

**APPLICATION FOR
BUREAU OF RECLAMATION WATERSMART GRANT FOR
WATER AND ENERGY EFFICIENCY FY2023**



**HIDALGO COUNTY IRRIGATION DISTRICT NO. 1
3,900 Linear Foot Main Canal Lining Project**

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Section I. Technical Proposal and Evaluation Criteria

1. Executive Summary

July 12, 2022

Hidalgo County Irrigation District No. 1

Edinburg, Hidalgo County, Texas

The Hidalgo County Irrigation District No. 1 (HCID#1) is located along the Lower Rio Grande Valley Region of Hidalgo County, Texas. The District Boundary encompasses approximately 13,580 acres of which 6,800 are under irrigation used by farmers to grow citrus, vegetables, sorghum, corn and hay, with citrus being the major crop for District lands. The district also delivers water to the City of Edinburg, Santa Cruz Irrigation District, North Alamo Water Supply, Sharyland Water Supply and Hidalgo MUD 1.

Moneys will be sought through Category A, Funding Group II to line 3,900 linear feet of the Main Canal with a geosynthetic composite liner and four inches of fiber reinforced concrete for additional protection. Adding the fiber reinforced concrete material will extend the life of the geosynthetic material past its usual 25-year lifespan beyond 50 years, according to the 10-year Study written by the Bureau of Reclamation. The addition of the liner in combination with the fiber reinforced concrete should remove all present seepage in the canal and is calculated to conserve 5,089 acre feet of water per year. The project will also include the installation of RUBICON metering gates, solar powered monitoring station, and SCADA and will provide more efficient, real-time monitoring and quicker detection of any issues at these points, as well as providing data to determine water loss post project construction. Presently the District requires pumping at the main pumphouse located in Peñitas, Texas to push water throughout the system. The remainder of the system is gravity fed which make the 6 pumps located at this pumphouse account for the main energy consumption of the system. A reduction in water loses will benefit by reducing pumpage and therefore providing an energy saving component to the project.

The project will be constructed on present HCID#1 right-of-way and no part of the construction is located on Federal land.

The project was included as part of the "2021 Rio Grande Water Plan". The upgrades to the district's main canal will result in a water loss savings as well as energy conservation while decreasing seepage losses. Water conserved through this project will remain in the Falcon and Amistad Dams for allocation to other end users in the Rio Grande System. This water savings will also help alleviated the over-allocated water resources from the Rio Grande River shared with Mexico.

The project should be completed in two years. Based on an estimated grant award date the project commencement date being October of 2023 and will be completed by September of 2025.

2. Project Location

The Project is located in southwest Hidalgo County, Texas, within the Hidalgo County Irrigation District No. 1 boundaries. A map of the geographic area showing the project location is included in Figures 1, 2, and 3. Figure 1 shows the district's location within Texas, Figure 2 is the project within the District's Boundary Map and Figure 3 shows the project detail. The project is located in the central portion of the district. The surrounding area includes agricultural land as well as some development.

This project is also located near to the McAllen water plant. The City of McAllen is home to more than 142,210 residents according to the 2020 Census and have plans to upgrade their intake structure to their North Water Plant in the future, which is located in the proposed improvements section. The project will provide a more reliable canal section for this new intake structure.

The location of the project components is shown below:

Table 1 – Project Location

Project Components	Latitude	Longitude
Lining of 3,900 LF of Main Canal	26.278912°	-98.254032°
1 – RUBICON Metering Gates With SCADA	26.278566°	-98.254145°
2 – RUBICON Metering Gates With SCADA	26.282719°	-98.253311°
3 – AGRIFLO Solar Powered Metering Station	26.288155°	-98.249380°

Figure 1 – District Location Within Texas

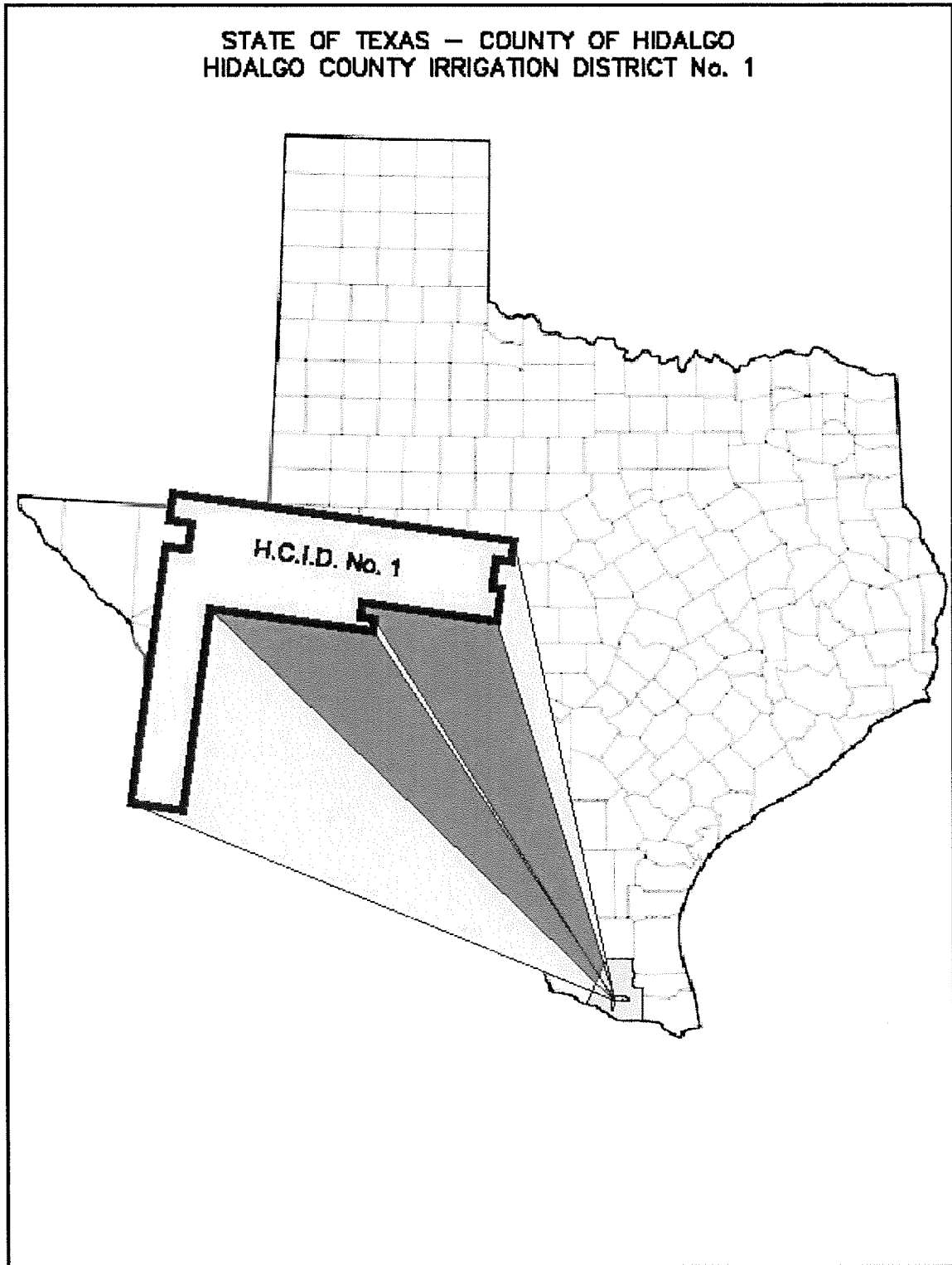
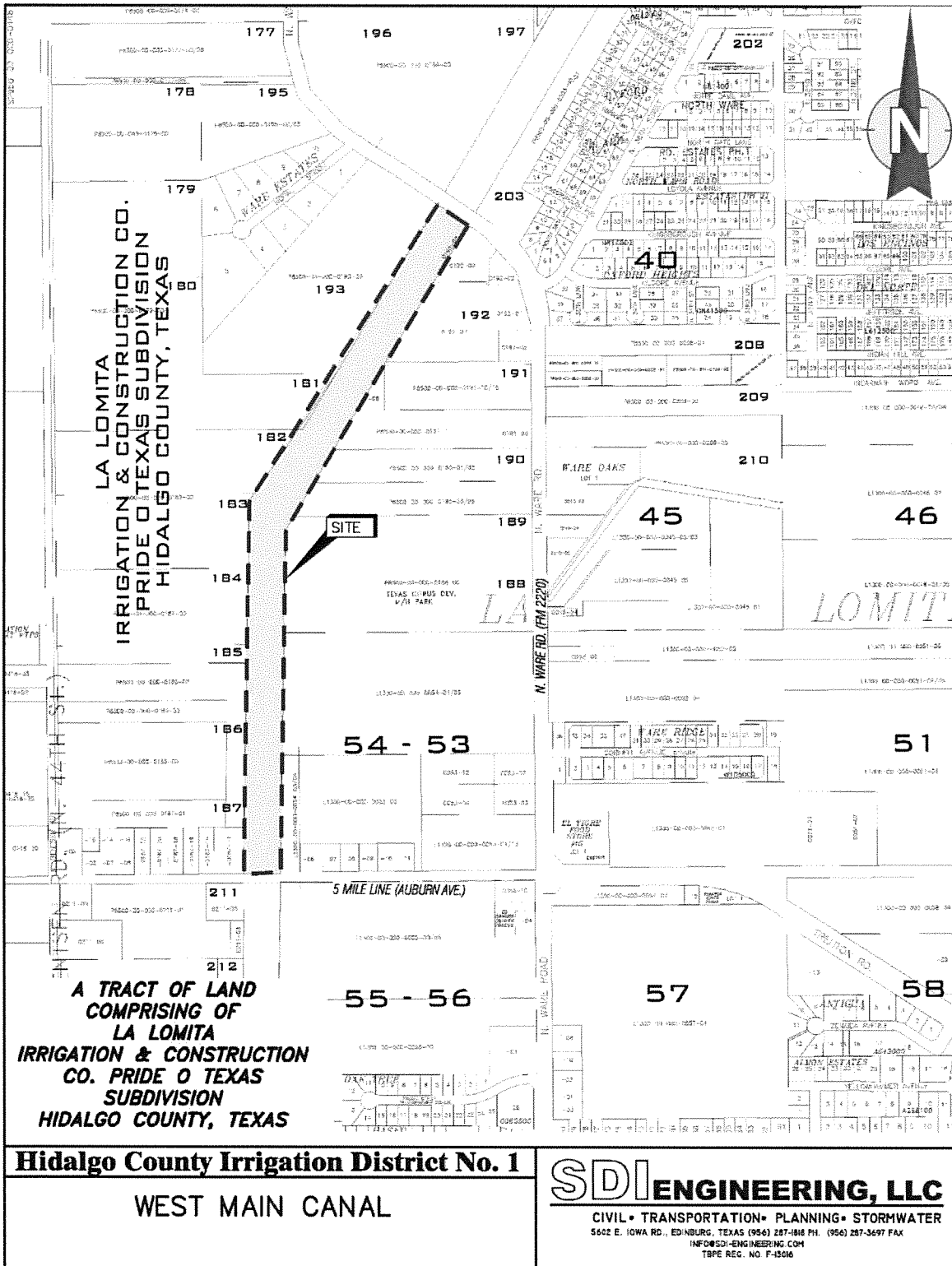


Figure 2 – District Boundary with Project Location



Figure 3 – Detail Project Location



3. Technical Project Description

The Hidalgo County Irrigation District No. 1 provides irrigation water to approximately 6,800 acres of farmland within its boundaries. In addition, the district delivers irrigation water to the Santa Cruz Irrigation District for irrigation and municipal use, North Alamo Water Supply, the City of Edinburg, Sharyland Water Supply, and Hidalgo MUD No. 1 for treatment and distribution to their potable water customers. Citrus, cotton, grain, sugar cane, vegetables and livestock farming are among some of the agricultural customers serviced by HCID#1.

As part of data collected for this grant application, a 5-year water audit was completed of the Hidalgo County Irrigation District No. 1 performed by SDI Engineering, LLC. The audit revealed several significant numbers including the amount of irrigation water being lost in the system prior to delivery and the system's overall efficiency. The water audit was completed on years 2017-2021 revealing that the district diverts an average of 94,025 acre-feet of water per year, of which approximately 54,689.49 acre-feet are for its municipal customers. The study also revealed that the district loses approximately 17,436.78 acre feet per year, while delivering an average of 76,588 acre feet per year to its customers, an efficacy rate of 81.54 % shown in Table 2 below.

Table 2
Water Diversions, Deliveries and Efficiency

CALENDAR YEAR	2017	2018	2019	2020	2021
Water Pumped	98,219	99,531	86,882	92,822	92,672
Annual Rainfall (inches)	19.26	14.61	21.33	27.4	26.58
City of Edinburg (Municipal)	7,728	13,274	9,141	9,662	12,755
Santa Cruz Irrigation District	43,337	42,838	30,376	40,023	32,982
North Alamo Water Supply (Municipal)	2,022	1,819	2,348	1,632	1,681
Sharyland Water Supply (Municipal)	2,987	3,074	4,213	4,247	3,018
Hidalgo MUD 1 (Municipal)	832.13	1077.26	920.89	861.77	596.79
District Irrigation	14,713	20,015	23,590	21,146	30,030
Total Water Delivered	71,619.37	82,096.61	70,589.36	77,572.96	81,063.23
System Losses	26,599.53	17,434.12	16,292.37	15,249.52	11,608.38
System Losses as a % of Water Charged	27.08%	17.52%	18.75%	16.43%	12.53%
Overall System Efficiency	72.92%	82.48%	81.25%	83.57%	87.47%

The proposed project would line an approximate 3,900 linear foot section of the main canal increasing the district's efficiency and conserving water and energy. The proposed project will include the lining of a section of the Main Canal with a geosynthetic composite liner, (Huesker's Canal³® or equal), and four inches of fiber reinforced concrete for additional protection. Adding the fiber reinforced concrete material will extend the life of the geosynthetic material past its usual 25-year lifespan to over 50 years by reducing the UV lights degrading effects. The liner is comprised of a top and bottom layer of nonwovens with a middle polyethylene membrane. The top and bottom nonwoven layers not only provide increased puncture protection, but also increased interface friction. Canal³ is neither affected by changing temperatures or frost which typically causes cracks in concrete lining or by animals which would help reduce blowouts caused by the Nutria population prevalent in this area.

The project will also include the installation of Rubicon metering gates with SCADA at 2 locations and 1 solar powered metering station, allowing the district to monitor post project water losses. The addition of the solar powered metering station will incorporate a renewable energy component to the project by allowing the district to compute the water loss savings post project construction. They will also provide more efficient, real-time monitoring and a quicker detection of any issues as well as providing data to determine the loss of water in the project area, post project construction.

This improvement project was included as part of the "2021 Rio Grande Water Plan". The upgrades to the district's main canal will result in water loss savings as well as energy conservation while decreasing seepage losses. The proposed project is expected to result in annual water savings of 5,089 acre-feet which will remain in the Falcon and Amistad Dams for allocation to other end users in the Rio Grande System. This water savings will also help alleviated the over-allocated water resources from the Rio Grande River shared with Mexico.





3.1 a & b – Mile 5 to Ware Rd. section of Main Canal looking South showing a blowout which happened in May of 2021. Water lost from the canal migrated to the land north of the canal. These events cause extensive water losses for the district as the canal rider must find the blowout when inspecting the canal and could be many hours later after the breach has occurred. The canal lining project will totally eradicate these events from happening and ensure that no water is lost by blowouts in the present earthen section.



3.2 - Mile 5 to Ware Rd. section of Main Canal looking north. The canal section north of the gates begin the earthen portion of the canal. Broken concrete lines this section of canal.

The district has been very successful with other similar projects lining approximately 6.61 miles of their Main Canal in the past 5 years with the same products. Blowouts were completely eliminated in the section of canals that were reconstructed which has resulted in a significant water savings for the district. Through their commitment to improve the system, the district has been able to decrease its water losses in the past years making their system more efficient by decreasing their water losses. The chart below shows the projects the district has completed within the past five year. The first two projects on the list were funded through the State Water Implementation Fund for Texas (SWIFT). A total of 7M dollars in funds were used from the SWIFT program along with funds from the district to complete these two projects. Photos of some of the recently completed projects are shown below.

Table 3
PAST 5 YEARS LINED PROJECTS

PROJECT	MILES
West Main Canal Diversion Point to 10th St.	2.11
East Main Canal 10th St. to Jackson Rd.	1.61
East Main Canal Jackson to Closser	1.68
Taylor Rd.	0.48
Rooth Rd.	0.74
TOTAL	6.61

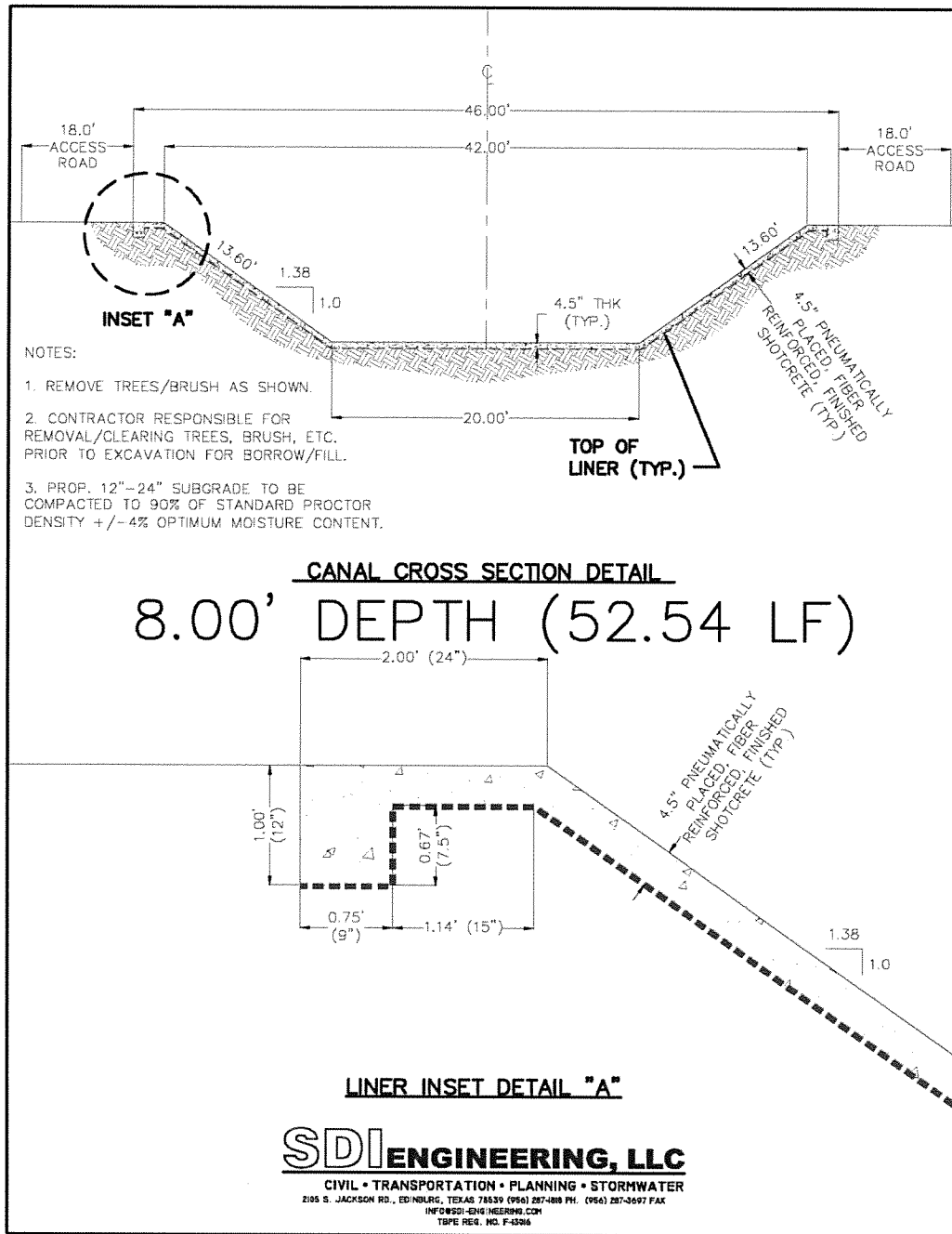


3.3 - Taylor Rd. Canal – This section of canal lining was completed in April of 2022 – The District bid out and contracted for the lining of a .48 mile section of canal with fiber reinforced concrete and Huesker’s Canal³ liner. The project was completed on time and within budget.



3.4 - East Main Canal – The District bid and contracted the lining of a 1.607 mile section of canal with the same proposed materials as this project. This project was completed in July of 2020 on time and within budget. Part of the funding of this project was provided through a Texas Water Development Board SWIFT loan.

Shown below is the typical cross section design for the new canal section.



4.0 – Cross section design of typical section of new canal section including the inset showing concrete placement and liner detail placement.

4. Evaluation Criteria

Evaluation Criterion A: Quantifiable Water Savings

The District’s proposed canal lining projects proposes to increase the system’s efficiency and reliability by conserving water and energy. The proposed project is estimated to conserve 5,089 acre feet of water per year. By including the installation of the 2 metered RUBICON gates, 1 solar powered measuring station and SCADA, the renewable energy component of this project will help reduce energy use as well as greenhouse gas emissions. The metering gates will also provide real-time data to the District’s personnel to increase the efficiency and reliability of water deliveries as well as metered numbers to show the post construction reduction of water loss in this section of canal.

The water losses identified in this project seep into the ground and borrow ditches. Once this water is lost, it is no longer available for any use and there are no known benefits associated with the seepage losses.

A Custom Soil Resource Report of the project area was completed showing that the following soils are present in the project area. Please note that all the soils are well drained and have a capacity to transmit water in the moderately high to high (Ksat) category (0.57 to 1.98 in/hour). The soils around the proposed project transmit water at a high rate further increasing seepage. The full report is found in [Appendix A](#).

**Table 4
Soil Properties**

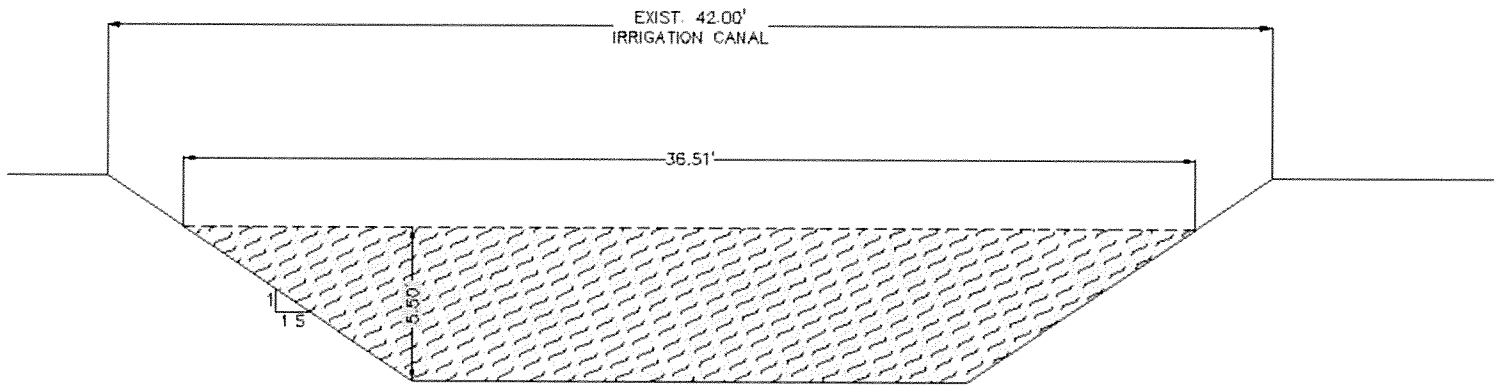
Map Unit Symbol	Map Unit Name	Drainage Class	Capacity to Transmit Water
3	Brennan fine sandy loam, 0 to 1 percent slopes	Well Drained	Moderately high to high (0.57 to 1.98 in/hr)
4	Brennan fine sandy loam, 0 to 3 percent slopes	Well Drained	Moderately high to high (0.57 to 1.98 in/hr)
28	Hidalgo sandy clay loam, 0 to 1 percent slopes	Well Drained	Moderately high to high (0.57 to 1.98 in/hr)
30	Hidalgo sandy clay loam, saline, 0 to 1 percent slopes	Well Drained	Moderately high to high (0.57 to 1.98 in/hr)

To calculate total water savings estimate, calculations for inflow/outflow were conducted on a typical section at the upstream and downstream ends of the project canal section using field measurements and Global Water VV1100 Model FP 211 Flow Probe, shown in Appendix I.

Canal cross sections were measured in the field and these numbers were used to calculate flow. The average water current velocities were then multiplied by their canal cross sectional area measurements. With these two numbers, a manual calculation was made to estimate the inflow and outflow discharge rates in cubic feet per seconds (CFS). The difference between these two discharge rates was the estimated seepage loss total for the canal.

Table 5

Mile 5 Canal Cross Section



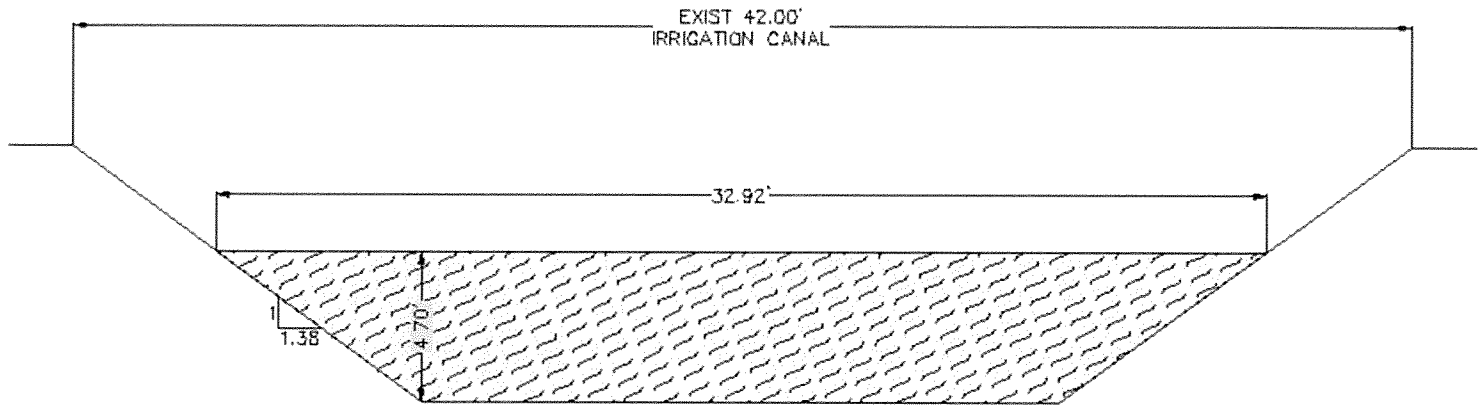
$$\text{Area (A)} = 155.403 \text{ ft}^2$$

$$\text{Velocity (V)} = 1.200 \frac{\text{ft}}{\text{s}}$$

$$Q = 155.403 \text{ ft}^2 \times 1.200 \frac{\text{ft}}{\text{s}}$$

$$Q = 186.48 \frac{\text{ft}^3}{\text{sec}}$$

Ware Rd. Canal Cross Section



$$\text{Area (A)} = 124.362 \text{ ft}^2$$

$$\text{Velocity (V)} = 1.443 \frac{\text{ft}}{\text{s}}$$

$$Q = 124.362 \text{ ft}^2 \times 1.443 \frac{\text{ft}}{\text{s}}$$

$$Q = 179.45 \frac{\text{ft}^3}{\text{sec}}$$

$$Q_{\text{loss}} = 186.48 \frac{\text{ft}^3}{\text{sec}} - 179.45 \frac{\text{ft}^3}{\text{sec}} = 7.03 \frac{\text{ft}^3}{\text{sec}}$$

$$Q_{\text{loss}} = 5,089 \text{ acre-feet/year}$$

From seepage calculations the proposed section of canal incurs losses of 13.94 acre-feet of water per day accumulating to 5,089 acre-feet of water loss per year shown above.

Post seepage losses are expected to be eliminated due to past project performance and the double layer or protection by the use of Husker's Canal³® and the 4-inches of fiber reinforced concrete. The installation of the concrete over the canal liner will further protect the liner from any UV effects extending the life of the canal past the 50-year mark.

Once the project is completed a seepage test will be performed on the newly lined canal to determine the post project seepage reduction in the newly lined section which is expected to be little to none.

Evaluation Criterion B: Renewable Energy

As per EPA numbers, transportation generates the largest share of greenhouse emissions. By the installation of the new metered gates, metering station, and SCADA, the District will be able to monitor the gates remotely and access real-time monitoring and quicker detection of any issues at these points. The District presently obtains this data from canal riders who inspect the canal visually using vehicles to drive to these sites. Multiple employees drive to these locations to inspect flow of the main canal daily. This is done at least two times a day, 365 days out of the year. The installation of metered gates, metering station, and SCADA will measure volumetric flow and canal levels and provide remote data which can be accessed through smartphones or iPads as well as providing the ability to control the gates remotely to adjust canal levels. The remote monitoring will eliminate the need for fossil fuel powered automobiles presently used for visual inspection and manual adjusting of the gates.

The metered gates and SCADA will also produce a savings in vehicle miles driven, which will reduce greenhouse gas emissions. Prior to this project the canal riders would visit the site at least twice a day for inspection and possible adjustments. The ability to access data instantaneously without the need to visit the canal location is estimated to save a total of 8,927.754 Metric Tons of greenhouse gas emissions per year which will be removed from the atmosphere as a result of this project. The greenhouse gas emission calculations are available in [Appendix B](#).

The main Peñitas pumphouse serves as the District's diversion pumping station for the entire system. The pumphouse houses six Fairbanks Morse model 36-inch 5811 pumps. The yearly energy savings generated by this project is 194,692 kWh. The energy savings was calculated at the Peñitas pumphouse point of diversion from the Rio Grande River. The pumps at this location divert water from the Rio Grande River into the District's irrigation system. The energy savings was generated by calculating the cost of energy consumption at the pumphouse for the last 5 years and dividing it by the total acre feet of water diversions. This figure is then multiplied by the total water savings of 22,284 acre-feet for this project. The total energy savings for this project equals \$25,284.16 per year in cost savings shown in [Appendix C](#).

Evaluation Criterion C: Sustainability Benefits

The District provides irrigation water for potable water use to the City of Edinburg, Santa Cruz Irrigation District, North Alamo Water Supply, Sharyland Water Supply and Hidalgo MUD. With deliveries to these entities being an average of 54,689.49 acre-feet per year in the past five years.

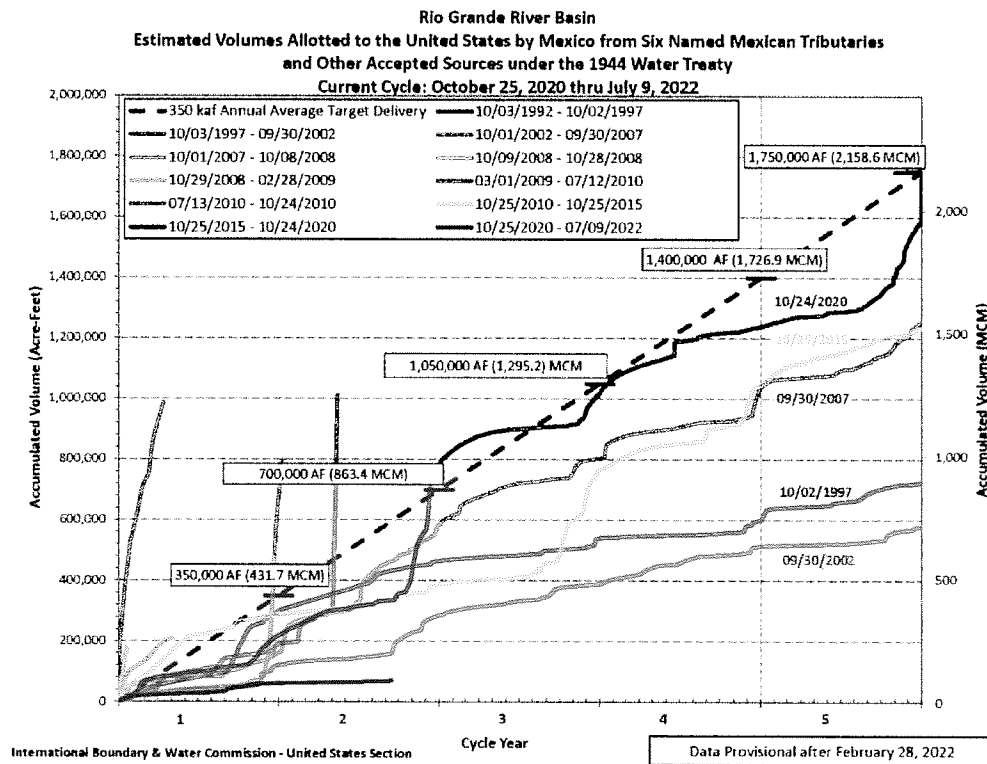
As the Rio Grande valley is subject to drought conditions a reliable source of water is critical to the area. The most recent drought in the Rio Grande Valley began in the fall of

2010 and lasted through the winter of 2014/2015 which taxed water allotments in the Rio Grande River.

In addition, all water in this region is supplied by the Lower Rio Grande River and the water is shared with Mexico as set out in the 1944 Water Treaty. In this treaty Mexico and the United States have an obligation to deliver a set amount of water to the Lower Rio Grande River but there have been many times where Mexico has failed to fulfill their five-year water commitments and have not complied with the 1944 Treaty. One such time was during the last drought when Mexico withheld its share of water which it should have released into the Rio Grande, making the situation more dire for local farmers.

The combination of drought and Mexico’s failure to fulfill their water commitments together can have a catastrophic effect on the Rio Grande Valley, therefore water conservation is key to this area. The table below depicts the last two year’s delivery of water by Mexico into the Rio Grande River. As you can see from October of 2020 to July of 2022 as depicted by the black line, Mexico’s deliveries have been far below their required allotments.

Figure 5 – 2020 to 2022 Mexico’s Water Allotments



In addition, the water storage at Falcon and Amistad Dam’s is presently extremely low and below conservation capacity as shown on the following graphs.

Figure 6 Falcon Reservoir 2022 Levels

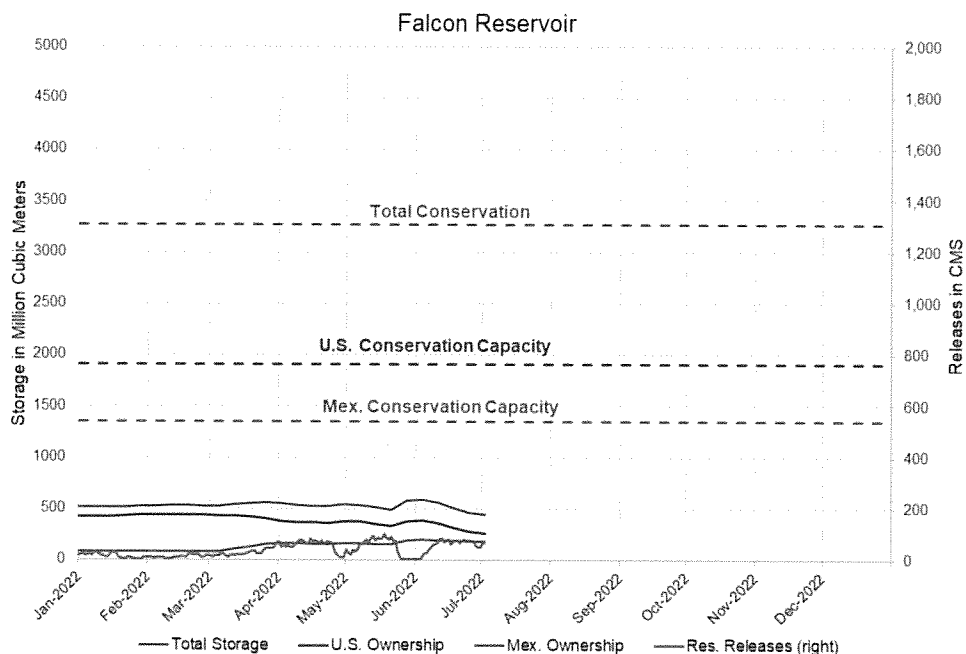
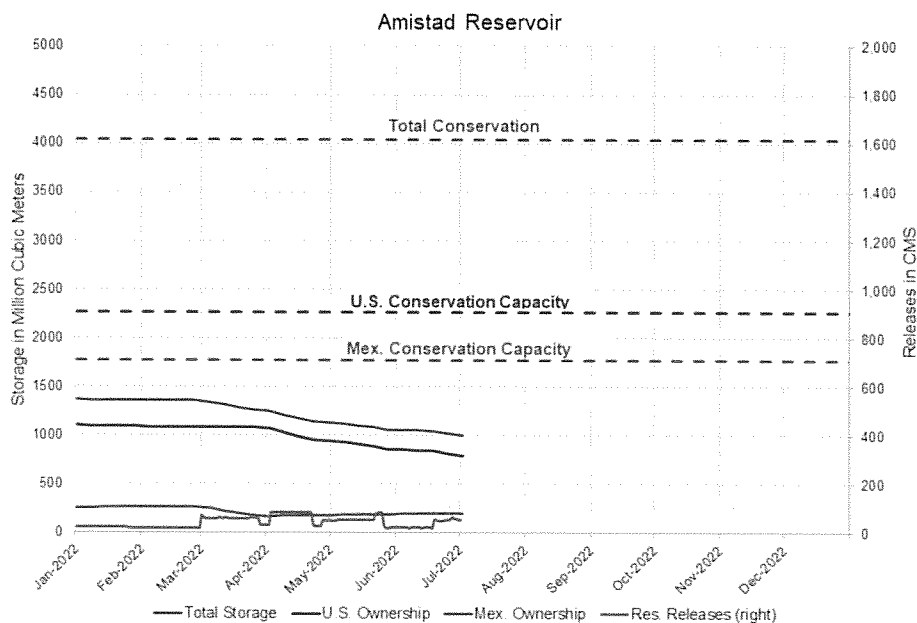


Figure 7 Amistad Reservoir 2022 Levels



A combination of these two factors can have an extremely negative affect to both the agricultural and municipal water users of the valley, but especially to the agricultural water allotments as municipal water rights are prioritized and agricultural water rights prorated during supply shortages. According to the Region M Water Plan, when agricultural

shortages occur, costs to the local economy have been estimated to be about \$135 million and a loss of 4,130 jobs annually.

This occurred in 2009, when drought resulted in the interruption of water diversions for some irrigation districts with lesser water rights, which caused a 49% loss of acreage and \$19 million in losses for farmers in parts of the Rio Grande Valley. These adverse economic impacts would have environmental justice implications as well, since the Rio Grande Valley is home to a disproportionate number of persons living below the poverty levels compared to the rest of Texas. Poverty levels in Hidalgo County are 28.4% versus 12.9% in the rest of the State, and 40% of children are living in poverty. The county's per capita income is \$17,816 versus the State average of \$32,177 (*Census Reporter*).

According to the Lower Rio Grande Basin Study conducted by the US Department of the Interior, Bureau of Reclamation and the Rio Grande Water Authority in December of 2013, a climate-affected future supply of water indicates an expected shortfall of over 300,000 acre-feet for municipal demands by the year 2060. This estimates that the municipal water rights would be available, but at the expense of agricultural rights. The reduction of irrigation flows also has serious impacts to the delivery of water to municipalities due to the need for push water. Climactic changes, combined with risks of Mexico's inability to meet obligations under the water treaty poses a significant reliability risk in the future.

The water savings for this project will alleviate the need for additional push water. Push water refers to the water needed to overcome transportation losses, including seepage and evaporation throughout the system to deliver water from the pumping station to the user. Push water losses presently are passed on as a charge to its customers. As per the water audit performed by SDI Engineering for the years 2017 to 2021, shown in Table 2, water losses in the system are estimated to be 18.46%. The District diverts an average of 94,025 acre-feet of water per year, and delivers an average of 76,588 acre-feet, making efficiency of the system 81.54%. During the drought of 2010-2015, municipal water rights were sold for as high as \$2,500 per acre-foot. Although the construction of this project is to conserve water, it will also benefit the district's municipal customers, especially during periods of drought.

In addition to the municipal customers, the US Fish and Wildlife Service holds a substantial amount of water rights in the Lower Rio Grande Valley. The water is used in the wildlife refuges here in the valley to manage and restore critical habitat, especially that of the Ocelot which has been an endangered species here in the Rio Grande Valley. Today only an estimated 50 ocelots remain in the United States therefore the breeding population at the Laguna Atascosa National Wildlife Refuge in the valley is an important part of the breeding program. As saved water will remain in the Falcon and Amistad Dams, the water will be available for other water users including these Refuges.

C.1 – Combating the Climate Crisis

The project will conserve water in the Lower Rio Grande Valley Watermaster System which is taxed by the factors described above. The savings will increase water available to other users.

In addition, greenhouse gases will be reduced by a total of 8,927.754 metric tons per year as shown in Appendix B. As explained in Criterion B the reduction in trips to the site through the installation of powered gates, SCADA and the solar powered monitoring station will not only reduce greenhouse gas emissions but establishes a renewable energy source.

C.2 – Disadvantaged or Underserved Communities

The project will benefit rural and disadvantaged communities by increasing the reliability of water supplies in these communities. The District presently sells water to the Santa Cruz Irrigation District who in turn sells water to North Alamo Water Supply Corporation (NAWSC) which services rural areas with potable water. The water sold to NAWSC will be used at their plant in the far northern area of the Rio Grande Valley. As previously explained, the Rio Grande Valley is home to a disproportionate number of persons living below the poverty levels compared to the rest of Texas.

C.3 – Tribal Benefits

There are no tribal benefits expected from this project.

C.4– Other Benefits

(a) The project will directly benefit agriculture and municipal users by making more water available to them through savings established by this project.

(b) In the 2013 Lower Rio Grande Basin Study was completed in cooperation with the USBR and the Rio Grande Regional Water Authority (RGRWA). According to the Texas Project for AgWater Efficiency quoted within the report, “as much as 80% of all agricultural conservation in the Lower Rio Grande Valley occurs within irrigation conveyances.” Conservation was one of the management strategies resulting in the largest amount of water savings when compared to other strategies.

© This project conserves water through the increased efficiency of the system’s water conveyance system while decreasing seepage and water loss in the project area making additional water available for other water users in the Rio Grande Valley.

(d) As previously discussed, the drought situation and Mexico’s inability to fulfill their water allotments to the Rio Grande River taxes the water available to users on the US side of the border. The water savings achieved by this project will provide additional water to the Rio Grande River for US water users.

Evaluation Criterion D: Complementing On-Farm Irrigation Improvements

The proposed project will complement on-farm drip-irrigation as well as other farm methods of watering. The implementation of the proposed project will allow more constant canal levels due to the decrease in seepage losses and increase the efficiency of the system by increasing the canal level to provide improved gravity irrigation. The increased head pressure and loss-free conditions will also enable automating water distribution over the irrigated farm area.

In the 2013 Lower Rio Grande Basin Study it was noted that “approximately 50% of the area experiences insufficient head”. Head loss related to push water can make it difficult to deliver irrigation water evenly over the span of a field no matter what irrigation methods are used.

Farmers implementing on-farm improved watering methods such as micro-irrigation, low-energy precision applications (LEPA), and high-frequency drip irrigation will benefit from the improvements to the system by creating a more constant, supply of water and will allow producers to take advantage of more efficient on-farm systems.

The District is ready to assist any farmers requesting technical or financial assistance through grants for the implementation of on-farm efficiency improvements.

Evaluation Criterion E: Planning and Implementation

Subcriterion E.1 – Project Planning

The latest Region M, 2021 Rio Grande Regional Water Plan adopted by the regional water planning group and TWDB identified that 85 percent of the water that is used in the Rio Grande system in Region M is carried by the irrigation districts. Therefore, conservation at this level will have a measurable and beneficial impact. Within this report the following items among others, were listed as Potentially Feasible Water Management Strategies:

- A. Irrigation District Improvements/Conservation, (ES.4.1.1 and Section 5.2.1.1), “ID conservation strategies include canal lining (new linings and replacement of damaged linings, metering and controls, including installation of automated system controls, meters and supervisory control and data acquisition (SCADA) systems where implementation leads to a measurable systems gains”;... “specifically “improvements to reduce loss of water by canal lining and repair of canal lining, and general repairs and improvements”; and*
- b. On-Farm Irrigation Conservation, (ES.4.7), The Planning Group in this section addresses and recommends among others, improvements to water district delivery systems, conveyance infrastructure improvements metering and telemetry. The referenced pages of the report are shown in Appendix D.

The district has shown a history of improvements to their system as noted in the table of projects completed in the past five years. The HCID#1 has a Water Conservation Plan which is included as Appendix E.

Subcriterion E.2 – Readiness to Proceed

The District will be ready to proceed with the project upon award and entering into a funding agreement with the Bureau of Reclamation. Once all documents have been signed, construction can begin upon approval of any environmental compliance.

The chosen contractor will provide a Storm Water Pollution Prevention Plan (SWP3) for this project which will be reviewed by the project engineer. All environmental requirements will be met resulting from consultation with the US Fish and Wildlife Services, Texas Parks and Wildlife Department, Texas Commission on Environmental Quality and the Texas Historical Commission.

Table 5 includes the Milestones and Schedule of Expenditure as well as a breakdown of the Bureau of Reclamation’s share of the cost. The schedule assumes October 1, 2023 as the date for the agreement with the USBR and project completion within 2 years of the agreement, and approval of environmental documents.

Table 6

Milestones and Scheduled Expenditures

REPORTING PERIOD	MILESTONES	TOTAL COST	USBR SHARE
October 1, 2023 to December 31, 2023	Enter into Agreement with BOR Environmental Review and Permitting Complete (100%)	\$ 102,461.79	\$ 51,230.89
January 1, 2024 to May 31, 2024	Design Surveying and Geotechnical Investigation (100%) Engineering Design (100%)	\$ 461,078.06	\$ 230,539.03
June 1, 2024 to December 31, 2024	Bid Canal Lining Project and Award to Successful Bidder Construction of Canal Lining Improvements (50%)	\$ 2,254,159.38	\$ 1,127,079.69
January 1, 2025 to July 31, 2025	Construction of Canal Lining (100%) Post Lining seepage test performed	\$ 2,254,159.38	\$ 1,127,079.69
August 1, 2025 to September 31, 2025	Final Report to BOR	\$ 51,230.90	\$ 25,615.45
PROJECT TOTAL		\$ 5,123,089.51	\$ 2,561,544.75

Evaluation Criterion F: Collaboration

Any water conservation project will benefit all other water users in the Rio Grande Valley, therefore it is to the benefit of all other users.

Letters of support are provided in Appendix G. The North Alamo Water Supply, Texas Citrus Association, Sharyland Water Supply Corporation, and the Santa Cruz Irrigation District 15 have provided letters of support for the project and will benefit from this project.

Evaluation Criterion G: Additional Non-Federal Funding

The District proposes to fund 50% of the project. The Non-Federal estimated portion for the project is shown below:

Non-Federal Funding	=	\$2,561,544.75
<hr/>		
Total Project Cost	=	\$5,123,089.51

Evaluation Criterion H: Nexus to Reclamation

USBR has been instrumental by providing financial assistance to many conservation projects. The “Lower Rio Grande Basin Study” completed in 2013 by the Rio Grande Regional Was Authority (RGRWA) and USBR references the 2010 Rio Grande Regional Water Plan for Region M. These plans show that irrigation conveyance system improvements will result in the largest savings in water compared to the other water conservation strategies mentioned. The proposed project is one of these projects.

This project will benefit other users by the savings of water which will be made available to other water providers in the valley. This project is tied to reclamation as water typically lost through seepage and canal blow outs will be made available for use instead of being lost in the system.

There is no tribal benefit expected by this project.

5. Performance Measures

Once the project is completed a seepage test will be performed on site measuring flow at various sections of the canal. Water current velocities will be collected using the same method as before. The new canal sections will be measured prior to releasing water into the newly constructed sections which will allow for more accurate readings and the measurement of current water velocities at the beginning and end of the project. A total of 3 cross section locations will be measured and water currents velocities will be taken

at these same three locations. The average water current velocities will be multiplied by the corresponding canal cross section measurements. We can then estimate the inflow and outflow of the constructed canal section manually in cubic feet per seconds (CFS). The difference between these two numbers will provide the seepage loss total for the project area.

Additionally, data will be collected for electrical and natural gas usage at the pumping station post project construction and will be quantified versus the prior year’s usage for the same time period. Savings will be calculated from the difference shown on the two readings.

The District will also continue recording the total water obtained from the Rio Grande River and total sales to their water customers and maintain calculations of annual water losses within the system building on the performed water audit.

The performance of the new system will be provided as part of the final report to the USBR.

6. Project Budget

A. Budget Proposal

The total cost of the project is estimated at \$5,123,089.51. The table below shows totals to be paid by each party. The District’s portion of the project represents 50% of the total budget considering the USBR portion of \$2,561,544.75. There are no other 3rd party contributors to the project.

Table 7

TOTAL PROJECT COSTS	
SOURCE	AMOUNT
Costs to be reimbursed by USBR	\$ 2,561,544.75
Costs paid by applicant	\$ 2,561,544.76
Value of 3rd party contributions	\$ -
TOTAL PROJECT COSTS	\$ 5,123,089.51

The Budget Proposal is outlined below in Table 8 and described in the Budget Narrative.

Table 8
Proposed Budget

BUDGET ITEM DESCRIPTION	UNIT	QUANTITY	COST / UNIT	TOTAL COST
SALARIES AND WAGE				\$0.00
FRINGE BENEFITS				\$0.00
TRAVEL				\$0.00
EQUIPMENT				\$0.00
CONTRACTUAL CONSTRUCTION				
<i>Lining of Main Canal</i>				
Site Preparation and Bypass Installation	STA	25	\$ 85,000.00	\$ 2,125,000.00
Fiber Reinforced Concrete	SF	196,758	\$ 9.50	\$ 1,869,197.87
Geosynthetic Canal Liner Installation	SF	233,123	\$ 2.75	\$ 641,088.72
Dewatering	LS	1	\$ 350,000.00	\$ 350,000.00
Sediment Removal/Canal Excavation & Grading	STA	25	\$ 15,000.00	\$ 375,000.00
Monte Cristo Cleaning/Repair of crossing	LS	1	\$ 65,000.00	\$ 65,000.00
Field Gates	EA	1	\$ 7,500.00	\$ 7,500.00
Steel Trash Grates	EA	2	\$ 15,000.00	\$ 30,000.00
Rubicon Metering Gates	EA	10	\$ 31,730.00	\$ 317,300.00
Agriflo Doppler with Antenna and Solar Panel	EA	1	\$ 12,000.00	\$ 12,000.00
Road Access and All Weather Drives	LS	1	\$ 2,250.00	\$ 2,250.00
Traffic Control	LS	1	\$ 25,000.00	\$ 25,000.00
SWPPP & Erosion Control Devices	LS	1	\$ 40,000.00	\$ 40,000.00
SCADA	LS	1	\$ 30,000.00	\$ 30,000.00
Total Contractual Construction				\$ 3,764,336.58
DISTRICT PURCHASED MATERIAL				
Geosynthetic Canal Liner	SF	233,123	\$ 2.00	\$ 466,246.00
Installation Support	LS	1	\$ 7,500.00	\$ 7,500.00
Total Material				\$ 473,746.00
Total Project Construction				\$ 4,238,082.58
CONTRACTUAL PROFESSIONAL SERVICES				
Engineering	@	9.50%		\$ 402,617.85
Project Management	@	2.50%		\$ 105,952.06
Surveying	@	2.00%		\$ 84,761.65
Inspection	@	2.00%		\$ 84,761.65
Materials Testing	@	1.50%		\$ 63,571.24
Geotechnical	@	1.00%		\$ 42,380.83
Subtotal				\$ 784,045.28
OTHER				
Environmental and Cultural Compliance	@	2.00%		\$ 84,761.65
TOTAL DIRECT COSTS				\$ 5,106,889.51
Indirect Costs	@	10.00%		\$ 16,200.00
TOTAL ESTIMATED PROJECT COSTS				\$ 5,123,089.51

B. Budget Narrative

The proposed cost for the project was developed using bid tabulation figures from several different projects within the District. The figures came from other canal lining projects that the District has bid over the past two years. Due to the unpredictable cost of gasoline at this time costs were increased between 5-10% to account for any changes that may occur from now to project bidding.

The District plans to purchase the canal liner directly from the manufacturer to maximize any savings and provide the liner to the contractor for installation. The District has been successful in providing a savings on past projects by purchasing the liner directly and then having the contractor charge for the installation costs only. The cost of the liner was based on the most current cost obtained from the last project and a 10% increase to account for any price changes. Since the cost of manufacturing of the liner has a direct correlation on gas prices, gasoline price escalations will affect the cost of the liner in either manufacturing or transportation costs.

The project construction of the main canal from Mile 5 to Ware Rd. includes a section of canal that is 3,900 feet long by 42 feet wide. The total amount of liner would require the lining of 52.54 feet total area accounting for the area of liner required to be installed into the ground, along with the top area on each side. Since the liner manufacturer can only produce rolls which are 25-foot wide, adjustments had to be made in order to allow for seam allowance and waste. The total calculated area of material equals 233,123 square feet, which includes a 1.5% increase for waste and seam allowance. Material will be ordered in rolls 18-foot and 25-foot wide for the canal lining. The cost of the liner was estimated using a cost of \$2.00 per square foot based on the criteria described above taking the possible inflation of cost into account. As part of the contract the manufacturer will provide technical support by visiting the site at the beginning of the project and instructing the selected contractor in the proper installation of the material as well as any other on-site visits as required for a cost of \$7,500. The total cost estimation of the liner is \$473,746.00. The total cost of installation by the contractor is \$2.75 per square foot for a total of \$641,088.72. The total cost of liner and installation is estimated at \$1,114,834.72.

The fiber reinforced concrete was estimated to be \$9.50 per square foot including installation. The area to be covered in concrete is 196,758 square feet. The cost per square foot estimated is \$9.50 per square foot for material and installation. The total cost of the concrete material and installation is \$1,869,197.87. Please note that all costs were derived based on various bids received by the District within the past 2 years and the criteria for price increase described above.

The installation of the metered Rubicon Gates and solar powered monitoring station were estimated using past cost proposals and adjusting for inflation as described in the first paragraph above for a total cost of \$329,300.

All other project components were derived from previous construction contracts plus an addition for the increase in prices that is expected.

The total cost for the project construction including all other components is \$4,238,082.58

The Budget Proposal also includes Engineering and other professional services. The cost of these is based on a percentage of the total construction cost above.

SDI Engineering is the District's Engineer and will design the canal and provide plans and specifications for the project as well as assisting with bidding. The cost is 9.5% of the project's construction cost of \$4,238,082.58 for a total of \$402,617.85.

SDI will also provide project management and perform daily inspections of the project to ensure compliance with the plans and specifications by the contractor. The cost for project management (2.50%) and inspection services (2.00%) is \$190,713.71.

Cost of Materials testing will be performed by a testing lab contracted by the District at an estimated cost of \$63,571.24 which is 1.5% of the total construction total.

Geotechnical costs are based on 1% of the construction total for a total amount of \$42,380.83 and include subsurface testing providing information which will be included in the bid package disseminated to prospective bidders.

The total cost of contractual professional services is \$781,045.28.

The District will not participate in any part of the work aside from the administration of the contracts and payment of services approved by both the Engineer and the District.

Environmental and Cultural Compliance is estimated at 2% of the construction totaling \$84,761.65. This includes any costs USBR will retain for its portion of the work. There are no environmental concerns regarding the project as all construction will be done within existing District right-of-way. The Texas Historical Commission will provide a review of the project as well as an archeological report on the history of the canal.

The District proposed to charge indirect costs at a de minimus rate of 10% of the modified total direct costs. There are 7 total contracts associated with this project. They are: Installation of canal liner and fiber reinforced concrete, geocomposite canal liner, solar powered monitoring station, metering gates and SCADA, engineering, surveying, and

materials testing and geotechnical. Each contract is expected to be over \$25,000 except for the solar powered monitoring station; therefore, the indirect costs of 10% of each contract, up to the first \$25,000 amounts to \$16,200.

The total project budget is \$5,123,089.51

Material component information is attached in Appendix F.

There are several construction components contracts to this project. Any contract expected to exceed the \$25,000 limit will be bid out by the District with the exception of professional services contracts which do not fall under the State Purchasing and General Services Act.

B.1 Funding Plan and Letters of Commitment

The District sold 3,000 acre-feet of water to the City of Edinburg in 2021. The District received proceeds of \$9,000,000.00 from this sale. The non-federal share of the project's budget will be funded by the proceeds from the sales of water rights to the City of Edinburg. As mentioned previously, there are no third-party source of funds. There are no project pre-award costs.

B.2 Letters of Project Support

The Texas Citrus Mutual Association, North Alamo Water Supply Corporation, Santa Cruz Irrigation District No. 15, and Sharyland Water Supply Corporation have provided letters of support for this project. These letters are included in Appendix G.

B.3 Official Resolution

The District considered the Resolution at their regular meeting of May 26, 2022. The signed Resolution as well as Meeting Minutes is included in Appendix H.

B.4 Conflict of Interest Disclosure Statement

The District has no actual or potential conflict of interests.

B.5 Restrictions to Lobbying

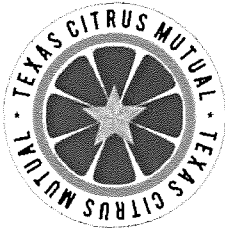
The District does not participate in any lobbying activities.

B.6 Uniform Audit Reporting Statement

The District was not required to submit a Single Audit report for the 2021 fiscal year.

The award of the grant will help with the District's commitment to improve their water conveyance system in order to save as much water as possible and improve water deliveries to their customers.

APPENDIX G
LETTERS OF SUPPORT



TEXAS CITRUS MUTUAL

July 20, 2022

Mr. Josh German
Program Coordinator
Bureau of Reclamation
P.O. Box 25007, MS 84-27133
Denver, CO 80225

RE: Letter of Support for Hidalgo County Irrigation District No. 1 Grant Application to the U.S. Bureau of Reclamation, WaterSMART: Water and Energy Efficiency Grants for fiscal year (FY) 2023

Dear Mr. German:

The Hidalgo County Irrigation District No. 1 (HCID#1) is applying for funding under the Bureau of Reclamation, WaterSMART Water and Energy Efficiency Grant for FY2023. HCID#1 is proposing to line a section of their Main Canal with geomembrane and concrete, which will help meet the irrigation demand in Hidalgo County.

The Texas commercial citrus industry is totally located in the Lower Rio Grande Valley, with about 85% of the acreage in Hidalgo County. The total economic impact in the state tops \$460 million annually with the demand for irrigation water being high on the list of priorities for all farmers.

Projects conserving water will help sustain the Texas citrus industry in South Texas. As such, Texas Citrus Mutual supports the project proposed by HCID#1 and recommends funding.

Respectfully,

Dale Murden
President and Grower
Texas Citrus Mutual



Jack Wallace, Jr. President

W.J. "Jud" Flowers, Vice President

Bryan Rowland, Secretary

Nowell Borders, Director

John Prukop, Director

July 14, 2022

Mr. Josh German
Program Coordinator
Bureau of Reclamation
P.O. Box 25007, MS 84-27133
Denver, CO 80225

RE: Letter of Support for Hidalgo County Irrigation District No. 1 Grant Application to the U.S. Bureau of Reclamation, WaterSMART: Water and Energy Efficiency Grants for fiscal year (FY) 2023 – Funding Group II

Dear Mr. German,

The Santa Cruz Irrigation District 15 supports the Hidalgo County Irrigation District No. 1's efforts to conserve water through projects which increase the efficiency of their water conveyance system.

Through the District's continued efforts to line their irrigation canals water losses have been decreased. The quantifiable water savings of these projects help decrease the demand on the limited water resources in the area making additional water available for other water suppliers.

As such, the Santa Cruz Irrigation District 15 supports the canal lining project proposed by the Hidalgo County Irrigation District No. 1 and recommends funding for this project through a grant award from the WaterSMART program.

Respectfully,


Jose A. Hinojosa
General Manager
Santa Cruz Irrigation District

SANTA CRUZ IRRIGATION DISTRICT NO. 15
P. O. Box 599 Edinburg, TX 78540 - Physical address: 601 E. FM 2812 Edinburg, TX 78539

phone 956 - 383 - 3441

**APPENDIX H
RESOLUTION**

RESOLUTION AUTHORIZING SUBMISSION OF A GRANT APPLICATION TO THE BUREAU OF RECLAMATION FOR FISCAL YEAR (FY) 2023; AUTHORIZING A SIGNATOR FOR THE APPLICATION AND APPROVING AND AUTHORIZING ALL OTHER INSTRUMENTS AND PROCEDURES RELATED THERETO

STATE OF TEXAS §
COUNTY OF HIDALGO §
HIDALGO COUNTY IRRIGATION DISTRICT NO. 1 §

WHEREAS, the **HIDALGO COUNTY IRRIGATION DISTRICT NO. 1**, (The “District”) is an irrigation district created within Hidalgo County, Texas in 1922 and is operating pursuant to Article 16, Section 59 of the Texas Constitution, Chapters 49 and 58 of the Texas Water Code, as amended, and other applicable laws of the State of Texas; and

WHEREAS, the Board of Directors of the District deems it necessary and advisable to make improvements to its irrigation water distribution system (the “System”), which are more specifically described in an application (the “Application”) submitted to the Bureau of Reclamation, for the benefit of conserving water and making improvements to its irrigation water conveyance system; and

WHEREAS, in the Application to the Bureau of Reclamation, the District requests financial assistance through the WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2023, to finance a portion of the design and construction of relining and internment of canals at identified sections of the Main Canal; and

WHEREAS, the District will provide a minimum of 50% match of total project costs as part of their portion of the project; and

WHEREAS, the District will work with the Bureau of Reclamation to meet all established deadlines for entering into a grant; and

WHEREAS, in order to fund the Project the Board of Directors of the District finds and declares a public purpose and deems it advisable and in the best interest of the District to submit an application for Grant Funding.

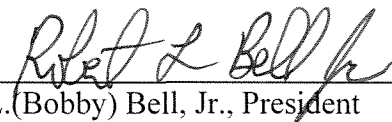
THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF HIDALGO COUNTY IRRIGATION DISTRICT NO. 1 THAT:

SECTION 1. That the District Manager or his designee is hereby authorized and directed to sign and file, for and on behalf of the District, a WaterSMART: Water and Energy Efficiency Grant Application for Fiscal Year 2023 from the Bureau of Reclamation for the purpose of the design and construction of the relining of identified section of the Main Canal; and

SECTION 2. That the Board hereby agrees and further does authorize the aforementioned representative or his designee to certify that the District has and will comply with all statutory and regulatory requirements related to any grant funding contracts.

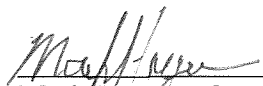
BE IT FURTHER RESOLVED, that the District Manager or his designee is hereby authorized to negotiate and execute a grant, documents, and any amendments on behalf of the District, and perform all reasonable and necessary action in support of the application, and if approved by the Bureau of Reclamation, to perform the terms and conditions of the award of money from the Fund.

**HIDALGO COUNTY IRRIGATION DISTRICT
NO. 1**



R.L.(Bobby) Bell, Jr., President

ATTEST:



Mark J. Fryer, Secretary