversion	$4,500	$2,500	$4,000	$9,000	$20,000
Oak Creek high water diversion	$15,000	-	-	-	$15,000
Canal/City Creek high water diversion	$10,000	$2,500	$4,000	$6,000	$22,500
Last Chance	$10,000	$2,500	$4,000	$9,000	$25,500
Flat concrete ditch diversion	$4,500	$2,500	$4,000	$9,000	$20,000
North fields pond transmission line inlet diversion	$1,800	$2,500	$4,000	$3,000	$11,300
North fields pond transmission line east inlet diversion	$4,500	$2,500	$4,000	$9,000	$20,000
1st & 2nd North pond high water ditch diversion (Oak Ck)	$4,500	$2,500	$4,000	$9,000	$20,000
3rd,4th,5th Chimney upper pond diversion	$15,000	$2,500	$4,000	$9,000	$30,500
Pete Hansen diversion	$3,000	$2,500	$4,000	$6,000	$15,500
Chimney seeps diversion (Sherm's pond)	$10,000	$2,500	$4,000	$6,000	$22,500
Point Ditch diversion – upper	$6,000	$2,500	$4,000	$6,000	$18,500
Point Ditch diversion – lower	$4,500	$2,500	$4,000	-	$11,000
Totals	**$114,300**	**$40,000**	**$64,000**	**$96,000**	**$314,300**
				Rounded	**$315,000**

[1] Structural Improvement Costs
[2] Onsite Measurement Costs
[3] Add for Remote Measurement Costs
[4] Add for Remote Controlling Costs
[5] This cost includes engineering and contingencies

Environmental Impacts

Rehabilitating diversion structures would have short-term impacts associated with reconstructing the diversion structures. All land surface disturbances would be confined to the area immediately around the diversion structure and on small adjacent staging areas. Impacted lands would be re-graded and re-vegetated, as needed, to restore them to natural conditions. A U.S. Army Corps of Engineers "dredge and fill" permit (Section 404 of the Clean Water Act) may be required. If required, conditions of the permit would be carefully followed.
EI: "1" (Minor); L/IC: "1" (Minor)

CM-2. Upgrade Creek Crossings

Safety and liability are concerns at several creek crossings within the system. These crossings must be made by the Company's water-master to divert and measure water. These crossings would be upgraded to create a safer environment for crossing. The Board of Directors has identified those crossings shown in Table 7-3 for upgrade.

Table 7-3
Creek Crossing Upgrades

Priority	Location
1	Oak Creek high water diversion
2	Crossing to access Pete Hansen diversion
3	Canal canyon main diversion

The upgrade would consist of standard metal grate catwalks, which would be equipped with a hand rail. For the catwalks on the diversion structures, the grate will be bolted to the concrete. For an open crossing, small footings will be poured and the grate will be bolted to the footing to insure a stable crossing. On long crossings, a pier may be used in the canal to reduce costs by cutting the span in half.

Projected Benefits
Upgrading creek crossings would improve safety and reduce liability. *S/L: "++"*

Estimated Costs

Table 7-4
Man Crossing Costs

Diversion Location	Catwalk Cost	Concrete Costs	Engineering/ Installation	Total Costs
Oak Creek high water diversion	$ 5,000	N/A	$ 1,500	$ 6,500
Canal canyon main diversion	$ 9,000	$ 610	$ 3,000	$12,610
Crossing to access Pete Hansen diversion	$11,000	$ 915	$ 3,500	$15,415
Totals	**$25,000**	**$ 1,525**	**$ 8,000**	**$34,525**
			Rounded	**$35,000**

As shown in Table 7-4, the total estimated cost for the man crossings is $35,000. This cost includes furnishing the steel, manufacturing, engineering, installation, and contingencies. The cost estimates on the steel were obtained from Sanpete Steel Company. The price on the manufacturing of the bridge was combined with the PRV lids, a candidate measure listed below, for bulk cost savings. These prices are subject to change.

Environmental Impacts
Implementation of this measure may have minor short-term impacts associated with construction of the crossings over the canals/streams. All land surface disturbances would be confined to the area immediately around and adjacent to the crossing. These disturbed lands would be re-graded and re-vegetated as needed to restore them to their natural conditions.
EI: "1" (Minor); L/IC: "1" (Minor)

CM-3. Upgrade PRV Structures

The Company has several pressure reducing valve (PRV) stations that are concrete constructed and approximately 4-feet deep. Covering these structures to increase safety and reduce liability is a high priority for the Company. The Board of Directors has identified those PRV structures listed in Table 7-5 for upgrade.

Table 7-5
Pressure Reducing Valve Structures

Priority	Location
1	3 City PRV
2	1 Last Chance
3	1 South Fields PRV
4	1 Chimney
5	North Fields 2nd north
6	North Fields 1st north
7	4 Flat PRV

Upgrade would consist of manufacturing steel grates to cover each PRV vault. The covers will be hinged on one side and lift open; there will also be an option to lock the covers.

Projected Benefits
Implementing this measure would improve safety, reduce liability, and extend the life of the facility.
S/L: "++"

Estimated Costs
The cost to have the lids manufactured, and installed per 4'x 8'lid is approximately $2,000 with a hinged access and option to lock. Total cost of covering the seven PRV vaults is therefore $24,000.

Environmental Impacts
Implementation would have minor short-term impacts associated with constructing the improvements on-site. All land surface disturbances would be confined to the area immediately around the PRV structures and would be re-graded and re-vegetated, as needed, to restore them to their natural conditions.
EI: "1" (Minor); L/IC: "1" (Minor)

Goal G-2: Increase Storage/Regulating Capacity within the System

The Company has experienced significant challenges with current demand on available water. Additional storage would allow more efficient use of existing water-rights by delivering more water to users to meet later-season needs. Sediment has decreased original capacity in most ponds; others are too small and need to be enlarged.

CM-4. Investigate Feasibility of Constructing New Storage (Freeman-Allred Pond)

As previously mentioned, the Company at one time intended to build an approximate 400 acre-foot storage reservoir to store spring runoff for use later in the season during low water availability. The Company would now like to explore the feasibility of building this storage reservoir. As the Company has significant challenges with the current demand on the available water, it is believed that this could help solve many of these problems.

This candidate measure therefore would consist of a study by an engineering contractor to explore the feasibility of constructing a 400-700 acre-foot Freeman-Allred pond. The first step in the analysis would be to evaluate water-rights to determine feasibility of reinstating the storage right once held by the Company. The analysis would also investigate the feasibility of partnering with Chester Irrigation Company to enlarge storage capacity. Once data is gathered and a preferred design approach is selected, the contractor would then prepare feasibility-level designs and cost estimates.

Projected Benefits

The primary benefit of this action will be to provide information that will help determine the feasibility of adding new storage to the system. The study is a first step in potentially implementing a project that could significantly improve the efficient management and delivery of water, thus conserving water. It is difficult to quantify benefits at this time.
WCE: "0", if implemented "++"

Estimated Costs

The cost of an engineering study for the Freeman-Allred pond is estimated at $15,000.

Environmental Impacts

There would be no environmental impacts associated with the study. The study would identify any proposed actions and evaluate potential environmental impacts from implementing those actions.
EI: "0" (None); L/IC: "0" (None)

CM-5. Rehabilitate Existing Regulating Ponds

As mentioned in Section VI, many of the settling ponds were not originally constructed to the maximum capacity allowed for these types of ponds. Management would like to look into the feasibility of enlarging as many of these as possible. Each pond would be evaluated on its own to determine what would be done. However, Table 7-6 below indicates the Board of Director's current concept and priority.

Table 7-6
Regulating Pond Rehabilitation

Name	Objective	Priority
Crawford	Relocate and Enlarge	1
Chimney Upper	Relocate and Enlarge	2
Chimney Seeps	Enlarge	3
North Fields	Enlarge	4
Pete Hansen	Enlarge	5
Last Chance	Enlarge	6
Flat	Enlarge	7

The maximum allowable size for a pond with an embankment, not requiring formal submission of plans to the state of Utah, is 20 acre-feet. The Company proposes enlarging each pond listed in Table 7-6 to hold 20 acre-feet of water. Restrictions and opposition may be met due to property ownership issues, and other unforeseen complications.

Projected Benefits

Enlarging existing regulating ponds would create more storage capacity for the system and would help the Company better manage its total water-rights.
WCE: "++"; O&M: "++"

Estimated Costs

A lump sum has been used to estimate the cost of each pond. The costs shown include engineering and contingencies. Relocating a pond will incur larger fees than a pond enlargement. Each pond will be engineered during the design phase of the project and more accurate costs will be assigned. Costs for the ponds are shown below in Table 7-7.

Table 7-7
Regulating Pond Rehabilitation Costs

Name	Objective	Cost[1]
Crawford	Relocate and Enlarge	$120,000
Chimney Upper	Relocate and Enlarge	$120,000
Chimney Seeps	Enlarge	$60,000
North Fields	Enlarge	$60,000
Pete Hansen	Enlarge	$60,000
Last Chance	Enlarge	$60,000
Flat	Enlarge	$60,000
Total		$540,000

[1]All costs include engineering and contingencies.

Environmental Impacts

Relocating and enlarging regulating ponds would have short-term impacts associated with construction activities. Constructing new ponds in previously undisturbed areas could potentially have the most environmental impacts. An environmental analysis should be prepared for these new areas prior to initiating any construction activity. All land surface disturbances would be confined to the area within the pond, areas immediately adjacent to the perimeter of the pond, and on small adjacent staging areas. Impacted lands would be re-graded and re-vegetated, as needed, to restore them to natural conditions. A U.S. Army Corps of Engineers "dredge and fill" permit (Section 404 of the Clean Water Act) may be required. If required, conditions of the permit would be carefully followed.

EI: "2" (Moderate); L/IC: "1" (Minor)

Goal G-3: Rehabilitate and Upgrade Deteriorating Conveyance Systems

CM-6. Concrete-Lined Canal on the Flat

This candidate measure consists of replacing approximately 2 miles of open ditch with pipe. It is estimated that the first mile (5,280 feet) will be 15-inch pipe to the first major turnout and the second mile (5,280 feet) will be 12-inch.

Projected Benefits

This measure would reduce seepage and evaporation losses from the deteriorating canal and reduce future maintenance costs. It is estimated that water losses in the ditch are currently 20 to 30 percent. Piping this section would essentially eliminate these loses.

WCE: "++"; O&M: "+"; S/L: "+"

Estimated Costs

The price per foot of furnished and installed 15-inch pipe is approximately $18 per linear foot, or a total of $95,040 (5,280 ft X $18). The price for 12-inch pipe furnished and installed is approximately $15 per linear foot, or $79,200 (5,280 ft X $15). Adding 25 percent for engineering and contingency brings the total cost to about $217,800, rounded to $218,000. PVC pipe costs are variable and fluctuate with the price of oil; therefore this cost is subject to change.

Environmental Impacts

Replacing the canal with pipe would have minor short-term impacts associated with installing the pipe. All land surface disturbances would be confined to the canal area and small staging areas adjacent to the canal. These areas would be re-graded and re-vegetated, as needed, to restore them to their natural condition. Construction would take place during the early spring or late fall when there would be no water in the canal.

EI: "1" (Minor); L/IC: "1" (Minor)

CM-7. Chimney System Flume Ditch

This candidate measure consists of replacing approximately 1,200 feet of existing 12-inch PVC pipe, that currently feeds water to the Chimney System lower pump station pond, with new PVC pipe. The existing pipe appears to be leaking and may be damaged. This measure would reduce water lost to seepage and reduce future maintenance costs.

Projected Benefits

This measure would reduce seepage losses from the deteriorated PVC pipe and reduce future maintenance costs.

WCE: "++"; O&M: "+"

Estimated Costs

The cost of 12-inch PVC furnished and installed is approximately $15 per linear foot, or $18,000 (1,200 feet X $15). Including an estimated 25 percent for engineering and contingencies, the total cost is estimated at $22,500, rounded to $23,000.

Environmental Impacts
Replacing the existing pipe with new pipe would have minor short-term impacts associated with removing and discarding the old pipe and installing the new pipe. All land surface disturbances would be confined to the canal area and small staging areas adjacent to the canal. These areas would be re-graded and re-vegetated, as needed, to restore them to their natural condition. Construction would take place during the early spring or late fall when there would be no water in the canal.
EI: "1" (Minor;, L/IC: "1" (Minor)

CM-8. Last Chance System Open Ditch (Pond Inlet)

This candidate measure consists of replacing approximately 1.2 miles of open ditch with pipe. The existing canal feeds the Last Chance System pond. It is estimated that the pipe is currently carrying 9 cfs of water.

Projected Benefits
This measure would reduce water loss from seepage and evaporation. It is estimated that water losses would be reduced by about 30 to 40 percent.
WCE: "++"; O&M: "+"; S/L: "+"

Estimated Costs
The cost of the PVC Pipe furnished and installed is $18 per linear foot, or about $114,000. Including an estimated 25 percent for engineering and contingencies, the total cost is estimated at $142,600, rounded to $145,000.

Environmental Impacts
Replacing the canal with pipe would have minor short-term impacts associated with installing the pipe. All land surface disturbances would be confined to the canal area and small staging areas adjacent to the canal. These areas would be re-graded and re-vegetated, as needed, to restore them to their natural condition. Construction would take place during the early spring or late fall when there would be no water in the canal.
EI: "1" (Minor); L/IC: "1" (Minor)

Goal G-4: Develop a Strategy for Addressing the Challenges within the City System

As mentioned in Section VI, growth within the city has created unique challenges for the City System. These are in part, the result of the various types of watering equipment being used, agricultural fields being developed into residential use, and approximately 90 acres that were originally designed into the system but have never used water or paid an assessment that will likely request water as they are developed. The present system has about 2130 shares of water for approximately 550 acres.

The Board of Directors has selected three candidate measures to deal with these challenges. First, the Board would like to continue ongoing efforts to find solutions to these various issues in the form of a "strategy plan". Second, the Board would like to install meters within the City System to assist in understanding and managing use within the system. Third, they would like to investigate the feasibility of separating the City/South Field pond into two systems with two ponds, one for each system.

CM-9. Develop a Plan for Dealing with City System Use Issues.

This candidate measure consists of developing a plan for dealing with the various City System issues. The plan would be prepared with public input, particularly stakeholders and beneficiaries that would be affected by the proposed activities. The plan would identify the issues, list activities or measures that would help mitigate the issues, and then adopt those for implementation. The document would be a "working" document that could easily be updated as additional information is gathered.

This document will be prepared by the Company as a continuation of past efforts. Prior to preparing the document, the Company will gather as much information as possible from stakeholders and the public.

Projected Benefits

The primary benefit of this measure would be to help assess the feasibility of making changes within the City System. The study is a first step in potentially implementing a project that could conserve a significant quantity of water by implementing a much more efficient water management program for the City System. The strategy plan itself would not yield conservation benefits but would lead to significant benefits if elements of the plan are implemented.
WCE: "0", if implemented "++"; O&M: "+"

Estimated Costs

Costs (staff time and materials) are estimated at $7,000.

Environmental Impacts

There would be no environmental impacts associated with preparing the plan. If the plan proposes specific actions, it would evaluate any potential environmental impacts from implementing those actions.
EI: "0" (None); L/IC: "0" (None)

CM-10. Install Meters within the City System

Without water measurement, it is difficult to manage a water system properly. With meters installed at every connection, water-users can be held responsible for their individual water consumption. The potential for water conservation is significantly increased.

This candidate measure would consist of adding a small "smart meter" to each connection in the system. The meters are economical and provide accurate flow data. Currently each residence has a 1.5-inch stub valve installed off the main line. The new metering system would include an irrigation box, a meter, and installation.

Projected Benefits

It is difficult to quantify water saved, but installing meters throughout the city is expected to yield substantial water conservation benefits.

WCE: "+++"; O&M: "+"

Estimated Costs

Costs for the system would be broken down as follows; $150 per meter, $25 per irrigation box and $100 installation fee per connection. This would bring the total per connection to $275. There are approximately 450 connections. The total cost for the metering system would be approximately $123,750, rounded to $125,000.

Environmental Impacts

The majority of areas where new meters would be installed are next to existing turnout valves which would result in minimal disturbance of the area. Land disturbances would be graded and re-vegetated to restore them to their original condition.

EI: "1" (Minor); L/IC: "1" (Minor)

CM-11. Investigate Feasibility of Separating City/South Field Pond System into Two Ponds, One for Each system

One option, being considered by the Board of Directors to address City System challenges, is to construct an additional pond and split the system so that both the City and South Field Systems would have their own ponds and delivery systems. This would increase capacity and help with the strains on the City System demands and would assist in the management of usage challenges.

This candidate measure consists of an engineering feasibility analysis of the system. The first of three steps would be to gather data and evaluate the feasibility of separating the system through modeling the two separated sections in order to evaluate flows and pressures in the systems. Data would be in two categories, preliminary design data and data from the users which would identify public issues and concerns. The second step would be to formulate a plan based on the data gathered in the first step. The third step would be to prepare a preliminary design and cost estimate for the plan formulated in step 2.

Projected Benefits

The primary benefit of this measure would be to help determine the feasibility of making this change within the City System. The study is a first step in potentially implementing a project that could conserve a significant quantity of water by implementing a much more efficient water management program for the City System. The study itself would not yield conservation benefits but would lead to significant benefits if the proposal is implemented.
WCE: "0", if implemented "++"; O&M: "+"

Estimated Costs

Cost of the feasibility study for splitting the system is estimated at $15,000.

Environmental Impacts

There would be no environmental impacts associated with the study. The study would identify any proposed actions and evaluate potential environmental impacts from implementing the actions.
EI: "0" (None); L/IC "0" (None)

Goal G-5: Acquire Prescriptive Easements for all Regulating Ponds' Main Inlet and Outlet Piping Where no Easement Exists

As mentioned in Section VI, when the Company installed the pressure irrigation systems there were numerous miles of underground main feed lines installed without any record of easements. The Company has been advised by legal counsel that it should get prescriptive easements recorded on all underground lines, that do not have risers coming off them, to adequately establish their presence.

CM-12. Acquire Necessary Easements

This candidate measure consists of land surveying, preparing legal descriptions, and recording easements for all regulating ponds' inlet and outlet lines. Those conveyance facilities shown and prioritized in Table 7-8 have been identified as needing easements.

Table 7-8
Prescriptive Easements

Name Conveyance Facility	Priority
Flat system pond inlet and outlet lines	1
North Fields pond transition line	2
North Fields pond outlet line	3
City/South Fields Pond outlet lines	4
Chimney seeps pond inlet and outlet lines	5
Chimney upper pond inlet and outlet lines	6
Pete Hansen inlet and outlet lines	7
Last Chance pond inlet and outlet lines	8
Crawford pond inlet and outlet lines	9

Projected Benefits

Benefits of this measure include assurance that necessary right-of-way for water conveyance facilities are protected in perpetuity. This is critical to ensuring viable water delivery to shareholders.

WCE: "0"; O&M: "+"; S/L: "+++"

Estimated Costs

The costs for locating, documenting, and recording the prescriptive easements are estimated to be approximately $15,000.

Environmental Impacts

No environmental impacts or legal and institutional constraints are anticipated with this measure.

EI: "0" (None); L/IC: "0" (None)

Goal G-6: Explore Feasibility of Converting the 3rd, 4th, and 5th North System to a Pressurized Sprinkler System.

The 3rd, 4th, and 5th North System is the last significant agricultural system that is still flood irrigated. The Company would like to put these lands under a pressurized irrigation system. Converting to a pressure system would be a significant water conservation measure. The land lies a significant distance from the source, resulting in considerable water loss to seepage and evaporation from its conveyance through the open unlined ditches. Also, on-farm efficiencies would be greatly improved from pressurized sprinklers over flood irrigation.

The primary constraint to the project is funding. To what level would current water-users support the project? The system is primarily made up of small individually owned farms and costs of the project would create an extreme financial burden on those individuals, unless some cost-share support could be secured. The challenge therefore, would be in obtaining cost-share funding through some governmental program or entity.

CM-13. Determine User Interest and Support for Pressurized Sprinkler System.

This candidate measure consists of conducting a study among stakeholders and beneficiaries to determine water-user interest and support for converting the system from flood irrigation to a pressurized sprinkler system. The study would first gather data, such as: constraints to conversion, anticipated costs, potential cost-share opportunities, benefits of conversion, examples from other conversions, etc. This data would be condensed into a "paper" that would be made available to affected water-users and other interested stakeholders. Meetings, surveys, or other stakeholder interest survey means would be used to assess interest in the proposal.

This document and stakeholder survey could be prepared by the Company or through an engineering consultant hired by the Company.

Projected Benefits

The benefit of this action will be to help assess the feasibility of making changes within the 3rd, 4th and 5th North System. The study is the first step in potentially implementing a project that could conserve a significant quantity of water, as a much more efficient water management program is developed for the 3rd, 4th and 5th North System. It is difficult to quantify benefits at this time.

WCE: "0", if implemented "+++"; O&M: "0", if implemented "++"

Estimated Costs

Cost of the study is estimated at $4,000.

Environmental Impacts

There would be no environmental impacts associated with the study. If the study indicates support for the project, future action would move to CM-14 below.

EI: "0" (None); L/IC "0" (None)

CM-14. Determine Cost Feasibility for Conversion to Pressurized Sprinkler System.

After receiving a positive response from CM-13 above, this conservation measure would consist of a feasibility study performed by an engineering contractor selected by the Board of Directors. This study would gather design data, evaluate alternative solutions, and prepare feasibility-level designs and cost estimates.

Projected Benefits

The engineering study would be the first stem to implementing the conversion to a pressurized sprinkler system. If implemented, the conversion would yield significant water conservation benefits.

WCE: "0", if implemented "+++"; O&M: "0", if implemented "++"

Estimated Costs

Cost of the feasibility study is estimated at $12,000.

Environmental Impacts

There would be no environmental impacts associated with the study. The study would identify any proposed actions and evaluate potential environmental impacts from implementing those actions.

EI: "0" (None); L/IC "0" (None)

Goal G-7. Establish Management Procedures for Improved Water Management and Conservation

CM-15. Complete Pressure Irrigation System Acreage Audits

During 2005, the Company began the process of completing an audit of all of our pressure irrigation systems. The intent of this audit is, first, to assure that all acres utilizing a pressure irrigation system are being assessed, and second, to collect data to be used to better manage each system.

This audit consists of using GPS equipment to map out all agricultural land being watered by a sprinkler system and then downloading this information into a computer program to detail the acreage of each systems use. Currently, approximately 80% of the audit is complete.

Projected Benefits
Completing the audits will give the Company's management the ability to see where each system stands in its feed capacity and will therefore facilitate informed decisions regarding management of, and future improvements to, each system. Although improving management improves efficiency, it is difficult to quantify water saved from implementing this measure.
WCE: "++"; O&M: "+"

Estimated Costs
Costs (staff time and materials) are estimated at $2,000.

Environmental Impacts
Implementing this measure would cause no environmental impacts and would not have any legal or institutional constraints.
EI: "0" (None;, L/IC: "0" (None)

CM-16. Establish Procedures for Better Management of Class B Water Use

The Company has approximately 7,600 shares of outstanding Class B stock, with the ability to issue an additional 7,400 shares (up to 15,000 shares). This is a secondary or high water-right to be used by these share-holders when all Class A water is being utilized and there is excess water available within the Company's water-rights.

The Company would like to establish policies and procedures to address Class B stock so it can be utilized as it was intended. It should also be noted that Class B stock is not currently being assessed by the Company due the lack of established policies for its use. The Company believes that this secondary water-right should be assessed in some way as it is a valid water-right and is a benefit to stockholders who use it.

Projected Benefits
Implementing this measure would improve the Company's ability to manage its water-rights and is expected to yield significant water conservation benefits.
WCE: "++"

Estimated Costs
Costs (staff time and materials) are estimated at $5,000.

Environmental Impacts
Better management of the Company's Class B stock is not expected to have any measurable impacts to environmental resources or have legal or institutional constraints.
EI: "0" (None); L/IC: "0" (None)

CM-17. Update Water Conservation Program

As mentioned in Section V, the Company currently has an effective water management program that includes policies and procedures that help guide their water management decisions. This program has been very effective in the past and the Board of Directors would like to continue to improve the program to make it even more effective in the future.

Included in the existing program are policies and procedures for water measurement and accounting, water pricing and billing, water education, use of water, water transfers, and operation and maintenance. The Board of Directors would like to improve current measures and add new ones, as appropriate. Among these additional improvements would be better procedures for dealing with City System use issues (Goal-4), improved procedures for accounting and assessing Class B stock (CM-16), and others.

Projected Benefits
Implementing this measure would improve the Company's ability to manage its water-rights and is expected to yield measurable water conservation benefits.
WCE: "+"

Estimated Costs
Costs (staff time and materials) are estimated at $5,000.

Environmental Impacts
Better management of the Company's water-rights through improved water conservation is not expected to have any measurable impacts to environmental resources or have legal or institutional constraints.
EI: "0" (None); L/IC: "0" (None)

Summary

The goals and candidate measures described above are summarized in Table 7-9.

Table 7-9
Summary of Goals and Candidate Measures

Goal	Candidate Measure
G-1. Bring existing diversion dams and other project structures to current standards.	CM-1. Rehabilitate and upgrade diversion structures CM-2. Upgrade creek crossings. CM-3. Upgrade PRV structures.
G-2. Increase storage/regulating capacity within the system.	CM-4. Investigate feasibility of constructing new storage (Freeman-Allred pond). CM-5. Rehabilitate existing regulating ponds.
G-3. Rehabilitate and upgrade deteriorating conveyance systems.	CM-6. Concrete-lined canal on the Flat CM-7. Chimney System flume ditch CM-8. Last Chance System open ditch (pond inlet).
G-4. Develop a strategy for addressing the challenges within the City System.	CM-9. Develop a plan for dealing with City System use issues. CM-10. Install meters within the City System. CM-11. Investigate feasibility of separating City/South Field pond into two systems with two ponds, one for each system.
G-5. Acquire prescriptive easements for all regulating ponds' main inlet and outlet piping where no easement exists.	CM-12. Acquire necessary easements.
G-6. Explore feasibility of converting the 3rd, 4th, and 5th North System to a pressurized sprinkler system.	CM-13. Determine user interest and support for pressurized sprinkler system. CM-14. Determine cost feasibility for conversion to pressurized sprinkler system.
G-7. Continue proactive management for improved water management and conservation.	CM-15. Complete pressure irrigation system acreage audits. CM-16. Establish procedures for better management of Class B water-use. CM-17. Update water conservation program.