

Grant Application Package

Opportunity Title:	WaterSMART: Drought Resiliency Project Grants for Fisca
Offering Agency:	Bureau of Reclamation
CFDA Number:	15.514
CFDA Description:	Reclamation States Emergency Drought Relief
Opportunity Number:	R15AS00046
Competition ID:	
Opportunity Open Date:	05/11/2015
Opportunity Close Date:	06/25/2015
Agency Contact:	Irene Hoiby Grants Officer E mail: ihoiby@uebr.gov Phone: 303 445 2025



This opportunity is only open to organizations, applicants who are submitting grant applications on behalf of a company, state, local or tribal government, academia, or other type of organization.

Application Filing Name:

Select Forms to Complete

Mandatory

Application for Federal Assistance (SF-424)

Optional

- Budget Information for Construction Programs (SF-424C)
- Assurances for Construction Programs (SF-424D)
- Disclosure of Lobbying Activities (SF-LLL)
- Attachments
- Budget Information for Non-Construction Programs (SF-424A)
- Assurances for Non-Construction Programs (SF-424B)

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Application for Federal Assistance SF-424	
* 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	
* 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	
* If Revision, select appropriate letter(s): _____ * Other (Specify): _____	
* 3. Date Received: Completed by Grants.gov upon submission.	4. Applicant Identifier: _____
5a. Federal Entity Identifier: _____	5b. Federal Award Identifier: _____
State Use Only:	
6. Date Received by State: _____	7. State Application Identifier: _____
8. APPLICANT INFORMATION:	
* a. Legal Name: City of Phoenix	
* b. Employer/Taxpayer Identification Number (EIN/TIN): 86-6000256	* c. Organizational DUNS: 1834911330000
d. Address:	
* Street1: 200 West Washington Street, 9th Floor	
Street2: _____	
* City: Phoenix	
County/Parish: Maricopa	
* State: AZ: Arizona	
Province: _____	
* Country: USA: UNITED STATES	
* Zip / Postal Code: 85003	
e. Organizational Unit:	
Department Name: Water Services Department	Division Name: Resources/Development Planning
f. Name and contact information of person to be contacted on matters involving this application:	
Prefix: Mr.	* First Name: Gary
Middle Name: Michael	
* Last Name: Gin	
Suffix: _____	
Title: Hydrologist	
Organizational Affiliation: City of Phoenix	
* Telephone Number: 602-495-5654	Fax Number: 602-495-5843
* Email: gary.gin@phoenix.gov	

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

C: City or Township Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

*** Other (specify):**

*** 10. Name of Federal Agency:**

Bureau of Reclamation

11. Catalog of Federal Domestic Assistance Number:

15.514

CFDA Title:

Reclamation States Emergency Drought Relief

*** 12. Funding Opportunity Number:**

R15AS00046

*** Title:**

WaterSMART: Drought Resiliency Project Grants for Fiscal Year 2015

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

Delete Attachment

View Attachment

*** 15. Descriptive Title of Applicant's Project:**

City of Phoenix, Aquifer Storage and Recovery (ASR) Well Restoration Program, Implementing ASR at the Deer Valley Water Treatment Plant, Phoenix, Arizona

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant 3, 6-9

* b. Program/Project 3, 6-9

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

* a. Start Date: 07/01/2015

* b. End Date 07/01/2017

18. Estimated Funding (\$):

* a. Federal	300,000.00
* b. Applicant	3,903,776.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	4,203,776.00

* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?

- a. This application was made available to the State under the Executive Order 12372 Process for review on
- b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- c. Program is not covered by E.O. 12372.

* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)

Yes No

If "Yes", provide explanation and attach

21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)

** I AGREE

** The list of certifications and assurances, or an Internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: Ms. * First Name: Kathryn

Middle Name:

* Last Name: Sorensen

Suffix:

* Title: Water Services Director

* Telephone Number: 602 262 6055 Fax Number: 602 495 5542

* Email: kathryn.sorensen@phoenix.gov

* Signature of Authorized Representative: Completed by Grants.gov upon submission. * Date Signed: Completed by Grants.gov upon submission.

Kathryn Sorensen 6/22/15



ASSURANCES - CONSTRUCTION PROGRAMS

OMB Number: 4040-0009
Expiration Date: 06/30/2014

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0042), Washington, DC 20503.

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NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the Awarding Agency. Further, certain Federal assistance awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, the right to examine all records, books, papers, or documents related to the assistance; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will not dispose of, modify the use of, or change the terms of the real property title or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal awarding agency directives and will include a covenant in the title of real property acquired in whole or in part with Federal assistance funds to assure non-discrimination during the useful life of the project
4. Will comply with the requirements of the assistance awarding agency with regard to the drafting, review and approval of construction plans and specifications.
5. Will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the complete work conforms with the approved plans and specifications and will furnish progressive reports and such other information as may be required by the assistance awarding agency or State.
6. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
7. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
8. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards of merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
9. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
10. Will comply with all Federal statutes relating to non-discrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing, (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

11. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal and federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
12. Will comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
13. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333) regarding labor standards for federally-assisted construction subagreements.
14. Will comply with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
15. Will comply with environmental standards which may be prescribed pursuant to the following. (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.), (f) conformity of Federal actions to State (Clean Air) implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
16. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system
17. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq).
18. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
19. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program
20. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL <i>RJK</i> <i>Kathryn Sorensen</i>	TITLE Water Services Director
	APPLICANT ORGANIZATION City of Phoenix

6/22/15

**Technical Proposal:
City of Phoenix, Aquifer Storage and Recovery
(ASR) Well Restoration Program, Implementing
ASR at the Deer Valley Water Treatment Plant,
Phoenix, Arizona**

**Bureau of Reclamation:
Drought Resiliency Project Grants for Fiscal Year 2015
Funding Opportunity Announcement (No. R15AS00046)**

**Applicant: City of Phoenix, Water Services Department
Contact: Project Manager, Gary M. Gin. R.G., Hydrologist
200 West Washington Street, 8th Floor
Phoenix, AZ 85008
Phone: (602) 495-5654
Fax: (602) 495-5843
e-mail: gary.gin@phoenix.gov
June 25, 2015**

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EXECUTIVE SUMMARY

City of Phoenix, Aquifer Storage and Recovery (ASR) Well Restorations Program, Implementation ASR at the Deer Valley Water Treatment Plant Phoenix, Arizona

Bureau of Reclamation: Funding Opportunity Announcement No. R15AS00046

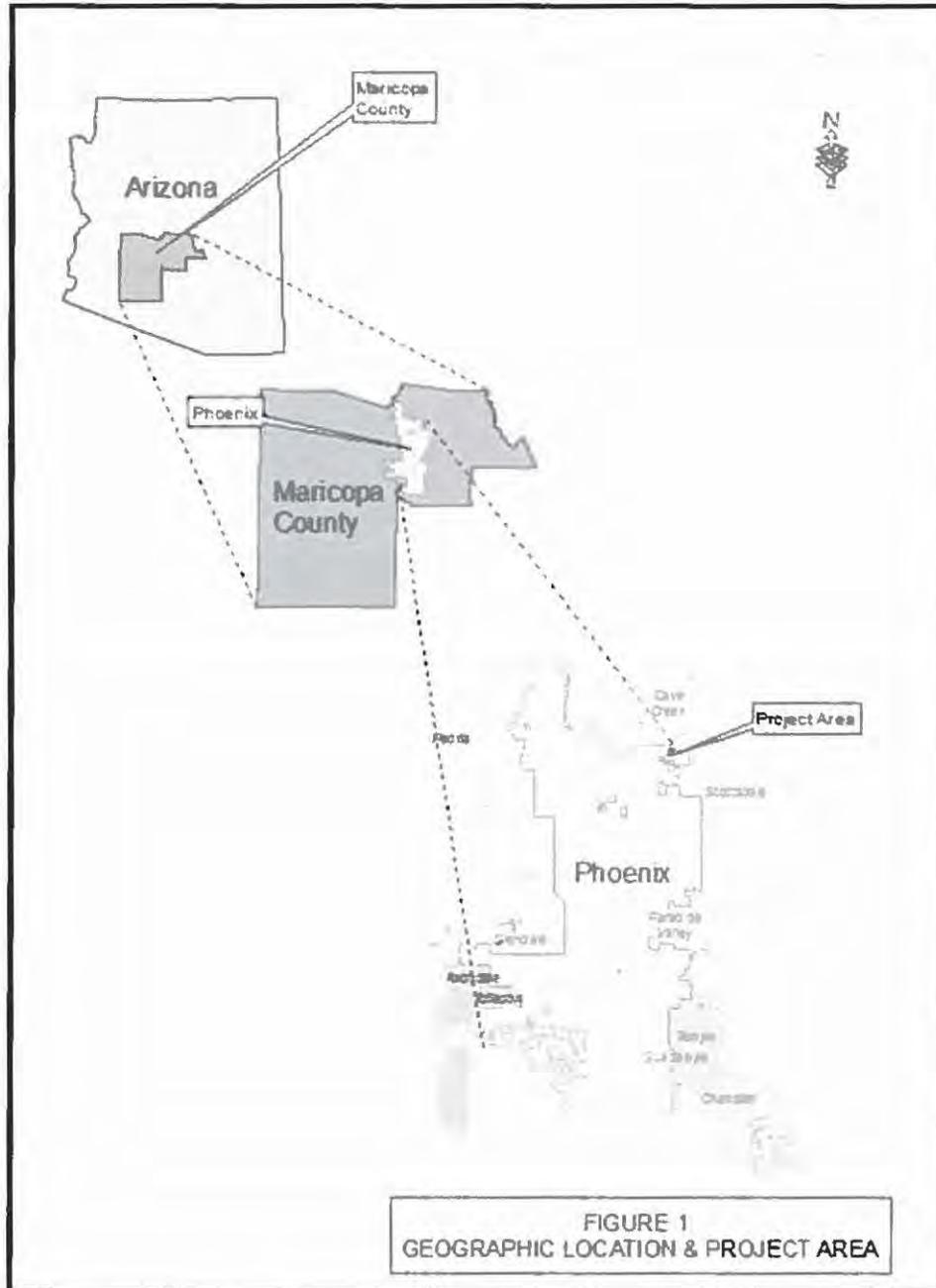
June 25, 2015

City of Phoenix, Maricopa County, Arizona

Phoenix has been operating Aquifer Storage and Recovery (ASR) wells for over four years. These dual purpose wells directly inject treated supplies (Central Arizona Project or Salt River Project supplied surface water supplies) into aquifers available during normal conditions. During shortages, high demand periods or system outages, these wells can be switched to recover and pump supplies that were banked/stored during previous years. ASR wells have reduced declining groundwater levels, maintained well productivity, reduced land subsidence, and reduced operational and maintenance costs. The City's most recent ASR well project is located at the Deer Valley Water Treatment Plant. This ASR will provide critical backup supplies to the plant during outages and also improve the City's resiliency to surface water shortages caused by long term drought. This ASR well has been constructed, tested (pump rate- 3,000 gallons per minute (gpm) and anticipated recharge rate- 2,400 gpm), and the above-ground infrastructure is being designed. Phoenix is requesting a Federal cost share of \$300,000 for the purchase of the well pump, motor, and column pipe assembly, which is a 7 percent contribution to the total cost of the project (\$4,203,776). These three components (pump, motor, and column pipe) are critical in creating this dual purpose well that can recharge and recovery under-utilized potable supplies. This ASR well system will be constructed so that both Central Arizona Project (CAP) and other surface water (surface water supplies (New Conservation Space (NCS) supplies) behind Roosevelt Dam-Salt River System) supplies can be stored in the aquifer. This dual purpose well system will provide the necessary resource surplus and operational flexibility Phoenix needs during drought conditions. The City of Phoenix project is not located in a Reclamation District and the project will be constructed in two years.

BACKGROUND DATA

The project is located within the City of Phoenix, Arizona near the City's Deer Valley Water Treatment Plant at 3030 West Dunlap Avenue (Figure 1).



Located in central Maricopa County, Phoenix was incorporated in 1881, and is largely surrounded by the Cities of Avondale, Scottsdale, Glendale, Peoria, Tempe, Chandler, Tolleson, Cave Creek, the Town of Paradise Valley, and the Gila River Indian Community. The City covers 519 square miles and is the largest city in the Phoenix metropolitan area. The population of Phoenix has steadily

increased from approximately 983,000 in 1990, 1,326,000 in 2000 to an estimated 1,506,000 in 2014. Phoenix has approximately 38 percent of Maricopa County's 4.01 million residents and approximately 23 percent of the State's 6.67 million residents. The \$140 billion per year Phoenix area economy is represented by a diverse range of industries that includes aerospace and electronics manufacturing, business services, finance, wholesale distribution, travel, and tourism.

The City's water service area is largely commensurate with the corporate limits, and serves more than 1.514 million residents with nearly 413,000 connections to the distribution system over 540 square miles. The system includes 6,861 miles of water mains and five water treatment plants with a total with an operational capacity of 555 MGD. The City also has 47 storage facilities with an active storage capacity of about 402 MG, 106 booster pump stations with a firm capacity of 1,142 MGD and 102 pressure reducing valves.

The total average daily demand for the water service area during 2014 was about 339 million gallons per day (MGD). Recent years have shown relative flat average daily demand. This is anticipated to continue into the near future despite population growth due in large part to water efficiency gains made by customers.

Phoenix's potable deliveries are largely reliant upon two surface water supplies. The Salt River Project (SRP) stores and delivers surface water from the Salt and Verde watersheds north and northeast of Phoenix, while the Central Arizona Project (CAP) conveys Colorado River water, which has a much larger watershed that spans from Wyoming to Mexico. Most of the water delivered to Phoenix by SRP is appurtenant to lands that are eligible to receive this water. Most but not all of Phoenix south of SRP's Arizona Canal (Figure 2) is eligible. Some water delivered to Phoenix by SRP was developed by Phoenix and others outside this constraint and may be used throughout the City. These supplies include "gateway", or a supply captured by Phoenix's financing of gates for Horseshoe Dam on the Verde River, and "Plan 6 / New Conservation Space" supplies captured when Phoenix and several other nearby cities agreed to finance the raising of Roosevelt Dam on the Salt River in the mid-1990s to enhance flood protection. Three City water treatments plants usually receive SRP supplies through the Salt River Project canal system that crosses parts of the Phoenix metropolitan area. CAP supplies are generally used to serve the City not served by Salt and Verde supplies, usually to areas north of the Arizona Canal (Figure 2). CAP is normally delivered to two City water treatment plants in proximity to CAP's aqueduct system. In a normal year, surface water makes up about 97% of Phoenix potable water production.

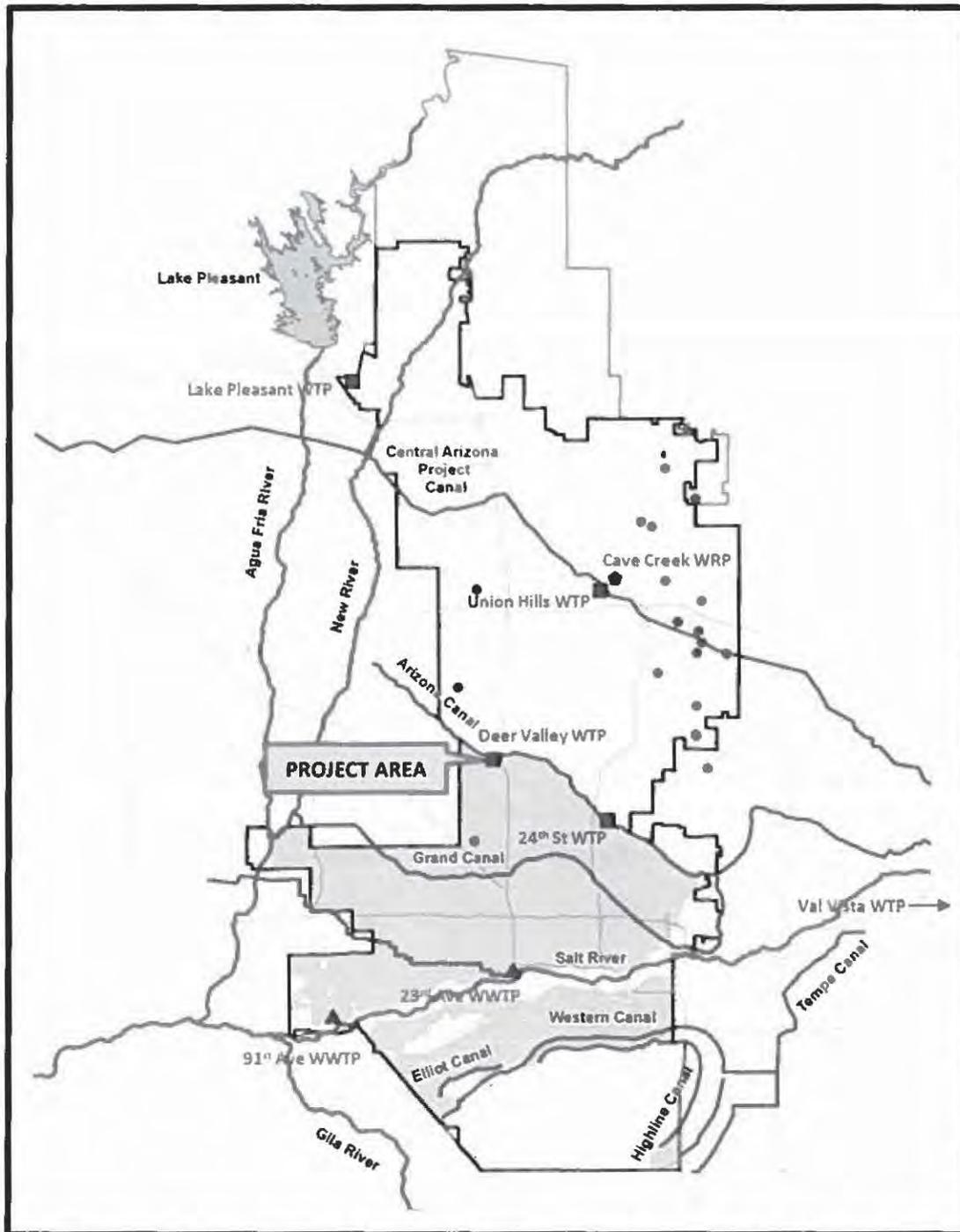


Figure 2: Phoenix canal systems, water treatment plants, and project area.

Groundwater makes up the remainder of the City's potable supplies. The City maintains a well-field for operational and peak demand needs. Over the years, more than 200 production wells were acquired or developed by Phoenix. However, a majority of these wells have been removed from service due to age, reduced efficiency and/or degraded water quality due to groundwater contamination. In 2004, the City had an estimated 30 wells operating and generated about 67 MGD. Now in 2015, there are approximately 22 active wells that generate 28 MGD. To address the operational constraints, productions needs and recovery limitations of the City's present well system,

a Groundwater Management Plan (GMP) was developed in 2010. The GMP identified the projects necessary to expand the City's well-field to meet future growth, mitigate water quality issues in the distribution system, and create a drought resource through the ability to augment groundwater production and/or the recovery of recharge credits when necessary. Ultimately, the new wells proposed by the GMP must be a part of a sustainable system for the long-term (75-100 years). Phoenix must be able to operate and manage the well-field efficiently and cost effectively, while stewarding non-renewable groundwater supplies appropriately and to adhere to the State's groundwater management requirements

The City lies within the Phoenix Active Management Area (AMA), one of several water planning and regulatory areas established by the Arizona State Legislature in the 1980 Groundwater Code. This comprehensive legislation and associated regulations established groundwater rights, conservation requirements, subdivision "assured water supply" standards and numerous other features designed to eventually eliminate over-draft of groundwater supplies in the area.

The key goal established by the Groundwater Code for the Phoenix AMA is "safe-yield" by the year 2025. This involves the balancing of groundwater withdrawals with the volume of water which recharges area aquifers. The Groundwater Code establishes specific requirements for water providers, farms, industries and others with the intent of meeting the safe yield target. The acquisition of CAP supplies and the continued use of SRP supplies have allowed Phoenix to substantially reduce its groundwater withdrawals in recent years, and thus the City has done its part to meet that goal. The City has also exceeded its conservation targets prescribed by the State since inception of the Code.

Arizona's Assured Water Supply (AWS) Rules became effective in 1995. These Rules require a demonstration of at least 100 years of renewable water supplies for new development. Phoenix's success in water resource planning has led the State of Arizona to grant a "Designation of Assured Water Supply" to the City. This "designation" was reconfirmed in 2010 and attests that Phoenix maintains sufficient water supplies to serve existing customers and all anticipated growth occurring through the year 2025 (the furthest date considered by the State at this time) for at least 100 years. The City received its "designation" from the State by demonstrating it could meet the following criteria:

- Physical, continuous and legal availability of a 100 year water supply.
- Satisfactory groundwater quality (for groundwater to be delivered to the distribution system) in accordance with Federal, State, and local drinking water standards.
- Consistency with AMA management plans and goals for proposed groundwater use.
- Financial capability to construct delivery systems, treatment systems, and storage facilities required for new development use.

A key component of the City's water management strategies is artificial recharge of groundwater aquifers. The City maintains permits to recharge the groundwater aquifer with CAP and reclaimed water supplies that are not needed to meet current demands. The storage of this water may be pumped or "recovered" in the future when additional supplies are needed for operational flexibility to meet

growth and/or drought related demands. To date, the City has stored more than 70,000 AF of its surface water supplies and another 120,000 AF of reclaimed water. However, as noted earlier, the City's well-field is considerably smaller than in the past and is geographically limited to certain parts of the City, inhibiting the ability of the City to effectively pump or "recover" these credits when needed.

Since 1985, Phoenix has periodically maintained and updated long-range water resources plans. The latest update, the 2011 Water Resources Plan, developed several long-range water supply and demand scenarios for Phoenix. The Plan incorporates supply augmentation and demand strategies to improve the City's supply resiliency during projected shortage periods, but which are consistent with the State's groundwater management objectives (City of Phoenix, 2011). Phoenix expects to continue to rely on non-groundwater sources for virtually all of its demands during normal supply conditions, and to continue to contribute substantially toward meeting the Phoenix AMA groundwater safe-yield objectives. However, regular long term droughts in the southwest, the uncertain impacts of climate change, and unanticipated changes in water demand require the flexibility to enhance the City's recharge capabilities and its ability to bank water during times of surplus in order to supplement surface water supplies with groundwater or recovered recharge credits when periodic shortages occur.

Phoenix's plan is to reconfigure/replace existing wells as dual purposes wells that can inject surplus surface water supplies into the aquifer for storage and to maintain declining water levels. During droughts or outages, the stored resource can be recovered for potable use. It is important to note that while surface water supplies are used to meet the majority of system demand, groundwater capacity will be expanded to serve as source supply during drought, surface water shortages, and emergency outages.

Previous Water with Bureau of Reclamation

The City has established a long-term working relationship with the Bureau of Reclamation (Reclamation). Below is a list of projects we are currently working on with the Reclamation.

Tres Rios Demonstration Wetlands Project:

This project was initiated in the early 1990's and is located adjacent to the 91st Avenue Wastewater Treatment Plant (WWTP). The project's conceptual design was developed by Reclamation in conjunction with City staff and the input of the Sub-Regional Operating Group (SROG) and an expert advisory panel. SROG represents the cities of Phoenix, Scottsdale, Glendale, Tempe, and Mesa, the owners of the regional wastewater treatment plant. The conceptual design completed in October 1983 proposed to construct wetlands as a pilot project to determine the capability of constructed wetlands to act as a tertiary wastewater treatment process and further polish the effluent leaving the 91st Avenue WWTP and also improve the riparian ecosystem existing downstream of the WWTP. The demonstration project proved to be successful and resulted in development of a full-scale Tres Rios Environmental Restoration project with the U.S. Corps of Engineers. The full scale project was

completed in 2010 and a total of 380 acres of wetlands, riparian habitat, trails, and open water areas were developed.

Central Arizona Salinity Study (CASS):

This project was initiated in 2001 when Reclamation and the City entered into an agreement to examine the problems created by importing highly saline water, human activities that concentrate salts and the lack of drainage needed to export salts away from Central Arizona. Phase I of CASS focused on characterizing the nature of the salinity problem, and time frame for possible action. A regional “salt balance” concluded that the Phoenix region imports approximately 1.5 million tons of salt per year. About 400,000 tons of salt leaves the watershed, approximately 1.1 million tons of salt remains in Central Arizona. The long-term accumulation of salts in Central Arizona may have negative consequences and economic impacts to virtually all sectors of society- residential, commercial, industrial, and agricultural. Phase I of CASS quantified those impacts and calculated that the annual economic benefit to Central Arizona would be about \$30 million by reducing the incoming total dissolved solids (TDS) concentration by 100 milligrams per liter (mg/L).

Phase II CASS focused on developing several approaches to salinity management for Central Arizona. These strategies include supporting federally funded programs to reduce salinity, establishing a public education program, continue exploring ways to use brackish groundwater and reclaimed water for beneficial uses, and promoting research in development of concentrate management and desalination technologies that reduce costs and water losses.

CASS is continuing to evaluate the impacts of salinity on our water cycle especially as it relates to the added salts coming into the wastewater system that in turn impacts water reclamation programs. In addition, CASS is continuing to research and pilot concentrate management technologies in an effort to reduce water losses and develop economically feasible solutions.

Agua Fria Linear Recharge Project:

The initial study for the Agua Fria Linear Recharge project was prepared under the authority of the Reclamation Groundwater Study and facilities Act of 1992 (Title XVI of Public Law 102-575, as amended). The U.S. Secretary of the Interior, in cooperation with the City conducted a feasibility study that examined uncommitted reclaimed water from a wastewater treatment plant for groundwater recharge and reuse in the Phoenix metropolitan area.

The project had determined that the City would be able to recharge reclaimed water from the 91st Ave WWTP alone, or from both the 91st Ave WWTP and 23rd Ave WWTP, into the aquifer underneath the Agua Fria River to augment the present and future water resources. The recharged water can be stored in the aquifer for years and recovered in the future to augment water resources during periods of drought, when other water sources may be reduced, and to help meet the increasing water demands associated with future growth.

during periods of drought, when other water sources may be reduced, and to help meet the increasing water demands associated with future growth.

The future water needs and supplies were projected at 40,000-100,000 acre-feet/year (AFY) of reclaimed water would be available for recharge from the 91st Ave WWTP or from a combination of both WWTPs (91st Ave and 23rd Ave). The City is continuing to work with Reclamation on finalizing the Environmental Impact Statement and Feasibility Study for the project.

TECHNICAL PROJECT DESCRIPTION

Evaluation Criterion A- Project Benefits (Deer Valley ASR Well #1) (40 points)

The intent of this project is to create a surplus of water resources in a developed area in Phoenix that lacks backup supplies for mitigating periods of drought or system outages. This project will benefit the immediate area and increase operational flexibility at the Deer Valley WTP for the next 50-75 years. An ASR well has been constructed and tested at the Deer Valley WTP (3030 West Dunlap Ave.) and the above-ground infrastructure is currently in design. Future ASR wells (3 additional dual purpose wells) will be constructed at this WTP and provide approximately 12-14 MGD of additional back-up supply (each well can recharge 2.9-3.0 MGD). 12-14 MGD back-up supply will be 12-14% of the production capacity at the Deer Valley WTP (100 MGD). These dual purpose wells will be able to physically store underutilized CAP and other treated surface water supplies (off the SRP system) into the aquifer underneath the Deer Valley WTP. If CAP supplies are greatly reduced, Phoenix will be able to take stored surface water supplies (NCS-134,000 acre-feet) behind the Roosevelt Dam to the future four ASR wells located at the Deer Valley WTP. By taking proactive steps in constructing these ASR wells at this WTP facility, Phoenix will develop significant back supplies for drought mitigation, create a sustainable aquifer, limit land subsidence, and reduce maintenance and energy costs.

Deer Valley ASR Well #1 is located in the northwest corner of the Deer Valley WTP (3030 West Dunlap Ave.) (Figure 3). Figure 3 illustrates the location of the ASR well, location of monitor well, location of recharge source line and the recovery line to the Deer Valley WTP reservoir. This well is screened exclusively in the Lower Alluvial Unit, which is predominately medium to coarse-grained sands. The screen interval of the well is from 930 -1,190 feet below land surface (Figure 4). The ASR well was pumped continuously for 24-hours at 2,700 gpm with minimal drawdown. The transmissivity of the Lower Alluvial Unit is estimated at 121,846 gallon per day per foot (Figure 5). Based on the transmissivity of the aquifer and construction of the well, this well can operate at 3,000 gpm and will not adversely impact the aquifer or any nearby wells since the majority of time these well will be in recharge mode (90% of the year) (Figure 5). With a pumping rate of 3,000 gpm we anticipate that the injection rate into the aquifer will be 2,400 gpm, which is 80 percent of the pumping rate. An injection rate that is 80 percent of the pumping rate is consistent with Phoenix's other operational ASR wells (three dual purpose wells).



Figure 3: Location of ASR well and Monitor Well #202 (Compliance Well)

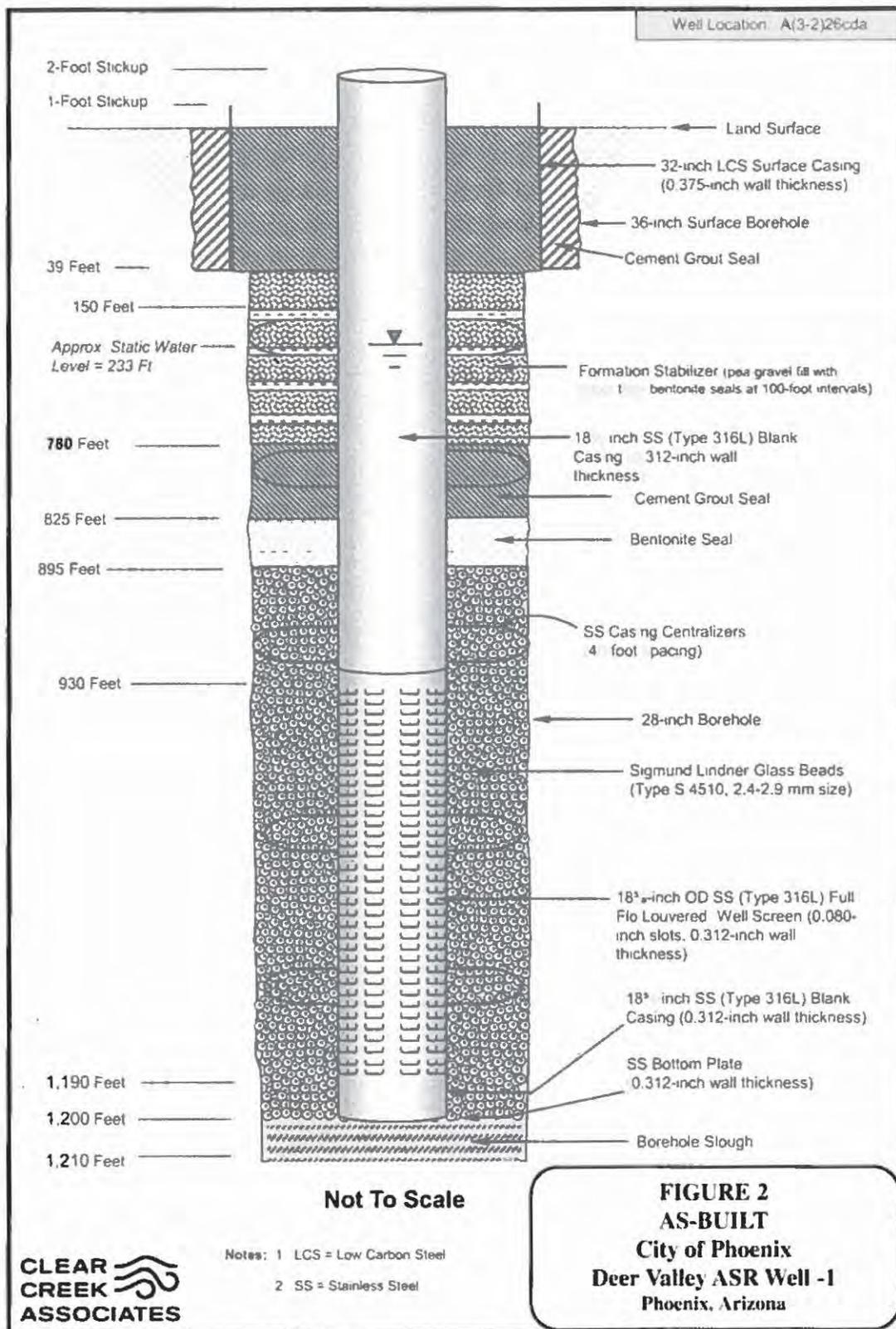


Figure 4- Deer Valley WTP ASR Well #1 As-Built

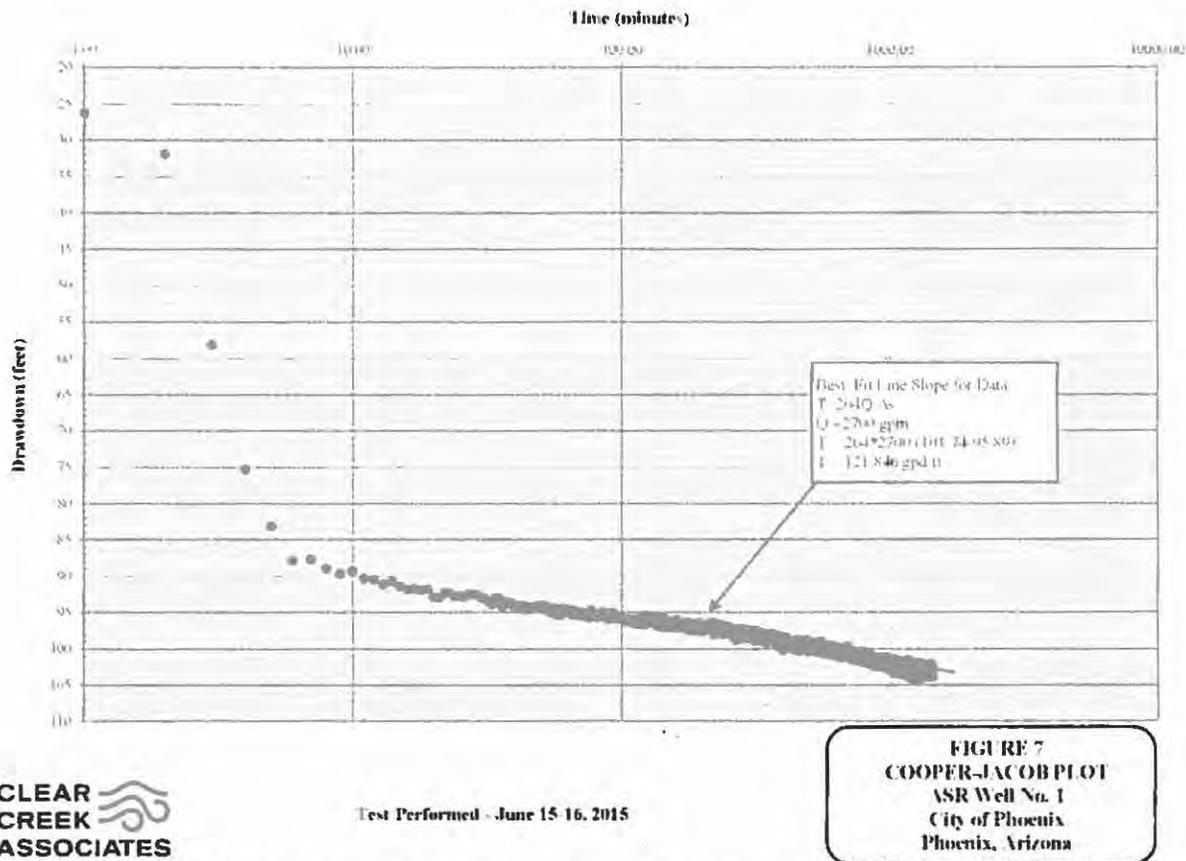


Figure 5- Deer Valley WTP ASR Constant Rate Pump Test, Estimation of Transmissivity

ADWR has documented a significant land subsidence feature by using interferometric synthetic aperture radar (www.azwater.gov/AzDWR/Hydrology/Geophysics/WestValleySubsidence.htm). This center of this feature is 5 miles west of the Deer Valley WTP and currently does not impact Phoenix's water supply wells. Phoenix's Aquifer Restoration Program at the Deer Valley WTP is to prevent this land subsidence from enlarging and impacting the production capacities and water quality of Phoenix's water supply wells.

This dual purpose well (Deer Valley WTP ASR well) will replace the existing City of Phoenix Well #202 (Figure 3). The existing well (#202) will be converted into a compliance well that will monitor water levels during recharge and pumping operations. In addition, water quality samples will be collected throughout the year to meet ADWR permit requirements. If recharge mound reaches 100 feet below land surface, then the recharge well will be shut down per the ADWR permit requirements. Pressure transducer devices (measure water levels) are installed in both ASR and monitor wells to ensure that the recharge mound does not reach the 100 foot below land surface permit limit.

Evaluation Criterion B- Drought Planning and Preparedness (20 points)

Two documents that address Phoenix's drought planning and preparedness include the 2011 City of Phoenix Water Resources Plan (WRP) and the 2015 Update to the Drought Management Plan and Water Use Reduction Guidelines (DMP) (Attachment 2). The WRP is the more encompassing

document in that it includes a full assessment of possible long term future supply and demand conditions for Phoenix. Specific supply augmentation and demand management mitigation strategies to address potential shortfalls are addressed in the WRP.

Specifically, the WRP considers the possibility of realistic, but severe long term shortages for both the Salt / Verde watershed and Colorado River watershed (as noted earlier in the application, the City of Phoenix normally relies on surface water for 97% of its supplies) (www.phoenix.gov/waterservicessite/Documents/wsd2011wrp.pdf). The WRP projects long term shortages on the watersheds to reflect both longstanding historic patterns of long term drought on these watersheds, but also to consider the possibility that climate change will exacerbate the duration and intensity of drought, and thus increasing the frequency and intensity of supply shortages for Phoenix.

The WRP contemplates a number of deficit mitigation strategies to eliminate shortage during severe conditions. Notable strategies assessed in the WRP are demand management strategies such as improving water use efficiency, curtailing demand if supply conditions warrant, and targeting programs for additional demand reductions as needed. In regards to augmenting supply, the WRP's strategies include working with the Arizona Water Banking Authority (AWBA) to develop a recovery plan for water the authority has recharged for CAP municipal and industrial subcontractors (such as Phoenix), expanding local groundwater capacity, firming CAP leases and other supplies, storing unused supplies and enhancing the City's ability to store and recover unused supplies when needed.

The latter two strategies listed above - storing unused supplies and enhancing the City's ability to store and recover unused supplies when needed - are completely consistent and in concert with the ASR well proposed at Deer Valley Water Treatment Plant that is the basis for this application. Although it is anticipated that it is more likely that the AWBA will convey recovered credits to Phoenix through the CAP Aqueduct or other conveyances, the well would prove beneficial if AWBA credits must be recovered by Phoenix's wells.

The DMP attached to this application largely focuses upon demand reduction strategies that would result based on anticipated supply shortages. The DMP employs a staged approach (consistent with City Ordinance), ranging from Stage 1 to Stage 4, with the latter the most critical shortage. The DMP's demand reduction measures expand from voluntary uses, then to discretionary uses, and lastly essential uses as conditions progress to Stage 4. The next WRP update, anticipated to be completed late this year, will be a comprehensive overarching plan that will incorporate supply, demand and drought management. The current DMP will be incorporated into the upcoming WRP.

Evaluation Criterion C- Severity of Actual or Potential Drought Impacts (20 points)

The project area is currently in drought. According to the USDA United States Drought Monitor map, the surface watersheds in which Phoenix relies upon most of its supplies (the Colorado River

watershed and the Salt / Verde River watersheds) are currently experiencing D0 (Abnormally Dry) to D2 (Severe Drought) conditions in an area delineated as having long term drought on the map.

Past drought occurrences are common in the arid Southwest, with both the Colorado River and the Salt / Verde River watersheds frequently having droughts of up to 20 years, and often concurrently. This is based on measured records since about the turn of the 20th Century and paleo-records based on tree ring research over approximately the last 800 years (Meko, D.M., and Hirschboeck, K.K., 2008), (Meko, D., Woodhouse, C. A., Baisan, C. A., Knight, T., Lukas, J. J., Hughes, M. K., and Salzer, M. W., 2007,).

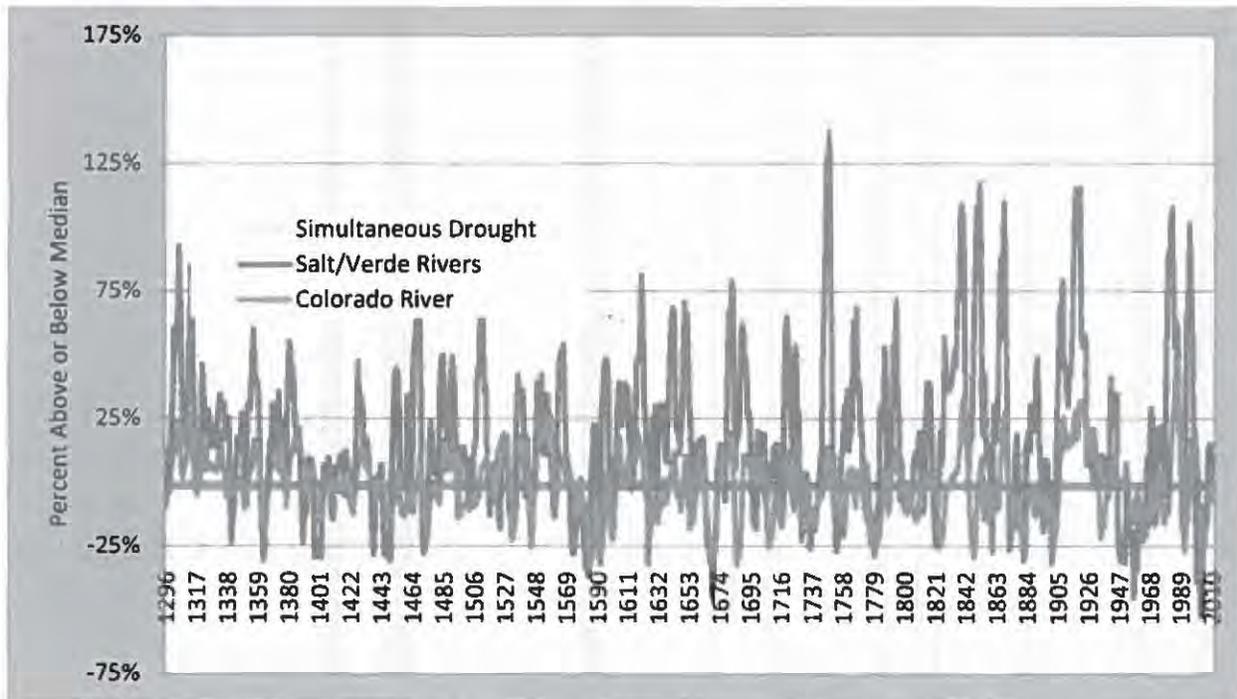


Figure 6- Colorado and Salt / Verde Rivers: 5 Year Average Flow Variations Based On Tree Ring Research and Measured Flows

The 2014 National Climate Assessment, produced by a team of more than 300 experts guided by a 60 member Federal Advisory Committee, includes projections of potential climate change effects under two main emissions scenarios. Scenario A2 assumes continued increases in emissions throughout this century, while B1 assumes much slower increases in emissions beginning now and significant emissions reductions beginning around 2050. For the southwestern United States, annual average temperatures are projected to rise by up to 5.5°F by 2041-2070 and by up to 9.5°F by 2070-2099 for the A2 emissions scenario, with the greatest increases in the summer and fall. For the B1 emissions scenario, projected temperature increases are up to 4.5°F (2041-2070) and up to 5.5°F (2070-2099). Summertime heat waves are projected to become longer and hotter, with decreasing wintertime cold air outbreaks.

The Assessment indicates that projections for precipitation changes are less certain. Under a continuation of current rising emissions trends (A2), reduced winter and spring precipitation is

consistently projected for the southern part of the Southwest by 2100 as part of the general global precipitation reduction in subtropical areas. In the northern part of the region, projected winter and spring precipitation changes are smaller than natural variations. Summer and fall changes are also smaller than natural variations throughout the region (Ch. 2: Our Changing Climate, Key Message 5). An increase in winter flood hazard risk in rivers is projected due to increases in flows of atmospheric moisture into California’s coastal ranges and the Sierra Nevada (Ch. 3: Water). These “atmospheric rivers” have contributed to the largest floods in California history and can penetrate inland as far as Utah and New Mexico.

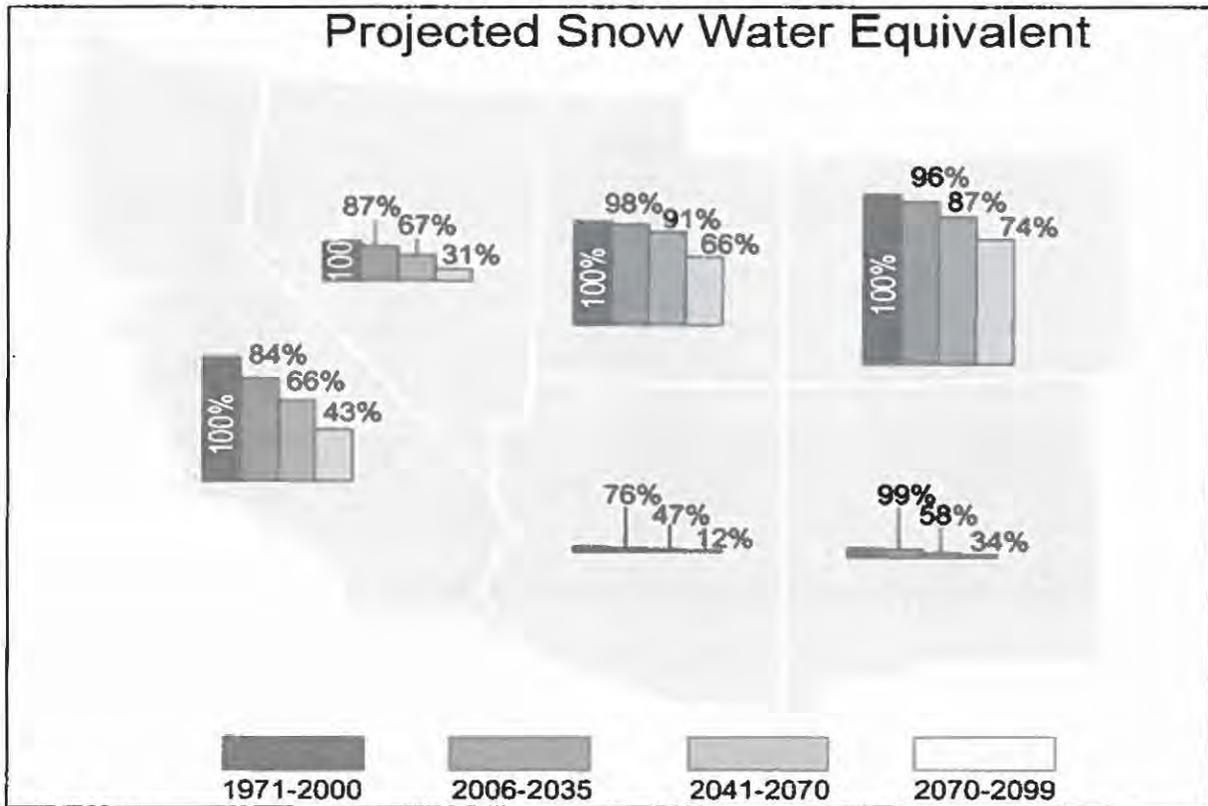


Figure 7- Projected Snow Water Equivalent Compared to the 1971-2000 Average, Courtesy National Climate Assessment

Evaluation Criterion D- Nexus to Reclamation (15 points)

The project will utilize potable water for recharge that will likely be sourced from either “Plan 6 / New Conservation Space” supplies that are stored behind Roosevelt Dam on the Salt River or Colorado River supplies from the Central Arizona Project, both of which are Bureau of Reclamation Projects.

The project is within the Lower Colorado River basin. The project indirectly involves Reclamation facilities, in the sense that the Plan 6 / New Conservation Space or Colorado River supplies will be conveyed to the recharge site from Roosevelt Dam or the CAP - SRP Interconnect Facility by way of

the Salt River Project Canal system to the City's Deer Valley Water Treatment Plant, where it will ultimately be treated and then recharged at the project.

While the project is located within the Lower Colorado River basin, it will not directly contribute water to the basin in the sense it will not augment surface water supplies in the basin, except that the project will reduce demand for surface water supplies by recovering supplies that had been previously recharged to meet demand.

The project will not help Reclamation meet trust responsibilities to any tribe(s).

Evaluation Criterion E- Project Implementation (5 points)

The project schedule is described in Attachment 1 (Tasks, milestones and dates are provided). The project is divided into the following tasks:

1. Construction of Deer Valley ASR Well #1- Constructed and tested June 2015. New well is 18-inch diameter and completed 1,200 feet below land surface (Figure X). The pumping rate of this well is 2,500 gallons per minute (gpm) continuously.
2. Design of ASR Well Infrastructure- Develop design documents, including conceptual design report, 30%, 60%, 90% and final bid plans and specifications for infrastructure components and equipment at the well site. Components of the design include pump/motor, column pipe, above-ground piping, valves, flow-meters, electrical gear and upgrades, pump-to-waste system, programming and instrumentation.
3. Permitting- Complete and obtain all permits as required for construction and operations of the ASR well, including coordination with regulatory agencies. Required permits to be obtained include permits through the ADWR: Underground Storage Facility (USF), Water Storage Permit, and Recovery Well Permit. Permits required through Maricopa County Environmental Services Department (MCESD) include the Approval to Construct and Approval of Construction permits. Obtaining the ADWR USF and Water Storage Permits will take about 10-11 months since the ADWR review period is 9-10 months. The numerical groundwater modeling is already completed and the analysis/simulation will take 1 week to produce results. Obtaining the Maricopa County construction permits will take several weeks. Design drawings are submitted to the County for review and a meeting is typically conducted to address the County's concerns. A site visit/inspection is done by the County once the project is constructed and operational.
4. Construction of Deer Valley ASR Well #1- Bidding, award and construction of the final design drawings and specifications. Construction administration and inspection services will be provided by Phoenix and the consultant engineer to ensure the project is constructed in accordance with the plans and specifications. The Contractor will provide commissioning testing of the well and provide training to City staff.

PERFORMANCE MEASURES

Quantifying project benefits is achieved by the following:

- Recharge and recovery rates and volumes will be measured by magnetic induction flowmeters installed at the well-head. All daily, month, and annual data are collected and stored in a digital library.
- A requirement under the ADWR USF permit, Phoenix must submit quarterly reports to ADWR calculating monthly volumes that are stored (banked) or pumped out of the ASR well. These reports quantify how much water is stored in the aquifer.
- Injection rate efficiencies are reported weekly to Gary Gin, City Hydrologist, to ensure well performance is stable and not clogging. If the well clogs, then injection rates will significantly decline and the volumetric recharge goals will not be met. Phoenix has developed measures that can unclog the well within 4 hours with the well pump cycling on and off multiple times.
- The ASR well system is programmed with alarms to notify the operator when the system is not operating correctly, and identify and isolate the source of the issue. This programming allows us to quickly respond to the issue and get the well back in operations. It is critical to have the ASR well system continuously operating in recharge mode so that performance measures/goals can be met. Having the well system down due to mechanical failure or severe well clogging will increase maintenance costs over time and lost opportunity for recharging available resources.
- If groundwater levels surrounding the ASR well remain stable or steady increase over successive years of recharge then the City has built a surplus of back-up supplies to mitigate against drought or system outages. Recharge activities will result in lower operations (energy costs) and maintenance costs to nearby water supply wells since groundwater levels will be either stabilized or rising in the region. To measure operational cost savings, historical energy costs for well pumping will be compared against energy costs after the recharge program starts.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

Impacts to soil, air, and animal habitat will be limited and measures will be taken to ensure that the project complies with all Federal, and State regulations. For the disturbance area, the Contractor will prepare a Dust Control Permit administered by Maricopa County and a Storm Water Pollution Prevention Plan in compliance with the Construction General Permit of the Arizona Pollutant Discharge Elimination System (AZPDES) which is administered by ADEQ.

The City is not aware of any endangered or threatened species in the project area. The project area is located within an existing facility (Deer Valley WTP).

There are no wetlands inside the project area. The area is defined as Sonoran Desert scrub biotic community (Turner and Brown, 1994), which has high annual temperatures with low precipitation.

The Deer Valley WTP recharge delivery line that will supply potable CAP and NCS water to the ASR well will be constructed in early 2016. The distribution line that will recover groundwater and banked resources was constructed in 2006.

This project will not impact or modify any existing irrigation systems. Groundwater will be pumped through the existing distribution pipeline system. There are no buildings, structures or features that are listed or eligible for listing on the National Register of Historic Places. There are no known archeological sites at the existing Deer Valley WTP (project area) and no other investigations are recommended. There will be no disproportionately high and adverse effect on low income or minority populations. The project area will not limit access or impact tribal lands. The project will not contribute or spread noxious weeds or non-native invasive species known to occur in the area.

EXISTING DROUGHT CONTINGENCY PLAN

The City of Phoenix Drought Management Plans is provided as Attachment 2

REQUIRED PERMIT OR APPROVALS

Required permits to be obtained include permits through the ADWR: Underground Storage Facility (USF), Water Storage Permit, and Recovery Well Permit. Permits required through Maricopa County Environmental Services Department (MCESD) include the Approval to Construct (ATC) and Approval of Construction (AOC) permits. The key to obtaining required permits in a timely manner through ADWR and Maricopa County is to coordinate a pre-application meeting to discuss project objectives, delineate components to be constructed, and describe how the system will operate and influence other infrastructure. Obtaining the ADWR USF and Water Storage Permits will take about 10-11 months since the ADWR review period is 9-10 months. The numerical groundwater modeling is already completed and the analysis/simulation will take 1 week to produce results. The Recovery Permit will take 2-3 months to submit application and gain approval. Obtaining the Maricopa County construction permits will take several weeks. Design drawings are submitted to the County for review and a meeting is typically conducted to address the County's concerns. A site visit/inspection is done by the County once the project is constructed and operational. The City does not anticipate any delays in obtaining these permits through ADWR and MCESD.

LETTERS OF SUPPORT

There are no other stakeholders supporting this project.

REFERENCES

nca2014.globalchange.gov/report/regions/southwest

www.azwater.gov/AzDWR/Hydrology/Geophysics/WestValleySubsidence.htm

Meko, D. M., and Hirschboeck, K. K., 2008, The Current Drought in Context: A Tree-Ring Based Evaluation of Water Supply Variability for the Salt-Verde River Basin, Final Report, Laboratory of Tree Ring Research, The University of Arizona

Meko, D., Woodhouse, C. A., Baisan, C. A., Knight, T., Lukas, J. J., Hughes, M. K., and Salzer, M. W., 2007, Medieval Drought in the Upper Colorado River Basin, Geophysical Research Letters, Vol. 34, L10705

www.phoenix.gov/waterservicessite/Documents/wsd2011wrp.pdf

Turner, R.M., and Brown, D., 1994, Tropical-Subtropical Desertlands. Sonoran Desertscrub, In Biotic Communities: Southwestern United States and Northwestern Mexico, edited by D. Brown, University of Utah press, Salt Lake City, pp. 181-222.

Attachement 1: City of Phoenix Deer Valley WTP ASR Well #1

ID	Task Name	Duration	Start	Finish	2015				2016			2017				
					Sep	Jan	May	Sep	Jan	May	Sep	Jan	May	Sep		
0	Deer Valley ASR Schedule	632 days	Thu 1/29/15	Sat 7/1/17												
1	Notice to Proceed with Design (Deer Valley WTP ASR)	1 day	Thu 1/29/15	Thu 1/29/15												
2	Submit ADWR USF	171 days	Fri 1/30/15	Fri 9/25/15												
3	Notice of Approval ADWR USF	1 day	Mon 9/28/15	Mon 9/28/15												
4	Preliminary Design Development to 30%	105 days	Fri 1/30/15	Thu 6/25/15												
5	30% Design Complete	1 day	Fri 6/26/15	Fri 6/26/15												
6	Preliminary Design Development to 60%	29 days	Mon 6/29/15	Thu 8/6/15												
7	60% Design Complete	1 day	Fri 8/7/15	Fri 8/7/15												
8	Preliminary Design Development to 90%	24 days	Mon 8/10/15	Thu 9/10/15												
9	90% Design Complete	1 day	Fri 9/11/15	Fri 9/11/15												
10	Request Maricopa County Environmental Services Dept (MCESD) Approval to Construct	21 days	Fri 9/11/15	Fri 10/9/15												
11	Preliminary Design Development to 100%	19 days	Mon 9/14/15	Thu 10/8/15												
12	100% Design Complete	1 day	Fri 10/9/15	Fri 10/9/15												
13	Receive MCESD Approval to Construct	1 day	Mon 10/12/15	Mon 10/12/15												
14	NTP for Construction Contract	1 day	Tue 10/13/15	Tue 10/13/15												
15	Advertise for Construction Firm	17 days	Fri 9/11/15	Mon 10/5/15												
16	Evaluate Contractor Qualifications	15 days	Wed 10/7/15	Tue 10/27/15												
17	Request for Council Approval RCA	25 days	Wed 10/28/15	Tue 12/1/15												
18	Notice to Proceed with Construction	1 day	Wed 12/2/15	Wed 12/2/15												
19	Construction Substantial Completion	413 days	Thu 12/3/15	Sat 7/1/17												
20	Mobilization	11 days	Fri 12/4/15	Fri 12/18/15												
21	Construction	379 days	Sat 12/19/15	Wed 5/31/17												
22	Construction Administration & Inspection	379 days	Sat 12/19/15	Wed 5/31/17												
23	Prepare Final Record Drawings	23 days	Thu 6/1/17	Sat 7/1/17												

Project: Deer Valley ASR Sched

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	



DROUGHT MANAGEMENT PLAN AND WATER USE REDUCTION GUIDELINES



CITY OF PHOENIX
WATER SERVICES DEPARTMENT
2015 UPDATE



CITY OF PHOENIX
DROUGHT MANAGEMENT PLAN AND
WATER USE REDUCTION GUIDELINES

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1.0 INTRODUCTION

Phoenix is built for drought.

In a broad sense, every water-related action the City and its residents have undertaken since the City was founded has been for the purpose of mitigating or responding to drought. Phoenix is not particularly vulnerable to earthquakes, blizzards, hurricanes, tornadoes, or other natural disasters, but it is nearly always hot and dry here, and drought is a constant threat. The rehabilitation of ancient canals, the building of Roosevelt Dam, the introduction of Colorado River water into central Arizona, the adoption of the Groundwater Management Act, the settlement of water rights claims with Native American communities, the development of the City's five surface water treatment plants, the installation of the City's water transmission mains and 7,000 miles of pipelines, the development of the City's two wastewater reclamation plants that treat water for re-use, the creation of the City's aquifer recharge facilities, and the implementation of the City's water conservation efforts are all activities undertaken to ensure public safety, economic opportunity, and quality of life in a desert community that basically exists in perpetual drought.

Since the 1980s, Phoenix has implemented water resource, water conservation, and infrastructure master plans. These efforts have led the City to have a diverse and ample water supply portfolio, have helped customers improve their water use efficiency, and have resulted in the infrastructure necessary to effectively convey water to customers. However, drought is a regular phenomenon in the southwestern U.S. and within the Colorado, Salt, and Verde River watersheds, where Phoenix gets most of its supplies. Reconstructed stream flow data on these watersheds indicates drought has endured for decades. Extended drought could lead to future water supply shortages for Phoenix. The Drought Plan builds upon these efforts and the City's Water Resources Plan, Water Infrastructure Master Plan, and Water Conservation Plan, and is crafted to:

- prepare Phoenix customers for the impacts of shortage;
- identify mechanisms through which the impacts caused by shortage can be shared equitably and in proportion to the magnitude of the shortage;
- identify tools that can be deployed to minimize disruption of the economy so that jobs are protected and regional economic stability is preserved;
- establish reliable two-way communication to provide timely information and feedback relative to voluntary measures and restrictions prior to and during shortage or other supply insufficiency conditions;
- ensure competent implementation of demand reduction measures; and
- identify tools that can be used to protect public health and safety during the most dire water shortage situations.



Phoenix completed its first Drought Management Plan (Plan) in 1990, followed by an update in 2000. In the 15 years since the update was completed, many tenets remain constant, but much has also changed and evolved. Changes in water demand since 2000, whether resulting from changes in plumbing code, landscaping preferences, types of non-residential uses, or other factors have implications for drought mitigation strategies. Phoenix has adjusted its supply portfolio by acquiring or leasing additional Central Arizona Project supplies since 2000, but has also relinquished groundwater supplies from McMullen Valley. Climate change implications appear to be much more important, and many large-scale models point toward hotter and drier conditions in the southwestern U.S. However, much research still remains to be done to better understand what may happen in the future and how Phoenix's supplies could be affected.

These factors, among others, led to this 2015 update to reflect these changes. One notable change for this update is the title of the plan, now called the Drought Management Plan and Water Use Reduction Guidelines. This change addresses a common misunderstanding about "drought" and "shortage". The terms are often used interchangeably, but they have significantly different meanings, especially in the arid Southwest. In this context, **drought** is a prolonged period of unusually dry climatic conditions over the Colorado, Salt and Verde River watersheds that supply most of Phoenix's water. These conditions reduce snowfall and rainfall, leading to a sustained period of below average spring runoff into reservoirs, which leads to a decline in reserve storage and supply security. **Shortages** occur when droughts endure with enough magnitude and severity such that normally available supplies are inadequate to meet current water demands. This distinction is important; it establishes a foundation for a prioritized, systematic framework of actions and measures that are adaptable to actual available supplies during both drought and shortage conditions.

It is also important to note that the City of Phoenix has maintained a very active and successful water conservation program since the 1980's, and has experienced a significant decline in water consumption rates of roughly 30% over the last twenty years. The City focuses its water conservation efforts on long-term culture change regarding water use and encourages its customers to embrace a desert lifestyle. While demand management tools appear in the Drought Management Plan and Water Use Reduction Guidelines, these tools should not be confused with on-going water efficiency and conservation efforts, as the drought plan tools are targeted towards short-term efforts and extreme shortage situations. In other words, the drought plan is not a water conservation program.

1.1 CURRENT DROUGHT MANAGEMENT AUTHORITY AND REQUIREMENTS

1.1.1 DROUGHT MANAGEMENT ORDINANCE

In 1990 the Water Services Department (WSD) completed the first Drought Management Plan. That same year, WSD recommended that drought management authority be codified into ordinance to provide the mechanisms needed to implement the Plan by the WSD Director, which was adopted by City Council as the Drought Management Response Procedure (P.C.C. 37-



121). The Ordinance authorized the WSD Director to implement a Drought Management Plan based upon four progressively restrictive water use reduction stages tied to the severity of drought.

The WSD Director is authorized to declare water use reduction stages and impose water use reduction measures as generally prescribed below:

- A Stage 1 Water Alert is when an insufficient supply situation appears likely. This stage triggers an intensive public education and information program.
- A Stage 2 Water Warning is when an insufficient supply situation occurs. This stage authorizes the WSD Director to impose and enforce water use reduction regulations and to impose a drought surcharge on the City Services Bill.
- A Stage 3 Water Emergency is when additional reductions in water supplies occur beyond the Stage 2 level, and water transfers and groundwater pumping are insufficient to meet water demands in the service area. Additional or increased water use reduction regulations and increased surcharges may be implemented by the WSD Director at this stage.
- A Stage 4 Water Crisis is when the WSD Director determines that, based on the severity of the crisis, additional measures must be instituted to protect human health and safety.

The Drought Management Ordinance also describes the circumstances and uses of any surcharges, fees, penalties and variances that may be implemented by the WSD Director, and addresses shortages caused by short term events, giving the WSD Director the authority to implement an Emergency Response Plan to address them. Limited exemptions to drought response measures are given to reclaimed water users. Current language of the full ordinance can be found attached as Appendix A – Drought Management Ordinance.

1.1.2 STATE COMMUNITY WATER SYSTEM REQUIREMENTS – DROUGHT PREPAREDNESS PLAN

The State of Arizona's State Community Water System requirements (A.R.S. § 45-341 - 45-343) specify that large community water systems (those systems that serve more than 1,850 persons) must prepare a drought preparedness plan that shall be designed to meet the specific needs of the water system. The plan must include contact information for the persons responsible for directing operations during an emergency period, drought response stages for the implementation of reductions due to shortage, a plan of action that the community water system will take in response to drought conditions, including public information and education provisions, development of emergency supplies, and specific water supply and or demand management measures for each stage of drought or shortage conditions.



2.0 SUPPLY AND DEMAND – PROVIDING A CONTEXT FOR DROUGHT MANAGEMENT

Phoenix has a unique portfolio of water supplies and specific characteristics about its water demand that are intrinsic to the management of potential supply shortages. Brief overviews of the City's supplies and demands described below are intended to provide some context to Phoenix's drought management and shortage mitigation approach. A comprehensive summary of supplies and demands can be found in the Water Resources Plan.

2.1 SUPPLY

Phoenix's typical water supplies delivered to customers are grouped into five major categories:

- Surface water associated with the Salt River Project (SRP);
- Salt and Verde River water supplies developed by or exchanged to Phoenix;
- Colorado River water delivered through the Central Arizona Project (CAP);
- Groundwater pumped from City wells or delivered by SRP;
- Reclaimed water (or treated wastewater effluent) for certain non-potable uses; and
- Long-term Storage Credits.

The first three categories are all surface water supplies. Normally, more than 90 percent of the City's demand is met with surface water from the Colorado, Salt and Verde Rivers. Surface water supplies are considered renewable because they are replenished with runoff from melting winter snowpack from the mountainous watersheds of the rivers. This is in contrast to groundwater, which is generally considered non-renewable because natural recharge into the underground aquifer from the surface is often a very slow process. However, unlike groundwater, surface water supplies in the southwest are susceptible to multi-year cyclical wet and dry periods. Drier periods caused by drought can last many years, which can lead to supply shortages for Phoenix. Climate change may exacerbate the length and intensity of drought in the southwest.

Phoenix (and the Arizona Water Banking Authority on behalf of Phoenix and other entities) also periodically recharges surface water supplies into the aquifer as a hedge or bank against possible supply shortages. Once stored, this water becomes a Long-term Storage credit that can be pulled back out of the aquifer, or "recovered" through the use of wells.

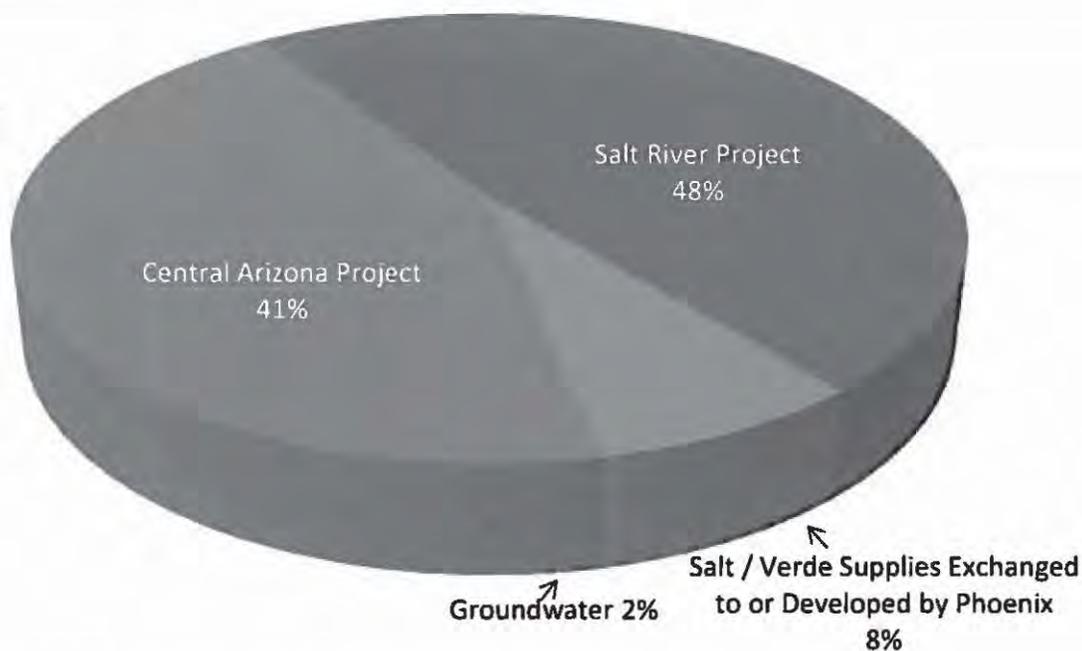


FIGURE 2-1. CITY DOMESTIC WATER SUPPLIES BY SOURCE, 2012 – 2014 AVERAGE

2.2 DEMAND

The City serves water for a wide range of uses. Residential water use, which includes single family homes, apartments, townhouses, condominiums, etc., accounted for about 71% of the City's water deliveries in 2014.

Commerce and Industry, which may include such diverse water uses as retail, restaurants, warehouses, hotels, offices and other non-residential private sector uses, accounts for another 20% of the City's water deliveries. Local, state and federal governments, as well as institutional users such as colleges and schools, account for the final 9% of the City's water deliveries.

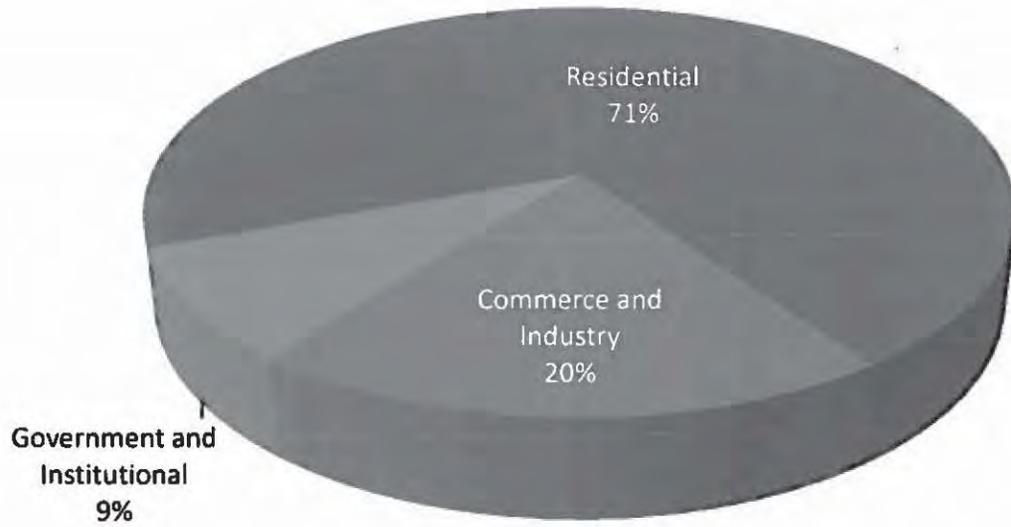


FIGURE 2-2. CITY WATER DELIVERIES BY SECTOR, 2014



3.0 PLANNING FOR DROUGHT

Preparing for drought-induced supply shortages requires strategies to both augment supply and reduce demand. The optimal mix of strategies is determined by the timing and potential volume of shortages, the lead time required to implement water supply augmentation and/or demand reduction projects, and the relative impact of each strategy. To determine the impact of each strategy, one must consider its relative costs, how scalable it is, how enduring its effects are, and its direct and indirect effects on economic, social, and environmental welfare.

3.1 SHORTAGE RESPONSE FRAMEWORK

The City of Phoenix integrates supply and demand strategies through a provision to help cover the additional costs of “emergency” supply deliveries and demand reduction programs specified in the City’s Drought Ordinance and through an adaptive Shortage Response Planning Framework that includes both supply augmentation as well as demand reduction measures (see Figure 3.1). Integrated supply and demand strategies are necessary because research suggests that surface water shortages on the Colorado, Salt and Verde River systems may last decades. In addition, the uncertainty of climate change may introduce a new normal in average annual surface water flows, requiring a need for long-term reductions in demand. The Shortage Response Framework is a progressive series of supply and demand actions designed to proactively prepare and respond to shortage impacts. Additional details on the Shortage Response Framework can be found in the Water Resources Plan.



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PHASE	Lead Time	Supply Related Actions	Demand Related Actions
MONITOR	Continuous	<ul style="list-style-type: none"> - Monitor watersheds, reservoir status and threats to supplies. - Identify opportunities for supplemental or "safety net" supplies that can be acquired at a low cost relative to expected future supplies. 	<ul style="list-style-type: none"> - Monitor growth and usage trends. - Anticipate trend changes. - Research large water uses to better understand potential for demand reduction. - Maintain public awareness.
EXPLORE AND PLAN	Near term - decades	<ul style="list-style-type: none"> - Explore options to fund and deploy supplemental or "safety net" supplies. - Acquire necessary supplies or secure access to supplies. - Conceptualize regional scale supplemental supply projects such as infrastructure and supply exchanges. 	<ul style="list-style-type: none"> - Advocate for plumbing code changes to generate long-term savings. - Support customer actions to improve landscape water efficiency. - Prepare customers for future drought conditions.
PREPARE AND DEPLOY LONG RANGE	5-10 Years	<ul style="list-style-type: none"> - For large scale or infrastructure intensive projects, secure funding, develop designs, acquire land access and make other investments to reduce construction lead time. - For other projects where multiple purposes may be served (such as new wells for system redundancy), design, fund and construct accordingly. 	<ul style="list-style-type: none"> - Evaluate large commercial and industrial customers and sectors for opportunities to develop cooperative agreements.
DEPLOY SHORT RANGE	2-5 Years	<ul style="list-style-type: none"> - If supported by a current risk analysis and re-evaluation of shortage impacts, begin constructing necessary facilities. 	<ul style="list-style-type: none"> - Execute demand reduction agreements with specified large customers or sensitive customers in anticipation of shortage. - Establish general customer outreach strategy.
OPERATE	1 Year	<ul style="list-style-type: none"> - Prepare facilities and or supplies for deployment. 	<ul style="list-style-type: none"> - Prepare customers for mandatory demand curtailment measures. - Implement drought surcharge - Implement curtailment measures.
MANAGE	During Shortage	<ul style="list-style-type: none"> - Execute plans for supply deployment. - Manage sources in a manner to preserve options (e.g. maintain groundwater reserves to the highest degree practical, etc.). 	<ul style="list-style-type: none"> - Assist customers in meeting voluntary or mandatory reduction measures - Enforce mandatory measures.

FIGURE 3-1. SHORTAGE RESPONSE FRAMEWORK



3.2 MANAGING DEMAND IN THE CONTEXT OF SUPPLY SUFFICIENCY

The City of Phoenix distinguishes between two water use reduction strategies that are influenced by the availability of supplies relative to demand. The first strategy, improved efficiency, is one of the basic tenets of traditional water conservation efforts. Efficiency programs impart gradual reductions in water use and do not adversely impact customer lifestyles or business opportunities. Efficiency gains prove beneficial to customers and the City by reducing waste, reducing costs and augmenting supplies that may buffer shortage. The City of Phoenix emphasizes efficiency gains as a long-term culture change in the community. Citizens are encouraged to embrace a desert lifestyle as a benefit to the customer and the community, and as proactive mitigation against drought conditions. While a variety of efficiency programs will be on-going during “normal” supply conditions, these efforts may be accelerated as the probability of shortage increases.

The second strategy, demand curtailment, is characterized as an urgent reduction of water demand necessary to mitigate supply shortfalls. Curtailment programs can be structured to minimize customer impacts and avoid measures that impose severe impacts on a customer’s quality of life and/or the local economy. Curtailment programs typically supplement, rather than replace efforts to accelerate efficiency improvements.

If demand curtailment becomes necessary, the City will employ a triage approach to balance water demand with available supplies; first targeting water use that provides the least value to customers and the community at-large. It is an inherently hierarchical approach, protecting societal and economic needs by initially targeting relatively innocuous uses such as leakage and waste followed by discretionary uses as deemed necessary. Only in the most pressing situations would essential uses get targeted for curtailment (See Figure 4-2, Demand Management and Supply Sufficiency).

The concepts shown in Figure 3-2 provide the foundation for WSD’s approach to prioritizing the curtailment measures identified under the water use reduction guidelines described in Chapter 4.

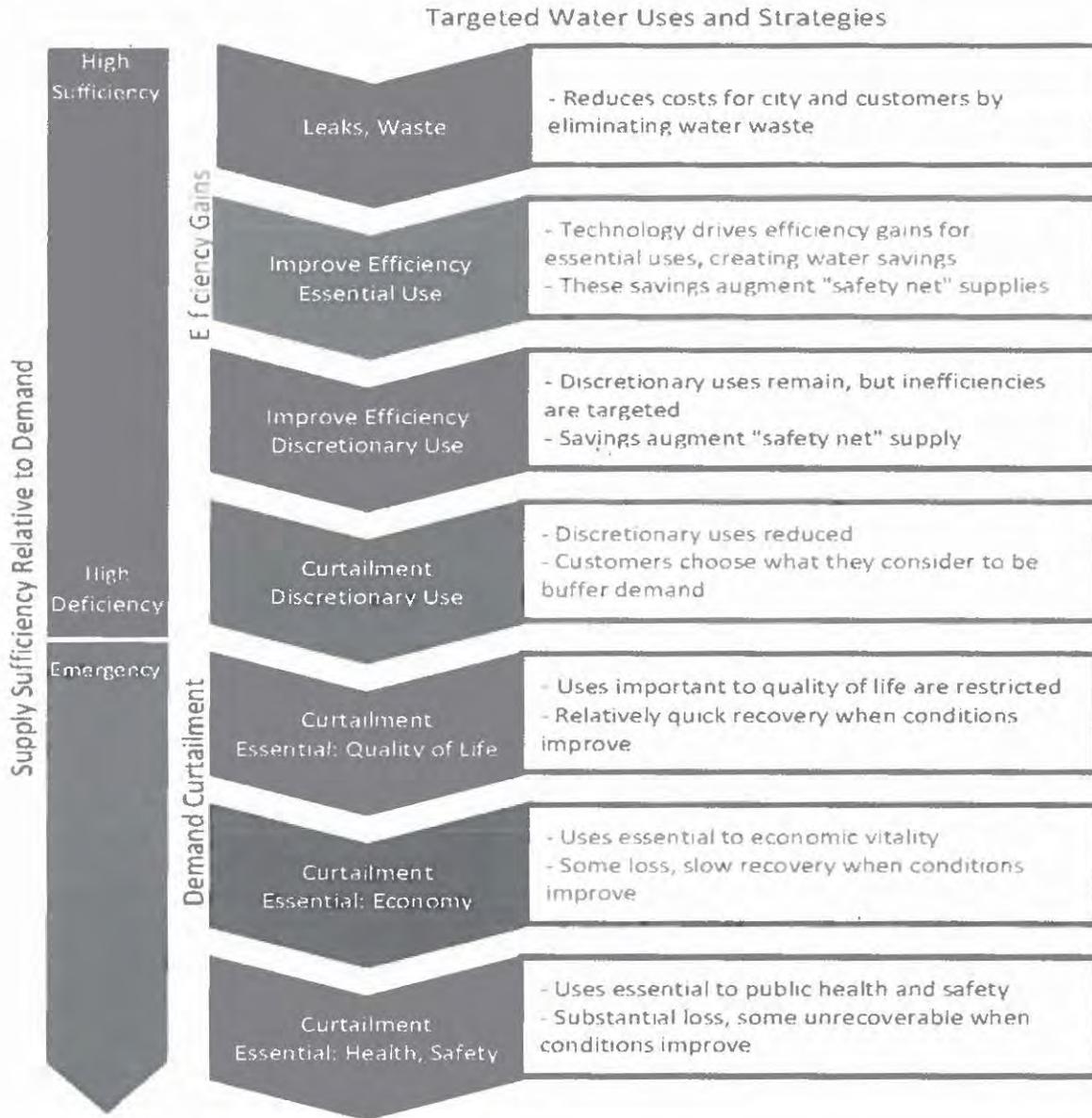


FIGURE 3-2. DEMAND MANAGEMENT AND SUPPLY SUFFICIENCY



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DROUGHT MANAGEMENT PLAN AND
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One purpose of the Drought Management Plan and Water Use Reduction Guidelines is to raise customer awareness about ways to reduce their vulnerability to drought. This can be accomplished in part by identifying the types of water uses that are most likely to be impacted by regulations and/or surcharges if and when the City is faced with responding to supply shortages. It is a goal of the WSD to make adequate water available for customers to maintain a lifestyle of their choice, however it is important for customers to understand decisions on how water is used can come with a risk when the City is facing supply deficits.



4.0 SHORTAGE REDUCTION GUIDELINES

Because the severity, timing, and duration of a shortage is highly unpredictable, the measures described within this chapter serve as guidelines for specific actions that may be taken by the WSD Director if the City were to declare a shortage. These guidelines adhere to the intent of the Drought Ordinance.

The shortage reduction guidelines are summarized in Figure 4-1. Each curtailment measure was assessed for the following:

Primary Goal

- **Decision Making-** Specific actions to take during shortage will need to be periodically evaluated by internal and external stakeholders as shortage conditions are declared and unfold. Implementation of specific measures will need to be monitored, may require coordinated efforts, and where necessary, may need to be adjusted to achieve targets.
- **Raise Awareness-** Measures that inform and educate customers about water use and efficiency, as well as voluntary and mandatory requirements.
- **Reduce Waste-** Measures that address reducing water waste and leaks.
- **Improve Efficiency-** Measures that address improving water use efficiency through operational improvements, maintenance or replacement.
- **Curtail Demand-** Measures that either through voluntary or mandatory actions reduces water demand.
- **Use Avoidance-** Measures that prevent or reduce new water demand.

Relative Impact- Relative impacts are measured under broad and somewhat subjective “low”, “medium” and “high” categories. Impacts will need to be further defined when curtailment measures are anticipated to be executed in the near term.

- **What is the water savings potential** of the measure?
- **Scalability-** Can the measure pinpoint targeted sectors, be rapidly expanded or simply be implemented at such a large scale to effectuate notable water savings?
- **Durability-** Will the water savings of the measure endure, particularly if shortage is persistent and requires continued demand reductions?
- **City Cost-** How expensive will the measure be to the City?
- **Customer Cost-** How expensive will the measure be to the customer?

Stage- Is the curtailment measure a viable option for a stage or multiple stages specified in the Drought Ordinance (Stage 1- Water Alert, Stage 2- Water Warning, Stage 3- Water Emergency, and Stage 4- Water Crisis)?



**CITY OF PHOENIX
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Curtailment Measure	Primary Goal					Relative Impact					Ordinance Stage				
	Decision Making	Raise Awareness	Reduce Waste	Improve Efficiency	Curtail Demand	Use Avoidance	Savings Potential	Scalability	Durability	City Cost	Customer Cost	Water Alert	Water Warning	Water Emergency	Water Crisis
Stakeholder Commission	√						N/A	N/A	N/A	L	L	√	√	√	√
Implementation Task Force	√						N/A	N/A	N/A	L	L	√	√	√	√
Customer Outreach		√					L	L	M	M	L	√	√	√	√
City Actions			√	√	√		L	M	M	M	L	√	√	√	√
Voluntary Reductions					√		L	L	L	M	M		√	√	√
Audits			√	√			M	M	M	M	M		√	√	√
Rebates			√	√			M	H	H	H	M		√	√	√
Efficiency Standards				√		√	H	H	H	M	H		√	√	√
Mandatory Rationing					√	√	H	M	L	H	H			√	√
Moratorium on Growth						√	H	L	L	H	H				√

N/A = Not applicable H = High M = Medium L = Low

FIGURE 4-1. SUMMARY OF CURTAILMENT MEASURES

4.1 CURTAILMENT MEASURES

The following contains brief descriptions of the types of measures the WSD would consider if it becomes necessary to accelerate efficiency and/or curtail water use.

4.1.1 STAKEHOLDER COMMISSION

A stakeholder commission may be established prior to or during shortage conditions. The commission may consist of public and private sector members representing various water using customers and communities. The commission’s purpose would be to provide the WSD Director with guidance and feedback regarding potential implementation measures, to help the Director to understand how such measures may affect their communities, and to assist the Director with decisions regarding adjusting the implementation measures as shortage conditions evolve.

4.1.2 IMPLEMENTATION TASK FORCE

An Implementation Task Force may be established prior to or during shortage conditions. The Implementation Task Force would function as an interdepartmental group who would actively work to ensure curtailment measures required by the WSD Director are being effectuated, and



to provide feedback to both the Director and Stakeholder Commission regarding the outcomes of implemented measures.

4.1.3 CUSTOMER OUTREACH

Although the City maintains an active and effective conservation outreach program as part of its efforts to encourage customers to embrace a desert lifestyle, during certain drought or shortage conditions enhanced outreach will be necessary to update customers on water supply conditions and provide clear expectations about their water use. In addition, enhanced outreach communicates important ways customers may reduce their vulnerability to drought impacts and become more aware of shortage response measures, including voluntary rationing. Customer outreach may include general messages and/or targeted communication directed at specific types of customers or water uses. It may utilize traditional or social media platforms.

General Communication The following examples demonstrate how general messages might be altered to suit the different Water Reduction Stages in City Ordinance:

- **Water Alert-** Messaging raises awareness of watershed conditions, the probability of worsening conditions, and of actions by the City to avoid an imbalance.
- **Water Warning-** Messaging:
 - Updates the public on watershed conditions, the probability of imbalance, and actions by the City to augment supplies and/or curtail water use, and
 - Initiates a call-to-action for customers to take voluntary measures to curtail water use and reduce vulnerability to future restrictions and/or surcharges.
- **Water Emergency-** Messaging:
 - Updates customers on watershed conditions and imbalance intensity and duration, and
 - Informs customers of any education opportunities, incentive programs, mandatory measures, and surcharges.
- **Water Crisis-** Messaging:
 - Updates customers on the severity of watershed conditions and imbalance intensity and duration.
 - Informs customers of any education opportunities, incentive programs, and expanded mandatory measures and surcharges.

4.1.4 CITY ACTIONS

During a supply shortage it will be important for the City to demonstrate it is doing its part to extend available water supplies. The City will implement a **City Department Drought Response Plan**. The measures contained in the City Department Drought Response Plan will be



progressive to correspond with the Water Reduction Stages. The City Department Drought Response Plan will be implemented in a manner to avoid direct impacts on customers, though depending on the severity of the situation facilities used by customers such as parks and community pools may be impacted.

4.1.5 VOLUNTARY REDUCTIONS

During the early stages of stressed water supplies, the City may make a call-to-action for voluntary reduction measures. In general, voluntary reductions promote short-term curtailment of discretionary water uses. While customers would identify water uses they can curtail at their own discretion, the City will recommend opportunities to reduce consumption with the least impact to lifestyles. Voluntary reductions do not require enforcement and the primary cost of voluntary reductions to the City will be associated with customer outreach and education. Any costs incurred by customers as a result of voluntary reductions will be at the sole discretion of the customer and may be offset by lower water bills.

4.1.6 WATER AUDITS

Water audits of properties and/or buildings and facilities help customers reduce demand. The results of a water audit will typically include detecting leaks or waste, identifying inefficient devices that may be upgraded and discovering wasteful behaviors or water management practices that can be improved upon. Water audits can be performed at any property and often focus on both indoor and outdoor water use. Water audits can be conducted by property owners with guidance or be offered as a service by the City.

The City currently conducts audits for targeted single-family residential homeowners each year as part of a residential retrofit program. This type of program makes the most sense during normal supply conditions by targeting homeowners who may not otherwise be able to improve their water use efficiency without some assistance.

However, audit programs are highly scalable. When anticipating or during shortage, the City's current program can be expanded and altered in scope by matching the magnitude of the shortage and by expanding to sectors which are targeted for demand reductions. During shortages, water audit programs that have the greatest benefit when targeting a broader audience could be emphasized and become a higher priority. Notably, the biggest water-use efficiency improvements could be realized by targeting customers that use large volumes of water for irrigating landscaping, such as multifamily housing and homeowner association common areas. For this reason, new water audit programs implemented during a shortage will likely shift in emphasis to initially focus on residential and customers with large irrigation systems. Single-family residential audits would likely need to be completed at a large scale to reap significant demand reductions, although the high proportion of total water use at single-family residences may warrant the effort. Home audits are not terribly complex, and with



proper instruction can usually be completed by homeowners that have some knowledge of plumbing fixtures and irrigation systems. Commercial, industrial and large irrigation system audits can be very complex and require extensive training and practice.

Completing an audit may take time, be inconvenient for the customer and require technical skills. However, the process is usually completed at relatively low cost. While leak repair and replacing outdated devices can significantly add to the overall cost of an audit, changing behaviors and water management practices typically come at little or no cost. The expectation that leak repair and behavior change is likely to account for a large portion of any water savings from audits suggests any initial savings might be somewhat transient. While plumbing fixtures and appliances have a limited operating life, the savings that result from improving the efficiency of a device is considered one-way or permanent. In other words, it is not likely that a customer will revert to a less efficient device at some point in the future.

4.1.7 REBATES

Rebates provide financial assistance to customers encumbered by inefficient water uses found with older buildings or landscaping. The savings potential and scalability of a rebate program is limited by the presence of devices (or plant material) and the relative efficiency of water use.

The City currently assists targeted single-family residential homeowners each year as part of a residential retrofit program by replacing older inefficient toilets and fixtures in older homes with modern, water efficient devices. However, Phoenix currently does not intend to have a large scale rebate program during normal supply conditions. If Phoenix provided rebates for replacing toilets or converting to desert landscaping on a large scale, the cost would need to be covered by a rate increase or a tax revenue subsidy. In either case, Phoenix water customers would ultimately foot the bill. The success of current, ongoing water use reductions by customers indicates that rebates are not warranted during normal supply conditions.

During a shortage, rebates may prove to be a useful tool for accelerating the process of improving efficiency and reducing water demand by providing an incentive for customers to replace inefficient devices and landscape features with more modern, water efficient equivalents.

Examples of some, but not all, possible rebate programs include: installing efficient plumbing fixtures and appliances such as toilets and clothes washers, replacing aesthetic grass with desert adapted vegetation, replacing active (athletic) grass with synthetic turf, or installing smart irrigation components such as weather-based controllers or soil moisture sensors.



4.1.8 EFFICIENCY STANDARDS

The U.S. Congress' passage of the 1992 Energy Policy Act played a big role in raising water and energy efficiency of homes. Since then, the U.S. EPA's Energy Star and WaterSense programs have contributed to further advancements in water and energy efficiency of household devices. Many toilets and washing machines available on the market today far exceed federally mandated efficiency requirements. These innovative technologies continue to drive down water use without impacting customer's quality of life.

Long term, sustained shortages may require adoption of water efficiency standards by the City that exceed WaterSense specifications.

4.1.9 MANDATORY RATIONING

Physical rationing and mandatory water use reductions are aggressive curtailment measures. These measures are usually "last resort" options when shortages persist and previously implemented measures do not provide sufficient relief. Rationing schemes typically target discretionary water uses. Common methods include percentage reductions, budgeted (or seasonal) allotments, fixed allotments and bans on specific end-uses:

Percent Reduction mandates reduce water use relative to historic water use. For example, customers may be required to reduce consumption by 10% compared to the prior year. Percent reduction mandates tend to disproportionately impact customers that already use water efficiently or have a high percentage of use that goes toward non-discretionary purposes. Percent reduction mandates are highly scalable in the sense that the reduction target can be adjusted to achieve the necessary level depending on water supply conditions. Percent reductions can usually be enforced through regular meter reading; however notice to customers will typically lag water use as a result of the billing schedule.

Budgeted Allotments limits the amount of water that is allowable for specific uses. Most commonly associated with landscape irrigation, water budgets have the benefit of being able to be scaled to reflect individual customer conditions. This allows a degree of fairness that is difficult to achieve through most rationing schemes. In addition, budgeted allotments can often be enforced through regular meter reading. Budgeted allotments can also be adjusted to achieve the necessary reduction levels depending on water supply conditions. For example a water budget may be designed to ensure "efficient" irrigation takes place during early stages of shortage, or a budget may be reduced to require deficit irrigation practices if necessary under severe shortage conditions.



Fixed Allotments are similar to budgeted allotments but they are not scaled to reflect unique customer conditions. Fixed allotments tend to disproportionately impact customers that use less water for discretionary purposes. However, some inequities can be reduced by establishing unit based allotments such as gallons per square feet of lot. The primary benefit of fixed allotments is they can be enforced very easily through regular meter reading.

End-Use Bans are imposed through customer information and enforcement. Specific bans, such as irrigation schedules, and restricted use of water features can be effective at reducing peaks as well as overall demand. Bans also help generate awareness and establish equity across the community. The enforcement of bans within a service area the size of Phoenix can be very challenging and costly.

Mandatory rationing measures will need to be accompanied by an established process for considering customer appeals for hardship.

4.1.10 MORATORIUM ON GROWTH

New development, even when allowed only with the most essential water uses, may be considered enough of risk to cause undue harm to providing an adequate supply to the existing customer base. A moratorium on new building permits may be warranted if supplies are stressed to a level that dictates severe demand reduction measures. Expanding water resource acquisition projects funded by new development may help avoid a moratorium.

4.2 SURCHARGES, FINES AND PENALTIES

The Drought Ordinance authorizes the assessment of surcharges, fines, and penalties to be placed in a special fund and to strictly meet the expenses of enforcing demand reduction measures, providing demand reduction assistance to customers, meeting demand reduction-induced cash shortfalls, or augmenting water supplies.

4.2.1 SURCHARGES

The Drought Ordinance authorizes the WSD Director to implement drought surcharges when declaring a Stage 2 – Water Alert, Stage 3- Water Emergency or Stage 4- Water Crisis. The surcharge has two basic purposes: 1) encourage demand curtailment motivated by cost avoidance, and 2) generate additional revenue. Revenue generated from the surcharge can be used to offset revenue losses resulting from curtailment measures, augment water supplies, fund programs that assist customers with reducing demand, and recover costs of enforcing mandatory rationing measures. While a drought surcharge might be perceived as being needed only as a “last resort” option, the complexity and costs of certain measures to mitigate shortage may warrant employing surcharges sooner than generally expected. First, in order for revenue



from the surcharge to help offset revenue losses, expand outreach efforts, and/or contribute to adequately fund supply augmentation programs, the surcharge would be most effective when assessed early during a drought cycle. Second, with respect to using a surcharge to spur demand reductions, particularly when targeting discretionary water uses, fairness and equity concerns are largely overcome by granting customers the choice to curtail demand in ways that least impact their lifestyle, or pay the higher price for the water they use. Third, customers that have adopted water efficient lifestyles often avoid significant impacts of a surcharge. And finally, the cost of administering and enforcing drought surcharges is relatively low compared with other mandatory rationing options.

4.2.2 FINES AND PENALTIES

The Drought Ordinance also authorizes the WSD Director to implement fines when declaring a Stage 2 – Water Alert, Stage 3- Water Emergency or Stage 4- Water Crisis and in conjunction with mandatory demand curtailment measures. Similar to surcharges, fines would encourage demand curtailment. However, because fines and penalties are imposed only after there has been a violation of an existing curtailment measure, they are of course result in an additional cost to a customer or business. Fines would usually target and discourage discretionary water uses, maximizing the City's ability and extent to provide water for essential uses. While lighter or more limited fines may be more appropriate and effective to curtail demand during earlier stages of a drought cycle, stiffer and more comprehensive may be implemented during the later stages of a drought when supplies are more compromised. While fines and penalties may provide additional revenue to implement curtailment measures, they are not expected to be nor should be a reliable revenue stream.



5.0 ADDRESSING SHORTAGE – CONCLUSION

Drought is a regular phenomenon and a fact of life in the arid southwest. Fundamental and progressive actions taken in Arizona and by Phoenix over the last few decades have greatly reduced the chances that drought will mean water shortages for City customers and businesses while simultaneously increasing the sustainability of our supplies.

Because of this foresight, the Drought Management Plan and Water Use Reduction Guidelines primarily focuses upon improving the water efficiency of our customers and helping them understand how to prepare for shortage when supplies are adequate, but shifts to curtailing demand when shortage occurs. Curtailment measures are progressive, focusing upon discretionary water uses at first, and would only address water uses important to quality of life, the economy, and public health, safety and welfare if absolutely necessary.

The City's approach to managing drought and the measures undertaken for water shortages will evolve with time. Changes in the water use characteristics by residents and businesses, the type and location of development and redevelopment in Phoenix, the regional climate and how regionally important supplies are managed all may alter Phoenix's drought management and curtailment measure strategies. As in the past, Phoenix will continuously strive to improve its water supply resiliency and to address these changes to ensure public safety, economic opportunity, and quality of life for residents and business.



APPENDIX A - DROUGHT MANAGEMENT ORDINANCE

ARTICLE X. DROUGHT MANAGEMENT RESPONSE PROCEDURE

37-121 Scope.

There is hereby established the following policies, rules, duties, penalties and plans for the City of Phoenix to be implemented during a declared water shortage. The drought management response procedure shall include the provisions of this article, rules and guidelines, adopted pursuant to this article and the drought management plan.

(Ord. No. G-3335, § 1)

37-122 Declaration of policy.

It is hereby declared that, because of the conditions prevailing in the City of Phoenix, the general welfare requires that the water resources available to the City be put to the maximum beneficial use to the extent to which they are capable, and that the waste or unreasonable use, or unreasonable method of use of water be prevented, and the conservation of such water is to be extended with a view to the reasonable and beneficial use thereof in the interests of the people of the City of Phoenix and for the public welfare.

(Ord. No. G-3335, § 1)

37-123 Authorization.

The Water Services Director, or his designated representative, is hereby authorized and directed to implement the applicable provisions of this article upon determination in accordance with the standards provided herein that such implementation is necessary to protect the public welfare and safety.

(Ord. No. G-3335, § 1; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-124 Application.

The provisions of this ordinance shall apply to all persons, customers, and property served by the Water Services Department wherever situated.

(Ord. No. G-3335, § 1; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)



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37-125 Water use reduction stages.

No customer of the City of Phoenix Water Services Department shall knowingly make, cause, use, or permit the use of water from the City for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provisions of this article, or in an amount in excess of that use permitted by the drought management plan, or emergency response plan, as appropriate, in effect pursuant to action taken by the Water Services Director, or his designated representative according to the provisions of this article.

The Water Services Director shall promulgate guidelines which shall set forth the criteria for determining when and where particular regulations within a water use reduction stage are to be implemented and terminated. Such guidelines shall be updated when, in the opinion of the Director, the conditions of the utility system have changed so as to necessitate such update. In addition, such guidelines shall be available for inspection at the City Clerk's office, and the Water Services Department administrative offices during normal business hours.

(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-126 Stage 1—Water alert.

The Water Services Director is authorized to declare a Stage 1 Water Alert when the Salt River Project or the Central Arizona Water Conservation District announces reductions in allotments to the City of Phoenix water service area, when an insufficient supply appears likely due to water system limitations or structural failure, or when a catastrophic incident threatens the existing water supply or water delivery system. Such declaration may designate the entire area served by the City of Phoenix Water Services Department, or a portion or portions of the service area as affected, in the event the shortage is not system-wide.

Upon declaration by the Water Services Director of the Stage 1 Water Alert and publication of such declaration, the Water Services Department shall implement the latest drought management plan or emergency response plan on file in the City Clerk's office that has been approved by resolution and kept available for public use and inspection. The water alert shall trigger an intensive public education and information program to assist all customers impacted by the shortage to understand the state of the emergency and the need for voluntary compliance. City of Phoenix personnel will direct their resources to enforcement of all existing City codes which influence water use or misuse.

The Water Services Director is authorized to terminate the Stage 1 Water Alert when the Water Services Director determines that the conditions upon which the Stage 1 Water Alert was declared no longer exist.



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(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-127 Stage 2—Water Warning.

The Water Services Director is authorized to declare a Stage 2 Water Warning when the water deliveries from Salt River Project or Central Arizona Water Conservation district are reduced, an insufficient supply situation occurs due to water system limitation or structural failure, or a catastrophic incident limits the existing water supply or water delivery system. Such declaration may designate the entire water service area served by the City of Phoenix, or a portion or portions of the service area as affected, in the event the shortage is not system-wide. Upon declaration by the Water Services Director of the Stage 2 Water Warning, and publication of such declaration, elements of Stage 2 Water Warning as described in the drought management plan or emergency response plan may become mandatory and be enforced. authorized to be imposed by this chapter for such uses as are contained in section 37-131 [37-130.1] below Such elements may include, in addition to any other remedy available in this chapter, any surcharge.

If and when the Water Services Director becomes aware of any violation of any use reduction regulation pertaining to water use or misuse, the Water Services Director shall have authority to take actions, including mandatory measures up to and including disconnection of service, and other such enforcement actions as are required or deemed necessary to assure compliance with the use reduction plan. A written notice shall be placed on the property where the violation occurred; and duplicate mailed to the person who is regularly billed for the service where the violation occurs, and to any other person known to the Department who is responsible for the violation or its correction. Said notice shall describe the violation and order that it be corrected, caused [ceased] or abated immediately or within such specified time as the Department determines is reasonable under the circumstances. If said order is not complied with, the Department may forthwith disconnect the service where the violation occurs. If a service is disconnected, assessment of a fee, to be determined by the Water Services Department, will be assessed and collected before service is restored. Said fee shall be in addition to other fees or charges imposed by this chapter for disconnection or reconnection of service.

Upon a second violation at the same property or by the responsible party, disconnection may be ordered immediately, and the service shall not be reconnected unless a device supplied by the Department which will restrict the flow of water to said service is installed. Furthermore, a fee for reconnection may be imposed in addition to other fees or charges imposed by this chapter for the disconnection and reconnection of service.



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The Water Services Director is authorized to terminate a Stage 2 Water Warning when water allotments, deliveries, storage, or distribution system conditions are determined to be sufficient to meet consumption demand without mandatory use reduction compliance.

(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-128 Stage 3—Water Emergency.

The Water Services Director is authorized to declare a Stage 3 Water Emergency when additional reductions in deliveries will occur to a level such that Stage 2 water use reduction measures and inter-service area water transfers, water withdrawals from City wells, and feasible water supply augmentation measures will be insufficient to meet water demands in the service area; or when a supply insufficiency due to system limitation or structural failure has occurred, and Stage 2 water use reduction measures and supply augmentation measures are either not possible or will not meet expected unrestricted demand. Such declaration may designate the entire water services area served by the City of Phoenix, or a portion or portions of the service area as affected, in the event the shortage is not system-wide.

Upon implementation by the Water Services Director or designated representative, mandatory water use reduction programs will be implemented and the surcharge recalculated and applied to meet the increased regulation and enforcement expenses per section 37-131 [37-130.1] below.

(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-129 Stage 4—Water crisis.

The Water Services Director is authorized to declare a Stage 4 Water Crisis when the Director determines that, based on the severity of the crisis, additional measures must be instituted as determined by the Water Services Director to protect human health and safety. The Water Services Director shall declare Stage 4 Water Crisis when Stage 3 emergency supply and use reduction programs are insufficient to meet water demand. Such declaration may designate the entire water services area served by the City of Phoenix, or a portion or portions of the service area as affected, in the event the shortage is not system-wide. In addition to any other remedy available in this chapter, the Director is authorized to set water prices in the form of a surcharge that shall be adjusted to reduce demand to match available supplies. All monies collected from surcharges in excess of replacement of revenues lost through drought-induced



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demand reductions and use reduction programs shall be used in a manner consistent with section 37-131 [37-130.1] below.

(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

37-130 Water use reduction implementation.

During drought or other supply shortage conditions, the Water Services Director shall monitor the projected supply and demand for water on a daily basis and shall advise the City Manager on the extent of the use reduction required through the implementation and/or termination of particular use reduction stages in order for the Department to prudently plan for and supply water. Thereafter, the Water Services Director may order that the appropriate phase of water use reduction be implemented or terminated in accordance with the applicable provisions of this article. Said order shall be made by public announcement and shall be published a minimum of one time in a daily newspaper of general circulation. Applicable restrictions herein outlined shall take effect and be enforceable upon publication of the notice; except that restrictions due to water treatment or delivery system failure, or unforeseen sudden increases in demand for water, shall be enforceable immediately following the filing of intent with the office of the City Clerk. Restrictions shall remain in effect until such time as applicable restrictions are removed.

(Ord. No. G-3335, § 1; Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

35-130.1 Surcharges, fees, penalties, and variances.

The assessment of surcharges, fees, and penalties is to be considered purely an exercise of the City's regulatory and police powers, and monies collected from reconnection fees, penalties, and surcharges are in no way to be considered rates for production of water revenue. Those monies shall be placed in a special fund. Said fund shall be used for, but not limited to, meeting the expenses of enforcement of this article, providing demand reduction assistance to customers, meeting demand reduction-induced cash shortfalls, or augmenting water supplies. The Water Services Director or his designated representative may, in writing, grant variances to persons who apply, on forms supplied by the City, for usages of water not in compliance with the water use reduction programs or for relief of the drought surcharge. These variances will be granted if it is found that such water use is necessary to prevent an emergency condition relating to health, safety, extreme economic hardship; or essential governmental services such as police, fire, and similar emergency services; or for customers who have made every



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reasonable effort to reduce water use. Efforts made to conserve water at any time prior to onset of drought conditions may be considered in granting said variance.

(Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

Editor's note—Ordinance No. G-4317, § 1, amended the Code by adding new provisions designated as §§ 37-131 and 37-132. At the discretion of the editor, these provisions have been renumbered as §§ 37-130.1 and 37-130.2, respectively, as ch. 37 already contained sections numbered 37-131 and 37-132

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(Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

Editor's note—Ordinance No. G-4317, § 1, amended the Code by adding new provisions designated as §§ 37-131 and 37-132. At the discretion of the editor, these provisions have been renumbered as §§ 37-130.1 and 37-130.2, respectively, as ch. 37 already contained sections numbered 37-131 and 37-132



37-130.2 Limited exemption to restrictions for users of reclaimed water.

The Water Services Director, at his discretion, may exempt certain uses and users of reclaimed water from any and/or all of the water use reduction requirements and drought restrictions contained in section 37-126 (Water Alert), through and including Section 37-129 (Water Crisis). Users must apply for exemption on forms supplied by the Water Services Department as outlined in Section 37-131 [37-130.1] (Surcharges, fees, penalties, and variances). Only the use of reclaimed water may be exempted from provisions of the drought plan. Users of both reclaimed water and potable water will not be exempt from restrictions on the use of potable water, and must comply with restrictions in effect during all stages of the plan.

The Water Services Director, in the interest of equity and community acceptance of said use of reclaimed water during a declared drought, may require exempt users to clearly post notices to the effect that the water being used is not from the public drinking water supply, and that said use conforms to water use restrictions in force at the time. Failure to make such posting in a timely fashion may, at the discretion of the Director, result in loss of exemption from the provisions of the drought plan as noted above.

(Ord. No. G-4317, § 1, passed 12-13-2000, eff. 1-12-2001; Ord. No. G-5444, § 3, adopted 10-21-2009, eff. 11-20-2009)

Note—See the editor's note following section 37-130.1.

City of Phoenix, Deer Valley WTP ASR Well #1 Attachment 3: Budget Proposal

Budget Item Description	\$/Unit (hr.)	Quantity	Recipient Funding	Reclamation Funding	Total Cost
SALARIES AND WAGES					
Gary Gin (Project Manager) Hydrologist	\$47.69	600 hrs	\$28,614		\$28,614
Steve Olfers (Water Facility Supervisor)	\$35.41	200 hrs	\$7,082		\$7,082
Marc Miles (Water Facility Supervisor)	\$37.18	100 hrs	\$3,718		\$3,718
Manuel Lucero (O&M Supervisor)	\$33.63	300 hrs	\$10,089		\$10,089
Christopher Garrison (Senior Utility Operator)	\$25.56	200 hrs	\$5,112		\$5,112
Susan Kinkade (Civil Engineer III)	\$47.69	50 hrs	\$2,384.50		\$2,384.50
Clarissa Chung (Environmental Quality Specialist)	\$30.44	70 hrs	\$2,130.80		\$2,130.80
Jennifer Calles (Laboratory Superintendent)	\$50.20	50 hrs	\$2,510		\$2,510
Aimee Conroy (Deputy Water Services Director)	\$55.84	50 hrs	\$2,792		\$2,792
Brandy Kelso (Deputy Water Services Director)	\$57.73	50 hrs	\$2,886.50		\$2,886.50
FRINGE BENEFITS	60.37%	\$67,318.80	\$40,640.36		\$40,640.36
TRAVEL		0	\$0		\$0
EQUIPMENT		0	\$0		\$0
SUPPLIES/MATERIALS		0	\$0		\$0
CONTRACTUAL		0	\$0		\$0
Design and Permitting ASR Well	\$410,113 L.S.	1	\$410,113		\$410,113
Construction of ASR well	\$2,655,704 L.S.	1	\$2,655,704	\$300,000	\$2,955,704
Construction Administration and Inspection Services	\$400,000 L.S.	1	\$400,000		\$400,000
ENVIRONMENTAL SERVICES DEPT.	\$15,000 L.S.	1	\$15,000		\$15,000
OTHER-REPORTING	\$15,000 L.S.	1	\$15,000		\$15,000
TOTAL DIRECT COSTS			\$3,603,776.16	\$300,000	\$3,903,776.16
INDIRECT COSTS %	\$300,000 L.S.	1	\$300,000		\$300,000
TOTAL PROJECT COSTS			\$3,903,776.16	\$300,000	\$4,203,776.16

City of Phoenix will provide 93 percent (\$3,903,776.16) towards the total project costs of \$4,403,776.16. The Federal funding request is estimated at 7 percent.

 ORIGINAL

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
2. Land, structures, rights-of-way, appraisals, etc.	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
3. Relocation expenses and payments	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
4. Architectural and engineering fees	\$ 410,113.00	\$ <input type="text"/>	\$ 410,113.00
5. Other architectural and engineering fees	\$ 107,959.00	\$ <input type="text"/>	\$ 107,959.00
6. Project inspection fees	\$ 400,000.00	\$ <input type="text"/>	\$ 400,000.00
7. Site work	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
8. Demolition and removal	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
9. Construction	\$ 2,655,704.00	\$ <input type="text"/>	\$ 2,655,704.00
10. Equipment	\$ 0.00	\$ <input type="text"/>	\$ 0.00
11. Miscellaneous	\$ 630,000.00	\$ <input type="text"/>	\$ 630,000.00
12. SUBTOTAL (sum of lines 1-11)	\$ 4,203,776.00	\$ <input type="text"/>	\$ 4,203,776.00
13. Contingencies	\$ 0.00	\$ <input type="text"/>	\$ 0.00
14. SUBTOTAL	\$ 4,203,776.00	\$ <input type="text"/>	\$ 4,203,776.00
15. Project (program) income	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
16. TOTAL PROJECT COSTS (subtract #15 from #14)	\$ 4,203,776.00	\$ <input type="text"/>	\$ 4,203,776.00
FEDERAL FUNDING			
17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.		Enter eligible costs from line 16c Multiply X <input type="text" value="7"/> %	\$ <input type="text" value="300,000.00"/>