

# EL PASO WATER RESOURCE MANAGEMENT PLAN

## PHASE III COMPLETION REPORT

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El Paso Water Utilities  
Public Service Board



El Paso County  
Water Improvement  
District No. 1

**BOYLE ENGINEERING CORPORATION**  
Albuquerque      Denver      El Paso

## EXECUTIVE SUMMARY

The sources of water available to El Paso comprise a limited resource supplying all of the municipal, industrial, and agricultural water needs of the area. The development of a long range plan for management of this resource was commissioned in October 1989 by the two principal Texas users of the water: the El Paso Water Utilities Public Service Board (PSB) and the El Paso County Water Improvement District No. 1 (EPCWID).

The development of the Water Resource Management Plan was performed in three phases. Phase I of the management plan development consisted of evaluation of basic data and the results of previous studies; development of population projections for the El Paso area over the 50-year planning horizon to the year 2040; and estimation of the future water demands for the area over the planning horizon. The results of the first phase of the management plan development are documented in the Phase I Completion Report dated July 1991.

Phase II of the management plan development consisted of an evaluation of sources of surface water, groundwater, and other alternatives which might supply the El Paso area in the future; assessment of the potential constraints on their development; and formulation of three alternative management plans by combining selected sources of water supplies. The results of the second phase of the management plan development are documented in the Phase II Completion Report dated August 1991.

This report describes the investigations performed and summarizes the results and conclusions from the third and final phase of the development of the Water Resource Management Plan. Phase III of the plan development involved 1) estimating the cost of the three alternative plans formulated in Phase II; 2) evaluating and ranking the three plans; 3) selecting the preferred plan; and 4) documenting the adopted plan.

The evaluations and comparative ranking of the three alternative plans were reviewed and critiqued periodically during the selection process by both the Technical Advisory Committee (TAC) and the Management Advisory Committee (MAC). The preferred plan was ultimately selected in consultation with both advisory committees. The technical memorandums documenting the Phase III development work and this concluding report have been reviewed and approved by the MAC.

The Phase III evaluations of potential additional sources of surface water and groundwater supplies and methods of expanding existing sources of El Paso's water supplies concluded:

1. Continuation of the historic policies and trends of the PSB in meeting the projected increased water demands in the future would likely exhaust the fresh water available from the Hueco Bolson by the mid-2020's.
2. There is no single new or additional source of surface water or groundwater currently available to the PSB which will supply El Paso's increasing municipal water demands in the future.
3. The adopted Water Resource Management Plan is comprised of a combination of surface water and groundwater sources and water use strategies. The elements which make up the plan are modular, and a number of alternative plans could be formulated by varying the water source components and magnitudes.
4. The sustainable groundwater and surface water supplies available to the PSB in 1990 will supply only 38 percent of the present population of the City of El Paso.
5. The only significant surface water supplies available to the El Paso area are the streamflows of the Rio Grande which are essentially fully controlled by the Rio Grande Project.
6. The Water Resource Management Plan should include an aggressive water conservation program to reduce non-essential water use and reuse of treated wastewater for irrigation and industrial processes to the maximum extent feasible.
7. The principal components of the Water Resource Management Plan should be first--water conservation, second--surface water supplies, and third-groundwater.

The three alternative management plans (designated Scenarios A, B, and C) formulated in Phase II of the plan development were evaluated with respect to 1) elimination of the overdraft on the Hueco Bolson; 2) sustainability of the supply; 3) capital and operating costs of the plan; 4) emphasis on water conservation; 5) reliability and variability of the supply sources; 6) susceptibility of the water supply to contamination; 7) perceived public acceptance of the plan; and 8) environmental, political, contractual and statutory constraints. The plan adopted for

management of El Paso's water resources through the next 50 years (Scenario A) consists of the following principal elements:

1. Immediate implementation of an aggressive water conservation program.
2. Development of a twenty-fold increase in re-use of treated wastewater.
3. Immediate implementation of an accelerated program of acquiring Rio Grande Project surface water supplies.
4. Development of agreements with the EPCWID to obtain additional Rio Grande Project surface water in exchange for treated wastewater and by means of drought contingency contracts in water-short years.
5. Construction of a 3,000 af regulating reservoir in the vicinity of Rio Bosque Park by 1993.
6. Perfection of an agreement with the EPCWID and the USBR by 1992 enabling the PSB to store its Project surface water supplies in Elephant Butte Reservoir and to make deliveries of surface water from storage during the non-irrigation season.
7. Expansion of the groundwater production from the Mesilla Bolson in Texas at an average increase of 1500 af/yr<sup>1</sup> starting immediately and continuing through the year 2010.
8. Acquisition of additional groundwater and/or surface water from New Mexico at an average incremental increase of 2,300 af/yr commencing in 2009.
9. Production of groundwater from the Hueco Bolson will be gradually curtailed to those periods when the water supplies from all other sources are insufficient to meet the demands. Reclamation of wastewater at the Fred Hervey Plant will increase to the plant's designed tertiary capacity. The reclaimed wastewater, less the amount supplied to the Newman Power Plant, will continue to be re-injected into the Hueco Bolson.

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<sup>1</sup> af/yr = acre-feet per year

Figure 1 at the end of this summary portrays the composition of the water supply for the adopted plan over the 50-year planning period.

The principal additional water supply facilities which must be constructed in the next 40 years to implement the adopted Water Resource Management Plan consist of the following:

- o 39 wells in the Mesilla Bolson in Texas.
- o 55 wells in the Mesilla Bolson in New Mexico (assuming that the New Mexico water supplies needed after 2008 will be obtained from groundwater) or alternatively, structures necessary to obtain surface water from New Mexico.
- o Expansion of the Jonathan W. Rogers Water Treatment Plant to a capacity of 60 MGD.
- o A 3,000 af regulating reservoir
- o A concrete lined channel having a capacity of 1500 cfs and 107 miles in length paralleling the Rio Grande from Caballo Dam to the American Diversion Dam
- o A 36" to 72" diameter Southern Transmission Pipeline along Doniphan Drive and the Rio Grande corridor linking Canutillo Well Field, the Robertson/Umberhauer Water Treatment Plant and the Jonathan W. Rogers Water Treatment Plant.
- o A 48" to 60" diameter Northern Transmission Pipeline, including three high-lift pump stations, linking the new northwest well field and the Loop 375 pipeline by crossing through the Franklin Mountains in a 24-foot diameter tunnel.
- o Two transmission pipelines varying in size from 24" to 42" interconnecting the Northern and Southern Transmission Pipelines.

In addition to the major system components listed above, appurtenant facilities, including distribution reservoirs and pipelines, wastewater re-use pipelines, well manifold and chlorination facilities, and booster pump stations, will also be required. The total capital expenditures for design and construction of the new water supply facilities, purchase of land and rights-of-way, and acquisition of rights to Rio Grande Project surface water and drought contingency contracts under the adopted Water Resource Management Plan is estimated to be nearly 462 million dollars at current (1990) prices.

Concurrent with the finalizing of the adopted Water Resource Management Plan, the PSB moved decisively to begin implementation of several aspects of the plan. It was recognized early in the plan development that an aggressive water conservation program would be a first-line component of the final plan. The PSB initiated implementation of the water conservation component in July 1990 with the appointment of a 40-person citizen's Water Conservation Advisory Committee. The Committee's recommendations were formally submitted to, and were adopted by, the PSB on November 28, 1990. Water conservation elements of the Water Resource Management Plan that have already been implemented consist of:

- o A Water Conservation Manager was added to the PSB staff in January 1991.
- o A new Water Conservation Ordinance was enacted by the El Paso City Council and went into effect April 1, 1991.
- o A revised water rates schedule was put into effect April 1, 1991.
- o The City's Plumbing Code was amended by ordinance effective September 12, 1991.
- o Also on September 12, 1991 the PSB initiated a rebate program for replacement of older installed toilets with new Ultra Low Flush (ULF) models.
- o A City Landscaping Ordinance is presently under development.

In the previous phases of the plan development it was predicted that the PSB would become the regional water provider for essentially all of El Paso County over the course of the next 50 years. In an action consistent with this conclusion, the PSB on December 13, 1990 officially reversed its policy of the past 17 years prohibiting providing of new water and sewer services outside of the El Paso city limits. Following this historic change in policy, the PSB undertook the following actions:

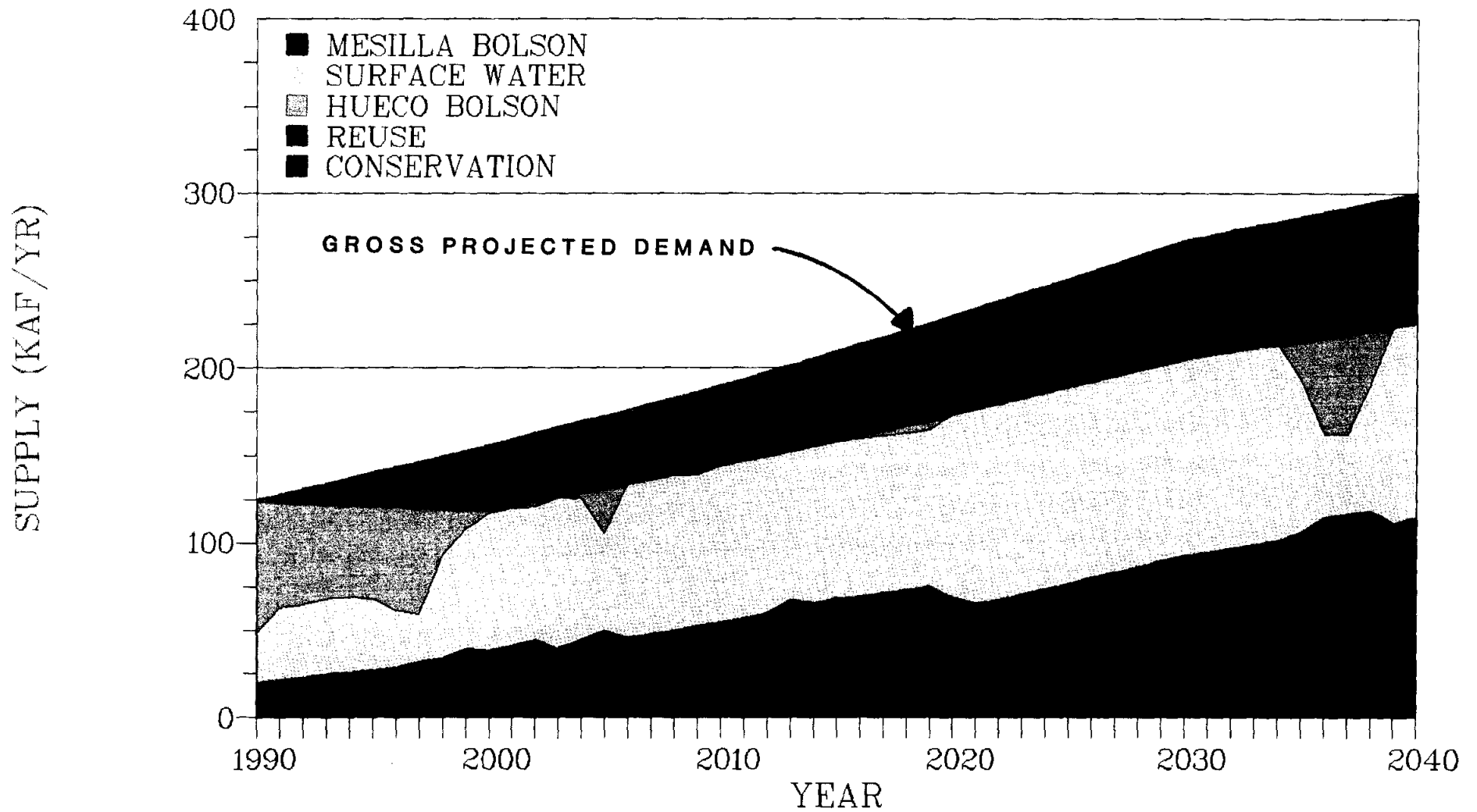
- o A "blue-ribbon" Steering Committee was appointed on April 24, 1991 to guide the development of policies and procedures for extending water and sewer services by the PSB outside of the city limits. This Steering Committee consisted of eight leaders from the City and El Paso County.

- o A study was undertaken to formulate the specific policies and procedures to be followed by the PSB in extending services outside of the city limits. The policies developed in this study with the guidance of the Steering Committee were formally submitted to the PSB and adopted on August 28, 1991.
- o Development of new PSB Rules and Regulations governing extension of water and sewer services outside of the city limits is presently underway.

Another significant event related to the management plan development occurred on March 6, 1991, when the City of El Paso, by and through the PSB, agreed to a negotiated settlement in the long standing litigation with New Mexico over obtaining groundwater from New Mexico. Certain of the terms of the settlement agreement will affect the selected Water Resource Management Plan. However, it will probably be some time before the extent of the impacts are known.

FIGURE 1

# EL PASO WATER RESOURCE MANAGEMENT PLAN SOURCES OF SUPPLY





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# INTRODUCTION

## STUDY OVERVIEW

Phase I of the development of the El Paso Water Resource Management Plan consisted of identification of previous investigations and information pertinent to the study; compilation of a database for use in the plan development; estimation of the projected population growth over the next 50 years for the City of El Paso and El Paso County; and estimation of the municipal water demands to be supplied by the El Paso Water Utilities/Public Service Board (PSB) and the irrigation water requirements of the El Paso County Water Improvement District No. 1 (EPCWID) through the year 2040 planning horizon.

In Phase I of the plan development it was projected that by the year 2040 the City of El Paso will more than double from its present population of slightly over one-half million to nearly 1.2 million persons. The total El Paso County population was projected to increase at a similar rate from its present population of about 0.6 million to nearly 1.4 million persons. In addition to supplying water to the City population, the PSB presently serves over 30 percent of the El Paso County population outside of the City. It was predicted that sometime around 2040, the PSB will have become the regional municipal and industrial water supplier for all of El Paso County. For this reason, the development and management of the water supply for the PSB service area must be considered on a regional basis. The need for close cooperation between the PSB and the EPCWID in sharing the limited water resource available to the El Paso area will continue to increase in the future.

In the next 50 years, if the present trends in use continue, the water demands supplied by the PSB are projected to increase from the present (1990) use of 116,700 af/yr (38 billion gallons per year) to over 300,000 af/yr (97.8 billion gallons per year). These water use estimates correspond to average individual consumption rates of 188 gpcd<sup>2</sup> at the present, which will increase slightly to 196 gpcd by the year 2040.

Phase II of the development of the management plan consisted of identifying and evaluating potential new surface water and groundwater sources of water supply for the El Paso area; analyzing other methods and solutions for obtaining additional water supplies or expanding the

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<sup>2</sup> gpcd = gallons per person per day

existing water supplies for the City of El Paso; assessing environmental, political, contractual and statutory factors which might affect the acquisition and development of new water sources; and formulating the more viable of the new sources and solutions into three alternative water supply plans.

Phase III of the management plan development involved evaluating the three alternative plans formulated in Phase II on a comparative basis to select the preferred plan and implementing several elements of the selected management plan. The Phase III work was performed under the following five tasks:

- Task 8 - Evaluation of Alternative Plans and Selection of Preferred Plan
- Task 9 - Preparation of Adopted Water Resource Management Plan
- Task 13 - Citizens Water Conservation Committee Recommendations
- Task 14 - Reconnaissance Layout and Cost Estimates of a Lined Conveyance Channel from Elephant Butte Reservoir to El Paso
- Task 15 - Establishment of Policy for Extension of Water and Sewer Services Outside the El Paso City Limits

Phase III was the final stage of the development of the Water Resource Management Plan for El Paso. The adopted management plan is described and programmed in a separate document which concludes the two-year initial plan development effort. However, the adopted Water Resource Management Plan is a dynamic concept. The plan should be evaluated periodically to assess how closely it is tracking with estimates and projections used in its development, and adjustments should be made in the plan as required to adapt it to changing conditions.

## **COORDINATION AND REVIEWS**

The Technical Advisory Committee (TAC) continued to review results and provide recommendations through the selection of the preferred plan in Task 8. The Management Advisory Committee (MAC) continued to provide guidance throughout Phase III of the plan development. The advisors serving on these two committees are listed in the Phase I Completion Report. Monthly meetings were held with the MAC to review the progress of the development work and to adjust the schedule of future events. John Balliew, P.E., Planning

and Development Manager for the PSB, continued to serve as the liaison and provided the day-to-day coordination with the PSB. Other PSB staff who were directly involved with various portions of the plan development included the Deputy General Manager, David R. Brosman, P.E. and the staff General Counsel, Herbert L. Prouty.

## **PUBLIC INVOLVEMENT**

The public information effort related to the study which was initiated during Phase I continued throughout Phase III of the plan development. The public was involved as members of a 40-person Water Conservation Committee. This advisory committee considered and made recommendations to the PSB regarding water conservation efforts to be implemented as part of the management plan. The Committee also provided input to the plan development on the degree of public acceptance of various conservation measures.

The public was also involved as members of the Steering Committee appointed by the PSB to guide the development of policies and procedures for extension of water and sewer services outside of the El Paso city limits. This committee was composed of eight leaders from the City of El Paso and El Paso County.

## **EVALUATION OF ALTERNATIVE PLANS AND SELECTION OF PREFERRED PLAN**

The objective of Task 8 in the development of the Water Resource Management Plan consisted of estimating the timing and costs of the new water system facilities required under the three alternative plans (Scenarios A, B and C) formulated in Phase II of the plan development and evaluation of the three scenarios on a comparative, un-biased basis to select the preferred plan. These analyses were performed in the following basic steps for each scenario:

1. Determination of the water demands within each of the seven established planning areas to be supplied by the PSB over the 50-year planning period.
2. Determination of the new physical water system facilities needed in each of the planning areas to supply the increasing water demands.
3. Development of a schedule for construction of the new water system facilities and implementation of other management plan actions.
4. Estimation of construction costs for the new water system facilities, future operating and maintenance costs of both the existing and new water system facilities, and costs of acquisition of additional surface water supplies, land and rights-of-way.
5. Identification of factors which might impact the implementation of the plan or affect the scenarios to different degrees.
6. Evaluation of the plan using a numerical ranking system.

A detailed description of the various analyses and results is contained in Appendix A.

### **DETERMINATION OF FUTURE WATER DEMANDS**

The increasing water demands to be supplied by the PSB in the future were estimated for each decade through the year 2040 planning horizon for each planning area. It was necessary to perform the analyses separately for each planning area because of the differences in the present and predicted future overall average individual water consumption rates, and the fact

that the delivery points for the new raw water supplies in many cases will not be in the same locations as the centers of the increasing demands.

The future gross water demands of the PSB service area were derived for each planning area by apportioning the population projections and future water demands for the City of El Paso and El Paso County estimated in Phase I of the plan development. A summary of the total projected populations and gross water demands of the entire PSB service area for each decade from 1990 through 2040 is given in Table 1. These population and water demand projections are the same for all three of the alternative management plans evaluated in Task 8.

The net future water demands of the PSB service area within each planning area were derived by deducting the estimated demand reductions resulting from the water conservation program and the amounts of treated wastewater reused to supply lawn and landscape irrigation and industrial process water needs. These reductions in the gross demands are described in the Phase II Completion Report. The reductions resulting from an aggressive water conservation program targeted to reduce the composite average individual consumption by 20 percent in ten years are the same for Scenarios A and C. The conservation reductions for Scenario B are smaller since they result from a less aggressive program targeted to reduce the composite average individual consumption by only 15 percent in ten years. The projected savings resulting from reuse of treated wastewater are the same for all three scenarios. The total net demands for the potable water system for the entire PSB service area for the adopted management plan are shown in Table 1.

## **ESTIMATES OF WATER SYSTEM FACILITIES AND COSTS**

For purposes of evaluating the three alternative plans, the capital costs of constructing the additional water system facilities were estimated for each of the scenarios. Reconnaissance-level layouts were prepared of the additional new water supply, treatment, transmission, major distribution and storage facilities required for each scenario. The smaller distribution and customer connection components of the water system were assumed to be the same under all three of the plans and were not included in the system layouts and cost estimates.

The types, sizes and quantities of new physical facilities required were based on supplying the net potable water demands derived for each decade in each planning area from the sources of additional raw water supplies formulated in the alternative plans. The future water system expansions for each planning area were estimated by the following procedure:





1. The net potable water demand in af/yr was converted to an average annual rate of supply in cubic feet per second (cfs).
2. The peak day rate of supply was calculated by multiplying the average annual supply rate in cfs by a factor of 1.8.
3. The surface water treatment plants were assumed to operate in a base-load manner. The surface water component of the supply (equivalent to the design capacity of the plants) was subtracted from the aggregate peak day supply rate. The remaining portion of the peak day supply rate was the peak rate to be supplied by wells.
4. The portion of the groundwater supply provided by Hueco Bolson wells (as determined from the modeling of the alternative scenarios in Phase II of the plan development) was converted to a peak supply rate and subtracted from the total peak rate to be supplied by wells. The remaining portion of the peak supply rate was the balance to be supplied by Mesilla Bolson wells.
5. The Mesilla Bolson groundwater component of the peak supply rate was divided by an assumed average well production capacity of 1674 gallons per minute (gpm) to determine the total number of Mesilla Bolson wells required. From this total number of Mesilla Bolson wells, the 15 existing intermediate and deep Canutillo production wells were subtracted to determine the number of additional new Mesilla Bolson wells needed.
6. New system storage requirements were estimated on the basis of providing one-half of the additional peak day supply above 1990 levels plus 30 percent extra for fire reserves. This volume was divided by 6 million gallons (MG) to determine the number of additional 6 MG steel tank reservoirs required.
7. Additional new transmission and major distribution pipelines and booster pumping stations were sized to carry the peak day supply rates.

It was assumed that the existing Hueco Bolson wells would be adequate to supply the Hueco Bolson component of the future water supply under all three scenarios. As the supply from Hueco Bolson groundwater is cut back from the 1989-1990 production levels of nearly 80,000 af/yr, the Hueco Wells will be placed on standby status.

A lined conveyance channel between the Percha Diversion Dam on the Rio Grande downstream of Caballo Reservoir and the American Diversion Dam on the Rio Grande at El Paso is included as a new water system facility in all three scenarios. This major system component is necessary to utilize the increased surface water supplies developed under the new management plans on a year around basis. During most of the non-irrigation season, if delivered to El Paso via the Rio Grande, the PSB's surface water would mix with irrigation return flows of such poor quality that it can not be practically treated at the PSB's conventional water treatment plants. The lined channel separate from the Rio Grande will preserve the higher quality Rio Grande Project releases from Caballo Reservoir.

Reconnaissance-level layouts and estimates of construction costs of four alternative alignments of a lined conveyance channel paralleling the Rio Grande were made under a separate Task 14. A discussion of this analysis and the results are included in the summary of the Task 8 evaluations in Appendix A. The four alternatives studied consisted of two alignments starting at a diversion immediately downstream of Elephant Butte Dam and two alignments starting at the existing Percha Diversion Dam two miles downstream of Caballo Reservoir. Each pair of the alignments was further investigated with one final approach to the American Dam located on the east side of the Rio Grande and the other approach on the west side of the river. The proposed conveyance channel consists of a concrete-lined open canal paralleling the Rio Grande and located outside of the Rio Grande floodway. The channel is designed with a capacity of 1500 cfs to simultaneously carry deliveries for the EPCWID, Mexico and the PSB. The least expensive option, a channel starting below Caballo Reservoir and approaching the American Dam on the east side of the Rio Grande, was adopted as the alternative included in all three of the plan scenarios. This alignment consists of 107 miles of lined channel, including seven crossings under the Rio Grande in inverted siphons.

The construction costs of the required new water system facilities were estimated for each scenario at 1990 price levels. In addition to the construction costs of new facilities, the estimated capital expenditures include the cost of land for new reservoirs and Mesilla Bolson wells and the contract costs of leasing additional rights to Rio Grande Project surface water. The estimated capital expenditures also include the engineering and administrative costs of designing and constructing the new water system facilities.

The operating and maintenance (O&M) costs for the entire water system, including the existing facilities, were also estimated for each scenario at 1990 price levels. The estimated O&M costs include the costs of electric power for pumping, annual taxes for water rights acreage owned

and leased, payments for excess and return flow surface water purchased, and cost of surface water obtained under drought contingency contracts. The annual O&M costs do not include amortization of bonded indebtedness, interest and other debt service. Table 2 contains a summary of the estimated annual capital expenditures and O&M costs for each of the three scenarios. As shown in Table 2, the total 50-year costs of the three plans are all comparable in magnitude. However, as shown in Figure 2, the total estimated expenditures for the alternative plans vary considerably from year to year. The difference in total outlays is the greatest between Scenarios A and C over the first two decades of the next century.

## **SELECTION OF THE PREFERRED PLAN**

The preferred plan was selected from among the three alternative scenarios by ranking each of the plans using a numerical matrix rating system. The matrix consisted of the three plans and five factors selected to evaluate how well the management plans met the principal objectives without being impacted by constraints which would seriously impede the development of the plan. The five evaluation factors against which the three alternative plans were rated were as follows:

1. Elimination of the overdraft of the Hueco Bolson
2. Development of sustainable sources of water supply
3. Economic and financial feasibility
4. Incorporation of aggressive water conservation goals
5. Reliability of the water supply

All of the five evaluation factors were considered to be equal in importance and were therefore given the same weight. The plans were rated with respect to each factor on a scale of ten to one, with ten being excellent and one being poor.

Water quality was not considered independently as an evaluation factor since the impacts of differences in water quality are manifested in the costs to develop and operate the water supply sources. The ratings of the alternative scenarios with respect to economic and financial feasibility were based on the comparative costs to develop and operate the water supply components of the plans.

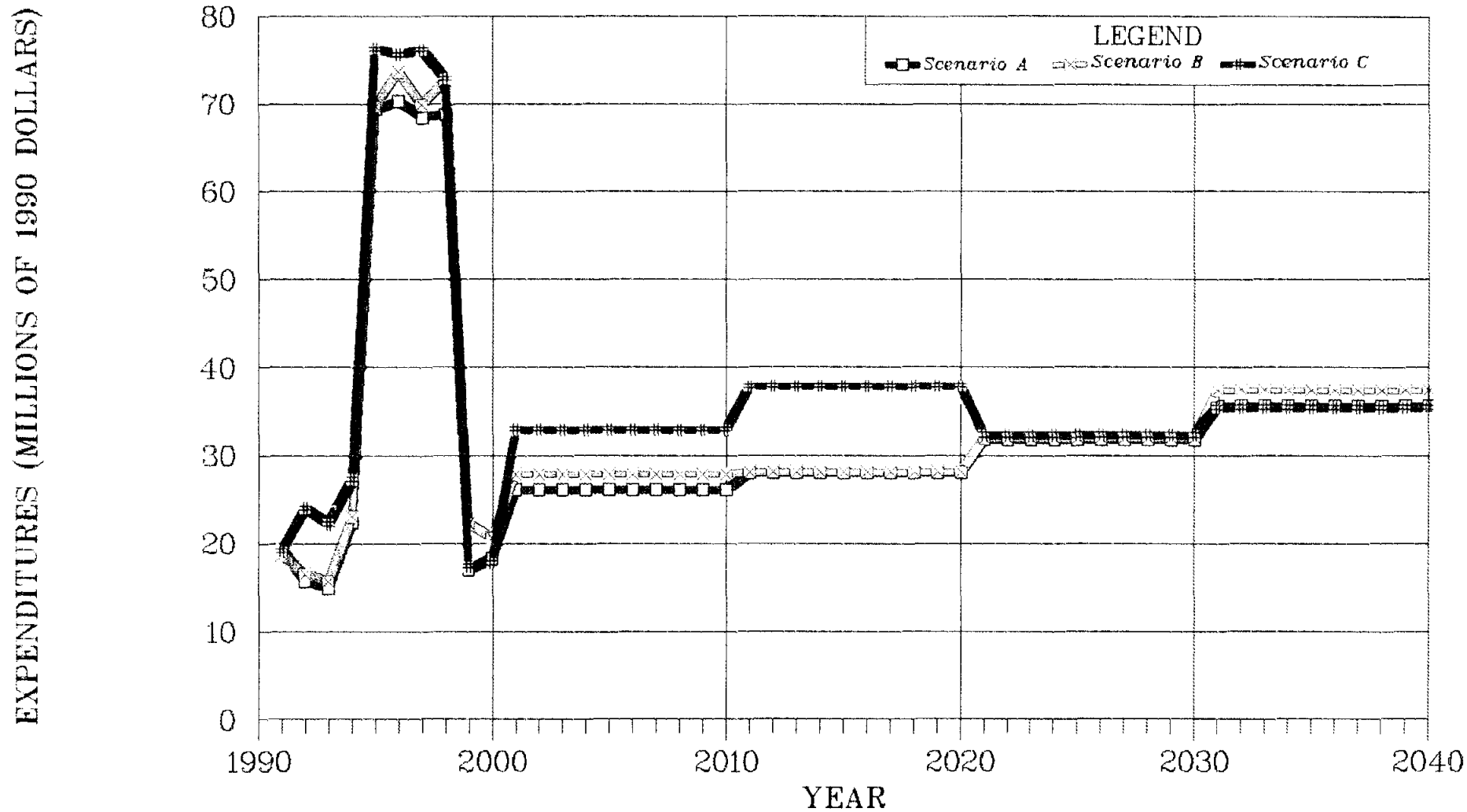
**TABLE 2**  
**SUMMARY OF CAPITAL EXPENDITURES AND OPERATIONAL COSTS**  
(Millions of 1990 Dollars)

<u>Year</u>	<u>Scenario A Costs</u>		<u>Scenario B Costs</u>		<u>Scenario C Costs</u>	
	<u>Capital</u>	<u>O&amp;M</u>	<u>Capital</u>	<u>O&amp;M</u>	<u>Capital</u>	<u>O&amp;M</u>
1991	12.48	6.95	11.38	7.28	11.60	7.55
1992	8.34	7.42	8.76	7.78	16.92	7.19
1993	7.44	7.56	7.90	7.86	15.16	7.14
1994	14.65	7.78	15.10	8.02	20.27	7.13
1995	58.52	10.86	58.97	10.74	66.24	10.11
1996	58.45	11.91	61.91	11.87	64.76	10.97
1997	56.36	12.15	57.72	12.25	59.26	17.01
1998	57.82	11.00	61.28	11.38	57.20	15.79
1999	9.76	7.30	13.22	9.07	4.52	12.99
2000	7.95	10.51	9.34	11.32	4.73	13.18
2001- 2010	57.86	204.34	59.54	220.25	70.80	259.88
2011- 2020	50.96	229.87	34.67	247.69	91.12	288.65
2021- 2030	35.11	283.25	37.05	283.54	10.59	313.76
2031- 2040	<u>26.19</u>	<u>330.82</u>	<u>26.67</u>	<u>347.75</u>	<u>7.15</u>	<u>348.04</u>
TOTALS	461.89	1,141.70	463.51	1,196.81	500.33	1,319.38
TOTAL 50-YEAR COSTS	1,604		1,660		1,820	

Note: Totals may not sum correctly due to rounding.

FIGURE 2

### COMPARATIVE COSTS OF ALTERNATIVE PLANS TOTAL ANNUAL CAPITAL AND OPERATING EXPENDITURES



Other factors considered in evaluating the alternative plans included: 1) degradation of water quality, 2) availability of cost-sharing grants, 3) public acceptance of the plan, 4) political, contractual, and statutory constraints in implementing the plan, and 5) potential environmental constraints on implementing the plan. The first two of these secondary factors were considered to be substantially equal in applicability to all three of the alternative scenarios and, therefore, would not result in any preferential distinction between the plans. The last three of the above secondary factors were judged to be much more subjective than the primary evaluation factors and it was concluded they would be difficult to evaluate without bias. However, after numerically rating the three plans, the last three secondary factors were considered in a sensitivity analysis of the results of the ranking. It was concluded that Scenarios A and B might have more political or contractual concerns than Scenario C, but such would probably be offset by greater public acceptance concerns and environmental constraints for Scenario C.

The sum of the ratings with respect to each of the five primary evaluation factors determined the relative rankings of the three plans. As shown in Table 3, Scenario A was ranked first and was accordingly selected as the preferred plan. The selection of Scenario A as the preferred Water Resource Management Plan for El Paso is qualified by the following conclusions:

- a. All three scenarios were formulated to provide the projected future municipal water demands over the 50-year planning period; therefore, the different natures and magnitudes of raw water sources combined in the final plans were not considered as a factor in the comparative evaluations of the composite plans.
- b. The predicted decline of the groundwater storage in the Hueco Bolson in Texas is the same for all three of the scenarios and they were accordingly rated the same with respect to reduction in reliance on the Hueco Bolson.
- c. All three alternative plans are comprised of a number of water supply components which are essentially modular. These components could easily be modified in both magnitude and timing, resulting in a large number of plan variations being possible.
- d. All three scenarios were numerically rated quite close. A change in any of the basic assumptions or data on which the plans were formulated could reverse their relative rankings. At the present, it is concluded that Scenario A is preferable to Scenarios B and C.

TABLE 3

**COMPARATIVE RATINGS OF ALTERNATIVE PLAN SCENARIOS**  
 (Rated on a scale of 10 = Best to 1 = Worst)

Alternative Plan	EVALUATION FACTORS					Total Rating	Rank
	Reduction in Reliance on Hueco Bolson	Maximizes Yield That is Sustainable	Comparative Cost To Develop and Operate	Meets Conservation Goals	Not Effected By Annual Variability In Supply		
SCENARIO A	10.0	6.2	10.0	10.0	5.2	41.4	1
SCENARIO B	10.0	5.2	8.9	7.2	6.2	37.5	3
SCENARIO C	10.0	7.3	5.7	10.0	5.5	38.5	2

- e. The selection of Scenario A as the preferred plan was based on evaluation of the alternative plans with respect to a number of appropriate factors. Selection of the preferred plan was not made solely on the basis of the least cost.

The selection of Scenario A as the recommended management plan was subsequently reviewed by both the MAC and the TAC, and Scenario A was adopted as the preferred management plan.



# BUDGETING FOR ADOPTED MANAGEMENT PLAN

## MAJOR ASSUMPTIONS

To assist the PSB in budgeting for and implementing the adopted Water Resources Management Plan, a capital expenditures and debt service plan and an implementation schedule were developed. The following conditions and assumptions were applied in developing the Capital Improvement Program:

- o The Capital Improvement Program was developed for the 10-year period 1992 through 2001 in terms of present (1990) dollars. Costs for future years were not escalated.
- o Outside funding through issuance of revenue bonds will be utilized for the capital expansion program. All bond issues were assumed to have the following characteristics:

Interest rate	-	6.5 percent
Term	-	20 years
Issuance Cost	-	1.0 percent
Type of Payment	-	Level Debt Service

- o The debt financing is directly related to the timing of the capital improvements.
- o The PSB will contribute 15 percent of the capital cost of the El Paso Conveyance Channel. It is expected the remaining 85 percent will be obtained from New Mexico and Federal sources.

## CAPITAL IMPROVEMENT PROGRAM

The detailed schedules comprising the proposed Capital Improvements Program are contained in Appendix B.

The total annual capital expenditures estimated to be required for the year 1992 through 2001 are summarized below. These capital expenditures consist of the estimated construction costs, including a 20 percent contingency allowance and an additional 20 percent for Engineering and Administration costs. These capital expenditures are as shown for plan Scenario A in Exhibit 6 of Appendix A except that the estimated cost of the El Paso Conveyance Channel has been reduced by 85 percent. A breakdown of the estimated capital expenditures by the principal improvement components of the Management Plan are shown in Table 9.1 in Appendix B.

<u>Year</u>	<u>Capital Expenditures</u>
1992	\$ 8,089,990
1993	\$ 6,420,690
1994	\$ 9,316,810
1995	\$ 14,175,876
1996	\$ 14,101,626
1997	\$ 15,474,206
1998	\$ 16,936,456
1997	\$ 15,474,206
1998	\$ 16,936,456
1999	\$ 9,762,890
2000	\$ 7,952,040
2001	\$ 5,785,750

It was assumed that revenue bonds would be issued annually from 1992 to 2001 to finance the capital requirements. The total annual bond issues, which include the net capital required plus the bond issuance costs, are shown in Table 9.2 in Appendix B.

Servicing the bonded debt would be by means of annual payments. Issuance of a new bond series each year will result in the annual debt service increasing annually throughout the budgeting period. In addition to the bond repayments, the annual debt service amount includes a deposit to the bond reserve fund. The annual reserve fund deposit consists of the aggregate of the amounts for each bond issue which will accumulate to one annual bond repayment within 61 months of issuance of the bonds.

The total annual debt service for years 1992 through 2001 is summarized below. A detailed schedule of the annual expenditures required is presented in Table 9.3 in Appendix B.

<u>Year</u>	<u>Total Debt Service</u>
1992	\$ 887,457
1993	\$ 1,591,797
1994	\$ 2,614,310
1995	\$ 3,998,789
1996	\$ 5,546,466
1997	\$ 7,244,748
1998	\$ 9,103,526
1999	\$ 10,175,045
2000	\$ 1,047,822
2001	\$ 1,685,759

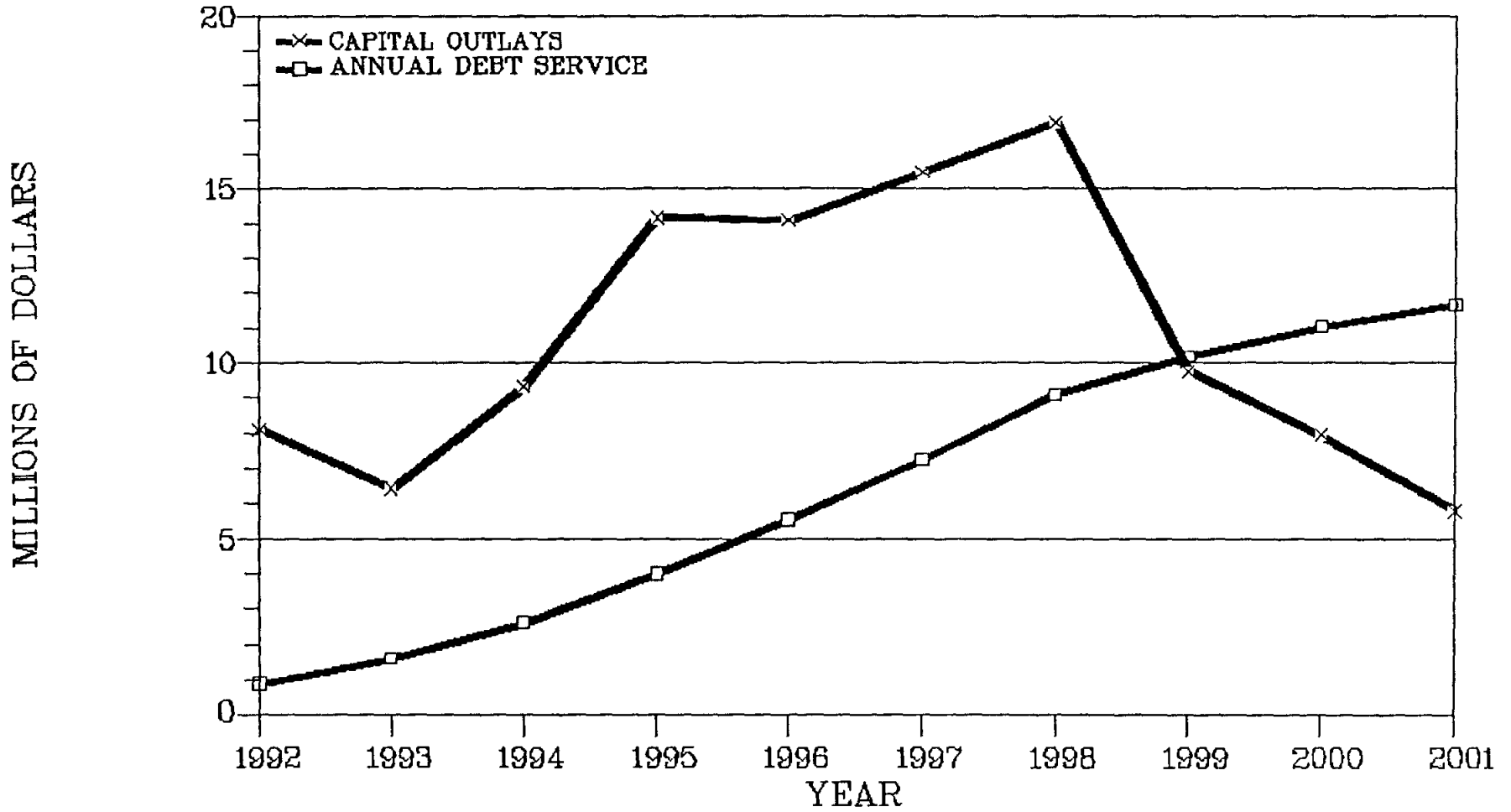
The proposed bond financing plan was formulated to accomplish two objectives: 1) defer the cash outlays by the PSB as much as possible, preferably until the management plan facilities come on line and increase the revenue base, and 2) smooth out the highly variable annual expenditures for construction of the capital improvements. Figure 3 shows graphically the comparison of the required capital outlays over the 10-year Capital Improvement Program, excluding the 85 percent of the cost of the El Paso Conveyance Channel expected to be paid for by New Mexico and the Federal government, and the proposed annual debt service payments by the PSB to finance the Water Resource Management Plan.

### **POSSIBLE FINANCIAL STRATEGIES**

The Capital Improvement Program is driven by the substantial capital outlays required for construction of management plan facilities during the initial 10-year period. Funding for these expenditures was assumed to be obtained through issuance of revenue bonds. The issuance of revenue bonds to fund all or part of these needs is a business decision the PSB must face each year as its long-term and annual capital programs are finalized. Servicing the bonded debt could be made through rate structure increases or by increasing the revenue base. Other methods of financing the required capital expenditures to supplement the bonding may be appropriate.

FIGURE 3

CAPITAL IMPROVEMENT PROGRAM, 1992 - 2001  
ANNUAL DEBT SERVICE VS. CAPITAL CONSTRUCTION OUTLAYS



The capital expenditures by the PSB for the El Paso Conveyance Canal were assumed to be 15 percent of the total capital costs for this facility. This percentage is arbitrary and could vary. Due to the proposed use of this facility by the EPCWID and Mexico in addition to the PSB, this facility should be eligible for Federal financial assistance. It is also expected that New Mexico will help finance this facility in accord with the terms of the Litigation Settlement Agreement (Appendix E).

Federal assistance might be possible either as a direct congressional appropriation, funding from the International Boundary and Water Commission (IBWC), or through the Department of Interior's Small Reclamation Projects program.

Alternative funding sources for the other capital project facilities might be state agencies such as the Texas Water Development Board which provides project loans from bond proceeds obtained from the sale of Texas Water Development Bonds. Loans might be available from the Texas Water Development Fund Water Supply Account, State Participation Account, the Economically Distressed Areas Program, the State Revolving Fund, and the Water Assistance Fund.

A single source of funding may not be sufficient to fund individual projects and a combination of sources might be required.

## **IMPLEMENTATION SCHEDULE**

A general schedule for implementing the planning, design and construction of the various capital project facilities is shown on Figure 9.1 in Appendix B.

## **PERMITTING REQUIREMENTS**

Permits will be required in connection with certain construction activities for the adopted Management Plan water facilities. Section 404 permits will be required where the conveyance canal crosses the Rio Grande and any designated wetlands. Construction of the regulating reservoir could also require a 404 permit because of possible on-site wetlands. Any new water wells will require permits from the Texas Water Well Drillers Board. Permits will also be required from the Texas Department of Transportation and the Southern Pacific Railway Company to cross their rights-of-way with pipe lines. In addition, all water supply facilities constructed will have to be in compliance with the requirements of the Federal Clean Water Act.

## **IMPLEMENTATION OF PLAN ELEMENTS**

The alternative management plan scenarios formulated in Phase II of the plan development were all predicated on start-up of the plan in 1991. Without delaying for final documentation and formal acceptance of the adopted management plan, the PSB initiated implementation of several elements of the recommended management plan scenario. These actions include:

- o Formal adoption and implementation of the proposed aggressive water conservation program.
- o Rescission of the PSB policy prohibiting extension of water and sewer services beyond the El Paso city limits and development of policies governing the providing of water and sewer services on a regional basis.
- o Undertaking a study to determine the feasibility of reclaiming and reusing treated wastewater for irrigation of large turf areas and industrial process water.

### **WATER CONSERVATION PROGRAM**

In July 1990, the PSB initiated implementation of an enhanced water conservation program by appointing a Citizens Water Conservation Committee. The mission of this committee was to develop recommendations to the PSB with respect to three aspects of the proposed water conservation program: 1) water saving plumbing fixtures; 2) water wasting; and 3) desert landscaping. The Water Conservation Committee was comprised of 38 citizens representing various interests and expertise as listed in Table 4. Douglas Rittman, Manager of Water Supply and Treatment for the PSB, served as Chairman of the Committee. Charles Reich, Boyle Engineering Project Manager, served as the Engineering Advisor to the Committee and provided liaison with the Water Resource Management Plan.

The Citizens Water Conservation Committee met eight times over a three month period from August 20, 1990 to November 19, 1990. The Committee's recommendations were formally submitted to the PSB at its regular board meeting on November 28, 1990 and were adopted. Appendix C contains a copy of the Citizens Water Conservation Committee recommendations adopted by the PSB along with two additions made by the PSB staff and the recommended schedule for implementation of the enhanced water conservation program.

TABLE 4

CITIZENS WATER CONSERVATION COMMITTEE

**Real Estate and Commercial**

Randy Huggins	El Paso Association of Builders
Mark Stanfield	Building Owners and Managers Association
Jerry Carlson	El Paso Apartment Association
Phyllis Goodrich	El Paso Board of Realtors

**Landscaping/Nurseries/Pest Control**

Adrienne Pannell	El Paso Association of Nurseyemen
Sallie Homan	Classic Landscape
Gary Starr	Greater El Paso Pest Control Association
Lewis Wright	American Association of Landscape Architects
"Tito" Garcia	American Association of Landscape Architects

**Technical Advisors**

John White	Texas A & M Extension Service
Dr. Howard Malstrom	Texas A & M Research Center
Dr. Stephen Riter	UTEP - Engineering
Wynn Anderson	UTEP - Administration
Tom Grimshaw	Texas Department of Health
Chuck Reich	Boyle Engineering Corporation
Doug Rittman	El Paso Water Utilities
Liz Blackmond	City Planning Department
Gilbert Puga	City Planning Department

**Civic Organizations, Government and At-Large**

Nancy Crowson	Keep El Paso Beautiful
Charles Page	El Paso Chamber of Commerce
Sylvia Thorsland	Upper Valley Neighborhood Association
Richard McCarthy	City Parks Department
Salvador Conchola	County Parks Department
Dr. Gary T. Ryan, M.D.	Citizens Environmental Advisory Committee
Benny Davis	Jobe Concrete
Leon Bean	Water Landscaping Wisely Association
Joan Duncan	Sierra Club

**Large Turf Irrigators**

Bruce Erhard	Coronado Country Club
Joe Mathis	Fort Bliss
John Whitaker	El Paso Independent School District
Dennis Hamilton	Ysleta Independent School District

**Aldermanic Representatives**

Bob Nickerson	Eastside District
Ricardo Diaz	Northeast District
Fred Ortiz	East/Central District
Victor M. Zepeda	Westside District
James A. Major	Lower Valley District
Nancy Heydemann	West/Central District
Moshe Azoulay	Mayor's Office

The Committee developed consensus positions of significance on two matters which are not evident in its recommendations:

- o Although the Committee was not charged with considering the role of water rates in the water conservation program, there was a strong consensus among the Committee members that an effective water rate structure should be implemented to encourage conservation while allowing the customers discretion as to how to use their water. It was the Committee's unanimous opinion that a properly designed water rate structure would be the most effective element of the proposed water conservation program.
- o The Committee had been asked to provide the PSB a public consensus on reducing future water demands by limiting population growth. After some initial debate, the Committee elected not to consider this issue and declined to make any recommendation to the PSB in this regard.

The PSB proceeded immediately with implementation of the enhanced water conservation program in accordance with the adopted recommendations and other elements as proposed in the Water Resource Management Plan. As of this date, the following water conservation program elements have been implemented:

1. A Water Conservation Manager was added to the PSB staff in January 1991.
2. A new Water Conservation Ordinance which includes mandatory restrictions on lawn watering and other non-essential water uses and prohibits practices which waste water was enacted by the El Paso City Council and went into effect April 1, 1991.
3. A revised water rates schedule structured to promote water conservation was put into effect April 1, 1991.
4. The City's Plumbing Code was amended by ordinance effective September 12, 1991 to require all new toilets and flush valves installed in El Paso to be the Ultra Low Flush (ULF) type and to require the use of low flow faucets and shower heads.
5. Also on September 12, 1991 the PSB initiated a rebate program for replacement of older installed toilets with the new ULF models.



Implementation of other aspects of the water conservation program proposed in the Water Resource Management Plan is continuing. A City Landscaping Ordinance designed to reduce water use for lawn and landscaping irrigation is presently under development.

## **EXTENSION OF WATER AND SEWER SERVICES BEYOND THE CITY LIMITS**

In Phase I of the plan development, it was predicted that the PSB would eventually become a regional municipal water supply utility for most of El Paso County. With this role in mind and because of increasing political and humanitarian pressures, the PSB on December 13, 1990 rescinded its 17-year old policy prohibiting the providing of new water and sewer services outside of the El Paso city limits. This policy change was adopted subject to five provisions as follows:

1. That the Public Service Board will seek City Council approval.
2. That the Public Service Board will not violate any of its bond covenants.
3. That expansion costs will not affect existing water and sewer rates inside the City.
4. That the Public Service Board does not violate any current contractual obligations with other organizations.
5. That the new policy is formed with guidance of leaders from the City and the County.

Following this policy change, the PSB developed specific policies and procedures for its guidance in reacting to the anticipated requests for service from water users located outside of the El Paso city limits. Pursuant to the 5th provision above, the PSB on April 24, 1991, appointed eight community leaders to a Steering Committee charged with guiding the development of the specific policies and procedures for extending water and sewer services beyond the city limits. Table 5 lists the members of the Steering Committee.

The Steering Committee met seven times during the three month period between May 16, 1991 and August 19, 1991 with Boyle engineers and PSB staff involved in developing the specific policies and procedures for extending services. The policies developed under the guidance of the Steering Committee were formally presented to the PSB at its regular board meeting on August 28, 1991 and were adopted. Appendix D contains a description of the development of

the policies and procedures for extending water and sewer services outside the El Paso city limits and the results of this effort, including the formal statement of the adopted policies.

## **WASTEWATER REUSE**

On August 22, 1991, the PSB initiated implementation of expanded reuse of treated wastewater as proposed in the Water Resource Management Plan by authorizing Boyle Engineering to proceed with a feasibility-level study of opportunities for reusing treated wastewater. This study is investigating the feasibility of reusing treated wastewater for irrigation of large areas of turf and highway landscaping and for process water use by existing industries. It is expected that feasible reuse projects will be included in the next PSB budget for implementation of the Water Resource Management Plan. This study commenced on September 12, 1991 and is currently under way.

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TABLE 5

STEERING COMMITTEE FOR DEVELOPMENT OF  
POLICIES AND PROCEDURES FOR EXTENSION OF  
WATER AND SEWER SERVICES OUTSIDE CITY LIMITS

---

**David R. Brosman, P.E., Chairman**  
Deputy General Manager, EPWU

**Hon. Alicia Chacon**  
County Judge El Paso County Commissioners Court

**Manny Cooper**  
Finance Manager, EPWU

**Dr. Laurence Nickey**  
Director, El Paso City-County Health District

**Justin Ormsby**  
Executive Director, Rio Grande Council of Governments

**Alan Rash, Esq.**  
Bond Attorney, Diamond, Rash, Leslie, Smith & Samaniego, P.C.

**Mary Carmen Saucedo**  
Trustee, El Paso Community Foundation

**Nestor Valencia**  
Vice-president for Planning, El Paso Community Foundation  
Formerly Director of El Paso Department of Planning, Research  
and Development

# SETTLEMENT OF LITIGATION WITH NEW MEXICO

## SETTLEMENT AGREEMENT

The long-standing litigation between the City of El Paso, by and through the PSB, and various New Mexico parties was initiated by El Paso on September 5, 1980. This action was in connection with the PSB's attempt to obtain permits for 266 wells in the Hueco and Mesilla Bolsons in New Mexico. This litigation continued on various fronts, in a number of courts, and with different parties, until March 16, 1991 when a negotiated settlement was agreed to by both sides. A copy of the Settlement Agreement is contained in Appendix E.

Certain of the terms of the Settlement Agreement relate to elements of the preferred Water Resource Management Plan, and may affect implementation of the plan. In the settlement, El Paso agreed that its priorities for meeting future water demands should be first--conservation, second--surface water, and third--groundwater. The agreement also provides that a number of additional studies be made of certain water sources and operations which are involved in the Water Resource Management Plan. The results of these further studies may also affect the implementation of some elements of the preferred plan.

## SETTLEMENT COMMISSION

One of the terms (No. 9) of the Settlement Agreement provides that a joint commission composed of an equal number of members from both sides be established. The purpose of the joint commission is to "...coordinate the work set forth in ... this Agreement, seek funds to support the studies and other work provided in this Agreement, and generally seek to promote coordination and cooperation among the parties with respect to their common water resources interests."

The El Paso members of the Joint Commission are:

**Mr. Edmund G. Archuleta**, General Manager of the PSB and Chairman of the MAC

**Mr. Edd Fifer**, General Manager of the EPCWID No. 1 and member of the MAC

**Mrs. Eliza Cushing**, Vice Chair of the PSB and member of the MAC

**Mr. Ted Houghton**, PSB Board Member

**Dr. Anthony Tarquin, Professor of Civil Engineering at UTEP and member of the TAC.**

The Joint Commission met for the first time on June 18, 1991.

TASK NO. 8  
FORMULATION OF ALTERNATIVE PLANS  
AND  
SELECTION OF PREFERRED PLAN

TECHNICAL MEMORANDUM

APPENDIX A

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# **EL PASO WATER RESOURCE MANAGEMENT PLAN**

## **TECHNICAL MEMORANDUM**

### **TASK NO. 8 - EVALUATION OF ALTERNATIVE PLANS AND SELECTION OF PREFERRED PLAN**

#### **1.0 INTRODUCTION**

This memorandum discusses the capital facilities required to implement the three alternative water supply plan scenarios, A, B and C, described in Task No. 7. To determine the comparative feasibility of the selected project plans, the following factors were considered:

- 1) Political, contractual and statutory constraints not previously identified.
- 2) Environmental constraints.
- 3) Cost of developing the sources of water supply.
- 4) Costs of constructing and operating the capital facilities.
- 5) Reliability of the water supply.
- 6) Relative security of the water supply from contamination.
- 7) Public acceptance.
- 8) Availability of Federal and State cost sharing.
- 9) Capability of the PSB and EPCWID No. 1 to finance capital facilities.

Based on projected future water demands, reconnaissance level capital expenditures and annual operating and maintenance costs for the facilities were developed utilizing 1990 price levels. Since the objective was to compare the relative overall cost of the three alternative plans, cost escalations over the 50-year planning period were not included in the comparative estimates.

Comparative evaluations of the alternate scenarios were developed utilizing a matrix of factors developed in consultation with the Management Advisory Committee (MAC) at a meeting on July 19, 1990. From this comparison, the recommended alternative plan was selected from the ranking produced by the numerical evaluation matrix.

On the basis of the evaluations described herein, our recommendation is that the El Paso Water Utilities Public Service Board, and the El Paso County Water Improvement District No. 1 should proceed with water resource management and development in accordance with Scenario A. However, it should be noted that the three scenarios are essentially modular inasmuch as each scenario is comprised of a number of water supply elements required to meet the total demand. The modular elements which comprise each of the scenarios, when taken together as a group could possibly be rearranged to form several other scenarios. Indeed, it is anticipated that as implementation proceeds throughout future years, management will find it useful to revisit the basic building blocks of water sources and use the modular elements in ways which are different than those scenarios presented. This aspect of water resource development will allow management to act and react within the context of the conditions, costs and environment existing at that time. We further recommend that periodic review and monitoring of the adopted development plan be performed in the event that changed conditions dictate that some of the plan elements are not achievable subject to legal, institutional, financial and other constraints.

## **2.0 FUTURE WATER DEMANDS**

### **2.1 Population Projections**

Population projections for the various components of the seven established planning areas were developed in Task No. 2. The results of these projections in ten year increments over the planning horizon are shown in Table 2.2 of the Phase I completion report. The projected water demands for each planning area in ten year increments is the same component presented in Table 2.5 of the Phase I Completion Report. The population projections by planning area for the City of El Paso and the total El Paso County are also included in Exhibit 1 to this memorandum.

For the purpose of developing capital facilities to supply the future demands, the Public Service Board service area population was also estimated and is shown in Exhibit 1. The PSB service area population was assumed to expand at a uniform rate to include the entire El Paso County by the year 2040. Graphic presentations of the population projections by Planning area and the totals for the City, County and PSB service area are shown in Figure 8.1.

### **2.2 Water Demands**

The water demand projections included in Table 2.5 of the Phase I Completion Report are based on historic usage and assumed the City of El Paso was not involved in an aggressive water conservation program. However, all three alternate water supply scenarios include water conservation as one component of the plan. Therefore, water demands with the conservation reduction were also developed for each decade for each scenario. The water demands used in this task utilizes projections based on the 1990 actual per capita use distribution. The usage rate attributed to each of the planning areas shows a relatively wide range in 1990 from 139 gpcd for the lower valley area to 232 gpcd in the northwest. The average for the entire service area population is 201 gpcd. Subjectively, the difference would appear rational in light of the comparative affluence of the planning areas. The methodology of projecting the conservation impact was based on the total service area conservation reduction attributable to the adopted conservation plan, a reduction of 201 gpcd to 160 gpcd by the year 2000. This represents a 20 percent reduction of usage. This reduction will not be uniform throughout the planning areas, since those areas with a present low per capita usage do not have the same elasticity as other areas because basic water needs comprise a higher percentage of usage. Indeed, the central area may experience increased water usage per capita because of ongoing industrialization. A

comparison of the 1990 usage vs. the projected usage in year 2000 is shown below. The projected gross PSB water demand and water demand with conservation by planning area for the three scenarios are presented in Exhibit 1 to this memorandum.

### Variation in Water Use Among Planning Areas

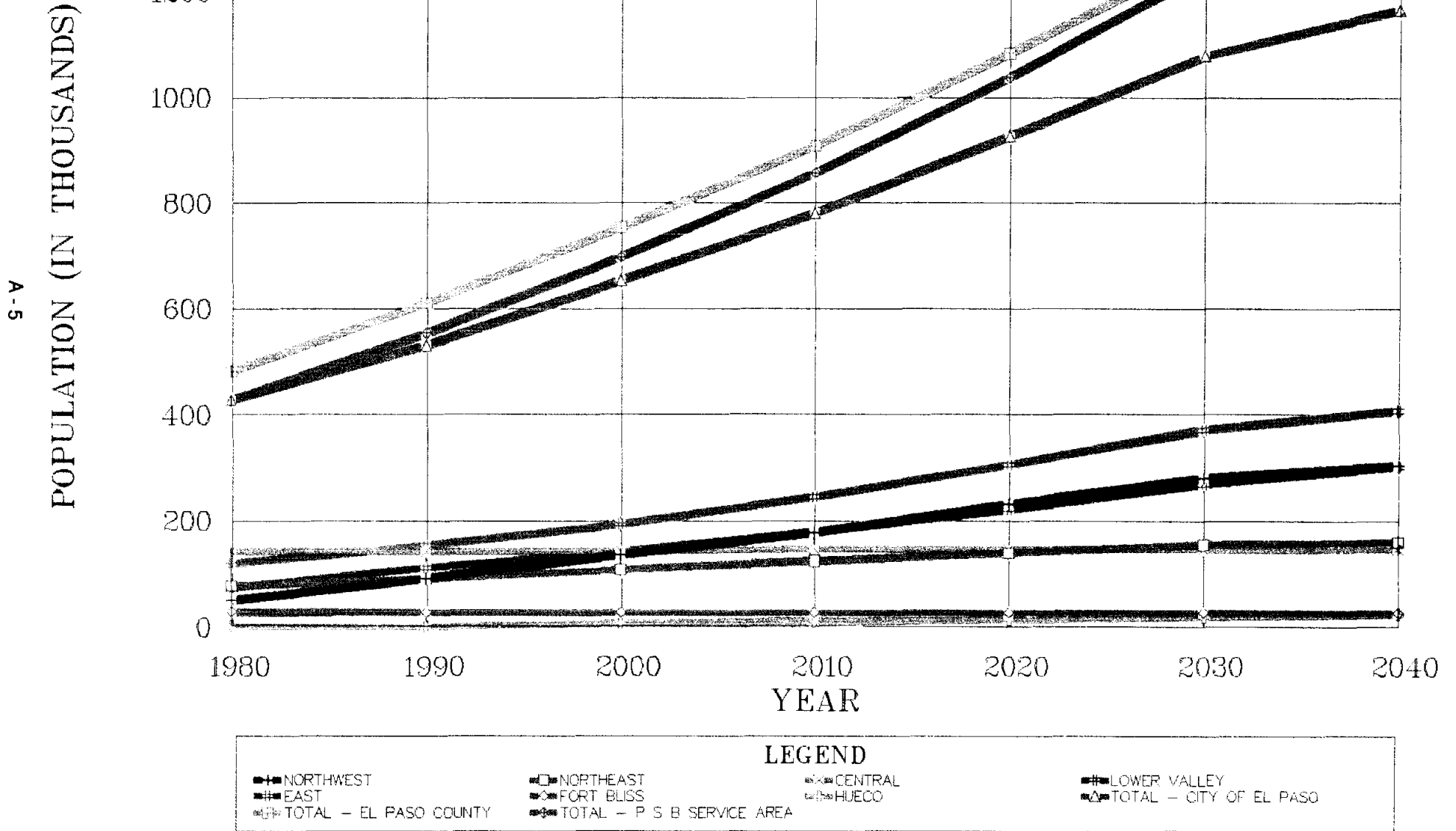
#### Average Consumption (gpcd)

<u>Planning Area</u>	<u>Present 1990</u>	<u>Scenarios A &amp; C 2000</u>	<u>Percent &lt;decrease&gt;</u>
Northwest	232	167	<28>
Northeast	226	165	<27>
Central	213	190	<11>
Lower Valley	139	136	<2>
East	211	145	<31>
Fort Bliss	250	179	<31> <sup>1</sup>
Hueco	354	228	<36> <sup>2</sup>

- 
- 1 Water usage is controlled by single agency.  
 2 Present population is so small that data on present usage is not reliable.

FIGURE 8.1

# POPULATION PROJECTIONS FOR PLANNING AREAS



### **3.0 FUTURE WATER SUPPLY FACILITIES**

#### **3.1 Matching Supply Sources to Demands**

The sources of both the surface and underground water supplies for the City of El Paso and El Paso County originate within different planning areas. In order to determine what capital improvement facilities are required to meet the water demand for each planning area, a water supply capability versus water demand for each area was established for each of the three scenarios. Supply facilities to provide water to planning areas where the supply source was less than the demand required were then identified. This resulted in a "water demand versus water supply balance" for the planning areas. The supply amounts required in acre-feet per year were then converted to cubic feet per second for utilization in designing the capital improvements needed.

In addition to supply facilities within the planning areas, one outside supply source was investigated. The Rio Grande water quality increasingly deteriorates below Caballo Reservoir, particularly during winter low-flow periods. To provide a more dependable and better quality supply to the El Paso area water treatment plants, a conveyance channel from Percha Diversion Dam (just below Caballo Dam) in New Mexico to the American Dam at El Paso is proposed. The gravity flow channel would be concrete lined for water conservation and hydraulic efficiency. Annual water allocations to the El Paso County Water Improvement District No. 1 and the Republic of Mexico will be made via the channel. In addition, upstream users such as the Elephant Butte Irrigation District could be included into the conveyance system. The reconnaissance level channel alignment along with concept design sections and costs are contained in Exhibit 9.

Based on the principal components of supply developed in Task No. 7, capital improvement facilities needed to supply the demands for each alternative scenario were developed for the years 1991 through 2000 and for each decade from year 2001 through 2040.

#### **3.2 Alternative Plan A Facilities**

Facilities required for this scenario to utilize the existing underground and surface supplies coupled with a conservation program are:

A. Groundwater Supply

1. Mesilla Bolson

- a. Construct 3 new wells per year from 1991 to 2000 (30).
- b. Construct 2 new wells per year from 2001 to 2007 (14).
- c. Construct 1 new well per year from 2008 to 2010 (3).
- d. Construct 2 new wells in the year 2011 (2).
- e. Construct 1 new well per year from 2012 to 2020 (9).
- f. Construct 3 new wells per year from 2021 to 2022 (6).
- g. Construct 2 new wells per year from 2023 to 2030 (16).
- h. Construct 2 new wells per year from 2031 to 2034 (8).
- i. Construct 1 well per year from 2035 to 2040 (6).
- j. Construct associated manifold collection, storage, chlorination, booster pump and transmission facilities.

B. Surface Water Supplies

- 1. Construct a concrete lined water conveyance channel from Percha Diversion Dam to the American Dam capable of carrying a maximum 1500 cfs for use 365 days a year at the Robertson - Umbenhauer and Jonathan Rogers Water Treatment Plants.
- 2. Water Treatment Plants
  - a. Increase existing 40 MGD Robertson - Umbenhauer water treatment plant operation beyond 213 days a year as required to treat the surface water available through 1997 and up to 365 days per year from 1998 through 2040.



b. 40 MG Jonathan Rogers water treatment plan on line by July 1992. Operate up to 213 days a year through 1997 and up to 365 days per year from 1998 through 2040.

c. Expand Jonathan Rogers water treatment plant to 60 MGD the full year around by the year 2020.

3. Construct a 3,000 AF earth embankment regulating reservoir with associated pumping and distribution lines in the vicinity of Rio Bosque Park to convey 750 cfs discharge to Riverside Canal and 62 cfs to the Jonathan Rogers water treatment plant.

C. Wastewater Reuse Facilities

1. Construct 6 cfs pipeline from Northeast wastewater treatment plant to Newman Power Plant.

2. Construct pipelines from wastewater plants to large turf areas to convey up to 11,500 AF by the year 2040 to potential users shown in Table 8.1.

3. Construct pipelines from wastewater treatment plants to industries to convey up to 6,900 AF per year by the year 2040 to potential users shown in Table 8.1.

D. Project Water Rights

1. Lease additional available lands with rights to Project water annually at a 60% rate of acquisition of the projected amount to become available as presented in Table 7.4 in Appendix E to the Phase II Completion Report.

2. Purchase long term drought contingency contracts for Project surface water in water-short years as presented in Table 7.4 in Appendix E to the Phase II Completion Report.

The new capital improvement facilities, including additional transmission and distribution system conduits and appurtenances, planned for years 1991 through 2000 and each decade thereafter are presented in Exhibit 2 to this memorandum.

**TABLE 8.1**

**WASTEWATER REUSE BY PLANNING AREA**  
(Usage in Acre-feet per Year)

Nature of Reuse and Customer	Planning Area	Year				
		2000	2010	2020	2030	2040
<b>TURF IRRIGATION</b>						
<b>Golf Courses:</b>						
Coronado CC	Northwest	0	500	500	500	500
Cielo Vista	East	450	450	450	450	450
Vista Hills	East	0	800	800	800	800
Underwood	Ft. Bliss	0	0	400	400	400
Horizon	East	0	400	400	400	400
Painted Dunes	East	350	350	350	350	350
<b>Ceneteries:</b>						
Evergreen	East	0	40	40	40	40
Restlawn	Northeast	100	100	100	100	100
Memory Gardens	Northwest	0	40	40	40	40
Desert View	East	40	40	40	40	40
Fort Bliss	Ft. Bliss	0	60	60	60	60
Concordia	Central	60	60	60	60	60
<b>Existing Parks:</b>	All	300	420	620	620	620
<b>New Parks &amp; Golf Courses:</b>	All	200	400	2,900	5,900	7,400
<b>Other Large Turf Areas:</b>						
Fort Bliss Parade G'nds	Ft. Bliss	0	50	50	50	50
El Paso Comm. College	Northeast	0	90	90	90	90
Chamizal Nat'l Park	Central	100	100	100	100	100
<b>INDUSTRIAL USE</b>						
Asarco	Northwest	0	200	500	1,000	1,000
El Paso Refining Phelps Dodge	Central	100	300	500	500	500
Chevron Refining Newman Power Plant	Northeast	4,000	4,000	4,000	4,000	4,000
New Industries	L.Valley	0	0	0	400	1,400
<b>CURRENT USES</b>						
Ascarate Park	Central	1,000	1,000	1,000	1,000	1,000
Reinjection into Hueco Bolson	Northeast	<u>5,800</u>	<u>7,200</u>	<u>7,200</u>	<u>7,200</u>	<u>7,200</u>
<b>TOTAL PROJECTED REUSE</b>		12,500	16,600	20,200	24,100	26,600

### 3.3 Alternative Plan B Facilities

Capital facilities required for this scenario to utilize the existing underground and surface supplies coupled with a less aggressive conservation program and reduced acquisition of rights to Project water are:

#### A. Groundwater Supply

##### 1. Mesilla Bolson

- a. Construct 3 new wells per year from 1991 to 1995 (15)
- b. Construct 4 new wells per year from 1996 to 2000 (20).
- c. Construct 2 new wells per year from 2001 to 2008 (16).
- d. Construct 1 new wells per year from 2009 to 2010 (2).
- e. Construct 3 new wells per year from 2011 to 2012 (6).
- f. Construct 2 new wells per year from 2013 to 2020 (16).
- g. Construct 3 new wells per year from 2021 to 2022 (6).
- h. Construct 2 new wells per year from 2023 to 2030 (16).
- i. Construct 2 new wells per year from 2031 to 2036 (12).
- j. Construct 1 new well per year from 2037 to 2040 (4).
- k. Construct associated manifold collection, storage, chlorination, booster pumps and transmission facilities.

#### B. Surface Water Supplies

1. Construct a concrete lined water conveyance channel from Percha Dam to the American Dam capable of carrying a maximum 1500 cfs for use 365 days a year in the Robertson - Umbenhauer and Jonathan Rogers Water Treatment Plants.

2. Water Treatment Plants

- a. Operate existing 40 MGD Robertson - Umbenhauer water treatment plant beyond 213 days a year as required to treat the surface water available through 1997 and up to 365 days a year from 1998 through 2040.
  - b. 40 MGD Jonathan Rogers water treatment plant on line by July 1992. Operate up to 213 days a year through 1997 and up to 365 days a year from 1998 through 2040.
3. Construct a 3,000 AF earth embankment regulating reservoir with associated pumping and distribution lines in the vicinity of Rio Bosque Park to convey 750 cfs discharge to Riverside Canal and 62 cfs to the Jonathan Rogers water treatment plant.

C. Wastewater Reuse Facilities

1. Construct 6 cfs pipeline from Northeast (Fred Hervey) wastewater treatment plant to Newman Power Plant.
2. Construct pipelines from wastewater plants to convey up to 11,500 AF by the year 2040 to potential users shown in Table 8.1.
3. Construct pipelines from wastewater treatment plants to industries to convey up to 6,900 AF per year by the year 2040 to potential users shown in Table 8.1.

D. Project Water Rights

1. Lease additional available lands with rights to Project water annually at a 45% rate of acquisition of the projected amount to become available as presented in Table 7.4 in Appendix E to the Phase II Completion Report.
2. Purchase long term drought contingency contracts for Project surface water in water short years as presented in Table 7.4 in Appendix E to the Phase II Completion Report.

The new capital facilities, including additional transmission and distribution conduits and appurtenances, planned for the years 1991 through 2000 and each decade thereafter are presented in Exhibit 3 to this memorandum.

### **3.4 Alternative Plan C Facilities**

Facilities required for this scenario to utilize the existing underground and surface supplies coupled with an aggressive conservation program are:

#### **A. Groundwater Supply**

##### **1. Mesilla Bolson**

- a. Construct 1 new well per year from 1991 to 2000 (10).
- b. Construct 1 new well per year from 2001 to 2010 (10).
- c. Construct 1 new well per year from 2011 to 2014 (4).
- d. Construct associated manifold collection, storage chlorination, booster pumps and transmission facilities.

#### **B. Surface Water Supplies**

1. Construct a concrete lined water conveyance channel from Percha Diversion Dam to the American Dam capable of carrying approximately 1500 cfs for use 365 days a year in the Robertson - Umbenhauer and Jonathan Rogers Water Treatment Plants.

##### **2. Water Treatment Plants**

- a. Operate existing 40 MGD Robertson - Umbenhauer water treatment plant up to 213 days per year through 1997 and up to 365 days per year from 1998 through 2040.
- b. 40 MGD Jonathan Rogers water treatment plant on line by July 1992. Operate up to 213 days per year through 1997 and up to 365 days per year from 1998 through 2040.

- c. Expand Jonathan Rogers water treatment plant to 60 MGD the full year around by the year 2016.
3. Construct a 3000 AF earth embankment regulating reservoir with associated pumping and distribution lines in the vicinity of Rio Bosque Park to convey 750 cfs discharge to Riverside Canal and 62 cfs to the Jonathan Rogers wastewater treatment plant.

C. Wastewater Reuse Facilities

1. Construct 6 cfs pipeline from Northeast (Fred Harvey) wastewater treatment plant to Newman Power Plant.
2. Construct pipelines from wastewater plants to large turf areas to convey up to 11,500 AF per year of treated wastewater by 2040 to potential users shown in Table 8.1.
3. Construct pipelines from wastewater treatment plants to industries to convey up to 6,900 AF per year by the year 2040 to potential users shown in Table 8.1.
4. Construct surface water conveyance and recharge facility consisting of:
  - a. New diversion dam and intake on the Rio Grande just south of New Mexico state line.
  - b. New intake, pumping station and conduit from diversion dam through Anthony Gap to Hueco Bolson recharge facility. Capacity to be 100 cfs with minimum supply of 4,700 AF per month.
  - c. Two parallel sets of sedimentation basins, infiltration basins and associated conduits and channels.
5. Construct additional wastewater reclamation and re-injection facility consisting of:
  - a. New 20 MGD reclamation and treatment plant near the Roberto R. Bustamante wastewater treatment plant on line by the year 2005.

- b. 16 new injection wells in the Hueco Bolson.
- c. Expand reclamation plant to 40 MGD by the year 2015.
- d. 16 additional injection wells in the Hueco Bolson.
- e. Pumping facilities and transmission lines from Roberto R. Bustamante wastewater treatment plant to reclamation plant and to injection wells.

D. Project Water Rights

1. Lease additional available lands with rights to Project water annually at a 60% rate of acquisition of the projected amount to become available as presented in Table 7.4 in Appendix E to the Phase II Completion Report.
2. Purchase long term drought contingency contracts for Project surface water in water short years as presented in Table 7.4 in Appendix E to the Phase II Completion Report.

The new capital facilities, including additional transmission and distribution system conduits and appurtenances, planned for the years 1991 through 2000 and each decade thereafter are presented in Exhibit 4 to this memorandum.

## 4.0 COMPARATIVE COSTS OF ALTERNATIVE PLANS

### 4.1 Basis of Cost Estimates

Estimated construction and operating costs for the new capital improvement facilities are based on 1990 price levels. No escalation factors are included throughout the planning horizon due to the uncertainties involved in escalating future capital, operation, and maintenance costs for up to 50 years. Also, since the costs are developed for comparative purposes only, the same escalation factors would have to be applied to all alternates to be meaningful. An annual escalation of 5 percent would result in comparative costs about 12 times the present cost by the year 2040. Such values, i.e. \$5,700,000 for one well and \$1.00 per kwh for power appear unrealistic in present terms.

For comparison of the alternative plans, conceptual layouts of facilities and cost estimates were prepared. Costs and designs were developed to a reconnaissance level of accuracy. Costs were developed utilizing data furnished by the PSB, construction bids on similar facilities in the El Paso area, costs developed in engineering reports prepared for the PSB, and construction cost data reported in national engineering publications.

### 4.2 Capital Construction Cost of Additional Facilities

Utilizing the cost data mentioned above, unit 1990 construction costs for the various components of the additional facilities were developed. A summary of unit costs developed for new water system facilities other than the conveyance canal is given in Exhibit 5 of this memorandum. The unit costs developed for the conveyance canal are contained in Exhibit 9 to this memorandum. All developed construction costs include a 20 percent contingency and 20 percent for engineering and administration. It was assumed that the transmission facilities would be constructed on existing or future public rights-of-way.

Capital costs for construction of the additional facilities, land acquisition and leases of project water rights were scheduled by year from 1991 through 2000 and every decade thereafter through 2040. The capital construction costs for alternate Scenarios A, B and C are presented in Exhibits 6, 7 and 8 of this memorandum. The annual and decade values of capital cost consist of the construction outlays for the facilities during the period only. Amortization, interest expense and other debt service costs are not included.



### **4.3 Project Surface Water Acquisition Costs**

The acquisition costs of Rio Grande Project surface water consists of several components. The leasing by the PSB of additional rights to Project water is included as a onetime capital cost of \$500 per acre for a 75-year lease of the Project water allocated to those lands. The annual tax assessment of \$30 per acre for all of the Project water rights lands owned and leased is included in the annual O & M costs. The first two acre-feet of Project surface water obtained for the water rights lands owned and leased is included in the annual tax assessment and no additional charge is included for this water. However, if the annual allocation in a water short year is less than two acre-feet per acre the full tax assessment of \$30 per acre is still paid. In years when the Project water allocation is above two acre-feet per acre the additional Project water received over and above two acre-feet per acre is paid for as an O & M cost at the rate of \$15 per acre-foot.

Excess Project water obtained during the irrigating season and return flow water obtained during the non-irrigation season are both charged for at the rate of \$15 per acre-foot and included in the O & M costs. Water purchased under drought contingency contracts in years when the annual Project water allocation is less than 1.5 acre-feet per acre is priced at \$150 per acre-foot and included in the O & M costs for that year.

### **4.4 Operating and Maintenance Costs for Additional Facilities**

The annual costs of operating and maintaining the additional facilities includes electric power, major equipment replacement, operating personnel, materials and supplies, and the annual payment to the EPCWID No. 1 for Project water as discussed above. Where possible, the operating costs were based on experience data furnished by the PSB for existing similar facilities, or contained in relevant engineering reports. In other cases, the operating costs were estimated as a conventional percentage of the facility construction cost.

The annual capital expenditures and power and other O & M costs for the additional capital facilities, leased water rights and drought contingency contracts are scheduled by years from 1991 through 2000 and every decade thereafter through 2040. These annual costs for the alternative plan scenarios A, B and C are presented in Exhibits 6, 7 and 8, respectively.

## 5.0 ECONOMIC ANALYSES

### 5.1 Financing Strategies

Generally speaking, municipal water supply utilities in the State of Texas are based on an enterprise fund concept. Capital, operations, and administration are funded by revenues generated by the sale of the water. On the other hand, agricultural water supplies, such as those managed by EPCWID No. 1, are funded by a combination of user fees with some subsidies in the form of operation and maintenance of supply reservoirs and the Rio Grande waterway. The alternative plans which are evaluated herein focus on the purpose of supplying municipal and industrial water demands in El Paso County while at the same time protecting and enhancing the agricultural water supplies.

Currently the PSB is completing a review of the Cost of Service for the utility. The rate structure under study will provide that current revenues are adequate to fund the operations of the utility, fund the development of existing and new water sources, and provide revenues to support a capital improvement program.

The capital improvement programs identified for each of the alternative plans show there are substantial construction capital needs for the full 50 year period to meet the growth of water demand. There will be a concomitant growth in the customer base and water sales to match the facilities expansion.

The precise strategy of whether to fund capital needs with debt or with current revenues, or a combination of both, is a business decision which the Public Service Board will face each year as the long-term and yearly capital program is finalized. It is obvious that the cost of capital is less when funded with current revenues. However, the rate of increase of water rates to match the program may indicate the need for debt-funded projects.

The State Revolving Fund (SRF) should be utilized to the maximum extent possible for all debt-funded capital costs. Cost sharing federal grants from the Environmental Protection Agency (EPA) and Housing and Urban Development Agency (H.U.D.) should also be utilized where authorized.

## 5.2 Comparative Total Costs of Alternative Plans

The comparative total cost, including both capital expenditures and operating costs for the three alternative scenarios are shown in Table 8.2. Cost analyses were performed on the basis of 1990 dollars for both capital and O & M costs. As previously discussed, the total comparative costs are indicated in 1990 dollars without considering the effect of inflation over the 50-year planning period and do not include debt service.

Figure 8.2 provides a graphic comparison of the levels of expenditures for construction and operation of the three alternative scenarios. Figures 8.3 and 8.4 show similar comparisons for the annual capital outlays and operating costs, respectively.

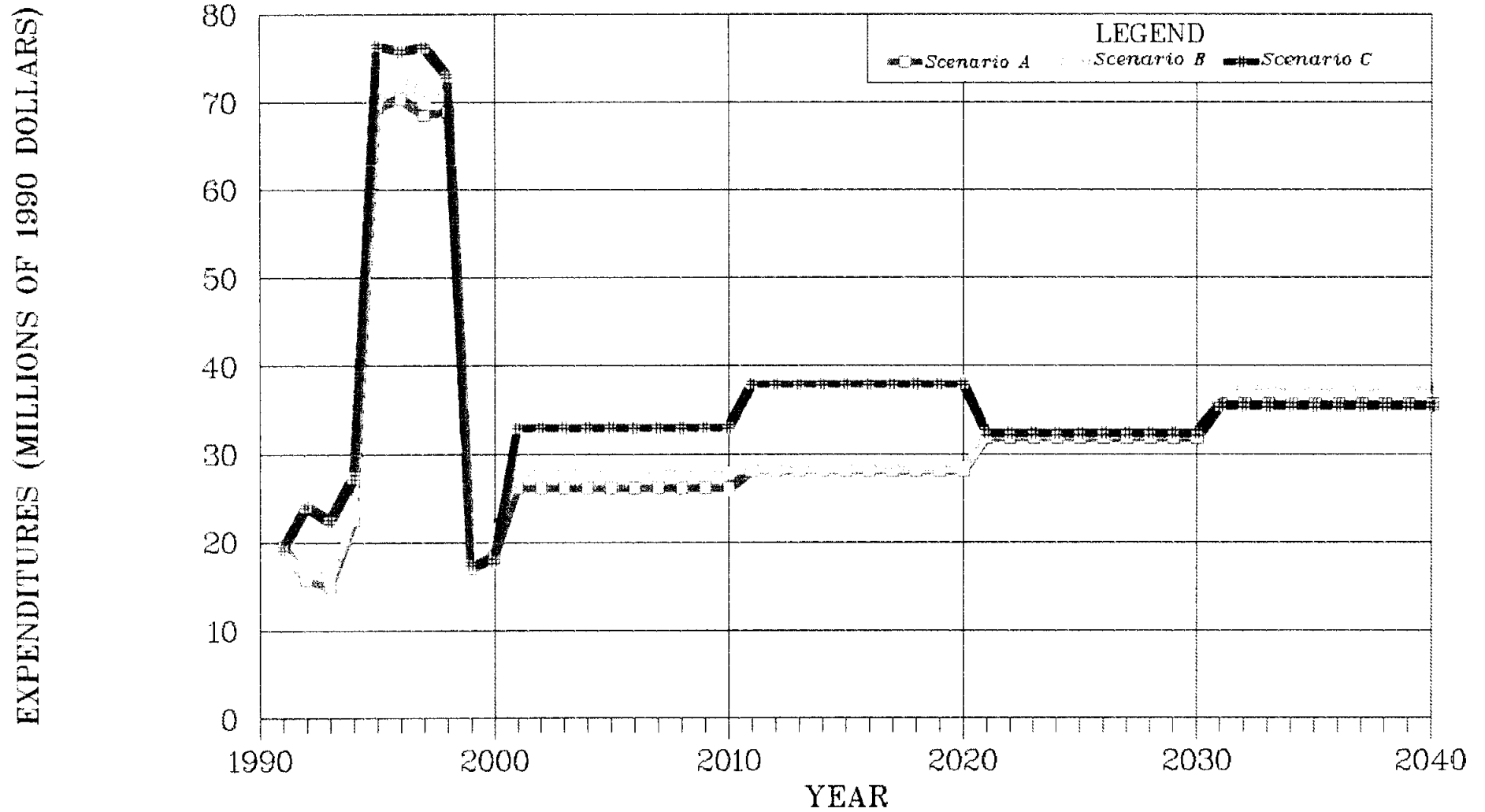
**TABLE 8.2**

**SUMMARY OF CAPITAL EXPENDITURES AND OPERATIONAL COSTS  
(1990 Dollars)**

YEAR	SCENARIO A		SCENARIO B		SCENARIO C	
	CAPITAL	O & M	CAPITAL	O & M	CAPITAL	O & M
1991	12,480,464	6,946,405	11,375,654	7,283,407	11,598,314	7,551,621
1992	8,344,990	7,419,711	8,755,330	7,778,542	16,919,640	7,190,627
1993	7,440,690	7,562,777	7,895,830	7,859,564	15,160,140	7,137,013
1994	14,647,840	7,776,512	15,101,380	8,016,699	20,265,690	7,125,304
1995	58,520,860	10,863,844	58,974,400	10,740,259	66,238,710	10,111,015
1996	58,446,610	11,908,378	61,907,750	11,871,285	64,764,460	10,965,849
1997	56,358,160	12,148,921	57,719,300	12,254,623	59,264,460	17,013,093
1998	57,820,410	10,999,704	61,281,550	11,384,866	57,198,210	15,791,102
1999	9,762,890	7,296,402	13,224,030	9,069,433	4,523,890	12,988,389
2000	7,952,040	10,512,480	9,343,180	11,323,632	4,733,890	13,181,875
2001 -						
2010	57,857,500	204,335,821	59,544,500	220,248,501	70,801,000	259,875,030
2011 -						
2020	50,957,000	229,867,944	34,665,200	247,694,094	91,116,400	288,645,230
2021 -						
2030	35,107,310	283,246,801	37,046,000	283,535,440	10,590,000	313,761,710
2031 -						
2040	26,191,700	330,816,423	26,673,600	347,751,145	7,151,000	348,037,290
<b>TOTAL</b>	<b>461,888,464</b>	<b>1,141,702,123</b>	<b>463,507,704</b>	<b>1,196,811,487</b>	<b>500,325,804</b>	<b>1,319,375,148</b>

<b>50 YEAR (Rounded)</b>	<b>1,604,000,000</b>	<b>1,660,000,000</b>	<b>1,820,000,000</b>
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FIGURE 8.2  
COMPARATIVE COSTS OF ALTERNATIVE PLANS  
TOTAL ANNUAL CAPITAL AND OPERATING EXPENDITURES



EXPENDITURES (MILLIONS OF 1990 DOLLARS)

FIGURE 8.3  
COMPARATIVE COSTS OF ALTERNATIVE PLANS  
ANNUAL CAPITAL OUTLAYS

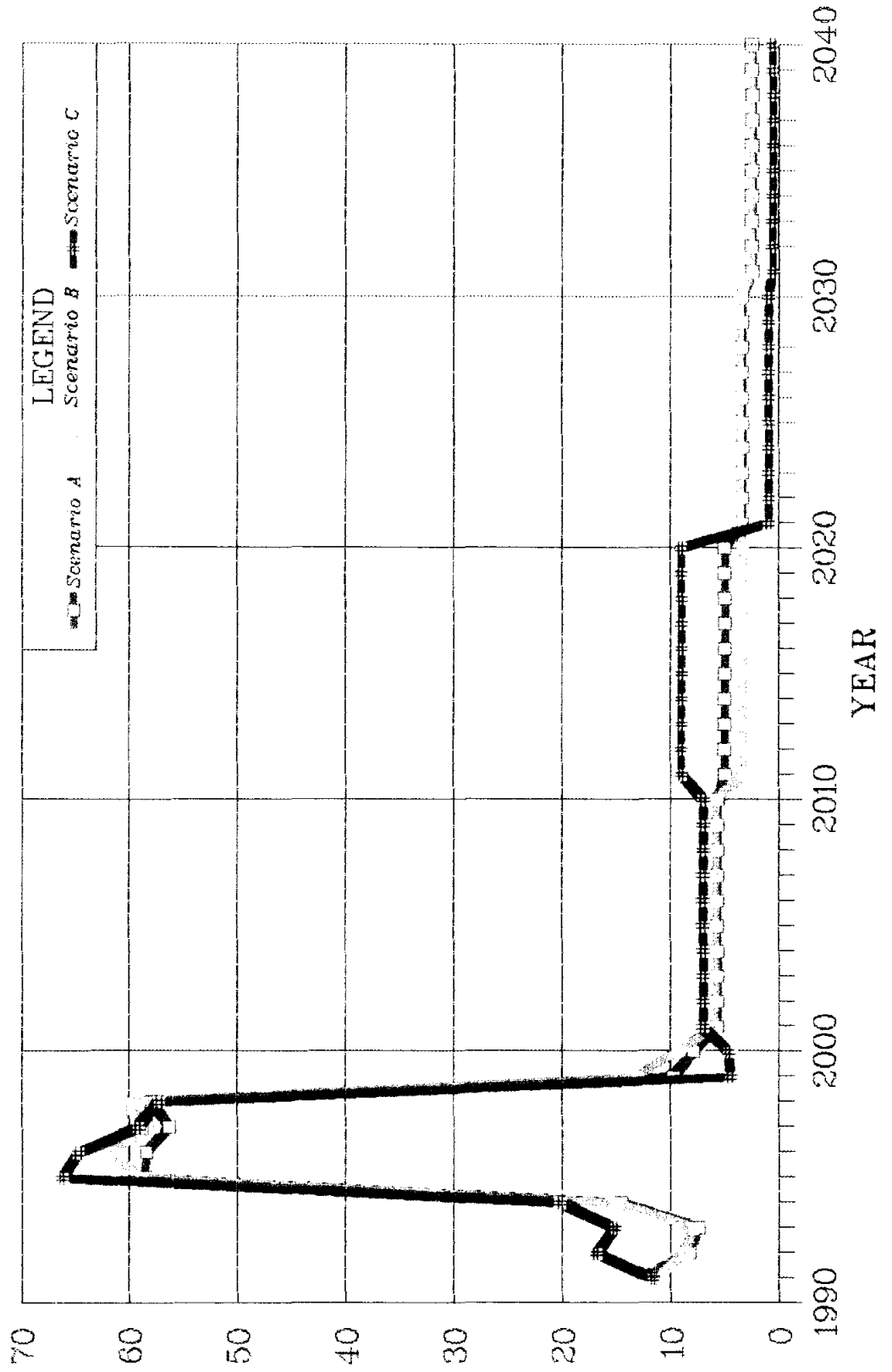
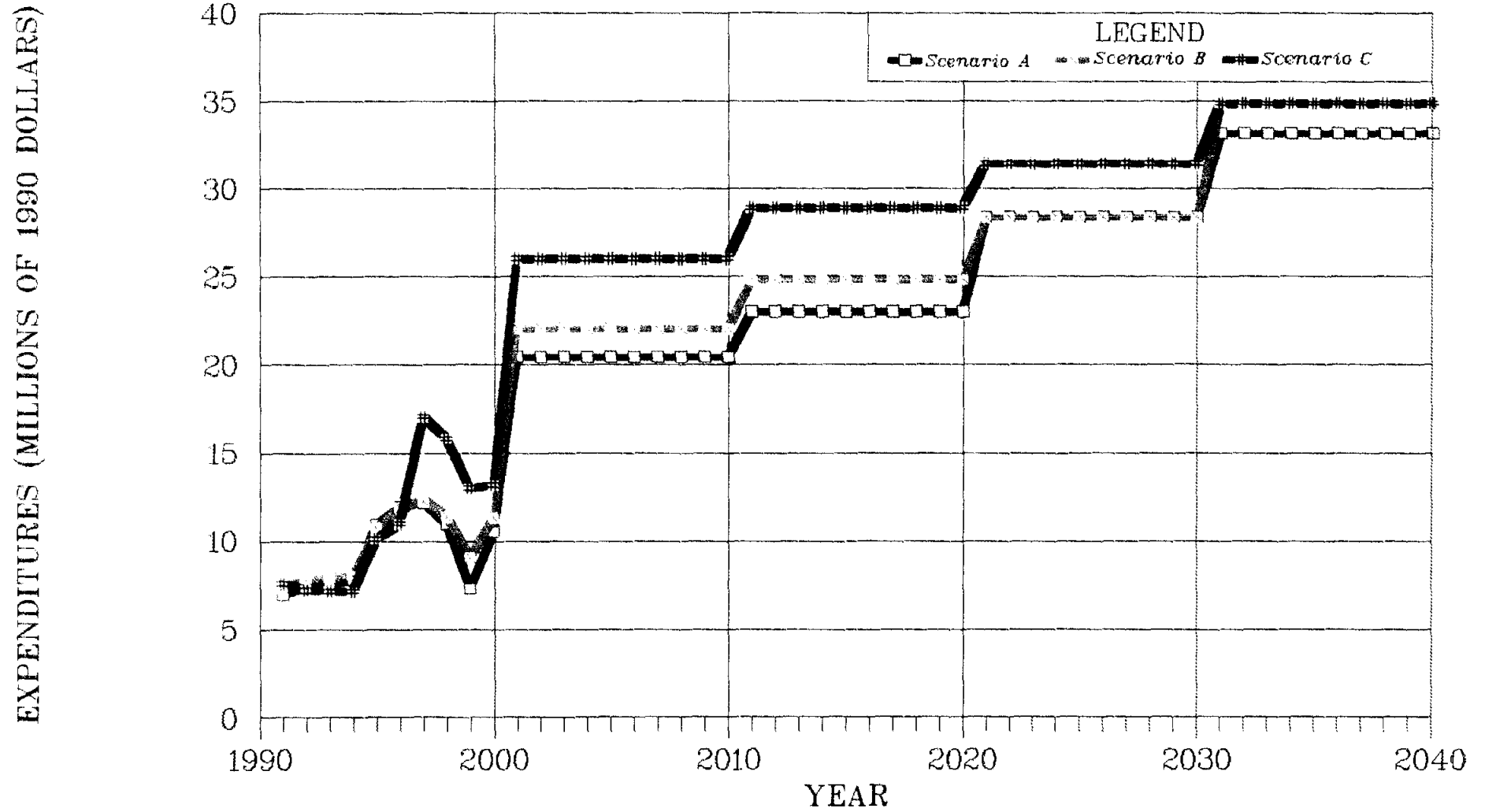


FIGURE 8.4  
COMPARATIVE COSTS OF ALTERNATIVE PLANS  
ANNUAL OPERATING AND MAINTENANCE COSTS



## 6.0 COMPARATIVE EVALUATION OF ALTERNATIVE PLANS

### 6.1 The Evaluation Process

A numerical rating system for comparative evaluation of the three alternative future water supply scenarios was developed in consultation with the MAC. The purpose of the numerical rating system was to provide a methodology for objectively comparing the three potential plans which consist of different combinations and magnitudes of water supply elements. It is often difficult to decide which combination of dissimilar elements best meets the overall goal which is also comprised of a number of different objectives. This is especially true when, as in this case, least cost is not the principal or only objective. In the evaluation of the alternative water resource management plans, the cheapest alternative was not the basis for selection as the recommended plan.

### 6.2 Evaluation Factors

A number of desired objectives were identified during the initial stages of plan development. At the same time it was recognized there could be different types of impediments and degrees of constraints imposed on implementation of the alternative plans.

The objectives and potential constraints initially considered as evaluation factors consisted of the following:

- 1) Elimination of the overdraft on the Hueco Bolson
- 2) Development of sustainable sources of water supply
- 3) Economic and financial feasibility
- 4) Incorporates aggressive water conservation goals.
- 5) Reliability of the water supply
- 6) Degradation of water quality
- 7) Availability of cost-sharing grants
- 8) Safety of the water supply from contamination



- 9) Public acceptance
- 10) Environmental, political, contractual, and statutory constraints

The applicability and relative importance of the initial evaluation factors listed above were discussed extensively with both Advisory Committees. The methodology for evaluating the alternative plans was structured in consultation with the MAC. The evaluation of the alternative plans and selection of the preferred plan was performed in a two-stage process as follows:

### **6.2.1 Numerical Rating**

First, the three alternative plans were rated numerically with respect to the first five evaluation factors listed above. The evaluation factors were selected on the basis of the following considerations:

- a. Factors 1) through 5) in the above list can be objectively rated by physical or quantitative parameters.
- b. Factors 1) through 5) in the above list were concluded to be more or less equal in importance and, therefore, were given equal weight.
- c. Water quality was not considered independently as an evaluation factor since the impacts of differences in water quality are manifested in the costs to develop and operate the water supply sources.
- d. The ratings of the alternative scenarios with respect to economic and financial feasibility are based on the comparative costs to develop and operate the water supply components of the plans.
- e. Factors 6) and 7) in the above list were concluded to have substantially equal applicability to the alternative plans and were dropped from the evaluation process.
- f. The last three factors in the above list were concluded to be too subjective in their applicability to the alternative plans, and it was difficult to obtain a clear distinction between the alternative plans for these factors. Accordingly, these subjective factors were not used in the first-

stage numerical rating, but rather were considered in the sensitivity analysis of the numerical rating results.

The alternative plans were rated with respect to each of the five evaluation factors on a scale of 10 to 1, with 10 being the best and 1 being the worst. The scores for the five evaluation factors were summed to obtain the total composite rating for each scenario.

The three alternative plans were then ranked in order of their total ratings. The numerical ratings and ranking of the three alternative scenarios is shown in a matrix format in Table 8.3.

### **6.2.2 Sensitivity Analysis**

Second, the three alternative plans were reviewed with respect to evaluation factors 8) through 10) in the above list to assess whether any perceived differences in these subjective factors might offset the total ratings and reverse the relative rankings. It was concluded there is no clear distinction with respect to the subjective factors which would alter the results indicated in Table 8.3. While Scenarios A and B would probably have more political or contractual constraints than Scenario C, this would be offset by Scenario C likely having greater public acceptance concerns and environmental constraints. The relative safety of the alternative plans from contamination of the overall water supply is even more argumentative.

## **6.3 Recommended Plan**

Based on the comparative evaluations of the three alternative plans described above, it is recommended that Scenario A be adopted as the basic Water Resource Management Plan for El Paso. In adopting Scenario A as the preferred plan, the following observations should be recognized:

- 1) All three alternative plans are comprised of a number of water supply source components which are essentially modular. These source components could easily be modified in both magnitude and timing, resulting in a large number of plan variations being possible.

TABLE 8.3

**COMPARATIVE RATINGS OF ALTERNATIVE PLAN SCENARIOS**  
 (Rated on a scale of 10 = Best to 1 = Worst)

Alternative Plan	EVALUATION FACTORS					Total Rating	Rank
	Reduction in Reliance on Hueco Bolson	Maximizes Yield That is Sustainable	Comparative Cost To Develop and Operate	Meets Conservation Goals	Not Effected By Annual Variability In Supply		
SCENARIO A	10.0	6.2	10.0	10.0	5.2	41.4	1
SCENARIO B	10.0	5.2	8.9	7.2	6.2	37.5	3
SCENARIO C	10.0	7.3	5.7	10.0	5.5	38.5	2

- 2) All three scenarios were numerically rated quite close. A change in any of the basic assumptions or data on which the plans were formulated could reverse their relative rankings.
  
- 3) Selection of Scenario A as the preferred plan was not made solely on the basis of the least cost, but was based on a systematic comparison of the three alternative plans for each of five evaluation factors.

**EXHIBIT 1**

**PROJECTED WATER DEMANDS BY PLANNING AREA**

PROJECTED WATER DEMANDS BY PLANNING AREA

Planning Area		Year 1990	2000	2010	2020	2030	2040
NORTHWEST	City Population	71,936	110,192	145,000	195,769	240,698	260,573
	County Population	90,111	135,031	176,800	231,371	280,907	304,634
	PSB Service Area Pop.	71,936	117,892	163,126	219,622	273,669	304,634
	Historical Usage (gpcd)	232	228	226	226	226	225
	Usage w/Conservation						
	Scenario A & C (gpcd)	232	167	168	171	173	176
	Scenario B (gpcd)	232	182	184	186	187	189
	Gross PSB Demand (af/yr)	18,696	30,111	41,235	55,553	69,132	76,902
	Demand w/Conservation						
	Scenario A & C (af/yr)	18,696	22,002	30,627	42,058	52,883	59,942
Scenario B (af/yr)	18,696	24,069	33,551	45,724	57,421	64,327	

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NORTHEAST	City Population	88,940	106,866	123,696	138,897	154,365	159,162
	County Population	88,940	106,866	123,696	138,897	154,365	159,162
	PSB Service Area Pop.	88,940	106,866	123,696	138,897	154,365	159,162
	Historical Usage (gpcd)	226	222	222	222	221	219
	Usage w/Conservation						
	Scenario A & C (gpcd)	226	165	167	167	168	170
	Scenario B (gpcd)	226	179	179	180	182	184
	Gross PSB Demand (af/yr)	22,517	26,517	30,693	34,464	38,181	38,958
	Demand w/Conservation						
	Scenario A & C (af/yr)	22,517	19,693	23,071	25,953	28,965	30,221
Scenario B (af/yr)	22,517	21,369	24,734	28,007	31,385	32,717	

PROJECTED WATER DEMANDS BY PLANNING AREA

Planning Area		Year 1990	2000	2010	2020	2030	2040
CENTRAL	City Population	140,694	143,184	145,744	145,648	146,184	146,471
	County Population	140,694	143,184	145,744	145,648	146,184	146,471
	PSB Service Area Pop.	140,694	143,184	145,744	145,648	146,184	146,471
	Historical Usage (gpcd)	213	213	213	213	218	223
	Usage w/Conservation						
	Scenario A & C (gpcd)	213	190	195	201	206	210
	Scenario B (gpcd)	213	201	206	210	215	221
	Gross PSB Demand (af/yr)	33,571	34,084	34,694	34,753	35,699	36,508
	Demand w/Conservation						
	Scenario A & C (af/yr)	33,571	30,476	31,853	32,795	33,767	34,375
Scenario B (af/yr)	33,571	32,160	33,551	34,263	35,208	36,180	

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LOWER VALLEY	City Population	118,711	145,010	178,094	213,339	252,754	278,155
	County Population	152,177	192,046	244,025	305,063	370,283	406,870
	PSB Service Area Pop.	130,662	166,176	214,356	273,877	349,128	406,870
	Historical Usage (gpcd)	139	139	139	140	140	140
	Usage w/Conservation						
	Scenario A & C (gpcd)	139	136	132	132	132	129
	Scenario B (gpcd)	139	137	134	134	134	132
	Gross PSB Demand (af/yr)	20,372	25,782	33,257	42,799	54,754	63,582
	Demand w/Conservation						
	Scenario A & C (af/yr)	20,372	25,317	31,793	40,498	51,625	58,568
Scenario B (af/yr)	20,372	25,410	32,057	40,958	52,564	59,936	

PROJECTED WATER DEMANDS BY PLANNING AREA

Planning Area		Year 1990	2000	2010	2020	2030	2040
E A S T	City Population	109,442	140,120	176,769	217,223	263,734	296,900
	County Population	110,610	141,711	179,014	220,213	267,535	301,026
	PSB Service Area Pop.	109,442	140,438	177,667	219,017	266,775	301,026
	Historical Usage (gpcd)	211	208	208	209	211	212
	Usage w/Conservation						
	Scenario A & C (gpcd)	211	145	146	148	150	152
	Scenario B (gpcd)	211	156	158	160	162	164
	Gross PSB Demand (af/yr)	25,868	32,644	41,298	51,278	63,057	71,321
	Demand w/Conservation						
	Scenario A & C (af/yr)	25,868	22,812	29,137	36,311	44,827	51,088
Scenario B (af/yr)	25,868	24,464	31,347	39,256	48,264	55,135	

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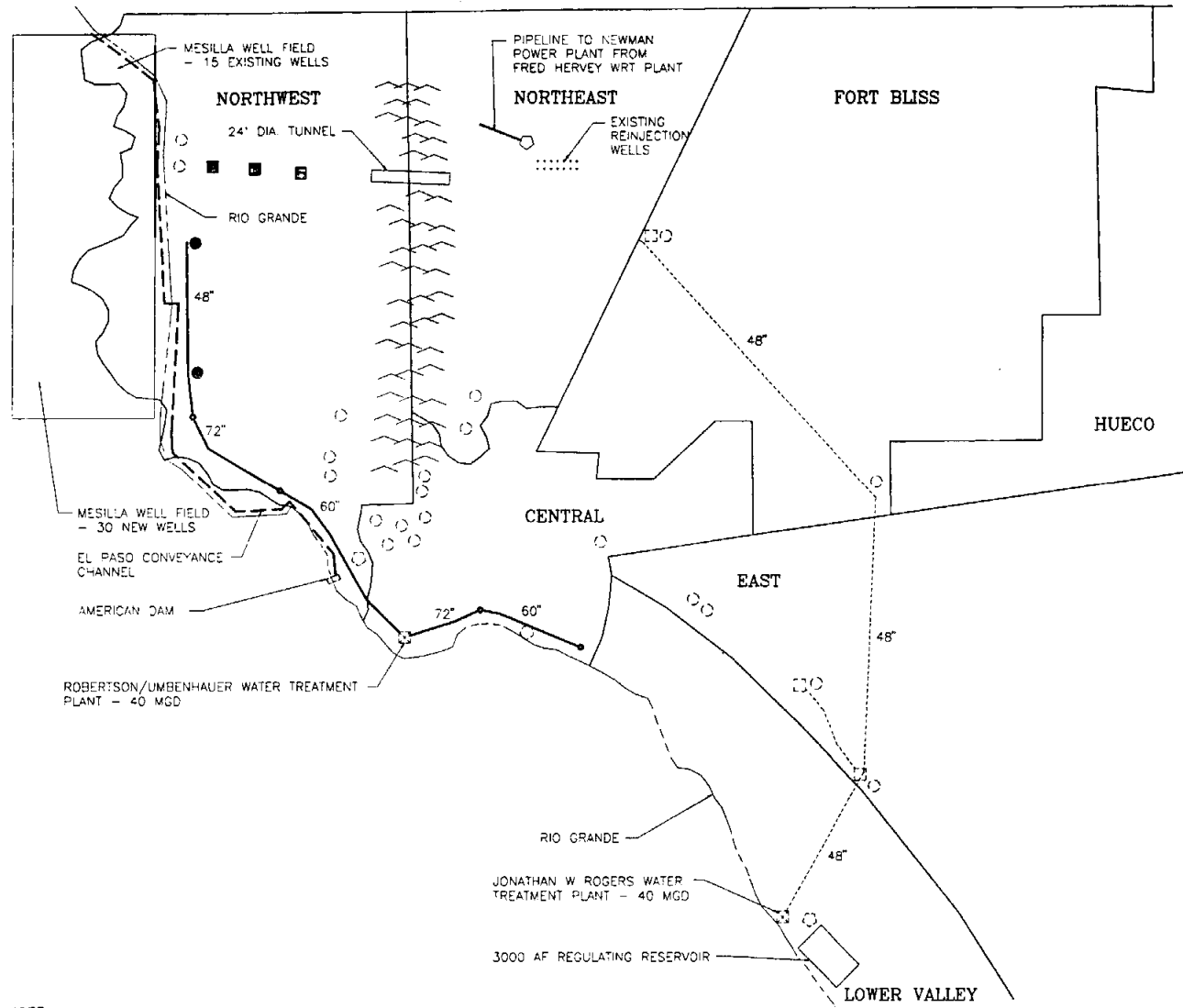
F O R T  B L I S S	City Population						
	County Population	26,661	26,700	26,700	26,700	26,700	26,700
	PSB Service Area Pop.	9,185	14,525	19,865	25,205	26,700	26,700
	Historical Usage (gpcd)	250	247	247	248	249	249
	Usage w/Conservation						
	Scenario A & C (gpcd)	250	179	183	184	185	185
	Scenario B (gpcd)	250	208	212	214	214	214
	Gross PSB Demand (af/yr)	2,572	4,019	5,485	7,002	7,433	7,433
	Demand w/Conservation						
	Scenario A & C (af/yr)	2,572	2,913	4,081	5,198	5,518	5,518
Scenario B (af/yr)	2,572	3,384	4,707	6,028	6,413	6,386	





**EXHIBIT 2**

**CAPITAL IMPROVEMENTS - SCENARIO A**

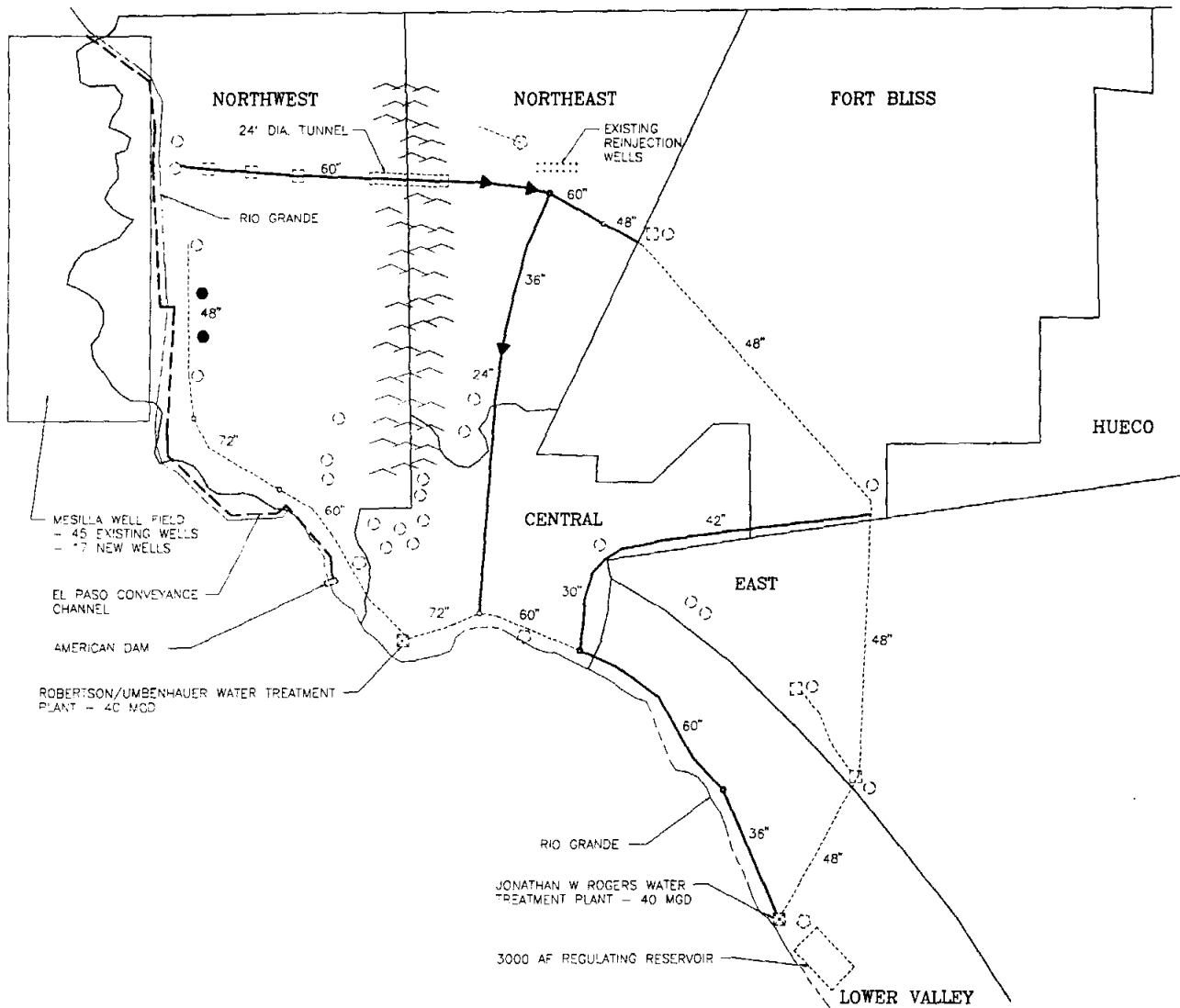


NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 REUSE NOT SHOWN

A-39

LEGEND	
---48"---	EXISTING WATER TRANSMISSION LINE
—48"—	PROPOSED WATER TRANSMISSION LINE
---	WATER CONVEYANCE CHANNEL
○	EXISTING RESERVOIR
●	PROPOSED 6 MG RESERVOIR
□	EXISTING PUMP STATION
■	PROPOSED PUMP STATION
○	EXISTING WASTEWATER TREATMENT PLANT
▲	PRESSURE REDUCING VALVE STATION
△	EXISTING PRESSURE REDUCING VALVE STATION
⊞	EXISTING WATER TREATMENT PLANT

SCENARIO A  
 CAPITAL IMPROVEMENTS  
 YEAR 2000



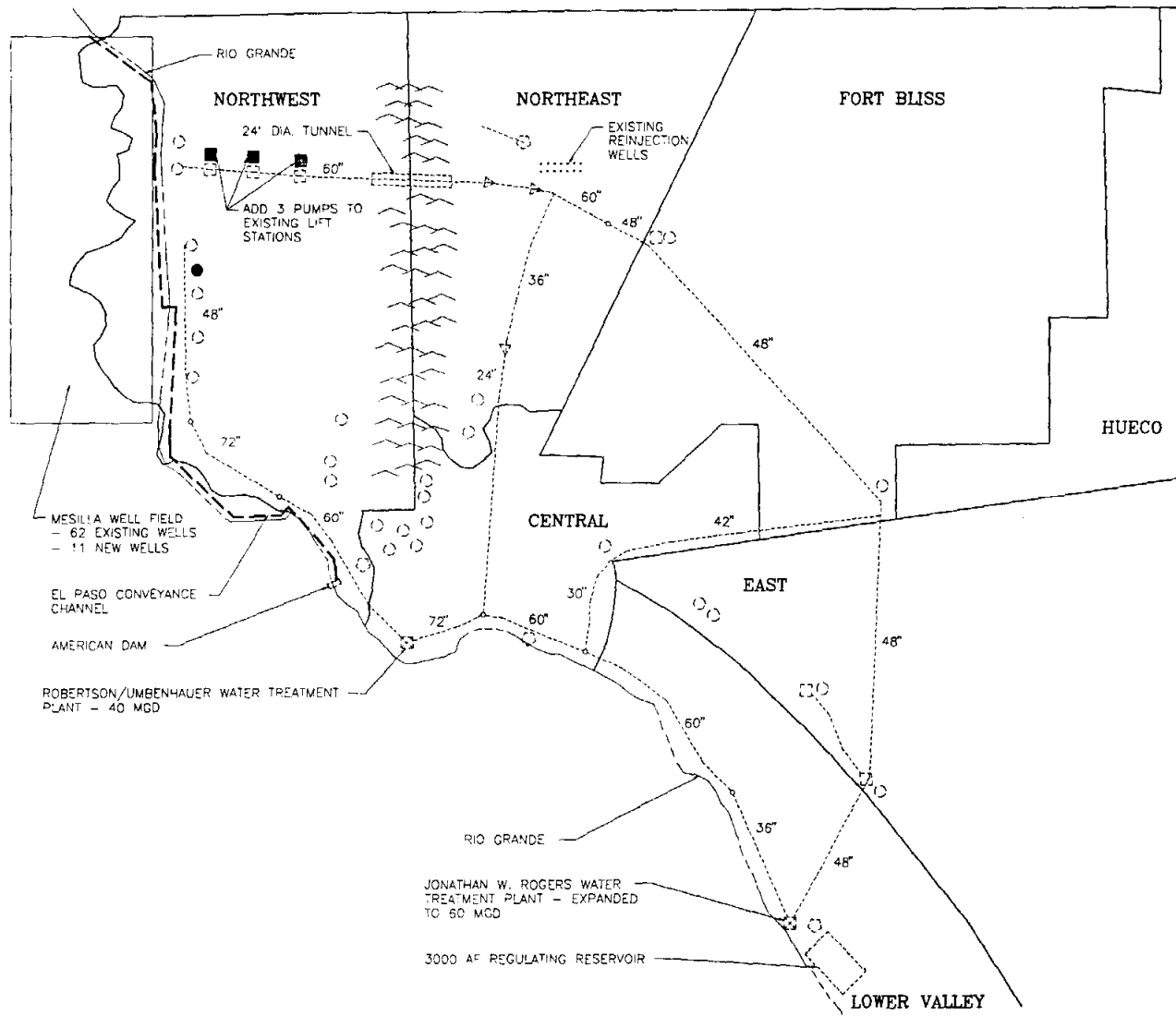
**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- ⊗ EXISTING PUMP STATION
- PROPOSED PUMP STATION
- ⊙ EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊞ EXISTING WATER TREATMENT PLANT

NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER REUSE NOT SHOWN

**SCENARIO A  
 CAPITAL IMPROVEMENTS**

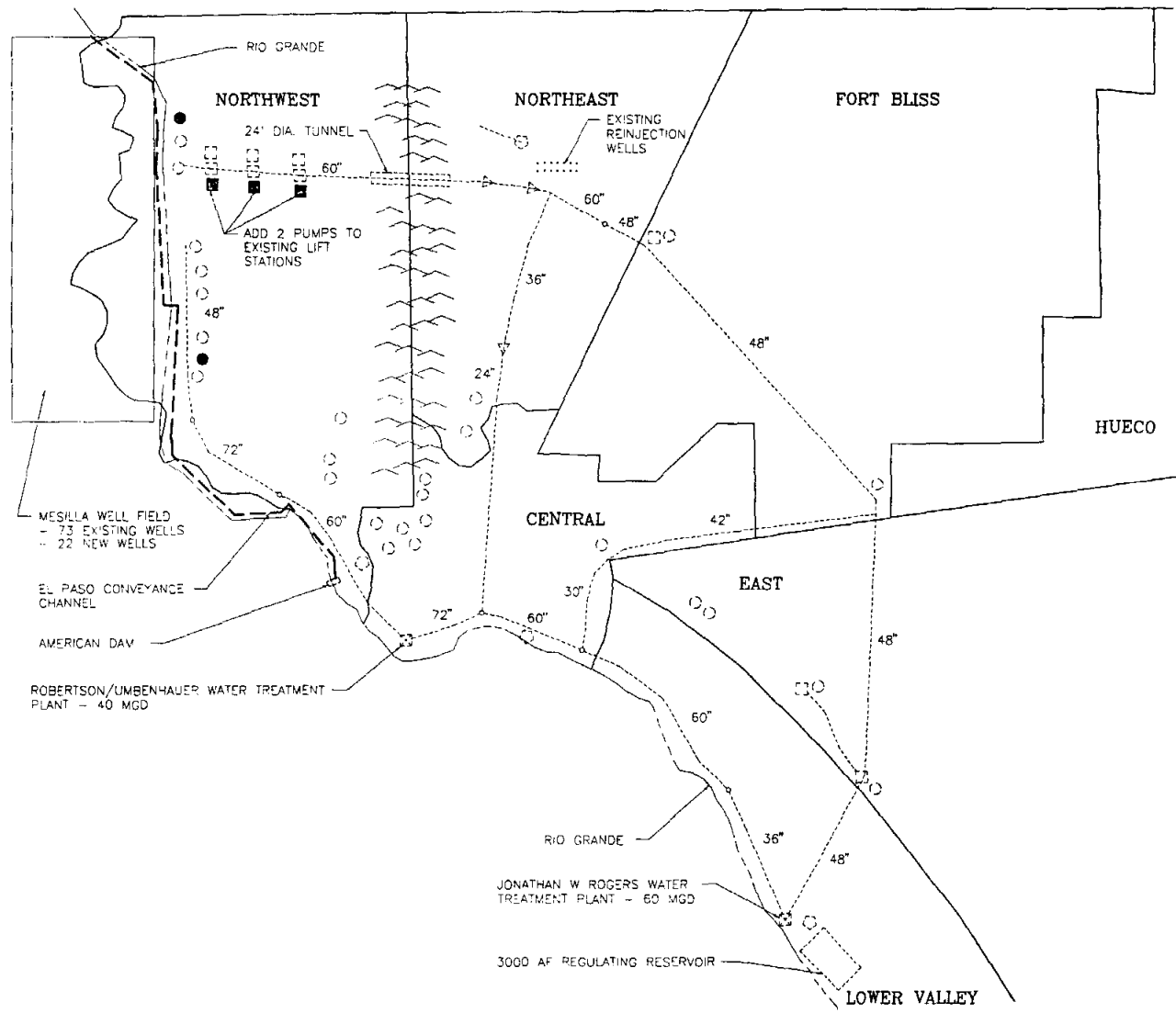
YEAR 2010



LEGEND	
--- 48" ---	EXISTING WATER TRANSMISSION LINE
— 48" —	PROPOSED WATER TRANSMISSION LINE
---	WATER CONVEYANCE CHANNEL
○	EXISTING RESERVOIR
●	PROPOSED 6 MG RESERVOIR
□	EXISTING PUMP STATION
■	PROPOSED PUMP STATION
○	EXISTING WASTEWATER TREATMENT PLANT
▲	PRESSURE REDUCING VALVE STATION
△	EXISTING PRESSURE REDUCING VALVE STATION
⊞	EXISTING WATER TREATMENT PLANT

NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 REUSE NOT SHOWN  
 A-43

SCENARIO A  
**CAPITAL IMPROVEMENTS**  
 YEAR 2020

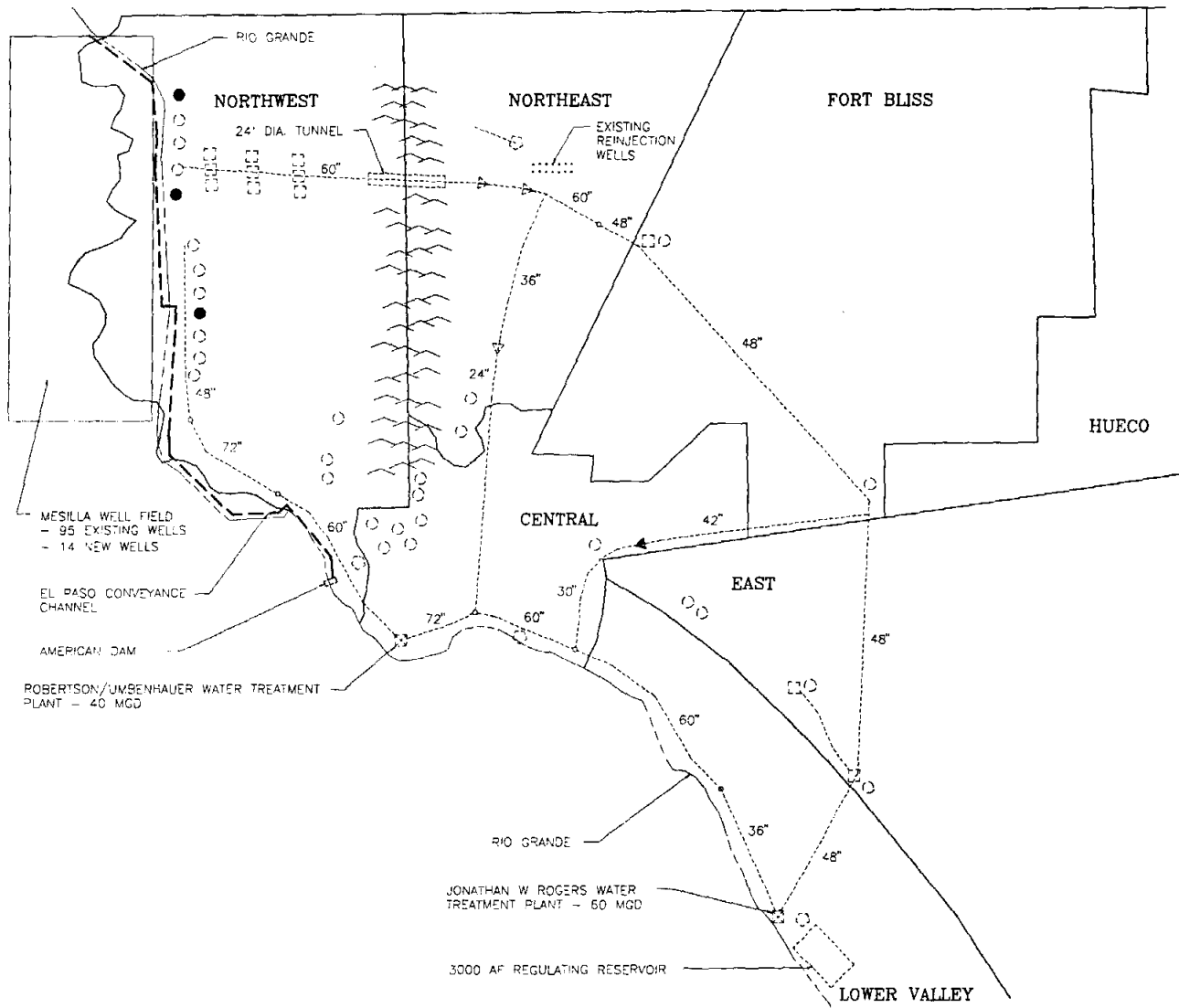


**LEGEND**

- EXISTING WATER TRANSMISSION LINE
- PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- PRESSURE REDUCING VALVE STATION
- EXISTING PRESSURE REDUCING VALVE STATION
- EXISTING WATER TREATMENT PLANT

NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 REUSE NOT SHOWN  
 A-45

SCENARIO A  
**CAPITAL IMPROVEMENTS**  
 YEAR 2030



**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PROPOSED PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- EXISTING WATER TREATMENT PLANT

**NOTE:**

NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER REUSE NOT SHOWN  
 A-47

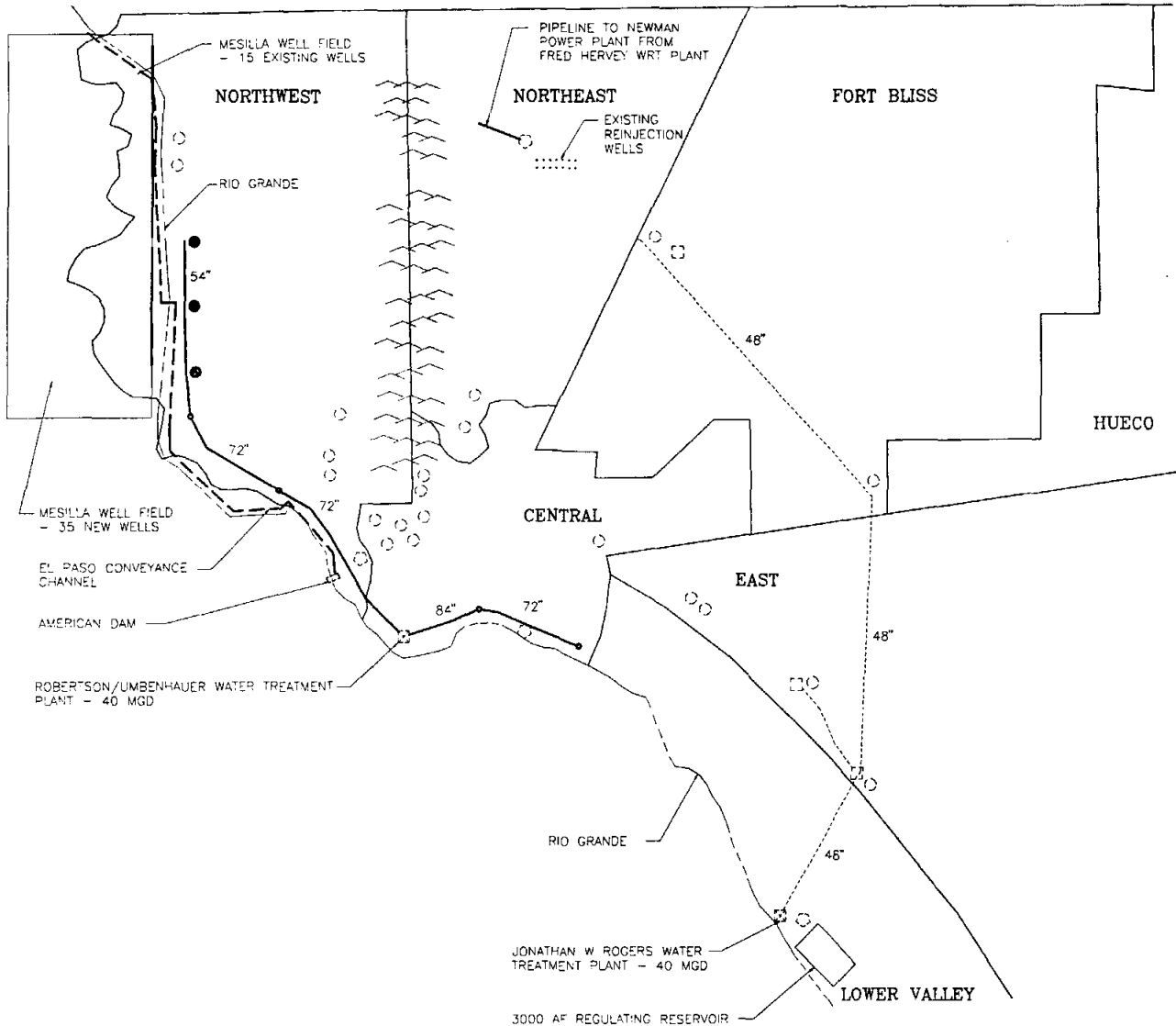
**SCENARIO A  
 CAPITAL IMPROVEMENTS**

YEAR 2040

**EXHIBIT 3**

**CAPITAL IMPROVEMENTS - SCENARIO B**





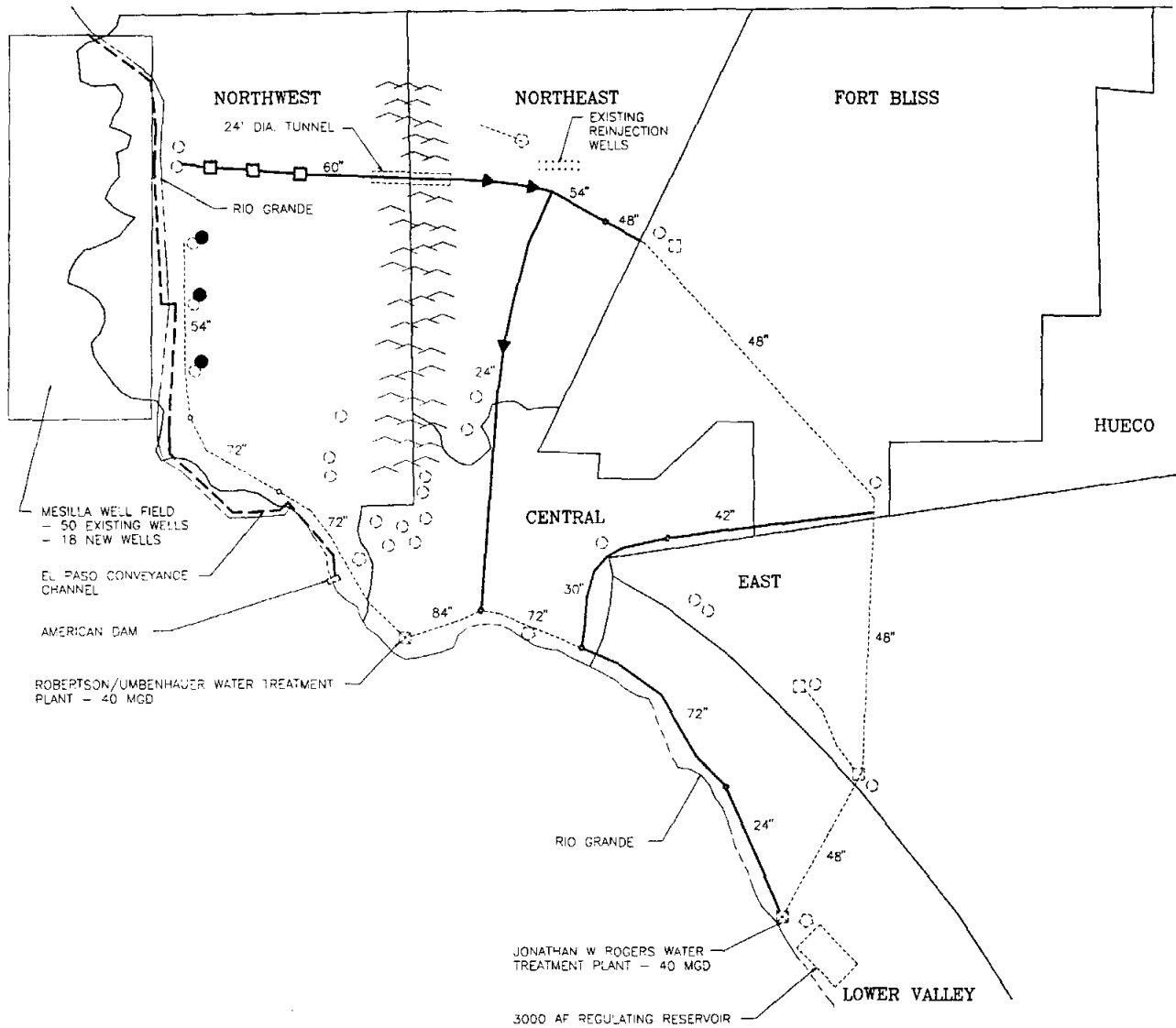
**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- ⊙ EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊞ EXISTING WATER TREATMENT PLANT

**SCENARIO B  
CAPITAL IMPROVEMENTS**

YEAR 2000

NOTE:  
NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
ARE SHOWN  
PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
REUSE NOT SHOWN  
A-51



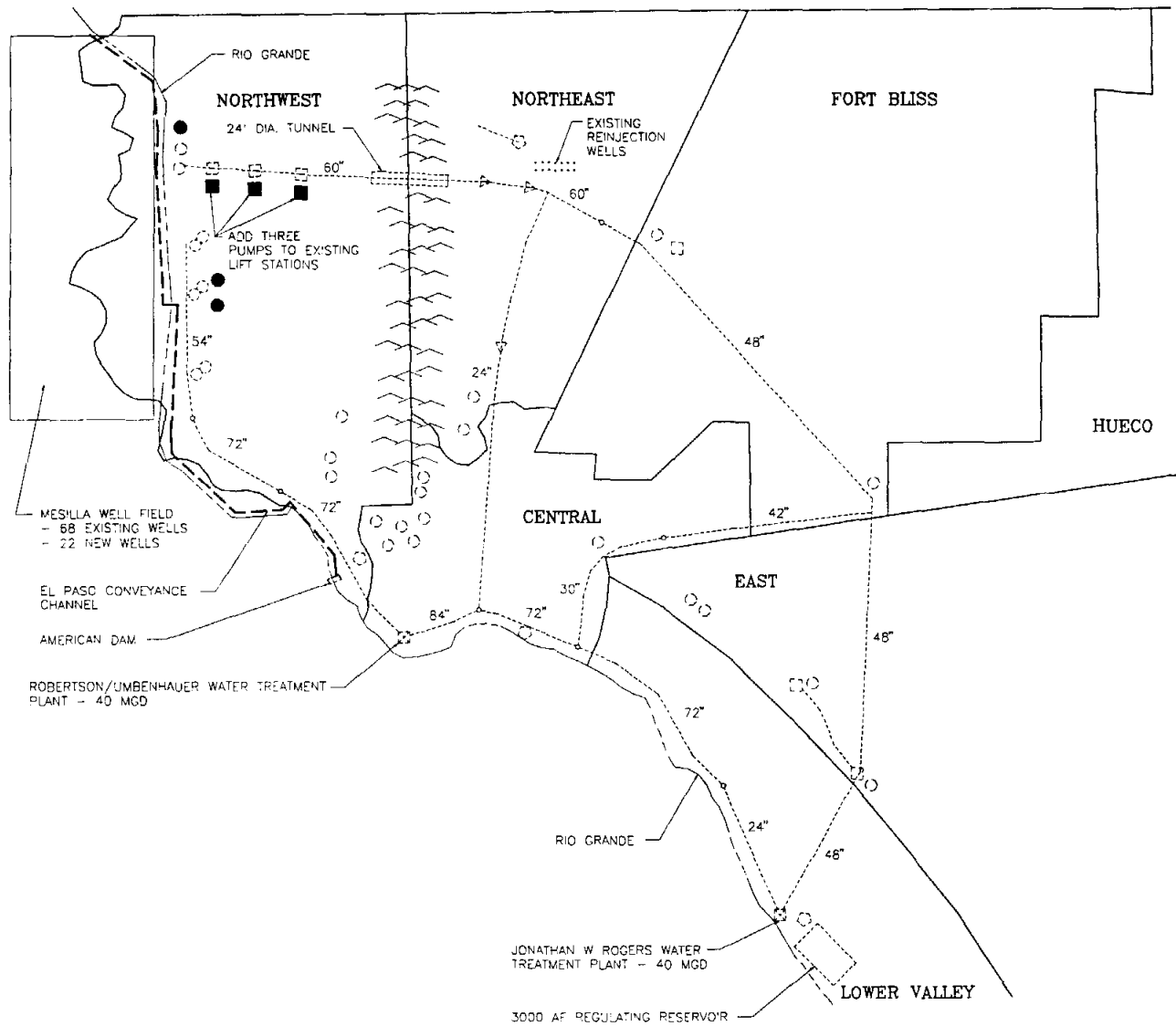
**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- - - - WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊠ EXISTING WATER TREATMENT PLANT

NOTE:  
 NOT ALL RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 RE-USE NOT SHOWN  
 A-53

**SCENARIO B  
 CAPITAL IMPROVEMENTS**

YEAR 2010



**LEGEND**

- 48" EXISTING WATER TRANSMISSION LINE
- 48" PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- PRESSURE REDUCING VALVE STATION
- EXISTING PRESSURE REDUCING VALVE STATION
- EXISTING WATER TREATMENT PLANT

**NOTE:**

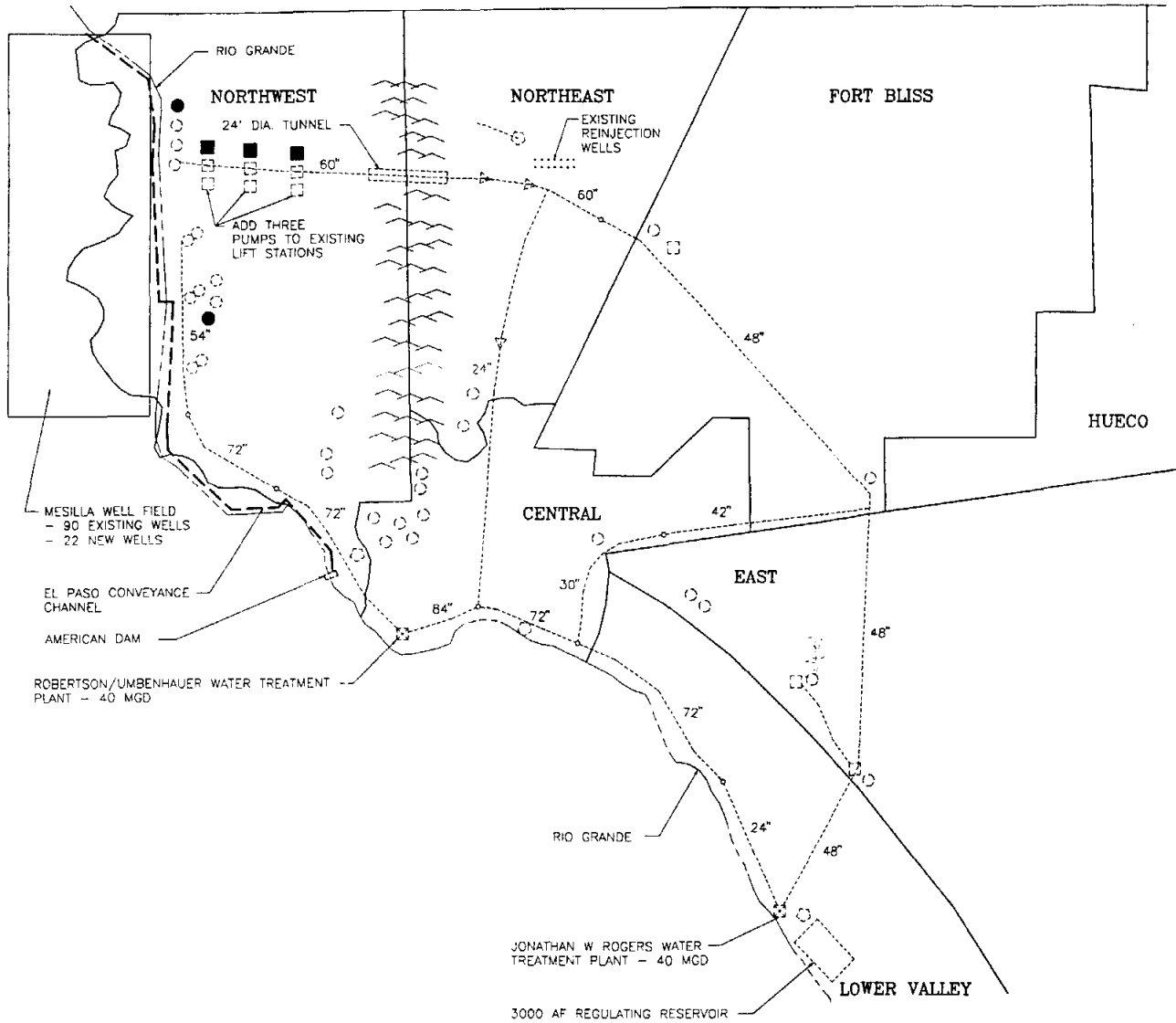
NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS ARE SHOWN

PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER RE-USE NOT SHOWN

A-55

**SCENARIO B  
CAPITAL IMPROVEMENTS**

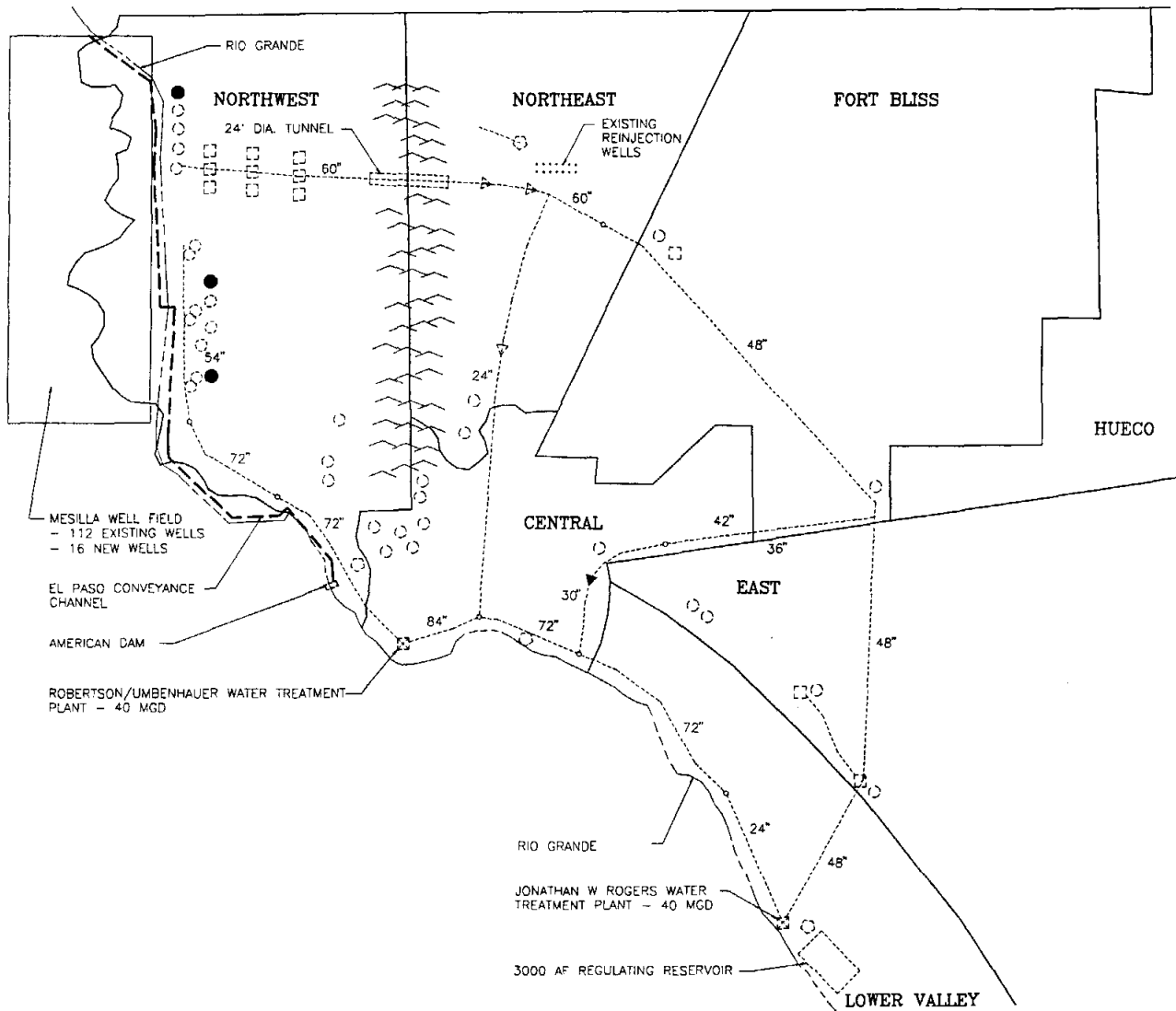
YEAR 2020



LEGEND	
--- 48" ---	EXISTING WATER TRANSMISSION LINE
— 48" —	PROPOSED WATER TRANSMISSION LINE
- - - -	WATER CONVEYANCE CHANNEL
○	EXISTING RESERVOIR
●	PROPOSED 6 MG RESERVOIR
□	EXISTING PUMP STATION
■	PROPOSED PUMP STATION
○	EXISTING WASTEWATER TREATMENT PLANT
▲	PRESSURE REDUCING VALVE STATION
△	EXISTING PRESSURE REDUCING VALVE STATION
⊞	EXISTING WATER TREATMENT PLANT

NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 RE-USE NOT SHOWN  
 A-57

SCENARIO B  
 CAPITAL IMPROVEMENTS  
 YEAR 2030



**LEGEND**

- 49" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
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- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PROPOSED PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ▣ EXISTING WATER TREATMENT PLANT

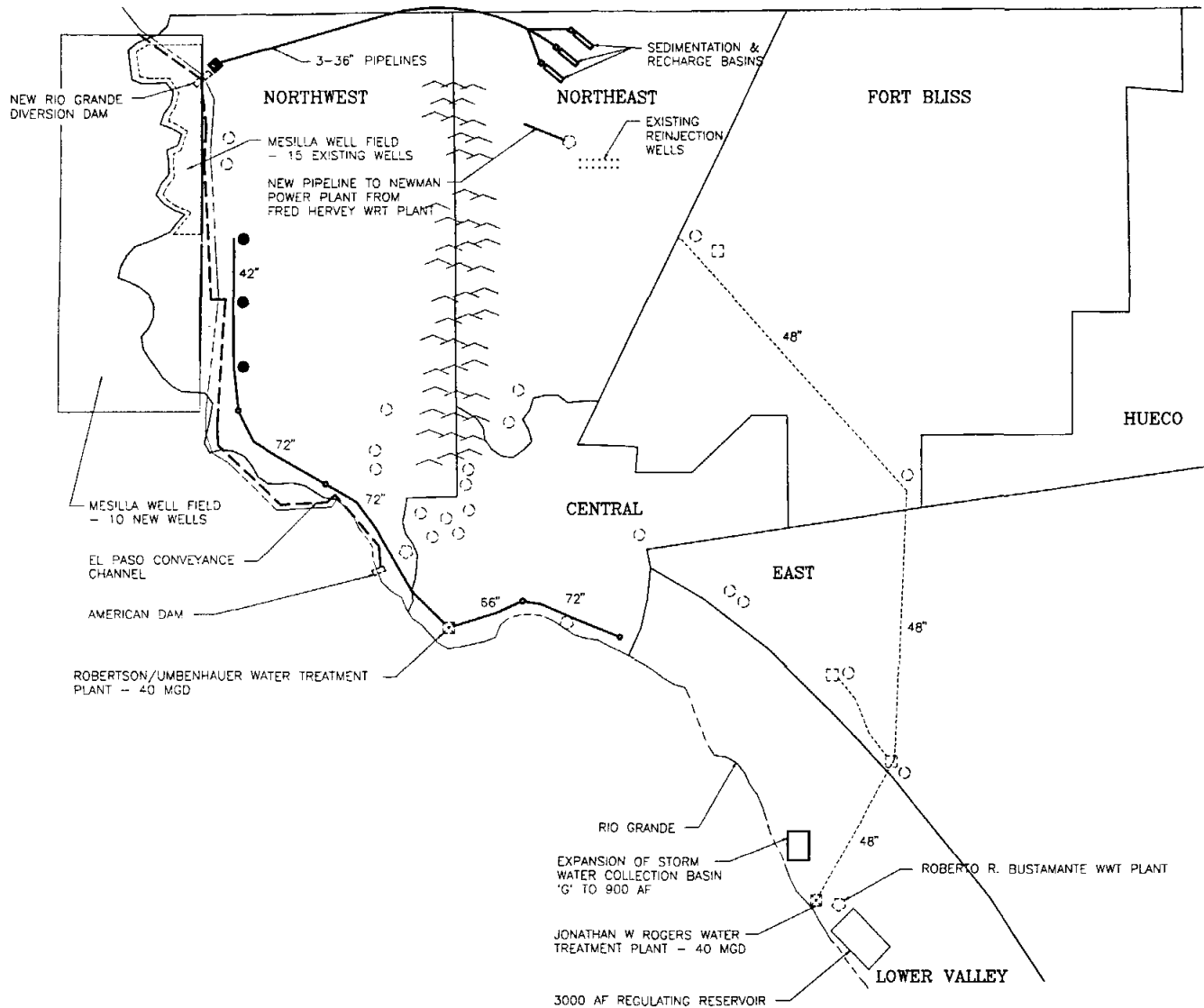
**SCENARIO B  
CAPITAL IMPROVEMENTS**

YEAR 2040

NOTE:  
 NOT ALL EXISTING RESERVOIRS AND PUMP STATIONS  
 ARE SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 REUSE NOT SHOWN  
 A-59

EXHIBIT 4

**CAPITAL IMPROVEMENTS - SCENARIO C**



**LEGEND**

- 48"--- EXISTING WATER TRANSMISSION LINE
- 48"— PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊞ EXISTING WATER TREATMENT PLANT

**NOTE:**

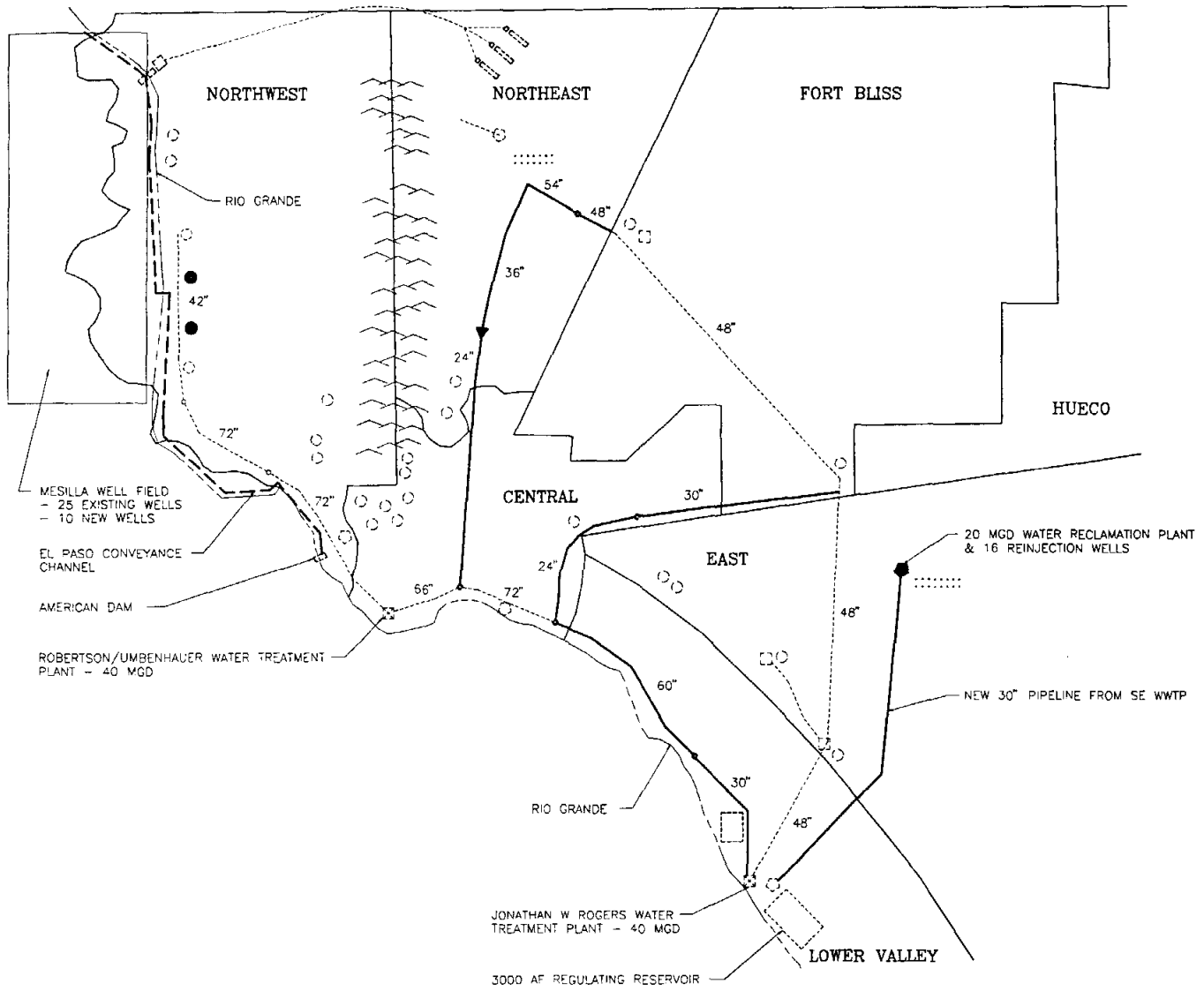
ALL EXISTING STORAGE TANKS AND PUMP STATIONS ARE NOT SHOWN

PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER RE-USE NOT SHOWN

A-63

**SCENARIO C  
CAPITAL IMPROVEMENTS**

YEAR 2000



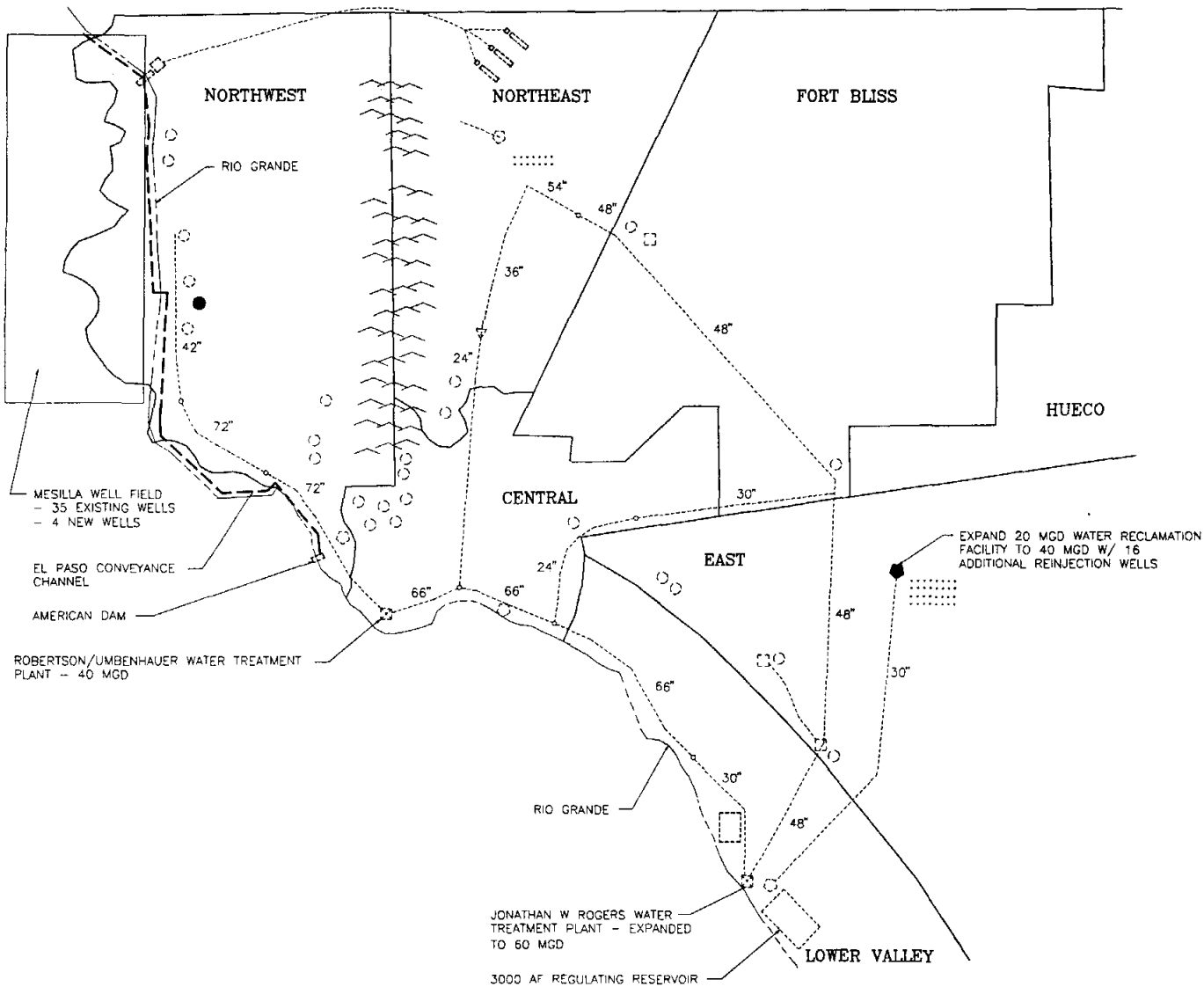
**LEGEND**

- 48"--- EXISTING WATER TRANSMISSION LINE
- 48"— PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- ◻ EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ◻ EXISTING WATER TREATMENT PLANT

NOTE:  
 ALL EXISTING STORAGE TANKS AND PUMP STATIONS  
 ARE NOT SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 RE-USE NOT SHOWN  
 A-65

SCENARIO C  
 CAPITAL IMPROVEMENTS  
 YEAR 2010





**LEGEND**

- 48"--- EXISTING WATER TRANSMISSION LINE
- 48"— PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
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- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊞ EXISTING WATER TREATMENT PLANT

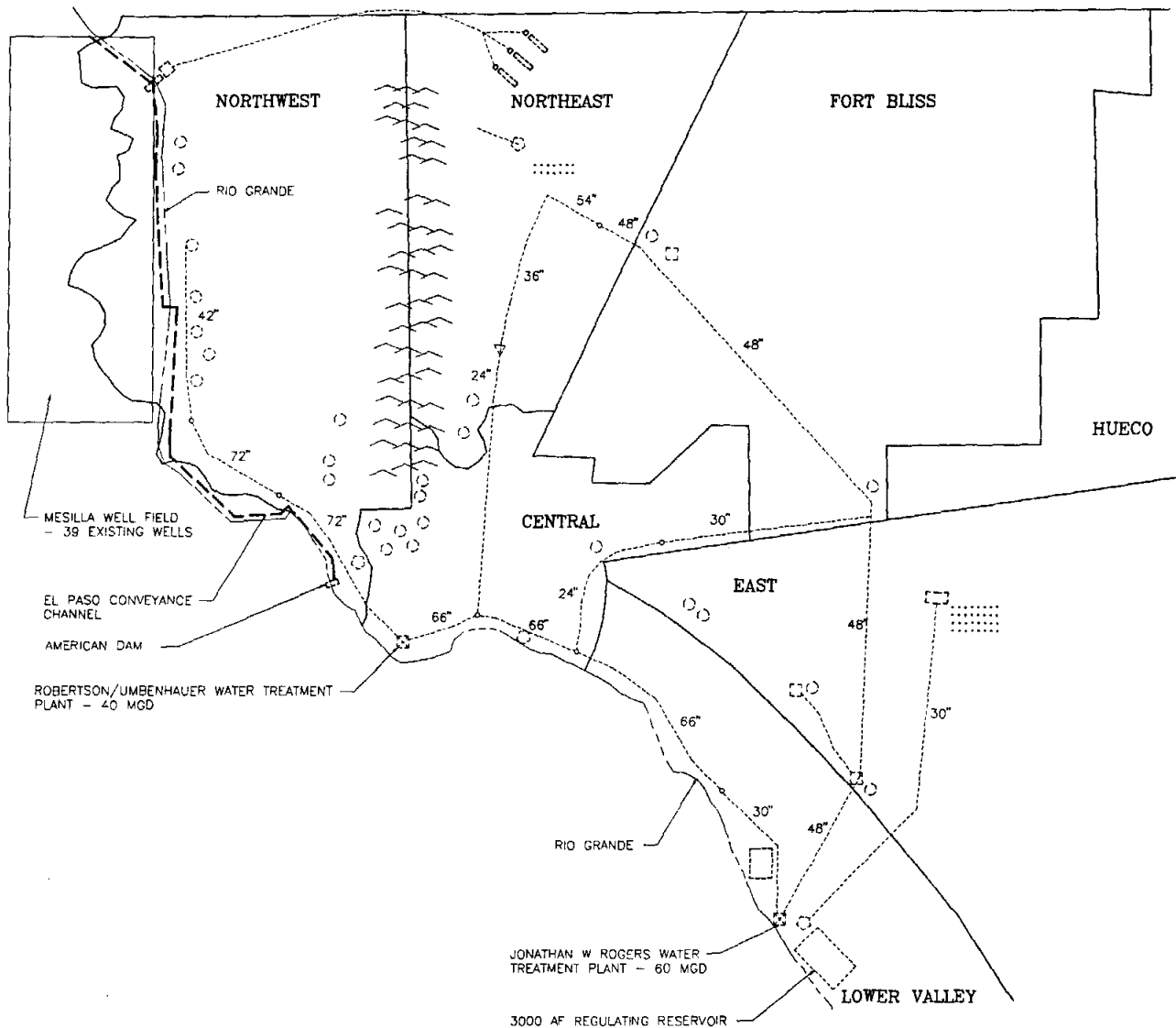
**SCENARIO C  
CAPITAL IMPROVEMENTS**

YEAR 2020

**NOTE:**

ALL EXISTING STORAGE TANKS AND PUMP STATIONS ARE NOT SHOWN

PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER RE-USE NOT SHOWN



**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
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- ⊖ EXISTING WASTEWATER TREATMENT PLANT
- ▲ PROPOSED PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊞ EXISTING WATER TREATMENT PLANT

**NOTE:**

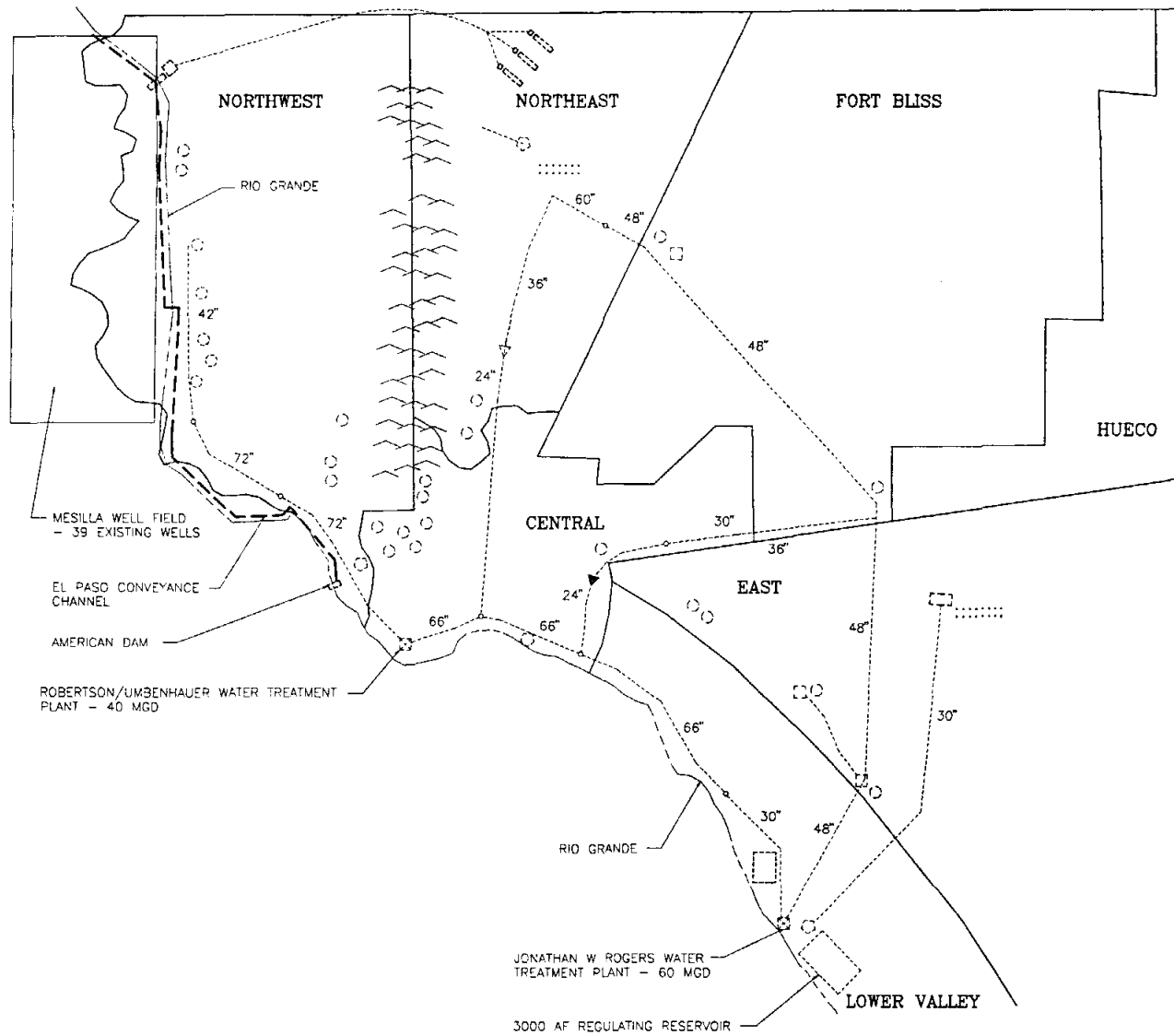
ALL EXISTING STORAGE TANKS AND PUMP STATIONS ARE NOT SHOWN

PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER RE-USE NOT SHOWN

A-69

**SCENARIO C  
CAPITAL IMPROVEMENTS**

YEAR 2030



**LEGEND**

- 48" --- EXISTING WATER TRANSMISSION LINE
- 48" — PROPOSED WATER TRANSMISSION LINE
- WATER CONVEYANCE CHANNEL
- EXISTING RESERVOIR
- PROPOSED 6 MG RESERVOIR
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- ⊗ EXISTING WASTEWATER TREATMENT PLANT
- ▲ PRESSURE REDUCING VALVE STATION
- △ EXISTING PRESSURE REDUCING VALVE STATION
- ⊠ EXISTING WATER TREATMENT PLANT

NOTE:  
 ALL EXISTING STORAGE TANKS AND PUMP STATIONS  
 ARE NOT SHOWN  
 PIPELINES TO TURF AREAS AND INDUSTRIES FOR WATER  
 RE-USE NOT SHOWN  
 A-71

**SCENARIO C  
 CAPITAL IMPROVEMENTS**

YEAR 2040

**EXHIBIT 5**

**UNIT COSTS FOR CAPITAL FACILITIES**

UNIT COSTS FOR CAPITAL FACILITIES

Item Description	Unit	Unit Cost (\$)
<b>Mesilla Bolson Pumping</b>		
<u>Water Wells</u>		
Drilling and Casing, incl. screens,	LF	204.00
Pump, Motor, house, foundation, chlorination	LS	154,750
Electrical	LS	45,000
<u>Collection &amp; Manifold Piping</u>		
14" Steel/Concrete Cylinder Pipe w/Trenching	LF	38.00
18" Steel/Concrete Cylinder Pipe w/Trenching	LF	49.00
24" Steel/Concrete Cylinder Pipe w/Trenching	LF	77.00
30" Steel/Concrete Cylinder Pipe w/Trenching	LF	98.00
**All fittings and jointing mat'l. included**		
<u>Reservoirs - 6 Million Gallons</u>		
6 MG Reservoirs	EA	1,740,000
Piping, Valves, Fittings, Paint	LS	360,000
<u>Surface Water</u>		
Conveyance Channel	See Appendix 10	
Expansion of 40 MGD Water Treatment Plant to 60 MGD	LS	29,400,000
<u>3000 Acre-Foot Storage Reservoir and Expansion of Basin "G" to 900 AF</u>		
Excavation	CY	2.10
Embankment incl. Compaction	CY	2.65
Screw Pumps w/160 hp Motors	EA	25,000
Turbine Pumps w/125 hp Motors	EA	21,000
Reinforced Concrete Structures	CY	350.00
Sluice Gates	EA	25,000
48" Reinforced Concrete Pipe w/Fittings	LF	161.00
Pond Lining	SY	.50
Buildings incl. Foundations	SF	42.00

UNIT COSTS FOR CAPITAL FACILITIES

Item Description	Unit	Unit Cost (\$)
<u>Reuse and Recharge Facilities</u>		
Pipeline from Fred Hervey WWTP to Newman PP		
18" Steel/Concrete Cylinder Pipe w/Trenching incl. fittings with jointing material	LF	49.00
Turbine Pumps @ 56 hp	EA	10,240
Electrical	LS	22,500
Pipelines from WWTP to Turf and Industrial Areas		
6" Pipeline w/Trenching	LF	16.80
8" Pipeline w/ Trenching	LF	19.60
10" Pipeline w/Trenching	LF	24.00
12" Pipeline w/Trenching	LF	28.00
14" Pipeline w/Trenching	LF	38.00
16" Pipeline w/Trenching	LF	45.00
**All fittings and jointing mat'l. included**		
Pumps	HP	250.00
Buildings incl. Foundations	SF	42.00
Misc. Facilities	CFS	12.50
20 MGD Waste Water Reclamation Plant	LS	24,100,000
Expand 20 MGD WWRP to 40 MGD	LS	28,800,000
Reclaimed Water Injection Wells incl. Associated Piping and Conveyance Systems	EA	325,000
Pump Station from WWTP to WWRP		
30" Steel/Concrete Cylinder Pipe w/Trenching	LF	98.00
Buildings incl. Foundations	SF	42.00
Turbine Pumps	EA	75,000
Recharge Facility w/Sedimentation & Spreading Basins incl. Rio Grande Diversion Structure, Lift Station, & Transmission Lines		
Rio Grande Diversion	LS	500,000
Pump Station	LS	5,390,000
Substructure	LS	1,200,000
Electrical	LS	1,600,000

UNIT COSTS FOR CAPITAL FACILITIES

Item Description	Unit	Unit Cost (\$)
Headworks and Valving	LS	440,000
Pumps & Motors	EA	200,000
Channels and Gates	LS	350,000
36" Concrete Cylinder Pipe	LF	119.00
Spreading Fields	LS	4,200,000
Earthwork	CY	2.00
Fences & other misc.	LS	500,000
Headworks	LS	500,000
<u>Transmission Facilities</u>		
<u>Western Slope Booster Stations</u>		
Vertical Turbine Pumps	EA	90,000
Building w/Appurtenances incl. Electrical	LS	350,000
Building Addition for 3 Pumps incl. Electrical	LS	155,000
Building Addition for 2 Pumps incl. Electrical	LS	100,000
Transmountain Tunnel w/o Pipeline	LF	595.00
Pressure Reducing Valve Station incl. Vault, Piping, Foundation, and Misc.	IN-DIA	1,250
24" Transmission Line incl. Trenching	LF	77.00
30" Transmission Line incl. Trenching	LF	98.00
36" Transmission Line incl. Trenching	LF	119.00
42" Transmission Line incl. Trenching	LF	140.00
48" Transmission Line incl. Trenching	LF	161.00
54" Transmission Line incl. Trenching	LF	182.00
60" Transmission Line incl. Trenching	LF	203.00
66" Transmission Line incl. Trenching	LF	235.00
72" Transmission Line incl. Trenching	LF	260.00
84" Transmission Line incl. Trenching	LF	292.00
<u>Project Water Rights</u>		
Leasing of Additional Water Rights Land	AC	500.00
<u>Miscellaneous Costs</u>		
Lands incl. Easements and Right of Way	AC	2000-4000

**EXHIBIT 6**

**- SCENARIO A -**

**CAPITAL EXPENDITURES**

**AND**

**OPERATING COSTS**



SCENARIO A

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1991 TO 1995

Item Description	1991				1992				1993				1994				1995			
	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total
<b>Hueco Bolson Pumping</b>																				
Water Wells	---	3,035,671	865,020	3,900,691	---	2,927,534	865,020	3,792,554	---	2,712,876	865,020	3,577,896	---	2,662,917	865,020	3,527,937	---	2,680,815	865,020	3,545,835
Reservoirs and Manifold piping	---	---	237,000	237,000	---	---	237,000	237,000	---	---	237,000	237,000	---	---	237,000	237,000	---	---	237,000	237,000
<b>Mesilla Bolson Pumping</b>																				
Water Wells	1,500,000	200,718	42,000	1,742,718	1,500,000	401,436	84,000	1,985,436	1,500,000	602,154	126,000	2,228,154	1,500,000	802,872	168,000	2,470,872	1,500,000	1,003,590	210,000	2,713,590
Collection & Manifold Piping	1,218,000	---	6,090	1,224,090	1,218,000	---	12,180	1,230,180	1,218,000	---	18,270	1,236,270	1,218,000	---	24,360	1,242,360	1,218,000	---	30,450	1,248,450
Reservoirs - 6 MG	2,100,000	---	10,500	2,110,500	---	---	10,500	10,500	---	---	10,500	10,500	2,100,000	---	21,000	2,121,000	---	---	21,000	21,000
Lands	4,800	---	---	4,800	48,000	---	---	48,000	3,200	---	---	3,200	4,800	---	---	4,800	4,800	---	---	4,800
<b>Surface Water</b>																				
El Paso Conveyance Channel	---	---	---	---	300,000	---	---	300,000	1,200,000	---	---	1,200,000	6,271,800	---	---	6,271,800	52,170,570	---	---	52,170,570
R/U Water Treatment Plant to operate 365 days/year	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000
3000 AF Regulating Reservoir	1,800,000	---	---	1,800,000	1,800,000	338,700	24,200	2,162,900	---	338,700	24,200	362,900	---	338,700	24,200	362,900	---	338,700	24,200	362,900
<b>Re-Use &amp; Recharge Facilities</b>																				
Pipeline from F. Hervey WWTP to Newman Power Plant	262,024	24,350	1,450	287,824	---	24,350	1,450	25,800	---	33,600	2,000	35,600	---	33,600	2,000	35,600	---	33,600	2,000	35,600
Pipelines from WWTP to Turf Areas & Industries	236,250	10,125	3,375	249,750	27,000	10,425	3,475	40,900	67,500	11,175	3,725	82,400	101,250	12,300	4,100	117,650	175,500	14,250	4,750	184,500
<b>Transmission Facilities</b>																				
Western Slope Booster Stations	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Transmountain Tunnel w/o Pipeline	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PRV Vault - 36"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PRV Vault - 60"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
48" CCP Transmission Line	1,183,350	---	5,917	1,189,267	1,183,350	---	11,834	1,195,184	1,183,350	---	17,750	1,201,100	1,183,350	---	23,667	1,207,017	1,183,350	---	29,584	1,212,934
60" CCP Transmission Line	1,055,600	---	5,278	1,060,878	1,055,600	---	10,556	1,066,156	1,055,600	---	15,834	1,071,434	1,055,600	---	21,112	1,076,712	1,055,600	---	26,390	1,081,990
72" CCP Transmission Line	1,032,200	---	5,181	1,037,381	1,032,200	---	10,322	1,042,522	1,032,200	---	15,483	1,047,683	1,032,200	---	20,644	1,052,844	1,032,200	---	25,805	1,058,005
<b>Project Water Rights</b>																				
Leased Water Rights Load & Drought Contingency Contracts	2,088,240	---	615,750	2,703,990	180,840	---	617,505	798,345	180,840	---	650,490	831,330	180,840	---	637,020	817,860	180,840	---	3,438,690	3,619,530
<b>Total Estimated Cost</b>	<b>12,480,464</b>	<b>3,528,864</b>	<b>3,417,541</b>	<b>19,426,869</b>	<b>8,344,990</b>	<b>3,960,445</b>	<b>3,459,266</b>	<b>15,813,477</b>	<b>7,440,690</b>	<b>3,956,505</b>	<b>3,606,272</b>	<b>15,003,467</b>	<b>14,647,840</b>	<b>4,108,389</b>	<b>3,688,123</b>	<b>22,424,352</b>	<b>58,520,860</b>	<b>4,328,855</b>	<b>6,534,889</b>	<b>69,384,704</b>

SCENARIO A

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1996 TO 2000

Item Description	1996				1997				1998				1999				2000			
	O & M				O & M				O & M				O & M				O & M			
	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total	Capital	Power	Other	Total
<b>Hueco Bolson Pumping</b>																				
Water Wells	—	3,011,422	865,020	3,876,442	—	3,061,634	865,020	3,926,654	—	1,347,895	865,020	2,212,915	—	576,070	132,500	708,570	—	67,257	15,470	82,727
Reservoirs and Manifold piping	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	35,853	35,853	—	—	4,166	4,166
<b>Mesilla Bolson Pumping</b>																				
Water Wells	1,500,000	1,204,308	252,000	2,956,308	1,500,000	1,405,026	294,000	3,199,026	1,500,000	1,605,744	336,000	3,441,744	1,500,000	1,806,462	378,000	3,684,462	1,500,000	2,007,180	420,000	3,927,180
Collection & Manifold Piping	1,218,000	—	36,540	1,254,540	1,218,000	—	42,630	1,260,630	1,218,000	—	48,720	1,266,720	1,218,000	—	54,810	1,272,810	1,218,000	—	60,900	1,278,900
Reservoirs - 6 MG	—	—	21,000	21,000	—	—	21,000	21,000	—	—	21,000	21,000	—	—	21,000	21,000	—	—	21,000	21,000
Lands	4,800	—	—	4,800	4,800	—	—	4,800	4,800	—	—	4,800	4,800	—	—	4,800	4,800	—	—	4,800
<b>Surface Water</b>																				
El Paso Conveyance Channel	52,170,570	—	500,000	52,670,570	48,098,770	—	500,000	48,598,770	48,098,770	—	750,000	48,848,770	—	—	1,000,000	1,000,000	—	—	1,000,000	1,000,000
R/U Water Treatment Plant to operate 365 days/year	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000
3000 AF Regulating Reservoir	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900
<b>Re-Use &amp; Recharge Facilities</b>																				
Pipeline from F. Harvey WWP to Newman Power Plant	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600
Pipelines from WWP to Turf Areas & Industries	101,250	15,375	5,125	121,750	101,250	16,500	5,500	123,250	135,000	18,000	8,000	159,000	101,250	19,125	6,375	126,750	303,750	22,500	7,500	333,750
<b>Transmission Facilities</b>																				
Western Slope Booster Stations	—	—	—	—	—	—	—	—	1,428,500	—	—	1,428,500	1,428,500	—	—	1,428,500	1,428,500	3,500,000	103,585	5,032,085
Transmountain Tunnel w/o Pipeline	—	—	—	—	1,983,350	—	—	1,983,350	1,983,350	—	—	1,983,350	1,983,350	—	—	1,983,350	—	—	24,750	24,750
PRV Vault - 36"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45,000	—	7,480	52,480
PRV Vault - 60"	—	—	—	—	—	—	—	—	—	—	—	—	75,000	—	7,635	82,635	—	—	7,635	7,635
48" CCP Transmission Line	1,183,350	—	35,501	1,218,851	1,183,350	—	41,417	1,224,767	1,183,350	—	47,334	1,230,684	1,183,350	—	53,251	1,236,601	1,183,350	—	59,168	1,242,518
60" CCP Transmission Line	1,055,600	—	31,668	1,087,268	1,055,600	—	36,946	1,092,546	1,055,600	—	42,224	1,097,824	1,055,600	—	47,502	1,103,102	1,055,600	—	52,780	1,108,380
72" CCP Transmission Line	1,032,200	—	30,966	1,063,166	1,032,200	—	36,127	1,068,327	1,032,200	—	41,288	1,073,488	1,032,200	—	46,448	1,078,648	1,032,200	—	51,610	1,083,810
<b>Project Water Rights</b>																				
Leased Water Rights Land & Drought Contingency Contracts	180,840	—	3,385,953	3,566,793	180,840	—	3,309,621	3,490,461	180,840	—	3,356,979	3,537,819	180,840	—	834,870	1,015,710	180,840	—	802,980	983,820
<b>Total Estimated Cost</b>	<b>58,446,510</b>	<b>4,351,405</b>	<b>7,046,973</b>	<b>70,354,988</b>	<b>58,358,160</b>	<b>5,113,450</b>	<b>7,035,461</b>	<b>68,507,081</b>	<b>57,820,410</b>	<b>3,601,939</b>	<b>7,397,765</b>	<b>68,820,114</b>	<b>9,762,890</b>	<b>3,031,957</b>	<b>4,284,445</b>	<b>17,059,292</b>	<b>7,952,040</b>	<b>6,227,237</b>	<b>4,285,243</b>	<b>18,464,520</b>

SCENARIO A

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 2001 TO 2040

Item Description	Year 2001 - 2010				Year 2011 - 2020				Year 2021 - 2030				Year 2031 - 2040					
	Annual Costs		Total	Other O & M	Annual Costs		Total	Other O & M	Annual Costs		Total	Other O & M	Annual Costs		Total	Other O & M		
	Capital Costs	Power			Capital Costs	Power			Capital Costs	Power			Capital Costs	Power				
Mesa Bolton Pumping	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
Water Wells	---	176,230	216,763	40,533	10,968	10,968	16,461	86,032	4,454	4,454	---	---	---	---	---	1,018,711		
Reservoirs and Manifold Piping	---	---	10,968	10,968	---	---	---	---	---	---	---	---	---	---	---	---	51,546	
Mesa Bolton Pumping	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Water Wells	8,000,000	2,766,322	4,317,322	749,000	---	---	945,000	5,536,725	---	---	---	---	---	---	---	---	9,434,761	
Collection & Manifold Piping	6,302,000	690,200	7,855,810	95,410	---	---	117,740	564,340	---	---	---	---	---	---	---	---	759,220	
Reservoirs - 6 MG	4,200,000	420,000	4,820,000	42,000	---	---	52,500	282,500	---	---	---	---	---	---	---	---	735,000	
Lands	27,200	2,720	2,720	---	---	---	---	1,760	---	---	---	---	---	---	---	---	1,920	
Surface Water	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
El Paso Conveyance Channel	---	---	9,000,000	9,000,000	---	---	9,000,000	9,000,000	---	---	---	---	---	---	---	---	9,000,000	
P/U Water Treatment Plant to operate 365 days/year	---	---	1,978,000	1,620,000	---	---	1,620,000	1,620,000	---	---	---	---	---	---	---	---	1,620,000	
JWR Water Treatment Plant expansion (20 MGD)	---	---	2,940,000	---	---	---	---	2,940,000	---	---	---	---	---	---	---	---	2,120,000	
5000 AF Regulating Reservoir	---	---	362,900	24,200	---	---	338,700	362,900	---	---	---	---	---	---	---	---	362,900	
Re-Use & Recharge Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Pipelines from F. Harvey WWP to Nampa Power Plant	---	---	35,600	2,000	---	---	33,600	35,600	---	---	---	---	---	---	---	---	35,600	
Pipelines from WWP to Turf Areas & Industries	4,239,000	423,900	4,778,900	13,500	---	---	22,500	789,500	---	---	---	---	---	---	---	---	739,200	
Transmission Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Western Slope Booster Stations	---	---	3,603,585	103,585	---	---	103,585	4,703,585	---	---	---	---	---	---	---	---	7,432,930	
- 3 Additional Pumps	---	---	---	---	---	---	---	52,500	---	---	---	---	---	---	---	---	---	
- 2 Additional Pumps	---	---	---	---	---	---	---	29,750	---	---	---	---	---	---	---	---	---	
Transmoulin Tunnel w/o Pipeline	---	---	29,750	29,750	---	---	---	29,750	---	---	---	---	---	---	---	---	29,750	
PRV Vault - 30"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
PRV Vault - 60"	---	---	7,480	7,480	---	---	---	7,480	---	---	---	---	---	---	---	---	7,480	
24" COP Transmission Line	2,679,600	287,960	2,967,560	13,398	---	---	---	7,635	---	---	---	---	---	---	---	---	7,635	
30" COP Transmission Line	2,499,000	249,900	2,748,900	12,495	---	---	---	7,635	---	---	---	---	---	---	---	---	7,635	
36" COP Transmission Line	6,211,600	621,160	6,832,760	31,059	---	---	---	31,059	---	---	---	---	---	---	---	---	31,059	
42" COP Transmission Line	3,370,000	337,000	3,707,000	17,850	---	---	---	17,850	---	---	---	---	---	---	---	---	17,850	
48" COP Transmission Line	1,348,500	134,850	1,483,350	59,852	---	---	---	59,852	---	---	---	---	---	---	---	---	59,852	
60" COP Transmission Line	16,280,600	1,628,060	17,908,660	80,920	---	---	---	80,920	---	---	---	---	---	---	---	---	80,920	
72" COP Transmission Line	---	---	51,610	51,610	---	---	---	51,610	---	---	---	---	---	---	---	---	51,610	
Project Water Rights	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Leased Water Rights Land & Drought Contingency Contracts	1,879,800	187,980	2,067,780	1,324,985	---	---	1,375,209	1,590,549	---	---	---	---	---	---	---	---	1,627,930	
Total Estimated Cost	57,857,500	5,785,750	63,643,250	13,316,230	26,219,332	26,219,332	50,957,000	5,095,700	56,052,700	26,082,494	26,082,494	35,107,310	3,510,731	38,618,041	31,835,411	28,191,700	16,490,781	54,109,811

**EXHIBIT 7**

**- SCENARIO B -**

**CAPITAL EXPENDITURES**

**AND**

**OPERATING COSTS**

SCENARIO B

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1991 TO 1995

Item Description	1991				1992				1993				1994				1995			
	O & M			Total	O & M			Total	O & M			Total	O & M			Total	O & M			Total
	Capital	Power	Other		Capital	Power	Other		Capital	Power	Other		Capital	Power	Other		Capital	Power	Other	
Huaco Bolson Pumping	---	3,516,008	865,020	4,381,028	---	3,370,716	865,020	4,235,736	---	3,140,380	865,020	4,005,400	---	3,019,342	865,020	3,884,362	---	2,832,265	865,020	3,487,285
Water Wells	---	---	237,000	237,000	---	---	237,000	237,000	---	---	237,000	237,000	---	---	237,000	237,000	---	---	---	237,000
Reservoirs and Manifold Piping	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mesilla Bolson Pumping	1,500,000	208,836	42,000	1,750,836	1,500,000	417,872	84,000	2,001,872	1,500,000	628,570	126,000	2,252,570	1,500,000	835,344	168,000	2,503,344	1,500,000	1,023,150	210,000	2,733,150
Water Wells	1,218,000	---	6,090	1,224,090	1,218,000	---	12,180	1,230,180	1,218,000	---	18,270	1,236,270	1,218,000	---	24,360	1,242,360	1,218,000	---	30,450	1,248,450
Collection & Manifold Piping	2,100,000	---	10,500	2,110,500	---	---	10,500	10,500	---	---	10,500	10,500	---	---	10,500	10,500	---	---	---	21,000
Reservoirs - 6 MC	4,800	---	---	4,800	4,800	---	---	4,800	4,800	---	---	4,800	4,800	---	---	4,800	4,800	---	---	---
Lands	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Surface Water	---	---	---	---	300,000	---	---	300,000	---	---	---	---	---	---	---	---	---	---	---	---
El Paso Conveyance Channel	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
R/J Water Treatment Plant to operate 800 cfs/day	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000	---	258,000	1,620,000	1,878,000
3000 AF Regulating Reservoir	1,800,000	---	---	1,800,000	1,800,000	338,700	24,200	2,162,900	---	338,700	24,200	362,900	---	338,700	24,200	362,900	---	338,700	24,200	362,900
Re-Use & Recharge Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pipeline from F. Harvey WWP to Newman Feed Plant	282,024	24,350	1,450	287,824	---	24,350	1,450	25,800	---	33,600	2,000	35,600	---	33,600	2,000	35,600	---	33,600	2,000	35,600
Pipelines from WWP to Turf Areas & Industries	238,250	10,125	3,375	249,750	27,000	10,425	3,475	40,900	67,800	11,175	3,725	82,400	101,250	12,300	4,100	117,650	175,500	14,250	4,750	194,500
Transmission Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Western Slope Booster Stations	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Transmountain Tunnel w/s Pipeline	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PRV Vault - 24"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PRV Vault - 36"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PRV Vault - 60"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
54" CDP Transmission Line	1,337,700	---	6,689	1,344,389	1,337,700	---	13,377	1,351,077	1,337,700	---	20,066	1,357,766	1,337,700	---	28,754	1,366,454	1,337,700	---	33,443	1,371,143
72" CDP Transmission Line	1,984,200	---	9,971	2,004,171	1,984,200	---	19,942	2,014,142	1,984,200	---	29,913	2,024,113	1,984,200	---	39,884	2,034,084	1,984,200	---	49,855	2,044,055
84" CDP Transmission Line	438,000	---	2,190	440,190	438,000	---	4,380	442,380	438,000	---	6,570	444,570	438,000	---	8,760	446,760	438,000	---	10,950	448,950
Project Water Rights	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Leased Water Rights Land & Drought Contingency Contracts	484,680	---	481,805	946,485	135,630	---	483,155	598,785	135,630	---	487,875	623,505	135,630	---	477,735	613,365	135,630	---	3,331,626	3,467,256
Total Estimated Cost	11,375,654	4,017,317	3,266,000	18,658,971	8,735,330	4,419,863	3,358,679	16,513,872	7,885,830	4,408,423	3,431,139	15,725,394	15,101,380	4,487,886	3,518,813	23,118,079	58,974,400	4,289,965	6,440,294	69,714,639

SCENARIO B

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1996 TO 2000

Item Description	1996				1997				1998				1999				2000			
	Capital	O & M			Capital	O & M			Capital	O & M			Capital	O & M			Capital	O & M		
		Power	Other	Total		Power	Other	Total		Power	Other	Total		Power	Other	Total		Power	Other	Total
<b>Mucro Bolson Pumping</b>																				
Water Wells	—	2,910,294	865,020	3,775,314	—	3,009,759	865,020	3,874,779	—	1,468,229	865,020	2,333,249	—	1,062,775	865,020	1,917,795	—	383,647	81,340	434,987
Reservoirs and Manifold Piping	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	22,010	22,010
<b>Mesilla Bolson Pumping</b>																				
Water Wells	2,000,000	1,322,628	280,000	3,602,628	2,000,000	1,601,076	336,000	3,937,076	2,000,000	1,879,524	392,000	4,271,524	2,000,000	2,157,972	448,000	4,605,972	2,000,000	2,436,420	504,000	4,940,420
Collection & Manifold Piping	1,624,000	—	38,570	1,662,570	1,624,000	—	46,690	1,670,690	1,624,000	—	54,810	1,678,810	1,624,000	—	62,930	1,686,930	1,624,000	—	71,050	1,695,050
Reservoirs - 8 MG	2,100,000	—	31,500	2,131,500	—	—	31,500	31,500	2,100,000	—	42,000	2,142,000	2,100,000	—	52,500	2,152,500	—	—	52,500	52,500
Lands	6,400	—	—	6,400	6,400	—	—	6,400	6,400	—	—	6,400	6,400	—	—	6,400	6,400	—	—	6,400
<b>Surface Water</b>																				
El Paso Conveyance Channel	52,170,570	—	500,000	52,670,570	48,098,770	—	500,000	48,598,770	48,098,770	—	750,000	48,848,770	—	—	1,000,000	1,000,000	—	—	1,000,000	1,000,000
R/U Water Treatment Plant to operate 365 days/year	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000
3000 AF Regulating Reservoir	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900
<b>Re-Use &amp; Recharge Facilities</b>																				
Pipeline from F. Harvey WWTP to Neuman Power Plant	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600
Pipelines from WWTP to Turf Areas & Industries	101,250	15,375	5,125	121,750	101,250	16,500	5,500	123,250	135,000	18,000	6,000	159,000	101,250	19,125	6,375	126,750	303,750	22,500	7,500	333,750
<b>Transmission Facilities</b>																				
Western Slope Booster Stations	—	—	—	—	—	—	—	—	1,428,500	—	—	1,428,500	1,428,500	—	—	1,428,500	1,428,500	3,500,000	103,585	5,032,085
Transmountain Tunnel w/o Pipeline	—	—	—	—	1,963,350	—	—	1,963,350	1,963,350	—	—	1,963,350	1,963,350	—	24,750	2,008,100	—	—	24,750	24,750
PRV Vault - 24"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30,000	—	7,295	37,295
PRV Vault - 36"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45,000	—	7,480	52,480
PRV Vault - 50"	—	—	—	—	—	—	—	—	—	—	—	—	75,000	—	7,835	82,835	—	—	7,835	7,835
54" COP Transmission Line	1,337,700	—	40,131	1,377,831	1,337,700	—	46,820	1,384,520	1,337,700	—	53,508	1,391,208	1,337,700	—	60,197	1,397,897	1,337,700	—	66,865	1,404,565
72" COP Transmission Line	1,994,200	—	59,828	2,054,028	1,994,200	—	69,797	2,063,997	1,994,200	—	79,768	2,073,968	1,994,200	—	89,739	2,083,939	1,994,200	—	99,710	2,093,910
84" COP Transmission Line	438,000	—	15,140	453,140	438,000	—	15,330	453,330	438,000	—	17,520	455,520	438,000	—	19,710	457,710	438,000	—	21,900	459,900
<b>Project Water Rights</b>																				
Leased Water Rights Land & Drought Contingency Contracts	135,630	—	3,276,176	3,411,806	135,630	—	3,197,131	3,332,761	135,630	—	3,244,987	3,380,617	135,630	—	689,205	824,835	135,630	—	656,925	792,555
<b>Total Estimated Cost</b>	<b>61,907,750</b>	<b>4,878,597</b>	<b>6,992,688</b>	<b>73,779,035</b>	<b>57,719,300</b>	<b>5,257,635</b>	<b>6,996,988</b>	<b>69,973,923</b>	<b>61,281,550</b>	<b>3,996,053</b>	<b>7,386,813</b>	<b>72,664,416</b>	<b>13,224,030</b>	<b>3,860,172</b>	<b>5,209,261</b>	<b>22,293,463</b>	<b>9,343,190</b>	<b>6,942,867</b>	<b>4,380,785</b>	<b>20,666,812</b>

SCENARIO B

ANNUAL CAPITAL EXPENDITURES AND OPERATING COST - 2001 TO 2040

Item Description	Year 2001 - 2010				Year 2011 - 2020				Year 2021 - 2030				Year 2031 - 2040								
	Capital Costs		Annual Costs		Capital Costs		Annual Costs		Capital Costs		Annual Costs		Capital Costs		Annual Costs						
	Capital Costs	Other O & M	Capital Costs	Other O & M	Capital Costs	Power	Other O & M	Total	Capital Costs	Power	Other O & M	Total	Capital Costs	Power	Other O & M	Total					
Haas Bolton Pumping	---	---	344,240	79,175	---	---	137,456	31,615	169,071	---	---	---	---	440,418	101,286	541,714					
Water Mains	---	---	---	21,425	---	---	---	6,555	6,555	---	---	---	---	---	27,410	27,410					
Reservoirs and Mainfield Piping	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---					
Melroe Bolton Pumping	9,000,000	900,000	3,284,104	626,000	4,992,104	1,106,000	7,332,119	1,060,000	9,731,021	11,000,000	1,100,000	7,217,021	1,414,000	8,000,000	800,000	9,040,823	11,520,823				
Water Mains	7,308,000	730,800	---	107,560	8,038,800	832,200	1,045,450	199,910	1,090,110	8,932,000	893,200	---	199,910	6,496,000	649,600	229,390	878,980				
Collection & Mainfield Piping	6,300,000	630,000	---	84,430	724,430	630,000	818,860	188,860	892,790	4,200,000	420,000	---	272,790	6,300,000	630,000	367,220	897,220				
Reservoirs - 6 MG	26,000	2,500	---	---	2,500	---	3,520	---	3,520	35,200	3,520	---	---	25,600	2,560	2,560	---				
Lands	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Surface Water	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
El Paso Conveyance Channel	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
R/U Water Treatment Plant to operate 365 days/year	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
3000 AF Regulating Reservoir	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Re-Use & Recharge Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Pipeline from F. Harvey WRP to Nelson Power Plant & Industries	4,239,000	423,900	40,500	13,500	4,716,900	477,900	6,795,000	679,500	7,474,500	6,346,300	634,630	96,750	32,250	5,802,000	582,000	115,500	739,200				
Transmission Facilities	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Western Slope Booster Stations	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
- 3 Additional Pumps	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
- 2 Additional Pumps	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Transmission Tunnel w/o pipeline	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
PRV Vault - 24"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
PRV Vault - 36"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
PRV Vault - 60"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
24" COP Transmission Line	6,699,000	669,900	---	33,485	7,032,385	703,385	1,076,000	107,600	1,183,600	5,100,000	510,000	103,585	5,103,585	510,350	121,185	6,721,185					
30" COP Transmission Line	2,499,000	249,900	---	12,485	2,661,385	266,385	---	---	---	---	---	---	---	---	---	---	---				
42" COP Transmission Line	3,570,000	357,000	---	17,850	3,944,850	394,485	---	---	---	---	---	---	---	---	---	---	---				
48" COP Transmission Line	1,368,500	136,850	---	6,843	1,511,693	151,168	---	---	---	---	---	---	---	---	---	---	---				
54" COP Transmission Line	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
60" COP Transmission Line	12,829,600	1,282,960	---	64,148	14,176,708	1,417,108	---	---	---	---	---	---	---	---	---	---	---				
72" COP Transmission Line	4,420,000	442,000	---	121,810	4,983,810	498,310	---	---	---	---	---	---	---	---	---	---	---				
84" COP Transmission Line	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Project Water Rights	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
Leased Water Rights Land & Brought Contingency Contracts	1,263,400	126,340	---	1,154,216	1,382,556	138,256	---	---	---	---	---	---	---	---	---	---	---				
Total Estimated Cost	59,544,500	5,954,450	6,361,144	13,443,768	77,979,300	7,979,300	34,963,200	3,496,520	10,961,375	13,908,034	26,235,928	37,046,000	3,704,600	14,344,071	13,909,473	32,056,144	26,873,800	2,667,360	19,528,841	15,246,273	37,442,474

**EXHIBIT 8**

**- SCENARIO C -**

**CAPITAL EXPENDITURES**

**AND**

**OPERATING COSTS**



SCENARIO C

ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1991 TO 1995

Item Description	1991			1992			1993			1994			1995			
	Capital	O & M Power	Other	Capital	O & M Power	Other	Capital	O & M Power	Other	Capital	O & M Power	Other	Capital	O & M Power	Other	
Mesa Borehole Pumping	—	3,808,130	865,020	4,673,170	2,829,350	865,020	3,784,370	2,734,050	865,020	3,599,070	2,638,410	865,020	3,501,430	2,734,050	865,020	
Water Mains	—	—	237,000	237,000	—	237,000	237,000	—	237,000	237,000	—	237,000	237,000	—	237,000	
Reservoirs & Manifold Piping	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Mesilla Borehole Pumping	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Water Mains	500,000	65,350	14,000	579,350	500,000	130,700	28,000	658,700	500,000	196,050	42,000	56,000	617,400	500,000	328,750	70,000
Collection & Manifold Piping	210,000	—	1,050	211,050	210,000	—	2,100	212,100	210,000	—	3,150	4,200	214,200	210,000	—	5,250
Reservoirs - 8 MG	2,100,000	—	10,500	2,110,500	—	—	10,500	10,500	—	—	10,500	10,500	10,500	—	—	10,500
Land	1,600	—	—	1,600	1,600	—	—	1,600	1,600	—	—	—	1,600	1,600	—	—
Surface Water	—	—	—	—	300,000	—	—	300,000	1,300,000	—	—	—	6,271,800	52,170,570	—	—
El Paso Conveyance Channel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAJ Water Treatment Plant to operate 363 days/year	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	1,878,000	—	258,000	1,620,000
3000 AF Regulating Reservoir	1,800,000	—	—	1,800,000	1,800,000	338,700	24,200	2,162,900	—	338,700	24,200	362,900	362,900	—	338,700	24,200
Expansion of Basin 'g' to 900 AF	900,000	—	—	900,000	900,000	37,900	16,950	954,850	—	37,900	16,950	54,850	54,850	—	37,900	16,950
Re-Use & Recharge Facilities	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pipelines from El Paso WTRP to Mesilla Power Plant	262,024	24,350	1,450	287,824	—	24,350	1,450	25,800	—	33,600	2,000	35,600	35,600	—	33,600	2,000
Pipelines from WTRP to Turf Areas & Industries	236,250	10,128	3,375	249,753	27,000	10,425	3,375	40,800	87,500	11,175	3,725	82,400	117,650	175,500	14,250	4,750
Recharge Facility w/acidification & spreading basins, incl. Rise in water table, infiltration, life station, & transmission line	—	—	—	—	9,500,000	—	—	9,500,000	9,500,000	—	—	—	9,500,000	9,500,000	—	—
Transmission Facilities	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PRV Vault - 24"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PRV Vault - 30"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42" COP Transmission Line	1,039,000	—	5,145	1,044,145	1,029,000	—	10,290	1,039,290	1,029,000	—	15,435	1,044,435	1,049,580	1,029,000	—	25,725
66" COP Transmission Line	883,000	—	4,485	887,485	883,000	—	8,330	891,330	883,000	—	13,985	896,985	910,980	883,000	—	22,325
72" COP Transmission Line	1,578,200	—	7,891	1,586,091	1,578,200	—	15,782	1,593,982	1,578,200	—	23,673	1,601,873	1,609,764	1,578,200	—	39,455
Project Water Rights	2,088,240	—	615,750	2,703,990	180,840	—	617,505	798,345	180,840	—	650,490	831,330	817,860	180,840	—	3,424,390
Leased Water Rights Land Drought Contingency Purchase	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Estimated Cost	11,598,314	4,165,975	3,385,646	19,149,935	18,919,640	3,729,425	3,481,202	24,110,267	18,160,140	3,609,478	3,527,538	22,287,153	27,360,984	66,238,710	3,742,250	8,387,965

SCENARIO C

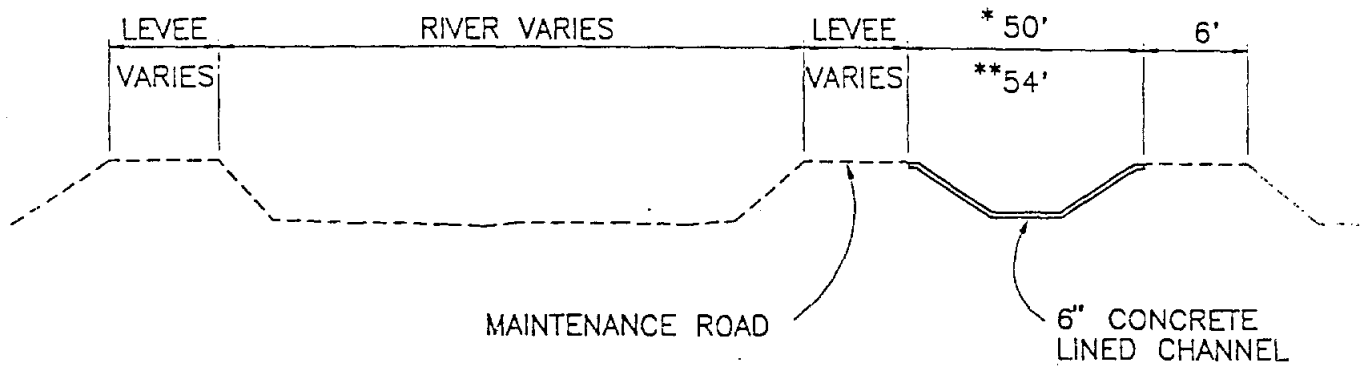
ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 1996 TO 2000

Item Description	1996				1997				1998				1999				2000						
	Capital		O & M		Capital		O & M		Capital		O & M		Capital		O & M		Capital		O & M				
	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other	Power	Other			
<b>Neuse Basin Pumping</b>																							
Water Mains	—	3,035,220	865,000	3,900,220	—	3,111,000	865,000	3,976,000	—	1,480,965	865,000	2,335,965	—	862,265	865,000	1,727,265	—	914,650	865,000	1,779,650	—	237,000	237,000
Reservoirs & Manifold Piping	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000	237,000	—	—	237,000
<b>Meallie Basin Pumping</b>																							
Water Mains	500,000	392,100	84,000	976,100	500,000	457,450	98,000	1,055,450	500,000	522,900	112,000	1,134,900	500,000	568,150	126,000	1,214,150	500,000	633,300	140,000	1,283,300	500,000	—	—
Collection & Manifold Piping	210,000	—	6,300	216,300	210,000	—	7,350	217,350	210,000	—	8,400	218,400	210,000	—	9,450	219,450	210,000	—	10,500	220,500	210,000	—	—
Reservoirs - 6 MC	—	—	10,500	10,500	—	—	21,000	21,000	—	—	21,000	21,000	—	—	21,000	21,000	—	—	21,000	21,000	—	—	—
Lands	1,600	—	—	1,600	1,600	—	—	1,600	1,600	—	—	1,600	1,600	—	—	1,600	1,600	—	—	1,600	1,600	—	—
<b>Surface Water</b>																							
El Paso Conveyance Channel	52,670,570	—	500,000	53,170,570	52,670,570	—	500,000	53,170,570	52,670,570	—	750,000	53,420,570	52,670,570	—	1,000,000	53,670,570	52,670,570	—	1,000,000	53,670,570	52,670,570	—	—
R/J Water Treatment Plant to operate 363 days/year	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	258,000	1,620,000	1,878,000	—	—	—
3000 AF Regulating Reservoir	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	338,700	24,200	362,900	—	—	—
Expansion of Basin 'G' to 800 AF	—	37,800	16,950	54,750	—	37,800	16,950	54,750	—	37,800	16,950	54,750	—	37,800	16,950	54,750	—	37,800	16,950	54,750	—	—	—
<b>Re-use &amp; Recharge Facilities</b>																							
Pipeline from F. Harvey WTP to Hannon Power Plant	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	33,600	2,000	35,600	—	—	—
Pipelines from WTP to Turf Areas & Industries	101,250	15,375	5,125	121,750	101,250	16,500	5,500	123,250	135,000	16,000	6,000	157,000	101,250	18,125	6,375	125,750	303,750	22,500	7,500	333,750	—	—	—
Recharge Facility w/depot station to provide 100 MG to Grand diversion structure, lift station, & transmission line	7,600,000	—	—	7,600,000	—	4,740,000	1,183,000	5,923,000	—	4,740,000	1,183,000	5,923,000	—	4,740,000	1,183,000	5,923,000	—	4,740,000	1,183,000	5,923,000	—	—	—
<b>Transmission Facilities</b>																							
PRV Vault - 24"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PRV Vault - 30"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42" COP Transmission Line	1,029,000	—	30,670	1,059,670	1,029,000	—	38,015	1,067,015	1,029,000	—	41,180	1,070,180	1,029,000	—	46,305	1,075,305	1,029,000	—	51,450	1,080,450	1,029,000	—	—
66" COP Transmission Line	883,000	—	26,790	919,790	883,000	—	31,255	924,255	883,000	—	35,720	928,720	883,000	—	40,165	933,165	883,000	—	44,850	937,850	883,000	—	—
72" COP Transmission Line	1,578,200	—	47,346	1,625,546	1,578,200	—	55,237	1,633,437	1,578,200	—	63,126	1,641,326	1,578,200	—	71,019	1,649,219	1,578,200	—	78,910	1,657,110	1,578,200	—	—
<b>Project Water Rights</b>																							
Leased Water Rights, Leas & Drought Contingency Contracts	180,840	—	3,378,873	3,559,713	180,840	—	3,317,436	3,498,276	180,840	—	3,365,979	3,546,819	180,840	—	634,870	1,015,710	180,840	—	665,860	1,046,700	180,840	—	—
<b>Total Estimated Cost</b>	64,784,460	4,110,865	6,664,864	75,730,309	59,264,460	5,993,156	6,019,842	78,277,653	57,169,210	7,439,465	6,351,637	72,669,312	4,523,860	6,877,740	6,110,648	17,512,278	4,733,660	6,999,650	6,162,625	17,915,765	—	—	—

## SCENARIO C

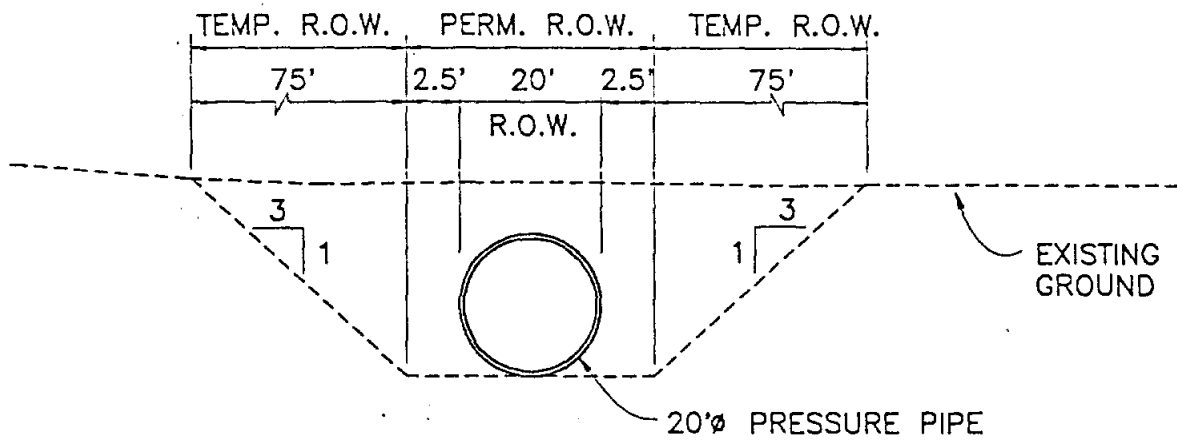
## ANNUAL CAPITAL EXPENDITURES AND OPERATING COSTS - 2001 TO 2040

Item Description	Year 2001 - 2010					Year 2011 - 2020					Year 2021 - 2030					Year 2031 - 2040				
	Annual Costs					Annual Costs					Annual Costs					Annual Costs				
	Capital Costs	Capital	Power	Other O & M	Total	Capital Costs	Capital	Power	Other O & M	Total	Capital Costs	Capital	Power	Other O & M	Total	Capital Costs	Capital	Power	Other O & M	Total
<b>Hueco Bolson Pumping</b>																				
Water Wells	---	---	1,200,000	865,020	2,065,020	---	---	1,200,000	865,020	2,065,020	---	---	1,500,000	865,020	2,365,020	---	---	4,400,000	865,020	5,265,020
Reservoirs & Manifold Piping	---	---	---	237,000	237,000	---	---	---	237,000	237,000	---	---	---	237,000	237,000	---	---	---	237,000	237,000
<b>Mesilla Bolson Pumping</b>																				
Water Wells	5,000,000	500,000	1,307,000	280,000	2,087,000	2,000,000	200,000	1,568,400	336,000	2,104,400	---	---	1,705,250	336,000	2,041,250	---	---	1,776,750	336,000	2,112,750
Collection & Manifold Piping	2,100,000	210,000	---	21,000	231,000	840,000	84,000	---	25,200	109,200	---	---	---	25,200	25,200	---	---	---	25,200	25,200
Reservoirs - 6 MG	2,100,000	210,000	---	31,500	241,500	2,100,000	210,000	---	42,000	252,000	---	---	---	42,000	42,000	---	---	---	42,000	42,000
Land	18,000	1,800	---	---	1,800	8,000	800	---	---	800	---	---	---	---	---	---	---	---	---	---
<b>Surface Water</b>																				
El Paso Conveyance Channel	---	---	---	9,000,000	9,000,000	---	---	---	9,000,000	9,000,000	---	---	---	9,000,000	9,000,000	---	---	---	9,000,000	9,000,000
R/J Water Treatment Plant to operate 363 days/year	---	---	258,000	1,620,000	1,878,000	---	---	258,000	1,620,000	1,878,000	---	---	258,000	1,620,000	1,878,000	---	---	258,000	1,620,000	1,878,000
JWR Water Treatment Plant expansion (20 MGD)	---	---	---	---	---	38,520,000	3,852,000	---	---	3,852,000	---	---	310,000	1,860,000	2,170,000	---	---	310,000	1,860,000	2,170,000
3000 AF Regulating Reservoir	---	---	338,700	24,200	362,900	---	---	338,700	24,200	362,900	---	---	338,700	24,200	362,900	---	---	338,700	24,200	362,900
Expansion of Basin 'G' to 900 AF	---	---	37,900	16,950	54,850	---	---	37,900	16,950	54,850	---	---	37,900	16,950	54,850	---	---	37,900	16,950	54,850
<b>Re-Use &amp; Recharge Facilities</b>																				
Pipeline from F. Harvey WTP to Newman Power Plant	---	---	33,800	2,000	35,800	---	---	33,800	2,000	35,800	---	---	33,800	2,000	35,800	---	---	33,800	2,000	35,800
Pipelines from WTP to Turf Area & Industries	4,239,000	423,900	40,500	13,500	477,900	6,795,000	679,500	67,500	22,500	769,500	8,346,300	834,630	98,750	32,250	963,630	5,832,000	585,200	115,500	36,500	739,200
20 MGD WW Reclamation Plant	24,100,000	2,410,000	371,400	1,192,200	3,973,600	---	---	619,000	2,504,000	3,123,000	---	---	619,000	2,504,000	3,123,000	---	---	619,000	2,504,000	3,123,000
Expand WW Reclamation Plant to 40 MGD	---	---	---	---	---	28,800,000	2,880,000	As Above	As Above	2,880,000	---	---	As Above	As Above	---	---	---	As Above	As Above	---
Reclaimed Water Injection Wells incl. Transmission Lines from WW Reclamation Plant	5,300,000	530,000	---	28,500	556,500	6,100,000	610,000	---	57,000	667,000	---	---	---	57,000	57,000	---	---	---	57,000	57,000
Pump Station from WTP to WW Reclamation Plant including Transmission Line	4,400,000	440,000	1,446,000	36,780	1,922,780	3,800,000	380,000	2,289,200	58,920	2,728,120	---	---	2,289,200	58,920	2,348,120	---	---	2,289,200	58,920	2,348,120
Recharge Facility w/sedimentation & spreading basins incl. Rio Grande diversion structure, lift station, & transmission line	---	---	4,740,000	1,183,000	5,923,000	---	---	4,740,000	1,183,000	5,923,000	---	---	4,740,000	1,183,000	5,923,000	---	---	4,740,000	1,183,000	5,923,000
<b>Transmission Facilities</b>																				
PRV Vault - 24"	---	---	---	7,295	7,295	---	---	---	7,295	7,295	---	---	---	7,295	7,295	---	---	---	7,295	7,295
PRV Vault - 30"	---	---	---	7,480	7,480	---	---	---	7,480	7,480	---	---	---	7,480	7,480	---	---	---	7,480	7,480
24" COP Transmission Line	4,843,100	484,310	---	23,218	487,528	---	---	---	23,218	23,218	---	---	---	23,218	23,218	---	---	---	23,218	23,218
30" COP Transmission Line	4,874,600	487,460	---	23,373	490,833	---	---	---	23,373	23,373	---	---	---	23,373	23,373	---	---	---	23,373	23,373
36" COP Transmission Line	3,808,000	380,800	---	19,040	399,840	---	---	---	19,040	19,040	---	---	---	19,040	19,040	---	---	---	19,040	19,040
42" COP Transmission Line	---	---	---	51,450	51,450	---	---	---	51,450	51,450	---	---	---	51,450	51,450	---	---	---	51,450	51,450
48" COP Transmission Line	1,368,500	136,850	---	6,843	143,693	---	---	---	6,843	6,843	---	---	---	6,843	6,843	---	---	---	6,843	6,843
54" COP Transmission Line	2,002,000	200,200	---	10,010	210,210	---	---	---	10,010	10,010	---	---	---	10,010	10,010	---	---	---	10,010	10,010
66" COP Transmission Line	5,170,000	517,000	---	70,500	587,500	---	---	---	70,500	70,500	---	---	---	70,500	70,500	---	---	---	70,500	70,500
72" COP Transmission Line	---	---	---	78,910	78,910	---	---	---	78,910	78,910	---	---	---	78,910	78,910	---	---	---	78,910	78,910
<b>Project Water Rights</b>																				
Leased Water Rights Land & Drought Contingency Contracts	1,879,800	187,980	---	1,368,637	1,554,617	2,153,400	215,340	---	1,420,317	1,635,657	2,243,700	224,370	---	1,288,115	1,510,465	1,299,000	129,900	---	1,717,173	1,647,073
<b>Total Estimated Cost</b>	<b>70,801,000</b>	<b>7,080,100</b>	<b>9,773,100</b>	<b>16,214,403</b>	<b>33,067,603</b>	<b>91,118,400</b>	<b>9,111,640</b>	<b>11,152,300</b>	<b>17,712,223</b>	<b>37,978,183</b>	<b>10,590,000</b>	<b>1,059,000</b>	<b>11,828,400</b>	<b>19,447,771</b>	<b>32,435,171</b>	<b>7,151,000</b>	<b>716,100</b>	<b>14,918,850</b>	<b>19,885,079</b>	<b>36,518,829</b>



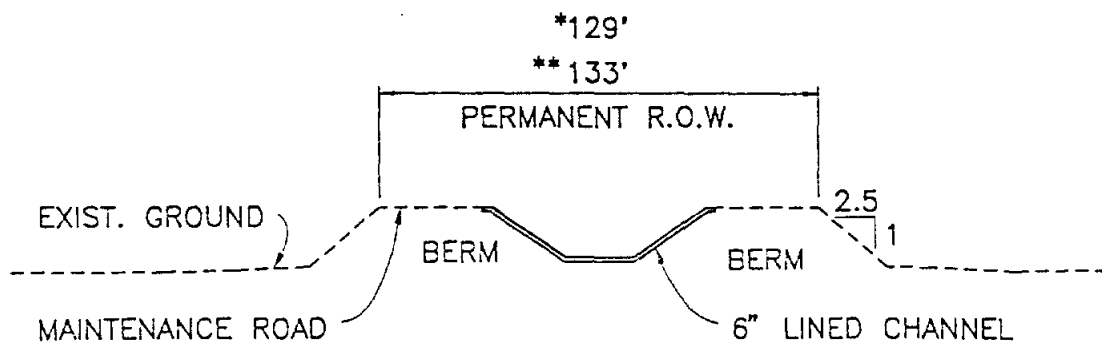
TYPICAL LEVEE CHANNEL SECTION R.O.W. DIAGRAM

N.T.S.



TYPICAL SIPHON SECTION R.O.W. DIAGRAM

N.T.S.

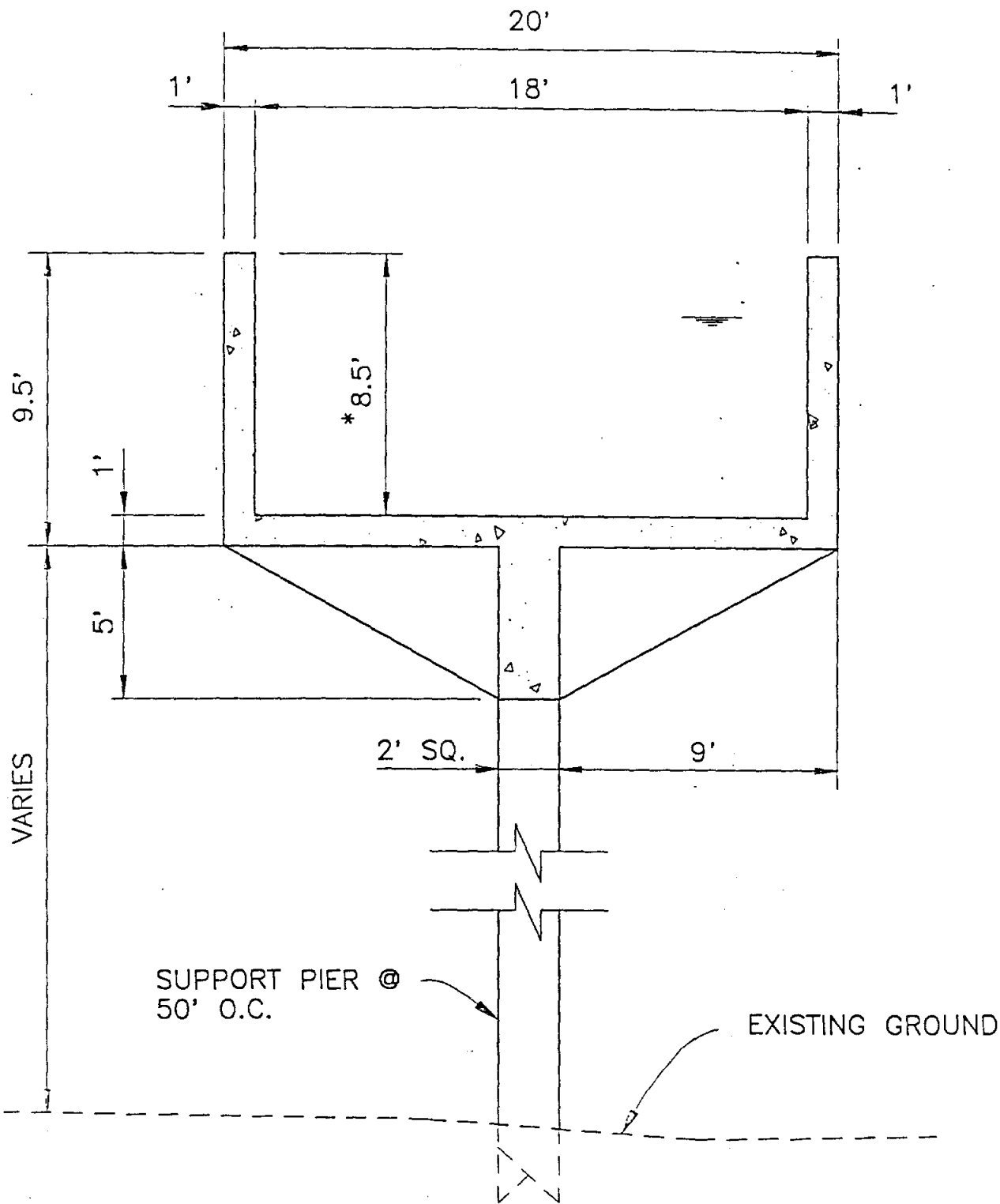


TYPICAL CHANNEL SECTION R.O.W. DIAGRAM

N.T.S.

- \* 16' BOTTOM WIDTH
- \*\* 20' BOTTOM WIDTH

TYPICAL RIGHT-OF-WAY  
DIAGRAMS



# TYPICAL CONCRETE FLUME SECTION

\* 6' + 2.5' FREEBOARD

SCALE: 1" = 5'

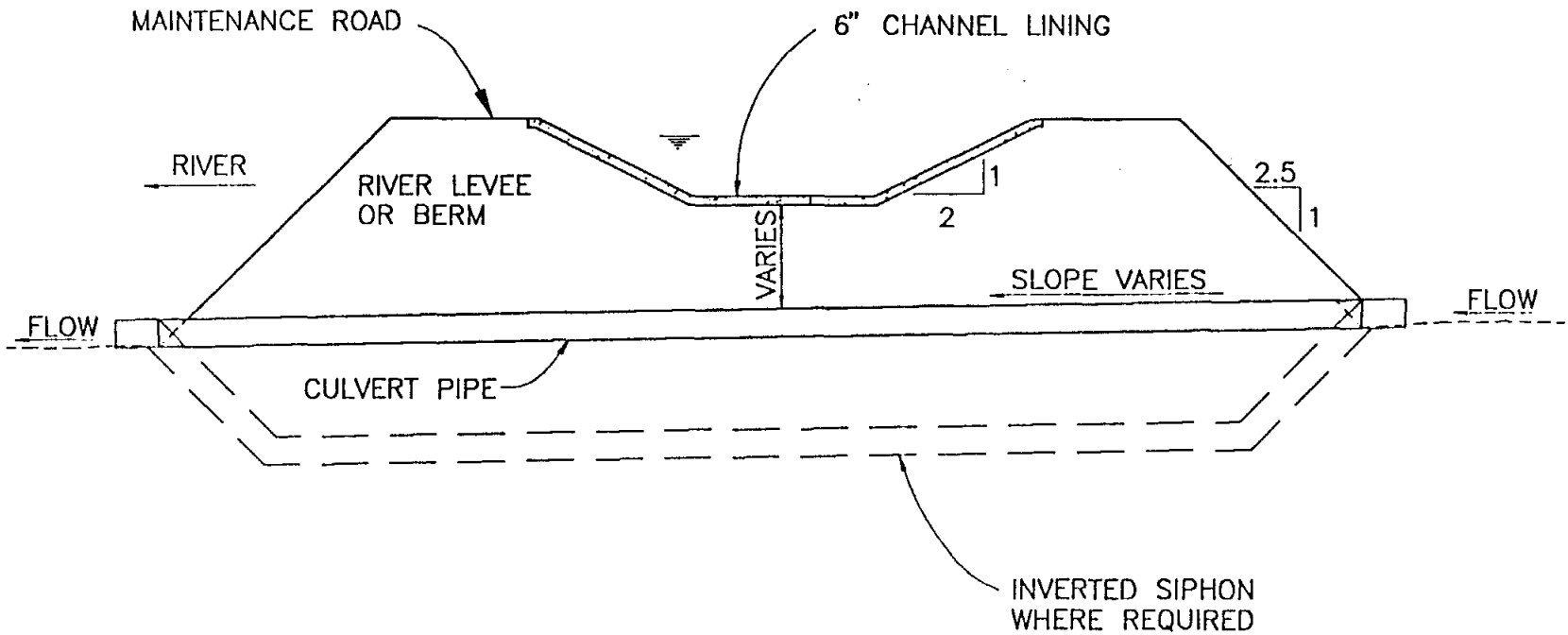
TYPICAL CONCRETE  
FLUME SECTION



TYPICAL MINOR  
DRAINAGE CROSSING

A-107

**BOYLE**  
ENGINEERING CORPORATION

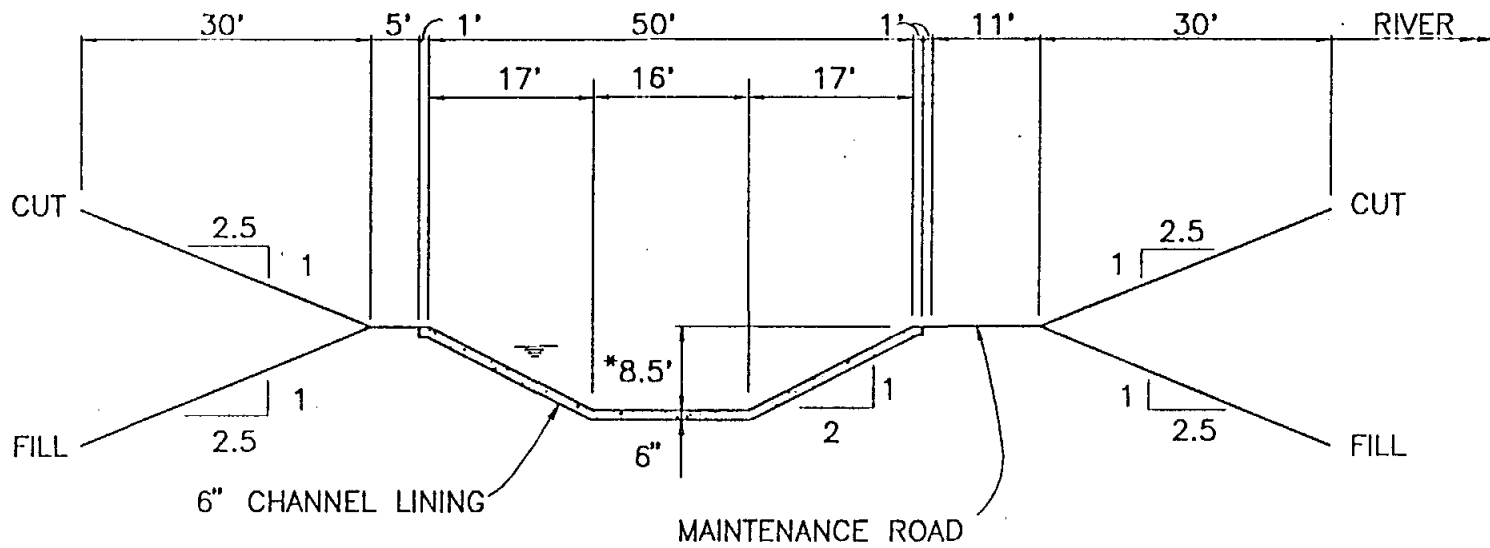


TYPICAL MINOR DRAINAGE CROSSING

SCALE: 1" = 20'

TYPICAL 16' STAND ALONE  
CHANNEL SECTION

A-108



TYPICAL 16' STAND ALONE CHANNEL SECTION

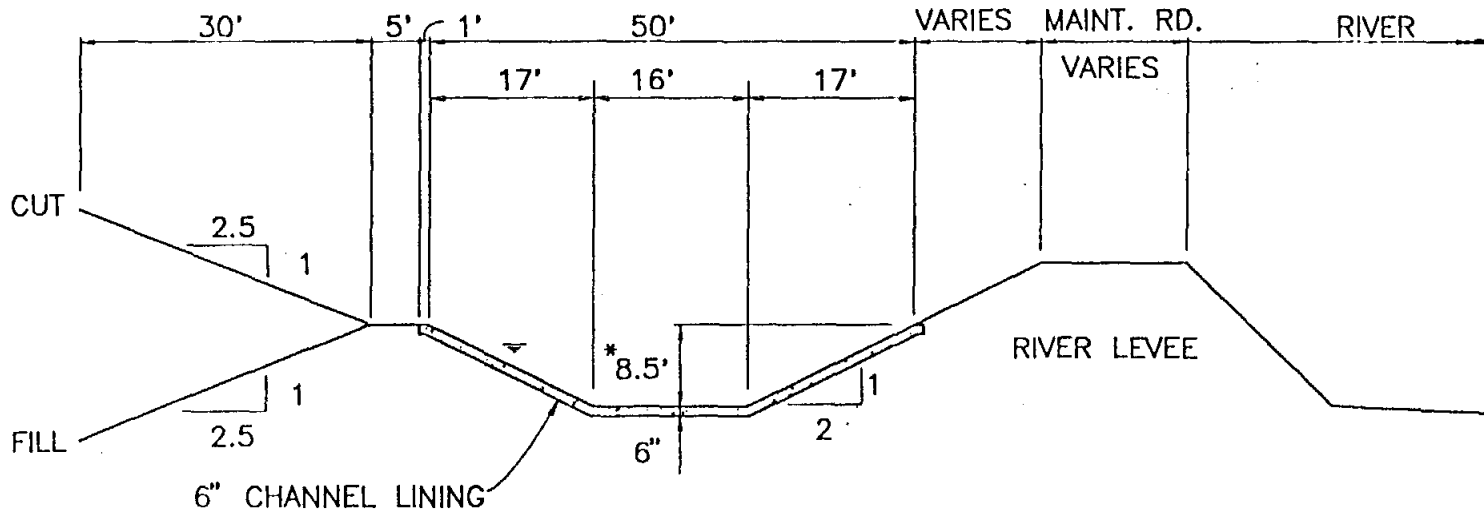
\* 6.5' + 2' FREEBOARD

SCALE: 1" = 20'

**BOYLE**  
ENGINEERS CORPORATION

TYPICAL 16' LEVEE  
CHANNEL SECTION

A-109



TYPICAL 16' LEVEE CHANNEL SECTION

\* 6.5' + 2' FREEBOARD

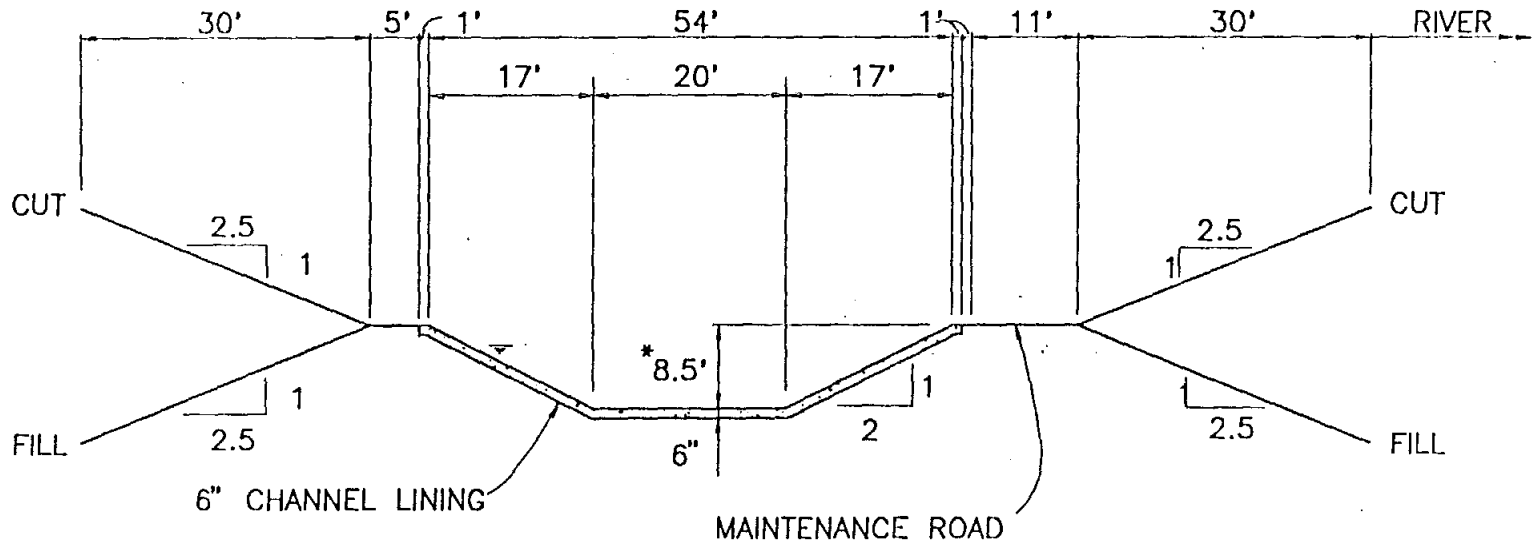
SCALE: 1" = 20'

**BOYLE**  
ENGINEERS & ARCHITECTS



TYPICAL 20' STAND ALONE  
CHANNEL SECTION

A-110



TYPICAL 20' STAND ALONE CHANNEL SECTION

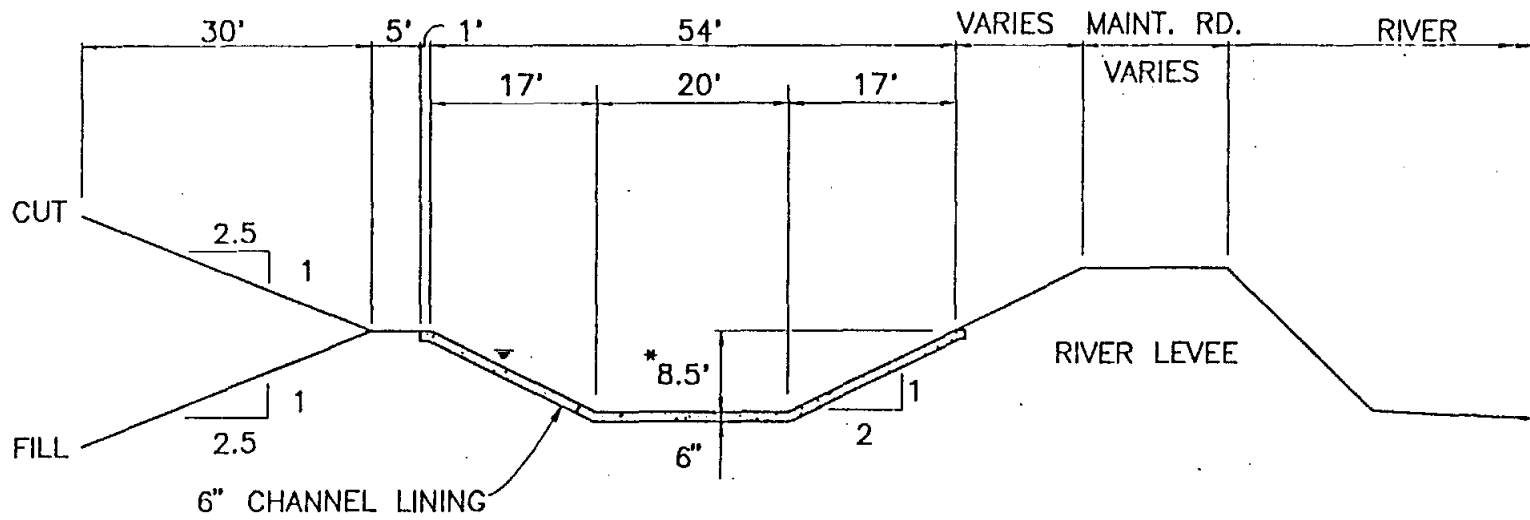
\* 6.5' + 2' FREEBOARD

SCALE: 1" = 20'

**BOYCE**  
ENGINEERING CORPORATION

TYPICAL 20' LEVEE  
CHANNEL SECTION

A-111

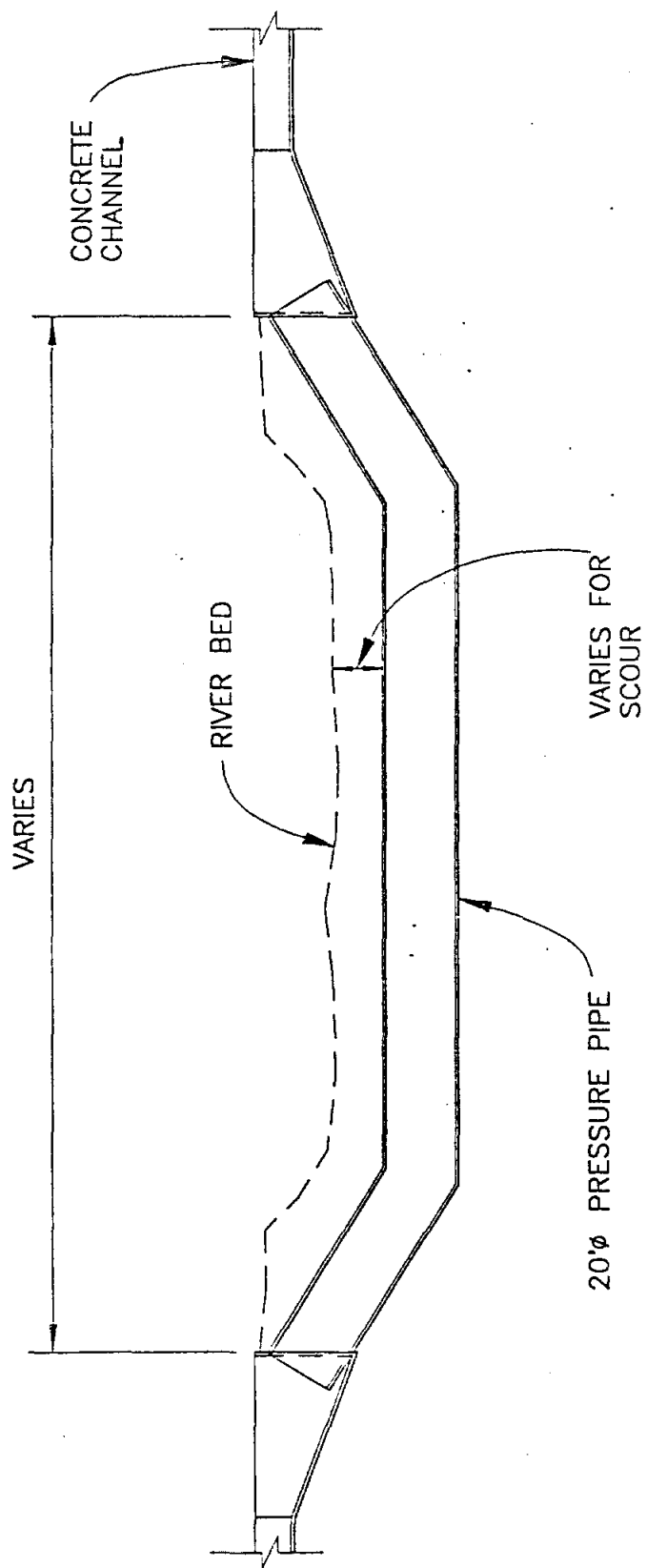


TYPICAL 20' LEVEE CHANNEL SECTION

\* 6.5' + 2' FREEBOARD

SCALE: 1" = 20'

**BOYLER**  
ENGINEERING CORPORATION



TYPICAL INVERTED SIPHON PROFILE

SCALE: 1" = 50'

TYPICAL INVERTED  
SIPHON PROFILE

A-112



**EXHIBIT 9**

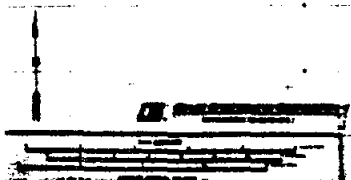
**CONVEYANCE CHANNEL**

**DESIGN SECTIONS, ALIGNMENT AND COSTS**



- LEGEND**
- PROPOSED WATER CONVEYANCE
  - RIO GRANDE
  - CITIES & TOWNS
  - COUNTY LINES

**EL PASO  
PROPOSED WATER CONVEYANCE  
SYSTEM**



EL PASO CONVEYANCE CANAL

DIVERSION AT CABALLO LAKE

A Canal from Below Caballo Lake Dam on the Rio Grande extending Southward along the river to the American Canal at its point of diversion by the American Dam.

CANAL CHARACTERISTICS

Beg. Station	Elev.	End Station	Elev.	Slope	Cross-Section	Description	Unit	Unit Price	Est. Qty.	Perm. ROW	Temp. ROW	Perm. ROW (ac)	Temp. ROW (ac)	Price/Ac.	Amount
1377+50	4230	1447+00	4150	.01151	Series of Steps	E. side 1-25-1 ditch king. then under 1-25 bridge	LF	240.00	6950	25	150	4.0	23.9	8,000.00	1,738,202.02
1447+00	4150	1495+00	4150	.00000	16 ft. Stand Alone	End at Percha Dam - Arrey Canal	LF	224.00	4800	130		14.3	.0	8,000.00	1,109,800.55
1495+00	4150	1495+50			STRUCTURE	Flume across Arrey Canal	LF	525.00	50					PERMIT	26,250.00
1495+50	4150	1624+00	4140	.00078	16 ft. Stand Alone	End At Trujillo Lateral - West Bank River	LF	224.00	12850	130		38.3	.0	6,000.00	3,108,496.42
1624+00	4140	1624+50			STRUCTURE	Flume across Trujillo Lateral	LF	525.00	50					PERMIT	26,250.00
1624+50	4140	1700+00	4130	.00132	16 ft. Stand Alone	End at Montoya Arroyo - West Bank River	LF	224.00	7550	130		22.5	.0	6,000.00	1,826,392.84
1700+00	4130	1702+00			STRUCTURE	Montoya Arroyo crossing	LF	525.00	200	50	50	.2	.2	75.00	105,020.66
1702+00	4130	1792+00	4120	.00111	16 ft. Stand Alone	End at Tierra Blanca Creek	LF	224.00	9000	130		26.9	.0	6,000.00	2,177,157.02
1792+00	4120	1793+50			STRUCTURE	Tierra Blanca Creek crossing	LF	525.00	150	50	50	.2	.2	75.00	78,765.50
1793+50	4120	1870+00	4110	.00131	16 ft. Stand Alone	End at Inverted siphon under Rio Grande	LF	224.00	7650	130		22.8	.0	6,000.00	1,850,503.47
1870+00	4110	1873+00			STRUCTURE	Inverted siphon under Rio Grande	LF	2,200.00	300					PERMIT	660,000.00
1873+00	4110	2280+00	4080	.00074	16 ft. Stand Alone	End at Garfield Canal East Bank Rio Grande	LF	224.00	40700	130		121.5	.0	6,000.00	9,845,587.88
2280+00	4080	2280+50			STRUCTURE	Flume over Garfield Canal	LF	525.00	50					PERMIT	26,250.00
2280+50	4080	2480+00	4060	.00100	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	19950	130		59.5	.0	6,000.00	4,826,031.41
2480+00	4060	2490+00			STRUCTURE	Inv. Siphon under Rio Grande @ US 85 Bridge	LF	2,200.00	1000					PERMIT	2,200,000.00
2490+00	4060	2565+00	4057	.00040	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	7500	130		22.4	.0	6,000.00	1,814,297.52
2565+00	4057	2568+00			STRUCTURE	Placitas Arroyo crossing	LF	525.00	300	50	50	.3	.3	75.00	157,530.99
2568+00	4057	2595+00	4055	.00074	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	2700	130		8.1	.0	6,000.00	653,147.11
2595+00	4055	2595+50			STRUCTURE	Culvert under SR 26	LF	400.00	50					PERMIT	20,000.00
2595+50	4055	2646+00	4053	.00040	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	5050	130		15.1	.0	6,000.00	1,221,627.00
2646+00	4053	2646+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
2646+50	4053	2712+00	4050	.00046	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	6550	130		19.5	.0	6,000.00	1,584,486.50
2712+00	4050	2720+00			STRUCTURE	Inv. Siphon under Rio Grande @ SR 140 Bridge	LF	2,200.00	800					PERMIT	1,760,000.00

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CANAL CHARACTERISTICS

Beg. Station	Elev.	End Station	Elev.	Slope	Cross-Section	Description	Unit	Unit Price	Est. Qty.	Perm. ROW	Temp. ROW	Perm. ROW (ac)	Temp. ROW (ac)	Price/Ac.	Amount
2720+00	4050	2722+00	4040	.05000	16 ft. Stand Alone	East Side of River	LF	224.00	200	130		.6	.0	6,000.00	48,381.27
2722+00	4040	2722+50			STRUCTURE	Flume over Rincon Canal	LF	525.00	50					PERMIT	26,250.00
2722+50	4040	2886+00	4030	.00061	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	16350	130		48.8	.0	6,000.00	3,955,168.60
2886+00	4030	2886+50			STRUCTURE	Culvert under SR 140	LF	400.00	50					PERMIT	20,000.00
2886+50	4030	2898+00	4030	.00000	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	1150	130		3.4	.0	6,000.00	278,192.29
2898+00	4030	2900+50			STRUCTURE	Rincon Arroyo crossing	LF	525.00	250	50	50	.3	.3	75.00	131,275.83
2900+50	4030	3071+00	4006	.00141	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	17050	130		50.9	.0	6,000.00	4,124,503.03
3071+00	4006	3071+50			STRUCTURE	Flume over Rincon Lateral	LF	525.00	50					PERMIT	26,250.00
3071+50	4006	3158+00	4000	.00069	16 ft. Stand Alone	East Shore--1 minor drainage crossing	LF	224.00	8650	130		25.8	.0	6,000.00	2,092,409.81
3158+00	4000	3160+00			STRUCTURE	Inverted siphon under Rio Grande	LF	2,200.00	200					PERMIT	440,000.00
3160+00	4000	3790+00	3980	.00032	16 ft. Stand Alone	West Shore--10 minor drainage crossings	LF	224.00	63000	130		188.0	.0	4,000.00	14,864,066.12
3790+00	3980	3793+00			STRUCTURE	Faulkner Canyon crossing	LF	525.00	300	50	50	.3	.3	75.00	157,530.99
3793+00	3980	3795+00	3960	.10000	16 ft. Stand Alone	End at Inverted siphon under Rio Grande	LF	224.00	200	130		.6	.0	8,000.00	49,575.02
3795+00	3960	3800+00			STRUCTURE	Inv. Siphon under Rio Grande @ US 85 Bridge	LF	2,200.00	500					PERMIT	1,100,000.00
3800+00	3960	4297+00	3920	.00080	16 ft. Stand Alone	East Shore--3 minor drainage crossings	LF	224.00	49700	130		148.3	.0	6,000.00	12,022,744.90
4297+00	3920	4298+00			STRUCTURE	Flume over Picacho Canal	LF	525.00	100					PERMIT	52,500.00
4298+00	3920	4308+00	3920	.00000	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	1000	130		3.0	.0	6,000.00	241,906.34
4308+00	3920	4308+50			STRUCTURE	Culvert under SR 359	LF	400.00	50					PERMIT	20,000.00
4308+50	3920	4500+00	3900	.00104	16 ft. Stand Alone	East Shore--1 minor drainage crossing	LF	224.00	19150	130		57.2	.0	10,000.00	4,861,110.56
4500+00	3900	4502+00			STRUCTURE	Flume over Del Rio Drain & Elwood Lateral	LF	525.00	200					PERMIT	105,000.00
4502+00	3900	4606+00	3895	.00048	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	10400	130		31.0	.0	10,000.00	2,639,976.49
4606+00	3895	4607+25			STRUCTURE	Culvert under US 70	LF	400.00	125					PERMIT	50,000.00
4607+25	3895	4681+00	3880	.00203	16 ft. Stand Alone	East Shore--1 minor drainage crossing	LF	224.00	7375	130		22.0	.0	10,000.00	1,872,098.71
4681+00	3880	4684+00			STRUCTURE	Culvert under US 10	LF	400.00	300					PERMIT	120,000.00
4684+00	3880	4729+00	3880	.00000	16 ft. Stand Alone	Along East Bank Alamo Drain (East Shore)	LF	224.00	4500	130		13.4	.0	10,000.00	1,142,297.52
4729+00	3880	4730+00			STRUCTURE	Flume over Clark Lateral	LF	525.00	100					PERMIT	52,500.00

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CANAL CHARACTERISTICS

Bcg. Station	Elev.	End Station	Elev.	Slope	Cross-Section	Description	Unit	Unit Price	Est. Qty.	Perm. ROW	Temp. ROW	Perm. ROW (ac)	Temp. ROW (ac)	Price/Ac.	Amount
4730+00	3880	4780+00	3880	.00000	16 ft. Stand Alone	Along East Bank Alamo Drain (East Shore)	LF	224.00	5000	130		14.9	.0	10,000.00	1,269,219.47
4780+00	3880	4780+50			STRUCTURE	Culvert under SR 359	LF	400.00	50					PERMIT	20,000.00
4780+50	3880	4870+00	3872	.00089	16 ft. Stand Alone	Along East Bank Alamo Drain (East Shore)	LF	224.00	8950	130		26.7	.0	15,000.00	2,405,454.27
4870+00	3872	4871+50			STRUCTURE	Flume over 1 minor drain. xing. & Calif. Lat.	LF	525.00	150					PERMIT	78,750.00
4871+50	3872	4932+00	3867	.00083	16 ft. Stand Alone	Along East Bank Alamo Drain (East Shore)	LF	224.00	6050	130		18.1	.0	15,000.00	1,626,033.33
4932+00	3867	4932+50			STRUCTURE	Culvert under US 374	LF	400.00	50					PERMIT	20,000.00
4932+50	3867	4938+00	3865	.00364	16 ft. Stand Alone	Along East Bank Alamo Drain (East Shore)	LF	224.00	550	130		1.6	.0	15,000.00	147,821.21
4938+00	3865	4940+50			STRUCTURE	Flume over E. Side Canal & Alamo Drain	LF	525.00	250					PERMIT	131,250.00
4940+50	3865	4998+00	3860	.00087	16 ft. Stand Alone	Along East Bank Del Rio Lateral (East Shore)	LF	224.00	5750	130		17.2	.0	15,000.00	1,545,403.58
4998+00	3860	4999+00			STRUCTURE	Flume over Del Rio Lateral	LF	525.00	100					PERMIT	52,500.00
4999+00	3860	5084+00	3856	.00047	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	8500	130		25.4	.0	10,000.00	2,157,673.09
5084+00	3856	5084+50			STRUCTURE	Culvert under SR 28	LF	400.00	50					PERMIT	20,000.00
5084+50	3856	5172+00	3847	.00103	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	8750	130		26.1	.0	10,000.00	2,221,134.07
5172+00	3847	5172+50			STRUCTURE	Flume over Mesilla Lateral	LF	525.00	50					PERMIT	26,250.00
5172+50	3847	5307+00	3836	.00082	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	13450	130		40.1	.0	10,000.00	3,414,200.37
5307+00	3836	5307+50			STRUCTURE	Culvert under SR 288	LF	400.00	50					PERMIT	20,000.00
5307+50	3836	5330+00	3836	.00000	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	2250	130		6.7	.0	10,000.00	571,148.76
5330+00	3836	5330+50			STRUCTURE	Flume over Brazito River Lateral	LF	525.00	50					PERMIT	26,250.00
5330+50	3836	5472+00	3823	.00092	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	14150	130		42.2	.0	10,000.00	3,591,891.09
5472+00	3823	5472+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
5472+50	3823	5545+00	3820	.00041	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	7250	130		21.6	.0	10,000.00	1,840,368.23
5545+00	3820	5553+00			STRUCTURE	Inv. Siphon under Rio Grande @ SR 28 Bridge	LF	2,200.00	800					PERMIT	1,760,000.00
5553+00	3820	5747+00	3810	.00052	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	19400	130		57.9	.0	10,000.00	4,924,571.53
5747+00	3810	5748+00			STRUCTURE	Culvert @ rdwy. & flume @ Chamberino E. Lat.	LF	462.50	100					PERMIT	46,250.00
5748+00	3810	5849+00	3800	.00099	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	10100	130		30.1	.0	10,000.00	2,563,823.32
5849+00	3800	5849+50			STRUCTURE	Flume over La Mesa Drain	LF	525.00	50					PERMIT	26,250.00

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CANAL CHARACTERISTICS

Beg. Station	Elev.	End Station	Elev.	Slope	Cross-Section	Description	Unit	Unit Price	Est. Qty.	Perm. ROW	Temp. ROW	Perm. ROW (ac)	Temp. ROW (ac)	Price/AC.	Amount
5849+50	3800	5856+00	3800	.00000	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	650	130		1.9	.0	10,000.00	164,998.50
5856+00	3800	5856+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
5856+50	3800	5904+00	3800	.00000	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	4750	130		14.2	.0	10,000.00	1,205,758.49
5904+00	3800	5904+50			STRUCTURE	Flume over Wood Lateral	LF	525.00	50					PERMIT	26,250.00
5904+50	3800	5978+00	3790	.00136	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	7350	130		21.9	.0	10,000.00	1,865,752.62
5978+00	3790	5978+50			STRUCTURE	Flume over Jiminez Lateral	LF	525.00	50					PERMIT	26,250.00
5978+50	3790	6022+00	3785	.00115	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	4350	130		13.0	.0	10,000.00	1,104,220.92
6022+00	3785	6023+50			STRUCTURE	Flume over East Lateral	LF	525.00	150					PERMIT	78,750.00
6023+50	3785	6082+00	3785	.00000	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	5850	130		17.5	.0	6,000.00	1,415,152.07
6082+00	3785	6082+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
6082+50	3785	6186+00	3780	.00048	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	10350	130		30.9	.0	6,000.00	2,503,730.58
6186+00	3780	6186+50			STRUCTURE	Culvert under Vinton Road	LF	400.00	50					PERMIT	20,000.00
6186+50	3780	6349+00	3765	.00092	16 ft. Stand Alone	Between W. Bank Levee Rio Grande and Vinton Lat.	LF	224.00	16250	130		48.5	.0	6,000.00	3,930,977.92
6349+00	3765	6349+50			STRUCTURE	Culvert under SR 259	LF	400.00	50					PERMIT	20,000.00
6349+50	3765	6428+00	3762	.00038	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	7850	130		23.4	.0	6,000.00	1,898,964.72
6428+00	3762	6428+50			STRUCTURE	Flume over Canutillo Lateral	LF	525.00	50					PERMIT	26,250.00
6428+50	3762	6456+00	3760	.00073	16 ft. Stand Alone	Along West Bank Canutillo Lateral	LF	224.00	2750	130		8.2	.0	6,000.00	665,242.42
6456+00	3760	6456+50			STRUCTURE	Culvert under Borderland Road	LF	400.00	50					PERMIT	20,000.00
6456+50	3760	6475+00	3760	.00000	16 ft. Stand Alone	Along West Bank Canutillo Lateral	LF	224.00	1850	130		5.5	.0	6,000.00	447,526.72
6475+00	3760	6482+00			STRUCTURE	Inverted Siphon under Rio Grande	LF	2,200.00	700					PERMIT	1,540,000.00
6482+00	3760	6498+00	3759	.00063	16 ft. Stand Alone	Along East Bank Montoya Main Lateral	LF	224.00	1600	130		4.8	.0	6,000.00	387,050.16
6498+00	3759	6498+50			STRUCTURE	Flume over Montoya Main Lateral	LF	525.00	50					PERMIT	26,250.00
6498+50	3759	6584+00	3752	.00082	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	8550	130		25.5	.0	15,000.00	2,297,947.93
6584+00	3752	6584+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
6584+50	3752	6606+00	3750	.00093	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	2150	130		6.4	.0	15,000.00	577,846.56
6606+00	3750	6606+50			STRUCTURE	Culvert under Country Club Road	LF	400.00	50					PERMIT	20,000.00

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CANAL CHARACTERISTICS

Beg. Station	Elev.	End Station	Elev.	Slope	Cross-Section	Description	Unit	Unit Price	Est. Qty.	Perm. ROW	Temp. ROW	Perm. ROW (ac)	Temp. ROW (ac)	Price/Ac.	Amount
6606+50	3750	6646+00	3748	.00051	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	3950	130		11.8	.0	15,000.00	1,061,625.07
6646+00	3748	6646+50			STRUCTURE	Flume over Memexas Drain	LF	525.00	50					PERMIT	26,250.00
6646+50	3748	6814+00	3734	.00004	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	16750	130		50.0	.0	6,000.00	4,051,931.13
6814+00	3734	6814+50			STRUCTURE	Flume over unnamed channel	LF	525.00	50					PERMIT	26,250.00
6814+50	3734	6903+00	3730	.00045	16 ft. Stand Alone	Along East Bank Levee Rio Grande	LF	224.00	8850	130		26.4	.0	15,000.00	2,378,577.69
ALTERNATE 1 ===== W. APPROACH =====															
6903+00	3730	6907+00			STRUCTURE	Inverted Siphon under Rio Grande	LF	2,200.00	400					PERMIT	880,000.00
6907+00	3730	6919+00	3730	.00000	16 ft. Stand Alone	Along West Bank Levee Rio Grande	LF	224.00	1200	130		3.6	.0	15,000.00	322,519.01
6919+00	3730	6919+50			STRUCTURE	Culvert under SR 273	LF	400.00	50					PERMIT	20,000.00
6919+50	3730	7005+00	3730	.00000	16 ft. Stand Alone	W. Shore under S. Pac. & abandoned rld. bridges	LF	224.00	8550	130		25.5	.0	6,000.00	2,068,299.17
7005+00	3730				STRUCTURE	Discharge above American Dam	LS	50,000.00	1					PERMIT	50,000.00
ALTERNATE 2 ===== E. APPROACH =====															
6903+00	3730	6927+00	3730	.00000	16 ft. Stand Alone	Between AT&SF Railroad and Rio Grande	LF	224.00	2400	130		7.2	.0	15,000.00	645,038.02
6927+00	3730	6927+50			STRUCTURE	Culvert under SR 273	LF	400.00	50					PERMIT	20,000.00
6927+50	3730	7012+00	3730	.00000	16 ft. Stand Alone	E. Shore under S. Pac. & abandoned rld. bridges	LF	224.00	8450	130		25.2	.0	8,000.00	2,094,544.72
7012+00	3730				STRUCTURE	Discharge above American Dam	LS	50,000.00	1					PERMIT	50,000.00
SUBTOTAL W/ ALTERNATE 1												1,637.2	25.3		149,181,558.4
20% FOR UNIDENTIFIED ITEMS															\$29,836,311.69
20% FOR ADMINISTRATION PLANNING, ENGINEERING, AND CONSTRUCTION ADMINISTRATION															\$29,836,311.69
TOTAL W/ ALTERNATE 1															\$208,854,181.83
SUBTOTAL W/ ALTERNATE 2												1,740.4	25.3		\$148,650,323.00
20% FOR UNIDENTIFIED ITEMS															\$29,730,064.60
20% FOR ADMINISTRATION PLANNING, ENGINEERING, AND CONSTRUCTION ADMINISTRATION															\$29,730,064.60
TOTAL W/ ALTERNATE 2															\$208,110,452.20

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TASK NO. 9

PREPARATION OF ADOPTED WATER  
RESOURCE MANAGEMENT PLAN

CAPITAL IMPROVEMENT PROGRAM

APPENDIX B

# **EL PASO WATER RESOURCE MANAGEMENT PLAN**

## **TASK NO. 9 - PREPARATION OF ADOPTED WATER RESOURCE MANAGEMENT PLAN**

### **10-YEAR CAPITAL IMPROVEMENT PROGRAM 1992 - 2001**

The initial Capital Improvement Program for implementing the adopted Water Resource Management Plan for the 10-year period 1992 through 2001 is summarized in the following tables and figure:

#### **Table 9.1: Annual Capital Expenditures - 1992 to 2001**

The capital expenditures shown in Table 9.1 correspond to those given in Exhibit 6 to Appendix A except that the values for the El Paso Conveyance Canal in Table 9.1 are 15 percent of the values in Exhibit 6 to Appendix A.

#### **Table 9.2: Bond Requirements**

This table indicates the annual bond issuance amounts necessary to provide the capital requirements given in Table 9.1. The annual bond issuance amounts include a one percent issuance cost and have been rounded up to an even 1000-dollar value.

#### **Table 9.3: Summary Debt Service**

Table 9.3 shows the annual cumulative debt service outlays by the PSB required to finance the implementation of the adopted management plan for the initial period from 1992 to 2001. The debt service values indicated are for annual bond issues in the amounts shown in Table 9.2 with 20-year terms at 6.5 percent interest. The annual debt service amounts also include a reserve fund contribution which will accumulate to one annual payment within 61 months of issuance of the bonds.

**Figure 9.1: Facility Implementation Schedule - Planning, Design and Construction**

Figure 9.1 graphically portrays the capital expenditures required for the various components of the Water Resource Management Plan to be constructed during the initial 10-year period from 1992 through 2001.

**TABLE 9.1**  
**ANNUAL CAPITAL EXPENDITURES - 1992 to 2001**

CAPITAL IMPROVEMENT	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>MESILLA BOLSON</b>										
1) WATER WELLS	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	800,000
2) COLLECTION & MANIFOLD PIPING	1,218,000	1,218,000	1,218,000	1,218,000	1,218,000	1,218,000	1,218,000	1,218,000	1,218,000	690,200
3) 6 MG RESERVOIRS	-	-	2,100,000	-	-	-	-	-	-	420,000
4) LANDS	48,000	3,200	4,800	4,800	4,800	4,800	4,800	4,800	4,800	2,720
<b>SURFACE WATER</b>										
1) EL PASO CONVEYANCE CANAL*	45,000	180,000	940,770	7,825,586	7,825,586	7,214,816	7,214,816	-	-	-
2) 3000 AF REGULATING RESERVOIR	1,800,000	-	-	-	-	-	-	-	-	-
<b>REUSE &amp; RECHARGE FACILITIES</b>										
1) PIPELINES FROM WWTP to TURF AREAS & INDUSTRIES	27,000	67,500	101,250	175,500	101,250	101,250	135,000	101,250	303,750	423,900
<b>TRANSMISSION FACILITIES</b>										
1) WESTERN SLOPE BOOSTER STATION	-	-	-	-	-	-	1,428,500	1,428,500	1,428,500	-
2) TRANS-MOUNTAIN TUNNEL	-	-	-	-	-	1,983,350	1,983,350	1,983,350	-	-
3) PRV VAULT 36"	-	-	-	-	-	-	-	-	45,000	-
4) PRV VAULT 60"	-	-	-	-	-	-	-	75,000	-	-
5) 24" CCP TRANSMISSION LINE	-	-	-	-	-	-	-	-	-	267,960
6) 30" CCP TRANSMISSION LINE	-	-	-	-	-	-	-	-	-	249,900
7) 36" CCP TRANSMISSION LINE	-	-	-	-	-	-	-	-	-	621,180
8) 42" CCP TRANSMISSION LINE	-	-	-	-	-	-	-	-	-	357,000
9) 48" CCP TRANSMISSION LINE	1,183,350	1,183,350	1,183,350	1,183,350	1,183,350	1,183,350	1,183,350	1,183,350	1,183,350	136,850
10) 60" CCP TRANSMISSION LINE	1,055,600	1,055,600	1,055,600	1,055,600	1,055,600	1,055,600	1,055,600	1,055,600	1,055,600	1,628,060
11) 72" CCP TRANSMISSION LINE	1,032,200	1,032,200	1,032,200	1,032,200	1,032,200	1,032,200	1,032,200	1,032,200	1,032,200	-
<b>PROJECT WATER RIGHTS</b>										
1) LEASED WATER RIGHTS LAND & DROUGHT CONTINGENCY CONTRACTS	180,840	180,840	180,840	180,840	180,840	180,840	180,840	180,840	180,840	187,980
<b>TOTAL ESTIMATED COST</b> (IN DOLLARS)	<b>8,089,990</b>	<b>6,420,690</b>	<b>9,316,810</b>	<b>14,175,876</b>	<b>14,101,626</b>	<b>15,474,206</b>	<b>16,936,456</b>	<b>9,762,890</b>	<b>7,952,040</b>	<b>5,785,750</b>

\* REPRESENTS 15% OF TOTAL CAPITAL EXPENDITURE REQUIRED.

**TABLE 9.2  
BOND REQUIREMENTS**

<b>WATER REVENUE BONDS</b>	<b>SERIES 1992</b>	<b>SERIES 1993</b>	<b>SERIES 1994</b>	<b>SERIES 1995</b>	<b>SERIES 1996</b>	<b>SERIES 1997</b>	<b>SERIES 1998</b>	<b>SERIES 1999</b>	<b>SERIES 2000</b>	<b>SERIES 2001</b>
NET REQUIRED CAPITAL	8,089,990	6,420,690	9,316,810	14,175,876	14,101,626	15,474,206	16,936,456	9,762,890	7,952,040	5,785,750
ISSUANCE COSTS	80,900	64,207	93,168	141,759	141,016	154,742	169,365	97,629	79,520	57,858
ROUNDING AMOUNT	110	103	22	365	358	52	179	481	440	392
<b>TOTAL ISSUANCE AMOUNT (IN DOLLARS)</b>	<b>8,171,000</b>	<b>6,485,000</b>	<b>9,410,000</b>	<b>14,318,000</b>	<b>14,318,000</b>	<b>15,629,000</b>	<b>17,106,000</b>	<b>9,861,000</b>	<b>8,032,000</b>	<b>5,844,000</b>

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**TABLE 9.3**  
**SUMMARY DEBT SERVICE**

PROPOSED DEBT SERVICE	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
SERIES 1992	741,574	741,574	741,574	741,574	741,574	741,574	741,574	741,000	741,000	741,000
SERIES 1993		588,558	588,558	588,558	588,558	588,558	588,558	588,558	588,558	588,558
SERIES 1994			854,428	854,428	854,428	854,428	854,428	854,428	854,428	854,428
SERIES 1995				1,156,894	1,156,894	1,156,894	1,156,894	1,156,894	1,156,894	1,156,894
SERIES 1996					1,293,264	1,293,264	1,293,264	1,293,264	1,293,264	1,293,264
SERIES 1997						1,419,113	1,419,113	1,419,113	1,419,113	1,419,113
SERIES 1998							1,553,225	1,553,225	1,553,225	1,553,225
SERIES 1999								895,379	895,379	895,379
SERIES 2000									729,360	729,360
SERIES 2001										530,635
RESERVE FUND	145,883	261,665	429,750	657,335	911,748	1,190,917	1,496,470	1,672,610	1,816,081	1,920,958
<b>TOTAL DEBT SERVICE (IN DOLLARS)</b>	<b>887,457</b>	<b>1,591,797</b>	<b>2,614,310</b>	<b>3,998,789</b>	<b>5,546,466</b>	<b>7,244,748</b>	<b>9,103,526</b>	<b>10,175,045</b>	<b>11,047,822</b>	<b>11,685,759</b>

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FIGURE 9.1

FACILITY IMPLEMENTATION SCHEDULE - PLANNING, DESIGN & CONSTRUCTION

CAPITAL IMPROVEMENT	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1) WATER WELLS & ASSOCIATED COLLECTION AND MANIFOLD PIPING	[Solid black bar]									
2) 6 MG RESERVOIRS			[Solid black bar]							[Solid black bar]
3) EL PASO CONVEYANCE CHANNEL	[Solid black bar]									
4) 3,000 A.F. REGULATING RESERVOIR	[Solid black bar]									
5) PIPELINES FROM W.W.T.P. TO TURF AREAS AND INDUSTRIES	[Solid black bar]									
6) BOOSTER PUMP STATIONS							[Solid black bar]			
7) TRANSMOUNTAIN TUNNEL						[Solid black bar]				
8) P.R.V. VAULT - 36"									[Solid black bar]	
9) P.R.V. VAULT - 60"								[Solid black bar]		
10) 24" C.C.P. TRANSMISSION LINE										[Solid black bar]
11) 30" C.C.P. TRANSMISSION LINE										[Solid black bar]
12) 36" C.C.P. TRANSMISSION LINE										[Solid black bar]
13) 42" C.C.P. TRANSMISSION LINE										[Solid black bar]
14) 48" C.C.P. TRANSMISSION LINE	[Solid black bar]									
15) 60" C.C.P. TRANSMISSION LINE	[Solid black bar]									
16) 72" C.C.P. TRANSMISSION LINE	[Solid black bar]									

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**TASK NO. 9**

**PREPARATION OF ADOPTED WATER  
RESOURCE MANAGEMENT PLAN**

**CAPITAL IMPROVEMENT PROGRAM**

**APPENDIX B**

RECOMMENDATIONS REGARDING  
A WATER CONSERVATION PROGRAM FOR THE CITY OF EL PASO  
PRESENTED TO  
THE EL PASO WATER UTILITIES PUBLIC SERVICE BOARD  
BY THE  
CITIZENS WATER CONSERVATION COMMITTEE

NOVEMBER 28, 1990

The Water Conservation Committee was constituted in August, 1990 for the purpose of advising the Public Service Board on water conservation issues and to recommend policies and public education efforts so as to implement the demand side conservation component of the Water Resource Management Plan presently being developed.

The Water Conservation Committee was charged with addressing three basic areas of water conservation:

- 1) water wasting
- 2) water saving plumbing fixtures, and
- 3) desert landscaping.

Public education was to be considered an integral part of each of the three areas of focus. The Committee was directed not to address the water rate structure which is being investigated under a separate study. However, the Committee believes that effective water rate increases should be the biggest impetus to conserving water.

The Water Conservation Committee was initially comprised of 40 individuals representing a broad spectrum of the public in the following six categories:

- \* Real Estate and Commercial
- \* Landscaping/Nurseries/Pest Control
- \* Technical Advisors
- \* Civic Organizations/Government/At-Large
- \* Large Turf Irrigators
- \* Aldermanic Representatives

The Water Conservation Committee met eight times during which formal recommendations were developed regarding the three assigned areas of concern plus several other related issues brought to the Committee. Most of the recommendations were the unanimous view of the Committee; However, the Committee was strongly divided on some of the recommendations with respect to Landscaping, and several of those which were adopted represent only a narrow majority of the members present.

The Water Conservation Committee herewith makes the following recommendations to the Public Service Board with regard to:

**I. WATER WASTING**

**A. LAWN AND LANDSCAPE WATERING**

1. Enact mandatory and permanent regulations to be in effect from April 1 through September 30.
2. Residential and commercial properties permitted to water:  
Even addresses - Tuesdays, Thursdays and Saturdays.  
Odd addresses - Wednesdays, Fridays, Sundays.
3. Industrial properties, parks, golf courses, schools and other large turf areas permitted to water Mondays, Wednesdays and Fridays.
4. Watering by all categories prohibited between the hours of 9:00 a.m. and 7:00 p.m.
5. Watering schedule exceptions permitted for:
  - a. Newly seeded or sodded lawns and new trees and plantings.
  - b. Properties where application of chemicals for special treatment require watering after the application.
  - c. The EPWU/PSB shall have the authority to review special situations and grant exceptions upon application of the citizen.

**B. NON-ESSENTIAL WATER USE RESTRICTIONS**

**1. Vehicle Washing**

- a. Residential car washing with hose permitted only if hose has shut-off nozzle attached.
- b. Charitable car washing with hose permitted only if hose has shut-off nozzle attached.
- c. All new commercial car washes must recycle and reuse the wash water. Existing commercial car washes which do not presently recycle their wash water will be allowed five years to convert to a recycling operation.

**2. Washing Off Paved Areas**

Washing off driveways, sidewalks, parking lots, gutters and similar paved areas with a hose should be prohibited except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions.

**3. "Fill and Draw" Swimming Pools**

- a. Definition: Pools not equipped with filtration, pumping and chemical feeding systems so that the water is continuously recirculated.
- b. New fill and draw swimming pools and wading ponds more than two feet in depth shall not be allowed to be filled and emptied.
- c. Existing fill and draw swimming pools and wading ponds more than two feet in depth will be allowed five years to convert to a recycling operation.

**4. Serving Water in Restaurants**

Serving of water only upon request in restaurants and other eating places should be voluntary. However, intensive educational and promotional efforts, including samples of effective table-tent and other notices, should be initiated to persuade those restaurants and eating places to implement water on request only when such will not detract from the level of service.

**5. Evaporative Cooler Bleeder Lines**

- a. Bleeder lines from evaporative coolers should not be larger than 1\8-inch inside diameter.
- b. If feasible, bleeder lines should be conducted outside and discharged so the effluent can be used to water landscaping.

**6. Enforcement of water Use Regulations**

- a. Mandatory water use regulations should be strictly enforced by EPWU/PSB personnel empowered to issue warnings and citations.

- b. Citations should automatically impose a set fine according to an established and published schedule. Fines would be paid to the EPWU/PSB. Refusal to pay fines would be cause for shutting off water service. This recommendation should be reviewed by attorneys for the PSB or City prior to being finalized into a regulation and ordinance.
- c. An appeal procedure should be established.

## II. WATER SAVING PLUMBING FIXTURES

### A. LOW WATER USE TOILETS

- 1. Amend the City plumbing code to require mandatory installation of ULF (1.6 gallons or less per flush) toilets in all new developments. The effective date should be six months after adoption to allow local dealers to use their existing stocks of non-conforming toilets.
- 2. If economic analysis indicates that a rebate program would be effective, the PSB should provide a \$100 per toilet rebate to customers for replacement of pre-1977 standard toilets (more than 4.0 gpf) with ULF toilets. The rebate should be in the form of credits on the customer's water and sewer bills and would require verification of the model replaced and installation of the new ULF toilet.
- 3. The PSB should increase its public information and education efforts to encourage customers to voluntarily retrofit their standard toilets to use less water. These efforts should include the following retrofit options (in order of preference):
  - a. Provide list of acceptable manufacturers of dual-flush mechanisms for retrofitting pre-1977 toilets (more than 4.0 gpf) and encourage the purchase and installation of these dual-flush mechanisms.
  - b. Provide information and advice on use and installation of 2-liter and 3-liter plastic beverage bottles as toilet dams in existing older toilets.
  - c. Continue providing conservation kits containing plastic bag toilet dams to customers at no charge.

4. The PSB should promote and utilize to the maximum extent possible the efforts of public interest firms and organizations in funding the purchase and distribution of conservation kits and in making volunteers available to advise and/or assist owners of older toilets in installing toilet dams and dual-flush mechanisms.
5. The City and its agencies, including the PSB, should budget and undertake a retrofit program immediately to replace all pre-1977 standard toilets and urinals (more than 4.0 gpf) in all City and agency buildings and facilities with ULF toilets and low flush urinals within 5 years.

**B. LOW WATER USE SHOWER HEADS**

1. Amend the City plumbing code to require mandatory installation of low-flow shower heads using 2.75 gpm or less in all new developments and remodeling. The effective date should be six months after adoption to allow local dealers to use their existing stocks of non-conforming shower heads.
2. If economic analysis indicates that a rebate program would be cost effective, the PSB should provide a \$10.00 per shower head rebate to customers for replacement of pre-1977 standard shower heads (non-therapeutic or safety type, more than 3.0 gpm) with low-flow shower heads. The rebate should be in the form of credits on the customer's water and sewer bills and would require verification of the shower heads replaced.
3. The PSB should increase its public information and education efforts to encourage customers to voluntarily replace or retrofit their pre-1977 shower heads to use less water. This effort should include continuation of providing conservation kits containing plastic flow restrictors for installation in existing shower head assemblies.
4. The PSB should promote and utilize to the maximum extent possible the efforts of public interest firms and organizations in funding the purchase and distribution of conservation kits and in making volunteers available to advise and/or assist owners of pre-1977 showers in installing the shower head flow restrictors.

5. The City and its agencies, including the PSB, should budget and undertake a retrofit program immediately to replace all pre-1977 standard shower heads (non-therapeutic or safety type, more than 3.0 gpm) in all City and agency buildings and facilities with low-flow shower heads within 3 years.

**C. LOW WATER USE FAUCETS**

1. Amend the City plumbing code to require mandatory installation of low-flow sink and lavatory faucets using 2.5 gpm or less in all new developments and remodeling. The effective date should be six months after adoption to allow local dealers to use their existing stocks of non-conforming faucets.
2. If economic analysis indicates that a rebate program would be cost effective, the PSB should provide a rebate to customers for replacement of standard faucets with low-flow faucets. The rebate should be in the form of credits on the customer's water and sewer bills and would require verification of the faucets replaced.
3. The PSB should increase its public information and education efforts to encourage customers to voluntarily replace or retrofit their standard faucets with low-flow faucets which will reduce the flow to 2.5 gpm or less.
4. The PSB should promote and utilize to the maximum extent possible the efforts of public interest firms and organizations in funding the purchase and distribution of conservation kits containing faucet aerators and in making volunteers available to advise and/or assist owners in installing the faucet aerators.
5. The City and its agencies, including the PSB, should budget and undertake a retrofit program immediately to replace all pre-1977 low water use faucets in all City and agency buildings and facilities with low water use faucets.

**D. LOW WATER USE DISHWASHERS**

The PSB should increase its public information and education efforts to encourage customers to purchase water efficient dishwashers. This effort should include publication of information regarding potential savings in water use and cost and information on how to identify models of water efficient dishwashers.



**E. LOW WATER USE CLOTHES WASHERS**

The PSB should increase its public information and education efforts to encourage customers to purchase water efficient clothes washers. This effort should include publication of information regarding potential savings in water use and cost and information on how to identify models of water efficient clothes washers.

**III. LANDSCAPING REQUIREMENTS AND POLICIES**

**A. LANDSCAPING ORDINANCE**

1. The City of El Paso should immediately develop and enact a Landscaping Ordinance containing the following salient provisions which shall be applicable to all new and remodeled landscaping for residential, commercial, industrial and institutional premises, schools and highway medians:
  - a. Natural landscape shall be preserved in the Mountain Development and Hillside Development Zones to the maximum extent practicable in accordance with the City's Grading Ordinance.
  - b. Areas of turf shall not exceed the following portions of landscapable areas for:

(1) Commercial and Industrial Developments	- 15%
(2) Institutional Developments	- 40%
(3) Schools (areas other than recreational/ sports)	- 40%
(4) Residential	- 50%
  - c. Turf shall not be installed in the following locations:
    - (1) Parkways and strip areas less than 10 feet in width.
    - (2) On slopes of 15 degrees or more from the horizontal.
  - d. A landscape/irrigation plan shall be prepared for all landscaping which will use EPWU/PSB water and whose area is 0.50 acre or larger and shall be submitted to the EPWU/PSB Conservation Office for approval. For landscape areas 2.0 acres or larger the landscape/irrigation plan shall be prepared by a qualified professional.

- e. Following installation of landscaping of 2.0 acres or larger, a water audit shall be performed by the EPWU/PSB Conservation Office to determine compliance with the ordinance provisions.
  - f. New landscapes of 10 or more acres shall utilize ET generated irrigation controllers. The PSB shall develop an ET network similar to AZNET or CALNET by 1995. All irrigators of 2 or more acres shall be required to tie into the system by 1997.
2. The Landscape Ordinance should be compared with and should incorporate and supersede or should govern comparable provisions now contained in the City's existing Subdivision Design, Median, Grading and Weed Ordinances.
3. A Subcommittee of landscape professional shall be formed to work with the Public Service Board and City Staff to formulate a landscape ordinance that will address:
- a. Water conservation,
  - b. Quality of life and aesthetics issues,
  - c. Recognizing the City's micro-climates,
  - d. The formulation of a plant list that will show low, medium, and high water use plant materials, and
  - e. The proper design and installation of irrigation systems.

**B. REBATES FOR RETROFITTING EXISTING LANDSCAPING**

If economic analysis indicates that a rebate program would be cost effective for landscaping in existence on the date of adoption of the ordinance, the EPWU/PSB should provide a rebate of \$0.25 per square foot of turf not contained on the approved list of low-water-use grasses with non-organic landscaping and/or low-water-use plants other than grasses up to a maximum of 50 per cent of the landscaped area. The rebate would be in the form of credits on the customer's water and sewer bill, and would require verification of the landscaping retrofit accomplished.

**C. LANDSCAPING INFORMATION AND ASSISTANCE**

1. A list of low-water-use trees, shrubs plants and turf grasses should be developed and should be updated and/or expanded for inclusion in the proposed Landscape Ordinance with input and assistance from the El Paso offices of the Texas A&M University Agricultural Extension Service and Agricultural Research Center, and knowledgeable individuals from UTEP, EPWU/PSB, EPCWID No. 1, El Paso Association of Nurserymen, American Association of Landscape Architects, Keep El Paso Beautiful, Water Landscaping Wisely Association, and other local organizations having relevant expertise.
2. A list of common varieties of water-use intensive trees, shrubs, plants and turf grasses presently found in the El Paso area should also be developed with input and assistance from the agencies and groups listed in subsection C.1. above. This list shall include for each species the normal range of water used annually.
3. The EPWU/PSB Conservation Office should develop recommendations for water efficient irrigation methods, systems and/or equipment with input and assistance from the agencies and groups listed in subsection C.1 above.
4. The EPWU/PSB Conservation Office should make the lists of low-water-use vegetation and water efficient irrigation methods, systems and equipment readily available and shall distribute the lists as widely as practicable to appropriate existing and new customers.
5. The EPWU/PSB Conservation Office should develop a program and staff to perform water audits of existing landscaping of 2.0 acres and more which are irrigated with City water and shall provide recommendations to the owners for improving more efficient water use.

#### IV. OTHER WATER CONSERVATION ISSUES

##### A. MANDATORY RECYCLING OF WATER BY GARMENT FINISHERS AND LARGE COMMERCIAL LAUNDRIES

1. Require large users (10,000 gpd or more) to reuse water (internally) where feasible. Conversion to recycling shall be required within five years.
2. Board approval of all very large users (100,000 gallons per day or more) could be required with the decision based upon a Water Use Justification Report which relates the water consumption to recycling potential.

##### B. DEVELOPMENT OF RE-USE OF WASTEWATER FOR IRRIGATION

The Water Conservation Committee has reviewed and endorses the following stated policy: "It is the stated policy of the Public Service Board to reduce to the maximum extent possible the rate of depletion of the Hueco Bolson by utilization of non-depleting surface water sources to the maximum extent possible and utilization of sewage effluent to recharge depleting ground water aquifers and to substitute for potable water use to the maximum extent possible for irrigation and industrial uses."

##### C. REQUIRE CONSERVATION PLANS BE DEVELOPED BY LARGE WATER USERS

1. Define a large user as using an average of 10,000 gallons per day or more.
2. Require large water users (10,000 gpd average) to prepare a Water Conservation Plan as a condition for continued service or for new service.
3. Require Board review and approval of all new very large users (100,000 gpd average).
4. Prohibit once through cooling uses.
5. Implement incentive type rate structures where reclaimed water can be used in lieu of potable water. This would be particularly applicable for golf course irrigation and for certain industrial customers using a significant amount of cooling water.

Recommendations  
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6. Consider implementation of mandatory recycling with stiff surcharge for those who do not recycle. The data provided in the Water Audits should identify reuse opportunities.

**D. REDUCING FUTURE WATER DEMANDS BY LIMITING POPULATION GROWTH**

The Committee elected not to consider this issue and makes no recommendation to the Public Service Board in this respect.

Respectfully submitted, November 28, 1990.  
WATER CONSERVATION COMMITTEE



Douglas D. Rittmann, Chairman

Adopted by the Public Service Board on the 28th of November, 1990.



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Edmund G. Archuleta, General Manager  
El Paso Water Utilities

NOVEMBER 28, 1990  
EL PASO WATER UTILITIES

STAFF RECOMMENDATIONS TO THE PUBLIC SERVICE BOARD ON THE  
WATER CONSERVATION PLAN BASED ON THE CITIZENS WATER CON-  
SERVATION COMMITTEE REPORT

RECOMMENDED ADDITIONS/CHANGES

1. Section III.A.1.b. (Landscaping Ordinance) add item (4) to read as follows:

(4) Residential - 50%

2. Under item III.A.1.c. (Landscaping Ordinance) delete the word "Spray irrigation" and add instead the word "Turf".

RECOMMENDED IMPLEMENTATION SCHEDULE

<u>Item</u>	<u>Priority</u>	<u>Schedule</u>
Prepare a water conservation ordinance	1	To PSB - Jan 23, 91 To City Council - Jan 29, 91 Effective date - Apr 1, 91
Amendment of the City Plumbing Code.	2	To City Council - Jan 29, 91 Adoption by City Council - Apr 1, 91. Effective date - Sep 1, 91
Development of a landscape ordinance.	3	Formation of a landscape committee - Feb 1, 91. Recommendations to the PSB - May 1, 91. Recommendations to City Council, Jun 1, 91. Effective date of new ordinance, Jan 1, 92.
Retrofit Program for all PSB toilets, urinals, sinks, and lavatory faucets.	4	Program to commence Mar 1, 91.
Rebates	5	EPWU Staff Recommendations to PSB - Jan 9, 91 (Budget review) Implementation - depending upon PSB budget approval.
Increased public information and assistance programs.	6	Mar 1, 91 commensurate with budget approval.
Water wasting enforcement and assistance with water audits, retrofit program, etc.	7	Effective Mar 1, 91 commensurate with budget approval.

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# **EL PASO WATER RESOURCE MANAGEMENT PLAN**

## **TECHNICAL MEMORANDUM**

### **TASK NO. 15 - ESTABLISH POLICY FOR EXTENSION OF WATER & SEWER SERVICES**

#### **1.0 INTRODUCTION**

This memorandum report describes the analyses, findings, conclusions and recommendations relative to the development of policies and procedures for extending water and sewer services to customers residing outside of the corporate limits of the City El Paso, but within El Paso County, Texas.

#### **1.1 Background**

On December 13, 1990 the El Paso Water Utilities/Public Service Board (EPWU/PSB) unanimously adopted a change in the Board's policy that had been in effect for 17 years which prohibited extending water or sewer services outside of the corporate limits of the City of El Paso. The change in policy which now permits the EPWU to extend water and sewer services outside of the City of El Paso was made subject to five conditions as follows:

1. That the Public Service Board will seek City Council approval.
2. That the Public Service Board will not violate any of its bond covenants.
3. That expansion costs will not affect existing water and sewer rates inside the City.
4. That the Public Service Board does not violate any current contractual obligations with other organizations.
5. That the new policy is formed with guidance of leaders from the City and the County.

This task was undertaken to develop policies and procedures governing the extension of water and sewer services outside of the City consistent with the above five conditions mandated by the PSB. The purpose of the policies developed in this study is to provide guidelines for the EPWU to fairly and uniformly evaluate and approve requests for service extensions outside the City and establish priorities for implementing the service extensions. The underlying objective of the implementation policies and procedures is to provide water and sewer service on a planned, equitable basis to county residents who are not now served, or who are served on a substandard basis, which condition creates hazards to public health throughout the area and a deterioration of the quality of life.

In developing the policies and procedures governing the extension of water and sewer services outside the City, the investigations and evaluations were grouped into four general categories or sub-tasks as follows:

1. Data Acquisition and Compilation
2. Identification and Evaluation of Funding Sources
3. Development of the Procedure for Determination of Priorities
4. Formulation of Policy Governing Extensions

Underlying the regulatory authority of the PSB is the fiduciary responsibility to maintain an economically viable utility. Accordingly, the policies and procedures developed in this study are based on being fiscally sound and consistent with accepted engineering principles for physical expansion of the system. Obviously there are serious socioeconomic concerns to be considered in any service extension policy. The PSB is committed to non-discrimination against any rate payor or class of customer. Therefore, to the extent possible, financing by agencies who are committed to meet socioeconomic needs will be identified as supplemental funding sources. An example is the El Paso Community Foundation which, unlike the EPWU, can finance plumbing improvements for individual households.

## **1.2 Steering Committee**

In accord with the fifth condition mandated by the PSB, a Steering Committee was appointed on April 24, 1991 to guide the policy development effort. The Steering Committee was comprised of eight knowledgeable City or County leaders as follows:

**David R. Brosman, P.E., Chairman**  
Deputy General Manager, EPWU

**Hon. Alicia Chacon**  
County Judge El Paso County Commissioners Court

**Manny Cooper**  
Finance Manager, EPWU

**Dr. Laurance Nickey**  
Director, El Paso City-County Health District

**Justin Ormsby**  
Executive Director, Rio Grande Council of Governments

**Alan Rash, Esq.**  
Bond Attorney, Diamond, Rash, Leslie, Smith & Samaniego, P.C.

**Mary Carmen Saucedo**  
Trustee, El Paso Community Foundation

**Nestor Valencia**  
Vice-president for Planning, El Paso Community Foundation  
Formerly Director of the City of El Paso Department of Planning, Research and  
Development

Two other EPWU staff attended the Steering Committee meetings and served as advisors throughout the study:

**John Balliew, P.E.**  
Project Coordinator for the Water Resource Management Plan studies

**Herb Prouty, Esq.**  
PSB General Counsel

The Steering Committee met seven times during the period from May 16, 1991 to August 19, 1991. Results of the study investigations and analyses were reviewed and proposals for incorporation into the policies and procedures were worked out during these Committee meetings. Minutes for each meeting were taken and recorded.

## 2.0 INVESTIGATIONS AND FINDINGS

### 2.1 Data Acquisition and Compilation

Collection of data, evaluations and analyses were performed to the extent considered adequate to identify major needs and as a basis for comparative value judgements involved in the formulation of the water and sewer service extensions policies. However, they should not necessarily be considered adequate for final engineering and management decisions required for implementation of service extensions.

The following types of data were acquired and compiled for use in this study:

- o Mapping -- Jurisdictional boundaries, limits of EPWU present water service, location of colonias and other potential outside-city customers
- o Population and Water Use -- Updated estimates of present and projected populations by planning areas
- o Level of Water Service -- Characterization of existing water service
- o General Water Quality -- Classification relative to suitability for domestic purposes
- o Water Purveyor Interviews-- Existing water supply situations in the County outside the City of El Paso

#### 2.1.1 Mapping

The following agencies and organizations were contacted to obtain data for a base map for the study:

City of El Paso Department of Planning, Research and Development  
County of El Paso Central Appraisal District

United States Geological Survey  
Parkhill, Smith & Cooper, Inc.  
El Paso County Lower Valley Water District Authority  
Moreno-Cardenas, Inc.  
Tornillo Water Supply Corporation  
Westway Control and Improvement District  
El Paso County Water Authority

Map data obtained from the above entities was used to develop a computer-generated base map prepared by AutoCAD to facilitate boundary changes and allow flexibility for analyses and portrayal of population, water use, and other data. Figure 15.1 shows the jurisdictional boundaries of the principal water districts and suppliers, including the EPWU, in El Paso County.

### **2.1.2 Population and Water Use**

These data were based on the projections developed in Task 2 of the Water Resource Management Plan study. Because of the more detailed population assessments required in this study, comparisons were made with other sources (Water and Wastewater Management Plans - Parkhill, Smith and Cooper, Inc. 1988). Adjustments were made to planning area populations for purposes of consistency in several instances. Determination of water use under present circumstances in outside-city areas was not performed. The various levels of service in many of the existing outside-city areas impose serious restrictions on water use. When and if water service is provided at municipal service standards, it is assumed that the per-capita usage will evolve to levels of consumption which were determined in Task 2 of the Water Resource Management Plan study.

### **2.1.3 Level of Water Service**

Determination of levels of water service was based on observations and interviews. The level of service may vary for individual developments within a service area, but characterizations referred to herein are for service areas considered on the whole.

# EL PASO COUNTY WATER DISTRICTS AND SUPPLIERS

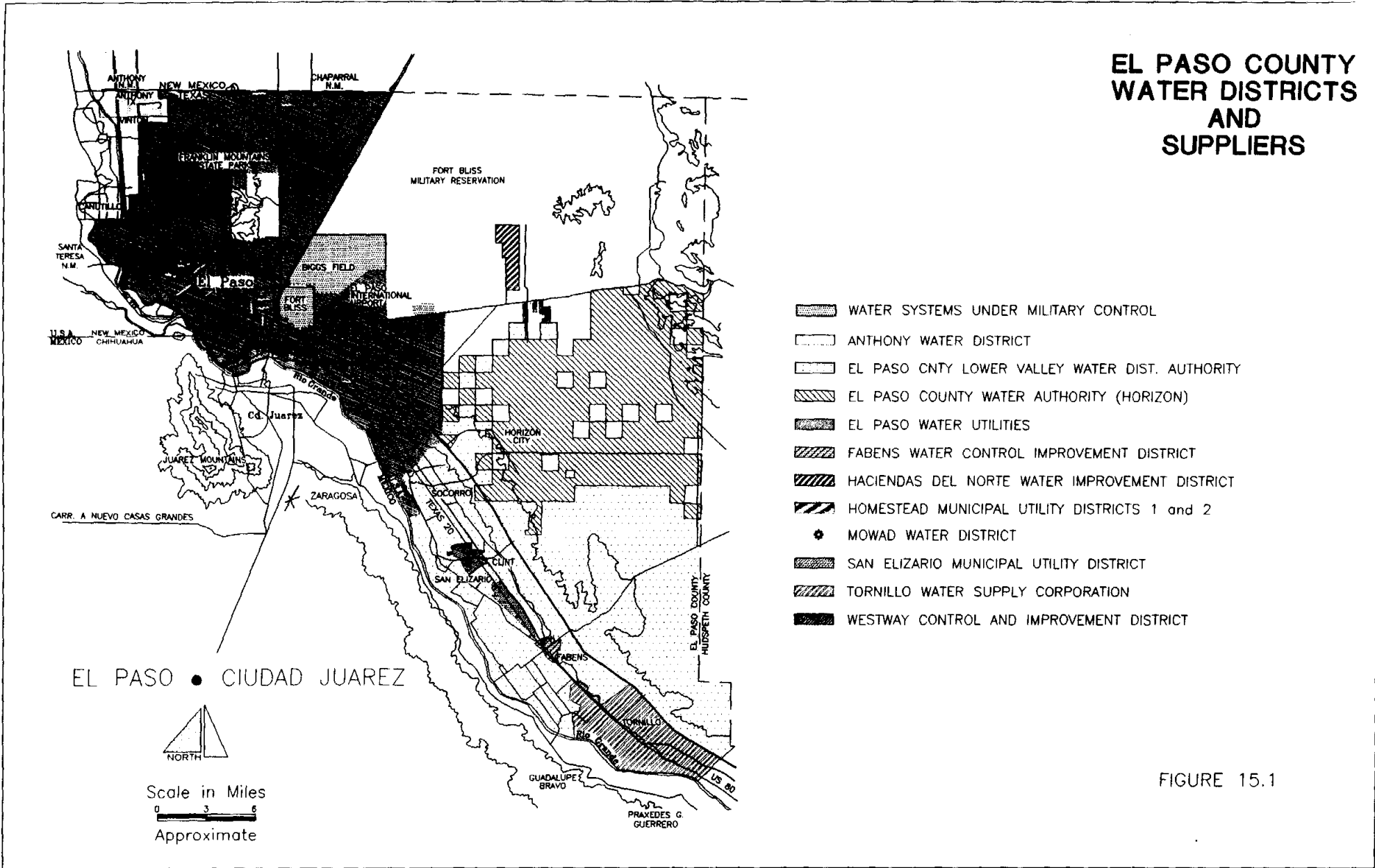


FIGURE 15.1

#### **2.1.4. General Water Quality**

Water quality was evaluated based on information developed in other tasks of the Water Resource Management Plan for the various sources of water. For example, wells in the Hueco Bolson located in the Lower Valley area are known to be brackish and marginally fit for potable water supplies; therefore, if a development is dependent upon a source of supply using such wells, it is classified as poor quality.

#### **2.1.5 Water Purveyor Interviews**

A list of public water systems other than the EPWU was obtained from the Texas Department of Health Region 3. This list is reproduced in Exhibit 1 and indicates the types of systems classified as community systems, non-community systems, and supplied by hauled water. Personal interviews and/or telephone contacts were conducted with representatives of a majority of the water systems listed in Exhibit 1. Prior to the start of this study, the EPWU surveyed a number of cities in the Southwest to ascertain what their policies and practices are with respect to providing water and sewer services outside of their corporate city limits.

### **2.2 Results of Basic Investigations**

The results of the EPWU survey of other cities in the Southwest are shown in Table 15.1. Details for the City of El Paso are included for comparison. All but one of the cities who responded provide water service outside of their corporate limits, and a majority also provide outside-city sewer services.

Figure 15.2 shows the information compiled on population concentrations, colonias, subdivisions, mobile home parks, large industries, and other water users. Where applicable and available, the data shown includes present populations, number of homes, number of lots and percentage of vacancies. The vacancy value is representative of potential future growth which may be accelerated by the provision of water. Exhibit 2 is a listing of those water systems and providers which currently hold Certificates of Convenience and Necessity (CCN) from the Texas Water Commission. A summary of population data by planning area is given in Table 15.2. In general, the highest density of potential customers is in the Lower Valley, followed by the Northwest and East planning areas.

TABLE 15.1

OUTSIDE CITY SERVICE POLICY SURVEY RESULTS TABULATION

CITY	ST	OUTSIDE SERVICE	WATER	SEWER	WHOLE SALE	RETAIL	RATE DIFFER	RATE BASIS	ANNEX POLICY	SERVICE AREA	CITY ONLY	NOTES
Oklahoma City	OK	YES	YES	YES	YES	YES	YES	COS	NO	560,000	450,000	1,2
Denver	CO	YES	YES	NO	YES (3)	YES	YES	COS	NO	1,000,000	600,000	3
Denver (S)	CO	YES	NO	YES	YES	NO	NO	--	NO	1,300,000	600,000	
Salt Lake City	UT	YES	YES	NO	NO	YES	YES	1.6	YES	166,000	276,000	
San Antonio	TX	YES	YES	NO	YES (5)	YES	YES	1.3	NO	960,000	920,000	0
San Antonio (S)	TX	YES	NO	YES	YES	YES	YES	COS	NO	960,000	928,000	4,7
Las Vegas	NV	NO	--	--	--	--	--	--	--	300,000	300,000	
Las Vegas (S)	NV	YES	NO	YES	YES (1)	YES	NO	--	YES	300,000	270,000	8
Fort Worth	TX	YES	YES	YES	YES (20)	YES	YES	COS	NO	700,000	450,000	4
Tucson	AZ	YES	YES	NO	NO	YES	NO	--	NO	583,000	400,471	6
Tucson (S)	AZ	YES	NO	YES	NO	YES	NO	--	NO	685,184	400,471	
Albuquerque	NM	YES	YES	YES	NO	YES	NO	--	YES	437,000	391,000	0
Dallas	TX	YES	YES	YES	YES (24)	YES	NO	--	NO	1,812,928	982,760	
Phoenix	AZ	YES	YES	YES	YES (6)	YES	YES	1.6	YES	1,000,000	976,000	0
Austin	TX	YES	YES	YES	YES (24)	YES	YES	1.6	YES	646,000	406,000	0
El Paso	TX	YES	YES	NO	YES (2)	YES	YES	2.0	NO	683,000	830,000	0

D-10

**General notes:**

- A. The mark "--" indicates that rate is not applicable.
- B. The number in parentheses in the Wholesale column is the number of wholesale customers when available.
- C. Houston did not respond to the questionnaire. The Salt Lake City sewer agency did not respond.
- D. It is assumed that wholesale rates are different from retail rates unless there is a "Special Note" to the contrary.
- E. If there is a multiplier type rate differential, the multiplier is listed in the Rate Basis column.
- F. The notation "(S)" adjacent to a city denotes a separate sewer agency.
- G. "Rate Differential" refers to that difference between rates charged to inside city customers versus the rate charged to outside city customers, not to the difference between wholesale and retail rates.

**Special notes:**

- 1. Wholesale and retail rates are the same.
- 2. There is no sewer rate differential, only for water.
- 3. Cost of service plus rate of return.
- 4. Limited retail.
- 5. Some areas are subject to surcharges.
- 6. The rate differential applies only to retail customers in unincorporated areas. Wholesale rates are cost of service based.
- 7. Did not receive survey form. Contact was made by telephone.
- 8. Provision of outside city service is sometimes related to an annexation policy depending on the area served.
- 9. The current policy information is shown. Currently in the process of developing a new policy.



# EL PASO COUNTY POTENTIAL CUSTOMERS FOR WATER SERVICE

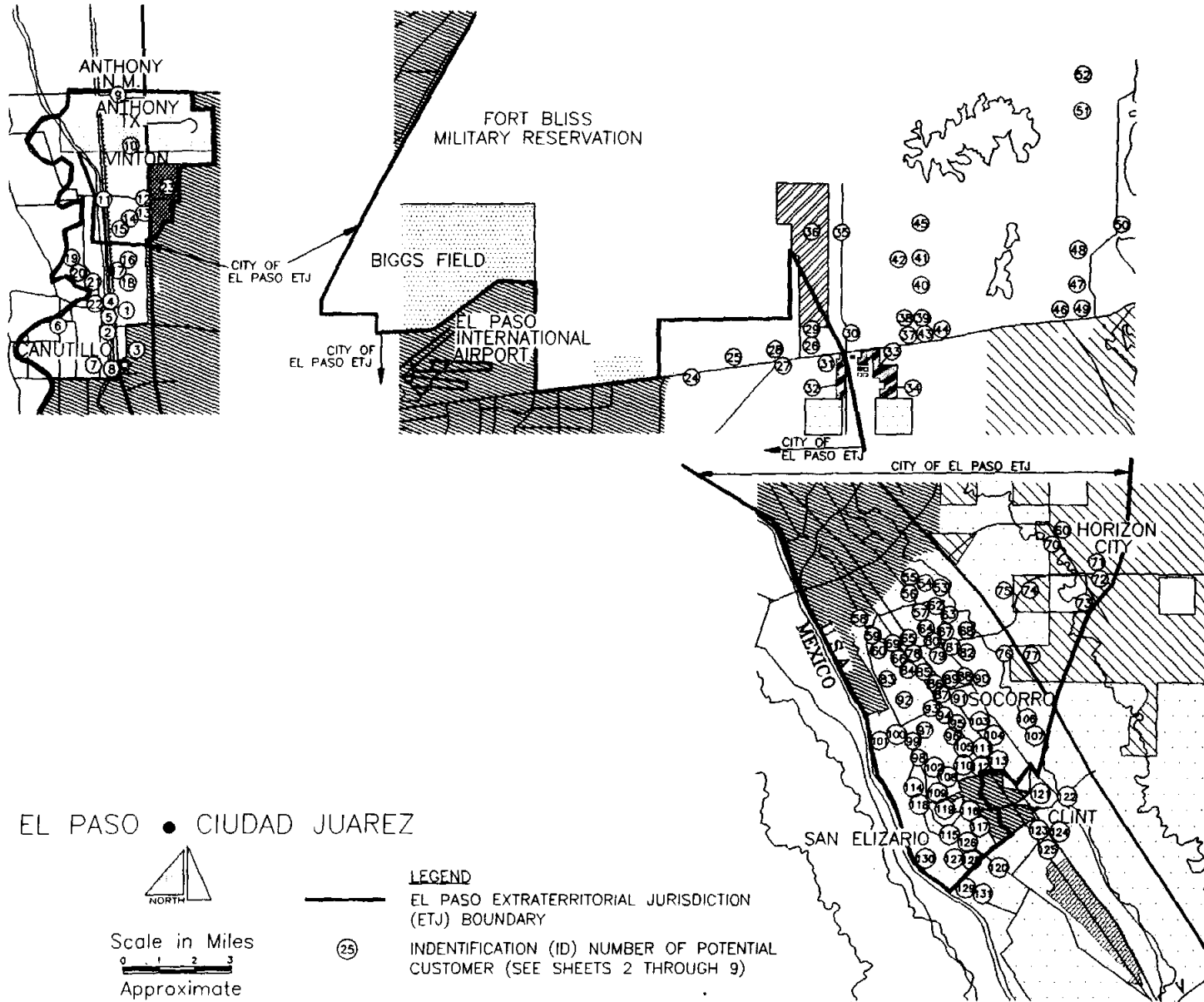


FIGURE 15.2  
(SHEET 1)

FIGURE 15.2 (SHEET 2)

POTENTIAL CUSTOMERS FOR WATER SERVICE

NORTHWEST PLANNING AREA

ID #	Name	Size	ID #	Name	Size
1	Canutillo ISD	No Data	13	Border Steel Inc.	No Data
2	Canutillo Area	Pop = 2,397 Homes = 510	14	Metal Processing	No Data
3	Gaslight Square Water Distrib.	Pop = 400 Homes = 85	15	Town of Vinton	Pop = 1,109 Homes = 236
4	La Union Estates	Pop = 94 Homes = 20 Lots = 16 % Vacant = 0	16	Hillside Mobile Home Park	Pop = 357 Homes = 76 Lots = 77 % Vacant = 1.3
5	Serene Acres	Pop = 24 Homes = 5 Lots = 8 % Vacant = 37.5	17	Nu-Way	Pop = 0 Homes = 0 Lots = 56 % Vacant = 100
6	Adelante Estates	Pop = 47 Homes = 10 Lots = 24 % Vacant = 58.3	18	Mayfair	Pop = 0 Homes = 0 Lots = 160 % Vacant = 100
7	Prado Verde	Pop = 235 Homes = 50 Lots = 114 % Vacant = 56.1	19	Valley Acres	Pop = 9 Homes = 2 Lots = 3 % Vacant = 33.3
8	Edmundo Kauffman Estates	Pop = 5 Homes = 1 Lots = 25 % Vacant = 96.0	20	Mountain Valley	Pop = 24 Homes = 5 Lots = 6 % Vacant = 16.7
9	Town of Anthony	Pop = 2,618 Homes = 557	21	Ponderosa Mobile Homes	Pop = 573 Homes = 122 Lots = 136 % Vacant = 10.3
10	La Tuna	Pop = 1,500	22	Schuman Estates	Pop = 14 Homes = 3 Lots = 52 % Vacant = 94.2
11	W Silver Inc.	No Data	23	Westway	Pop = 1834 Homes = 390 Lots = 1061 % Vacant = 63.2
12	Great Southwest Water Irrigation	No Data			

FIGURE 15.2 (SHEET 3)

POTENTIAL CUSTOMERS FOR WATER SERVICE

EAST PLANNING AREA

ID #	Name	Size	ID #	Name	Size
24	Turf Estates	Pop = 396 Homes = 90	33	Desert Glen	Pop = 70 Homes = 16 Lots = 75 % Vacant = 78.7
25	Desert Oasis	Pop = 264 Homes = 60 Lots = 80 % Vacant = 25	33	Homestead Meadows South	Pop = 940 Homes = 214 Lots = 654 % Vacant = 67.3
26	Monte Vista Trailer Park	Pop = 58 Homes = 16 Lots = 189 % Vacant = 91.5	33	Homestead	Pop = 321 Homes = 73 Lots = 111 % Vacant = 34.2
27	Hillcrest	Pop = 123 Homes = 28 Lots = 228 % Vacant = 87.7	34	Deerfield Park	Pop = 370 Homes = 84 Lots = 354 % Vacant = 76.3
28	Butterfield Trail	Pop = 518 Homes = 144 Lots = 156 % Vacant = 7.7	35	Homestead Meadows	Pop = 389 Homes = 108 Lots = 376 % Vacant = 71.3
29	Flamingo	Pop = 58 Homes = 16 Lots = 121 % Vacant = 86.8	36	Haciendas Del Norte	Pop = 223 Homes = 62 Lots = 528 % Vacant = 88.3
30	East Wind	Pop = 151 Homes = 42 Lots = 52 % Vacant = 19.2	37	Acacia Grove	Pop = 0 Homes = 0 Lots = 30 % Vacant = 100
31	Vista Del Este	Pop = 122 Homes = 34 Lots = 364 % Vacant = 90.7	38	Montana Land Estates	Pop = 277 Homes = 77 Lots = 71 % Vacant = 0
32	Las Casitas	Pop = 232 Homes = 55 Lots = 205 % Vacant = 73.2	39	Montana East & Yucca Foothills	Pop = 126 Homes = 35 Lots = 94 % Vacant = 62.8
33	S.W. Estates	Pop = 129 Homes = 32 Lots = 65 % Vacant = 50.8			

FIGURE 15.2 (SHEET 4)

POTENTIAL CUSTOMERS FOR WATER SERVICE

EAST PLANNING AREA (Cont.)

ID #	Name	Size	ID #	Name	Size
40	Sundown, John Michael & Western Heritage	Pop = 25 Homes = 7 Lots = 74 % Vacant = 90.5	47	Butterfield City, Unit 4	Pop = 4 Homes = 1 Lots = 300 % Vacant = 99.7
41	Paso View	Pop = 464 Homes = 129 Lots = 215 % Vacant = 40	48	Hueco Valley Subdiv. Eisenberg. Estates	Pop = 24 Homes = 8 Lots = 31 % Vacant = 74.2
42	Paso View West	Pop = 86 Homes = 24 Lots = 30 % Vacant = 20	49	Camel Back Estates	Pop = 4 Homes = 1 Lots = 34 % Vacant = 97.1
43	Desert Meadows Estates	Pop = 83 Homes = 23 Lots = 238 % Vacant = 90.3	50	Monte Carlo	Pop = 4 Homes = 1 Lots = 151 % Vacant = 99.3
44	Primrosa Acres	Pop = 9 Homes = 2 Lots = 9 % Vacant = 78	51	Hueco Mtn. Estates	Pop = 100 Homes = 28 Lots = 690 % Vacant = 95.9
45	Vista De Lomas	Pop = 54 Homes = 15 Lots = 124 % Vacant = 87.9	52	Wilco 1-5	Pop = 11 Homes = 3 Lots = 5,649 % Vacant = 99.9
46	Butterfield City, Unit 2	Pop = 47 Homes = 13 Lots = 113 % Vacant = 88.5			

FIGURE 15.2 (SHEET 5)

POTENTIAL CUSTOMERS FOR WATER SERVICE

LOWER VALLEY PLANNING AREA

ID #	Name	Size	ID #	Name	Size
53	Grijalva Garden	Pop = 762 Homes = 136 Lots = 165 % Vacant = 17.6	62	San Augustin	Pop = 118 Homes = 21 % Vacant = 46.8
54	Delip	Pop = 1092 Homes = 195 Lots = 336 % Vacant = 42.0	63	Rio Rancho	Pop = 112 Homes = 22 Lots = 48 % Vacant = 54.2
55	North Loop Acres	Pop = 202 Homes = 36 Lots = 51 % Vacant = 29.4	64	La Fuente	Pop = 84 Homes = 15 Lots = 37 % Vacant = 59.5
56	Bagge Estates	Pop = 375 Homes = 67 Lots = 118 % Vacant = 43.2	65	Monterosales	Pop = 342 Homes = 61 Lots = 90 % Vacant = 32.2
57	Gurden	Pop = 717 Homes = 128 Lots = 222 % Vacant = 42.3	66	La Jolla	Pop = 263 Homes = 47 Lots = 119 % Vacant = 60.5
58	Sunshine	Pop = 67 Homes = 12 Lots = 17 % Vacant = 29.4	67	Ellen Park	Pop = 330 Homes = 59 Lots = 79 % Vacant = 25.3
59	Spanish Trail	Pop = 454 Homes = 81 Lots = 117 % Vacant = 30.8	68	Hillcrest Manor	Pop = 112 Homes = 20 Lots = 12 % Vacant = 25
60	Alameda Estates	Pop = 207 Homes = 37 Lots = 50 % Vacant = 26.0	69	Horizon Country Club Estates	Pop = 800 Homes = 182 Lots = 336 % Vacant = 45.8
61	Villa Espana	Pop = 224 Homes = 40 Lots = 60 % Vacant = 33.3	70	Horizon Heights	Pop = 800 Homes = 182 Lots = 627

FIGURE 15.2 (SHEET 6)

POTENTIAL CUSTOMERS FOR WATER SERVICE

LOWER VALLEY PLANNING AREA (Cont.)

ID #	Name	Size	ID #	Name	Size
71	Desert Mesa	Pop = 200 Homes = 45 Lots = 99 % Vacant = 54.5	80	Lynn Park	Pop = 711 Homes = 127 Lots = 181 % Vacant = 29.8
72	Horizon Manor	Pop = 400 Homes = 91 Lots = 417 % Vacant = 78.2	81	Mary Lou Park	Pop = 482 Homes = 86 Lots = 121 % Vacant = 28.9
73	Horizon Ind. Park	Lots = 30	82	Country Green	Pop = 1008 Homes = 180 Lots = 251 % Vacant = 28.3
74	Horizon Hills	Pop = 0 Homes = 0 Lots = 85 % Vacant = 100	83	Socorro Mission	Pop = 134 Homes = 24 Lots = 37 % Vacant = 35.1
75	Sparks	Pop = 1600 Homes = 303 Lots = 1566 % Vacant = 80	84	Las Milpas	Pop = 207 Homes = 37 Lots = 60 % Vacant = 38.3
76	Panorama Village	Pop = 0 Homes = 0 Lots = 702 % Vacant = 100	85	Poole	Pop = 370 Homes = 66 Lots = 147 % Vacant = 55.1
77	El Paso Hills	Pop = 0 Homes = 0 Lots = 599 % Vacant = 100	86	Aldama	Pop = 207 Homes = 37 Lots = 46 % Vacant = 19.6
78	Wiseman	Pop = 179 Homes = 32 Lots = 51 % Vacant = 37.2	87	San Ysidro	Pop = 0 Homes = 0 Lots = 87 % Vacant = 100
79	Belen Plaza	Pop = 174 Homes = 31 Lots = 56 % Vacant = 44.6			

FIGURE 15.2 (SHEET 7)

POTENTIAL CUSTOMERS FOR WATER SERVICE

LOWER VALLEY PLANNING AREA (Cont.)

ID #	Name	Size	ID #	Name	Size
88	Sun Haven Farms	Pop = 17 Homes = 3 Lots = 77 % Vacant = 96.1	97	Friedman Estates	Pop = 1837 Homes = 328 Lots = 574 % Vacant = 42.8
89	Bauman Estates	Pop = 594 Homes = 106 Lots = 178 % Vacant = 40.4	98	Lewis	Pop = 50 Homes = 9 Lots = 12 % Vacant = 25
90	McAdoo	Pop = 11 Homes = 2 Lots = 116 % Vacant = 98.3	99	Angie	Pop = 73 Homes = 13 Lots = 15 % Vacant = 13.3
91	Roseville	Pop = 414 Homes = 74 Lots = 139	100	El Campestre	Pop = 745 Homes = 133 Lots = 234 % Vacant = 43.2
92	Vinedo Estates	Pop = 218 Homes = 39 Lots = 58 % Vacant = 32.8	101	El Gran Valle	Pop = 84 Homes = 23 Lots = 234 % Vacant = 90.2
93	Mesa Verde	Pop = 48 Homes = 1 Lots = 45 % Vacant = 98.0	102	Valle Real	Pop = 129 Homes = 23 Lots = 51 % Vacant = 54.9
94	Jones	Pop = 119 Homes = 33 Lots = 63 % Vacant = 47.6	103	Santa Martina	Pop = 54 Homes = 15 Lots = 69 % Vacant = 78.3
95	Aljo	Pop = 554 Homes = 99 Lots = 115 % Vacant = 13.9	104	Rancho Mirival	Pop = 179 Homes = 32 Lots = 52 % Vacant = 38.5
96	Melton Place	Pop = 11 Homes = 2 Lots = 26 % Vacant = 92.3	105	Bejar Estates	Pop = 37 Homes = 10 Lots = 40 % Vacant = 75.0

FIGURE 15.2 (SHEET 8)

POTENTIAL CUSTOMERS FOR WATER SERVICE

LOWER VALLEY PLANNING AREA (Cont.)

ID #	Name	Size	ID #	Name	Size
106	Quail Mesa	Pop = 39 Homes = 7 Lots = 15 % Vacant = 53.3	114	Glorieta	Pop = 90 Homes = 16 Lots = 31 % Vacant = 48.4
107	Althena West	Pop = 470 Homes = 84 Lots = 118 % Vacant = 28.8	115	Plaza Bernal	Pop = 258 Homes = 46 Lots = 71 % Vacant = 35.2
108	Brinkman	Pop = 146 Homes = 26 Lots = 39 % Vacant = 33.3	116	Campo Bello	Pop = 0 Homes = 0 Lots = 47 % Vacant = 100
109	Gonzalez	Pop = 17 Homes = 3 Lots = 35 % Vacant = 91.4	117	Rio Posado	Pop = 95 Homes = 17 Lots = 44 % Vacant = 61.4
110	Villalobos	Pop = 28 Homes = 5 Lots = 87 % Vacant = 94.3	118	Valle Villa	Pop = 374 Homes = 65 Lots = 105 % Vacant = 38.1
111	San Paulo	Pop = 151 Homes = 27 Lots = 40 % Vacant = 32.5	119	Los Aves	Pop = 157 Homes = 28 Lots = 50 % Vacant = 44
112	Lordsville	Pop = 101 Homes = 18 Lots = 27 % Vacant = 33.3	120	Col. Del Rio	Pop = 286 Homes = 51 Lots = 125 % Vacant = 59.2
113	Burbridge	Pop = 190 Homes = 34 Lots = 36 % Vacant = 5.5	121	Wildhorse Valle	Pop = 95 Homes = 17 Lots = 30 % Vacant = 43.3



FIGURE 15.2 (SHEET 9)

POTENTIAL CUSTOMERS FOR WATER SERVICE

LOWER VALLEY PLANNING AREA (Cont.)

<u>ID #</u>	<u>Name</u>	<u>Size</u>	<u>ID #</u>	<u>Name</u>	<u>Size</u>
122	Hacienda Real	Pop = 50 Homes = 9 Lots = 24 % Vacant = 62.5	127	Gloria Elena	Pop = 202 Homes = 36 Lots = 34 % Vacant = 0
123	Connington	Pop = 118 Homes = 21 Lots = 35 % Vacant = 40	128	Sylvia	Pop = 202 Homes = 36 Lots = 50 % Vacant = 28
124	Sunshine Acres	Pop = 39 Homes = 7 Lots = 35 % Vacant = 80	129	Cuna Del Valle	Pop = 34 Homes = 6 Lots = 117 % Vacant = 94.9
125	Morning Glory Manor	Pop = 39 Homes = 7 Lots = 120 % Vacant = 94.2	130	Col. De Las Azeleas	Pop = 302 Homes = 54 Lots = 255 % Vacant = 78.8
126	Madrikena	Pop = 62 Homes = 11 Lots = 17 % Vacant = 35.3	131	Col. Dalias	Pop = 174 Homes = 31 Lots = 293 % Vacant = 89.4

**TABLE 15.2**  
**POPULATION BY PLANNING AREA**

<u>Planning Area</u>	<u>1990 Population Not in EPWU Service Area</u>	<u>Estimated Population w/o Water Service</u>	<u>Percent of Total Population w/o Water Service</u>
Northwest	15,459	3,710	24%
Lower Valley	42,906	16,304	38%
East	<u>10,464</u>	<u>1,960</u>	19%
Total in EL Paso County	68,829	21,974	32%

Exhibit 3 is a compilation of the current water rates of 14 water purveyors in the El Paso area. Typical water rates vary between \$1.00 and \$2.00 per 1,000 gallons. A family of four using water at the rate of 160 gallons per person per day will require approximately 20,000 gallons per month.

## **2.3 Funding Sources**

Investigation of funding sources for water systems extensions outside the present EPWU service area revealed five possible sources of funds. The sources and a description of each are as follows:

### **2.3.1. Texas Water Development Board (TWDB)**

The Texas Water Development Board administers loans for water supply, wastewater treatment, flood control, municipal solid waste and agricultural projects. Funds for the projects are provided from bond proceeds obtained from the sale of Texas Water Development Bonds which are secured by the full faith and credit of the state. Applicants for these funds must be political subdivisions of the state. Successful applicants must meet criteria which indicates their ability to repay the loan. The Board accepts as security for the loans, borrower pledges such as general obligation bonds,

revenue bonds, and tax and revenue certificates of obligation. The State currently has an AA bond rating which provides a lower cost of financing than the applicant can normally obtain.

Texas Water Development Board loans may be available from one or more of the following funds or accounts:

**a. Texas Water Development Fund, Water Supply Account**

Provides loans for financing such water related projects as water wells, retail and wholesale transmission lines, storage tanks and water treatment plants.

**b. Texas Water Development Fund, State Participation Account**

State may purchase an interest of up to 50 percent in a reservoir or regional water supply facility to enable construction of the facilities to optimum size and the oversizing of transmission and collection lines. The state's interest in the facilities is purchased by the borrower at a future specified date.

**c. Texas Water Development Fund, Economically Distressed Areas Program (EDAP)**

Loans and/or grants can be made to finance construction, acquisition or improvements to water supply (and wastewater) and treatment facilities, including necessary engineering work. Funds are available only for areas meeting the definition of "economically distressed area" (El Paso County does). Customers of extended EPWU water services constructed under an EDAP funds cannot be charged water rates higher than charged City of El Paso residents. Further, the sponsoring entity must contribute financially by either guaranteeing repayment of the debt service of the bond issue or by paying the lesser of \$500,000 or 2.5 percent of the total project costs. This program was initially funded in 1989 with authorization to issue \$100 million in bonds. It is understood the Texas Legislature has authorized an additional \$150 million for this fund which is pending voter approval.

It is possible to receive a grant/loan combination from the EDAP. The grant to loan ratio is established based on the ability of the borrower to repay the loan.

#### **2.3.4 El Paso Community Foundation**

The El Paso Community Foundation has been very active in locating grant funds for community projects. The Ford Foundation through the El Paso Community Foundation has given grants to projects in economically distressed areas. There are other sources of funds that can be utilized through the efforts of the El Paso Community Foundation. The El Paso Community Foundation should be made an active participant in the funding of potential water projects in economically distressed areas.

A single funding source will normally not be sufficient to fund a project. An individual project may require a combination of grants and loans from the above sources.

**d. Water Assistance Fund, Water Loan Assistance Fund**

Loans are available to eligible political subdivisions for water supply and treatment projects, among others.

**e. Water Assistance Fund, Research and Planning Fund**

Provides for 50/50 matching grants to finance, among other works, regional water supply plans. Financial assistance under this sub-fund must be initiated by the TWDB by identifying a problem area and soliciting an application. The planning area project must involve more than one political subdivision.

**2.3.2 Texas Department of Commerce (TDC)**

**a. Community Development Block Grant Program**

Federal funds available from the U.S. Department of Housing and Urban Development (HUD) are furnished to, and administered by, the TDC. The financial assistance is available to low to moderate income counties and is in the form of a grant. The El Paso Region (consisting of 6 counties) traditionally gets four grants per year, of which two have traditionally been made to El Paso County agencies. Grants have been limited to a maximum of \$250,000, but consideration is being given to increasing this limit by 10 percent. The grantee must provide 15 percent matching funds.

**b. Farmers Home Administration (FmHA)**

Financial assistance is in the form of a combination grant/loan. The grant portion is limited to a maximum of 75 percent. The application and evaluation procedure is complex. Evaluation by the FmHA will continue to be based on 1980 census values until the 1990 census becomes official.

**2.3.3 El Paso Water Utilities/Public Service Board**

The EPWU/PSB has a good bond rating which in most cases is similar to the State's bond rating. Therefore, when applicable, the PSB could use their bonding ability to finance projects at possibly a lower rate than the State can loan funds.

### **2.3.4 El Paso Community Foundation**

The El Paso Community Foundation has been very active in locating grant funds for community projects. The Ford Foundation through the El Paso Community Foundation has given grants to projects in economically distressed areas. There are other sources of funds that can be utilized through the efforts of the El Paso Community Foundation. The El Paso Community Foundation should be made an active participant in the funding of potential water projects in economically distressed areas.

A single funding source will normally not be sufficient to fund a project. An individual project may require a combination of grants and loans from the above sources.

### 3.0 DETERMINATION OF PRIORITIES

#### 3.1 Socioeconomic Concerns

Everyone needs water for survival. Those who do not have water service at municipal standards (that is, piped into plumbing in their homes at adequate pressure) will obtain water by hauling or from shallow wells. These non-municipal types of service are easily contaminated and often contribute to serious health problems.

The usually accepted priority for providing adequate water supplies to users is:

- |                   |                       |
|-------------------|-----------------------|
| 1. Drinking Water | 6. Sanitary (Toilets) |
| 2. Culinary Water | 7. Irrigation         |
| 3. Bathing        | 8. Cooling            |
| 4. Dishwashing    | 9. Commercial         |
| 5. Laundry        | 10. Industrial        |

The first six uses are necessary for life and health, whereas the last four are normally only necessary for enjoyment and economic well being. It is usually a difficult decision to not provide any or all of the water needed for economic or enjoyment purposes. However, this study addresses the pragmatic issues of how to provide the extension of life-line water service for public health benefit to the greatest number of people who do not now have adequate water, in the fastest practical time, and within the bounds of financial possibility.

#### 3.2 Planning and Jurisdictional Concerns

The extension of water service to customers outside of the EPWU's present service area will have three effects; (1) it will end the deprivation and improve public health conditions of current residents, (2) it will promote additional growth in subdivisions and other developments due to the availability of water, and (3) it will significantly increase the amount of wastewater discharge.

Orderly growth requires an organized approach to utility extension. It provides for the most favorable rate structure for the water users. Extension of water and sewer services by "leap-frogging" to areas which are not contiguous with developed water distribution and/or sewage collection systems is contrary to basic planning objectives and invariably leads to operational and financial concerns. After extensive evaluations of the physical system requirements

needed to serve potential customers and much debate by the Steering Committee it was agreed that contiguity should be the primary factor in considering areas desiring extensions of water and/or sewer services.

Jurisdictional concerns involve the rights and potential problems which might arise in situations where the EPWU would be extending services into the extraterritorial jurisdiction (ETJ) of another municipality or an area covered by a Certificate of Convenience and Necessity (CCN).

### 3.3 Procedure for Determining Priorities

Based on the relative importance of the factors discussed above, a weighted numerical rating procedure was developed for the purpose of uniformly ranking the potential customers to determine their relative priority and phasing for extensions of service. The adopted procedure consists of rating each potential customer for three categories of factors: 1) Jurisdictional, 2) Present Quality of Life, and 3) Cost/Funding. The relative importance of each factor is defined by a numerical weight. The factors for which potential customers are rated to establish their priority and the relative weight of the factors are as follows:

<u>Factor</u>	<u>Relative Weight</u>
1) Jurisdictional Factors	
a. Site in El Paso ETJ	150
b. Site contiguous to EPWU	100
c. Water resource available	50
2) Present Quality of Life Factors	
a. Without access to public system	10
b. Inadequate water quantity	4
c. Inadequate water quality	8
d. Water contamination potential	9
e. Sewer or septic system available	8
3) Cost/Funding	
a. Funding available	10
b. Able to pay rates	6

Note that the above factors do not include consideration of the comparative cost of service. It is assumed that if municipal service is extended to customers outside of the municipal boundaries, the water and sewer rates will comply with the applicable Rules and Regulations of



the EPWU/PSB, and that such rates might be comparable to or lower than the current cost to individual households.

In rating a potential customer, each factor is considered a question which is answered "Yes" or "No". A "Yes" answer is denoted as 1 and a "No" answer is denoted as 0. Each factor is then multiplied by either 1 or 0 to obtain the weighted rating for that factor. Finally the weighted factor scores are summed to obtain the relative numerical priority.

In order to satisfy many of the concerns, it was concluded that, except in extraordinary situations as determined by the PSB, service extensions by the EPWU should be limited to within the ETJ of the City of El Paso. Within El Paso's ETJ, each of the three general planning areas adopted for this study were divided into contiguous service areas. The areal extent of these service areas were defined by the following two criteria:

- a. Contiguity to EPWU's existing pipeline network.
- b. A cost of approximately \$1,000,000 required for the construction of transmission and distribution facilities within the service area. (Not included in the cost is any impact fee or plumbing within the residences).

The service areas are shown on Figure 15.3 designated with Roman numerals. Only those service areas numbered I are presently contiguous to EPWU's present water system. As the first service area in each Planning Area becomes served, the adjacent service area becomes contiguous. The priority rating procedure is structured so that a prospective customer must receive a priority rating higher than 300 to satisfy the requirement of contiguity. Accordingly only those prospective customers ranked with a relative priority of 300 or higher would be considered in the initial phase of extending services.

### **3.4 Priorities of Potential Customers**

Using the adopted prioritization procedure, the 131 potential customers listed on Figure 15.2 were rated to determine their relative priorities. The resulting numerical priority rating matrix is presented in Exhibit 4. In completing the priority matrix, several assumptions were made. A potential customer within five miles of the corporate limits of El Paso was considered to be

# EL PASO COUNTY PRIORITY SERVICE AREAS BY PLANNING AREA

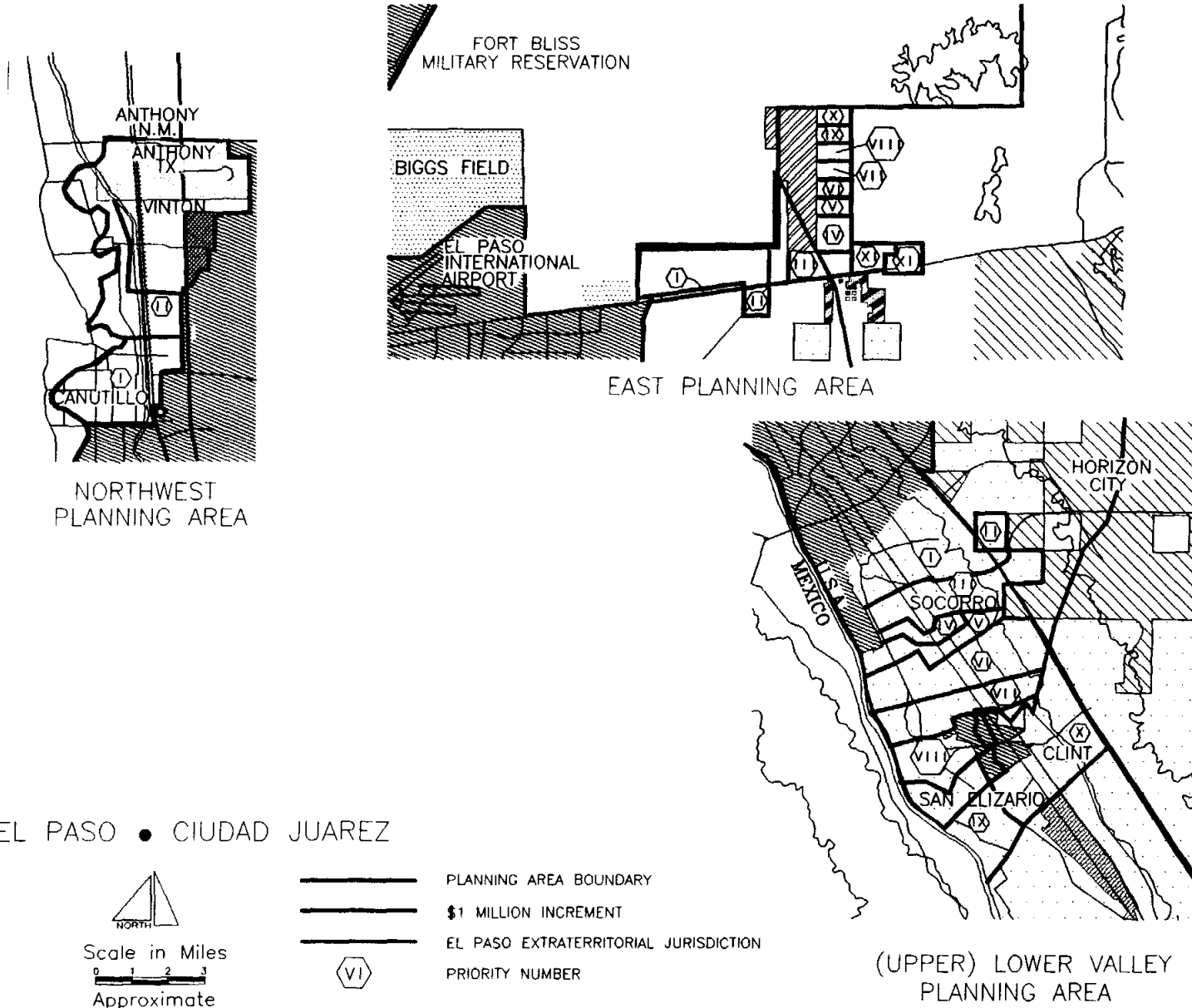


FIGURE 15.3

within El Paso's ETJ, even if it was located within the ETJ of another entity. This allows a logical extension of services without allowing "leap frogging". In addition, it was assumed that: 1) water resources are available to all potential customers, 2) funding is available to all potential customers, and 3) all potential customers would be able to pay for the service provided.

The prioritization matrix in Exhibit 4 indicates there are 19 potential customers within the highest relative priority (355). Three of these are in the Northwest Planning Area:

- #4 - La Union Estates
- #5 - Serene Acres
- #6 - Adelante Estates

The remaining 16 are in the Lower Valley Planning Area:

- #53 - Grijalva Gardens
- #54 - Delip
- #55 - North Loop Acres
- #56 - Bagge Estates
- #57 - Gurdev
- #58 - Sunshine
- #59 - Spanish Trail
- #60 - Alameda Estates
- #61 - Villa Espana
- #62 - San Augustin
- #63 - Rio Rancho
- #64 - La Fuente
- #65 - Monterosales
- #66 - La Jolla
- #67 - Ellen Park
- #68 - Hillcrest Manor

Eight other potential customers received priorities higher than 300 and would be considered eligible for the first phase of service extensions. They are:

Northwest Planning Area:

- #1 - Canutillo ISD
- #2 - Canutillo Area
- #3 - Gaslight Square Water Distribution
- #7 - Prado Verde
- #8 - Edmundo Kauffman Estates

East Planning Area:

- #24 - Turf Estates
- #25 - Desert Oasis
- #26 - Monte Vista Trailer Park

When the first phase service extensions have been substantially completed, the first service areas will have been essentially incorporated in the EPWU's service area. The next adjacent service areas (number II on Figure 15.3) will then be considered to be contiguous and the prioritization matrix should be re-scored.

#### **4.0 POLICIES GOVERNING EXTENSIONS OF SERVICES**

In consultation with the Steering Committee and the PSB's General Counsel, policies embodying the concepts and constraints discussed in this report were developed for adoption and guidance of the PSB. The statement of those policies follows.

**EL PASO WATER UTILITIES / PUBLIC SERVICE BOARD**

**POLICIES GOVERNING**

**EXTENSION OF WATER AND SEWER SERVICES**

**OUTSIDE THE CORPORATE LIMITS OF THE CITY OF EL PASO**

**BUT WITHIN EL PASO COUNTY, TEXAS**

Whereas, the El Paso Water Utilities Public Service Board (hereinafter sometimes referred to as the "EPWU") has, by their Resolution of December 13, 1990, determined that the best interests of the citizens of El Paso will be served if water and sewer service extensions are provided by the EPWU to private residences and other users (including those of a commercial or industrial nature) who now have no service, or substandard service, outside the corporate limits of the City of El Paso, but within El Paso County, Texas; and

Whereas, presently thirty two percent (32%) of the population in El Paso County outside of the City of El Paso (approximately 22,000 people) suffer from inadequate water service and an even larger number do not have adequate sewer service; and

Whereas, this condition constitutes a great public health hazard to a significant portion of all the population of El Paso County; and

Whereas, the lack of adequate water and sewer services deprives the affected citizens of full enjoyment of their homes and property; and

Whereas, although the EPWU has no legal obligation to extend water and sewer services outside the corporate limits of the City of El Paso, it is deemed to be in the public interest to extend said services on a fair and reasonable basis, and in a manner that will result in such extensions of services being provided without violating existing bond covenants which bind the EPWU and without imposing undue financial burdens upon existing water and sewer customers inside the corporate limits of the City of El Paso; and

Whereas, consistent with good practices of utility management and operations, any extension of service should be planned and programmed so as to serve the most citizens in the shortest time practical and at the least capital costs while at the same time recognizing the imperative of protecting the public health; and

Whereas, the EPWU recognizes that these existing conditions are partially due to the inability of current laws to adequately control development outside the City of El Paso's extraterritorial jurisdiction (herewith sometimes referred to as "ETJ"); and

Whereas, appropriate rules and regulations will be adopted to govern the extension of water and sewer services to customers outside the corporate limits of the City of El Paso that will preserve and protect the public health; and

Whereas, by extension of water or sewer services on a wholesale basis to customers located outside the corporate limits of the City of El Paso, the EPWU assumes no responsibility or obligation for the quality of service and/or rates charged to individual customers for water or sewer service by the EPWU as the wholesaler.

NOW THEREFORE, be it resolved that all extensions of water and sewer services outside of the corporate limits of the City of El Paso by the El Paso Water Utilities Public Service Board shall be governed by the following policies:

I.

**WITH RESPECT TO EXTENSIONS OF WATER AND SEWER SERVICES, BOTH RETAIL AND WHOLESALE, IN GENERAL:**

1. For purposes of these policies, an "outside-city customer" for water and/or sewer services from the EPWU shall be defined as any person, municipality, town, village, unit of government, governmental agency, corporation, utility, community, water district, water supply and sewer service corporation, subdivision and other groupings of residences, commercial establishments, institutions, and industries, or any other entity or combination thereof who desire water and sewer service from the EPWU. To be considered for extensions of water and/or sewer services, such outside-city customer must not be located in the extraterritorial jurisdiction or the corporate limits of any municipality other than the City of El Paso, or in a service area covered by a current Certificate of Convenience and Necessity ("CCN") held by any public utility or other

entity other than the EPWU, unless such other municipality or public utility has certified in writing that it has no interest in providing the water and/or sewer services to the requesting outside-city customer and has entered into an agreement with the EPWU to allow the EPWU to serve in such service area and where such service is in full compliance with the rules and regulations of the Texas Water Commission and the requirements of the applicable CCN. Nothing herein shall prevent the EPWU from serving outside-city customers in another entity's service area where the EPWU has acquired the right to serve through a dual certification or where the entity is decertified or is in the process of being decertified by the Texas Water Commission, the Department of the Environment or any successor agency and the EPWU has otherwise been granted the right to provide service by the appropriate legal or regulatory authorities.

2. Water and sewer services will be extended by the EPWU only to outside-city customers within the ETJ of the City of El Paso, as it may now exist or hereinafter be extended, and within El Paso County, except that in exceptional or emergency situations, as solely determined by the Public Service Board, the EPWU may extend water or sewer services beyond the ETJ of the City of El Paso when it is deemed to be in the interest of public safety, health or welfare to do so, and it is done pursuant to the requirements and conditions herein set forth.
3. Extensions of water and sewer services will be contingent upon an engineering determination by the EPWU that the available water supply and sewage handling and treatment capacity, at the point from which the extensions of service would be made are adequate, or can reasonably be made adequate, to provide the extended service and when such extensions can be made in full compliance with all applicable laws, rules and regulations, as they may now read or be hereinafter amended.
4. Any outside-city customer to which water and/or sewer services are extended must acknowledge in writing that they understand that obtaining water and/or sewer service from the EPWU does not imply nor guarantee that any other City of El Paso services whatsoever such as fire protection, fire suppression, solid waste disposal or police protection will be provided. (Fire protection includes hydrants, minimum residual pressure, and storage capacity to maintain flows for extended periods). The City of El Paso and the EPWU have limited authority to provide municipal services outside their



corporate limits and an extension of water and/or sewer services outside such corporate limits does not imply, guarantee or in any way warrant or otherwise obligate the City or the EPWU to extend or provide additional municipal services.

5. Any outside-city customer to which water and sewer service is extended must agree in writing to comply with all EPWU Rules and Regulations pertaining to water and sewer use, including, but not limited to rules and regulations governing industrial wastewater pretreatment requirements, and to City of El Paso ordinances regarding water conservation and all other applicable laws, rules or regulations which are in effect at the time or which may be enacted in the future or hereinafter amended.
6. Any outside-city customer to which water service is extended, who is located within the El Paso County Water Improvement District No. 1 and has rights to Rio Grande Project water must agree in writing to assign said entitlements to Project Water to the EPWU, to the extent said customer may make such an assignment under the law, before water service will be extended.
7. All water and sewer facilities required for service extensions shall be designed and constructed in conformance with EPWU standards. The EPWU shall review and approve all design documents prior to construction and shall review and approve all construction prior to acceptance for operation and maintenance.
8. Prior to extending retail service to areas outside the City, the County shall agree to the use of County public rights-of-way for installation of water and/or sewer lines and shall grant easements at no cost to the EPWU and further shall agree there will be no franchise fees or other charges by the County for extension of said water and/or sewer lines.

## II.

### **WITH RESPECT TO SUBDIVISIONS EXISTING AT THE TIME OF ADOPTION OF THESE POLICIES GOVERNING THE EXTENSION OF WATER AND SEWER SERVICES:**

1. An application for extension of water service only will not be considered by the EPWU until a certification is made by the El Paso City-County Health Department that the customer has adequate sewage collection and disposal systems and that providing a new or additional water supply to the customer will not create a public health problem.

2. The EPWU shall establish a relative priority for each outside-city customer in accordance with the following procedure:
  - A. The Planning Area in which each outside-city customer is located will be identified. Three Planning Areas are established as follows:
    - (1) Lower Valley - From the corporate limits of the City of El Paso extending southeast between Interstate Highway 10 and the Rio Grande to the county line.
    - (2) East - From the corporate limits of the City of El Paso extending east between Interstate Highway 10 and the Fort Bliss Military Reservation boundary to the county line.
    - (3) Northwest - From the corporate limits of the City of El Paso extending north between the Texas state line and the ridge of the Franklin Mountains to the county/state line.
  - B. Each Planning Area shall be subdivided into Service Areas. The highest priority ranking shall be given to a Service Area most contiguous to the City of El Paso corporate limits. Lower priority ranking shall be assigned sequentially to the more remote Service Areas. Only those outside-city customers located in a Service Area most adjacent to the corporate limits of the City of El Paso will be rated as being contiguous to an existing EPWU utility system. When water and/or sewer services have been extended to the outside-city customers within a first Service Area, a second Service Area will become contiguous and so on for the purpose of establishing priority ratings among outside-city customers.
  - C. Outside-city customers within the same Service Area shall be priority ranked by the EPWU in its discretion according to comparative need, considering such factors as existing water source, public health situations, handling of wastewater, and ability of the outside-city customer to pay for the service provided in an amount commensurate with the cost for the EPWU to provide the service.
  - D. The EPWU shall, within the purview of applicable local, state and federal laws, use its best efforts to seek public and private funding to assist in providing capital for utility extensions to potential outside-city customers within the ETJ of

the City of El Paso, consistent with maintaining a viable utility and without impacting the water and sewer rates of existing customers. It is acknowledged that the ability to obtain public and private funding to provide for such capital costs will be a significant factor in establishing priorities for extension of water and sewer services.

### III.

#### **WITH RESPECT TO SUBDIVISIONS NOT EXISTING AT THE TIME OF ADOPTION OF THESE POLICIES GOVERNING THE EXTENSION OF WATER AND SEWER SERVICES:**

1. All proposed developments located outside of the corporate limits of the City of El Paso must conform to the City's subdivision regulations and applicable ordinances and EPWU Rules and Regulations in effect at the time the application is submitted for the extension of water or sewer service.
2. The outside-city customer, or its designated agent, shall post cash or other security acceptable to the EPWU into escrow to the account of the EPWU. The amount to be escrowed shall be one hundred twenty-five percent (125%) of the estimated increase in the EPWU's current Capital Improvements Program reasonably attributable to the additional or expanded water or sewer facilities required for extending services to the proposed outside-city customer. Alternatively, the applicant for extended water or sewer services may elect to construct the facilities on its own account. Said additional or expanded facilities shall conform to the City of El Paso's Master Plan or any amendments thereof existing at the time of application for extended service. In the event subsequent development by other parties connects to the original extended service facilities, such further development by outside-city customer will be levied a connection fee assessed pro rata to their service demand in comparison to the full capacity of the service facilities extension. Said connection fee shall be reimbursed to the original applicant.



# Texas Department of Health

Robert Bernstein, M.D., F.A.C.P.  
Commissioner

Robert A. MacLean, M.D.  
Deputy Commissioner

Public Health Region 3  
6090 Surety Dr., Suite 115  
El Paso, Texas 79905  
(915) 779-7783

Gordon Cox, M.D.  
Regional Director

April 12, 1991

Thomas T. Mann, Jr., P.E.  
Boyle Engineering Corporation  
5778 N. Mesa, Suite 200  
El Paso, Texas 79912

Dear Mr. Mann:

Enclosed is the information you requested of the public water systems (community and non-community) located in El Paso County.

0710140 - NC	Americana Inn 14327 Gateway West El Paso, Tx 79936 Doc Shaga, Owner No certified operator	(915) 882-3025
0710157 - NC	Arvey Park George Dashley, Owner 11200 Montana Box 6 El Paso, TX 79936 No certified operator	(915) 598-7522
0710078 - C	Ft. Bliss Biggs Army Airfield	(915) 868-7594
0710020 - C	Ft. Bliss Main Base Area	same
0710083 - C	Site Monitor Bill Lewis - Water Plant Manager ATZD-13E-WM Ft. Bliss, TX 79916-0032 Bill Lewis - S	same
0710118 - C	Butterfield MHP 13313 Round Darts #7 Roy Bennett, Owner P.O. Box 335 Butterfield, TX 75074	(214) 786-6393

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0710095 - C	Cuadrilla Improvement Corp Jose Gomez, President P.O. Box 1213 El Paso, TX 79838 Joe Cara - D Water bought from Fabens	(915) 764-3332
0710007 - C	Desert Oasis Park located at 12705 Montana Joseph Shau Cho Wong, Owner 5287 S. Boston Greenwood Village, CO 80111 Chuck Martin - D	(915) 855-3366
0710085 - NC	Deluxe Inn 11700 Gateway East El Paso, TX 79927 Ernie McCracken, Owner	(915) 858-0415
0710105 - C	East El Paso Water Corp 14300 Montana Ave. El Paso, TX 79936 Norman Salome, Manager W.F. Kelton - C	(915) 857-4158
0710123 - C	Eastwind MHP 14521 Montana El Paso, TX 79936 J.A. Lightborn, Owner J.A. Lightborn - D	(915) 857-10 50
0710004 - C	El Paso County WCID - Westway 1002 Tiffany Canutillo, TX 79935 Ema Villalobos, President Raul Quintero - B	(915) 886-3756
0710096 - NC	W. Silver Inc. located at 9059 Doniphan Mark Finnebock, President Star Rt 71 Anthony, TX 79821	(915) 886-3553

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0710050 - C Hillside MHP (915) 877-2395  
P.O. Box R  
Canutillo, TX 79835  
Jesse Trigg, Owner  
Jesse Trigg - D

0710153 - C Lee Limas MHP (915) 877-3607  
P. O. Box 327  
Canutillo, TX 79835  
Leroy Limas, Manager  
Leroy Limas - D

0710079 - NC Little Diner (915) 877-2175  
Ray Gallegos, Owner  
324 Crane Street  
El Paso, Texas 79922

0710018 - C El Paso County WCID #4 - Fabens (915) 851-2288  
Alex Fierro, President  
P. O. Box 277  
Fabens, TX 79838  
Kenneth Wilson - C

0710005 - C El Paso County Water Authority (915) 852-3917  
John Enson, President  
1539 Pawling  
El Paso, TX 79927  
Ronald Rodenhaver - B

0710117 - NC Love's Country Store (915) 731-9000  
Reba Baker, Admin. Asst.  
P.O. Box 26210  
Oklahoma City, OK 73126

0710100 - C San Elizario MUD (915) 859-7272  
Jim Ivey, President  
950 Americas Ave. N  
El Paso, TX 79907  
Raul Murrillo - C  
Water bought from Fabens

0710017 - C Snug Harbor Motel and MHP (915) 877-3459  
Lucia Vogt, Owner  
P.O. Box 295  
Canutillo, TX 79835  
Ruben Vogt - D

0710139 - C Valley Acres MHP (915) 877-2249  
797 Barley Drive, Space R  
Anthony, NM 88021  
Juan Michel, Owner  
Juan Michel - D

0710071 - C Vinton MHP (915) 877-2933  
Don Sims, Manager  
8248 Kiely Rd.  
Anthony, NM 88021  
Don Sims - D

0710151 - C Vinton Village Estates (915) 581-4827  
Bob Brown, Owner  
P.O. Box 1288  
Canutillo, TX 79835  
Don Sims - D

0710010 - C Urlaub WS (505) 589-0983  
James Urlaub, Owner  
Drawer 130  
Canutillo, TX 79835  
James Urlaub - C

0710066 - NC Green Acres MHP and Riverview Estates WS (915) 833-3545  
Terry Bourbon, Owner  
P.O. Box 290  
Canutillo, TX 79835  
Terry Bourbon - C

0710052 - NC Hall's Lounge and Grill (915) 877-9994  
Richard H. Hall, Owner  
P.O. Box 316  
Anthony, NM 88021

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0710076 - C      FBI - La Tuna      (915) 886-3422  
Tom L. Wooten, Warden  
P.O. Box 1000  
Anthony, NM 88021  
Frank Garcia - C

0710147 - D      Mayfair #E Subdivision      (505) 522-1307  
Sam Osborne, Owner  
P.O. Box 104  
Canutillo, TX 79835  
Merle Osborne - D

0710073 - NC      Mountain Pass Canning Co.      (915) 886-3951  
Dick Ray, Field Manager  
P.O. Box 220  
Anthony, NM 88021

0710131 - NC      Rocky's Restaurant and Bar      (915) 778-9620  
7926 Doniphan  
Rogelio Barraza, Owner  
1118 Marlow  
El Paso, TX 79905

0710030 - NC      Border Steel Mills Inc.      (915) 886-2000  
I-10 @ Vinton Rd  
Henry Wilson, Plant Engineer  
P.O. Box 12843  
EL Paso, TX 79912

0710093 - NC      Cal-Tex Spice Co.      (915) 886-3501  
8909 Kingway St.  
Fernando Nova, Plant Manager  
P.O. Box 1682  
Anthony, NM 88021

0710112 - C      Danny Boy MHP      (915) 886-4769  
Charles Flory, Owner  
Star Route 1 Box 364  
Anthony, TX 79821  
Charles Flory - D



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0710009 - C	Gaslight Square MHP William Steel, Owner 500 Transmountain Rd C-4 Canutillo, TX 79835 Anthony Tarquin - D	(915) 877-2238
0710121 - NC	Great Southwest Water & Irrigation Dist. Clinton McCombs, President P.O. Box 1520 Canutillo, TX 79835	(915) 779-3048
0710157 - C	Sparks - Ramirez WS Socorro Ramirez 250 Holy Cross El Paso, TX 79927 No certified operator	(915) 852-3742
0710034 - C	Turf Estates Gary Lucas, Owner 15961 Marsha Rd RR#3 El Paso, TX 79936 Gary Lucas - D	(915) 857-1258
0710086 - C	Viata Montana Court Alfredo Garcia, Manager 13999 Montana Space 26 El Paso, TX 79936	(915) 857-3112
0710001 - C	City of Anthony Jerry Montgomery, Mayor P.O. Box 1269 Anthony, TX 79821 Jacob Morales - E	(915) 886-2207
0710040 - NC	Bergen Southwest Steel Michael Jordan, Manager 7450 Doniphan Dr. P.O. Box 12909 El Paso, TX 79912	(915) 877-2300

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0710092 - C Homestead MUD (915) 857-1051  
Gary Crossland, President  
4027 A Las Casitas  
El Paso, TX 79936  
Serapio Salcedo - B

0710156 - HW Hueco Tanks Country Store/Cafe (915) 857-1095  
Enriqueta Zavala, Owner  
6011 Hueco Tanks Rd.  
El Paso, TX 79936

0710064 - NC Texas Parks & wildlife Dept. Hueco Tanks (915) 426-3833  
Park Rd 6B  
Tom Palmer  
P.O. Box 1058  
Ft. Davis, TX  
Bob Miles - C

0710145 - C McCracken Estates WS (915) 857-0054  
5200 O'Shea St  
Bob Brooker, Owner  
El Paso, TX 79936  
Bob Brooker - D

0710115 - C Montana Land Estates (915) 891-4436  
4360 Rancho Vista  
D.R. Brooker  
10201 Gateway W Suite 400  
El Paso, TX 79925

0710116 - NC Mountain View and Mountain Vista (915) 851-4172  
Clint ISD  
Thomas Rodriguez, Head Maintenance  
P.O. Box 779  
Clint, TX 79836  
Thomas Rodriguez - D

0710124 - C Mountain Meadows WS (915) 565-4681  
B.M. Jobe, Owner  
1 McKelligon Canyon  
El Paso, TX 79930  
Mario Ojeda - D

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0710084 - C Pasoview Estates (915) 857-2528  
7000 Miracle Lane  
El Paso, TX 79936  
Gene McCardle, Owner  
Lewis Horn - C

0710075 - NC Phelps Dodge Refining Corp (915) 778-9881  
6999 North Loop  
Fred Harvia, Engineer  
P.O. Box 20001  
El Paso, TX 79998  
Stan Stevenson - D

0710125 - C Fern Village (915) 857-0309  
Jaff Kaake, President  
14900 Montana #4  
El Paso, TX 79936  
Dabbie Kish - D

0710097 - NC Hacienda Adobe Hall (915) 544-5403  
S.O. Torres, Owner  
7200 Maggar  
El Paso, TX 79936

0710091 - C Hacienda Del Norte WID (915) 857-1092  
13901 Montana  
Lajay Goue, President  
1391 Sagebrush  
El Paso, TX 79936  
Lewis Horn - C

0710133 - HW Hilda's Diner (915) 857-1198  
14555 Montana  
Hilda Lynch  
258 Columbia  
El Paso, TX 79907

0710087 - C E & L Non-Profit Water Corp. (915) 858-3766  
4190 Krag  
El Paso, TX 79936  
Craig Russell, President  
Craig Russell - C

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0710154 - C EP County Lower Valley Water Dist. Authority (915) 652-4334  
Michael Cissielaki, General Manager  
E. Payton Rd.  
El Paso, Texas 79927

0710082 - NC El Paso Natural Gas - Huecco Club (915) 541-5655  
13000 Montana  
Pete McDonald, Manager  
P.O. Box 1492  
El Paso, TX 79978

0710144 - HW Esther's Tavern (915) 657-1550  
13515 Montana  
Esther Cornell  
11190 Shoreline  
El Paso, TX 79936

0710134 - NC El Rancho Escondido (915) 566-5525  
14549 Montana  
Nick Nabhan, Owner  
4832 Hastings  
El Paso, TX 79903

0710142 - HW Lucy's Bakery (915) 651-1151  
Rodolfo Guevara, Owner  
390 Bauman  
Socorro, TX 79927

0710019 - C Tornillo WSD (915) 764-2820  
H.R. Saybart, President  
P.O. Box 136  
Tornillo, TX 79853  
Raul Murrillo - E

\*\*NC - Non-community  
C - Community  
HW - Hauled water

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If we may be of further assistance, please contact our office at  
(915) 779-8016.

Respectfully submitted,

*Richard Menden for*

Fernando Rico, Jr., P.E.  
Water Hygiene  
Program Manager, PHR 3

FR:RM:dg

EXHIBIT 2

WATER PURVEYORS IN  
EL PASO COUNTY  
HAVING  
CERTIFICATES OF CONVENIENCE  
AND NECESSITY

TEXAS WATER COMMISSION  
TWC WATER/SEWER UTILITIES SYSTEM  
REPORT OF WATER UTILITIES

CCN #	REC #	TDH #	PHONE/ CONTACT PHONE	UTILITY-NAME/ CCN HOLDER/ ADDRESS	CONTACT NAME/ CONTACT TYPE	TWC DIST COUNTY NAME OWNERSHIP*
00000	A0282	0710145	915 857-0054 915 857-0054	MCCRACKEN ESTATES WATER SYSTEM BROOKER, BOB 5200 O'SHEA EL PASO TX 79938-0000	BOB BROOKER OWNER	I
00000	P0948		915 585-4440 000	EL PASO CO LOWER VALLEY WATER 10005 ALAMEDA AVENUE SUITE P EL PASO TX 79927-0000	MICHAEL H CIESIELSKI GENERAL MANAGER	D
00000	U0039	0710120	915 833-3275 915 833-3275	DEERFIELD PARK WATER SUPPLY SY C/O JOE KENNARD - PRESIDENT P O BOX 13021 EL PASO TX 79913-0000	JOE KENNARD PRESIDENT	W
10211			915 533-9701	EL PASO CITY OF 320 S CAMPBELL P O BOX 511 EL PASO TX 79909-0000	EDMUNDO ARCHULETA GENERAL MANAGER	C
10745	1090018		817 878-3271 817 878-3271	BRANDON-IRENE WATER SUPPLY COR C/O ROY SUROVIK C/O ROY SUROVIK BOX 389 ITASCA TX 78055-0000	JESSE SCHREINER PRESIDENT	W
11017			915 589-0883 915 589-0883	U R L A U B DRAWER 130 CANUTILLO TX 79835-0000	JAMES URLAUB OWNER	I
11418	0710019		915 784-2350 915 784-2789	TORNILLO WATER SUPPLY CORPORAT C/O H R SEYBERT - PRESIDENT PO BOX 136 TORNILLO TX 79853-0000	H R SEYBERT PRESIDENT	W
11785			915 833-3545 915 542-8290	GREEN ACRES/RIVERVIEW WTR WKS BOURBON, TERRY P O BOX 290 CANUTILLO TX 79835-0000	TERRY BOURBON OWNER	I

\*OWNERSHIP: C=CITY, D=DISTRICT, I=INVESTOR, M=MOBILE HOME PARK, P=POLITICAL SUBDIV, S=SUBMETERING, W=WATER SUPPLY CORP, X=MISC/UNKNOWN

D-55

FORM 204-111

TEXAS WATER COMMISSION  
TWC WATER/SEWER UTILITIES SYSTEM  
REPORT OF WATER UTILITIES

CCN #	REG #	TDH #	PHONE/ CONTACT PHONE	UTILITY-NAME/ CCN HOLDER/ ADDRESS	CONTACT NAME/ CONTACT TYPE	TWC DIST COUNTY NAME OWNERSHIP*
11841			915 857-2628 915 857-0410	PASO VIEW WATER SYSTEM C/O GENE MCCARDLE 7000 MIRACLE LANE EL PASO TX 79936-0000	GENE MCCARDLE CO-OWNER	I 10 EL PASO
11861			915 779-6341	VALLEY DOMESTIC WATER 14201 NORTH LOOP P O BOX 10698 CLINT TX 79836-0000	BENNY DAVIS	I 10 EL PASO
12127	0710118		214 786-6388 214 786-6388	BUTTERFIELD MOBILE HOME PARK P O BOX 935 POTTSBORD TX 75078-0935	ROY B & SHIRLEY M BE CO OWNERS	I 10 EL PASO
12150			915 857-0125 000	FERN VILLAGE WATER SYSTEM FERN VILLAGE HOMEOWNERS ASSN. 14900 MONTANA, #4 EL PASO TX 79936-0000		I 10 EL PASO
12184	0710034		915 857-1268 915 857-1268	TURF WATER SYSTEM C/O GARY LUCAS C/O GARY LUCAS 15961 MARSHA RD - RR NO 3 EL PASO TX 79936-0000	GARY LUCAS OWNER	I 10 EL PASO
12208			915 592-5160 915 592-5160	O R B DEVELOPMENT, INC. C/O JO ANN BROOKER 1819 ARNOLD PALMER EL PASO TX 79935-0000	JO ANN BROOKER OWNER	I 10 EL PASO
12225	0710124		915 532-8888 915 565-4681	MOUNTAIN MEADOW ESTATES WATER JOBE, B M C/O B M JOBE 18 MCKELLIGON CANYON EL PASO TX 79930-0000	B M JOBE OWNER	I 10 EL PASO
12389	0710105		915 544-6208 000	EAST EL PASO WSC C/O NORMAN SALOME - MANAGER 4420 NORTH MESA EL PASO TX 79902-0000	NORMAN SALOME MANAGERWN	W 10 EL PASO

\*OWNERSHIP: C=CITY, D=DISTRICT, I=INVESTOR, M=MOBILE HOME PARK, P=POLITICAL SUBDIV, S=SUBMETERING, W=WATER SUPPLY CORP.  
X=MISC/UNKNOWN

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EXHIBIT 3

CURRENT WATER RATES  
CHARGED BY UTILITIES IN  
EL PASO AREA

## CURRENT MONTHLY WATER RATES

(AS OF MAY 29, 1991)

<u>CITY/DISTRICT</u>	<u>RATES</u>	
	<u>INSIDE CITY/DISTRICT</u>	<u>OUTSIDE CITY/DISTRICT</u>
Anthony, TX	0-3,000 gal = \$6.50 greater than 3,000 = \$6.50 + \$0.66/1,000 gal	N/A
Albuquerque, NM	\$4.67 + \$0.69/1,000 gals	N/A
Las Cruces, NM	0-5,000 gal = \$4.80 + \$0.46/1,000 gal 5,000-10,000 gal = \$7.10 + \$0.51/1,000 gal 10,000-50,000 gal = \$9.65 + \$0.93/1,000 gal greater than 50,000 gal = \$46.85 + \$1.33/1,000 gal	N/A
Dona Ana Mutual Water DWCA	0-5,000 gal = \$9.89 greater than 5,000 gal = \$9.89 + \$1.46/1,000 gal	N/A
Tornillo WSC	0-5,000 gal = \$15.00 greater than 5,000 gal = \$15.00 + \$0.90/1,000 gal	N/A
El Paso County WCID No. 4	0-7,500 gal = \$9.25 greater than 7,500 gal = \$9.25 + \$0.60/1,000 gal	N/A
Homestead MUD	0-12,000 gal = \$19.50 12,000-18,000 gal = \$19.50 + \$1.50/1,000 gal 18,000 - 24,000 gal = \$28.50 + \$1.75/1,000 gal greater than 24,000 gal = \$39.00 + \$2.00/1,000 gal	N/A
Haciendas Del Norte WID	Annual O & M Fee = \$110.00 + 0-10,000 gal = \$8.00 10,000-20,000 gal = \$8.00 + \$1.00/1,000 gal 20,000-30,000 gal = \$18.00 + \$1.25/1,000 gal greater than 30,000 gal = \$30.50 + \$2.25/1,000 gal	N/A
Paso View	0-6,000 gal = \$15.00 greater than 6,000 gal = \$15.00 + \$2.50/1,000 gal	N/A
El Paso County WCID	0-4,000 gal = \$8.00 4,000-8,000 gal = \$16.00 8,000-20,000 gal = \$16.00 + \$2.00/1,000 gal greater than 20,000 gal = \$40.00 + \$6.00/1,000 gal	N/A

<u>CITY/DISTRICT</u>	<u>INSIDE CITY/DISTRICT</u>	<u>OUTSIDE CITY/DISTRICT</u>
Alamogordo, NM	0-4,500 gal = \$5.50 greater than 4,500 = \$5.50 + \$0.91/1,000 gal	0-4,500 gal = \$15.00 greater than 4,500 = \$15.00 + \$1.82/1,000 gal
El Paso County Water Authority	0-5,000 gal = \$2.00 5,000-35,000 gal = \$2.00 + \$0.40/1,000 gal 35,000-50,000 gal = \$14.00 + \$0.75/1,000 gal 50,000-500,000 gal = \$23.25 + \$1.00/1,000 gal	0-5,000 gal = \$11.70 greater than 5,000 gal = \$11.70 + 2.34/1,000 gal
El Paso Water Utilities	0-3,000 gal = \$3.33 3,000 - 175% AWC = \$3.33 + \$1.02/1,000 gal greater than 175% AWC = \$1.89/1,000 gal	2 times the rate of a user within the city.
El Paso County Lower Valley Water District Authority	0-8,250 gal = \$15.27 8,250 - 15,750 gal = \$15.27 + \$2.43/1,000 gal 15,750 - 23,250 gal = \$33.50 + \$2.77/1,000 gal greater than 23,250 gal = \$54.28 + \$3.24/1,000 gal	N/A

EXHIBIT 4

PRIORITY RANKINGS  
OF  
POTENTIAL OUTSIDE-CITY  
CUSTOMERS

P R I O R I T Y R A N K I N G M A T R I X

D-65

NORTHWEST PLANNING AREA		JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			GRAND TOTAL
		Site in El Paso ETJ	Site contiguous to EPWU	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	
Potential Customer / / Relative Weight		150	100	50		10	4	8	9	8		10	6		
1	Canutillo ISD	1	1	1	300	0	1	1	1	1	29	1	1	16	345
2	Canutillo area	1	1	1	300	0	1	1	1	0	21	1	1	16	337
3	Gaslight Square Water Distrib.	1	1	1	300	0	0	0	1	1	17	1	1	16	333
4	La Union Estates	1	1	1	300	1	1	1	1	1	39	1	1	16	355
5	Serene Acres	1	1	1	300	1	1	1	1	1	39	1	1	16	355
6	Adelante Estates	1	1	1	300	1	1	1	1	1	39	1	1	16	355
7	Prado Verde	1	1	1	300	0	0	0	1	1	17	1	1	16	333
8	Edmundo Kauffman Estates	1	1	1	300	0	0	0	1	1	17	1	1	16	333
9	Town of Anthony	0	0	1	50	0	0	0	0	0	0	1	1	16	66
10	La Tuna Fed. Corr. Inst.	0	0	1	50	0	0	0	0	0	0	1	1	16	66
11	W. Silver Inc.	1	0	1	200	0	0	0	0	0	0	1	1	16	216
12	Great Southwest Water Irrigation	1	0	1	200	0	0	0	0	0	0	1	1	16	216
13	Border Steel Inc.	1	0	1	200	0	0	0	0	0	0	1	1	16	216
14	Metal Processing	1	0	1	200	0	0	0	0	0	0	1	1	16	216
15	Town of Vinton	1	0	1	200	1	1	1	1	1	39	1	1	16	255
16	Hillside Mobile Home Park	1	0	1	200	0	0	0	1	1	17	1	1	16	233
17	Nu-way	1	0	1	200	1	1	1	1	1	39	1	1	16	255
18	Mayfair	1	0	1	200	1	1	1	1	1	39	1	1	16	255

Legend: Yes = 1, No = 0

P R I O R I T Y R A N K I N G M A T R I X

NORTHWEST PLANNING AREA				JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS				COST/FUNDING FACTORS			
Potential Customer / / Relative Weight	Site in El Paso ETJ	Site contiguous to EPMU	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	GRAND TOTAL	
	150	100	50		10	4	8	9	8		10	6			
19 Valley Acres	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
20 Mountain Valley	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
21 Ponderosa Mobile Homes	1	0	1	200	0	0	0	1	1	17	1	1	16	233	
22 Schuman Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
23 Westway	1	0	1	200	0	1	1	0	0	12	1	1	16	228	

Legend: Yes = 1, No = 0

D-66

P R I O R I T Y R A N K I N G M A T R I X

D-67

EAST PLANNING AREA  
 Potential Customer /  
 / Relative Weight

	JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			
	Site in El Paso ETJ	Site contiguous to EPWJ	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	GRAND TOTAL
	150	100	50		10	4	8	9	8		10	6		
24 Turf Estates	1	1	1	300	0	0	0	0	0	0	1	1	16	316
25 Desert Oasis	1	1	1	300	0	0	0	0	0	0	1	1	16	316
26 Monte Vista Trailer Park	1	1	1	300	0	0	0	0	0	0	1	1	16	316
27 Hillcrest	1	0	1	200	1	1	1	1	1	39	1	1	16	255
28 Butterfield Trail	1	0	1	200	0	0	0	0	1	8	1	1	16	224
29 Flamingo	1	0	1	200	1	1	1	1	1	39	1	1	16	255
30 Eastwind MHP	0	0	1	50	0	0	0	0	1	8	1	1	16	74
31 Vista del Este	1	0	1	200	0	0	0	0	1	8	1	1	16	224
32 Las Casitas	1	0	1	200	0	0	0	0	1	8	1	1	16	224
33 Southwest Estates	1	0	1	200	0	0	0	0	1	8	1	1	16	224
33 Desert Glen	1	0	1	200	0	0	0	0	1	8	1	1	16	224
33 Homestead Meadows South	1	0	1	200	0	0	0	0	1	8	1	1	16	224
33 Homestead	0	0	1	50	0	0	0	0	1	8	1	1	16	74
34 Deerfield Park	0	0	1	50	0	0	0	0	1	8	1	1	16	74
35 Homestead Meadows	1	0	1	200	1	1	1	1	1	39	1	1	16	255
36 Haciendas del Norte	1	0	1	200	0	0	0	0	1	8	1	1	16	224
37 Acacia Grove	0	0	1	50	1	1	1	1	1	39	1	1	16	105
38 Montana Land Estates	0	0	1	50	1	1	1	1	1	39	1	1	16	105

Legend: Yes = 1, No = 0

P R I O R I T Y R A N K I N G M A T R I X

EAST PLANNING AREA	JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			GRAND TOTAL
	Site in El Paso ETJ	Site contiguous to EPWJ	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	
	150	100	50		10	4	8	9	8		10	6		
39 Yucca Foothills	0	0	1	50	1	1	1	1	1	39	1	1	16	105
39 Montana East	0	0	1	50	1	1	1	1	1	39	1	1	16	105
40 Sundown	0	0	1	50	0	0	0	0	1	8	1	1	16	74
40 John Micheal	0	0	1	50	0	0	0	0	1	8	1	1	16	74
40 Western Heritage	0	0	1	50	0	0	0	0	1	8	1	1	16	74
41 Paso View	0	0	1	50	0	0	0	0	1	8	1	1	16	74
42 Paso View West	0	0	1	50	0	0	0	0	1	8	1	1	16	74
43 Desert Meadows Estates	0	0	1	50	1	1	1	1	1	39	1	1	16	105
44 Primrose Acres	0	0	1	50	1	1	1	1	1	39	1	1	16	105
45 Vista de Lomas	0	0	1	50	1	1	1	1	1	39	1	1	16	105
46 Butterfield City Unit #2	0	0	1	50	1	1	1	1	1	39	1	1	16	105
47 Butterfield City Unit #4	0	0	1	50	1	1	1	1	1	39	1	1	16	105
48 Hueco Valley	0	0	1	50	1	1	1	1	1	39	1	1	16	105
48 Eisenberg Estates	0	0	1	50	1	1	1	1	1	39	1	1	16	105
49 Camelback Estates	0	0	1	50	1	1	1	1	1	39	1	1	16	105
50 Monte Carlo	0	0	1	50	1	1	1	1	1	39	1	1	16	105
51 Hueco Mountain Estates	0	0	1	50	1	1	1	1	1	39	1	1	16	105
52 Wilco	0	0	1	50	1	1	1	1	1	39	1	1	16	105

Legend: Yes = 1, No = 0

D-68

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P R I O R I T Y R A N K I N G M A T R I X

LOWER VALLEY PLANNING AREA

Potential Customer / / Relative Weight
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	JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			GRAND TOTAL
	Site in El Paso ETJ	Site contiguous to EPWJ	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	
	150	100	50		10	4	8	9	8		10	6		
53 Grijalva Gardens	1	1	1	300	1	1	1	1	1	39	1	1	16	355
54 Delip	1	1	1	300	1	1	1	1	1	39	1	1	16	355
55 North Loop Acres	1	1	1	300	1	1	1	1	1	39	1	1	16	355
56 Bagge Estates	1	1	1	300	1	1	1	1	1	39	1	1	16	355
57 Gurdev	1	1	1	300	1	1	1	1	1	39	1	1	16	355
58 Sunshine	1	1	1	300	1	1	1	1	1	39	1	1	16	355
59 Spanish Trail	1	1	1	300	1	1	1	1	1	39	1	1	16	355
60 Alameda Estates	1	1	1	300	1	1	1	1	1	39	1	1	16	355
61 Villa Espana	1	1	1	300	1	1	1	1	1	39	1	1	16	355
62 San Augustin	1	1	1	300	1	1	1	1	1	39	1	1	16	355
63 Rio Rancho	1	1	1	300	1	1	1	1	1	39	1	1	16	355
64 La Fuente	1	1	1	300	1	1	1	1	1	39	1	1	16	355
65 Monterosales	1	1	1	300	1	1	1	1	1	39	1	1	16	355
66 La Jolla	1	1	1	300	1	1	1	1	1	39	1	1	16	355
67 Ellen Park	1	1	1	300	1	1	1	1	1	39	1	1	16	355
68 Hillcrest Manor	1	1	1	300	1	1	1	1	1	39	1	1	16	355
69 Horizon Country Club Estates	1	0	1	200	0	0	0	0	1	8	1	1	16	224
70 Horizon Heights	1	0	1	200	0	0	0	0	1	8	1	1	16	224

Legend: Yes = 1, No = 0

D-69

P R I O R I T Y R A N K I N G M A T R I X

LOWER VALLEY PLANNING AREA				JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS				COST/FUNDING FACTORS			
Potential Customer / / / Relative Weight	Site in	Site	Water	SUB	Without	Inadequate	Inadequate	Water	Sewer or septic	SUB	Funding	Able to	SUB	GRAND	
	El Paso	contiguous	resource	TOTAL	access to	water	water	contamination	system	TOTAL	available	pay rates	TOTAL	TOTAL	
	ETJ	to EPWU	available		public system	quantity	quality	potential	available						
	150	100	50		10	4	8	9	8		10	6			
71 Desert Mesa	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
72 Horizon Manor	1	0	1	200	0	0	0	0	1	8	1	1	16	224	
73 Horizon Industrial Park	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
74 Horizon Hills	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
75 Sparks	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
76 Panorama Village	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
77 El Paso Hills	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
78 Wiseman Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
79 Belen Plaza	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
80 Lynn Park	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
81 Mary Lou Park	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
82 Country Green	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
83 Socorro Mission	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
84 Las Milpas	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
85 Poole	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
86 Aldama	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
87 San Ysidro	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
88 Sunhaven Farms	1	0	1	200	1	1	1	1	1	39	1	1	16	255	

Legend: Yes = 1, No = 0

D-70

P R I O R I T Y R A N K I N G M A T R I X

LOWER VALLEY PLANNING AREA				JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS					COST/FUNDING FACTORS			GRAND TOTAL
Potential Customer / / Relative Weight	Site in El Paso ETJ	Site contiguous to EPWJ	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL			
	150	100	50		10	4	8	9	8		10	6				
89 Bauman Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
90 McAdoo	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
91 Roseville	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
92 Vinedo Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
93 Mesa Verde	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
94 Jones	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
95 Aljo	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
96 Melton Place	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
97 Friedman Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
98 Lewis	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
99 Angie	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
100 El Campestre	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
101 El Gran Valle	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
102 Valle Real	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
103 Santa Martina	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
104 Rancho Mirival	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
105 Bejar Estates	1	0	1	200	1	1	1	1	1	39	1	1	16	255		
106 Quail Mesa	1	0	1	200	1	1	1	1	1	39	1	1	16	255		

Legend: Yes = 1, No = 0

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P R I O R I T Y R A N K I N G M A T R I X

LOWER VALLEY PLANNING AREA

Potential Customer / / Relative Weight

	JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			GRAND TOTAL
	Site in El Paso ETJ	Site contiguous to EPWU	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	
	150	100	50		10	4	8	9	8		10	6		
107 Athena West	1	0	1	200	1	1	1	1	1	39	1	1	16	255
108 Brinkman	1	0	1	200	1	1	1	1	1	39	1	1	16	255
109 Gonzalez	1	0	1	200	1	1	1	1	1	39	1	1	16	255
110 Villalobos	1	0	1	200	1	1	1	1	1	39	1	1	16	255
111 San Paulo	1	0	1	200	1	1	1	1	1	39	1	1	16	255
112 Lordsville	1	0	1	200	1	1	1	1	1	39	1	1	16	255
113 Burbridge	1	0	1	200	1	1	1	1	1	39	1	1	16	255
114 Glorieta	1	0	1	200	1	1	1	1	1	39	1	1	16	255
115 Plaza Bernal	1	0	1	200	1	1	1	1	1	39	1	1	16	255
116 Campo Bello	1	0	1	200	1	1	1	1	1	39	1	1	16	255
117 Rio Pasado	1	0	1	200	1	1	1	1	1	39	1	1	16	255
118 Valle Villa	1	0	1	200	1	1	1	1	1	39	1	1	16	255
119 Los Aves	1	0	1	200	1	1	1	1	1	39	1	1	16	255
120 Colonia del Rio	0	0	1	50	1	1	1	1	1	39	1	1	16	105
121 Wildhorse Valley	0	0	1	50	1	1	1	1	1	39	1	1	16	105
122 Hacienda Real	0	0	1	50	1	1	1	1	1	39	1	1	16	105
123 Connington	0	0	1	50	1	1	1	1	1	39	1	1	16	105
124 Sunshine Acres	0	0	1	50	1	1	1	1	1	39	1	1	16	105

Legend: Yes = 1, No = 0

D-72

P R I O R I T Y R A N K I N G M A T R I X

LOWER VALLEY PLANNING AREA		JURISDICTIONAL FACTORS				PRESENT QUALITY OF LIFE FACTORS						COST/FUNDING FACTORS			GRAND TOTAL
		Site in El Paso ETJ	Site contiguous to EPWU	Water resource available	SUB TOTAL	Without access to public system	Inadequate water quantity	Inadequate water quality	Water contamination potential	Sewer or septic system available	SUB TOTAL	Funding available	Able to pay rates	SUB TOTAL	
Potential Customer / / Relative Weight	150	100	50		10	4	8	9	8		10	6			
125 Morning Glory Manor	0	0	1	50	1	1	1	1	1	39	1	1	16	105	
126 Madrilena	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
127 Gloria Elena	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
128 Sylvia	0	0	1	50	1	1	1	1	1	39	1	1	16	105	
129 Cuna del Valle	0	0	1	50	1	1	1	1	1	39	1	1	16	105	
130 Colonia de las Azeleas	1	0	1	200	1	1	1	1	1	39	1	1	16	255	
131 Colonia de las Dalias	0	0	1	50	1	1	1	1	1	39	1	1	16	105	

Legend: Yes = 1, No = 0

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LITIGATION  
SETTLEMENT AGREEMENT

APPENDIX E

## SETTLEMENT AGREEMENT

WHEREAS, the parties to this Agreement the ELEPHANT BUTTE IRRIGATION DISTRICT ("EBID"), THE CITY OF EL PASO ("El Paso"), and THE REGENTS OF NEW MEXICO STATE UNIVERSITY ("NMSU"), are the parties to the pending appeal by El Paso in the New Mexico Court of Appeals, and are major suppliers and users of water in the Lower Rio Grande and Hueco Basins; and

WHEREAS, the parties share common interests in the development, use and conservation of the water resources of those basins; and

WHEREAS, the parties desire to work together with respect to those common interests.

NOW, THEREFORE, the parties agree as follows:

1. El Paso agrees to withdraw its litigation, without prejudice, to wit:

a) its pending well applications in the Hueco Basin and Lower Rio Grande Basin;

b) its pending case in the New Mexico Court of Appeals;

c) all protests to applications for appropriation and transfer in New Mexico; and

d) its counterclaims and cross-claims in the adjudication.

2. El Paso understands and agrees that its goals for meeting water demand should be first, conservation, second, surface water, and third, ground water.

3. EBID agrees to withdraw its claims against El Paso in the stream adjudication, Cause No. CV-86-848, and its attack on El Paso's Canutillo Well Field without prejudice. EBID agrees that El Paso and NMSU will remain parties to the adjudication. It further agrees not to assess any new fees on additional supplies of surface water for the region from upstream sources being transported through EBID's present system for delivery to Texas for municipal and/or agricultural purposes, assuming that said system has the capability to carry said water as well as the water allocated to EBID and El Paso County Water Improvement District No. 1 and unless water is transported during the present non-irrigation season, in which event EBID may assess a fee based on its actual operation and maintenance costs attributable to the use of that water.

4. In the stream adjudication which EBID has filed and to which El Paso is a party, EBID alleges that the surface and ground water in the Rio Grande Stream System in New Mexico hydrologically constitute intermingled sources of a single supply, the rights to the use of which are interdependent. El Paso agrees to study the Canutillo Well Field to determine whether, and to what extent, pumpage from that well field is affecting Rio Grande Project water, and if so, to identify appropriate measures, which measures will take into consideration the project as a whole, measures undertaken by others, and what El Paso has delivered back to the project. El Paso will continue to use ground water, including drilling new wells, but it will do so consistent with the goals in Paragraph 2.



5. The parties agree to work together to study, identify and address common concerns and objectives with respect to water resources in the region, including the possibility of securing additional supplies of surface water for the region from upstream sources.

6. The parties agree to study and to support, where warranted by study, construction of conveyance facilities to carry project water by pipeline, canal, or other means from Caballo or downstream points, to Texas. This support will include the New Mexico parties cooperating with El Paso to assist in obtaining federal financing for such a project through grants, loans, appropriations and/or federal matching funds.

7. The parties agree to work together in a cooperative effort to maximize the utilization of waters provided to New Mexico and Texas through the Rio Grande Project in order to provide reliable and cost-effective water supplies to meet current and projected long-term agricultural and municipal needs of the region. Subject to the availability of funding, this cooperative effort will include the following:

a) an ongoing study of ways to harmonize and integrate the elements of each of the parties' water plans;

b) study of and support for, where warranted by study, and where legally and contractually possible, changes in the facilities or operation of the Rio Grande Project in order to maximize conservation and use of project waters to the benefit of all the parties, including carry-over of unused stored project water that EBID and El Paso County

Water Improvement District No. 1 are entitled to from year to year;

c) implementation of changes in operation of the Rio Grande Project to allow year-round delivery of project water;

d) exchange of technical data available to the parties where permitted by law.

8. The New Mexico parties and El Paso agree that conserved water should be treated as the property of those responsible for the conservation, if consistent with applicable water law.

9. The parties agree to establish and participate as members in a joint commission which will coordinate the work set forth in Paragraphs 4, 5, 6, 7, 8 and 11 of this Agreement, seek funds to support the studies and other work provided in this Agreement, and generally seek to promote coordination and cooperation among the parties with respect to their common water resource interests. The joint commission will be established within ninety (90) days of the date of this Agreement, and will hold its first meeting within thirty (30) days of its formation. One-half of the members of the joint commission will be appointed by El Paso, and one-half of the members will be appointed by the New Mexico parties.

10. Subject to availability of funding, NMSU agrees to help staff and coordinate the work of the commission as set forth in Paragraphs 4, 5, 6, 7, 8 and 11 of this Agreement.

11. The parties agree to explore the feasibility of changing or clarifying those legal and institutional requirements and

constraints which impede the achievement of the objectives of this Agreement.

12. All parties are responsible for their own attorneys' fees and costs.

13. The provisions of this Agreement on the development and use of water resources state the parties' goals and objectives, but are not intended to restrict any party's lawful use of water resources or its water resource planning.

14. It is understood by the parties that the El Paso County Water Improvement District No. 1 is EBID's counterpart in Texas and that some of the actions contemplated in this Agreement will require El Paso County Water Improvement District No. 1's cooperation and participation.

15. This Agreement may be signed in multiple original counterparts which, when taken collectively, shall constitute one and the same instrument.

DATED this 6th day of March, 1991, at 10:30 o'clock A.M. P.M.

ELEPHANT BUTTE IRRIGATION DISTRICT

THE REGENTS OF NEW MEXICO STATE UNIVERSITY

By: John Salopek  
John Salopek, President

By: James E. Halligan  
James E. Halligan, President of New Mexico State University

THE CITY OF EL PASO by and through its PUBLIC SERVICE BOARD

By: [Signature]  
Joe Hanson, Chairman

(4589.nml)