

Bayview Irrigation District No. 11, Pipeline Installation Project, Bayview, Texas

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General Criteria

1. Project Type

The proposed project falls under the Border Environment Cooperation Commission (BECC) area of water conservation. The purpose of the project is to provide Bayview Irrigation District No. 11 (BID) with improvements to its distribution system that will minimize water loss as well as improve the conveyance efficiency of the system, thereby conserving water and energy.

2. Project Location

The project is located in Cameron County, Texas near the town of Bayview. Cameron County is the southernmost county in Texas and it is bounded by the Rio Grande and the Gulf of Mexico. BID lies in the northern part of Cameron County in the Lower Rio Grande Valley. The proposed project is approximately 20 miles from the United States - Mexico border and thus falls within the BECC required 62-mile (100 kilometers) limit. The BID total irrigated area is 6,000 acres. In the year 2000, BID had 76.5 miles of underground pipeline and 15 miles has been added since that time. There are also 5 miles of open canals, which will become covered pipeline after our project is completed. This means BID currently have 91.5 miles underground but BID will have 96.5 when BID converts the 5 miles to underground.

3. Project Description and Work Tasks

The project sponsor is BID, a public entity governed by Chapters 49 and 58 of the Texas Water Code, whose ruling body is a Board consisting of user representatives. BID diverts 100% of the water used in the district from the Rio Grande River. The water that is used is released from the Falcon Reservoir. BID holds from the Texas Commission of Environmental Quality (TCEQ) a Certificate of Adjudication authorizing them to divert up to 17,478.025 acre-feet for irrigation.

BID's global efficiency on water delivered for irrigation has been estimated by the District to be approximately 70 percent. The on-farm field distribution and application efficiencies vary depending on crop type, land slope, soil type, method of irrigation application, irrigation practice, flow rate of delivered water and various other factors. The estimated average ratio of the quantity of crop consumption use to irrigation water delivered ranges from 80 to 90 percent.

BID proposes replacing existing dilapidated concrete and earthen-lined canals with rubber-gasketed jointed reinforced concrete pipe. The project has four parts:

- *Northeast 113 Earthen Canal Project*
- *North 113 Canal Project*
- *South 113 Canal Project*
- *Unit One Project*

The proposed project will provide a more efficient means of water delivery thus increasing the availability of the water and sustainability for irrigation use. This water conservation has the potential to partially offset water shortages within the district during periods of drought. An increase in availability of water could also reduce the risk of diseases associated with the lack of water for irrigation use. In addition, the change in conveyance method from open canal to pipeline could reduce the hazard of drowning and other public health issues relative to vector control.

Northeast 113 Earthen Canal

The Northeast 113 Earthen Canal was built in 1977. It is 8,944 feet long and has a top width of 9 feet. Its soil type is clay loam. The loss rate on this canal as measured by the Texas A&M District Management System team is 2.13 acre-feet per mile per day. This canal was full for 94 days, with a total loss of 312.08 acre-feet per year. This canal provides irrigation water for 380 acres in row crops. We delivered 125.69 acre-feet to the fields in 2001, with a loss of 312.08 acre-feet of water. This project would install 6,240 feet of 30" concrete pipe and replace five 20 hp motors and pumps with one 12x12 pump and motor. In addition to saving 312 acre-feet of water per year, the District would save the cost of repairs for four pumps and motors, plus the energy and standby charges.

North and South 113 Canal

Built in 1949, Canal 113 is 9,723 feet long with a 9-foot top width. The soil type is clay. The canal is concrete lined, but has serious problems with pencil-size cracks. The loss rate is 2.13 acre-foot per mile per day and total loss in acre-feet per day is 3.60. This canal is used year round for the irrigation of row crops, sugar cane and citrus. The total loss is over 1,078.52 acre-feet per year. Three pumps are located in a pump station at the south end of the canal. The sizes are 20 hp, 40 hp and 60 hp. These three pumps would be replaced by one new 40 hp pump. Bayview Irrigation will not only save water, but energy too.

Unit One Canal

Unit One Canal was built in 1953. It is 9,804 feet long and has a 9-foot top width. The soil type is clay and this canal is part concrete and part earth. The canal has serious problems and a loss rate of over 3.34 acre-feet per mile per day or 7.18 acre-feet per day. This canal is filled one week per month to service the United States Immigration and Naturalization Detention Center with water and all other demands. Total losses on this canal are 603.12 acre-feet per year. Our plan is to remove three pumps that currently serve this canal and connect the canal to the South Boory pump, saving energy and repairs on three pumps.

The Northeast 113 Canal Project construction will begin in July of 2004 and will be completed by September 2004. Unit One Canal Project would start in September 2004 and end in December 2004.

The North 113 Canal Project would start in August 2005 and end by October 2005, with the South 113 Canal Project starting in October 2005 and ending in December 2005. Depending

on the crops, South 113 may not start until October 2006 and end in December 2006.

The proposed cost breakdown by project is as follows:

Project	Construction	Administrative & Engineering	Total Project Costs
<i>North East, North, South 113 Canal</i>	<i>\$ 838,704</i>	<i>\$ 83,870</i>	<i>\$ 922,574</i>
<i>Unit One Canal</i>	<i>\$ 456,950</i>	<i>\$ 45,695</i>	<i>\$ 502,645</i>
<i>Total Project Costs</i>	<i>\$ 1,295,654</i>	<i>\$ 129,565</i>	<i>\$ 1,425,219</i>

4. Conformance with International Treaties and Agreements

The Texas Commission of Environmental Quality (TCEQ) and the International Boundary and Water Commission (IBWC) are the authorities for allocation of water to the District. The 1944 Water Treaty between the United States and Mexico applies. BID diverts water from the Rio Grande River in accordance with a Permit issued by TCEQ, governed by Chapters 49 and 58 of the Texas Water Code. TCEQ's Rio Grande Watermaster Office in Harlingen is responsible for allocating, monitoring, and controlling the use of surface water by the District in coordination with IBWC. The Watermaster also cooperates with IBWC and its Mexican counterpart to monitor U.S. and Mexican compliance with the U.S.-Mexico Treaty of 1944. There is no reported non-compliance by BID under the TCEQ permit.

Human Health and Environment

1. Human Health and Environmental Need

The proposed project addresses one of the most pressing problems facing the Lower Rio Grande Valley of Texas, i.e., water shortages due to drought over the last seven years and an increasing demand due to population growth. Water conservation reduces the impact of drought conditions and makes available additional water resources that would otherwise be lost to meet both domestic and agriculture demands. The future health, social and economic well being of the population in the Rio Grande Valley will be dependent on conservation and maximizing beneficial use of available water to meet domestic and agricultural needs. The project addresses the critical water shortages by reducing water losses and providing for more efficient delivery of water, thus enhancing availability of water both domestic and agriculture use.

2. Environmental Assessment

The proposed water conservation measures achieved through installing a closed conduit (pipeline) system would have a direct effect on conserving water thus making it more available for irrigation of crops and/or for human consumption. In addition, the change in conveyance method from open canal to pipeline may reduce the risk of drowning, and other public safety and health issues relative to vector control. An indirect long-term effect may be additional permanent jobs for an area with a high unemployment rate. Overall, the construction of the proposed water conservation measures would have a sustained positive environmental impact, enhancing the prospects for continued economic growth of the region, as well as the improved health and social well being of the region's growing population.

The total cumulative effects would be positive. The project may not pose any environmental hardships or have any negative effects on the project area. From a standpoint of soils, vegetation impacts, endangered and/or threatened species, disruption to wildlife habitat, wetlands and waterways, land use, farmlands, historical-cultural resources, air quality and acoustic impacts, hazardous materials, traffic hazards and disruptions, clearing, grubbing, and spoil disposal, and obstruction of views, the project may have a minimal to negligible effect with an overall positive result. In summary, the project may have a positive impact from environmental, cultural, and economic perspectives.

No negative or unavoidable impacts as a result of this project are anticipated or have been identified. Environmental benefits have been discussed under Direct, Indirect and Cumulative effects. No environmental risks or associated costs are anticipated in the project area.

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

Preparation of the Environment Summary Report by the BID utilized for its completion information requested in concurrence letters dated August 25, 2003, to the following cooperating agencies:

- *United States Fish and Wildlife Service*
- *Texas Parks and Wildlife Department*
- *Texas Historical Commission*

Technical Feasibility

1. Appropriate Technology

All technology used in the proposed improvements is appropriate on local experience and that of the USBOR for irrigation projects with similar operations and infrastructure. The Members of BID Board of Directors had farmed in the district and other districts for 50 years. The past president was an engineer and based on all of their experience, the Board unanimously agreed concrete pipe was the best way to go.

The BID's consultant developed the calculations regarding the size needed for the pipelines. As to the types of pipelines, the consultant developed an evaluation of the convenience of using PVC or RCP, and determined that the best option will be RCP. There will be no further review of the design as there is no one that has jurisdiction over this, as it is not a treated water system. The final design is in accordance with Professional Engineering Practices, thus the professional seal. This is a little different than working for a municipal supply system where the TCEQ would review or if funded by the TWDB, they would review.

According to the Canal Ponding Tests for BID, prepared by the Texas Water Resources Institute of the Texas A&M University, through the District Management System Program, the implementation of the two components of the project will allow estimated water savings of 2,000 acre-feet per year on an average annual basis. The expected water savings from the two components of the project over their expected productive lives is 40,000 acre-feet.

2. Operation and Maintenance Plan

The project sponsor and their consulting engineer have indicated the proposed projects do not require long term O&M plans for the proposed improvements, training or certification of operators, or preparation of an O&M manual. The project is replacing an open canal with a closed conduit conveyance system, thereby reducing O&M in comparison to the existing canal system's needs.

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 specifications. Any emergencies or contingencies that may occur during the course of the proposed project will have none or very limited impact on the ongoing operations of the delivery of raw water by BID. No contingency plan is required for the proposed project.

Financial Feasibility and Project Management

1. Financial Feasibility

BECC requested a third party review to determine if BID could support the initial investment and the sustainability of operations and maintenance for the project. BECC's financial consultant, Brown and Caldwell, Inc., analyzed the financial information concerning the project, the financial condition of BID, the District's ability to support and sustain the proposed funding structure of the project as well as the on-going operation and maintenance of the improvements. Their opinion is that BID has the capability to undertake the proposed project.

The project costs are as follows:

Cost of the Project for the Northeast, North and South 113 and Unit One Improvements

	<i>Funding Source</i>	<i>NE, N, and S 113 Canal</i>	<i>Unit One Canal</i>	<i>TOTAL</i>
<i>Administrative & Eng.</i>	<i>BID</i>	<i>\$ 83,870</i>	<i>\$ 45,695</i>	<i>\$ 129,565</i>
<i>Construction</i>	<i>NADB/BID</i>	<i>\$ 838,704</i>	<i>\$ 456,950</i>	<i>\$ 1,295,654</i>
<i>TOTAL</i>		<i>\$ 922,574</i>	<i>\$ 502,645</i>	<i>\$ 1,425,219</i>

Cost in Dollars. September 2003

The funding sources for the project are summarized in the table below. Based on the Water Conservation Investment Fund (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

<i>Source</i>	<i>Type</i>	<i>Amount USD</i>	<i>% of Phase Project Cost</i>
<i>NADB</i>	<i>Grant</i>	<i>\$ 637,548</i>	<i>45%</i>
<i>BID</i>	<i>Cash</i>	<i>\$ 394,812</i>	<i>28%</i>
<i>BID</i>	<i>In-Kind</i>	<i>\$ 392,859</i>	<i>27%</i>
<i>TOTAL</i>		<i>\$ 1,425,219</i>	<i>100%</i>

With this increased conservation, BID will be able to sell 4,000 acre-feet of water for \$100,000 per year.

As total expenditures increase in 2004 and 2005 due to the construction of the water conservation project, the District plans to sell irrigation water to meet these demands.

BID will provide construction services as an in-kind contribution to the project including labor, heavy equipment and related tasks.

2. Rate Model

The rate model for this type of Project Sponsor is better described as a Fee and Assessment Structure. BID charges an annual flat rate assessment of \$19.00 per net acre. This assessment supports the operation and maintenance of the District. In addition, BID charges a delivery fee of \$20.00 per acre-foot of water for irrigation.

The table below summarizes the existing structure.

Existing Assessment Fee Structure

<i>Fees</i>	<i>Interval</i>	<i>Charge per Acre</i>
<i>Flat Rate Assessment</i>	<i>Per Year</i>	<i>\$ 19.00</i>
<i>Delivery Charge</i>	<i>Per Irrigation</i>	<i>\$ 20.00</i>

BECC's financial consultant, Brown and Caldwell Inc., rendered an opinion concluding that BID can provide this capability without an adjustment to its current Fee and Assessment Structure.

3. Project Management

BID will manage the project. The District has managed the construction of similar projects throughout its properties. District personnel are specifically skilled in the operation of heavy equipment. BID operates in a self-sufficient manner, supporting itself through user fees. The project will not require additional staffing. Therefore, the existing organizational structure 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. 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 BID. The Plan was submitted on August 30, 2003 and approved on September 8, 2003.

2. Local Steering Committee

The Steering Committee is made up of Marc Sundquist, local landowner and Mayor of Bayview, Texas; Roger Schultz, owner of Niagara Citrus, a local landowner and District irrigator; Gordon R. Hill, Manager of BID; and John Williams, a local landowner and District irrigator who also serves as President of the Board of Directors of BID.

3. Local Organizations

The BID itself includes few organizations. The city of Bayview has about 300 people. A presentation was made to the city council on August 21, 2003. Other organizations contacted include the Lower Valley Water authority, U.S. Fish and Wildlife, Texas Parks and Wildlife and the Texas Historical commission.

4. Public Access to Project Information

The Project Plan was made available for public viewing thirty days prior to the first BECC public meeting. The documents were available for viewing during normal business hours at the District office. During non-business hours, the documents were available by contacting the

District for an appointment. In addition, notices of availability of project information were included in the notice that was published in Los Fresnos Leader 30 days prior to the first public meeting.

The McAllen Monitor and Los Fresnos Leader newspapers ran articles about the proposed water conservation project. A fact sheet has been developed containing basic information about the project such as maps, technical, environmental, financial and public participation components. The fact sheet has been utilized by the Steering Committee for community outreach. Copies of the fact sheets are available at the office of the BID.

5. Public Meetings

The first BECC public meeting was held at 9:00 a.m. on Monday, October 27, 2003 at the offices of BID. This was a general information meeting covering the technical aspects of the proposed water conservation improvements and provided the public with an update of the proposed project and an explanation of what the BECC Certification Document is designed to accomplish. The second BECC public meeting took place at 9:00 a.m. on Wednesday, October 29, 2003 and focused on the financial aspects of the project, such as the NADB financial analysis as well as financial impact to District customers. The meetings were held in the morning to accommodate the schedules of local farmers. At both meetings the landowners were asked to indicate their level of support for the project including the Financial Plan. No objections were voiced and the farmers support the proposed project.

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 may positively impact the area and sustainable life of area residents through water conservation. Water is becoming a scarce resource and is critical for the sustainability of life and economic growth. Elimination of water loss through seepage, reduction of energy needs by closely monitoring water distribution times and quantities of flow will allow the project to provide a positive impact on the overall environment by conserving and effectively using a limited water supply resource. Local residents may benefit from better agricultural yields and from a better quality of life as a result of the water conservation plan.

The required public review process ensured that residents in the project's influence area participated in the development process fully aware that decisions they made may affect the sustainable management of environmental resources, achieving environmental and socio-economic improvement in their community.

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 points 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/or grants.*

The Texas Water Resources Institute of the Texas A&M University prepared Canal Ponding Tests, through the District Management System Program, in order to estimate the Seepage Rate in the existing canals.

Well before 1995, BID and its Board of Directors became aware of the need for conservation and took action within its limited means to accomplish this. After a district-wide examination of the water distribution system, it was determined that a savings of 20% could indeed be achieved by converting elevated canals to underground pipe. Unfortunately, the staggering cost of such a project would be impossible for a district this size to handle and a more economically feasible plan was undertaken in two steps.

- *The first step in this plan involved converting the district from open-ditch irrigation to polypipe irrigation with a goal to conserve 15 percent in water usage. By 1995, the district had converted 80% of its delivery system to polypipe. As of today, the BID has converted 98% to polypipe.*
- *The second step was the installation of meters at all delivery points of water for on-farm irrigation. In January 1996, this step was completed and all water began to be sold on an acre-foot basis. The total cost of all meters including installation was approximately \$50,000. Using these tools in on-farm irrigation, BID has conserved 8,613 acre-feet of water or a savings of 43%. If this conservation plan had not been adopted in 1991, BID would have depleted its water supply in mid 1995.*
- *In order to study the most effective ways to gain On-farm water savings, the District began a pilot project in 1991. The project spanned two years comparing the water usage irrigating with both open-ditch system and polypipe system. The District found that irrigating 200 acres of sugar cane with open ditch system required 672 hours of irrigation per year, while irrigating the same area of sugar cane with polypipe, required only 252 hours of irrigation. The monetary savings illustrated by the pilot project are important because they provide individual farmers with greater incentive to conserve water.*
- *The conservation of on-farm usage has saved the District \$38,700 in water transportation expense. Electricity for in-use district pumping has resulted in a savings of \$38,500 for a total savings of \$77,300. Additionally, the farmer saved \$11.97 per acre in irrigation salaries and \$4.16 per acre in water expenses, or a per acre savings of \$16.13.*
- *District wide, the farming community saved about \$258,000 in expenses by converting to polypipe and metering the water while this conservation plan cost BID approximately \$100,000.*

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

BID maintains a competent staff of two in administration and management, and a skilled staff of three in operation and maintenance. There is no State-licensing requirement for personnel. Typical job requirements are pump and engine maintenance, vehicle repair, welding, and operation of equipment. BID operates a training program for its employees. These projects may reduce the O&M budget by approximately \$13,000 per year. The proposed project may not

require additional personnel, increase operating costs, or require additional training to facilitate the inclusion of the proposed project into its infrastructure.

3. Conformance with Local and Regional Conservation and Development Plans

BID adopted the Water Conservation Plan and a Drought Contingency Plan on October 17, 1995. These plans were submitted to the Region “M” Water Planning Group. The plans were prepared in accordance with Title 30 of the Texas Administrative Code (TAC) and Chapter 288 of the Water Code. The project conforms to the Rio Grande Regional Water Plan, which recommends agricultural water conservation and on-farm water use efficiency in order to reduce irrigation shortages.

4. Natural Resources Conservation

The proposed project was developed with the intent of conserving water. BID provides water to approximately 6,000 acres of agricultural cropland. According to the Canal Ponding Tests for BID, prepared by the Texas Water Resources Institute of the Texas A&M University, through the District Management System Program, the implementation of the two components of the project will allow estimated water savings of 2,000 acre-feet per year on an average annual basis, as shown in the following table.

<i>Item</i>	<i>Description</i>	<i>Annual Water Savings (Acre-feet)</i>	<i>Annual Energy Savings (Kw-hr)</i>
<i>30” Pipeline replacing Delivery Canal (113)</i>	<i>Replace 15,963’ with 30” rubber-gasketed reinforced concrete pipe</i>	<i>1,390</i>	<i>197,157</i>
<i>Multi-Size Pipeline replacing Delivery Canal (Unit One)</i>	<i>Replace 26,000’ concrete lined canal with rubber- gasketed reinforced concrete pipe ranging in diameter from 48” to 60”</i>	<i>603</i>	<i>128,022</i>
<i>Total Annual Savings</i>		<i>1,993</i>	<i>325,179</i>

The estimated water savings during the expected lifespan of the project are approximately 40,000 acre-feet.

The energy savings estimated by BID with the implementation of the two components of the project are 325,179 Kilowatt-hours per year, on an average annual basis. The expected energy savings from the two components of the project over their expected productive lives are 6,503,580 Kilowatt-hours. Improving efficiency by minimizing water lost through seepage and evaporation may save significant amounts of water and energy. It may also make available a greater amount of water for a more efficient use of this natural resource in irrigation for the production of crops as well as municipal and industrial responsible usage.

5. Community Development

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

Documents available related to the BID, Texas, Pipeline Installation Project:

- *Baseline Conditions and Irrigation District Indicators for the BID, Texas*
- *Environmental Summary*
- *Canal Ponding Tests for BID, Texas- prepared by Texas A&M University, through the District Management System Program*
- *Financial Analysis*
- *Certification Document*
- *Final Design for the Canal 113 and Unit One Canal*