City of Phoenix

City Council Report

Agenda Date: 9/5/2018, **Item No.** 2

Water Resources, Infrastructure, and Financial Plans

This report provides the Water, Wastewater, Infrastructure, and Sustainability Subcommittee with an update on the Water Services Department's plans regarding Colorado River issues. Additionally, it addresses rehabilitation of aging infrastructure, as well as the impact of these costs on the community water system's financial plan.

THIS ITEM IS FOR INFORMATION AND DISCUSSION.

Summary

The Colorado River is over-allocated. The Lower Basin states of Arizona, California, and Nevada, as well as the Republic of Mexico take more water out of Lake Mead than is returned to the system, creating a structural deficit. This structural deficit causes water levels in Lake Mead to decline over time. To make matters worse, the Colorado River basin has been experiencing an extended drought since the year 2000. Water levels in Lake Mead are currently at historic lows.

The most recent Bureau of Reclamation projections show a 57 percent chance of shortage in 2020, rising to a 70 percent chance by 2022, and a 14 percent chance that Lake Mead will fall below elevation 1,025 feet, the third tier of shortage, by 2023. Most alarmingly, the Bureau of Reclamation recently presented a chart that shows Lake Mead could hit 985 feet in elevation within four years. Elevation 985 feet constitutes deadpool in Lake Mead; below this elevation water cannot be released from the dam (**Attachment A**).

Phoenix and the metro region have taken many actions over many decades to prepare for these conditions, knowing that central Arizona's priority on the river system is lowest and that water delivered through the Central Arizona Project canal is first to be cut under shortage declarations. Millions of acre-feet of Colorado River water have been banked in central Arizona aquifers to mitigate the impact of shortages. Wastewater is reclaimed and extensively reused throughout the Valley of the Sun. We have tied the availability of adequate water supplies to the ability to subdivide land and grow, so that growth does not outstrip supplies. Phoenix has acquired a physically and legally diverse set of water supplies so that we have a bank of water to fall back on in shortage. We have proactively protected our local aquifers so that groundwater will be

available during surface water shortages.

Nonetheless, conditions are worsening and the Colorado River basin appears to be "aridifying." Because the Colorado River is over-allocated, and because snowpack has diminished, shortage appears to be inevitable. Phoenix has planned methodically for shortage on the Colorado River and can withstand even tier three shortage declarations by the Secretary of the Interior at Lake Mead elevation 1,025 feet.

However, Lake Mead is shaped like a "V", and once water levels begin to fall they can continue to fall at a non-linear rate. Given no drastic solution to the problem of over-allocation, and assuming snowpack continues to be paltry, it is possible that Lake Mead elevations will fall below elevation 1,025 feet in the next few years. Below this level the Law of the River is unclear and we enter unchartered territory. The uncertainty that could result from extreme Colorado River shortages has the potential to hamper economic opportunity in our region and impact property values. The responsibility of Phoenix Water is to counter this uncertainty, and ensure provision of safe, reliable water supplies in all foreseeable circumstances for public health, economic opportunity, and quality of life.

The good news is that underneath Phoenix is a vast alluvial aquifer containing trillions of gallons of fossil groundwater supplies and millions of acre-feet of Colorado River water previously banked underground that, if managed wisely, can be used to meet demands for generations to come. However, in its decision forty years ago to fully convert to a renewable surface water supply system to save groundwater supplies for the future, Phoenix Water for the most part abandoned its well fields, and our ability to physically access this banked water and groundwater is extremely limited. The Phoenix Water distribution system is designed to meet demands based on continued surface water availability. Because of this, portions of our distribution system are vulnerable to extreme shortages on the Colorado River.

When it comes to water conservation, Phoenix plays the long game. We want our customers to use water wisely as a lifestyle choice in the desert, regardless of conditions on our watershed from year to year. Phoenix Water has developed a culture of wise water use through education and outreach, and structured water rates to clearly signal the scarcity of water in the desert, giving residents a direct economic incentive to conserve our most precious resource. As a community, we use water far more efficiently than we did several years ago; Phoenix's water consumption rates have fallen approximately 30 percent in the last twenty years. However with shortage on the Colorado River looming, we must ask our customers to conserve more. We are developing a new, multi-pronged conservation effort that will include, for example, additional retrofits of interior plumbing to more efficient fixtures, enhanced social

media, free business and HOA water audits, a self-audit tool, and enhanced print, billboard, bus, light rail wraps, and other outreach media. We will emphasize providing residents with the tools they need to save money, conserve water, and play a role in positive solutions.

Phoenix has long practiced integrated supply and demand management planning; conservation is the bedrock of our water resource planning. However, ensuring reliable water deliveries under extreme Colorado River shortages will require both conservation and infrastructure. This is because even if customers use less water in other portions of our service territory, we cannot physically pump the conserved water to these vulnerable areas. This is a problem with the hydraulics of our distribution system that can only be resolved with new pump stations, transmission mains, and pressure-reducing valves. Nor can we move water appurtenant to lands within the Salt River Valley Water Users' Association (SRP) to lands outside of the district. This is a matter of state and federal law.

To rectify this situation, prepare for deep shortage conditions on the Colorado River, and ensure reliable water deliveries under all foreseeable scenarios, Phoenix Water is focused on improving its physical access to water banked underground and groundwater. To this end, Phoenix has entered into a series of agreements. The first was the exchange agreement with the City of Tucson. Through this agreement, Phoenix banks Colorado River water in Tucson aquifers, and can call upon that water during future times of shortage. Tucson recovers Phoenix's banked water, delivers it to Tucson Water customers, and in exchange directs the Central Arizona Water Conservation District to deliver Tucson's Colorado River water to Phoenix's surface water treatment plants. Last November, Phoenix entered into a similar agreement with the City of Avondale. These agreements provide Phoenix with additional physical access to banked water during shortage, but these exchanges work only so long as Tucson and Avondale have access to Municipal & Industrial priority Colorado River water delivered through the Central Arizona Project canal. That is, these exchanges work well during moderate but not extreme shortages.

Most recently, Phoenix entered into an agreement with Salt River Project (SRP) that provides Phoenix physical access to banked water even during extreme shortage conditions. Phoenix Water purchased a right-of-first-refusal to SRP's well pumping capacity. Phoenix can direct SRP to pump up to 20,000 acre-feet per year of banked water on Phoenix's behalf. That banked water gets pumped out of SRP wells and into the SRP canal system, where it can then be delivered to the 24th Street and Deer Valley Water Treatment Plants. From there, the water would need to be pumped to the portions of the Phoenix Water distribution system normally served from the Union Hills Water Treatment Plant with Colorado River water. To do so, we will need to build

additional transmission mains, pump stations, and pressure-reducing valves. These mains, pumps, and pressure-reducing valves will cost approximately $300 million. Design of these improvements is slated to begin in January 2019, and construction is expected to be completed at the end of 2023. It may be possible to achieve completion earlier if necessary.

In addition, Phoenix Water is drilling wells to provide improved physical access to banked water and groundwater in portions of our service territory normally served with Colorado River water. We are in the process of designing, constructing, and equipping 15 new wells for that purpose. These wells should be in place by the end of 2022, at a cost of approximately $110 million. We will also continue to recharge as much water as possible to ensure that we have a large store of banked water that we can draw upon for many years. The cost of recharging water and other related resiliency efforts constitutes an additional $75 million over the next five years. All told, Phoenix can expect to expend nearly $500 million over the next five years to ensure reliable water deliveries in the face of shortage on the Colorado River. This compares favorably with the $1.5 billion that Southern Nevada Water Authority spent to lower its Lake Mead intake as mitigation against falling Lake Mead water levels, funding for which resulted in a 19 percent rate increase for its customers.

Water is the foundation of public health, economic opportunity, and quality of life in our desert city. Continued economic investment and the stability of our regional economy depend very closely on our ability to ensure absolute certainty in the delivery of clean, safe water. With these infrastructure improvements in place, a continued focus on our culture of conservation, and sustained investment in sound aquifer management, Phoenix Water can provide certainty even under worst-case scenarios on the Colorado River and for generations to come.

Rehabilitation of Aging Infrastructure

The City of Phoenix water system is one of the largest in the nation. It is composed of five surface water treatment plants, 107 pump stations, 22 active wells, 48 reservoirs and storage facilities, 53,000 hydrants, 160,000 valves, approximately 430,000 service lines, and nearly 7,000 miles of pipelines, all of which are used to serve around 1.6 million customers with safe, clean reliable water at the tap twenty-four hours a day and 365 days a year over 540 square miles. People often think of Phoenix as a young city, but the City's water utility has been in operation for more than 110 years, and this infrastructure is aging.

Pipeline rehabilitation and replacement is the largest single infrastructure cost in the City's water utility. Over the next five years, Phoenix Water anticipates spending approximately $525 million on pipelines. In addition to this, Phoenix Water anticipates

spending approximately $185 million on surface water treatment plants, $145 million on water pump stations and pressure-reducing valves, around $55 million on reservoirs and other water storage facilities, and $105 million on other system needs, such as power redundancy, security, telemetry, and technology upgrades. Infrastructure rehabilitation, replacement, and improvements are necessary to ensure the delivery of safe, clean, reliable water supplies to our community.

Community Water System Financial Strategy

The Phoenix City Council acts as steward for the community water system. Each year, the Water Services and Finance Departments develop a rolling five-year financial plan for the water utility to ensure continued financial viability. The financial plan is the basis for forecasting necessary rate adjustments that provide revenue to recover the cost of operating a safe and reliable system, maintain high-quality bond ratings, develop the infrastructure necessary to respond to shortages on the Colorado River, respond to outside market cost increases for raw water, chemicals, and infrastructure materials, and ensure system reliability through rehabilitation and replacement of aging infrastructure. Revenues and costs are balanced over a five-year financial plan to avoid large swings in water utility rates, affording our customers and businesses a level of certainty for budget planning and business investment.

The City's water utility does not operate for profit. Rather, the goal of rate adjustments is to earn sufficient revenue to cover the cost of debt service, operations, and required rehabilitation, replacement, and development of capital infrastructure while allowing the utility to end each fiscal year with a cash fund balance large enough to pay for unforeseen needs, and to maintain ratings that keep borrowing costs low.

The five-year financial plan is updated by the Finance and Water Services departments each year. The need for capital infrastructure rehabilitation, replacement, and development is re-evaluated and re-prioritized. Operating expenses and revenues are updated and re-projected. Necessary rates are then calculated over the five-year time frame to ensure adequate revenues and ending fund balances. The resulting plan is presented to the City Council, the steward of the community water system, when rate adjustments are necessary.

Over the next five years, approximately $1.515 billion in infrastructure improvements are necessary to continue the provision of safe, clean, reliable water to Phoenix customers. Of this, approximately $500 million is necessary to develop the infrastructure and other improvements that will ensure Phoenix can continue reliable water deliveries even in worst-case shortage scenarios on the Colorado River. $525 million is needed for rehabilitation and replacement of aging water pipelines. Approximately $185 million is necessary for surface water treatment plant

rehabilitation, nearly $145 million for aging pump stations and pressure-reducing valves, $55 million for aging reservoirs, and another $105 million on various projects including power redundancy, homeland security, and telemetry improvements.

The water financial plan indicates that a rate adjustment of six percent is required in February 2019, and a future rate adjustment of six percent in February 2020, is necessary to support the capital, operational, and financial requirements of the water system. These rate adjustments are necessary to maintain the target level for fund balances and to ensure there are adequate net revenues to support debt service, which are essential in maintaining bond ratings. The wastewater financial plan indicates that rate adjustments are not necessary at this time.

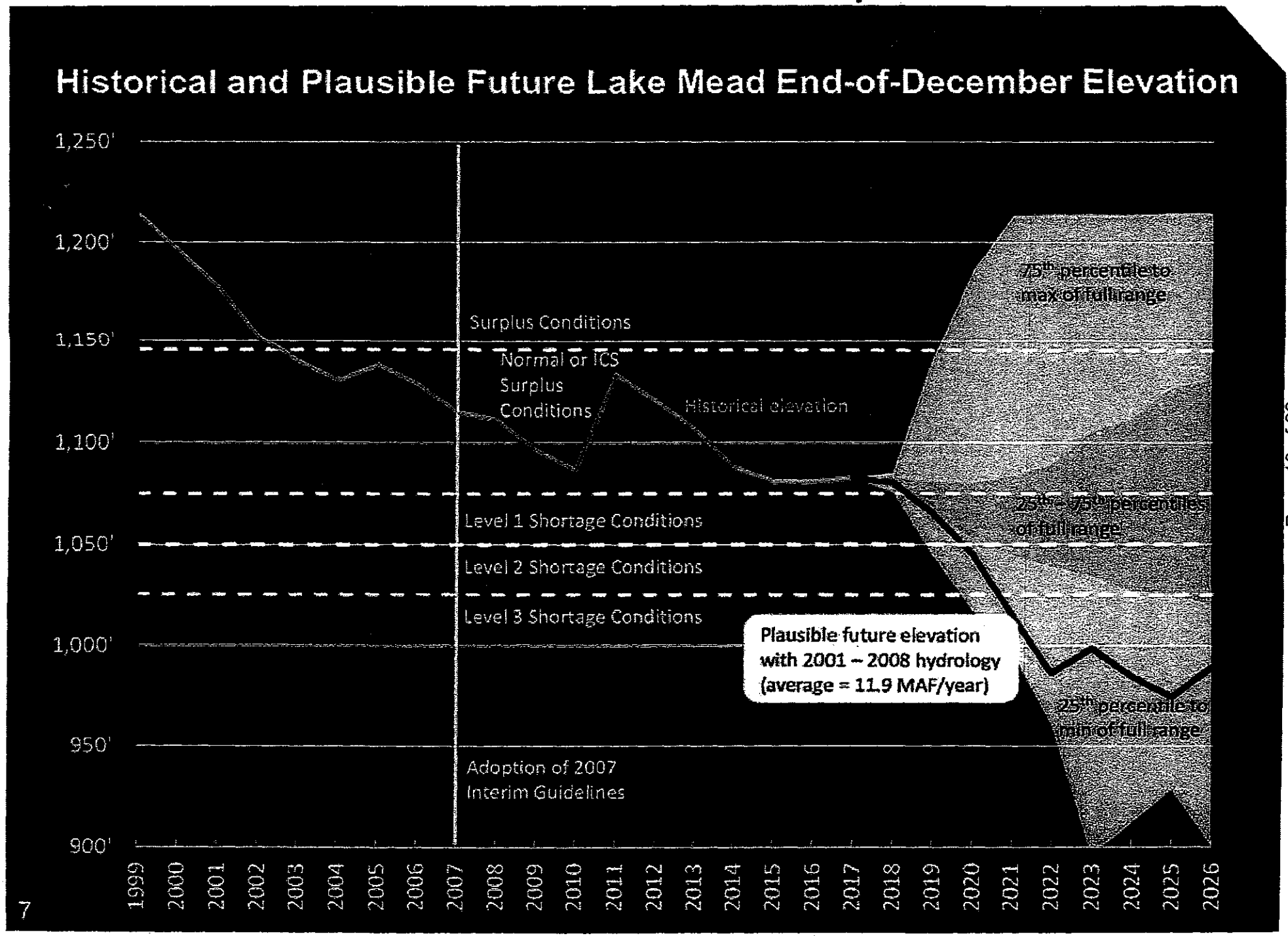
If water rates are not raised, the water utility must drastically shrink infrastructure investment to avoid depleting fund balances. This could put the operational reliability of the utility at risk, and the City would not be able to guarantee water deliveries in certain portions of its service territory during deep shortage conditions on the Colorado River. Further, not maintaining infrastructure, adequate revenues, and fund reserves could lead to a downgrade in bond ratings.

Phoenix water rates are among the lowest in the nation and will continue to be among the lowest even with the proposed rate increase in place (**Attachment B**). The Citizens' Water/Wastewater Rate Advisory Committee completed a study on the affordability of Phoenix water and sewer rates in the spring of 2018, and concluded that rates can be increased while still maintaining acceptable levels of affordability in the community. Phoenix water and sewer rates rank among the most affordable among the 25 largest cities in the U.S. by the AR20 (Affordability Ratio at the 20th income percentile) measure of affordability and by the *Hours at Minimum Wage* measure of affordability (**Attachment C**).

At its Aug. 16, 2018, meeting, the Water/Wastewater Rate Advisory Committee voted unanimously to recommend to the City Council that water rates be raised by six percent in the spring of 2019 and by another six percent in the spring of 2020. The Water Services Department plans to ask the Phoenix City Council to adopt a notice of intent to increase water rates at the Oct. 9, 2018, City Council Policy session, and will seek public input through a variety of opportunities during the months of October and November 2018. A final vote by Phoenix City Council is planned for December, 2018. If these votes are positive, new rates would take effect in February, 2019.

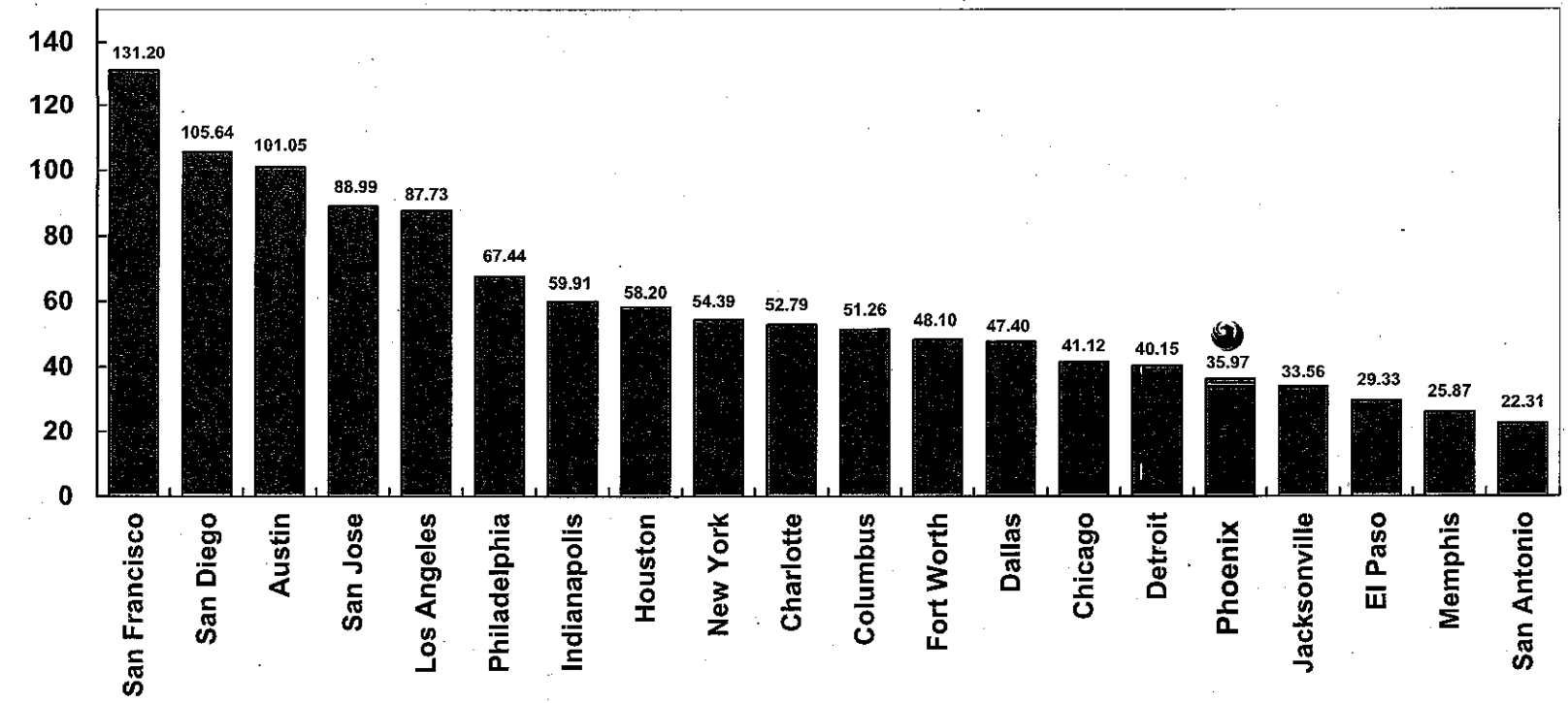
Responsible Department
This item is submitted by Deputy City Manager Karen Peters and the Water Services Department.

Attachment A - Bureau of Reclamation Projections



7

Attachment B
SINGLE FAMILY WATER RATE COMPARISON
OF MONTHLY BILLS
TWENTY LARGEST U.S. CITIES



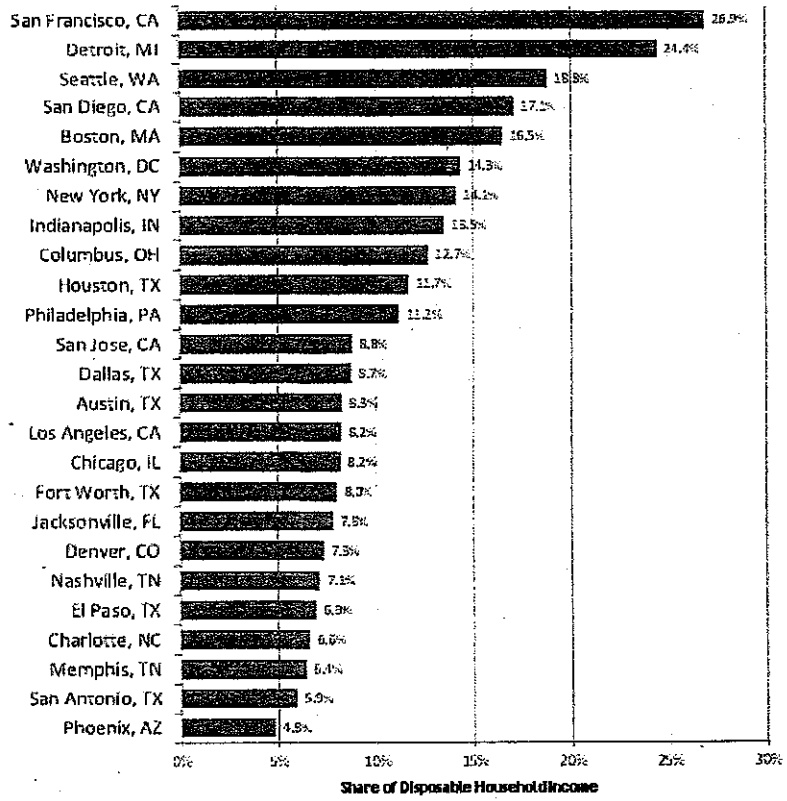
Single family residential customer with a 5/8" meter using a monthly average over a 12 month period of 13.95 ccf and rates in place July 2018. Philadelphia bill based on rate increase approved for September 2018. San Antonio bill based on rate increase approved for 2019.

Attachment C

Affordability in Largest 25 U.S. Cities in 2017

Affordability Ratio at the 20th Income Percentile (AR_{20})

2017 basic water & sewer cost for family of four as share of disposable income



Monthly Basic Water & Sewer Cost as Hours at Minimum Wage

2017 rates, family of four at 50 gpcd