



City of Phoenix Lake Pleasant Water Treatment Plant Design Build and Operate Project



The Phoenix Lake Pleasant Water Treatment Plant is one of the nation's first large-scale Design Build and Operate (DBO) water treatment plant projects. The City of Phoenix used the DBO approach to increase the speed of construction, foster technological innovation, reduce risk, and achieve lifecycle cost savings. Customer usage and operating conditions were different than originally anticipated, highlighting the potential impact of how risk associated with reductions in demand is allocated in service delivery agreements.

Now ten years after the execution the original Design, Build, Operate (DBO) Agreement, the Lake Pleasant Water Treatment Plant, one of the largest, highest profile DBO water treatment plants in the country, continues to serve as an important water supply option for the City of Phoenix. The City's choice to use DBO as the project delivery mechanism had little to do with access to capital, since Phoenix is a financially healthy city with excellent access to credit. Instead, Phoenix sought to reduce risk, improve project quality, increase operational efficiency, and achieve lifecycle cost savings over a traditional Design Bid Build (DBB) project. However, due to lower than anticipated water demand growth, the plant is currently operating at production levels significantly

below what was forecast when the City signed the original DBO agreement. The City was able to renegotiate the terms of the agreement in 2014 leading to a significant reduction in annual expenditures.

Key Project Details

Table 1. Key Project Details

Project Title:	Lake Pleasant Water Treatment Plant Design Build and Opearate (DBO) Project
Primary Facility:	Drinking water treatment plant (80 mgd)
Local Government Entity:	City of Phoenix
Primary Partner(s):	American Water Services (Project Leader and Operations), Black & Veatch (Design), and McCarthy Building Companies (Construction)
Delivery Model:	Design Build and Operate (DBO)
Contract Period:	15 years
Population Served:	Approximately 1.535 million people served by entire Phoenix Water System (2016) ¹
Major Initial Outlays:	\$605,000 for project delivery model analysis and evaluation ² \$6.8 Million (estimated) for professional services during procurement ³ \$228,846,090 for DBO design/build fee including permitting, design, construction, and start up ⁴
Flow of Revenues:	City of Phoenix sets rates, collects fees, and uses revenues to pay debt service on City issued bonds for DBO design/build fee and to pay contractually required annual DBO operating fees

Background

The City of Phoenix water system serves approximately 23% of the population of Arizona (1.535 Million).⁵ The City relies primarily on surface water directly withdrawn from area watersheds, water supplied through large federal and state water supply projects such as the Salt River Project (water from Salt and Verde Rivers), and water from the Central Arizona Project (water from the Colorado River).⁶ Historically, the cost of water to customers in Phoenix has been low compared to many other utilities across the country. A survey of large water utilities in 2016 found Phoenix had the lowest rates of any major water utility in the country, with an annual cost of slightly more than \$80 for 60,000 gallons.⁷

The genesis for the Lake Pleasant Water Treatment Plant can be traced to the 1992 City of Phoenix Water Master Plan, which recommended constructing a drinking water treatment plant that was capable of using water from the Central Arizona Project.⁸ In the late 1990s, the City of Phoenix realized that it would need to

¹ Kathryn Sorensen (Director of Phoenix Water Services), email message to author, July 13, 2016.

² City of Phoenix Request for Council Action (RCA) Items. June 9, 1999.

³ Gritzuk, Michael. *Recommendation for Project Delivery Methods for the Future Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. January 11, 2000.

⁴ Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

⁵ *2011 Phoenix Water Resource Plan*. City of Phoenix Water Services Department.

⁶ *ibid*

⁷ *The State of Public Water in the United States*. Food and Water Watch. February 2015.

⁸ *City of Phoenix Civic Improvement Corporation Junior Lien Water System Revenue Bonds Series 2005. Appendix C: Engineering Review of the Water System*. June 2, 2005.

build a new drinking water treatment plant to supply households in the growing northern part of the city.⁹ The City included this expansion in its five-year Capital Improvement Program (CIP).¹⁰ The City considered a variety of delivery models and eventually chose the Design Build, Operate (DBO) model. At the time, City staff recommended proceeding with the project, as they believed that the City would be unable to serve the northern part of the City's service area if the plant was not operational by 2007.¹¹

In 2003, the City awarded the DBO agreement to a consortium comprised of American Water Services, Black & Veatch, and McCarthy Building Companies. Through this agreement, the City retained ownership of the plant and rate-setting responsibility. McCarthy Building Companies managed plant construction, Black & Veatch managed design, equipment procurement, and start-up, while American Water Services, Inc. (American Water) managed the overall project and continues to manage operations post-construction. At the time it opened, the plant was the largest drinking water DBO project in North America. The plant's current capacity is 80 million gallons per day (mgd), and it could be expanded to provide 320 mgd. The plant has received several awards for its use of new technology, including a ballasted flocculation process for high-rate sedimentation, automation, and design that uses local materials.¹² The project also included a new raw water intake on Waddell Canal,¹³ a pump station, two miles of raw water pipeline, two finished water storage reservoirs with 40 million gallon capacity, and carbon regeneration equipment.¹⁴

⁹ *Lake Pleasant Water Treatment Plant*. American Water. June 9, 2009.

<http://www.amwater.com/files/LakePleasantCaseStudy06.16.09.pdf>

¹⁰ *City of Phoenix Civic Improvement Corporation Junior Lien Water System Revenue Bonds Series 2005*. June 2, 2005.

¹¹ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

¹² *Lake Pleasant Water Treatment Plant*. Water Design-Build Council. 2015. <http://waterdesignbuild.com/water-design-build-projects/lake-pleasant-water-treatment-plant-az/>

¹³ *Lake Pleasant Water Treatment Plant*. American Water. June 9, 2009.

<http://www.amwater.com/files/LakePleasantCaseStudy06.16.09.pdf>

¹⁴ Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

Project Development and Procurement

The City engaged several advisors during the project development phase to evaluate potential project delivery models and to help with early phase implementation activities such as planning meetings with key stakeholders (see Table 2). The advisors joined City staff to create a “study team” that was responsible for carefully evaluating various project delivery models and making a final recommendation to City Council.¹⁵

Table 2. Primary Advisors to City of Phoenix for Evaluating Service Delivery Mechanisms (1999)¹⁶

Company	General Responsibility	Approximate Cost
Greely and Hansen	Coordinated team of engineering, legal, and financial advisors	Not to exceed \$250,000
Hawkins, Delafield & Wood	Researched procurement law, provided legal feedback on options, and prepared legal summary documents	\$63,750
Malcolm Pirnie	Participated in interviews and jointly prepared technical memorandums	\$201,801
Raftelis Financial	Evaluated financial and economic impacts of alternative project delivery methods	\$89,380
		Total \$604,931

The project delivery evaluation process occurred throughout 1999; during this period the City of Phoenix considered 11 different delivery models for the project. The study team evaluated the potential models against a set of 24 core values (e.g. compliance with regulations, minimized costs, viability in market place, etc.). The study team selected these core values based on consultation with stakeholders and legal/financial advisors. The evaluation of core values narrowed the list of delivery methods to three: Design-Bid-Build in consultation with the City Water Services Department, Design-Build with City Operations, and DBO with a private partner. The study team evaluated these three options based on estimated net present value lifecycle costs, time to completion, risk, and track record of success.¹⁷

City staff presented the results of the evaluation to the City Council Environment and Natural Resources Subcommittee on December 15, 1999 and to the full City Council in January of 2000. The evaluation team and City Council Environment and Natural Resources Subcommittee recommended proceeding with the DBO model, and City Council adopted the recommendation in January 2000.¹⁸ Later that year, the State of Arizona amended state law to authorize the use of new project delivery methods including DBO.¹⁹

As part of the project development process, the City calculated a “benchmark” cost target that reflected what the City believed the project would cost to construct and operate using more traditional service models (such as a Design, Bid, and Build and public operation). The City established a savings goal of 8% to 16% that it hoped to realize by using alternative delivery mechanisms. Members of both the Environment and Natural Resource Sub

¹⁵ Gritzuk, Michael. *Recommendation for Project Delivery Methods for the Future Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. January 11, 2000.

¹⁶ City of Phoenix Request for Council Action (RCA) Items. June 9, 1999.

¹⁷ *Environmental and Natural Resources Subcommittee Meeting Minutes*. City of Phoenix City Council. December 15, 1999.

¹⁸ Gritzuk, Michael. *Recommendation for Project Delivery Methods for the Future Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. January 11, 2000.

¹⁹ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

Committee and full City Council cited the anticipated maximum estimated net present value lifecycle cost savings (\$32 Million) as a critical reason for selecting the DBO model.^{20,21}

The City issued a Request for Qualifications (RFQ) in November of 2000.²² In July of 2001, the City invited three firms to begin the proposal process, which consisted of submitting preliminary technical proposals, revised preliminary technical proposals, financial technical proposals, and price proposals. On September 5, 2001, the City issued the formal Request for Proposals (RFP) outlining the project requirements for the three pre-qualified firms and issued subsequent addenda until November 8, 2002. During this time, the City provided the firms with “reasonable” access to the plant site and key utility assets that would be needed for the project. The City provided each team with a stipend of \$100,000 to offset some of the costs of participating in the proposal process.²³ The firms submitted preliminary technical proposals on December 5, 2001, and the City held individual meetings with the proposers to clarify aspects of their preliminary proposals in January 2002. The City worked with the proposers from March 2002 to May 2002 to clarify and revise the proposed service agreement that would govern the project terms. The firms submitted their final technical proposals and price proposals on November 22, 2002.²⁴

After evaluating and scoring the three proposals, the selection team recommended that the City award the DBO agreement to Earth Tech Consortium, as it’s proposal was the highest rated and presented the lowest lifecycle cost. City Council awarded the agreement to Earth Tech Consortium on April 30, 2003. However, in June of 2003, the City rescinded the contract after Earth Tech Consortium was unable to post the required performance bond; Earth Tech Consortium subsequently withdrew its proposal.²⁵

After Earth Tech Consortium withdrew, the City evaluated other options that included switching from a DBO approach to other procurement models. The City Water Services Department recommended selecting the second rated proposal submitted by the All American Water Team, which was comprised of American Water Services Inc., Black and Veatch, and McCarthy Building Companies. The City Manager’s Office, on the other hand, recommended returning to the Construction Manager at Risk (CMAR) model used previously to build other Water Services Department facilities, stating concerns “that so far the DBO process has had many uncertainties and difficulties and that this first-time process will continue to be problematic.”²⁶ Despite these concerns, on July 3, 2003, the City Council approved the recommendations of the City Water Services Department and awarded the DBO contract to American Water Services Inc. on behalf of the entire All American Water Team.²⁷

In August 2003, the City Water Services Department issued a notice to begin the permitting and design work under the agreement. The project required the City to obtain 48 separate permits from a variety of state and federal agencies. Construction of the plant began on June 1, 2004.²⁸ In February 2007, the City declared that the

²⁰ *Environmental and Natural Resources Subcommittee Meeting Minutes*. City of Phoenix City Council. December 15, 1999.

²¹ Gritzuk, Michael. *Recommendation for Project Delivery Methods for the Future Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. January 11, 2000.

²² *Lake Pleasant Water Treatment Plant Design-Build-Operate Project Service Agreement*. City of Phoenix, Arizona, Water Services Department. August 2003.

²³ Nathan Wright (Management Assistant, Phoenix Water Services), email message to author, April 8, 2016.

²⁴ *Lake Pleasant Water Treatment Plant Design-Build-Operate Project Service Agreement*. City of Phoenix, Arizona, Water Services Department. August 2003.

²⁵ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

²⁶ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

²⁷ *ibid*

²⁸ Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

plant was substantially completed. The operation phase of the plant under the DBO agreement officially began in June 2007.²⁹

Timeline

Table 3. Select project milestones

Date	Milestone
1992	City of Phoenix Water Master Plan recommends constructing a water treatment plant that is capable of using water from the Central Arizona Project. This is the genesis for the Lake Pleasant Water Treatment Plant. ³⁰
June 1999	City Council approves professional services agreements to evaluate alternative delivery mechanisms.
January 2000	City Council approves moving forward with the DBO model to construct water treatment plant.
April 2003	City Council awards DBO contract to Earth Tech Consortium.
June 2003	Earth Tech Consortium does not post the payment and performance bonds stipulated in contract; City Council rescinds contract award to Earth Tech Consortium. ³¹
July 2003	City Council awards DBO contract to American Water Services, Inc. on behalf of the All American Water Team. ³²
August 2003	City of Phoenix executes a DBO agreement with American Water Services, Inc. ³³
June 2004	Construction of the plant begins.
June 2005	The City issues revenue bonds for long-term financing of project. ³⁴
February 2007	Plant is substantially complete; plant performance testing is complete.
June 2007	Operation terms of DBO agreement officially begin. ³⁵
January 2014	The City modifies terms of DBO agreement to reduce the amount of water it receives from the plant.

Key Financial Features and Outcomes

The City of Phoenix structured the Lake Pleasant Water Treatment Plant DBO agreement to include a “design/build” payment of \$228,846,090 to cover the permitting, design, construction, and start-up of the facility, as well as a separate series of operation service fees during the life of the agreement.³⁶

The DBO design/build fee did not include any of the project development costs incurred by the City leading up to the award. A financial analysis done as part of the service delivery model presented estimates for project development costs, including “multi-disciplinary” professional services during procurement (\$1.5 Million),

²⁹ Nathan Wright (Management Assistant, Phoenix Water Services), email message to author, April 8, 2016.

³⁰ *City of Phoenix Official Bond Statement Appendix C: Engineering Review of the Water System*. June 2, 2005.

³¹ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

³² Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

³³ *Lake Pleasant Water Treatment Plant Design-Build-Operate Project Service Agreement*. City of Phoenix, Arizona, Water Services Department. August 2003.

³⁴ *City of Phoenix Civic Improvement Corporation Junior Lien Water System Revenue Bonds Series 2005*. June 2, 2005.

³⁵ Nathan Wright (Management Assistant, Phoenix Water Services), email message to author, April 8, 2016.

³⁶ Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

preparation of preliminary design used for the request for proposals (\$3.5 Million), and legal costs for preparation of all contract documents (\$1.8 Million). The City used an appropriation from its Capital Improvement Program (provided from tax-exempt bonds issued in 1996) to cover these costs as well as the costs associated with the initial service delivery model evaluation work.³⁷

The City eventually financed the design/build portion of the DBO agreement with tax-exempt bonds that were issued in 2005 by the City of Phoenix Civic Improvement Corporation. The project was included in \$600 million in junior lien (subordinated) revenue bonds collateralized by the entire water system. The bond issue was structured with serial bonds maturing in years 2010 – 2027 and a term bond maturing in 2029. Yields to investors ranged from 3.07% to 4.11%. The principal repayment schedule was structured to provide level debt service payments over the 20-year repayment period.³⁸ The City relies on water utility user fees and charges to make debt service payments.

The operations and maintenance component of the agreement specifies the payment of an Annual Service Fee (ASF) that is comprised of a fixed component, a variable component, and pass through charges. The original agreement provided the City with the opportunity to select one of three potential desired average day delivery volumes every year of the agreement, each with a different fixed fee that the City would have to pay for that year. At the time the agreement was executed, the three production levels were 40 mgd, 55 mgd, and 70 mgd, and the fixed charge portion of the service fee was \$5,154,605, \$5,777,763, and \$6,413,473 respectively. Under the agreement, the City pays directly for electricity.³⁹

At the time the agreement was executed, the net present value of the estimated fixed portion of the service fees was \$115.5 million for the 15 years term of the agreement.⁴⁰ The fixed fee portion of the agreement covers labor and materials costs of operating the facility, including major maintenance, repair, and replacement costs.⁴¹ Major capital repairs and replacements are included in a maintenance plan. Under the agreement, the City can request and pay for additional capital modifications.

According to City reports, the inclusiveness of the DBO agreement in terms of covering the costs and risks of building and operating the plant was one of the primary drivers for choosing the DBO model.⁴² Table 4 shows the allocation of risk responsibility for select areas. Under the agreement, American Water absorbed the majority of operational risks and had to assure the City that the plant produced specific volumes of water at very high quality levels. The agreement did allocate some operational risk to the City, including electricity price increases; however, it protected the City from jumps in energy use through payment clauses that incorporated maximum allowable energy usage.⁴³

Table 4. Allocation of Select Risk Responsibilities under the Original Phoenix Design Build and Operate (DBO) Agreement ⁴⁴

³⁷ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

³⁸ *City of Phoenix Civic Improvement Corporation Junior Lien Water System Revenue Bonds Series 2005*. June 2, 2005.

³⁹ *Lake Pleasant Water Treatment Plant Design-Build-Operate Project Service Agreement*. City of Phoenix, Arizona, Water Services Department. August 2003.

⁴⁰ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. City of Phoenix. July 2, 2003.

⁴¹ *ibid*

⁴² Gritzuk, Michael. *Lake Pleasant Water Treatment Plant Project Update*. City Council Report. City of Phoenix. January 13, 2005.

⁴³ *Lake Pleasant Water Treatment Plant Design-Build-Operate Project Service Agreement*. City of Phoenix, Arizona, Water Services Department. August 2003.

⁴⁴ Fairbanks, Frank. *Lake Pleasant Water Treatment Plant Project*. City Council Report. July 2, 2003.

Risk Category	Responsible Parties	Description
Construction and Permitting	American Water Services	Responsible for all issues related to integration of design and construction. Fixed design/build price includes initial construction and delivery of completed project by February 2007.
	City of Phoenix	Responsible for assisting with permitting.
Financing	American Water Services	Responsible for financing during construction, but retains no equity in facility after construction is completed.
	City of Phoenix	Responsible for obtaining and retiring debt used for facility.
Operations and Maintenance	American Water Services	Responsible for assuring proper functioning of plant for life of agreement.
	City of Phoenix	Responsible for any operation and maintenance charges beyond what is specified in agreement; responsible for increases in electricity prices.
Capital Modification	American Water Services	Responsible for repairs and replacements as specified by agreement.
	City of Phoenix	Responsible for major modifications beyond what is specified in agreement.
Finished Water Quality	American Water Services	Responsible for meeting water quality standards above requirements of other City of Phoenix facilities and US EPA Standards.
	City of Phoenix	Agreement accommodates anticipated future water quality needs. The City is responsible for added cost of chlorine if it requests chlorine residuals higher than 1.3 mg/L.
Demand	American Water Services	Agreement includes a minimum production amount (mgd) that the City is required to purchase regardless of whether it is needed.
	City of Phoenix	Agreement includes a minimum production amount (40 mgd) and associated fee that the City must pay even if actual demands fall below that level.

At the time of the execution of the agreement, the City estimated that the net present value of design/build and operating costs under the DBO agreement would be 7% lower than if they had used a traditional Design Bid Build and public operation approach. These estimated savings were slightly less than the original estimated savings target (8% to 16%) cited at City Council meetings when the DBO approach was approved in 1999 and 2000. During the early evaluation of service delivery models, the anticipated design and construction cost savings were highlighted more than any additional anticipated operation and labor cost savings. However, the study team envisioned that the approach would incentivize technological innovation to decrease operation costs. Leadership from several of the City's labor unions voiced their opposition to the DBO approach when it was presented to City Council.⁴⁵ The City operated several water treatment facilities, and as such, was experienced with staffing and operating facilities.

In the end, the financial impact of choosing a DBO model over other models can never be calculated exactly because it requires comparing an option that was actually implemented with an option that was only modeled using the best available assumptions at the time. Water Department leaders reported being pleased with the design and build aspects of the project and believed the project delivery methodology resulted in a well built, functioning facility at a reasonable cost.⁴⁶

The ultimate financial impact on customers on the operations cost side is more complicated. Department staff believed that the original structure of the DBO operations agreement was based on water demand assumptions that never fully materialized, which led the City to pay more for operation than it would have if it had run the plant by itself. For this reason, the City considered exercising the buyout clause to terminate the agreement in 2012.⁴⁷ Water supply demands and growth patterns in the City changed substantially since the plant was planned and constructed, and population growth in Phoenix has been slower than originally anticipated. In addition, the City of Phoenix, like many urban water systems across the country, has experienced unprecedented drops in water demand over the last 10 years. The 2000 Water Resources Plan Update projected that the average day demand in 2010 would be 363 mgd.⁴⁸ However, the 2011 Water Resources Plan reported that actual average day demand in 2010 was approximately 300 mgd, a 16% decline since peak demand year of 2002, even while population increased by almost 8%⁴⁹ (see Figures 1). As a result, the City did not need the water volume that it had originally forecast.

⁴⁵ *City Council Policy Session*. City of Phoenix City Council. January 11, 2000.

⁴⁶ Nathan Wright (Management Assistant, Phoenix Water Services), email message to author, April 8, 2016.

⁴⁷ Kathryn Sorensen (Director, Phoenix Water Services), telephone interview with author, October 9, 2015.

⁴⁸ *City of Phoenix Civic Improvement Corporation Junior Lien Water System Revenue Bonds Series 2005. Appendix C: Engineering Review of the Water System*. June 2, 2005.

⁴⁹ *2011 Phoenix Water Resource Plan*. City of Phoenix Water Services Department.

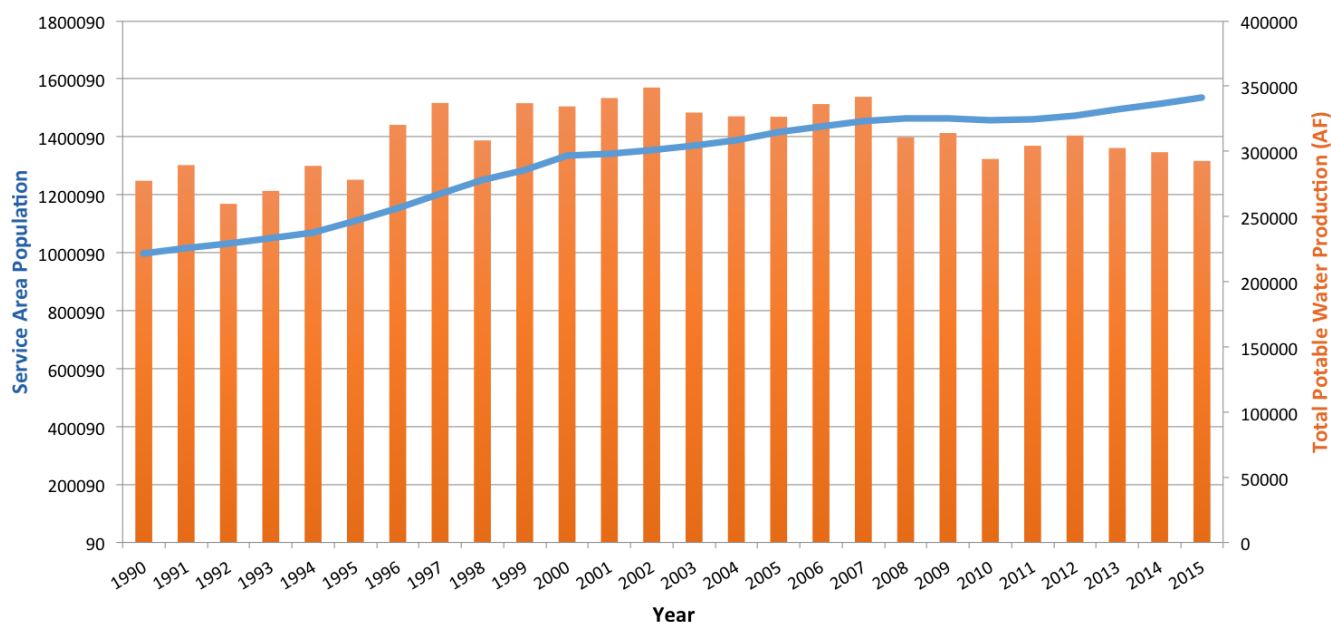


Figure 1. Water Demand and Population Growth.⁵⁰

Since going into operation, the City had selected and paid for the minimum level of production from the plant (40 mgd). By 2011, the City determined that the plant was producing more water than needed and at an elevated per unit cost due to the high water quality standards that had originally been specified in the agreement. The City had required that the plant be designed to provide water with very low levels of disinfection by-products such as Trihalomethane (THM) under the assumption that water from the treatment plant would be needed to serve areas far away from the plant. Very low levels of THM in water from the plant would allow for THM increases that would be expected during transmission. The plant was designed to produce water at 40 parts per billion (ppb) THM, well below the US EPA Safe Drinking Water Standard of 80 ppb.⁵¹ Treating water to 40 ppb THM requires additional chemical and operating procedures beyond what would be required to meet the current federal requirements, resulting in increased costs. However, the plant's water has not been needed in those distant service areas, and water quality models show that the water would meet all regulatory requirements if the THM levels were adjusted.

The City estimated that renegotiating the agreement to purchase 25 mgd instead of the 40 mgd minimum in the original agreement would save \$1.1 Million a year.⁵² Furthermore, the City estimated that setting the THM "not to exceed" level at 60 ppb rather than 40 ppb would save an additional \$200,000 per year. In the end, Phoenix was able to successfully renegotiate the agreement to allow for lower volumes and less strict THM standards. The revised agreement terms became effective January 1, 2014.⁵³ This reduction required the installation of variable frequency drives (VFDs) in the Lake Pleasant Pump Station. By the terms of the agreement, the City was responsible for the costs of this modification for a total cost of approximately \$2 Million.⁵⁴

⁵⁰ Kathryn Sorensen (Director, Phoenix Water Services), email message to author, April 8, 2016.

⁵¹ Table of Regulated Drinking Water Contaminants. US Environmental Protection Agency. July 15, 2016. <https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants>

⁵² Sorensen, Kathryn. Proposed Opportunities for Operational Savings at the Lake Pleasant Water Treatment Plant. City Council Report. City of Phoenix. November 19, 2013

⁵³ *First Amendment to the Service Agreement for the Design, Construction and Operation of the Lake Pleasant Water Treatment Plant Project*. Contract No. 107745-01. City of Phoenix. January 1, 2014.

⁵⁴ City of Phoenix Ordinance S-41768, May 27, 2015

The DBO experience in Phoenix highlights the potential for risk allocation to result in financial implications at the construction and operation phases of the agreement. Risks are often presented and discussed at the outset of a project in hypothetical terms, but the financial impact of a risk allocation decision is never fully experienced until after a project is implemented. From the City's perspective, the transfer of construction, permitting, and design risk at the project outset contributed towards the on-time and on-budget delivery of a complex multifaceted project. On the other hand, the City's retention of demand risk eventually did carry significant financial implications in the form of operation costs that were higher than if the City had not entered into the agreement. While the City was able to re-negotiate the agreement and minimize this impact, water department staff believed the structure of the original agreement limited their operational flexibility so much that the staff seriously questioned the use of similar long-term operation agreements in the future.⁵⁵

⁵⁵ Kathryn Sorensen (Director of Phoenix Water Services), telephone interview with author, October 9, 2015.

Appendix A. Simplified Project Financial Flows

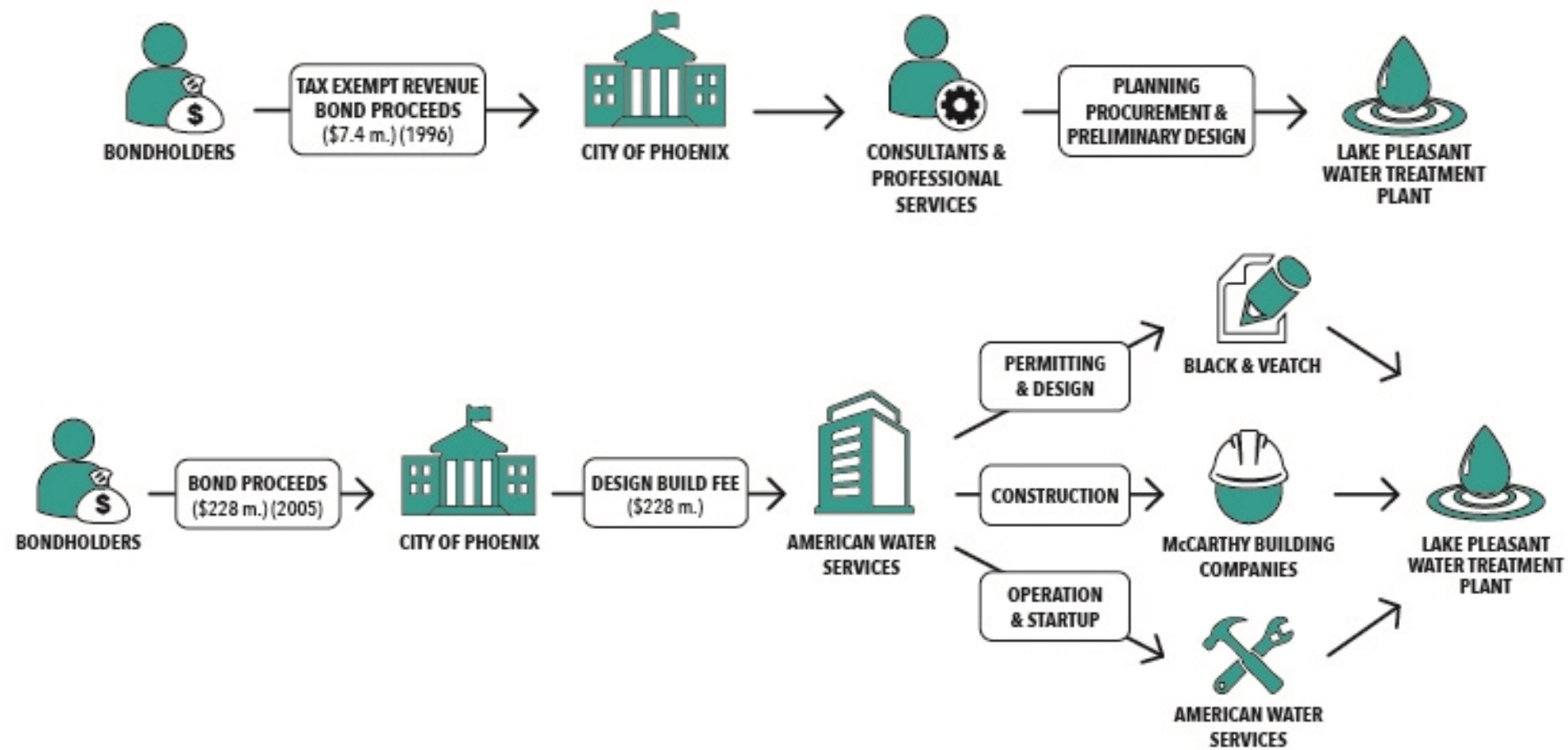


Figure 1. Flow of Initial Project Outlays

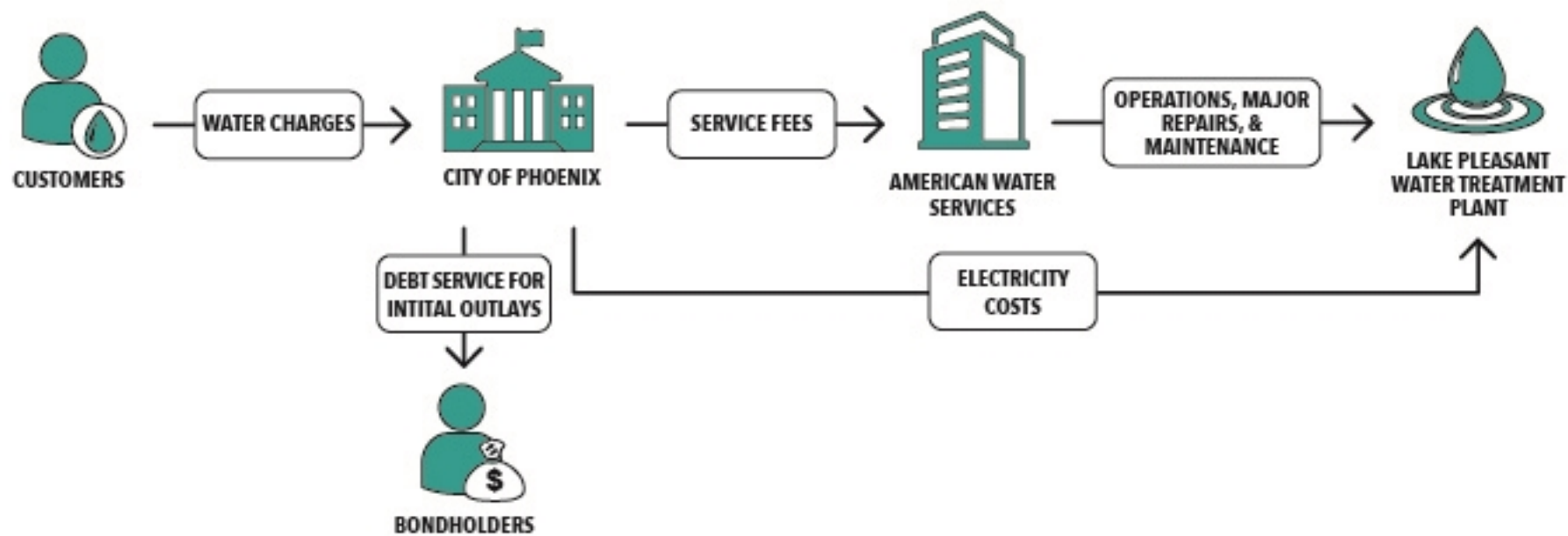


Figure 2. Recurring financial flow

Acknowledgements

Written by Jeff Hughes[†]

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[†]Jeff Hughes is a member of the United States Environmental Protection Agency's Environmental Finance Advisory Board.

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About the Water Infrastructure Resiliency Finance Center

The Water Infrastructure and Resiliency Finance Center identifies financing approaches to help communities make better informed decisions for drinking water, wastewater, and stormwater infrastructure that are consistent with local needs.

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