

City of Albuquerque  
Water Resources Management Strategy

# Evaluation of Alternatives and Strategy Formulation



February 1997

**City of Albuquerque Public Works Department  
Water Resources**



**CITY OF ALBUQUERQUE**

---

Martin J. Chávez, Mayor  
Lawrence Rael, Chief Administrative Officer  
Robert E. Gurulé, Director, Public Works Department  
Norman Gaume, P.E., Project Manager

**ALBUQUERQUE CITY COUNCIL**

---

Vickie S. Perea, President, District 7  
Sam Bregman, Vice President, District 4  
Ruth M. Adams, District 6  
Alan B. Armijo, District 1  
Michael Brasher, District 9  
Tim Cummins, District 8  
Vincent E. Griego, District 2  
Adele Hundley, District 3  
Angela M. Robbins, District 5  
Mark S. Sanchez, Director, Council Services

**CONSULTANT**

---

CH2M HILL, Michael J. Bitner, Project Manager

**CONTENTS**

**I. OVERVIEW..... 1**

A. POLICIES..... 1

B. PROJECTS ..... 2

C. COSTS AND RATE IMPLICATIONS ..... 3

D. TIMING AND PHASING..... 4

E. HOW THIS DOCUMENT IS ORGANIZED..... 4

**II. INTRODUCTION ..... 5**

A. ALBUQUERQUE’S ESTABLISHED WATER PLAN ..... 5

B. SCIENTIFIC STUDIES SHOW THE NEED TO CHANGE..... 6

C. A NEW PLAN IS NEEDED QUICKLY ..... 7

D. STRATEGY FORMULATION ..... 8

    1. *Planning Process* ..... 8

    2. *Technical Basis* ..... 9

    3. *Public Involvement*..... 11

**III. WATER RESOURCES MANAGEMENT POLICIES ..... 13**

A. PROCEED WITH DISPATCH TO DEVELOP AND FULLY USE THE CITY’S EXISTING SURFACE WATER SUPPLIES ..... 13

B. ESTABLISH A GROUND-WATER DROUGHT RESERVE ..... 14

C. SUPPORT REGIONAL WATER RESOURCES PLANNING AND MANAGEMENT..... 15

    1. *Continue and Expand Technical Investigations in the Middle Rio Grande Valley*..... 15

    2. *Seek to Adopt a Regional Water Management Strategy*..... 16

    3. *Modify and Improve the Accuracy and Efficiency of Administration of Water Rights in the Middle Valley* ..... 16

D. PURSUE THE CONJUNCTIVE USE OF AVAILABLE WATER RESOURCES ..... 17

    1. *Use Reclaimed Wastewater, Surface Water and Shallow Ground Water for Irrigation and Nonpotable Uses*..... 18

    2. *Favor Reclaimed Water Use* ..... 18

    3. *Use Surface Water and Deep Aquifer Ground Water Conjunctively for Municipal and Industrial Supply*..... 19

E. PURSUE ACQUISITION OF NEW WATER SUPPLIES AS NEEDED ..... 19

F. FULLY IMPLEMENT THE WATER CONSERVATION STRATEGY..... 20

G. FULLY IMPLEMENT THE GROUND-WATER PROTECTION POLICY AND ACTION PLAN ..... 21

H. EQUITABLY INCORPORATE THE COSTS OF PROVIDING A SAFE AND SUSTAINABLE WATER SUPPLY INTO WATER RATES..... 22

I. PROTECT VALUED ENVIRONMENTAL RESOURCES..... 23

J. PRESERVE AND ENHANCE THE QUALITY OF LIFE IN THE REGION..... 23

K. ENCOURAGE AND FACILITATE PUBLIC INVOLVEMENT AND SUPPORT ..... 24

L. UPDATE THE CITY/COUNTY COMPREHENSIVE PLAN AND OTHER CITY PLANS ..... 24

**IV. STRATEGY FOR THE USE OF EXISTING SUPPLIES ..... 25**

A. DRINKING WATER SUPPLY PROJECT ..... 26

B. RECLAMATION AND REUSE PROJECTS ..... 26

V. IMPLEMENTATION PLAN..... 27

A. PUBLIC INVOLVEMENT ..... 27

B. SITE SELECTION..... 27

C. DRINKING WATER SUPPLY PROJECT ..... 28

    1. MRGCD Access Agreement..... 28

    2. Preliminary Design ..... 28

    3. Environmental Permitting..... 29

    4. State Engineer Office Permitting ..... 30

    5. Design and Construction..... 30

    6. Aquifer Storage and Recovery Demonstration..... 31

D. RECLAMATION AND REUSE PROJECTS ..... 31

    1. North Interstate 25 Reclamation and Reuse..... 31

    2. Southside Water Reclamation Plant Reuse ..... 32

    3. Shallow Ground-Water Irrigation Project..... 32

E. REGIONAL WATER RESOURCES PLANNING..... 33

F. FISCAL IMPACT AND FINANCING PLAN ..... 33

G. IMPLEMENTATION SCHEDULE..... 36

**APPENDIX—REPORT OF THE CUSTOMERS ADVISORY COMMITTEE**

## I. OVERVIEW

---

The Water Resources Management Strategy outlined below is designed to ensure City of Albuquerque water customers a safe and sustainable water supply to 2060. This strategy establishes a shift away from taking more and more water from the aquifer—most of which is not replenished—to developing the City’s existing renewable surface water supplies and protecting the aquifer so that it remains a permanent, reliable source of high quality water.

The City formulated the strategy on the basis of recent studies that provide a new, more accurate picture of Albuquerque’s hydrogeologic setting. Evaluation of alternative strategy components was based on the following criteria:

- implementability
- reliability and sustainability
- environmental protection
- effect on the quality of life
- financial feasibility

Extensive public involvement and interaction with regulators and neighboring jurisdictions, including the Pueblos of Sandia and Isleta, aided the formulation of this strategy.

### A. Policies

This Water Resources Management Strategy represents major water policy changes from those that have guided City activities since the 1950s. The policy directives that appear below are not listed in order of priority. They summarize the array of policy changes necessary and appropriate for Albuquerque in the 1990s and beyond.

- Proceed immediately to develop and fully use the surface water supplies that the City now owns.
- Establish a ground-water reserve for use in times of drought.
- Pursue and support regional water resources planning and management.
- Pursue use of a combination of reclaimed (recycled) water, surface (river) water, water from the shallow aquifer, and water from the deep aquifer. Match the various qualities of water available with the needs of different users. For example, lower quality waters—such as shallow ground water—could be used for irrigation and some industrial supplies, while high quality water from the deep aquifer should be reserved when possible for domestic use.
- Pursue acquisition of new water supplies as needed.
- Continue implementing the City’s water conservation strategy and programs.
- Continue implementing the *Ground-Water Protection Policy and Action Plan*.

- Ensure that water rates reflect the cost of providing a safe and sustainable water supply, fairly distribute the rate burden, and foster conservation.
- Protect valued environmental resources.
- Preserve and enhance the quality of life.
- Encourage and facilitate public involvement.
- Update the *Albuquerque/Bernalillo County Comprehensive Plan*, this strategy, and other City plans as necessary.

## **B. Projects**

This Water Resources Management Strategy includes a phased plan of work to implement the policies listed above. Required projects, developed to a conceptual level of detail, have been identified based on the analyses completed to date. Further work, including additional consideration of practical alternatives and development of an Environmental Impact Statement, will determine the details of the actual projects, including where and how they will be constructed.

The following conceptual projects are included in the plan:

- Build and operate infiltration galleries in the metropolitan area near the Rio Grande to divert 97,000 acre-feet/year of water. Much of this water will be added to the river upstream from the San Juan-Chama Diversion Project. About half of the 97,000 acre-feet of water will return to the river after being used by City customers and returned to the City's Southside Water Reclamation Plant.
- Build and operate a water treatment plant to bring the water diverted from the river to drinking water standards.
- Build and operate water transmission pipelines to deliver treated surface water throughout the City's water service area.
- Develop and operate a demonstration program for aquifer storage and recovery (ASR). Continue operation and study of how this technology might be used in overall water management.
- Over time, build and operate a series of water reclamation (recycling) facilities at the Southside Water Reclamation Plant. These facilities will include constructed wetlands and will eventually have the capacity to provide 3,900 acre-feet/year of water for nonpotable uses.
- Over time, build and operate water recycling facilities in the North Interstate 25 area, to include both reclamation of industrial wastewaters and small-scale diversion of water from the Rio Grande. These facilities would provide irrigation water for the Northeast Heights area, and would eventually have the capacity to provide 2,800 acre-feet/year.
- Develop and operate a recharge enhancement program in the Central Valley that will make it possible to use about 900 acre-feet/year of shallow ground water for irrigation on a sustainable basis.

In addition to the development of these identified project concepts into constructed water supply and reclamation projects, several activities must be undertaken, including:

- Define performance measures and guidelines for the establishment and maintenance of the drought reserve.
- Conduct rate studies and adopt a new rate structure that fairly distributes the costs of providing a sustainable water supply.
- Continue study of Middle Rio Grande Valley hydrogeology to foster better understanding among all those involved of the consequences of water management policies and of the opportunities for regional action.
- Work with the Middle Rio Grande Conservancy District (MRGCD) and neighboring jurisdictions to formulate and gain adoption of a regional water management strategy using the guidelines provided by the Interstate Stream Commission for this purpose.
- Work to ensure that administrative rules and policies of the State Engineer take into account recent advances in our understanding of the aquifer and its hydrologic connection to the river.
- Continue and expand public involvement and public education programs that foster aquifer protection, conservation, sensible water practices and policies, and a better understanding of the community values that should be reflected in water policy.

### **C. Costs and Rate Implications**

The projects outlined above imply total capital costs of about \$180 million and annual operating costs of about \$ 13.8 million. Project phasing and the time required for permitting and design mean that not all the capital needs to be raised immediately. This will make it possible to gradually phase in required rate increases.

This Water Resources Management Strategy calls for increasing rates by 4.7 percent in Fiscal Years (FY) 1998 and 1999, and instituting increases of 4.5 percent per year for the following 5 years. This is the equivalent of increasing the typical monthly residential water and sewer bill from about \$32 in 1998 to about \$43 in 2005. Even with these rate increases, City of Albuquerque water rates will remain competitive with those of utilities in neighboring areas such as Rio Rancho and Paradise Hills.

Failing to implement this Water Resources Management Strategy will not prevent rates from rising. Continuing the City's past practice of using local ground water exclusively would require additional new wells costing about \$43 million and additional annual operations and maintenance (O&M) costs of about \$4 million. Over the 60-year planning period, this amounts to a total increased cost for ground-water development of about \$106 million in net present worth terms.

Surface water use also reduces future costs to comply with more stringent arsenic drinking water standards. Without the ability to use surface water, larger

arsenic treatment facilities for ground water would be needed, requiring additional capital cost investments of between \$8 million and \$37 million, depending on the regulatory standards set, and up to \$3 million in average annual O&M costs. Additional capital and O&M costs over the planning period would have a total net present worth between \$14 and \$84 million.

The greatest costs of continuing past practices, however, are the substantial costs of being without water in times of drought and the inevitable and very substantial costs of land surface subsidence and the attendant damage to buildings and infrastructure that will occur if aquifer water levels are not maintained. These costs are difficult to quantify but are huge.

The costs of failing to implement this Water Resources Management Strategy, considering only some of the undesirable effects for which costs can be estimated, amount to about \$200 million to \$275 million.

#### **D. Timing and Phasing**

Prompt action to develop renewable water supplies is imperative because about half of the water the City now pumps from the aquifer is not replenished. The City is operating in a water deficit. Another reason for prompt action relates to the "use it or lose it" principle of western water law. In the water-scarce west, water and water rights that are being stored for future use are much less secure than water that is being actively used for municipal supply. In addition, the large-scale projects that will do the most to shift the City to renewable supplies require lengthy and complex permitting processes that are subject to unforeseen delays. Implementation must begin now.

Some small-scale projects, such as the North I-25 industrial water recycling and the Southside Water Reclamation Plant reuse projects, can be implemented without delay. The Public Works Department is integrating these projects into its plans. The first phase, the North I-25 industrial recycling project, could be in service in 1998.

The City estimates that the major projects to divert, treat, and distribute surface water will come online in 2004. The many steps toward implementation are outlined in the body of this document.

#### **E. How This Document is Organized**

This Water Resources Management Strategy begins by outlining the history, rationale, and technical knowledge that form its foundation. It then delineates policy directives and projects for implementation. Costs, rate implications, and timing considerations are also covered. Later portions of the document explain the steps required to move forward now that the strategy has been adopted, including those needed for facility siting, regulatory permitting, and pursuit of institutional change.

## II. INTRODUCTION

---

This document sets forth the City of Albuquerque’s Water Resources Management Strategy—a long-range water supply plan for the City. The purpose of the strategy is to secure the water-supply future of Albuquerque by: (1) determining how to best use the water that the City has and (2) making the best choices for future supplies and management.

The *Albuquerque/Bernalillo County Comprehensive Plan* sets out goals and policies for land use, environmental, and resource management decisions. It requires that "the water resources of the metropolitan area shall be managed to ensure [a] permanent adequate supply" and for the City to "maintain a dependable, quality supply of water for the urbanized area’s needs."

The *Comprehensive Plan* provides other broad policy direction related to water resources management that support the Plan’s other goals related to land use, environmental protection and heritage conservation, and community resource management. For example, it calls for "efficient water management and use" suggesting several conservation policies and techniques. It also notes that "existing water rights shall be protected and new rights acquired if necessary." Noting the need to "minimize the potential for contaminants to enter the community water supply," the *Comprehensive Plan* states that it may be necessary to "increase the cost of water, if necessary, to install treatment capabilities."

To carry out the mandate of providing a safe and sustainable water supply the City needs to establish specific policies. Section III of this Water Resources Management Strategy defines those policies needed to accomplish the goals of the *Comprehensive Plan*. Section IV describes the separate projects needed to accomplish the policies calling for the best use of the City’s existing supplies. Section V lays out the steps required to implement those projects and the other steps needed to accomplish the policies. The Appendix contains a report from the water resources planning Customers Advisory Committee.

The following paragraphs summarize the City’s water supply planning history and the development of this strategy.

### A. Albuquerque’s Established Water Plan

Albuquerque’s previous water plan, as it existed since the 1960s, consisted of providing water for homes and businesses by pumping ground water from the local aquifer, which was assumed to be replenished by seepage of water from the Rio Grande and to have an essentially unlimited supply. Legal water rights (to satisfy

administrative requirements of the State Engineer and to provide for the presumed depletion of the river caused by the City's pumping) would be secured by acquiring and retiring surface water rights.

A substantial surface water supply to replace river seepage was obtained through a 1962 contract providing for the City's perpetual share of a federal water supply project called the San Juan-Chama Diversion Project. The San Juan-Chama project imports water from the Colorado River basin to the Rio Grande basin. The 1960s Water Plan said that it would take several decades until all of the San Juan-Chama water would be needed to offset the river losses caused by increasing municipal and industrial use. In the meantime, the City made interim uses of the San Juan-Chama water, storing its water in reservoirs and selling some to other users.

It was an elegantly simple and inexpensive way to provide Albuquerque's water supply and meet State Engineer requirements: the aquifer would supply the City, the river would re-supply the aquifer, the San Juan-Chama water would re-supply the river. It was also based on a faulty understanding of the aquifer and its relationship to the river.

## **B. Scientific Studies Show the Need to Change**

New studies, completed by a multiagency team of scientists assembled and cooperatively funded by the City, have added greatly to the knowledge of the aquifer and its connection to the river. Based on extensive new data, they found geologic patterns that explain why some parts of the aquifer produce water far more readily than others, and have led to a dramatically different view of the aquifer. The new results show the amount of good-quality aquifer to be only a fraction of that estimated by 1960s studies. The new information also shows that the river provides much less recharge to the aquifer than previously thought.

State and federal agencies and public and private specialists have contributed to these studies. The key investigations include:

- *Deep Hole Test Drilling Program*, City of Albuquerque, 1988-1991.
- *Hydrogeologic Framework of the Northern Albuquerque Basin*, New Mexico Bureau of Mines and Mineral Resources, 1992.
- *Geohydrologic Framework and Hydrologic Conditions in the Albuquerque Basin*, Central New Mexico, U.S. Geological Survey, 1992.
- *Simulation of Ground-Water Flow in the Albuquerque Basin, Central New Mexico, 1901-1994, with Projections to 2020*, U.S. Geological Survey, 1995.

- *Middle Rio Grande Water Assessment*, U.S. Bureau of Reclamation with the New Mexico Bureau of Mines and Mineral Resources, 1997.

The studies confirm unequivocally that the old water supply plan will not work. The City is depleting the local aquifer—more than half the water pumped by the City from the aquifer is not being replenished. As a result, the City is *mining* the aquifer to provide water for today's customers and eventually would deplete the aquifer, even without additional growth and others' pumping.

These conditions pose many long-term risks to the water supply. As an increasing demand competes for a decreasing supply of water, there will be decreased well yields, higher pumping costs, deterioration in water quality, and inevitably, irreversible damage to the aquifer and a subsiding land surface. Land-surface subsidence, which would be caused by compaction of the dewatered aquifer, would cause extremely costly damage to homes, buildings and infrastructure in the City.

It is now clear that the City can make no use of its renewable surface water resources under the 1960s Water Plan. The City's San Juan-Chama and Rio Grande surface water will not simply seep from the river into the aquifer in sufficient quantities to replenish ground-water pumping.

In addition to the problems with the 1960s Water Plan, which were revealed by the new understanding of aquifer and its connection with the river, the new studies also confirm that arsenic occurs throughout the ground water. High concentrations of arsenic have forced the City to shut down two wells. More stringent federal standards will very likely be in place soon and the treatment to remove arsenic will be very expensive.

### **C. A New Plan is Needed Quickly**

There is a fundamental basis for water rights in the arid western United States: "use it or lose it." There are simply too many demands on the limited resources to allow water supplies to be held in reserve indefinitely.

The City has taken delivery of its San Juan-Chama water as best it could (mostly storing the water in reservoirs, providing short-term leases to other users, and supplementing irrigation supplies), while anticipating its eventual full use—passively recharging the aquifer—as called for in the 1960s Water Plan. However, in the water-scarce west, water and water rights that are being stored for future use are much less secure than water that is being actively used for municipal supply.

The states of Colorado, Nevada, Arizona, Texas, and California are all in need of new supplies to meet increasing demands. Indian nations also seek supplies. All

across the west, the federal government has sought to reallocate water supplies to meet emerging needs. In fact, as federal, state and regional agencies grapple with issues on the San Juan River, a task force dealing with the federal Animas-La Plata project has suggested using some of the City's "unused" San Juan-Chama project allotment.

Therefore, the City needs to quickly implement a long-term water supply plan that stops excessive pumping from the aquifer, uses its existing surface water, and provides for future needs. The City recognizes that many opportunities for improved water resources management are regional in nature and calls for a significant effort to develop, over time, a regional water resources management plan for the Middle Rio Grande Valley. However, it is clear that changing the City's 1960s Water Plan for use of its existing resources benefits everyone in the region. So, implementation of elements of this strategy dealing with the City's existing supplies must proceed in parallel with and ahead of completion of the regional plan.

## **D. Strategy Formulation**

This section describes the planning process that led to the formulation of this Water Resources Management Strategy, including the development of the technical basis supporting the findings and the extensive public involvement activities that helped shape the strategy.

### **1. Planning Process**

As a result of the findings of the studies described above, the City initiated several coordinated planning efforts to determine the best course of action. These efforts confirmed the technical conclusions of experts involved in the new studies. The planning efforts also developed some key concepts that make up this Water Resources Management Strategy. The following documents record the results of the planning efforts:

- *Albuquerque/Bernalillo County Ground-Water Protection Policy and Action Plan*, 1994.
- *City of Albuquerque Water Conservation Strategy*, 1994.
- *Albuquerque Water Resources Management Strategy—San Juan-Chama Diversion Project Options*, CH2M HILL, 1995.
- *The Value of Water*, F.L. Brown, S.C. Nunn, J.W. Shomaker, and G. Woodward, 1996.
- *Middle Rio Grande Water Assessment*, U.S. Bureau of Reclamation with the New Mexico Bureau of Mines and Mineral Resources, 1997.

Collectively, these scientific studies and planning efforts provide an assessment of the water supply, water quality issues, and legal limitations on supply. In addition to this water resources assessment, these planning efforts examined water demand, including present water uses, future water uses through 2060, and water conservation.

## **2. *Technical Basis***

The scientific studies and planning efforts established a fundamental understanding of the physical setting and some of the water supply options available. Building on that work, a strategy formulation phase determined which of the available options and combinations of options constituted the best overall strategy for developing a safe and sustainable water supply. Using a rigorous process, the City identified possible alternatives, evaluated them, and selected the projects that comprise this strategy.

The City assembled a project team including experts from national and local consulting firms and water law attorneys. A City Staff Steering Committee guided and reviewed the technical analyses. In addition to the *ex officio* involvement of the Legal Department, the Staff Steering Committee included:

- Public Works Department specialists in water rights and financial affairs and Managers of the Finance, Utility Development, Water Utility, Wastewater Utility, and Water Resources Divisions
- Department of Finance and Management
- Environmental Health Department
- Planning Department
- City Council staff

The project team also benefited from the advice, counsel, and participation of representatives from regional, state, and federal agencies.

The Staff Steering Committee helped the project team formulate a set of 32 alternatives for use of the City's existing water resources. The public and *stakeholders* (agencies and groups interested in the outcome) suggested many aspects of these alternatives. Each alternative included a specific and practical means to meet future water demands using existing water supplies. The alternatives addressed management, conservation, water and infrastructure development, and water quality management. The project team assessed the hydrologic effects of each alternative on the aquifer and river system;

developed conceptual cost estimates; and considered social, political, and institutional issues.

To evaluate the alternatives, the team developed system-level evaluation criteria based on community values and technical reality. Evaluation of the 32 alternatives considered:

- Long-term reliability and sustainability, including degree of beneficial use of existing renewable surface water sources, reduction in aquifer mining, and preservation of a ground-water reserve for use in times of drought.
- Protection of valued environmental resources, including physical, hydrological, and environmental impacts.
- Project implementability, including technical and political feasibility, the ability to obtain necessary permits, implementation schedule, and public support.
- Ability to support the quality of life in the region, including socioeconomic benefits, basic water and sewer services, public amenities such as parks and greenbelts; and the equitable sharing of costs and benefits in terms of social, cultural, and generational considerations.
- Financial feasibility, including life-cycle costs of facilities and potential costs related to other water quality issues and responses to drought.

The Albuquerque Water Resources Management Strategy includes the alternative that best meets these criteria, based on the work completed to date. The report, *Albuquerque Water Resources Management Strategy—Evaluation of Alternatives and Strategy Formulation* (CH2M HILL, 1997), documents this work. In addition to consideration of technical, legal, and institutional issues, an extensive public involvement effort was integral to the evaluation of alternatives and formulation of this strategy.



### **3. *Public Involvement***

The City seeks to reach its water resources management decisions through a public process so that they reflect community values. The strategy formulation phase included an extensive effort to facilitate public involvement to ensure broad understanding of water resources activities. The public involvement effort brought significant input about community values and objectives and how they can be reflected in water resources activities. The effort sought comment from City customers and from others throughout the region.

A 10-member Customers Advisory Committee, called for by the Mayor and authorized by City Council legislation, guided the project team during their technical work, provided useful advice and counsel, and helped shape this strategy document. Their report, describing their activities and recommendations, is included as an attachment.

Although the initial focus for implementing this strategy is limited to effectively using the City's existing resources, the City recognizes that ultimately solutions must be regional in nature. The City played a lead role in finding solutions that protect limited resources and ensure their best use. In doing so, the City carried out a number of public involvement and public information initiatives and communicated with a wide array of groups having an interest in the outcome.

In addition to gaining insight into the views of ratepayers, these efforts also focused on

- Technical experts in water issues
- Regulators
- Pueblo leaders
- Decisionmakers in neighboring jurisdictions
- MRGCD board and staff

The City sought their views regarding which strategy alternatives would likely gain the widest acceptance and provide the most value.

Along with dozens of meetings with agency officials, public groups, and City customers, residents and officials from the region participated in a series of four advertised regional and technical forums:

- In August 1995, citizens and officials commented on the initial assessment of the water supply, demands, preliminary options, and legal and institutional issues.
- In April and May of 1996, citizens and officials commented on a preliminary list of identified alternatives and a suggested set of values, objectives, and performance measures, which would become the evaluation criteria.
- In September 1996, citizens and officials commented on a preliminary prioritization and ranking of the alternatives.
- In March 1997, citizens and officials commented on the final recommendations.

A town meeting, sponsored by the Mayor and City Council in April 1997 focused public discussion on the draft strategy and water rate impacts. Additional public involvement occurred as the City Council considered the Mayor's resulting proposal.

As described in the sections that follow, the City will continue its public involvement efforts as this strategy is implemented.

### III. WATER RESOURCES MANAGEMENT POLICIES

---

This section puts forth the City's Water Resources Management Policy and provides a brief explanation or rationale for each policy statement. The order of the policy statements is not meant to indicate their priority.

#### A. Proceed with Dispatch to Develop and Fully Use the City's Existing Surface Water Supplies

**POLICY A:** The City of Albuquerque will proceed with dispatch to develop and fully use its San Juan-Chama and Rio Grande surface water as a direct water supply. It will move expeditiously to obtain the necessary funding and permits to construct the required projects. The water supply will be reliable and safe, fully protective of public health.

*RATIONALE: A safe and sustainable water supply is needed to maintain the dependable quality supplies called for in the Comprehensive Plan. A safe and sustainable supply is also of paramount importance if the Comprehensive Plan's other goals related to land use, environmental protection and heritage conservation, and community resource management are to be achieved. Only renewable supplies are sustainable. To make future use of the City's vested and acquired rights to Rio Grande water and of the City's San Juan-Chama Diversion Project water, for which City customers pay nearly \$2 million per year, the City must proceed with the implementation plan outlined in Section V. These changes will accomplish the Comprehensive Plan's goal of "efficient water management and use."*

*As outlined in the Comprehensive Plan, "Existing water rights shall be protected." The City's existing Rio Grande and San Juan-Chama surface water rights cannot be used for municipal water supply as originally planned. The surface water will not simply seep into the aquifer in sufficient quantity to replenish pumping. As long as the surface water rights remain unused, they are more vulnerable to challenges from other water users in the water-scarce west. The City needs to preserve these rights by putting them to the use for which they were acquired.*

*Use of renewable surface water will also protect the aquifer and the Albuquerque community from the effects of overpumping ground water and will provide a water supply system that is renewable in perpetuity.*

## **B. Establish a Ground-Water Drought Reserve**

**POLICY B:** The City will establish a ground-water drought reserve that maintains sufficient water in storage in the aquifer to provide water supply during a prolonged drought. Water levels in the aquifer will be maintained so that a 10-year drought reserve will be accessible without causing adverse, irreversible impacts to the aquifer. Aquifer storage will be pursued to allow replenishment of the reserve.

*RATIONALE:* A portion of the high-quality, easily accessible ground water stored in the aquifer needs to be preserved to allow for its use during future drought conditions. This would enable the City to provide an uninterrupted supply while avoiding depletion of Rio Grande flows when surface water flows are below acceptable flow levels due to drought. Ground water used as a drought supply has very high economic and quality-of-life value. Previous studies of the frequency and severity of droughts in the southwest suggest that a 10-year drought reserve is prudent.

## C. Support Regional Water Resources Planning and Management

**POLICY C:** The City will pursue efforts to enhance regional water resources planning and management activities within the Middle Rio Grande Valley. The City will work cooperatively with its neighbors—the Pueblos, the Middle Rio Grande Conservancy District, Middle Valley cities and counties, and involved state and federal agencies. The City will become proactively involved in and monitor the progress of regional water management initiatives that may affect the City and the region.

*RATIONALE:* In developing the elements of this strategy related to the use of the City's existing resources for its public water supply, the City has used a process consistent with the State's Regional Water Planning Handbook (Interstate Stream Commission, 1994). The City recognizes the need to work in cooperation with other entities that share use of the Middle Valley's water resources. The regional planning process must be extended to include other water use in the region. Regional water resources planning needs to address uses for public and domestic water supply, irrigated agriculture, livestock, commercial, industrial, and fish, wildlife and recreation. The City, neighboring jurisdictions, and other water users will need to work with State and regional agencies with water management responsibilities.

This policy involves three elements, outlined below.

### 1. **Continue and Expand Technical Investigations in the Middle Rio Grande Valley**

**POLICY C.1:** The City will continue its proactive role to ensure that the necessary investigations are completed efficiently and expeditiously and that they result in the use of an improved quantitative model for water rights administration within the Middle Valley.

*RATIONALE:* Effective regional water resources planning and management must be based on sound understanding of hydrologic reality. Additionally, because human uses are causing rapid changes in the hydrologic system, these changes must be monitored and scientific information must remain current.

*The investigations necessary to improve the quantification of the water resources of the region and the interconnection between the surface and ground-water systems have been identified in the Plan of Study to Quantify the Hydrologic Relations Between the Rio Grande and the Santa Fe Group Aquifer System Near Albuquerque, Central New Mexico, USGS, 1995.*

## **2. Seek to Adopt a Regional Water Management Strategy**

**POLICY C.2:** The City commits to seek common solutions within a regional context. The City will seek to work cooperatively with others in the Middle Valley to establish a framework for coordinated water resources management. The framework will allow for the fair participation and representation of the interests of the public; domestic, municipal, industrial, and agricultural water users; and environmental and riparian and riverine corridor uses.

*RATIONALE: The City recognizes that its planning cannot occur in isolation. In addition to implementation of the necessary technical investigations described above, regional issues that need to be pursued include: water conservation, reclamation, and reuse; an inclusive public process to determine acceptable tradeoffs among urban, agricultural, and riparian water needs; equitable sharing of costs and benefits; appropriate use and regulation of domestic wells; preservation and enhancement of aquifer recharge through land-use planning; maintenance and enhancement of the existing irrigation canal and drain system; and management of flood waters and development of aquifer storage and recovery capabilities.*

## **3. Modify and Improve the Accuracy and Efficiency of Administration of Water Rights in the Middle Valley**

**POLICY C.3:** The City will work with the State Engineer Office to facilitate, support, and encourage the adoption of improved methods of estimating river depletions within the Middle Valley. The City will support and pursue the adoption of legislation where necessary and appropriate to secure its rights and to improve the efficiency of water resources management in the region.

*RATIONALE: Improved accuracy and efficiency of administration of water rights and the management of water resources in the Middle Valley is to the benefit of everyone within the region. Achieving these benefits will require a significant effort.*

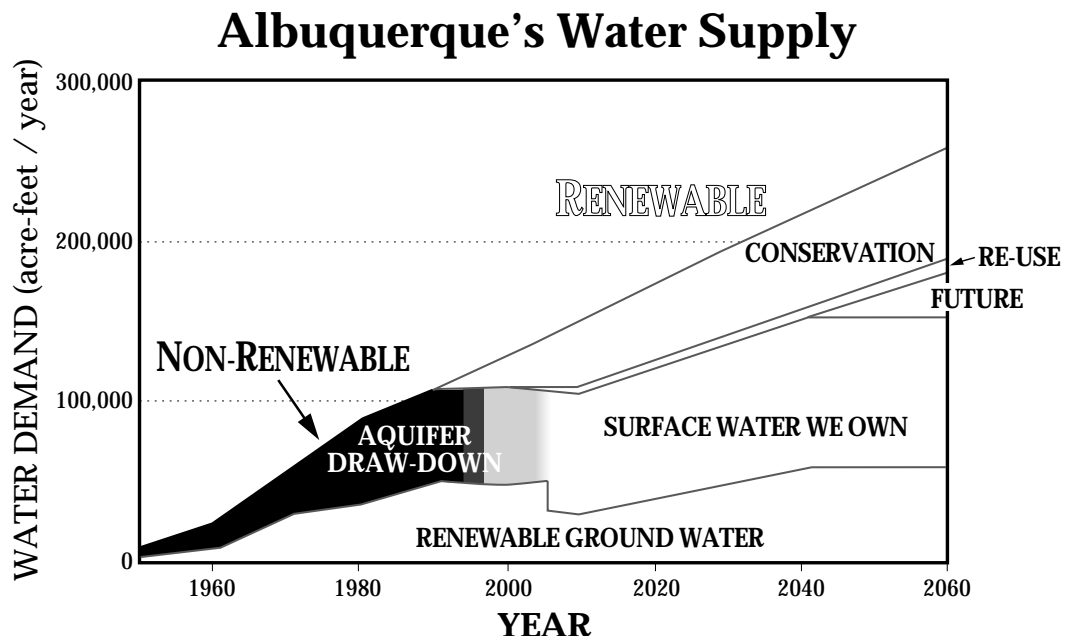
## D. Pursue the Conjunctive Use of Available Water Resources

**POLICY D:** The City will enhance the sustainability of the water supply by effectively combining the use of surface water, reclaimed water, and shallow and deep ground water. The City will seek to match the various qualities of water available with the water quality required for specific uses.

*RATIONALE:* Enhancing the efficiency of the City's water use, as called for in the Comprehensive Plan, requires conjunctive management and use of all available resources: surface water for municipal and industrial supply and for irrigation, as well as use of lower-quality shallow ground water for irrigation and nonpotable use. Reclamation and reuse of existing water supplies, where economically feasible and protective of human health and the environment, represent viable methods of increasing the usefulness of a limited water supply.

This policy involves the following three elements.

- Use reclaimed wastewater, surface water, and shallow ground water for irrigation and nonpotable uses.
- Favor reclaimed water use.
- Use a combination of surface water and deep aquifer ground water for municipal and industrial supply.



**1. Use Reclaimed Wastewater, Surface Water and Shallow Ground Water for Irrigation and Nonpotable Uses**

**POLICY D.1:** To the extent practicable, eliminate the use of high-quality water from the deep aquifer for irrigation of parks, golf courses, and other large turf applications. Use reclaimed wastewater, surface water, and shallow ground water for irrigation and nonpotable uses. Use of shallow ground water will be augmented with enhanced recharge as necessary to protect shallow ground-water levels.

*RATIONALE:* The water quality of reclaimed wastewater, surface water, and portions of the shallow ground-water system, though generally not adequate for use as a drinking water supply (without additional treatment), is well suited for irrigation and certain industrial uses. Shallow ground-water use must be augmented with enhanced recharge to avoid harmful water-level declines.

**2. Favor Reclaimed Water Use**

**POLICY D.2:** The City will favor the use of reclaimed water where economically feasible and protective of human health and the environment. The City will take action to ensure the appropriate use of nonpotable supplies to meet nonpotable needs. This may include providing economic incentives as necessary to encourage the use of reclaimed water.

*RATIONALE:* Reclaimed water from industrial and municipal effluent sources can be an economically feasible alternative to the use of deep aquifer pumping to meet industrial and irrigation demands, which do not require drinking water quality sources. However, sufficient treatment must be provided to protect public health and the environment. Consideration must also be given to satisfying the return flow needs of the Rio Grande from both water rights and environmental standpoints.

### **3. Use Surface Water and Deep Aquifer Ground Water Conjunctively for Municipal and Industrial Supply**

**POLICY D.3:** As called for in Policy A, develop the new facilities needed to efficiently and fully use the City's San Juan-Chama and Rio Grande surface water for drinking water supply. Use pumping from the deep aquifer to meet seasonal peak demands and as a drought reserve. Provide for methods to store available surface water in the aquifer and to recover it from storage.

*RATIONALE:* The use of ground water will always be a key component of the City's supply system. Using the City's surface water for municipal and industrial supply will protect the aquifer so that it is available to meet seasonal peak demands and as a drought reserve. Without a ground-water component of supply, the City would need extremely expensive surface water storage facilities and larger and more costly treatment facilities to meet seasonal peak demands.

Successful establishment of a drought reserve requires that water withdrawn from the aquifer during times of drought be replenished during times of above average water availability. In Albuquerque, this requires artificial recharge of the aquifer with deep recharge wells. It is essential that this capability be developed and demonstrated.

## **E. Pursue Acquisition of New Water Supplies as Needed**

**POLICY E:** The City will pursue a portfolio of potential additional sources of supply. This will entail legal and institutional changes to provide for short-term leases and long-term acquisition of rights and supplies. Full consideration will be given to the regional context.

*RATIONALE:* The Comprehensive Plan calls for new water rights to be acquired if necessary to accommodate increasing needs. The legal and physical availability of water supplies, however, depends on a number of extremely complex and difficult issues that need to be resolved. Resolution of these issues will need to involve others within the region.

## **F. Fully Implement the Water Conservation Strategy**

**POLICY F:** The City will take the necessary steps to fully achieve its adopted water conservation goal to reduce per capita use 30 percent by 2004 compared to the base period average of 250 gallons per person per day.

In addition to the ongoing programs providing significant resources to reduce water use, the City's water resources and conservation programs will address State evaluation criteria by providing: (1) public education regarding the need and methods for conserving, (2) metering of all City water uses, (3) accounting for different types of uses (residential, commercial, etc.) and comparison of amounts of use to western norms, and (4) drought contingency plans.

*RATIONALE: As a scarce commodity, water should be conserved. Water conservation is required by the City's adopted water conservation strategy (Enactment No. 40-1995). Water conservation progress has been excellent, but full implementation is necessary. Successful implementation of the conservation program is a foundation for this Water Resources Management Strategy. In addition to representing wise management and stewardship of the water resources, successful implementation of an effective conservation program is by State law a regulatory prerequisite for obtaining the future permits the City will require.*

## **G. Fully Implement the Ground-Water Protection Policy and Action Plan**

**POLICY G:** The City will take steps to fully implement the *Ground-Water Protection Policy and Action Plan*. Prevention of future contamination, protection of aquifer recharge areas, and the remediation of existing ground-water contamination will be areas of special emphasis and high priority.

*RATIONALE:* The Albuquerque/Bernalillo County Ground-Water Protection Policy and Action Plan (County Resolution No. AR 121-93 and City Enactment No. 81-1994) is another cornerstone of this Water Resources Management Strategy. The early stages of its implementation are underway, but its full implementation is vital to the success of this Water Resources Management Strategy. The ground-water system is essential for water supply and as a drought reserve. Its protection from contamination is of paramount importance. The results of recent technical investigations show that the extent of the productive aquifer is smaller than earlier studies suggested. Most recharge of the deep aquifer system occurs via the currently substantially contaminated shallow ground-water system in the Inner Valley. Contamination within recharge windows is being transported toward public water supply wells. These conditions must be addressed or the viability of the ground-water component of the supply is imperiled.

## **H. Equitably Incorporate the Costs of Providing a Safe and Sustainable Water Supply into Water Rates**

**POLICY H:** The City will develop an equitable water rate structure that provides a stable and predictable revenue stream sufficient to cover operating and capital replacement costs, as well as finance system expansion and acquisition of new water supplies. The rates and fees will be designed to encourage conservation. Necessary rate increases will be gradual to the extent possible. Provisions will be made to assure that low-income individuals continue to receive affordable basic water and wastewater services.

*RATIONALE:* As called for in the Comprehensive Plan and the Ground-Water Protection Policy, rates and fees should be designed to reflect the true cost of obtaining and protecting the water supplied to customers. The Value of Water Study confirmed the need for water prices to reflect its true value. Analyses show that the cost of providing a safe and sustainable supply is economically feasible. These costs to the City should be equitably shared. The impact of rates on customers should be fair and recognize that high-volume uses are not necessarily bad or wasteful. For example, large families use more water than small ones, even though their per capita use may be the same.

Consideration should be given to the life-cycle costs of projects, the degree to which existing water resources are utilized, and potential savings to customers that accompany wise resource management. Costs related to arsenic treatment needs or the avoidance of drought effects and land surface subsidence will be much greater if this strategy is not implemented.

## **I. Protect Valued Environmental Resources**

**POLICY I:** As the City moves to implement its use of existing water resources, it will take steps to protect valued environmental resources of the region, including both the shallow and deep aquifer; the bosque and valley; the Rio Grande stream system; and recreational, historical, and cultural values. In every implementation phase, the City will consider impacts on environmental resources and take appropriate steps to mitigate unavoidable damage.

*RATIONALE:* It is necessary that the historically intended use of the City's San Juan-Chama and Rio Grande water for municipal and industrial needs be accomplished in a manner that protects valued environmental resources of the area. Use of these waters will allow the City to avoid irreversible damage to the aquifer and land surface subsidence.

## **J. Preserve and Enhance the Quality of Life in the Region**

**POLICY J:** The City seeks a Water Resources Management Strategy that will preserve and enhance the quality of life within the region. The implementation of the strategy will include support of infrastructure needs (basic water and wastewater services) and public amenities (parks, green belts, etc.). In addition, the benefits and costs of implementation will be shared equitably—among current and future residents of the region.

*RATIONALE:* As the largest population center in the state, Albuquerque recognizes its obligation to continue to strive to enhance the quality of life within the region. Factors influencing quality of life include support of desired socioeconomic growth and development, support of public amenities, and lack of disruption of normal activities.

## **K. Encourage and Facilitate Public Involvement and Support**

**POLICY K:** The City will keep the public informed about the choices and tradeoffs involved in making water management decisions and will invite public comment and participation in implementation of these policies.

*RATIONALE: An informed public contributes to the successful implementation of water resources management solutions. It is the public that defines the values of the region, upon which the policies are based.*

## **L. Update the City/County Comprehensive Plan and Other City Plans**

**POLICY L:** After public review and adoption by the City Council, and where applicable, the *Albuquerque/Bernalillo County Comprehensive Plan* and/or other Rank plans shall be amended to reflect this Albuquerque Water Resources Management Strategy. This Water Resources Management Strategy will be updated as necessary. City staff will report semi-annually to the City Council on the implementation of this strategy.

*RATIONALE: Water resource management and other City plans and policies must integrate. Water resources management must reflect the dynamic nature of water issues, Federal and State regulations, and the emerging and changing technical understanding of the available resources.*



In addition to fully achieving the 30 percent per capita water conservation goal, the City must construct a drinking water supply project and three reclamation and reuse projects.

## **A. Drinking Water Supply Project**

To allow full use of the City's existing resources, protect the aquifer for use as a drought reserve, and facilitate the combined use of ground water and surface water, the following project components are required.

- Diversion of about 97,000 acre-feet per year of San Juan-Chama and Rio Grande surface water using subsurface infiltration galleries located alongside the Rio Grande in the metropolitan area, with about half of this amount returned to the Rio Grande after treatment at the Southside Water Reclamation Plant.
- Construction and operation of a water treatment plant to provide safe use of surface water directly for municipal water supply.
- Construction of transmission pipelines to convey treated surface water throughout the City's water service area.
- Development of a program to demonstrate and implement aquifer storage and recovery technology at appropriate City wellfields.

## **B. Reclamation and Reuse Projects**

To facilitate the conjunctive use of available water resources and enhance ongoing conservation and reclamation efforts, the following projects are required.

- Phased construction of reclamation and reuse facilities at the Southside Water Reclamation Plant, incorporating constructed wetlands, with an eventual capacity of about 3,900 acre-feet per year.
- Phased construction of facilities for the reclamation and reuse of industrial water in the North Interstate 25 area, augmented with the use of surface water and/or additional reclaimed industrial water for turf irrigation needs in the Northeast Heights, with an eventual capacity of about 2,800 acre-feet per year.
- Development, through recharge enhancements, of the sustainable use of shallow ground water for irrigation of large turf areas within the Central Valley area with a capacity targeted at about 900 acre-feet per year.

## V. IMPLEMENTATION PLAN

---

This section identifies the activities that must be completed to implement this strategy. It describes: the steps needed to complete the projects required for the use of existing supplies, other essential work, fiscal impacts to the City, and the planned implementation schedule.

The implementation plan embodies five necessary activities, including:

- Public involvement
- Selection of sites for construction of all of the project facilities
- Permitting, design, and construction of the drinking water supply project
- Early implementation of the reclamation and reuse projects
- Continuation and expansion of regional planning efforts

### A. Public Involvement

The City will continue the public involvement program developed for the water resources management planning process. It will continue to seek the advice and counsel of the Customers Advisory Committee and to engage the public and elected officials in the region in the ongoing planning and decisionmaking process. As described in the paragraphs that follow, the requirements for additional environmental analyses, site selection, and consideration of alternatives will allow many opportunities for public input.

Public educational opportunities will be incorporated into the projects where appropriate. For example, the water treatment pilot facility described below will include public access and education features.

### B. Site Selection

The projects required to make use of the City's existing water resources are conceptual in nature. A first step in their implementation will be the selection of site locations for the identified facilities. This will be an open public process that will include the following steps:

- Identify and secure suitable available sites and rights-of way.
- Coordinate with the Middle Rio Grande Conservancy District.
- Evaluate potential sites with regard to appropriate criteria, such as environmental, technical and financial feasibility, public support/quality of life.
- Develop preliminary construction impact and traffic management plans.

- Prepare a preliminary ranking and provide for public review and comment.
- Prepare final recommendations and purchase land, rights of way, and easements.

## **C. Drinking Water Supply Project**

Completion of the drinking water supply project involves:

- MRGCD access agreement
- Preliminary design
- Environmental permitting
- State Engineer Office permitting
- Design and construction
- Aquifer storage and recovery demonstration

### **1. MRGCD Access Agreement**

The City will work with the Middle Rio Grande Conservancy District to secure an appropriate and equitable agreement allowing the City access to divert its water from the river. The steps include:

- Identify and evaluate alternative diversion designs; select a preferred alternative based on cost, technical merits, environmental impacts, and effects on District facilities and operations. Coordinate with the preliminary design activities described below.
- Identify and evaluate mitigation measures as necessary and appropriate.
- Negotiate an equitable agreement.

### **2. Preliminary Design**

Additional design information will be developed concurrently with site selection activities. These steps include:

- Complete preliminary design of river diversion facilities, involving environmental, hydrogeologic and geotechnical investigations, and test operation of infiltration gallery prototypes.
- Complete hydraulic analyses of water treatment plant and pipelines.
- Monitor river water quality.
- Complete the treatment process predesign including pilot testing for the water treatment plant; establishment of design and performance criteria to assure safe, reliable, and economically feasible drinking water; and preliminary design of the water treatment plant.
- Complete preliminary analysis of the distribution system to include systems operations, interconnections, and pipeline design.

### 3. *Environmental Permitting*

The City will pursue full compliance with the *National Environmental Policy Act (NEPA)*. NEPA requires evaluation of environmental impacts for any “*major federal action*”. Federal actions needed for implementation could involve obtaining necessary federal permits or changes in operation of federal facilities. The NEPA process also provides a structured process well suited to achieving the City’s goals of public involvement and regional consideration of issues. The NEPA process will require further evaluation of the *Proposed Action*—the drinking water supply project as refined during preliminary design. In addition, NEPA requires examination of *Alternatives* to the Proposed Action. These alternatives will include a few *Action Alternatives*, which will be agreed upon in the early stages of the NEPA process, and a *No Action Alternative*.

An *Environmental Impact Statement (EIS)* will be developed and will involve the detailed evaluation of environmental effects of the proposed action and the alternatives. The EIS and additional information developed during the Preliminary Design activities will allow for final selection of the action and identification of required mitigation measures.

The NEPA process will involve the following steps, completed by the City and the participating federal agencies:

- Document the proposed action and alternatives, including the no action alternative; develop a Memorandum of Understanding defining the roles of involved agencies, outline the process for compliance with the Endangered Species Act, and submit a Notice of Intent to Prepare an Environmental Impact Statement (EIS) to the *Federal Register*. Prepare a purpose and need statement, based on this strategy, setting forth the criteria by which each alternative will be judged and obtain approval by the participating federal agencies. Initiate and maintain the Administrative Record.
- Continue the existing public involvement program, tailored to encompass the NEPA required public scoping to obtain input from the public and agencies to identify issues to be addressed and alternatives to be considered. Identify a communication plan for involving interested groups. Conduct a site visit to all relevant locations with agencies and interest groups involved in the project.
- Complete field studies according to approved work plans, prepare technical reports for each discipline area that present all literature and field data collected and an impact analysis.
- Comply with the Endangered Species Act by meeting with the U.S. Fish and Wildlife Service (USFWS) to confirm Section 7 consultation needs and, if necessary, prepare a Biological Assessment according to agreed upon

scope and format. The USFWS will prepare a Biological Opinion based on the Biological Assessment and technical reports.

- Comply with the Fish and Wildlife Coordination Act, which requires federal agencies to coordinate with the USFWS on the impacts and mitigation needs of the project. The USFWS will prepare a Coordination Act report based on the technical reports and Draft EIS.
- Prepare a preliminary Draft EIS, summarizing the material presented in the technical reports, for review by the agencies. Issue the revised document as a Draft EIS. Provide for review by the public and responsible agencies. Conduct public hearings to receive written and oral comments on the Draft EIS. Prepare a Final EIS that responds to written and oral comments received on the Draft EIS and identifies the proposed action.
- Prepare and file a Record of Decision that explains why the selected action was picked, what impacts are expected and what construction, operation and mitigation commitments are being made.
- Obtain the necessary federal permits. These may include a Water Quality Certification, as required by Section 401 of the Clean Water Act to certify that the project will not violate state or federal water quality standards, and possibly a Dredge and Fill Permit (Section 404).

#### **4. *State Engineer Office Permitting***

The City must also obtain a diversion permit from the New Mexico State Engineer Office to enable the diversion of its surface water from the Rio Grande. The steps include:

- Develop a preliminary application for the diversion.
- File a notice of intent.
- Develop a numerical model that allows accurate calculation and administration of the ground-water and surface water systems.
- Finalize and submit the application when site-specific locations are known.
- The State Engineer will require a public notice period during which protests may be filed. Develop the technical documentation to allow affirmative response to the State Engineer's review of public welfare, conservation, and impairment issues.
- If protests are filed, the State Engineer will conduct a hearing to evaluate the merits and render a decision.

#### **5. *Design and Construction***

With the permits and necessary approvals in hand, the design of the facilities will be finalized and construction documents prepared. The construction project will be advertised, a contract awarded to a successful bidder, and the diversion facilities, water treatment plant, and transmission facilities constructed.

## **6. *Aquifer Storage and Recovery Demonstration***

The steps required to implement a small-scale aquifer storage and recovery demonstration program, as well as its long-term operation, include the following:

- Draft and obtain state legislature adoption of enabling legislation. (Current state law does not provide for aquifer storage and recovery.)
- Obtain state and federal permits.
- Complete preliminary and final design, bidding, construction, and ongoing operation.

## **D. *Reclamation and Reuse Projects***

Because of the size and magnitude of the water supply project outlined above, it will take several years to obtain the necessary permits and construct the facilities. The reclamation and reuse projects, however, are stand-alone projects that can and should be constructed as soon as possible. To allow for the early implementation of the reclamation and reuse projects, and to create operational information that may be useful in the permitting and final design of the large water supply project, the following reclamation and reuse projects will be pursued in parallel with and ahead of implementing the drinking water supply project.

### **1. *North Interstate 25 Reclamation and Reuse***

The North I-25 reclamation, reuse and irrigation project will be constructed in phases: the first phase will provide nonpotable supplies from Philips Semiconductors and other industries in the area for nonpotable uses, including industrial uses and irrigation needs of the Balloon Fiesta Park. The second phase will add the capability to divert surface water using subsurface infiltration galleries and potentially additional reclaimed water to expand the nonpotable uses to include large turf areas in the Northeast Heights.

The activities required to complete the first phase are similar to those required for the water supply project. However, because of the smaller scale, they can be completed more quickly. The necessary steps include:

- Complete preliminary design of the reclamation and distribution facilities.
- Pursue federal funding through the Bureau of Reclamation's reuse program and completion of the NEPA documentation. Obtain a state ground-water discharge permit.
- Complete final design, construction contract bidding and award, and construction.

The required tasks for completion of the second phase are similar. In addition, obtain both an agreement with the Middle Rio Grande Conservancy District for location of the infiltration gallery and a State Engineer Office permit.

## **2. *Southside Water Reclamation Plant Reuse***

Construction of the reuse facilities at the Southside Water Reclamation Plant will also proceed in two phases. The first phase will supply existing turf irrigation needs; the second phase will involve future expansion.

Phase 1 will include constructed wetlands and facilities needed to provide reclaimed water for existing parks, greenbelts and golf courses in the southern part of the City. The necessary steps include:

- Complete preliminary design of the reclamation and distribution facilities, including completion of ongoing evaluations of the treatment efficiency of constructed wetlands for this type of application.
- Pursue federal funding through the Bureau of Reclamation's reuse program and completion of the NEPA documentation. Obtain a state ground-water discharge permit.
- Complete final design, construction contract bidding and award, and construction.

As nonpotable demands increase, where feasible, expand the reclamation and reuse facilities.

## **3. *Shallow Ground-Water Irrigation Project***

One of the better ways to combine the use of nonpotable surface water and shallow ground water is to develop a relatively small-scale shallow ground-water irrigation project, with recharge enhancements. Such a project would go a long way toward laying the groundwork for future regional benefits and cooperation. The key steps include:

- Coordinate with the Middle Rio Grande Conservancy District to work out operational and institutional issues associated with enhanced recharge using Conservancy District canals and drains.
- Work with irrigators currently using deep aquifer ground water as their irrigation supply. Facilitate their transition to the sustainable use of the shallow aquifer for nonpotable irrigation.
- Apply for and obtain a State Engineer Office diversion permit.
- Complete preliminary and final design, construction contract bidding, and construction.

## **E. Regional Water Resources Planning**

Initial activities required to continue the regional planning process include the following:

- Develop agreements with neighboring jurisdictions and other ground-water users to define the regional planning objectives and process. Pursue state funding assistance for the regional water planning.
- Implement the necessary technical investigations to better define the region's water resources, the interconnection between the river and the aquifer, and define performance measures for the establishment of the drought reserve.
- Work with the participating jurisdictions and the State Engineer Office to update the administration of water rights within the Middle Valley to reflect the physical workings of the hydrologic system.
- Evaluate the need for additional sources of short-term and long-term supply as the administrative and technical issues begin to be resolved. Assess the actual quantities of water that will be required and available in the future. Examine flexibility that could be exercised by the federal water managers for operation of existing facilities on the Rio Grande. Evaluate the ability to exchange, transfer, or lease water from existing water uses using water-bank concepts or other means. Consider the economic, technical, environmental, and institutional/legal feasibility related to developing the various alternatives or new sources.
- Become involved in and monitor the progress of regional water management initiatives and recovery programs for endangered species.
- Pursue and acquire sources as appropriate.

## **F. Fiscal Impact and Financing Plan**

The following table summarizes the estimated capital and operating costs of the required activities. These approximate cost estimates are based on conceptual engineering for the projects described in Section IV. Cost estimates will be refined during site selection and preliminary design efforts, as described above. The table presents only the incremental funding requirements for the required projects and initiatives. Costs for currently funded ongoing activities are not included; neither are costs for other potential future needs. Examples of these include: more ground-water wells, future arsenic treatment, meeting more stringent wastewater discharge standards, and keeping existing infrastructure serviceable.

<b>Activity</b>	<b>Capital Cost</b>	<b>Annual O&amp;M</b>
Public Involvement	\$400,000	(existing funding)
Site Selection and Acquisition	\$4,100,000	
Drinking Water Supply Project	\$147,300,000	\$12,800,000
Reclamation and Reuse Projects	\$27,600,000	\$1,000,000
Regional Water Supply Planning	\$600,000	(existing funding)
<b>TOTAL</b>	<b>\$180,000,000</b>	<b>\$13,800,000</b>

Implementation of these projects will afford the City’s customers significant and real savings compared to costs that would occur without these projects—that is, if the City were to achieve its conservation goal, but continue to rely solely on local ground-water for all of its supply. These expected cost savings include the following.

<b>Activity</b>	<b>Expected Capital Savings<sup>a</sup></b>	<b>Annual O&amp;M Savings</b>	<b>Total Savings<sup>a</sup> (Net Present Value)</b>
Ground-Water Development	\$43,000,000	\$4,000,000	\$106,000,000
Safe Drinking Water Act Compliance—Arsenic Treatment	\$8,000,000 to \$37,000,000	\$400,000 to \$3,200,000	\$14,000,000 to \$84,000,000
Response to Drought (lost revenues and repair of damaged landscaping), and Land Surface Subsidence (damage to buildings and infrastructure)	\$83,000,000		\$83,000,000
<b>TOTAL</b>	<b>\$134,000,000 to \$163,000,000</b>	<b>\$4,400,000 to \$7,200,000</b>	<b>\$203,000,000 to \$273,000,000</b>

<sup>a</sup>Capital savings and total savings represent Net Present Value of savings through 2060.

The following table presents the estimated additional revenue requirements for the projects described above, assuming 25 percent cash financing with revenue bonds covering the remaining costs. As currently practiced, revenue requirements will be met by adjusting rates. The table shows that the average increase in the typical household water and wastewater bill will be gradual. Albuquerque’s rates will remain competitive with our neighbors.

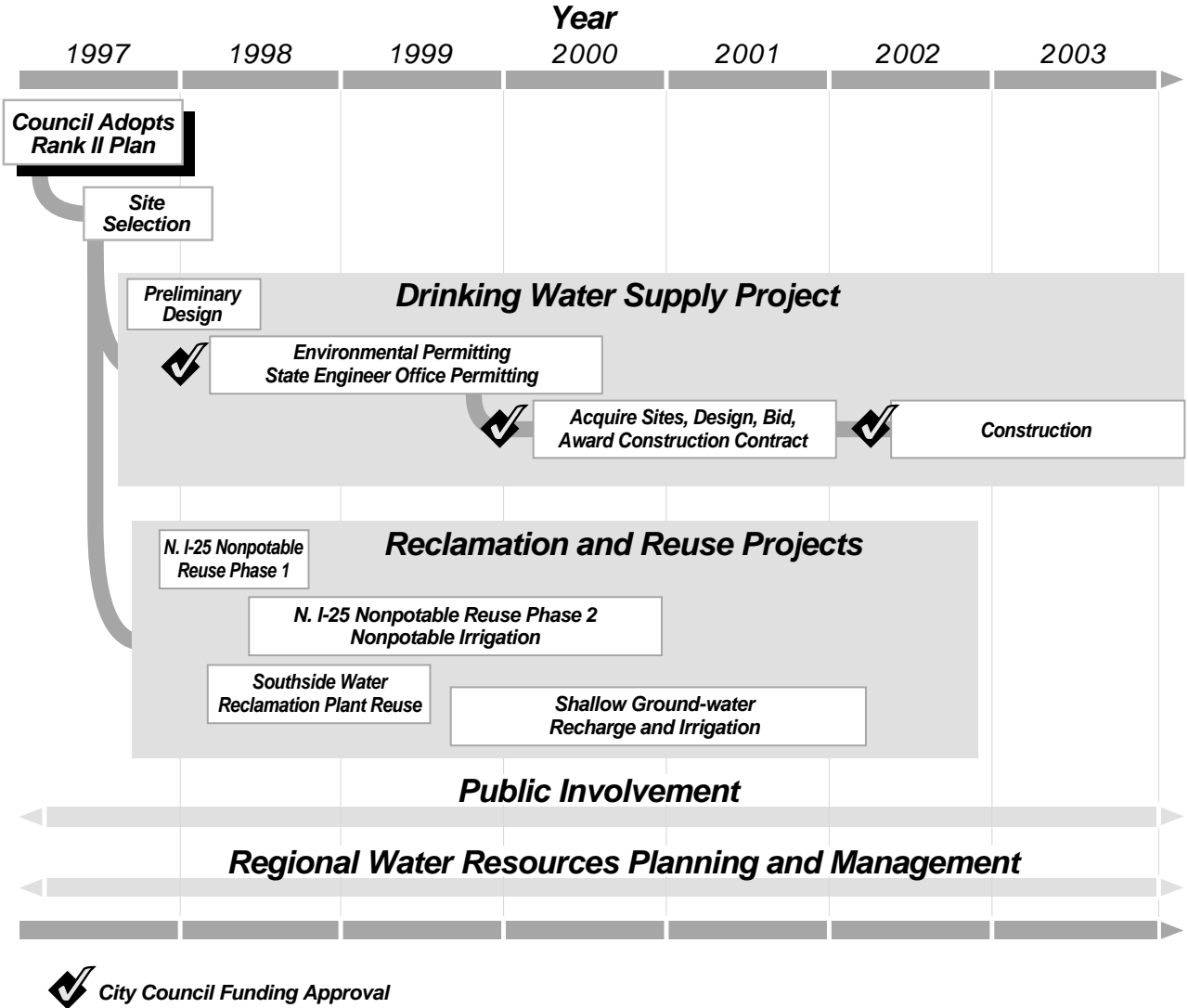
City Fiscal Year	Additional Annual Revenue Requirement <sup>a</sup>	Typical Monthly Residential Rate Increase	Typical Monthly Residential Water and Sewer Bill	Incremental Rate Increase	Cumulative Rate Increase
1998	\$1,300,000	\$1.50	\$33.33	4.7%	4.7%
1999	\$4,300,000	\$1.55	\$34.88	4.7%	9.6%
2000	\$6,800,000	\$1.57	\$36.45	4.5%	14.5%
2001	\$5,700,000	\$1.64	\$38.09	4.5%	19.7%
2002	\$10,900,000	\$1.71	\$39.80	4.5%	25.1%
2003	\$31,400,000	\$1.79	\$41.59	4.5%	30.7%
2004	\$38,600,000	\$1.87	\$43.46	4.5%	36.6%
2005	\$32,200,000	\$0.00	\$43.46	0.0%	36.6%

<sup>a</sup>Annual requirements for cash outlays and debt service for projects identified.

The results of the preliminary analyses presented above indicate that it is practical to finance the implementation of the strategy through water rates. Prior to enactment of rate increases, the City will conduct a rate study and design that will determine the allocation of funding requirements based on source of water used (nonpotable or potable) and customers' use. Allocation will be made to fixed and commodity charges and impact fees. The rate design will consider lifeline rates—to allow provision of basic services to low-income customers.

## G. Implementation Schedule

The figure below shows the planned implementation schedule and sequencing of activities. The first of the reuse project phases will be online in 1998 with the major drinking water supply project completed in 2004.



---

**APPENDIX  
REPORT OF THE CUSTOMERS ADVISORY COMMITTEE**

---

## APPENDIX

### REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES MANAGEMENT STRATEGY

#### I. CUSTOMERS ADVISORY COMMITTEE

The Customers Advisory Committee (CAC) was established by City Council Bill No. R-31, as amended by No. R-71. The CAC is composed of water system customers from a broad range of interests and geographical areas of the City. An impartial oversight committee, the CAC was charged with helping the Public Works Department water resources planning team to develop the criteria and measures of performance used to evaluate and rank various water supply alternatives.

Because the CAC began its work without advance knowledge or pre-conceived ideas of the City's water problems, the Committee was able to bring fresh perspectives to bear on the selection process; endorsement of the Strategy was not a foregone conclusion.

Since June 1996, the Committee members have attained a high degree of familiarity with water supply issues through twice-monthly comprehensive briefings and discussions with the planning team, review of accompanying technical documents, and meetings with key players in the federal and state water management area. Additionally, the Committee toured Albuquerque's water supply facilities and Middle Rio Grande Conservancy District diversion structures.

The CAC has reviewed in detail the City of Albuquerque's Water Resources Management Strategy (Strategy) and submits this brief Report as an appendix to that document. The Report reflects independent concerns of the CAC members and their constituent groups, and is intended to serve as an outline for further Committee work.

#### II. FINDINGS

After six months of intensive study and debate, the CAC finds that:

A. The City of Albuquerque should proceed with dispatch to develop and fully use its San Juan - Chama and Rio Grande surface water as a direct water supply. Albuquerque must act now to protect the quality and quantity of water contained in the deep aquifer and provide a water supply system that is renewable and reliable even in times of drought.

REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND  
CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES  
MANAGEMENT STRATEGY

January 27, 1997 - Page 2

B. During this process, a broad range of conjunctive use options were evaluated. Some options were rejected because they were cost-prohibitive, some because implementation was impractical or would be unacceptable to the public. The recommended strategy will maximize the use of renewable water supplies, and make the most efficient use of present resources. It represents the appropriate balance between costs, implementability and a secure future water supply.

C. The City of Albuquerque's Water Resources Management Strategy has the potential to safeguard Albuquerque's water future, while at the same time preserving the City's unique ambiance and quality of life. The Mayor and City Council should endorse the Strategy immediately and take necessary steps to facilitate its prompt implementation. Delays translate directly into higher costs; all increased level of uncertainty with respect to permitting, institutional constraints, and water availability; impairment of the city's claims to unused San Juan-Chama project water; and irreparable damage to the aquifer.

D. Continued public oversight of each phase of the Strategy's implementation will play an essential role in building public support and awareness of the program and all of its implications, and will provide the water customers with a means of making their needs and concerns known to the Public Works Department.

### III. RELATED CONCERNS

During the course of CAC work, members raised and discussed a host of issues of concern to them and to their constituent groups. These issues, while collateral to the decision to fully use surface water supplies, raise matters of equal importance to the water consumers.

The Committee would like to examine the following areas in depth during the next stage of its work.

#### A. Rates and Costs

Rate structures must reflect the real costs of water. "Lifeline rates" for basic human needs should be considered; rates should be structured to encourage conservation and limit outdoor irrigation. Consumers' acceptance of necessary rate increases and

REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND  
CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES  
MANAGEMENT STRATEGY

January 27, 1997 - Page 3

changes in rate structures will depend on the public being well-informed and educated about the issues.

B. Environment

The Bosque and the river are exceptional resources of great value both to residents and to wildlife, and provide Albuquerque with an environment unique in the West. Great care must be taken that construction activities do not harm irreparably the river and bosque ecosystems. For example, construction activities associated with the infiltration galleries and water delivery structures may destroy habitat and old growth cottonwoods. Surface water diversions will diminish river flows and may have harmful impacts on ecosystems dependent on shallow groundwater flows. The effects and impacts on the entire Rio Grande, San Juan and Chama River Systems, and particularly in the Middle Rio Grande Valley, still are not well understood.

The CAC recognizes the Strategy's provisions to prevent adverse environmental impacts to the river systems, and to mitigate any unavoidable effects. The environmental effects of the viable alternatives must be studied and evaluated through preparation of an Environmental Impact Statement before any irreversible decisions and commitments of resources are made.

C. Aquifer Preservation and Rehabilitation

Albuquerque's deep aquifer is like money in the bank for times of need. We have been borrowing from the bank for too long, however, and the bank is about to fold. Reliance on aquifer depletion to provide municipal supplies must cease as soon as possible and efforts should be made to enhance aquifer recharge and protect groundwater quality. Immediate protective measures are necessary, because potential problems associated with ground subsidence and increased contamination will be difficult, if not impossible, to remedy.

D. Education

Because public support of the City's water strategy is vital, public awareness of Albuquerque's water needs and current water supply situation must increase. Albuquerque needs an aggressive, high-profile, on-going educational campaign, similar to the successful efforts in the conservation area. The Public Works department should be funded adequately and directed to complete this critical work.

REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND  
CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES  
MANAGEMENT STRATEGY

January 27, 1997 - Page 4

E. Conservation

We encourage City initiatives to enhance current, successful voluntary conservation efforts. Such initiatives should include: allowing the appropriate use of residential grey water for outside irrigation; retrofitting of older buildings with water-saving devices; re-using water for large commercial turf areas and converting turf areas to low-water use landscaping; and providing positive incentives to consumers for using conservation controls and equipment.

F. Sustainable Development and Future Water Supplies

Sustainable development means living within the limits of available resources, so that present water needs may be met without compromising the ability of future generations to meet their needs. Albuquerque's historical practice of simply purchasing surface water or sinking more wells to meet greater demand is no longer realistic or appropriate. Careful thought must be given to growth patterns and land management within the metropolitan area so that Albuquerque may balance growth with attainable water resources. The CAC notes one study's conclusion that existing consumptive water uses in the Middle Rio Grande Valley exceed average annual renewable supplies.

Existing supplies, including the full use of the San-Juan Chama water, will serve about 700,000 people if Albuquerque meets its current conservation goals. Conservation efforts, as mandated by both the State and the City, must be aided by responsible, rigorously planned development.

Careful thought must also be given to assumptions about future availability of new supplies. Competing demands from New Mexico's other fast-growing municipalities, coupled with existing interstate compact commitments and as yet unknown water rights claims, result in a highly unpredictable water scenario. Albuquerque and the West generally) can no longer assume that the ability to pay, or political will, or any other factor will guarantee that "wet water," as opposed to paper water rights, will be there for the buying.

Efforts to secure additional water supplies should include an evaluation of the potential acquisitions with regard to their effect on the Middle Rio Grande valley hydrologic system. See paragraph G, below.

REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND  
CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES  
MANAGEMENT STRATEGY

January 27, 1997 - Page 4

G. Land Use

Preservation of existing open space and irrigated lands not only adds to Albuquerque's ambiance, but contributes to the health of the middle valley hydrologic system. For example, one study finds that the Middle Rio Grande Conservancy District's irrigated agriculture and existing canal structures are responsible for about half the recharge in the valley. A consequence of increasing urbanization, therefore, is that agricultural lands and other lands vital to maintaining groundwater supplies are being lost.

In the western water marketplace, water used for municipal purposes typically has a higher immediate economic value than water used to support agriculture. The CAC recognizes, however, that the long-term health of the groundwater system is a high-value use; and financial analyses of competing land uses must include potential effects on Albuquerque's water resources.

H. Relationship with Middle Rio Grande Conservancy District

It is imperative that the City work with the MRGCD as an equal partner to develop a mutually beneficial relationship. The MRGCD owns land, diversion structures and canals which are critical to the success of the proposed San Juan - Chama water project. The District also owns considerable water rights which could benefit the city and region as the District's irrigation needs decline in the future.

I. Regional/Statewide Concerns

The CAC endorses wholeheartedly the Strategy's emphasis on regional planning and cooperation. The Rio Grande stream system constitutes a unique area at New Mexico, and the interests of all users are inextricably connected. Because water rights negotiations in other regions and other states may affect Albuquerque's water rights, the City should take a pro-active role to ensure that its rights are protected in whatever venue they are being discussed.

The CAC recognizes that the State Engineer Office has tremendous authority and discretion over water rights issues, but continues to be handicapped in the exercise of that authority due to staff and funding shortfalls. The Committee urges the City to work cooperatively with that agency and with other state and federal agencies to ensure that technical resources are used

REPORT OF THE CUSTOMERS ADVISORY COMMITTEE TO THE MAYOR AND  
CITY COUNCIL ON THE CITY OF ALBUQUERQUE WATER RESOURCES  
MANAGEMENT STRATEGY

January 27, 1997 - Page 5

efficiently to provide the best water resource information possible.

Accommodation and compromise, consultation and collaboration, and a shared commitment to finding mutually beneficial solutions are essential to water planning. Albuquerque is well-positioned to take, and should take, a leadership role in state-wide and regional water planning activities.

APPROVED BY COMMITTEE JANUARY 27, 1997

Bobbi Altman  
League of Neighborhoods, West Side

Charles Barnhart  
Albuquerque Economic Forum

Norman Churchill, Vice Chairman  
League of Neighborhoods, East Side

\*Vickie L. Gabin; chairwoman  
Sierra Club

Aileen Gatterman  
League of Women Voters

William Brooks Gauert  
Coalition of Neighborhoods

Hector Gonzales  
Unincorporated Bernalillo County

Carl Lucero  
Hispano Chamber of Commerce

Bill Mairson  
Shared Vision

Jim Morris  
Greater Albuquerque Chamber of  
Commerce

\* The Sierra Club generally agrees with the Strategy. Because of environmental concerns, however, the Club does not at this time endorse infiltration galleries, as a preliminary preferred diversion alternative. It is essential that diversion alternatives be evaluated in the EIS before a final decision is made.

---

**CUSTOMERS ADVISORY COMMITTEE**

---

Vickie Gabin, Sierra Club, Chair  
Norman Churchill, League of Neighborhoods, East Side, Vice-Chair  
Bobbi Altman, League of Neighborhoods, West Side  
Charles Barnhart, Albuquerque Economic Forum  
Aileen Gatterman, League of Women Voters  
William Brooks Gauert, League of Neighborhoods  
Hector Gonzales, Unincorporated Bernalillo County  
Carlo Lucero, Hispano Chamber of Commerce  
Bill Mairson, Shared Vision - Environmental Caucus  
Jim Morris, Greater Albuquerque Chamber of Commerce

---

**WATER SUPPLY PLAN STAFF STEERING COMMITTEE MEMBERS AND PARTICIPANTS**

---

Stephen Bockemeier, Finance Division, Public Works Department  
Charles Bowman, Wastewater Utility Division, Public Works Department  
John Castillo, Public Works Department  
Lou Columbo, Council Services  
Gary Daves, Water Rights, Public Works Department  
Sandy Doyle, Finance Division, Public Works Department  
Bob Hogrefe, Wastewater Utility Division, Public Works Department  
Bob Hume, Water Utility Division, Public Works Department  
Ondrea Linderoth, Open Space, Design and Development  
Curt Montman, Environmental Health Department  
Greg Olson, Utility Development Division, Public Works Department  
Ted Pearson, Legal Department  
Roy Robinson, Water Utility Division, Public Works Department  
Gerald Romero, Office of Management & Budget, Mayor's Office  
Myra Segal, Council Services  
Tom Shoemaker, Water Utility Division, Public Works Department  
Art Stuart, Water Utility Division, Public Works Department  
Jean Witherspoon, Water Conservation, Public Works Department  
Shirley Wozniak, Planning Department

---