

# Brownsville Irrigation District Main Canal Replacement

[General Criteria](#)

[Human Health and Environment](#)

[Technical Feasibility](#)

[Financial Feasibility](#)

[Community Participation](#)

[Sustainable Development](#)

[List of available documents](#)

## General Criteria

### 1. Type of Project

*The project falls within the BECC priority of rational use of water and water conservation. The purpose of the project is to improve water use and make sustainable use of water resources within the Brownsville Irrigation District (BID).*

*The BID is located within the Rio Grande watershed. A Texas Water Development Board (TWDB) “Water Master” who administers water released from the Falcon Reservoir in the Rio Grande watershed regulates the BID water rights.*

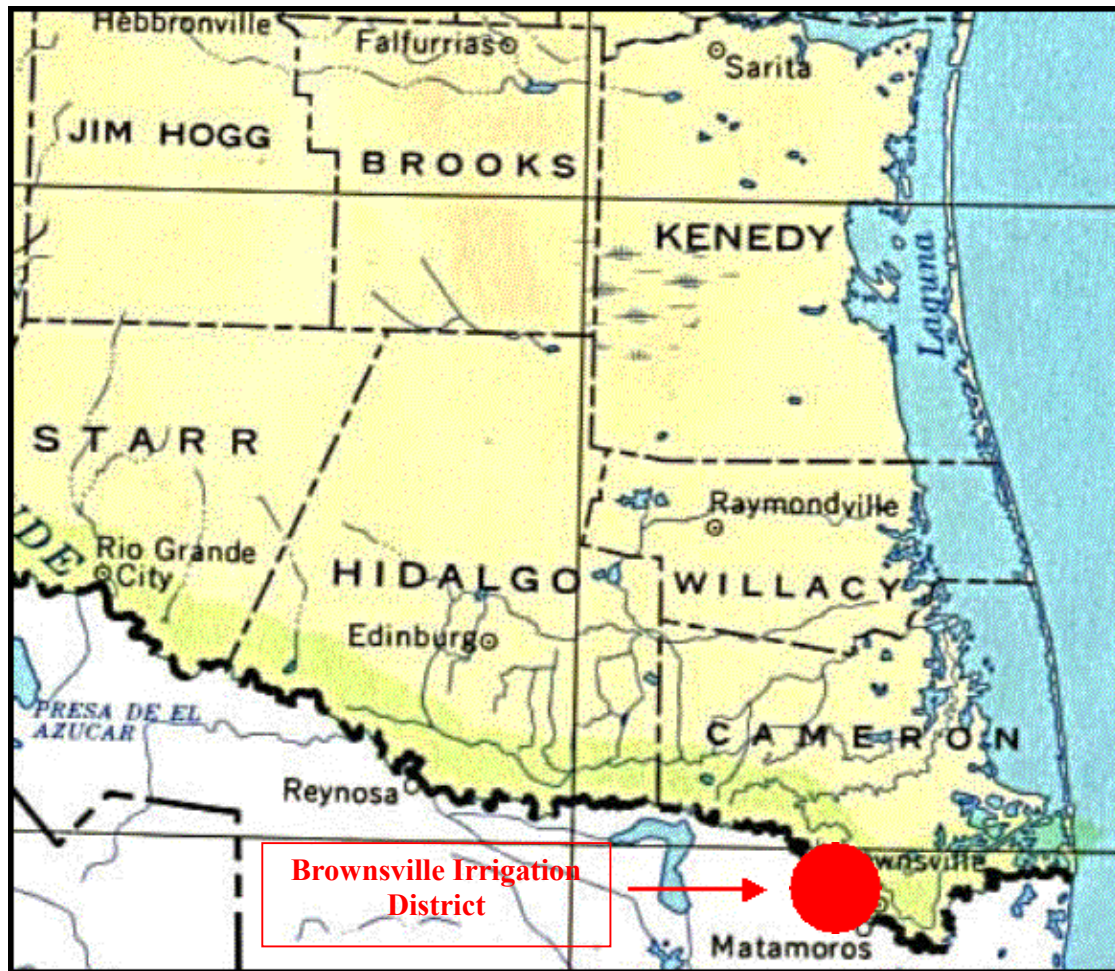
*The BID diverts 100% of the water used in the system from the Rio Grande in accordance with the water rights it owns. The International Boundary and Water Commission (IBWC) releases the water from Falcon Reservoir.*

*The BID was created under the applicable articles of the Texas Constitution in 1919 as “Cameron County Water and Improvement District Number 5”. At that time, the District purchased the facilities of the “Indiana Cooperative Canal Company”, a privately owned company that had been organized to furnish water to land within the District. The Board of Directors held its first meeting on August 13, 1919 and its first bonds were sold on March 1, 1920. The District was reorganized on several times and on May 18, 2000, the District obtained approval from the Texas Natural Resources Conservation Commission, now the Texas Commission for Environmental Quality (TCEQ) to change its name to “Brownsville Irrigation District”. The District’s primary operation is to provide irrigation and “farmland drainage” to 20,204 acres in southern Cameron County, Texas.*

*The District holds water rights from the State of Texas, administered by TCEQ. TCEQ Certificate of Adjudication No. A843-000 authorizes the District to divert a maximum quantity of water of 33,949 acre-feet of “Class A” irrigation water per year, if allocated to the District. In addition, TCEQ Certificate of Adjudication No. M843-000 authorizes the District the use of 6,071 acre-feet of water per year for municipal purposes.*

### 2. Project Location

*The BID is located in southeast Cameron County, Texas just east of and within Brownsville City, Texas. The district is within the 62-miles border area as shown below.*



### **3. Project Description and Work Tasks**

*The Districts proposes to replace the open main canal with a “low head” pressure pipe to save 1,060 acre-feet of water per year; reduce operation and energy costs, increase overall efficiency in the conveyance of irrigation water, and reduce the effort required for water conservation. The project proposes significant actions that include:*

- *Replacement of the main canal with pipes*
- *Construction of 4 Road Crossings*
- *Installation of 2 54” Gate Valves*
- *Construction of Levee Crossings*
- *Construction of Drainage Ditch Crossings*

*The cost of proposed structural improvements under the project is expected to be \$2.356 million.*

#### **Description of the Community**

*The project will benefit all residents who live along the main canal as well as the users of the irrigation system all in Cameron County.*

*The District has 1,600 irrigation accounts and 480 non-agricultural accounts. The area of the district is about 20,040 acres.*

### **Project Justification**

*In addition to the main proposed water conservation objectives, there are indirect benefits from the project which include the following:*

- *Avoidance of the potential liability of the District because the canal is a “nuisance” to the community*
- *Allowing a more efficient Transportation Plan for the City of Brownsville through the development of streets crossing the canal at a reasonable cost.*
- *Reducing for the maintenance costs of operation of the canal. With the pipe system electrically operated gates can be used to control the flow, thereby reducing labor costs.*
- *The replacement of the canal with pipe will allow the right-of-way to be reduced to 30 to 40 feet from, thereby making land available for sale for other purposes.*

### **4. Compliance with International Treaties and Agreements**

*The Texas Commission of Environmental Quality (TCEQ) and the IBWC are the authorities for allocation of water to the District. This project will not violate the allocation of water rights. The 1944 Water Treaty between the United States and Mexico applies. The BID will continue to make all surface water diversions from the Rio Grande in accordance with the agreements in place and 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. These water conservation measures would partially offset water shortages during periods of drought. Through water conservation and a more efficient use of the allocated water 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 inadequate because its high total dissolved solids in excess of 1500 mg/l in dissolved salts and does not meet the Primary Drinking Water Standards.*

*The Rio Grande Valley has, in the past 7 years, experienced a drought that has limited the amount of surface water available for irrigation and municipal use. The drought in northern Mexico and in 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 would 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.*

*This project would have direct and indirect positive effects on the District zone and the surroundings that include the City of Brownsville. Among the positive effects that would occur with the implementation of the proposed project are:*

- Safety. The existing canal is an “attractive nuisance” and a safety hazard for the near by inhabitants in the community. Replacing of the canal with pipe will eliminate this potential liability for the District.*
- Operation & Maintenance Cost. The O & M cost associated with the management of open canals would be greatly reduced. With the pipe system electrically operated gates can be used to control the flow, thereby reducing labor cost.*
- Water Savings. The existing canal operation loses 50 to 100 acre-feet of water a year by evaporation and seepage. There are possibly another 50 to 100 acre-feet of water that is lost by unauthorized use and spillage of water by residents along the canal.*
- Transportation. The elimination of open canals would allow for a more efficient transportation plan for the City of Brownsville by allowing for the development of streets crossing the canal at a reasonable cost.*
- Land Use. The replacement of the canal with pipe would allow the right-of-way to be reduced to 30 to 40 feet, thereby make the remainder of the land available for sale of development of other purposes.*

## **2.- Environmental Assessment.**

*In accordance with The **National Environmental Policy Act (NEPA)**, Title I, Sec. 101 [42 USC § 4331] (b) and Sec. 102 [42 USC 4332] (A), (B) and (C), the United States Bureau of Reclamation (USBOR) will conduct a full environmental evaluation. This is required as part of their review of the Brownsville Irrigation District (BID) to have their project (replacement of the main, east and west fork canals with pipe) qualify for Federal funding as per the Lower Rio Grande Valley Water Conservation and Improvement Act of 2000, as amended.*

*The USBOR understands that the Brownsville Irrigation District's canal replacement project is being considered by BECC for certification in June of this year. To date, the specific potential effects of the proposed project have yet to be evaluated in sufficient detail to determine the appropriate level of NEPA documentation. However, as the District (BID) prepares and submits their draft Project Plan under USBOR guidelines, the USBOR will begin their evaluation of potential impacts to environmental and cultural/historic resources.*

*The USBOR, as a federal regulatory agency in charge of the NEPA process completion for the BID, and as a cooperating agency in coordination with the Border Environment Cooperation Commission (BECC) to best satisfy its own certification criteria process, has stated that the BID project has the ability to comply with all applicable local, state and federal environmental and cultural resources laws and regulations that may apply under NEPA, the National Historic Preservation Act (NHPA), and other relevant statutes.*

*Once these processes have been completed and any necessary mitigation included as part of the total project cost, the project will then be able to qualify for Federal funding and the NEPA process will be cleared by the USBOR with an issuance of statement of findings document. USBOR has agreed to provide BECC with a copy of the final NEPA*

*documentation when completed for the BID project in accordance with the Council of Environmental Quality (CEQ) Regulations [Sections 1501.6 and Sec. 1508.5] on cooperating agencies in the NEPA process.*

### **3.- Compliance with Applicable Environmental and Cultural Resource Laws and Regulations.**

*As part of the preparation of the Environmental Assessment by the USBOR, comments will be 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 will have to comply with all applicable regulations from the contacted agencies.*

## *Technical Feasibility*

### **1. Appropriate Technology**

*The project proposes to improve existing facilities and activities were selected after a careful analysis of current operating efficiencies and a review of present physical conditions.*

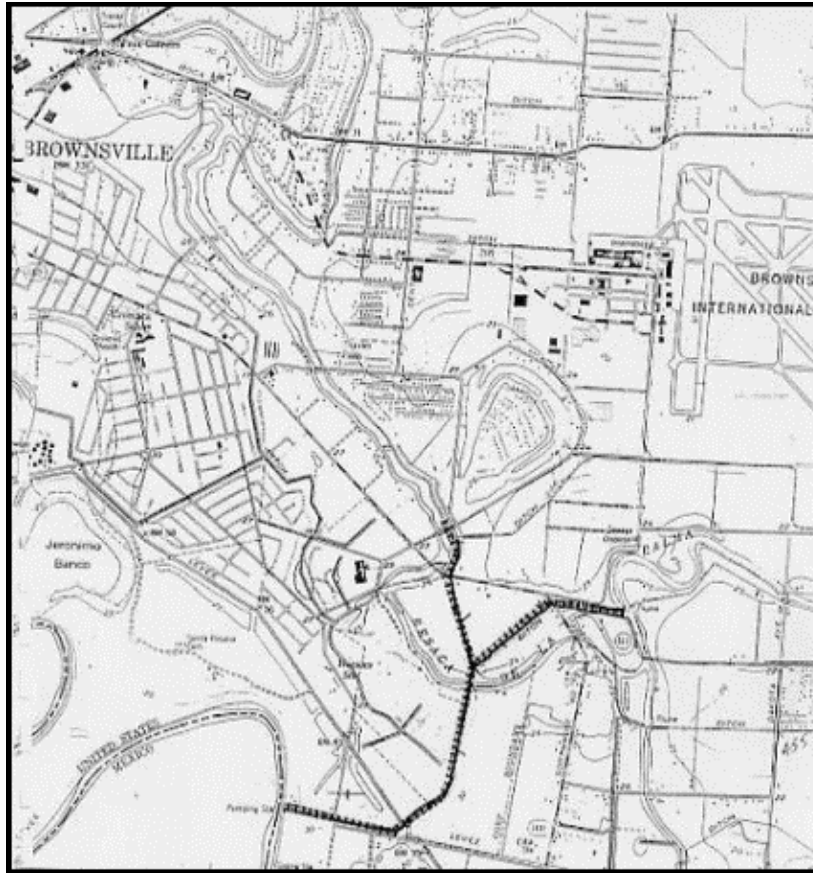
*The BID diverts 100% of the water used in the system directly from the Rio Grande River. All of the water diverted by the District originates from water released by the IBWC from the Falcon Reservoir.*

*The District pumps water from the Rio Grande River using a pump station located approximately 6.75 miles downstream of the Gateway Bridge in downtown Brownsville. The water is pumped in to a “main canal” and flows approximately 6,000 feet to a point just North of Resaca de la Palma, which is used as a storage reservoir.*

*Residential subdivisions and homes have been built all along the main canal. The people living along canal have health and safety concerns regarding the canal, and the open canal constitutes a barrier separating the communities along the canal. The District pumps an average 189 days per year through this main canal. The average duration of each pumping is 9 days.*

*The Districts proposes to replace the open main canal with a “low head” pressure pipe to save 1,060 acre-feet of water per year; reduce operation and energy costs, increase overall efficiency in the conveyance of irrigation water, and reduce the effort required for water conservation. The project proposes significant actions that include:*

- *Replacement the existing main canal with a 72” diameter concrete pipe with a pressure rating of 30 feet of head (13 psi ± a 2 safety factor)*
- *Replacement the east and west fork canal with a 72” diameter concrete pipe with a pressure rating of 30 feet of head (13 psi ± a 2 safety factor)*
  - *Construction of 4 Road Crossings*
  - *Installation of 2 54” Gate Valves*
  - *Construction of Levee Crossings*
  - *Construction of Drainage Ditch Crossings*



*The cost of proposed structural improvements under the project is expected to be \$2.356 million.*

*On the basis of current efficiencies reported by the irrigation districts and estimated efficiencies of possible project components, the proposed project activities will increase water use efficiencies and thus will conserve water as follows:*

<b>Reclaimed Water Volume</b>	
<i>Concept</i>	<i>Reclaimed volume Acre-feet/year</i>
<i>Seepage losses</i>	<i>100</i>
<i>Canal charging losses</i>	<i>810</i>
<i>Unauthorized use and spillage "losses"</i>	<i>50</i>
<i>Evaporation losses</i>	<i>100</i>
<b><i>TOTAL</i></b>	<b><i>1,060</i></b>

*The above volumes are related to current irrigated areas and water use which are affected by the different components of the proposed infrastructure improvements.*

*Given the technical characteristics of the proposed project, the increase in water availability that may be achieved via irrigation efficiencies with the implementation of the proposed actions is quantifiable and verifiable. The proposed actions may be compared to the implementation of similar actions in other irrigation districts.*

## **2. Operation and Maintenance Plan**



*Irrigation districts have regulations and operation standards applicable to each agricultural cycle. The purpose of these rules is to regulate the management, operation, conservation, maintenance and improvement of infrastructures and water distribution, and irrigation services provided to District users.*

### **Operation and Maintenance Policies**

*Infrastructure activities proposed to increase irrigation district efficiencies are not enough by themselves. Rather, they must be combined with policies aimed at improving operations and maintenance and ensuring adherence to water right allocations and diversions established under the Water Master's legal framework.*

### **Hydrological Information for Operation Improvements**

*Periodic hydrological reviews are planned and advisable, since additional information on supply sources will become available with time. Such information will help the project define the maximum irrigable area, overall operation policies, and/or crop plans that are congruent with water availability and efficient water use policies.*

### **Maintenance**

*Irrigation District facilities require constant preventive and corrective maintenance to prevent the gradual deterioration of the facilities and avoid incurring losses in irrigation efficiencies and eventual high repair costs. This is imperative considering current policies related to water conservation and efficient use of water stemming from the lack of water resources in the study area and in the country overall.*

*The reduction of the estimated 1,060 acre-feet of water per year with the project will result in a energy saving of 121,000KWH per year, which is a savings of \$12,826 per year based on 2001 energy prices. Suppliers of mechanical, electrical or electro-mechanical equipment must provide operation and maintenance manuals to prevent the premature deterioration of equipment.*

## **3. Compliance with Applicable Design Standards and Regulations**

*The Implementation of the proposed works complies with all applicable standards and regulations.*

*Current standards and specifications, manuals, and design guides applicable to the project include:*

- *American Society for Testing Materials (ASTM)*
- *American Water Works Association (AWWA)*
- *American National Standards Institute (ANSI)*
- *Occupational Safety and Health Administration (OSHA)*
- *Construction Regulations for Reinforced Concrete Buildings ACI-318R-89 and comments*
- *Concrete Sanitary Structures for Environmental Enhancement ACI-350R-89*
- *American Institute of Steel Construction (AISC)*
- *American Welding Society (AWS)*
- *American Society of Mechanical Engineers (ASME)*
- *American Society of Civil Engineers (ASCE)*
- *Portland Cement Association (PCA)*

*The project responds to the Rio Grande Regional Water Planning Group's (RGRWPG) general guidelines to achieve sustainable development at the regional level, as follow.*

- *Optimize the supply of water available from the Rio Grande*

- *Reduce projected municipal water supply needs through expanded water conservation programs*
- *Diversify water supply sources for domestic, municipal and industrial (DMI) uses through the appropriate development of alternative water sources (e.g., reuse of reclaimed water, groundwater, and desalinization)*
- *Minimize irrigation shortages through the implementation of agricultural water conservation measures and other measures*
- *Recognize that the acquisition of additional Rio Grande water supplies will be the preferred strategy of many DMI users for meeting future water supply needs.*

## *Financial Feasibility and Project Management*

### **1. Financial Feasibility**

*A consultant analyzed the financial information concerning to the project, and the BID'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. The consultant's recommendation was that the BID has the capability to undertake the proposed project.*

*The project costs are as follows:*

<b>Cost of the Project for the Main Canal Replacement</b>		
	<i>Funding Source</i>	<i>TOTAL (USD)</i>
<i>Planning &amp; Design</i>	<i>SECO/District</i>	<i>180,000</i>
<i>Construction</i>	<i>WCIF/District</i>	<i>2,176,000</i>
<i>TOTAL</i>		<i>2,356,000</i>

*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 a maximum of \$4,000,000. The funding sources for the project are as follows:*

<b>Financial Structure for the Project</b>			
<i>Source</i>	<i>Type</i>	<i>Amount (USD)</i>	<i>% of Phase Project Cost</i>
<i>NADB</i>	<i>WCIF- Grant</i>	<i>\$ 1,178,000</i>	<i>50.0</i>
<i>State of Texas</i>	<i>SECO Grant</i>	<i>\$ 205,000</i>	<i>9.0</i>
<i>Brownsville ID</i>	<i>Cash</i>	<i>\$ 973,000</i>	<i>41.0</i>
<i>TOTAL</i>		<i>\$ 2,356,000</i>	<i>100.0</i>

*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.*

### **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 \$20.00 flat rate assessment for the first acre and \$5.00 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.*

<b>Existing Assessment Fee Structure</b>			
<i>Fees</i>	<i>First Acre</i>	<i>Additional Acre</i>	<i>Lot</i>
<i>Rate/ Base charge</i>	<i>\$ 20.00</i>	<i>\$ 5.00</i>	<i>\$ 18.00</i>
<i>Rate/ No Base charge</i>	<i>\$ 10.00</i>	<i>\$ 6.00</i>	<i>\$ 18.00</i>
<i>Base charge/ No flat rate</i>	<i>\$ 18.00</i>	<i>\$ 4.00</i>	<i>\$ 18.00</i>
<i>Base Rate/ No flat rate</i>	<i>\$ 5.00</i>	<i>\$ 0.00</i>	<i>\$ 18.00</i>
<i>Resaca Font. lot</i>			<i>\$ 18.00</i>
<i>Resaca Font. lot development</i>			<i>\$ 5.00</i>
<i>Resaca Font. lot Resaca Font.</i>			<i>\$ 40.00</i>

*In addition, the District charges a \$6.00 delivery fee per acre irrigated for the first four inches and \$2.00 per inch for amounts over four inches. The delivery fee is paid prior to the date that water is to be delivered by the District.*

*The fee structure for Brownsville 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 Brownsville Irrigation District. The District has managed the construction of pipeline installation throughout the District's properties. The District is expected to 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 Participation Plan.**

*BECC certification 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 Brownsville Irrigation District. The Plan was submitted by the District and approved by BECC in early May 2003.*

#### **Steering Committee.**

*The steering committee members Jose Hinojosa, City of Brownsville; Juan Olvera, Irrigation District Board of Directors; David Ivory, City of Brownsville; James L. Holdar; Cameron County Drainage District #1; Ray Loop, R & F Farms (District Irrigator); Tim Loop, L & L Farms (District Irrigator); and Joe Barrera, General Manager of the Brownsville Irrigation District.*

#### **Local Organizations.**

*Organizations contacted were the City of Brownsville; the Brownsville Public Utilities Board; El Jardin Water Corporation; and the Texas Department of Transportation.*

**Public Access to Project Information.**

*The Water Conservation Project Report was available for public viewing at the District offices prior to the first BECC public meeting. This information of availability of project information was included in public meeting notices published in the Brownsville Herald, and posted at various locations, such as the Brownsville Water Works offices, Brownsville City Hall and Cameron County Courthouse. A project fact sheet was developed and made available at the District offices. The fact sheets were utilized 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 May 21<sup>st</sup> to present the technical components of the project to the public. The second public meeting will be held on Jun 17<sup>th</sup> to present the financial analysis and impact to District members.*

## *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.*

*With the elimination of the current water losses by the implantation of this project, there will be a saving of 1060 acre-feet of water, which can be used for other purposes. In addition, there will be electrical savings of 121,000 KWH per year. The overall environment will benefit by the conservation of water, and the fuel savings resulting from the reduction of the electricity. Local residents will benefit from better agricultural yields resulting from having more water available for irrigation use, or for other uses, if the use is converted to municipal or industrial use. The quality of life for the residents who live along the canal will be improved by the elimination of a physical barrier separating the communities, and the elimination of the hazards of an open canal. The overall community will benefit from the increase in the resources required for growth and development. The efficiencies resulting from this project will aid in the goal of having a sustainable development framework of infrastructure for the community. The proposed improvement in the District's operational system will provide a net positive effect for the community and the State of Texas,*

*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. The daily cleaning of debris, monitoring of the canal and the reduction of weed control will result in an annual savings of \$130,570.*

*On the other hand, the elimination of the canal will allow a more efficient transportation plan for the City of Brownsville by allowing for the development of streets crossing the canal at a reasonable cost and reduction of transportation time.*

## **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 the Texas Water Development Board (TWDB) provided financial assistance to the BID 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 is preparing the Economic and Conservation Evaluation of Capital Renovation Projects for the BID, with funds provided through a federal initiative, “Rio Grande Basin Initiative”, administered by the Cooperative State Research, Education, and Extension Service, US Department of Agriculture.*

*The NADB WCIF 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 for the development of this project will follow a planning and public participation process that will develop alternatives and associated costs, will solicited public input in to the process, will established priorities based on input of the stakeholders and will 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 Policy” both dated August 13, 1999 of the BID*
- *“Rules and Regulations Governing Irrigation Water Service -Brownsville Irrigation District*

*The project also will conform to the requirements of the following:*

- *USBOR*
- *US Army COE*
- *Texas Historical Commission*

## **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 will conserve sufficient water to allow continued development in the Brownsville City and other rural communities that depend on the Rio Grande for their water supply. Therefore, both the City and the irrigation District will be able to manage growth within their available resources.*

*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 required by water pumping that will be saved with the implementation of the improvements in the BID.*

## **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.*

*In addition, the replacement of the canal with pipe would allow the right-of-way to be reduced to 30 to 40 feet, thereby the remainder of the land available for sale for some other community benefits.*

### *List of available documents*

- *Baseline Conditions Report and Irrigation District Indicators for the Brownsville Irrigation District.*
- *Engineer’s Report. The Conceptual Design for Brownsville Irrigation District’s Main Canal Replacement.*
- *Regional Water Plan for The Rio Grande. Executive Summary*