



**US Army Corps  
of Engineers®**  
Albuquerque District

Environmental Assessment  
for the  
  
Acequia Del Llano Rehabilitation Project  
Santa Fe County, New Mexico

Prepared by

U.S. ARMY CORPS OF ENGINEERS  
ALBUQUERQUE DISTRICT  
4101 Jefferson Plaza NE  
Albuquerque, New Mexico 87109

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**Finding of No Significant Impact**  
**Acequia del Llano Rehabilitation Project**  
**Santa Fe County, New Mexico**

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the New Mexico State Engineer's Office and the members of the Acequia del Llano, is planning a project to rehabilitate the Acequia del Llano, Santa Fe County, New Mexico. The project area is located in Santa Fe Canyon below Nichols Reservoir and east of the City of Santa Fe, New Mexico.

The proposed rehabilitation work on the Acequia del Llano would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The Act authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. The Acequia del Llano rehabilitation project also qualifies under Section 215 of the Flood Control Act of 1968, Public Law 90-483, as amended. Section 215 provides that the Secretary of the Army may enter into an agreement to credit or reimburse the costs of certain work accomplished by states or political subdivisions thereof, which later is incorporated into an authorized project.

The Corps proposes to rehabilitate the Acequia del Llano by replacing the existing earthen and concrete-lined ditch and sections of plastic polyvinyl chloride (PVC) pipe with continuous PVC irrigation pipe. Project components include: 1) installing approximately 1920 linear feet of 6-inch diameter, 80 PSI PVC irrigation pipe along and below the existing earthen ditch; and 2) constructing a reinforced concrete outlet structure with a drainage gate.

The purposes of the acequia rehabilitation project are to improve water delivery efficiency by limiting seepage and evaporative loss and to reduce maintenance required to clean sediment from the ditch.

Acequia del Llano diverts water from the Santa Fe River at Nichols Dam. The acequia serves 20 members and is used to irrigate about 30 acres of orchards and gardens. Project construction is scheduled during the non-irrigation season beginning in January 2009 with an expected duration of about 6 weeks. The Acequia del Llano members would be responsible for assuring operation and maintenance upon project completion.

As required by the Endangered Species Act of 1973, the Corps has determined that the project would have no effect on any threatened or endangered species or designated or proposed critical habitat receiving protection under the Endangered Species Act.

The proposed action is the rehabilitation of an existing irrigation structure. Therefore, the project is exempt from the provisions of Sections 404 and 401 of the Clean Water Act (33 CFR 323.4). The project complies with Executive Order 11990, Protection of Wetlands.

The Acequia del Llano is eligible for nomination to the National Register of Historic Places and the New Mexico State Register of Cultural Properties. Piping the ditch and changing its alignment could be considered an adverse effect to the ditch. However, the portion to be piped has been extensively modified, and no longer retains integrity. No prehistoric archaeological sites are known to occur within or in the immediate vicinity of the project area. Historic properties, including two historic roads and an abandoned ditch that served the Santa Fe hydroelectric plant, are known from within the project area and its vicinity, but will not be affected by the proposed project. Tribes indicating an interest in activities in Santa Fe County were sent a scoping letter to assess if there were any potential tribal concerns with the project. To date, no tribal concerns have been identified, and no traditional cultural properties are known to occur within or in the vicinity of the project area. The Corps is of the opinion that the proposed Acequia del Llano rehabilitation project would have “No Adverse Effect to Historic Properties.” The New Mexico State Historic Preservation Office (NMSHPO) has concurred with this finding. Should previously undiscovered artifacts or features be unearthed during construction, work would be stopped in the immediate vicinity of the find, a determination of significance made, and a mitigation plan formulated in coordination with the NMSHPO and with Native American groups that may have concerns in the project area.

The proposed project would result in minor, short-term changes to local air quality. An increase in particulates would be expected as a result of topsoil disturbance; localized concentrations of carbon monoxide from equipment during construction are also anticipated. Construction-related effects to air quality would be minimized through the use of best management practices.

Implementing the proposed action would cause temporary increases in noise levels from the operation of heavy equipment. This increase would last approximately six weeks during day time hours. To reduce noise and disturbance, construction activities would comply with OSHA and local noise standards and would be conducted only during the daytime hours of 7 a.m. to 5 p.m.

Measures to protect the environment that would be implemented as part of this project include the following:

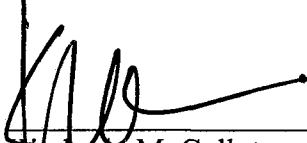
- The contractor would be required to have emission control devices on all equipment.
- The contractor would use best management practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. Stockpiles of debris, soil, sand, or other materials that could produce dust would be watered or covered. Materials transported on- or off-site by truck would be covered.
- All fuels and lubricants would be stored outside of the 100-year floodplain of the Santa Fe River and construction equipment would be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water.
- Aquatic habitat in the Santa Fe River channel below the acequia pipeline would be protected with silt fencing to prevent runoff of sediments from areas disturbed by construction.

- All construction equipment would be cleaned with a high-pressure water jet before entering the project area to prevent introduction of invasive plant species.
- The work area would be marked to ensure that equipment stays within the authorized construction area and to prevent visitors to the adjacent Audubon Center from inadvertently crossing into the work area.

The proposed project would not change or affect water rights or the amount of water diverted. The proposed action would result in minor or temporary effects on soils, air quality, noise levels, vegetation, and wildlife species and habitat. There would be no adverse effect to cultural resources as a result of this project. The following elements were analyzed, but would not be significantly affected by the proposed action: climate, physiography, geology, water quality, waters of the U.S., wetlands, floodplains, special status species, land use, visual resources, human health and safety, aesthetics, land use, Indian Trust Assets, socioeconomics, and environmental justice.

The planned action is being coordinated with Federal, state, and local agencies with jurisdiction over the biological and cultural resources of the project area. Based upon these factors and others discussed in the following environmental assessment, the proposed action would not have significant effects on the human environment. Therefore, an environmental impact statement will not be prepared for the proposed rehabilitation work on the Acequia del Llano.

1/8/09  
Date

  
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Kimberly M. Colloton  
Lieutenant Colonel, U.S. Army  
District Commander

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## 1.0 INTRODUCTION

### 1.1 Background and Location

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the New Mexico State Engineer's Office and the members of the Acequia del Llano, is planning a project to rehabilitate the Acequia del Llano, Santa Fe County, New Mexico. The project area is located in Santa Fe Canyon below Nichols Reservoir and immediately east of the municipal boundary of the city of Santa Fe, New Mexico (Figures 1 and 2). The land traversed by Acequia del Llano in the project area is owned by the City of Santa Fe and by the Audubon Society.

The proposed rehabilitation work on the Acequia del Llano would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The Act authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. The Acequia del Llano rehabilitation project also qualifies under Section 215 of the Flood Control Act of 1968, Public Law 90-483, as amended. Section 215 provides that the Secretary of the Army may enter into an agreement to credit or reimburse the costs of certain work accomplished by states or political subdivisions thereof, which later is incorporated into an authorized project. The Secretary of the Army, acting through the Chief of Engineers, and, when he determines it to be in the public interest, may enter into agreements providing for reimbursement to States or political subdivisions thereof for work to be performed by such non-Federal public bodies at water resources development projects authorized for construction under the Secretary of the Army and the supervision of the Chief of Engineers.

Acequia del Llano diverts water from the Santa Fe River at the Nichols Reservoir dam; its priority date for water appropriations rights is after 1877 and before 1907 (New Mexico Office of the State Engineer 1987; Snow 1988). At the bottom of the dam, an outlet structure and flow meter control water flow into a pipe that supplies the acequia. The main ditch is approximately 1.5 miles long. Approximately 1,000 feet of the main ditch has been placed into plastic polyvinyl chloride (PVC) pipe in intermittent sections, and about 200 feet are lined with concrete. The remaining length of the ditch is earthen.

The acequia currently serves 18 families and two organizations: the Randall Davey Audubon Center and the City of Santa Fe Water Company. The acequia irrigates approximately 30 acres of gardens and orchards; major crops include vegetables, apples, cherries, pears and peaches.

The Corps proposes to rehabilitate the Acequia del Llano by installing approximately 1,920 linear feet of continuous PVC irrigation pipe from the inflow below Nichols Dam to the property boundary of the Randall Davey Audubon Center. The pipeline would follow the downhill (north) side of an unpaved access road from the bottom of Nichols Dam to the Santa Fe Watershed Road and then would follow the north side of the Watershed Road until near the project end, where it would cross the road to rejoin the present ditch at the Audubon Center

boundary (see Figures 1 and 2). The objectives of the project are to improve water delivery efficiency by limiting seepage and to reduce the maintenance effort required to clean sediment from the ditch. Project construction is scheduled during the non-irrigation season beginning in January 2009 with an expected duration of about 6 weeks. The Acequia del Llano members would be responsible for assuring operation and maintenance upon project completion.

The Corps would provide 75 percent of construction funding and is, therefore, the action agency for this project. The Office of the State Engineer is the project sponsor, and with the local ditch association, would be responsible for the remaining 25 percent of construction costs. Project design and inspection would be undertaken by the USDA Natural Resources Conservation Service (NRCS).

## 1.2 Purpose and Need

The primary objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members by minimizing evaporative and seepage losses from the earthen ditch segments. A secondary benefit of the proposed project would be to reduce maintenance costs for the members of the acequia.

Acequia del Llano traverses the steep slopes of Santa Fe Canyon. Currently, the earthen portions of the ditch experience water losses to seepage and evaporation. The sections of the ditch that have been placed in pipe are not continuous and also lose water to seepage. Maintenance of the earthen ditch is time-consuming and costly due to frequent accumulation of sediment and debris from the slope above the acequia.



**Figure 1: Vicinity Map of Proposed Project Area, Santa Fe County, New Mexico.**

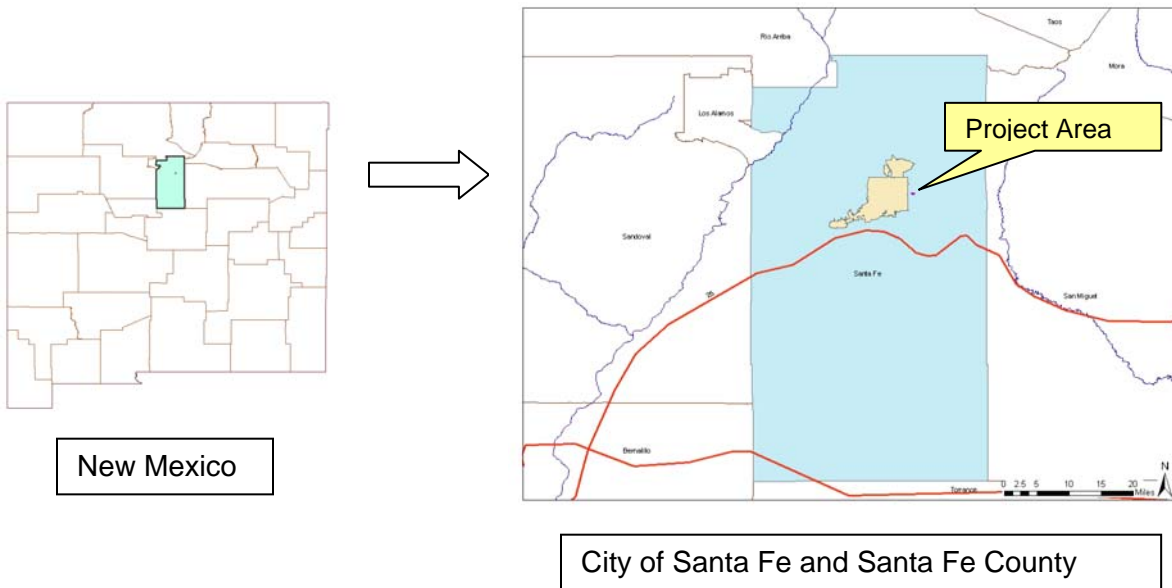
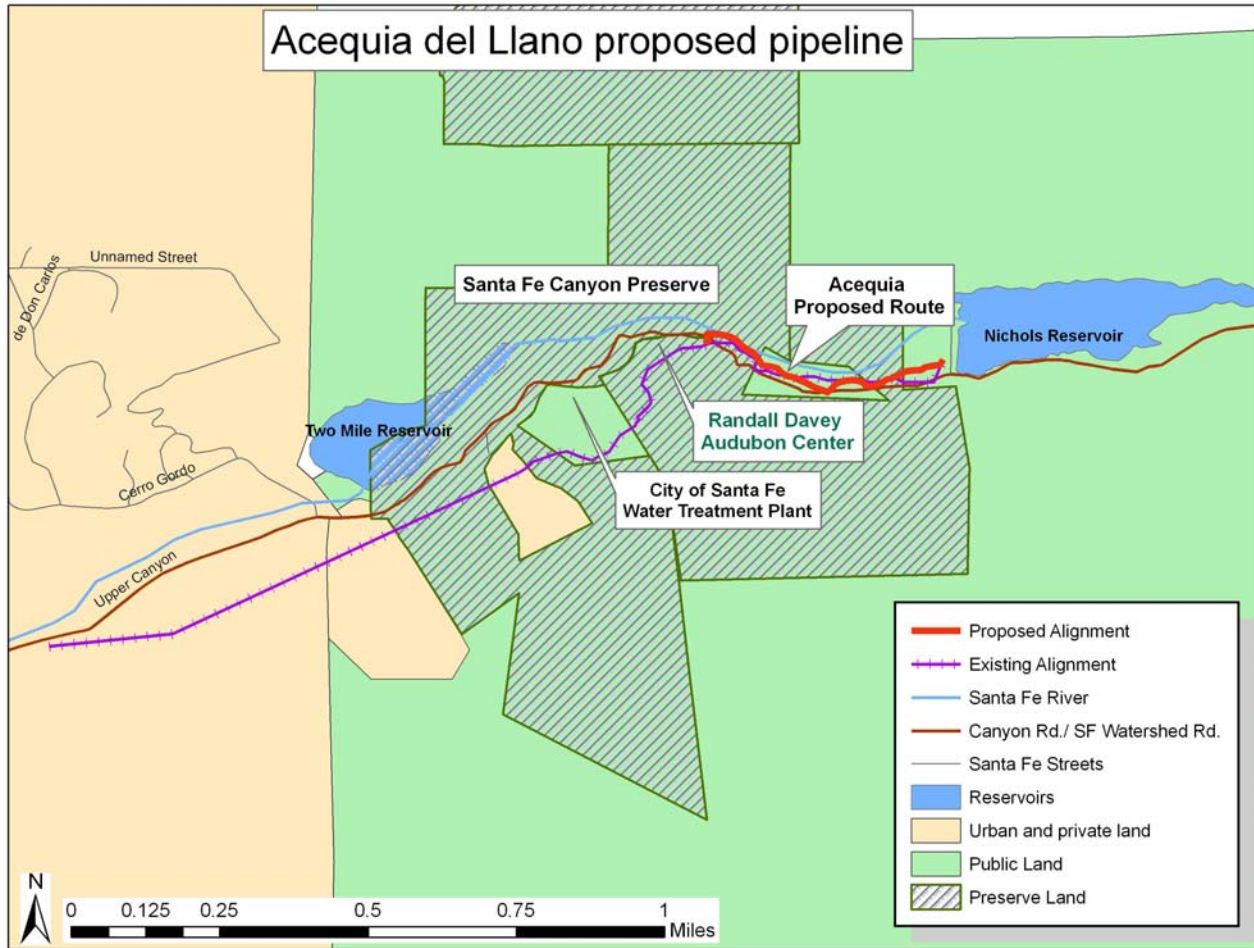
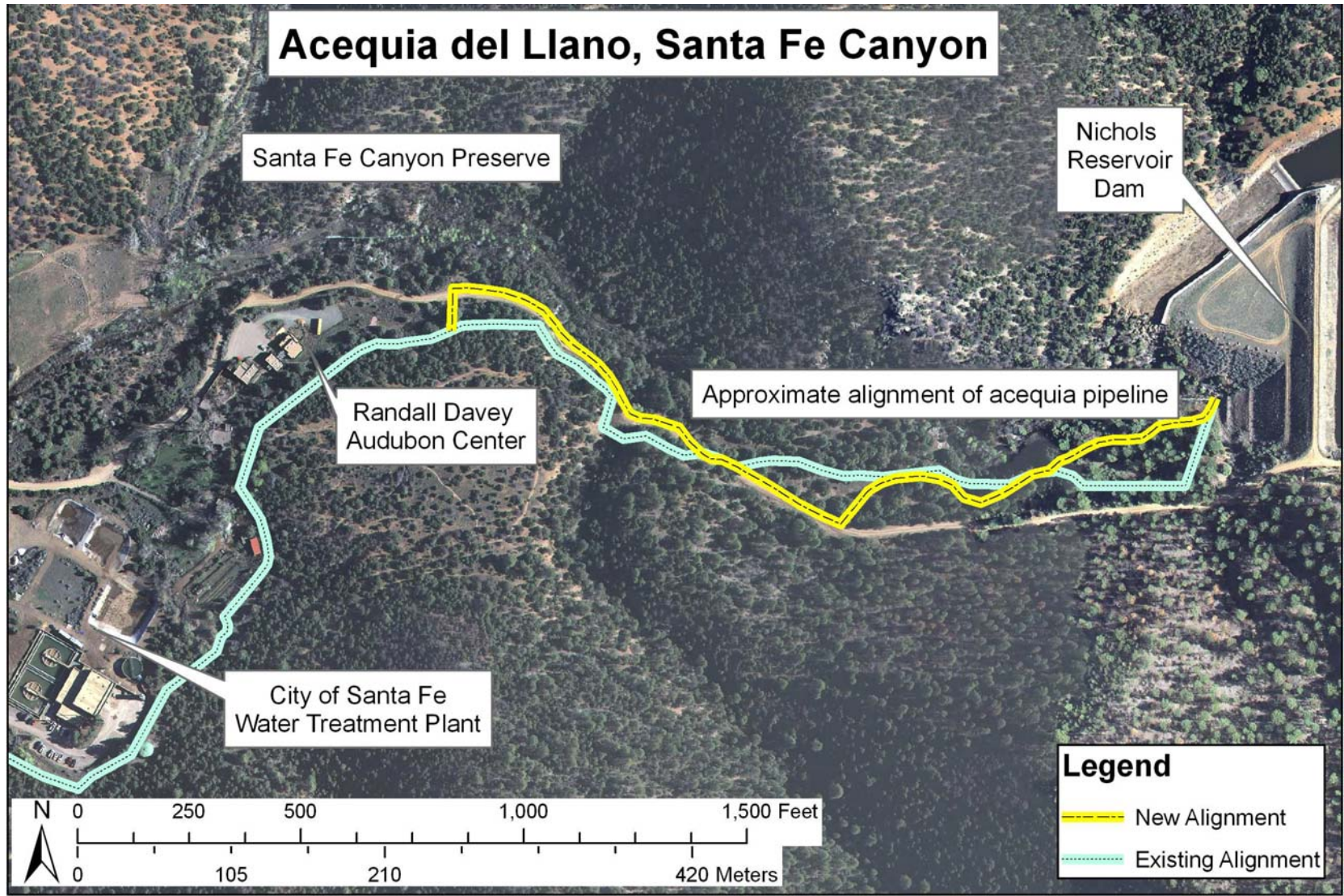


Figure 2: Acequia del Llano Project Area Aerial Photo, Santa Fe County, New Mexico



### 1.3 Regulatory Compliance

This Environmental Assessment (EA) was prepared by the Corps, Albuquerque District, in compliance with all applicable Federal Statutes, Regulations, and Executive Orders, including the following:

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Clean Water Act of 1972 and Amendments of 1977(CWA)
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, 1994
- Floodplain Management (Executive Order 11988)
- National Environmental Policy Act of 1969, as amended (42 U.S.C 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- U.S. Army Corps of Engineers' Procedures for Implementing NEPA (33 CFR 230; ER 200-2-2)
- Farmland Protection Policy Act of 1981, as amended (7 U.S.C. 4201 *et seq.*)
- Executive Order 13112, Invasive Species
- Noxious Weed Act of 1974 (PL93-269; 7 U.S.C. 2801)

This EA also reflects compliance with all applicable State and local regulations, statutes, policies, and standards for conserving the environment such as water and air quality, endangered plants and animals, and cultural resources.

## 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

### 2.1 Proposed Action

The Corps proposes to rehabilitate the Acequia del Llano by replacing the existing earthen and concrete-lined ditch and sections of PVC pipe with continuous PVC irrigation pipe. The pipeline would follow a new alignment along the downhill (north) side of the Santa Fe Watershed Road, abandoning the current ditch. Project components include: 1) installing approximately 1920 linear feet of 6-inch diameter, 80 PSI PVC irrigation pipe along with flow valves where needed; and 2) constructing a reinforced concrete outlet structure with a drainage gate where the new pipeline would empty into the existing ditch as it continues downstream from the project area. In order to install the pipeline, a trench 11 feet wide and 3 feet deep with sloping sides would be dug. After laying the PVC pipe, the trench would be backfilled to surface level and the area would be reseeded with appropriate native plants. Existing roads would be used for access to the area. Equipment staging and refueling would be confined to existing roads and bladed areas outside the floodplain of the Santa Fe River

During project analysis and design, completed by NRCS, the proposed action was determined to be most effective. The design would allow flow at a rate of 0.5 cubic feet per second (CFS).

The design was based on current water usage as well as the irrigation water needs of the community and the acequia's allocation of 150 gallons per minute.

## 2.2 The No-Action Alternative

Under the no-action alternative there would be no modification of the existing open ditch and intermittent pipe conveyance system. The earthen ditch and existing sections of PVC pipe would continue to function and be maintained as they have in the recent past. Typical maintenance of the acequia system in the project's area of influence would continue, including cleaning sediment and vegetation from the existing earthen ditch and piling dirt along the ditch to maintain its carrying capacity and minimize overflows.

## 3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

### 3.1 Physiography, Geology, and Soils

Soils within the project area are mapped in two units. The Santa Fe River floodplain is categorized as Morenda, Fiesta, and Espanola soils, 1 to 85 percent slopes, flooded. The side of the valley between the floodplain and Upper Santa Fe Watershed Road is mapped as Arnor gravelly sandy loam, 2 to 8 percent slopes (USDA 2008).

Morenda, Fiesta and Espanola soils occur on floodplain, valley slopes and stream terraces. These soils consist of alluvium derived from granite, gneiss, and schist and are moderately well drained, nonsaline, and occasionally or never flooded. The depth to water table varies from about 39 to 59 inches in Morenda soils to more than 80 inches in Fiesta and Espanola soils.

Morenda soil is in the cottonwood-willow-sedge ecological site (*Populus fremontii/Salix/Carex*) and would not be affected by the proposed project because of its topographic position along the stream, below the area of action. Espanola soils are in the Ponderosa pine-Arizona fescue ecological site (*Pinus ponderosa/Festuca arizonica-Danthonia parryi*). Fiesta soils are associated with the Ponderosa pine/Rocky Mt. juniper/Gambel oak-mountain mahogany ecological site (*Pinus ponderosa-Juniperus scopulorum/Quercus gambelii-Cercocarpus montanus/Poa fendleriana-Muhlenbergia montana*). The vegetation observed on the site visit is similar to this ecological site description for the upstream portion of the proposed pipeline route.

Arnor gravelly sandy loam is a well-drained, nonsaline soil with depth of 59 to 79 inches to paralithic bedrock. Depth to water table is more than 80 inches. The ecological site is pinyon-juniper (*Juniperus monosperma-Pinus edulis/Bouteloua gracilis*). This soil map unit corresponds to the higher topographic positions along Santa Fe Watershed Road. The ecological site describes vegetation on the higher slopes of the project area and the portion of the pipeline route that follows Santa Fe Watershed Road.

The proposed project would have a minor, temporary effect to these soils during construction. A trench would be excavated in order to lay the pipe for the acequia. The trench would be backfilled according to NRCS specifications. However, the total area to be disturbed is expected to be less than 0.5 acre. Standard Best Management Practices (BMPs) to prevent on- and off-site erosion would be incorporated in contract specifications, and would include silt fences, straw bales, geotextiles, or similar measures. Following installation of the PVC irrigation pipe, the soil would be stabilized and revegetated using appropriate native plant materials. Use of these BMPs would ensure that soils are only minimally affected. The No-Action alternative would have no effect to soils.

### 3.2 Climate

Santa Fe County's climate is semiarid but highly varied because of the wide range in elevation and the uneven topography. Elevations in the Santa Fe River watershed range from 12,408 feet above mean sea level at the top of Lake Peak to 5,220 feet at the Rio Grande. The elevation at the project site is about 7400 feet. Slopes are extremely steep (often 40 degrees or greater) in the upper watershed from the ridgeline down to the zone where the pre-Cambrian rocks of the Sangre de Cristo Mountains are overlapped by the deep sediments of the Santa Fe Group (Grant 2002). The average temperature at Santa Fe in January is 30.3 degrees F; in July, the average is 70.7 degrees F. Daily variation in temperature is large and commonly exceeds 30 degrees F. Average annual precipitation ranges from about 9 to 20 inches within the county and is 14 inches in Santa Fe (U.S. Department of Agriculture 2008). However, precipitation is characterized by extremes, with large storms shaping the landscape (Goldman 2003). About one-third of the annual average falls during the "monsoon" months of July to September, with most falling as brief, generally heavy thunderstorms (U.S. Department of Agriculture 2008). In the past, before construction of dams on the Santa Fe River watershed, heavy thunderstorms would cause destructive flooding in Santa Fe, as described by Goldman (2003).

Global climate change related to carbon emissions is expected to result in a dryer Southwest with greater variation in precipitation (Backlund, Janetos, and Schimel 2008). However, the contribution of the proposed project to climate change would be negligible. The construction phase of the project would produce carbon emissions; however, it is likely that the reduced need for maintenance of the acequia would result in less vehicular travel to the project site over the longer term, producing correspondingly lower carbon emissions. Thus, neither the proposed action nor the No-Action alternative would have a detectable effect on climate.

### 3.3 Water Quality

Section 402 of the Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.*), as amended, regulates point-source discharges of pollutants into waters of the United States and specifies that storm-water discharges associated with construction activities shall be conducted under the National Pollution Discharge Elimination System (NPDES) guidance. Construction activities characterized by clearing, grading, and excavation are associated with storm-water discharges, subjecting the underlying soils to erosion by storm-water. The NPDES general permit guidance would not apply to this project because the total project area is less than one acre. Therefore, a

Storm-Water Pollution Prevention Plan (SWPPP) is not required. Nevertheless, standard Best Management Practices to prevent on- and off-site erosion, sediment and storm-water discharges would be incorporated in contract specifications, as described in Section 3.1 above. Therefore, impacts from storm-water due to the proposed work are expected to be negligible.

Section 404 of the CWA, (CWA; 33 U.S.C. 1251 *et seq.*) as amended, provides for the protection of waters of the United States through regulation of the discharge of dredged or fill material. The proposed action is the rehabilitation of an existing irrigation structure. Therefore, the project is exempt from the provisions of Sections 404 and 401 of the Clean Water Act (33 CFR 323.4).

The Santa Fe River is currently an intermittent stream with two perennial reaches, one being from its source at Santa Fe Lake to the bridge at Cerro Gordo/Upper Canyon Road (this includes the Acequia del Llano project area). Prior to the middle of the twentieth century, the stream was fed by springs through the historic Santa Fe plaza area (Goldman 2003; Grant 2002). The Santa Fe River provides about 40% of the City's water supply from Nichols and McClure reservoirs located in the Sangre de Cristo Mountains east of town.

Water quality in the Santa Fe River headwaters, above Nichols Reservoir and the Acequia del Llano project area, fully supports its designated uses, including domestic and municipal water supply, primary contact, wildlife habitat, and high quality coldwater aquatic life. However, the river segment that includes the project area, from Nichols Reservoir downstream to the Santa Fe Wastewater Treatment Plant, was assessed as impaired in 2008 because of aluminum and PCB in the water column. Total Maximum Daily Load (TMDL) standards are to be developed for this reach after additional data has been collected. The reach below the City wastewater treatment plant (downstream of the project area) has TMDL standards in effect for stream-bottom deposits, chlorine, dissolved oxygen and pH, as a step toward attaining the designated uses of that reach as a marginal cold water fishery, a warm water fishery, and for livestock watering (NMED Surface Water Quality Bureau 2008). Due to the use of Best Management Practices outlined above, the proposed project is not expected to result in any additional discharges of sediment or pollutants into the Santa Fe River. Neither the proposed project nor the No-Action alternative would alter water quality in the Santa Fe River.

The Santa Fe River watershed was identified in New Mexico's Unified Watershed Assessment as a Category I watershed: that is, one of the state's watersheds in most urgent need of restoration. A Watershed Restoration Action Strategy (WRAS) was completed in 2002 as required by the USEPA Clean Water Action Plan (Grant 2002). Most factors identified as contributing to water quality problems in the Santa Fe River are associated with increasing urban development and water use. In the upper watershed, dense tree growth and corresponding decline of grass cover have been identified as a source of sediment. Restoration actions to be implemented in the municipal watershed include forest and rangeland management actions to reduce the potential for crown fire and improve vegetative understory to maximize soil stability. The proposed work on the Acequia del Llano would not affect these restoration plans for the Santa Fe River watershed.

### 3.4 Floodplains and Wetlands

Executive Orders 11988 (Floodplain Management) requires Federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Part of the proposed project area, including the diversion point of the acequia, is located within flood hazard areas inundated by the 100-year flood (Federal Emergency Management Agency 2008). The nature of acequia systems inherently depends on the diversion structure or distribution system being located in the floodplain. With the re-alignment of the acequia below the existing ditch, slightly more of its length would fall within the floodplain. However, the acequia pipeline would be placed below ground and would not affect the floodplain surface. No additional development would occur within the floodplain. The acequia's water users are all located downstream and above the floodplain, which narrows below the City's water treatment plant. Canyon neighborhood is served by City water and sewer; improving the acequia with its small water allocation would not contribute to additional development, but would allow present agricultural and horticultural land uses to continue. Neither the proposed project nor the No-Action alternative would result in any additional development in the Santa Fe River floodplain.

Executive Order 11990 (Protection of Wetlands) requires the avoidance, to the greatest extent possible, of both long and short-term impacts associated with the destruction, modification, or other disturbance of wetland habitats. There are no naturally occurring wetlands within the project area, and therefore, no impacts to wetlands would occur. Neither the proposed action nor the No-Action alternative would affect wetlands or change wetland acreage in the area.

### 3.5 Air Quality, Noise, and Aesthetics

The New Mexico Environment Department Air Quality Bureau (NMED/AQB) monitors air quality throughout the state in areas of State jurisdiction according to need. Recently, the US Environmental Protection Agency (USEPA) has placed emphasis on the monitoring of ozone and fine particulate matter because these two pollutants have been found to be the cause of increasing respiratory problems, especially asthma. Santa Fe County currently meets standards for these pollutants and is classified as an air quality attainment area (USEPA 2008).

In Santa Fe County, ozone and particulates are the only pollutants monitored, because of the absence of industries that would produce the other pollutants. The NMED/AQB maintains two air quality monitoring stations at Santa Fe. The Santa Fe Airport site monitors ozone and fine particulates (PM 2.5). The Santa Fe Runnels site monitors both coarse and fine particulates (PM 10 and 2.5). Carbon monoxide was monitored at Santa Fe until 2007 (NMED/AQB 2008). Air quality in the Santa Fe Metropolitan Statistical Area is generally good. Since 2003, most days had air quality index values of "good", 22 days had "moderate" air quality, and there were no days with "unhealthy for sensitive groups" or poorer index values (USEPA 2008).

The Class I air quality areas closest to the project are Bandelier National Monument, 21 miles away from the project area, and the Pecos Wilderness in Santa Fe National Forest, which

extends to within four miles of Nichols Dam. Class I areas are special areas of natural wonder and scenic beauty, such as national parks, national monuments, and wilderness areas, where air quality should be given special protection. Class I areas are subject to maximum limits on air quality degradation.

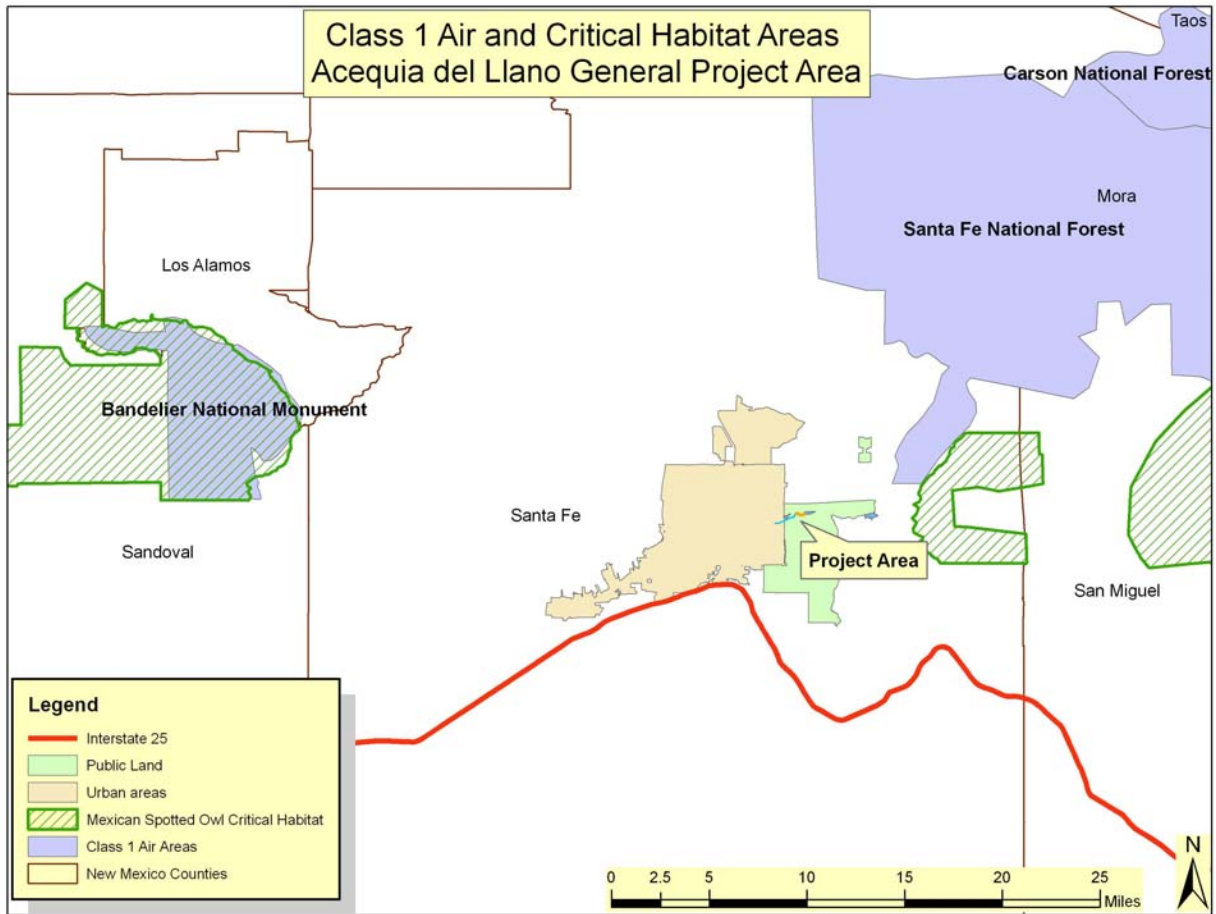
The proposed project would result in a temporary but negligible, localized increase in suspended dust (coarse particles) from construction activities. Best Management Practices to be followed during construction to minimize dust include the following: Access roads and disturbed soil would be wetted. All vehicles involved in transporting fill material, rubble and spoil to or from the project site would be covered and would have required emission control equipment. Stockpiles of debris, soil, sand, or other materials that could produce dust would be watered or covered. These practices would minimize dust and emissions-related air quality impacts during construction. Once construction is complete, the operation of the acequia would have no further effects on air quality. Therefore, air quality in the city of Santa Fe, Santa Fe County, Santa Fe National Forest, and Bandelier National Monument would not be affected by the proposed project or by the No-Action alternative.

Background noise levels in the proposed project area are low. The Occupational Safety and Health Administration (OSHA) noise standards limit noise levels to 90 decibels (dBA) averaged over an eight-hour day (29CFR 1910.95). The City of Santa Fe Noise Ordinance limits noise in residential areas during daytime hours to 55 dBA. The Noise Center (League for the Hard of Hearing, 2008) advises that noise levels above 85 dBA will harm hearing over time and noise levels above 140 dBA can cause damage to hearing after just one exposure. During construction, noise would temporarily increase in the vicinity during vehicle and equipment operation. Noise levels in the immediate work area would likely be comparable to that generated by a tractor (90 dBA) during work hours. Construction noise may be audible from the Randall Davey Audubon Center, but is not likely to be noticed from the nearest residential areas 1500 feet downstream. The increase in noise during construction would not be loud enough to harm hearing and would be temporary, ending when construction is complete. Therefore, the proposed project would have no significant affect on noise.

Aesthetically, the project area is characterized by forest land, nature preserves, and open space. The United States Secretary of Agriculture closed the Santa Fe River watershed to entry in 1932 to protect the quality of the city's water. The project area is not accessible to the public and there would be no impact on recreation or aesthetics from the proposed work. Construction equipment would be staged from the Santa Fe Watershed Road above the Audubon Center and would be visible only when traveling to and leaving the project area. After project completion, the landscape would return to its 'natural' appearance. Aesthetic conditions would not be affected by the proposed project or the No-Action alternative.



**Figure 3: Project area showing nearest Class 1 Air Quality Areas and Designated Critical Habitat for Mexican Spotted Owl**



### 3.6 Vegetation Communities

The project area lies in a transition zone between the Great Basin Conifer Woodland and Rocky Mountain Montane Conifer Forest biotic communities (Brown and Lowe 1977; Brown 1982). Corps personnel visited the site on June 20, 2008. A list of plants observed on the site visit is provided in Table 1. Photographs taken along the acequia route show the existing vegetation condition (Figure 4). Additional plants photographed by a Canyon resident may be viewed at the Canyon neighborhood website, <http://www.sfcanyon.org/>. More detailed information on the vegetation of the watershed is given in Grant (2002) and Goldman (2003). The Santa Fe River channel near the diversion point supports a riparian community of alder, willows, and birch, with an understory of sedges, rushes and horsetails. The canyon slopes are forested with ponderosa and pinyon pine in the lower canyon and pinyon-juniper on the higher slopes. The existing ditch supports a thin band of lush vegetation, including some of the riparian species. Immediately along the Watershed Road the vegetation is typical of a drier open roadside with the occasional prickly pear cactus, and dominant cover of grasses and forbs such as blue and sideoats grama, needle-and-thread grass, Western wheatgrass, penstemon, and various composites. The No-Action alternative would result in no effects to this vegetation.

Under the proposed project, a small amount of vegetation (less than 1 acre) would be disturbed. Because the alignment for the acequia pipeline is proposed to follow the Santa Fe Watershed Road, much of the vegetation has been previously disturbed. The native grasses and forbs are expected to return following construction and reseeded.

### 3.7 Noxious Weeds and Invasive Species

The Federal Noxious Weed Act of 1974 (Public law 93-269; 7 U.S.C. 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Executive Order 13112 directs Federal agencies to prevent the introduction of invasive (exotic) species and to control and minimize the economic, ecological, and human health impacts that invasive species cause. In order to prevent new infestations of noxious weeds and invasive species, all equipment would be cleaned with a high-pressure water jet before entering the area. Following construction, native species would be planted .., minimizing the opportunity for invasive species to colonize the area. Therefore, the proposed project is in compliance with the Federal Noxious Weed Act and Executive Order 13112.

**Table 1: List of plants observed at Acequia del Llano project site, Santa Fe Canyon**

<b>Family</b>	<b>Genus-species</b>	<b>Common name</b>
Asteraceae	<i>Achillea millefolium</i>	Yarrow
Asteraceae	<i>Ericameria nauseosa</i>	Rabbitbrush, chamisa
Betulaceae	<i>Alnus incana</i>	Thinleaf alder
Betulaceae	<i>Betula occidentalis</i>	Water birch
Cactaceae	<i>Echinocereus triglochidiatus</i>	Claret cup cactus
Cactaceae	<i>Opuntia phaeacantha</i>	brown spined prickly pear
Cupressaceae	<i>Juniperus communis</i>	common/ spreading juniper
Cupressaceae	<i>Juniperus monosperma</i>	one-seeded juniper
Cupressaceae	<i>Juniperus scopulorum</i>	Rocky Mt. Juniper
Cyperaceae	<i>Carex sp.</i>	Unidentified sedge
Equisetaceae	<i>Equisetum arvense</i>	field horsetail
Fabaceae	<i>Lupinus caudatus</i>	spurred lupine
Fabaceae	<i>Melilotus officinalis</i>	yellow sweet clover
Grossulariaceae	<i>Ribes cereum</i>	wax currant
Juncaceae	<i>Juncus arcticus var. balticus</i>	wire rush, mountain rush
Onagraceae	<i>Oenothera cornopifolia</i>	combleaf evening primrose
Pinaceae	<i>Pinus edulis</i>	Piñon pine
Pinaceae	<i>Pinus ponderosa</i>	Ponderosa pine
Pinaceae	<i>Pseudotsuga menziesii</i>	Douglas fir
Poaceae	<i>Bouteloua curtipendula</i>	sideoats grama
Poaceae	<i>Bouteloua gracilis</i>	blue grama
Poaceae	<i>Elymus smithii</i>	Western wheatgrass
Poaceae	<i>Hesperostipa comata</i>	needle-and-thread
Poaceae	<i>Poa bigelovii</i>	Bigelow's bluegrass
Polemoniaceae	<i>Phlox nana</i>	Santa Fe phlox
Polygonaceae	<i>Rumex sp.</i>	dock
Rosaceae	<i>Amelanchier utahensis</i>	Utah serviceberry
Salicaceae	<i>Populus angustifolia</i>	narrow-leaved cottonwood
Salicaceae	<i>Salix exigua</i>	Coyote willow
Salicaceae	<i>Salix lucida</i>	Shining willow
Scrophulariaceae	<i>Penstemon barbatus</i>	scarlet penstemon
Scrophulariaceae	<i>Verbascum thapsus</i>	mullein
Typhaceae	<i>Typha latifolia</i>	broad-leaved cattail
Ulmaceae	<i>Ulmus pumila</i>	Siberian elm

**Figure 4: Photos, Acequia del Llano, existing condition.**

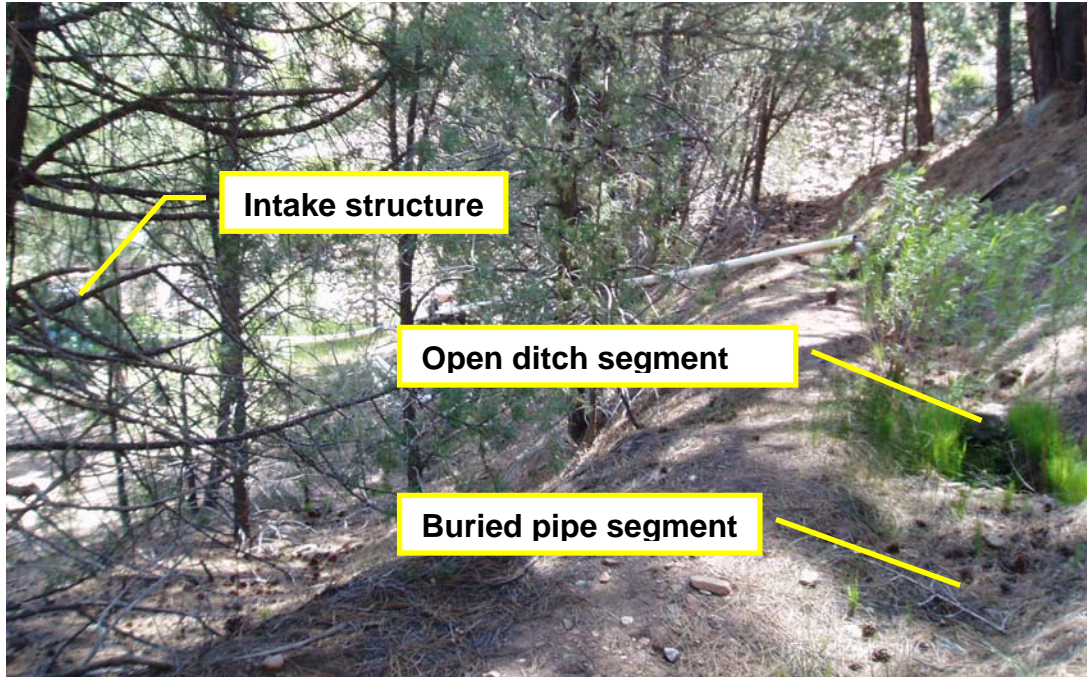


**4a:** Diversion structure showing toe of Nichols Dam, intake water control structure to be left in place, and pipeline running uphill to existing ditch.



**4b:** Upper end of intake pipe, releasing water into ditch.

**Figure 4: Acequia del Llano, existing condition (continued).**



**4c:** View along ditch facing upstream, showing intake pipe and small segment of open ditch.



**4d:** Open ditch segment running along Santa Fe Watershed Road

### 3.8 Wildlife

Because Santa Fe Canyon is transitional between biotic communities and includes riparian habitat, a variety of species are known or expected to occur within the project area. Mammals documented by the Randall Davey Audubon Center and the U.S. Fish and Wildlife Service include: Black Bear (*Ursus americanus*), Raccoon (*Procyon lotor*), Ringtail (*Bassariscus astutus*), Longtail and shorttail Weasels (*Mustela frenata*, *M. erminea*), Striped Skunk (*Mephitis mephitis*), Coyote (*Canis latrans*), Gray Fox (*Urocyon cinereoargenteus*), Bobcat (*Lynx rufus*), Porcupine (*Erethizon dorsatum*), Rock Squirrel (*Spermophilus variegatus*), Red Squirrel (*Tamiasciurus hudsonicus*), Abert's Squirrel (*Sciurus aberti*), Least Chipmunk (*Tamias minimus*), Deer Mouse (*Peromyscus maniculatus*), White-throated Woodrat (*Neotoma albigula*), Black-tailed Jack Rabbit (*Lepus californicus*), Mountain Cottontail (*Sylvilagus nuttali*), mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus*) and mountain lion (*Felis concolor*).

Birds to be expected in the canyon in fall and winter include the White-winged Dove, Northern Flicker, Steller's jay, Western Scrub-jay, Black-billed Magpie, Common Raven, Bushtit, Black-capped and Mountain chickadees, White-breasted Nuthatch, Townsend's Solitaire, Spotted and Canyon Towhees, Dark-eyed Junco, and House Finch. More complete species lists are available for the area from Randall Davey Audubon Center at [http://nm.audubon.org/center/Natural\\_History.html](http://nm.audubon.org/center/Natural_History.html) and The Nature Conservancy at [http://www.nature.org/wherewework/northamerica/states/newmexico/files/santa\\_fe\\_canyon\\_bird\\_checklist.pdf](http://www.nature.org/wherewework/northamerica/states/newmexico/files/santa_fe_canyon_bird_checklist.pdf).

Several species of herptiles are documented in Santa Fe County and could occur in the project area, including Canyon Tree Frog (*Hyla arenicolor*), Tiger Salamander (*Ambystoma tigrinum*), Gopher Snake (*Pituophis cantifer*) Many-lined Skink (*Eumeces multivirgatus*), and Whiptail lizards (*Aspidoscelis* spp.) (New Mexico Department of Game and Fish 2008).

Some wildlife species would be temporarily displaced during construction but are expected to return after construction is complete. Because the work would take place during the late fall, there would be no effect to migratory birds or to nesting or breeding behavior. Herptiles and most small mammals would not be active during this time. No direct negative impacts are expected occur to wildlife as a result of the proposed project or the No-Action alternative.

### 3.9 Special Status Species

Three agencies have primary responsibility for protecting and conserving plant and animal species within the proposed project area. The United States Fish and Wildlife Service (USFWS), under authority of the Endangered Species Act of 1973, has the responsibility for Federal listed species. The New Mexico Department of Game and Fish (NMDGF) has the responsibility for state-listed wildlife species. The New Mexico State Forestry Division (Energy, Minerals, and Natural Resources Department) has the responsibility for state-listed plant species. Special status species that occur in Santa Fe County and may occur near the proposed project area are listed below in Table 2 (USFWS 2008, NMDGF 2008).

**Table 2: Federal and State Threatened, Endangered, and Candidate Species Listed for Santa Fe County, New Mexico with Potential to Occur in the Project Area**

Common Name	Scientific Name	Federal Status (USFWS) <sup>a</sup>	State of New Mexico status
New Mexico jumping mouse	<i>Zapus hudsonius luteus</i>	C	
Black-footed ferret	<i>Mustela nigripes</i>	E, EXPN	X
Mexican spotted owl <i>Designated Critical Habitat</i>	<i>Strix occidentalis lucida</i>	T	S
Rio Grande cutthroat trout	<i>Oncorhynchus clarki virginalis</i>	C	
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	E	
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	E
Least tern	<i>Sterna antillarum athalassos</i>	E not listed for county	E
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	C	S
Bald eagle	<i>Haliaeetus leucocephalus</i>	DM	T
Peregrine falcon	<i>Falco peregrinus anatum</i>	SOC	T
Arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	SOC	T
Violet-crowned hummingbird	<i>Amazilia violiceps ellioti</i>	-	T
American marten	<i>Martes americana origenes</i>	-	T
Boreal owl	<i>Aegolius funereus</i>	-	T
Lilljeborg's peaclam	<i>Pisidium lilljeborgi</i>	-	T
White-tailed ptarmigan	<i>Lagopus leucura altipetens</i>	-	E
Baird's sparrow	<i>Ammodramus bairdii</i>	SOC	T
Gray vireo	<i>Vireo vicinior</i>	-	T

<sup>a</sup> **Endangered Species Act (ESA)** (as prepared by U.S. Fish and Wildlife Services) **status:**

**E**= Endangered: any species that is in danger of extinction throughout all or a significant portion of its range.

**T**= Threatened: any species that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.

**C**= Candidate: taxa for which the Services has on file sufficient information to support proposals to list them as endangered or threatened species.

**DM**= Delisted Taxon, Recovered, Being Monitored First Five Years

**EXPN** = Experimental Population, Non-Essential

**SOC** = Species of concern (included for planning purposes; not protected under ESA)

<sup>b</sup> **State of New Mexico status:**

**E**= Endangered: Animal species whose prospects of survival or recruitment within the state are in jeopardy.

**T**= Threatened: Animal species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.

**S**= Sensitive Taxa (informal).

**X**= Taxa considered to be Extirpated

The Bald Eagle, a Federally delisted and State Threatened species, is normally found near major waterways and larger lakes where adequate food supplies may be found. The Bald Eagle is known to occur in New Mexico primarily during the late fall and winter months. Bald Eagles utilize large trees for perching and forage primarily for fish, ducks, and carrion along rivers and at local reservoirs. Bald eagles have been observed flying down the canyon but are not known to roost at Nichols Reservoir. Large trees for roosting are not present in the acequia project area. Due to the lack of habitat and limited disturbance of the proposed project, there would be no effect to the Bald Eagle.

The Mexican spotted owl was listed as Threatened on Mar 16, 1993. A Recovery Plan was finalized on 16 October 1995. Critical habitat was designated on 31 August 2004 (50 CFR Part 17). This owl is frequently associated with mature mixed-conifer, pine-oak, and riparian forests including smaller trees under the canopy of large trees. Owls are also found in canyon habitat dominated by vertical-walled rocky cliffs within complex watersheds including tributary side canyons. These types of areas provide vertical structure and high plant species richness that are important to owls. Due to the proximity to developed urban areas, the past history of disturbance including logging, and the lack of mature forest and large trees, Mexican spotted owls are unlikely to occur in the project area. Mexican spotted owl critical habitat is located about 5 miles east of the Nichols Reservoir dam (Figure 3). However, the limited scope and disturbance of this project make it unlikely that there would be any effects beyond the immediate project area. In summary, due to the distance to critical habitat, lack of suitable habitat within the project area, and the limited disturbance caused by the proposed project, there would be no effect to the Mexican spotted owl or its designated critical habitat by either the proposed action or the No-Action alternative.

Other special status animals listed in Table 1 have not been detected in the project area and would not be affected by the proposed project due to the limited disturbance and the lack of preferred habitat in the project area.

Bats, including one Federal species of concern and three species considered sensitive by the State of New Mexico, may occur in the project area. The Santa Fe River riparian corridor and the acequia and its distribution system (laterals) support mesic or riparian vegetation in which insects are expected to be relatively abundant. The sensitive bat species are: Townsend's big-eared bat (*Corynorhinus townsendii*), Fringed Myotis (*Myotis thysanodes*), Yuma Myotis (*Myotis yumanensis*), and Small-footed Myotis (*Myotis subulatus*). A small strip of lush vegetation along the open ditch may be replaced by the typical pinyon-juniper upland vegetation of the canyon slopes once the open ditch is abandoned. However, the impact on the bats is expected to be minimal as the river channel with its riparian vegetation would not be affected. Rehabilitation of the acequia system would allow for the continued flow of water through the laterals and cultivation of orchards and crops that provide habitat for the bats' insect prey.

The Forestry Division of the New Mexico Energy, Minerals, and Natural Resources Department has the responsibility for maintaining the state list of rare, threatened and endangered plant species. The New Mexico Rare Plants Technical Council list indicates that there are twelve rare plant species that occur in Santa Fe County (New Mexico Rare Plants



Technical Council 2008; see Table 3). Although these plants are known to exist in Santa Fe County, they are not likely to occur within the project area. Most occur at higher elevations or on specialized substrates that do not occur in the project area. Also, there was no presence of these species during the site visit to the project area, nor have they been documented by the Canyon Neighborhood ( <http://www.sfcanyon.org/> ) or at the Audubon Center ( <http://nm.audubon.org/center/Plants.html> ). One rare plant, Santa Fe raspberry (*Rubus aliceae*) historically occurred in Santa Fe Canyon but has not been found in the past several decades and is taxonomically questionable. Correspondence with State Botanist indicated that its presence at the project site is unlikely (B. Sivinski, e-mail to D. Price, 11 September 2008). Therefore, there would be no effect to these rare plants by the proposed project or the No-Action alternative.

**Table 3: Rare, Threatened and Endangered Plant Species Listed for Santa Fe County, New Mexico**

Scientific name	Common Name	Status- Federal	Status- State
<a href="#"><i>Abronia bigelovii</i></a>	Tufted sand verbena	SOC	SOC
<a href="#"><i>Astragalus cyaneus</i></a>	Cyanic milkvetch	SOC	SOC
<a href="#"><i>Astragalus feensis</i></a>	Santa Fe milkvetch	SOC	SOC
<a href="#"><i>Astragalus siliceus</i></a>	Flint Mountains milkvetch	SOC	SOC
<a href="#"><i>Cuscuta fasciculata</i></a>	Santa Fe dodder	SOC	SOC
<a href="#"><i>Delphinium sapellonis</i></a>	Sapello Canyon larkspur	SOC	SOC
<a href="#"><i>Hackelia hirsuta</i></a>	New Mexico stickseed	SOC	SOC
<a href="#"><i>Mentzelia springeri</i></a>	Springer's blazing star	SOC	SOC
<a href="#"><i>Mentzelia todiltoensis</i></a>	Todilto stickleaf	SOC	SOC
<a href="#"><i>Muhlenbergia arsenei</i></a>	Tough muhly, Navajo muhly	SOC	SOC
<a href="#"><i>Opuntia viridiflora</i></a>	Santa Fe cholla	SOC	E
<a href="#"><i>Rubus aliceae</i></a>	Santa Fe raspberry	SOC	SOC

### 3.10 Cultural Resources

The Acequia del Llano is eligible for nomination to the National Register of Historic Places and the New Mexico State Register of Cultural Properties. This acequia has a water rights priority date of between 1877 and 1907 and currently serves 30 irrigated acres. Piping the ditch and changing its alignment could be considered an adverse effect to the ditch. However, the portion to be piped has been extensively modified, and no longer retains integrity.

A search of the New Mexico Cultural Resource Information System returned records of three historical sites in the vicinity of the project: LA120650, LA138426, and LA38429. The first two sites are associated with the old Santa Fe Watershed road. These roads continue in use as the main access routes to Nichols Reservoir and to the toe of the dam. The new proposed acequia alignment would follow LA120650, crossing it once, but would not otherwise alter or affect these historic roads. LA38429 is the remains of the old High Line Ditch, built in 1902 to supply the City's then-new hydroelectric plant (Goldman 2003). LA38429 lies upslope from Acequia del Llano and would be unaffected by the proposed work. None of these properties will be adversely affected by this project.

Downstream from the project area, the Randall Davey Audubon Center is a member of the Acequia del Llano. The Center encompasses 135 acres that were originally part of the Talaya Hill Grant given in 1731 to Manuel Trujillo. The Randall Davey House, which is listed in National, State and City of Santa Fe registers of historic and cultural buildings, was originally built as a sawmill, and provided lumber for the building of Fort Marcy. Artist Randall Davey lived and painted in the house from 1920-1964 (Audubon New Mexico 2008). The house is now maintained as a museum.

Nichols Dam, which now functions as the diversion structure for Acequia Del Llano, was constructed in 1943 and is therefore a historical structure in its own right. Nichols Dam would not be affected by the proposed work.

Corps archaeologists surveyed the 4.07-acre project area on June 20, 2008 (see Appendix A). No new archaeological sites or isolated occurrences were encountered during this survey in the project area. Historic properties visited include the acequia and the two watershed road segments (LA 120650 and LA 138426). The High Line Ditch was not relocated.

The Corps is of the opinion that the proposed project would have no adverse effect to historic properties, as detailed in the report in Appendix A. The New Mexico State Historic Office (NMSHPO) concurred with this finding on November 25, 2008 (See Appendix A). Should previously-undiscovered artifacts or features be unearthed during construction, work would be stopped in the immediate vicinity of the find, a determination of significance made, and the Corps will consult with the NMSHPO and with American Indian Tribes that may have concerns in the project area as to the best course of action.

### 3.11 Socioeconomic Considerations and Land Use

The historic Santa Fe Canyon Neighborhood lies along the lower portion of Acequia del Llano, downstream from the project area. Most acequia members live in this neighborhood; however, three members' primary residences are out of state. Most acequia members are also members of the Santa Fe Canyon Neighborhood Association. The neighborhood is characterized by a mix of longtime residents and newcomers and is somewhat rural in character with a mix of low-density residential and small agricultural landholdings.

The population of Santa Fe County in 2007 was estimated at 142,955 (U.S. Census Bureau 2008). Within Santa Fe County, the ethnic background is: Native American, 4.1%; Hispanic or Latino origin, 49.0%; African-American, 0.9%; Asian, 0.9%; two or more races, 3.6%. The Hispanic population of Santa Fe County is proportionally slightly greater than that of the State of New Mexico (42.1%), and the Native American population is proportionally smaller than that of the state as a whole.

Santa Fe County is relatively prosperous compared to New Mexico as a whole. In 2005, the estimated median household income in Santa Fe was estimated at \$45,786, while the estimate for the state was \$37,603 (U.S. Census Bureau 2008). Correspondingly fewer individuals in Santa Fe County are living in poverty (12.8% of individuals in Santa Fe County compared to 18.4% of individuals statewide). The unemployment rate for Santa Fe County also compares favorably with the state; the seasonally adjusted unemployment rate in July 2008 was 3.5% for Santa Fe County compared to the statewide rate of 4.1% (New Mexico Department of Workforce Solutions 2008).

Land uses in the vicinity of the project area include National Forest land; nature preserves owned by The Nature Conservancy and the Audubon Society; the City of Santa Fe's Water Treatment Plant and Nichols Reservoir; and low-density residential areas with orchards and gardens. The proposed project would not affect land use or socioeconomic resources in the project area and would permit the traditional acequia culture to continue. This in turn would help maintain the historic character of Canyon Neighborhood and the City of Santa Fe. All acequia members would benefit from the proposed action. Under the No-Action alternative, the viability of the Acequia del Llano would stagnate or possibly decline because of the decreased reliance on gardens and orchards for income or subsistence and the increasing difficulty of getting landowners who are new to the area to participate in acequia maintenance (Ackerly 1996).

### 3.12 Indian Trust Assets

Indian Trust Assets are legal interests in property held in trust by the United States for Indian tribes or individuals. Examples of trust assets include land, minerals, hunting and fishing rights, and water rights. The United States has an Indian Trust Responsibility to protect and maintain rights reserved by or granted to Indian tribes or individuals by treaties, statues, executive orders, and rights further interpreted by the courts. This trust responsibility requires

that all Federal agencies take all actions reasonably necessary to protect such trust assets. There would be no effect on Indian Trust Assets by the proposed project or the No-Action alternative.

### 3.13 Human Health and Safety

There would be no effect from the proposed project on community services, such as law enforcement, fire protection, emergency medical care, or schools. Public visitation and programs at the Randall Davey Audubon Center would not be affected because the work would take place outside the Center's boundary, in the closed watershed where the public is not allowed. Nevertheless, the work area will be clearly marked to ensure public safety. Neither the proposed project nor the No-Action alternative is expected to create adverse effects on human health or safety.

### 3.14 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Low-Income Populations; February 11, 1994) was designed to focus the attention of federal agencies on the human health and environmental conditions of minority and low-income communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations and proposed actions. The 1995 EPA guidance document, "Environmental Justice Strategy: Executive Order 12898" defines the approaches by which the EPA will ensure that disproportionately high environmental and/or socioeconomic effects on minority and low-income communities are identified and addressed. Further, it establishes agency wide goals for all Native Americans with regard to Environmental Justice issues and concerns.

The project would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. This program is largely intended to provide needed assistance (technical, financial, etc.) to Acequia and Community Ditch associations in which water resources are degrading and in need of improvement. Despite the relative prosperity of Santa Fe County, acequia associations find maintenance of these systems increasingly challenging as this work formerly relied on a communal form of work that has been displaced by the monetary economy. Acequia members who maintain a more traditional way of life may not have the financial resources to maintain or improve the acequia system, while newcomers may not appreciate the significance of this work or may not be willing or able to contribute to maintenance given time constraints. The proposed project would benefit all acequia members and the community as a whole by allowing the culturally and historically significant Acequia del Llano to continue to function. There would be no disproportional affect on minority and low-income communities as a result of the proposed action.

Under the No-Action alternative, the acequia members would likely find maintenance of the acequia system increasingly challenging. Those who rely on the acequia for income or

subsistence would be disproportionately affected. Thus, the No-Action alternative is more likely to affect the low-income segment of the local population.

### 3.15 Cumulative Impacts

NEPA defines cumulative effects as "...the impact on the environment which results from the incremental impact of the action when added to other, past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Another project that will take place in the Santa Fe Canyon area in fall 2008 is a USACE-funded project to improve the City of Santa Fe's Water Treatment Plant (WTP) on Upper Canyon Road. An Environmental Assessment is being prepared for this project. The site of the WTP is downstream from the Acequia del Llano project area and from the Randall Davey Audubon Center (Figure 1).

The WTP improvement project constitutes Phase III of scheduled phased modifications and improvements to enhance its reliability and to meet the goals of the Safe Drinking Water Act amendments. Implementation would begin in November 2008 and continue for approximately four months. The current phase of the WTP improvement project includes installation of new equipment and would not expand the footprint of the WTP or disturb any new ground. Equipment to be installed includes Two 65-foot diameter gravity thickeners, one additional 80,000 gallon EQ tank for spent filter backwash water, an EQ mix/recycle pumping station, spent filter backwash treatment using plate settlers, and a residual processing building with batch tanks and centrifuges.

Because the WTP improvement project would involve no new ground disturbance, its effects when added to the proposed Acequia del Llano rehabilitation would not result in significant effects to natural resources including air and water quality, floodplains and wetlands, soils, climate, vegetation, wildlife, or special status species. The WTP would address a health and safety need of the entire community; therefore, socioeconomic effects of the two projects cumulatively would be beneficial. There would be no cumulative impacts to cultural and historical resources. Traffic and noise may increase temporarily on Upper Canyon Road due to the two projects but this impact would be minor.

The footprint of the proposed Acequia del Llano rehabilitation project lies within a previously disturbed forested area near the urban interface. The construction would disturb less than one acre and would not significantly impact the current conditions of the local environment. Positive effects are anticipated to occur from the proposed project that would enhance the quality of life for residents in the area. For these reasons, the proposed project when combined with past, present, or future activities would not significantly add to or raise local cumulative environmental impacts to a level of significance.

#### 4.0 CONCLUSIONS AND SUMMARY

This Environmental Assessment addresses the potential effects of the rehabilitation of the Acequia del Llano. The proposed location is in Santa Fe Canyon immediately downstream from Nichols Reservoir. The rehabilitated acequia would run along the Santa Fe Watershed Road, east of the Santa Fe city limits on land owned by the City and the Audubon Society. Impacts to the environment would be non-significant and short-term. Long-term benefits to the acequia members and to the historic character of the Canyon Neighborhood would result from the project. The proposed project would not result in any moderate or significant, short-term, long-term, or cumulative adverse effects. Therefore, construction of the proposed project would not significantly affect the quality of the human environment and is recommended for implementation.

#### 5.0 PREPARATION, CONSULTATION AND COORDINATION

##### 5.1 Preparation

This Environmental Assessment was prepared by the U.S. Army Corps of Engineers, Albuquerque District. Personnel primarily responsible for preparation include:

Dana M. Price	Botanist
Lance Lundquist	Archaeologist
Jonathan Van Hoose	Archaeologist
Patricia Phillips	Project Manager

##### 5.2 Quality Control

This EA has been reviewed for quality control purposes. Reviewers include:

Julie A. Alcon	Chief, Environmental Resources Section
Champe Green	Senior Ecologist
Gregory Everhart	Archaeologist

##### 5.3 Consultation and Coordination

Agencies and entities that were consulted in preparation of this Environmental Assessment include:

Mr. Richard Ellenberg  
Acequia del Llano Representative

Ms. Linda Newberry and Ms. Karyn Stockdale  
Randall Davey Audubon Center

Mr. Robert M. Findling  
Director of Land Protection & Stewardship  
The Nature Conservancy in New Mexico

Mr. Gary P. Martinez, Director  
Santa Fe Water Division

Mr. Wally Murphy, Field Supervisor  
US Fish and Wildlife Service  
New Mexico Ecological Services Field Office

Mr. Robert Sivinski  
NM Forestry and Resources Conservation Division  
Energy, Minerals, and Natural Resources Department

Mr. Allen Fowler  
Forest Environmental Coordinator  
Santa Fe National Forest

Ms. Mary Orr  
Espanola Ranger District  
Santa Fe National Forest

Canyon Neighborhood Association

Acequia del Llano members

Honorable Joe Shirley  
President, Navajo Nation

#### 5.4 Mailing List for Draft Environmental Assessment

Mr. Wally Murphy  
Field Supervisor  
US Fish and Wildlife Service  
New Mexico Ecological Services Field  
Office  
2105 Osuna Road NE  
Albuquerque, NM 87113

Mr. Rob Lawrence  
US Environmental Protection Agency,  
Region 6  
Office of Planning and Coordination  
1445 Ross Avenue  
Dallas, TX 75202-2733

Mr. Steve Hansen  
Deputy Area Manager  
Bureau of Reclamation  
555 Broadway NE, Suite 100  
Albuquerque, NM  
87102-2352

Mr. Robert Sivinski  
NM Forestry and Resources Conservation  
Division  
Energy, Minerals, and Natural Resources  
Department  
P.O. Box 1948  
Santa Fe, NM 87504-1948

Mr. Matt Wunder  
NM Department of Game and Fish  
Conservations and Services Division  
P.O. Box 25112  
Santa Fe, NM 87504

Ms. Marcy Leavitt,  
Water and Waste Management Division  
NM Environmental Department  
P.O. Box 26110  
Santa Fe, NM 87502

Mr. John R. D'Antonio, Jr.  
NM State Engineer  
P.O. Box 25102  
Santa Fe, NM 87504-5102

Mr. Estevan Lopez  
NM Interstate Stream Commission  
P.O. Box 25102  
Santa Fe, NM 87504-5102

Ms. Linda Newberry  
Randall Davey Audubon Center  
P.O. Box 9314.  
Santa Fe, NM 87504

Robert M. Findling  
The Nature Conservancy in New Mexico  
212 E. Marcy Street  
Santa Fe, NM 87501

Gary P. Martinez  
Santa Fe Water Division  
801 W. San Mateo Road  
Santa Fe, NM 87505

Ms. Mary Orr  
Española Ranger District, Santa Fe National  
Forest  
PO Box 1346  
Española, NM 87532

Acequia del Llano members

Santa Fe Public Library  
Attn: Ms. Mary Adams  
145 Washington Street  
Santa Fe, NM 87501

Honorable Levi Pesata  
President, Jicarilla Apache Nation

Honorable Wallace Coffey  
Chairman, Comanche Nation of Oklahoma



Honorable Billy Evans Horse  
Chairman, Kiowa Tribe of Oklahoma

Honorable George Rivera  
Governor, Pueblo of Pojoaque

Honorable Joe Shirley  
President, Navajo Nation

Honorable Michael Chavarria  
Governor, Pueblo of Santa Clara

Honorable Max Zuni  
Lt. Governor, Pueblo of Isleta

Honorable Ernest Suina  
Governor, Pueblo de Cochiti

Honorable Earl Salazar  
Governor, Ohkay Owingeh

Honorable Ernest Mirabel  
Governor, Pueblo of Nambe

Honorable Benjamin H. Nuvamsa  
Chairman, Hopi Tribal Council

Honorable Sisto Quintana  
Governor, Pueblo of Santo Domingo

Honorable Roybal Leon  
Governor, Pueblo of San Ildefonso

Honorable Robert Mora  
Governor, Pueblo of Tesuque

#### 5.5 Summary of Public Review Comments and Corps' Responses

The Draft Environmental Assessment (DEA) was available for public review and comment from October 8 to November 7, 2008. A Notice of Availability was published in the Santa Fe Reporter on October 8 and in the Santa Fe New Mexican on October 10, 2008 (Appendix C). Additionally, an informational flyer was available at the Canyon Neighborhood Association annual picnic on September 20. The DEA was available on the Corps' website and at the Santa Fe Public Library.

A summary of the public and agency comments with the Corps' responses are included in Table 4. Comments were received from: the U.S. Fish and Wildlife Service (letter dated October 16, 2008; Appendix B); the Agua Fria Village Association (letter dated November 3, 2008; Appendix C); and the Randall Davey Audubon Center (letter dated November 5, 2008; Appendix C). The Navajo Nation Historic Preservation Department (letter dated October 22, 2008; Appendix A) identified no concerns but requested that they be informed of any new cultural resource discoveries. One acequia member called to obtain clarification about the work location, but did not submit comments. The New Mexico Energy, Minerals, and Natural Resources Department provided information in preparation of the DEA (e-mail dated September 11, 2008) but had no further comments. No other comments were received.

**Table 4: Public Review Comments Received and Corps' Responses**

ID	Comment	Response
USFWS	Rocky Mountain Elk ( <i>Cervus elaphus</i> ) and mountain lion ( <i>Felis concolor</i> ) should be added to the wildlife species list in Section 3.8.	Concur. Section 3.8 as been updated.
<b>Agua Fria Village Association</b>	<p>The plans to replace earthen ditch with irrigation pipe will reduce water evaporation and possible contamination. This complements the plans and goals of the Santa Fe Watershed Association for establishing a “Living River” for the Santa Fe River area.</p> <p>The six inch pipe may be too small for future uses of the Acequia Madre and Acequia de los Pinos. A pipe 8-12 inches in diameter would be more appropriate.</p>	<p>We appreciate your review and letter discussing the history of Agua Fria and the Santa Fe Watershed.</p> <p>We are following the NRCS' recommendations for the pipe diameter that is needed to accommodate the water allocated to and used by the Acequia del Llano. It is not a general rule to use 6" pipe. Other acequia projects have used larger diameter pipe and future projects would have their pipe sizing calculated based on usage and allocation.</p>
<b>Randall Davey Audubon Center</b>	<p>We believe that sufficient water and effort will be saved to justify the project. However, we have the following concerns that we ask that you address:</p> <p>Impacts on Audubon’s acequia ditch where the water exits the pipe into our open ditch.</p> <p>How hard will the water be coming out, and will it damage our open ditch?</p>	<p>The flow of water through the system would not exceed the Acequia's allocation of 150 gallons per minute, which is all the ditch can receive through the pipe coming out of the reservoir. This amount of water has been flowing in the ditch since the dam and outlet to ditch was installed. Flow would not change except that water formerly lost to seepage and evaporation would remain within the system. There is no drop from the end gate structure into the ditch; therefore, water velocity would remain the same. The size of rock rip-rap where the end gate empties into the existing open ditch is based on expected flow through the acequia.</p>

<p><b>Randall Davey Audubon Center</b> (continued)</p>	<p>Is there anything at that gate that regulates the flow and/or slows it down if necessary?</p> <p>Who will be responsible for watching how hard the water is coming out and whether it is damaging our ditch when increased flows occur?</p> <p>Who will be responsible for maintaining the outlet on Audubon property, cleaning it out if necessary and/or repairing any damage that might occur on our open ditch?</p> <p>Are erosion measures being proposed to deal with possible erosion, non-point pollution or other water quality issues and noxious weed invasion after the disturbance of the earth around the acequia?</p> <p>We are assuming that this is occurring on the easement that the acequia holds with National Audubon. If this is not accurate, please let us know, and a formal agreement may need to be written before the project can proceed.</p>	<p>Flow through the acequia would continue to be regulated at the source. At the dam, the 4" diameter steel pipe that is the beginning of the acequia has an inline valve that would start and stop the flow of water into the proposed pipeline. There is also a flow meter on the 4" dia steel pipe that measures actual pipe flow.</p> <p>The acequia association will continue to be responsible for management of water in the ditch, including pipe flows. This project would not change the operation of the Acequia or the responsibility of its members and Mayordomo or other authorized person to regulate water.</p> <p>By New Mexico law, the acequia group will be responsible for all management and maintenance of their ditch.</p> <p>The Corps will include Best Management Practices (BMPs) in contract specifications to prevent on- and off-site erosion. Following construction, the soil will be stabilized and revegetated using native plant materials, as stated on p. 7 of the Draft Environmental Assessment (DEA). The contract specifications will also include a requirement to clean all previously used equipment to prevent the spread of noxious weeds, as stated in p. 13 of the DEA.</p> <p>The acequia improvements will end immediately upstream of the Randall Davey Audubon Center boundary. Other Audubon property located upstream of the Center is crossed by the section of the acequia that will be piped.</p>
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<p><b>Randall Davey Audubon Center</b> (continued)</p>	<p>We would appreciate if someone from the acequia or NRCS would come out and show us exactly where on Audubon property the project will occur, and we can discuss any possible impacts.</p> <p>Because we have public visitors and children onsite on a regular basis, we want to alleviate, as much as possible, any impacts on our programs, so scheduling is also important.</p>	<p>This section will use the existing easement. Acequia representative, Mayordomo Richard Ellenberg has met with Audubon and will be available throughout the project if further consultation is needed.</p> <p>A pre-construction meeting will be held with the Contractor and work schedule can be discussed at this time. Work is taking place outside the Audubon Center boundary; disruption of programs or visitation is not anticipated.</p>
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## 6.0 REFERENCES CITED

- Ackerly, Neal W. 1996. A review of the historic significance and management recommendations for preserving New Mexico's acequia systems. Report prepared by Dos Rios Consultants, Inc. for the New Mexico Historic Preservation Division, Santa Fe. [http://www.nmacequiacommission.state.nm.us/Publications/nackerly\\_aceq\\_rpt96.pdf](http://www.nmacequiacommission.state.nm.us/Publications/nackerly_aceq_rpt96.pdf) .
- Audubon New Mexico. 2008. Randall Davey History. [http://nm.audubon.org/center/Davey\\_History.html](http://nm.audubon.org/center/Davey_History.html)
- Backlund, Peter, Anthony Janetos, and David Schimel. 2008. The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States. Final Report of the U.S. Climate Change Science Program Subcommittee on Global Change Research. <http://www.climatechange.gov/Library/sap/sap4-3/final-report/default.htm>
- Brown, David E. 1982. Desert Plants: Biotic Communities of the American Southwest-United States and Mexico. University of Arizona, Superior, Arizona.
- Brown, David E. and C.H. Lowe. 1977. Biotic Communities of the Southwest Map. USDA Forest Service, Ft. Collins, Colorado.
- Goldman, Don. 2003. The Santa Fe River and its Water. Report prepared by The Nature Conservancy in New Mexico, Santa Fe. 42pp.
- Grant, Paige. 2002. Santa Fe River Watershed Restoration Action Strategy. Santa Fe Watershed Association, Santa Fe, NM. [http://www.nmenv.state.nm.us/swqb/Santa\\_Fe\\_WRAS-2002.pdf](http://www.nmenv.state.nm.us/swqb/Santa_Fe_WRAS-2002.pdf) .
- League for the Hard of Hearing. 2008. Noise levels in our environment fact sheet. <http://www.lhh.org/noise/facts/environment.html> (Accessed: 16 September 2008).
- Federal Emergency Management Agency. 2008. Flood Insurance Rate Map: Santa Fe County, New Mexico. Map Number 35049C0409D.
- New Mexico Department of Game and Fish. 2008. New Mexico Species List/Species Account – BISON-M. <http://www.bisonm.org> (Accessed: 29 August 2008).
- New Mexico Department of Workforce Solutions. 2008. Economic Research and Analysis. Table A: Civilian Labor Force, Employment, Unemployment and Unemployment rate. <http://www.dws.state.nm.us/LMI/dws-data.html#TA> (Accessed: 16 September 2008).
- New Mexico Environment Department Air Quality Bureau. 2008. Ambient Air Monitoring in New Mexico. <http://www.nmenv.state.nm.us/aqb/monitor/index.html> (Accessed: 18 September 2008).

- New Mexico Environmental Department Surface Water Quality Bureau. 2008. 2008-2010 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List of Assessed Surface Waters. <http://www.nmenv.state.nm.us/SWQB/303d-305b/2008-2010/index.html>
- New Mexico Office of the State Engineer. 1987. Irrigation in New Mexico State Special Report. A Roster, by County, of Organizations Concerned with Surface Water Irrigation in New Mexico. Santa Fe, NM. Available online at <http://www.nmacequiacommission.state.nm.us/Publications/ose-acequia-rpt1987.pdf>
- New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants Home Page. Albuquerque, NM. <http://nmrareplants.unm.edu> (Latest update: 14 August 2008)
- Snow, David H. 1988. The Santa Fe Acequia Systems. Planning Department, City of Santa Fe, NM.
- U.S. Census Bureau. 2008. USA Counties General Profile: Santa Fe, New Mexico. <http://censtats.census.gov/usa/usa.shtml> (Accessed: 16 September 2008)
- U.S. Census Bureau. 2005. Small Area Income and Poverty Estimates for New Mexico Counties, 2005. <http://www.census.gov/hhes/www/saipe/county.html>
- U.S. Department of Agriculture. 2008. Online Soil Survey for Santa Fe County. <http://websoilsurvey.nrcs.usda.gov/app/> (Accessed: 15 September 2008).
- U.S. Environmental Protection Agency. 2008. *Air data by geographic area: State of New Mexico*. <http://www.epa.gov/air/data/repsst.html?st~NM~New%20Mexico> (Accessed: 22 August 2008).
- U.S. Fish and Wildlife Service. 2008. Endangered Species List: Santa Fe County, New Mexico. <http://www.fws.gov/southwest/es/EndangeredSpecies/lists/> (Accessed: 19 August 2008).