- Executive Order 11991, Protection and Enhancement of Environmental Quality, March 5, 1970 (35 FR 4247);
- Populations and Low-Income Populations, February 11, 1994 (59 FR 7629);
- Executive Order 13007, Indian Sacred Sites, May 24, 1996 (61 FR 26771); and
- Executive Order 13112, Invasive Species, February 3, 1999 (64 FR 6183).

1.6 Document Organization

This EA consists of eight chapters. Chapter 1 describes the purpose of and need for the Proposed Action, cooperating agencies, project background, related and ongoing activities, and a summary of issues. Chapter 2 describes the process used to formulate alternatives, the alternatives considered in detail, the alternatives considered but eliminated from detailed study, and the proposed action. Chapter 2 also includes a description of Ute Reservoir and a summary comparison of alternatives and impacts. Chapter 3 describes the current condition of resources within the Project Area that could be affected by the alternatives. Chapter 4 describes and analyzes the environmental impacts of the alternatives on Project Area resources. Chapter 5 describes relevant past, present, and reasonably foreseeable actions and their cumulative impacts on Project Area resources. Chapter 6 describes the scoping and public participation process that was conducted during preparation of this EA. Chapter 6 also describes coordination with federal, state, and local agencies; Native American groups; and private organizations. Chapter 7 provides a list of referenced material for the EA. Chapter 8 provides a list of individuals who prepared the EA

Chapter 2. Alternatives

Chapter 2 presents the alternatives analyzed in this EA: the No Action Alternative – in which federal funding would not be appropriated for construction of the Project and ground water use would continue as it has in the past; and the Proposed Action Alternative (Proposed Action) – in which a pipeline project including raw water intake, conveyance, and storage; water treatment; and finished water storage and conveyance would be funded and constructed. Chapter 2 also describes alternatives considered but eliminated.

2.1 No Action Alternative

NEPA requires analysis of a “No Action” alternative (Council on Environmental Quality (CEQ) Guidelines 1502.14). No Action does not necessarily require continuation of current conditions or the status quo, but rather a reasonable projection of future conditions or actions that would

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occur if the Proposed Action is not implemented. The No Action Alternative is described below and will be analyzed along with the Proposed Action to provide a basis for comparison.

2.1.1 Current M&I Water Supply

All Participating Communities currently rely on ground water from the Ogallala aquifer for their M&I water supply. Overall, total demand on the aquifer (including agricultural demand) is much greater than aquifer recharge, as shown in declining water levels throughout the aquifer (Figure 3). As water levels in the aquifer decline, less water can be pumped out. Well production rates also decline and wells eventually become too expensive to operate given the amount of water they are able to produce.

As discussed in more detail in Chapter 1, the ability of the Participating Communities to provide a reliable M&I water supply is currently or will soon be limited by declining ground water levels in the Project Area.

2.1.2 No Action Alternative

If federal funding is not appropriated or approved for Project construction, the Participating Communities would continue to use the Ogallala aquifer as their only water source. Some communities have opportunities for joint projects due to their proximity (e.g., Clovis and Texico). Most communities see an urgent need for alternative water sources within the next 5 to 10 years, with complete depletion of existing sources within about 40 years. Individual community options for the No Action Alternative are summarized below. Roosevelt County has transferred its water reservations in Ute Reservoir to Portales. Curry County may transfer its reservation to one of the communities within its boundaries. Neither Curry nor Roosevelt county is currently a direct water provider and does not anticipate taking on that role (Pyle, pers. comm. 2008; Hardin, pers. comm. 2008). According to best available information, the ground water resources in the Project Area will be depleted within about 40 years. The No Action Alternative does not meet the purpose and need for the Project in that it does not provide "a long-term sustainable water supply" for the Participating Communities.

For purposes of this EA, the No Action Alternative assumes a continuation of existing conditions in Ute Reservoir. However, in the absence of the Project, the State would likely pursue other purchasers for Ute Reservoir water.

Clovis. Clovis' M&I water system is owned and operated by NMAW. Other than ground water, Clovis has no reasonable options for M&I water supply except for the Proposed Action. Like Texico, NMAW purchases and retires agricultural lands, and converts those water rights to M&I

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uses. The need for new purchases and additions of new wells to the system is continuous; each new well loses capacity and must be replaced about every 4 years. NMAW has purchased land and water rights for a new well field south of Clovis that will be drilled sometime in the next 10 years. It may be possible to complete a joint water supply project with Texico, CAFB, and Portales; but no formal discussions have taken place (Wright, pers. comm. 2008).

Elida. Elida's current water supply (ground water wells) is located about 11 miles south of town. The need for an alternate water source will be urgent within about 10 years, because the water table in the Elida area is shallower than other parts of the aquifer. Other than ground water, Elida has no reasonable options for M&I water supply except for the Proposed Action. Joint projects with nearby communities are not under discussion, and likely are not an option due to the community's remote location (Nuckols, pers. comm. 2008).

Grady. Grady plans to drill additional ground water wells as needed to supplement the existing well for M&I water supply. However, Grady is a small community with low water demand and a fairly stable water table in its well. Grady has not experienced declines in its water table or well capacity in the past 6 years (Shafer, pers. comm. 2008).

Melrose. Melrose operates a well for its M&I water. Other than ground water, Melrose has no reasonable options for M&I water supply except for the Proposed Action. Additional ground water wells could be drilled; however, Melrose is not currently seeking alternative well sites or agricultural water transfer. The need for an additional water supply is immediate; on hot days, the existing water supply is often inadequate. Joint projects with nearby communities are not under discussion (Bostwick, pers. comm. 2008).

Portales. The Proposed Action would provide about 60 percent of Portales' projected water needs. In the absence of the Project, Portales would continue to drill additional wells on lands already owned by the city. Portales would continue to purchase and transfer additional agricultural land and water rights according to its 40-year plan (Wilson 2004). Portales would potentially move more aggressively on some of its existing plans and research, including complete water reuse and options for deep ground water desalination. Joint projects with nearby communities are not under discussion (Ortega, pers. comm. 2008).

Texico. Texico would continue its existing strategy for M&I water supplies, which includes purchasing agricultural land and water rights, converting them to M&I purposes, and tying them into the water system. Other than ground water, Texico has no reasonable options for M&I water supply except for the Proposed Action. Currently, Texico needs to drill new wells approximately

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every 5 years to maintain an adequate water supply. Therefore, land and water right purchase must take place about every 5 years. Major concerns for Texico include water quality declines and the rising cost and availability of using ground water for M&I water supply. Texico indicated that it may be possible to complete a joint water supply project with Clovis, but no formal discussions have taken place (Cooper, pers. comm. 2008).

CAFB. CAFB's existing system of six wells provides drinking water, irrigation water, and nonpotable water for other CAFB activities. Normally CAFB operates only two of its six wells, which have adequate capacity to meet water demands. Because of the size of CAFB, other wells could be permitted and drilled. CAFB has no other reasonable options for drinking water other than ground water except for the Proposed Action. Ground water levels appear to be dropping 2 to 3 feet per year and unquantified drops in production also have occurred. Options for using deep brackish ground water also have been discussed, but no research has been completed to date. It may be possible to complete a joint water supply project with Clovis, but no formal discussions have taken place (Rebman, pers. comm. 2009).

In summary, the No Action Alternative would require the Participating Communities to continue to upgrade the existing ground water supply system by drilling new wells, purchasing and converting existing agricultural wells and water rights, constructing new water treatment facilities, and investing in other infrastructure.

2.2 Proposed Action

Under the Proposed Action, Reclamation would transfer funds appropriated by Congress to the ENMRWA. The ENMRWA would use federally-appropriated funds to construct a peak-day 30-million-gallons-per-day (mgd) delivery system from the Ute Reservoir to the Participating Communities. Design information for the Proposed Action was taken from Preliminary Engineering Reports completed by CH2M HILL in 2006; and 30 percent design documents completed in 2007, 2008, and 2009. The major system components include the following (Figure 5 and Figure 6):

- Raw water intake, conveyance, and storage;
- Water treatment; and
- Finished water storage and conveyance.

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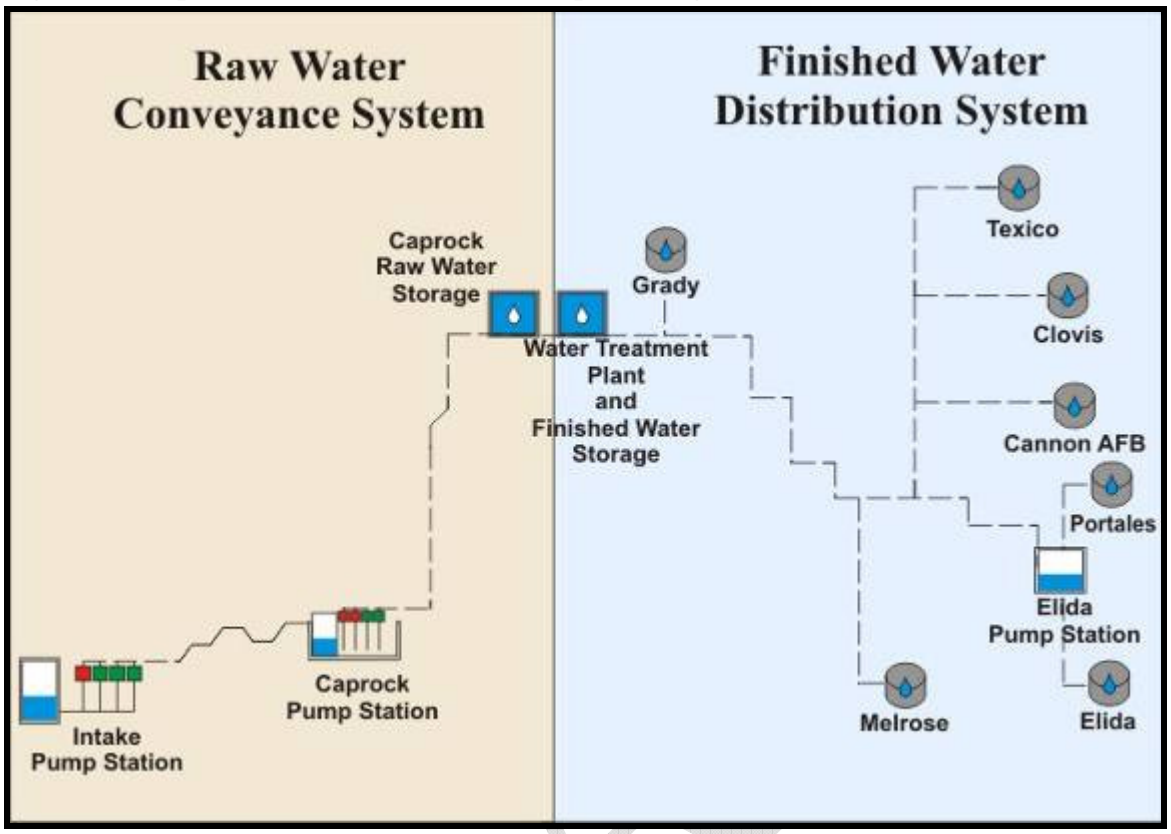
Figure 5. Proposed Action Alternative Conceptual Diagram.



Source: Adapted from CH2M HILL 2006a.

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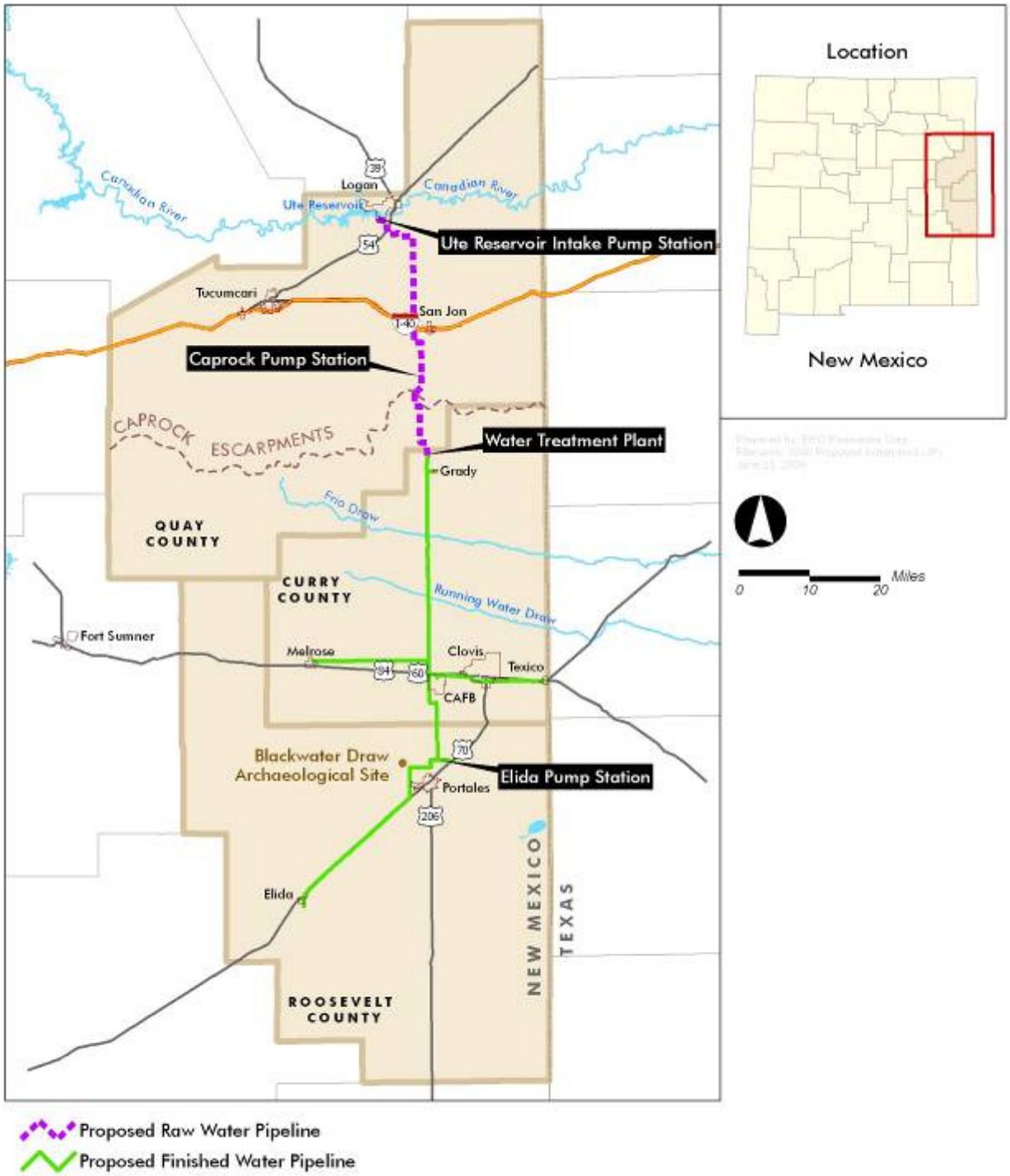
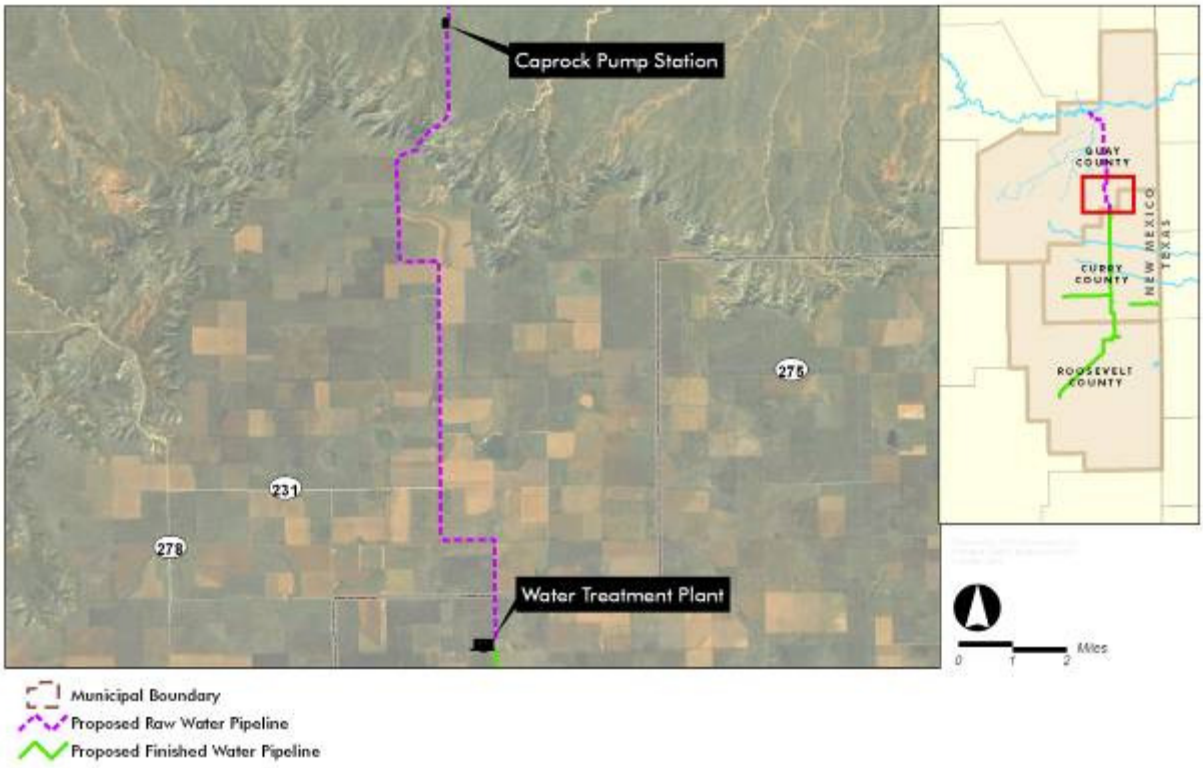
Figure 6. Proposed Action Location.



The Proposed Action would include raw water storage at two locations (Caprock pump station and the top of the Caprock escarpment (the Caprock)) and finished water storage at the water treatment plant (WTP), with a 30-mgd peak-day capacity. Ute Reservoir would act as the intake pump station forebay (Figure 7). The Participating Communities would use their existing finished water storage facilities for final storage. Pump stations would be located at the reservoir and at the base of the Caprock to convey raw water to the WTP (Figure 8). A small pump station would lift finished water to Elida. The type and size of conveyance piping would vary, with large diameter pipes for mainline conveyance (42- to 48-inch) down to 4- to 12-inch lateral lines for delivery to each Participating Community. Major highways and railroad crossings would be constructed by boring (auger boring or directional drilling). Creek crossings would be completed during low flow and would be open trenched, with the exception of Revuelto Creek, which would be bored.

Figure 7. Location of Proposed Ute Reservoir Intake Pump Station.

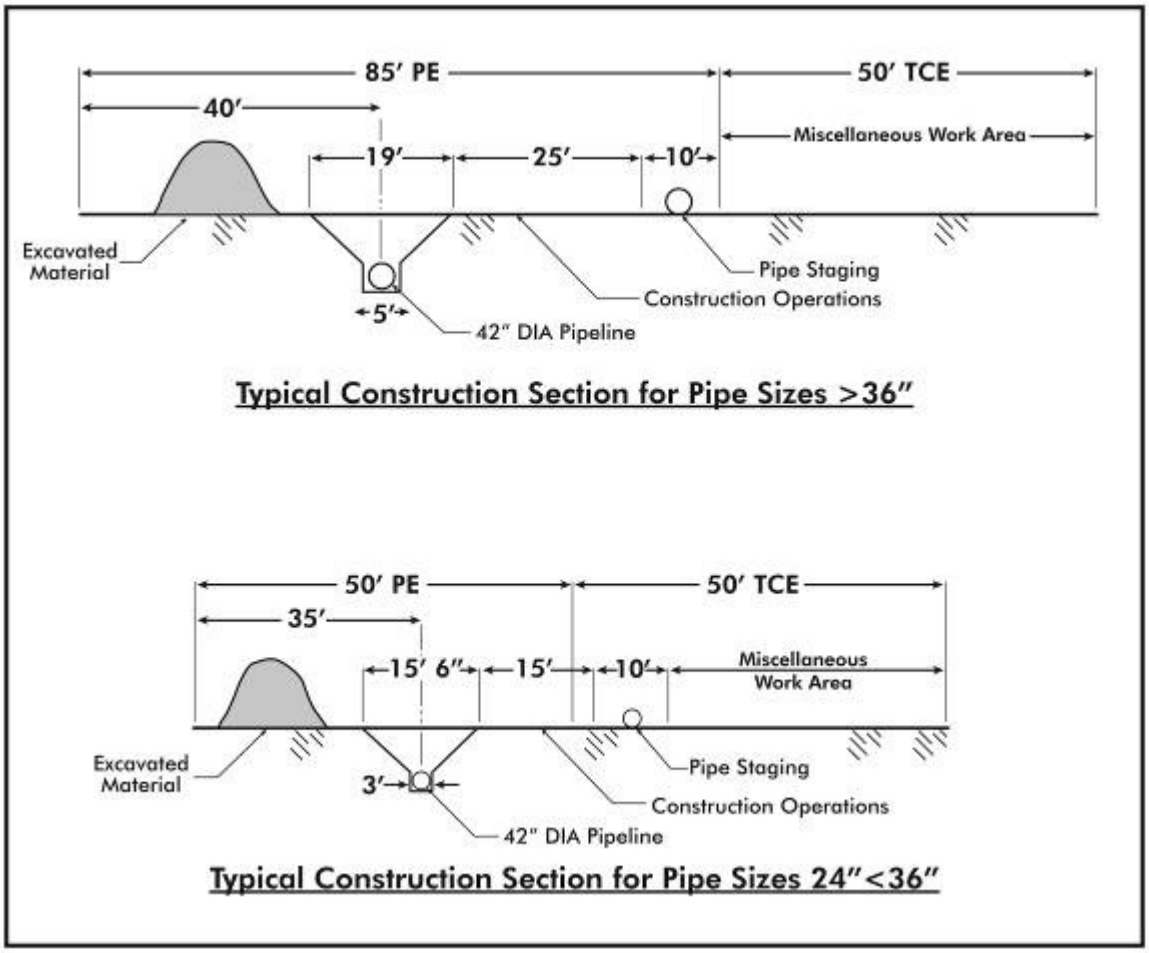
Figure 8. Location of Caprock Pump Station and Water Treatment Plant.



Electrical infrastructure would require upgrades and additional service lines. About 10 miles of new or upgraded distribution lines would be required, and two substations would require upgrading (San Jon and Grady substations). One new substation may be required to serve the intake pump station.

New permanent access roads would be required to access permanent facilities, including the intake facilities at Ute Reservoir, booster stations and water storage tanks, and the WTP. Primary access roads would have a 24-foot paved surface and 5-foot gravel shoulders (total 34-foot width). Secondary access roads would have gravel surface with a total width of 15 ft. Temporary access roads would be required where the pipeline route does not adjoin existing roads. Permanent and temporary easements would be required for pipeline construction (Figure 9). Permanent and temporary easement agreements and license agreements with NMISC and other landowners would be required. For pipe diameters 36 inches or greater, a 50-foot temporary easement and an 85-foot permanent easement would be needed (total of 135 ft). For pipe diameters less than 36 inches, 50-foot permanent and temporary easements would be required (total of 100 ft).

Figure 9. Typical Permanent and Temporary Construction Easements.



2.2.1 Raw Water Intake, Conveyance, and Storage

The intake pump station would be located along the south side of Ute Reservoir, approximately 2 miles west of U.S. Highway 54 along South Shore Drive (Figure 7). The intake structure would consist of an upper screened "Tee" at an elevation of 3,759 ft and a lower screened "Tee" at elevation of 3,735 ft (below the level of the Conservation Pool at 3,741 ft). The intake structure would divert water to a 48-inch diameter raw water pipeline, which would convey the water to the intake pump station. The intake pump station would pump the water to the booster pump station, which would be approximately 4 miles south of Interstate 40 (I-40) along State Highway 39. The footprint of the intake structure and pump station would be about 3 acres. From the booster pump station, the raw water would be conveyed by 36- to 42-inch-diameter raw water pipeline to a storage facility on the Caprock. About 41 miles of raw water pipeline would be installed.

2.2.2 Water Treatment

The WTP design and method is capable of meeting current and anticipated drinking water quality regulations. This design was based on results obtained from treatability testing from Ute Reservoir water samples, known existing and potential future source water quality issues, and proposed finished water quality goals (CH2M HILL 2006b, 2006c, 2006d, 2006e; Table 4). The WTP would be located near the northernmost Participating Community, Grady (Figure 2 and Figure 8), and would require about 34 acres. The WTP would be a conventional coagulation plant with the following characteristics and components:

- Net production capacity of 28 mgd, with minimum plant flow of 5 mgd, and average treated water flow of 15 mgd;
- Two parallel rapid mix, flocculation, sedimentation, and ozonation process trains;
- Combined filtration through six parallel granular media filters;
- Disinfection using a chlorine/ammonia system;
- Solids setting and landfill disposal (about 3,000 cubic yards per year); and
- Finished water storage capacity of 10 million gallons.

Table 4. Water Treatment Plan Process, Benefits, and Goals.

Unit Process	Process Benefit	Targeted Finished Water Quality Goal
Rapid mix	Destabilization of dissolved organic carbon (DOC) and turbidity	Turbidity; disinfection by-product precursors
Flocculation	Flocculation of destabilized particles into settleable floc	Turbidity; disinfection by-product precursors
Sedimentation	Settling of particles	Turbidity; pathogens; disinfection by-product precursors; manganese; iron
Ozonation	Provide disinfection; oxidize DOC, soluble iron and manganese, and taste and odor; and prepare water for biological filtration	Pathogens, taste and odor, disinfection by-product precursors, iron, manganese
Biological filtration	Removal of particles, DOC, taste and odor, and pathogens	Turbidity, pathogens, taste and odor, disinfection by-product precursors, iron, manganese, finished water biological stability
Finished water chemistry adjustment	Provide finished water stability	Finished water pH and alkalinity
Sodium hypochlorite and aqueous ammonia addition	Provide disinfection and chlorine residual	Pathogens, chlorine residual

Source: CH2M HILL 2006c.

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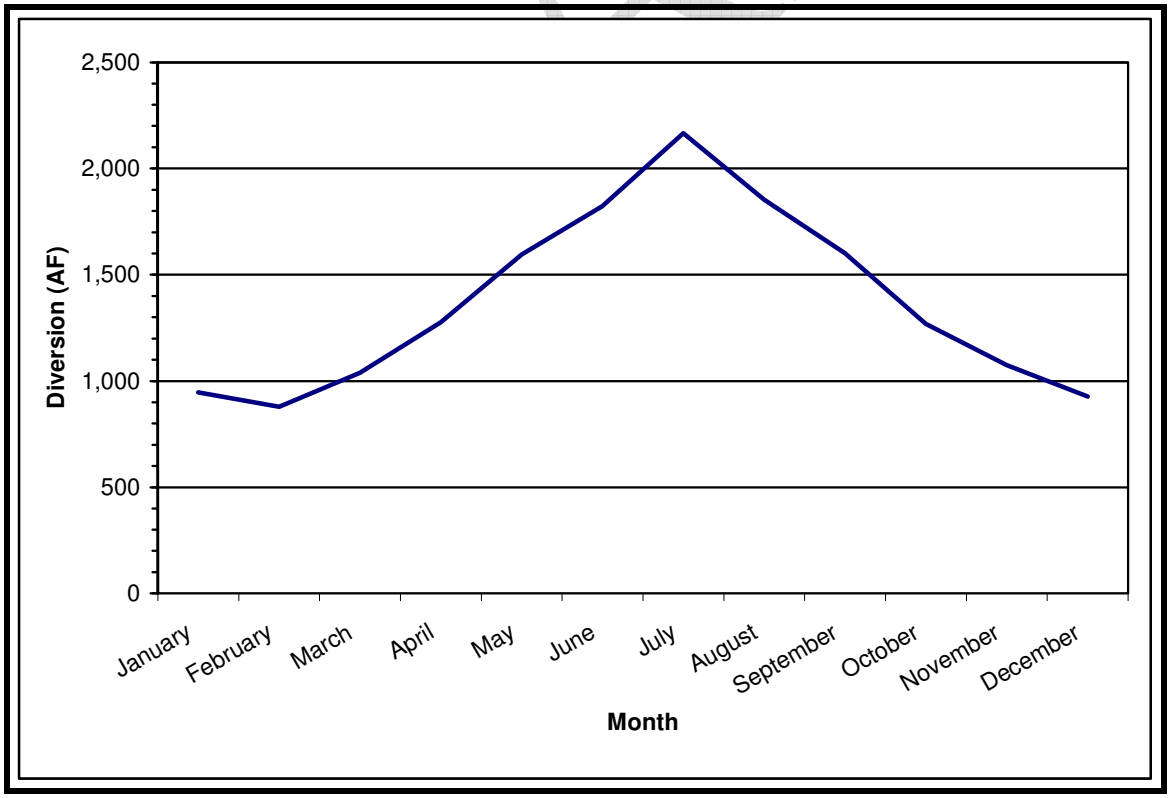
2.2.3 Finished Water Conveyance and Storage

Most of the finished water system would be gravity fed since the Participating Communities are lower in elevation than the WTP. However, two booster pump stations (about 2 to 4 acres) would be needed to deliver water to the Participating Communities. Each of the Participating Communities would use existing storage facilities. About 113 miles of finished water pipeline, including community laterals, would be installed.

2.2.4 Pumping and Operation

The annual maximum withdrawal from Ute Reservoir for the Project would be 16,450 AFY, which is the total volume of water reserved by the Participating Communities. Maximum monthly withdrawals were developed by distributing the total annual withdrawal based on historical monthly water use by ENMRWA members from 1993 to 1998 (Smith Engineering Company 2003). The maximum monthly withdrawal schedule for the Project is shown in Figure 10, and the approximate allocation among the Participating Communities is shown in Table 5. Actual Ute Reservoir withdrawals may be lower than the demands shown depending on hydrologic conditions and actual demands from the Participating Communities.

Figure 10. Maximum Monthly Diversions under the Proposed Action.



Source: Smith Engineering Company 2003.

Table 5. Participating Communities Water Use, Future Demand, and Water Reservation.

Participating Community	Current Water Use (AFY)	2060 Demand Estimate (AFY)[1]	Water Reservation (AFY)
City of Clovis	6,162	8,988	12,292[2]
Town of Elida	49	74	50
Village of Grady	21	27	75
Village of Melrose	141	203	250
City of Portales	4,217	4,523	3,333
City of Texico	171	293	250
CAFB	1,121	1,706	-
Curry County	1,013	1,188	100
Roosevelt County	1,776	-	100
Totals	14,671	17,002	16,450

[1] Demand estimates for Roosevelt County are incorporated into other entities.

[2] Includes CAFB.

Note: Some Participating Communities have reserved water in excess of their current and forecasted water needs, while some have reserved less. It is possible for the communities to reallocate or sublease their water allocation to balance community needs.

Source: CH2M HILL 2006b.

2.3 Alternatives Considered, but Eliminated from Detailed Analysis

Several other alternatives with Ute Reservoir as a water source were considered but eliminated, including an alternative WTP location and different water storage options (aquifer storage and open surface water storage). The Project represents the most cost-effective, efficient alternative to using this surface water resource.

Use of a deep brackish ground water aquifer also was considered but eliminated from detailed analysis. Using brackish ground water has significant drawbacks, including drilling and treatment cost, low per-well yield, and environmental impacts of evaporation ponds and brine disposal. In addition, brackish ground water is a limited nonsustainable resource and, therefore, does not meet the purpose and need for the Project. To meet the demands of the Participating Communities, the brackish ground water alternative would require:

- About 286 new wells over the 55-year planning period;
- Raw and finished water distribution system;
- Water treatment for TDS concentrations ranging from 5,000 to 10,000 milligrams per liter (mg/L), possibly as high as 60,000 mg/L, as well as a potential water treatment solution for radium;
- Evaporation/concentration facilities/ponds for saline waste water; and
- Brine by-product disposal options.

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Additional details regarding alternatives considered are in CH2M HILL's December 2, 2005 *Fresh and Brackish Groundwater Resources in the ENMRWS Project Area Technical Memorandum* (2006d).

Table 6 provides a summary of resource impacts from the No Action Alternative and Proposed Action.

Table 6. Summary of Impacts of the Alternatives.

Resource	Effect of the No Action Alternative*	Effect of the Proposed Action
Ute Reservoir Storage	None*	Reduced storage as a result of Project withdrawals
Canadian River Streamflow	None	Reduced infrequent short-term high flows from reservoir releases/spills at maximum 325 cfs, but no effect on constant baseflow
Ground Water	Reduced ground water levels and potential pumping rates for the Ogallala aquifer	Small decrease in decline in ground water levels as a result of decreased M&I demands from the Ogallala aquifer
Geomorphology	None	Decrease in sediment transport capacity at infrequent short-term high flows associated with reservoir releases/spills; potential small increase in riparian vegetation growth and reduced channel capacity between the Ute Dam and Revuelto Creek confluence
Ute Reservoir Water Quality	None	Decreased stratification for Ute Reservoir as a result of lower storage levels; fewer and shorter low dissolved oxygen events, and less phosphorous releases from reservoir sediments; shorter reservoir residence time; could result in less algae growth
Canadian River Water Quality	None	Reduction in infrequent short-term low TDS dilution flow from Ute Reservoir releases, resulting in fewer low TDS streamflow events, but no change to constant baseflow water quality
Ground Water Quality	Potentially degraded water quality in Ogallala aquifer supply as aquifer water levels decline	None

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Resource	Effect of the No Action Alternative*	Effect of the Proposed Action
Recreation (Curry and Roosevelt Counties)	Reductions in "discretionary uses" such as irrigation of parks and golf courses	Potential improvements in recreation due to stable long-term water supply
Recreation (Quay County)	Reservoir levels would remain in historic range, with water levels below 3,777 feet elevation every 5 years*	Declines in Ute Reservoir water level could affect recreation with water levels below 3,777 feet in elevation every 2 years on average; potential 6 percent decline in visitation, depending on conditions at nearby reservoirs; impacts to usability of boat docks
Socioeconomics: Economic Conditions (Curry and Roosevelt Counties)	Economic development declines; loss of existing businesses and residents; increased water costs	Increased water costs; in long term, Proposed Action would have costs about 7 percent lower than the No Action Alternative
Socioeconomics: Economic Conditions (Quay County)	Potential impacts due to declining economic conditions in Curry and Roosevelt counties)	Short-term economic benefits from construction of about $4 million per year; 6 percent decrease in recreation visits at Ute Reservoir could result in decreased revenues of about $1 million per year and could affect 19 full- and part-time jobs
Socioeconomics: Property values	Potential declines in property values in Curry and Roosevelt counties due to water supply cost and uncertainty	Potential declines in property values with locational premiums adjacent to Ute Reservoir at low water levels, depending on locations and steepness of shoreline
Threatened and Endangered Species	No change to habitat for interior least tern, lesser prairie-chicken, or shiner*	No effect to tern; minimization and avoidance for lesser prairie-chicken; decrease in duration and frequency of Compact releases could increase riparian vegetation between the Ute Dam and Revuelto Creek confluence
Vegetation and Wetlands	Potential impacts to surface vegetation from new ground water wells/well fields	Approximately 44 acres of permanent vegetation impacts; about 0.5 acres temporary wetland impacts

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Resource	Effect of the No Action Alternative*	Effect of the Proposed Action
Wildlife	Potential impacts to habitat from groundwater wells/well fields	Permanent impacts to about 37 acres of short-grass prairie habitat, and 6.5 acres of mesquite mid-and short-grass prairie; impacts to other habitat types would be short-term; impacts to open juniper woodlands would be semipermanent due to slow regeneration of woodlands; temporary construction impacts from noise and human activity
Geology, Soils, Air Quality, and Climate	Potential impacts due to groundwater well/well field drilling	Temporary soil disturbance during construction; potential increase in fugitive dust; about 310 acres of temporary impacts to soils classified as "Prime if Irrigated"
Cultural Resources, Indian Trust Assets, and Environmental Justice	No impacts to cultural resources or ITAs; impacts to Portales are potentially an environmental justice concern because of the lower than average income in that community	Any eligible sites would be mitigated as approved by SHPO; no ITAs in Project Area; no environmental justice concerns

*For the purposes of this EA, the No Action Alternative assumes a continuation of existing conditions in Ute Reservoir. However, in the absence of the Project, the State would likely pursue other purchasers for Ute Reservoir water.

Chapter 3. Affected Environment

Chapter 3 is a description of the environmental setting for the Proposed Action. Each part of the environmental setting that could be affected by either the No Action Alternative or the Proposed Action is discussed, and resources related to important issues brought up during scoping have more detailed sections. Those resources that would not be affected, or that would have effects that could not be measured, are described only briefly. The information in this EA was summarized from various resource studies and technical reports (see the list of Technical reports; Appendix B).

3.1 Hydrology

The surface water hydrology Project Area includes Ute Reservoir, the Canadian River downstream of Ute Reservoir to the state line, and sections of Revuelto Creek, Running Water Draw, Frio Draw, and Blackwater Draw. The ground water hydrology Project Area is the aquifer extent of both the Ogallala and other regional aquifers within Quay, Curry, and Roosevelt

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