San Antonio Water System

Proposed Feasibility Study
Brackish Groundwater Desalination Program
for the
U.S. Army Corps of Engineers

December 2014

Points of Contact:

William R. Peche
Director of External Affairs
San Antonio Water system
(210) 233 - 3851
william.peche@saws.org

Mike Parker
President
Welch Resources
(202) 841 - 1139
mikeparker13@yahoo.com

Pursuant to P.L. 113 - 121 SEC. 7001, the Water Resources Reform and Development Act of 2014, this document will serve as the San Antonio Water System (SAWS) submission for the Water Resources Infrastructure Report to Congress.

Table of Contents

0.0 Executive Summary

The Edwards Aquifer is an underground formation that provides clean drinking water to the South Texas region. The Edwards is used by the City of San Antonio, farmers, the military and other regional stakeholders as a primary source of fresh water. The Edwards is also the source of the Comal and San Marcos springs, which provide a habitat for eight endangered species.

The purpose of this request is to enlist the assistance of the U.S. Army Corps of Engineers in our next major capital project, which is to construct a Brackish Groundwater Desalination plant to treat brackish water from a formation known as the Wilcox Aquifer. Brackish water is made fit for public consumption through extensive treatment, and will diversify our water supplies away from the Edwards and improve our ability to care for the ecologically sensitive habitats that are fed by the Aquifer.

The Brackish Groundwater Desalination Plant will be the latest major water supply project undertaken by San Antonio Water System (SAWS) in the last 20 years. SAWS has built one of the largest underground storage and recovery reservoirs in the nation and a robust water recycling system. SAWS has also engaged in a very aggressive conservation effort: the City of San Antonio has reduced daily per-capita water use by 40% over the last 30 years. All of these efforts have been primarily to the benefit of the Edwards Aquifer ecosystem and the endangered species that live within it.

Each of these obligations has been shouldered by our ratepayers in a growing city. We have engaged all manner of state, local and federal interests for this project, and would like to engage the Army Corps of Engineers as it is the Federal entity with expertise and jurisdiction over this kind of environmental project.

This project falls within the mission areas of the Army Corps. It is a worthy cause for a city and utility that has already gone to great lengths on its own to protect endangered species while providing for the needs of a growing city.

1.0 Non-Federal Sponsor

The non-Federal sponsor of the program is San Antonio Water System (SAWS). There are no other non-Federal interests that will be contributing to the proposed feasibility study. SAWS provides water and wastewater services to over 1.7 million people in the City of San Antonio, Bexar County, as well as parts of neighboring Medina and Atascosa Counties. This includes more than 367,000 water connections and 415,000 wastewater connections. SAWS also provides services to a number of Federally owned facilities including the Audie Murphy Medical Center, a hospital owned by the VA, and two major military installations to include Joint Base San Antonio - Fort Sam Houston, and Joint Base San Antonio - Lackland.

2.0 Feasibility Study

This proposal is to request a feasibility study, in order to seek future authorization and funding through the U.S. Army Corp of Engineers (USACE), for SAWS Brackish Groundwater Desalination (BGD) Program.

This project would fall under the authority of the Army Corps of Engineer's Aquatic Preservation authority. It also falls under the Army Corps of Engineers secondary mission of Environmental Infrastructure development and preservation.

3.0 Project Purpose

San Antonio's main water supply is the Edwards Aquifer, although over the past two decades this has begun to change. Since the early 1990s, federal courts, the Texas Legislature, and the City of San Antonio have developed restrictive measures in order to protect the endangered species within the Edwards Aquifer and related spring flows.

SAWS has doubled its efforts on water conservation and development of alternative water supplies in order to diversify from the environmentally sensitive Edwards Aquifer. SAWS internationally recognized water conservation programs, both indoor and outdoor, resulted in a 40% reduction of per-capita water use over the last 30 years. Water diversification goals resulted in the creation of one of the largest recycled water networks in the nation, one of the nation's largest Aquifer Storage and Recovery facility, and the procurement of additional surface and groundwater supplies.

The next step for SAWS is to continue to procure drought resistant water supplies that will reduce reliance on the Edwards Aquifer, enable SAWS to meet its obligations regarding endangered species issues in the Comal and San Marcos Springs, and to meet future demand for the City of San Antonio. One of these water supplies is brackish groundwater desalination.

SAWS has previously developed two feasibility studies (Appendix 2 and Appendix 3). The purpose of these studies was to determine (1) the need for development of alternative water supplies to reduce future demand on the Edwards aquifer, (2) the feasibility of brackish groundwater desalination, and (3) to garner project support from federal, state and local leadership.

The BGD program will consist of three phases. Currently Phase I of the project is under construction and is scheduled to be complete in October of 2016. Phases II and III are anticipated to be complete in 2021 and 2026, respectively.

Phase	Million Gallons per Day (MGD)	Water Delivery Date
I	12	2016
II	12	2021
III	6	2026
Total	**30**	**-**

Though there has been extensive work done in the past on the BGD program, this requested feasibility study would help refine and reexamine the requirements for Phases II and III and to demonstrate that the program meets the mission of the USACE by utilizing an alternative water supply to reduce demand on the environmentally sensitive Edwards Aquifer.

4.0 Cost Estimate

The estimated cost to develop a feasibility study for the remaining BGD program would be approximately $500,000 for a standard feasibility study.

Below are additional costs that could be utilized for feasibility development. Currently SAWS and other federal and non-federal interests would be able to provide a body of existing work and evidence on the Edwards Aquifer spanning decades, as well as comprehensive studies on brackish groundwater desalination development. SAWS does not believe that any of the following items would be necessary in the requested feasibility study unless existing studies and methodology are unacceptable:

- Field Work / Environmental Work: $2,000,000
- Drilling Test Wells $1,500,000
- Testing and equipment: $ 900,000

The traditional point of entry into the Army Corps for non-Federal interest is the Water Resources Development Act (WRDA). However, there has been no WRDA signed into law since 2007, and therefore, no method to involve the Army Corps of Engineers in this project for many years. As a result, SAWS has moved forward with aspects of this project. A large body of work exists including previous feasibility studies, which could help inform future feasibility work.

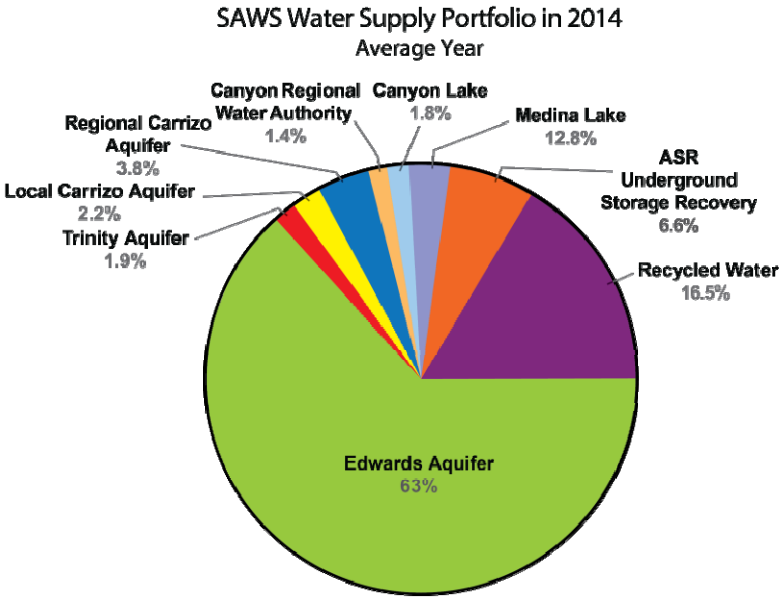
SAWS has begun Phase I of the project already, but additional phases remain and considerable value could be added by the Army Corps and its expertise for Phases II and III. Further, other federal efforts and SAWS in-kind services might be utilized to complete parts of the report to further reduce cost.

5.0 Environmental Benefits

A series of events in the 1990s culminated in the creation of the Edwards Aquifer Authority (EAA) by the Texas Legislature. Through several lawsuits by the Lone Star Chapter of the Sierra Club, federal intervention was a looming threat, so the creation of the EAA spurred locally-based solutions.

The directives given to the EAA are intended to promote effective management of the Edwards Aquifer leading to the protection of the endangered species dependent on Comal and San Marcos springs. Among the requirements placed upon SAWS is to maintain springflow even during a phenomenon such as the drought of record, a catastrophic event that occurred from 1950 to 1957, during which time the Comal springs dried up completely.

The Edwards Aquifer is San Antonio and the surrounding region's cornerstone water supply. The U.S. Fish & Wildlife Service (USFWS) has identified eight endangered and threatened species that reside in the Edwards Aquifer and/or the related San Marcos and Comal Springs. In 2007 the Texas Legislature passed Senate Bill 3, omnibus water legislation that restricts withdrawals from the Edwards during critical periods of drought, places a regional pumping cap of 572,000 acre-feet/year on the Edwards, and delineates regional co-operation. More recently, SAWS worked with stakeholders around the region to develop a Habitat Conservation Plan for the benefit of species and human needs associated with the



Edwards Aquifer. The plan was developed to maintain spring flow habitat for the federally endangered and threatened species within the aquifer ecosystem.

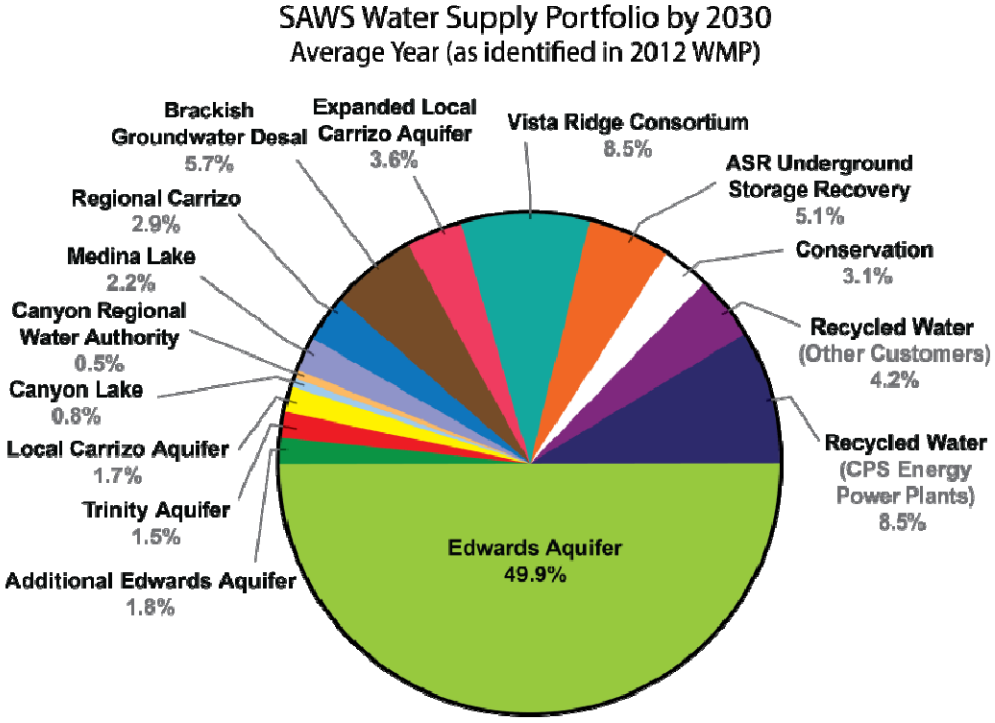
SAWS Water Planning

SAWS takes a conservative approach to water planning largely due to unpredictable weather patterns, regulatory uncertainty, and an expanding population base. In SAWS Water Management Plans, future water supply projects are planned based on demand of the system and a reoccurrence of the drought of record. SAWS current service area serves over 1.7 million people; and by 2070 the population is projected to be 2.8 million people. This increase in population would put a large strain on the already sensitive ecosystem within the Edwards Aquifer if additional measures are not taken to acquire alternative water supplies. Based on regulatory uncertainties, pumping restrictions tied to the endangered species in the Edwards Aquifer, and population growth, SAWS has determined that future phases of brackish desalination will be necessary and warrant additional investigation in order to meet the water management strategy for the City of San Antonio over the next 50 years. Not only will brackish desalination provide a sustainable source of water for future generations but it will help reduce reliance on the environmentally sensitive Edwards Aquifer.

6.0
7.0 Project Support

SAWS has received federal, state, and local support for the BGD program:

Bureau of Reclamation: SAWS worked diligently with the U.S. Bureau of Reclamation to develop a feasibility study for SAWS BGD program that would satisfy the requirements of the Title XVI Program. On June 21, 2011



SAWS received a letter indicating that SAWS feasibility study was complete and met the qualifications under the Title XVI program.

U.S. Fish and Wildlife Service (USFWS): SAWS has entered into an agreement partnering with USFWS on a Habitat Conservation Program, which works to preserve endangered species in the Comal and San Marcos Springs.

U.S. Environmental Protection Agency (EPA): EPA incorporated all three phases of SAWS BGD program into their Urban Waters Program. The EPA report recognizes the positive impact that the BGD program will have in preserving endangered species within the Edwards Aquifer and springs. The report states:

> "In addition to providing a new source of water that will help mitigate the effects of sustained drought in the area, the Brackish Groundwater Desalination Program will also help preserve endangered species within the Edwards Aquifer and its natural springs. The Edwards Aquifer is the source of the only two major springs remaining in Texas - the San Marcos and the Comal - which are home to several endangered species and feed the Guadalupe River Basin."

U.S. Army Corps of Engineers: Stakeholders at the Federal, State and Local levels have strongly encouraged Army Corps engagement, and SAWS has sought for some time to engage the Army Corps of Engineers. The point of entry to the Army Corps must happen through Congress and the Water Resources Development Act process, which has been unavailable for several years until now.

State of Texas: In 2002, Governor Rick Perry showed support for desalination by tasking the Texas Water Development Board (TWDB) to research and provide support for ocean desalination and later brackish groundwater desalination in the state of Texas. SAWS partnered with the TWDB during Phase I of the BGD program in order to secure low interest loans. To receive these loans, SAWS was required to submit a feasibility report and provide an environmental assessment of the land that the project would encompass. Additionally, SAWS has received support by numerous members of the Texas House of Representatives and state agency officials.

Local Level: On a local level SAWS has received support from then-Mayor Julian Castro, the San Antonio City Council, and SAWS Board of Trustees. Certain adjacent counties and cities have also expressed either support or neutrality, which is a considerable sign in a region with a history of feuds over water rights.

SAWS has worked diligently to engage all possible stakeholders who are affected by the Edwards Aquifer. It has also engaged every federal and state entity within whose jurisdiction these issues would fall.

8.0 Sponsor Financial Ability

SAWS is capable of providing the required cost share amount for the feasibility study. SAWS currently has over $4.1 billion in total assets, over $462 million in operating revenues, and a solid credit rating of Aa2 (Moody's), A (Fitch) and AA+ / AA (Standard & Poor). For more information regarding SAWS financials please refer to the 2013 comprehensive annual financial report: http://www.saws.org/who_we_are/Financial_Reports/CAFR/

9.0 Statement of Support

Please refer to Appendix 1 for letters of support.

Appendix 1: Letters of Support

- City of Floresville, TX Resolution
- 2009 Texas Water Development Board Resolution
- 2011 Texas Water Development Board Resolution
- 2013 Texas Water Development Board Resolution
- Joint Base San Antonio Commanding General Letter of Support

Appendix 2: U.S. Bureau of Reclamation Feasibility Study

- Bureau of Reclamation Feasibility Study

Appendix 3: SAWS Initial Feasibility Study

- San Antonio Water System (SAWS) Brackish Groundwater Desalination Feasibility Study dated October 29, 2008

Appendix 4: EPA Urban Waters Documentation

- Environmental Protection Agency (EPA) Urban Waters Final Work Plan
- Environmental Protection Agency (EPA) Urban Waters Press Release

Pursuant to P.L. 113 - 121 SEC. 7001, the Water Resources Reform and Development Act of 2014, this document will serve as the San Antonio Water System (SAWS) submission for the Water Resources Infrastructure Report to Congress.

Points of Contact for this document are:

William R. Peche
Director of External Affairs
San Antonio Water system
(210) 233 - 3851
william.peche@saws.org

Mike Parker
President
Welch Resources
(202) 841 - 1139
mikeparker13@yahoo.com

Alexander T. Silbey
President
ATS Communications, inc.
(571) 969 - 7050
atsilbey@me.com