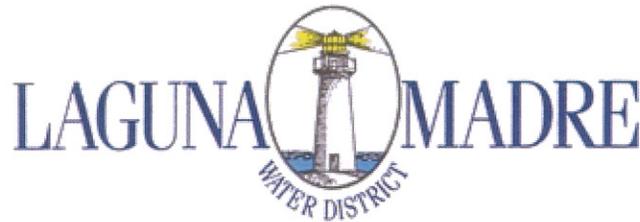


WaterSMART: Development of Feasibility Studies under the Title XVI
Water Reclamation and Reuse Program for Fiscal Year 2014



Port Isabel Water Reclamation Facility
Technical Proposal

Applicant

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May 4, 2014



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5-4-14

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Executive Summary

Date: May 4, 2014
Applicant Name: Laguna Madre Water District
Service Area: Cities of South Padre Island, Port Isabel, and Laguna Vista
County: Cameron
State: Texas

The Laguna Madre Water District ('LMWD' or 'District'), provides potable water, wastewater service and limited reclaimed water service to 35,146 acres and approximately 6,200 customers in Port Isabel, South Padre Island, Laguna Heights, and Laguna Vista, Texas. LMWD's only current source of water is the 7,300 AFY of water rights from the Rio Grande river. These are subject to curtailment, to a minimum threshold of 5,550 AFY, which is the current prorated allocation. Potable demands are nearing that amount and are projected to exceed the available supplies in the very near future, as shown in Figure 1.

Therefore, LMWD would like to reuse the effluent from the 1.1 mgd Port Isabel Wastewater Treatment Plant to offset potable uses and/or supplement its water supply. This study will identify the highest and best use for the effluent from this facility. The proposed alternative uses for reclaimed water are: 1) Non-potable irrigation of golf course(s) and football and baseball playing fields and 2) potable reuse supplying advanced-treated effluent to the District's existing raw Reservoir No. 3 to augment surface water supply currently being diverted from the Rio Grande.

The proposed Feasibility Study for this Port Isabel Water Reclamation Facility is anticipated to begin by the end of May 2014 and will be completed by March 1, 2015.

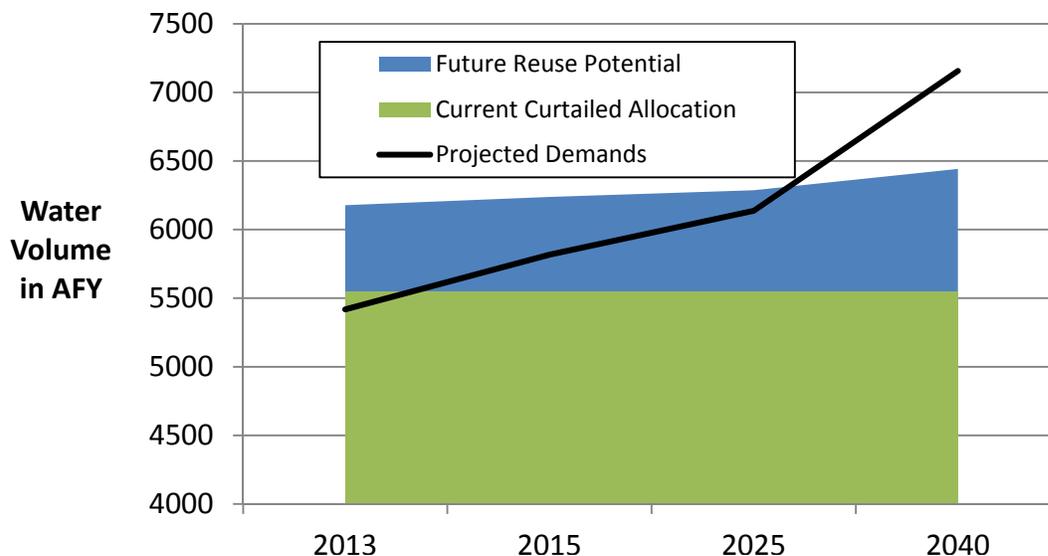


Figure 1. Summary of the District's Water Supply Situation: Projected Demands, Current Water Allocations (Fully Curtailed), and the Potential for Reuse to Close the Water Supply Gap

Technical Study Description

Task 1. Introduce the Project

This task will identify the non-Federal project sponsor as the Laguna Madre Water District ('LMWD' or 'District') and:

- (1) Describe the district in terms of population served, geographic area, and institutional history
- (2) Provide a map of the service area
- (3) Provide a summary of completed studies related to alternative water supplies and their conclusions, and
- (4) Provide a map summarizing the proposed study area and the major project components

Task 2. Identify Needs and Challenges

This task serves to identify the need for the reuse project in terms of the District's water supply, develop a case for implementing reuse over other supply project, and identify

Task 2a. Identify the Current Water Supply Gap

This task will include the following items:

- (1) Evaluate previous studies on population growth and demand projections
- (2) Evaluate current and historical water supplies, with a focus on drought and curtailment conditions
- (3) Identify the need for additional water supplies

Task 2b. Investigate Water Supply Alternatives

This task will include the following items:

- (1) Evaluate previous studies done on water supply alternatives
- (2) Evaluate current options for local and regional water supplies. These will include:
 - a. the purchase of additional water from the Rio Grande
 - b. construction of a 1 mgd seawater desalination facility
 - c. participating in a regional brackish water desalination project
 - d. reuse
- (3) Compare planning-level cost estimates for the supply alternatives gathered from subtasks (1) and (2)
- (4) Identify potential reuse alternatives, including
 - a. non-potable reuse
 - b. potable supply augmentation

Task 2c. Identify Water Quality Concerns

This task will include the following items:

- (1) For non-potable reuse
 - a. Define water quality requirements according to water quality requirements set forth in Section 30 of the Texas Administrative Code Chapter 210 (30 TAC 210), which defines water quality requirements for Type I and Type II reclaimed water.
 - b. Define additional water quality requirements based on end user requirements. These may include limits on salinity (EC or TDS), total chlorides, hardness, and

other constituents of concern to irrigation users.

(2) For potable reuse

- a. Define water quality requirements for potable reuse determined by TCEQ on a case-by-case basis in accordance with the 30 TAC 290 - “Public Drinking Water” Innovative/alternate treatment clause, which allows permitting of any treatment process that does not have specific design requirements in 290.42(a) – (f) of this title.”
- b. Define Public Health Goals set forth in current research and policy documents (WaterReuse Research Foundation Project No. 11-02)

Task 2d. Identify Wastewater Disposal Option under Non-Title XVI Alternative

The wastewater from the PI WWTP is currently discharged to the Vadia Ancha, a tidal mudflat that drains to the Brownsville Ship Channel. If the non-Title XVI alternative is implemented, no changes to this discharge are needed.

Task 3. Identify Water Reclamation and Reuse Opportunities

Task 3a. Identify Uses of Potable Reclaimed Water

The two potential uses of reclaimed water are for potable supply augmentation and non-potable uses, mainly irrigation. Previous analysis has determined that potable supply augmentation should occur at Reservoir No. 3, as this is the largest of the nearby water supply reservoirs and serves a water treatment plant that is operated year-round. Reservoir No. 1, which is adjacent to Water Treatment Plant (WTP) No. 1 and the PI WWTP, could be an alternative location to receive advanced-treated reclaimed water.

Additional non-potable uses, beyond the current users, will be considered as part of Task 3b.

Task 3b. Identify Potential Users of Non-Potable Reclaimed water

The user of reclaimed water for potable reuse is the District itself. Preliminary analysis of potential non-potable users has identified two nearby, high-volume District customers, including the Long Island Village Golf Course and Port Isabel Little League playing fields.

(1) Additional uses of non-potable reclaimed water will be identified, as follows:

- a. Determine the top 25 potable water users in the District’s service area
- b. Determine, based on preliminary review of distance, water quality requirements, water supply needs (both peaking and average), at three to five additional potential reclaimed water customers
- c. Approach those customers to determine their interest in reclaimed water as an alternative non-potable water supply
- d. Develop planning level-cost estimates for the required infrastructure to service those customers that have indicated an interest in reclaimed water.

Task 3c. Identify and Address Potential Hurdles Associated with Reclaimed Water Uses

There are four categories of potential hurdles associated with the use of reclaimed water: technical, permitting, cost, and public perception. These will be identified for each use category, as follows:

(1) For non-potable uses:

- a. Identify water quality goals as defined in Task 1c(1), compare those to the current

effluent quality from the PI WWTP, and determine treatment requirements to meet those water quality goals.

- b. Identify permitting and public perception issues, if any, encountered during the implementation of the previous reclamation project (currently serving the South Padre Island Golf Course). Determine if any additional action needs to be taken during the planning phase.
 - c. Consider pricing incentives to encourage the use of reclaimed water. It is anticipated that reclaimed water will be of higher quality for the purposes of irrigation than the water quality of the current potable (or raw) water supply, due to the necessary desalination step. Therefore, also consider marketing the purified water at an increased rate.
- (2) For potable use:
- a. Compare water quality goals as defined in Task 1c(2) to the current effluent quality from the PI WWTP, and determine treatment requirements to meet those water quality goals.
 - b. Develop treatment alternatives capable of meeting those treatment goals. These are anticipated to include advanced treatment processes such as reverse osmosis (RO), advanced oxidation processes (AOP), and/or equally effective alternative treatment options.
 - c. Develop a preliminary public information strategy, to be implemented during the pilot phase of the potable reuse project.

Task 3d. Identify Jurisdictional Issues

LMWD owns and operates all of the water and wastewater conveyance and treatment facilities associated with the project alternatives discussed in this proposal. The District also has full, consumptive, ownership of the water in its system. Therefore, no jurisdictional issues are anticipated.

Task 3e. Describe Potential Sources of Reclaimed Water

The source of reclaimed water for this study is the effluent from the PI WWTP. Based on the Water Supply Analysis conducted earlier this year, the effluent from the PI WWTP will provide in excess of 700 AFY of effluent for reuse. If this water is used to offset potable demand or augment potable supplies with a high efficiency (likely only achievable with potable reuse¹), it has the potential to close the imminent water supply gap and delay the need for additional water supply projects past 2025 or beyond. The purpose of this study is to identify the highest and best use for this water.

Task 3f. Describe Source Water Facility

The source water facility is the PI WWTP. This task consists of the following:

- (1) Asses the total flows available from the PI WWTP, as follows:
 - a. Summarize the analysis of the Water Supply Analysis document with respect to the water supplies available from the facility based on historic effluent flows,

¹ Due to the non-unity recovery of water from the anticipated advanced treatment facilities, the anticipated water flows in the Water Supply Analysis were based on a conservative assumption of 80% recovery. Non-potable “recoveries” are likely to be lower due to the need to meet peaking demands as well as the need to identify customers for the water.

- b. Assess the potential of diverting additional wastewater to this facility to boost overall flows to the PI WWTP, thus increasing the amount of recoverable water.
- (2) Assess the PI WWTP, as follows:
- a. Describe the treatment process and design criteria of this facility.
 - b. Conduct site inspection and facility condition assessment.
 - c. Evaluate blower replacement for energy and life cycle cost savings, as advanced treatment will increase energy use, and other energy offsets within the WWTP are thus all the more important.
 - d. Recommend other equipment repairs and replacement, and
 - e. Develop computer hydraulic model to reassess the treatment plant capacity.

Task 3g. Describe Current Reuse Practices

LMWD is currently serving reclaimed water to the South Padre Island Golf Course from its Laguna Vista Wastewater Treatment Plant (LV WWTP). This study will

- (1) Describe the current reuse project with respect to the user(s) served and the volumes of water delivered
- (2) Provide maps to supplement the above description.

Task 3h. Summarize Current Water Reclamation Technology

This study will supplement the descriptions provided in Task 3g, as follows:

- (1) Describe the current reuse project at Laguna Vista with respect to additional treatment implemented (media filters), and water quality achieved, and
- (2) Based on (1), determine if any additional treatment, such as desalination, for example, would be beneficial.

Task 4. Description of Alternatives

Task 4a. Describe Non-Federal Funding Condition

If the reuse feasibility study cannot be completed, the District will likely continue delaying water supply projects and/or continue pursuing the seawater desalination project that provides water at significantly higher expense but for which the feasibility study and pilot work have already been completed.

Task 4b. Define Objectives of the Project

The stated objective of this project is to determine the highest and best use of the reclaimed water produced by the PI WWTP. The evaluation of this use will be determined by the following criteria:

- (1) Cost per volume of water delivered
- (2) Ability of the alternative to delay the need for additional water supply
- (3) Reliability of water supply offset / augmentation (e.g., drought resistance, demand hardening)
- (4) Project risk (e.g., associated with permitting and public acceptance uncertainties)
- (5) Energy efficiency

Task 4c. Describe the Non-Title XVI Alternatives

The non-Title XVI alternative is considered to be a 1 mgd seawater desalination project constructed by the District. The District has already developed a detailed project description,

including a full feasibility and pilot study.² A cost estimate is available for this alternative and will be provided for comparison to the reclamation alternatives developed during this study.

Task 4d. Development of Reclamation Project Alternatives with Cost Estimates

Note: This task will be preceded by Tasks 4e and 4f but has been placed in this location to follow the flow of the Directives and Standards Publication No. WTR 11-01.

- (1) Develop three to five project alternatives that may include one or both of the proposed uses (non-potable and potable). Elements that may vary between the alternatives will be identified as part of Task 4f. Anticipated flow allocation between non-potable and potable uses, respectively (and potential temporal variations in the flow split) may also differentiate project alternatives.
- (2) As part of the alternatives development, special attention will be paid to the role of existing infrastructure available at the District that would support the development of individual project elements.
- (3) Develop detailed cost estimates for the selected alternatives. This will include
 - a. detailed project (capital) cost estimates
 - b. annual operation, maintenance, and replacement cost estimates
 - c. life cycle cost estimates
 - d. cost of water per volume delivered (dollars per AF or MGD)

Task 4e. Determine Waste Discharge Requirements

This task includes two parts:

- (1) Determine alternative discharge location for current wastewater effluent from the PI WWTP. The existing TPDES permit allows discharge to the Vadia Ancha, a mud flat that provides potential habitat to several protected species (as described in more detail below). An alternative discharge location directly to the Port Isabel Channel, which connects to the main Brownsville Ship Channel, will be investigated. This will include the following subtasks
 - a. Perform a pipe routing analysis
 - b. Contact and negotiate with property owners along proposed route
 - c. Evaluate the need to remove heavy metals
 - d. Evaluate whole effluent toxicity (WET) compliance
 - e. Apply to TCEQ to move permitted discharge location
- (2) Determine feasibility of discharging treatment residuals from water reclamation (i.e., reverse osmosis concentrate) to the new discharge location. This will include
 - a. Determine receiving water quality requirements, especially with respect to salinity (salinity in the receiving water body is equivalent to seawater) and heavy metals.
 - b. Determine residuals water quality
 - c. Determine any additional residuals treatment necessary to meet receiving water quality goals
 - d. Discuss with TCEQ to approve permit conditions for subpart (1)c that will allow for the discharge of treatment residuals in the WWTP outfall.
 - e. If needed, develop alternative waste disposal options. These may include:
 - i. Deep well injection
 - ii. Additional treatment to achieve zero liquid discharge

² NRS, 2010. Feasibility and Pilot Study for the South Padre Island Seawater Desalination Project.

Task 4f. Describe Potential Project Elements

Note: This task will precede Tasks 4d and 4e but has been placed in this location to follow the flow of the Directives and Standards Publication No. WTR 11-01.

This task will identify project elements that, when assembled into project alternatives, will achieve water quality and water quantity goals. These project elements may consist of any of the following:

- (1) Treatment technologies employed to achieve treatment goals for each use.
 - a. For non-potable uses, these may include filtration, supplemental disinfection, and/or reverse osmosis (RO) for desalination.
 - b. For potable reuse, advanced treatment technologies, including filtration, RO, and advanced oxidation processes (AOP) will be considered. Alternative treatment technologies, such as ozonation and Biofiltration, will also be considered. The RO/AOP alternative has been approved by TCEQ for a similar potable water augmentation application implemented by the Colorado River Municipal Water District at Big Spring, TX.
- (2) For potable use: Location of the treatment facilities (for example, the advanced treatment facility could be located adjacent to Reservoir No. 3 instead of adjacent to PI WWTP as shown on Figure 3)
- (3) Conveyance infrastructure
 - a. For non-potable uses: different distribution pipe alignments and associated storage, pipeline and pump station elements
 - b. For potable reuse: a pump station to convey reclaimed water along an existing pipeline from PI WWTP site to Reservoir No. 3
- (4) For all of the above, consider measures that can increase energy efficiency, such as
 - a. Evaluate use of variable frequency drives for large equipment
 - b. Evaluate energy efficiency of treatment process alternatives (e.g., ozone and biofiltration versus reverse osmosis)

Task 5. Economic Analysis

As stated in Task 4b, the objective of this project is to determine the highest and best use of the reclaimed water produced by the PI WWTP. The evaluation of this use will be determined by the criteria listed in Task 4b.

Task 5a. Describe the Potential of the Project to Meet Future Demands

From the analysis provided above and detailed in the Water Supply Analysis, the water supply needs have been identified. These will be summarized in the Feasibility Report. The Water Supply Analysis also determined that an alternative based on potable reuse will be able to meet the demands through at least 2025 (see Figure 1). For project alternatives based around non-potable reuse, the analysis will include:

- (1) Analysis of water demands, taking into account both diurnal and seasonal variations
- (2) Analysis of water volume produced and the impact of storage on the ability to meet demands

Task 5b. Compare Costs between Title XVI Project Alternative

This task will:

- (1) Compare cost of project alternatives developed in Task 4d. The basis for this comparison will be
 - a. Cost of water on a per mgd basis.
 - b. Project capital cost and the availability of funding to meet the needed expenditure
- (2) All comparisons will be made on the basis of the same interest rates and period of analysis. Figure 2 provides an example of such a comparison but will be refined with the outcome of the reclaimed water alternatives selection.

Task 5c. Compare Cost of Non-Title XVI Project Alternative to Proposed Title XVI Alternatives

Planning level cost estimates for the non-Title XVI alternative (seawater desalination) have been developed previously. This task will:

- (1) Compare cost of project alternatives developed in Task 4d against the non-Title XVI alternative. The basis for this comparison will be
 - a. Cost of water on a per mgd basis.
 - b. Project capital cost and the availability of funding to meet the needed expenditure
- (2) All comparisons will be made on the basis of the same interest rates and period of analysis. Figure 2 provides an example of such a comparison but will be refined with the outcome of the reclaimed water alternatives selection.

Task 5d. Compare Other Benefits between Non-Title XVI Project Alternative and Proposed Title XVI Alternatives

Based on the stated objectives of the project, first identified in Task 4b and reiterated at the beginning of this section, the noneconomic value of water supply alternatives that will be considered include water supply reliability and relative project risk. These evaluation criteria will be incorporated as follows:

- (1) District staff will identify the relative importance of financial and non-financial criteria.
- (2) Based on this definition, the alternatives will be evaluated using a multi-criterion decision analysis (MCDA) approach. One potential tool for such an approach is a decision tool developed for WateReuse Research Foundation Project 09-02 (Multi-Criteria Decision Tool to Evaluate Dual Distribution and Potable Reuse Alternatives).

Task 6. Selection of the Title XVI Project

Selection of the Title XVI project will be determined based on the objectives and evaluation criteria of the project, as identified in Task 4b. The following steps will be taken to select the Title XVI Project:

- (1) Evaluate alternatives based on the criteria identified in Task 4b and quantified in Task 5.
- (2) Determine the relative importance (weighting) of financial and non-financial criteria.
- (3) Based on the results of (1) and (2), compare the alternatives using a multi-criterion decision analysis (MCDA) approach. One potential tool for such an approach is a decision tool developed for WateReuse Research Foundation Project 09-02 (Multi-Criteria Decision Tool to Evaluate Dual Distribution and Potable Reuse Alternatives).

All project alternatives, including the non-Title XVI alternative, reduce the use of existing diversions from natural watercourses and Federal water supply facilities as they provide a supply that is independent of the current supply from the Rio Grande. On this segment of the river, there

are two major water supply reservoirs, Amistad Reservoir just upstream of Del Rio, Texas, and Falcon Reservoir near Zapata, Texas. These are jointly operated by the binational International Boundary and Water Commission (IBWC, US) and Comision Internacional De Limites Y Aguas (CILA, MEX).

Task 7. Consider the Potential Effects on the Environment

In order to minimize the District’s environmental impact with respect to energy requirements, this task includes following:

- (1) Evaluate the energy requirements of the proposed treatment facilities
- (2) Evaluate energy saving measures, including
 - a. Evaluate energy saving measures in conjunction with the condition assessment of the PI WWTP proposed under Task 3f
 - b. Evaluate potential energy saving measures in the design of the new reclaimed water treatment facilities, such as energy recovery devices and variable frequency drives on large equipment.
- (3) Evaluate the availability of renewable energy, including
 - a. Evaluate purchasing energy produced renewably from local utilities
 - b. Evaluate construction of a local renewable energy project, such as a wind turbine. The District has received recommendations from the contractor who installed a 10 kW wind turbine at the Laguna Vista WWTP and will evaluate both a similar 10 kW turbine as well as a larger 100 kW turbine to offset the energy consumption of advanced treatment facilities.

Task 8. Legal and Institutional Requirements

The proposed project is associated with limited legal and institutional requirements, which are and/or will be addressed in the following.

Task 8a. Analyze Water Rights

All of the proposed uses of water in the system are considered “direct” (i.e., they do not involve a discharge to the Waters of the State) and therefore none of the flows are subject to new appropriation. Therefore, the District owns the full cycle of water proposed in this project, from municipal water rights from the Rio Grande to full consumptive use.

Task 8b. Analyze of Institutional and Legal requirements

The District not only owns but controls the full cycle of water proposed in this project, from municipal rights to full consumptive use. The main legal requirements for a reclamation project therefore relate to water quality, which are discussed in Task 8d.

Task 8c. Analyze Multi-Jurisdictional and Interagency Aspects

Because the District controls the full cycle of water proposed in this project, no additional agencies are involved, nor are regional collaborations needed.

Task 8d. Analyze Permitting Requirements

Two aspects of the project require permitting. These are addressed in Task 2c (permitting for potable reuse) and Task 4e (permitting for waste discharge).

Task 8e. Discuss Any Unresolved Issues Pertaining to Implementing the Proposed Project

No additional issues have been identified at this time that would impede the implementation of the proposed project. However, throughout the course of the study, such issues may arise and will be identified and discussed as part of this task.

Task 9. Demonstrate Financial Capability of Sponsor

The District is financially capable of implementing this project, based on the issuance of Outstanding Waterworks and Sewer System Revenue Notes, Series 2007 (available balance \$550,000) and Unlimited Tax Bonds, Series 2012 (available balance \$6,689,000). As a result, the District has \$7,089,000 available for non-Federal sources of construction funding. The Feasibility Study will determine the project costs required to complete the Port Isabel Water Reclamation Facility. Future funding opportunity announcements, and other available grants, will be pursued to obtain a Federal match to the District's existing local funding availability.

As part of this task, the District will:

- (1) Update the schedule for project implementation. The current anticipated schedule includes substantial study completion by March 2015, design completed in February 2016, start of construction in June 2016, and project completion in October 2017.
- (2) Demonstrate the District's capability and willingness to implement the project based on the information provided above and any additional information available at that time.
- (3) Provide a funding plan for the project, including capital (construction) cost, operation, maintenance, and replacement cost.
- (4) List all the Federal and Non-Federal sources of funding and any restrictions on them.

Regarding Research Needs

No additional research is anticipated as part of this project. Water quality goals for non-potable reuse are clearly defined in the Texas regulations. Research conducted for the WaterReuse Research Foundation has defined water quality goals for potable reuse, the treatment processes necessary to achieve those goals, and the monitoring requirements to make sure they actually are meeting those goals. Carollo's current water quality study, performed for the Texas Water Development Board at the CRMWD's facility at Big Spring, will provide further support for potable reuse as proposed by the District.

Evaluation Criteria

Evaluation Criterion # 3: Statement of Problems and Needs

Introduction to the District

The Laguna Madre Water District ('LMWD' or 'District'), is located in southeastern Cameron County, Texas, on the Gulf of Mexico and is headquartered in Port Isabel, Texas. LMWD provides potable water, wastewater service and limited reclaimed water service to 35,146 acres and approximately 6,200 customers in Port Isabel, South Padre Island, Laguna Heights, and Laguna Vista, Texas.

LMWD extracts surface water diverted from the Rio Grande through a series of pump stations

and reservoirs followed by treatment at two existing surface water treatment plants with a combined capacity of 9.1 million gallons per day (mgd). An expansion of Water Treatment Plant No. 2 is nearing completion, which will increase the combined capacity to 11.1 MGD in May 2014.

LMWD operates a collection system with 28 lift stations with flow routed to one of four wastewater treatment plants with a combined permitted capacity of 5.85 mgd (Isla Blanca, Andy Bowie, Port Isabel, and Laguna Vista). Both Isla Blanca and Andy Bowie wastewater treatment plants are located on South Padre Island, and they discharge to the Laguna Madre. Laguna Vista Wastewater Treatment Plant discharges to the City of Port Isabel Reservoir. On June 2013, the District added a cloth media filter at Laguna Vista Wastewater Treatment Plant and obtained authorization from TCEQ to discharge Type I Reclaimed Water to a South Padre Island Golf Course community lake.

Current Water Supply Situation

LMWD’s only current source of water is 7,300 AFY of water rights from the Rio Grande. These are subject to curtailment, to a minimum threshold of 5,550 AFY, which is the current prorated allocation. The District’s withdrawals from the Rio Grande for the past four years are shown in Table 1. Based on these data, LMWD’s withdrawals exceeded the curtailed water allocation in three years (2010-2012) but remained below the curtailed water allocation in 2013, the first year in which the District was fully curtailed, due to the implementation of Stage 2 restrictions on water usage.

Table 1 Historical Water Diversions			
Water Supply Summary			
Laguna Madre Water District			
Year	Allocation^{a)}	Actual Diversion Amount	
	AFY	AFY	MGD
2010	7,300	5765	6.5
2011	7,300	6156	6.9
2012	5,873	5558	6.2
2013	5,550	5273	6.0

Notes:
a) The District’s allocation of 7,300 AFY was partially curtailed in 2012 and fully curtailed in 2013.

Based on a Water Supply Analysis conducted earlier this year,³ during **non-drought conditions**, a water supply gap occurs sometime between 2025 and 2040, whereas **during drought conditions**, a water supply gap is imminent, occurring sometime before 2015 (see Figure 1). This imminent water gap represents the relevant situation, as it is unlikely that the District will obtain its full allocation of water in the near future.

Beyond the simple fact that the District is running out of water, the concept of portfolio diversification makes the pursuit of another source of water supply compelling. With its current supply, the District is wholly dependent on the Rio Grande for water. Not only does that expose

³ Carollo Engineers 2014, *Draft Memorandum, Water Supply Summary*, Laguna Madre Water District.

LMWD to the risk of curtailments and other water shortage conditions, but it also exposes the District to the risk of other more acute issues associated with relying on a single source of supply. For example, a very recent precautionary notification (dated April 30, 2014) from the TCEQ indicated a release of an unknown material on the Mexican side of the Lower Rio Grande watershed that was causing fish kills and was expected to migrate into the Falcon reservoir and from there downstream to all the Texas users on the river. For all of these reasons, relying on the Rio Grande for additional water supply is considered as a non-viable alternative by the District.

Evaluation Criterion # 2: Water Reclamation and Reuse Opportunities – 15 points

Water Supply Alternatives (sub-criterion 3)

Based on the issues described above, the District has determined that a separate, drought-resilient water supply project must be implemented. The District has considered a number of potential sources of water, including implementing reuse as described in this application, buying water from a regional brackish water desalination facility, or implementing seawater desalination, as investigated previously in a Seawater Desalination Feasibility and Pilot Study.⁴

Based on a preliminary cost comparison conducted as part of the Water Supply Analysis, reuse appears to be the more cost-effective option for increasing the District’s water supplies. This is illustrated in Figure 2.

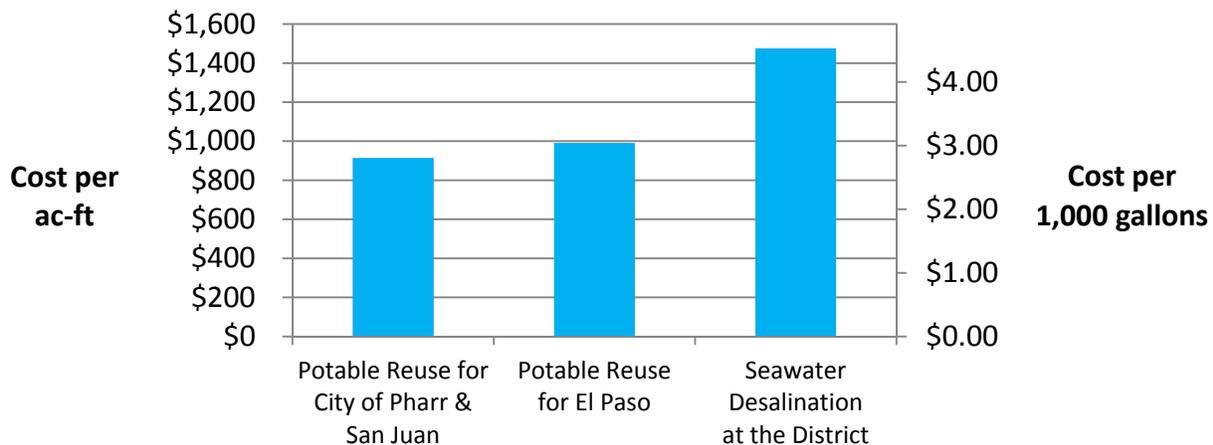


Figure 2. Water Supply Cost Comparison*

- * The costs in Figure 2 were obtained from a number of sources and based on several assumptions, as follows:
- All project costs are determined on a 1 mgd capacity basis with debt service assumptions on capital expenditures of 5% and 25 years project life.
 - The cost estimate for the nearby Cities of Pharr and San Juan were obtained from the Water Reuse Priority and Implementation Plan Report for the City of Pharr and San Juan, December 2011 (by Alan Plummer and Associates, Inc.).
 - The cost estimate for El Paso Water Utilities was taken from a case study for El Paso Water Utilities performed by Carollo Engineers, Inc. as part of WateReuse Research Foundation Project 11-10 (in publication).
 - The cost of seawater desalination was based on a combination of updated capital cost provided by the State Comptroller's office in February 2012 and O&M estimates provided in the Seawater Desalination Feasibility and Pilot Study.

⁴ NRS, 2010. Feasibility and Pilot Study for the South Padre Island Seawater Desalination Project.

Potential Uses of Reclaimed Water (sub-criterion 1)

Based on this analysis, LMWD is considering using advanced-treated water from the Port Isabel Water Reclamation Facility to supplement its water supply. Therefore, the only reclaimed water uses to be considered by the study are ones that either directly augment or offset potable uses. Based on the estimates provided in the Water Supply Analysis, reuse can supply over 600 AFY of water, which is sufficient to close the District’s water supply gap during drought conditions through at least 2025, if not beyond (see Figure 1).

Potential Source of Reclaimed Water (sub-criterion 3)

The reclaimed water available from the PI WWTP is the only source of reclaimed water considered at this time. Wastewater from the Laguna Vista WWTP is already being reused beneficially, and the water at the two WWTPs on South Padre Island has high salinity, which makes it less suitable for reuse. The location of the PI WWTP, along with the identified potential users of reclaimed water, and the infrastructure needed for the proposed alternatives is shown schematically on Figure 3.

Potential Markets for Non-Potable Reclaimed Water (sub-criterion 2)

Several customers for non-potable reclaimed water have been identified by the District, including the Long Island Village Golf Course and Port Isabel Little League playing fields. Additional non-potable uses, beyond the current users, will be considered as part of Task 3b. The main obstacles faced by the District with potential customers of non-potable reclaimed water are the perception that the water is not safe, and high TDS levels. A public education campaign is planned for the subsequent phases of this project to address public perception issues. Desalination to meet TDS requirements, if necessary, is expected to come with significant costs and may drive the decision to implement potable reuse as an alternative to non-potable use.

Potential Markets for Potable Reclaimed Water (sub-criterion 2)

The reuse potential shown on Figure 1 is estimated based on 80% recovery of the total wastewater effluent volume, and it does not take into account the possibility of diverting additional raw wastewater flows currently pumped from Laguna Heights to the Laguna Vista WWTP towards the PI WWTP instead (see Figure 3). The reverse operation of the force main sewer (which is already in place and can be operated in both directions) could increase the volume of water treated at the PI WWTP, resulting in additional water supplies available through a reclamation project at this facility. Note that this reverse in operation would not rob the existing reclamation project at the Laguna Vista WWTP, as the reuse needs at this facility are lower than the available supplies.

The typical obstacles seen with non-potable reuse projects do not apply to potable reuse. For example, the distribution system already exists, no customers must be identified or markets assessed, there are no on-site conversion costs, and except for losses during treatment, the full amount of water can be reused, because the existing potable infrastructure has built-in storage to equalize supply and demand. The hurdles encountered for potable reuse projects, are different but no less significant. These include public acceptance and the attainment of water quality goals that are protective of public health. As stated above, a public education campaign is planned for the next project phase (regardless of the project alternative chosen) to address these issues. Water quality goals and regulatory hurdles will be addressed as described in Task 3c.

Evaluation Criterion # 3: Description of Potential Alternatives – 15 points

Project Objective (subcriterion 1)

The main objective of this study is to determine the highest and best use of the reclaimed water available from the PI WWTP. This use will be evaluated based on the objectives defined in Task 4b, which include the cost of water, the ability of the reuse project to close the District’s water supply gap, supply reliability, project risk, and energy efficiency.

Reuse Alternatives (subcriterion 2)

The two main alternatives considered will be augmentation of potable supplies by returning advanced-treated water to Reservoir No. 3 or non-potable uses near the Port Isabel WWTP, including the Long Island Village Golf Course and Port Isabel Little League playing fields (see Figure 3).

Project Elements and Technologies for Potable Reuse (subcriterion 3)

The potable reuse alternative will likely consist of an advanced water treatment (AWT) facility located on the site of the PI WWTP and a pump station for sending water back to Reservoir No. 3 through an existing pipeline (see Figure 3).

A basic plant layout that is being considered for this alternative is shown in Figure 4. Advanced-treated reclaimed water would be conveyed using one of two existing parallel pipelines (15” PVC & 16” AC), to Reservoir No. 3, where, during times of peak demand (measured conservatively as the maximum ratings on both water treatment plants, as shown on Figure 3), it would have a mean residence time of at least 7 days. Here, the advanced treated reclaimed water would mix with the surface water supplies from the Rio Grande and enter the two existing water treatment plants for additional treatment prior to distribution. Alternatives to be evaluated center around the AWT facility, for which the “gold standard” treatment process of MF/RO/AOP will be compared to an ozone/Biofiltration /UV disinfection based approach (with side-stream RO for salinity reduction).

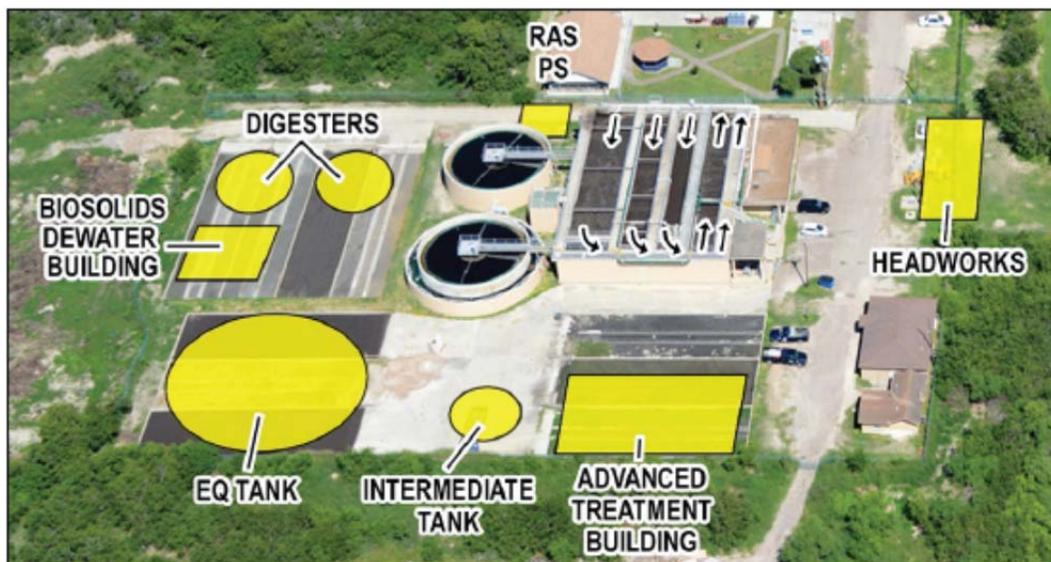


Figure 4. Proposed Layout of the PI WWTP with proposed process upgrades and advanced treatment processes for potable reuse

Project Elements and Technologies for Non-Potable Reuse (subcriterion 3)

The District has identified selected customers who currently use potable water for non-potable purposes. These include the Long Island Village Golf Course, the Port Isabel Little League Fields, and the adjacent Animal Shelter (see Figure 3). The water quality needed to meet these uses from a permitting perspective are different, as golf course irrigation requires only Type II water, whereas the irrigation of playing fields requires Type I water. However, the water quality requirements placed on the water by the prospective users will likely be more stringent than the minimum quality required by TCEQ.

The Little League Fields and Animal Shelter are operated by the City of Port Isabel, and they are located adjacent to Water Treatment Plant No. 1. Their close location to PI WWTP makes them good candidates for reclaimed water, and these sites will be evaluated as described in Task 3.

As a rule of thumb, golf courses require water with a TDS of less than 500 mg/L, whereas the current effluent at the Port Isabel WWTP has a TDS of approximately 1,500 mg/L, making it unsuitable for irrigation. The raw water provided by the District to the Long Island Village Golf Course also exceeds 500 mg/L at this time, which means the irrigation demands at the golf course are likely higher (to provide for sufficient leaching) than they would be with higher-quality water. This will be taken into account during the analysis of water demands and water quality requirements conducted under Task 3. A potential hurdle for this use will be the need to convey recycled water across the Port Isabel Channel as the Long Island Village development (including its golf course) are located on an island just east of the PI WWTP.

Port Isabel High School is another potential customer, but they have voiced concerns regarding the public health aspects of using reclaimed water on their playing fields. As the playing fields are located near Laguna Heights, adjacent to the existing pipeline that would convey advanced-treated water from PI WWTP to Reservoir No. 3 under the potable reuse alternative (see Figure 3), the water quality of the reclaimed water under such a scenario would be much higher than their existing potable water based on a number of measures, including salinity. This higher-quality water would not only be superior for irrigation purposes, but would support the public outreach effort needed to successfully connect this user.

Evaluation Criterion # 4: Stretching Water Supplies – 15 points

Postponing Alternative Water Supply Projects (subcriterion #1)

As evaluated in preliminary work for this study (described above, see also Figure 1), this reclamation project stretches the existing water supplies from the Rio Grande from the current status of water shortage to sufficient water through the year 2025. This estimate is conservative for the reasons stated above (recovery, potential to pump more wastewater to the reclamation plant) and may, in conjunction with the successful conservation campaign currently being implemented by the District, actually provide enough water for the next several decades. In addition, RO-treated water used for irrigation would reduce water demands for irrigation users as the leaching requirements would be reduced or eliminated.

Reducing Diversions from the Rio Grande (subcriteria #2 and #3)

The District's only current source of water supply is both a natural watercourse and host to

Federal water supply facilities in the form of the Amistad and Falcon reservoirs. This project would reduce diversions from the Rio Grande, which is operated under federal jurisdiction between the United States and Mexico Sections of the International Boundary and Water Commission (IBWC). The Treaty of February 3, 1944, for the Utilization of Water of the Colorado and Tijuana Rivers and of the Rio Grande, distributed the water in the international segment of the Rio Grande from Fort Quitman, Texas to the Gulf of Mexico. This treaty also authorized the two countries to construct, operate, and maintain dams on the main channel of the Rio Grande. Water rights in the Lower Rio Grande are served by the Falcon-Amistad system. Water below Amistad is allocated on an account basis, much like having a bank account with a constantly changing balance. Priority is given to all municipal accounts so, at the beginning of each year, each municipal account's storage balance is set to the authorized water-right amount. The municipal priority is guaranteed by the monthly reestablishment of a municipal reserve in the system of 225,000 acre-feet. That is equivalent to one year's average diversions for all municipal demand below Amistad for Texas users. Irrigation accounts, on the other hand, are not reset each year and must rely on balances carried forward. Each month, a determination is made as to how much unallocated water assigned to the United States is within the Falcon-Amistad system. If surplus water is identified, it is allocated to irrigation accounts on a monthly basis. When water is used, it is subtracted from the respective account by type of use from the account's usable balance. This system of accounting for water usage was put in place after an international treaty with Mexico was established in accordance with a district court ruling of 1969. The District's only account is Adjudication Certificate 0850-000, which is municipal.

Laguna Madre Water District's account is affected by Watermaster Rule §303.22(g) that states:

For each month of a proration period, the total amount of water authorized to be used for that calendar year by each of the four water rights listed in the following table will be incrementally reduced or restored in the following manner. When the United States' share of storage in the Amistad-Falcon system is less than 50% of its total storage capacity, each 1.0% drop or rise in reservoir storage will reduce or increase the unprorated annual authorization by a corresponding amount listed under proration reduction in the following table. Once the prorated annual authorization has been reached, no further reductions will be made. During any month in which proration has been in effect, any allocation for the listed water rights will be based on the reduced unprorated annual amount.

Certificate of Adjudication	Annual Authorization (Acre-feet) - Unprorated	Annual Authorization (Acre-feet) - Prorated	Proration Reduction (Acre-feet)
23-802	33,948.85	20,000.00	1,162.40
23-837	4,375.00	3,656.00	59.90
23-850 (LMWD)	3,750.00	2,000.00	145.80
23-851	2,522.50	1,642.00	73.40

LMWD was prorated from 1995 through 2002, and proration began again in 2012 and is currently implemented at its maximum reduction of 1,750 AF. Reclaimed water, or another alternate water supply, is necessary for the District to keep demand below the authorized diversion amount during drought conditions. Reducing diversions from the Rio Grande will also provide surplus water for agriculture and result in a reduction of crop losses.

The Laguna Madre Water District is a member of the Rio Grande Regional Water Authority (RGRWA), and the District actively participates in regionalization efforts. In November 2013, RGRWA and Reclamation completed a Lower Rio Grande Basin Study that determined the magnitude and frequency of water supply shortages in the area are severe. Population in the

eight-county region is expected to grow from 1.7 million in 2010 to 4.0 million in 2060, resulting in the need for an additional 592,000 ac-ft/yr of total water demand. The Study determined that climate change may likely increase the shortage by an additional 86,438 ac-ft/yr. As population increases in the Port Isabel wastewater collection system, this project allows 80% of wastewater to be recovered for either potable or non-potable reuse to augment Rio Grande water supply.

Environment and Water Quality – 15 points

The main environmentally relevant aspects of this project include reduced withdrawals from the Rio Grande and reduced and/or relocated effluent discharge from the PI WWTP.

Reduced and/or Relocated Discharges will Improve Water Quality in the Vadia Ancha (sub-criteria #1 and #3)

The Vadia Ancha is part of the Laguna Atascosa National Wildlife Refuge undergoing restoration as part of the Bahia Grande Restoration Project. The northern and southern portions of the Refuge are connected through habitat corridors supported in part by the District's existing reclaimed water project at the Laguna Vista WWTP. The restoration is anticipated to create or maintain potential habitat for a number of endangered or threatened species, including Ocelot, Kemps 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. A recent update on the restoration project web site notes, "With the hydrology restored, the tidally affected lagoon system is once again an important nursery for finfish such as red drum and shellfish such as shrimp and blue crab. The interior islands are attracting breeding waterbirds such as gull-billed terns, skimmers and more recently the first nesting pair of brown pelicans in south Texas since the 1920's."

The current discharge from the PI WWTP is associated with concentrations of heavy metals, specifically zinc and copper; in response, the District will be implementing a source control program and perform WET testing at the plant to track the improvement in this parameter (see Task 4e). With the implementation of a source control program, the overall concentrations of these parameters will be reduced, but relocating the effluent discharge will eliminate the discharge of these heavy metals and other constituents of concern into the Vadia Ancha altogether. It will also eliminate the discharge of (comparably) low-salinity water that might also negatively affect marine habitat.

Reduced Withdrawals may Increase Flow Conditions in the Rio Grande (sub-criterion #2)

The District's current source of water supply is the Lower Rio Grande. The Environmental Flows Recommendations Report published by TCEQ notes that the Texas Rio Grande system is significantly over-appropriated, but "that environmental flow standards adopted by the TCEQ [...] apply only to new permits or certain water rights amendments [...]." Therefore, any water left in the Rio Grande is available to serve the environmental flow requirements of the river, meeting a critical environmental need, especially during drought conditions.

Legal and Institutional Requirements – 10 Points

Two permitting requirements have been identified associated with the proposed project:

- 1) The discharge of RO concentrate, at an anticipated salinity of 15,000 mg/L, is not expected to

be an issue from a salinity perspective, as the salinity standard for the Port Isabel Channel is 30,000 mg/L (effectively seawater). Additional parameters, such as the heavy metals currently present in the PI WWTP effluent may need to be addressed through treatment and/or source control in order for TCEQ to grant a discharge permit. These issues will be addressed in Task 4e.

(2) Reuse permits must be obtained from TCEQ for both potable and non-potable uses. Since both proposed uses are “direct” (i.e., no discharge to and subsequent diversion from waters of the state), no additional appropriations are necessary. For non-potable uses, obtaining a reclaimed water authorization from TCEQ in accordance with existing regulations is straightforward and clearly outlined in 30 TAC 210. For potable uses, TCEQ permits projects on a case-by-case basis in accordance with the 30 TAC 290 - “Public Drinking Water” Innovative/alternate treatment clause, which allows permitting of any treatment process that does not have specific design requirements in 290.42(a) – (f) of this title.” Three direct potable reuse projects in Texas have been permitted under this clause to date, including the Raw Water Production Facility at Big Spring, which has been operating since May 2013. These permitting issues will be addressed in Tasks 2c and 3c.

Renewable Energy and Energy Efficiency – 10 points

While the energy required to operate an advanced treatment facility is significant, this can be partially offset by the reduction in pumping costs associated with conveying water from the Rio Grande some 25 miles away, and by energy efficiency improvements (such as blower replacements at the PI WWTP planned as part of this project). The study will consider offsetting the remaining additional energy requirements with the use of renewable energy; the District has moved towards this goal at its existing reclaimed water project through the installation of a wind turbine at the Laguna Vista WWTP. A preliminary estimate of the changes in energy usage expected under the proposed project has been tallied in the Table 2 below. The evaluations of specific energy efficiency measures will be addressed in Tasks 3f and 4d, and the evaluation of alternatives will include an energy efficiency criterion in the MCDA (Tasks 5d and 6). As shown in Table 2, energy efficiency and renewable energy components identified to date have the potential to offset over 40% of the energy required to run “standard” advanced treatment processes. Additional wind turbines would proportionally reduce the net energy requirements.

Table 2. Energy Balance for the Proposed Project			
Process Change	kW	MWh/year	Energy Offset
Advanced Treatment	229.2	2008	--
Blower Replacement	-37.1	-325	16%
Raw Water Pumping Cost Saved	-20.5	-180	9%
Wind turbine (100kW)	-37.1	-325	16%
Net / Total	134.5	1178	41%

Watershed Perspective – 10 points

The main purpose of the proposed project is to provide the District with a new source of water supply. As such, the reclaimed water itself is not intended to provide environmental benefits. However, the reduction in withdrawals from the Rio Grande provides benefits to this watershed as described above.

In addition, the successful implementation of a cost-effective, comparably low-energy (compared to seawater desalination) direct potable reuse project in the Rio Grande Valley could provide leadership for other neighboring utilities to pursue this alternative instead of continuing to rely on the dwindling water resources of the Rio Grande. This alternative also postpones the implementation of a small-scale seawater desalination facility previously planned by the District, which allows it to continue pursuing other regional water supply projects such as cooperation on regional brackish water desalination and regional seawater desalination without the imminent need for water driving project decisions.

Required Permits or Approvals

Two main permits are required for the project to move forward (discharge permit and either a non-potable reuse authorization and/or permitting of a new public water supply for potable reuse). These are discussed in detail in the Technical Study Description section on “Legal and Institutional Requirements.” As stated in the Technical Study Description section on the “Financial Capability of Sponsor,” the District has authorized the project, passed an official resolution approving this application, and has selected an engineer (Carollo) to perform the study. Approval of Carollo’s contract is on the Agenda for the District Board’s May 14, 2014 meeting. No additional permits or approvals are anticipated for this project.

Funding Plan

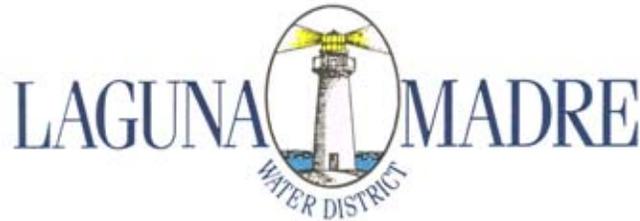
The District has funding mechanisms in place that will allow it to complete this project. The funding plan for the project has been described in the section on “Financial Capability of Sponsor.” In summary, the District has \$7,089,000 in non-Federal funds available for the implementation of this project. The Feasibility Study will determine the project costs required to complete the Port Isabel Water Reclamation Facility. Future funding opportunity announcements, and other available grants, will be pursued to obtain a Federal match to the District’s existing local funding availability.

The District intends to perform a rate study concurrently with the current feasibility study for a Port Isabel Reclaimed Water Facility to implement a rate structure that can fund operation, maintenance, and replacement costs for both the water and wastewater systems. The proposed reclaimed water improvements will be considered when developing a revised rate structure, including periodic rate increases, to fund annual operation and maintenance costs for the life of the proposed facility.

Official Resolution

The LMWD Board of Directors approved Resolution No. 105-04-14, agreeing to certain requirements of a WaterSMART funding opportunity for development of a feasibility study under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2014 for a proposed Port Isabel Water Reclamation Facility. A fully executed copy is included as a separate attachment.

WaterSMART: Development of Feasibility Studies under the Title XVI
Water Reclamation and Reuse Program for Fiscal Year 2014



**Port Isabel Water Reclamation Facility
Budget Proposal**

Applicant
Laguna Madre Water District
Carlos Galvan
General Manager
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Port Isabel, Texas 78578
Email: cgalvan@lmwd.org
Phone: (956) 943-2626 Ext. 110
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Study Manager
Charles F. Ortiz, P.E.
District Engineer
105 Port Road
Port Isabel, Texas 78578
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Phone: (956) 943-2626 Ext. 130
Fax: (956) 943-6827

May 4, 2014

Budget Proposal

The Feasibility Study will evaluate the existing Port Isabel Wastewater Treatment Plant and develop recommendations for proposed facilities needed to provide advanced-treated effluent suitable for non-potable and/or potable reuse water. Contractual work includes engineering services for the condition assessment, permitting compliance, and master planning of the required facilities for a Port Isabel Water Reclamation Facility. Budget is proposed for two District employees to provide services needed to complete a Feasibility Report to Reclamation. The applicant will request 50% reimbursement of actual costs incurred for the duration of the project. Any costs incurred above the Total Study Funding amount will be covered entirely by Laguna Madre Water District. Project object class categories are proposed as follows:

1. Salaries and Wages

Salaries and Wages for two District employees are included for the District's portion of work required to complete a Feasibility Study Report to Reclamation. Charles Ortiz, District Engineer, will serve as program manager. Services to be provided by the District include:

- a. Plant historical operation and maintenance data, as needed.
- b. Record of Maps, Drawings, as-built-Drawings, and Master Plans.
- c. Pertinent available documents concerning policies, procedures regulations, ordinances, local code requirements and permits that may potentially impact this project.
- d. Evaluation of energy efficiency projects to supplement the energy used by the proposed Port Isabel Water Reclamation Facility
- e. Evaluation of and public outreach regarding non-potable reuse customers as described under Task 3b subpart (1) a.-c. and Task
- f. Timely review of submittals
- g. Technical writing to prepare Feasibility Study Report to Reclamation

The two employees who will be performing these services are the District Engineer and AutoCAD/GIS Mapping Technician.

For District Engineer, Personnel Cost Calculation can be determined using an Annual Salary of \$104,484.90. There are 2080 hours per year, less 80 hours vacation time earned, less 56 hours holiday time allowed, and less 96 hours estimated sick leave resulting in Annual Working Hours of 1,848. Adjusted Hourly Rate is \$56.54. The District has a standard policy of implementing a 2.5% increase on the employee's annual evaluation date. District Engineer's Evaluation Date is September 13th.

For AutoCAD/GIS Mapping Technician, Personnel Cost Calculation can be determined using an Hourly Wage of \$17.415 x 2080 hours = \$36,223.20. Using same annual working hours of 1,848, adjusted hourly rate is \$19.60. AutoCAD/GIS Mapping Technician's annual evaluation date is January 26th.

2. Fringe Benefits

Fringe benefits are determined as follows:

- a. Employer portion of FICA (6.2 percent)
- b. Employer portion of retirement (13.87 percent)
- c. Insurance contribution by employer is \$491.80/month, or \$5,901.60/year

Therefore, fringe benefits for District Engineer is \$14.54/hour. Fringe benefits for AutoCAD/Mapping Technician is \$7.13/hour.

3. Travel

No Travel is proposed for reimbursement through this Cooperative Agreement.

4. Equipment

No Equipment is proposed for reimbursement through this Cooperative Agreement.

5. Materials and Supplies

No Materials and Supplies are proposed for reimbursement through this Cooperative Agreement.

6. Contractual

The majority of work will be completed through an Agreement for Professional Services between Laguna Madre Water District and Carollo Engineers, Inc. Engineering scope of work includes Facility Condition Assessment, Permitting Compliance Evaluation, and Facility Master Planning. Exhibit C, Fee Proposal, is provided to support contractual costs for the Port Isabel Water Reclamation Facility Upgrade.

7. Construction

No construction is proposed for this Cooperative Agreement.

8. Reporting

District Engineer will prepare Financial Reports on a semiannual basis as well as a Final Report. The hourly cost for this effort is included in Salaries and Wages and Fringe Benefits.

9. Other

No other costs are proposed for reimbursement through this Cooperative Agreement.

10. Indirect Costs

No Indirect Costs are proposed for reimbursement through this Cooperative Agreement.

11. Total Cost

The Total amount of study costs, including the Federal and non-Federal cost-share amounts are \$150,000 and \$150,054, respectively. Proposed cost-share is 50-50.

12. Budget Form

SF-424A, Budget Information – Nonconstruction Programs are included in this electronic submittal of Grant Application Package. Budget Proposal Format is provided in Table 2.

Table 1: Port Isabel Water Reclamation Facility Budget Proposal

Budget Item Description	COMPUTATION		Quantity Type	TOTAL COST
	\$/Unit	Quantity		
Salaries And Wages				
District Engineer	\$56.54	205	Hours	\$11,590.70
AutoCAD/GIS Mapping Technician	\$19.60	20	Hours	\$392.00
Fringe Benefits				
District Engineer	\$14.54	205	Hours	\$2,980.70
AutoCAD/GIS Mapping Technician	\$7.13	20	Hours	\$142.60
Contractual				
Carollo Engineers, Inc.	\$284,948	1	Not to exceed	\$284,948.00
Total Study Costs				\$300,054.00

**EXHIBIT C
LMWD PORT ISABEL WATER RECLAMATION FACILITY
FACILITY UPGRADE
Facility Condition Assessment and Master Plan
Fee Proposal**

2/26/2014

Task No.	Description	PM	QA/QC Prin. I	QA/QC Prin. II	DM	PE	Senior Staff Engr	Staff Engineer	EIT	Senior Techs & EAs	Techs & EAs	Support Staff	Total Hours (Carollo)	Cost (Carollo)	Other Direct Costs	Total Cost per Task
100	Facility Condition Assessment	42	0	4	52	144	36	146	26	0	0	8	458	\$ 86,599	\$ 4,600	\$ 91,200
101	Review Existing Facility Condition Reports					4			10				14	\$ 1,834		
102	Conduct Site Inspection of Facilities				16	20		8					44	\$ 9,003	\$ 1,300	
103	Evaluate Blower Replacement Options and Benefits	0	0	0	0	20	0	24	16	0	0	0	60	\$ 9,702		
	- Determine Benefits of Immediate Replacement					8		8	16				32	\$ 4,598		
	- Prepare Blower Replacement Recommendations and Specifications					12		16					28	\$ 5,104		
104	Identify Equipment in Need of Immediate Repairs or Replacement	0	0	0	0	52	16	56	0	0	0	0	124	\$ 22,947		
	- Electrical System including MCC Panels					16		16					32	\$ 5,910		
	- Blower Room HVAC System					4	16						20	\$ 3,874		
	- Basin Aeration System					16		8					24	\$ 4,569		
	- WAS System					4		8					12	\$ 2,148		
	- RAS System					4		8					12	\$ 2,148		
	- Aerobic Digester					4		8					12	\$ 2,148		
	- Effluent Disinfection System					4		8					12	\$ 2,148		
105	Develop Computer Model of Plant Hydraulics					4		24					28	\$ 4,832		
106	Technical Memorandum - Facility Condition Assessment				8	12	4	24				8	56	\$ 9,671		
107	Condition Assessment Progress Meetings (1)	10			12	16		10					48	\$ 10,012		
108	TM Review Meeting (1)	16		4		16							36	\$ 8,085	\$ 1,300	
109	Presentation to Board for Permitting and Compliance Assessment	16			16		16						48	\$ 10,514	\$ 2,000	
200	Facility Permitting Compliance	12	0	0	14	99	0	0	0	0	0	0	125	\$ 26,007	\$ 20,000	\$ 46,007
201	Brine Disposal Regulatory Compliance	2			3	15							20	\$ 4,183	\$ 3,000	
202	Heavy Metal Removal/Treatment					25							25	\$ 5,043	\$ 5,000	
203	Whole Effluent Toxicity Compliance					32							32	\$ 6,454	\$ 6,500	
204	Technical Memorandum - Facility Permitting Compliance	2			3	15							20	\$ 4,183	\$ 3,000	
205	Permitting Issues Progress Conference Call (1)	2			2	8							12	\$ 2,544	\$ 1,500	
206	TM Review Meeting (1)	6			6	4							16	\$ 3,599	\$ 1,000	
300	Facility Master Plan	70	26	36	94	182	42	174	12	84	0	26	746	\$ 143,126	\$ 4,617	\$ 147,743
301	Develop Options to Provide Potable Reuse Water	6	10	0	18	34	26	24	0	24	0	0	142	\$ 27,329	\$ -	
	Develop Treatment Train Options to Provide Reduction Credits	4	10		16	30	24	16					100	\$ 20,514		
	Develop Preliminary Facility Site Plans	2			2	4	2	8		24			42	\$ 6,815		
302	Develop Options to Provide Irrigation Reuse Water	6	0	0	4	16	8	8	0	24	0	0	66	\$ 11,794		
	Develop Options to Provide Irrigation Reuse Water	4			2	10	6						22	\$ 4,575		
	Develop Preliminary Facility Site Plans of Options	2			2	6	2	8		24			44	\$ 7,219		
303	Develop Facility Upgrade Phasing Options	0	0	0	3	16	0	18	0	0	0	0	37	\$ 6,926		
	Develop Sequencing Options to Keep Plant Operational During Const.				2	8		10					20	\$ 3,744		
	Revise Sequencing Options to Match Funding				1	8		8					17	\$ 3,182		
304	Evaluate Facility Upgrade Options	0	0	0	0	12	0	12	12	0	0	0	36	\$ 5,665		
	Develop Cost Estimates of Options					8		8	12				28	\$ 4,188		
	Evaluate Non-economic Factors of Options					4		4		0	0		8	\$ 1,478		
305	Review Project Funding Constraints	0	0	0	1	4	0	0	0	0	0	0	5	\$ 1,034		
	Review Available Funding				1	4							5	\$ 1,034		
306	Develop Implementation Plan	4	0	0	12	26	8	28	0	0	0	10	88	\$ 15,956		
	Recommend Treatment Option to be Implemented				8	16	8	16					48	\$ 9,258		
	Recommend Implementation Plan	4			4	10		12				10	40	\$ 6,698		
307	Technical Memorandum - Facility Master Plan	6	16	16	8	24	0	60	0	36	0	16	182	\$ 32,779		
	Prepare Draft Master Planning Technical Memorandum	4	16	16	4	16		40		24		10	130	\$ 24,267		
	Prepare Final Master Planning Technical Memorandum	2			4	8		20		12		6	52	\$ 8,512		
308	Master Planning Progress Meetings (4)	16			16	18		24					74	\$ 15,102		
309	TM Review Meetings (1)	16		4	16	16							52	\$ 11,712	\$ 2,000	
310	Presentation to Board of Master Plan	16		16	16	16							64	\$ 14,829	\$ 2,617	
	TOTAL FACILITY MASTER PLAN HRS	124	26	40	160	425	78	320	38	84	0	34	1,329			
	TOTAL FACILITY MASTER PLAN COST	\$ 29,599	\$ 6,752	\$ 10,388	\$ 36,272	\$ 85,723	\$ 14,953	\$ 53,664	\$ 3,903	\$ 11,735	\$ -	\$ 2,744		\$ 255,731	\$ 29,217	\$ 284,948

**RESOLUTION NO. 105-04-14 AGREEING TO CERTAIN REQUIREMENTS OF
A WATERSMART FUNDING OPPORTUNITY FOR DEVELOPMENT OF A
FEASIBILITY STUDY UNDER THE TITLE XVI WATER RECLAMATION
AND REUSE PROGRAM FOR FISCAL YEAR 2014 FOR A PROPOSED
PORT ISABEL WATER RECLAMATION 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 the Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Program, and

WHEREAS, the Laguna Madre Water District desires to develop a Port Isabel Water Reclamation 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 Galvan, 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 9th day of April 2014:

ATTEST:



Robert Vela, Secretary



Whitey Thomas, Vice Chairman

