

ENVIRONMENTAL SUMMARY
FOR THE
DELTA LAKE IRRIGATION DISTRICT
WATER CONSERVATION IMPROVEMENTS PROJECT



PREPARED FOR:

DELTA LAKE IRRIGATION DISTRICT
ROUTE 1, BOX 225, EDCOUCH, TEXAS 78538

UNDER THE AUSPICES OF:
TEXAS WATER DEVELOPMENT BOARD and
TEXAS STATE ENERGY CONSERVATION OFFICE

TWDB Contract No. G18900

PREPARED BY:
AXIOM-BLAIR ENGINEERING
2711 WEST ANDERSON LANE, SUITE 210
AUSTIN, TEXAS 78757

JUNE 2003

TABLE OF CONTENTS

1 INTRODUCTION..... 1

2 DESCRIPTION OF NEED AND PURPOSE 2

2.1 Need..... 2

2.2 Purpose 3

3 PROPOSED PROJECT DESCRIPTION 4

3.1 Reservoir Renovation Project..... 4

3.2 Seepage Recovery Pilot Project..... 5

3.3 Telemetry and Flow Measurement Project..... 5

3.4 Canal Rehabilitation Project 7

4 PROJECT FUNDING 9

5 ENVIRONMENTAL IMPACTS OF THE PROJECT 9

5.1 Social and Economic Impacts 9

5.2 Soils 10

5.3 Vegetation Impacts..... 10

5.4 Endangered and/or Threatened Species..... 11

5.5 Wildlife Habitat 12

5.6 Weather..... 12

5.7 Wetlands and Waterways..... 13

5.8 Flood Zones 13

5.9 Storm Water 13

5.10 Effects of Earthwork on Water Bearing Bodies..... 14

5.11 Public Land..... 14

5.12 Land Use 15

5.13 Farmlands 15

5.14 Historical-Cultural Resources 15

5.15 Air Quality and Acoustic Impacts 16

5.16 Hazardous Materials 16

5.17 Traffic Hazards and Disruptions 16

5.18 Clearing, Grubbing and Spoil Disposal 16

5.19 Obstruction of Scenic Views 17

6 CONCLUSIONS 17

EXHIBITS

- Exhibit 1* District Boundary Map
- Exhibit 2* TCEQ District Information Report
- Exhibit 3* District Water Supply System Map
- Exhibit 4* Reservoir Renovation Project Site Location Map
- Exhibit 5* Review Letters for the Emergency By Pass Canal Project
- Exhibit 6* Seepage Recovery Pilot Project Site Location Map
- Exhibit 7* Telemetry and Flow Measurement Site Location Map
- Exhibit 8* Canal Rehabilitation Project Site Location Map
- Exhibit 9* U.S. Census Bureau General Profiles for Willacy and Hidalgo Counties
- Exhibit 10* TxDOT Revegetation Seed Mix Criteria
- Exhibit 11* Federal and State Endangered Species List
- Exhibit 12* Cooperative Management Agreement
- Exhibit 13* List of Historic Sites for Willacy and Hidalgo Counties
- Exhibit 14* NAGPRA Report

1 INTRODUCTION

The purpose of the Delta Lake Irrigation District's *Water Conservation Improvements Project* (the "Project") is to preserve and extend the existing water resources of the Lower Rio Grande Valley. In general, water will be preserved by constructing improvements, which will reduce or recover losses due to seepage and evaporation and will allow for a more efficient operation of the water delivery system as a whole. The Project is being developed under the *Lower Rio Grande Valley Water Resources Conservation and Improvement Act of 2000* (Public Law 106-576) and was prepared in accordance with the *Guidelines For Preparing and Reviewing Proposals for Water Conservation and Improvement Projects* associated with the Act. Public Law 106-576 was passed to encourage water supply improvement projects in select locations within the Rio Grande basin. It provides funding for study, evaluation, design, and construction of irrigation water system improvements. This Environmental Summary was prepared to partially fulfill the requirements of Contract Number G18900 between the Texas Water Development Board and the Delta Lake Irrigation District.

The proposed Project will be comprised of four separate components. The first component, the *Reservoir Renovation Project*, consists of constructing seven diversion structures from a proposed by-pass canal along the eastern edge of the eastern reservoir of Delta Lake. The second component, the *Seepage Recovery Pilot Project*, will consist of a feasibility study into the possibility of collecting water that seeps from the Main Canal and pumping it back into the system. The third component, the *Telemetry and Flow Measurements Sites Project*, includes the installation of flow measurement devices at 20 water diversion points to monitor deliveries and send this information, by telemetry, to the District headquarters. The fourth component, the *Canal Rehabilitation Project*, will replace approximately 17,800 linear feet of open channel laterals with new gasket joint PVC or RCP pipe.

The Project Applicant, Delta Lake Irrigation District (DLID or the District) was established on June 22, 1914. The District is a political subdivision of the State of Texas, organized under and by virtue of Article XVI, Section 59 of the Constitution of the State of Texas. It is operated under the statutes of Chapter 49 and 58 of the Texas Water Code. The Delta Lake Irrigation District Board consists of the following five Directors:

Mr. Neal Galloway	President
Mr. Glen Hester	Vice President
Mr. Dale Murden	Secretary
Mr. James Carlson	Director
Mr. Tom Wetegrove	Director

DLID provides irrigation, drainage, flood control and water supply functions to 148.95 square miles of Hidalgo and Willacy Counties. As shown in Exhibit 1, the District boundary includes the cities of Hargill, La Sara, Monte Alto and part of the City of Raymondville. The DLID legal address is Delta Lake Irrigation District, Route 1, Box 225, Edcouch, Texas 78538. The general manager, Max Phillips, may be reached at (956) 262-2101. TCEQ District information reports are included as Exhibit 2.

The Rio Grande is the only water source for DLID. All of the water diverted by the District, from the Rio Grande, originates as surface water released by the International Boundary and Water Commission from Falcon Reservoir. The District pumps water northward through a 32-mile canal (Willacy Canal) originating at the Rio Grande and terminating at the southeast corner of the East Reservoir of Delta Lake. The District water supply system consists of 250 miles of lined or partially lined canals, 42 miles of unlined canal and 122 miles of unlined laterals. DLID operates Delta Lake (a.k.a. Monte Alto Reservoir) as a buffer for absorbing changes in daily producer uses as well as equalization mitigating the four-day travel time of water from Falcon Reservoir. As indicated on Exhibit 1, Delta Lake is separated by a roadway that divides the lake into a larger East Reservoir and a smaller West Reservoir. The two reservoirs are connected via a culvert running under the dividing roadway and can be isolated from one another using a valve. Exhibit 3 depicts the District's water supply system.

The Delta Lake Irrigation District has 174,776 acre-feet of authorized water rights and has the largest amount of irrigated agriculture of the 28 irrigation districts in the Lower Rio Grande Valley of Texas. The District is located within the boundaries of the Texas Water Development Board's Rio Grande Regional Water Planning Group (Region M) and delivers water to the North Alamo Water Supply Corporation and the cities of Raymondville, Lyford, Hargill, La Sara and Monte Alto. The District's 5-year average annual agricultural water diversion was 97,295 acre-feet for 1994 to 1998.

2 DESCRIPTION OF NEED AND PURPOSE

2.1 Need

An assessment of the current and future water supplies and demands for Lower Rio Grande Valley is included in the *Adopted Regional Water Plan* (the "Region M Plan") published in January 2001 by the Texas Water Development Board's (TWDB) Rio Grande Regional Water Planning Group. According to the Region M Plan, the population in the Rio Grande Valley is expected to more than double in the next 50 years. With population growth, some of the land currently used for farming and ranching will be converted to urban use. As such, municipal water demand is expected to

increase over the next 50 years while irrigation demand is expected to decrease over the same period.

The Rio Grande is currently the only water source for the District and is expected to remain the only source in the foreseeable future. Water in the Rio Grande downstream from Fort Quitman, Texas is apportioned between the United States and Mexico according to the 1944 Treaty. The apportionment is administered by the International Boundary and Water Commission (IBWC). Two international reservoirs, Amistad and Falcon, provide controlled storage capacity for over eight million acre-feet of water owned by the United States and Mexico. According to the Region M Plan, it is estimated that (by 2050) the firm yield of the Amistad-Falcon Reservoir System will decrease by nearly 10 percent due to sedimentation.

2.2 Purpose

Water conservation by the District has become increasingly important due to an enduring drought that has affected the lower Rio Grande Valley over the past several years. The drought and the projected decrease in irrigation water supply has required the District to place a greater emphasis on water conservation to ensure the delivery of water to the customers they serve. Historically, the District has aggressively sought to develop ways to deliver the maximum amount of water possible to each turnout. The District has implemented metering of all irrigation deliveries and has invested approximately \$400,000 per year replacing small open laterals with buried pipelines. Last year the District installed 4,800 linear feet of 36" RCP and 10,000 linear feet of 18" PVC pipe. This has increased the efficiency of the District and the growers by reducing the energy used per acre irrigated.

The proposed *Water Conservation Improvements Project* is proposed to continue the District's commitment to conserve water and energy. The components were selected as priorities from a list of 11 major and 37 minor projects identified throughout the District's water delivery system. The installation of the flow measurement devices will allow the District to remotely measure the amount of water delivered from each of the 20 diversion points to the different canal systems. By monitoring the information, the District will be able to reduce the amount of excess water that is passed through the system. Eliminating and recovering seepage will allow more water to be available to each customer in times of shortages. Given that the Rio Grande is the District's only anticipated water source, it is their goal to maximize efficiency by reducing over pumping and seepage losses.

3 PROPOSED PROJECT DESCRIPTION

3.1 Reservoir Renovation Project

The *Reservoir Renovation Project* will consist of the design of seven diversion structures on a proposed by pass canal to be built along the eastern edge of the East Reservoir of Delta Lake. This by pass canal will begin at the southeastern corner of the reservoir where the Main Canal supplies the lake and terminate at a pump house along the reservoir's northern edge. A project location map showing the bypass canal and the location of the diversion points is included as Exhibit 4.

The proposed by pass canal will be constructed along the inner edge of the eastern embankment, utilizing the existing berm. In 1998 and again in 2002, the Rio Grande Valley was under extreme drought conditions. As such, the Delta Lake Irrigation District came very close to depleting its allocation of irrigation water and thus the "transport water" that is necessary to convey the municipal water through the East Reservoir of Delta Lake. Since the North Alamo Water Supply Corporation (NAWSC) supplies the municipal water to 90% of the residents in Willacy County, they applied to the Texas Water Development Board for emergency grant funds to construct the by pass canal described above. Rain in late summer of 2002 averted the short-term water shortage, but not the risk that the shortage will occur again. Grant money was approved in early 2003 for the project submitted by NAWSC. NAWSC is responsible for any technical or administrative activities under the funding authorized by TWDB Resolution 03-9 and no funds for such activities are being provided to Delta Lake Irrigation District or their consultants for such activities. Copies of all technical information developed in conjunction with the DLID SECO project will be provided to North Alamo WSC. DLID and North Alamo will have periodic meetings to coordinate the project and make sure that no duplication of effort is occurring. An Environmental Summary was prepared and previously submitted (June 2002) to reviewing agencies in conjunction with the grant application for the proposed by pass canal project. The Environmental Summary was prepared for the NAWSC as the "Emergency Bypass of the Delta Lake East Reservoir for Delivery of Raw Water". Review letters from Texas Parks and Wildlife, Texas Historical Commission, U.S. Fish and Wildlife and the U.S. Army Corps of Engineers are attached as Exhibit 5.

The seven new control structures will be designed to accommodate existing diversion points along the eastern edge of the reservoir. Radial gates will be installed at the Main and "J" Canals to provide better flow control and hydraulic equalization between the reservoir and the by pass canal. Canal gate diversion structures will be designed for the other five diversion points. Even with the proposed improvements, the East Reservoir of Delta Lake will continue to be utilized as a reservoir for the District, but in

an “off-line” instead of “in-line” capacity. The proposed control structures will allow the steady flow of water to the by pass canal and excess water will be diverted into the East Reservoir. In times of extreme water shortages, the proposed by pass canal will allow the District to provide domestic water when lake levels are low.

3.2 Seepage Recovery Pilot Project

The *Seepage Recovery Pilot Project* will consist of a feasibility study into the possibility of collecting water that seeps from the Main Canal and pumping it back into the system. Because of the size of the canal, concrete or urethane lining is estimated to be prohibitively costly. The seepage recovery project is proposed as an alternative to lining. It is anticipated that the energy required to pump the recovered seepage back into the Main Canal will be approximately 25% of the energy required to pump water from the Rio Grande, or for every acre-foot of seepage water that is salvaged, the District will reduce energy cost per acre-foot by 75%. A Project Location Map showing the proposed study area is included as Exhibit 6.

In conjunction with this component, studies will be conducted to better determine the actual loss rate from the canal, the quality of the water recovered and the ability to collect and return the lost water back to the canal. A survey will also be completed to determine the area with the greatest water loss rate to ensure the project location is the most cost effective. Once the project location is determined, a 5 cfs seepage recovery system will be designed consisting of a subsurface telescoping toe interceptor drain running adjacent and parallel to the banks of the Main Canal and a low head lift station to pump the water back into the canal.

3.3 Telemetry and Flow Measurement Project

The *Telemetry and Flow Measurement Project* includes the installation of flow measurement devices at 20 diversion points within the District’s water supply system. These devices will be permanently installed to monitor deliveries into particular laterals of the system and send this information, by telemetry, to the District headquarters. This information will allow the District to track water usage, identify where losses are occurring and allow the District to forecast and provide for future water uses. By having more information, the District can operate the system more efficiently. A project location map showing the flow measurement sites is included as Exhibit 7.

The 20 diversion points will contain one or multiple measurement devices depending on the diversion structures located on the site. Each of the measurement devices on the individual sites will be connected to a single telemetry system. The diversion structures can be broken into two categories, pump houses (closed conduit flow) and check structures (open channel flow).

At all of the pump house sites, water is drawn from the supply canal with single or multiple pumps and discharged to a pump well. Once the water enters the pump well, it is distributed to single or multiple distribution lines for delivery to the customer(s). Each pump discharge pipe will be equipped with a strap-on propeller meter to measure flow from the individual pumps and a calibration port to ensure accurate measurements. These meters will be enclosed in either a concrete or a steel vault to protect them from the weather and vandalism. A submersible pressure transmitter will be installed in each pump well, which will measure the water level and shut off the pump(s) if excess water is recycling back into the canal.

At each of the check structures, the flow will be measured downstream from the check structure using a flow measurement structure or device. The canals containing the check structures could be divided into two categories; large (top width in excess of 20-foot), earthen canals and small, concrete-lined canals. Based on their ability to be computer calibrated using as-built dimensions, long-throated flumes were selected for flow measurement of the small, concrete-lined canals. A cross-section from the existing canal will be utilized to design a flume for each of the sites using the WinFlume software. Rating tables will be prepared for each of the flumes based on the proposed design. Once the flumes have been constructed, as-built dimensions will be utilized to prepare revised rating tables for use in determining flows at different elevations. Each flume will be equipped with a submersible pressure transmitter, housed in a stilling well, for determining the water level in the approach section of the flume and a staff gage for visual verification.

It was decided that a velocity flow meter would be the most cost effective and accurate metering device for the large earthen canals. A Doppler meter, which measures velocity in the channel, will be installed at each of these sites. The meter will be installed in a concrete slab constructed along one bank of the channel. The slab will be located sufficiently downstream from the check structure to minimize unsteady flow. The meter will measure the velocity of the water and will be equipped with an integrated pressure sensor for water surface level measurement. A rating curve will be developed for each of the canal Doppler meter sites to determine the flow. The meters will be calibrated using a portable metering device.

A telemetry system will be installed at each of the 20 diversion points for the District to periodically, and on demand, poll for data from the field devices (remote telemetry unit (RTU)), process the data into a central data base (base computer), send controls to field devices and display the data in useful formats to water operation personnel. A Base System will be located at the District Headquarters and will consist of a base computer, which will hold the central database to store and convert all of the data from the RTUs, and an antenna to receive from and transmit data to the remote telemetry systems. The

base computer will be equipped with software that will display current, last 24 hours and monthly water and flow level data of any or all of the RTUs. It will also store all engineering and conversion data necessary for converting flow.

A remote telemetry system will be installed at each of the flow measurement sites. Each system will consist of the following:

1. Remote Telemetry Unit (RTU)
2. Radio and RF Modem
3. AC/DC Linear Power Supply

These items will be mounted inside a steel NEMA 12 enclosure on a panel with room for a storage battery to be placed on the bottom of the enclosure. A radio antenna will be mounted on a 20-foot antenna mast for transmitting and receiving data from the Base System.

At sites equipped with a pump house, the telemetry system enclosure will be mounted inside, on the specified wall, and wired to the existing power source. At sites without a pump house, but where electricity is available, the telemetry system enclosure will be installed in a steel vandal box and wired to the existing power source. When electricity is not available, the telemetry system enclosure will be installed in a steel vandal box and a solar panel will be added to the antenna mast to provide power.

Once the telemetry system enclosures are mounted, the RTU will be wired to the metering device(s), the pressure transmitter, the existing pump panel(s), solar panel and antenna, as specified in the construction drawings. The system will then be programmed with the calibration coefficients for each site and DLID personnel will be trained in the operation and calibration procedures for the Telemetry System.

3.4 Canal Rehabilitation Project

The *Canal Rehabilitation Project* is to replace approximately 17,800 linear feet of existing concrete lined canal with buried pipeline. This component will save water by eliminating seepage and evaporation and their associated pumping requirements and costs. This will result in the flow rate of water delivered to individuals to be increased or allow for a greater number of fields to be simultaneously irrigated. A project location map showing the canal repair sites is included as Exhibit 8.

Four potential project alternatives were considered for the repair of the deteriorating concrete lined canal segments. Alternatives include the following:

- Replace the existing canal with concrete.
- Line the existing canal with a polyurethane liner.

- Replace the existing canal with a pipeline.
- No-build alternative

Preliminary cost estimates were prepared and found that replacing the existing concrete was 100 to 200 percent more expensive than lining the canal with a polyurethane liner or replacing the canal with a pipeline. Additionally, the soils in the area shrink and swell extensively in the presence and absence of moisture. Concrete lining would always be susceptible to cracking and separating resulting in the problems the District is currently experiencing. No benefits were found to justify the additional cost and future problems of replacing the existing concrete lining. Replacing the existing canal with concrete was therefore eliminated as a viable alternative.

According to an on-going study by Texas A&M University, concrete lined canals similar in size and soil type can lose from 220 to 375 acre-feet/mile per year of water due to seepage. Adding this to a loss of 2.2 acre-feet/mile per year due to evaporation converts to a total from 749 to 1396 acre-feet of water loss per year for the proposed 3.37 miles of canal. With the ongoing drought and the District's commitment to water and energy savings, the no-build alternative was eliminated from consideration.

Both lining the canal with a polyurethane liner and replacing the canal with a pipeline had the positive benefit of eliminating seepage and low maintenance costs, but each had its limits on cost-effectiveness. It was found that at higher flow rates, it was more cost-effective to line the canal with a polyurethane liner. At low flow rates, replacing the canal with a pipeline was more cost-effective. Since both the liner and the pipeline would be installed along the existing canal alignment, the environmental impacts of the projects would be very similar. However, the segments selected for replacement are small laterals with low flow rates and based on the above observations, replacing the canals with pipeline will be the most cost-effective alternative.

In conjunction with this component of the Project, a detailed hydraulic study of each segment of the lateral will be performed using the EPANET software to determine the flow requirements and pipe sizes. All proposed pipelines larger than 24-inches will be installed as reinforced concrete pipe (RCP) and those smaller than 24-inches will be installed as polyvinyl chloride (PVC) pipe. Each of the pipelines will be installed in one of the embankments of the existing canal, with its alignment parallel to the edge of the existing canal. A concrete inlet structure will be constructed at the intersection of the proposed pipeline and the supply canal. This structure will be located to ensure the inlet of the pipeline will remain submerged and thus, ensuring the pipeline will remain pressurized. A turnout connection box will be constructed at each point of delivery along the alignments. A drain pipeline will be provided at the end of each pipeline.

Once the pipelines are in place, the existing canal will be backfilled with material from each of the embankments to provide a uniform slope across the District right-of-way

4 PROJECT FUNDING

Funding for the proposed project will be provided by multiple sources. A project plan and report as well as construction drawings and specifications will be completed using funds provided by the State Energy Conservation Office (SECO) through the Texas Water Development Board (TWDB). The estimated construction cost is estimated to be \$7,125,000. DLID is also seeking a grant from NADB for 50% of the construction cost. The District will provide funding for the remaining 50% of the construction cost.

5 ENVIRONMENTAL IMPACTS OF THE PROJECT

5.1 Social and Economic Impacts

The proposed project is located within the boundaries of Hidalgo and Willacy Counties and, therefore, socioeconomic data for both counties was utilized for this study. Exhibit 9 attached contains the *U.S. Census Bureau General Profiles for Hidalgo County and Willacy County, Texas*. Most of the data represents conditions within the Counties for the 1999 to 2001 time period.

Hidalgo County had a population of 569,463 in 2000, an increase of approximately 48.5 percent from the 1990 population. In 2000, approximately 35 percent of the population was under the age of 18 while about 10 percent was 65 years or older. The median household income was \$24,863 (1999) while the per capita personal income was \$9,899 (1999). The unemployment rate within the County in 2000 was approximately 12 percent and about 36 percent of the county's residents live below the poverty level. In 2000, approximately 51 percent of persons 25 and older were high school graduates while about 13 percent were college graduates.

Willacy County had a population of 20,082 in 2000, an increase of approximately 13.4 percent from the 1990 population. In 2000, approximately 32 percent of the population was under the age of 18 while about 12 percent was 65 years or older. The median household income was \$22,114 (1999) while the per capita personal income was \$9,421 (1999). The unemployment rate within the County in 2000 was approximately 14 percent and about 33 percent of the county's residents live below the poverty level. In 2000, approximately 49 percent of persons 25 and older were high school graduates while about 8 percent were college graduates.

The proposed project is not expected to segregate, disturb or otherwise unreasonably disrupt any existing residences, businesses or other facilities. No relocations will be required. The overall economic impact of the proposed project is expected to be wholly positive. The project will not place a disproportionate share of negative environmental impacts on any racial, ethnic or socioeconomic group of people.

5.2 Soils

The *USDA Soil Survey of Hidalgo County* and the *USDA Soil Survey of Willacy County* were utilized to determine the soils underlying the project areas. In Hidalgo County, the boundary for construction areas lies south of Hwy 186, north of Hwy 1925 and approximately four miles east of Hwy 281. Soils in the western portion of the construction area are “dominantly nearly level to gently sloping loamy soils; on uplands”. The soils that dominate the area are Delfina, Hargill, Hidalgo, Racombes and Willacy and are deep and moderately permeable. The soils typically have a brown or grayish brown fine sandy loam or sandy clay loam surface layer. Soils in the eastern portion of the construction area are “dominantly nearly level, loamy and clayey soils; on uplands”. The soils in this area are Hidalgo, Mercedes and Raymondville and are deep and slowly and very slowly permeable. These soils typically have a gray or dark grayish brown clay, clay loam or sandy clay loam surface layer.

All of the construction areas within Willacy County are located west of Hwy 77 and south of Hwy 186. The soil in this area is “loamy and clayey soils dominantly of the middle and high stream terrace”. The land is nearly level and slopes gently towards the northeast. The soils that dominate the area are Delfina, Hargill, Hidalgo, Lozano, Lyford, Mercedes, Racombes, Raymondville and Willacy. These soils are characterized by layers of dark brown or gray fine sandy loam and sandy clay loam.

Construction of the existing irrigation and drainage canal system significantly disturbed the original soil profile. As a result, no virgin soils are expected to be disturbed by the project. Construction practices will utilize methods to minimize soil loss due to wind and rain erosion. All runoff from the construction area will drain into the existing drainage canals, which will serve as a sediment trap. Silt fences will be installed in areas where the erosion hazard is considered high. Temporary erosion control procedures will be utilized until all areas disturbed by construction have been successfully revegetated (except the canal).

5.3 Vegetation Impacts

The general area encompassing the project alignments has existed as irrigation and drainage canals and farmland for over 50 years. During this time, vegetative growth has encumbered the drainage and irrigation canals and embankments. In general, the

alignment contains a variety of native and introduced ground cover vegetation. Typical grasses found scattered in and around the project area include Green Sprangletop (*Leptocloa dubia*), Bermuda (*Cynodon dactylon*), Rhodes (*Chloris guyana*) and Buffalo (*Buchloe dactyloides*). The general project area also contains a scattering of trees, primarily of the Hackberry (*Celtis* spp.) and Mesquite (*Prosopis glandulosa*) species.

All vegetation and debris will be removed within the existing canal and along the edge of the embankment in areas where the control structures will be constructed. Vegetation will also be removed along the embankments where pipelines are to be installed and in areas disturbed in conjunction with the proposed monitoring sites. Although significant disturbance will occur within the work zones, no significant long-term impacts on the distribution, diversity and coverage of vegetation is expected. Vegetation is expected to be rapidly reintroduced by adjacent, undisturbed areas of plants.

Upon completion of pipeline construction, disturbed areas will be revegetated with grass using a seed mix recommended by the Texas Department of Transportation for the Pharr District. Exhibit 10 contains a detail of the proposed seed mix modified to reflect the advice of Texas Parks and Wildlife biologists. Removal of significant trees (trunk diameters 8-inches and larger) will be mitigated by planting new trees on a 25 percent caliper-inch basis (one caliper inch planted for each four caliper inches removed). Trees will be planted in the general project area, however, due to safety concerns, no trees will be planted in close proximity to the canal embankments.

5.4 Endangered and/or Threatened Species

Ten species are included on the Federal Endangered Species List potentially inhabit Hidalgo County and sixteen are included on the list for Willacy County. In addition, the Texas Parks and Wildlife Department lists 48 species of plants and animals that are endangered, threatened or potentially threatened within Hidalgo County and 39 species in Willacy County. 34 species are common to both Hidalgo and Willacy Counties. The federal and state species lists are included in Exhibit 11. A significant number of species detailed in Exhibit 11 are known to inhabit a narrow corridor along the Rio Grande or along the Texas Gulf Coast. In addition, a number of the avian species are migratory birds that do not permanently inhabit the South Texas Region.

Of the 78 total species included on the State and Federal lists, twenty-two could not be eliminated from consideration as a result of habitat limitations, occupation windows, soils limitations and topographic preferences. The twenty-two include three amphibians, eight birds, one insect, three mammals, five reptiles and two plants. Pedestrian surveys of the project area and interviews of the staff of the Delta Lake Irrigation District did not produce any information that might indicate the presence of

endangered or threatened species. As a result, it is unlikely the proposed project will adversely affect, directly or indirectly, any species identified by the United States government of the State of Texas as threatened or endangered. However, the Delta Lake Irrigation District is committed to protecting the environment and its inhabitants. All construction drawings will include specifications requiring the contractor to protect existing waterways, vegetation and wildlife from unnecessary disruptions during construction.

5.5 Wildlife Habitat

Hidalgo and Willacy Counties are home to a variety of plant and animal species. The land within the project area is undoubtedly populated by a variety of creatures, particularly due to the proximity of the irrigation and drainage canals. Construction of the proposed improvements will undoubtedly require the relocation of numerous animals into adjacent areas. Despite this fact, wildlife displacement should occur only into immediately adjacent areas. Wholesale movement of animals into significantly removed areas is not anticipated. The following table summarizes the potential impacts that the project may have on wildlife habitat:

Summary of Potential Wildlife Habitat Impacts

Project Component	Construction Area	Open Water Habitat		Jurisdictional Wetland		Woody/Brushy Habitat	
		Increase	Decrease	Increase	Decrease	Increase	Decrease
Reservoir Renovation Project	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Seepage Recovery Pilot Project	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Telemetry and Flow Measurement Project	5.0	0.0	0.0	0.0	0.0	0.0	0.0
Canal Rehabilitation Project	20.5	0.0	1.9	0.0	0.0	1.9	0.0
Total (acres)	39.0	0.0	1.9	0.0	0.0	1.9	0.0

Upon completion of construction, existing vegetation is expected to re-establish the canal flanks through migration inward toward the canal. The canal itself will be maintained more-or-less free of vegetation to promote efficient hydraulics and water conservation. After vegetation is re-established, the project is not expected to have any significant long-term impact on the vegetative character and/or diversity of the area.

5.6 Weather

According to the Texas State Climatologist, Hidalgo and Willacy Counties are considered to have a Subtropical, Subhumid Modified Marine Climate. The weather is characterized by long, hot summers, short mild winters and brief fall and spring transitions. The following is general climatic information obtained from historic data from the U.S. Weather Service weather station located in Raymondville, Texas:

Average Annual Rainfall	27.4 Inches
Average High Temperature	84.3°F

Average Low Temperature	61.7°F
Coldest Average Monthly Low	45.8°F (Jan)
Hottest Average Monthly High	96.8°F (Aug)
Driest Average Month	1.3 Inches (Dec)
Wettest Average Month	5.5 Inches (Sep)

Localized extreme temperatures have varied from the low teens to near 110°F. Daily temperature highs average in the nineties for four full months of the year. The lower valley region has historically experienced periodic droughts of varying extremes.

5.7 Wetlands and Waterways

No significant wetlands or waterways will be unreasonably removed and/or disturbed by the proposed project. Eliminating seepage will remove a water source for plants and animals residing in the vicinity of the canals. However, this source only represents a small portion of the total water sources available in the area. Other available water sources will include rainfall, which exceeds 27 inches per year, water in the remaining irrigation and drainage canals and irrigation water.

5.8 Flood Zones

The proposed alignment lies within the confines of an existing drainage and irrigation system and, as such, is subject to inundation. In light of the fact that the project is being constructed in response to drought, the likelihood of flooding during the construction phase is very improbable.

5.9 Storm Water

The limits of construction will vary in size from approximately ¼ acre to in excess of 20 acres depending on the site. Projects containing disturbed areas larger than one acre in size are subject to *Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES)* requirements. TPDES rules allow construction under the Construction General Permit. Prior to commencing construction, a Storm Water Pollution Prevention Plan will be prepared and a Notice of Intent for will be filed with the TCEQ. Construction will progress in a manner consistent with the Pollution Prevention Plan, utilizing appropriate erosion and sedimentation control measures in locations where negative water quality impacts are possible. Typical temporary control measures may include the installation of silt fences, rock berms and erosion control matting. Permanent erosion control will be accomplished through the re-establishment of a vegetative ground cover. All temporary controls will be inspected on a regular basis to assure effectiveness. Revegetation activities will occur in phases and will commence as soon as construction activity has been completed for individually

defined segments. A *Notice of Termination* will be filed with the TCEQ upon completion of construction.

5.10 Effects of Earthwork on Water Bearing Bodies

The project will disturb the existing irrigation canals proposed within this project. Other than connections to existing canals and reservoirs, no earthwork is proposed on any other creek, stream, river, pond or other water bearing body.

5.11 Public Land

The proposed improvements will be constructed on land owned by the DLID, a public entity created by the state legislature. Despite this fact, the project limits do not include any parks, dedicated greenbelts and/or recreation areas. Several areas of the Las Palmas Wildlife Management Area lie within the District boundaries. However, a visual review by a member of our staff of the Wildlife Management Area maps located at the U.S. Fish and Wildlife office in Alamo, Texas revealed that none of our proposed projects lie within the wildlife management areas.

The District owns and manages a water supply canal (Willacy Canal) and adjacent lands that were renamed the Otha Holland Wildlife Corridor in conjunction with a Cooperative Management Agreement (the "Agreement") between the District and the U.S. Fish and Wildlife Service. This mutually beneficial agreement was signed on June 7, 1990 and was to provide the District assistance in eliminating illegal dumping and trespassing on its land, while preserving and protecting wildlife habitat. In order to maintain the habitat, there are several restrictions on cleaning and maintaining the corridor, but the Agreement does not restrict construction. A copy of the Cooperative Management Agreement is attached as Exhibit 12. The construction area of the *Seepage Recovery Pilot Project* described above will lie entirely within the Otha Holland Wildlife Corridor. The toe drain will be placed in one of the two borrow ditches running parallel to the Willacy Canal to collect subsurface seepage water. A 5 cfs pump house will be constructed on the embankment between the canal and the borrow ditch to return the recovered water back into the canal. Some clearing will be necessary to complete the project, but the District will attempt to minimize the disruption to the wildlife habitat in the corridor. Despite the clearing, no land dedicated to public use (including wildlife management) is expected to be unreasonably impacted by the proposed construction.

5.12 Land Use

Land within the project areas has generally existed as irrigation canals for a number of years. No commercial uses currently exist on the property. No change in the current land use is proposed with this project.

5.13 Farmlands

Since the proposed project consists of improvements to irrigation canals, farmlands surround the sites. Projects are subject to the Farmland Protection Policy Act if they may irreversibly convert farmland (directly or indirectly) to non-agricultural use. The project, as proposed, are not anticipated to have any adverse effects on any agricultural land in the area. Because no impacts are anticipated, no reporting is required under the Farmland Policy Protection Act.

5.14 Historical-Cultural Resources

Exhibit 13 contains the Cameron County listing from *the National Register Information System* of the *National Register of Historic Places*. One hundred thirty three registered sites exist within Hidalgo County and eighteen sites exist within Willacy County. None of the federally listed sites lies within or in close proximity to the project area. Other than the canal and its associated structures, there are no Official State Historical Markers or structures 50 years old or older (built prior to 1952) located within the limits of construction. Modifications to existing canals will occur at a few locations; however, removal or modification of significant existing structures is not anticipated.

The National Park Service maintains a *Native American Consultation Database* (NACD) generally suitable for determining the need for additional investigation associated with compliance with the *Native American Graves Protection and Repatriation Act* (NAGPRA). Exhibit 14 contains information downloaded from the Park Service NACD web site. Review of the information contained in Exhibit 14 revealed that no federally listed Indian Reservations exist within either Hidalgo or Willacy Counties. The *Full Data Report* from the NACD did not indicate any tribal information for either county.

Given that all proposed construction sites have been previously disturbed by irrigation canal construction, the possibility of discovering meaningful intact archeological resources is virtually nonexistent. The *Texas Historic Atlas* lists no known archeological sites within the project area. In the unlikely event any archeological or other culturally significant artifacts and/or structures are discovered, construction activity will cease immediately and appropriate local and state authorities will be notified.

5.15 Air Quality and Acoustic Impacts

Air quality impacts associated with the proposed project are expected to be limited and temporary. Heavy earth moving and shaping equipment will be utilized for construction and will produce combustion exhaust. All equipment will be legal for use within the State of Texas and will comply with any applicable air quality regulations. Earth moving operations are expected to generate dust. Extreme dust generation will be controlled through the use of sprinkling methods. Given the rural location, no significant air quality impacts are expected on any business, residence or public facility.

Construction equipment will produce significant noise during operating hours. Upon completion of the project, noise generation is expected to be limited to that generated by occasional maintenance vehicles. Similar to air impacts, due to the isolated nature of the project, acoustic impacts are expected to be limited and temporary.

5.16 Hazardous Materials

Visual site reconnaissance did not reveal any areas containing signs of potential hazardous material contamination. Interviews with DLID staff did not produce any indication that hazardous materials have been legally or illegally stored within the project area in the past. Should hazardous materials be encountered during construction, mitigative measures will be taken in accordance with all applicable laws. No hazardous materials are proposed to be incorporated into the improvements. Fuel, lubricants and other liquids associated with the operation of construction equipment will be transported, stored, and used in strict accordance with applicable laws.

5.17 Traffic Hazards and Disruptions

The vast majority of construction will occur off-road in an undeveloped area. Despite this fact, transportation of equipment to and from the project site may utilize existing roadways to some extent. No unreasonable traffic delays and/or hazards are expected to occur as a result of transporting equipment and materials. All traffic detours and other traffic handling procedures will be in strict compliance with the *Texas Manual on Uniform Traffic Control Devices*.

5.18 Clearing, Grubbing and Spoil Disposal

Areas within the limits of construction will be initially cleared using equipment generally including tractors and skid-steer loaders. Significant earth work and demolition will be conducted with relatively large-scale excavators. Localized hauling of material will be required to allow cut-and-fill to be balanced for the project, significantly reducing the need to truck-in borrow or truck-out spoil. Trenches will be dug using trenching

equipment. At the commencement of clearing, any existing topsoil will be stripped and stockpiled for use in surfacing finished slopes and grades. Vegetative material will generally be disposed of offsite in a legal manner.

5.19 Obstruction of Scenic Views

No local or state defined scenic views; corridors or facilities are located in close proximity to the project site. The local area does not contain any unique topographic features and therefore, no impact to views, scenic or otherwise, are expected.

6 CONCLUSIONS

Preparation of this Environmental Summary Report utilized information for a wide variety of sources including the TCEQ, the U.S. Census Bureau, the U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, the Texas Historical Commission, the National Weather Service, the U.S. Soil Conservation Service, the Texas Department of Transportation and others. Additional information was collected through visual field reconnaissance and interviews of locally knowledgeable individual. The information collected is sufficient to support the following conclusions:

- The need for the project is real and immediate. No reasonable alternatives exist to the recommended alternatives.
- No short or long term detrimental socioeconomic effects are expected as a result of the project. Socioeconomic impacts are expected to be wholly positive.
- Short-term wildlife habitat disturbance associated with the project will be moderate; however, long-term disturbance is expected to be minimal to none.
- No significant, long-term air, water or vegetative impacts are anticipated.
- No cultural resources will be impacted as a result of the proposed project.

From a regional perspective, the *Water Conservation Improvements Project* is expected to have a positive impact from environmental, cultural and economic perspectives.

EXHIBITS