CULTURAL RESOURCES SURVEY AND PLANNING REPORT: EL PASO–LAS CRUCES REGIONAL SUSTAINABLE WATER PROJECT

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1.0 Introduction

The availability of an adequate and potable water supply has prescribed cultural subsistence and adaptation through the ages. This dictum certainly applies to the Rio Grande valley project area, which provides the basis for this report. From the earliest hunters who inhabited the region more than 12,000 years ago, to the advanced farming, irrigation, and technological practices of today, the availability of abundant, usable ground and surface water is the primary underlying basis for the development and proliferation of the area. Without water, the entire project area would not support human subsistence and the history of the area would be told only by those passing through in search of arable land.

The El Paso-Las Cruces Regional Sustainable Water Project is intended to provide a sustainable water supply for the El Paso-Las Cruces region. Currently, drinking water in the region depends on local aquifers, some of which may be exhausted of potable water by 2025. To achieve this water supply objective, the New Mexico/Texas Water Commission has issued various contracts for technical studies to examine water conveyance and treatment alternatives from Elephant Butte Reservoir through the city of El Paso as shown in Map 1.1. The mandate of this contract is to increase municipal and industrial use of surface water from the Rio Grande, improve the quality of surface water, and extend the life of the Hueco and Mesilla aquifers.

1.1 Study Purpose

This document presents the results of a cultural resources study by Geo-Marine, Inc. (GMI), for the El Paso-Las Cruces Regional Sustainable Water Project. This study, undertaken with CH2M HILL (contract number DEN 15851, GMI Project No. 3502-001) as a planning document, was performed for the United States Section, International Boundary and Water Commission (USIBWC) (the lead agency) to comply with requirements of the National Environmental Policy Act (NEPA) of 1969, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended), the Advisory Council on Historic Preservation regulation 36 CFR Part 800, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and the New Mexico State Burial Law. The project

Map 1.1 Location of proposed actions in southern New Mexico/Texas.

may also require approval by the U.S. Army Corps of Engineers (CE) under Section 404 permit requirements, which invokes Section 106 of the NHPA. A flowchart showing the steps involved in the Section 106 process is provided in Figure 1.1. Additional studies to complete Section 106 compliance will be required as project features are scheduled for construction.

Other entities involved with this project, either through project management, land ownership, or a specific interest, include the Bureau of Land Management (BLM), the Bureau of Reclamation (USBR), United States Fish and Wildlife Service (USFWS), El Paso Water Utilities/ Public Service Board (EPWU/PSB) (the joint lead agency), Elephant Butte Irrigation District (EBID), and El Paso County Water Improvement District No 1. The time frame for completion of project construction is 2010.

Five action alternatives and a No Action Alternative have been selected for this project (Table 1.1). The different alternatives include: Aqueduct with Local Plants, hereafter referred to as Alternative A; Aqueduct with Combined Plant, Alternative B; River with Combined Plant, Alternative C; River with Local Plants (preferred alternative), Alternative D; and River with Year-round Lower Plants, and Alternative E. Alternative E is the same as Alternative D, except that water remains in the Rio Grande for a longer distance. Table 1-1 lists project features associated with the action alternatives. Tables 1-2 through 1-7 show design and operational characteristics for the various water treatment plants.

The document is divided into four chapters: 1.0 Introduction, 2.0 Methodology, 3.0 Affected Environment, and 4.0 Environmental Consequences: Management Recommendations. Following the text are a References Cited section and three appendices: Appendix A, the Texas Historic Sites Inventory Form; Appendix B, the legal description of the project area; Appendix C, maps of the project area and archaeological sites; and Appendix D, letters to Native American groups.

In addition to the archeological investigations, a brief environmental and cultural background is presented to provide context for the cultural resources found in the project area. Methods and results of a file search are also reviewed. This study will provide a basis for management of the cultural resources and project planning within the proposed project area.

Figure 1.1. Flowchart showing the Section 106 process.

Table 1.1
Project Features Associated with the Action Alternatives

Preferred Alternative–River with Local Plants (A)	River with Year-Round Lower Plants Alternative (B)	River with Combined Plant Alternative (C)	Aqueduct with Local Plants Alternative (D)	Aqueduct with Combined Plant Alternative (E)
Water Treatment Plants (WTP) and Associated Facilities				
Hatch Area WTP	Hatch Area WTP	Hatch Area WTP	Hatch Area WTP	Hatch Area WTP
Las Cruces Area WTP (I-10 Site)	Las Cruces Area WTP (I-10 Site)	Las Cruces Area WTP (I-10 Site)	Las Cruces Area WTP (Leasburg Site)	Las Cruces Area WTP (Leasburg Site)
Anthony Area WTP	Anthony Area WTP		Anthony Area WTP	
Upper Valley WTP	Upper Valley WTP	Upper Valley WTP	Upper Valley WTP	Upper Valley WTP
Jonathan Rogers WTP	Jonathan Rogers WTP	Jonathan Rogers WTP	Jonathan Rogers WTP	Jonathan Rogers WTP
Canal WTP	Canal WTP	Canal WTP	Canal WTP	Canal WTP
Diversion Structures				
Hatch Diversion	Hatch Diversion	Hatch Diversion	Hatch Diversion	Hatch Diversion
Las Cruces Diversion	Las Cruces Diversion	Las Cruces Diversion		
Anthony Diversion	Anthony Diversion			
Upper Valley Diversion	Upper Valley Diversion	Upper Valley Diversion		
Aqueducts				
El Paso Aqueduct	El Paso Aqueduct	El Paso Aqueduct	El Paso Aqueduct	El Paso Aqueduct
			New Mexico–Texas Aqueduct	New Mexico–Texas Aqueduct
Aquifer Storage and Recovery (ASR)				
Northeast El Paso ASR	Northeast El Paso ASR	Northeast El Paso ASR	Northeast El Paso ASR	Northeast El Paso ASR

Table 1.1
Project Features Associated with the Action Alternatives

Preferred Alternative–River with Local Plants (A)	River with Year-Round Lower Plants Alternative (B)	River with Combined Plant Alternative (C)	Aqueduct with Local Plants Alternative (D)	Aqueduct with Combined Plant Alternative (E)
Water Acquisition				
Water Rights Purchases	Water Rights Purchases	Water Rights Purchases	Water Rights Purchases	Water Rights Purchases
Forbearance Agreements	Forbearance Agreements	Forbearance Agreements	Forbearance Agreements	Forbearance Agreements
Water Conservation	Water Conservation	Water Conservation	Water Conservation	Water Conservation
Water Banking	Water Banking	Water Banking	Water Banking	Water Banking
Fish and Wildlife Enhancements and Mitigation				
Enhancements:				
Floodway within Levees	Floodway within Levees	Floodway within Levees	Floodway within Levees	Floodway within Levees
Retired Agricultural Lands	Retired Agricultural Lands	Retired Agricultural Lands	Retired Agricultural Lands	Retired Agricultural Lands
Bosque Park	Bosque Park	Bosque Park	Bosque Park	Bosque Park
Diversion Sites	Diversion Sites	Diversion Sites	Diversion Sites	Diversion Sites
Existing On-stream Diversions	Existing On-stream Diversions	Existing On-stream Diversions	Existing On-stream Diversions	Existing On-stream Diversions
Modify Levee/Expand Floodway	Modify Levee/Expand Floodway	Modify Levee/Expand Floodway	Modify Levee/Expand Floodway	Modify Levee/Expand Floodway
Drains/Canals Habitat	Drains/Canals Habitat	Drains/Canals Habitat	Drains/Canals Habitat	Drains/Canals Habitat
Watershed Management	Watershed Management	Watershed Management	Watershed Management	Watershed Management
Mitigation:				
Sensitive Plants	Sensitive Plants	Sensitive Plants	Sensitive Plants	Sensitive Plants
			Wetlands	Wetlands

Table 1.2
Primary Design and Operational Characteristics of the Proposed New Hatch Area Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants	River with Year-Round Lower Plants Alternative	River with Combined Plant Alternative	Aqueduct with Local Plants Alternative	Aqueduct with Combined Plant Alternative
Treatment Plant Capacity Constructed (mgd)[b]: Phases 1/2/3	3.5/1/0	3.5/1/0	3.5/1/0	3.5/1/0	3.5/1/0
Treatment Plant Capacity Total (mgd): Phases 1/2/3	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5
Non-Irrigation Season: Phases 1/2/3	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5	3.5/4.5/4.5
Raw Water Diversion Location	River at Hatch Area WTP Site	River at Hatch Area WTP Site	River at Hatch Area WTP Site	River at Hatch Area WTP Site	River at Hatch Area WTP Site
Raw Water Conveyance	Hatch Diversion Structure	Hatch Diversion Structure	Hatch Diversion Structure	Hatch Diversion Structure	Hatch Diversion Structure
Regulating and Storage Reservoirs	At Hatch Area WTP Site	At Hatch Area WTP Site	At Hatch Area WTP Site	At Hatch Area WTP Site	At Hatch Area WTP Site
Treated Water Storage	None	None	None	None	None
Treated Water Transmission System	Pipeline to Existing System	Pipeline to Existing System	Pipeline to Existing System	Pipeline to Existing System	Pipeline to Existing System

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

Table 1.3
Primary Design and Operational Characteristics of the Proposed New Las Cruces Area Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants (I-10 Site)	River with Year-Round Lower Plants Alternative (I-10 Site)	River with Combined Plant Alternative (I-10 Site)	Aqueduct with Local Plants Alternative (Leasburg Site)	Aqueduct with Combined Plant Alternative (Leasburg Site)
Treatment Plant Capacity Constructed (mgd)[b]: Phases 1/2/3	20/7/7	20/7/7	20/7/7	20/7/7	20/7/7
Treatment Plant Capacity Total (mgd): Phases 1/2/3	20/27/34	20/27/34	20/27/34	20/27/34	20/27/34
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	20/27/34	20/27/34	20/27/34	20/27/34	20/27/34
Non-Irrigation Season: Phases 1/2/3	10/14/17	10/14/17	10/14/17	10/14/17	10/14/17
Raw Water Diversion Location	River near I-10 WTP Site	River near I-10 WTP Site	River near I-10 WTP Site	Leasburg Diversion near Leasburg WTP Site	Leasburg Diversion near Leasburg WTP Site
Raw Water Conveyance	Las Cruces Diversion Structure	Las Cruces Diversion Structure	Las Cruces Diversion Structure	Leasburg Canal	Leasburg Canal
Regulating and Storage Reservoirs	At I-10 WTP Site	At I-10 WTP Site	At I-10 WTP Site	Leasburg WTP Site	Leasburg WTP Site
Treated Water Storage	None	None	None	None	None
Treated Water Transmission System	Pipelines to Existing Systems	Pipelines to Existing Systems	Pipelines to Existing Systems	Pipelines to Existing Systems	Pipelines to Existing Systems

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

Table 1.4
Primary Design and Operational Characteristics of the Proposed New Anthony Area Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants	River with Year-Round Lower Plants Alternative	River with Combined Plant Alternative	Aqueduct with Local Plants Alternative	Aqueduct with Combined Plant Alternative
Treatment Plant Capacity Constructed (mgd)[b]: Phases 1/2/3	4/4/8	4/4/8	None	4/4/8	None
Treatment Plant Capacity Total (mgd): Phases 1/2/3	4/8/16	4/8/16	None	4/8/16	None
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	4/8/16	4/8/16	None	4/8/16	None
Non-Irrigation Season: Phases 1/2/3	2/4/8	2/4/8	None	2/4/8	None
Raw Water Diversion Location	River at Anthony Area WTP Site	River at Anthony Area WTP Site	None	Mesilla Diversion	None
Raw Water Conveyance	Anthony Diversion Structure	Anthony Diversion Structure	None	New Mexico-Texas Aqueduct (Pipeline)	None
Regulating and Storage Reservoirs	At Anthony Area WTP Site	At Anthony Area WTP Site	None	At Anthony Area WTP Site	None
Treated Water Storage	None	None	None	None	None
Treated Water Transmission System	Pipeline to Existing System	Pipeline to Existing System	None	Pipeline to Existing System	None

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

Table 1.5
Primary Design and Operational Characteristics of the Proposed New Upper Valley Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants	River with Year-Round Lower Plants Alternative	River with Combined Plant Alternative	Aqueduct with Local Plants Alternative	Aqueduct with Combined Plant Alternative
Treatment Plant Capacity Constructed (mgd)[b]: Phases 1/2/3	80/0/0	80/0/0	84/4/8	80/0/0	84/4/8
Treatment Plant Capacity Total (mgd): Phases 1/2/3	80/80/80	80/80/80	84/88/96	80/80/80	84/88/96
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	80/80/80	60/60/60	84/88/96	80/80/80	84/88/96
Non-Irrigation Season: Phases 1/2/3	80/80/80	40/40/40	82/84/88	80/80/80	82/84/88
Raw Water Diversion Location	River at Upper Valley WTP Site	River at Upper Valley WTP Site	River at Upper Valley WTP Site	Mesilla Diversion	Mesilla Diversion
Raw Water Conveyance	Upper Valley Diversion Structure	Upper Valley Diversion Structure	Upper Valley Diversion Structure	New Mexico–Texas Aqueduct	New Mexico–Texas Aqueduct
Regulating and Storage Reservoirs	At Upper Valley WTP Site	At Upper Valley WTP Site	At Upper Valley WTP Site	Westside Reservoir and at Upper Valley WTP Site	Westside Reservoir and at Upper Valley WTP Site
Treated Water Storage	New Reservoir	New Reservoir	New Reservoir	New Reservoir	New Reservoir
Treated Water Transmission System	El Paso Aqueduct	El Paso Aqueduct	El Paso Aqueduct and Pipeline to Anthony	El Paso Aqueduct	El Paso Aqueduct and Pipeline to Anthony

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

Table 1.6
Primary Design and Operational Characteristics of the Proposed Expanded Jonathan Rogers Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants	River with Year-Round Lower Plants Alternative	River with Combined Plant Alternative	Aqueduct with Local Plants Alternative	Aqueduct with Combined Plant Alternative
Treatment Plant Capacity Expansion (mgd) [b]: Phases 1/2/3	20/20/0	20/20/0	20/20/0	20/20/0	20/20/0
Treatment Plant Capacity Total (mgd): Phases 1/2/3	60/80/80	60/80/80	60/80/80	60/80/80	60/80/80
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	60/80/80	60/80/80	60/80/80	60/80/80	60/80/80
Non-Irrigation Season: Phases 1/2/3	0/0/0	0/0/0	60/60/60	0/0/0	0/0/0
Raw Water Diversion Location	American Diversion	American Diversion	American Diversion	American Diversion	American Diversion
Raw Water Conveyance	American Canal	American Canal	American Canal	American Canal	American Canal
Regulating and Storage Reservoirs	At Jonathan Rogers WTP Site	At Jonathan Rogers WTP Site	At Jonathan Rogers WTP Site	At Jonathan Rogers WTP Site	At Jonathan Rogers WTP Site
Treated Water Storage	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs
Treated Water Transmission System	Existing System	Existing System	Existing System	Existing System	Existing System

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

Table 1.7
Primary Design and Operational Characteristics of the Existing Canal Water Treatment Plant (WTP) and Associated Facilities during Phases 1, 2, and 3 for the Action Alternatives[a]

Design and Operational Characteristics	Preferred Alternative–River with Local Plants	River with Year-Round Lower Plants Alternative	River with Combined Plant Alternative	Aqueduct with Local Plants Alternative	Aqueduct with Combined Plant Alternative
Treatment Plant Capacity Expansion (mgd)[b]: Phases 1/2/3	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Treatment Plant Capacity Total (mgd): Phases 1/2/3	40/40/40	40/40/40	40/40/40	40/40/40	40/40/40
Seasonal Treated Water Demand (mgd)					
Irrigation Season: Phases 1/2/3	40/40/40	40/40/40	40/40/40	40/40/40	40/40/40
Non-Irrigation Season: Phases 1/2/3	0/0/0	20/20/20	0/0/0	0/0/0	0/0/0
Raw Water Diversion Location	American Diversion	American Diversion	American Diversion	American Diversion	American Diversion
Raw Water Conveyance	American Canal	American Canal	American Canal	American Canal	American Canal
Regulating and Storage Reservoirs	At Canal WTP Site	At Canal WTP Site	At Canal WTP Site	At Canal WTP Site	At Canal WTP Site
Treated Water Storage	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs	Existing Reservoirs
Treated Water Transmission System	Existing System	Existing System	Existing System	Existing System	Existing System

[a]Phase 1 = Present to year 2010; Phase 2 = years 2011 to 2020; Phase 3 = years 2021 to 2030
[b]mgd = million gallons per day of treated water

1.2 Objectives

This report provides the New Mexico and Texas State Historic Preservation Officers (SHPO), the USIBWC and other federal land management officials with cultural resources data to assist in decision-making through the NEPA process. These resources can include prehistoric sites, historic homes and buildings, traditional cultural properties, and burials. The objectives of this study and report encompass the following:

1. Identify previously recorded sites within the project area.

2. Locate (or relocate) and document all cultural resources within the project area.

3. Determine the National Register of Historic Places eligibility, based on criteria presented in 36 CFR §60.4, for all sites found in the project area.

4. Aid the USIBWC and other applicable agencies in compliance with pertinent federal and state laws, as defined in Section 1.1 of this document.

5. Recommend a plan for future Section 106 cultural resources compliance.

6. Locate the ethnographic, traditional and religious use areas and determine their eligibility to the NRHP, using as guidelines National Historic Register Bulletin 38; the American Indian Religious Freedom Act, PL 95-341; and the Native American Graves and Repatriation Act of 1990, PL-101-601.

1.3 Study Area

The northern boundary of the Area of Potential Effect (APE) (referred to hereafter as the study area) is the Elephant Butte Reservoir in south-central New Mexico and the southern boundary is Riverside Canal, located just south of El Paso, Texas. Communities that will benefit from this project will include Salem, Hatch, Rincon, Leasburg, Las Cruces, Vado, La Mesa, Berino, Chamberino, and Anthony, New Mexico, and Canutillo and El Paso, Texas. The project is primarily limited to the Rio Grande floodplain, but a portion of the project, the El Paso Aqueduct extends east from Vinton, Texas, through Anthony Gap to northeastern El

Paso. The project includes five alternatives, labeled A, B, C, D, and E (see Table 1.1), and the No Action Alternative (see Appendix C).

As it is proposed, most of the project features will be constructed between 2005 and 2010. The project is set up in three phases, to be carried out over the next 30 years. Phase 1 is scheduled to be completed by 2010, Phase 2 in 2020, and Phase 3 in 2030.

Table 1.2 describes the current information regarding the project features and sizes and construction phases. Where possible, Class III archaeological inventory was conducted; however, several project features remain in the planning stages. Once the NEPA process is complete, a compliance document will be written for the project features using data collected during this study. Class III surveys will be undertaken and Section 106 compliance documents will be written for generic project features as they are specified.

Table 1.8
Project Feature Summary Table

Area	Alternatives	Project Feature Size*	Phase to be Completed
Water Treatment Plants			
Hatch WTP	A,B,C,D,E	17 acres	Phase 1
Leasburg WTP	A,B,C,D,E	65 acres	Phase 1**
Las Cruces WTP	A,B,C,D,E	57 acres	Phase 1
Anthony WTP	A,B,D	40 acres	Phase 1**
Upper Valley WTP	A,B,C,D,E	233 acres	Phase1**
Jonathan Rogers WTP	A,B,C,D,E	25 acres	Phase 2
Aqueducts			
New Mexico-Texas	D,E	25 miles x 50 ft ROW	Phase 1**
Westside Regulating Reservoir	D,E	22 acres	Phase 1**
El Paso	A,B,C,D,E	26 miles x 100 ft ROW (388 acres)	Phase 1**
Canutillo	A,B,C,D,E	6 miles x 50 ft ROW	Phase 1
Rio Grande Flows			
Elephant Butte Reservoir	A,B,C,D,E	n/a	Phase 1***
Caballo Reservoir	A,B,C,D,E	n/a	Phase 1***
Aquifer Storage and Recovery	A,B,C,D,E	71 x 1 acre (wellheads) 29 miles x 100 ft ROW (water transmission lines)	Phase 1
Diversion Structures	A,B,C,D,E	4 acres (4 sites)	Phase 1
Water Transmission Lines	A,B,C,D,E	~100 miles x 30 ft ROW	Phase 1
Land Conversion	No Data	No Data	Phase 1***
Fish and Wildlife Enhancements	No Data	No Data	Phase 1

* area of potential effect
** Class III archaeological survey has been completed
*** Will probably require no survey work

2.0 Methodology

2.1 Assumptions and Assessment Guidelines

Assumptions and assessment guidelines documented within this report are included in Sections 2.3.1 (Existing Data Review) and 2.3.3 (Impact Assessment).

2.2 Cultural Resources Significance Criteria

The determination of site significance is dependent upon the assessment of a site's integrity, the types of data that are present, and the applicability of that data to important local and regional research questions. The requirements that must be met before a site can be eligible for inclusion in the National Register of Historic Places (NRHP) are defined by four criteria set forth in 36 CFR §60.4:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Criterion A is applicable in this report because the majority of the project area is located within the historic Elephant Butte Irrigation district, a NRHP-listed property. This district is

regarded as important because of its contribution to the early irrigation efforts in the Rincon and Mesilla valleys.

Given that the data base for sites recorded in the project area is derived from survey-level investigations only, the assessment of these sites for inclusion in the NRHP is preliminary. Vandalism of sites in portions of the project area has resulted in a scarcity of diagnostic tools, which contributes to the limitations imposed by survey-level data. With limited temporal indicators, period-specific regional research issues cannot be fully addressed. Under such circumstances, NRHP Criterion D is most applicable. This criterion has two requirements that must be met before an archaeological site may be determined eligible for inclusion in the NRHP (United States Department of the Interior 1990):

1. The property must have, or have had, information to contribute to our understanding of human history or prehistory.

2. The information must be considered important.

To properly address the first requirement, limited test excavations are most helpful. In lieu of excavation data, surface observation and diagnostic artifacts must be relied upon in demonstrating that sites "may be likely to yield information important in prehistory" (United States Department of the Interior 1990). The presence of temporally diagnostic artifacts assists in providing temporal information critical to the assessment of the importance of potential information. In situations where diagnostic artifacts are absent, the presence of subsurface deposits is a crucial requirement to qualify sites for the NRHP. More specifically, such deposits must express the potential to yield important information. This potential can be extremely difficult to demonstrate through survey-level investigation. Intact hearth deposits, however, are often discernible and should be considered to include important information.

To address the second requirement under Criterion D, the information remaining within sites must be considered important. Because the current data regarding these sites are based on survey-level investigation, the assessment of importance can only be preliminary. Without a

complete and thorough analysis of surface artifacts, supplemented by test excavations, a site's information potential cannot be fully explored.

2.3 Methods

2.3.1 Existing Data Review

Previous archaeological research associated with the Rio Grande area consists of large-scale historic studies of irrigation canal systems (Ackerly 1992). Many small-scale prehistoric and historic studies of areas along the terraces and within the valley itself have been conducted also (see Carmichael 1985; Davis 1976; Etcheison 1987; Foster 1981; Giese 1994; Hammack 1962; Hester 1977; Lehmer 1948; O'Laughlin and Martin 1980; O'Laughlin 1981; Sale and Gibbs 1998; Scarborough 1985; Schaafsma 1974; Trost 1970)

Previous research within the North Franklin Mountains/Anthony Gap area consists of several pipeline, powerline, and highway right-of-way projects. These projects either follow New Mexico State Highway (NM) 404 or the existing pipeline/powerline corridor.

Along the eastern slopes of the Franklin Mountains and into the Hueco Bolson, several small- and large-scale cultural resource studies have been conducted, especially on Fort Bliss Military Reservation (see Browning et al. 1998; Carmichael 1986; O'Laughlin and Martin 1989, 1993; Sale and Gibbs 1995; Whalen 1977, 1978).

2.3.1.1 Prehistoric Resources

Searches for archaeological sites located within one mile of the project area were conducted using the Archaeological Records Management System (ARMS) data base at the Laboratory of Anthropology (LA) in Santa Fe, New Mexico, and the Texas Archeological Research Laboratory (TARL) data base in Austin. The data base of the Bureau of Land Management (BLM) office in Las Cruces, New Mexico, also was examined. Specific sites located within the project area are discussed in the Affected Environment section of this document.

Information regarding the NRHP-listed Elephant Butte Historic Irrigation District was acquired from the Historic Preservation Division in Santa Fe.

2.3.1.2 Historic Resources

Previously recorded cultural resources information was obtained from several sources, including the New Mexico ARMS; TARL; the historical archives at New Mexico State University in Las Cruces, New Mexico; the University of Texas at El Paso; the BLM in Las Cruces; and the county courthouses in El Paso and Las Cruces. In addition, the library at the USIBWC in El Paso was examined for historic irrigation systems information.

2.3.1.3 Ethnographic Resources

Consultation letters have been sent to the relevant and valid Native American groups (Mescalero Apache and Tigua tribes); copies are located in Appendix D. Other interested parties were provided the opportunity to comment during public scoping meetings and will be provided the opportunity to comment on the DEIS.

Based on a preliminary ethnographic study (Greenberg 1999 [not yet available]) and a tribal resolution (Ysleta Del Sur Pueblo 1999), the Ysleta del Sur Pueblo claims religious use of the Rio Grande channel. The locale is downstream of the Riverside Dam, south of the Zaragosa crossing.

The El Paso-Las Cruces Regional Sustainable Water Project would not change the historic condition of the portion of the river that includes the locale where these ceremonies were practiced.

2.3.1.4 Paleontological Resources

The fossil record within the study area extends from the Permian to the Quaternary periods. Permian trackways from 280-million-year-old footprints have been found in the Robledo Mountains, just west of the Rio Grande Valley, Late Cretaceous period fossils have been identified in the mountains east of Elephant Butte Reservoir, and Quaternary period fossils are common on the terraces above the Rio Grande floodplain (Lucas 2000).

As the majority of the project area is located within the Rio Grande floodplain, paleontological resources are not considered an issue within the project boundaries. Should an inadvertent important paleontological discovery be uncovered during the project, the New Mexico Museum of Natural History (Albuquerque) authorities will be consulted.

2.3.2 Field Methods

2.3.2.1 Survey Methods

Both linear and block archaeological surveys were conducted during this project. The Class III pedestrian survey consisted of two archaeologists walking parallel transects at 15-meter intervals, recording all observed cultural resources. Locations of all cultural resources were plotted on corresponding 7.5′ topographic maps. Specific methods are detailed within each proposed action (see Section 4). A reconnaissance survey was conducted along the New Mexico-Texas Aqueduct and the Canutillo Aqueduct, and at the Hatch Water Treatment Plant. An intensive pedestrian survey will be conducted within these areas when the right-of-way is precisely defined.

2.3.2.2 Recording Methods

In distinguishing between archaeological sites and isolated occurrences, three criteria were used as measures for evaluating the significance of cultural resources in the project area: (1) surface artifact density, (2) artifact diversity, and (3) potential for buried deposits. When an area contained several artifacts and/or features, the location was closely examined to make a site or isolated occurrence determination. Isolated occurrences consist of locations that

contain 10 artifacts or less, or single datable features. Sites are composed of greater than 10 artifacts in a location and/or datable features.

When a site was discovered, the location was plotted on the applicable 7.5′ topographic map. New Mexico LA or TARL site forms and sketch maps were completed for each site. Photographs of the site location, features, and collector potholes also were taken. Any temporally diagnostic artifacts found were analyzed and sketched in the field. No artifacts were collected during the survey.

2.3.3 Impact Assessment

2.3.3.1 Cultural, Paleontological, and Ethnographic Resources Impact Assessment

The significance of cultural and ethnographic resources within the area of potential effect for each alternative needs to be assessed through use of Criteria A through D, as indicated in Section 2.2. Professional judgement, state standards, theoretical issues, and current paradigms are primary tools for assessing the significance of cultural resources.

This study was conducted in support of an environmental impact statement (EIS). Avoidance of cultural, paleontological, and ethnographic resources and/or mitigation of eligible properties impacted by the project, will fulfill certain National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) requirements for the EIS. This document presents an assessment of the cultural, paleontological, and ethnographic resources found in the proposed project area.

The majority of the project area lies within the Rio Grande floodplain. While both prehistoric and historic populations have used riverine resources for several millennia, flooding, and more recently, historic agricultural and urban usage have destroyed most surface evidence of the previous inhabitants. While subsurface cultural manifestations may exist within the Rio Grande floodplain, locating them may prove difficult. In addition, the context of these remains can be questioned due to the numerous floods and river channel changes prior to the construction of Elephant Butte Reservoir.

2.3.3.1.1 Native American Graves Protection and Repatriation Act

If Native American remains, funerary objects, objects of cultural patrimony, or sacred objects are found or identified, the procedures outlined in the Native American Graves Protection and Repatriation Act (NAGPRA) Section 3(d) and the implementing regulations, 43CFR10.4a-c, will be followed. Work will cease in the vicinity of the discovery. The appropriate federal agencies will be contacted by telephone immediately (within 24 hours), followed by written confirmation sent by certified mail. Every effort will be made to protect the human remains and artifacts (e.g., covering the remains with a layer of sterile soil) until a determination regarding their treatment is made. Native American groups, such as the Mescalero Apache and the Tigua tribes must be consulted by the appropriate federal agencies to determine the proper course of action.

If burials are discovered on New Mexico state lands, local law enforcement will be notified and all construction activities will cease (1978 New Mexico Statutes §18-6-11.2). Local law enforcement will notify the state medical investigator and the State Historic Preservation Officer to determine the proper course of action for removal and reinterment of the burial by qualified personnel.

2.3.3.1.2 Monitoring/Discovery Plan

Monitoring of archaeological resources is designed to identify, document, and collect samples from any previously undocumented cultural resources discovered during construction. All of these activities are designed to minimize construction delays.

Many of the project features are located within the Rio Grande floodplain, where thousands of years of flooding have erased what may have once been prehistoric and early historic sites. It is therefore unlikely that sites will be discovered in these within the floodplain. If subsurface artifacts or features are discovered, the contractor will consult with the federal lead agency, and the SHPO to determine the appropriate treatment of the resource. All work in the vicinity of the discovery will cease, and the location will be documented.

Terrace areas above the Rio Grande, the area around Anthony Gap, and the Hueco Bolson are known to contain sites. It is recommended, in concurrence with the Texas Historical Commission, that an archaeological monitor be present during all ground-disturbing activities within these areas. If fire-cracked rock and/or carbonized remains are found in association with artifacts, sediment samples will be obtained for flotation and radiocarbon dating. Artifacts found in association with a discovery will be collected and analyzed. If larger subsurface finds are encountered, 1 x 1 meter square units will be excavated at the discovery location, and excavated to sterile soil. Vertical control will be excavated in 10 cm levels, and all material will be screened through 1/8 wire hardware mesh. All artifacts will be collected.

3.0 Affected Environment

3.1 General Project-Wide Setting

The project area consists of three distinct environmental zones: the Rio Grande valley, the Franklin Mountains, and the Hueco Bolson. The following is a discussion of the regional paleoenvironment and the current setting of the three environmental zones to provide context for the archaeological setting. A brief summary of wildlife within the region also is provided. Impacts are presented in Section 4 – Environmental Consequences.

3.1.1 Paleoenvironment

Prior to 10,000 B.C., the climate of the project area was moister than it is now. Under those conditions, shallow lakes or playas along the desert floor held water over longer periods of time. The range of moisture-sensitive plants increased during this period, thus expanding forests. Pinon and juniper trees were found at lower elevations, including the desert floors. The faunal assemblage included now-extinct mammoth, horse, camel, antelope, bison, tapir, sloth, and others.

Between 10,000 and 9500 B.C., there was a period of decreased effective moisture. This resulted in desiccation of many of the desert lakes (Irwin-Williams 1979). Conditions of increased effective moisture returned from 9500 to 9000 B.C. During that period, an increase of 3 to 4 inches in annual rainfall and a decrease of 3 to 4 degrees Fahrenheit in mean annual temperature took place, as compared to the present. Rich grasslands supported by those conditions attracted grazing animals. The earliest recognized human remains, associated with big game hunting activities of the Paleo-Indian culture, define this period.

Between 8600 and 5000 B.C., there was another trend of decreasing moisture, during which time, the Pleistocene megafauna became extinct. By the end of the period, playas had dried, the climate had stabilized, and conditions became similar to those of the present. By ca. 3000 B.C., all of the animal species had become those of modern times (Irwin-Williams 1979).

Within the past 300 years, the region surrounding El Paso has supported expansive grasslands with mixed patches of oak, mesquite, and juniper (Kenmotsu and Pigott 1977). After 1881, local economic incentives encouraged overgrazing during relatively brief periods of relatively high effective moisture. During times of less rainfall, droughts desiccated the region. Between 1885 and 1925, the desert grasslands had recovered to some extent from overgrazing, but by the end of the period erosion had removed most of the relatively thin topsoil. The once extensive grama grasslands within the region could not recover, and the desert scrub and coppice dune complex remains.

3.1.2 Environmental Zones

3.1.2.1 Rio Grande Valley

The majority of the Rio Grande valley within the project area consists of agricultural farmland. Crops grown within this area include primarily pecans, cotton, onions, cabbage, corn, chile pepper, and alfalfa. Soils consist of river clays and sandy loams. Along the edges of the valley, sandy soils exist within a tumbled cobble matrix.

Before farmlands dominated the land, thickets (bosques) of plants lined the river. These included cottonwood trees, mesquite, various shrubs and assorted grasses. Very few remnants of the bosques remain today due to river channelization and vegetation clearing and control. Salt cedar tamarisk has replaced the indigenous plant life in the nonfarmland areas.

The soils of the Rio Grande area are deep sands, loams, and clays that formed on alluvium, and lie on flood plains and stream terraces. These types of soils, through the passage of time lend themselves to the possibility of subsurface cultural material. The Glendale and Harkey series soils are the most common, but numerous similar types also are present and make for a complex distribution of soils. Most of the river valley soil types are deep, nearly level, and well drained. Glendale series soils are common in depressed areas. The Glendale A horizon is largely clay loam and ranges from zero to 12 inches in depth. There is no Glendale B horizon. The Glendale C horizon is moderately to highly stratified with four primary layers, largely varying in color and clay content. The Harkey series soils range from fine, sandy loam to clay loam in the A horizon, zero to 20 inches in depth. The Harkey C horizon,

extending to roughly 60 inches, contains less clay and is typically very fine, sandy to silt loam. Just north of Radium Springs, New Mexico, extending for roughly seven miles, the rock outcrop Torriorthents association occurs. Each series of this association is well drained, but varies from shallow to deep, and from hilly to extremely steep terrain. These soils form in alluvium and colluvium on mountains. Extrusions, escarpments, ledges, ridges, lava flows, and cliffs are all indicative of rock outcrop. Torriorthents soils range from fine sand to cobbly and stony alluvium and colluvium (Bulloch and Neher 1980; Jaco 1971).

3.1.2.2 Franklin Mountains/Anthony Gap

The Franklin Mountains/Anthony Gap area is within the high desert runoff zone of the northern extension of the Franklin Mountains. It is characterized by bedrock outcrops, steep alluvial fans, medium and low alluvial cuts, and transitional zones on the east and west margins. The northern Franklin Mountains are formed from the faulting Permian limestone. Naturally occurring chert outcrops are visible in the limestone escarpments, and angular cobbles frequently occur in the detrital limestone debris common to the upper alluvial fans. In addition to the local bedded rhyolite and cherts, quartzite and obsidian from ancestral Rio Grande gravels are present along the lower alluvial fan ridge tops. The western and eastern margins of the alluvial fans are typified by an increasing sandy soil content as they merge with the Rio Grande valley and the Hueco Bolson (Bulloch and Neher 1980).

Outside of the floodplain, the terrain rises to the east on the alluvial fans of the Franklin, Organ, and San Andres mountains east of the Rio Grande valley. In the El Paso area, Delnorte-Canutio association soils are most common, but the Turney-Berino, Hueco-Wink, and Bluepoint associations also occur here. Delnorte-Canutio soils are nearly level to steep soils that are either shallow over caliche or deep and gravelly throughout. Surface and subsurface cultural materials are often found within the context of these soil types. They are characteristic of the Franklin Mountain footslopes (Bulloch and Neher 1980; Jaco 1971).

Vegetation within the upper slopes of this zone includes ocotillo (*Fouquieria splendens*), yucca (*Yucca elata*, *Y. torreyi,* and *Y. baccata*), catclaw (*Acacia* sp.), creosote bush (*Larrea tridentata*), sotol (*Dasylirion* sp.), agave (*Agave lechuguilla*), cholla cactus (*Opuntia imbricata*), prickly pear cactus (*Opuntia phaeacantha*), Mormon tea (*Ephedra trifurca*), and

remnant juniper trees (*Juniperus monosperma*). Shrubs such as littleleaf sumac (*Rhus microphylla*) occur in low frequency along the drainage cuts. Within the lower alluvial fans, soaptree yucca (*Yucca elata*), creosote bush, mesquite (*Prosopis glandulosa*), and grasses including blue grama (*Bouteloua gracilis*), fluff grass (*Erioneuron pulchellum*), purple three-awn (*Aristida purpurea var. wrightii*), broom snakeweed (*Gutierrezia sarothrae*), and mesa dropseed (*Sporobolus flexuosus*) become more prevalent.

3.1.2.3 Hueco Bolson

The Hueco Bolson environmental zone is typified by generally level topography with internal drainage playas. The zone is bound on the west by the Franklin Mountains, on the east by the Hueco Mountains, and on the north by the Jarilla Mountains. Soils consist of sandy loams, often mixed with small-sized gravels from nearby alluvial fans and remnant Rio Grande channels.

The majority of the vegetation community is composed of mesquite-stabilized sand dunes varying from 5 to 12 feet in height. Common plants in this area include mesquite, sandsage (*Artemisia filifolia*), soaptree yucca, creosote bush, four-wing saltbush (*Atriplex canescens*), blue grama, fluff grass, purple three-awn, mesa dropseed, and buffalo gourd (*Cucurbita foetidissima*).

Areas of undisturbed vegetation are characterized by grasslands, punctuated by zones of creosote bush. Vegetation in this area includes soaptree yucca, creosote bush, cholla cactus, and various grasses including blue grama and fluff grass.

Turney-Berino soils occur on the west side of the Franklin Mountains downslope from the Delnorte-Canutio soils in the Hueco Bolson. These are found on nearly level to gently sloping terrain and are moderately deep, possessing a clay loam subsoil over soft caliche. Surface and subsurface cultural materials are often found within the context of these soil types. Hueco-Wink association soils are also found on the nearly level to gently sloping areas of the Hueco Bolson, and extend from the east into the project vicinity to roughly five miles west of Biggs Army Airfield. They possess a very fine, sandy loam subsoil of moderate depth over caliche. Bluepoint soils are also present in the southeastern portion of

the project area, running along the margins of the Rio Grande floodplain. Into New Mexico, Bluepoint soils predominate and floodplain margins run parallel to the Rio Grande valley for nearly the entire length of the project corridor to Hatch. Bluepoint soils are generally deep, and present on the gently undulating to moderately rolling terrain of terraces, ridges, and alluvial fans along the margins of the Rio Grande. They are well to excessively drained, loamy sands that form on alluvium modified by wind.

3.1.3 Wildlife

Common bird species expected to occur within the study area include black-throated sparrow (*Amphispiza bilineata*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), and western kingbird (*Tyrannus verticalis*). Common raptors include red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), barn owl (*Tyto alba*), and burrowing owl (*Speotyto cunicularia*).

Small mammal species found within the project area can include Merriam's kangaroo rat (*Dipodomys merriami*), Ord's kangaroo rat (*D. ordi*), and deer mouse (*Peromyscus maniculatus*), as well as desert cottontail (*Sylvilagus audubonii*), black-tailed jack rabbit (*Lepus californicus*), and skunk (*Mephitis mephitis*). Predators in the area consist of carnivorous mammals such as coyote (*Canis latrans*) and swift/kit fox (*Vulpes velox*). Deer (*Odocoileus virginianus* and *Odocoileus hemionus*) are found within mountainous portions of the study area.

3.2 Cultural Resources Overviews

3.2.1 Prehistoric Overview

Evidence of human occupation in southern New Mexico spans more than 12,000 years. These cultural remains reflect the presence of human populations in the area dating from the Paleo-Indian, the Archaic, the Formative, the Precontact, the Protohistoric, and the Historic periods, as shown in Table 3.1. A brief summary of these periods is presented here.

Table 3.1
Regional Chronology

Period/Phase	Approximate Date
Paleo-Indian	Ca. 10,000-6000 B.C.
Archaic	6000 B.C.- A.D. 200
Early	6000-4300 B.C.
Middle	4300-900 B.C.
Late	900 B.C.-A.D. 200
Formative	A.D. 200-1450
Mesilla	A.D. 200-1100
Doña Ana	A.D. 1100-1200
El Paso	A.D. 1200-1450
Precontact	A.D. 1450-1581
Protohistoric	A.D. 1581-1659
Historic	A.D. 1659-present

For more detailed discussions of the culture history of the area, see Abbott et al. 1996; Beckes et al. 1977; Carmichael 1986; Miller and Kenmotsu 1999; O'Laughlin and Martin 1993; Whalen 1977, 1978.

3.2.1.1 The Paleo-Indian Period

Evidence suggests that during the Paleo-Indian period, from ca. 10,000 B.C. to 6000 B.C., humans inhabiting southern New Mexico were organized in small, highly mobile, hunter-gatherer groups who subsisted on available game, including both small species and the now-extinct megafauna species, as well as a variety of vegetal foodstuffs. Material remains of Paleo-Indian populations include large lanceolate projectile points with prominent basal fluting, side scrapers, end scrapers, gravers, and drills. Based on changes in projectile point morphology, the Paleo-Indian period is divided into three subperiods or complexes: the Clovis, Folsom, and Plano (Irwin-Williams 1979). There was a general trend throughout the

period for the environment to become increasingly dry—a condition that is thought to have had an adverse effect on big game populations. In response to declining herds and a changing environment, Paleo-Indian populations appear to have gradually adopted an increasingly more generalized subsistence economy.

3.2.1.2 The Archaic Period

The Archaic period represents a continuum of human occupation lasting some 5,000 to 6,000 years in the American Southwest. During this period, subsistence strategies gradually shifted from the available resources in the preceding Paleo-Indian period to a broader-based hunting and gathering adaptation. Climatic changes discussed in previous research (Irwin-Williams 1979; Van Devender 1977) are considered to have had important influences on the adaptation and distribution of populations during the Archaic period. These changes appear to represent a response to environmental stresses occurring throughout the Southwest during this post-glacial period.

Archaic period occupations may be distinguished by the recognition of a variety of projectile point styles (stemmed, shouldered, and side- and corner-notched), bifaces, flake scrapers, and drills. These sites typically consist of lithic and fire-cracked rock scatters that are often situated on mesa tops overlooking substantial arroyos or arroyo systems. Three broad subdivisions within the Archaic period have been utilized by previous researchers and are based on morphological changes in projectile point types and a number of chronometric dates. These subdivisions, known simply as Early, Middle, and Late Archaic, have been discussed by Beckett and MacNeish (1987) and Carmichael (1986).

Irwin-Williams (1973, 1979), however, attempted to refine the greater American Southwest Archaic period from data associated with previous and on-going projects found throughout various geographic regions of the Southwest, including the Colorado Plateau, Mogollon Highlands, Sonoran Desert, and portions of the southern Great Basin. Several related complexes stem from this refinement but as of yet are not fully defined or understood. Recent refinement in Archaic materials in the southern Rio Grande valley of New Mexico and in adjacent basins to the east has also developed in the past 10 years (Beckett and MacNeish 1987; MacNeish 1993).

The Early Archaic period is not well represented within the region. The Middle Archaic is better represented, with several Middle Archaic-style points reported from previous investigations within the region. An increase in the use of the area during the Late Archaic period is suggested by the significant increase in the number of sites in the Tularosa Basin in southern New Mexico. The majority of Archaic period sites and components documented in the area are Late Archaic sites.

3.2.1.2.1 Early Archaic (6000 - 4300 B.C.)

Early Archaic period remains reflect an adaptation to increasingly arid conditions. This transition is thought to have occurred throughout the Early Archaic period and appears to have significantly impacted animal populations. According to Johnson and Holliday (1986), bison constituted the main protein source for inhabitants of southeastern New Mexico during the Early Archaic period. Increasingly drier conditions led to the extinction of most large faunal species. Johnson (1983) suggests that the shift to a more generalized hunting and gathering subsistence strategy, particularly systematic plant use, was an adaptive response to nutritional stress created by these changing climatic conditions.

Sites of this period may be differentiated from Paleo-Indian and later Archaic occupations by projectile point types. Early Archaic types include straight-stemmed, concave base varieties like Bajada or large, straight-based types like Jay. These date from approximately 5500 to 3200 B.C. (Irwin-Williams 1979).

3.2.1.2.2 Middle Archaic (4300-900 B.C.)

The Middle Archaic period is a time of shifting subsistence strategies. Data suggest that the climate fluctuated between extended periods of aridity, and relatively cool and moist phases (Johnson and Holliday 1986). During dry periods, the subsistence strategy was similar to the Early Archaic period, with a generalized pattern of hunting and gathering and intensive plant exploitation. During the intervening cool and moist period, the emphasis of subsistence activities may have returned to bison hunting (Johnson and Holliday 1986).

During the Middle Archaic period, there appears to have been a change from the manufacture of large, straight-stemmed projectile points, characteristic of the Early Archaic, to smaller or medium-sized, shouldered, and concave-based types, such as San Jose, Pedernales, and Hanna.

3.2.1.2.3 Late Archaic (900 B.C. - A.D. 200)

The climate during the Late Archaic period was similar to modern conditions. Johnson and Holliday suggest that improved range conditions led to the resurgence of bison populations, and, once again, their exploitation became a primary subsistence activity. Material culture associated with the Late Archaic includes grinding stones, bifacial tools, and scrapers, as well as baskets, cordage, and snares. The diverse artifact assemblages evident during this time suggest a more intensive subsistence strategy, with an increased emphasis on small game and wild plants.

The Late Archaic period also is characterized by a substantial increase in medium-sized corner- and side-notched projectile point styles such as Marcos, Williams, Shumla, and Ensor. These points resemble those associated with Archaic points from the Central Texas area of the Southern Plains (Rodgers 1987).

3.2.1.3 The Formative Period

The Formative period (A.D. 200-1450) is defined by the inception of ceramics. Early in this period, discrete ceramic and architectural traditions emerged that represent discrete culture regions. As defined by Lehmer (1948), the study areas lie within the Jornada Branch, a desert-adapted expression within the larger Mogollon culture region. The Jornada Branch includes three phases: Mesilla, Doña Ana, and El Paso. While they are not beyond debate, the phases originally named by Lehmer are defined by changes in ceramic attributes and tradewares, and, to some extent, residential structure types.

3.2.1.3.1 Mesilla Phase (A.D. 200–1100)

The beginning of the Mesilla phase corresponds with the production of plain, brownware pottery. The increased use of cultigens and the increased storage potential provided by

ceramic vessels contributed to the inception of a sedentary, village lifestyle during this phase. Structures were roof or ramp-entry circular pit structures. Decorated tradewares, predominantly Mimbres Black-on-white, are included in ceramic assemblages. Pinched and direct brownware rim forms are usually attributed to the Mesilla phase and are used for temporal assignments, particularly in the absence of decorated tradewares (Whalen 1978).

3.2.1.3.2 Doña Ana Phase (A.D. 1100–1200)

The Doña Ana encompasses a transition from pithouse to pueblo-style dwellings (Lehmer 1948) and a change in diagnostic ceramics to Chupadero Black-on-white, Three Rivers Red-on-terra-cotta, and black and red decoration combinations. The existence of the Doña Ana transitional phase has been in contention because of its short temporal span. Supported by recent research, the Doña Ana phase has become accepted as a short-term transition along a continuum of increasing population, dependence upon agriculture, social integration, and cultural complexity (Whalen 1981). Based on the presence of large numbers of open sites exhibiting ceramics relating to this timeframe and well-developed roasting features, it is presumed that the continuation of horticulture and agriculture practices provided the subsistence base for large segments of the population.

3.2.1.3.3 El Paso Phase (A.D. 1200-1450)

The El Paso phase is the Pueblo period of Jornada Mogollon prehistory. Although several structural types have been reported, contiguous, surface-room blocks of puddled adobe are the typical structural remains that are found (Sale and Laumbach 1989). El Paso Polychrome jars with everted rims are associated with this phase. A specialized, intensive farming adaptation has been suggested for the El Paso phase, although hunting and gathering continued to play an important role in subsistence (Whalen 1978). Small mammals, particularly rabbits, are found in faunal assemblages of this phase (Carmichael 1986). Trade with surrounding regions reached its peak during this phase, suggested by the presence of ceramic tradewares from central New Mexico, eastern Arizona, and northern Mexico. An increase in the size and density of habitation sites represents a population increase and corresponds with higher levels of social organization (Carmichael 1986).

The end of the El Paso phase is marked by depopulation of the southern New Mexico/ western Texas region. While it has been suggested that the local occupants may have reverted to a less intensive adaptation such as a hunter-gatherer lifestyle, (Wimberly 1979), there is little archaeological evidence for occupation of the region after A.D. 1400. Production of the local ceramic types ended abruptly, and most major village locations were abandoned by A.D. 1350 (Wimberly and Rogers 1977). Recent evidence from Pueblo sites west of the Tularosa Basin indicates that the El Paso phase may have persisted there until A.D. 1450 (Upham 1991).

3.2.1.4 The Precontact Period

The Precontact period (A.D. 1450-1581) is defined here as the relatively brief (approximately 130-year) span between abandonment of the region by Pueblo groups and the first documented encounter between Native Americans and Spanish explorers. Several cultural groups may have used the study areas during the Precontact period. According to Beckett and Corbett (1992), the Chinarra, Concho, Jano, Jocome, Manso, Suma, Piro, and Tarahumara may have occupied the local region. Unfortunately, archaeological evidence representing these groups has not been found or at least has not been recognized.

3.2.1.5 The Protohistoric Period

The Protohistoric period (A.D. 1581-1659) represents the temporal span between first European/Native American contact and the Historic or settlement period. Many of the aboriginal groups inhabiting the region during the Precontact period also may have been present during the Protohistoric period. Contact between Native Americans and Europeans, however, undoubtedly wrought changes to aboriginal lifestyles. Not only did the introduction of new materials such as metals revolutionize subsistence activities, but a defensive (and offensive) posture was initiated among some Native American groups. This posture often resulted in a changed campsite preference (i.e., defensive overlook), which, along with the changes in material culture, is potentially visible in the archaeological record. The Mescalero Apache represent the only documented aboriginal Protohistoric inhabitants of the region.

3.2.2 Historic Overview

3.2.2.1 Spanish Exploration

The date used for the onset of the Historic period (A.D. 1659-present) is based on developments within the El Paso and Rio Grande valley areas. The first missions were established in El Paso by Fray Garcia in 1659 (Peterson and Brown 1994) and northward expansion followed. As a result of the Pueblo Revolt in 1680, the Spanish were driven out of New Mexico and retreated south to El Paso. Within a month of the revolt, several thousand Spanish and Pueblo Indian refugees had arrived in the El Paso area. This area became the northernmost outpost of New Spain until the reconquest of Santa Fe by Governor Don Diego de Vargas in 1692.

3.2.2.2 Early Settlement of Las Cruces/El Paso

From 1692 until the end of Spanish rule in 1821, the El Paso area was largely composed of a series of missions and Indian settlements under the control of Franciscan missionaries and Spanish officials (Hughes 1914). In 1821, Mexico won its independence from Spain, bringing the El Paso area under Mexican rule. The United States established its boundary with Mexico after the Treaty of Guadalupe Hidalgo was signed in 1848, and after the Gadsden Purchase was completed in 1853 (Harris and Sadler 1993). Following this event, population of the El Paso area grew tremendously as transportation methods improved, first with wagon roads and later with the development of railroads (Staski 1984).

To protect the area from Indian attacks, an American military presence was established in the El Paso area in 1849, with Fort Bliss being formally established in 1854. After several abandonments and reoccupations prompted by inadequate site locations and the onset of the Civil War, the post was permanently established on the eastern foothills of the Franklin Mountains in 1893 (Harris and Sadler 1993).

3.2.2.3 Beginning of Modern Irrigation

With the arrival of Euroamerican farmers in the American West in the mid-1800s, a stable water source was needed to support the growing population. Western farmers learned that the desert's prehistoric inhabitants relied heavily on irrigation and water management techniques to yield successful crops year after year. In order for a large sedentary population to be sustained in this arid land, an effective method of water management and control had to be implemented.

In southern New Mexico, most farms and settlements were situated near perennial streams or rivers, However, seasonal depletion of the stream flows often stunted their crops. In most small towns and villages, the use of an acequia—an irrigation ditch or canal—that diverted water from a stable source—such as the Rio Grande—often met the water needs for the entire community. As populations in southern New Mexico continued to grow at the turn of the century, a more aggressive water management plan had to be developed.

A series of destructive floods in the late 1800s and early 1900s impacted the communities in the Mesilla Valley and brought about serious changes to the acequia and canal systems. These floods were the catalysts for the creation of several private companies to develop and manage irrigation systems. In 1885, the Mesilla Valley Irrigation Company was chartered under the laws of New Mexico, and began consolidating ownership of various irrigation ditches in the Mesilla Valley (Wozniak 1998). In 1888, citizens from El Paso and southern New Mexico established the Jornada and El Paso Canal and Reservoir Company. This company proposed a plan to construct a dam and reservoir on the Rio Grande, above the Palomas Valley, and to bring water south across the Jornada into the Mesilla and El Paso valleys to relieve the recurring shortages of irrigation water (Wozniak 1998).

Initial costs for the proposed water works were staggering. Witnesses from the Mesilla Valley appeared in front of a U.S. Special Senate Committee to appropriate federal money to help fund a large water storage facility on the Rio Grande. John Wesley Powell, head of the Senate Committee, concluded that there were sufficient irrigable lands in the Mesilla Valley to take the entire flow of the Rio Grande at the valley's head (Wozniak 1998). Because there were no private funds or federal money, plans for a large water reservoir and dam began to

deteriorate. The lack of support by the federal government also was questioned by the Republic of Mexico, which also was experiencing shortages of water in the Juarez Valley. The governing bodies of New Mexico, Texas, and Mexico concurred that a reservoir was needed, but the location of the storage facility was the primary point of contention (Lester 1977). Texas and Mexico argued that the reservoir and dam should be constructed in the narrows above El Paso; New Mexico contended that this would flood thousands of acres of fertile farmland in the Mesilla Valley (Wozniak 1998).

In 1893, Nathan E. Boyd of Las Cruces formed the Rio Grande Dam and Irrigation Company (Lamar 1984). It was sold to a conglomerate of British investors in 1894 because of recurring financial problems within the company. With the infusion of foreign capital, the company proposed to build a dam at Elephant Butte to provide water to the Mesilla Valley. Early in the spring of 1895, officials from the Rio Grande Dam and Irrigation Company filed an application in Washington D.C., for approval of the reservoir site. On February 1, 1895, Secretary of the Interior Hoke Smith approved the dam site with an added stipulation that the reservoir be constructed within five years (Lester 1977).

In January 1897, the Rio Grande Dam and Irrigation Company started construction on the first diversion dam at the head of the Mesilla Valley (Lester 1977). Soon after the Elephant Butte project was initiated, the United States, urged by proponents of the international dam, filed an injunction against the company claiming that the dam would destroy a navigable stream and present a danger to residents adjacent to and south of the dam (Lester 1977). The court found in favor of the Rio Grande Dam and Irrigation Company, deciding that the Rio Grande was not a navigable river within the boundaries of New Mexico, and that construction of the dam could proceed. In 1899, the U.S. Supreme Court reversed the case on a legal technicality and remanded the case to a lower court stating the navigability of the Rio Grande was still not proven. On May 3, 1903, a territorial court in New Mexico decided that the Rio Grande Dam and Irrigation Company had failed to meet its contractual obligation to build the dam in five years; thus, they did not meet the contract stipulations and forfeited rights for the project (Lester 1977).

The ruling allowed for progress of the controversial International Dam project in El Paso (Lester 1977). The court's decision sparked a maelstrom of opposition from New Mexicans in the Mesilla Valley, culminating in the organization of a special federal government commission to resolve the matter. During this time, all of southern New Mexico was reeling from a devastating drought that destroyed crops and forced local farmers to once again ask for government assistance for the construction of a reservoir at Elephant Butte (Wozniak 1998).

3.2.2.4 International Boundary and Water Commission

The conclusion of the Mexican-American War and the 1848 Treaty of Guadalupe Hidalgo established the Rio Grande as a permanent boundary between the United States and Mexico. However, difficulties soon arose with this division because of sudden river channel changes during floods, which repeatedly altered the international borders between the two countries (Bowman 1955). The meandering river provoked the drafting of a series of treaties and the formation of several temporary commissions.

Between 1854 and 1855, a temporary commission, headed by Major W. H. Emory, was established to survey the line dividing the two countries (Bowman 1955). As stated in Emory's report, an International Boundary Commission, composed of one commissioner and one consulting engineer from each country, would exercise exclusive jurisdiction over problems arising from changes in the bed of the river and from the construction of structures that would affect the boundary. In December 1888, Matias Romero proposed the formation of the commission, by treaty, between the two countries. The treaty was ratified early in 1889.

On January 8, 1894, the International Boundary Commission was formally organized in the office of the Mexican consul at El Paso, with Colonel Anson Mills appointed as United States Commissioner, and Jose Maria Canalizo appointed for Mexico (Clark 1987). In order to manage the boundary more efficiently, the river was divided into three sections. The first section ranged from El Paso to Presidio del Norte. This was the most problematic section because of the strong currents and infirm soils that formed the riverbed. The river's path often meandered and created entirely new channels that could be mistaken for the

international boundary. The second section, from Presidio to Rio Grande City, was composed of bedrock and firm riverbed materials. The last section, from Rio Grande City to the Gulf of Mexico, was subject to constant shifting through erosional episodes and through avulsive actions by the river, leaving many segregated tracts or bancos (Bowman 1955). Finally, the United States Section, International Boundary and Water Commission (USIBWC) was established to manage the boundary and the river.

3.2.2.5 Acts and Legislation

Several attempts to provide a constant water source for irrigated agriculture on which to build stable communities in the American West predated the passage of the Federal Reclamation Act. Often, these attempts fell short because of the expensive, complicated channel and dams needed to control, store, and distribute water from the Rio Grande and its tributaries.

One of the most important actions for irrigation legislation was the Carey Act, passed August 18, 1894. This act offered public-land states with desert lands 1 million federal acres each, provided they would irrigate the granted lands. However, eight years after the passage of the Carey Act, only 7,640 acres had been patented. The federal government took direct action with a series of national irrigation congresses held in the late 1890s (Warne 1973).

The 1902 passage of the Newlands Act established the United States Reclamation Service, now known as the United States Bureau of Reclamation (USBR). With the passage of this act, the federal government began large-scale construction of irrigation projects throughout the Southwest (Baker et al. 1973). Once on the statute books, the Reclamation Act of 1902 quickly became effective. On June 28, 1902, the Secretary of the Interior withdrew lands for six surveys and projects throughout the Southwest (Warne 1973). The most prominent of these early USBR projects was Elephant Butte Dam in central New Mexico, which was constructed between 1910 and 1916 (Baker et al. 1973).

3.2.2.6 Dam and Reservoir Construction/Elephant Butte Irrigation District and El Paso County Water Improvement District No. 1

With the passage of the Reclamation Act in 1902, citizens of the Mesilla Valley finally had an appropriate channel through which to ask for assistance. Beginning in March 1903, the USBR began researching viable locations for a storage facility on the Rio Grande. Engineers for the USBR concluded that the optimum location for meeting the flood control, water storage, and agricultural needs of New Mexico, Texas, and Mexico was a reservoir at Elephant Butte (Lester 1977). Congress appropriated $1 million to help pay for the initial project construction costs; the remainder was to be paid by the water users of the Mesilla and El Paso valleys. In the spring of 1905, landowners and water users formed the Elephant Butte Water Users Association—now known as the Elephant Butte Irrigation District (EBID)—to meet requirements set by the USBR for contracts to construct reclamation projects (Wozniak 1998). The association issued 110,000 shares of stock at $40 a share. The funds derived from the stocks would be used to repay money borrowed for the construction of the dam, while allowing each shareholder his or her proportionate allotment of water (Clark 1987).

The Leasburg Project began in the summer of 1905, under the auspices of the USBR. According to USBR documentation, the Leasburg Diversion Dam would not increase irrigable acreage in the Mesilla Valley. Irrigated acreage remained stable at approximately 27,000 acres. The Leasburg Project merely gave farmers a reliable source of water until the completion of the Elephant Butte Reservoir. Construction of the Leasburg Diversion Dam was completed in the spring of 1908, and soon after delivered the first constant source of water to farmers in the Mesilla Valley (Wozniak 1998).

The federal government spent eight years in preparing for the construction of the Elephant Butte Dam. In 1909, survey crews completed their work for the storage facility, and construction crews finished a number of developmental works, including a water-supply system and a concrete water tank (Lester 1977). The dam was engineered and designed as a gravity structure and contained 600,000 cubic yards of concrete. Once completed, the dam measured 1,200 feet long and 300 feet tall, and had a holding capacity of 2 million acre-feet of water (Baker et al. 1973). In 1915, prior to the dam's completion, Elephant Butte

Reservoir made its first water deliveries to farmers in the Mesilla Valley. Before the dam's completion in 1916, irrigable land was estimated at 38,876 acres; by 1926 this increased to 142,523 acres.

The main dam at Elephant Butte was completed in 1916 at an approximate cost of $5 million (Lester 1977). Soon after construction was completed, an intensive recruiting program was established to bring new farms to the Mesilla Valley in hopes that they would ease the cost burden of the project (Lester 1977). However, new settlers could not produce enough capital to offset water use costs. The federal government passed the Reclamation Extension Act in 1914, in response to escalating costs of reclamation projects in the West, and to ease the financial strains on individual irrigators and water associations. The act extended the repayment period for construction costs from 10 to 20 years (Wozniak 1998). In the same year that Elephant Butte Dam was completed, the East Side and West Side canals were finished, and in 1916 the Mesilla Diversion Dam was completed (Wozniak 1998). Percha Dam, located 30 miles south of Elephant Butte, was completed two years later and served the irrigation needs for the Rincon Valley (Clark 1987).

By the end of the 1920s, 90 percent of the arable lands in the Mesilla and Rincon valleys were under cultivation. This aggressive campaign to expand drainage and irrigation systems continued until 1929. Despite the economic depression, most of the Mesilla Valley was faring well, but by 1931 crop prices collapsed causing the EBID to provide economic relief to the besieged farmers (Wozniak 1998). In 1932, Congress deferred water-use payments for 1931, 1933, 1934, and 1935. In 1936, the federal government organized a special committee to determine the conditions of repayment under the current 40-year formula. After three years of study, recommendations were made to Congress to enact a three-part relief plan. First, part of the total cost of the project was written off. Second, settlers were exempt from payments from 1939 to 1943. Lastly, the period repayment for the construction costs of the project was extended to 50 years (Wozniak 1998).

In 1933, the United States and Mexico entered into an agreement to improve the International Diversion Dam (originally constructed in 1918) above El Paso to carry out the provisions of the Convention of 1906 (Clark 1987). The improvements were completed in 1941. They

also agreed to construct a dam 22 miles south of Elephant Butte, at Caballo, to help control the flow of the river south of Elephant Butte. The Caballo Dam also would relieve the threat of floods in El Paso while contributing valuable hydroelectric power production year- round to Elephant Butte, and with no loss of water. Construction of the dam began in 1935 with $3 million in Congressional-appropriated funds. Completed in 1938, Caballo Dam stores 1 million acre-feet of water, and provides storage for any water lost through sedimentation (Clark 1987).

The El Paso County Water Improvement District No. 1 (EPCWID) was founded in 1918 when Elephant Butte Dam was completed. The jurisdiction begins at the New Mexico/Texas border and includes 69,010 acres, two diversion dams (American and Riverside), and more than 245 miles of canals, drains, and wasteways. It is organized per the statutes of the state of Texas as provided by Article XVI §59 of the Texas Constitution (Mosely 1978). Under the provisions set forth, EPCWID may levy and assess taxes as necessary in order to fulfill its contractual obligation to repay the UBRC for operation costs. The EPCWID works in conjunction with several government agencies, including the EBID, the USIBWC, and the USBR to manage and distribute water to El Paso County and Mexico.

Since the end of World War II, the USBR, the USIBWC, the EBID, and EPCWID have played significant roles in irrigation projects and management of water resources in southern New Mexico and West Texas, substantiating the importance of water management projects and boundary regulation throughout the Southwest.

3.3 Results of Investigation

The El Paso-Las Cruces Regional Sustainable Water Project is divided into Alternatives A, B, C, D, E, and the No Action Alternative (see Map 1.1 and Table 1.1). These alternatives include the construction or modification of water treatment plants, and the construction of storage ponds, aqueduct systems, and water diversion systems. Water transmission lines will be constructed to the surrounding communities. The proposed actions are described below, with results of cultural resources investigations for each location.

3.3.1 Water Treatment Plants

The water treatment plants consist of several parts. Raw water is conveyed to the treatment plant by either a river diversion structure or a conveyance pipeline. The water is treated and either stored for later use or piped into the existing local system. Within some alternatives, treated water may be contained at a treated water storage reservoir.

3.3.1.1 Hatch Water Treatment Plant (Alternatives A, B, C, D, and E)

The proposed action at the Hatch Water Treatment Plant is the construction of a 4.5 million-gallon-per-day (mgd) water treatment plant (see Map 1.1 and Appendix C) for use by Hatch, New Mexico, and for future water needs, including the proposed Spaceport City. The proposed 100-acre general area is located on private land and is bisected by State Highway 140. The area consists of agricultural lands within the Rio Grande floodplain (Figure 3.1). In all five of the alternatives, water at the proposed treatment plant would be gathered using a parallel diversion structure, and regulating and storage reservoirs would be constructed. No treated water will be stored at this location. No previously recorded sites have been located within one mile of the 100-acre general area. Due to private landowner concerns, the area cannot be intensively surveyed until a specific location is designated.

As part of the proposed Hatch Water Treatment Plant, treated water transmission lines would be constructed from the proposed plant location to the communities of Salem and Rincon, New Mexico. Preliminary engineering information indicates these lines would be installed in existing rights-of-way along U.S. Highway (US) 85 and New Mexico State Highway (NM) 154. When the proposed routes for the water transmission lines are formally defined, they must be subjected to archaeological survey.

3.3.1.1.1 Prehistoric Resources

No data have been generated regarding the prehistoric resources.

Figure 3.1. Proposed location of Hatch Water Treatment Plant, facing south.

3.3.1.1.2 Historic Resources

Two remnant adobe walls from a car garage were observed on the western boundary of the proposed area. According to landowner Paul Thompson, a frame house once stood in the vicinity of the adobe garage but collapsed sometime after 1947 and was hauled away. Because the structure remnant is on private land, it was not inspected. If this parcel becomes part of the proposed water treatment plant, it would be recorded and archival research would be performed. Based on the initial assessment, it is unlikely that the location is eligible for inclusion in the National Register of Historic Places (NRHP).

3.3.1.1.3 Paleontological Resources

No paleontological resources are known to exist within this area.

3.3.1.1.4 Ethnographic Resources

No known ethnographic resources exist within this area.

3.3.1.2 Leasburg Water Treatment Plant (Alternatives D and E)

The proposed action is the construction of a 50-mgd water treatment plant for use by Las Cruces and surrounding communities. The proposed site is located between Interstate Highway 10 and the Atcheson Topeka and Santa Fe railroad approximately two miles southeast of the Radium Springs interchange. A total of 65 acres was subjected to a Class III archaeological survey within the boundaries of the proposed treatment plant location. A water treatment plant for this location is included in Alternatives D and E, but the exact placement of the plant has not been determined. Seven sites have been previously documented within one mile of the proposed Leasburg Water Treatment Plant (Table 3.2).

Table 3.2
Sites Located Within one Mile of the Proposed Leasburg Water Treatment Plant

LA No.	Site Type	USGS* Map
6329	Artifact scatter with hearth	Leasburg
6330	Artifact scatter with hearth	Leasburg
6331	Artifact scatter with hearth	Leasburg
112596	Irrigation ditch	Leasburg
112597	Irrigation ditch	Leasburg
117862	Artifact scatter with 4 thermal features	Leasburg
117863	Mogollon artifact scatter with 1 hearth	Leasburg

* 7.5 minute quadrangle map

3.3.1.2.1 Prehistoric Resources

One site and five isolated occurrence locations were documented within the proposed Leasburg Water Treatment Plant area.

3.3.1.2.1.1 Site LA 128798

Site Laboratory of Anthropology (LA) 128798 is a Formative period artifact scatter. The site is located approximately two miles southeast of the town of Radium Springs. The site is situated on a small hill overlooking the Rio Grande floodplain to the west at an elevation of 3,990 ft amsl (Appendix C). Two small southwest trending drainages are located to the north and south of the site. Vegetation on the site consists of creosote, mesquite, soaptree yucca, four-wing saltbush, prickly pear cactus, and a variety of ground forbs (Figure 3.2).

Figure 3.2 Overview photograph of LA 128798.

The 7,500 m^2 site consists of an artifact scatter of over 100 artifacts, consisting of lithic debitage in all stages of reduction, El Paso brownware ceramics, and ground stone (mano fragments and a pounding stone). One Formative-style projectile point was also observed. A scatter of fire-cracked rock is scattered over the majority of the site, but no discrete features could be identified. Many naturally occurring river cobbles are also present on the site, indicating that one function of the site may have been a lithic acquisition area. Based on sand accumulation on portions of the site, the potential for subsurface deposits exists. Based

on the potential for this site to yield additional important information, LA 128798 is considered potentially eligible for inclusion on the National Register of Historic Places.

The five isolated occurrence locations are listed in Table 3.3.

Table 3.3
Isolated Occurrence Locations within the Proposed Leasburg Water Treatment Plant

Isolate No.	Artifact Information	UTM (Zone 13)
1	1 whole chert flake (5 cm in length)	E323050 N 3593130
2	1 whole chert flake (3 cm in length)	E322630 N 3593820
	1 whole chert flake (3 cm in length)	
	1 multiplatform chert core (6 cm in size)	
	1 multiplatform obsidian core (7+ cm in size)	
3	1 chert biface/core (7+ cm in size)	E 322810 N 3593380
4	1 whole chert flake (4 cm in length)	E 322660 N 3593220
	1 unifacial ground stone fragment (7+ cm in size)	
5	1 bedrock mortar in drainage bottom	E 322880 N 3593605

*UTM = Universal Transverse Mercator

3.3.1.2.1 Historic Resources

No historic resources were observed within the proposed Leasburg Water Treatment Plant.

3.3.1.2.2 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.1.2.3 Ethnographic Resources

No known ethnographic resources exist within this area.

3.3.1.3 Las Cruces Water Treatment Plant (Alternatives A, B, and C)

The proposed action is the construction of a 50-mgd water treatment plant for use by Las Cruces and surrounding communities. The location for this water treatment plant has not been chosen, but a proposed site is located adjacent to the Las Cruces Solid Waste Transfer Station. An archaeological survey will be conducted when this plant location is defined. A new water treatment plant is proposed in the Las Cruces area in Alternatives A, B, and C. No previously recorded sites have been located within one mile of the proposed area.

3.3.1.3.1 Prehistoric Resources

Pending a decision on water treatment plant location, no data have been generated regarding the prehistoric resources.

3.3.1.3.2 Historic Resources

Pending a decision on water treatment plant location, no data have been generated regarding the historic resources.

3.3.1.3.3 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.1.3.4 Ethnographic Resources

No known ethnographic resources exist within this area.

3.3.1.4 Anthony Water Treatment Plant (Alternatives A, B, and D)

The proposed action at this location is the construction of a 16-mgd water treatment plant for use by Anthony, New Mexico and surrounding communities (Figure 3.3; see Map 1.1 and

Appendix C). The Anthony Water Treatment Plant is included in Alternatives A, B, and D. The raw water conveyance will connect to the New Mexico-Texas aqueduct either under Alternative D (described below) or from a diversion structure at the Rio Grande under Alternative A and B. The water will be piped to the local system. A new reservoir would be constructed to store treated water. The proposed Anthony Water Treatment Plant is located 2.5 miles south of Vado, New Mexico, on land owned by El Paso Natural Gas. A total of 76.5 acres was subjected to a Class III archaeological survey within the boundaries of the proposed treatment plant location. The area was composed of agricultural lands in the Rio Grande floodplain. No previously recorded archaeological sites are present within one mile of the survey area.

Figure 3.3. Proposed location of Anthony Water Treatment Plant facing southeast.

As part of the proposed Anthony Water Treatment Plant, treated water transmission lines must be constructed from the proposed plant location to the communities of La Mesa, Vado, Berino, Chamberino, and Anthony, New Mexico. Preliminary engineering planning information indicates these lines would be installed in existing rights-of-way along NM 28,

NM 226, and NM 478. In addition, plans to link the proposed Anthony Water Treatment Plant with the proposed El Paso Aqueduct have also been identified. When the proposed routes for these water transmission lines are formally defined, they must be subjected to archaeological survey.

3.3.1.4.1 Prehistoric Resources

No prehistoric resources were identified. Because of river flooding and continued plowing, it is unlikely that the area will contain prehistoric cultural resources. However, subsurface artifacts or features may be present because prehistoric activities certainly occurred within the floodplain.

3.3.1.4.2 Historic Resources

No historic resources were identified.

3.3.1.4.3 Paleontological Resources

No paleontological resources are known to exist within this area.

3.3.1.4.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.1.5 Upper Valley Water Treatment Plant (Alternatives A, B, C, D, and E)

The proposed action at this location is the construction of either an 80-mgd (Alternatives A, B, or D; see Table 1.1) or a 96-mgd (Alternatives C or E; see Table 1.1) water treatment plant for use by east El Paso, Canutillo, and Anthony, Texas (see Map 1.1 and Appendix C). The proposed Upper Valley Water Treatment Plant is located west of Vinton, Texas, and west of the levee on the western bank of the Rio Grande. Under Alternatives D and E, water would be conveyed to the treatment plant by the New Mexico-Texas Aqueduct. If either Alternative A, B, or C is selected, a parallel water diversion structure would be constructed to channel raw water into the water treatment plant. Under all alternatives, water would be piped into the El Paso Aqueduct to transport water to east El Paso; under Alternatives C and

E, a pipeline would be constructed to Anthony New Mexico/Texas; under Alternatives D and E, a regulating reservoir would be constructed near the Mesilla Diversion Dam; in all alternatives, a new reservoir would be constructed to store treated water. A total of 233 acres was subjected to a Class III archaeological survey for cultural resources within the proposed location. In addition, a one-half mile section of road rights-of-way along Doniphan Drive was surveyed between Valley Chile Street and the La Tuna Federal Prison entrance for a proposed wastewater force main. The area consists of agricultural lands within the Rio Grande floodplain. No previously recorded sites were located within one mile of the survey area.

3.3.1.5.1 Prehistoric Resources

The area was subjected to intensive archaeological survey, and no prehistoric resources were identified. Because of river flooding and continued plowing, it is unlikely that the area will contain prehistoric cultural resources.

3.3.1.5.2 Historic Resources

A house and associated well house (site 41EP5466) are situated near the center of the proposed treatment plant location (Figure 3.4). The house was constructed in the 1930s and the well house was constructed during the 1950s or 1960s. The frame-construction house has a pitched roof. The floor plan of the house could not be determined because the windows and doors were boarded closed. Surrounding the structure are several elm trees and agave plants. Archival research was conducted at the El Paso Courthouse to determine whether it was associated with an important person or event, or was architecturally important. None of these criteria were met, and thus, the structure is not considered eligible for inclusion in the NRHP. However, the house was recorded using a Texas Historic Sites Inventory Form as shown in Appendix A.

3.3.1.5.3 Paleontological Resources

No paleontological resources are known to exist within this area.

Figure 3.4. House located within the boundaries of the proposed Upper Valley Water Treatment Plant, facing east.

3.3.1.5.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.1.6 Westside Regulating Reservoir (Alternatives D and E)

The proposed action at this location is to construct a 22-acre regulating reservoir for water conveyance to the Upper Valley Water Treatment Plant under Alternative D or E, via the New Mexico-Texas Aqueduct (see Table 1.1, Map 1.1, and Appendix C). The proposed area is located west of the Rio Grande and is approximately 100 meters south of the Mesilla Diversion Dam. The area is situated along the edge of the Rio Grande, with sand ridges sloping upward to the west. A dense stand of salt cedar is located on the southeast portion of the proposed area.

Approximately 75 acres were subjected to a Class III archaeological survey within the proposed location. One previously recorded site was located within the original area

surveyed (LA 854, described below), but no other recorded sites were located within one mile of the survey area. A parcel of approximately 22 acres within the 75 surveyed acres was determined for the regulating ponds within the salt cedar thicket. No cultural resources were observed in this area. Site LA 854 is not located within the 22-acre parcel.

3.3.1.6.1 Prehistoric Resources.

3.3.1.6.1.1 Site LA 854

Previously recorded site LA 854 is located in the northwest portion of the originally proposed area (see Appendix C). This site was revisited and evaluated to comply with current recording standards. The site was originally recorded around 1932 by the Laboratory of Anthropology (LA) and updated in 1987 by the USBR (Etchieson 1987).

The site is situated on a series of sand ridges along the Rio Grande overlooking the Mesilla Diversion Dam at an elevation of 3,900 feet above mean sea level (amsl); (see Appendix C, Figure 3.5). The site measures approximately 400 x 150 meters. Vegetation includes soaptree yucca, mesquite, creosote bush, and various grasses. An improved gravel road passes the site on the southern end. Disturbance on the site includes numerous four-wheel drive roads and ATV paths, a borrow pit that has impacted the southeast portion of the site, a landfill on the southern boundary, and erosion.

When originally recorded in 1932, the site was described as “a Mogollon ceramic scatter containing El Paso plain, Mimbres Black-on-white, and plain red to brownware ceramics” (Etchieson 1987). Herbert Dick excavated a pithouse located on LA 854 in 1955, but no report for this excavation exists. In 1987, USBR archaeologists examined the site, extended its boundaries, and discovered a human burial eroding from a cutbank. The site was divided into three discrete loci, each atop a separate, sandy ridge.

Figure 3.5. Site LA 854 showing borrow pit, facing northeast.

The burial was removed and additional test excavation was conducted. A total of 264 artifacts was collected, including flaked stone, ground stone, bone, shell, burned rock, and brownware Mimbres boldface and redware ceramics. Etchieson describes the burial as "a male, approximately 35 years old. Burial goods included a brownware jar, a mano, and a brownware sherd 'scoop'." Radiocarbon analysis on the skeleton provided a date of 470±90 A.D. (Etchieson 1987).

Additional disturbance to site LA 854 was observed during this investigation. The southern locus, previously identified by Etchieson in 1987 as Knoll A, showed evidence of enlargement of a previously existing borrow pit as well as mechanical blading. Off-road vehicle activity has impacted all three loci. However, some portions of the site remain intact, particularly the upper slopes of Knolls B and C. El Paso brownware sherds, flakes, and ash stains are still present on the site.

3.3.1.6.2 Historic Resources

The Mesilla Diversion Dam, a feature of the Elephant Butte Historic Irrigation District, is located approximately 200 meters northeast of the proposed reservoir. There will be no direct impacts to the dam, but the construction of a chain link fence around the proposed reservoir may create a visual impact. Consultation with the USBR archaeologist and the New Mexico SHPO must be conducted prior to construction.

3.3.1.6.3 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.1.6.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.1.7 Jonathan Rogers Water Treatment Plant (Alternatives A, B, C, D, and E)

The existing Jonathan Rogers Water Treatment Plant is located in southeast El Paso, just south of the Riverside Canal. Under Alternatives A, B, C, D, and E, the proposal is to expand the facility by 20 mgd and store the raw surface water at a proposed 25 acre area on the south side of the plant. The area surrounding the plant is continually bladed to remove weed growth and no archaeological remains were observed.

3.3.1.7.1 Prehistoric Resources

No prehistoric resources exist within this area.

3.3.1.7.2 Historic Resources

No historic resources exist within this area.

3.3.1.7.3 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.1.7.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.2 Aqueducts

Construction of four aqueducts is proposed for this project (see Table 1.1, Map 1.1, and Appendix C). The New Mexico-Texas Aqueduct would transport water from the proposed Westside Regulating Reservoir to the Upper Valley Water Treatment Plant. The El Paso Aqueduct would transport water from the Upper Valley Water Treatment Plant to northeast El Paso. The Canutillo Aqueduct would transport water from the Upper Valley Water Treatment Plant to the Canutillo Booster Pump Station. Finally, the Anthony Aqueduct would transport water from the Upper Valley Water Treatment Plant to Anthony.

3.3.2.1 New Mexico-Texas Aqueduct (Alternatives D and E)

The proposed New Mexico-Texas Aqueduct would transport water from the Mesilla Diversion Dam along the western side of the Rio Grande to the Upper Valley Water Treatment Plant (see Map 1.1 and Appendix C). This 96-mgd aqueduct is proposed under Alternative D or E. To work, a pipeline will be constructed along the western side of 25 miles of existing canal drains, which are located in developed agricultural lands and pecan orchards within the Mesilla Valley of the Rio Grande. A 50-foot right-of-way corridor is proposed for the pipeline.

A Class III archaeological survey was conducted along the proposed aqueduct right-of-way. Eight previously recorded sites were located within one mile of the proposed aqueduct corridor (Table 3.4). No previously recorded sites are located within the proposed corridor.

3.3.2.1.1 Prehistoric Resources

No prehistoric resources were identified within the right-of-way.

Table 3.4
Sites Located Within one Mile of the Proposed New Mexico-Texas Aqueduct

LA No.	Site Type	USGS* Map
1664	Prehistoric Artifact Scatter	Black Mesa
1665	Prehistoric Artifact Scatter	Black Mesa
1666	Prehistoric Artifact Scatter	Black Mesa
2801	Prehistoric Artifact Scatter	Black Mesa
72708	Prehistoric Artifact Scatter, Petroglyphs	Black Mesa
6044	Rockshelter	San Miguel
5173 (Town of La Mesa)	Historic Buildings	La Mesa
98986	Prehistoric Artifact Scatter	La Mesa

*USGS=U.S. Geological Survey

3.3.2.1.2 Historic Resources

3.3.2.1.2.1 Site LA 129236

Site LA 129236 consists of two concrete foundations, representing the remains of a house and a garage (see Appendix C). This location is situated between NM 28 and the Lower Chamberino Lateral/La Mesa Drain intersection and is approximately 1.2 miles north-northwest of Chamberino. The house foundation measures 24 x 26 ft and the garage measures 20 x 30 ft. Concrete footers surround the house foundation. A sparse scatter of artifacts associated with the foundations includes wire nails, clear and green glass, a metal barrel lid, garage door guides, and modern beer bottles. The foundations are located approximately 30 ft from the edge of the drain. The structure is depicted on the 1955 U.S. Geological Survey (USGS) La Mesa topographic map, indicating a construction date prior to that time, possibly the 1940s. This site is not considered eligible for inclusion on the NRHP.

3.3.2.1.2.2 Isolated Occurrences

Two historic isolated occurrences were located along the New Mexico-Texas Aqueduct (see Appendix C). The first location (IO #1) consists of three whole clear glass bottles and two bottle fragments observed eroding from the dirt drain bank. This location is situated approximately 1.5 miles southeast of the town of La Mesa. Based on the bottle types present, this cache was probably deposited at this location in the 1930s. Bottle 1 was manufactured by the Hazel-Atlas glass company between 1920 and 1964 and possibly contained battery acid. Bottle 2 was manufactured by Owen-Illinois between 1929 and 1966 and contained medicine. Bottle 3 is a panel bottle has "Rawleigh's Trademark" embossed on the side. This bottle was manufactured between 1925 and 1936. Bottle 4 is purple with an applied lip bottle neck manufactured between 1903 and the 1920s. Bottle 5 is a clear glass base manufactured by the C. L. Flauccus Glass company between 1880 and 1929 (Toulouse 1971).

Isolated Occurrence 2 (IO #2) is an abandoned 26-ft-long flatbed farm trailer piled with railroad ties, metal scraps, and other associated debris. This location is situated approximately one-half mile southeast of Chamberino. The trailer dates to the middle 1940s and has dual rims.

Four migrant worker quarters were observed just outside the right-of-way in the vicinity of La Mesa and Chamberino. The structures are elongated and have several entryways. Three of the buildings are associated with the late 1940s or early 1950s. These buildings are constructed of adobe, with asbestos shingles and metal window casements with rollouts. Two of the structures contained red brick chimneys. The fourth building appears to date to the late 1930s. This structure has a natural rock foundation, adobe walls, and four-panel wooden window casements. All four of the structures, which are on private land approximately 75 feet from the proposed right-of-way, have deteriorating walls and partially collapsing roofs. Construction and maintenance of the aqueduct would not impact these structures.

The proposed New Mexico-Texas Aqueduct follows the West Side Canal for approximately two miles as it leaves the proposed Westside Regulating Reservoir. The West Side Canal is a feature of the NRHP-listed Elephant Butte Irrigation District. Although no modification to this water control feature is proposed, visual impacts may occur. Consultation with the

USIBWC, or other applicable agency and the New Mexico SHPO must be initiated prior to ground-disturbing activities.

3.3.2.1.3 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.2.1.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.2.2 El Paso Aqueduct (Alternatives A, B, C, D, and E)

The proposed El Paso Aqueduct will transport water from the proposed Upper Valley Water Treatment Plant to east El Paso (see Map 1.1 and Appendix C). This aqueduct is proposed under all four alternatives. The proposed aqueduct includes approximately 26 miles of pipeline and a series of pumping stations and reservoirs. The pipe is to be 60 inches in diameter installed within a 100 foot wide right-of way.

The proposed pipeline will cross under the Rio Grande from the Upper Valley Water Treatment Plant, traverse eastward toward the Franklin Mountains, then turn north to NM 404 along the west side of existing natural gas pipelines (Figure 3.6). Two 2-acre booster pump stations are proposed to be constructed: one on the west side of Interstate 10 approximately one mile north of the Vinton interchange; the second on the south side of NM 404, approximately two miles east of the Interstate 10 Chaparral interchange.

From this booster pump station, the pipeline follows NM 404 eastward through Anthony Gap between the road and the right-of-way fence, making a short detour to the north side of the road to the proposed Anthony Gap Summit Reservoir in the pass (Figure 3.7). The pipeline then rejoins the south side of NM 404 between the road and the right-of-way fence, until meeting the intersection of NM 404 and NM 213.

Figure 3.6. Proposed El Paso Aqueduct route facing south along El Paso Natural Gas pipeline road.

Figure 3.7. Proposed El Paso Aqueduct route, facing west from the summit of Anthony Gap.

There the pipeline turns south and follows the western side of the road between the road and the right-of-way fence, returning into Texas past the Newman Power Plant. Approximately one mile south of FM 2529, the pipeline turns due east for one mile, then turns south for one mile, then east 1.2 miles until meeting the boundary of Painted Dunes Golf Course (Figure 3.8). The pipeline turns south-southeast under US 54, through a greenbelt area. The pipeline then crosses under Dyer Street and into a ponding area. The final leg follows the western side of Railroad Drive to the existing Loop 375 Reservoir and Booster Pump Station.

Figure 3.8. Proposed El Paso Aqueduct route, facing west near the Painted Dunes Golf Course.

A Class III archaeological survey was conducted along the proposed aqueduct corridor. A 100-foot-wide corridor was inspected in all areas except where the corridor was restricted, such as between highways and right-of-way fences. Proposed booster pump station locations also were surveyed.

The majority of the surveyed route could be clearly identified using USGS topographic maps. Because the survey area was not marked with flagging, one portion of the project corridor

that does not follow existing roads remains in question. This area is just south of the Newman Electric Power Plant. A 100-foot, east-west corridor was surveyed as marked on the project engineer's 7.5′ maps. This corridor must be resurveyed once the area is flagged to make sure no cultural resources are present.

3.3.2.2.1 Prehistoric Resources

One previously unrecorded site (LA 127219) was found during the survey. The site is located in New Mexico within the proposed Anthony Gap Booster Pump Station boundaries. The only prehistoric isolated occurrence observed during the survey was a single piece of obsidian debitage. This artifact was located just north of NM 404, approximately 200 meters east of the proposed Anthony Gap Summit Reservoir.

Twenty-two sites have been previously recorded within one mile of the proposed pipeline. (Table 3.5). These include 18 sites in Texas and four in New Mexico. Two previously recorded sites in Texas (41EP14 and 41EP2612) are located within the proposed pipeline corridor. Site 41EP14 is listed on the NRHP, and site 41EP2612 is considered eligible for inclusion on the NRHP. Descriptions for all previously recorded sites are detailed below.

3.3.2.2.1.1 Site LA 127219

Site LA 127219, documented during this project, is a low density nondiagnostic lithic scatter that is situated on a small terrace overlooking Anthony Wash (see Appendix C and Figure 3.9). The site is south of NM 404, approximately two miles southeast of the I-10/NM 404 intersection at an elevation of 4,100 feet amsl. The site measures approximately 750 m^2. Vegetation on the site consists of mesquite, littleleaf sumac, creosote, prickly pear, and *Yucca baccata*.

The site consists of a low-density scatter of 30 artifacts (less than 1 per square meter). Artifacts found on the site include flakes, a core, and a bifacial tool. Raw materials are locally available cherts and rhyolite.

Table 3.5
Previously Recorded Sites within one Mile of the Proposed El Paso Aqueduct

Site No.	Site Type	Quadrangle Map
41EP14*	Prehistoric artifact scatter with features	North Franklin Mountain
41EP347*	Prehistoric artifact scatter with features	North Franklin Mountain
41EP2637*	Prehistoric artifact scatter	North Franklin Mountain
41EP2638*	Prehistoric artifact scatter	North Franklin Mountain
41EP2910*	Prehistoric artifact scatter with features	North Franklin Mountain
41EP2911*	Prehistoric artifact scatter with features	North Franklin Mountain
41EP318	Prehistoric artifact scatter	North Franklin Mountain
41EP363	Prehistoric artifact scatter	North Franklin Mountain
41EP2612**	Prehistoric artifact scatter with features	North Franklin Mountain
41EP2613**	Prehistoric artifact scatter	North Franklin Mountain
41EP2614**	Prehistoric artifact scatter	North Franklin Mountain
41EP2617	Prehistoric artifact scatter	North Franklin Mountain
41EP2618	Prehistoric artifact scatter	North Franklin Mountain
41EP2619	Prehistoric artifact scatter	North Franklin Mountain
41EP2622**	Prehistoric artifact scatter	North Franklin Mountain
41EP2623**	Prehistoric artifact scatter	North Franklin Mountain
41EP2624**	Prehistoric artifact scatter with features	North Franklin Mountain
41EP2645	Prehistoric artifact scatter	Newman SW
LA 43233	Prehistoric artifact scatter	Anthony
LA 55791	Prehistoric artifact scatter	Anthony
LA 55792	Prehistoric artifact scatter	Anthony
LA 100321	Prehistoric artifact scatter with features	Anthony

* All combined into one large site (41EP14)
** Texas State Archeological Landmarks

Figure 3.9. Site LA 127219, facing east.

No features were observed on the site. Based on the limited assemblage and low potential for subsurface remains (shallow arroyo cuts, trowel test), this site is not considered eligible for inclusion in the NRHP.

3.3.2.2.1.2 Site 41EP14

Site 41EP14 is a large ceramic and lithic scatter with numerous fire-cracked rock features. The site is located immediately southwest of the Newman Power Plant in northeast El Paso (see Appendix C). Martin Luther King Boulevard bisects the site.

It is located on the lower eastern alluvial fan of the Franklin Mountains with elevations ranging between 4,065 and 4,130 feet amsl. The site measures approximately 1,368,000 m^2. Vegetation consists of creosote bush, Mormon tea, broom snakeweed, and various grasses.

The site was originally recorded in the 1960s by the El Paso Archaeological Society when a burial was discovered and removed from an eroding wash. The area was revisited in 1979

during a Public Service Board and El Paso Archaeological Society survey. The site was re-recorded and the site area expanded. Ceramic types include El Paso Brown, Jornada Brown, Mimbres Black-on-white, Chupadero Black-on-white, and Alma plain. The lithic assemblage consists of flakes, tools, cores, and projectile points. Manos and metates were also present on the site. Hundreds of fire-cracked rock features are scattered across the site area. The features vary in size between 1 and 100 m^2 and consist of burned rock middens. Many of the features on the site contain carbonized ash staining.

Subsequent recording efforts in 1991 and 1992 by Roger Hill (Texas Archeological Research Laboratory [TARL] files) focused on the western side of Martin Luther King Boulevard. El Paso Polychrome, El Paso Bichrome, and unknown plainware ceramic types were added to those types that were previously mentioned. In addition to the multicomponent Formative period designation, Hill and Hill (1993:TARL files) proposed a potential Archaic period component to the site. Hill and Hill expanded the original boundary to include other smaller sites surrounding 41EP14. The sites now located within the 41EP14 boundary include 41EP347, 41EP2637, 41EP2638, 41EP2910, and 41EP2911.

The current survey determined that the site was adequately mapped and described. No update is necessary. Numerous collectors' piles and the presence of fewer types of decorated ceramics indicate that the site has been regularly looted. Runoff from the Franklin Mountains has impacted several fire-cracked rock features on the site. No artifacts were identified in the proposed right-of-way during this survey. Previous recording efforts have determined the site eligible for inclusion in the NRHP, and Geo-Marine, Inc. (GMI), agrees with that eligibility recommendation.

3.3.2.2.1.3 Site 41EP2612

Previously recorded site 41EP2612 is a ceramic and lithic artifact scatter with fire-cracked rock features (Figure 3.10 and Appendix C). The site is located approximately 300 meters south of the North/South Freeway, approximately 700 meters south of the Painted Dunes Golf Course, and approximately 25 meters east of the Western Greenbelt Levee Dam (Figure 3.10). The site is on level ground at an elevation of 3,965 feet amsl. Site 41EP2612

measures approximately 2,100 m^2. Vegetation on the site includes creosote, cholla cactus, broom snakeweed, and grasses.

Figure 3.10. Site 41EP2612, facing west showing greenbelt levee.

Site 41EP2612 was originally recorded by the El Paso Archaeological Society between 1981 and 1983. The El Paso Centennial Museum updated the site in 1985 during the North/South Freeway and greenbelt survey (TARL files), and the last update was conducted by New Mexico State University (Miller 1987). Previous recording of 41EP2612 indicated that the site was a scatter of lithic and ceramic artifacts with two fire-cracked rock features. Ceramics on the site include Mimbres Black-on-white, El Paso Polychrome, El Paso Brown, Chupadero Black-on-white, and corrugated wares. Two mano fragments and flaked stone tools also were present.

The 1987 recording indicated similar quantities and types of artifacts, but five fire-cracked rock features were observed instead of two. The 1987 recording recommended the site as eligible for inclusion in the NRHP. This site also is listed as a Texas State Archeological Landmark.

During the current survey, a deflated and scattered hearth feature with associated lithics and El Paso brownware sherds was found. A barbed-wire fence surrounds the site, which is likely associated with previous construction projects. GMI agrees with the previous recommendation and considers the site eligible for inclusion in the NRHP.

3.3.2.2.2 Historic Resources

One isolated historic occurrence, a historic beer can that was made between 1935 and 1962, was observed during the survey. This artifact was located at the corner of NM 404 and Martin Luther King, Jr., Boulevard/NM 213.

3.3.2.2.3 Paleontological Resources

No significant paleontological resources are known to exist within this area.

3.3.2.2.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.2.3 Canutillo Aqueduct (Alternatives A, B, C, D, and E)

The Canutillo Aqueduct is proposed to be constructed between the Upper Valley Water Treatment Plant and the existing Canutillo Booster Pump Station (see Map 1.1). The pipeline will be constructed along the eastern side of nine miles of the existing Vinton Canal drain (Bosque Road), approximately six miles of which are located on private land. A vehicle and pedestrian reconnaissance of the area was conducted, and an intensive pedestrian survey will be conducted after plans are finalized. A 50-foot right-of-way corridor is proposed for the pipeline.

The drain is located in developed agricultural lands of the Rio Grande valley within one-half mile of the river. No sites have been previously located within one mile of the proposed aqueduct.

3.3.2.3.1 Prehistoric Resources

No prehistoric resources were observed along the proposed corridor.

3.3.2.3.2 Historic Resources

No historic resources were observed along the proposed corridor.

3.3.2.3.3 Paleontological Resources

No paleontological resources are known to exist within this area.

3.3.2.3.4 Ethnographic Resources

No ethnographic resources are known to exist within this area.

3.3.3 Rio Grande Flows

This project may periodically affect the volume flow of the Rio Grande. No physical modification to existing dam structures is planned.

3.3.3.1 Elephant Butte Dam (Alternatives A, B, C, D, and E)

Elephant Butte Dam is a feature of the Elephant Butte Historic Irrigation District and is listed in the NRHP as a site and as part of the district. No direct impacts are proposed for this location.

3.3.3.2 Caballo Dam (Alternatives A, B, C, D, and E)

Caballo Dam is listed in the State Register of Historic Properties, and is eligible for inclusion in the NRHP. No direct impacts are proposed for this location. Consultation with the New Mexico SHPO, EBID, USIBWC, and other applicable agencies must be completed if water levels are projected to exceed current maximums.

3.3.3.3 River Reaches (Alternatives A, B, C, D, and E)

The Rio Grande reaches are defined as the space between the flood levees including the river. No direct impacts are proposed for this location.

3.3.4 Aquifer Storage and Recovery (Alternatives A, B, C, D, and E)

The proposed Aquifer Storage and Recovery (ASR) is designed to store and later recover a blend of treated surface water and native ground water through pumping into the Hueco Bolson Aquifer. This portion of the project is still in the design phase, and no archaeological survey work was conducted. However, a records search was conducted to aid in planning. An archaeological survey must be conducted in the proposed project areas when well field locations are finalized.

The proposed ASR consists of 71 one-acre wellhead locations and approximately 29 miles of 100 foot wide right-of-way corridor for the water transmission lines. The ASR is grouped into three areas: north, central, and south (see Map 1.1). The north area is located immediately east and south of the Newman Electric Plant, and situated just east of Martin Luther King Boulevard. The central area is located between the North/South Freeway and Railroad Drive. The south area is located along Loop 375, and east of Biggs Army Airfield and El Paso International Airport.

3.3.4.1 Northern Area

Previous research within the northern area has been limited. Three sites have been documented within one-half mile of proposed injector wells. Site density in this area is predicted to range between 5 and 10 sites per square mile. This area is situated on lower alluvial fans, and the environment consists of creosote, tarbush, and grassland.

3.3.4.2 Central Area

Previous research within the central area has been extensive. The majority of the sites documented in this area are a result of the Northeast El Paso Flood Control Project. Thirty-five sites have been found within one-half mile of proposed injector wells. Site density

within this area ranges between 10 and 15 sites per square mile. This area is located within a grassland/mesquite-stabilized dune environment.

3.3.4.3 Southern Area

Previous research within the southern area has been extensive, especially within Fort Bliss Military Reservation and along Texas State Highway 375 (O'Laughlin and Martin 1993; Whalen 1977).

Approximately 100 sites have been recorded within one-half mile of the proposed injector wells. Site density in this area ranges between 5 and 40 sites per square mile. This area is located within a grassland/mesquite-stabilized dune environment.

3.3.4.4 Summary of Aquifer Storage and Recovery

It should be noted that although numerous sites have been recorded in the vicinity, it does not mean that the same site density occurs in the project area. It is not possible to fully assess the cultural resource data for the ASR until a Class III archaeological survey is undertaken. The environment in which these sites are located affects detection during survey. Within the mesquite-stabilized dune areas, shifting sands cover and uncover artifacts and features, affecting site size and shape, and changing quantities of visible artifacts. In grassland areas, sites are obscured by dense grasses during certain portions of the year. Moreover, some sites may have been destroyed by the expansion of residential and commercial development of El Paso.

3.3.5 Diversion Structures

Up to four 2-acre diversion structures may be constructed. No data are available for diversion structures.

3.3.6 Water Transmission Lines

Water transmission lines will be constructed to provide water from the water treatment plants to surrounding communities. In the Hatch area, water lines will be constructed to the towns

of Salem and Rincon, New Mexico. From the proposed Anthony Water Treatment Plant, water lines will be constructed to the towns of Vado, Berino, and Chamberino. When design specifications are completed, the transmission lines would be subjected to archaeological survey.

3.3.7 Land Conversion

No data are available for land conversion.

3.3.8 Fish and Wildlife Enhancements

Fish and wildlife enhancements are proposed for the Rio Bosque park, located immediately southeast of the Jonathan Rogers Water Treatment Plant. No previously recorded sites have been documented in this area. This location would be subjected to pedestrian cultural resources inventory when plans for the area are finalized.

4.0 Environmental Consequences: Management Recommendations

The archaeological survey was performed within definable areas to identify new as well as previously recorded cultural resources in the project area (Table 4.1) in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended); Advisory Council on Historic Preservation regulation 36 CFR Part 800; the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990; the New Mexico State Burial Law; and cultural resources requirements of the National Environmental Policy Act (NEPA) of 1969. It also is probable that the U.S. Army Corps of Engineers (CE), under Section 404 Permit requirements, will have to comment on the cultural resources within the project area.

With the exception of the No Action Alternative, no perceivable differences between the alternatives could be identified, as all of the NRHP-eligible sites are located within project features of the Proposed Action and all Action Alternatives.

4.1 Water Treatment Plants

All of the proposed water treatment plants and associated ponds are located within the Rio Grande valley, where thousands of years of flooding and 150 years of agricultural use have buried or destroyed the prehistoric and early historic surface manifestations (see Map 1.1 and Appendix C). If subsurface cultural remains are discovered during the construction, the discovery plan, as described in Section 2.3.3.1.2 should be followed.

4.1.1 Hatch Water Treatment Plant (Alternatives A, B, C, D, and E)

The proposed Hatch Water Treatment Plant was not surveyed because it is located on private land and not specifically defined. The 100-acre, general locational area was visually inspected from various roads. The remnant of one historic period adobe garage was located on the western boundary of the defined property. Eligibility recommendations for inclusion in the National Register of Historic Places (NRHP) were not made regarding the building remains. Once the Hatch Water Treatment Plant location is defined, a Class III

archaeological survey should be conducted. NRHP eligibility determinations must be generated for all sites within the area.

Table 4.1
Identified Cultural Resources and Recommendations

Area	Alternatives	Cultural Resources Identified/ Management Concerns	Recommendations/ NRHP Criteria
Water Treatment Plants			
Hatch WTP	A,B,C,D,E	Private land, potential historic structure on west side of proposed area.	Class III survey and documentation once survey area is determined.
Leasburg WTP	A,B,C,D,E	One prehistoric site, LA 128798 discovered.	Consult with NM SHPO**. Avoid site LA128798. Monitor area for subsurface resources during construction.
Las Cruces WTP	A,B,C,D,E	Private land, no known cultural resources in vicinity of proposed site.	Class III survey and documentation once survey area is determined.
Anthony WTP	A,B,D	No surface cultural resources identified.	
Upper Valley WTP	A,B,C,D,E	1930s historic house and wellhouse documented.	House not considered eligible for NRHP.
Jonathan Rogers WTP	A,B,C,D,E	Area not determined.	
Aqueducts			
New Mexico-Texas	D,E	Eight previously recorded sites were located within one mile of project corridor. One site, LA 129236, observed within project corridor.	Site LA 129236 not considered eligible for inclusion in NRHP.
El Paso	A,B,C,D,E	Newly recorded LA 127219 discovered at Anthony Gap Booster Pump Station, 41EP14 located west of Newman power plant, 41EP2612 located south of US 54 in greenbelt area within ROW. A one mile section of survey south of Newman power plant not clearly identified.	LA 127219 not considered eligible for NRHP. 41EP14 eligible for NRHP (Criterion D); consult with TX SHPO**. 41EP2612 eligible for NRHP (Criterion D); avoid site and/or consult with SHPO. Resurvey and document unclear area after better definition of ROW is provided. Monitor all sites and areas outside floodplain for potential subsurface artifacts/features in the ROW.
Westside Regulating Reservoir	D,E	Previously recorded LA 854 updated; eligible for NRHP. Area chosen for storage ponds will avoid site.	Monitor area for subsurface resources during construction.

Table 4.1
Identified Cultural Resources and Recommendations

Area	Alternatives	Cultural Resources Identified/ Management Concerns	Recommendations/ NRHP Criteria
Canutillo	A,B,C,D,E	No cultural resources identified. Portions unsurveyed because of private land. Class III survey and documentation once project area is determined	
Rio Grande Flows			
Elephant Butte Reservoir	A,B,C,D,E	Changes to river flows	No recommendation.
Caballo Reservoir	A,B,C,D,E	Changes to river flows	No recommendation.
Aquifer Storage and Recovery	A,B,C,D,E	Planning stages; between 5 and 30 sites per square mile in the three areas.	Class III survey and documentation, consultation with TX SHPO** and Fort Bliss when precise areas are identified.
Diversion Structures	A,B,C,D,E	No Data	No Data.
Land Conversion	No Data	No Data	No Data
Fish and Wildlife Enhancements	No Data	No Data	No Data

*ROW=Right-of-way
**SHPO= State Historic Preservation Officer

4.1.2 Leasburg Water Treatment Plant (Alternatives A, B, C, D, and E)

A total of 65 acres was subjected to a Class III survey for the proposed Leasburg Water Treatment Plant. One site (LA 128798) was documented during this survey. This site is a prehistoric artifact scatter that is considered eligible for inclusion in the NRHP under Criterion D. Avoidance of this site is recommended. If the site cannot be avoided, then a treatment plan would be implemented in consultation with the New Mexico SHPO.

4.1.3 Las Cruces Water Treatment Plant (Alternatives A, B, C, D, and E)

This location has not been defined, and no archaeological work has been conducted.

4.1.4 Anthony Water Treatment Plant (Alternatives A, B, and D)

A total of 76.5 acres was subjected to a Class III archaeological survey for the proposed Anthony Water Treatment Plant. No cultural resources were observed.

4.1.5 Upper Valley Water Treatment Plant (Alternatives A, B, C, D, and E)

Approximately 233 acres were subjected to a Class III archaeological survey for the proposed Upper Valley Water Treatment Plant. No prehistoric resources were observed. One house and an associated well house constructed in the 1930s were recorded. The house was documented by completing a Texas Historic Sites Inventory Form. Based on archival research, this house is not considered eligible for inclusion in the NRHP because it does not meet any of the criteria. No other cultural resources were observed in this area. Concurrence with GMI's findings by the Texas SHPO must be obtained prior to the destruction of the structures. This water treatment plant is located in the Rio Grande floodplain. Although much of this area has been significantly modified, buried cultural resources may potentially be found.

4.1.6 Westside Regulating Reservoir (Alternatives D and E)

There was one prehistoric site (LA 854) within the 75 acres surveyed, but no historic period resources were observed. Site LA 854 is eligible for inclusion in the NRHP under Criterion D. The project area was refined to a 22-acre locale after the initial survey was completed. The 22-acre plot avoided LA 854 and did not contain any cultural resources (see Appendix C). If changes in reservoir design will impact site LA 854, an appropriate treatment plan should be developed prior to any ground-disturbing activities. A proposed chain link fence to surround the ponds may cause a visual impact to the Mesilla Diversion Dam, but no direct impacts will occur. Because the area of proposed construction is covered with dense vegetation, an archaeological monitor would be present during ground-disturbing activities to stop construction if any subsurface cultural remains are unearthed, protect the remains, and consult with the federal and state agencies regarding their significance and treatment.

4.1.7 Jonathan Rogers Plant (Alternatives A, B, C, D, and E)

It is proposed to expand the existing Jonathan Rogers Water Treatment Plant by 25 acres to an area immediately south of the plant. As the area surrounding the plant has been bladed, it is unlikely that cultural resources will be affected.

4.2 Aqueducts

Two of the three proposed aqueducts—New Mexico-Texas and Canutillo—are located within the Rio Grande valley. The third, the El Paso Aqueduct, is partially located within the floodplain. Thousands of years of flooding and agricultural use of this area have buried or destroyed the prehistoric or early historic surface manifestations. However, flooding events may have left subsurface artifacts and features intact. Although much of this area has been significantly modified, there is potential for buried cultural resources. GMI recommends that an archaeological monitor be present during initial ground-disturbing activities to record any subsurface cultural remains that are unearthed.

4.2.1 New Mexico-Texas Aqueduct (Alternatives D, E)

Approximately 25 miles of proposed pipeline right-of-way were subjected to a Class III archaeological survey for the New Mexico-Texas Aqueduct. Site LA 129236, consisting of two concrete foundations, was discovered during the survey. This site is not considered eligible for inclusion in the NRHP. Four migrant worker buildings were observed just outside the proposed right-of-way. The buildings were not documented because they are on private land. If final design indicates the buildings may be impacted, landowners should be contacted so that the migrant farm quarters can be documented.

4.2.2 El Paso Aqueduct (Alternatives A, B, C, D, and E)

Approximately 26 miles of proposed pipeline right-of-way were subjected to a Class III archaeological survey for the El Paso Aqueduct. Previously recorded sites 41EP14 and 41EP2612, and one newly recorded site, LA 127219, were located within the proposed pipeline corridor. An approximate one mile long, east-west section of the proposed pipeline,

located just south of the Newman Power Plant, crosses open ground. A 100-foot-wide area was intensively surveyed within this portion of the right-of-way. No cultural resources were observed in this area. However, the exact location of the proposed right-of-way within this one-mile segment should be subjected to archaeological survey when plans are finalized. Specific recommendations for sites documented within the entire right-of-way are listed below.

Site 41EP14 is a prehistoric artifact scatter that is eligible for inclusion in the NRHP under Criterion D. The site is located just west of the Newman Power Plant in northeast El Paso. This site is bisected by Martin Luther King, Jr., Boulevard. The pipeline is proposed to be constructed in the road right-of-way, within a bar ditch that has been cut approximately 1 meter below the ground surface, and thus below the cultural level. Therefore, the potential for impacts to occur is low. However, GMI recommends that a monitor be present during ground-disturbing activities to ensure the installation is conducted within previously disturbed areas; this recommendation will require consultation with the Texas Historical Commission prior to construction.

Site 41EP2612 is a prehistoric artifact scatter that is eligible for inclusion in the NRHP under Criterion D and is listed as a Texas State Archeological Landmark. The site is located in the greenbelt zone south of US 54, just south of Painted Dunes Golf Course. The proposed pipeline will cross the site's western boundary. Avoidance of this site is recommended by moving the pipeline route to the west by 50 feet and monitoring the pipe installation. If the site cannot be avoided, then a treatment plan would be developed in consultation with the Texas SHPO.

LA 127219 is a prehistoric artifact scatter. It is located in the area proposed for the Anthony Gap Booster Pump Station. Based on the surface assemblage, the site is not considered eligible for inclusion in the NRHP. However, construction of the pump station should be monitored during initial ground-disturbing activities.

4.2.3 Canutillo Aqueduct (Alternatives A, B, C, D, and E)

Approximately nine miles of proposed aqueduct right-of-way were reconnaissance surveyed for the Canutillo Aqueduct. Several portions of this proposed right-of-way are located on private land and could not be examined. No cultural resources were identified within the surveyed portion of the survey area. The private land areas must be examined prior to construction.

4.3 Rio Grande Flows

River flows from the Rio Grande are expected to fluctuate, but not beyond current limits. It is recommended that, if flow fluctuations are expected to exceed the current maximum levels of Elephant Butte and Caballo reservoirs, or the river reaches, the New Mexico SHPO, USIBWC, USBR, EBID, and other applicable agencies be consulted prior to any change.

4.4 Aquifer Storage and Recovery/Injector Wells (Alternatives A, B, C, D, and E)

Based on a file search conducted at the Texas Archeological Research Laboratory (TARL), high densities of previously recorded sites have been documented within the proposed aquifer storage and recovery locations. Intensive archaeological survey and documentation must be conducted within the project boundaries prior to construction of these facilities.

4.5 Diversion Structures (Alternatives A, B, C, D, and E)

No data are available for diversion structures.

4.6 Water Transmission Lines

No impacts have been identified for the proposed water transmission lines.

4.7 Land Conversion (Alternatives A, B, C, D, and E)

No data are available for land conversion.

4.8 Fish and Wildlife Enhancements (Alternatives A, B, C, D, and E)

Fish and wildlife enhancements are planned for the Rio Bosque Park, located between the Jonathan Rogers Plant and the Soccoro Ponds. Prior to alteration of this area, cultural resources surveys must be conducted.

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APPENDIX A

Texas Historic Building Form

APPENDIX B

Legal Description of the Project Area

Quad Name	Location	T	R	Section	1/4	1/4	1/4	UTM Easting	UTM Northing
	Hatch WTP								
Rincon, NM	NW Corner	19s	3W	10	NE	NE	SE	300420	3616420
Rincon, NM	SW Corner	19s	3W	10	SE	SE	SE	300420	3615920
Rincon, NM	NE Corner	19s	3W	11	NE	NE	SW	301270	3616400
Rincon, NM	SE Corner	19s	3W	11	SE	SE	SW	301270	3615900
	Leasburg WTP								
Leasburg, NM	*NW Corner 1*	21s	1E	19	NE	SW	NW	322650	3594000
Leasburg, NM	*SW Corner 2*	21s	1E	19	SW	SW	NW	322650	3593750
Leasburg, NM	*NE Corner 3*	21s	1W	24	SE	SE	NE	322450	3593750
Leasburg, NM	*SE Corner 4*	21s	1W	24	SE	NE	SE	322560	3593220
Leasburg, NM	*Corner 5*	21s	1E	19	SW	SW	SW	322750	3592780
Leasburg, NM	*Corner 6*	21s	1E	19	SE	SE	SW	323390	3592780
	Las Cruces WTP								
Las Cruces, NM	*NW Corner*	23s	1E		unplatted			328410	3754650
Las Cruces, NM	*NE Corner*	23s	1E		unplatted			329600	3574600
Las Cruces, NM	*SW Corner*	23s	1E		unplatted			329300	3573450
Las Cruces, NM	*SE Corner*	23s	1E		unplatted			329950	3573390
	Anthony WTP								
La Mesa, NM	NW Corner	26s	3E	6	NW	NE	SE	342330	3549820
La Mesa, NM	SW Corner	26s	3E	6	SW	SE	SE	342330	3549030
La Mesa, NM	NE Corner	26s	3E	6	NE	NE	SE	342740	3549780
La Mesa, NM	SE Corner	26s	3E	6	SE	SE	SE	342740	3549000
	Upper Valley WTP								
La Union NM-TX	UTM Corner 1		unplatted					345820	3539810
La Union NM-TX	UTM Corner 2		unplatted					346280	3539920
La Union NM-TX	UTM Corner 6		unplatted					346220	3538640
Canutillo TX-NM	UTM Corner 3		unplatted					347120	3538900
Canutillo TX-NM	UTM Corner 4		unplatted					346910	3538630
Canutillo TX-NM	UTM Corner 5		unplatted					347000	3558610
	Westside Regulating Reservoir								
Black Mesa, NM	NW Corner	24s	1E	13	NW	NW	NW	330200	3566910
Black Mesa, NM	SW Corner	24s	1E	13	NW	SW	NW	330180	3566380
Black Mesa, NM	NE Corner	24s	1E	13	NE	NW	NW	330460	3566900
Black Mesa, NM	SE Corner	24s	1E	13	NE	SE	NW	330840	3566410
	NM-TX Aqueduct								
La Union NM-TX	BOL	27s	3E		unplatted			346090	3538920
La Union NM-TX	Bend-1	27s	3E		unplatted			345910	3538880
La Union NM-TX	Bend-2	27s	3E		unplatted			345880	3538960
La Union NM-TX	Bend-3	27s	3E		unplatted			344930	3538900
La Union NM-TX	Bend-4	27s	3E		unplatted			344600	3540640
La Mesa, NM	Bend-5	26s	3E		unplatted			343660	3541580
La Mesa, NM	Bend-6	26s	3E		unplatted			343160	3543640
La Mesa, NM	Bend-7	26s	3E		unplatted			342300	3544780
La Mesa, NM	Bend-8	26s	3E	7	NE	SW	SE	342200	3547780
La Mesa, NM	Bend-9	26s	3E	7	SE	NE	SE	342600	3547890
La Mesa, NM	Bend-10	26s	3E	7	NW	NE	SE	342470	3548300
La Mesa, NM	Bend-11	26s	3E	7	SW	SW	NE	342050	3548240
La Mesa, NM	Bend-12	26s	3E	*7	NE	NW	NW	341130	3549180
La Mesa, NM	Bend-13	26s	2E	*1	SE	SE	SE	340100	3549190
La Mesa, NM	Bend-14	25s	2E	36	SE	SE	SW	340230	3550740
La Mesa, NM	Bend-15	25s	2E	24	NE	SW	SW	340010	3554140
La Mesa, NM	Bend-16	25s	2E	24	SW	SW	NW	339590	3554680
San Miguel, NM	Bend-17	25s	2E		unplatted			339600	3556080
San Miguel, NM	Bend-18	25s	2E		unplatted			338940	3556760
San Miguel, NM	Bend-19	25s	2E		unplatted			338970	3557260
San Miguel, NM	Bend-20	25s	2E		unplatted			338410	3558300

Quad Name	Location	T	R	Section	1/4	1/4	1/4	UTM Easting	UTM Northing
San Miguel, NM	Bend-21	24s	2E	unplatted				338000	3558330
San Miguel, NM	Bend-22	24s	2E	unplatted				337200	3560240
San Miguel, NM	Bend-23	24s	2E	unplatted				335730	3560280
Black Mesa, NM	Bend-24		unplatted					334800	3562100
Black Mesa, NM	Bend-25		unplatted					334310	3562220
Black Mesa, NM	Bend-26		unplatted					332750	3564220
Black Mesa, NM	Bend-27		unplatted					332600	3564230
Black Mesa, NM	EOL		unplatted					330710	3566620
	El Paso Aqueduct								
Canutillo, TX-NM	BOL	27s	3E	10		unplatted		347020	3538580
Canutillo, TX-NM	Bend-1	27s	3E			unplatted		347580	3538560
Canutillo, TX-NM	Bend-2	27s	3E			unplatted		347620	3538620
Canutillo, TX-NM	Bend-3	27s	3E			unplatted		348400	3538620
Canutillo, TX-NM	Bend-4	27s	3E			unplatted		348400	3538480
Canutillo, TX-NM	Bend-5		unplatted					350460	3538580
Canutillo, TX-NM	Bend-6		unplatted					350450	3538720
Canutillo, TX-NM	Bend-7		unplatted					350600	3538730
Canutillo, TX-NM	Bend-8		unplatted					350620	3539850
Canutillo, TX-NM	Bend-9		unplatted					352330	3539840
Anthony, NM-TX	Bend-10	26s	4E	32	NW	NW	SW	352280	3541460
Anthony, NM-TX	Bend-11	26s	4E	29	SE	NE	SW	353060	3542900
Anthony, NM-TX	Bend-12	26s	4E	28	SW	SW	SE	354800	3542440
Anthony, NM-TX	Bend-13	26s	4E	28	SW	SW	SE	354820	3542500
Anthony, NM-TX	Bend-14	26s	4E	33	NE	NE	NE	355440	3542300
Anthony, NM-TX	Bend-15	26s	4E	27	SW	NW	SW	355660	3542780
Anthony, NM-TX	Bend-16	26s	4E	27	SE	NE	SE	356920	3542780
Newman SW NM-TX	Bend-17	26s	5E	19	SE	NE	NE	361860	3545090
North Franklin Mountain, TX	Bend-18		unplatted					363680	3537460
North Franklin Mountain, TX	Bend-19		unplatted					365370	3537450
North Franklin Mountain, TX	Bend-20		unplatted					367380	3535580
North Franklin Mountain, TX	Bend-21		unplatted					367340	3535590
North Franklin Mountain, TX	Bend-22		unplatted					368140	3532610
North Franklin Mountain, TX	Bend-23		unplatted					368280	3532610
North Franklin Mountain, TX	Bend-24		unplatted					368790	3532320
North Franklin Mountain, TX	Bend-25		unplatted					368790	3531270
North Franklin Mountain, TX	Bend-26		unplatted					369050	3531030
North Franklin Mountain, TX	EOL Railroad Dr.		unplatted					368700	3530140
	Vinton Booster Pump Station								
Canutillo, TX-NM	NW Corner		unplatted					350280	3538430
Canutillo, TX-NM	NE Corner		unplatted					350450	3538430
Canutillo, TX-NM	SW Corner		unplatted					350280	3538210
Canutillo, TX-NM	SE Corner		unplatted					350450	3538210

Quad Name	Location	T	R	Section	1/4	1/4	1/4	UTM Easting	UTM Northing
	Anthony Gap Booster Pump Station								
Anthony NM-TX	NW Corner	26s	4E	29	NE	SE	SE	353520	3542700
Anthony NM-TX	SW Corner	26s	4E	29	SE	SW	SE	353410	3542520
Anthony NM-TX	NE Corner	26s	4E	29	NE	SE	SE	353750	3542570
Anthony NM-TX	SE Corner	26s	4E	29	SW	SE	SE	353660	3542400
	Anthony Gap Summit Reservoir								
Anthony NM-TX	NW Corner	26s	4E	27	NE	NW	SE	356560	3543000
Anthony NM-TX	NE Corner	26s	4E	27	NW	NE	SE	356840	3543000
Anthony NM-TX	SW Corner	26s	4E	27	SE	NW	SE	356560	3542780
Anthony NM-TX	SE Corner	26s	4E	27	SW	NE	SE	356830	3542820
	Canutillo Aqueduct								
Canutillo, TX-NM	BOL	27s	3E		unplatted			348200	3532900
Canutillo, TX-NM	Bend-1	27s	3E		unplatted			348060	3532900
Canutillo, TX-NM	Bend-2	27s	3E		unplatted			347570	3533830
Canutillo, TX-NM	Bend-3	27s	3E		unplatted			347600	3536910
Canutillo, TX-NM	Bend-4	27s	3E		unplatted			347360	3536910
Canutillo, TX-NM	Bend-5	27s	3E		unplatted			347370	3537650
Canutillo, TX-NM	EOL	27s	3E		unplatted			347010	3538590

*Irregular Section

APPENDIX C

Project Area and Site Maps

(maps may be removed to protect archaeological site locations)

APPENDIX D

Letters to Native American Groups

APPENDIX E

Letter from Texas Water Development Board and State Historic Preservation Officers