Harlingen Irrigation District Cameron County No. 1, Texas Canal Lining, Pipeline Installation, Flow Measurement, Telemetry, and Water Delivery Project

General Criteria

1. Type of Project

The proposed project falls under the Border Environment Cooperation Commission (BECC) priority area of water conservation. The proposed modernization and technical improvements are summarized below:

- *Canal Lining: Wyrick Main Canal and Bowman Canal- 3.26 miles*
- *Pipeline Installation: Wyrick Lateral, Taylor & Citrus Canals – 5.66 miles*
- *Flow Meters & Telemetry: 73 Sites throughout system and 400 on farm site meters.*

2. Project Location

The project is located within the boundaries of the Harlingen Irrigation District Cameron County No. 1, Texas (HIDCC No.1). Cameron County is the southernmost county in Texas and is bounded by the Rio Grande and the Gulf of Mexico. The District's infrastructure extends approximately 20 miles north from the Rio Grande and approximately 8 miles north of Harlingen, Texas and is 13 miles wide at its north end and 1 mile wide at its southern end. The Proposed project is within the 62-mile limit from the border that the BECC requires for project certification.

3. Project Description and Work Tasks

The District obtains water for irrigation from the Rio Grande authorized through the Texas Commission of Environmental Quality (TCEQ) Certificate of Adjudication No. 23-831 authorizing the District diversion rights up to 98,232 acre-feet of "Class A" irrigation water and 4,692 acre-feet of municipal water for domestic purposes. In addition, the District holds water rights to divert 20,488 acre-feet of municipal water for use by the Harlingen Water Works Service.

The District has 3309 irrigation accounts, 500 non-agricultural accounts and one municipal account with the Harlingen Water Works Services (HWWS) which provides municipal water service to the Cities of Harlingen, Primera, Combes, Palm Valley and rural water supplies to Military Highway Water Supply and East Rio Hondo Water Supply. The District also has 40 miles of earthen canals constructed between 1905 and 1915, 26 miles of concrete lined canals constructed in the 1950's and 1960's, and 155 miles of pipelines extending from the canal systems. The District's delivery efficiency ranges from 75 to 80% or approximately 20

to 25% of the quantity of water that the District diverts from the Rio Grande is lost to seepage, evaporation, spills, and other operational losses.

The proposed project is a two phase project consisting of using impervious lining of water delivery canals and replacement of existing canals with pipelines in one phase and installation of a District wide flow measurement, telemetry and water delivery management system. Through the proposed project, the District proposes to conserve water through improvements to the canals by either lining the larger capacity canals with polyurethane liners and converting some of the smaller canals to pipelines utilizing reinforced concrete pipe and PVC pipe. Efficiency of operation is proposed to be increased through installation of flow meters and a telemetry system, which will allow the District to move to towards 100% volumetric pricing of water delivered by the District to water users.

The proposed project improvements are sited within the Districts boundaries. The proposed water conservation improvement project consists of two phases. Phase I includes the installation of flow measurement devices at 73 pump sites and at canal diversion points. These devices will be permanently installed to monitor deliveries into particular laterals of the system and forward real time information by telemetry to District headquarters. This information will allow the District to more efficiently match water supply deliveries with water demands thus reducing over pumping requirements and conserve water supply and corresponding energy requirements. This real time information will also allow the District 100% volumetric pricing for water delivered to its users. Phase II includes the repair of 47,100 linear feet of existing concrete lined canals that have been severely damaged due to excessive ground movement. Repair of canals will be by use of polyurethane liners or conversion to pipelines. Lining of canals will be limited to the large capacity canals with flows greater than 80 to 140 cfs. Canals with flows less than 80 to 140 cfs and limited to an equivalent pipe diameter of 72-inches maximum will be converted to pipelines using either RCP or PVC pipe. For diameters of 30-inches or greater RCP pipe will be used. For diameters of 24-inches or less, PVC pipe will be used.

Work tasks included 1) Final Project Study Report, 2) Plans & Specifications, 3) Review Draft Plans & Specifications, 4) Final Plans & Specifications, 5) Installation Specifications, 6) Materials Specifications, 7) Project Funding Awarded, 8) Project Bid Package, 9) Bid Advertisement, 10) Bid Award & Contracting, 11) Flow Measurement & Telemetry (Phase I) Construction, 12) Canal Lining Construction (Phase II), and 13) O&M Training. Final Report was completed in March of 2003 and revised in May of 2003.

The proposed cost breakdown by project phases is as follows:

Cost Breakdown by Project Phases

Item	*Cost-Phase I Flow Metering /Telemetry*	*Cost-Phase II Canal Lining/Pipelines*	*Total (USD)*
Construction	*1,400,000*	*1,800,000*	*3,200,000*
Engineering & Admin	*180,000*	*180,000*	*360,000*
Total Project	*1,580,000*	*1,980,000*	*3,560,000*

4. Compliance with International Treaties and Agreements

The International Boundary and Water Commission (IBWC) is an independent bi-national public organization that foresees that the 1944 Water Treaty between the United States and Mexico related to water and boundaries issues applies. The project will not violate the allocation of water rights. The District will continue to meet all state surface water diversions from the Rio Grande in accordance with the agreements in place and the restrictions of the Treaty.

Human Health and Environment

1. Human Health and Environmental Need

The human health impacts from this project would be all positive from the sense that through water conservation, additional water would be made available for growing crops for human consumption and additional water would be available for municipal use. This water conservation would partially offset water shortages during periods of drought. Through water conservation and a more efficient use of the allocated waters for irrigation and municipal use, a growing population of the region can be sustained over a longer period without creating health risks through diseases due to unsanitary conditions because of lack of water. The District does not use groundwater for its operations since the groundwater is undependable and has a high total dissolved solid in excess of 1500 mg/L in dissolved salts and thus does not meet the Primary Drinking Water Standards. The District does not analyze the water quality of the Rio Grande except for total soluble salts. The Rio Grande traditionally runs from 500 to 1000 mg/L of TDS, which meets TCEQ primary water standards.

The Rio Grande Valley has in the past 7 years experienced a drought, which has limited the amount of surface water available for irrigation and municipal use. The drought in northern Mexico and the entire Rio Grande Basin, which includes the Rio Conchos Basin in northern Mexico, has contributed significantly to the water shortages for irrigation in the Lower Rio Grande Valley. This water shortage has created an economic hardship in the region through reduction of crops and subsequent reduced revenue. The proposed water conservation project will provide a modern, centralized means of controlling and monitoring flows to the various accounts/parcels and eliminate water seepage losses with resulting water savings and respective energy savings through reduced pumping.

2. Environmental Assessment

An Environmental Summary Report has been prepared for the Harlingen Irrigation District Cameron County No. 1 Water Conservation Improvements Project. Construction of the proposed water conservation project will have a direct positive impact through conservation of water, thus making more water available for irrigation and municipal use. The overall cumulative effect will be positive. The project will not pose any environmental hardships or have any negative effects on the project area. The Texas Historical Commission, United States Fish and Wildlife, United States Army Corps of Engineers, and Texas Parks and Wildlife Department have reviewed the project and letters of concurrence with the project have been issued.

No environmental risks or associated costs are anticipated in the project area due to the proposed project improvements.

3. Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

As previously mentioned and as part of the preparation of the Environmental Summary Report, comments were solicited from relevant Federal, State, and Local cooperating agencies, including: Texas Historical Commission, the U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, National Weather Service, U.S. Soil Conservation Service, Texas Department of Transportation, Texas Water Development Board, and the U.S. Army Corps of Engineers. The project improvements comply with all applicable regulations from the contacted agencies.

Technical Feasibility

1. Appropriate Technology

The proposed water conservation improvements have been described in the Project Plan prepared by the design consultant for the Districts and submitted to BECC. All design and construction requirements are to adhere to U.S. Department of Interior, Bureau of Reclamation (USBOR) under the "Guidelines for Preparing and Reviewing Proposals for Water Conservation and Improvement Projects under Public Law 106-576" as per the memorandum of agreement between the District and USBOR. The USBOR has reviewed and approved the Project Plan as well as the "Economic and Conservation Evaluation of Capital Renovation Projects: Harlingen Irrigation District Cameron County No. 1 – Canal Meters and Telemetry Equipment, Impervious-Lining of Delivery Canals, Pipelines Replacing Delivery Canals, and On-Farm Delivery-Site Meters" Report prepared by Texas Water Resources Institute Texas A&M University. All technology used in the proposed improvements is appropriate based on local experience and that of the USBOR for irrigation projects with similar operations and infrastructure.

According to the Economic and Conservation Evaluation of Capital Renovation Projects for the Harlingen Irrigation District, prepared by the Texas Water Resources Institute of the Texas A&M University, the implementation of the four components of the project will allow estimated water savings of 13,092 acre-feet/year, on an average annual basis. The expected water savings from the four components of the project over their expected productive lives are 138,019 acre-feet.

The energy savings estimated by the Texas Water Resources Institute with the implementation of the four components of the project are 614,613 KWH/year, on an average annual basis. The expected energy savings from the four components of the project over their expected productive lives are 6,738,105 KWH.

2. Operation and Maintenance Plan

The proposed projects do not require a long term O&M plan for training, or certification of operators, and preparation of an O&M manual. All O&M documentation of any equipment installed as a result of the proposed project shall be provided by vendors of such equipment as shall be required in the project bid specifications.

No start-up operational plan is required for these projects. Start-up and operational plans may be in conformance with the recommendations of the manufacturers of the equipment supplied in accordance with the project bid specifications.

Any emergencies or contingencies that may occur during the course of the proposed project shall have none or very limited impact on the ongoing operations of the delivery of raw

water by HIDCC No. 1. No contingency plan is required for the proposed project. The bid specifications shall specify the standards and submittals required by all vendors and contractors for the proposed projects.

3. Compliance with Applicable Design Regulations and Standards

The Project will comply with the design standards of the USBOR and regulations of the Texas Water Development Board (TWDB).

Financial Feasibility and Project Management

1. Financial Feasibility.

The financial information concerning the project, Harlingen Irrigation District, and the District's financial condition to obtain sufficient support of the District's capability to sustain the proposed funding structure of the project and the on-going operation and maintenance of the improvements, were analyzed by a consultant and the recommendation was that HIDCC No. 1 has the capability to undertake the proposed project.

The project costs are as follows:

Cost of the Project for the Canal Lining/Pipeline and Water Delivery Improvements

	Funding Source	*Canal Lining/ Pipeline*	*Water Delivery Improvements*	*TOTAL*
Administrative & Eng.	*SECO/ID*	*$ 180,000*	*$ 180,000*	*$ 360,000*
Construction	*WCIF/ID*	*$ 1,800,000*	*$1,400,000*	*$ 3,200,000*
TOTAL		*$ 1,980,000*	*$1,580,000*	*$ 3,560,000*

Cost in Dollars. June 2003

The funding sources for the project are summarized in the table below. Based on the WCIF Guidelines, the WCIF grant may support 50% of the project costs or up to a maximum of $4,000,000. The funding sources for the project are as follows:

Financial Structure for the Project

Source	*Type*	*Amount USD*	*% of Phase Project Cost*
NADB	*WCIF- Grant*	*$ 1,780,000*	*50.0%*
State of Texas	*SECO Grant*	*$ 178,030*	*5.0%*
Harlingen ID	*Cash*	*$ 1,221,970*	*34.0%*
Harlingen ID	*Short-term Note*	*$ 380,000*	*11.0%*
TOTAL		*$ 3,560,000*	*100.0%*

The BECC requested a third party review of the capability of the District for supporting the initial investment and the sustainability of operations and maintenance for the project. BECC's financial consultant, Brown and Caldwell, rendered an opinion concluding that the District does provide this capability without an adjustment to the current Fee and Assessment Structure.

The District has developed the project in accordance with requirements for funding participation by the United States Bureau of Reclamation (USBOR). The District has

submitted the project for consideration by USBOR. Should the USBOR funding become available, the District will request reimbursement for approved cash expenditures.

2. Rate Model.

The rate model for this type of Project Sponsor is better described as a Fee and Assessment Structure. The District charges an annual $24.00 flat rate assessment for the first acre and $9.00 for every subsequent acre in each parcel that is irrigable whether it is irrigated or not. This assessment supports the operation and maintenance of the District. The table below summarizes the existing structure.

Existing Assessment Fee Structure

Fees	*Interval*	*Charge Per Acre*
Flat Rate Assessment	*Per Year*	*$ 24.00 first acre + $ 9.00/additional acre*
Delivery Charge	*Per Irrigation*	*$ 6.00*

The delivery charge is paid prior to the date that water is to be delivered by the District. In addition, Harlingen charges municipal and industrial users $0.12 per thousand gallons plus 15% for travel and storage loss.

The fee structure for Harlingen Irrigation District has not been adjusted during the historic five-year period. The proposed project and funding source structure does not require an adjustment to the current Fee and Assessment Structure implemented by the District.

3. **Project Management**.

The project will be managed by Harlingen Irrigation District. The District has managed the construction of similar projects throughout the District's properties. The District will operate in a self-sufficient manner, supporting itself through user fees. The project will not require additional staffing. Therefore, the existing organizational structure, which has been provided, will be sufficient.

Community Participation

1. Comprehensive Community Participation Plan

BECC certification requires a public participation process to promote community understanding of and support for the proposed project is required. The Public Participation Plan (Plan) was developed per certification requirements and was designed to provide a framework for the sponsor and steering committee to conduct public participation in the areas served by Harlingen Irrigation District. The Plan was submitted and approved on September 2002.

Steering Committee

The steering committee members are H.J. Garrett and Rick Guerrero, District Board Members; Leonard Simmons, landowner; Wayne Halbert, District General Manager; and

Cloice Whitley of Harlingen Water Works. A technical support group was developed in support of the committee is composed of Al Blair, Consulting Engineer; Eric Liegh, Texas A&M Extension-Weslaco; Alan Moore, Engineer/General Manager, Cameron County Drainage District No. 5; and Troy Allen, Field Supervisor, Harlingen Irrigation District.

Local Organizations

Steering committee developed presentations to the boards of directors of the Harlingen Water Works Services, Adams Gardens Irrigation District, Drainage District No. 5. The governing bodies of the cities of Primera, Combes, and Palm Valley and the rural water supply corporations of Military Highway Water Supply and East Rio Hondo Water Supply were considered for presentation as well.

Public Information

The Water Conservation Project Report was available for public viewing at the District offices thirty days prior to the first BECC public meeting. In addition, notices of availability of project information were included in public meeting notices published in the Valley Morning Star, mailed to all landowners in the District, and posted at various locations, such as the Harlingen Water Works offices, Harlingen City Hall and Cameron County Courthouse. The Jim Hearn Farm Program, of the KURV radio station in Edinburg provided interview airtime with District members to talk about the project. The program has a foot print coverage from Brownsville to Rio Grande City. A project fact sheet was developed and made available at the District offices and mailed to all landowners and producers in the District. The fact sheets were utilized by the steering committee for community outreach. Steering committee members made contact with individual District members to inform them of the project and solicit their input and support.

Public Meetings

The first BECC public meeting was held on October 29, 2002 to present the technical components of the project to the public. The second public meeting was held on May 22, 2003, to present the financial analysis and impact to District members. Survey questions were distributed to landowners to receive public input asking to indicate their level of support for the project including the Financial Plan.

2. Report Documenting Public Support

The final Comprehensive Public Participation Report was delivered to the BECC.

Sustainable Development

1. Definition and Principles

The project complies with BECC's definition of Sustainable Development: "*Conservation oriented social and economic development that emphasizes the protection and sustainable use of resources, while addressing both current and future needs, and present and future impacts of human actions.*" *This project would positively impact the area and sustainable life of the area's residents through the conservation of water which is becoming a scarce resource and critical for sustainability of life and economic growth. Through elimination of water loss through seepage and reduction of energy needs by closely monitoring water distribution times and quantities of flow, the project provides a positive impact on the overall environment by conserving and effectively using a limited water supply resource. Local residents will benefit from better agricultural yields within a sustainable development framework and from a better quality of life within mature water resources conservation scheme, being careful not to compromise water and soil resources for the future, considering*

that modernization and technical improvements within the District's operational system provide a net positive effect.

The required public review process ensures that residents in the project's influence area participate in the development process fully aware that the decisions they make will focus on the sustainable management of environmental resources to achieve a better environmental and socio-economic improvement in their community. Besides the water conservation from mitigating seepage losses, there are energy savings both from pumping less water forthcoming from reducing leaks and from improving efficiency of the pumping plants.

2. Institutional and Human Capacity Building

The Rio Grande Regional Water Plan, in support for the implementation of agricultural water conservation strategies, includes the following strategies for reducing irrigation shortages:

- *Expanded technical assistance should be available from local, state, and federal sources to assist irrigation districts with more detailed, systematic evaluations of district facilities and management policies to identify cost effective water efficiency improvements.*
- *The State of Texas and the federal government should assist with the financing of irrigation water efficiency improvements through the provision of low interest loans and /grants.*

Accordingly, due to the limited financial capacity of irrigation districts, the State of Texas through the State Energy Conservation Office (SECO) and TWDB provided financial assistance to the HIDCC No. 1 for the preparation of feasibility studies, and the necessary documentation that was required to support federal appropriations of construction funds.

Also, the Texas Water Resources Institute of the Texas A&M University prepared the Economic and Conservation Evaluation of Capital Renovation Projects for the Harlingen Irrigation District, with funds provided through a federal initiative, "Rio Grande Basin Initiative", administered by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture.

The NADB Water Conservation Investment Fund will complement with grant funds the capital investments that will be spent in the Irrigation District improvements. The use of these grant funds allows the Irrigation District to improve its infrastructure in order to reduce water losses in water conveyance.

The project will be managed by the local sponsor and be constructed and operated in conformance with the requirements of both the regulatory and funding agencies. The process used in the development of this project has followed a planning and public participation process that has developed alternatives and associated costs, solicited public input in to the process, established priorities based on input of the stakeholders and proceed according to the priorities established in the planning process.

3. Conformance with Applicable Local and Regional Conservation and Development Plans

The proposed project complies with all local and regional conservation and development plans. In particular the project complies with the following:

- "*Water Conservation Policy*" *and* "*Drought Contingency and Water Allocation Policy*" *both dated September 1, 1999 of the Harlingen Irrigation District Cameron County No. 1.*

- "*Rules and Regulations Governing Irrigation Water Service-Harlingen Irrigation District Cameron County No. 1*"- Harlingen, Texas.
- "*Rio Grande Regional Water Plan*", *which recommend agricultural water conservation and on-farm water use efficiency, in order to reduce irrigation shortages*

The project also conforms to the requirements of the following:

- *USBOR per letter dated July 24, 2002*
- *US Army COE per letter dated October 15, 2002*
- *Texas Historical Commission per letter dated November 6, 2002*

4. Natural Resources Conservation

Water conservation in the agricultural sector will not only reduce projected irrigation shortages, it will also "free up" additional Rio Grande water supplies for future domestic-municipal industrial needs. The construction of the proposed project improvements would conserve sufficient water to allow continued development in the Cities of Harlingen, Palm Valley, Primera, Combes and other rural communities, which depend on the Rio Grande for their water supply. Therefore, the Cities and the irrigation District would be able to manage sustainable growth within their available resources.

According to the Economic and Conservation Evaluation of Capital Renovation Projects for the Harlingen Irrigation District, prepared by the Texas Water Resources Institute of the Texas A&M University, the implementation of the four components of the project would allow estimated water savings of 13,092 acre-feet/year, on an average annual basis, as shown in the table below.

Item	*Description*	*Annual Water Savings (Acre-feet)*	*Annual Energy savings (Kw-hr)*
Meters	*105 meters located at 73 pumping sites and canal division points within the District's delivery system*	*2,157*	*89,729*
Impervious-Lining of delivery canals	*3.26 miles of what are now concrete-lined laterals; Bowman A and Wyrick A, B, & C segments*	*1,576*	*88,530*
Pipeline Replacing of delivery canals	*5.66 miles of 24" pipelines replacing what are now concrete-lined laterals; Wyrick D, E, & F, Taylor, and Citrus A & B segments*	*3,230*	*181,450*
Farm Delivery-Site meters	*400 meters located at farm delivery points*	*6,129*	*254,904*
Total Annual Savings		*13,092*	*614,613*

The expected water savings from the four components of the project over their expected productive lives are 138,019 acre-feet.

The energy savings estimated by the Texas Water Resources Institute with the implementation of the four components of the project are 614,613 KWH/year, on an average annual basis. The expected energy savings from the four components of the project over their expected productive lives are 6,738,105 KWH.

The project will not only have an impact in water resources, but it will also contribute in savings of natural resources required to generate the energy that will be saved with the implementation of the improvements in the Harlingen Irrigation District.

5. Community Development

The benefit obtained by the modernization of these irrigation facilities by the proposed projects may directly impact agricultural production and may result in an increased income and an improved quality of life for the end users. With this, the increased economic may be enhanced by making residents active participants in their community's development.
An improved quality of life for the residents may also have a favorable impact on the development of health, and education of the area.

List of available documents

Documents available related to the Harlingen Irrigation District Cameron County No. 1, Texas, Canal Lining, Pipeline Installation, Flow Measurement, Telemetry, and Water Delivery Project:

- *Baseline Conditions and Irrigation District Indicators for the Harlingen Irrigation District*
- *Environmental Summary*
- *Economic and Conservation Evaluation of Capital Renovation Projects: Harlingen Irrigation District Cameron County No. 1- Canal Meters and Telemetry Equipment, Impervious-Lining of Delivery Canals, Pipelines Replacing delivery Canals, and On-Farm delivery-Site Meters prepared by Texas A&M University*
- *Financial Analysis*
- *Certification Document*
- *Project Plan*