ENVIRONMENTAL ASSESSMENT

for the

ACEQUIA DE LOS RANCHOS REHABILITATION PROJECT
SANTA FE COUNTY
NEW MEXICO

Prepared by

US Army Corps
of Engineers®
Albuquerque District

4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109

February 2010

Finding of No Significant Impact
Acequia de los Ranchos
Santa Fe County
New Mexico

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the Camino de los Ranchos Acequia, Santa Fe County, New Mexico, is planning a project that would improve the acequia. The purpose of this project is to provide the Acequia de los Ranchos Association (Association) members with a reliable and more efficient water distribution system. The existing concrete ditch lining system is aged and damaged beyond repair and is expected to fail completely in the future. Additionally, erosion from non-member livestock accessing the ditch results in continual sedimentation of the ditch.

The construction work is authorized under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662). The Act authorizes the Corps to conduct restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Under Section 1113 of the Act, Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region. The Corps is responsible for 75 percent of total project costs while the Office of the State Engineer (OSE) and the local ditch association, would be responsible for the remaining 25 percent of the total project cost. Project design and inspection would be undertaken by the USDA Natural Resources Conservation Service. The duration of the proposed construction would be eight weeks, and is expected to start in February 2010.

The Corps, in cooperation with the OSE and the Association, proposes to construct:

- 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia;
- a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River;
- a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Rio Quemado and 178 feet of 15-inch diameter plastic pipeline to the sluice structure at the Santa Cruz River;
- three 12-inch diameter left turn outs with 12-inch diameter alfalfa valves;
- two 15-inch diameter in-line gates;
- a 15-inch diameter aluminum flap;
- one air vent on the Rio Quemado pipeline and two air vents on the Santa Cruz River;
- six air relief valves along the length of the pipeline.

Vegetation would be removed from approximately 2 acres along the acequia alignment during construction. Two proposed staging areas (0.27 and 0.63 acres) have been identified on acequia members' properties). All pipeline work is within the acequia's right-of-way.

The proposed action is the reconstruction of an existing, recently damaged irrigation structure. Therefore, under 33 CFR 323.4, the project is exempt from the provisions of Section 404 of the Clean Water Act (33 CFR 323.4). Construction along the existing acequia alignment would not

affect the adjacent floodplain. Therefore, the planned action is consistent with Executive Order 11988 (Floodplain Management).

Aside from the acequia itself, the cultural survey found no prehistoric or historic archaeological sites or other historic properties within or immediately adjacent to the project area. The Corps has determined that the acequia system is eligible for listing on the National Register of Historic Places. The proposed action would affect the Acequia de los Ranchos itself; however, the Corps is of the opinion that the proposed action would not adversely impact those elements of the acequia that contribute to its historic significance. To date, the Corps has received no indication of tribal concerns that would impact the project. Based on this information, the Corps is of the opinion that there would be **no adverse affect to historic properties** by the proposed undertaking, or on the historic and cultural resources of the region.

None of the species of concern listed for Santa Fe County are expected to occur in the project area. There would be no effects to bald eagles, southwestern willow flycatchers, Rio Grande silvery minnows, or black-footed ferrets, or any other federal threatened or endangered species.

Best Management Practices (BMPs) that would be employed during construction include the use of silt fences as part of the Fugitive Dust Control Permit, wetting of soils within the construction zone, and compliance with local soil sedimentation and erosion-control regulations. The contractor would be required to have emission control devices on all equipment, and to use paved or graveled roads for access to the work area if possible. Construction has been scheduled during fall and winter months when reptiles and amphibians are less active. Sloped escape ramps will be provided along the ditch during construction to facilitate passive escapement by small animals. The trenches would be examined daily, prior to starting work, for small mammals and reptiles to be removed prior to initiating work. A Storm Water Pollution Prevention Plan would be prepared by the contractor and implemented during construction. Disturbance to vegetation during construction would be mitigated by native re-seeding and re-vegetation with plant species native to New Mexico. All equipment would be cleaned when moving between areas to prevent transfer of noxious weeds.

Only minor short-term adverse impacts to visual resources, soils, air, noise, vegetation, and wildlife, would occur during construction. No impacts would occur to physiography, geology, water resources, climate, wetlands or other waters of the U.S., special status species, floodplains, environmental justice, or cultural resources. There would be a minor beneficial impact to socioeconomics and land use. The proposed action would not result in any moderate or significant, short-term, long-term, or cumulative adverse effects.

The planned action has been fully coordinated with federal, state, tribal, and local agencies with jurisdiction over the ecological, cultural, and hydrological resources of the project area. Based upon these factors and others discussed in detail in the Environmental Assessment, the planned action would not have a significant effect on the human environment. Therefore, an Environment Impact Statement will not be prepared for the proposed improvement of the acequia irrigation ditch.

2/8/10
Date

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

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1.0 INTRODUCTION

1.1 Background and Location

The Water Resources Development Act (WRDA) of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq. as amended) authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Under Section 1113 of the Act, Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region. The Secretary of the Army, therefore, has been authorized and directed to undertake, without regard to economic analysis, such measures as are necessary to protect and restore New Mexico's acequias. The Act also recognized community acequias as public entities, allowing acequia officials to serve as local sponsors of water related projects through the Department of Defense.

Section 215 of the Flood Control Act of 1968 (P.L. 90-483), as amended, 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, 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 supervision of the Chief of Engineers. The U.S. Army Corps of Engineers, Albuquerque District (Corps) is responsible for 75 percent of total project costs while the Office of the State Engineer (OSE) and the local ditch association would be responsible for the remaining 25 percent of the total project cost. The Corps has the authority for review and approval of the environmental impacts of the proposed project, as presented in this Environmental Assessment (EA). Project design and inspection would be undertaken by the USDA Natural Resources Conservation Service. The duration of the proposed construction would be eight weeks, and is expected to start in February 2010.

The proposed action at the Acequia de los Ranchos is located in Chimayo, New Mexico near the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road (Figures 1 and 2). The principal objective of the acequia rehabilitation project is to improve the maintenance of the acequia madre and the efficiency of water delivery to the acequia members.

1.2 Purpose and Need

The purpose of this project is to provide the Association members with a reliable and more efficient water distribution system. The existing concrete ditch lining system is aged and damaged beyond repair and is expected to fail completely in the future. Additionally, erosion from non-member livestock accessing the ditch results in continual sedimentation of the ditch.

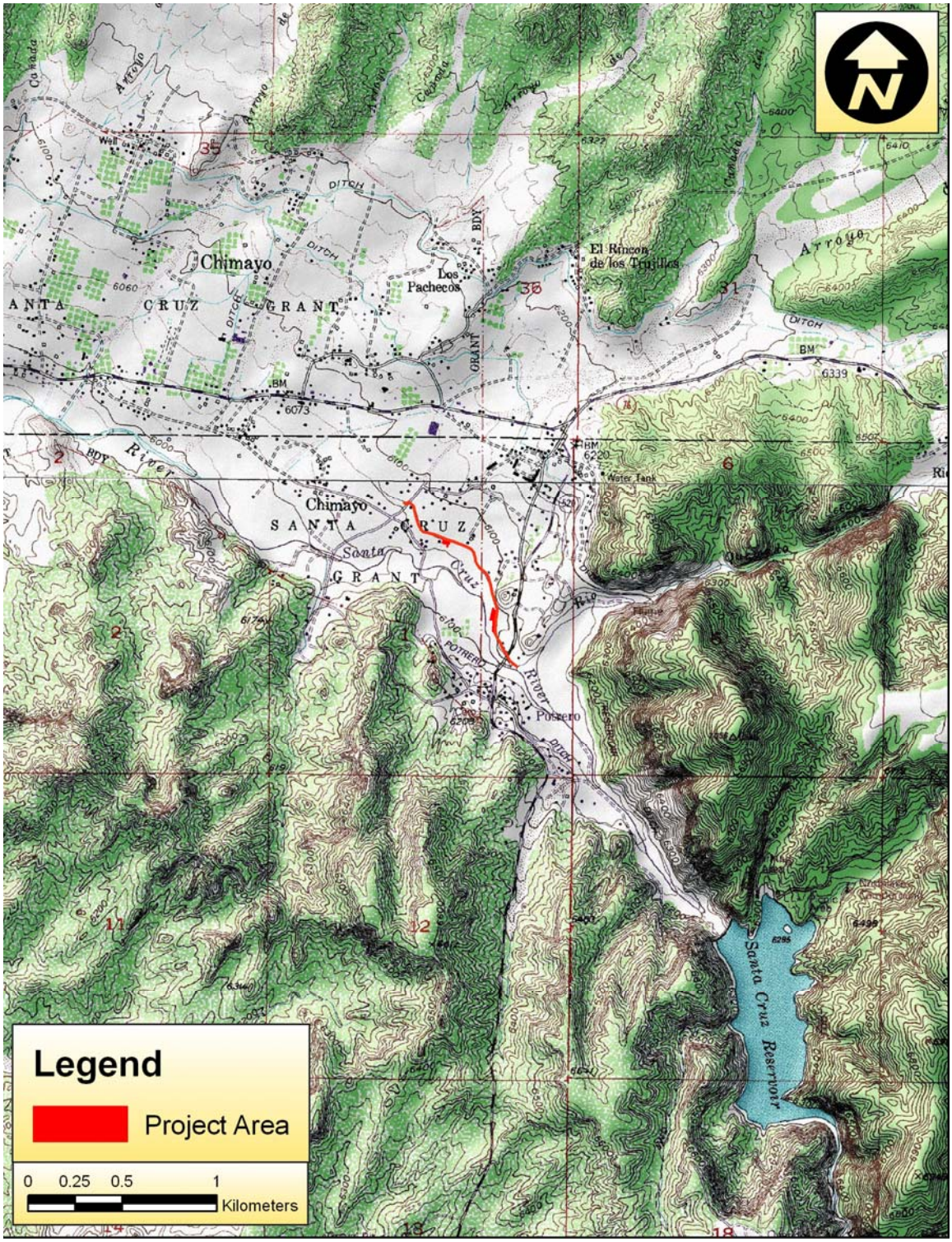

Figure 1. Vicinity map of proposed action location for Acequia de los Ranchos, Santa Fe County, New Mexico.

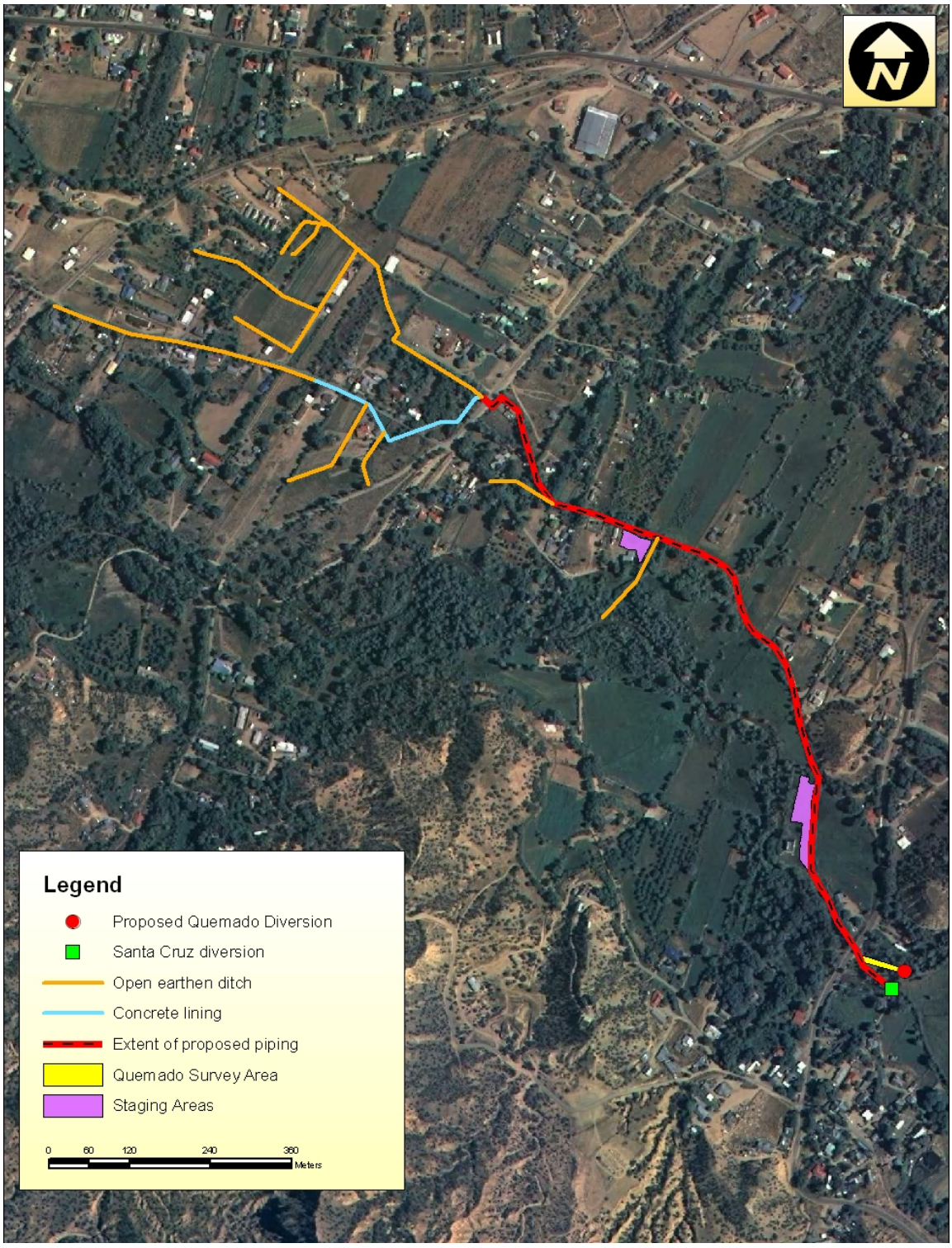

Figure 2. Detail of project area for proposed Acequia de los Ranchos rehabilitation, Santa Fe County, New Mexico.

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 as amended, including the following:

- National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq*.)
- Archaeological Resources Protection Act (16 U.S.C. 470 *aa et seq*.)
- Clean Water Act (33 U.S.C 1251 *et seq.*)
- Clean Air Act (42 U.S.C. 7401 *et seq.*)
- Endangered Species Act (16 U.S.C. 1531 *et seq*.)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations
- Executive Order 11988, Floodplain Management
- National Environmental Policy Act (42 U.S.C 4321 *et seq*.)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Part 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 (25 U.S.C. 3001 *et seq*.)
- Executive Order 11593, Protection and Enhancement of the Cultural Environment
- Executive Order 11990, Protection of Wetlands
- U.S. Army Corps of Engineers' Procedures for Implementing NEPA (33 CFR Part 230; ER 200-2-2)
- Farmland Protection Policy Act (7 U.S.C. 4201 *et seq.*)
- Executive Order 13112, Invasive Species
- Federal Noxious Weed Act (7 U.S.C. 2814)
- Energy Independence and Security Act of 2007, P.L. 110-140, Section 438, 121 Stat. 1492, 1620 (2007)

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

1.4 Scoping and Issues

Scoping for this EA is based on potential issues at the proposed action site. They include cultural resources, best management practices, water quality, vegetation and wildlife. Appendix A contains copies of the scoping letters submitted to potentially interested agencies.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

All agencies that assist or take part in projects that utilize Federal funding are mandated by the National Environmental Policy Act (NEPA) to evaluate alternative courses of action. Typically, alternatives are a set of different locations that satisfy certain defined project criteria. However,

alternatives can also include design considerations and/or attributes that may mitigate or reduce impacts generated by a given action. In general the NEPA process provides decision makers with an evaluation of the present and future conditions with regard to the implementation and timing of an alternative at a given site. Finally, a particular design chosen from alternatives evaluated can then be implemented in the best interest of the public and environment.

2.1 Proposed Action

The Corps, in cooperation with the OSE and the Association, proposes to construct: 1) 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia (Figure 2); 2) a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River (Station 0+00); 3) a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Rio Quemado and 178 feet of 15-inch diameter plastic pipeline to the sluice structure at Station 1+75; 4) three 12-inch diameter left turn outs with 12-inch diameter alfalfa valves at Stations 23+32, 27+70, and 32+44; 5) two 15-inch diameter in-line gates at Stations 32+50 and 39+15; 6) a 15-inch diameter aluminum flap gate at Station 39+20; 7) one air vent on the Rio Quemado pipeline at Station 0+06; two air vents on the Santa Cruz River pipeline at Stations 0+10 and 1+85; and 8) air relief valves at Stations 0+55, 3+10, 32+45, 32+55, 38+00, and 39+10. Vegetation would be removed from approximately 2 acres along the acequia alignment during construction. Two proposed staging areas (0.27 and 0.63 acres) have been identified on acequia members' properties (Figure 2). All pipeline work is within the acequia's right-of-way.

As the action agency, the Corps would provide 75 percent of construction funding for this project. The non-Federal financial responsibility of any work carried out under this section of the Act is 25 percent. OSE is the local project sponsor, and with the Association would be responsible for the remaining 25 percent of construction costs. Project design has been completed by the USDA Natural Resources Conservation Service (2007).

The existing concrete ditch lining system is damaged beyond repair and is expected to fail completely in the future. Additionally, erosion from non-member livestock accessing the ditch results in continual sedimentation of the ditch. The current proposed acequia improvements would replace a portion of the existing concrete-lined ditch, add a sluice structure to the currently functioning diversion structure on the Santa Cruz River, and replace a currently non-functioning diversion structure on the Rio Quemado. The proposed action would construct a new plastic pipeline with sluicing structures and protective features that would exclude adjacent runoff, trash and debris. This alternative was selected because of ease of operation, efficiency, maintenance and available site conditions with easy access, and also low annual maintenance cost. The proposed construction period for the proposed action is eight weeks and is expected to start in February 2010. The Federal costs for this phase of the proposed action are $138,028.97 with a non-Federal cost share of $46,009.65.

2.2 Alternative Analysis

Two alternatives were considered and then eliminated from further study. They are 1) replacing the non-reinforced concrete with an earthen ditch; and 2) replacing the non-reinforced concrete with reinforced concrete. These alternatives were not carried forward for further review in this EA because of cost, logistics, maintenance requirements, and/or functionality.

Factors that can determine the particular method of ditch rehabilitation include the elevation and slope of land adjacent the ditch, public safety, and cost. Seepage problems resulting in loss of water and problems with bank stabilization typically accompany earthen ditches and these are resolved with either piping or concrete lining. While open ditches are aesthetically pleasing and in keeping with the cultural and historical nature of these structures, they require labor-intensive and costly cleaning to remove sediment and accumulated debris. It can be easier to make repairs on open ditches as damaged areas are readily identified and accessible. Buried pipe eliminates public safety concerns associated with open ditches, eliminates sediment entry from adjacent surface water runoff erosion in sloped areas, and eliminates channel blockages from external debris.

2.3 The No-Action Alternative

Under the No-Action alternative, there would be no construction of the irrigation pipeline, sluicing structures, protective grates, or air vents. No federal funding would be expended and there would be no new effects to the project site or surrounding environment. The acequia would continue to expend funds for routine cleaning and maintaining the structural integrity of the open ditch. The No-Action alternative would have no impact to the ensuing resources; however the acequia would continue to fill with sediment and require constant maintenance.

3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

3.1 Physical Resources

3.1.1 Physiography and Geology

The project area is on the Intermontane Plateaus of the Southern Rocky Mountains Province (Fenneman and Johnson 1946; Natural Resources Conservation Service 2009a). The Rio Quemada is a tributary to the Santa Cruz River with the Acequia de los Ranchos located immediately upstream of the confluence. Landforms in most areas are controlled by the underlying sedimentary rock formations, with fluvial landforms in the Rio Grande rift basin. Elevation ranges between 4,600 to 9,300 feet (1,400 to 2,835 meters) in areas of the foothills and high mesas that border the Southern Rocky Mountains. Relief generally is less than 1,500 feet (455 meters).

Most of the area is characterized by generally horizontal beds of sedimentary rocks (Natural Resources Conservation Service 2009a). The sedimentary rocks have been eroded into plateaus, mesas, hills, and canyons. Wide valleys in the rift basin have accumulated deep alluvial sediments, and fan remnants are common. The Española Basin is a west-tilted half graben and a

prominent feature of the Rio Grande rift. Surficial geology in the project area consists of west-dipping beds of the Tesuque Formation, which are middle to upper Miocene age (Kelson and Olig 1995), and modern alluvium associated with arroyo channels.

Physiographic characteristics of the project area and local geologic conditions would not be affected by either the no action or the proposed action alternatives. The proposed action would not cause any marked changes in local surface topography.

3.1.2 Soils

The soil in the project area is primarily stream alluvium (Mirada-Bosquecito complex and Chupe fine sandy loam) derived from sandstone, siltstone, granite, gneiss, and schist resulting in a fine sandy or silt loam above a fine sandy loam with a base of stratified gravelly coarse sand over the floodplain for the Santa Cruz River (Natural Resources Conservation Service 2009a). The adjacent hillslope is composed of very fine sandy loam derived from micaceous sandstone and siltstone (Koshare) on top of gravelly coarse sand. The soil moisture regime is mainly aridic with a mesic soil temperature (Natural Resources Conservation Service 2009b).

Soil conditions in the project area would not change with the no action alternative. Continuing maintenance of the existing facility would include periodic removal of accumulated sediment from the open ditch segments.

The existing soil conditions in the project area were created by irrigated agriculture, and road construction. Ongoing actions affecting soils in the project area are limited to periodic maintenance of the open ditch. The proposed action would include placement of soil to fill the existing ditch, create a bed for the pipeline, and level the ground surface of the filled area. Based on an area averaging about 22 feet wide with a length of 4,000 feet, the resulting fill would cover about 2 acres. The fill would be similar in composition to existing soils. The 2-acre impact area would be devoid of vegetation in the short term and would therefore be subject to increased erosion rates compared to undisturbed, vegetated areas. Another 0.91 acres of land on two private landowners' properties (Figure 2) would be used as staging areas. There would be a short-term effect to soils during construction at the staging area as it would be used for stockpiling materials and equipment. After construction, soils would be stabilized with the re-seeding and the reestablishment of vegetation.

3.1.3 Climate

Santa Fe County has a semiarid climate. The project area has a mid-latitude desert climate, with an annual average precipitation amount of 9.85 inches as recorded for nearby Espanola, NM (Western Regional Climate Center 2009). Precipitation is irregular, but there is typically a pattern of monsoonal rains in July and August as Gulf air masses penetrate into the region (Figure 3). Cyclonic precipitation occurs during winter months, with average annual snowfall of 11.6 inches. Average diurnal temperature fluctuations of 20° F to 30° F are characteristic of the project area. Summer temperatures are warm and winters are mild (Figure 4). Average air temperatures worldwide are predicted to increase beyond the current range of natural variability because human activities have, since the Industrial Revolution, caused accumulation of greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide, chlorofluorocarbons) in the atmosphere (U.S. Environmental Protection Agency 1998, 2005). The potential impacts

resulting from climate change are varied, even within the State of New Mexico (New Mexico Agency Technical Work Group 2005). Summer air temperatures in the southwestern U.S. are predicted to rise considerably from 2010 through 2039, average annual precipitation is expected to decrease, and mountain snow-packs are predicted to decrease significantly (Field *et al*. 2007: 627).

New Mexico Governor Bill Richardson signed Executive Order 05-33 in 2005, which included development of recommendations for reducing greenhouse gas emissions in the State to year 2000 levels by 2012, 10 percent below 2000 levels by 2020, and 75 percent below 2000 levels by 2050. The year 2000 reference level is 83 million metric tons of carbon dioxide equivalent gases (MMtCO e; New Mexico Climate Change Advisory Group 2006: 2-2). Residential and commercial fuel use accounted for about five percent of total emissions in the State in 2000 (New Mexico Climate Change Advisory Group 2006: 2-4), or about 7.3 MMtCO e (New Mexico Climate Change Advisory Group 2006: 2-6).

The no action alternative would not affect the existing climate as no changes would occur in regards to rehabilitation of the acequia.

The proposed action will result in additional temporary and minimal greenhouse gas emissions during construction of the project, and will cumulatively add to past, ongoing, and future greenhouse gas emissions in New Mexico. The project-related emissions will be a very small proportion of the total greenhouse gas emissions in the State (83,000,000 metric tons). Project-related greenhouse gas emissions can be reduced by implementing one or more of the Best Management Practices (BMPs) described in section 3.2.1. Climate will not be adversely impacted by the proposed action.

3.1.4 Water Resources

The project area is located on the alluvial floodplain of the Santa Cruz River, a tributary to the Rio Grande. The peak storm flows since 1932 are between 500-700 cfs, based on the USGS Santa Cruz River near Cundiyo, NM gage (08291000) data (USGS 2009). It should be noted that this gage is located upstream of Santa Cruz Reservoir and the project area exists downstream where there is no gage. The range of average annual discharge is between 18 and 616 cfs.

Section 404 of the Clean Water Act, (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. Projects that involve a discharge, or placement, of dredged or fill material in the waters of the United States, including wetlands, require the Corps to complete a Section 404 (b) (1) evaluation. Construction of irrigation ditches is exempted from Section 404 of the Clean Water Act (CWA; 33 U.S.C. 1251 et seq.); therefore a Section 404(b) (1) analysis would not be needed for the project.

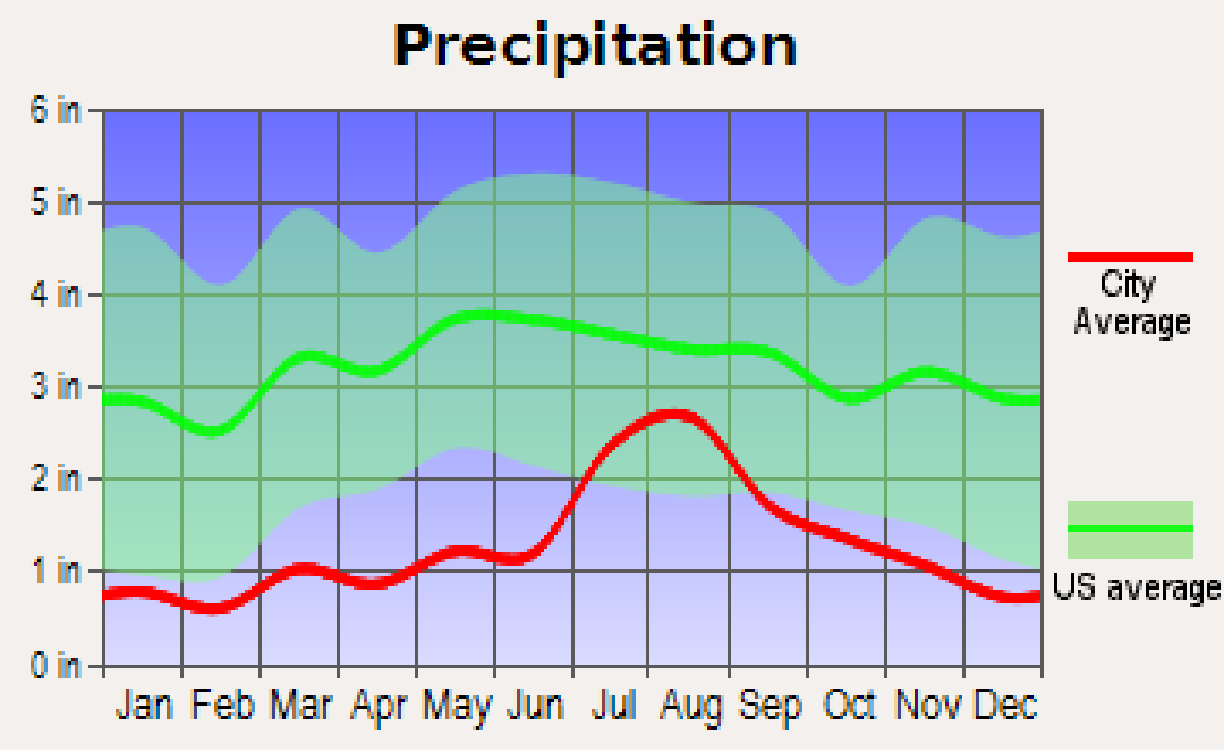

Figure 3. Precipitation characteristics in Chimayo near project area.
Graph generated by City.com (2009).

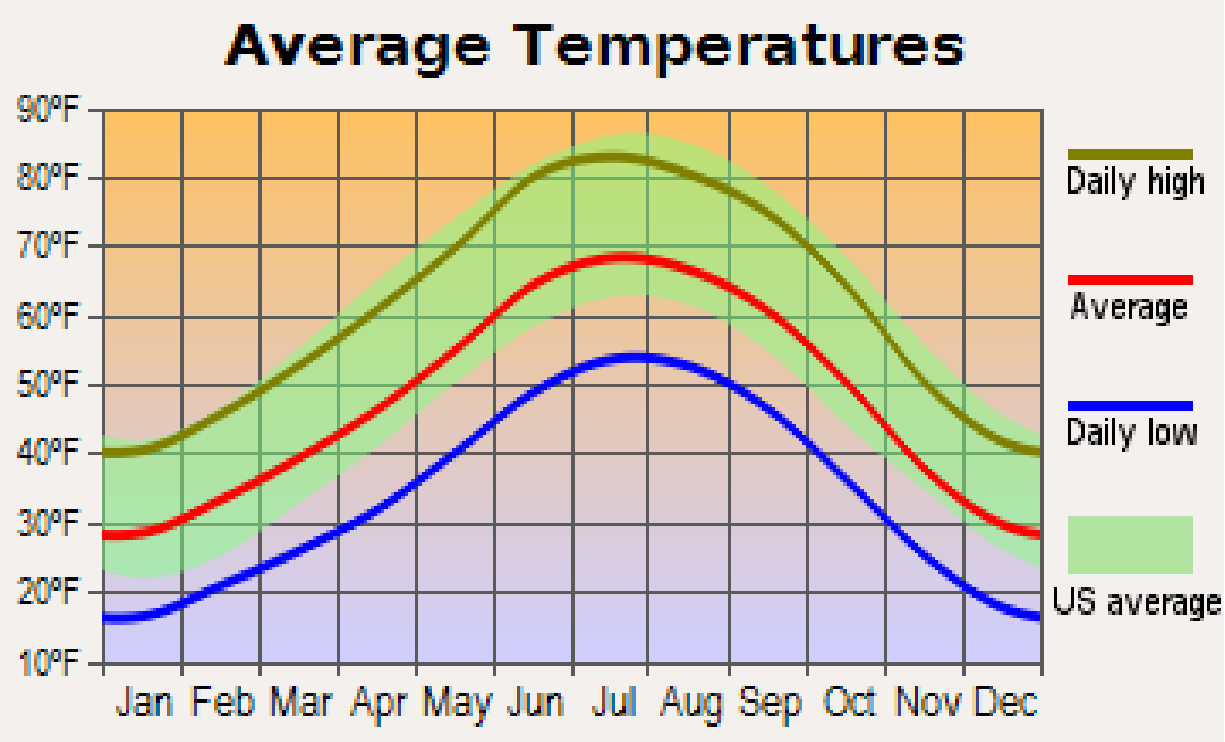

Figure 4. Temperature characteristics in Chimayo near project area.
Graph generated by City.com (2009).

Section 401 of the CWA, (CEA; 33 U.S.C. 1251 *et seq.*) as amended, requires that a Water Quality Certification Permit be obtained for anticipated discharges associated with construction activities or other disturbance within waterways. Section 401 of the CWA does not apply to this project, as there would be no discharge associated with construction activities or other disturbance within waterways.

Section 402 of the CWA (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 would be conducted under the National Pollution Discharge Elimination System (NPDES) guidance. Construction activities associated with storm-water discharges are characterized by such things as clearing, grading, and excavation, subjecting the underlying soils to erosion by storm-water, which results in a disturbance to one or more acres of land. The NPDES general permit guidance would apply to this project because the total area is greater than one acre. Therefore, Storm-Water Pollution Prevention Plan (SWPPP) is required. Standard Best Management Practices to prevent on- and off-site erosion would be incorporated in contract specifications. Impacts from storm-water are expected to be negligible.

3.1.5 Floodplains and Wetlands

Executive Order 11988 (Floodplain Management) provides Federal guidance for activities within the floodplains of inland and coastal waters. The order 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. The project area is classified as a special flood hazard area inundated by 100-year floods with no elevations determined (Federal Emergency Management Agency 2008). Replacement of ditch with a pipeline would reduce the potential damage from flooding to the acequia. Construction would occur along the existing acequia alignment and not result in permanent alterations to the adjacent floodplain. Therefore, impacts to the historic or current floodplains are not expected due to the proposed action.

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. An ephemeral wetland, less than 0.5 acre in size, is located on private property along approximately 100 feet of the existing acequia. Source water from this wetland comes from another irrigation ditch and the area is dry during winter months. Crews would avoid the wetland during the acequia rehabilitation.

3.2 Air Quality and Noise

3.2.1 Air Quality

The Clean Air Act of 1970, as amended, established National Ambient Air Quality Standards for six criteria air pollutants: ozone, airborne particulates, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. If measured concentrations of the six pollutants exceed their respective standards, the U.S. Environmental Protection Agency can designate the area as a non-attainment area for that pollutant.

The Upper Rio Grande Valley Intrastate Air Quality Control Region 157 covers 6,136 square miles in the northern section of the state including Santa Fe County. No exceedances of the National Ambient Air Quality Standards have been measured in the air quality monitoring network in Santa Fe County (New Mexico Environment Department 2009a). The nearest air quality monitoring stations are in Santa Fe County (New Mexico Environment Department 2009b). Therefore, the area is currently in attainment of all Federal air quality standards.

The no action alternative would not affect existing air quality as no changes would occur in regards to rehabilitation of the acequia.

The proposed action would result in short-term effects to local air quality from operation of a backhoe during construction. A temporary increase in particulates (dust) would be expected as a result of soil disturbance. Also, local concentrations of carbon monoxide would increase minutely from equipment emissions during the eight week construction period. No long-term effects to air quality are anticipated as a result of operation of the proposed facilities.

Construction-related effects to air quality would be minimized with Best Management Practices (BMPs) by: 1) requiring the contractor to have emission control devices on all equipment; 2) employing the use of best management practices to control wind erosion, including wetting of soils within the construction zone; 3) compliance with local soil sedimentation and erosion-control regulations; and 4) the use of already paved or graveled roads for access to the work area. Construction and maintenance of the proposed action would conform to air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act. Therefore, there would be short term negative effects on air quality during construction only.

3.2.2 Noise Levels

In considering potential effects of increased noise levels, sensitive noise receptors are identified in a project area. Sensitive receptors include but are not limited to homes, lodging facilities, hospitals, parks, and undeveloped natural areas.

Background noise levels in the proposed action area are relatively low. According to the Noise Center for the League for the Hard of Hearing (League for the Hard of Hearing, 2007), a typical, quiet residential area, has a noise level of 40 decibels. A residential area near heavy traffic has a noise level of 85 decibels. Heavy machinery has a noise level of 120 decibels. During construction, noise would temporarily increase in the vicinity during vehicle and equipment operation. The Noise Center advises that noise levels above 85 decibels would harm hearing over time and noise levels above 140 decibels can cause damage to hearing after just one exposure. However, the increase in noise during construction would be minor and temporary, ending when construction is complete. Therefore, the proposed action would have a short term negative effect on noise during construction only.

The project area generally has a moderate to low level of noise as most of the area is semi-rural with two-lane paved roads and scattered homes. Sounds created by humans heard in the project area included vehicle traffic traveling adjacent roads, especially State Route 76 and Juan Medina Road.

The no action alternative would not result in any construction in the project area. Therefore, there would be no adverse effect on current noise levels.

If the proposed action is implemented, there would be temporary increases in noise levels from backhoe operation, lasting for about eight weeks during the construction period. Additional construction-related noise from vehicles and people at the site would persist throughout the construction period. These increases in noise would occur in day time hours and may disrupt the relatively quiet project setting. Birds and other wildlife that use this area may be temporarily displaced by the increased level of noise. To reduce temporary construction noise, construction contract BMPs would require that construction equipment and activities comply with state and local noise control ordinances.

3.3 Biological Resources

3.3.1 Vegetation Communities

The project area is located on the edge of the Rocky Mountain Montane Conifer Forest biotic community as described by Brown (1982). The vegetation along the Santa Fe River is typical riparian willows and cottonwood. The upland vegetation at the lower elevations is grass and sagebrush with piñon -juniper woodland and ponderosa pine forests are at mid elevations. Forests of Rocky Mountain Douglas-fir and white fir are at the higher elevations.

The no action alternative would not result in any construction in the project area. Therefore, there would be no adverse effect to current vegetation communities.

BMPs include re-vegetation of the disturbed project areas with native plant species would occur following construction. Therefore, there would be short-term effects to vegetation during construction.

3.3.2 Noxious Weeds

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 addition, the State of New Mexico, under administration of the U.S. Department of Agriculture, designates and lists certain weed species as being noxious (Nellessen 2000). “Noxious” in this context means plants not native to New Mexico that may have a negative impact on the economy or environment and are targeted for management or control. Class C weeds are common, widespread species that are fairly well established within the state. Management and suppression of Class C weeds is at the discretion of the lead agency. Class B weeds are considered common within certain regions of the state but are not widespread. Control objectives for Class B weeds are to prevent new infestations, and in areas where they are already abundant, to contain the infestation and prevent their further spread. Class A weeds have limited distributions within the state. Preventing new infestations and eliminating existing infestations is the priority for Class A weeds.

The no action alternative would not result in any construction in the project area. Therefore, there would be no adverse effect to noxious weeds.

Vegetation within the proposed action area is a mixture of native plants, tame pasture grasses, and a few Class C weeds. Class C weeds present include Siberian Elm and Russian Olive. In order to prevent new infestations, all equipment would be cleaned with a high-pressure water jet prior to entering the project area, and before leaving an area and entering a new area. Therefore, the proposed action is in compliance with Executive Order 13112.

3.3.3 Wildlife

Some of the major wildlife species in this area are mule deer, elk, coyote, black bear, mountain lion, black-tailed jackrabbit, Gunnison's prairie dog, badger, piñon jay, black-billed magpie, mountain chickadee, red-breasted nuthatch, white-breasted nuthatch, collared lizard, fence lizard, and western rattlesnake.

The no action alternative would not result in any construction in the project area. Therefore, there would be no adverse effect to current wildlife communities.

The proposed action construction would take place along the current ditch alignment. The BMPs to avoid and protect wildlife that would be employed during construction include 1) providing sloped escape ramps along the ditch to facilitate escapement; 2) limiting construction to the fall and winter when reptiles and amphibians are less active and migratory birds are not present; and 3) examining the trenches daily, prior to starting work, for small mammals and reptiles to be removed prior to initiating work. Therefore, no significant impacts would occur to wildlife or wildlife habitat as a result of the proposed action or the no-action alternative.

3.3.4 Special Status Species

Three agencies have primary responsibility for protecting and conserving plant and animal species within the proposed action area. The United States Fish and Wildlife Service (USFWS), under authority of the Endangered Species Act of 1973 (16 U.S.C. 1531), as amended, has the responsibility for Federal listed species (USFWS 2009). The New Mexico Department of Game and Fish (NMDGF 2009), 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. Plant species of concern are listed on the New Mexico Rare Plants Technical Council Website (NMRPTC 2009). Each agency maintains a continually updated list of species that are classified, or are candidates for classification, as protected based on their present status and potential threats to future survival and recruitment into viable breeding populations. These types of status rankings represent an expression of threat level to a given specie's survival as a whole and/or within local or discrete populations. Special status species that potentially occur in Santa Fe County and may occur near the proposed action area are listed in Table 1.

The plants listed in Table 1 are known to exist in Santa Fe County, but are not likely to occur within the project area. The preferred site condition for these plants is not present within or near the project area. Therefore, there would be no adverse effect to these endangered plants by the proposed action or the no-action alternative.

Special status animal species listed by USFWS (USFWS 2009) and New Mexico Department of Game and Fish for Santa Fe, County (NMDGF 2009) that might occur in or near the project area but are not anticipated to occur include the following:

The bald eagle is a state threatened species that recently was federally delisted, but is still protected under the Golden and Bald Eagle Act. The bald eagle is known to occur in New Mexico primarily during the late fall and winter months. The bald eagle utilizes large trees for perching and forages primarily for fish, ducks, and carrion along rivers and at local reservoirs. The Santa Cruz River is a small stream lacking preferred habitat in the project area. Due to the ease of mobility of the bald eagle, the limited disturbance of the proposed action and the lack of preferred habitat in the project area, there would be no adverse effect to the bald eagle.

The southwestern willow flycatcher (flycatcher) is a state and federally listed endangered species that relies on dense riparian habitat for nesting. It has been reported as occurring along the Rio Grande near Ohkay Owingeh Pueblo and Velarde (approximately 12 miles from the proposed action area) in the last ten years. Willow stands exist in the general vicinity of the project, but lack the appropriate structure for use by flycatchers. Construction would occur during the winter months, outside the breeding season for migratory birds. There would be no adverse effect to flycatchers because of the lack of preferred breeding habitat.

The Rio Grande silvery minnow is a state and federally listed endangered species that has been extirpated from the Rio Chama and Rio Grande upstream of Cochiti Lake. There would be no adverse effect to silvery minnows because they do not occur in the project area.

Continued operation and maintenance of the open ditch under the no action alternative would not have any effects on any threatened, endangered, or sensitive species that may occur in Santa Fe County. The proposed action would have no adverse effect on any threatened, endangered, or sensitive species that may occur in Santa Fe County, as none are likely to occur in the project area.

Table 1. Special status species listed for Santa Fe County, New Mexico, that potentially occur in the vicinity of the proposed action area.

Common Name	Scientific Name	**Federal Status (FWS 2008)[a]**	**New Mexico status (NMDGF 2008)[b]**
Animals			
Bald eagle	*Haliaeetus leucocephalus*	DM	T
Least tern	*Sterna antillarum*	E	E
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	E
Mexican spotted owl	*Strix occidentalis lucida*	T	SC
Yellow-billed Cuckoo	*Coccyzus americanus*	C	---
Rio Grande silvery minnow	*Hybognathus amarus*	E	---
Rio Grande cutthroat trout	*Oncorhynchus clarki virginalis*	C	---
Peregrine falcon	*Falco peregrinus anatum*	SC	T
Arctic peregrine falcon	*Falco peregrinus tundrius*	SC	T
Boreal owl	*Aegolius funereus*	---	T
White-tailed ptarmigan	*Lagopus leucura altipetens (NM)*	---	E
Baird's sparrow	*Ammodramus bairdii*	SC	T
Violet-crowned hummingbird	*Amazilla violiceps ellioti*	---	T
Gray vireo	*Vireo vicinior*	---	T
American marten	*Martes americana origenes (NM)*	---	T
Lilljeborg's peaclam	*Pisidium lilljeborgi*	---	T
Plants (NMRPTC 1999)			
Tufted sand verbena	*Abronia bigelovii*	SC	SC
Cyanic milkvetch	*Astragalus cyaneus*	SC	SC
Santa Fe milkvetch	*Astragalus feensis*	SC	SC
Ripley's milkvetch	*Astragalus ripleyi*	SC	SC
Flint Mountains milkvetch	*Astragalus siliceous*	SC	SC
Santa Fe dodder	*Cuscuta fasciculata*	SC	SC
Sapello canyon larkspur	*Delphinium sapellonis*	SC	SC
New Mexico stickseed	*Hackelia hirsuta*	SC	SC
Springer's blazing star	*Mentzelia springeri*	SC	SC
Todilto stickleaf	*Mentzelia todiltoensis*	SC	SC
Tough muhly, Navajo muhly	*Muhlenbergia arsenei*	SC	SC
Santa Fe cholla	*Opuntia viridiflora*	SC	SC
Santa Fe raspberry	*Rubus aliceae*	SC	SC

[a] **Endangered Species Act (ESA)** (as prepared by U.S. Fish and Wildlife Services) **status:** Only Endangered and Threatened species are protected by the ESA.

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 on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.

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

SC= Species of Concern: taxa for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possible appropriate, but for which sufficient data on biological vulnerability and threat are not currently available to support proposed rules.

[b] **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.

SC= Species of Special Concern.

3.4 Cultural Resources

Chimayo is an area rich in cultural resources. A search of the New Mexico Cultural Resource Information System showed numerous historic and archaeological sites in the general area, and several within a half mile of the project area. No archaeological sites or other historic properties, aside from the Acequia de los Ranchos itself, occur within the project footprint. The headgate of the Acequia lies approximately 200 meters northwest and downhill from the historic Santuario de Chimayo. The proposed action will have no impact on the Santuario de Chimayo.

A Corps archaeologist conducted a 3.13-acre survey of the project area on May 20, 2009, supplementing an initial site visit on January 29, 2009. This survey included the alignment of the acequia segment to be piped, as well as two staging areas on private land, and the vicinity of the current diversion structure on the Santa Cruz River as well as the location of the proposed new diversion on the Rio Quemado. The survey identified a single historic property: the Acequia de los Ranchos itself.

The Acequia de los Ranchos is a historic property considered eligible for listing on the National Register of Historic Places. The proposed action will alter one aspect the ditch: the concrete-lined ditch form. However, the concrete form is not itself a historic element; it was installed in 1967 and 1986, and has not achieved historic significance in its own right. In altering the form of the ditch by installing buried pipe, the project therefore would only be changing an aspect of the ditch that has already been changed from its historic "open earthen ditch" form. The proposed action does not destroy, damage, or remove any currently-existing historic material or element; in addition, the ditch could be returned to its historic "open earthen ditch" form at a future time by removing the pipe. This project is therefore consistent with the Secretary of the Interior's Standards for the rehabilitation of historic properties (36 CFR 67.7 and 36 CFR 68.2[b]).

Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 20, 1998, and based on the State of New Mexico Indian Affairs Department's Native American Consultations List, American Indian tribes that have indicated they have concerns in Santa Fe County have been contacted regarding the proposed action (see Appendix A). To date, the Corps has received no indication of tribal concerns that would impact this project; both the Hopi Tribal Council and the Pueblo of Isleta responded indicating no concern. No Traditional Cultural Properties are known by the Corps to occur in the project construction area. Tribal correspondence is presented in Appendix A.

The Corps is of the opinion that the proposed Acequia de los Ranchos Rehabilitation Project will have no adverse effect to historic properties. Should previously undiscovered artifacts or features be discovered during construction, work will stop in the immediate vicinity of the find, a determination of significance made, and consultation would take place with the New Mexico State Historic Preservation Office (NMSHPO) and with Native American groups that may have concerns in the project area, to determine the best course of action.

The Corps submitted documentation of a finding of **no adverse effect to historic properties** to the NMSHPO on September 16, 2009 (see Appendix A). As of January, 2010, 121 days after the

Corps submitted its determination to NMSHPO for review, the Corps had not received a response from NMSHPO. Pursuant to 36 CFR 800.5(c)(1), "the agency official may proceed after the close of the 30 day review period if the SHPO/THPO has agreed with the finding or has not provided a response." Given this, and the time-sensitive nature of the proposed action, the Corps stands by its determination of **no adverse effect to historic properties** and may proceed with the undertaking pursuant to 36 CFR 800.5(c)(1). Documentation of NMSHPO consultation is presented in Appendix A.

3.5 Land Use and Visual Resources

The project area is a rural landscape located between State Route 76 and Juan Medina Road in northern Santa Fe County. Homes are separated by agricultural fields which are used as pasture or for crop production. The Acequia de los Ranchos serves about 50 irrigators with about 85 acres irrigated by the ditch system (Beraldo Montoya pers. comm.). Alfalfa and grass hay for livestock feed are the principle crops (Natural Resources Conservation Service 2009b). Lands adjacent to the project area are used for crop production, livestock grazing, or the yards of nearby homes.

The major soil resource concerns are wind erosion, water erosion, maintenance of the productivity of the soils, and management of soil moisture. Conservation practices on cropland generally include crop residue management, minimum tillage, and irrigation water management. Proper grazing use is a concern on grazing lands. The primary concerns are controlling erosion along roads and minimizing surface compaction.

Land in the project area is privately owned by members of the Acequia de los Ranchos as well as nonmembers (Beraldo Montoya pers. comm.). The project is surrounded by developed land. Man-made features visible from the project area include wire fences, paved roads, and homes and outbuildings. Background views of the surrounding area include low hills and mountains. The no action alternative would not result in any adverse effect on current land uses or visual resources in the project area.

The presence of construction equipment and workers' vehicles in the project area would have little, if any, effect on the visual quality of the project area during construction. This alternative would not change current rural character of the project area and surrounding lands.

3.6 Socioeconomic Considerations

Regulations for implementing NEPA require analysis of social effects when they are interrelated with effects on the physical or natural environment (40 CFR §1508.14). Federal agencies are required to "*identify and address disproportionately high and adverse human health or environmental effects*" of their programs and actions on minority populations and low-income populations, as directed by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

3.6.1 Socioeconomics

The project area is located in unincorporated Chimayo, New Mexico. The project area is entirely

within the relatively affluent Santa Fe County, although Chimayo also straddles the relatively economically challenged Rio Arriba County. The acequia users are served by Rio Arriba County services for police and fire protection. Nearby Española, NM has emergency services, a public library, and public schools, including a community college.

Chimayo, a census-designated place (CDP), had a population of 2,924 (Table 2) in 2000 (U.S. Census Bureau 2009). There are several residences adjacent to the project area boundaries.

The leading employment sectors in Chimayo (U.S. Census Bureau 2009) are public administration (23.9 percent), education, health care, and social services (18.4 percent) and arts, entertainment, recreation, accommodation and food services (15.9 percent). Agriculture alone employs zero percent of the CDP's workers (U.S. Census Bureau 2009).

No changes would occur in the project area with the no action alternative; there would be no adverse effects related to socioeconomics of the area and no adverse effects related to environmental justice issues. The Acequia de los Ranchos would continue to maintain the open ditch and problems with seepage and sediment deposition would continue.

There would be no adverse effect from the proposed action on county services, such as law enforcement, fire protection, emergency medical care, or schools. No property would be acquired so no residents or businesses would be affected by relocations. The proposed action is not expected to create adverse effects on human health or the environment.

Elimination of the open ditch would result in a reduction of on-going maintenance costs for the Acequia de los Ranchos. Elimination of the need to remove sediment and clear trash and vegetation from the open ditch would reduce costs for routine maintenance. Reduced costs for association members would result in more profitable farming operations. In addition, the new sluice would remedy the problem of potential damages to private property when the ditch overflows after intercepting high levels of stormwater runoff.

Construction of the project would provide some short-term economic benefits for local businesses. Depending on the location of the contractor selected, local financial expenditures by the contractor may result in the form of purchasing supplies, renting equipment, workers' wages, and meal purchases. Some state gross receipts taxes on goods and services purchased locally (e.g. in Española, Pojoaque, or Santa Fe) would return to Rio Arriba and/or Santa Fe counties for local government use.

Although the racial and economic profiles of Chimayo indicate that there are higher percentages of minority and low-income persons in these areas as compared with the rest of the country, there would be no disproportionate adverse effects on these populations. Rather, there would be a beneficial economic benefit to the acequia members and the surrounding community. Therefore, the proposed action complies with Executive Order 12898.

The proposed action would take place entirely along the existing ditch right-of-way. The entire Acequia de los Ranchos would benefit from the proposed water system improvements. The proposed action would not adversely socioeconomic resources in the project area.

Table 2. Selected social demographic 2000 census data for Chimayo and New Mexico (U.S. Census Bureau 2009).

	Chimayo	New Mexico
Total population	2,924	1,819,046
Male	50.1%	49.2%
Female	49.9%	50.8%
Median age (years)	36.2	34.6
Under 5 years	6.3%	7.2%
18 years and over	74.7%	72.0%
65 years and over	12.2%	11.7%
One race	94.3%	96.4%
White	48.6%	66.8%
Black or African American	0.1%	1.9%
Native American	0.7%	9.5%
Asian	0.1%	1.1%
Native Hawaiian and Other Pacific Islander	0	0.1%
Some other race	44.8%	17.0%
Two or more races	5.7%	3.6%
Hispanic or Latino (of any race)	90.8%	42.1%
Household population	2,924	1,782,739
Average household size	2.54	2.63
Average family size	3.05	3.18
Total housing units	1,323	780,579
Occupied housing units	86.9%	86.9%
Vacant housing units	13.1%	13.1%
Economic Characteristics	**Chimayo**	**New Mexico**
In labor force (population 16 years and over)	1,204	834,632
Mean travel time to work in minutes	33.7	21.9
Median household income in 1999 (dollars)	$31,474	$34,133
Median family income in 1999 (dollars)	$35,938	$39,425
Per capita income in 1999 (dollars)	$17,023	$17,261
Families below poverty level	14.1%	14.5%
Individuals below poverty level	19.0%	18.4%

Note: Percentages may not always sum to 100 due to rounding.

3.6.3 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. In an accompanying memorandum, President Clinton emphasized that existing laws, such as the National Environmental Policy Act (NEPA), should provide an opportunity for federal agencies to assess the environmental hazards and socioeconomic impacts associated with any given agency action upon minority and low-income communities. In April of 1995, the EPA released a guidance document entitled Environmental Justice Strategy: Executive Order 12898. In short, this document defines the approaches by which the EPA would 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.

Selected demographic characteristics of the population of Chimayo CDP and New Mexico are shown in Table 2. Chimayo has a higher percent composition of Hispanics or Latinos (90.8 percent) compared to 42 for all New Mexico residents (Table 2). The per capita income in Chimayo is approximately 98 percent of the average New Mexico resident (Table 2). Correspondingly, the percentage of persons living below the poverty level in Chimayo (19.0 percent) is less than one percent greater than the state average (18.4 percent).

The Acequia de los Ranchos Rehabilitation Project would be conducted under Section 215 of the Water Resources Development Act of 1999 (Public Law 106-53; 33 U.S.C. 2201 *et seq*.) as amended. This program is largely intended to provide needed assistance (technical, financial, etc.) to protect and rehabilitate acequias for their community. As such, this project would benefit an area within a minority and low-income community. No adverse impacts on minority and low-income populations are expected. Under the definition of Executive Order 12898, there would be no adverse environmental justice impacts under the proposed action.

3.7 Cumulative Impacts

Cumulative effects address the cumulative impact of the direct and indirect effects of the proposed action when added to the aggregate effects of past, present, and reasonably foreseeable future actions. For all resources, the aggregate effect of past and present actions was considered to be represented by the current, existing condition of the resource (Council on Environmental Quality 2005). Therefore, the specific effects of individual past and present actions typically were not cataloged in the analysis. In order for direct or indirect effects to incrementally add to the effects of past, present, or reasonably foreseeable future actions, they must overlap with those effects in time or space (Council on Environmental Quality 1997).

The time frame for analysis of cumulative effects varied, depending on the duration of direct and indirect effects. For example, direct effects resulting from construction were expected to persist for relatively short periods of time (about eight weeks). Conversely, indirect effects resulting from operation of the rehabilitated acequia system would persist for the life of the facility.

Similarly, the geographic bounds for cumulative effects analysis varied with the resource under consideration, depending on zone of influence of the direct or indirect impact being analyzed.

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."

Cumulative effects for the proposed action on physiography, geography, and soils were analyzed for the project area because effects would diminish markedly outside of this area. Because the proposed acequia rehabilitation would impact only the existing alignment to a depth necessary to bury 15-inch pipe, there would be no cumulative effects to underlying physiography and geology of the area. The proposed action would not overlap in time or space with past and ongoing ditch maintenance actions that affect soils in the project area because maintenance would cease with implementation of the proposed action. Ditch maintenance actions would be supplanted by placement of fill and surface disturbance associated with the proposed action (i.e., the effects would not accumulate).

The contribution of the proposed action to climate change in the project area would be negligible. The construction phase of the proposed action 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, the proposed action would not contribute cumulatively to climate change in the area.

The appropriate area for cumulative effects analysis for air quality is the area within 300 feet of the project area. Effects of the project on air quality beyond that distance would be negligible. The effects of past and ongoing actions on air quality in the airshed are represented by the existing conditions. There are no known future actions that may impact air quality and that would overlap spatially and temporally with the proposed action. Consequently, the project would not have any cumulative effects on air quality.

Cumulative effects of noise increases were assessed using an approximately one-half mile radius from the project area, assuming that large equipment noise may be heard from that distance at times. The increase in noise generated by construction of the project would add to noise levels from vehicles on State Route 76 and Juan Medina Road and other roads and noise generated from surrounding homes, resulting in a cumulative increase in noise levels during the period of construction.

The proposed action specifies that disturbed areas will be re-vegetated with native plants. Therefore, the project would not result in cumulative adverse effects to the vegetation community in the area. Likewise, planting native plants and engaging in BMPs that prohibit transport of weeds could cumulatively result in fewer noxious weeds at the project area. As the project would not affect visual resources or land uses, there would be no cumulative effects to land use and visual resources.

There may be cumulative adverse effects to wildlife in the area that previously used the open

acequia for a source of water. There are not likely to be any cumulative effects to special status species.

Land use in the proposed action area would continue to be a mix of rural residential and agricultural. The proposed action would result in decreased maintenance costs for members of the acequia and this would contribute to cumulative economic effects on the local economy.

The footprint of the proposed action lies within a rural area. The proposed acequia improvements would take place within Santa Fe County (Figure 1). The improvements to the acequia would not significantly impact the current conditions of the local environment. For these reasons, the proposed action, when combined with past, present, or future activities in the Acequia de los Ranchos, would not significantly add to or raise local cumulative environmental impacts to a level of significance.

4.0 CONCLUSIONS AND SUMMARY

The proposed action evaluated in this EA addresses the method and potential effects for the acequia improvements. The proposed acequia improvements are located in a rural area in northern Santa Fe County, New Mexico. Impacts to the environment would be negligible and short-term. The proposed acequia improvements would benefit the local community and the county. The proposed action would not result in any moderate or significant, short-term, long-term, or cumulative adverse effects. Therefore, the proposed action 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 EA was prepared for the Acequia de los Ranchos by the U.S. Army Corps of Engineers, Albuquerque District (USACE). Personnel primarily responsible for preparation include:

Sarah Beck	Biologist
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5.2 Quality Control

This EA has been reviewed for quality control purposes. Personnel who reviewed this EA include:

Lance Lundquist	Archaeologist, USACE, Albuquerque District
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5.3 General Consultation and Coordination

Agencies and entities contacted formally or informally in preparation of this Environmental Assessment include:

US Fish and Wildlife Service
New Mexico Ecological Services Field Office

NM Department of Game and Fish
Conservations and Services Division Albuquerque

NM Forestry and Resources Conservation Division
Energy, Minerals, and Natural Resources Department

Water and Waste Management Division
NM Environmental Department

Environment Section
New Mexico Department of Transportation

NM State Engineer

Surface Water Quality Bureau
NM Environmental Department

NM Interstate Stream Commission

Comanche Nation of Oklahoma

Hopi Tribal Council

Jicarilla Apache Nation

Kiowa Tribe of Oklahoma

Navajo Nation

Ohkay Owingeh

Pueblo de Cochiti

Pueblo of Isleta

Pueblo of Nambe

Pueblo of Pojoaque

Pueblo of San Ildefonso

Pueblo of Santa Clara

Pueblo of Santo Domingo

Pueblo of Tesuque

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Appendix A

Scoping Letters and Responses

The following tribes were consulted during the scoping process for the proposed project:

Comanche Nation of Oklahoma
Jicarilla Apache Nation
Navajo Nation
Pueblo de Cochiti
Pueblo of Nambe
Pueblo of San Ildefonso
Pueblo of Santo Doming
Hopi Tribal Council
Kiowa Tribe of Oklahoma
Ohkay Owingeh
Pueblo of Isleta
Pueblo of Pojoaque
Pueblo of Santa Clara
Pueblo of Tesuque

The following pages contain an example of the scoping letter sent to each tribe, as well as a copy of the letter sent to the New Mexico State Historical Preservation Office.

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

August 19, 2009

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Division

Honorable Donald G. Tofpi
Chairman, Kiowa Tribe of Oklahoma
Post Office Box 369
Carnegie, Oklahoma 73015

Dear Chairman Tofpi:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico Office of the State Engineer / Interstate Stream Commission and the Acequia de los Ranchos Association, plans to rehabilitate the Acequia de los Ranchos on the Santa Cruz River and Rio Quemado, in the town of Chimayó in Santa Fe County, New Mexico (see Enclosure 1), under the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project will construct a new diversion structure on the Rio Quemado, and will replace approximately 3,819 feet of concrete-lined open ditch with buried pipe. The principal objective of the acequia rehabilitation project is to improve the maintenance of the acequia madre and the efficiency of water delivery to the acequia members in response to significant erosional impacts resulting from both rainfall runoff and livestock trampling. The existing concrete ditch lining system is damaged beyond repair in multiple locations and is in substantial danger of failure.

Chimayó is located in Santa Fe County, NM, approximately one mile south of the intersection of State Route 76 and Juan Medina Road (Enclosure 1). The Acequia de los Ranchos is located in Chimayó, New Mexico, with its headgate approximately 200 meters northwest of the historic Santuario de Chimayó, and near the confluence of the Santa Cruz River and the Rio Quemado. A Corps archaeologist conducted a site visit to on January 29, 2009, and an archaeological survey of the project area on May 20, 2009. No archaeological sites were identified in either the construction area or in the proposed staging areas. This project will have no effect on the Santuario.

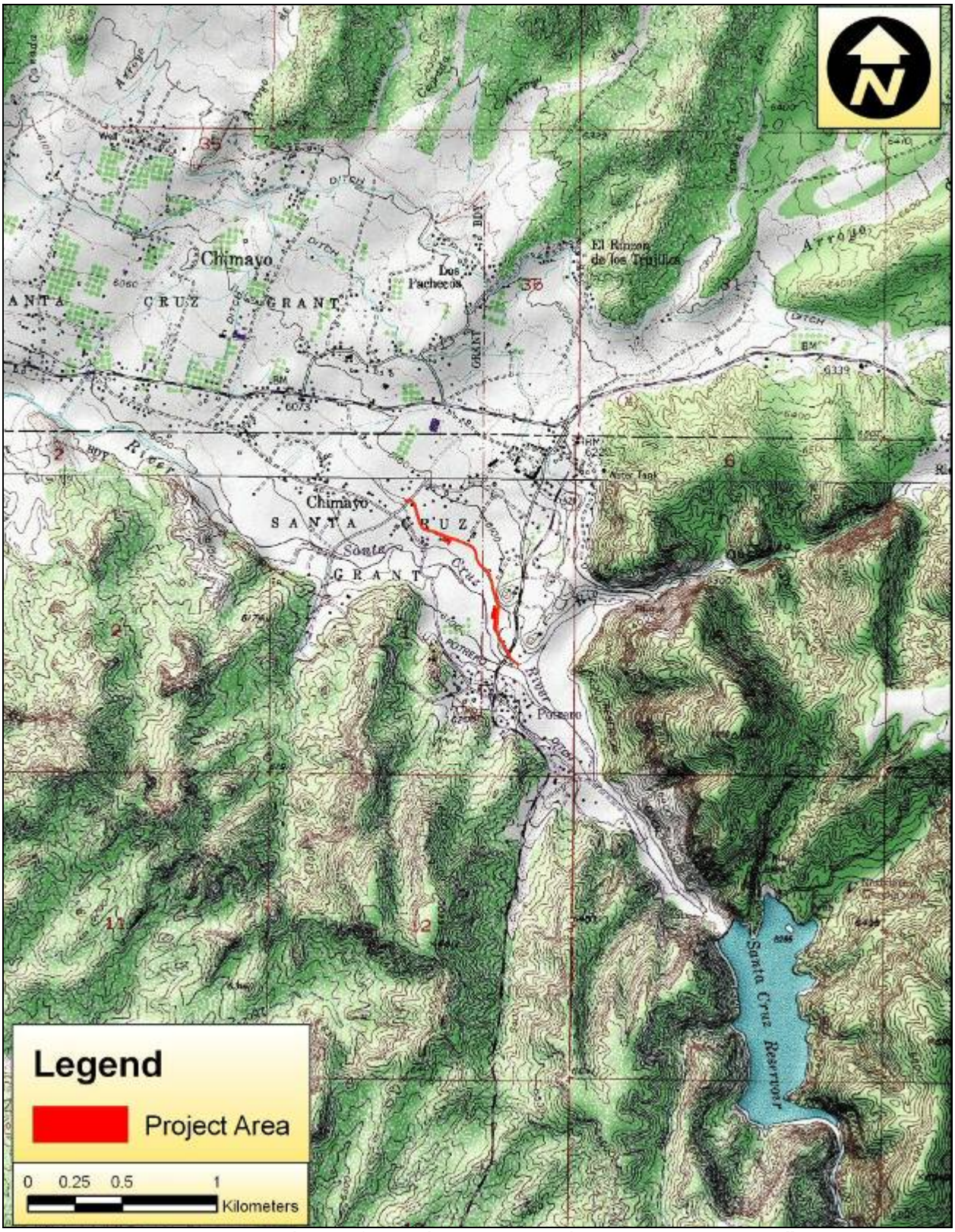
The purpose of this scoping letter is to inform you about this project, and to give you the opportunity to provide any concerns or comments you may have regarding this project. If you have any questions or require additional information, please contact Dr. Jonathan Van Hoose, archaeologist at (505) 342-3687 (jonathan.e.vanhoose@usace.army.mil) or myself at (505) 342-3281.

Sincerely,

Julie Alcon,
Chief, Environmental Resources Section

Enclosure

Copy furnished w/Encl:



Enclosure 1. Location of project area shown on USGS 7.5" quadrangles maps Chimayó, NM (36105-A8) and Cundiyo, NM (35105-H8).

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

August 19, 2009

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Division

Honorable Mary Felter
Tribal Secretary/Acting CEO, Hopi Tribal Council
Post Office Box 123
Kykotsmovi, Arizona 86039

Dear Tribal Secretary/Acting CEO Felter:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico Office of the State Engineer / Interstate Stream Commission and the Acequia de los Ranchos Association, plans to rehabilitate the Acequia de los Ranchos on the Santa Cruz River and Rio Quemado, in the town of Chimayó in Santa Fe County, New Mexico (see Enclosure 1), under the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project will construct a new diversion structure on the Rio Quemado, and will replace approximately 3,819 feet of concrete-lined open ditch with buried pipe. The principal objective of the acequia rehabilitation project is to improve the maintenance of the acequia madre and the efficiency of water delivery to the acequia members in response to significant erosional impacts resulting from both rainfall runoff and livestock trampling. The existing concrete ditch lining system is damaged beyond repair in multiple locations and is in substantial danger of failure.

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Sincerely,

Julie Alcon,
Chief, Environmental Resources Section

Enclosure

Copy furnished w/Encl:

Mr. Leigh Kuwonwosiwma
Director, Cultural Preservation Office
Hopi Tribal Council
Post Office Box 123
Kykotsmovi, Arizona 86039

No historic properties significant to the Hopi Tribe affected
for Kuwanwisiwma
8-28-09

PUEBLO OF ISLETA
GOVERNOR'S OFFICE

P.O. BOX 1270, ISLETA, NM 87022

PHONE: 505-869-3111
FAX: 505-869-4236

August 27, 2009

Department of The Army
Albuquerque District, Corps of Engineers
Julie Alcon, Chief, Environmental Resources Section
4101 Jefferson Plaza, N.E.
Albuquerque, NM 87109-3435

Dear Ms. Alcon:

This letter is in response to your letter regarding the proposed new diversion structure on the Rio Quemado in the town of Chimayo in Santa Fe County, New Mexico.

I am pleased to inform you that this project will not have an impact on religious or cultural sites affiliated with the Pueblo of Isleta.

However, in the event that discoveries are found during construction, we would appreciate being advised of such findings. Please forward all environmental assessment plans to our office.

Thank you for your consideration in contacting this office to express our concerns.

Sincerely,

PUEBLO OF ISLETA

J. Robert Benavides
Governor

cc: files

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

October 14, 2009

Planning, Projects and Program Management Division
Planning Branch
Environmental Resources Section

Dear :

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with the Office of the State Engineer and the members of the Acequia de los Ranchos Association, is planning a project to rehabilitate the Acequia de los Ranchos, Santa Fe County, New Mexico. The purpose of this project is to provide the Acequia Association members with a reliable and more efficient water distribution system. The proposed Acequia de los Ranchos rehabilitation project area is located in Chimayo, New Mexico near the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road (see Enclosure). The proposed project entails replacing a non-functioning diversion structure on the Rio Quemado, adding sluice structures at both diversions, and enclosing approximately 3,819 feet of the ditch in 15-inch diameter plastic pipeline. Project construction is proposed to begin in fall 2009 and continue for approximately eight weeks.

The Corps is soliciting comments from Federal, State, and local interests for compliance under the National Environmental Policy Act (NEPA). The Draft Environmental Assessment (DEA), entitled “Acequia de los Ranchos Rehabilitation Project, Santa Fe County, New Mexico” is electronically available for viewing and copying at the Albuquerque District website at http://www.spa.usace.army.mil/fonsi or hard copies will be sent upon request.

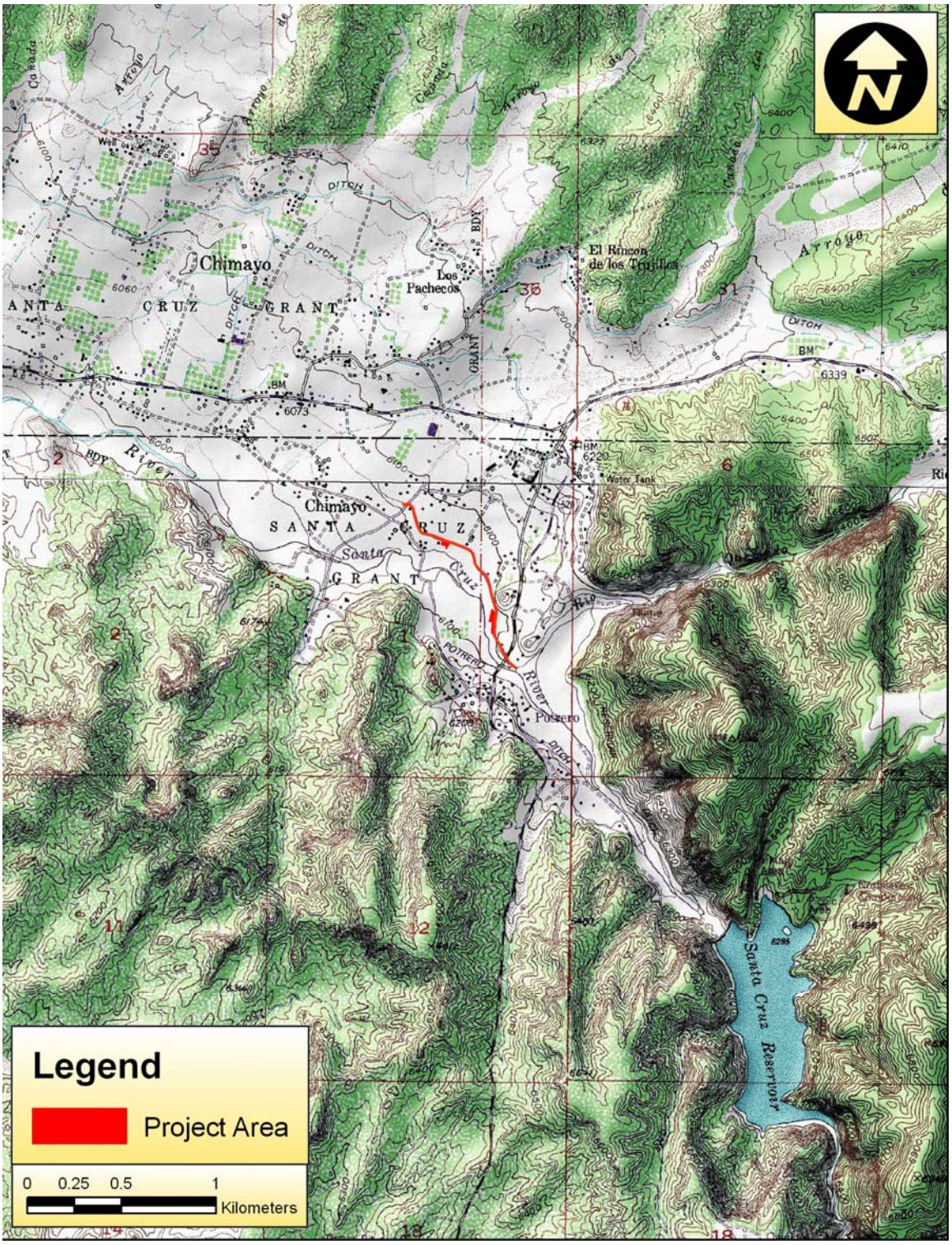
Please review the DEA and provide any written comments to the above address, Attn: Ms. Sarah Beck, Environmental Resources Section. Written comments must be received **no later than November 13, 2009,** so that comments can be addressed and revisions made to the DEA in a timely manner. If we do not receive comments by this date, we will assume you have no concerns or have no objections to the project. You may also facsimile your correspondence to (505) 342-3668 or e-mail to sarah.e.beck@usace.army.mil. If you need additional information, please contact Ms. Sarah Beck at (505) 342-3333.

Sincerely,

Julie A. Alcon
Chief, Environmental Resources Section

Enclosure

Enclosure 1: Vicinity map of proposed project location for Acequia de los Ranchos, Santa Fe County, New Mexico.



GOVERNOR
Bill Richardson

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod Stevenson

Robert S. Jenks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8101
Fax: (505) 476-8128

Visit our website at www.wildlife.state.nm.us
For information call: 505-476-8000
To order free publications call: 1-800-862-9310

November 19, 2009

Ms. Sarah Beck
Environmental Resources Section
Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109

Re: Proposed rehabilitation; Acequia de los Ranchos, Santa Fe County; NMDGF Doc. No. 13409

Dear Ms. Beck,

The Department of Game and Fish (Department) has reviewed your request for information regarding the above-referenced project, and provides the following recommendations to minimize or eliminate impacts to wildlife.

Open trenches and ditches can trap small mammals, amphibians and reptiles and can cause injury to large mammals. Periods of highest activity for many of these species include night time, summer months and wet weather.

- To minimize the amount of open trenches at any given time, keep trenching and back-filling crews close together.
- Trench during the cooler months (October – March). However, there may be exceptions (e.g., critical wintering areas) which need to be assessed on a site-specific basis.
- Avoid leaving trenches open overnight. Where trenches cannot be back-filled immediately, escape ramps should be constructed at least every 90 meters. Escape ramps can be short lateral trenches sloping to the surface or wooden planks extending to the surface. The slope should be less than 45 degrees (100%). Trenches that have been left open overnight, especially where endangered species occur, should be inspected and animals removed prior to back-filling.

With implementation of these recommendations during construction, the Department believes that this project as proposed is unlikely to adversely affect wildlife or wildlife habitats. For your convenience, we have enclosed a copy of New Mexico Wildlife of Concern for Santa Fe County (Biota Information System of New Mexico, BISON-M, New Mexico Dept. of Game and Fish electronic database). Species accounts, habitat associations and county species lists (use the "Database Query" option) can be accessed from the BISON-M database via the World-wide Web at http://www.bison-m.org . The Department recommends that you contact the U.S. Fish and Wildlife Service for current listing of federally listed species.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact Scott Draney, Northeast Area Habitat Specialist at (505) 751-4738 or scott.draney@state.nm.us.

Sincerely,

Terra Manasco
Assistant Chief, Conservation Services Division
Technical Guidance Section

TLM/sd

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Lief Ahlm, NE Area Operations Chief, NMDGF
Scott Draney, NE Area Habitat Specialist, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
SANTA FE COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/ifw2es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information.

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Violet-crowned Hummingbird	Amazilia violiceps	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Loggerhead Shrike	Lanius ludovicianus	s		
Gray Vireo	Vireo vicinior	T		
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	s		
Yuma Myotis Bat	Myotis yumanensis yumanensis	s		
Long-legged Myotis Bat	Myotis volans interior	s		
Fringed Myotis Bat	Myotis thysanodes thysanodes	s		
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	s	SOC	
Yellow-bellied Marmot	Marmota flaviventris	s		
Gunnison's Prairie Dog	Cynomys gunnisoni	s		
Heather Vole	Phenacomys intermedius intermedius	s		
Red Fox	Vulpes vulpes	s		
Ringtail	Bassariscus astutus	s		
American Marten	Martes americana origenes	T		
Black-footed Ferret	Mustela nigripes		E	
Western Spotted Skunk	Spilogale gracilis	s		
Lilljeborg's Peaclam	Pisidium lilljeborgi	T		
Socorro Mountainsnail	Oreohelix neomexicana	s		

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

OCT 19 2009

Thank you for your recent request for information on threatened or endangered species or important wildlife habitats that may occur in your project area. The New Mexico Ecological Services Field Office has posted lists of the endangered, threatened, proposed, candidate and species of concern occurring in all New Mexico Counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: http://www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm. If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find New Mexico Listed and Sensitive Species Lists on the main page and click on the county of interest. Your project area may not necessarily include all or any of these species. This information should assist you in determining which species may or may not occur within your project area.

Under the Endangered Species Act of 1973, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. Similarly, it is their responsibility to determine if a proposed action has no effect to endangered, threatened, or proposed species, or designated critical habitat. On December 16, 2008, we published a final rule concerning clarifications to section 7 consultations under the Act (73 FR 76272). One of the clarifications is that section 7 consultation is not required in those instances when the direct and indirect effects of an action pose no effect to listed species or critical habitat. As a result, we do not provide concurrence with project proponent's "no effect" determinations.

If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included on the web site for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Also on the web site, we have included additional wildlife-related information that should be considered if your project is a specific type. These include communication towers, power line safety for raptors, road and highway improvements and/or construction, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area.

Sincerely,

Wally Murphy
Field Supervisor

SL

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

October 15, 2009

Planning, Projects and Program Management Division
Planning Branch
Environmental Resources Section

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

Dear Mr. Murphy:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with the Office of the State Engineer and the members of the Acequia de los Ranchos Association, is planning a project to rehabilitate the Acequia de los Ranchos, Santa Fe County, New Mexico. The purpose of this project is to provide the Acequia Association members with a reliable and more efficient water distribution system. The proposed Acequia de los Ranchos rehabilitation project area is located in Chimayo, New Mexico near the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road (see Enclosure). The proposed project entails replacing a non-functioning diversion structure on the Rio Quemado, adding sluice structures at both diversions, and enclosing approximately 3,819 feet of the ditch in 15-inch diameter plastic pipeline. Project construction is proposed to begin in fall 2009 and continue for approximately eight weeks.

The Corps is soliciting comments from Federal, State, and local interests for compliance under the National Environmental Policy Act (NEPA) and the Endangered Species Act. The Draft Environmental Assessment (DEA), entitled "Acequia de los Ranchos Rehabilitation Project, Santa Fe County, New Mexico" is electronically available for viewing and copying at the Albuquerque District website at http://www.spa.usace.army.mil/fonsi or hard copies will be sent upon request.

Appendix B

Cultural Resources Survey Report and Letter to SHPO

NMCRIS No. 115177

A 3.13-ACRE CULTURAL RESOURCES INVENTORY FOR THE ACEQUIA DE LOS RANCHOS, SANTA FE COUNTY, NEW MEXICO

Prepared by

Jonathan E. Van Hoose

With contributions by

Sarah E. Beck

U.S. Army Corps of Engineers
Albuquerque District

Prepared for

U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435
Office: (505) 342-3283; Fax: (505) 342-3668

New Mexico Annual State General Permit No. NM-09-193

Report No. USACE-ABQ-2009-013

September 11, 2009

NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

1. NMCRIS Activity No.: 115177	2a. Lead (Sponsoring) Agency: USACE, Albuquerque District	2b. Other Permitting Agency(ies):	3. Lead Agency Report No.: USACE-ABQ-2009-013

4. Title of Report: A 3.13-Acre Cultural Resources Inventory for the Acequia de los Ranchos, Santa Fe County, New Mexico

Author(s) Jonathan E. Van Hoose

5. Type of Report
☐ Negative ☒ Positive

6. Investigation Type
☐ Research Design ☒ Survey/Inventory ☐ Test Excavation ☐ Excavation ☐ Collections/Non-Field Study
☐ Overview/Lit Review ☐ Monitoring ☐ Ethnographic study ☐ Site specific visit ☐ Other

7. Description of Undertaking (what does the project entail?): The U.S. Army Corps of Engineers, Albuquerque District, in cooperation with the Acequia de los Ranchos Association proposes to install 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia; a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River; and a new steel-plate diversion structure on the Rio Quemado to supplement the water provided by the Santa Cruz diversion. The Santa Cruz diversion will remain in place. These improvements will allow the users of the acequia system to continue using this portion of the acequia, mitigating the continuing difficulties in using and maintaining this segment due to constant erosion of sediment into the ditch and away from the margins of the ditch's concrete lining, leading to repeated failure.

8. Dates of Investigation: (from: 1/28/2009 to: 5/20/2009)

9. Report Date: September 11, 2009

10. Performing Agency/Consultant: USACE, Albuquerque District
Principal Investigator: Jonathan Van Hoose
Field Supervisor: Jonathan Van Hoose
Field Personnel Names: Jonathan Van Hoose, Sarah Beck, Michael Porter

11. Performing Agency/Consultant Report No.: USACE-ABQ-2009-013

12. Applicable Cultural Resource Permit No(s): NM-09-193

13. Client/Customer (project proponent): USACE
Contact: Jonathan Van Hoose
Address:
U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza, NE
Albuquerque, NM 87109
Phone: (505) 342-3687

14. Client/Customer Project No.: N/A

15. Land Ownership Status ***(Must be indicated on project map):***

Land Owner	Acres Surveyed	Acres in APE
Rosendo Cordova (Private)	0.27	0.27
Charles Ortiz (Private)	0.63	0.63
Acequia de los Ranchos Association (Private)	2.23	2.23
TOTALS	3.13	3.13

16 Records Search(es):

Date(s) of ARMS File Review 1/28/2009	Name of Reviewer(s) Jonathan Van Hoose	
Date(s) of NR/SR File Review 1/28/2009	Name of Reviewer(s) Jonathan Van Hoose	
Date(s) of Other Agency File Review 1/28/2009	Name of Reviewer(s) Jonathan Van Hoose	Agency USACE

17. Survey Data:

a. Source Graphics ☒ NAD 27 ☐ NAD 83

☒ USGS 7.5' (1:24,000) topo map ☐ Other topo map, Scale:

☒ GPS Unit Accuracy ☒<1.0m ☐ 1-10m ☐ 10-100m ☐>100m

b. USGS 7.5' Topographic Map Name / USGS Quad Code

Chimayo, NM	36105-A8
Cundiyo, NM	35105-H8

c. County(ies): Santa Fe

17. Survey Data (continued):

d. Nearest City or Town: Chimayo, NM

e. Legal Description:

Township (N/S)	Range (E/W)	Section	¼ ¼ ¼
T20N	R09E	1	NW, SW, NE.
T20N	R09E	1	SW, SW, NE.
T20N	R09E	1	SW, SE, NE.
T20N	R09E	1	NW, NW, SE.
T20N	R09E	1	NE, NW, SE.

Projected legal description? Yes [x] , No [ ] Unplatted [x] (Santa Cruz Land Grant)

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.): The Acequia de los Ranchos headgate is located in Chimayó, New Mexico on the Santa Cruz River, approximately 40 meters east of the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road. The acequia madre extends a total of approximately 6,281 feet in a northwesterly direction from that point, ending at the intersection of Cañada Ancha and Camino de los Ranchos.

18. Survey Field Methods:

Intensity: ☒ 100% coverage ☐ <100% coverage

Configuration: ☒ block survey units ☒ linear survey units (l x w): **see below** ☐ other survey units (specify):

Scope: ☒ non-selective (all sites recorded) ☐ selective/thematic (selected sites recorded)

Coverage Method: ☒ systematic pedestrian coverage ☐ other method (describe)

Survey Interval (m): 7 Crew Size: 1 Fieldwork Dates: 1/29/2009, 5/20/2009

Survey Person Hours: 4 Recording Person Hours: 3 Total Hours: 7

Additional Narrative: The survey crew consisted of one Corps archaeologist, Jonathan Van Hoose. Additional GPS data was collected by Corps biologist Michael Porter during the January visit, and additional photographs were taken by Corps biologist Sarah Beck during the May survey. The area surveyed included (a) the area between the proposed location for a new diversion on the Rio Quemado and the point where it would tie into the current acequia, totaling 0.15 acre; (b) the acequia alignment from the current diversion structure on the Santa Cruz River, northwest to the end of proposed piping, for a total of 2.08 acres; (c) two noncontiguous staging areas on private property owned by Charles Ortiz and Rosendo Cordova, amounting to 0.27 acre and 0.63 acre, respectively; and (d) the location for a proposed new diversion structure on the Rio Quemado, and the area for a new pipeline to connect it to the acequia, for 0.15 acre; for a total survey area of 3.13 acres.

The survey began with Corps personnel meeting Acequia de los Ranchos Association members Beraldo Montoya and Charles Ortiz on the January 28, 2009 site visit. During this visit, the archaeologist took photographs of the diversion structure on the Santa Cruz River, the now-disused gate on the Rio Quemado, and portions of the ditch to the southeast of Juan Medina Road. The archaeologist then walked along the acequia alignment from the area just downstream of the diversion structure to the end of the proposed piping project, looking for evidence of archaeological materials and noting details of acequia context and construction. The acequia alignment was walked over twice, during the January visit and the May survey. The precise route and alignment of the acequia were recorded via GPS on January 28. The staging areas and the area between the proposed new Rio Quemado diversion and the location where it would be tied

into the existing acequia were surveyed during the May 20 survey, with Van Hoose walking transects with approximately five- to seven-meter transect intervals. Staging area boundaries were recorded by walking the perimeters with GPS. No archaeological sites, isolated artifacts, features, or other historic properties other than the acequia itself were noted during survey. All locational information, including acequia alignment and survey boundaries, was recorded with a Trimble Geo-XH GPS sub-foot unit. Key elements of the acequia, associated structures and features, and the acequia's context were photographed.

19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.): Floodplain of Rio Quemado and Santa Cruz River. Soil: primarily stream alluvium (Mirada-Bosquecito complex and Chupe fine sandy loam) derived from sandstone, siltstone, granite, gneiss, and schist resulting in a fine sandy or silt loam above a fine sandy loam with a base of stratified gravelly coarse sand over the floodplain for the Santa Cruz River Vegetation: Rocky Mountain Montane Conifer Forest biotic community as described by Brown (1982). The vegetation along the Santa Fe River is typical riparian willows and cottonwood. Upland vegetation at the lower elevations is grass and sagebrush with piñon-juniper woodland and ponderosa pine forests are at mid elevations. Forests of Rocky Mountain Douglas-fir and white fir are at the higher elevations. Elevation approx. 6080-6100 ft amsl.

20.a. Percent Ground Visibility: 80 b. Condition of Survey Area (grazed, bladed, undisturbed, etc.): Ground visibility varied widely depending on the location being surveyed. Visibility for much of staging area #1 (property owned by Rosendo Cordova) was ~5-50% due to heavy grass cover, while visibility at staging area #2 was 50-75%. Visibility for the majority of the acequia alignment was high (approaching 100 percent), and visibility for the area of the new Quemado diversion was between moderate to high, ~75-100%.

21. CULTURAL RESOURCE FINDINGS ☒ Yes, See Page 3 ☐ No, Discuss Why:

22. Required Attachments (check all appropriate boxes):
- ☒ USGS 7.5 Topographic Map with sites, isolates, and survey area clearly drawn
- ☒ Copy of NMCRIS Mapserver Map Check
- ☒ LA Site Forms - new sites (*with sketch map & topographic map*)
- ☒ LA Site Forms (update) - previously recorded & un-relocated sites (*first 2 pages minimum*)
- ☐ Historic Cultural Property Inventory Forms
- ☐ List and Description of isolates, if applicable
- ☐ List and Description of Collections, if applicable

23. Other Attachments:
- ☐ Photographs and Log
- ☒ Other Attachments

(Describe): HWDSIF

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Responsible Archaeologist: Jonathan Van Hoose

Signature J. Van Hoose Date 9/11/09 Title (if not PI):

25. Reviewing Agency: USACE, Albuquerque
Reviewer's Name/Date 9/11/09

Accepted (X) Rejected ( )

Tribal Consultation (if applicable): ☒ Yes ☐ No

26. SHPO
Reviewer's Name/Date:

HPD Log #:

SHPO File Location:
Date sent to ARMS:

CULTURAL RESOURCE FINDINGS

[fill in appropriate section(s)]

1. NMCRIS Activity No.:	2. Lead (Sponsoring) Agency:	3. Lead Agency Report No.:
115177	USACE, Albuquerque District	USACE-ABQ-2009-013

SURVEY RESULTS:

Sites discovered and registered: 0
Sites discovered and NOT registered: 0
Previously recorded sites revisited (*site update form required*): 0
Previously recorded sites not relocated *(site update form required)*: 1
TOTAL SITES VISITED: 0
Total isolates recorded: 0 Non-selective isolate recording? ☒

Total structures recorded (*new and previously recorded, including acequias*): **0**

MANAGEMENT SUMMARY: The Corps, at the request of the New Mexico State Engineer/Interstate Stream Commission and Acequia de los Ranchos Association (Association), is planning a project that would install 3,819 feet of buried pipe with associated features, and construct a second diversion on the Rio Quemado. Work would be conducted under the Water Resources Development Act of 1986 (Public Law 99-662), as amended. The Corps is of the opinion that there would be no adverse affect to historic properties as a result of this undertaking.

The Acequia, with a non-adjudicated priority date of March 18, 1907, is located in the town of Chimayo, Santa Fe County, New Mexico. The acequia provides irrigation water to between 81 and 85 acres of cultivated land for 50 or 51 irrigators. Its diversion structure obtains water from the Santa Cruz River near the confluence of the Santa Cruz River and Rio Quemado, and is approximately 200 meters northwest of the historic Santuario de Chimayo. The project would have no effect on the Santuario.

The project would install 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia; a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River; and a new steel-plate diversion structure on the Rio Quemado to supplement the water provided by the Santa Cruz diversion. The Santa Cruz diversion will remain in place.

The Acequia de los Ranchos acequia madre has a total length of 6,281 feet, of which 4,963 feet (79 percent) is lined with concrete installed in 1967 and 1986; 1,318 feet of the acequia madre retains a historic "open earthen ditch" form. The proposed piping project would replace 3,819 feet of the concrete-lined portion (61 percent of the acequia madre's total length) with buried pipe. In addition to the acequia madre, a major lateral measuring approximately 1,519 feet retains an "open earthen ditch" form, as do at least 3,774 additional feet of minor laterals and field ditches. None of the acequia madre or other portions of the system currently retaining an "open earthen ditch" form will be affected by this project.

At present, the acequia obtains water from the Santa Cruz River via a single concrete diversion structure. Historically, the acequia obtained water simultaneously from both the Santa Cruz River and the Rio Quemado, but channel erosion in the Rio Quemado has left the former Rio Quemado headgate above the current water level, leading to its abandonment. The proposed project, in addition to piping an extent of the ditch and installing a sluice box / trash rack, will also construct a second diversion structure on the Rio Quemado, thus restoring the acequia's earlier dual-headgate arrangement.

The proposed project is being undertaken to address and alleviate negative impacts currently being experienced by the acequia system that impair the acequia's function, create increasing damage, and generate labor and maintenance requirements that are beyond the current Association's ability to address easily. Primary negative impacts include:

1) Erosion resulting in downslope movement of sediments from an adjacent hillside into the ditch, resulting in blockage causing increased erosion around the concrete lining and requiring extensive labor to clear out.

2) Severe erosion of sediment away from the concrete lining, sharply undercutting the concrete and leading to repeated failure. This erosion is caused by two processes: (a) extensive trampling of surrounding sediment by livestock owned by non-members as the animals drink water from the ditch; and (b) frequent obstruction of the ditch by debris, including modern trash, that blows into the ditch and causes overflow. Such erosion undercuts the concrete lining, causing it to fracture and give way entirely, resulting in extensive water loss and requiring costly repair and labor investment resulting in increasing hardship to the dwindling and aging members of the acequia association.

3) These detrimental impacts of severe erosion of sediment into the ditch and of sediment undercutting the current concrete lining endanger the acequia's continued function and jeopardize the continued use of this acequia segment; because this segment is the upstream portion of the acequia, the entire acequia system is impacted. Piping this extent of the acequia would eliminate these two causes of erosion.

A Corps archaeologist conducted a field visit to the project area on January 29, 2009, and surveyed the project area on May 20, 2009. Enclosed for your review is the report entitled A 3.13-Acre Cultural Resources Inventory for the Acequia de los Ranchos, Santa Fe County, New Mexico, by Jonathan E. Van Hoose (NMCRIS 115177, Corps Report No. USACE-ABQ-2009-013). The survey did not identify any historic properties aside from the acequia itself. The archaeologist was unable to relocate the only site indicated by an ARMS search as possibly intersecting the project area (LA 89010, a historic structure), and confirmed that no portion of the proposed project intersects any archaeological site.

Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense

William S. Cohen on October 20, 1998, and based on the State of New Mexico Indian Affairs Department's Native American Consultations List, American Indian tribes that have indicated they have concerns in Santa Fe County have been contacted regarding the proposed project. To date, the Corps has received no indication of tribal concerns that would impact this project. No known Traditional Cultural Properties are known by the Corps to occur within the project area.

The Corps considers the Acequia de los Ranchos to be eligible for listing on the National Register of Historic Places under Criterion (a) of 36 CFR 60.4, as irrigation features such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history.

The proposed project does not involve restoring the concrete-lined ditch to its earlier historic "open earthen ditch" form, but rather seeks to rehabilitate the acequia so that it may continue to function in its current context providing agricultural irrigation. While preferable from a historic preservation standpoint, restoration would not address the serious maintenance issues impacting the acequia, and as such would not be feasible technically or economically (cf. 36 CFR 67.7), given the realities of an aging and shrinking acequia association membership.

Piping the ditch will affect it. However, in relation to Section 106 of the NRHP, the Corps is of the opinion that the proposed project will result in no adverse effect to historic properties for the following reasons:

1) The current detrimental impacts of severe erosion, both of sediment into the ditch and of sediment undercutting the current concrete lining, resulting from rainfall runoff, trash obstructions, and livestock trampling, create repeated failure, hinder adequate function of the acequia and jeopardize the continued use of this segment.

2) The project will alter a single element of the acequia: its form. However, the only portion of the system that will be affected is a portion that has already lost the integrity of its historic form by the addition of concrete lining in 1967 and 1986; the concrete lining has not acquired historical significance in its own right. As this segment of the acequia lacks integrity of form, its form is thus not a contributing element to the acequia's eligibility for the NRHP.

3) The acequia segment does retain integrity of alignment and function, both of which are active contributing elements to the ditch's eligibility. Neither of these elements will be changed or adversely affected by the proposed project.

4) This project satisfies the Secretary of Interior's standards for rehabilitation of historic structures (36 CFR 67.7). The proposed project will not destroy, damage, or remove any currently-existing historic material or element from the acequia. Further, the installation of buried pipe in place of the current concrete lining is reversible such that "if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired," as specified in the Secretary's standards (36 CFR 67.7). Future removal of the pipe would allow a return to the historic open earthen ditch form.

5) While the project will alter the acequia's form, it will preserve other factors relevant to its eligibility for the NRHP. The proposed project is thus a means of preserving the continued use of the acequia in its historic cultural context as an agricultural irrigation feature by preserving its alignment and function in a manner that is economically feasible (cf. 36 CFR 67.7). All portions of the acequia system that do retain the earlier historic "open earthen ditch" form (including 1,318 feet of the acequia madre; a major lateral measuring 1,519 feet; and at least 3,774 feet of minor laterals and field ditches) will remain unaltered by this project, as will an extent of ditch with the 1967 concrete lining. These portions will retain their eligibility for the NRHP.

For these reasons, the Corps considers the effects to the acequia not to be adverse. Should previously undiscovered artifacts or features be discovered during construction, work will stop in the immediate vicinity of the find, a determination of significance made, and consultation would take place with appropriate parties to determine the best course of action.

IF REPORT IS NEGATIVE YOU ARE DONE AT THIS POINT.

SURVEY LA NUMBER LOG
Sites Discovered:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

Previously recorded revisited sites:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

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CHAPTER 1
INTRODUCTION AND PROJECT DESCRIPTION

Sarah E. Beck and Jonathan E. Van Hoose

Purpose of the Survey and Project Background

The Water Resources Development Act (WRDA) of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq. as amended), authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Under Section 1113 of the Act, Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region. The Secretary of the Army, therefore, has been authorized and directed to undertake, without regard to economic analysis, such measures as are necessary to protect and restore New Mexico's acequias. The Act also recognized community acequias as public entities, allowing acequia officials to serve as local sponsors of water related projects through the Department of Defense.

Section 215 of the Flood Control Act of 1968 (P.L. 90-483), as amended, 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, 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 supervision of the Chief of Engineers. The U.S. Army Corps of Engineers, Albuquerque District (Corps) would reimburse 75 percent of total project cost and is, therefore, the action agency for this project. The Corps has the authority for review and approval of the environmental and cultural impacts of the proposed 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.

Project Description and Location

The proposed Acequia de los Ranchos rehabilitation project area is located in Chimayó, New Mexico near the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road (Figure 1.1). The principal objective of the acequia rehabilitation project is to improve the maintenance of the acequia madre and the efficiency of water delivery to the acequia members in response to significant erosional impacts resulting from rainfall runoff, trash obstruction, and livestock trampling. The existing concrete ditch lining system is damaged beyond repair in multiple locations and is in danger of substantial failure. Additionally, erosion from non-member livestock accessing the ditch results in continual sedimentation of the ditch. The proposed project would ameliorate these impacts so that Association members may continue to use this historic water delivery feature in its

historical and cultural context for agricultural irrigation. Project construction would be scheduled in October 2009, with an expected duration of approximately eight weeks.

The Corps, in cooperation with the Acequia de los Ranchos Association, proposes to construct: 1) 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia; 2) a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River; 3) a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Rio Quemado and 178 feet of 15-inch diameter plastic pipeline to the sluice structure; 4) three 12-inch diameter left turn outs with 12-inch diameter alfalfa valves at Stations; 5) two 15-inch diameter in-line gates; 6) a 15-inch diameter aluminum flap gate; 7) one air vent on the Rio Quemado pipeline; two air vents on the Santa Cruz River pipeline; and 8) six air relief valves. Two staging areas (0.27 and 0.63 acres) have been identified on private property owned by Rosendo Cordova and Charles Ortiz. All pipeline work is within the acequia's right-of-way, and is in conformance with the Taos Resource Management Plan (BLM 1988). Project design has been completed by the USDA Natural Resources Conservation Service (2007).

The proposed project is being undertaken to address and alleviate negative impacts currently being experienced by the acequia system that impair the acequia's function, create increasing damage, and generate labor and maintenance requirements that are beyond the current Association's ability to address easily. Primary negative impacts include:

1) Erosion of sediment downslope from an adjacent hillside into the ditch, resulting in blockage causing erosion around the concrete lining and requiring extensive labor to clear out.

2) Severe erosion of sediment away from the concrete lining, sharply undercutting the concrete and leading to repeated failure. This erosion is caused by (a) extensive trampling of surrounding sediment by livestock owned by non-members as the animals drink water from the ditch; and (b) frequent obstruction of the ditch by debris, including modern trash, that blows into the ditch and causes overflow. Such erosion undercuts the concrete lining, causing it to fracture and give way entirely, resulting in extensive water loss and requiring costly repair and labor investment, increasing hardship to the dwindling and aging members of the acequia association.

3) These detrimental impacts of severe erosion of sediment into the ditch and of sediment undercutting the current concrete lining endanger the acequia's continued function and jeopardize the continued use of this acequia segment; because this segment is the upstream portion of the acequia, the entire acequia system is impacted. Piping this extent of the acequia would eliminate these two causes of erosion.

Land Ownership

Land in the project area is privately owned. Project construction will occur within the Acequia de los Ranchos Association's right-of-way. In addition, the two staging areas are privately owned by Charles Ortiz and Rosendo Cordova (Beraldo Montoya, personal communication). No soil disturbance is expected at the staging areas, which would be used only for stockpiling materials and equipment.

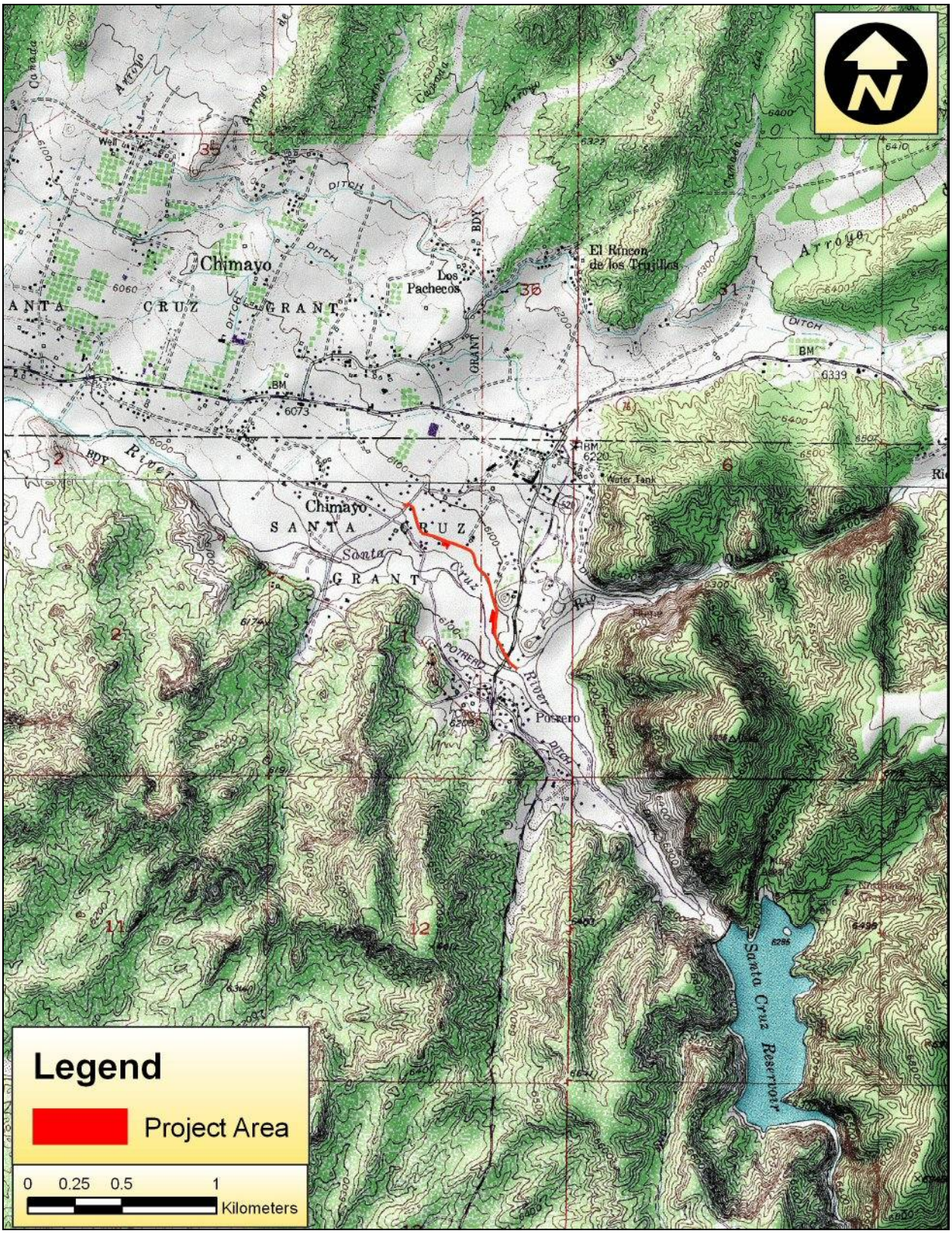

Figure 1.1. Location of project area, shown on USGS 7.5" quadrangles maps Chimayó, NM (36105-A8) and Cundiyo, NM (35105-H8).

Project Personnel and Schedule

Jonathan Van Hoose, Corps archaeologist, conducted a visit to the project area with Corps biologist Michael Porter on January 29, 2009, and conducted a cultural resources survey on May 20, 2009. Photographs from both visits are included in this report. Jonathan Van Hoose prepared this report, and Sarah Beck, Corps biologist, prepared the natural setting section appearing in Chapter 2 and contributed to this chapter. Lance Lundquist, Corps archaeologist, peer-reviewed this document. The project proponents would prefer to begin construction at the end of irrigation season in October, 2009, and expect construction to last approximately six to eight weeks.

CHAPTER 2
ENVIRONMENTAL SETTING

Jonathan E. Van Hoose and Sarah E. Beck

Natural Environment

Physiography and Geology

The project area is on the Intermontane Plateaus of the Southern Rocky Mountains Province (Fenneman and Johnson 1946; Natural Resources Conservation Service 2009a). The Rio Quemado is a tributary to the Santa Cruz River with the Camino de los Ranchos Acequia located immediately upstream of the confluence. Landforms in most areas are controlled by the underlying sedimentary rock formations, with fluvial landforms in the Rio Grande rift basin. Elevation ranges between 4,600 to 9,300 feet (1,400 to 2,835 meters) in areas of the foothills and high mesas that border the Southern Rocky Mountains. Relief generally is less than 1,500 feet (455 meters).

Most of the area is characterized by generally horizontal beds of sedimentary rocks (Natural Resources Conservation Service 2009a). The sedimentary rocks have been eroded into plateaus, mesas, hills, and canyons. Wide valleys in the rift basin have accumulated deep alluvial sediments, and fan remnants are common. The Española Basin is a west-tilted half graben and a prominent feature of the Rio Grande rift. Surficial geology in the project area consists of west-dipping beds of the Tesuque Formation, which are middle to upper Miocene age (Kelson and Olig 1995), and modern alluvium associated with arroyo channels.

Soils

The soil in the project area is primarily stream alluvium (Mirada-Bosquecito complex and Chupe fine sandy loam) derived from sandstone, siltstone, granite, gneiss, and schist resulting in a fine sandy or silt loam above a fine sandy loam with a base of stratified gravelly coarse sand over the floodplain for the Santa Cruz River (Natural Resources Conservation Service 2009a). The adjacent hillslope is composed of very fine sandy loam derived from micaceous sandstone and siltstone (Koshare) on top of gravelly coarse sand. The soil moisture regime is mainly aridic with a mesic soil temperature (Natural Resources Conservation Service 2009b).

Climate

Santa Fe County has a semiarid climate. The project area has a mid-latitude desert climate, with an annual average precipitation amount of 9.85 inches (recorded for nearby Espanola, NM, Western Regional Climate Center 2009). Precipitation is irregular, but there is typically a pattern of monsoonal rains in July and August as Gulf air masses penetrate into the region (Figure 2.1). Cyclonic precipitation occurs during winter months, with average annual snowfall of 11.6 inches. Average diurnal temperature fluctuations of 20° F to 30° F are characteristic of the project area. Summer temperatures are warm and winters are mild (Figure 2.2).

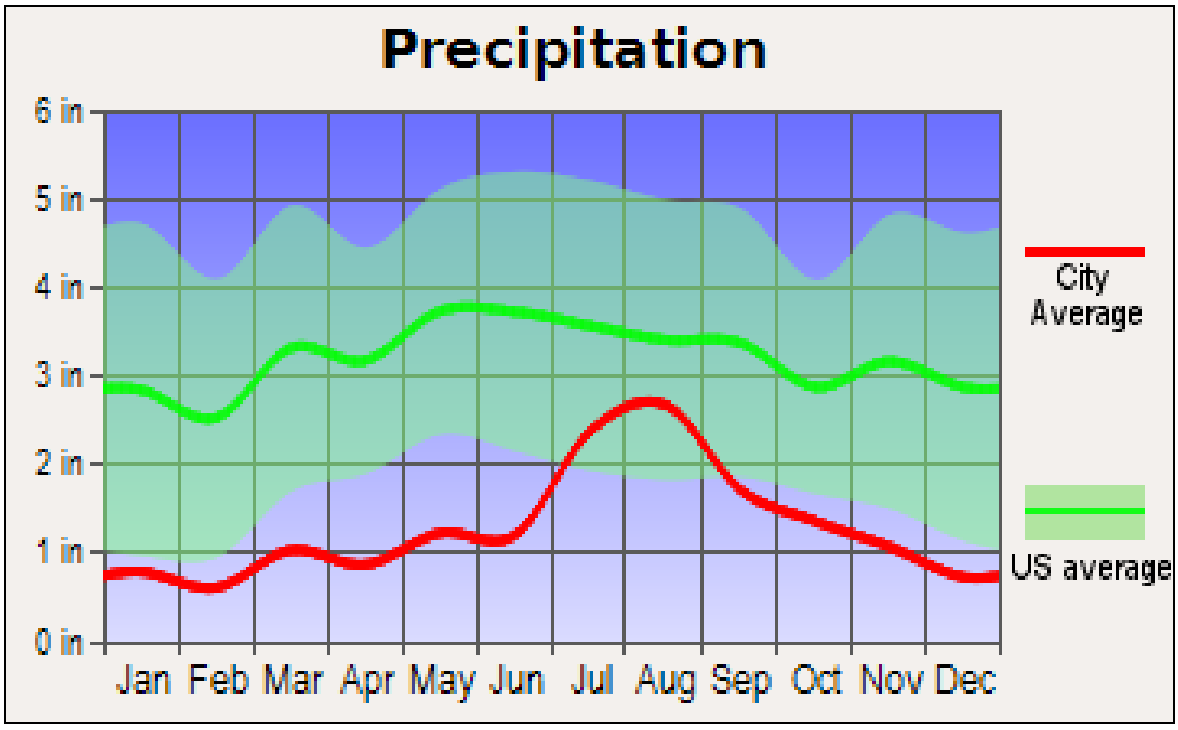

Figure 2.1. Precipitation characteristics in Chimayó near project area. Graph generated by City.com (2009).

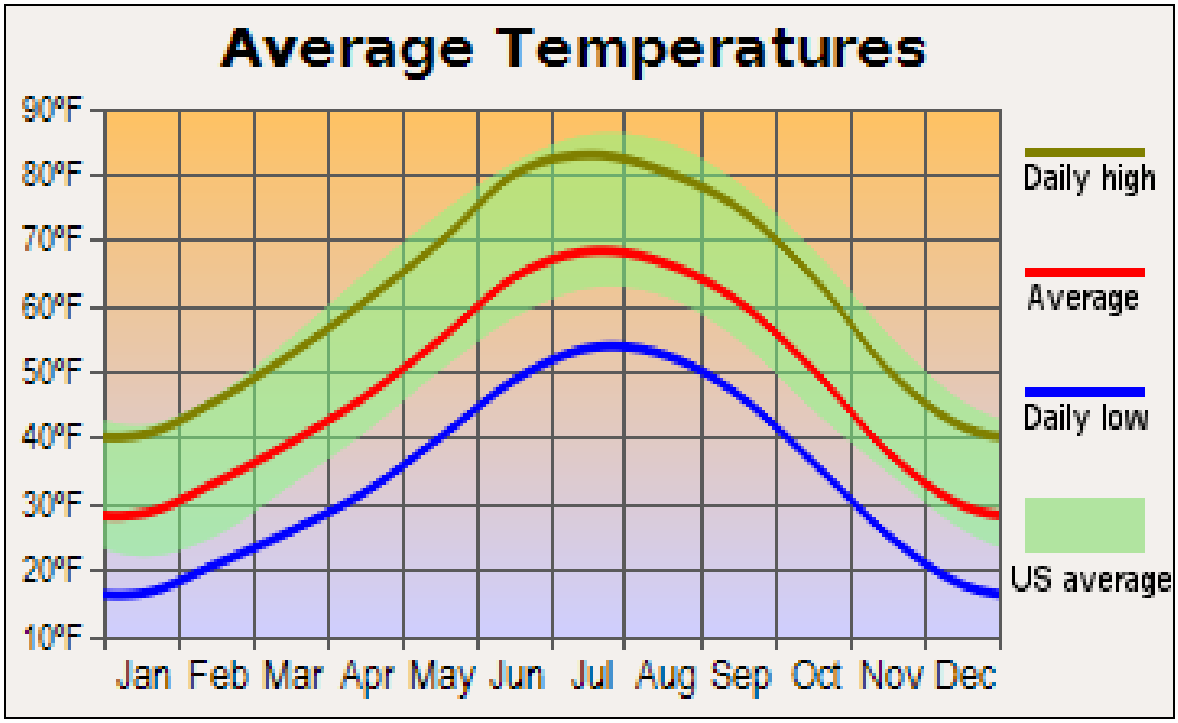

Figure 2.2. Temperature characteristics in Chimayó near project area. Graph generated by City.com (2009).

Water Resources

The project area is located on the alluvial floodplain of the Santa Cruz River, a tributary to the Rio Grande. The peak storm flows since 1932 are between 500-700 cfs, based on the USGS Santa Cruz River near Cundiyo, NM gage (08291000) data (USGS 2009). It should be noted that this gage is located upstream of Santa Cruz Reservoir and the project area exists downstream where there is no gage. The range of average annual discharge is between 18 and 616 cfs.

Vegetation and Wildlife

The project area is located on the edge of the Rocky Mountain Montane Conifer Forest biotic community as described by Brown (1982). The vegetation along the Santa Fe River is typical riparian willows and cottonwood. Upland vegetation at the lower elevations is grass and sagebrush with piñon-juniper woodland and ponderosa pine forests are at mid elevations. Forests of Rocky Mountain Douglas-fir and white fir are at the higher elevations. Some of the major wildlife species in this area are mule deer, elk, coyote, black bear, mountain lion, black-tailed jackrabbit, Gunnison's prairie dog, badger, piñon jay, black-billed magpie, mountain chickadee, red-breasted nuthatch, white-breasted nuthatch, collared lizard, fence lizard, and western rattlesnake.

Results of Records Check

An online records check of the New Mexico Office of Cultural Affairs, Historic Preservation Division, Archaeological Records Management Section's (ARMS) database was conducted by Jonathan Van Hoose on January 28, 2009. Table 2.1 lists archaeological surveys that have been conducted within 0.5 miles of the project area. A screen-capture of the ARMS map server search is shown in Appendix A, Figure A.1.

According to the ARMS database and Corps' records, five surveys have been conducted within 0.5 miles of the project area. These surveys total 371.7 acres and resulted in the recording of 14 unique historic properties. This translates into 3.77 historic properties per 100 acres surveyed, about 164 percent higher than the average for New Mexico. The Corps contacted ARMS staff for information, and as of November 6, 2006, approximately 12 percent of New Mexico has been surveyed, for a total 9,072,164 acres and 148,540 sites. This equals 1.64 sites per 100 acres. Table 2.2 lists archaeological sites located within 0.5 miles of the project area.

Table 2.1. Surveys conducted within 0.5 miles of project area.

NMCRIS Number	Performing Agency	Survey End Date	Acres	Number of Sites	Survey Type
23389	CCRS	8/8/1988	21.5	0	Intensive
23695	CCRS	9/8/1988	45.0	0	Intensive
49452	CCRS	7/21/1995	3.2	0	Intensive
67355	TRC	5/31/2000	112.9	9	Unknown
76185	LBAI	9/27/2001	17.0	0	Intensive
79664	CCRS	11/18/1986	1.9	0	Intensive
83863	BLM-ABQ	1/23/1987	30.4	0	Intensive
83897	TAOS RA	1/28/1987	3.7	0	Intensive
87026	TEC	5/31/2004	136.1	5	Intensive

There are nine known archaeological sites within one-half mile of the project area; ARMS data for these sites are presented in Table 2.2. Four of the sites are prehistoric, four are historic, and one is of unknown temporal affiliation. The boundaries of one site, LA 89010, intersect with the project area according to ARMS search data. However, these site boundaries are based on an arbitrary circular footprint drawn around a site center with an arbitrary radius of 150 meters.

LA 89010 is a historic building, listed in the ARMS database as a "church / religious structure." The site does not appear to have been recorded as part of an archaeological survey, but rather appears to have been entered into the ARMS database from a brief mention in a 1967 document prepared by Alfred Dittert (Dittert 1967), which contains a very general description of historic resources in New Mexico. This report is associated with the NMCRIS activity number 16311, described in the ARMS database as "New Mexico historic sites for NM State Planning Office", and which appears to have involved the assignment of site numbers to various New Mexico historic properties described in the Dittert report.

Dittert did not provide precise locations for any of the properties described in his report; it is thus likely that the actual location assigned to this site in the ARMS database, as well as the size of the site and its boundaries, are rough estimates at best. Nonetheless, field personnel did not detect any evidence that the proposed project overlaps in any way with any archaeological site or historic property aside from the Acequia de los Ranchos itself.

Table 2.2. Known archaeological sites within 0.5 miles of project area.

LA Number	Site Type	Occupation Type	Site Size (acres)
LA 153	Nonstructural	Prehistoric	7208.0
LA 156	Nonstructural	Prehistoric	704.0
LA 39936	Structural	Historic	71454.1
LA 88110	Structural	Historic	71454.1
LA 89010	Structural	Historic	71453.9
LA 138467	Nonstructural	Prehistoric	11250.0
LA 142883	Structural	Historic	3016.5
LA 145737	Nonstructural	Prehistoric	2640.0
LA 145738	Structural	Unknown	706.3

Table 2.3. Properties within 0.5 miles of project area listed on the State Register of Historic Places and National Register of Historic Places.

Number	Name	Address	State Register Date	National Register Date
71	Oratorio de San Buenaventura	Plaza	5/23/1969	n/a
75	Plaza del Cerro	Plaza	5/23/1969	7/17/1972
188	El Santuario de Chimayó	El Portero de Chimayó	5/22/1970	4/15/1970

Results of Tribal Consultation

Pursuant to 36 CFR 800.2, consulting parties in the Section 106 process identified for the Undertaking include the Corps, the Association, and the New Mexico State Historic Preservation Office. Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department's 2008 Native American Consultations List, American Indian tribes that have indicated they have concerns in Santa Fe County were sent scoping letters regarding the proposed project. To date, the Corps has received no indication of tribal concerns that would impact this project.

Culture History and Literature Review

The proposed project is within the Santa Fe district of the Northern Rio Grande archaeological region (Cordell 1979; Crown et al. 1996; Stuart and Gauthier 1988). The following culture history overview provides a general context for the last 14,500 years of known occupation around the project area—from the Ice Age to the present—and is based largely on the works of Cordell (1979) and Stuart and Gauthier (1988), describing trends in the northern Rio Grande in general, with specific focus on the Santa Fe district where appropriate. Specific citations are provided from other referenced sources.

The Paleoindian Period (c. 12,500 BC to 5500 BC)

Humans were present in North America by approximately 12,500 BC (Feidel 1999), and the Paleoindian period dates from this time to approximately 5500 BC. The most distinctive artifact types associated with the Paleoindian period are lanceolate spear points, many of which exhibit distinct basal flutes (large flake scars extending from the point base). Throughout the Great Plains and the Southwest, these points have been found associated with large ice-age mammal species such as mammoths, mastodons, and several extinct species of bison. While these finds have contributed to an image of Paleoindians as specialized big-game hunters, in reality they probably pursued more diverse subsistence strategies. The period appears to be characterized by low population densities and high mobility, resulting in Paleoindian sites being rare and having low archaeological visibility.

The Archaic Period (5500 BC to AD 400/600)

The Archaic Period extends from approximately 5500 BC to AD 400 and represents a continuation of a hunting-gathering lifestyle; however, the range of animal species is similar to those found today, without many of the larger species (e.g. mammoth, camels) that became extinct after the end of the last ice age (cf. Irwin-Williams 1973). This represents the primary difference from the preceding Paleo-Indian Period. During the Archaic, both large and small animals were hunted and trapped. Based on the increasing presence of manos and metates (grinding stones usually used to grind corn or other seeds), it is clear that the processing of plants became more important later in the period. Towards the end of the Archaic, longer-term habitation sites that include shallow pithouses (structures at least partly dug into the ground) are found in central New Mexico.

Two major changes occurred towards the end of the Archaic. Indications of maize appear in the archaeological record by about 2000 BC; however, maize became relatively more common after 1000 BC. Finally, the bow and arrow appeared around AD 500 and replaced the spear as the primary weapon.

The Ancestral Pueblo Period (AD 400/600 to AD 1540)

The Archaic Period is followed by the Ancestral Pueblo Period. Depending on the location within New Mexico, between three and five major phases are recognized within this period and are based on a host of characteristics, including house forms and construction techniques, settlement patterns, pottery types, and other elements of material culture. One of the key new developments during this period is the appearance and proliferation of pottery; because stylistic changes in the ceramics over time are much better understood by archaeologists, the appearance of pottery makes Ancestral Pueblo sites much easier to place within a precise chronological sequence than preceramic sites.

The first chronological sequence developed for this period in the Southwest was the Pecos Classification (Kidder 1924: 84-88), which includes the Basketmaker III (AD 600-750), Pueblo I (AD 750-900), Pueblo II (AD 900-1100), Pueblo III (AD 1100-1300), and Pueblo IV (1300-1600) periods. Wendorf and Reed (1955) proposed an alternative sequence for the northern Rio Grande valley, which was defined largely on the basis of specific sets of changes in settlement pattern and site structure; these periods are termed Developmental (AD 400/600 to AD 1200), Coalition (AD 1200 to AD 1325), and Classic (AD 1325 to approximately AD 1540). The following discussion follows this classification scheme.

A number of general trends characterize the Ancestral Pueblo period in the northern Rio Grande valley. While hunting and gathering continued, reliance on agricultural products continually increased. Pithouse villages with larger communal structures indicate larger social groups living in one location for longer periods of time. Small living and storage rooms built on the ground surface (rather than into the ground, as with earlier pithouses) begin to appear early in this period, and increase in size and abundance. In later periods, above-ground architecture completely replaces pithouses for living and storage functions, with below-ground structures then being limited to communal and ceremonial use.

As populations increased, these small houses were replaced with large buildings of up to several hundred rooms made of rock and/or adobe. Not all of the rooms in these connected structures were necessarily occupied at once; often the large roomblocks grew by accretion, with older rooms being abandoned and new rooms being constructed over time. Overall, the Ancestral Pueblo period saw fundamental changes in architecture, shifts and growth in population, and agricultural reliance in the northern Rio Grande valley.

Developmental Period (AD 400/600 to AD 1200)

The Developmental Period, dating between AD 400/600 and 1200, and represents a time of gradual transition from the Archaic period, and includes the appearance and spread of new technologies including ceramics and the bow and arrow. It is also characterized by the construction of more elaborate, substantial pithouses (Cordell 1979:42; Schmader 1994). The period is often subdivided into Early (AD 600 to 900) and Late (AD 900 to 1200).

The Developmental period is characterized by increasing sedentism made possible by greater reliance on agriculture. Increased precipitation during this period made intensified maize cultivation possible. A more sedentary existence is suggested also by the presence of pottery and large pit structures that were occupied for longer periods during the year (Allen and McNutt 1955; Schmader 1994), and by increased numbers of storage cists both inside and outside pithouses (Schmader 1994). Early Developmental ceramics consist of pottery types widely distributed throughout the Southwest, including both locally manufactured wares and others associated with the Mogollon culture area to the south (Anschuetz 1984). Early in the period the associated ceramics are similar to those found throughout northern New Mexico; later in time the stylistic attributes, including paint, design, and temper, become more locally distinctive. Pithouses during this time were more substantial than before, with structural elements reflecting greater investment in domestic architecture than previously. Dispersed, seasonal settlements inhabited by people with fluid group memberships are believed to characterize this period. Surface structures appeared toward the end of the period, along with an increase in site size (Anschuetz 1984: 27; Wendorf and Reed 1955: 140).

The Developmental period also saw changes in climatic conditions. The Early Developmental period witnessed an overall increase in precipitation, but with short-term periodicity and great variance and unpredictability in precipitation levels. Anschuetz (1984) suggests that populations were growing and that this increased density constrained mobility and increased competition for limited subsistence resources. As a result, populations were forced to increase agricultural production, while uplands provided buffers against potential floods on the floodplain and would have allowed dispersion for dry farming during favorable periods of rainfall. During the eleventh century, rainfall patterns shifted to greater short-term predictability and longer-term periodicity. According to Anschuetz, this resulted in more intensive but seasonal use of upland areas, probably in response to increasing population densities.

Coalition Period (AD 1200 to 1325)

The Coalition Period, AD 1200 to 1325, is marked by a dramatic population increase in many portions of the northern Rio Grande region after around AD 1250, hypothesized to originate from an indeterminate combination of migration from other areas such as Mesa Verde, Chaco Canyon, or portions of west central New Mexico; and internal population growth. Crown et al. (1996) find strong evidence for population shifts throughout the region between AD 1150 and AD 1350; this was coincident with an overall trend toward increases in the number and density of sites, and a shift from dispersed habitations to aggregated residences. An important theme in the interpretation of this period is the relationship between a collapsing core area (the San Juan Basin) and its developing periphery (the Rio Grande valley) (Stuart and Gauthier 1988; Tainter 1987).

During this period, populations appear to shift throughout the northern Rio Grande. Different areas experience different degrees of population growth, likely stemming both from internal population increase and the arrival of groups from elsewhere. Regardless of the actual pace or trajectory of population growth, all regions experience aggregation (the consolidation of greater numbers of people into smaller numbers of communities) at more or less the same time between AD 1250 and AD 1300 (Crown et al. 1996).

In some areas, this shift precedes population increase, but follows it in others. In the Santa Fe District (which includes the project area), aggregation and population growth are roughly coincident, with both growing sharply between AD 1200 and 1250 (Crown et al. 1996: 198); this differs from the adjacent Pajarito District, where aggregation increases steadily until at least AD 1375, while population peaks around AD 1300 and then drops off by AD 1375 (Crown et al. 1996: 196). This pattern is reversed in the nearby Chama District, where aggregation appears to precede sharp population growth by approximately 50 to 75 years (Crown et al. 1996: 193).

In general, Coalition period habitations continue the shift from pithouses to above-ground structures (Cordell 1979), and sites generally consist of linear or L-shaped room blocks (containing from two to 200 rooms, with structures containing between 13 and 30 rooms the most common) which tend to be located near major drainages (Stuart and Gauthier 1988). By their measure, Crown et al. (1996) note that nearly all habitation sites in the northern Rio Grande contained more than 50 rooms by AD 1300 (Crown et al. 1996: 199). In decorated ceramics, there is a shift from the use of mineral paint to organic paint represented by the appearance of Santa Fe Black-on-white (Cordell 1979).

Classic Period (AD 1325 to 1540)

Substantial social and technological change is evident during the Classic period, beginning around AD 1325 (Cordell 1979; Stuart and Gauthier 1988; Wendorf and Reed 1955). By this time, the majority of the northern Rio Grande population lived in large aggregated settlements (Crown et al. 1996), some containing more than 1,000 rooms (Stuart and Gauthier 1988). The development of glaze-paint pottery occurred during this period, allowing relatively fine-grained chronological placement based on a series of stylistic and technological changes in the Rio Grande Glaze sequence. Glaze wares replaced black-paint wares in most regions (with the exception of the Jemez area, where Jemez Black-on-white persists for some time), and the appearance of this technology has been interpreted as evidence for migration from the west (Shepard 1942: 197-199), diffusion of ideas from the Zuni and Little Colorado areas (Wendorf and Reed 1955: 150, 161), local development, or a combination of the three.

The end of the Classic period saw the arrival of the Spanish, first with Coronado's entrada of 1540, and then with the first establishment of a Spanish colony in 1598. By the time of European contact, some of the large Classic pueblos had already been abandoned for nearly a century. Theories on these abandonments include overpopulation, overexploitation of natural resources, drought, and conflict (Cordell 1979: 45). End dates for the Classic period have been alternatively designated as 1540, the year of Coronado's entry into the area; and approximately 1600, a time when the establishment of a permanent colony (1598) began to impinge significantly on Pueblo life. This report uses the earlier date, while recognizing the inherently arbitrary nature of using this as a cutoff.

The Historic Period (AD 1540 to Present)

In general, this period in central and northern New Mexico is characterized by rapid change and acculturation (the exchange and adoption of cultural elements such as beliefs and behaviors between groups coming into contact with one another) among Indians, Spanish, Mexicans, and Anglo-Americans. This period, dating from about AD 1540 to the present, can be seen as a series of phases reflecting aspects of social interaction between different groups. In broad outline, key

elements of these include (in chronological sequence): Spanish exploration followed by colonization; the Pueblo Revolt; the post-Revolt colonial period under Spanish and then Mexican rule; the annexation of New Mexico as a United States territory; and U.S. statehood.

Currently, there are four major linguistic groups among the Pueblo Indians of the Southwest—Zuni, Uto-Aztecan (Hopi), Tanoan, and Keres. The Tanoan language family is divided into three primary subgroups: Tiwa, Tewa, and Towa.

Pueblo population throughout the northern Rio Grande region faced a general decline during this period as a result of multiple factors, including disease. In addition to missionary efforts to convert indigenous groups to Christianity, this period was also characterized by concerted efforts by the Spanish to consolidate control over Pueblo populations through strategies such as *reducción* (Spicer 1962), a policy of forced concentration of populations into a smaller number of more easily controlled settlements. In some portions of the Rio Grande, these efforts likely led in part to native dispersal into peripheral areas in order to escape Spanish control (Kulisheck 2002). Beginning around 1650, the Spanish established their own farms in the growing gaps between Pueblo lands.

The Spanish Colonial Period (AD 1540 – 1821)

When Coronado entered New Mexico in 1540, he found a series of large, aggregated villages concentrated along the length of the Rio Grande valley; the Rio Grande is one of the few parts of the Southwest where such aggregated population centers persisted into the Historic period. Coronado's 1540-1542 entrada noted the province of Yuque-Yunque, incorporating the pueblo of Ohkay Owingeh as well as several other large villages in the Chama area, possibly including the large site of Sapawe (Schroeder 1979). Coronado's entry into the Southwest was followed by intermittent additional Spanish forays until 1598, when Juan de Oñate established a permanent colony, with his primary base in the vicinity of Ohkay Owingeh near the location of modern Española (Simmons 1979), west of the project area. The establishment of the Spanish colony with a base in the Española area led to Spanish settlement throughout the surrounding area, including in the Santa Cruz River valley in the vicinity of the current project area.

The Pueblo Revolts of 1680 and 1696

The last decades of the seventeenth century were characterized by significant upheaval, as conflict escalated between indigenous populations and the Spanish colonial presence. The Pueblo Revolt of 1680 was a unified action on the part of several pueblos, in alliance with other indigenous groups including Apache and Navajo, who together successfully drove the Spanish out of New Mexico for more than a decade (Knaut 1995; Sando 1979). Twelve years later (AD 1692), Diego de Vargas led a Spanish contingent to retake New Mexico, beginning a process of reconquest that was intermittently violent between approximately 1692 and 1696.

Continued resistance culminated in a second revolt in 1696, which was of smaller scale than the 1680 revolt and was not ultimately successful (Edelman 1979; Espinosa 1988). The Santa Cruz valley, and the location of Chimayó in particular, played key roles in this event. After Vargas's Reconquest of 1692, he established a new *villa* in the Santa Cruz valley as a location for new Spanish settlement. This establishment resulted in the displacement of several Tano groups, who were granted resettlement by Vargas at "the site they could newly settle in the place and end of

the Cañada they call Chimayó, next to the sierra," in the vicinity of the modern town of Chimayó (Kessell et al. 1998: 610). After a 1694 revolt involving the Jemez, Acoma, Zuni, and Navajo was put down by the Spanish, another revolt broke out in 1696, centered on the displaced Pueblo groups in Chimayó (Spicer 1962). This revolt spread to involve Taos, Picuris, Santo Domingo, Cochiti, and Acoma, and was ultimately defeated by Vargas (Kessell et al. 1998). Following this defeat, the Tanos who had been occupying the Chimayó area abandoned New Mexico to reside with the Hopi (Dozier 1966; Spicer 1962). The suppression of the 1696 revolt marked the end of the last significant organized resistance by Rio Grande pueblos against Spanish rule.

Post-Revolt Period to 1821

The town of Chimayó was settled soon after the establishment of Santa Cruz, with its original center being the historic Plaza del Cerro, which is located almost precisely one kilometer from the current project's Santa Cruz River diversion structure (Dittert 1967).

Before the Pueblo Revolt of 1680, Spanish settlers generally maintained scattered estates (haciendas) in close proximity to Pueblo villages, which served as sources of labor (Cordell 1979:115), but after the reconquest this shifted to a focus on the greater security afforded by living in villages (ranchos). While the shift to rancho settlement is partly due to decreasing Pueblo population sizes and increasing Spanish population size (Cordell 1979:118), it was also likely a response to both perceived threat of Pueblo action, and to increasingly common raids on both Spanish and Pueblo communities by Apache, Navajo, and Comanche groups. Early in the eighteenth century, these ranchos were still fairly scattered, but increasing need for greater security encouraged the construction of defensible plazas later in the century (Cordell 1979: 118).

The Mexican Period (AD 1821-1846)

The nineteenth century saw a series of geopolitical shifts resulting in New Mexico changing hands more than once. The Republic of Mexico was founded in 1821, but Mexican control over New Mexico only lasted a quarter of a century before New Mexico was annexed by the United States in 1846 (Cordell 1979; Weber 1982). Raiding on Pueblo and Hispanic communities by nomadic groups increased during the Mexican period, encouraging further aggregation for defense (Cordell 1979). Anglo settlers began to enter the area as well during this period, a pattern which intensified after annexation. Settlement and livestock grazing expanded into previously unoccupied regions (Pratt et al. 1988: 53), and farming continued to be a central activity.

In 1837, New Mexico experienced a rebellion against the Mexican governor Colonel Albino Pérez, popularly known as "The Chimayó Rebellion" (Simmons 1988). This rebellion was largely a response to increased administrative control from the Mexican federal government, which involved the imposition of new taxes and the restriction of self-government. Rural populations in the area in and around Chimayó, including some Pueblos, mounted an armed insurrection which resulted in the occupation of Santa Fe and the beheading of the governor. Following the successful deposition of Pérez, the rebel army appointed a new governor, reaffirmed loyalty to the Mexican Republic, and then disbanded (Simmons 1988: 113).

This period also saw the establishment of what has since become an important and widely-known pilgrimage site, the Santuario de Chimayó (see discussion below).

Acequias and the Acequia de los Ranchos

Colonial-era remains in the study area include agricultural features such as acequias (irrigation ditches), including the Acequia de la Mesa Prieta examined in the present study (which is named for the Spanish name for Black Mesa, located just south of the project area – Julyan 1996:4). As described in detail by Ackerly (1996), there is some evidence for irrigation systems in the Pueblo world before Spanish contact. Fray Marcos de Niza describes irrigated agricultural land in the Rio Grande valley in 1539 (Ackerly 1996:5; Hammond and Rey 1940:69-72).

Spanish settlement of the area began to increase during the 1700s, and acequia systems were a vital component of agriculture during this period. Ackerly (1996:54) presents the temporal distribution of acequia systems in Figure 2.3. The Acequia de los Ranchos, subject of the present survey, has a non-adjudicated priority date of March 18, 1907. A priority date of 1907 would place the Acequia de los Ranchos fairly late; Figure 2.3 presents a figure from Ackerly's (1996) acequia study, showing the temporal distribution of acequia systems in the Santa Fe, Santa Cruz, Taos, and Costilla basins. Ackerly's figure shows the earliest acequias as dating before 1701, with dramatic increase beginning in the period after 1800, particularly the period of 1876-1900 (Figure 2.3). Most of the acequias thus date to the late 1800s, tapering off in the first quarter of the 20th century to nearly zero after 1925.

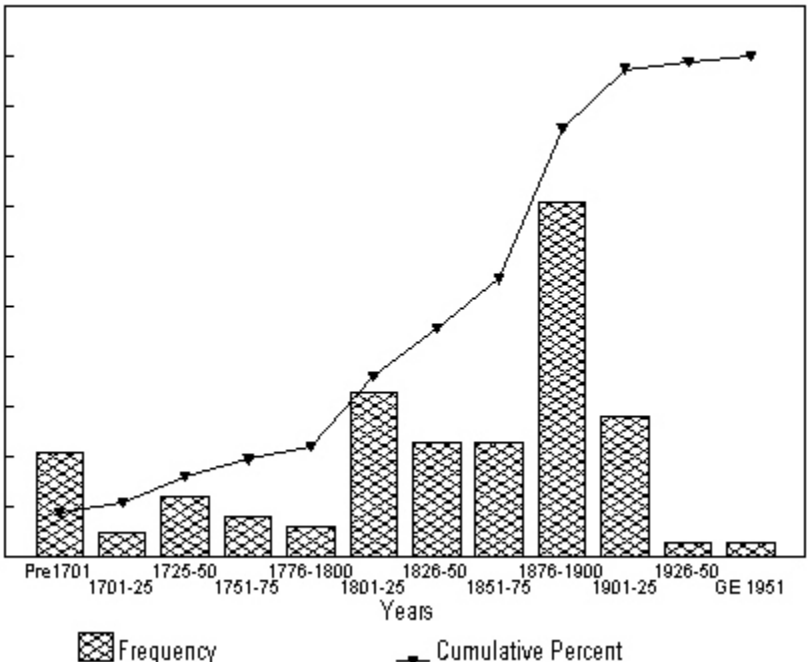

Figure 2.3. Temporal distribution of acequia systems in the Santa Fe, Santa Cruz, Taos, and Costilla basins. Figure reproduced from Ackerly (1996:54, Figure 7).

The Territorial and Statehood Periods (AD 1846-1912 and AD 1912-Present)

The nineteenth and twentieth centuries saw further economic and political changes affecting New Mexico, including an increase in trade between New Mexico and the United States, mani-

fested in part in the development of the Santa Fe Trail; growth of mining activities; the advent and development of railroad networks; and lumber operations. Annexation by the United States also led to the establishment of American military outposts throughout New Mexico, as well as conflict with and relocation of various indigenous groups, and the creation of Indian reservations. New Mexico became a state in 1912.

THE SANTUARIO DE CHIMAYÓ

Completed in 1816, the Santuario de Nuestro Señor de Esquipulas, popularly known as the Santuario de Chimayó, is a chapel and shrine built on a hillside to the south of the Santa Cruz River, southeast of the confluence of the Rio Quemado with the Santa Cruz. Traditionally, this site is believed by many to be associated with miraculous healings, and has become a principal pilgrimage site. Originally built as a private shrine by don Bernardo de Abeyta (a Penitente) and kept in private hands until 1929, the chapel is now operated by the Archdiocese of Santa Fe (Dittert 1967; Noble 1994; Swadesh 1974; Archdiocese 2009).

CHAPTER 3
FIELD METHODS

Jonathan E. Van Hoose

Introduction

Areas surveyed included the locations of the current diversion structure on the Santa Cruz River and proposed new Rio Quemado diversion; the portion of the acequia to be piped; and the proposed staging areas. The following methods were used for the survey.

Size of the Survey Crew, Transect Interval(s) and Transect Method

The survey crew consisted of one Corps archaeologist, Jonathan Van Hoose. Additional GPS data was collected by Corps biologist Michael Porter during the January visit, and additional photographs were taken by Corps biologist Sarah Beck during the May survey. The area surveyed included (a) the area between the proposed location for a new diversion on the Rio Quemado and the point where it would tie into the current acequia, totaling 0.15 acre; (b) the acequia alignment from the current diversion structure on the Santa Cruz River, northwest to the end of proposed piping, for a total of 2.08 acres; (c) two noncontiguous staging areas on private property owned by Charles Ortiz and Rosendo Cordova, amounting to 0.27 acre and 0.63 acre, respectively; and (d) the location for a proposed new diversion structure on the Rio Quemado, and the area for a new pipeline to connect it to the acequia, for 0.15 acre; for a total survey area of 3.13 acres.

The survey began with Corps personnel meeting Acequia de los Ranchos Association members Beraldo Montoya and Charles Ortiz on the January 28, 2009 site visit. During this visit, the archaeologist took photographs of the diversion structure on the Santa Cruz River, the now-disused gate on the Rio Quemado, and portions of the ditch to the southeast of Juan Medina Road. The archaeologist then walked along the acequia alignment from the area just downstream of the diversion structure to the end of the proposed piping project, looking for evidence of archaeological materials and noting details of acequia context and construction. The acequia alignment was walked over twice, during the January visit and the May survey. The precise route and alignment of the acequia were recorded via GPS on January 28. The staging areas and the area between the proposed new Rio Quemado diversion and the location where it would be tied into the existing acequia were surveyed during the May 20 survey, with Van Hoose walking transects with approximately five- to seven-meter transect intervals. Staging area boundaries were recorded by walking the perimeters with GPS. No archaeological sites, isolated artifacts, features, or other historic properties other than the acequia itself were noted during survey. All locational information, including acequia alignment and survey boundaries, was recorded with a Trimble Geo-XH GPS sub-foot unit. Key elements of the acequia, associated structures and features, and the acequia's context were photographed.

Field Conditions

During the January 28, 2009 field visit, average temperatures ranges in the 30s and 40s Fahrenheit, with partly cloudy skies, good visibility, and no precipitation. During the May 20, 2009 survey, average temperatures were in the 70s Fahrenheit, with sunny skies.

Ground visibility varied widely depending on the location being surveyed. Visibility for much of staging area #1 (property owned by Rosendo Cordova) was low due to heavy grass cover, while visibility at staging area #2 was moderate to high. Visibility for the majority of the acequia alignment was high (approaching 100 percent), and visibility for the area of the new Quemado diversion was between moderate to high.

Methods of Site Location and Site Recording

A pre-field check of the New Mexico Office of Cultural Affairs Archaeological Records Management Section's (ARMS) database on January 28, 2009 by Jonathan Van Hoose indicated the presence of several archaeological sites within 0.5 miles of the project area, with one (LA 89010) potentially intersecting the project area. A field check during survey failed to relocate the site, a historic structure, and field personnel found no evidence to suggest that any archaeological site or historic property (save the acequia itself) is located within the project area. See Appendix A, Figure A.1 for the results of this ARMS search.

Standard survey methods, such as presence of features and artifacts, were used to identify historic properties. Prior to going to the field, a 100 m UTM grid was superimposed over a color 2005-2006 aerial image of the project area. The alignment of the acequia, the locations of individual features such as the diversion structure and head gates, and the boundaries of proposed staging areas, were mapped using a hand-held Trimble Geo-XH sub-foot GPS unit. Were any artifacts located, they would have been flagged individually flag and piece-plotted using the Trimble GPS; however, no artifacts were located during survey.

Photography and Documentation Methods

Digital photographs were taken at different points during the survey using an Olympus Stylus 400 4.0-megapixel camera set at a resolution of 2272 × 1704 pixels during the May 2009 survey. Some of these photos have been incorporated into this document, as have some photographs taken during an earlier site visit on January 29, 2009. Notes, photographs, and copies of the report are stored at the Corps' Albuquerque District office.

Strategies Employed for Collection or Limited Tests

No artifact collection or testing was conducted as part of this project.

CHAPTER 4
RESULTS OF SURVEY

Jonathan E. Van Hoose

Location of Cultural Properties

The public disclosure of the location of archaeological sites on state and private lands is prohibited by Section 18-6-11.1 NMSA 1978. Public disclosure of archaeological site locations is federally prohibited by 16 USC 470hh (36 CFR 296.18). Confidential site location information is provided in Appendix A. Appendix A should be removed prior to public disclosure of this report.

Acequia de los Ranchos

The Acequia de los Ranchos, with a non-adjudicated priority date of March 18, 1907 (Ray Acosta, personal communication), is located in the town of Chimayó, Santa Fe County, New Mexico. The acequia provides irrigation water to between 81 and 85 acres of cultivated land for 50 or 51 irrigators, growing crops including the local Chimayó heirloom chile, fruit trees, corn, squash, flowers, and some hay (Beraldo Montoya, personal communication). Water is diverted by a single concrete weir diversion structure on the Santa Cruz River approximately 200 meters northwest of the historic Santuario de Chimayó. The proposed project will have no effect on the Santuario.

From the diversion, the water proceeds into the acequia madre, which extends in a generally northwesterly direction for a total distance of approximately 6,281 feet. In the past, the system has obtained water both from the current diversion on the Santa Cruz River, and from a second headgate on the Rio Quemado. In recent decades, the channel of the Rio Quemado has incised somewhat, dropping the water level below the current level of the Quemado gate; this has led to its subsequent abandonment.

Corps personnel conducted an initial visit to the project area on January 29, 2009, and a Corps archaeologist returned to conduct a cultural resources survey on May 20, 2009. The purpose of the survey was to examine staging areas, the proposed location for a new Quemado diversion, and the portion of the acequia to be affected by the proposed project; and to document the current negative impacts being experienced by the acequia. All areas covered by the current survey are shown in Figure 4.1.

The acequia's current function is impacted by two major ongoing processes: first, a stretch of ditch that winds along a steep slope is subject to constant erosion and movement of sediment into the ditch, which makes maintenance difficult. In addition, the acequia's open-ditch form makes it possible for non-association members to water their cattle from it. This has the dual impacts of substantial water loss for acequia members, and the introduction of significant erosion of sediment around and under the concrete lining of the ditch as a result of repeated trampling by cattle. Both of these require increasing time, labor, and money to repair and maintain.

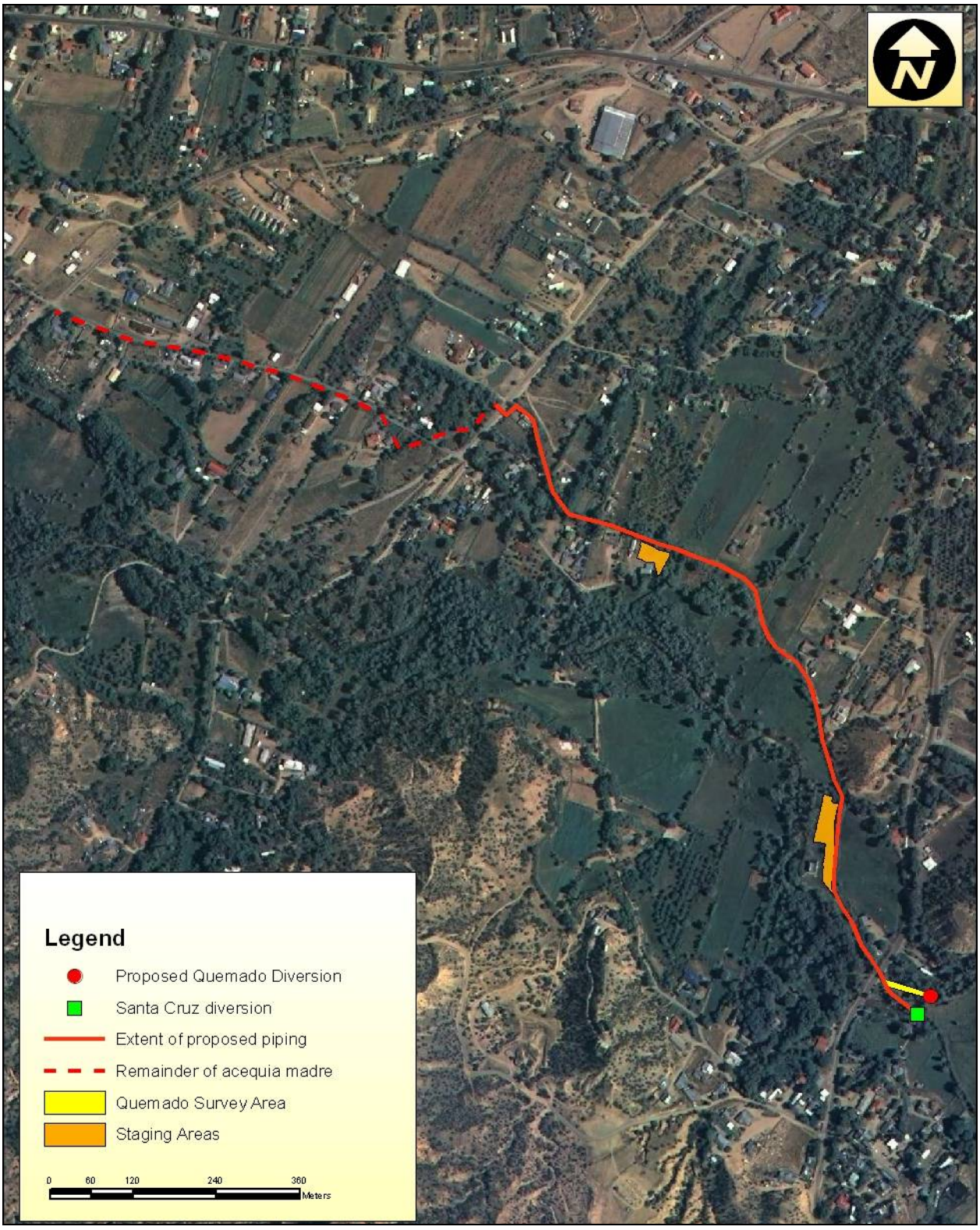

Figure 4.1. Acequia madre, showing staging areas and construction footprint. The dashed portion of the acequia madre (outside the project area) was not surveyed, but was inspected visually.

The proposed project would address these issues by replacing the current concrete lining with buried pipe for the 3,819 feet of acequia beginning at the Santa Cruz diversion structure. In addition, the project would install a second diversion on the Rio Quemado to operate concurrently with and supplement the current Santa Cruz diversion; this second diversion would then be tied into the current acequia via a short pipeline.

After an overview, the following sections describe each of the following in turn: the current Santa Cruz River diversion structure; the locations of the former Quemado gate and the proposed new Quemado diversion structure; the acequia alignment to be piped, including a discussion of current erosional impacts to the system; and the proposed staging areas.

Overview

The Acequia de los Ranchos, established in 1907, consists of an acequia madre measuring approximately 6,281 total feet; a major lateral; and several smaller laterals and field ditches. The system as originally constructed exhibited a traditional open earthen ditch form, without concrete or piping. In the last 42 years, however, this has changed substantially. As shown in Figure 4.2, the majority of the acequia madre is now a concrete-lined open ditch. This concrete lining was installed in two episodes: an original event in 1967, when approximately 4,963 feet, or 79 percent of the acequia madre, was lined with concrete beginning at the location of the diversion structure on the Santa Cruz River. Subsequently, a deteriorating stretch of this lining measuring more than 400 meters was replaced with newer concrete lining in 1986. All of the current acequia madre that will be impacted by the proposed project is lined with concrete, and all field gates post-date the installation of this lining.

Several parts of the Acequia de los Ranchos system do preserve an open earthen ditch form, however. The distal portion (1,318 feet) of the acequia madre is an unlined open earthen ditch (Figure 4.2); this portion of the acequia madre is outside the project area. In addition, the system includes at least one major lateral (approximately 1,519 feet), which continues in a line northeastward from a branch point where the ditch considered to be the acequia madre takes a sharp turn toward the southwest (Figure 4.3). This major lateral also retains an open earthen ditch form. Further, several smaller laterals and field ditches are part of the system (a minimum of 3,774 feet), all of which are unlined open earthen ditches (Figure 4.4). These are only the portions of the system that were able to be confirmed as open earthen ditch; other laterals and field ditches in the system likely retain open earthen ditch forms as well. The proposed piping project would replace 3,819 feet of the concrete-lined portion (61 percent of the acequia madre's total length) with buried pipe; however, all of the open earthen-ditch portions of the system are outside of the proposed project area and will be unaffected by the project.

Figure 4.2. Full extent of acequia madre, showing extent of different ditch forms types.

Figure 4.3. Acequia madre and major lateral, showing extent of different ditch form types.

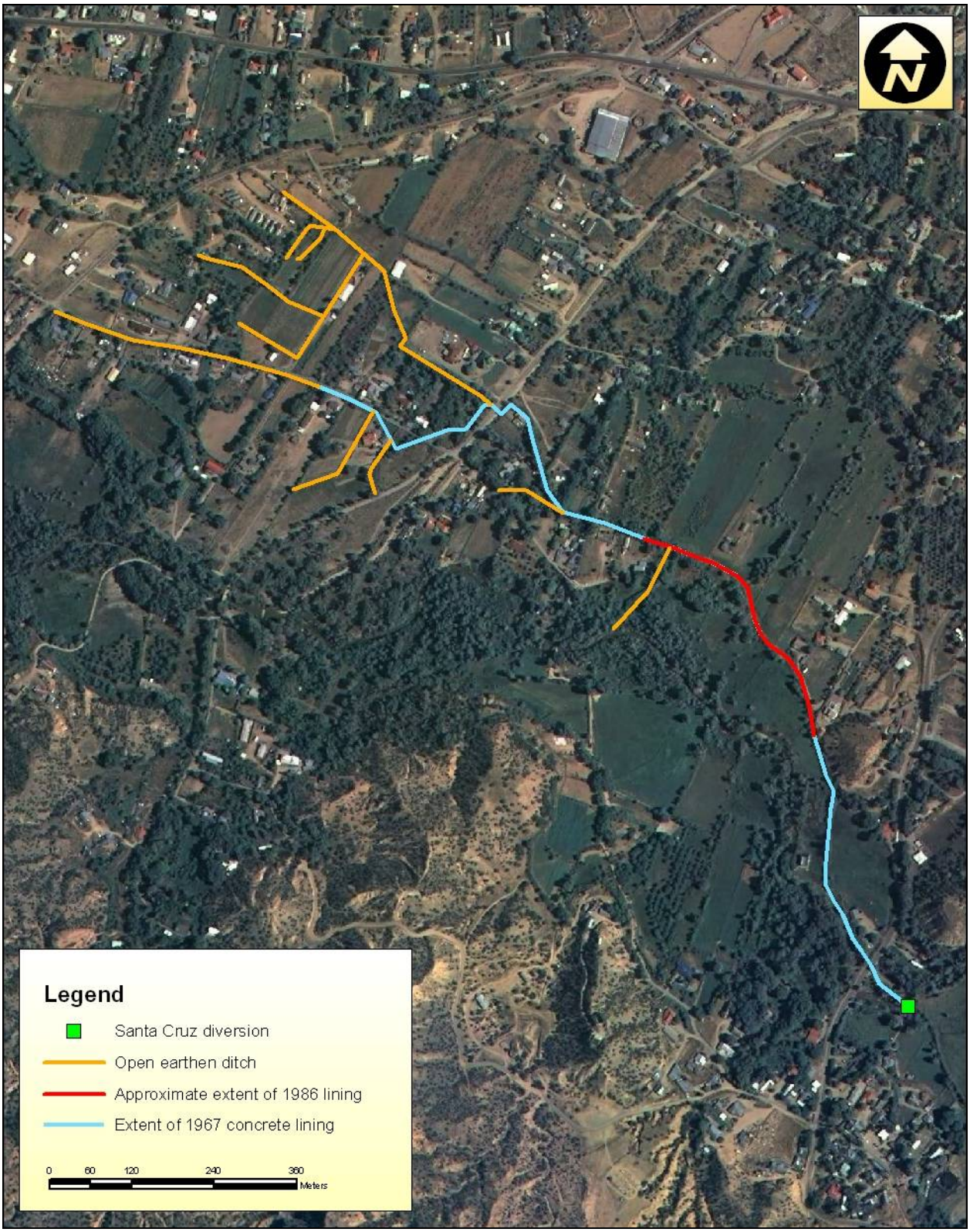

Figure 4.4. Acequia madre, major lateral, and minor laterals and field ditches, showing extent of different ditch form types.

Current Diversion on the Santa Cruz River

The current diversion structure (Figure 4.5) obtains water from the Santa Cruz river at a point approximately 40 meters east of the Santa Cruz-Quemado confluence. It is a concrete weir lying perpendicular to the direction of flow, feeding water into a headgate in a wing wall at the weir's northern end (Figure 4.6). This headgate opens into a small irregular five-sided open concrete chamber (Figure 4.6, Figure 4.8); this chamber then opens via a second gate (Figure 4.8, Figure 4.9) into the acequia itself.

The weir itself is made of concrete, with exposed surfaces showing varying degrees of erosion. A small portion of the upstream edge of the weir has fractured off, and has been repaired using a wooden board (visible in foreground of Figure 4.7). Also visible in Figure 4.7, the diversion structure is roughly slab-shaped, with a raised vertical rim forming the upstream edge of the diversion. Enough sediment has accumulated along the upstream edge of the diversion to bring the river bottom level with the top of the structure on the upstream side.

The diversion raises the water level so that it enters the headgate, located in the concrete wing wall at the northern end of the diversion. The headgate is a welded metal frame with a sliding metal gate operated through turning a screw-type mechanism via a detachable turning wheel (see Figure 4.8; removable wheel visible in background of Figure 4.10). The wing wall has three portions (Figure 4.6): a central wall in direct contact with the diversion and two wings at the west and east ends of this central wall. The formal headgate is located in the eastern half of the central portion of the wing wall.

The water enters through this gate into an irregularly-shaped five-sided concrete chamber (apparently acting somewhat as a sluice box), with the wing wall forming two of the chamber's five sides (Figure 4.6). In addition, there is currently an opening in the base of the eastern wing that allows water from just upstream of the diversion to pour into the open chamber without obstruction (visible in Figure 4.7 and Figure 4.8). Movement of water into the acequia itself is controlled via a second gate in the northern wall of the five-sided concrete chamber. This gate is also a welded metal frame of the same construction as the headgate (Figure 4.9), and opens into the concrete-lined ditch (Figure 4.10).

The ditch at this location is approximately rectangular in cross-section, with vertical walls and a horizontal bottom. As shown in the diagram in Figure 4.11, the proposed project would add a new trash rack / sluice box abutting the concrete chamber immediately downstream of this second metal gate, replacing the first bit of the ditch. The existing diversion and concrete chamber will not be altered. The ditch leading away from the new trash rack will be piped.

Figure 4.5. View of diversion structure from downstream, facing southeast.

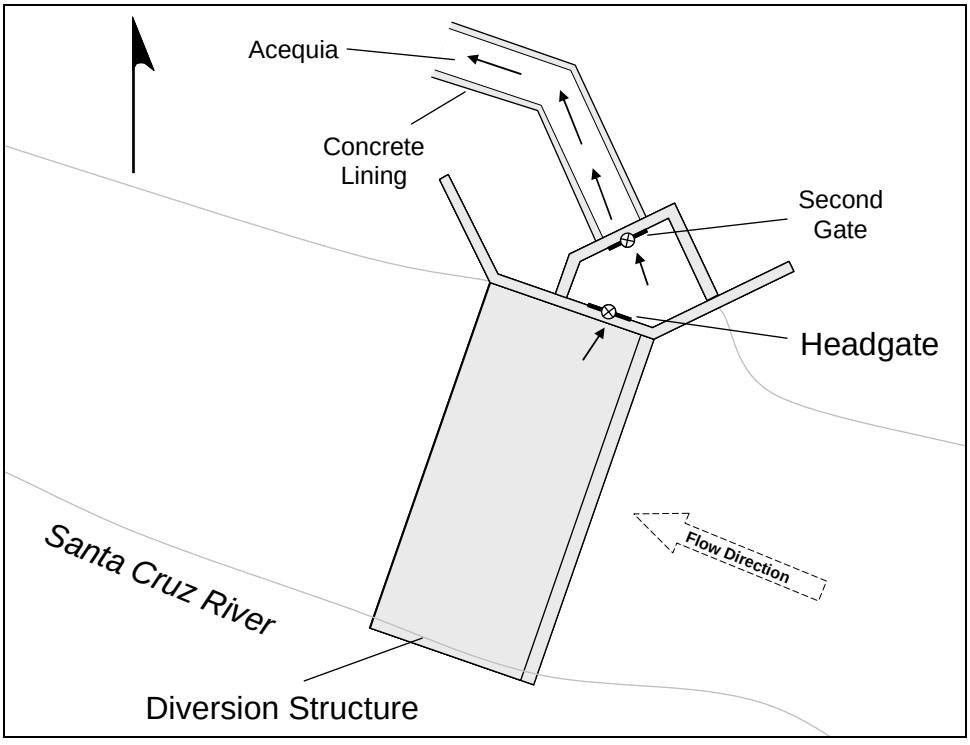

Figure 4.6. Schematic of diversion structure, showing diversion, headgate, chamber with second gate, and acequia.

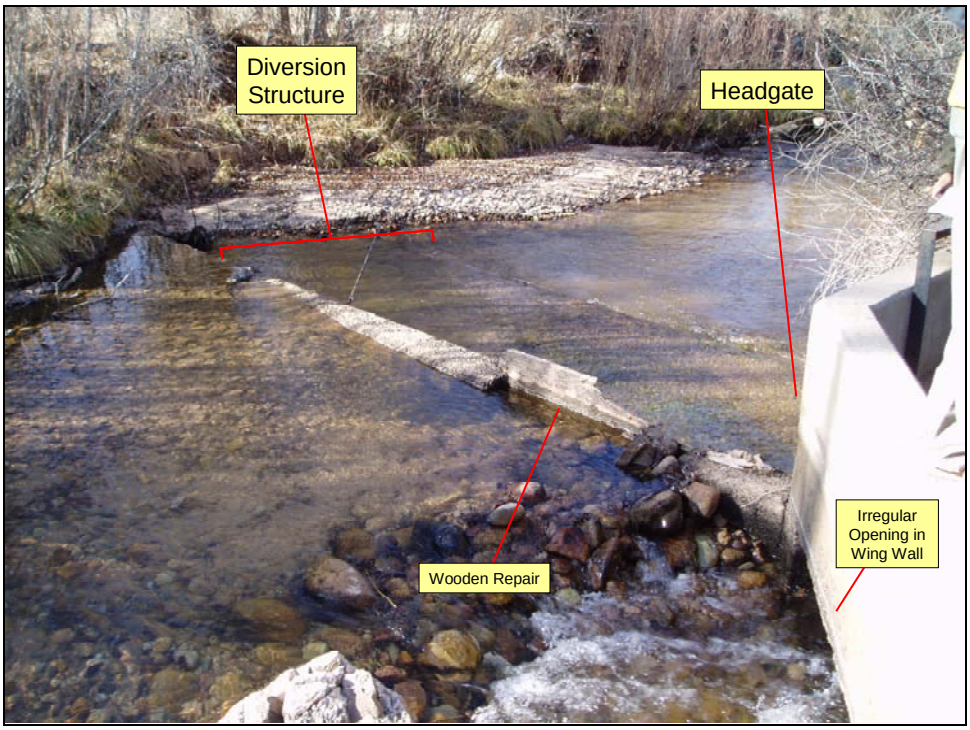

Figure 4.7. Diversion structure and headgate for the Acequia de Los Ranchos, facing west.

Figure 4.8. View of the headgate of the Acequia de los Ranchos, facing southwest. Note headgate leading into open chamber / sluice box, with second gate leading to ditch (right). Note water pouring in through an irregular opening in the wing wall just to the left of the formal sliding gate.

Figure 4.9. Metal gate leading from concrete chamber to ditch channel, facing southwest.

Figure 4.10. View of the second sliding metal gate shown in Figure 4.9, from opposite direction (facing south), showing water flowing into concrete-lined ditch (foreground). Note removable wheel attached to headgate mechanism in background.

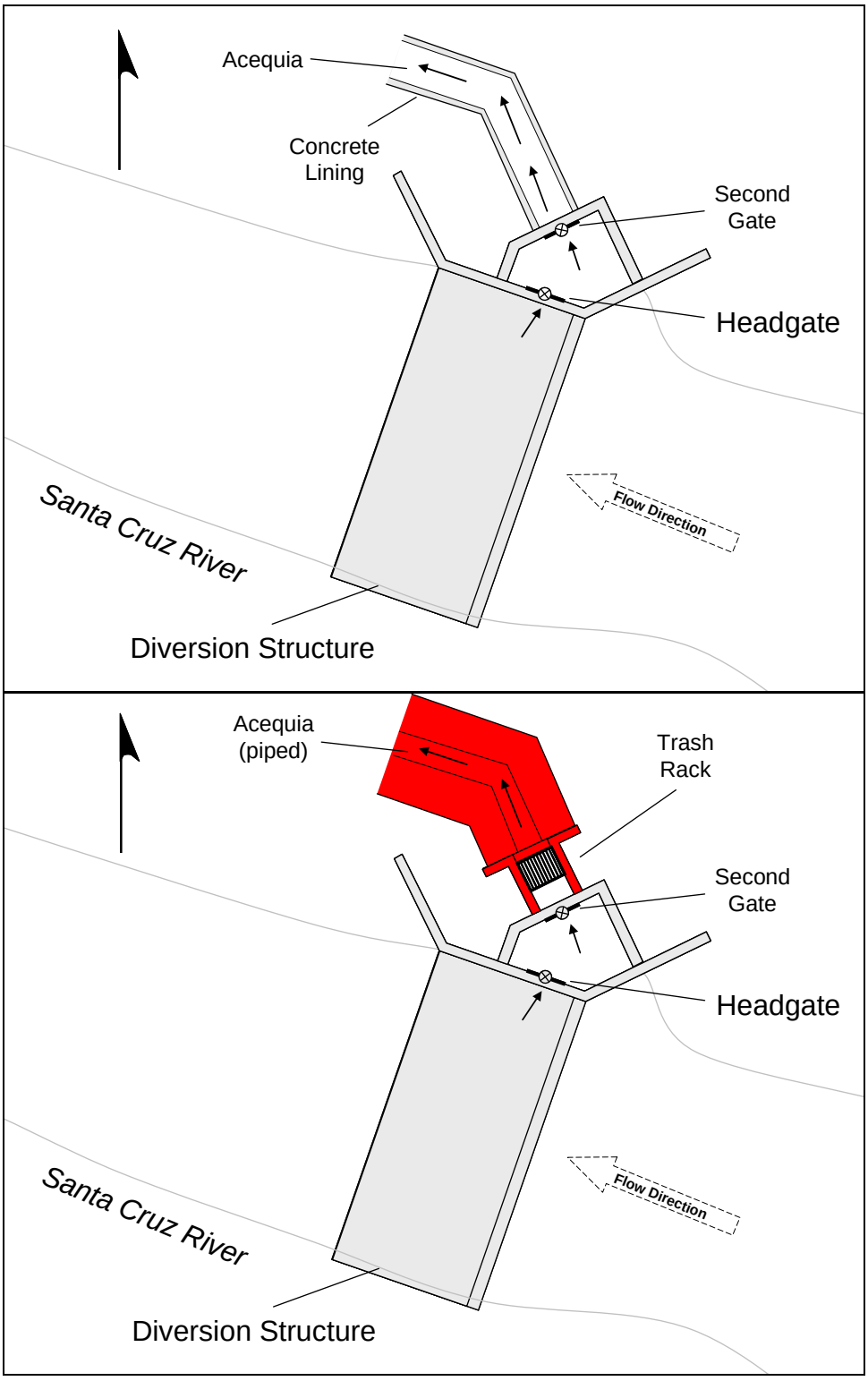

Figure 4.11. Schematic diagrams of current Santa Cruz diversion and headgate (top) and proposed addition of trash rack (bottom). New elements are marked in red. (Not to scale).

Rio Quemado: Old Headgate and Location for New Diversion

The proposed project would install a new diversion structure on the Rio Quemado, approximately 60 meters upstream of the Quemado-Santa Cruz confluence. This will not replace the current Santa Cruz diversion, but will function concurrently with it; as noted earlier, this would represent a return to an earlier dual-headgate configuration for the acequia. The acequia previously had a headgate on the Rio Quemado, but subsequent channel cutting resulted in a drop in water level below the level of the gate (Beraldo Montoya and Charles Ortiz, personal communication). This resulted in the eventual abandonment of the Quemado headgate and exclusive reliance on the Santa Cruz headgate. Figure 4.11 is an aerial view of the upstream portion of the acequia, showing relative locations of the Santa Cruz diversion, the old Quemado headgate, the proposed location for a new Quemado diversion, and alignments for the ditch and for the piping that would tie in the new Quemado diversion to the acequia.

The old Quemado headgate is still visible, located approximately 22 meters upstream of the Quemado-Santa Cruz confluence (Figure 4.12). The old gate is mounted in an upright concrete slab/wall with sliding metal gate controlled by a screw-type mechanism similar to those on the Santa Cruz diversion (Figure 4.13 and Figure 4.14; compare with Figure 4.9). The old gate is now partially buried under sediment and surface vegetation and debris, and sits nearly a meter above the current Quemado water surface level, as seen in Figure 4.13.

The proposed location for the new diversion (Figure 4.15) was surveyed, as was a corridor approximately 10 meters wide over the alignment for the pipeline connecting it to the current acequia (Figure 4.12). This alignment is in an active floodplain, most of which is within an area disturbed previously by construction of Juan Medina Road to the west, as well as an unpaved access road that extends from Juan Medina eastward across the Quemado (Figure 4.12). This access crosses the river just west of the proposed diversion point. No historic cultural resources were identified in that corridor or around the proposed diversion location, and the likelihood for intact buried deposits in this area is low due to the floodplain setting and previous construction disturbance.

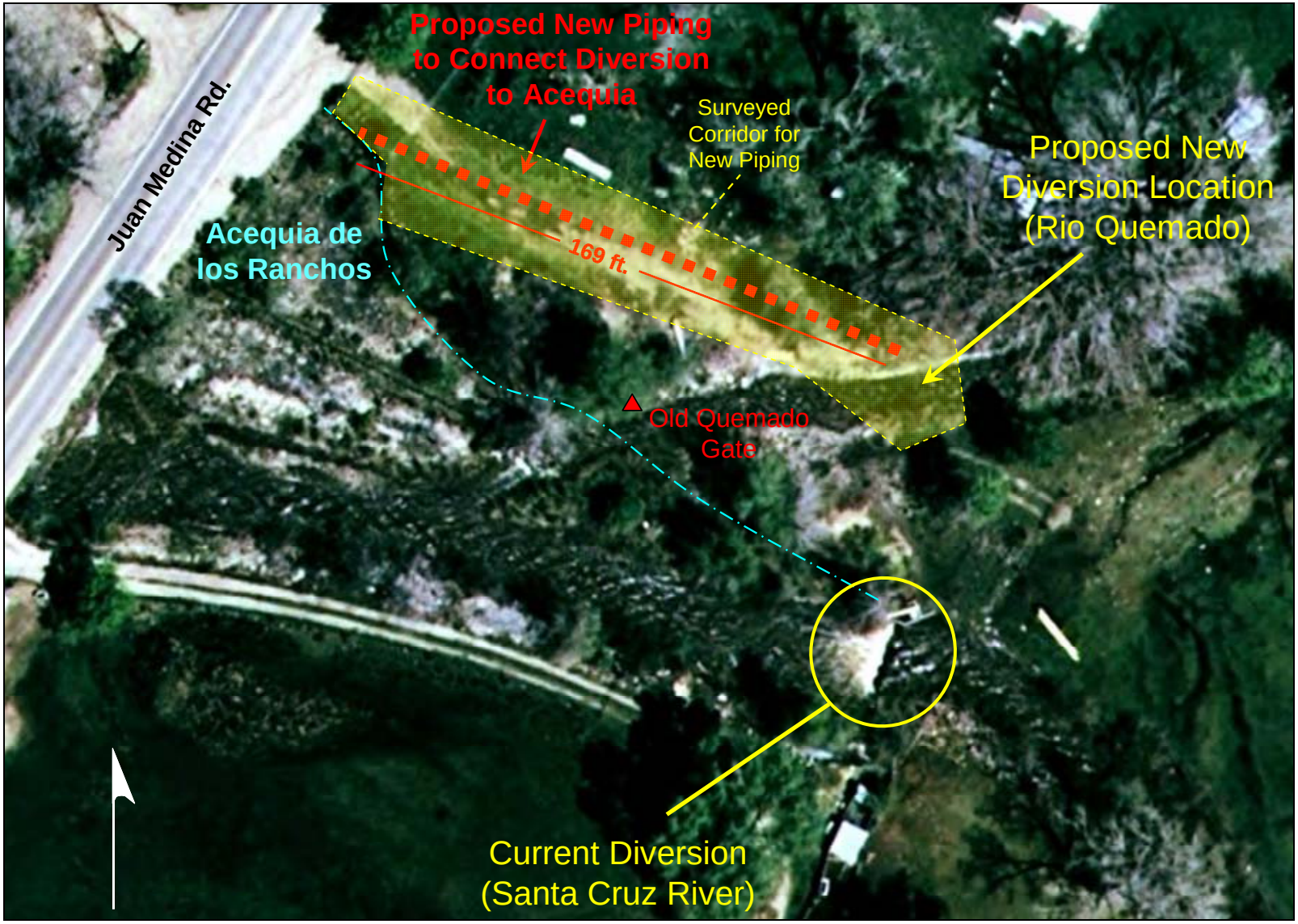

Figure 4.12. Aerial photograph of the Quemado-Santa Cruz confluence vicinity, showing locations of current diversion, proposed new diversion, present acequia alignment, old headgate, and 169 feet of proposed additional piping.

Figure 4.13. View of former headgate on the Rio Quemado, facing northeast, showing current difference in elevation between the Quemado water level and the gate.

Figure 4.14. View of former Quemado headgate, facing northwest, showing gate mechanism.

Figure 4.15. View of Rio Quemado, facing southeast, toward approximate proposed location for new Quemado diversion.

Acequia de los Ranchos Ditch Alignment

As described earlier in this chapter, the acequia madre for the Acequia de los Ranchos system measures approximately 6,281 feet from its starting point at the Santa Cruz River diversion structure to its endpoint near the intersection of Cañada Ancha and Camino de los Ranchos in Chimayó. The ditch takes several forms over its course (concrete-lined and open earthen ditch), and traverses different kinds of topography. This section will describe the ditch as it exists within the proposed project area, namely the 3,819 feet of ditch beginning at the diversion structure and ending at the north side of Cañada Ancha.

The entire extent of the acequia madre within the proposed project area is concrete-lined. As described above, this entire extent was first lined with concrete in 1967; subsequently, a segment somewhat longer than approximately 400 meters in length was re-lined in 1986 (see again Figure 4.2). The concrete lining within the project area is not uniform, not only between the 1986 and 1967 portions, but within the 1967 extent as well.

Beginning at the Santa Cruz diversion structure, the acequia proceeds northwest a short distance before being carried underneath a hill by a small siphon (Figure 4.16), closeable via a sliding metal gate. Once it emerges from this siphon, it then crosses the Rio Quemado via another si-

phon that passes underneath the Quemado channel (Figure 4.17) approximately three meters south of the old Quemado gate (cf. Figure 4.12).

Figure 4.16. Segment of ditch near Santa Cruz diversion, showing concrete lining dating to 1967.

Figure 4.17. Siphon allowing the acequia to pass underneath the Rio Quemado channel.

The acequia then proceeds northwestward in a curved alignment toward Juan Medina Road (Figure 4.18; see also Figure 4.12), where it once again passes underneath Juan Medina Road via another, longer siphon. When it emerges on the north side of Juan Medina Road, it passes through private property for a distance of approximately 270 feet; for the entire length of this segment, the acequia channel is covered over with plywood paneling or other sheeting material, removing it from view.

Figure 4.18. View of the Acequia de los Ranchos facing southeast from Juan Medina Road, toward the Santa Cruz diversion structure.

As seen in Figure 4.16, the concrete lining the portion of the acequia between the Santa Cruz diversion and where it passes under Juan Medina Road has a flat floor, with two parallel concrete walls oriented perpendicular to the ground surface. No lipping or curvature is present in cross-section, and the overall thickness of the lining appears small. But when the channel emerges from the wooden paneling on the other side of the road, the lining (still part of the 1967 work) has a different cross-section: a flat floor with walls angled outward. Some distance further is the 1986 concrete lining, which also has angled walls, but also has a lip over the surrounding sediment at the upper edge. The 1986 lining appears to be thicker than the 1967 lining. Figure 4.19 presents generalized cross-sections of these three forms of lining.

Moving northwest after the area where the ditch is covered over, the acequia follows a path that takes it to the top of a raised berm, variably measuring some approximately three to five meters in height. This berm separates two areas containing agricultural fields that are at different elevations; the fields to the north are close to the level of the top of the berm, while the fields to the south are much lower. Indeed, the fields to the north slope upward above the grade of the berm, making it impossible to irrigate those fields from the Acequia de los Ranchos.

As it passes along the property of Rosendo Cordova (and adjacent to the larger of the two staging areas, as shown above in Figure 4.1), the acequia is paralleled by another acequia that also originates at the Santa Cruz River. This other acequia is an open earthen ditch and travels along the base of the berm for a distance of approximately 1,300 feet. Both acequias have spoil piles of sediment cleared out of the ditch as a result of repeated ditch cleaning operations. A generalized cross-section of this segment of the acequia is presented in Figure 4.20, and pictures of this stretch are presented in Figure 4.21, Figure 4.22, and Figure 4.23. The Acequia de los Ranchos travels along the raised berm for a total distance of approximately 2,000 feet.

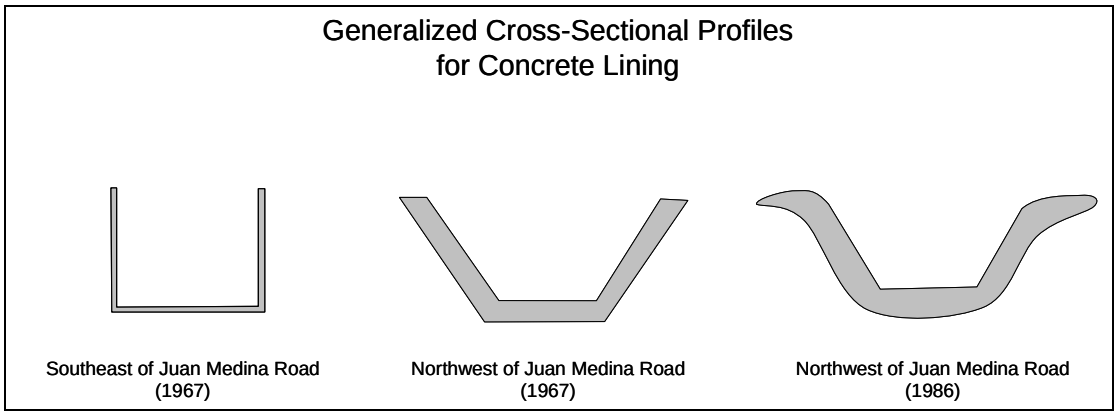

Figure 4.19. Generalized cross-sections for 1967 concrete ditch lining southeast of Juan Medina Road (left) and that found for the remainder of the acequia (1967, middle; 1986, right).

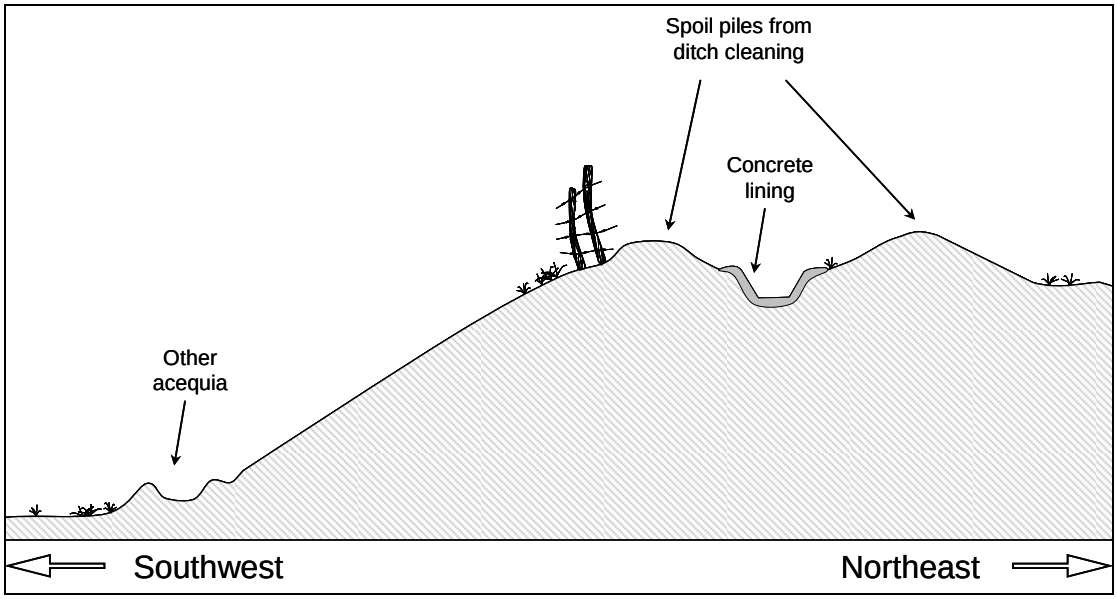

Figure 4.20. Typical cross-section of the portion of the acequia northwest of Juan Medina Road, facing northwest. The Acequia de los Ranchos is the ditch at the top of the raised berm.

Figure 4.21. Segment of ditch with concrete lining dating to 1986, facing northwest.

Figure 4.22. View of acequia, facing northwest.

Figure 4.23. View of acequia, facing northwest.

A number of modern features were observed within the survey area along the acequia alignment. Figure 4.24 shows a concrete feature built by a private landowner for the purpose of changing oil in automobiles. This oil-change pad is built into the southwestern side of the raised berm, and consists of three vertical concrete walls with an open space in the middle. Two removable planks are placed over the acequia to allow cars to back up over the ditch and onto the oil change pad. In addition, at the approximate midpoint of the proposed project, another acequia (the Martinez ditch) crosses the Acequia de los Ranchos via a siphon that carries the other acequia under the raised Los Ranchos berm (Figure 4.25).

The majority of the ditch extent within the proposed project area does not contain field gates. Field gates begin to appear in the northwestern portion of the acequia madre, as the ground level to the south of the ditch rises and comes closer to the ditch level, resulting in a much lower berm. Figure 4.26 shows a generalized cross-section of this portion of the acequia madre, with a lower berm and field gates. The field gates are constructed of sheet metal, which slide within folded metal sleeves on the sides (see Figure 4.27); note that the gate rests on top of a concrete patch superimposed on the ditch lining, and thus postdates 1967. Figure 4.28 shows the lower acequia berm as it crosses the property of Charles Ortiz. Nearing the project endpoint, the acequia intersects Cañada Ancha and travels under the road via a culvert / siphon (Figure 4.29 and Figure 4.30).

The concrete-lined ditch then continues for a short distance toward the northwest. A short distance beyond this, the acequia madre takes an abrupt turn toward the southwest via a metal gate and a separate segment of concrete pipe leading into a separate concrete-lined ditch (Figure 4.31

and Figure 4.32). While this has the appearance of being a field gate or lateral, the acequia members consider this to be a continuation of the acequia madre, which then proceeds toward the southwest before once again turning toward the northwest. The portion of the ditch that continues northwest along the same line as the madre from this point is considered to be a major lateral (see again Figure 4.2 and Figure 4.3). This lateral retains an open earthen ditch form. The point where the acequia madre changes direction is the end point for the proposed piping project; the lateral and the remainder of the madre will be unchanged.

Figure 4.24. Oil-change pad built into acequia berm, facing west.

Figure 4.25. Siphon carrying Martinez ditch under the Los Ranchos ditch, facing north.

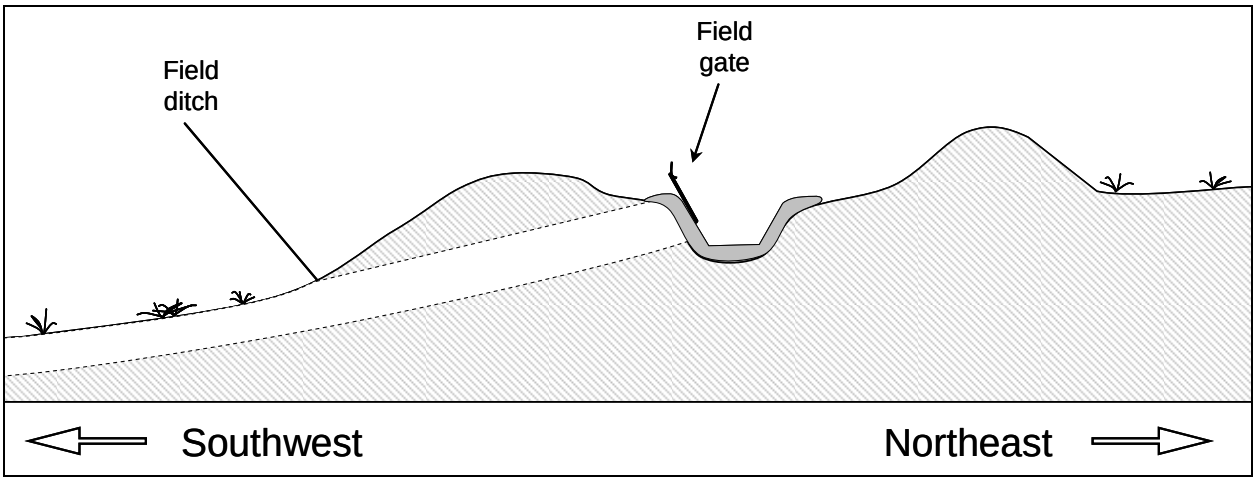

Figure 4.26. Typical cross-section of the western portion of the acequia, showing field gate, facing northwest.

Figure 4.27. Sliding metal field gate, facing west.

Figure 4.28. View of acequia berm adjacent to Association member Charles Ortiz's house, facing north.

Figure 4.29. Culvert / siphon carrying ditch under road.

Figure 4.30. North end of the siphon where the acequia emerges from under the road. Picture taken facing northeast. This represents the endpoint for the proposed project.

Figure 4.31. View of project endpoint, where acequia madre direction shifts to the southwest via a metal gate and concrete pipe. Photograph taken facing northeast.

Figure 4.32. View of point where acequia madre shifts direction to the southwest, looking back at concrete pipe leading from metal gate.

Current Impacts to the Acequia

The acequia is currently experiencing several erosional impacts that negatively affect the system's ability to function efficiently. These can be divided into two classes of impact: (1) erosion of sediment into the acequia, and (2) erosion of sediments away from the concrete lining. These impacts are documented in the following section.

Erosion Into Acequia

Part of the acequia madre traverses the lower portion of a steep hill (Figure 4.33). The hillslope is subject to substantial surface erosion associated with rainfall; Figure 4.34 presents a view upslope from the acequia, showing eroding surface. This results in large amounts of sediment washing downslope and accumulating in the acequia itself, which requires extensive labor to clear out (Figure 4.33). In addition, the blockage of the acequia by these sediments also contributes to ditch overflow and subsequent erosion of sediment away from the concrete lining, which jeopardizes the ditch's stability; see and Figure 4.34 for photograph of overflowing ditch.

Erosion Around Concrete Lining

In addition to ditch blockage from hillslope erosion, other processes also contribute to erosion of supporting sediments away from the ditch lining, leading to repeated ditch failure. The primary contributing processes are trampling by livestock and ditch obstruction by debris, including modern trash.

The acequia traverses areas grazed by livestock not owned by members of the acequia. When water flows in the acequia, many animals drink from it. In so doing, their feet extensively trample the ground surface immediately around the concrete lining of the ditch, leading to extensive erosion of sediment away from the ditch lining and the consequent loss of supporting sediment under the lining. Further, the animals trample the concrete lining itself, which then results in fracturing and failure of the concrete lining itself, particularly when robbed of a supporting ground surface. Figure 4.38 and Figure 4.39 show examples of this process.

The second major cause of erosion away from the ditch lining is the frequent blockage of the ditch by debris, including modern trash, that finds its way into the acequia. A large portion of the acequia madre runs along the top of a high raised berm. When any portion of this ditch becomes blocked with debris, water overflows the ditch and runs down the side of this berm, causing immediate and severe erosion. This rapidly undercuts the concrete lining entirely, depriving the concrete lining of support and leading to collapse. Figure 4.40 and Figure 4.41 show a recent example of this process, photographed on May 20, 2009; massive erosion of the earthen berm undercuts the current lining, and reveals concrete rubble from previous ditch failure events. Figure 4.42 shows ditch cleaning operations after one of these overflow events.

This phenomenon occurs frequently, and requires a great deal of time and labor to repair, during which all irrigation downstream of the failure ceases entirely. Because the majority of the area most subject to this kind of failure is upstream of the first headgate, instances such as these result in the complete loss of irrigation for the entire Acequia de los Ranchos system until the repair can be made.

Figure 4.33. View of acequia, facing northwest, showing segment along steep slope.

Figure 4.34. View upslope (east), showing eroding surface.

Figure 4.35. View of acequia channel where impacted by downslope erosion.

Figure 4.36. Views of acequia completely full of sediment washed in from adjacent slope. Photographs courtesy of Beraldo Montoya.

Figure 4.37. Water overflowing ditch as a result of infill of sediment from upslope erosion. Photograph courtesy of Beraldo Montoya.

Figure 4.38. Example of erosion undercutting concrete lining due to trampling by livestock.

Figure 4.39. View of portion of acequia with extensive trampling and erosion due to cattle. Note displaced fragments of concrete ditch lining to the right of the ditch.

Figure 4.40. Berm erosion caused by ditch blockage and overflow, facing northeast.

Figure 4.41. Another view of erosion caused by ditch blockage, facing east.

Figure 4.42. Ditch cleaning operations due to ditch overflow (note erosion in foreground). Photograph courtesy of Beraldo Montoya.

Proposed Staging Areas

There are two proposed staging areas for this project: one is an approximately 0.63-acre plot located on land privately owned by Rosendo Cordova near the southwestern end of the acequia; the other is an approximately 0.27-acre area located on land privately owned by Charles Ortiz, located near the project endpoint. Intensive pedestrian survey showed no cultural materials in the first staging area, and only recent historic refuse in the second. No cultural materials eligible for inclusion on the National Register of Historic Places were located in either staging area. Both staging areas would be used exclusively for the stockpiling of materials related to the construction, and for driving vehicles.

The first staging area, on land owned by Rosendo Cordova, is a patch of land lying east and northeast of a private home, bounded on the west by trees and on the east by the berm that carries the Acequia de los Ranchos (Figure 4.43). Another acequia runs parallel to the Acequia de los Ranchos, at the foot of the eastern slope of this berm, as illustrated in Figure 4.20. This first staging area is a broad, densely grassy lawn also used for grazing livestock (Figure 4.44). On the day of the May 20 survey, the entire area contained varying degrees of moisture, including some standing water. Surface visibility was fairly low due to the density of the grass over this area, but some areas showed exposed sediment churned up by substantial livestock trampling (Figure 4.45). No historic cultural materials were noted in this survey area.

Figure 4.43. Aerial view of Staging Area 1, on property owned by Rosendo Cordova.

Figure 4.44. Staging Area 1, facing north.

Figure 4.45. Staging Area 1, facing south.

The second proposed staging area is near the northeastern end of the project area, on land owned by Association member Charles Ortiz. This area, covering approximately 0.27 acres, has moderate vegetation cover with good ground surface visibility. The staging area (Figure 4.46) is bounded by the Acequia de los Ranchos (to the north), a mobile home (west), a lateral ditch of the Acequia (east), and the Ortiz house (south). The ground in this area does show some prior disturbance due to construction and other earth moving activities, including the installation of a subsurface cellar-like feature (visible in Figure 4.47). Survey personnel noted the presence of some recent historic refuse in the area, but observed no historic cultural materials.

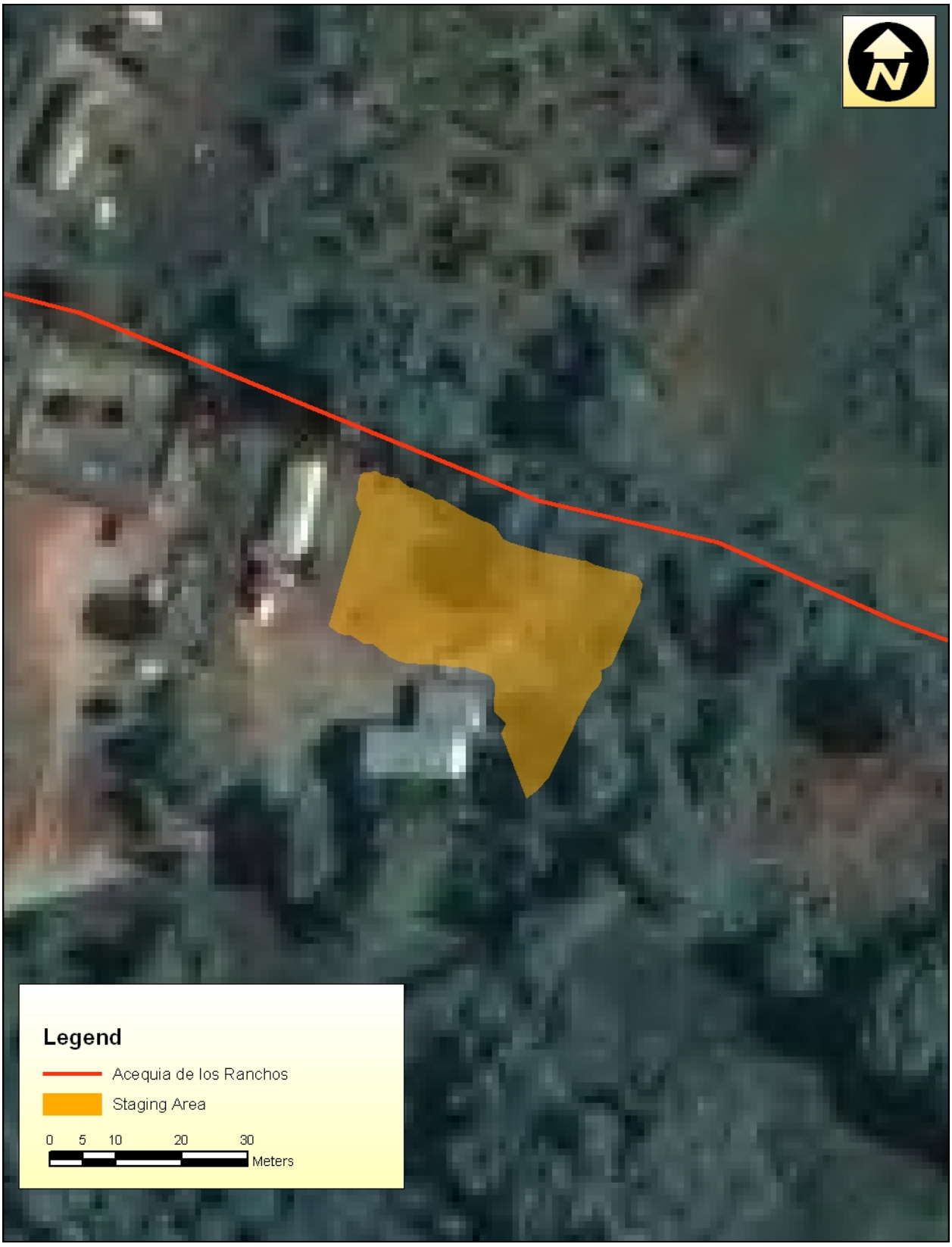

Figure 4.46. Staging Area 2, on property owned by Charles Ortiz.

Figure 4.47. Staging Area 2, facing southeast.

Description of Other Archaeological Sites and Other Sites Not Relocated

No previously recorded archaeological sites were encountered during this survey in the project area, other than the acequia itself, described in this chapter. As noted in Chapter 2, the ARMS database lists LA 89010 as being close to the project area, and shows its site boundaries overlapping with the project's endpoint (Appendix A, Figure A.2). However, both the site location and site boundaries appear to be general and imprecise estimates (see Chapter 2 for further discussion). This site was not relocated during survey, and field personnel did not detect any evidence that the proposed project overlaps in any way with any archaeological site or historic property aside from the Acequia de los Ranchos itself.

Interpretive Summary

In sum, the survey examined the portions of the Acequia de los Ranchos that would be impacted by the proposed project that would include installation of buried pipe and associated structures, and the construction of an additional diversion structure on the Rio Quemado to operate concurrently with the Santa Cruz River diversion. The survey identified no historic properties except for the acequia itself.

The Acequia de los Ranchos is a century-old acequia system extending northwest from a diversion on the Santa Cruz River, conveying irrigation water to between 81 and 85 acres of cultivated land. While the current system obtains water from a single diversion on the Santa Cruz, the acequia historically also diverted water from the Rio Quemado. The Santa Cruz diversion is a concrete weir. The majority of the acequia madre is lined with concrete installed in 1967 and 1986, and all associated gates and other features within the project area post-date the concrete

lining (and are thus 42 years old or less). An additional extent of the acequia outside of the project area retains a historic open earthen ditch form. The acequia is subject to frequent severe erosional impacts including both erosion of sediment into the channel, and erosion of sediment out from around the concrete lining.

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CHAPTER 5
SUMMARY AND RECOMMENDATIONS

Jonathan E. Van Hoose

Evaluation and Statement of Significance

The present survey examined the extent of the Acequia de los Ranchos alignment to be impacted by the proposed piping project, and the location for the proposed new Rio Quemado diversion, as well as the two proposed staging areas. The project is on private land owned by members of the Acequia de los Ranchos association and within the acequia's right of way.

The Acequia de los Ranchos is located in Santa Fe County, with its headgate on the Santa Cruz River approximately 200 meters northwest of the historic Santuario de Chimayó and approximately 40 meters east of the confluence of the Santa Cruz River and Rio Quemado. The acequia madre extends approximately northwest for a distance of 6,281 feet. The survey identified no new archaeological sites or other historic properties except for the Acequia de los Ranchos itself. Field personnel failed to relocate the only site indicated by an ARMS search as potentially intersecting the project area (LA 89010, a historic structure), and confirmed that no portion of the proposed project intersects any archaeological site. The project will have no effect on the Santuario.

The proposed project would pipe 3,819 feet of the acequia madre, currently lined with concrete; install a trash rack adjacent to the diversion on the Santa Cruz River; and construct an additional diversion structure on the Rio Quemado, which will tie into the present ditch just north of the Santa Cruz-Quemado confluence. It currently irrigates between 81 and 85 acres of agricultural land for a total of 50 or 51 parsiantes (Beraldo Montoya, personal communication). At present, the acequia obtains water from the Santa Cruz River via a single concrete diversion structure. Historically, the acequia obtained water simultaneously from both the Santa Cruz River and the Rio Quemado, but channel erosion in the Rio Quemado has left the former Rio Quemado headgate above the current water level and therefore in disuse. The proposed project, in addition to piping an extent of the ditch, will also construct a second diversion structure on the Rio Quemado, thus restoring the acequia's earlier dual-headgate arrangement.

The proposed project is being undertaken to address and alleviate negative impacts currently being experienced by the acequia system that impair the acequia's function, create increasing damage, and generate labor and maintenance requirements that are beyond the current Association's ability to address easily. Primary negative impacts include:

- Erosion resulting in downslope movement of sediments from an adjacent hillside into the ditch, blocking flow, causing increased erosion around the concrete lining and requiring extensive labor to clear out.

- Severe erosion of sediment away from the concrete lining severely undercutting the concrete lining and leading to repeated failure. This erosion is caused by two processes: (1) extensive trampling of surrounding sediment by livestock owned by non-members as the animals drink water from the ditch; and (2) frequent obstruction of the ditch by debris, including modern trash, that blows into the ditch and causes overflow. Such erosion undercuts the concrete lining, causing it to fracture and give way entirely, resulting in extensive water loss and requiring costly repair and labor investment that is an increasing hardship to the dwindling and aging members of the acequia association.

- These detrimental impacts of severe erosion of sediment into the ditch and of sediment undercutting the current concrete lining endanger the acequia's continued function and jeopardize the continued use of this acequia segment; because this segment is the upstream portion of the acequia, the entire acequia system is impacted. Piping this extent of the acequia would eliminate these two causes of erosion.

The Corps determines that the Acequia de los Ranchos, which has a non-adjudicated priority date of March 18, 1907 (Ray Acosta, personal communication), is eligible for listing on the National Register of Historic Places under Criterion (a) of 36 CFR 60.4, as irrigation features such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history.

Effect Determination

The Secretary of the Interior's Standards for the treatment of historic properties include four types of treatments: *preservation, rehabilitation, restoration,* and *reconstruction* (36 CFR 68; see also Weeks and Grimmer 1995). The goal of the proposed project is to *rehabilitate* a portion of the acequia madre so that it may continue to be used effectively for its historic function, taking into account the realities of present technical and economic challenges. The following section considers first the definition of "rehabilitation" in relation to the Secretary of Interior's standards; the following section will assess adverse effects specifically in relation to the proposed project.

Standards for Rehabilitation

"Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving *those portions and features of the property which are significant* to its historic, architectural, and cultural values" (36 CFR 68.2[b], emphasis added). This definition specifically targets the treatment of those existing elements of a property that are significant. The Secretary of the Interior's standards for rehabilitation ("Standards") under Department of Interior regulations listed as follows, "are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility" (36 CFR 67.7).

The central theme underlying these standards is that historically significant materials and elements which remain a part of the structure must not be damaged, destroyed or removed. In addition, permissible additions to the system must be reversible, such that the property could be returned to its historic configuration at some future date. The full set of Secretary's standards is

presented below, with language relating to treatment of currently-existing historic elements in bold:

1. A property shall be used for its historic purpose or be placed in a new use that requires **minimal change to the defining characteristics** of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The **removal of historic materials or alteration of features and spaces that characterize a property** shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes **that have acquired historic significance in their own right** shall be retained and preserved.

5. **Distinctive** features, finishes, and construction techniques or examples of craftsmanship **that characterize a property** shall be preserved.

6. Deteriorated **historic** features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a **distinctive** feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause **damage to historic materials** shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction **shall not destroy historic materials** that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that **if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.**

Assessment of Adverse Effects

Under 36 CFR 800.5, Assessment of Adverse Effects, examples are provided in subsection (2) and include seven examples of adverse effects to historic properties. This project has the potential to affect the Acequia de los Ranchos. The criteria of adverse effect pursuant to the seven examples of types of adverse effects as listed in 36 CFR 800.5 (a)(2) are applied below.

(i) Physical destruction of or damage to all or part of the property;

The proposed construction would be confined to approximately 3,819 feet of the acequia itself, which will not destroy the property but will alter this segment from open concrete-lined ditch to buried pipe and associated maintenance structures. None of the existing water control structures (field gates, culverts, etc.) are more than 50 years old, as all are superimposed on concrete lining that was installed in 1967 and 1986; accordingly, the concrete lining that occurs along the entire segment is also less than 50 years old. In addition, associated features have been variously modified throughout their use lives. No historic materials that **have acquired historic significance in their own right** (Standard #4) will be destroyed (Standard #9), damaged (Standard #7), or removed (Standard #2).

The two staging areas will be used only for stockpiling and storing equipment and materials, and will not involve any earth moving, ground disturbance, or excavation of sediments in those areas. No historic properties were observed in the location of the proposed new diversion on the Rio Quemado.

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;

The purpose of this project is to rehabilitate the acequia so that it may continue to function well in its current cultural context (per definition of "rehabilitation" above). The proposed project would affect one element, the current "open concrete-lined ditch" design of the Acequia de los Ranchos. However, the lining of this ditch segment with concrete in 1967 and 1986 has already substantially altered the ditch from its earlier "open earthen ditch" form, and the concrete lining has not **acquired historic significance in its own right** (Standard #4), and is therefore neither **historic** nor **distinctive** (Standards #5 and #6). The form of this ditch segment thus lacks integrity, and the Corps considers this to be a non-contributing element to the ditch's historic significance.

Other parts of the acequia madre *not* impacted by this project do retain the original historic "open earthen ditch" form, and this currently constituting 21.0 percent of the acequia madre. None of the ditch that retains this form will be altered for the proposed project. Further, an additional extent of the 1967 concrete-lined open ditch measuring 1,144 feet (18.2 percent of the acequia madre) will also remain unmodified. Finally, the overall Acequia de los Ranchos system continues to contain additional segments of open earthen ditch, in particular 1,318 feet of the acequia madre; a major lateral that continues northwest from the end of the project area (following in a direct line with the acequia madre), totaling an additional 1,519 feet; and several smaller laterals and field ditches measuring an aggregate total of at least 3,774 additional feet.

All parts of the system that currently retain the earlier "open earthen ditch" form will retain that historic form and will not be altered by the current project. All portions of the ditch outside the area to be piped would remain eligible. Further, the addition of piping is reversible; if removed in the future, the ditch could be returned to its historic open-ditch form and **the essential form and integrity of the property would be unimpaired** (Standard #10).

(iii) Removal of the property from its historic location;

This category does not apply to this project. The acequia and the Santa Cruz River diversion will remain in their current locations.

(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

The proposed project will alter the "open concrete-lined ditch" form of 3,819 feet of this segment of the acequia. This extent constitutes 71.5 percent of the current acequia madre. However, as above, the Corps considers that for the following reasons this element of form is not a contributing element to the ditch's historic significance:

(1) The entirety of the segment to be piped has already been substantially altered from its historic "open earthen ditch" form as a result of the installation of concrete lining in 1967 and again in 1986; thus, the current form of this segment of the ditch is a non-contributing element to the acequia's overall eligibility.

(2) All portions of the ditch system that currently retain the historic "open earthen ditch" form will remain unchanged by the proposed project. This includes 1,318 feet of the acequia madre; 1,519 feet of a major lateral stemming from the acequia madre near the project endpoint; and a minimum of 3,774 total feet for field ditches currently in use.

The proposed project will not change the character and purpose of the acequia's use as a conveyance for irrigation water from the Santa Cruz River and Rio Quemado. The proposed rehabilitation work is consistent with the Secretary of the Interior's standards for rehabilitation, both by not **damaging, removing,** or **destroying** original components that retain integrity (Standards #1, 2, 4, 5, 6, 7, and 9), and because the piping could be removed at a later date and returned to an open earthen ditch (Standard #10).

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

This category does not apply to this project. The acequia alignment traverses private land consisting of active agricultural fields owned largely by acequia Association members, the project proponents. The land through which the acequia runs consists of active agricultural fields.

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

This category does not apply to this project.

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

This category does not apply to this project.

Summary and Recommendations

The Acequia de los Ranchos system is eligible for nomination to the National Register of Historic Places and the New Mexico Register of Historic Places. The proposed project does not involve restoring the concrete-lined ditch to its earlier historic "open earthen ditch" form, but rather seeks to rehabilitate the acequia so that it may continue to function in its current context providing agricultural irrigation. While preferable from a historic preservation standpoint, restoration would not address the serious maintenance issues impacting the acequia, and as such would not be feasible technically or economically (cf. 36 CFR 67.7), given the realities of an aging and shrinking acequia association membership.

Piping the ditch will affect it. However, in relation to Section 106 of the NRHP, the Corps is of the opinion that the proposed project will result in **no adverse effect to historic properties** for the following reasons:

- The current detrimental impacts of severe erosion, both of sediment into the ditch and of sediment undercutting the current concrete lining, resulting from rainfall runoff, trash obstructions, and livestock trampling, create repeated failure, hinder adequate function of the acequia and jeopardize the continued use of this segment.

- The project will alter a single element of the acequia: its form. However, the only portion of the system that will be affected is a portion that has already lost the integrity of its historic form by the addition of concrete lining in 1967 and 1986. As this segment of the acequia lacks integrity of form, its form is thus not a contributing element to the acequia's eligibility for the NRHP.

- The acequia segment does retain integrity of alignment and function, both of which are active contributing elements to the ditch's eligibility. Neither of these elements will be changed or adversely affected by the proposed project.

- This project satisfies the Secretary's standards for rehabilitation of historic structures. The proposed project will not destroy, damage, or remove any currently-existing historic material or element from the acequia. Further, the installation of buried pipe in place of the current concrete lining is reversible such that "if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired," as specified in the Secretary's standards (36 CFR 67.7). Future removal of the pipe would allow a return to the historic open earthen ditch form.

- While the project will alter the acequia's form, it will preserve other factors relevant to its eligibility for the NRHP. The proposed project is thus a means of preserving the continued use of the acequia in its historic cultural context by preserving its alignment and function in a manner that is economically feasible (cf. 36 CFR 67.7). All portions of the acequia system that do retain the earlier historic "open earthen ditch" form will remain unaltered by this project, as will an extent of ditch with the 1967 concrete lining, and will retain their eligibility for the NRHP.

For these reasons, the Corps considers the effects to the acequia not to be adverse.

Consistent with the Department of Defense American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, tribes indicating an interest in activities in Santa Fe County (based on the State of New Mexico Indian Affairs Department's 2009 Native American Consultations List) were sent a scoping letter to assess whether 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 therefore is of the opinion that the proposed Acequia de los Ranchos project will have **no adverse effect to historic properties**. Should previously undiscovered artifacts or features be unearthed during construction, work will be stopped in the immediate vicinity of the find, a determination of significance made, and further consultation conducted in coordination with the New Mexico State Historic Preservation Officer and with Native American groups that may have concerns in the project area to determine the best course of action.

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APPENDIX A

CONFIDENTIAL SITE LOCATION DATA

— FOR OFFICIAL USE ONLY —

The public disclosure of the location of archaeological sites on state and private lands is prohibited by Section 18-6-11.1 NMSA 1978. Public disclosure of archaeological site locations is federally prohibited by 16 USC 470hh (36 CFR 296.18).

If the pages in this appendix are missing, then this copy was intended for public distribution.

— REMOVE APPENDIX PRIOR TO PUBLIC DISTRIBUTION —

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

September 14, 2009

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Jan Biella
Interim State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Dear Ms. Biella:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of **no adverse effect to historic properties** for a proposed rehabilitation of the Acequia de los Ranchos. The Corps, at the request of the New Mexico State Engineer/Interstate Stream Commission and Acequia de los Ranchos Association (Association), is planning a project that would install 3,819 feet of buried pipe with associated features, and construct a second diversion on the Rio Quemado. Work would be conducted under the Water Resources Development Act of 1986 (Public Law 99-662), as amended.

The Acequia, with a non-adjudicated priority date of March 18, 1907, but possibly dating to as early as the 1600s, is located in the town of Chimayo, Santa Fe County, New Mexico (Enclosure 1). The acequia provides irrigation water to between 81 and 85 acres of cultivated land for 50 or 51 irrigators. Its diversion structure obtains water from the Santa Cruz River near the confluence of the Santa Cruz River and Rio Quemado, and is approximately 200 meters northwest of the historic Santuario de Chimayo. The project would have no effect on the Santuario.

The project would install 3,819 feet of new 15-inch diameter plastic pipeline from the existing point of diversion on the Santa Cruz River downstream along the existing acequia; a sluice structure to remove heavy sediment, trash and debris before they enter the new pipeline at the point of diversion on the Santa Cruz River; and a new steel-plate diversion structure on the Rio Quemado to supplement the water provided by the Santa Cruz diversion. The Santa Cruz diversion will remain in place.

The Acequia de los Ranchos acequia madre has a total length of 6,281 feet, of which 4,963 feet (79 percent) is lined with concrete

installed in 1967 and 1986; 1,318 feet of the acequia madre retains a historic “open earthen ditch” form. The proposed piping project would replace 3,819 feet of the concrete-lined portion (61 percent of the acequia madre’s total length) with buried pipe. In addition to the acequia madre, a major lateral measuring approximately 1,519 feet retains an “open earthen ditch” form, as do at least 3,774 additional feet of minor laterals and field ditches. None of the acequia madre or other portions of the system currently retaining an “open earthen ditch” form will be affected by this project.

At present, the acequia obtains water from the Santa Cruz River via a single concrete diversion structure (Enclosure 2). Historically, the acequia obtained water simultaneously from both the Santa Cruz River and the Rio Quemado, but channel erosion in the Rio Quemado has left the former Rio Quemado headgate above the current water level, leading to its abandonment. The proposed project, in addition to piping an extent of the ditch and installing a sluice box / trash rack, will also construct a second diversion structure on the Rio Quemado, thus restoring the acequia’s earlier dual-headgate arrangement (Enclosure 3).

The proposed project is being undertaken to address and alleviate negative impacts currently being experienced by the acequia system that impair the acequia’s function, create increasing damage, and generate labor and maintenance requirements that are beyond the current Association’s ability to address easily. Primary negative impacts include:

1) Erosion resulting in downslope movement of sediments from an adjacent hillside into the ditch, resulting in blockage causing increased erosion around the concrete lining and requiring extensive labor to clear out (Enclosures 4 and 5).

2) Severe erosion of sediment away from the concrete lining, sharply undercutting the concrete and leading to repeated failure. This erosion is caused by two processes: (a) extensive trampling of surrounding sediment by livestock owned by non-members as the animals drink water from the ditch (Enclosure 6); and (b) frequent obstruction of the ditch by debris, including modern trash, that blows into the ditch and causes overflow. Such erosion undercuts the concrete lining, causing it to fracture and give way entirely (Enclosure 7), resulting in extensive water loss and requiring costly repair and labor investment resulting in increasing hardship to the dwindling and aging members of the acequia association.

3) These detrimental impacts of severe erosion of sediment into the ditch and of sediment undercutting the current concrete lining endanger the acequia’s continued function and

jeopardize the continued use of this acequia segment; because this segment is the upstream portion of the acequia, the entire acequia system is impacted. Piping this extent of the acequia would eliminate these two causes of erosion.

A Corps archaeologist conducted a field visit to the project area on January 29, 2009, and surveyed the project area on May 20, 2009. Enclosed for your review is the report entitled *A 3.13-Acre Cultural Resources Inventory for the Acequia de los Ranchos, Santa Fe County, New Mexico*, by Jonathan E. Van Hoose (NMCRIS 115177, Corps Report No. USACE-ABQ-2009-013). The survey did not identify any historic properties aside from the acequia itself. The archaeologist was unable to relocate the only site indicated by an ARMS search as possibly intersecting the project area (LA 89010, a historic structure; see Enclosure 8), and confirmed that no portion of the proposed project intersects any archaeological site.

Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 20, 1998, and based on the State of New Mexico Indian Affairs Department's Native American Consultations List, American Indian tribes that have indicated they have concerns in Santa Fe County have been contacted regarding the proposed project. To date, the Corps has received no indication of tribal concerns that would impact this project. No known Traditional Cultural Properties are known by the Corps to occur within the project area.

The Corps considers the Acequia de los Ranchos to be eligible for listing on the National Register of Historic Places under Criterion (a) of 36 CFR 60.4, as irrigation features such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history. We seek your concurrence in our eligibility determination.

The proposed project does not involve restoring the concrete-lined ditch to its earlier historic "open earthen ditch" form, but rather seeks to rehabilitate the acequia so that it may continue to function in its current context providing agricultural irrigation. While preferable from a historic preservation standpoint, restoration would not address the serious maintenance issues impacting the acequia, and as such would not be feasible technically or economically (cf. 36 CFR 67.7), given the realities of an aging and shrinking acequia association membership.

Piping the ditch will affect it. However, in relation to Section 106 of the NRHP, the Corps is of the opinion that the proposed project will result in **no adverse effect to historic properties** for the following reasons:

1) The current detrimental impacts of severe erosion, both of sediment into the ditch and of sediment undercutting the current concrete lining, resulting from rainfall runoff, trash obstructions, and livestock trampling, create repeated failure, hinder adequate function of the acequia and jeopardize the continued use of this segment.

2) The project will alter a single element of the acequia: its form. However, the only portion of the system that will be affected is a portion that has already lost the integrity of its historic form by the addition of concrete lining in 1967 and 1986; the concrete lining has not acquired historical significance in its own right. As this segment of the acequia lacks integrity of form, its form is thus not a contributing element to the acequia's eligibility for the NRHP.

3) The acequia segment does retain integrity of alignment and function, both of which are active contributing elements to the ditch's eligibility. Neither of these elements will be changed or adversely affected by the proposed project.

4) This project satisfies the Secretary of Interior's standards for rehabilitation of historic structures (36 CFR 67.7). The proposed project will not destroy, damage, or remove any currently-existing historic material or element from the acequia. Further, the installation of buried pipe in place of the current concrete lining is reversible such that "if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired," as specified in the Secretary's standards (36 CFR 67.7). Future removal of the pipe would allow a return to the historic open earthen ditch form.

5) While the project will alter the acequia's form, it will preserve other factors relevant to its eligibility for the NRHP. The proposed project is thus a means of preserving the continued use of the acequia in its historic cultural context as an agricultural irrigation feature by preserving its alignment and function in a manner that is economically feasible (cf. 36 CFR 67.7). All portions of the acequia system that do retain the earlier historic "open earthen ditch" form (including 1,318 feet of the acequia madre; a major lateral measuring 1,519 feet; and at least 3,774 feet of minor laterals and field ditches) will remain unaltered by this project, as will an extent of ditch with the 1967 concrete lining. These portions will retain their eligibility for the NRHP.

For these reasons, the Corps considers the effects to the acequia not to be adverse. We seek your concurrence on this determination of **no adverse effect to historic properties.** Should previously undiscovered artifacts or features be discovered during construction, work will stop in the immediate vicinity of the find, a determination of significance made, and consultation would take place with your office and with Native American groups that may have concerns in the project area, to determine the best course of action.

In sum, we seek your concurrence in our eligibility determination and in our determination of **no adverse effect to historic properties** by this project. If you have questions or concerns, or require additional information regarding the Acequia de los Ranchos Rehabilitation Project, please contact Dr. Jonathan Van Hoose, archaeologist, at (505) 342-3687, or me at (505) 342-3281.

Sincerely,

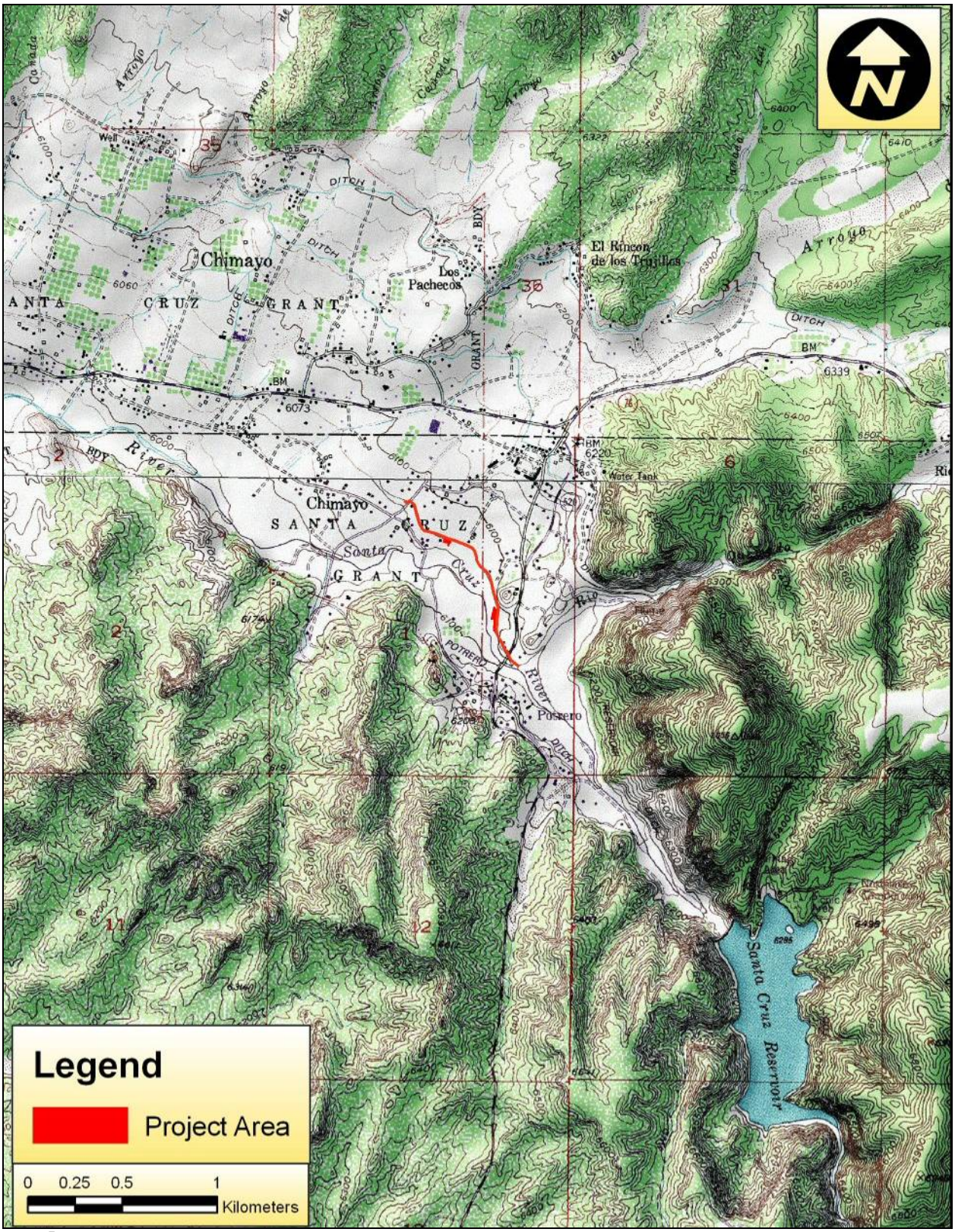
Julie Alcon
Chief, Environmental Resources Section

I CONCUR

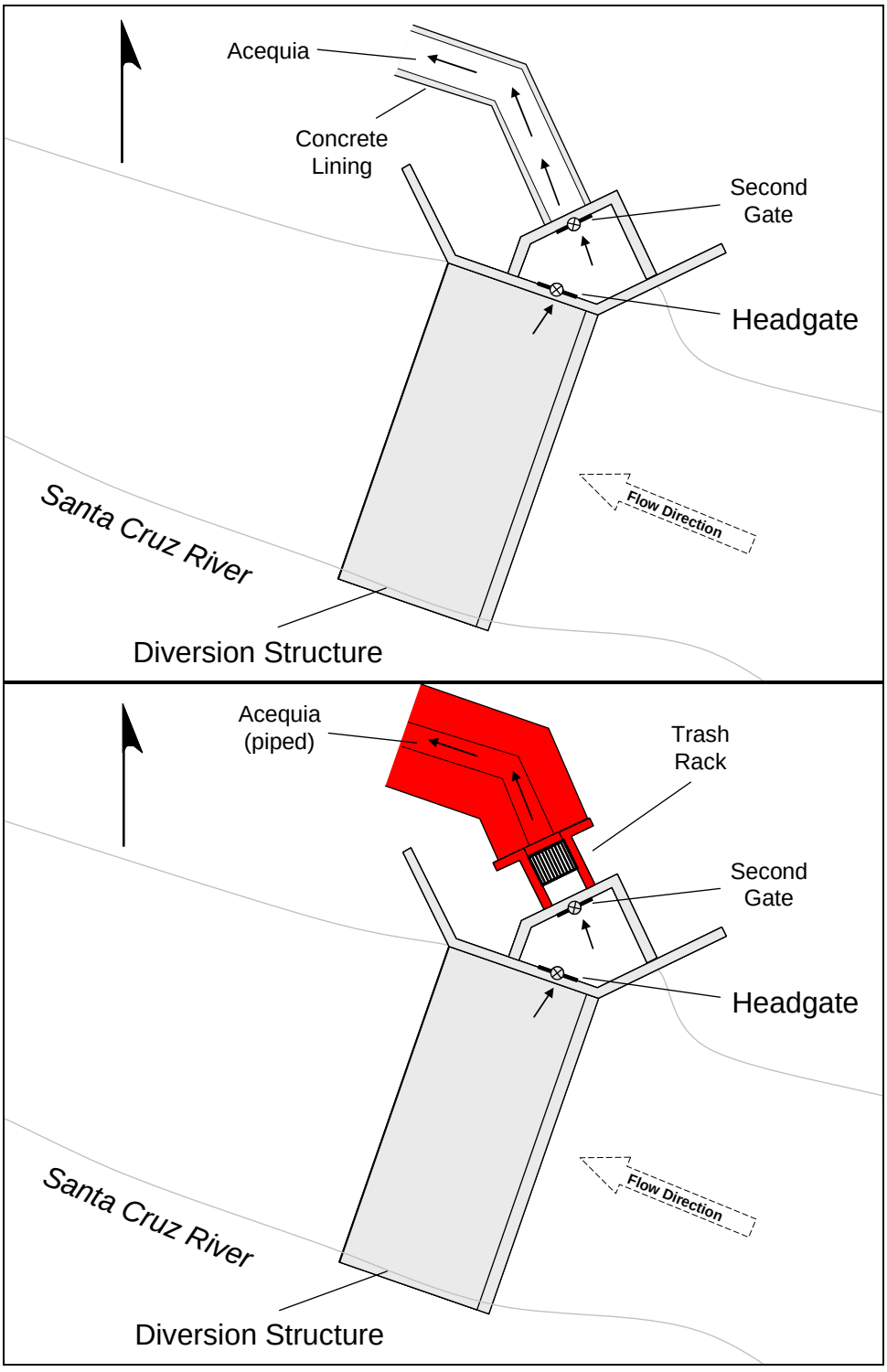
_____
Date

_____
JAN BIELLA
INTERIM NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

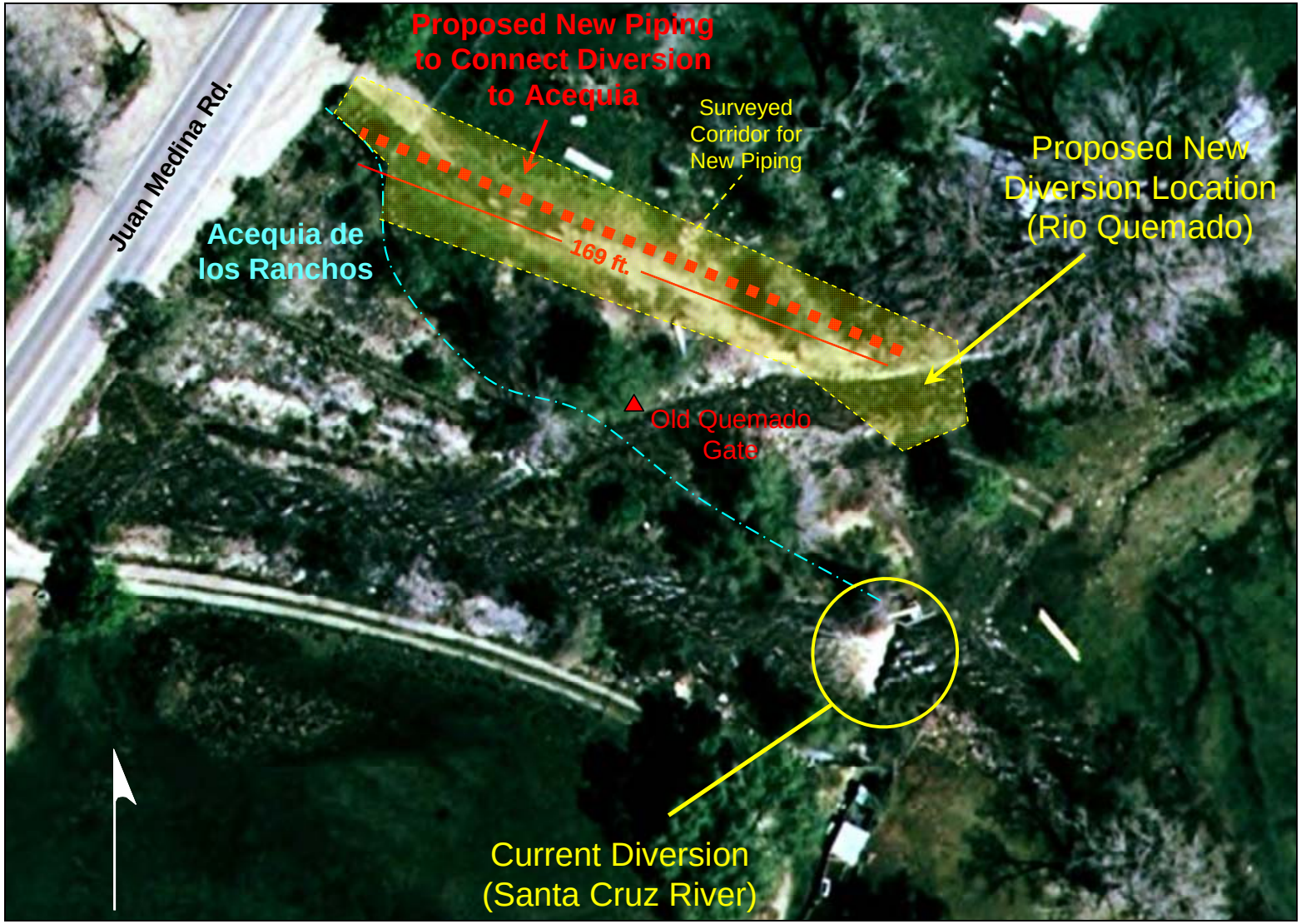
Enclosures



Enclosure 1. Location of project area shown on USGS 7.5" quadrangles maps Chimayo, NM (36105-A8) and Cundiyo, NM (35105-H8).



Enclosure 2. Plan-view schematic of the Santa Cruz diversion structure, showing current configuration (top) and location of proposed new sluice box / trash rack (bottom, shown in red). Not to scale.



Enclosure 3. Aerial photograph of the Quemado-Santa Cruz confluence vicinity, showing locations of current diversion, proposed new diversion, present acequia alignment, old headgate, and proposed additional piping (169 feet).

Enclosure 4. View upslope (east), showing eroding surface.

Enclosure 5. View of acequia channel where impacted by downslope erosion, facing northwest.

Enclosure 6. View of portion of acequia with extensive trampling and erosion due to cattle. Note displaced fragments of concrete ditch lining to the right of the ditch.

Enclosure 7. Severe erosion undercutting concrete lining, causing it to fail. Erosion also severely impacts the raised berm on which this part of the ditch runs.

CONFIDENTIAL SITE LOCATION DATA

— FOR OFFICIAL USE ONLY —

The public disclosure of the location of archaeological sites on state and private lands is prohibited by Section 18-6-11.1 NMSA 1978. Public disclosure of archaeological site locations is federally prohibited by 16 USC 470hh (36 CFR 296.18).

— REMOVE THIS SECTION PRIOR TO PUBLIC DISTRIBUTION —

Appendix C

Site Photos

Existing non- reinforced concrete acequia showing sediment deposition, January 2009.

Existing non-reinforced concrete acequia, January 2009.

Existing and nonfunctioning headgate on the Rio Quemado, January 2009.

Existing non-reinforced concrete acequia after annual cleaning, May 2009.

Severe erosion on existing non-reinforced acequia, May 2009.

Ephemeral wetland located on private property, May 2009.

Appendix D

Notice of Availability and Affidavit of Publication

Notice of Availability
Draft Environmental Assessment for the
Acequia de los Ranchos Rehabilitation Project, Santa Fe County, New Mexico

Pursuant to the Council on Environmental Quality regulations that implement the National Environmental Policy Act, the U.S. Army Corps of Engineers (Corps), Albuquerque District, has completed the **Draft Environmental Assessment for the Acequia de los Ranchos Rehabilitation Project, Santa Fe County, New Mexico (Draft EA)**. The purpose of this project is to provide the Acequia Association members with a reliable and more efficient water distribution system. The proposed Acequia de los Ranchos rehabilitation project area is located in Chimayo, New Mexico near the confluence of the Santa Cruz River and Rio Quemado, approximately one mile south of the intersection of State Route 76 and Juan Medina Road. The proposed project entails replacing a non-functioning diversion structure on the Rio Quemado, adding sluice structures at both diversions, and enclosing approximately 3,819 feet of the ditch in 15-inch diameter plastic pipeline. Project construction is proposed to begin in fall 2009 and continue for approximately eight weeks.

The Draft EA is electronically available for viewing and copying at the Albuquerque District website (under "FONSI/ Environmental Assessments") at:

http://www.spa.usace.army.mil

or a hard copy will be sent upon written request to the following address:

U.S. Army Corps of Engineers
Albuquerque District
Environmental Resources Section
Attn: CESPA-PM-LE (Sarah Beck)
Albuquerque, New Mexico 87109-3435

Paper copies of this document are also available for review at:

Española Public Library
314-A Oñate Street
Española, NM 87532

The public review will extend from October 8, 2009 to November 7, 2009. Written comments should be sent to the above address and will be accepted until 4:00 PM, November 7, 2009. Alternatively, comments may be sent electronically to **sarah.e.beck@usace.army.mil**. If you need additional information or have questions, please contact Ms. Beck at 505/342-3333.

#####

Affidavit of Publication

State of New Mexico
County of Rio Arriba

I, Robert Trapp, being first duly sworn, declare and say I am the Publisher of the ***Rio Grande SUN***, a weekly newspaper published in the English language and having a general circulation in the County of Rio Arriba, State of New Mexico, and being a newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 of the Session Laws of 1937. The publication, a copy of which is hereto attached, was published in said paper once each week for 1 consecutive weeks and on the same day of each week in the regular issue of the paper during the time of publication and the notice was published in the newspaper proper, and not in any supplement. The first publication being on the 8th day of October 2009

and the last publication on the 8th day of October 2009. Payment for said advertisement has been duly made, or assessed as court costs. The undersigned has personal knowledge of the matters and things set forth in this affidavit.

Robert Trapp Publisher

Subscribed and sworn to before me this 8th day of OCT. A.D. 2009

Maria V Lopez Garcia

Maria V. Lopez Garcia /Notary Public
My commission expires 13 July 2013

Publisher's Bill

82 lines one time at 51.66

____ lines ____ times at ____

Affidavit 5.00

Subtotal 56.66

Tax 4.46

Total 61.12

Payment received at ***Rio Grande SUN***

Date Oct 5, 2009

By

NOTICE OF AVAILABILITY
Draft Environmental Assessment for the Acequia de los Ranchos Rehabilitation Project, Santa Fe County, New Mexico

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U.S. Army Corps of Engineers
Albuquerque District Environmental Resources Section
Attn: CESPA-PM-LE (Sarah Beck)
Albuquerque, New Mexico 87109-3435

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(Published October 8, 2009)

Appendix E

Clean Water Act Section 404
Irrigation Exemption Memo and Summary

US Army Corps of Engineers
Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435
Fax No. 505-342-3498

Irrigation Exemption Summary

FARM OR STOCK POND OR IRRIGATION DITCH CONSTRUCTION OR MAINTENANCE

Pursuant to Section 404 of the Clean Water Act (33 USC 1344) and Federal Regulations (33 CFR 323.4(a)(3)), certain discharges for the construction or maintenance of farm or stock ponds or irrigation ditches have been exempted from requiring a Section 404 permit. Included in the exemption are the construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance (but not the construction) of drainage ditches. Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.

A Section 404 permit is required if either of the following occurs:

(1) Any discharge of dredged or fill material resulting from the above activities which contains any toxic pollutant listed under Section 307 of the Clean Water Act shall be subject to any applicable toxic effluent standard or prohibition, and shall require a permit.

(2) Any discharge of dredged or fill material into waters of the United States incidental to the above activities must have a permit if it is part of an activity whose purpose is to convert an area of the waters of the United States into a use to which it was not previously subject, where the flow or circulation of waters of the United States may be impaired or the reach of such waters reduced. Where the proposed discharge will result in significant discernible alterations to flow or circulation, the presumption is that flow or circulation may be impaired by such alteration. For example, a permit will be required for the conversion of a wetland from silvicultural to agricultural use when there is a discharge of dredged or fill material into waters of the United States in conjunction with construction of dikes, drainage ditches, or other works or structures used to effect such conversion. A discharge which elevates the bottom of waters of the United States without converting it to dry land does not thereby reduce the reach of, but may alter the flow or circulation of, waters of the United States.

If the proposed discharge satisfies all of the above restrictions, it is automatically exempted and no further permit action from the Corps of Engineers is required. If any of the restrictions of this irrigation exemption will not be complied with, an individual permit is required and should be requested using ENG Form 4345 (Application for a Department of the Army permit). A nationwide permit authorized by the Clean Water Act may be available for the proposed work. State or local approval of the work may also be required.

For additional information concerning exemptions, nationwide permits, or for a written determination regarding a specific project, please contact the Corps at the following addresses:

In New Mexico:
Albuquerque District Corps of Engineers
ATTN: Regulatory Branch
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435
Phone: (505) 342-3283

In southeastern Colorado:
Southern Colorado Regulatory Office
720 North Main Street, Room 300
Pueblo, Colorado 81003-3047
Phone: (719) 543-9459

In southern New Mexico and western Texas:
El Paso Regulatory Office
P.O. Box 6096
Ft. Bliss, Texas 79906-0096
Phone: (915) 568-1359