



Notice of Funding Opportunity No.: R23AS00076  
Funding Program: WaterSMART: Water Recycling and Desalination Planning  
Project Name: Port Isabel Seawater Desalination Treatment Facility  
Applicant: Laguna Madre Water District (LMWD)  
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## Section 1: Executive Summary

Date: February 2023

Applicant Name and Project Location: Laguna Madre Water District, Port Isabel, Texas, Cameron County

**Project Summary:** The proposed work is to complete a feasibility study for a seawater desalination water treatment facility in the City of Port Isabel, Texas. The Texas State Water Plan includes a potable water reuse project as well as a seawater desalination water treatment facility project by Laguna Madre Water District (LMWD or District) as part of the water management strategy. LMWD has already completed an approved feasibility study from the Bureau of Reclamation for the potable water reuse project and this work will focus on completing and seeking approval from the Bureau of Reclamation on a feasibility study for the seawater desalination water treatment facility project identified in the state water plan. LMWD is aware of the Bureau of Reclamation's requirements under their WTR 11-01 Directives and Standards for Feasibility Studies and will follow these guidelines during the development of the study. The proposed activities under this work include planning activities, preliminary design, and environmental compliance activities required to develop the necessary information to pursue the future design and construction of a seawater desalination water treatment facility to serve the water demands of LMWD.

The District maintains its own water supply system from the Rio Grande to two existing water treatment plants that provide water to a total service area of 36,429 acres. The authorized amount for LMWD of municipal water rights from the Rio Grande is 7,696 acre-feet which is reduced to 5,946 acre-feet under drought conditions. There are two reservoirs in the area, Falcon and Amistad that are fed from the Rio Grande and when those two reservoirs combined balance is less than 50% capacity, the District authorized amount increases/decreases by 145.8 acre-feet per year for each percentage change +/- in capacity. Considering that the sole source of water supply for the District is the Rio Grande, the variability of water available during periods of drought, and the District's proximity to the Gulf of Mexico with hurricanes being the most frequent natural hazard affecting the area, a need for diversifying the water supply in this region is critical to ensure a resilient capability to deliver water safely to its customers.

**Project Duration and Estimated Completion Date:** The proposed Feasibility Study for this Port Isabel Seawater Desalination Water Treatment Facility is anticipated to begin around October 2023 and be completed no later than December 2024.

Will the project involve Federal lands? The project will impact federally controlled property in the Brazos Island Harbor Channel and LMWD has worked in the past with the United States Army Corps of Engineers (USACE) for previous projects in this area. Until a final location is determined for the actual location of the seawater desalination water treatment facility, LMWD will continue to communicate and work with USACE during the feasibility study and determine the location of any infrastructure that will impact the Federally controlled property in the Brazos Island Harbor Channel, at which point proper authorization and permitting will be prepared and requested.

## Section 2: Project Location

The District is located in Port Isabel in southeastern Cameron County, Texas on the Gulf of Mexico as shown in Figure 1. The District currently provides water and wastewater services to the City of Port Isabel, City of South Padre Island, Village of Laguna Vista, and unincorporated areas of Cameron County including Laguna

Heights and Long Island. The proposed seawater desalination water treatment plant project would be located in the City of Port Isabel, which is identified by the red circle on Figure 1.

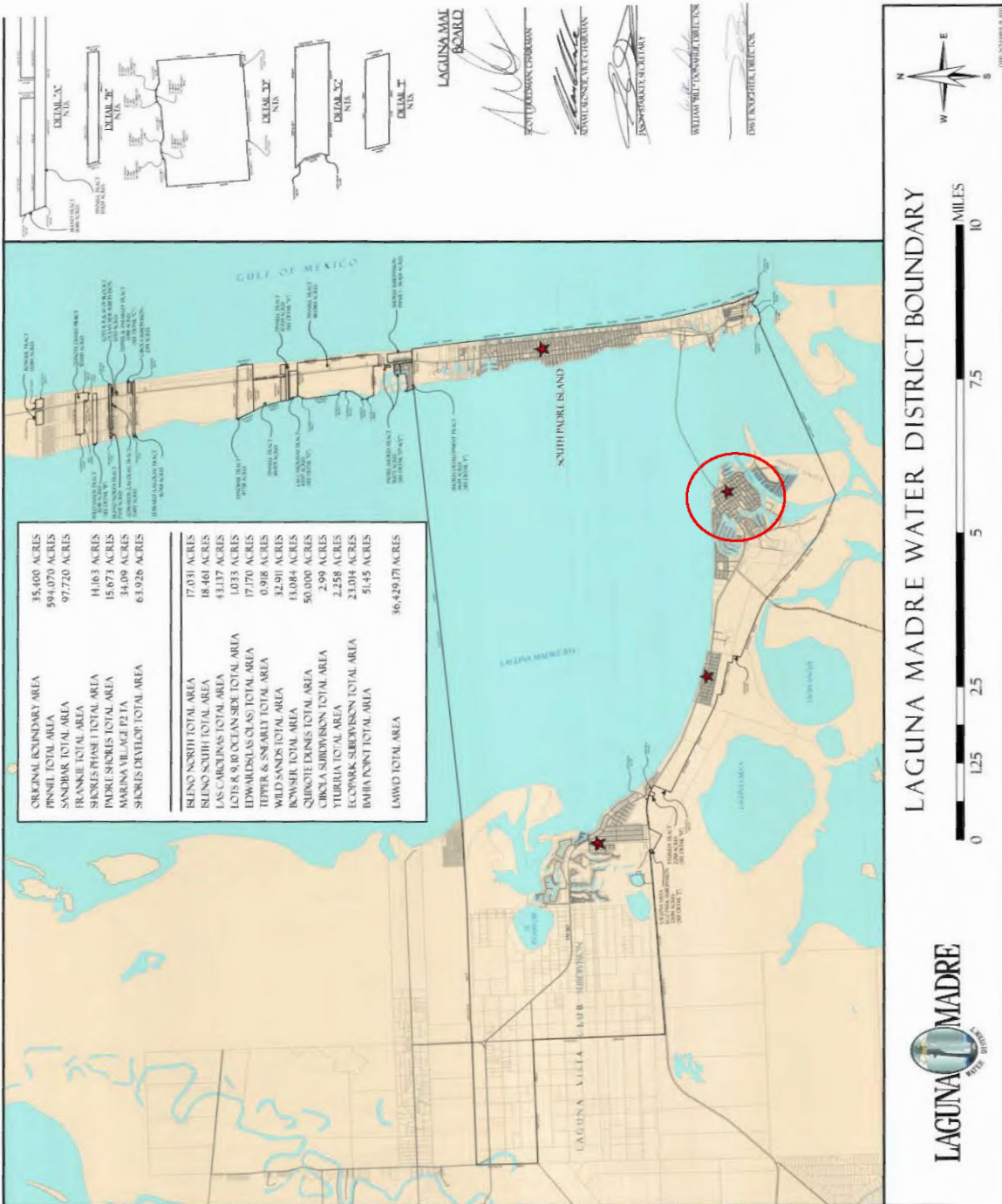


Figure 1: Laguna Madre Water District Water Service Map



### Section 3: Project Description

Applicant Category: Seeking to apply under Funding Group 1 which provides up to \$1M in federal funds for planning, preliminary design, and environmental compliance activities that may take no more than 24 months to complete.

Eligibility of Applicant: The Laguna Madre Water District is a water district in Cameron County, Texas that provides water and wastewater services to the City of Port Isabel, City of South Padre Island, Village of Laguna Vista, and unincorporated areas of Cameron County including Laguna Heights and Long Island. A water district in the State of Texas is an eligible entity for Funding Group I per Section C.1.1. in the Notice of Funding Opportunity (NOFO).

Goals: The goal of the proposed project is to complete a Feasibility Study report per Bureau of Reclamation's requirements under their WTR 11-01 Directives and Standards for a seawater desalination water treatment facility in Port Isabel, Texas.

LMWD serves a population of 45,264 customers through 15,088 connections and is comprised of ten class types: residential, commercial, industrial, churches, schools, hotels, mobile homes, apartments, restaurants, condominiums, and unassigned. The system demand fluctuates depending on seasonal water usage and the number of visitors South Padre Island has at any given time. The year-round warm weather area is a popular tourist destination known for its beaches, dolphin watches, fishing (redfish, trout, and flounder), bird watching, and golf. The challenges faced are population growth, increased demand, diminishing supplies, stringent regulations, and an aging infrastructure. The most significant issues for LMWD are water supply and distribution pipelines. According to the Texas Water Development Board (TWDB), the population growth for the LMWD service area is estimated to be about 20% every ten years from 2020 to 2070. Table 1 summarizes existing and projected water demands by planning year in millions of gallons per day (MGD). While the permanent population within the District is above 10,000 people, more than 100,000 people travel to the area during the peak summer tourist season. In order to meet the peak hour demands projected in 2042 of 9.65 MGD, this proposed feasibility study will assess a 3 MGD seawater desalination water treatment facility with the capability to expand to 5 MGD, which could significantly reduce the **District's** dependence on the Rio Grande and accommodate these demands while ensuring growth does not adversely impact region.

Table 1: Existing and Projected Water Demands

Year	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
2022	3.27	5.97	7.17
2027	3.82	6.97	8.36
2032	4.01	7.32	8.78
2042	4.40	8.04	9.65

The objectives and tasks this work will focus on are explained below; as data is collected during the planning process, these tasks could be expanded or adjusted to accommodate any additional information that is discovered during the feasibility study.

- Task 1 – Conduct a Raw Water Source Characterization: Assess the raw water source quality and update any physical characteristics of the topography as well as current and tidal analysis.
- Task 2 – Alternatives Analysis: Conduct a thorough alternatives analysis on the site location and approach to ensure the best site for this project is identified. An in-depth view of the latest information on various intakes and outfalls will also be assessed to ensure a well-informed recommendation is provided taking into account environmental considerations as well as climate change impacts.
- Task 3 – Technology Assessment: Assess the latest advancements in pretreatment technologies for seawater treatment as well the post-treatment and concentrate disposal options. Unique design considerations for this location would be the climate change impacts seen with stronger hurricanes that hit this area as well as an increase in frequency that would need to be considered during pre-design evaluations of the proposed treatment system. Other areas to consider are the corrosion protection required in materials, as well as the proper blending with the current water chemistry that comes from the Rio Grande water.
- Task 4 – Conceptual Design: A conceptual design will be completed and included in the feasibility study.
- Task 5 – Environmental Considerations: An initial assessment of the various environmental compliance and considerations this project will require will also be included. These may pertain to permitting and approval requirements, working with USACE on the federal land permitting that might be required, and estimations on timeline and costs for these permits and considerations.
- Task 6 – Cost Data Development: Capital cost of the project and alternatives will be assessed to include purchasing of potable water from other nearby districts as well as a no project alternative. The operational and maintenance costs will also be assessed for this project and for alternatives.

## Section 4: Technical Proposal and Evaluation Criteria

### 4.1 Evaluation Criterion 1 – Project Planning and Analysis

#### 4.1.a Subcriterion 1a – Water Recycling Needs and Opportunities

##### 1. Describe the problems and needs in the project area.

The District is located in southeastern Cameron County, Texas, on the Gulf of Mexico and is headquartered in Port Isabel, Texas. LMWD maintains its own water supply system from the Rio Grande, which provides water to a total service area of 36,429 acres. The authorized amount for LMWD of municipal water rights from the Rio Grande is 7,696 acre-feet (6.87 MGD), which is reduced to 5,946 acre-feet (5.3 MGD) under drought conditions. During drought conditions, over 1 MGD in reduction is required with the potential for additional reduction depending on the severity and duration of the drought.

The challenges faced are population growth, increased demand, diminishing supplies, stringent regulations, aging infrastructure, and the sole dependence on the Rio Grande as their sole water source. The variability in water demand for this area is also a challenge due to its seasonal tourism which based on the data provided in Table 1 the average demand can go from 3.2 MGD to a peak hour demand of 7 MGD. Which is not possible to meet during periods of drought when the water rights to the Rio Grande are reduced to levels around 5 MGD.



A need to diversify the water sources and augmenting water supplies are key to ensure LMWD can deliver safe water to its stakeholders and meet its projected growth.

2. Describe the current and projected water supplies and demands in the project area; include a discussion on supply and demand imbalances. Additional consideration will be given to proposals that explain how the problems and needs in the area may be impacted by climate change, and/or if supply and demand projections will include climate change information.

According to the TWDB, the population growth for the LMWD service area is estimated to be about 20% every ten years from 2020 to 2070. The projected population for 2030 is 54,317 with a raw demand of 6,406 acre-feet (5.7 MGD). Table 1 provided in Section 3 of the application provides data for projected water demands with average demand as well as a peak hour demand since the project area has seasonal peaks due to its significant tourism. Also, the sole source of water supply for LMWD is the Rio Grande with allocated water rights of up to 6.87 MGD; however, in periods of drought, that allocation is reduced to around 5.3 MGD with additional cuts that can go into effect depending on the severity and the length of the drought.

Due to its location by the Gulf of Mexico, this area is also impacted by hurricanes. Due to climate change, as hurricanes and storms become more frequent and, in some cases, more severe, the need to diversify the water sources for LMWD is crucial to ensure water will still be available if a hurricane was to go through the area. LMWD's dependence on a sole surface water source that can be impacted by climate change through both droughts and hurricanes further highlights the critical need to diversify the water portfolio.

The feasibility study proposed for this project would complete the water management strategy for this region as LMWD moves forward with work already outlined in the Water Recycling Feasibility Study. How climate change impacts this region will be better assessed to provide crucial updates on the supply demand needs by having both the water recycling and the seawater desalination studies completed to fully complete a much-needed diversification of water supplies and fortify the resiliency of these sources.

3. Describe how the planning activities will investigate potential uses and markets for reclaimed or desalinated water (e.g., environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation).

The planning activities as stated in the objectives will investigate the raw water source for its successful treatment to augment the water supplies for the region that can be used for potable and non-potable uses. LMWD currently serves a population of 45,264 customers through 15,088 connections and is comprised of ten class types; they are residential, commercial, industrial, churches, schools, hotels, mobile homes, apartments, restaurants, condominiums, and unassigned. With these various types of customers, a seawater desalinated water supply will be a resilient source that can deliver consistent water of the quality required by all of the ten identified class types. Alternatives will be assessed as part of the feasibility study and opportunities to partner and collaborate with other water districts in the region can be incorporated as well.

The water quality of the District's current water supply from the Rio Grande will be detailed as part of the feasibility study. There are a number of segments from the Rio Grande that are listed as part of both the 303(d) and 305(b) Lists for the State of Texas. According to the EPA, Category 5 of the 303(d) List in the

2022 State of Texas Integrated Report includes the state’s most impaired or threatened surface waterbodies; once included, a priority is assigned by the state for the development of a Total Maximum Daily Load (TMDL) based on the severity of the pollution and the waterbody’s uses (40 C.F.R. §130.7(b)(4)). Table 2 below includes the segments of the Rio Grande that are listed as part of the 303(d) List for the 2022 Texas Integrated Report along with their identification, impairment description, first year listed, and impairment category.

Table 2: Rio Grande Segment Information - 2022 Texas Integrated Report 303(d) List ([Source](#))

Segment ID	Segment Name	ID	Impairment Description	First Year Listed	Impairment Category
2302	Rio Grande Below Falcon Reservoir	2302_03	Bacteria in Water (Recreation Use)	1996	5c
2304	Rio Grande Below Amistad Reservoir	2304_01, 2304_02, 2304_03, 2304_07, 2304_09	Bacteria in Water (Recreation Use)	1996	5c
2306	Rio Grande Above Amistad Reservoir	2306_01, 2306_02, 2306_03, 2306_04, 2306_05, 2306_06, 2306_07, 2306_08	Sulfate in Water	2010	5b
2307	Rio Grande Below Riverside Diversion Dam	2307_01, 2307_02	Chloride in Water	1996	5c
			Total Dissolved Solids in Water		
		2307_03, 2307_04, 2307_05	Bacteria in Water (Recreation Use)	2002	5c
			Chloride in Water	1996	
			Total Dissolved Solids in Water	1996	
2308	Rio Grande Below International Dam	2308_01	Bacteria in Water (Recreation Use)	2014	5c
2314	Rio Grande Above International Dam	2314_01	Bacteria in Water (Recreation Use)	2002	5c

The listings in Table 2 support the idea that treated seawater could ultimately be a higher-quality source of water for the District that could open the door for new industries and markets to become established in the area. Higher quality water expands the potential for a variety of business types that may require cleaner water to operate. New businesses could bring additional job opportunities that currently do not exist throughout the District’s service area and the surrounding areas.

- Describe the source water that will be considered for the project, including location, capacities, existing flows, treatment processes, and quantities of impaired water available to meet the new reclaimed, recycled, or desalinated water demands.

The water source that will be considered for the project is seawater near the City of Port Isabel, with an intake potentially in the Laguna Madre Bay. The Laguna Madre Bay is the body of water that is between the City of Port Isabel and the City of South Padre Island, which can be seen in Figure 1 in this application. The initial seawater desalination plant is estimated to be built at a 3 MGD capacity with the ability to expand to a 5 MGD capacity to ensure it can provide additional water supplies to meet the peak hour demands projected in 2042 of 7 MGD when combined with the Rio Grande. In the executive summary it was mentioned that LMWD has a potable water reuse feasibility study approved by the Bureau of Reclamation. The projection is for that project to provide an additional 1 MGD of new water supplies by 2040. In combination with the potential future 5 MGD capacity from the seawater desalination facility, the peak hour demand would only require 1 MGD be sourced out of the Rio Grande River, providing a reduction of up to 4 MGD from the river during that peak hour.

#### 4.1.b Subcriterion 1b – Evaluation of Project Alternatives

1. Describe the objectives that all alternatives will be designed to meet. What other water supply alternatives and project alternatives will be investigated?

The main objective that all alternatives will be designed to meet **is the diversification of the District's water supply portfolio**. Through the addition of another water source, the District will increase the overall resiliency of their system and not be solely dependent upon water from the Rio Grande River that can be significantly affected by drought, hurricanes, and other water users.

At this point in time, other water supply and project alternatives that will be investigated include potable reuse, purchasing water from a neighboring district to be transported to the District via a pipeline and pump station(s), and groundwater supply. There is a possibility that other alternatives will be identified and evaluated throughout the course of this feasibility study.

2. Describe how the planning activities will develop project alternatives (water supply sources, reuse strategies, or treatment technologies) that have been or will be investigated.

LMWD has already started to look into treating their wastewater and building an advanced water treatment plant to incorporate potable reuse as a new source of water. From the approved feasibility study for the potable reuse project, it is estimated that up to 1 MGD in new water could be available by 2040. From that study, an estimated cost of \$2.50 per 1,000 gallons is what will be assessed during this planning to update the cost of this already identified alternative. Another alternative is the potential to purchase water from a neighboring district. The cost of a pipeline and pump station(s) will be assessed during this effort to obtain a valid comparison. **The District's close proximity to** the Gulf of Mexico limits their opportunity to utilize groundwater as another water source, but with the objective to assess the topography of the region, this option can be evaluated and assessed as an alternative if viable.

The treatment technologies that are widely used in seawater desalination are membranes with reverse osmosis being the world-wide used technology. Pretreatment is the first stage of the desalination process and with seawater as the source, this stage would ensure the removal of algae, organic materials, and other particles. Typically, this pretreatment is a multimedia filter that could be layers of sand and other media such



as anthracite. From there, the water moves to a secondary pretreatment, typically a microfiltration membrane system to remove any smaller particles that could foul or impact the reverse osmosis membranes. The water then goes through seawater reverse osmosis membranes to remove the dissolved salts. The last steps are post-treatment to add some minerals back into the water as well as a disinfectant, such as chlorine, and then to storage or distribution. The brine created from the desalination process will also have to go through its own assessment to determine the best way to return it back. This evaluation will be done by analyzing various outfalls and diffusers that are currently being used and implemented in various seawater desalination treatment plants across the world.

3. Provide a general description of the selected project, including project features, benefits, anticipated costs, and analyses conducted.

In 2010, LMWD completed a feasibility study for a seawater desalination plant to be located on South Padre Island. The capital cost mentioned in the study was \$12M with a life cycle cost of \$4.79 per 1,000 gallons of water treated. The study from 2010 will be used as a reference, but this new study will re-evaluate and reassess the costs and alternatives that were identified in the original. With inflation and the ongoing supply chain challenges, costs will certainly be much higher than the 2010 dollars that were identified in the previous study.

Typically, the operation and maintenance costs are higher for seawater desalination than the initial capital investment; however, advancements in membranes, optimization of treatment trains, and technology advancements for the recovery and reduction of energy are all anticipated to reduce the cost of desalination.

4. Include a preliminary schedule showing major tasks, milestones, and dates for the planning, design, and construction activities related to the project.

Table 3: Preliminary Project Schedule

Task	2023	2024			
	Q4	Q1	Q2	Q3	Q4
1.0 Project Management	X	X	X	X	X
2.0 Team Meetings	X	X	X	X	X
3.0 Raw Water Source Characterization	X				
4.0 Alternatives Analysis		X			
5.0 Technology Assessment		X	X		
6.0 Conceptual Design			X	X	
7.0 Environmental Considerations			X	X	X
8.0 Cost Data Development				X	X
9.0 Feasibility Study Report Submitted to the Bureau of Reclamation					X

#### 4.2 Evaluation Criterion 2 – Stretching Water Supplies

1. Describe the potential for the project to reduce, postpone, or eliminate the development of new or expanded non-recycled water supplies.

There are two reservoirs in the area, Falcon and Amistad. These reservoirs are fed from the Rio Grande. When the two reservoirs' combined balance is less than 50% capacity, the District's authorized amount increases/decreases by 145.8 acre-feet per year for each percentage change +/- in capacity. According to Water Data for Texas<sup>1</sup>, in August 2022, Amistad reservoir was 32.7% full and Falcon reservoir was 12% full. This means that they were at a combined total of 23.81% and that LMWD had an additional reduction of 145.8 acre-ft per year for each percentage change in capacity from their already reduced water allocation due to drought. With a seawater desalination water treatment facility that can initially provide up to 3 MGD in new water supplies, the District could ensure that there will be enough water to meet demand as well as reduce the amount of water that is currently being pulled from the Rio Grande. In turn, this reduction will increase the capacities of the Falcon and Amistad Reservoirs and minimize the need to enforce additional water cuts to water users during times of drought and/or when the reservoirs are at less than 50% combined capacity. These water savings would also provide more allocation for agriculture users having Class A and Class B water rights and reduce water stress for farmers.

[<sup>1</sup>Water Data for Texas](#)

2. Describe the potential for the project to alleviate pressure on existing water supplies and/or facilities. Please describe the existing water supplies, identify the supplies and/or facilities that will be impacted and explain how they will be impacted by the Project, including quantifications where applicable.

As mentioned in the previous question, this project will alleviate some of the pressure on the Rio Grande. By lessening the amount being withdrawn from the Rio Grande, more water will be able to stay stored at the Falcon and Amistad Reservoirs. This increase in water in the reservoirs could help to potentially avoid reductions in water allocations for users during periods of drought by allowing the reservoirs to stay at higher than 50% capacity. This change would positively impact the majority of other users of the Rio Grande north of LMWD, since a **reduction in LMWD's surface** water demand could potentially benefit other entities that rely solely on the river.

3. Describe the potential for the project to make water available to address a specific concern. Explain the specific concern and its severity. Also explain the role of the project being investigated in addressing that concern and the extent to which the project will address it. Specific concerns may include, but are not limited to water supply shortages, water supply reliability, groundwater depletion, water quality issues, natural disasters that may impact water supply infrastructure, heightened competition for water supplies, availability of alternative supplies, increasing cost of water supplies.

The challenges LMWD faces are population growth, increased demand, diminishing supplies, stringent regulations, aging infrastructure, and climate change impacts from severe droughts and extreme hurricane storms. Since the only water source is the Rio Grande, inadequate water supply to meet expected water demands is the main concern. According to the TWDB, the population growth for the LMWD service area is

estimated to be about 20% every ten years from 2020 to 2070. LMWD also has extreme seasonal peak water demands due to tourism and is a favored vacation spot, particularly during the summer months. The water demand projections during peaks in 2042 are above 7 MGD, while the amount of water that the District could obtain from the river is no more than 6.8 MGD in times of excess and around 5 MGD when the Rio Grande is impacted by severe drought. With no other viable water source, the proposed project will offer the ability to initially create an additional 3 MGD of supply with the potential of up to 5 MGD by 2042. This additional supply will enable the District to be able to meet peak demands and also have adequate supply for their projected population growth.

4. Describe the potential for the project to help create additional flexibility to address drought. Will water made available by the project being investigated continue to be available during periods of drought? To what extent is the water made available by the project being investigated more drought resistant than alternative water supply options? Explain.

Seawater desalination is sustainable and will not be impacted by drought. It is also very consistent in terms of water quality and no other alternative water source provides the flexibility to increase capacity to meet growing demands as far into the future as desalination does. One potential unique challenge for this project is the impact of a strong hurricane that could impact source reliability, but this potential would be thoroughly assessed as part of this project.

#### 4.3 Evaluation Criterion 3 – Environment and Water Quality

1. Describe the potential for the project to improve the quality of surface water or groundwater.

**This project has the potential to improve the quality of the water in the Rio Grande as the District's decreased withdrawal would enable more water to stay in the river to undergo natural remediation.** By having more water in the river, it could reduce the concentration of contaminants such as salt that accumulate along the route of the Rio Grande as well as during periods of drought. Regarding the concentrate created by desalination, it is well documented in literature that disposing of the concentrate back into the ocean does not affect the water quality of the ocean and has no measured impact on the water quality near the outfall either. The feasibility study will allow the ability to assess any impacts from the intake and outfall at Port Isabel as each area is unique. Other desalination plants such as the one in Carlsbad, CA blend the concentrate with a percentage of seawater very close to the outfall before it is released back into the ocean. The project has the potential to improve the quality of the water from the Rio Grande and will not impact the quality of the seawater.

2. Describe the potential for the project to improve effluent quality beyond levels necessary to meet State or Federal discharge requirements.

There is currently no operational seawater desalination plant in Texas. The District will be working closely with the Texas Commission on Environmental Quality (TCEQ) during the feasibility study to ensure that state guidelines for discharge requirements are closely evaluated and effluent quality is met based on the requirements.

3. Describe the potential for the project to improve flow conditions in a natural stream channel.

This project will allow for increased flow along the Rio Grande that will improve the overall condition of the river in its natural stream channel and will restore flow of the river back into the ocean due to decreased withdrawals. Additionally, by augmenting the existing water supplies with desalinated seawater, more water will be available to run along the Rio Grande and eventually complete its journey as it empties into the Gulf of Mexico.

4. Describe the potential for the project to restore or enhance habitat for non-listed fish and wildlife species.

This project has the potential to restore and enhance existing habitats for non-listed fish and wildlife species through decreased withdrawal from the Rio Grande. If withdrawal is decreased and supply is supplemented through desalinated seawater, existing habitats could avoid destruction that they might currently face when river levels decrease to the point where their habitats are completely exposed. Supplemental water supply in the river also means that fish and wildlife species will have more consistent access to any water supplies that they need to maintain and cultivate their habitats. The Rio Grande lower valley area is also key for the various migratory birds and butterflies as they make their way south, by having additional water in the river this could certainly assist in ensuring these migratory birds and butterflies have adequate water and food during their journey every year.

5. Describe the potential for the project to provide water or habitat for federally listed threatened or endangered species.

This project has significant potential to provide water for and protect the habitats of federally listed threatened or endangered species. **Due to the District's immediate proximity to the Gulf of Mexico and the surrounding coastal environment**, there is an abundance of species that could benefit from this project. These species include, but are not limited to, **Ocelot, Kemp's Ridley's Sea Turtle, Aplomado Falcons, Gulf Coast Jacarandas, Brown Pelican, Hawksbill Sea Turtle, Leatherneck Turtle, Piping Plover, American Alligator, Green Sea Turtle, and Loggerhead Sea Turtle.**

#### 4.4 Evaluation Criterion 4 – Department of the Interior Priorities

##### 4.4.1 Climate Change

Please provide specific details and examples on how the project will address the impacts of climate change and help combat the climate crisis.

1. Does this proposed project strengthen water supply sustainability to increase resilience to climate change?

According to NASA, climate change is making droughts more frequent, severe, and pervasive. For a river like the Rio Grande which continues to face various periods of droughts as well as an increase in water demand, this project would strengthen the sustainability of water not only for LMWD but also for the river. A seawater desalination project would obtain its water from a drought-resilient source, which creates the opportunity to reduce the pressure and overuse of surface water from the Rio Grande. Another challenge

that will have to be looked at during this feasibility study is the impact climate change is having on hurricanes as global warming and models predict hurricanes would become more intense. This would be assessed for any impact that it could have on a seawater desalination facility whose intake and outfall major infrastructure is in the ocean.

2. Does the proposed project contribute to climate change resiliency in other ways not described above?

No, the proposed project does not contribute to climate change resiliency in other ways that are not described above.

#### 4.4.2 Disadvantaged or Underserved Communities

1. Will the proposed project serve or benefit a disadvantaged or historically underserved community? Benefits can include, but are not limited to, public health and safety by addressing water quality, new water supplies, or economic growth opportunities.

Yes, the project will serve and benefit multiple disadvantaged and historically underserved communities. In Texas, there are two affordability criteria that must be met by entities that apply for state and/or federal funding through the TWDB. These criteria include having an Annual Median Household Income (AMHI) of **less than 75% of the State of Texas'** and a Household Cost Factor (HCF) that is greater than or equal to one percent if only water or sewer service is provided or greater than or equal to two percent if both water and sewer service are provided. **According to the United States Census Bureau's 2021 American Community Survey's 5-Year AMHI Data**, all communities **included within LMWD's service area**, other than the City of South Padre Island, are categorized as having AMHIs that fall below the 75% threshold, as shown in Table 4. Additionally, Figure 2 and Figure 3 show the persistent poverty census tracts and the historically disadvantaged census community tracts within the District's service area as defined by the Bipartisan Infrastructure Law.

Table 4: 2021 ACS AMHI Data for LMWD Service Area

Entity	2021 ACS 5-Year AMHI (\$)	Percentage of <b>State of Texas' AMHI</b> (%)
State of Texas	\$67,321	100%
City of Port Isabel	\$36,649	54%
City of South Padre Island	\$60,688	90%
Cameron County	\$43,057	64%







2. Please describe in detail how the community is disadvantaged based on a combination of variables listed in the NOFO.

According to E.O. 13985, the term “underserved communities” refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life. With this definition and the variables above in mind, LMWD’s service area is disadvantaged based on low income, high and/or persistent poverty, distressed neighborhoods, and disproportionate impacts from climate change as a result of limited water supplies.

Additionally, tourism is a big **source of income for LMWD’s service area due to its location along the coast.** South Padre Island in particular is a big tourism destination during the spring and summer. If there is not enough water supply to meet demand year-round, especially during high peak seasons, **LMWD’s service area** will experience additional negative economic impacts from an inability to provide sufficient water to maintain and cultivate the existing local tourism industry.

#### 4.4.3 Tribal Benefits

1. Does the proposed project directly serve and/or benefit a Tribe? Will the project improve water management for an Indian Tribe?

This project will indirectly serve and benefit Tribes that utilize water from the Rio Grande north of LMWD. Tribes that live in New Mexico along the river will benefit from augmented water supplies as a result of **LMWD’s decreased reliance and withdrawal from the Rio Grande.** This augmented supply will help to relieve potential stress that the Tribes may experience during periods of lower flow. Additionally, this project will reflect environmental **stewardship through LMWD’s** shift from consistently withdrawing the maximum permitted amount from the river to only taking what they need as a result of expanding their water supply portfolio to include an additional source.

2. Does the proposed project support Tribal resilience to climate change and drought impacts or provide other Tribal benefits such as improved public health and safety by addressing water quality, new water supplies, or economic growth opportunities?

Yes, this project will support Tribal resilience to climate change and drought impacts by the supplemental water supplies that may become available as a result of decreased withdrawal downstream by LMWD. Additional water supplies can relieve potential stress on Tribes, especially during times of lower flow and drought. As a result of decreased withdrawal downstream, there is also a possibility for improved water quality as a result of natural remediation through increased residence time within the river.

#### 4.5 Evaluation Criterion 5 – Watershed Perspective

1. Will the proposed project implement a regional or state water plan or an integrated resource management plan? Explain.

Yes, the project will **implement one of LMWD’s** recommend water management strategies that is included in the **Texas Water Development Board’s** 2022 State Water Plan. **While LMWD’s** desalination project is

scheduled for 2050-2070 according to the 2022 State Water Plan, LMWD can expedite the timing of the project due to an increased and urgent need for an alternative water supply. Desalination supply estimates from the 2022 State Water Plan are included below in Table 5:

Table 5: 2022 TWDB State Water Plan Strategy Supply Volume

2022 TWDB State Water Plan – Strategy Supply Volume by Planning Decade (AFY)					
2020	2030	2040	2050	2060	2070
0	0	0	1,120	1,120	1,120

2. Will the proposed project help meet the water supply needs of a large geographic area, region, or watershed? Explain.

Yes, the proposed project will help meet the water supply needs of multiple large geographic areas. The first **geographic area is the LMWD’s service area** (Figure 1), which includes the City of Port Isabel, City of South Padre Island, the Village of Laguna Vista, and unincorporated areas of Cameron County including Laguna Heights and Long Island. The second is the Rio Grande Watershed in its entirety, which will benefit through decreased stress on the watershed as a whole (Figure 4).

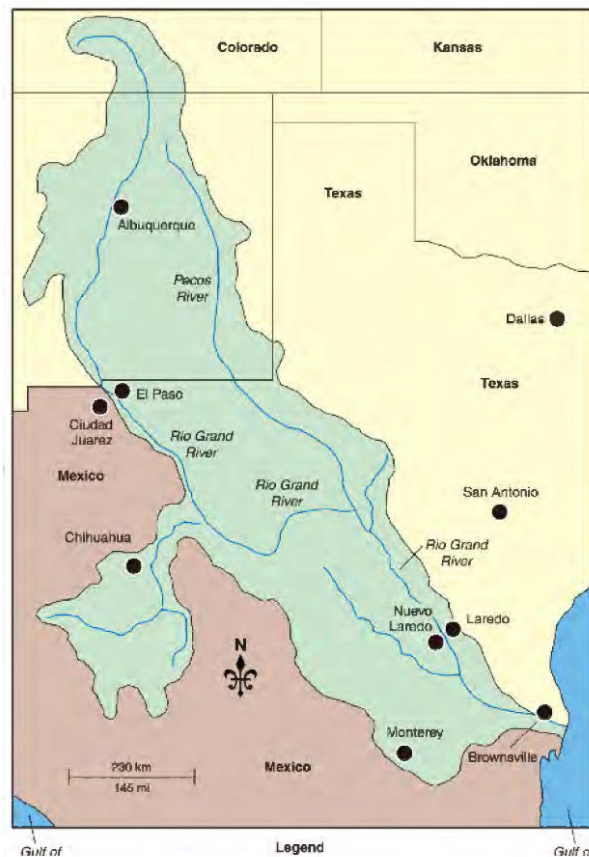


Figure 4: Rio Grande Watershed (Source)

3. Will the proposed project promote collaborative partnerships to address water-related issues? Explain. Describe stakeholder involvement in the project planning process.

Yes, the proposed project will promote collaborative partnerships to address water-related issues. This project immediately involves numerous other stakeholders that rely upon LMWD for their water including the City of Port Isabel, City of South Padre Island, the Village of Laguna Vista, and unincorporated areas of Cameron County including Laguna Heights and Long Island. Each of these stakeholders will be thoroughly involved in the project planning process because they will be immediately impacted by any changes that LMWD makes to their water supply portfolio. Each stakeholder has been made aware of the project and the **need to broaden LMWD's water supply sources**. All entities will be updated on progress throughout planning and decisions will be made collaboratively, this will be accomplished during quarterly meetings which unless required will be conducted virtually.

4. Will the proposed project include public outreach and opportunities for the public to learn about the project? Explain.

Yes, this project will include significant public outreach and education components. The need for education and information sharing with the public throughout planning, design, and construction of the project is critical, especially because there are not many seawater desalination treatment facilities in the U.S., and this project could end up being the first large desalination project in the State of Texas. Public education and information **sharing will increase the public's understanding of the** project and the need for an additional reliable water source. Lastly, potential pushback from the public due to a lack of understanding of the motive and purpose for the project could be minimized or avoided altogether.

This public outreach and education will be provided via meetings open to the public, recorded webinars that can be made available to the public via a project website, information pamphlets on what is seawater desalination treatment in English and Spanish, and new ways such as leveraging social media. A communication/education plan will form part of the feasibility study to ensure the public is properly informed via various formats such as those already described.

## Section 5: Project Budget

### 5.1 Funding Plan

The District commits a contribution of \$496,750.00 towards the total project cost of \$986,750. The non-Federal cost share for the project will be provided via budget allocations for salaries and wages and Capital Improvement Planning during updates performed **at the commencement of the District's Fiscal Year 2024**. No costs incurred prior to the project start date are included as project costs for this proposal. No additional State or Federal funding assistance is requested for the proposed project.

### 5.2 Letters of Commitment

No third-party funding sources are anticipated at this time.

### 5.3 Budget Proposal

Table 6: Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount
Non-Federal Entities	
1. LMWD	\$496,750
Non-Federal Subtotal	\$496,750
Requested Reclamation Funding	\$490,000
Total Project Cost	\$986,750

Table 7: Total Project Cost Table

Source	Amount
Costs to be Reimbursed with the Requested Federal Funding	\$490,000
Costs to be Paid by the Applicant	\$496,750
Value of Third-Party Contributions	\$0
Total Project Cost	\$986,750

### 5.4 Budget Narrative

Table 8: Project Budget

Summary			
Budget Object Category	Total Cost	Federal Estimated Amount	Non-Federal Estimated Amount
a. Personnel	\$34,000	\$0	\$34,000
b. Fringe Benefits	\$8,500	\$0	\$8,500
c. Travel	\$0	\$0	\$0
d. Equipment	\$0	\$0	\$0
e. Supplies	\$0	\$0	\$0
f. Contractual	\$940,000	\$490,000	\$450,000
g. Construction	\$0	\$0	\$0
h. Other Direct Costs	\$0	\$0	\$0
i. Total Direct Costs	\$0	\$0	\$0
i. Indirect Charges	\$4,250	\$0	\$4,250
Total Costs	\$955,240	\$490,000	\$496,750
Cost Share Percentage		49.7%	50.3%

The project budget shown above presents the anticipated distribution of costs across various categories. Under the Personnel category, costs are for estimated time dedicated to the project by the Project Manager, Mr. Charles Ortiz, PE, District Engineer, and some of his assisting staff. The Project Manager has an

approximate hourly rate of \$55/hr. and is anticipated to spend approximately 400 hours performing project management across the life of the project. It is anticipated that approximately two additional staff members will be assisting the Project Manager, with an estimated allocation of 400 total hours for these additional staff members, and having an average hourly rate of approximately \$30/hr.

Fringe Benefits costs are allocated as an approximate 25% of the estimated employee compensation.

It is anticipated that the contractual costs will account for the performance of the work by a consulting engineering firm. The selected engineering consulting firm will perform the engineering feasibility study, as preliminarily described under Section 3 of this application. This will include the performance of the raw water source characterization, alternative analyses, technology assessment, conceptual design, environmental considerations, and cost data development. It is anticipated that the selected firm will be procured via a qualifications-based procurement process. The estimated average rate of engineering consultants with expertise in this field is \$235/hr., with staff ranging from E-1 to E-7 (~\$125/hr. to ~\$415/hr.), and an approximate estimate of 4,000 manhours being required to complete the **project as described under 'Section 3: Project Description'**. The contractual work is expected to be performed on a lump sum basis, with the total contract cost being subdivided into the main six tasks described in Section 3.

No travel costs, equipment costs, supply costs, or construction costs are anticipated as part of this project, and no federal funding is being requested for them. Meetings will be held virtually to eliminate travel costs, and no additional equipment or supplies are necessary for the successful performance of the project. Construction is not a part of the scope of work for this project.

The indirect charges shown in Table 8 are for 10% De Minimis costs for personnel and fringe benefits.

#### Section 6: Resolution and Letters of Support

The District's draft resolution (Resolution No. 199-03-23) is included in Appendix A. The anticipated date of approval for the resolution is March 8, 2023, and the executed version will be submitted as soon as it is finalized. Appendix B includes letters of support for the project.

#### Section 7: Overlap or Duplication of Effort Statement

LMWD confirms that there is no overlap or any duplication of efforts between the proposed project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment or key personnel.

#### Section 8: Conflict of Interest Disclosure Statement

**Per 2 CFR §1402.112, "Financial Assistance Interior Regulation" applicants must state in the application if any actual or potential conflict of interest exists at the time of submission. There is not an actual or potential conflict of interest that exists at the time of submission of this application.**



**Appendix A**  
**Official Resolution**



**RESOLUTION NO. 199-03-23 AGREEING TO CERTAIN REQUIREMENTS OF  
A WATERSMART FUNDING OPPORTUNITY FOR DEVELOPMENT OF A  
FEASIBILITY STUDY UNDER THE AUTHORITY OF SECTION 1604 OF  
TITLE XVI OF PUBLIC LAW 102-575 FOR A PROPOSED  
PORT ISABEL SEAWATER DESALINATION FACILITY**

**WHEREAS**, the Laguna Madre Water District recognizes the need to conserve water and identify and implement alternative water supply opportunities, and

**WHEREAS**, the Bureau of Reclamation has issued a Funding Opportunity Announcement for WaterSMART: Water Recycling and Desalination Planning, and

**WHEREAS**, the Laguna Madre Water District desires to develop a Port Isabel Seawater Desalination Treatment Facility to meet these goals, now therefore;

**BE IT RESOLVED** by the Board of Directors of the Laguna Madre Water District that:

Scott Friedman, Chairman of the Board, has the legal authority to enter into an agreement for this project, and

The Board of Directors of the Laguna Madre Water District being the governing body, supports the application submitted, and

The General Manager, Carlos J. Galvan, Jr. has reviewed and supports the application to be submitted, and

The Laguna Madre Water District has the capacity to provide the amount of funding and/or in kind contributions specified in the funding plan, and

The Laguna Madre Water District will work with Reclamation to meet established deadlines for entering into a cooperative agreement

**PASSED AND APPROVED** this 8<sup>th</sup> day of March 2023:

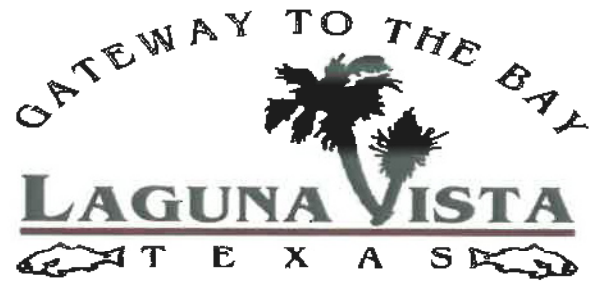
**ATTEST:**

\_\_\_\_\_  
**CHAIRMAN**

\_\_\_\_\_  
**SECRETARY**



**Appendix B**  
**Letters of Support**



February 27, 2023

Bureau of Reclamation  
Water Resources and Planning Office  
Attn: Ms. Maribeth Menendez  
P.O. BOX 25007, 86-63000  
Denver, CO 80225  
Email: mmenendez@usbr.gov

RE: Letter of Support for Laguna Madre Water District's WaterSMART: Water Recycling and Desalination Planning Application for Port Isabel Seawater Desalination

Dear Ms. Menendez,

Please accept my strong support and recommendation for the Laguna Madre Water District's application for a Feasibility Study for Port Isabel Seawater Desalination. The proposed project is desperately needed to consider future integration of an alternative water supply at Water Treatment Plant No. 1, located in Port Isabel, Cameron County, Texas. Access to the Gulf of Mexico through the Laguna Madre Bay is an optimal location to consider augmentation of Rio Grande flows through a seawater desalination process. South Padre Island, Port Isabel, and Laguna Vista residents support this effort to reduce surface water diversions from the Rio Grande.

The District's Water Demands use over 90% of available Water Rights during times of drought. The Falcon and Amistad Reservoir System continues to be very low as United States combined capacity is currently 31.16%. The Region must prepare for long-term capacity shortages in the Rio Grande.

The 2022 Texas State Water Plan includes a seawater desalination plant project by LMWD as part of their water management strategy. Our letter of support is to request a study that will focus on creating a feasible plan per Bureau of Reclamation's requirements under their WTR 11-01 Directives and Standards for the seawater desalination plant project to produce an additional 3 million gallons per day of water supplies as an initial phase and be prepared for tomorrow. The study will include planning activities, preliminary design, and any environmental compliance



activities needed to develop the information required to pursue the schedule of having this seawater desalination plant online by 2050.

We recognize the need for an alternative water supply much sooner than year 2050, and our goal is to see Seawater Desalination Treatment Facility materialize on an expedited basis to resolve Water Scarcity issues throughout the Rio Grande Valley, Texas.

Therefore, I support this project, and I strongly urge RECLAMATION to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. Thank you for your attention and consideration of this request!

Sincerely,

  
Rendie Gonzales,  
City Manager



February 27, 2023

Bureau of Reclamation  
Water Resources and Planning Office  
Attn: Ms. Maribeth Menendez  
P.O. BOX 25007, 86-63000  
Denver, CO 80225  
Email: mmenendez@usbr.gov

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Therefore, I support this project, and I strongly urge RECLAMATION to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. Thank you for your attention and consideration of this request!

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark W. Milum", is written over a light blue horizontal line.

Mark W. Milum  
City Manager



CITY OF PORT ISABEL  
*"An Equal Opportunity Provider, Lender and Employer"*  
305 East Maxan Street  
Port Isabel, Texas 78578  
(956) 943-2682  
(956) 943-2029 Facsimile

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February 27, 2023

Bureau of Reclamation  
Water Resources and Planning Office  
Attn: Ms. Maribeth Menendez  
P.O. BOX 25007, 86-63000  
Denver, CO 80225  
Email: [mmenendez@usbr.gov](mailto:mmenendez@usbr.gov)

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We recognize the need for an alternative water supply much sooner than year 2050, and our goal is to see Seawater Desalination Treatment Facility materialize on an expedited basis to resolve Water Scarcity issues throughout the Rio Grande Valley, Texas.



Therefore, I support this project, and I strongly urge the US Bureau of Reclamation to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. Thank you for your attention and consideration of this request.

Sincerely,

JARED HOCKEMA  
City Manager



February 27, 2023

Bureau of Reclamation  
Water Resources and Planning Office  
Attn: Ms. Maribeth Menendez  
P.O. BOX 25007, 86-63000  
Denver, CO 80225  
Email: [mmenendez@usbr.gov](mailto:mmenendez@usbr.gov)

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tomorrow. The study will include planning activities, preliminary design, and any environmental compliance activities needed to develop the information required to pursue the schedule of having this seawater desalination plant online by 2050.

We recognize the need for an alternative water supply much sooner than the year 2050, and our goal is to see the Seawater Desalination Treatment Facility materialize on an expedited basis to resolve Water Scarcity issues throughout the Rio Grande Valley, Texas.

Therefore, I support this project, and I strongly urge RECLAMATION to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope the Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. Thank you for your attention and consideration of this request.

Sincerely,

Randy Smith, City Manager  
City of South Padre Island

February 27, 2023

Bureau of Reclamation

Water Resources and Planning Office  
Attn: Ms. Maribeth Menendez  
P.O. BOX 25007, 86-63000  
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We recognize the need for an alternative water supply much sooner than year 2050, and our goal is to see Seawater Desalination Treatment Facility materialize on an expedited basis to resolve Water Scarcity issues throughout the Rio Grande Valley, Texas.

Therefore, I support this project, and I strongly urge RECLAMATION to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. Thank you for your attention and consideration of this request!

Sincerely,

Mark Barnard  
Coastal Realty  
2901 Central Blvd. Suite A  
Brownsville, TX 78520  
(956) 541-9000 Office  
(956) 371-3003 Cell  
mark@coastalrty.com  
[www.coastalrty.com](http://www.coastalrty.com)





February 27, 2023

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The District's Water Demands use over 90% of available Water Rights during times of drought. The Falcon and Amistad Reservoir System continues to be very low as United States combined capacity is currently 31.16%. The Region must prepare for long-term capacity shortages in the Rio Grande. This preparation must include forward planning and looking projects, such as a desalination plant.

The 2022 Texas State Water Plan includes a seawater desalination plant project by LMWD as part of their water management strategy. This letter of support requests a study to focus on creating a feasible plan per the Bureau of Reclamation's requirements under their WTR 11-01 Directives and Standards for the seawater desalination plant project, to produce an additional 3 million gallons per day of water supplies, as an initial phase and to prepare for tomorrow. The study should include planning activities, preliminary design, and any environmental compliance activities needed to develop the information required to pursue the schedule of having this seawater desalination plant online by 2050, if not earlier.

The need for an alternative water supply much sooner than year 2050 is recognized, and it is a worthy goal to see a Seawater Desalination Treatment Facility materialize on an expedited basis to resolve Water Scarcity issues throughout the Rio Grande Valley in Texas.



Therefore, I support this project, and I strongly urge RECLAMATION to select the Laguna Madre Water District's Port Isabel Seawater Desalination Feasibility Study for award. I hope Bureau of Reclamation recognizes the value of this project that will lead the path for Seawater Desalination along the Texas Coast. If I may provide any additional information, please do not hesitate to contact me. Thank you for your attention and consideration of this request!

Sincerely,

A handwritten signature in black ink, appearing to read 'G. Young', with a long horizontal flourish extending to the right.

Dr. Glenn R. Young  
General Manager

February 27, 2023

Bureau of Reclamation  
Water Resources and Planning Office  
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Sincerely,

Steve Bearden

Port Director/General Manager

"This Institution is an Equal Opportunity Provider & Employer"

250 Industrial Drive • Turning Basin on Port Road • Port Isabel, TX 78578 • (956) 943-7826 • FAX (956) 943-8922