Water Planning, Infrastructure Development and Conservation

Lower Rio Grande Water Users Organization
Water Symposium
June, 2007

Jorge A. Garcia, Ph.D., P.E.
Utilities Director
“The nation’s attention was focused on Las Cruces because of the dynamic pattern being established. Leading financial experts predict this area will be among the fastest growing localities in the nation for the next 30 years. 1965 was the year Las Cruces began to realize this potential.”
The water planning process

- **Regional Water Plan**
  - 1994 Regional Plan
    - New plan completed in August, 2004

- **Las Cruces 40-year Water Plan**
  - 1995 Plan
    - Update draft completed in January, 2006
    - Final draft in progress

- **Water & Wastewater Master Plan**
  - 1995 Master Plan
    - Update currently under Development. To be Completed Fall of 2007
Las Cruces 40-yr Water Plan

- Conjunctive use of surface and groundwater
- Water conservation
- Reclaimed water use
- Aquifer storage and recovery
- Importation
- Potential desalination options
Water supply.....

Current water rights:
21,869 AF Mesilla Bolson
10,200 AF Jornada Bolson
Water in 0.5 af

Water in 0.5 af

Outdoor use 0.25 af

Conservation

Reclaimed water

Wastewater out 0.25 af

Irrigation of Parks, golf courses medians

Water Reclamation Plant

Return flow

River

WWTP

1 acre-foot (AF) = 325,851 gallons

1 MGD = 1,120 AFY
Water Plan Population Projections

Population

High ——— Medium ——— Low

267,101
Water Plan Customer Projections

Customers

- High
- Medium
- Low
Projected demand and water rights

The graph below shows the base LRG-430 right of 21,866 ac-ft/yr, the addition of the East Mesa permit in 2002, and the addition of the pending West Mesa permit in 2008. The East Mesa permit is represented by the dashed line to indicate that it is only meant to accommodate increases in demand on a temporary basis.

Figure 10. Graph showing City of Las Cruces historical water diversions for 1960 to 2005 and projected water demands for 2006 to 2045 represented by a band representing low to high growth rates, City of Las Cruces’s total existing adjudicated water rights, and current and pending permits.
Water Plan Demand & Available Supply
Sample Management Scenario 1

Acre-feet

2005 2010 2015 2020 2025 2030 2035 2040 2045

LRG 430
East Mesa
LRG 389&399
West Mesa
S Water
High
Water Plan Demand & Available Supply
Sample Management Scenario 2

Acre-feet

LRG 430
East Mesa
LRG 389&399
West Mesa
S Water
5.00% Reclaimed

High
Water Use by Sector in LRG

- Irrigated Agriculture: 6.81%
- Public Water Systems: 1.27%
- Commercial: 0.76%
- Livestock: 0.53%
- Domestic wells: 0.49%
- Power: 0.03%
- Industrial/Mining: 90.11%
Change in Water Use by Sector
Allocation of 500,000 AF

<table>
<thead>
<tr>
<th>Percentage Use by Sector</th>
<th>Municipal Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.11%</td>
<td>0</td>
</tr>
<tr>
<td>86.51%</td>
<td>20,000</td>
</tr>
<tr>
<td>84.70%</td>
<td>30,000</td>
</tr>
<tr>
<td>82.90%</td>
<td>40,000</td>
</tr>
</tbody>
</table>

Legend:
- Green: Agricultural use
- Blue: Municipal use
City of Las Cruces
Surface Water Treatment
Facility Study - Final

Submitted: February 2006
2006 Surface Water Treatment Facility Study

Figure 19: Process Block Flow Diagram for Surface Water Treatment Plant

- **Initial Screen**
- **Coagulant**
- **PAC (As Necessary)**
- **KMnO₄ (As Necessary)**
- **Thickener (If necessary)**
- **Sludge Lagoons**
- **Decant**
- **Supernatant**

Flow Path:
- Rio Grande River → Initial Screen → Coagulation / Flocculation / High Rate Clarification → MF / UF → GAC (If necessary) → Clear Well → Distribution System
- Sludge to Landfill

Additional Notes:
- 20 mgd initial capacity
- 11,312 afy
2006 Surface Water Treatment Facility Study

Treatment Plant Site Layout
Water Rights Ordinance

- First enacted in 1985…..Ord #623
  - Acreage based
  - Payment due at time of annexation
- Modified in 1998…..Ord #1670
  - Acreage based
  - Increased payment amount
- Modified in 2000….Ord #1843
  - Conveyance or payment-in-lieu due at time of development
  - Payment based on meter size, rather than acreage
  - Added conveyance of Project water rights
Water Rights Ordinance 1843…

- Conveyance of Water Rights or Project Water Rights is a Prerequisite for Development of Land.
  - “Each landowner or developer shall convey surface or ground water rights or project water rights to the City at the time of development.”

- Payment in Lieu of Conveyance for Non-Water Righted Land.
  - “The landowner or developer of non-water righted land may, in lieu of conveying water rights or project water rights to the City, pay to the City a sum of money which will enable the City to acquire water rights or project water rights. The amount of the payment in lieu of conveyance shall be based on the size of the City water meter or meters to be placed on the land.”
Reclaimed water use

- City currently in the design phase of the East Mesa Water Reclamation Facility
- Will initially treat 0.5 million gallons per day (MGD) and later expanded to 1.0 MGD
- Tertiary treated water will be used for irrigation of landscapes, golf course, medians, etc
- Reclaimed water use offsets fresh water demands
AQUIFER STORAGE AND RECOVERY ASSESSMENT,
MESILLA AND JORNADA BASINS,
DOÑA ANA COUNTY, NEW MEXICO

by
Roger L. Peery
Steven T. Finch, Jr.
JOHN SHOMAKER & ASSOCIATES, INC.
Albuquerque, New Mexico
(505) 343-5007

prepared for
City of Las Cruces
and
Lower Rio Grande Water Users Organization

April 2002
$0.00
Aquifer storage and recovery (ASR)
Water & Wastewater Master Plan

- Provides guidance for infrastructure development
- Delineates specific water and wastewater projects to meet growth needs
- Defines the “capital improvement plan” as required by Development Fee Act
1988 Water Master Plan
1989 Wastewater Master Plan
1989 Wastewater Master Plan
1995 Water & Wastewater Master Plan
1995 Water & Wastewater Master Plan

[Map showing water service areas in Las Cruces, New Mexico, with various colors for different service areas and years.]

Legend:
- Utility Service Area Boundary
- City Limits
- University Water
- Dona Ana Water
- Mesilla Water
- City of Las Cruces Water Existing Service Area
- Year 2000 Service Area Boundary
- Year 2005 Service Area Boundary
- Year 2010 Service Area Boundary
- Year 2015 Service Area Boundary

Scale in Feet

Water Service Areas Figure 2-1
1995 Water & Wastewater Master Plan
East Mesa

$1,030,500

$644,063

$136,026
Zone 1 Water Supply Project - Phase I

$1,673,865

EAST MESA WELLFIELD IMPROVEMENTS

- 12" WATER PIPELINE
- 16" WATER PIPELINE
- 30" WATER PIPELINE
Well 69 pump station construction
Tank connection
Zone I Water Supply – Phase II

$3,781,322

$1,932,188

ZONE 1 WATER TRANSMISSION PIPELINE

30" WATER PIPELINE - PREFERRED ALIGNMENT

36" WATER PIPELINE - ALTERNATE ALIGNMENT
36-inch pipeline construction
PROPOSED 24-INCH ZONE 1 WATER TRANSMISSION LINE

$1,236,188

Proposed 24" Zone 1 Transmission Line 10,500 LF

South Zone 1 Pressure Zone Storage Tank

Existing 18" Zone 1 Transmission Line

Jomada Pressure Zone Storage Tank
CITY OF LAS CRUCES WEST MESA WATER TRANSMISSION LINES

$1,953,176
$12,414,424

EQ Basins
8.9 to 13.5 MGD

Entrance Works
Wastewater Plant Expansion…

On-going entrance works construction

$ 2,825,424
New entrance works

Demolition of old entrance works
New belt press

Sludge compost operation
Water reclamation plant

Biological Nutrient Removal (BNR) System - Aeromod

Wastewater Influent

Primary Treatment
Auger/ Screens
And Eutek Head Cell

To JAHWWTF

$9.65M

Demonstrates odor control treatment method
PRELIMINARY SEWER SERVICE PLAN
FOR
THE VISTAS AT PRESIDIO

Vistas at Presidio II

Vistas at Presidio I

Extension of Interceptor 211

Extension of Interceptor 236

Extension of Interceptor 235-A

Extension of Interceptor 235-B

Lift Station to Reclamation Plant

Proposed Water Reclamation Plant
Water Conservation

Joshua G. Rosenblatt
Water Conservation Coordinator
Benefits of Water Conservation

- Increasing efficient use is the least expensive way to enhance water supplies
- Extend water and wastewater infrastructure lifespan and operating costs
- Conservation program maintains compliance with OSE & NMDFA
- Las Cruces is Proactive
2004 Winter VS Summer City Customer Water Consumption

Gallons

Feb 2004 VS June 2004

Feb-04

Jun-04

Residential
Multi Res
Commercial
CLC Parks
Golf Course
PHASE 1 WATER CONSERVATION - MAIN COMPONENTS

- PUBLIC INFORMATION
  - Web Pages
  - Media Releases
  - Mailings
  - Information Stations
- EDUCATION
  - Public Workshops
  - Presentations
  - School District K-12
  - NMSU
- ORDINANCE
  - Conservation Ordinance
  - Landscape Ordinance
- CITY LEAD
  - Facilities
  - Special Projects
  - Regional Collaboration
- MONITORING AND REPORTS
  - Demand Analysis Trending
  - Cost Benefit Analysis
Creating a Water Wise Oasis
“LUSH & LEAN” Initiative

Two (2) Bureau of Reclamation Grants awarded in recognition of the City’s “Lush & Lean” Initiative.
GATHERING HISTORY FOR MEASURING PERFORMANCE

Total Annual Single Family Water Demand
City of Las Cruces Accounts 2002 to 2006

Number of SFR Accounts
2002 - 21,153
2006 - 25,124
3,971 Increase

Gallons (000)

- 2002
- 2003
- 2004
- 2005
- 2006
<table>
<thead>
<tr>
<th>Summer Conservation</th>
<th>2005</th>
<th>2006</th>
<th>ACTUAL</th>
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<tbody>
<tr>
<td><strong>Impact</strong></td>
<td>Gallons (000)</td>
<td>Gallons (000)</td>
<td>% Diff</td>
</tr>
<tr>
<td>Total SFR</td>
<td>2,938,778</td>
<td>2,895,550</td>
<td>-1.5</td>
</tr>
<tr>
<td>June</td>
<td>355,808</td>
<td>386,454</td>
<td>1.1</td>
</tr>
<tr>
<td>July</td>
<td>428,178</td>
<td>373,904</td>
<td>-12.7</td>
</tr>
<tr>
<td>August</td>
<td>313,151</td>
<td>287,554</td>
<td>-8.2</td>
</tr>
<tr>
<td>3 Month Total</td>
<td>1,097,137</td>
<td>1,047,912</td>
<td>-4.5</td>
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<tr>
<td>Per Cent of Total</td>
<td>37.3%</td>
<td>36.2%</td>
<td>-1.1</td>
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<tr>
<td>Scenario 5%</td>
<td>54,857</td>
<td>49,225</td>
<td>-4.7</td>
</tr>
<tr>
<td>Annual Reduction</td>
<td>1.9%</td>
<td>1.7%</td>
<td>Actual</td>
</tr>
</tbody>
</table>
The Measure of Success - Production and Demand Analysis

Single Family Residential Gallons per Capita per Day (GPCPD) Trend

Year

GPCPD
GIS Developments
Smart Data Points
Swimming Pools VS Lawns
It’s the Year 2010 PHASE I 5 YEAR ACCOMPLISHMENTS

Public Outreach
- K-12 Outreach
- City Lead By Example
- Enhanced Enforcement
- Demand Monitoring and Trending Methods Established
- 1% per year reduction

The results of Phase I and measured community response will provide the framework for all subsequent conservation measures to achieve both short and long range goals.
Beyond Phase 1 – Proposed Future Initiatives

- Conservation Surcharge (Ex. >2x Avg) on utility bill
- Revised Landscape ordinance to include residential properties, lawn permits
- Heightened enforcement by Codes with assistance from utility staff and public reporting.
- Fines placed on utility bills.
Report Water Wasting
528-4100
The Conservation Program is off to a great start
We have exceeded the first years goal
Strong public and administrative support
Many simple cost effective steps are underway that will measurably contribute to demand reduction year after year.
End of Presentation

Thank you
Historical Water Diversions

Water Customers
Mesilla (ac-ft)
Jornada (ac-ft)
Well TDS Data

TDS (mg/L) vs Well Number

- TDS limit
- Standard
- Average (2)

Data points for wells 20 and 24 are shown, with well 21 exceeding the TDS limit.
Well TDS Data

- TDS (mg/L)
- TDS limit
- Average (2)
- WW (2)
Well Hardness Data

- Well Numbers: 20, 21, 24
- Hardness (mg/L): 0 to 800
- Hardness Limit

Well Number

Hardness (mg/L)

Hardness

Hardness Lim