



EXECUTIVE SUMMARY

The largest integrated design-build-operate project in North America was delivered in a public-private partnership thanks to close cooperation, communication and collaboration. Today, that project – the Lake Pleasant Water Treatment Plant – provides high quality drinking water to more than 400,000 households in the sprawling and rapidly growing city of Phoenix, Ariz.

To quickly meet the growing population's demand for more clean water and to meet current and future regulations, the city in August of 2003 awarded a design-build-operate (DBO) contract to American Water Services, Inc. It marked the first private operation and maintenance of a water facility for the city of Phoenix. The project team included the city as owner with control of the rate-setting process; American Water as the prime contractor, operator and project guarantor or sole contact for the city of Phoenix; and a joint-venture design-build team of Black & Veatch and McCarthy Building Companies, Inc. Completed on a fast track thanks to the innovative DBO contract, construction began in July of 2004, by February of 2007 the plant was substantially completed, and in June of 2007 the Lake Pleasant Water Treatment Plant (LPWTP) was contractually completed (see Selected Project Fast Facts and Highlights.)

With nearly 400 people involved, smooth and responsive flow of information was vital to an on-time and on-budget completion. The integrated team – utilizing state-of-the-art software, regular coordination sessions and open lines of communication – worked from the same office to streamline delivery. A year-long design planning process aided in eliminating time between construction phases, and a six-year project was cut to four years.

Advance planning and deep collaboration with sub-contractors helped the team to overcome significant challenges, such as escalating material costs and substantial labor shortages in the Phoenix area. The project required careful coordination and involvement with more than a dozen government agencies, including the Arizona State Land Department. By using phased permitting, the change orders were few during the 42-month design, permitting and construction schedule. As a result, construction began two months early, saving the city nearly \$30 million.

At every phase of development, safety was at the top on the list of priorities. Despite a multi-year construction schedule with more than 900,000 man-hours, a comprehensive safety program produced near perfect results. The project was completed with zero lost-time accidents (see Selected Project Fast Facts and Highlights.)

The LPWTP, built with an eye toward future generations, incorporates the latest in modern water treatment technology and automation, many of which are firsts for the city of Phoenix. The 80 million gallons per day facility – expandable in 80 mgd increments to an ultimate capacity of 320 mgd – uses multiple barriers for

pathogen, virus and bacteria removal. The selected water treatment processes achieve superior operating and cost efficiency with numerous improvements specific to residents' needs, the local environment and available resources.

The raw water begins at the Central Arizona Project's Waddell Canal, where a pump station – also built as part of the project – pumps water to the treatment plant. A two-mile pipeline 90 inches in diameter carries the raw water to the treatment facility, which is able to treat water of any quality at maximum capacity. Two 20 million gallon buried reservoirs and a finished water pumping station are located at the main plant site.

Not only does the LPWTP provide a reliable supply of safe drinking water that meets or exceeds all requirements of the Safe Drinking Water Act, it was built with foreseeable future regulations in mind. The plant is included in the Partnership for Safe Water program as well as other benchmarking performance programs.

Environmental stewardship to minimize carbon footprint has long been very important to the City and the Team. So, sustainability of project features was an important element of the exhaustive design detailing. The team was committed to control environmental impacts to air, groundwater, surface water, ambient noise, light emissions, traffic, waste disposal and fuel handling.

The city and the team maintained a high standard of ecological responsibility throughout. Facilities and workflows were designed to minimize environmental impacts during construction and operation. The entire plant was built to match the natural setting, consistent with the Frank Lloyd Wright architectural philosophy. Extensive use of indigenous materials links the worlds of nature and man and demonstrates the interdependence of the architecture and the site. This low-profile architectural style blends with the environment while allowing for newer and more compact process technology, such as high-rate ballasted flocculation, to reduce the footprint of the plant by approximately 33 percent.

Additionally, the team established an on-site, five-acre nursery that was dedicated to salvaging site plants. By anticipating a mortality rate of 10 percent, the team was able to save 95 percent of the trees and cactus for use around the completed facility. With an innovative mine operation to crush site rock, the team was able to reuse site materials in landscape features around the plant.

"The success of the Lake Pleasant Water Treatment Plant illustrates how public-private partnerships provide water services in an effective and cost-efficient manner," said Phil Gordon, the mayor of Phoenix. "Driven by the partnership, the project looks decades ahead to help maintain reliable delivery of drinking water supplies. By bringing this additional renewable water supply into the desert, the DBO team has helped to reduce groundwater dependence in the area and to improve livability for residents of the city of Phoenix."

"In the case of Phoenix, a public-private partnership was the right choice and continues to serve our city well."