AQUATIC HABITAT RESTORATION AT SANTA ANA PUEBLO, NEW MEXICO
(Section 1135)

TECHNICAL APPENDIX F

COST EFFECTIVENESS AND INCREMENTAL COST ANALYSIS

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APPENDIX F. COST EFFECTIVENESS AND INCREMENTAL COST ANALYSIS

F.1. GENERAL

Corps of Engineers *Planning Guidance* (ER 1105-2-100, 22 Apr 2000, as amended) and policy (*Civil Works Ecosystem Restoration Policy*, ER 1165-2-501, 30 Sep 1999) require that ecosystem restoration projects be analyzed for cost effectiveness and incremental benefits gained from contemplated restoration alternatives. Analysis of cost effectiveness, in general, compares the relative costs and benefits of alternative plans. For example, if one alternative can produce a greater level of output for the same or less cost than others, only the greater output choice—the "cost-effective" solution—makes economic sense; economically ineffective alternatives can be eliminated. After elimination of inefficient and ineffective solutions, there frequently remain several least-cost, cost-effective alternatives offering a range of output values from which to choose. For instance, five solutions might remain viable, each entailing successively greater benefits and costs. Incremental analysis calculates the cost per unit of output gained by each successive solution, allowing the decision maker to determine the point of diminishing returns. The final selection of a recommended plan also may be influenced by non-economic considerations such as, specific output targets, budget constraints, impacts to other environmental resources, and opportunity costs.

To compare the cost effectiveness of various restoration alternatives, an environmental output unit is required. An output unit is the quantification of expected improvement in target functions or values, such as increased productivity or habitat availability. To compare disparate habitat features, a common output unit is necessary. The current study includes riparian woodland, riparian shrub, wetland shrub, saltgrass meadow, and aquatic habitats. It is widely recognized that these habitat types each have different values to various groups of wildlife and aquatic organisms. Although research has documented many of these values relative to individual habitat types, a common indicator, or output unit, has not been developed for Rio Grande riparian, wetland, and aquatic ecosystems. Therefore, a direct comparison of benefits among the various features cannot be made. However, the activities proposed in this study can be analyzed in two separate incremental analyses—for aquatic and vegetated habitats—and cost-effective solutions from each can be combined as the selected plan.

F.2. AQUATIC HABITAT RESTORATION

F.2.1. Initial evaluation

Hydraulic modeling was performed to support problem identification and the evaluation of alternatives (and, later, design of the preferred plan). One-dimensional hydraulic modeling was performed using the HEC-RAS River Analysis System (HEC 1998) and 2-dimensional modeling was completed with the finite element model RMA-2V (WES 1998) [see Technical Appendix C – Hydraulics]. Initial 1-dimensional modeling included six cross sections (Cochiti Rangelines) through the project area. Results from this modeling effort were used for comparative analysis of historical trends of channel geometry and hydraulic characteristics for the Santa Ana reach of the Rio Grande. Detailed 1-dimensional hydraulic modeling included approximately 60 cross-sections throughout the Santa Ana reach and was used to evaluate existing conditions, sediment transport, stable channel design and preliminary design of restoration alternatives. The 2-dimensional modeling was used to verify results from the 1-dimensional modeling efforts, refine the hydraulic design, and determine restoration benefits.

Because existing discharge conditions differ significantly from historic flows, restoration goals were not established to attain the exact channel width and depth parameters exhibited in the past. Rather, the restoration goal was a wider and shallower channel cross-section that would be relatively stable within the existing (and foreseeable future) discharge condition. Recently installed grade control structures (called Gradient Restorations Facilities, "GRF"s) have stabilized the channel bed elevation and slope; however, aquatic habitat and geomorphic conditions differ significantly from the recent historic condition.

The proposed "Overbank Lowering" entails the partial excavation (scraping) of active sandbars within the incised riverbed (not within the abandoned, vegetated floodplain). The overbank modification would be accomplished by uniformly lowering the topography of the existing overbank, including side channels, by designated amounts to initiate overbank flooding at the 2-year discharge of 5,400 cfs. The overbanks will be uniformly excavated to preserve the relative topography and diversity within the overbank areas. Six sandbars were identified for Overbank Lowering within the project reach.

Excavated spoil material would be removed from the site to an upland disposal area. Redistribution of material throughout the channel cross-section was evaluated and determined to be contrary to the design objective. During such a cut-and-fill activity, flow within this perennial reach would need to be diverted to allow for deposition within the channel. Because the overbank area is the only available location for a temporary diversion channel, this would, in fact, disturb the substrate across the entire river cross-section. Overbank Lowering, however, would limit earthwork activities to exposed bars and would not require diversion for construction. Additionally, existing grade controls have eliminated entrenched sections of the channel which could receive fill material. Following Overbank Lowering, there is potential for minor redeposition of fines (silt and clay) within the overbanks, but redeposition of significant amounts of sand and gravel bed load is not anticipated.

F.2.2. Calculation of Ecological Index

Increasing the availability of shallow, low velocity aquatic habitat would benefit the majority of native fish species in the study area (such as, red shiner, western mosquitofish, fathead minnow, Rio Grande silvery minnow, and longnose dace). Restoration design was based on habitat use of the endangered Rio Grande silvery minnow. Aquatic habitat characteristics were based on the descriptions of highly utilized areas in the *Rio Grande Silvery Minnow Recovery Plan* (USFWS 1999). The plan indicated that silvery minnows were most frequently found in areas with depth ranging from 0.3 to 1.0 feet (10 to 30 cm) and where flow velocity was less than 0.7 ft/sec (20 cm/sec). The plan also indicated that minnows tend to shift to deeper water in winter, but those areas were generally typified by lower velocities during this season. Therefore the "preferred habitat" used in subsequent analysis were those areas with depths less than 2 feet (60 cm) and velocity less than 1 ft/sec (30 cm/sec).[1]

To quantify potential benefits to the silvery minnow, the two-dimensional hydraulic model (RMA-2V) was used to determine the extent of preferred habitat with and without the implementation of Overbank Lowering [see Technical Appendix C - Hydraulics]. Because the grade control structures have stabilized the channel in the study reach, future geomorphic conditions were considered to be reasonably similar to the existing condition.

The extent of preferred habitat for the existing condition increased with discharge (see Figure F.1), indicating that a wide range of topographic relief is present throughout the floodway (channel plus overbank areas). Therefore, excavation was formulated to lower existing bars uniformly by 1 to 2 feet; the general contours of the existing surface would be retained. An excavation depth (to the nearest half-

[1] These parameters also are supported by the current *Draft Revised Recovery Plan* (USFWS 2007) which states that most minnows are found in water less than 16 inches (40 cm) deep with flow velocity less than 1 ft/sec (30 cm/sec).

foot) was initially selected for each of six bars that would result in inundation of the majority of the bar at 5,400 cfs; this was termed alternative "A". To provide a range of alternatives for cost efficiency analysis, excavation depths 0.5 feet shallower (alternative "B") and 0.5 feet deeper (alternative "C") also were evaluated. *Therefore, excavation depth increases in 0.5-foot increments from alternatives "B" to "A" to "C".* [This terminology is consistent with Technical Appendix C, but may be altered in the Detailed Project Report.] The area over which excavation is to be performed is the same for all three action alternatives, namely 62.2 acres.

The hydraulic model determined the extent of preferred habitat area for the without-project ("Existing") and the three excavation-depth alternatives over a range of discharges (Table F.1 and Figure F.1) [also see Technical Appendix C]. For the without-project condition, acreage of preferred habitat increased over the range of flows analyzed. For all three with-project alternatives, acreage increased up to 5,400 cfs, then decreased in extent through 7,000 cfs. This reduction in preferred habitat area at higher flows was not a major concern after it was considered in light of their relatively infrequent occurrence.

Table F.1. Extent of preferred Rio Grande silvery minnow habitat within the study reach at various discharges.

Discharge (cfs)	Preferred[a] habitat (acres)			
	Existing	B	A	C
500	13.39	17.17	19.82	23.22
1000	11.27	18.00	20.30	22.81
2000	14.19	19.06	22.09	25.69
3000	17.23	24.10	27.28	27.82
4000	19.74	26.02	29.51	31.66
5400	22.05	28.09	27.72	24.17
7000	26.50	18.82	13.17	9.46

[a] Depth = 2 feet or less and velocity = 1 foot/sec or less.

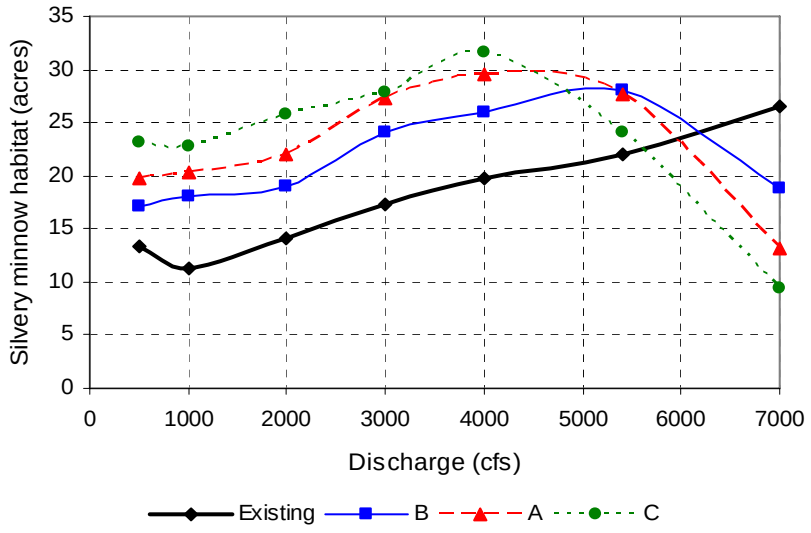

Figure F.1. Acres of Rio Grande silvery minnow habitat at various discharges.

Habitat suitability is a function of both physical and temporal availability. The temporal availability of preferred minnow habitat is dependent on the frequency distribution of discharge. Therefore, the probability distribution of the mean daily discharge at streamflow gages upstream and downstream from the Pueblo of Santa Ana (see Technical Appendix B - Hydrology, Table B.4) were averaged to

characterize the study reach (Table F.2). These frequencies were aggregated in discharge classes of approximately 1,000 cfs increments (Table F.3). The resultant frequency distribution was equated to time by multiplying by 365 (Table F.3) and expressed as "days per year" (that is, the relative distribution of flows over a "statistical" year). This temporal parameter was multiplied by the acreage of preferred habitat at a similar discharge and the resultant index was expressed in "acre-days per year" (Table F.4 and Figure F.2).

Table F.2. Probability distribution of mean daily discharge (WY 1974-1999).

Discharge range (cfs)	Albuquerque gauge	San Felipe gauge	Average
0-100	4.22	0.01	2.12
101-200	2.66	1.44	2.05
201-500	15.98	9.45	12.72
501-750	18.16	17.15	17.66
751-1000	15.24	21.42	18.33
1001-2000	22.37	28.88	25.63
2001-3000	6.98	6.55	6.77
3001-4000	6.37	6.26	6.32
4001-5000	3.29	3.75	3.52
5001-6000	2.77	2.39	2.58
6001-7000	1.49	2.15	1.82
7001-8000	0.34	0.54	0.44
8001-9000	0.14	0.01	0.08

Table F.3. Probability of discharge classes.

Discharge class (cfs)		Probability	Probability x 365 ("days per year")
Range	Mid-point		
250-750	500	9.51	34.7
751-1250	1000	27.10	98.9
1501-2500	2000	27.48	100.30
2501-3500	3000	16.20	59.1
3501-4500	4000	6.54	23.9
4501-6300	5400	6.33	23.1
6301-7700	7000	3.84	14.0
Totals		97.0[a]	354.0[a]

[a] Totals are less than 100% and 365 days due to discharges less than 250 cfs and greater than 7,700 cfs.

Table F.4. Frequency-dependent availability of preferred Rio Grande silvery minnow habitat (acre-days/year).

Discharge class mid-point (cfs)	Existing	B	A	C
500	465	596	688	806
1000	1115	1781	2008	2256
2000	1423	1912	2215	2576
3000	1018	1425	1613	1644
4000	471	621	704	756
5400	509	649	640	558
7000	372	264	185	133
Total [a]	5373	7246	8053	8730
Difference from Existing condition (and % increase)	--	+1897 (+35%)	+2680 (+50%)	+3357 (+62%)

[a] Total acre-days per year is the index used in incremental cost analysis.

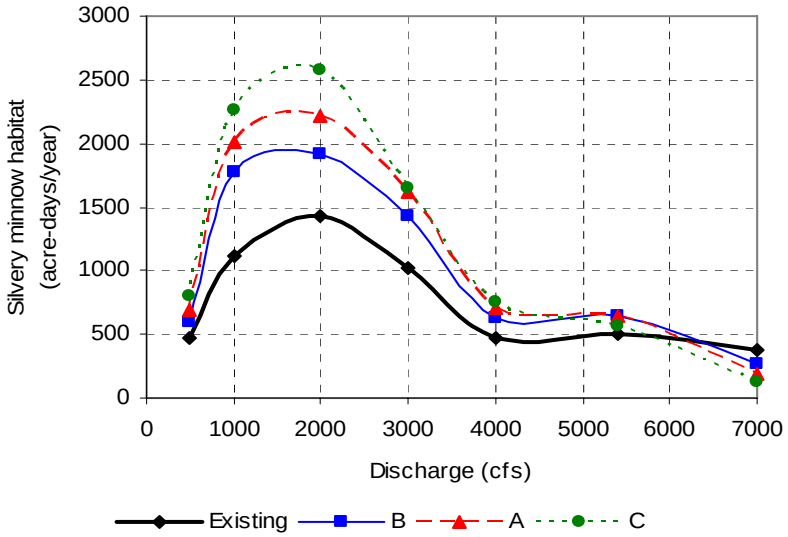

Figure F.2. Frequency-dependent availability of Rio Grande silvery minnow habitat.

All three excavation-depth alternatives resulted in positive increases in the frequency-dependent availability of preferred habitat. For the entire range of discharge up to 7,000 cfs, Overbank Lowering alternatives would provide approximately 1,900 to 3,360 additional acre-days per year of preferred habitat.

F.2.3. Incremental Cost Analysis for Aquatic Habitat

IWR-Plan software was used to evaluate cost-effectiveness. Costs were estimated with MCASES version 2.2 software (see Technical Appendix H) and include site preparation, excavation, haul, disposal site management, and contingency costs. Estimated excavation quantities for alternatives B, A, and C were approximately 120,000 cubic yards (CY), 171,000 CY, and 221,000 CY, respectively. The index of ecological benefits used as "habitat units" is the total acre-days per year of preferred silvery minnow habitat for each alternative (Table F.4). All three alternatives are non-combinable and independent of each other. Table F.5 summarizes the result of the analysis.

Table F.5. Incremental cost analysis for aquatic habitat.

Alternative measures	Habitat units (acre-days/yr.)	Cost	Average cost per habitat unit	Incremental habitat units	Incremental cost	Incremental cost per habitat unit
Existing	5373	$ 0	$ 0	5373	$ 0	$ 0
B	7246	$ 2,516,700	$ 337	1873	$ 2,516,700	$ 1,344
A	8053	$ 3,299,900	$ 422	807	$ 883,200	$ 1,095
C	8730	$ 4,267,900	$ 489	677	$ 868,000	$ 1,283

Cost, habitat units (acre-days per year), and average cost per habitat unit all increase with succeeding excavation depths. The incremental cost per habitat unit was highest for the initial excavation, decreased by nearly 19% for excavation 0.5-foot deeper (alt. A), and then increased by 17% for the deepest excavation (alt. C). Alternative A was considered the "best buy" solution.

F.3. VEGETATED HABITATS

Riparian and wetland habitat measures were formulated to provide wildlife habitat components that complement the overall restoration plan developed and approved by the Pueblo of Santa Ana. Emphasis was placed on wetland, meadow, and native shrub communities—all of which have significantly decreased in abundance over the past 50 years (Crawford et al. 1993, Roelle and Hagenbuck 1995). These habitat types were identified as crucial components contributing to overall wildlife diversity and habitat quality in the study area.

Revegetation methodologies have been the subject of much research and experimentation within Rio Grande ecosystems (Dreesen et al. 2002, Caplan et al. 2005, NRCS 2005). The methods proposed here—pole, whip, and tall-pot plantings—have been determined to be successful and cost-effective techniques through the efforts, and iterative refinements, of numerous Federal, Tribal and local entities.

F.3.1. Saltgrass Meadow

A relict saltgrass meadow area occurs near the southern end of the riparian zone in the study area. Meadow vegetation had begun to be displaced by saltcedar more than 50 years ago. The Pueblo killed saltcedar in this area by aerial spraying in 1998; however, the area currently harbors a moderately dense stand of live (re-sprouted) and dead saltcedar, along with herbaceous vegetation (largely noxious weed species). The soil type in this somewhat poorly drained area is Sparham clay loam. Groundwater in the 5-acre stand is sufficiently close to the ground surface to support vegetation typical of existing meadows in the middle Rio Grande valley during the growing season. This site is unique in terms of soil type and moisture within the floodplain of the study area and, therefore, is considered the only area suitable for meadow restoration. Removal of saltcedar, root-plowing (to eliminate re-sprouting) and reseeding with herbaceous species (primarily saltgrass, alkali sacaton, and scratchgrass muhly) were determined to be the most practical restoration activities.

F.3.2. Riparian Shrub Stand

A 5-acre shrub stand dominated by Russian olive and saltcedar adjacent to the saltgrass meadow discussed above also was evaluated for its restoration potential. Originally, replacement of this vegetation with an additional 5 acres of saltgrass meadow was considered; however, clarification of soil type and groundwater depth indicated that this area was, in fact, better suited to woody vegetation types. Areas of relatively shallow groundwater are limited in the abandoned floodplain of the study area, and this site was

determined to be the most logical location for riparian shrub restoration. Additionally, the location of this shrub stand between the existing cottonwood forest and the proposed saltgrass meadow would increase overall wildlife habitat value due to the juxtaposition and diversity of vegetation structure.

Existing aboveground vegetation would be removed with a brush mower. Root-plowing would eliminate the occurrence of re-sprouting and the need for subsequent herbicidal treatment. The area would be replanted with native shrub species suited to existing soil conditions—primarily New Mexico olive and silver buffaloberry. Tall-pot containers were considered to be the most practical and likely successful planting methodology (NRCS 2005). Existing stands of these species within the middle Rio Grande valley range up to 500 stems per acre; therefore a planting density of 200 stems per acre was determined suitable to allow for rapid establishment and future development of vegetation.

F.3.3. Wetland Restoration

As evidenced by remembrances of Pueblo elders and recent historic (1918 and 1935) vegetation maps, emergent and shrub wetlands occurred throughout the study area. The last vestiges of wetland habitat occupied a high-flow channel in 1981 (Hink and Ohmart 1984), which has since dried due to channel incision and subsequent lowering of the water table in the area.

Because channel degradation at the project site has precluded the use of the river's flow in the creation of new wetland areas, excavation to the water table within the abandoned floodplain was considered the most viable approach to creating suitable hydrologic conditions. A 15-acre area where non-native vegetation was previously removed by the Pueblo and has been monitored for groundwater levels over the past eight years was considered the most suitable location in the study area for this activity.

An evaluation of the creation of different wetland types was performed early in the study by David Evans and Associates, Inc. (2000; see Technical Appendix E). Open water/emergent wetland was contrasted with a shrub-dominated wetland, and both 5- and 10-acre areas were considered for each type. The open water/emergent wetland entailed a higher cost-per-acre due to greater planting costs and the deeper excavation requirements. Size increases entailed increased costs, but not in direct proportion to acreage. Recognizing that these two wetland types provide very different habitat values for wildlife, the shrub wetland was considered the preferred and cost-effective alternative during this initial evaluation. Additionally, because groundwater levels would be at or below the surface, a shrub wetland also was consistent with planning constraints in that it would not create mosquito problems nor be a potentially attractive nuisance to visitors at the nearby Hyatt Tamaya resort. Therefore, the open water/emergent wetland alternative was eliminated from detailed analysis.

The Pueblo has previously created three shrub swales (i.e., excavated groundwater depressions) within the study area. Vegetation has developed successfully, however, utilization of the swales by wildlife has been less than expected, apparently due to their relatively small size (1 to 1.5 acres). Therefore, swales with a minimum size of approximately 5 acres were considered in the current evaluation. The swale would be excavated to a depth of 5 feet and waste spoil would be removed to an upland disposal site. Narrow trenches within the swale bottom would be excavated, planted with coyote willow and Gooding's willow whips at a density of approximately one stem per linear-foot, and backfilled. Slopes of the swale would be 5:1 and would include a 10-foot-wide bench for slope stability and transitional vegetation plantings.

The selected location is approximately 15 acres and has been previously cleared of woody vegetation. The area surrounding the Shrub Swale also is planned to be replanted in the current project with riparian trees and shrubs that would tolerate the relatively deeper water table in the abandoned floodplain. (This

area is referred to as the "Riparian Plantings" feature.) In the subsequent incremental cost analysis, four alternatives (scales) were considered for the entire 15-acre site:

A0: No action.
A1: 15 acres of Riparian Plantings;
A2: A 5-acre Shrub Swale with 10 acres of surrounding Riparian Plantings; and
A3: A 10-acre Shrub Swale with 5 acres of surrounding Riparian Plantings.

F.3.4. Bankline Plantings

Along the west side of Rio Grande, approximately 1,410 linear feet of actively eroding bankline were identified. While the recently installed grade controls will serve to prevent widespread erosion, the bank will continue to slough during higher flows. Hydraulic Engineers also have recommended bankline stabilization as additional protection for proposed features (Shrub Swale and Riparian Plantings) adjacent to this bankline. The bank would be most simply stabilized by installing a row of coyote willows whips in a trench along the toe and backfilling. These plantings also would provide cover for animals foraging along the bank or within the adjacent channel.

F.3.5. Ecological Index

Improved wildlife habitat quality and utilization are the ultimate objectives of habitat restoration. Proposed improvements would benefit most native, terrestrial vertebrate taxa. Birds tend to be the most commonly surveyed wildlife taxa because they are abundant, ubiquitous, and conspicuous. Existing avian census literature that included the existing and proposed habitat types was reviewed for consistency in survey methodology. Avian density data from two studies were used to develop the avian abundance index used in subsequent incremental cost analysis. Hink and Ohmart (1984) was the primary source of avian density data. Although performed approximately 25 years ago, we believe that the results of this study are still pertinent because avian habitat selection and preference has not markedly changed over this period. While absolute abundance of birds may have changed over time, the relative utilization among habitat types likely has remained consistent. The Hink and Ohmart study, however, lacked comparable data for Russian olive *vs*. New Mexico olive/silver buffaloberry stands; therefore avian density data from Hawks Aloft, Inc. (HAI 2006) was used to characterize the proposed Riparian Shrub restoration measure. Both of these studies used the same survey methodology and included two years of censuses.

Because habitat utilization differs among seasons, avian density data from both the summer (June-August) and winter (December-February) seasons were averaged. Density data were then used to calculate avian abundance within the footprint of each restoration measure. Table F.6 summarizes source data and the avian abundance index used in subsequent incremental cost analysis.

Table F.6. Avian abundance and costs of vegetative restoration measures.

Restoration measures	Code in ICA model	"With" or "without" measure	Acres	Vegetation type (C/S code)[a]	Avian density (per 100 ac) Summer	Winter	Mean	Avian abundance in footprint	Cost of measure[b]
Bankline Planting	B0	Without	1.6	Riverbank (RV * 0.5)[c]	23.5	83.5	53.5	0.9	$0
	B1	With	1.6	Coyote willow (C/CW5 * 0.5) [c]	172.5	141.5	157.0	2.5	$18,750
Riparian Shrubs	S0	Without	5	Russian olive (RO5)	842.5[d]	601.2 [d]	721.9	36.1	$0
	S1	With	5	NM olive / silver buffaloberry (NMO-SB5)	1258.4 [d]	416.1 [d]	837.3	41.9	$48,115
Saltgrass Meadow	M0	Without	5	Saltcedar (SC5)	142.0	155.0	148.5	7.4	$0
	M1	With	5	Saltgrass meadow (OP6, site OP16)	191.0	2529.0	1360.0	68.0	$32,161
Shrub Swale and surrounding Riparian Planting	A0	Without	15	Saltcedar (SC7A)	120.0	92.0	106.0	15.9	$0
	A1	With	15	Riparian (C/CW1)	186.0	114.0	150.0	22.5	$196,600
		With	5	Willow shrub (C/CW5E)	623.0	1209.0	916.0	45.8	$799.975
		With	10	Riparian (C/CW1)	186.0	114.0	150.0	15.0	$131,067
	A2	Sum	15					60.8	$931.041
		With	10	Willow shrub (C/CW5E)	623.0	1209.0	916.0	91.6	$1,265,179
		With	5	Riparian (C/CW1)	186.0	114.0	150.0	7.5	$65,533
	A3	Sum	15					99.1	$1,330,732

[a] C/S code = Community/Structure habitat code (Hink and Ohmart 1984).
[b] Costs include 25% contingency, PED, and S&A.
[c] Density data for Bankline Plantings was halved to approximate the value of a narrow strip of vegetation.
[d] Density data for Russian olive and NM olive/silver buffaloberry are from HAI (2006); all other density data are from Hink and Ohmart (1984).

F.3.6. Incremental Cost Analysis for Vegetative Restoration Features.

IWR-Plan software was used to evaluate cost-effectiveness. Costs were estimated with MCASES version 2.2 software and include site preparation, excavation, haul, and disposal site management, and contingency costs. The index of ecological benefits used as "habitat units" is avian abundance within each measure's respective footprint and is based on avian densities from surveys in similar habitat types (Table F.6). Restoration measures are combinable and independent of each other. The "Shrub Swale" measure included four scales of activity (see section F.3.3 and Table F.6) and all other measures included two scales. Table F.7 and Figure F.3 summarize the result of the analysis.

All measures and scales were determined to be cost-effective, least-cost solutions. The "best buy" solution included Shrub Swale scale A3 (10-acre Shrub Swale and 5 acres of surrounding Riparian Plantings) because of its relatively low incremental cost per unit. Results including different scales of the Shrub Swale measure have also been included in Table F.7 and Figure F.3 for comparison purposes.

Table F.7. Incremental cost analysis of vegetative restoration measures.

Measures	Identifier in Fig. F.3	Included measures	Cumulative cost	Output (Avian abundance)	Average cost	Incremental cost	Incremental output	Incremental cost per unit output
Without plan (No action)	0	M0 S0 B0 A0	$0	60.3	$0	$0	0.0	$0
Saltgrass Meadow	M1	M1 SO B0 A0	$32,161	120.9	$266	$32,161	60.6	$531
Riparian Shrubs	S1	M1 S1 B0 A0	$80,276	126.7	$634	$48,115	5.8	$8,296
Bankline Plantings	B1	M1 S1 B1 A0	$99,026	128.3	$772	$18,750	1.6	$11,719
Shrub Swale & Rip'n. Plantings	A3	M1 S1 B1 A3	$1,429,758	211.5	$6,760	$1,330,732	83.2	$15,994
Alternate: A1 replaces A3 ...								
Shrub Swale & Rip'n. Plantings	A1	M1 S1 B1 A1	$295,626	134.9	$2,191	$196,600	6.6	$29,788
Alternate: A2 replaces A3 ..								
Shrub Swale & Rip'n. Plantings	A2	M1 S1 B1 A2	$1,030,067	173.2	$5,947	$931,041	44.9	$20,736

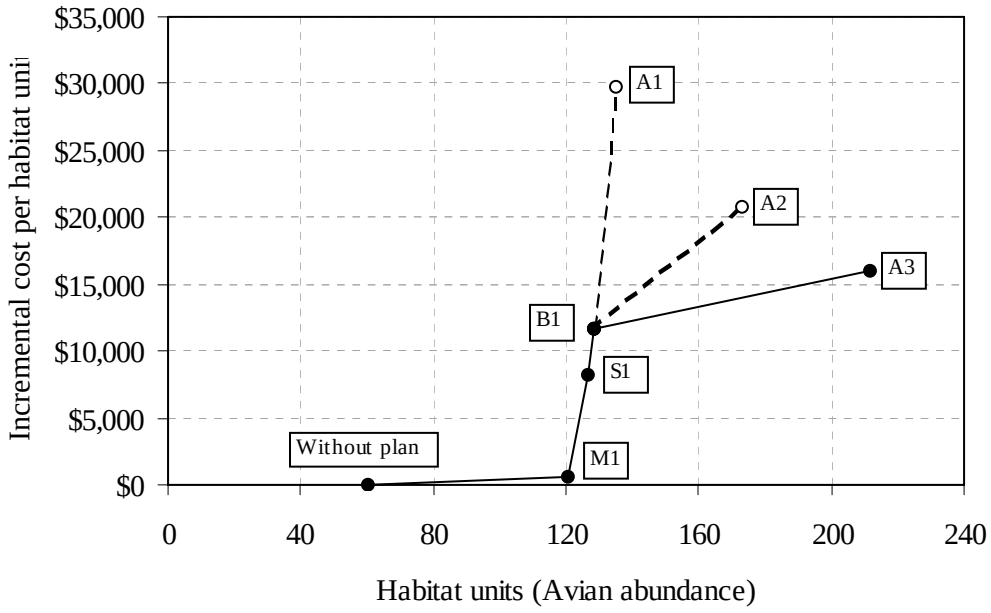

Figure F.3. Incremental cost analysis results for vegetative restoration features. The solid line indicates the "best buy" solution, and dashed lines depict alternative scales of the Shrub Swale measure. Codes indicate successive measures added to the analysis (see Table F.7).

F.4. PLAN SELECTION

The analyses above identified an array of cost-effective solutions for both aquatic and vegetative restoration. The following alternatives for were combined to form the selected plan after considering overall benefits, costs, the cost limitation of the Section 1135 program, economy, completeness, and project objectives: Overbank Lowering alternative A, and the vegetative restoration solution including Shrub Swale scale A2 (5-acre Shrub Swale and 10 acres of surrounding Riparian Plantings).

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AQUATIC HABITAT RESTORATION AT SANTA ANA PUEBLO, NEW MEXICO
(Section 1135)

TECHNICAL APPENDIX G

REAL ESTATE PLAN

REAL ESTATE PLAN

Aquatic Restoration
Pueblo of Santa Ana Reservation, New Mexico

NATURE OF REPORT: This Supplemental Real Estate Design Memorandum (SREDM) was prepared under the general guidelines of ER 405-1-12, Chapter 2 and Chapter 12, and is for planning purposes only. Final real property acquisition lines and estimate of value are subject to change after approval of this document. This report addresses the Government's need for temporary and permanent easements of varying lands located on the Pueblo of Santa Ana Reservation, New Mexico.

AUTHORIZATION: This planning report is under the authority of Section 1135(b) of the Water Resources Development Act (WRDA) of 1986, Public Law 99-662, as amended.

PROJECT LOCATION AND DESCRIPTION: The project is located approximately ten miles north of the Albuquerque city limits. The project is confined to the Pueblo of Santa Ana Reservation, in and along the edges of the Rio Grande. All of the required real estate for this project belongs to Santa Ana and consists of areas in the Rio Grande, forest-type land called "Bosque" on both sides of the Rio Grande and is considered open land with sparse vegetation and uneven topography.

The land within the Rio Grande channel is sometimes submerged during periods of high water flows and when the water recedes it creates large sand bars. It is possible to walk long sections of dry areas within the river banks. This land has no utilities and its highest and best use is considered to be open space for scenic and recreation use. The land between the river banks is within a flood zone. The land value is estimated to be a bulk acreage value of $1,000 per acre based on similar situations and utility.

The Bosque land on the east side of the Rio Grande is a densely vegetated corridor with a Middle Rio Grande Conservancy District (MRGCD) levee, bordering along the east side. The only access to this section is limited through and across the MRGCD levee. MRGCD will allow temporary access for the project along their existing easement. There are no utilities in this section, due to limited access. There is a requirement to clear the thick vegetation prior to any type of development. The highest and best use is considered to be open space for recreation - until a future date that residential development would be permitted and feasible. This land is located within a flood zone and the land value is estimated to be a bulk acreage value of $10,000 per acre based on similar land sales.

The Bosque land on the west side of the Rio Grande consists of areas cleared of salt cedar and Russian olive. The revitalized Bosque consists predominately of cottonwood trees and native vegetation. This Bosque area has previously been cleared of non-native vegetation by Santa Ana Pueblo, to complement a new resort hotel and championship golf course. There is good access with improved roads and unimproved trails throughout the Bosque. There is some water and electricity within the Bosque, with full utilities of

electricity, gas, water, and sewer located closer to the resort. The highest and best use is considered to be for residential development. Located approximately 1.0 mile south of the project location in the town of Bernalillo, a new residential development is under way. It is a high end subdivision called Bosque Encantado encompassing approximately 110 acres. There are approximately 85 lots ranging in size from 0.50 acres to just over 1.0 acre. The value averages $100,000 per lot with a high of a recent lot sale of $250,000 for a 1.08 acre lot. This is a fully developed subdivision with utilities and access roads. This subdivision as well as the subject area is located in a flood zone. If the subject were available on the open market, it is estimated that it would be more desirable due to the support of the existing luxury resort hotel and golf course. The land value is estimated to have a bulk acreage value of $75,000 per acre based on similar land sales. Lastly, the remaining type of land involved in the project is sparsely vegetated open space land located west of the west-side Bosque. This land has varying topography, good access but limited utilities. It has a lower appeal than the Bosque land but is close to the resort and golf course. The highest and best use is considered to be residential development, with possibly a higher density. The majority of this land is not in a flood zone and the value is estimated to have a bulk acreage value of $40,000 per acre based on similar land sales.

REAL ESTATE REQUIREMENTS: This project is unique in that all of the real estate is located and owned by the Pueblo of Santa Ana Reservation. The Pueblo is a sovereign entity and does not adhere to normal real estate practice and laws. For the purposes of this real estate plan, we will treat the real estate as if it were available to the open market. This will be necessary for the crediting issues for this project. The real estate values will be compared to similar type lands and estates. The land requirements will be referred to as permanent easement and temporary easement.

The life of the project is estimated at 40 years with the first year consisting of construction and the remaining time for monitoring and maintaining.

REAL ESTATE BASELINE COST ESTIMATE:

East and West sides of Rio Grande

Area	Size	Value	Estate	Total
1. Swales	6.6 ac.	$75,000/ac.	Permanent Easement	$495,000
2. Upland around Swales	7.5 ac.	$75,000/ac.	Permanent Easement	$562,500
3. Bank Lowering	62.2 ac.	$1,000/ac.	Temporary Easement	$62,200
4. Salt grass Meadow	10 ac.	$75,000/ac.	Permanent Easement	$750,000
5. Access Road	2.44 ac.	$7,500/ac.	Temporary Easement	$18,300
6. Waste	34 ac.	$100/ac.	Commercial	$3,400

Sub Total:	$1,891,400
Contingency 15%	$283,710
Improvements	$0
Total Land Payment	$2,175,110
Relocations	$0
Severance Damage	$0
Minerals	$0
Timber	$0
Administrative Estimated:	
Real Estate Activities	$25,000
Condemnation	$0
Total Admin. Costs	$25,000
Total Land Acquisition Costs	**$2,200,110**

RELOCATION ASSISTANCE:
Facility/Utility Relocations: There are no facility relocations involved with the proposed project.

PL 91-Relocation Assistance Benefits: The project is not displacing usable or habitable structures. Also, there is not any personal property that requires relocation.

MINERAL ACTIVITY: There is no known or anticipated mineral activity in the vicinity of the project. If any arise, the values indicated in this plan may change.

HTRW: The selected plan would involve substantial grading in the vicinity of the stream channel to create the ecological restoration area and other project features. Although no known hazardous material waste sites would be affected by this project, the potential to encounter previously undocumented hazardous materials and wastes, originating from previous uses of the properties that would affect the project, exist. If contamination is encountered during construction, work will cease in the vicinity of the contaminated area until the extent and type of contamination has been determined.

LAND OWNERS: The land owner is the Pueblo of Santa Ana Reservation. As mentioned earlier, they are a sovereign entity and normal real estate procedures may not apply to them.

NON-FEDERAL SPONSOR: There are no lands or jurisdictional waters of the United States of America within the project boundaries. Further, there is no navigational servitude exercised by the Federal government. The non-federal sponsor is the Pueblo of

Santa Ana Reservation. Since the sponsor is the land owner and is in agreement with the project, no lands will need to be acquired.

REAL ESTATE ACQUISITION SCHEDULE: The following table is shown below with Real Estate to begin in Fiscal Year-07

Acquisition Tasks	
Receipt of preliminary drawings from PM	Aug 2006
Real Estate Plan	Aug 2006
Receipt of final drawings and plans from PM	Aug 2006
Prepare acquisition maps & legal descriptions	Aug 2006
Real Estate Certificate of Sufficiency	July 2007
Prepare title evidence	Jan 2007
Begin appraisals	Mar 2007
Review appraisals	May 2007
Begin negotiations	Jun 2007
Closings Prepare and review condemnation assemblies	NA
Obtain rights of entry	On Going
Begin construction	Aug 2007

Prepared by:

Louie Gurule — Aug 21, 2006
Realty Specialist
Real Estate Division

Reviewed and approved by:

JOHN M. BAKER — _____, 2006
Chief, Real Estate Division

AQUATIC HABITAT RESTORATION AT SANTA ANA PUEBLO, NEW MEXICO
(Section 1135)

TECHNICAL APPENDIX H

COST ESTIMATE

Riparian and Wetland Restoration
OVERBANK LOWERING

Pueblo of Santa Ana Reservation
Sandoval County, New Mexico

Estimated by	USAENGR DIST ALB CE <> SPA-EC-S
Designed by	Ayres and Associates, Fort Collins, Colorado
Prepared by	C de Baca, Alan, R
Preparation Date	9/16/2006
Effective Date of Pricing	9/16/2006
Estimated Construction Time	Days

Description *Page*

Description *Page*

Description *Page*

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Total Project Cost, Feature			8,660,686	2,212,298	10,872,984
A1 Overbank Lowering - (Depth)	1.0000	LS	1,929,775	486,939	2,416,714
A1 C Construction Cost	1.0000	LS	1,619,175	435,539	2,054,714
A1 C 06 Fish and Wildlife Facilities	1.0000	LS	1,619,175	435,539	2,054,714
A1 P Project Costs	1.0000	LS	310,600	51,400	362,000
A1 P 01 Lands and Damages	1.0000	LS	0	0	0
A1 P 30 Planning Engineering and Design	1.0000	LS	150,000	15,000	165,000
A1 P 31 Construction Management	1.0000	LS	160,600	36,400	197,000
A2 Overbank Lowering - (Depth + 0.5)	1.0000	LS	2,627,256	672,629	3,299,885
A2 C Construction Cost	1.0000	LS	2,253,456	606,429	2,859,885
A2 C 06 Fish and Wildlife Facilities	1.0000	LS	2,253,456	606,429	2,859,885
A2 P Project Costs	1.0000	LS	373,800	66,200	440,000
A2 P 01 Lands and Damages	1.0000	LS	0	0	0
A2 P 30 Planning Engineering and Design	1.0000	LS	150,000	15,000	165,000
A2 P 31 Construction Management	1.0000	LS	223,800	51,200	275,000
A3 Overbank Lowering - (Depth + 1.0)	1.0000	LS	3,313,166	854,746	4,167,912
A3 C Construction Cost	1.0000	LS	2,877,366	774,546	3,651,912
A3 C 06 Fish and Wildlife Facilities	1.0000	LS	2,877,366	774,546	3,651,912
A3 P Project Costs	1.0000	LS	435,800	80,200	516,000
A3 P 01 Lands and Damages	1.0000	LS	0	0	0
A3 P 30 Planning Engineering and Design	1.0000	LS	150,000	15,000	165,000
A3 P 31 Construction Management	1.0000	LS	285,800	65,200	351,000
B1 Shrub Swale	1.0000	LS	517,736	130,146	647,882
B1 C Construction Cost	1.0000	LS	440,036	116,846	556,882
B1 C 06 Fish and Wildlife Facilities	1.0000	LS	440,036	116,846	556,882
B1 P Project Costs	1.0000	LS	77,700	13,300	91,000
B1 P 01 Lands and Damages	1.0000	LS	0	0	0
B1 P 30 Planning Engineering and Design	1.0000	LS	37,000	4,000	41,000

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
B1 P 31 Construction Management	1.0000	LS	40,700	9,300	50,000
C1 Pole & Shrub	1.0000	LS	79,140	19,160	98,300
C1 C Construction Cost	1.0000	LS	66,640	16,660	83,300
C1 C 06 Fish and Wildlife Facilities	1.0000	LS	66,640	16,660	83,300
C1 P Project Costs	1.0000	LS	12,500	2,500	15,000
C1 P 01 Lands and Damages	1.0000	LS	0	0	0
C1 P 30 Planning Engineering and Design	1.0000	LS	6,000	1,000	7,000
C1 P 31 Construction Management	1.0000	LS	6,500	1,500	8,000
D1 Saltgrass Meadow	1.0000	LS	25,609	6,552	32,161
D1 C Construction Cost	1.0000	LS	22,209	5,552	27,761
D1 C 06 Fish and Wildlife Facilities	1.0000	LS	22,209	5,552	27,761
D1 P Project Costs	1.0000	LS	3,400	1,000	4,400
D1 P 01 Lands and Damages	1.0000	LS	0	0	0
D1 P 30 Planning Engineering and Design	1.0000	LS	1,500	500	2,000
D1 P 31 Construction Management	1.0000	LS	1,900	500	2,400
E1 Shrub Stand	1.0000	LS	38,392	9,723	48,115
E1 C Construction Cost	1.0000	LS	32,092	8,023	40,115
E1 C 06 Fish and Wildlife Facilities	1.0000	LS	32,092	8,023	40,115
E1 P Project Costs	1.0000	LS	6,300	1,700	8,000
E1 P 01 Lands and Damages	1.0000	LS	0	0	0
E1 P 30 Planning Engineering and Design	1.0000	LS	3,000	1,000	4,000
E1 P 31 Construction Management	1.0000	LS	3,300	700	4,000
00 Plant Maintenance	1.0000	LS	129,611	32,403	162,014
00 C Construction Cost	1.0000	LS	129,611	32,403	162,014
00 C 06 Fish and Wildlife Facilities	1.0000	LS	129,611	32,403	162,014

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Total Project Cost, Item			8,660,686	2,212,298	10,872,984
A1 Overbank Lowering - (Depth)	1.0	LS	1,929,775	486,939	2,416,714
A1 C Construction Cost	1.0	LS	1,619,175	435,539	2,054,714
A1 C 06 Fish and Wildlife Facilities	1.0	LS	1,619,175	435,539	2,054,714
			1,619,175.14		2,054,714.48
A1 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	1,619,175	435,539	2,054,714
A1 C 060373 Habitat and Feeding Facilities	1.0	LS	1,268,760	341,146	1,609,906
A1 C 06037302 Site Work	1.0	LS	1,268,760	341,146	1,609,906
			1,174.85		1,468.56
A1 C 06037302 001 Clearing and Grubbing - (Bar 1)	14.0	ACR	16,448	4,112	20,560
			1,166.24		1,457.80
A1 C 06037302 002 Clearing and Grubbing - (Bar 2)	11.0	ACR	12,829	3,207	16,036
			1,041.90		1,302.37
A1 C 06037302 003 Clearing and Grubbing - (Bar 3)	22.0	ACR	22,922	5,730	28,652
			1,174.85		1,468.56
A1 C 06037302 004 Clearing and Grubbing - (Bar 4)	7.0	ACR	8,224	2,056	10,280
			1,151.18		1,438.98
A1 C 06037302 005 Clearing and Grubbing - (Bar 5)	2.0	ACR	2,302	576	2,878
			1,174.85		1,468.56
A1 C 06037302 006 Clearing and Grubbing - (Bar 6)	7.0	ACR	8,224	2,056	10,280
			9.89		12.56
A1 C 06037302 011 Excavation, Random - (Bar 1)	33,380.0	CY	330,047	89,113	419,160
			9.98		12.68
A1 C 06037302 012 Excavation, Random - (Bar 2)	17,090.0	CY	170,586	46,058	216,644
			9.93		12.62
A1 C 06037302 013 Excavation, Random - (Bar 3)	30,235.0	CY	300,380	81,103	381,483
			9.91		12.59
A1 C 06037302 014 Excavation, Random - (Bar 4)	17,585.0	CY	174,295	47,060	221,354
			10.63		13.50
A1 C 06037302 015 Excavation, Random - (Bar 5)	2,790.0	CY	29,667	8,010	37,677
			9.96		12.64
A1 C 06037302 016 Excavation, Random - (Bar 6)	19,370.0	CY	192,837	52,066	244,902

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
A1 C 060399 Associated General Items	1.0	LS	350,415	94,393	444,808
A1 C 06039902 Site Work	1.0	LS	350,415	94,393	444,808
			1.59		1.99
A1 C 06039902 001 Waste	134,905.0	CY	214,629	53,657	268,286
			20,890.21		27,157.27
A1 C 06039902 002 Haul Roads	6.5	MI	135,786	40,736	176,522
A1 P Project Costs	1.0	LS	310,600	51,400	362,000
A1 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
A1 P 0101 Project Planning	1.0	EA	0	0	0
A1 P 010102 Project Design Memorandum	1.0	LS	0	0	0
A1 P 01010201 Real Estate Plan	1.0	LS	0	0	0
A1 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
A1 P 30 Planning Engineering and Design	1.0	LS	150,000	15,000	165,000
A1 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	150,000	15,000	165,000
A1 P 300401 Plans and Specifications (P&S)	1.0	LS	150,000	15,000	165,000
A1 P 30040102 Plans and Specifications	1.0	LS	150,000	15,000	165,000
A1 P 30040102 001 Design and Procurement Costs	1.0	LS	150,000	15,000	165,000
A1 P 31 Construction Management	1.0	LS	160,600	36,400	197,000
A1 P 3101 Supervision and Administration	1.0	LS	160,600	36,400	197,000
A1 P 310101 Project Office S&A	1.0	LS	72,300	17,300	89,600
A1 P 31010101 Project Office Operations	1.0	LS	64,300	15,100	79,400
A1 P 31010101 001 Daily Contract Oversite	1.0	LS	64,300	15,100	79,400
A1 P 31010102 Project Office Other S&A	1.0	LS	8,000	2,200	10,200
			8,000.00		10,200.00
A1 P 31010102 001 Other Daily Contract Oversite	1.0	EA	8,000	2,200	10,200
A1 P 310102 Area Office S&A	1.0	LS	24,100	4,300	28,400
A1 P 31010201 Area Office Other S&A	1.0	LS	24,100	4,300	28,400
A1 P 31010201 001 Project Coordination	1.0	LS	24,100	4,300	28,400

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
A1 P 310103 District Office S&A	1.0	LS	64,200	14,800	79,000
A1 P 31010303 District Office Other S&A	1.0	LS	48,200	10,800	59,000
A1 P 31010303 001 Budgetary Documents	1.0	LS	48,200	10,800	59,000
A1 P 31010301 Technical Management by Construction	1.0	LS	8,000	2,000	10,000
A1 P 31010301 001 Claims Management Documents	1.0	LS	8,000	2,000	10,000
A1 P 31010302 Technical Manager	1.0	LS	8,000	2,000	10,000
A1 P 31010302 001 Upward Reporting Documents	1.0	LS	8,000	2,000	10,000
A2 Overbank Lowering - (Depth + 0.5)	1.0	LS	2,627,256	672,629	3,299,885
A2 C Construction Cost	1.0	LS	2,253,456	606,429	2,859,885
A2 C 06 Fish and Wildlife Facilities	1.0	LS	2,253,456	606,429	2,859,885
			2,253,456.29		2,859,885.09
A2 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	2,253,456	606,429	2,859,885
A2 C 060373 Habitat and Feeding Facilities	1.0	LS	1,765,685	475,316	2,241,001
A2 C 06037302 Site Work	1.0	LS	1,765,685	475,316	2,241,001
			1,174.85		1,468.56
A2 C 06037302 001 Clearing and Grubbing - (Bar 1)	14.0	ACR	16,448	4,112	20,560
			1,166.24		1,457.80
A2 C 06037302 002 Clearing and Grubbing - (Bar 2)	11.0	ACR	12,829	3,207	16,036
			1,041.90		1,302.37
A2 C 06037302 003 Clearing and Grubbing - (Bar 3)	22.0	ACR	22,922	5,730	28,652
			1,174.85		1,468.56
A2 C 06037302 004 Clearing and Grubbing - (Bar 4)	7.0	ACR	8,224	2,056	10,280
			1,151.18		1,438.98
A2 C 06037302 005 Clearing and Grubbing - (Bar 5)	2.0	ACR	2,302	576	2,878
			1,174.85		1,468.56
A2 C 06037302 006 Clearing and Grubbing - (Bar 6)	7.0	ACR	8,224	2,056	10,280
			9.91		12.59
A2 C 06037302 011 Excavation, Random - (Bar 1)	44,510.0	CY	441,299	119,151	560,450
			9.98		12.68
A2 C 06037302 012 Excavation, Random - (Bar 2)	25,630.0	CY	255,879	69,087	324,967

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			9.94		12.62
A2 C 06037302 013 Excavation, Random - (Bar 3)	47,765.0	CY	474,675	128,162	602,837
			9.96		12.66
A2 C 06037302 014 Excavation, Random - (Bar 4)	23,445.0	CY	233,629	63,080	296,709
			9.75		12.38
A2 C 06037302 015 Excavation, Random - (Bar 5)	4,185.0	CY	40,792	11,014	51,806
			9.91		12.59
A2 C 06037302 016 Excavation, Random - (Bar 6)	25,060.0	CY	248,462	67,085	315,547
A2 C 060399 Associated General Items	1.0	LS	487,771	131,113	618,884
A2 C 06039902 Site Work	1.0	LS	487,771	131,113	618,884
			1.59		1.99
A2 C 06039902 001 Waste	191,070.0	CY	304,371	76,093	380,464
			28,215.38		36,680.00
A2 C 06039902 002 Haul Roads	6.5	MI	183,400	55,020	238,420
A2 P Project Costs	1.0	LS	373,800	66,200	440,000
A2 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
A2 P 0101 Project Planning	1.0	EA	0	0	0
A2 P 010102 Project Design Memorandum	1.0	LS	0	0	0
A2 P 01010201 Real Estate Plan	1.0	LS	0	0	0
A2 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
A2 P 30 Planning Engineering and Design	1.0	LS	150,000	15,000	165,000
A2 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	150,000	15,000	165,000
A2 P 300401 Plans and Specifications (P&S)	1.0	LS	150,000	15,000	165,000
A2 P 30040102 Plans and Specifications	1.0	LS	150,000	15,000	165,000
A2 P 30040102 001 Design and Procurement Costs	1.0	LS	150,000	15,000	165,000
A2 P 31 Construction Management	1.0	LS	223,800	51,200	275,000
A2 P 3101 Supervision and Administration	1.0	LS	223,800	51,200	275,000
A2 P 310101 Project Office S&A	1.0	LS	100,700	24,100	124,800
A2 P 31010101 Project Office Operations	1.0	LS	89,500	21,100	110,600

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
A2 P 31010101 001 Daily Contract Oversite	1.0	LS	89,500	21,100	110,600
A2 P 31010102 Project Office Other S&A	1.0	LS	11,200	3,000	14,200
A2 P 31010102 001 Other Daily Contract Oversite	1.0	EA	11,200.00 11,200	3,000	14,200.00 14,200
A2 P 310102 Area Office S&A	1.0	LS	33,600	6,000	39,600
A2 P 31010201 Area Office Other S&A	1.0	LS	33,600	6,000	39,600
A2 P 31010201 001 Project Coordination	1.0	LS	33,600	6,000	39,600
A2 P 310103 District Office S&A	1.0	LS	89,500	21,100	110,600
A2 P 31010303 District Office Other S&A	1.0	LS	67,100	15,100	82,200
A2 P 31010303 001 Budgetary Documents	1.0	LS	67,100	15,100	82,200
A2 P 31010301 Technical Management by Construction	1.0	LS	11,200	3,000	14,200
A2 P 31010301 001 Claims Management Documents	1.0	LS	11,200	3,000	14,200
A2 P 31010302 Technical Manager	1.0	LS	11,200	3,000	14,200
A2 P 31010302 001 Upward Reporting Documents	1.0	LS	11,200	3,000	14,200
A3 Overbank Lowering - (Depth + 1.0)	1.0	LS	3,313,166	854,746	4,167,912
A3 C Construction Cost	1.0	LS	2,877,366	774,546	3,651,912
A3 C 06 Fish and Wildlife Facilities	1.0	LS	2,877,366	774,546	3,651,912
A3 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	2,877,366.11 2,877,366	774,546	3,651,911.77 3,651,912
A3 C 060373 Habitat and Feeding Facilities	1.0	LS	2,255,193	607,483	2,862,676
A3 C 06037302 Site Work	1.0	LS	2,255,193	607,483	2,862,676
A3 C 06037302 001 Clearing and Grubbing - (Bar 1)	14.0	ACR	1,174.85 16,448	4,112	1,468.56 20,560
A3 C 06037302 002 Clearing and Grubbing - (Bar 2)	11.0	ACR	1,166.24 12,829	3,207	1,457.80 16,036
A3 C 06037302 003 Clearing and Grubbing - (Bar 3)	22.0	ACR	1,041.90 22,922	5,730	1,302.37 28,652
A3 C 06037302 004 Clearing and Grubbing - (Bar 4)	7.0	ACR	1,174.85 8,224	2,056	1,468.56 10,280

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			1,151.18		1,438.98
A3 C 06037302 005 Clearing and Grubbing - (Bar 5)	2.0	ACR	2,302	576	2,878
			1,174.85		1,468.56
A3 C 06037302 006 Clearing and Grubbing - (Bar 6)	7.0	ACR	8,224	2,056	10,280
			9.93		12.61
A3 C 06037302 011 Excavation, Random - (Bar 1)	55,635.0	CY	552,551	149,189	701,740
			9.88		12.54
A3 C 06037302 012 Excavation, Random - (Bar 2)	34,170.0	CY	337,464	91,115	428,579
			9.88		12.55
A3 C 06037302 013 Excavation, Random - (Bar 3)	65,295.0	CY	645,261	174,220	819,481
			9.87		12.54
A3 C 06037302 014 Excavation, Random - (Bar 4)	29,305.0	CY	289,255	78,099	367,354
			9.97		12.66
A3 C 06037302 015 Excavation, Random - (Bar 5)	5,580.0	CY	55,626	15,019	70,645
			9.89		12.56
A3 C 06037302 016 Excavation, Random - (Bar 6)	30,760.0	CY	304,088	82,104	386,192
A3 C 060399 Associated General Items	1.0	LS	622,173	167,063	789,236
A3 C 06039902 Site Work	1.0	LS	622,173	167,063	789,236
			1.58		1.98
A3 C 06039902 001 Waste	247,235.0	CY	391,788	97,947	489,735
			35,443.83		46,076.98
A3 C 06039902 002 Haul Roads	6.5	MI	230,385	69,115	299,500
A3 P Project Costs	1.0	LS	435,800	80,200	516,000
A3 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
A3 P 0101 Project Planning	1.0	EA	0	0	0
A3 P 010102 Project Design Memorandum	1.0	LS	0	0	0
A3 P 01010201 Real Estate Plan	1.0	LS	0	0	0
A3 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
A3 P 30 Planning Engineering and Design	1.0	LS	150,000	15,000	165,000
A3 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	150,000	15,000	165,000

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
A3 P 300401 Plans and Specifications (P&S)	1.0	LS	150,000	15,000	165,000
A3 P 30040102 Plans and Specifications	1.0	LS	150,000	15,000	165,000
A3 P 30040102 001 Design and Procurement Costs	1.0	LS	150,000	15,000	165,000
A3 P 31 Construction Management	1.0	LS	285,800	65,200	351,000
A3 P 3101 Supervision and Administration	1.0	LS	285,800	65,200	351,000
A3 P 310101 Project Office S&A	1.0	LS	128,600	30,700	159,300
A3 P 31010101 Project Office Operations	1.0	LS	114,300	26,900	141,200
A3 P 31010101 001 Daily Contract Oversite	1.0	LS	114,300	26,900	141,200
A3 P 31010102 Project Office Other S&A	1.0	LS	14,300	3,800	18,100
			14,300.00		18,100.00
A3 P 31010102 001 Other Daily Contract Oversite	1.0	EA	14,300	3,800	18,100
A3 P 310102 Area Office S&A	1.0	LS	42,900	7,700	50,600
A3 P 31010201 Area Office Other S&A	1.0	LS	42,900	7,700	50,600
A3 P 31010201 001 Project Coordination	1.0	LS	42,900	7,700	50,600
A3 P 310103 District Office S&A	1.0	LS	114,300	26,800	141,100
A3 P 31010303 District Office Other S&A	1.0	LS	85,700	19,200	104,900
A3 P 31010303 001 Budgetary Documents	1.0	LS	85,700	19,200	104,900
A3 P 31010301 Technical Management by Construction	1.0	LS	14,300	3,800	18,100
A3 P 31010301 001 Claims Management Documents	1.0	LS	14,300	3,800	18,100
A3 P 31010302 Technical Manager	1.0	LS	14,300	3,800	18,100
A3 P 31010302 001 Upward Reporting Documents	1.0	LS	14,300	3,800	18,100
B1 Shrub Swale	1.0	LS	517,736	130,146	647,882
B1 C Construction Cost	1.0	LS	440,036	116,846	556,882
B1 C 06 Fish and Wildlife Facilities	1.0	LS	440,036	116,846	556,882
			440,035.78		556,882.14
B1 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	440,036	116,846	556,882
B1 C 060373 Habitat and Feeding Facilities	1.0	LS	440,036	116,846	556,882
B1 C 06037302 Site Work	1.0	LS	440,036	116,846	556,882

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			774.69		968.36
B1 C 06037302 001 Clearing	6.5	ACR	5,035	1,259	6,294
			8.44		10.72
B1 C 06037302 002 Excavation, Random	40,500.0	CY	341,871	92,305	434,176
			10.99		13.74
B1 C 06037302 011 Stem Planting	6,880.0	EA	75,636	18,909	94,545
			22.32		27.90
B1 C 06037302 012 Potted Shrub Planting	460.0	EA	10,266	2,567	12,833
			45.45		56.81
B1 C 06037302 013 Pole Planting	159.0	EA	7,227	1,807	9,033
B1 P Project Costs	1.0	LS	77,700	13,300	91,000
B1 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
B1 P 0101 Project Planning	1.0	EA	0	0	0
B1 P 010102 Project Design Memorandum	1.0	LS	0	0	0
B1 P 01010201 Real Estate Plan	1.0	LS	0	0	0
B1 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
B1 P 30 Planning Engineering and Design	1.0	LS	37,000	4,000	41,000
B1 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	37,000	4,000	41,000
B1 P 300401 Plans and Specifications (P&S)	1.0	LS	37,000	4,000	41,000
B1 P 30040102 Plans and Specifications	1.0	LS	37,000	4,000	41,000
B1 P 30040102 001 Design and Procurement Costs	1.0	LS	37,000	4,000	41,000
B1 P 31 Construction Management	1.0	LS	40,700	9,300	50,000
B1 P 3101 Supervision and Administration	1.0	LS	40,700	9,300	50,000
B1 P 310101 Project Office S&A	1.0	LS	18,300	4,400	22,700
B1 P 31010101 Project Office Operations	1.0	LS	16,300	3,900	20,200
B1 P 31010101 001 Daily Contract Oversite	1.0	LS	16,300	3,900	20,200
B1 P 31010102 Project Office Other S&A	1.0	LS	2,000	500	2,500
			2,000.00		2,500.00
B1 P 31010102 001 Other Daily Contract Oversite	1.0	EA	2,000	500	2,500

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
B1 P 310102 Area Office S&A	1.0	LS	6,200	1,100	7,300
B1 P 31010201 Area Office Other S&A	1.0	LS	6,200	1,100	7,300
B1 P 31010201 001 Project Coordination	1.0	LS	6,200	1,100	7,300
B1 P 310103 District Office S&A	1.0	LS	16,200	3,800	20,000
B1 P 31010303 District Office Other S&A	1.0	LS	12,200	2,800	15,000
B1 P 31010303 001 Budgetary Documents	1.0	LS	12,200	2,800	15,000
B1 P 31010301 Technical Management by Construction	1.0	LS	2,000	500	2,500
B1 P 31010301 001 Claims Management Documents	1.0	LS	2,000	500	2,500
B1 P 31010302 Technical Manager	1.0	LS	2,000	500	2,500
B1 P 31010302 001 Upward Reporting Documents	1.0	LS	2,000	500	2,500
C1 Pole & Shrub	1.0	LS	79,140	19,160	98,300
C1 C Construction Cost	1.0	LS	66,640	16,660	83,300
C1 C 06 Fish and Wildlife Facilities	1.0	LS	66,640	16,660	83,300
C1 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	66,640.32 66,640	16,660	83,300.40 83,300
C1 C 060373 Habitat and Feeding Facilities	1.0	LS	66,640	16,660	83,300
C1 C 06037302 Site Work	1.0	LS	66,640	16,660	83,300
C1 C 06037302 001 Clearing	7.5	ACR	733.91 5,504	1,376	917.39 6,880
C1 C 06037302 011 Potted Shrub Planting	1,500.0	EA	22.13 33,196	8,299	27.66 41,494
C1 C 06037302 012 Pole Planting	375.0	EA	47.66 17,874	4,468	59.58 22,342
C1 C 06037302 021 Seeding	7.5	ACR	1,342.25 10,067	2,517	1,677.81 12,584
C1 P Project Costs	1.0	LS	12,500	2,500	15,000
C1 P 01 Lands and Damages	1.0	LS	0	0	0
C1 P 0101 Project Planning	1.0	EA	0.00 0	0	0.00 0
C1 P 010102 Project Design Memorandum	1.0	LS	0	0	0

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
C1 P 01010201 Real Estate Plan	1.0	LS	0	0	0
C1 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
C1 P 30 Planning Engineering and Design	1.0	LS	6,000	1,000	7,000
C1 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	6,000	1,000	7,000
C1 P 300401 Plans and Specifications (P&S)	1.0	LS	6,000	1,000	7,000
C1 P 30040102 Plans and Specifications	1.0	LS	6,000	1,000	7,000
C1 P 30040102 001 Design and Procurement Costs	1.0	LS	6,000	1,000	7,000
C1 P 31 Construction Management	1.0	LS	6,500	1,500	8,000
C1 P 3101 Supervision and Administration	1.0	LS	6,500	1,500	8,000
C1 P 310101 Project Office S&A	1.0	LS	2,800	600	3,400
C1 P 31010101 Project Office Operations	1.0	LS	2,500	500	3,000
C1 P 31010101 001 Daily Contract Oversite	1.0	LS	2,500	500	3,000
C1 P 31010102 Project Office Other S&A	1.0	LS	300	100	400
			300.00		400.00
C1 P 31010102 001 Other Daily Contract Oversite	1.0	EA	300	100	400
C1 P 310102 Area Office S&A	1.0	LS	1,200	300	1,500
C1 P 31010201 Area Office Other S&A	1.0	LS	1,200	300	1,500
C1 P 31010201 001 Project Coordination	1.0	LS	1,200	300	1,500
C1 P 310103 District Office S&A	1.0	LS	2,500	600	3,100
C1 P 31010303 District Office Other S&A	1.0	LS	1,900	400	2,300
C1 P 31010303 001 Budgetary Documents	1.0	LS	1,900	400	2,300
C1 P 31010301 Technical Management by Construction	1.0	LS	300	100	400
C1 P 31010301 001 Claims Management Documents	1.0	LS	300	100	400
C1 P 31010302 Technical Manager	1.0	LS	300	100	400
C1 P 31010302 001 Upward Reporting Documents	1.0	LS	300	100	400
D1 Saltgrass Meadow	1.0	LS	25,609	6,552	32,161
D1 C Construction Cost	1.0	LS	22,209	5,552	27,761
D1 C 06 Fish and Wildlife Facilities	1.0	LS	22,209	5,552	27,761

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			22,208.91		27,761.14
D1 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	22,209	5,552	27,761
D1 C 060373 Habitat and Feeding Facilities	1.0	LS	22,209	5,552	27,761
D1 C 06037302 Site Work	1.0	LS	22,209	5,552	27,761
			2,022.56		2,528.20
D1 C 06037302 001 Clearing and Grubbing	5.0	ACR	10,113	2,528	12,641
			2,419.22		3,024.03
D1 C 06037302 011 Seeding	5.0	ACR	12,096	3,024	15,120
D1 P Project Costs	1.0	LS	3,400	1,000	4,400
D1 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
D1 P 0101 Project Planning	1.0	EA	0	0	0
D1 P 010102 Project Design Memorandum	1.0	LS	0	0	0
D1 P 01010201 Real Estate Plan	1.0	LS	0	0	0
D1 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
D1 P 30 Planning Engineering and Design	1.0	LS	1,500	500	2,000
D1 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	1,500	500	2,000
D1 P 300401 Plans and Specifications (P&S)	1.0	LS	1,500	500	2,000
D1 P 30040102 Plans and Specifications	1.0	LS	1,500	500	2,000
D1 P 30040102 001 Design and Procurement Costs	1.0	LS	1,500	500	2,000
D1 P 31 Construction Management	1.0	LS	1,900	500	2,400
D1 P 3101 Supervision and Administration	1.0	LS	1,900	500	2,400
D1 P 310101 Project Office S&A	1.0	LS	800	225	1,025
D1 P 31010101 Project Office Operations	1.0	LS	700	200	900
D1 P 31010101 001 Daily Contract Oversite	1.0	LS	700	200	900
D1 P 31010102 Project Office Other S&A	1.0	LS	100	25	125
			100.00		125.00
D1 P 31010102 001 Other Daily Contract Oversite	1.0	EA	100	25	125
D1 P 310102 Area Office S&A	1.0	LS	300	50	350

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
D1 P 31010201 Area Office Other S&A	1.0	LS	300	50	350
D1 P 31010201 001 Project Coordination	1.0	LS	300	50	350
D1 P 310103 District Office S&A	1.0	LS	800	225	1,025
D1 P 31010303 District Office Other S&A	1.0	LS	600	175	775
D1 P 31010303 001 Budgetary Documents	1.0	LS	600	175	775
D1 P 31010301 Technical Management by Construction	1.0	LS	100	25	125
D1 P 31010301 001 Claims Management Documents	1.0	LS	100	25	125
D1 P 31010302 Technical Manager	1.0	LS	100	25	125
D1 P 31010302 001 Upward Reporting Documents	1.0	LS	100	25	125
E1 Shrub Stand	1.0	LS	38,392	9,723	48,115
E1 C Construction Cost	1.0	LS	32,092	8,023	40,115
E1 C 06 Fish and Wildlife Facilities	1.0	LS	32,092	8,023	40,115
			32,092.31		40,115.39
E1 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	32,092	8,023	40,115
E1 C 060373 Habitat and Feeding Facilities	1.0	LS	32,092	8,023	40,115
E1 C 06037302 Site Work	1.0	LS	32,092	8,023	40,115
			2,022.56		2,528.20
E1 C 06037302 001 Clearing and Grubbing	5.0	ACR	10,113	2,528	12,641
			21.98		27.47
E1 C 06037302 011 Potted Shrub Planting	1,000.0	EA	21,980	5,495	27,474
E1 P Project Costs	1.0	LS	6,300	1,700	8,000
E1 P 01 Lands and Damages	1.0	LS	0	0	0
			0.00		0.00
E1 P 0101 Project Planning	1.0	EA	0	0	0
E1 P 010102 Project Design Memorandum	1.0	LS	0	0	0
E1 P 01010201 Real Estate Plan	1.0	LS	0	0	0
E1 P 01010201 001 All Other Real Estate	1.0	LS	0	0	0
E1 P 30 Planning Engineering and Design	1.0	LS	3,000	1,000	4,000
E1 P 3004 Construction Contract Planning, Engineering & Design	1.0	LS	3,000	1,000	4,000

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
E1 P 300401 Plans and Specifications (P&S)	1.0	LS	3,000	1,000	4,000
E1 P 30040102 Plans and Specifications	1.0	LS	3,000	1,000	4,000
E1 P 30040102 001 Design and Procurement Costs	1.0	LS	3,000	1,000	4,000
E1 P 31 Construction Management	1.0	LS	3,300	700	4,000
E1 P 3101 Supervision and Administration	1.0	LS	3,300	700	4,000
E1 P 310101 Project Office S&A	1.0	LS	1,500	350	1,850
E1 P 31010101 Project Office Operations	1.0	LS	1,300	300	1,600
E1 P 31010101 001 Daily Contract Oversite	1.0	LS	1,300	300	1,600
E1 P 31010102 Project Office Other S&A	1.0	LS	200	50	250
			200.00		250.00
E1 P 31010102 001 Other Daily Contract Oversite	1.0	EA	200	50	250
E1 P 310102 Area Office S&A	1.0	LS	500	50	550
E1 P 31010201 Area Office Other S&A	1.0	LS	500	50	550
E1 P 31010201 001 Project Coordination	1.0	LS	500	50	550
E1 P 310103 District Office S&A	1.0	LS	1,300	300	1,600
E1 P 31010303 District Office Other S&A	1.0	LS	900	200	1,100
E1 P 31010303 001 Budgetary Documents	1.0	LS	900	200	1,100
E1 P 31010301 Technical Management by Construction	1.0	LS	200	50	250
E1 P 31010301 001 Claims Management Documents	1.0	LS	200	50	250
E1 P 31010302 Technical Manager	1.0	LS	200	50	250
E1 P 31010302 001 Upward Reporting Documents	1.0	LS	200	50	250
00 Plant Maintenance	1.0	LS	129,611	32,403	162,014
00 C Construction Cost	1.0	LS	129,611	32,403	162,014
00 C 06 Fish and Wildlife Facilities	1.0	LS	129,611	32,403	162,014
			129,610.84		162,013.55
00 C 0603 Wildlife Facilities and Sanctuaries	1.0	EA	129,611	32,403	162,014
00 C 060373 Habitat and Feeding Facilities	1.0	LS	129,611	32,403	162,014
00 C 06037302 Site Work	1.0	LS	129,611	32,403	162,014

Currency in US dollars

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			4,276.34		5,345.42
00 C 06037302 001 Landscape Maintenance, Shrub Swale	8.0	MO	34,211	8,553	42,763
			4,879.01		6,098.76
00 C 06037302 002 Landscape Maintenance, Pole & Shrub	8.0	MO	39,032	9,758	48,790
			3,523.00		4,403.75
00 C 06037302 003 Landscape Maintenance, Saltgrass Meadow	8.0	MO	28,184	7,046	35,230
			3,523.00		4,403.75
00 C 06037302 004 Landscape Maintenance, Shrub Stand	8.0	MO	28,184	7,046	35,230

Currency in US dollars

AQUATIC HABITAT RESTORATION AT SANTA ANA PUEBLO, NEW MEXICO
(Section 1135)

TECHNICAL APPENDIX I

CULTURAL RESOURCES REPORT

A Cultural Resources Inventory of 29.2 Acres for Riparian and Wetland Restoration, Pueblo of Santa Ana Reservation, New Mexico

Prepared by

Gregory D. Everhart
Archaeologist

U.S. Army Corps of Engineers
Albuquerque District

Prepared for

U.S. Army Corps of Engineers
Albuquerque District
and
the Pueblo of Santa Ana

May 25, 2001

COE Report No. 01-03

New Mexico Archaeological Records Management Section
NMCRIS Project/Activity/Report No. 74826

ABSTRACT

On May 3, 2001, a U.S. Army Corps of Engineers (Corps), Albuquerque District, archaeologist and project team members conducted a site visit of the project area located along the Rio Grande on Santa Ana Pueblo lands. On May 17, two Corps' archaeologists conducted an intensive cultural resources inventory along two project access roads that covered approximately 11.8 hectares (29.2 acres). The site visit and survey were conducted in anticipation of construction activities that provide for the installation of river gradient restoration facilities in the Rio Grande channel. No artifacts or cultural resource manifestations were observed during the site visit or pedestrian surveys, and all other areas to be utilized have been surveyed or previously disturbed. The Corps is of the opinion that there would be "No Historic Properties Affected" by the proposed river restoration project.

INTRODUCTION

The Corps, in cooperation with the Pueblo of Santa Ana, is planning a riparian and wetland restoration project, along the Rio Grande river channel, under the authority of Section 1135(b) of the Water Resources Development Act of 1986 (Public Law 99-662), as amended. The objective of this authority is to improve degraded ecosystem functions relative to water resources projects constructed by the U.S. Army Corps of Engineers, providing such modifications are feasible and consistent with the original project purpose. The purpose of the Section 1135 feasibility study was to investigate and recommend cost-effective environmental quality improvements, if any, in the problem area identified along the Rio Grande in the Ranchiit'u area. The Pueblo of Santa Ana is the local project sponsor.

LOCATION AND PROJECT DESCRIPTION

The project area is located on Pueblo of Santa Ana Reservation land in the Ranchiit'u (El Ranchito, Ranchitos) area located north of the historic community of Bernalillo, Sandoval County, New Mexico (Figure 1). Bernalillo is located immediately west of Interstate Highway 25 about 27 kilometers (km; 17 miles) north of Albuquerque, the largest city in New Mexico. The project's construction areas are located along the Rio Grande and access will be from both sides of the river. Proposed construction includes the installation of three (3) grade restoration facilities and one (1) downstream bed sill, the reshaping of six (6) sand bars, and creation of 6.8 hectares (17 acres) of wetland within cleared overbank areas of the floodplain. The construction area begins, at the upstream end, at the center of Section 16, Township 13 North, Range 4 East, extending downstream for approximately three (3) miles (4.8 kilometers [km]) and the project ends at a location about 0.7 mile (1.1 km) upstream of the Bernalillo-U.S. Highway 550-Rio Grande bridge (Figure 2). Construction activities will occur in the Rio Grande's river channel in Sections 16, 17, 19, 20, and 30, Township 13 North, Range 4 East. The access roads surveyed for cultural resources have been referenced as Access Roads A and B (Figure 2, Table 1).

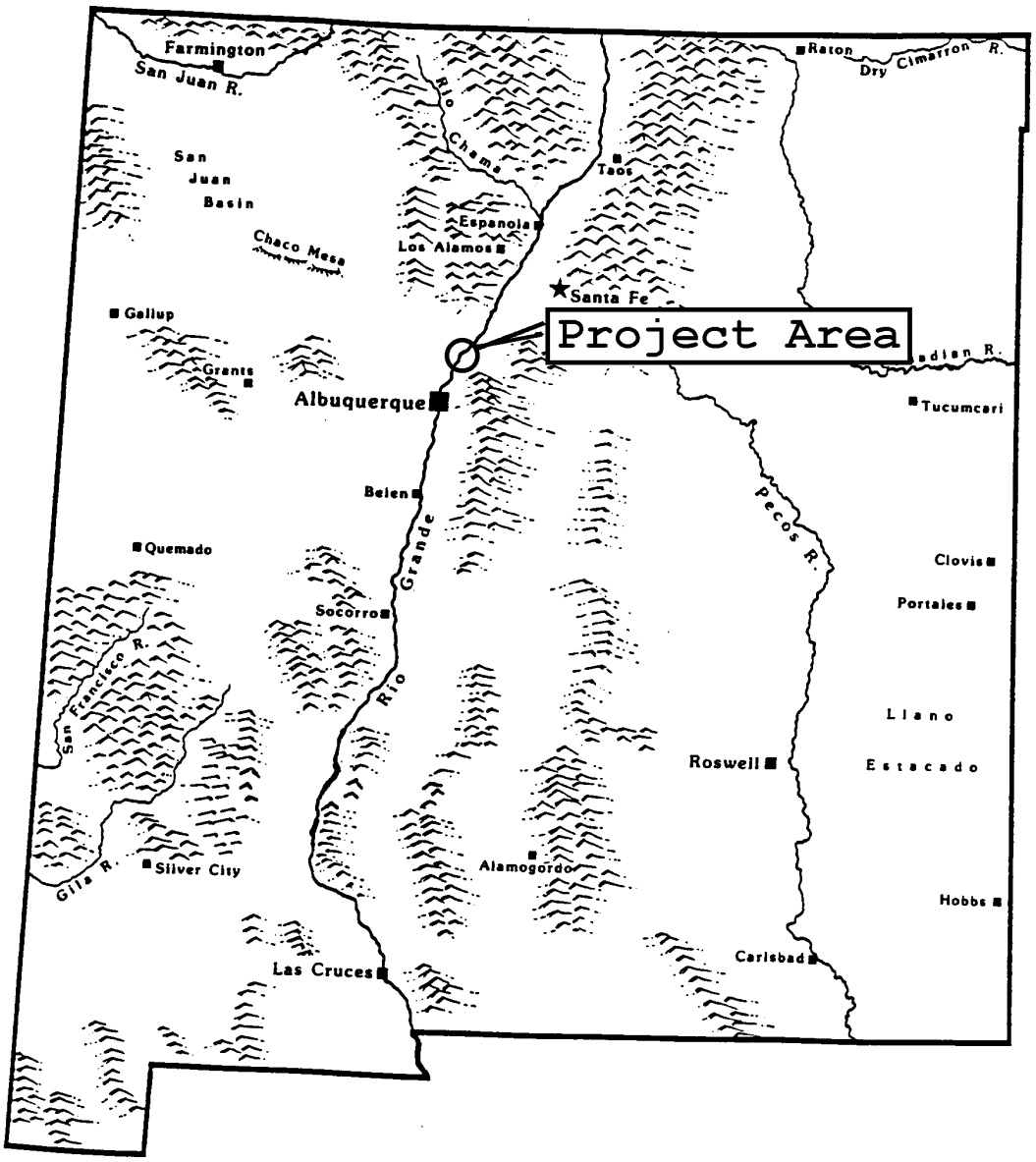

Figure 1: General Area Map: Sandoval County, New Mexico; Not to Scale.

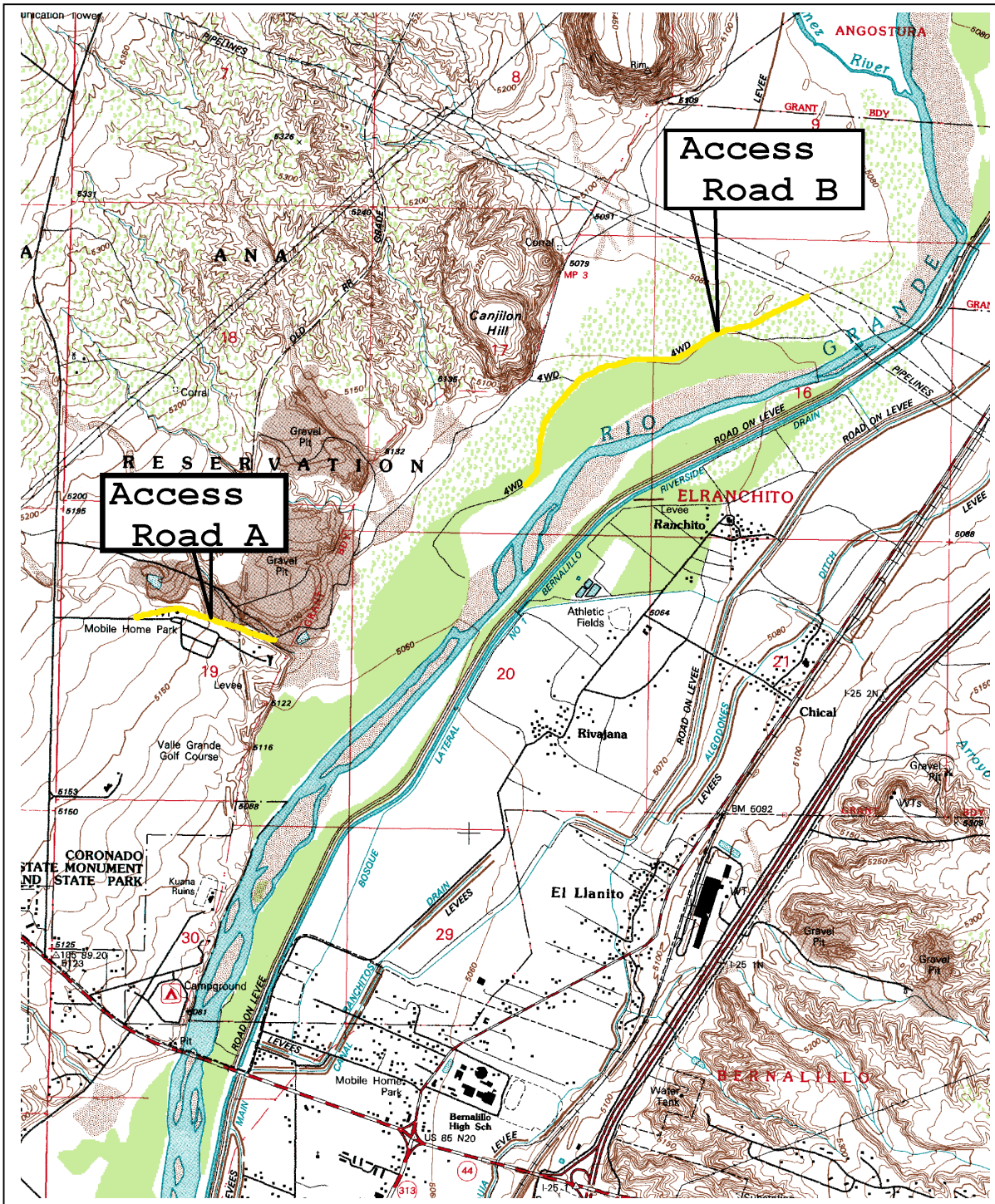

Figure 2: General Project Location: Access Roads A & B (in yellow) were surveyed for Cultural Resources and are located on Pueblo of Santa Ana Reservation land; adapted from USGS 7.5 Minute Quadrangle Map: Bernalillo, Sandoval County, New Mexico (35106-C5; digital 1990 [NAD 83]), Not to Scale.

Table 1: Specific Location and Dimension Information for the Project Area(s):

USGS 7.5 Minute Quadrangle Map(s):
Bernalillo, Sandoval County, New Mexico
(35106-C5; paper = 1954 [NAD 27], Photorevised 1972)
(35106-C5; digital = 1990 [NAD 83])

Construction Area Description:
Within Sections 16, 17, 19, 20, and 30, Township 13 North, Range 4 East;
Sandoval County, New Mexico

Areas Surveyed for Cultural Resources (see Figure 2)
UTM Coordinates (NAD 27), Zone 13:
Access Road A:
approximate start point: 358115 E, 3912055 N
approximate end point: 358865 E, 3911945 N

Access Road A (Existing Access Road to be Widened, Straightened, and Graveled):
Survey Area: 130 feet wide X 2500 feet = 7.5 acres
[40 meters X 760 meters = 3.04 hectares]

Access Road B:
approximate start point: 361750 E, 3913795 N
approximate end point: 360220 E, 3912775 N

Access Road B (Existing Access Road to be Widened, Straightened, and Graveled):
Survey Area: 130 feet wide X 7220 feet = 21.7 acres
[40 meters X 2200 meters = 8.8 hectares]

Total Area Surveyed for Cultural Resources: 29.2 acres [11.8 hectares]

Construction activities would follow all Federal laws and regulations and Tribal resolutions, and would utilize best management practices. The project is planned for construction in phases with riparian vegetation removal and wetland construction starting as early as September, 2001, and channel work being conducted approximately between July 2002 and March 2003, with revegetation subsequent to channel work.

ENVIRONMENT

The Ranchiit'u area is located along the Rio Grande Valley in the Mexican Highland Section of the Basin and Range Physiographic Province in north-central New Mexico (Fenneman 1931; Williams 1986:24). The project area lies at the northern end of the Albuquerque Basin with the Santa Ana Mesa to the northwest and the Sandia Mountians to the southeast (Williams 1986:28-31). The geology of the area includes a broad rift valley with extensive Quaternary gravel terraces and sand deposits with mesas formed from numerous faults and several intrusive volcanic basalt flows (Chronic 1987:92-99). Elevation in the Bernalillo area averages about 1,540 meters (5,050 feet). The construction area includes and crosses the Rio Grande channel and the banks immediately adjacent to the river channel; therefore the soils are all recent alluvial sands and gravels

The climate of the middle Rio Grande Valley is arid continental. The summers are clear, hot, and breezy and the winters are cool, clear and sunny. The average annual precipitation is about 8 inches and humidity is generally low. Annual average snowfall is less than 5 inches. Surface winds, controlled by valley topography, are from the south in the summer and from the north in winter with annual wind velocity averaging about 10 miles per hour. The area has a wide range of daily temperatures with maximum summer temperatures near 100 degrees Fahrenheit (°F) and the lowest winter low recorded at -25°F. The average growing season is about 165 days.

Historically, vegetation included a cottonwood overstory with a willow and saltgrass-dominated understory. Local species would include Fremont cottonwood, coyote willow, one-seed juniper, pinyon pine, New Mexico olive, alkali sacaton, sand dropseed, vine mesquite, cattails, prickly pear, and sunflowers. Many exotic species have been introduced, however, such as saltcedar, Siberian elm, Russian olive, and Russian thistle (Smith 2001:10).

Wildlife in the area is typical for New Mexico and would include small mammals such as squirrels, mice, gophers, rats, rabbits, skunks, and beaver as well as larger mammals such as an occasional fox or coyote. Resident and migratory birds include Mourning Dove, Common Raven, Turkey Vulture, Great Horned Owl, Red-tailed Hawk, American Kestrel and various swallows and sparrows. Fish in this area of the Rio Grande include white sucker, flathead chub, flathead minnow, red shiner, gizzard shad, longnose dace, and the Rio Grande silvery minnow. Reptiles and amphibians may include tiger salamander, Plains and western spadefoot, short-horned lizard, western collared lizard, Great Plains skink, western hognose snake, bullsnake, and western rattlesnake (Smith 2001:8-12).

PREVIOUS CULTURAL RESOURCE STUDIES

Culture history and archaeological work for Pueblo of Santa Ana and generally for the middle Rio Grande area has been documented in numerous references such as White (1942), Cordell (1979, 1984, 1997), Ortiz (1979), Strong (1979), and Bayer (1994). This area is within

the Northern Rio Grande Region as archaeologically defined by Wendorf and Reed (1955) (Rodgers 1979:16; Cordell 1997:197; Penner *et al*. 2001). Previous Corps of Engineers work on the Pueblo of Santa Ana Reservation includes the Jemez Canyon Dam and Protection (levee) Works at the Pueblo of Santa Ana as reported in Rodgers (1979), Ward (1977), USACE (1994).

In recent years, the Pueblo of Santa Ana has been actively working to develop and protect it's natural and cultural resources and has sponsored numerous archaeological surveys on Pueblo of Santa Ana Reservation lands. These surveys were performed in anticipation of construction and rehabilitation projects and habitat restoration efforts related to Pueblo of Santa Ana Reservation development. Survey results for these and other activities have been provided to the Pueblo of Santa Ana and the New Mexico State Historic Preservation Office and include Penner *et al*. (2001), Larralde (2000, 1999a, 1999b), Acklen *et al*. (1998a, 1998b), Anschuetz (1997), Condie (1993), Frizell and Acklen (1987), Walt and Marshall (1986a, 1986b), Harrill (1984), Koczan (1984), and Enloe (1976). These were linear surveys for utility line rights-of-way such as underground pipelines and above-ground electrical lines, highway roads projects, and block surveys for gravel quarry areas and areas to be developed.

CULTURE HISTORY

The project area is located on Pueblo of Santa Ana Reservation land, in an agricultural area along the Rio Grande known as Ranchiit'u (El Ranchito, Ranchitos). The Ranchiit'u is within the Northern Rio Grande Region as archaeologically defined by Wendorf and Reed (1955) (Rodgers 1979:16; Cordell 1997:197; Penner *et al*. 2001). The culture history of the Southwest and the project area has been chronologically generalized into several classification schemes that utilize noticeable changes in the cultural record, as seen in temporal and spatial similarities and differences, to assist in the explanation and interpretation of the cultural record. The primary Periods and their approximate dates are as follows:

PaleoIndian	ca. 11,500 B.P.- 7,500 B.P.
Archaic	ca. 7,500 B.P.- 2,000 B.P.
Anasazi	ca. 1 - 1540
Historic	1540 - Present.

These Periods are further subdivided to describe specific regional and local variations in the archaeological record (Penner *et al*. 2001:10-14; Bayer 1994:247-264; Cordell 1997: 197-199, 1984: 106-107, 1979: 131-151; Rodgers 1979:16-24; Simmons *et al.* 1989:23-26, 32-35; Stuart and Gauthier 1984: 44-54).

The earliest cultural time periods represented in the archaeological record are the PaleoIndian and Archaic Periods that are typically identified by the presence of morphologically diagnostic projectile points. Judge (1973) has provided evidence for PaleoIndian Period human use of the central Rio Grande Valley. In New Mexico, the chronology defined by Cynthia Irwin-Williams (1973) for the Arroyo Cuervo region in northwestern New Mexico has been the most

widely utilized for the Archaic Period although Huckell (1996) has recently brought together documentation for the period in the Southwest. The end of the Archaic Period is difficult to define chronologically because the mobile hunting and gathering lifestyle continued in many areas into the Historic Period.

Generally in the Rio Grande Valley, the prehistoric Puebloan Period is characterized by increasing population sizes, movement of people across the landscape, more sedentism and aggregation of peoples into larger villages, an increasing dependence on agriculture, and a more intense and efficient use of the environment. Small pithouse villages, larger above-ground roomblocks, and huge adobe pueblos with scattered fieldhouses are common. There is an increasing use of water control methods and local and long distance trade is important.

In the Ranchiit'u area, the chronological Puebloan cultural sequence includes the Rio Grande Developmental (ca. 660-1200), the Coalition period (ca. 1200-1325), the Rio Grande Classic (ca. 1325-1600), and the Historic period dating from about 1600 to present (Cordell 1997:197-199, 359-360; Rodgers 1979:18-24). The Pueblo of Santa Ana people, who call themselves "Tamayame" and their Pueblo "Tamaya," are one of several Keresan speaking groups that live in the middle Rio Grande area. Archaeological evidence supports their ancestral creation and migration stories (Strong 1979:404-405; Bayer 1994:1-11).

The Historic Period in the Southwest is initiated with the 1540 *entrada* of the Spanish. In 1598 Oñate arrived in the Rio Grande Valley, claiming the region for the King of Spain and began his colonization and subjugation efforts (Strong 1979:405; Bayer 1994:34-35). After years of oppression, exploitation, desecration, spiritual persecution, disease, in addition to drought and resulting famine, the Tamayame actively joined with other Rio Grande Pueblos to expel the Spaniards in what has been called the Pueblo Revolt of 1680 (Strong 1979:405; Bayer 1994:63-66; Simmons 1988:65-72). In the aftermath, and as a result of the effects of the Revolt and several subsequent Spanish forays in which numerous Puebloan pueblos, including those of the Santa Anan people were attacked and burned, the Tamayame affiliated themselves with the Spaniards after de Vargas' Reconquest (Strong 1979:405; Bayer 1994:66-72). The Tamayame resettled in an area of traditional use, building homes and a Spanish church at Tamaya (Bayer 1994:72; Harrington 1916:519-521, Map 29, Plate 20b).

At the end of the Seventeenth Century, the Puebloans received grants from the Spaniards for the land around their Pueblos. However, these areas did not include all of the areas the Puebloans had traditionally used and, located in such an arid and marginal environment as that of the Southwest, were generally not large enough to sufficiently support the Pueblo. The Tamayame soon recognized that land and water would increasingly become scarce with the influx and rapid population growth of the colonizers. In order to reestablish their claims to the Ranchiit'u and other nearby areas, the Tamayame, in 1709, started purchasing the land back (Strong 1979:398, 405; Bayer 1994:73-95; White 1942:27-28). Eventually, the majority of the Tamayame moved to, and today continue to live in, the Ranchiit'u area (Strong 1979:398, 405; Bayer 1994:223; Harrington 1916:519-521). Encroachment, trespass, fraudulent claims, and schemes continually pressed the Tamayame for their land (Bayer 1994).

In 1821 Mexico won its independence from Spain and in 1846 the United States invaded and took the Southwest. Through most of the Historic Period, the Tamayame and their neighbors farmed along the streams and rivers, grazed livestock in the upland areas, and utilized regional timber resources and a few did some mining. "It was not until 1869 that Congress confirmed the land claims of the Santa Anas; the patent was not issued until 1883!" (White 1942:74; GAO 2001:28). However, it was not until the *Sandoval* case was settled in 1913 that most of the land problems were abated; but not ended (White 1942:74-75; Bayer 1994:154-166).

In the 1880s, the arrival of Atchison, Topeka, and Santa Fe (AT&SF) Railroad brought a huge and rapid influx of new residents to New Mexico (Bayer 1994:173-174). In the 1920s and 1930s, the railroads along with Fred Harvey were also bolstering Southwest tourism and helped raise philanthropist's concerns for the Pueblo peoples which instituted a Native American arts and crafts trade (Bayer 1994:173-174, 225-228; Simmons 1988:172-175; Myrick 1990:34-39). Railroad construction was almost furious in its growth as they pressed to provide access to the West's natural resources (Myrick 1990:xiii-xviii).

In 1880, the AT&SF Railroad's main line tracks were laid through the Pueblo of Santa Ana's Ranchiit'u as the line was pushed southward to Albuquerque and Belen (Bayer 1994:173). The construction of branch lines soon followed. The Santa Fe Northwestern Railway (SFNW) was one such branch line that, in order to reach timber resources in the Cañon de San Diego Grant and the Jemez Mountains, crossed not only the Ranchiit'u, but also the Spanish Pueblo Grant at Tamaya, and Pueblo of Santa Ana's traditional lands in the Ojo de Espiritu Santo Grant as well as the Spanish Pueblo Grants at Zia and Jemez (Bayer 1994:157-164, 212-213; Glover 1990:2-9). Initial surveys for the SFNW route to the Jemez Mountains were conducted in 1921, a construction contract was awarded on October 16, 1922, and work in the roadbed in Bernalillo began on November 8, 1922 (Glover 1990:4-7). Work on the massive, wooden Rio Grande trestle was completed early in 1923 (Glover 1990:6-7). The right-of-way agreements with the Pueblos of Santa Ana, Zia, and Jemez were signed in March, 1926, were legally questioned, and were then reapproved on July 10, 1928 (Glover 1990:8-9; Bayer 1994:212). The SFNW ceased operations and the railroad was abandoned in 1941; today, all that remains in the Ranchiit'u area are portions of the old railroad grade bed and cut-off pieces of the old Rio Grande trestle pilings (Glover 1990:42, 57; and see Photograph No. 1).

Formation of the Middle Rio Grande Conservancy District (MRGCD) was approved in 1924 and operations began the next year to provide facilities for the efficient delivery of irrigation water, to prevent flood hazards and provide flood protection measures, to regulate the Rio Grande channel and stream flows, and to provide drains to reclaim land that had become saturated and saline from high groundwater levels (Ackerly *et al*. 1997:20-21). The development and rehabilitation work conducted by the MRGCD had impacts to the Ranchiit'u area in the form of rights-of-way for flood control structures, ditches and drains; however, these structures have also provided flood control and made irrigation of the Ranchiit'u land easier for the Tamayame (Bayer 1994:240-244). To assist in the prevention of flood hazards and providing for flood protection measures, the U.S. Army Corps of Engineers has also constructed flood protection

structures on the Pueblo of Santa Ana Reservation lands such as the Jemez Canyon Dam (Rodgers 1979).

METHODOLOGY AND SURVEY RESULTS

On May 3, 2001, a U.S. Army Corps of Engineers (Corps), Albuquerque District, archaeologist and project team members conducted a site visit of the proposed construction area located along the Rio Grande on Pueblo of Santa Ana Reservation lands. The site visit was conducted in anticipation of construction activities that provide for the installation of channel gradient restoration facilities in the Rio Grande channel. Prior to the site visit, a search of the New Mexico Historic Preservation Division's (NMHPD) Archeological Records Management Section database was conducted to identify cultural resources sites reported within the vicinity of the project area. The database search found that no archaeological sites have been reported within the river's 100-year floodplain in the project area; and therefore, no sites are reported to occur in the vicinity of the proposed construction areas along the Rio Grande channel.

The Pueblo of Santa Ana's Natural Resources Department has aerial photography of the project location for the years 1935, 1952, 1963, and 1997 indicating that all of the 100-year floodplain in this area, except for a small area (previously an island) that will not be disturbed by the current project, has at one time or another, since the 1930s, been part of the river's active channel. On-site inspection and aerial photography of the project area also indicates that significant aggradation, some of which was induced by the installation of Kellner jetty-jacks, has also occurred historically in this river reach. Therefore, if cultural resources sites were within the 100-year floodplain, they would have been either washed away by the river and/or buried by significant sediment deposition. A recent archaeological survey and assessment that considered the potential for cultural resources to occur within the 100-year floodplain came to the same conclusion: "Based on aerial photo analysis, preliminary geomorphic studies, and field inspection, it became clear that the low terraces within the bosque represent relatively recent historic period alluvial deposits with little or no potential to contain cultural materials of significant antiquity or archaeological integrity." (Penner *et al*. 2001). All proposed construction would occur within and immediately adjacent to the river channel; therefore, the Corps is of the opinion that no cultural resources will be affected within the 100-year floodplain by the river restoration project.

A database search of the State Register of Cultural Properties, maintained by the NMHPD, and of the National Register of Historic Places found that numerous State and National Register properties occur within the historic community of Bernalillo as well as several that are located in the general vicinity of the project area. Of these, Coronado State Monument Museum (State Register No. 1515) and Kuaua Ruin (State Register No. 225) are located downstream of the project area. They are, however, located on gravel terraces well above the river channel (see Photograph No. 1). No State or National Register properties would be affected by the river restoration project.

Also located a short distance downstream of the project area are piling remnants of the Rio Grande trestle once used by the Santa Fe Northwestern Railway (SFNW; Photograph No. 1). These piling remnants are only visible during low river flows. The Santa Fe Northwestern Railway was in operation from 1922 to 1941 with the Rio Grande trestle being constructed in early 1923 (Glover 1990:6-7, 42, 57; Myrick 1990:228-231). Glover (1990:6, Figure 4) provides an excellent historic photograph (by M.E. Hanna) of the Rio Grande trestle. A portion of the railroad's grade bed is also visible on the west side of the river on Pueblo of Santa Ana and Coronado State Monument lands. The trestle's piling remnants and the grade bed would not be affected by the river restoration project.

Photograph No. 1: Piling remnants of Santa Fe Northwestern Railway's Rio Grande trestle. Photograph looking downstream. A portion of the Coronado State Monument campground is visible on the gravel terrace in the upper right-hand corner of the photograph.

Project construction activities will utilize existing paved and graveled access roads located on both sides of the Rio Grande, some of which will need to be widened. On the east side of the river, this includes the Middle Rio Grande Conservancy District's (MRGCD) right-of-way; utilizing the levee top, banquette, and/or drain ditch service roads; all adjacent to the Bernalillo Riverside Drain. These roads are located north of U.S. Highway 550 (a.k.a. old State Highway No. 44) and extend from the highway, north for a distance of approximately 2.0 miles to the floodplain access points. Although earlier water control features existed in the floodplain, the MRGCD was organized in 1925 and many of the levees, drains, irrigation ditches, and associated structures and features along the middle Rio Grande were constructed in the 1930s (Berry and Lewis 1997:1-3, 12; Ackerly *et al*. 1997:7-21) and, therefore, are considered historic. These levees are included in the documentation package for all Middle Rio Grande levee rehabilitation projects as documented in Berry and Lewis (1997). The portion of the levee that would be utilized as an access route is a spoil bank levee that is not an engineered structure. The levee top, banquette, and drain ditch service road surfaces require minor rehabilitation in the form of grading and additional gravel surfacing. These roads were not surveyed for cultural resources because they are built-up roads and their surfaces have been disturbed numerous times since their construction in the 1930s. Rehabilitation would affect neither the form nor function of the levee. Rehabilitation would cause no impact to the elements that contribute to either the historic character of the levee structure or of its contribution as a structural component of the MRGCD system as a whole. Grading and the addition of gravel surfacing may assist in preserving the levee structure. No other MRGCD system structures or features would be affected by the river restoration project.

On the west side of the river, existing paved and improved gravel access roads that cross upland areas of the Pueblo of Santa Ana Reservation land would be utilized. On May 17, 2001, two Corps archaeologists conducted an intensive cultural resources inventory (Class III) of portions of the two (2) west side access roads (Figure 2). The pedestrian survey was conducted by walking 10-meter wide linear transects along either side of the roads; a total of approximately 11.8 hectares (29.2 acres) was covered. The May 17 survey found no artifacts or cultural resource manifestations. Generally, ground surface visibility along the sides of the Access Road A was about 80 to 95 percent. Ground surface visibility along the sides of Access Road B was about 5 to 40 percent. Access Road B is located in the Jemez River alluvial outwash fan and in recent years this area has been heavily inundated with vegetative growth; primarily dense tamarisk. As noted by Penner *et al*. (2001), in the densest areas, the tamarisk is too thick to walk through and the only open areas are those created by bulldozing the tamarisk out to create access roads. Some work, to remove lines of jetty-jacks installed in the 1960s, has also occurred in the area. The pedestrian survey covered all natural and man-made open areas along both sides of the access route.

During project planning, long-time Pueblo of Santa Ana Tribal Administrator, Mr. Roy Montoya, in consultation with tribal members, indicated that no Traditional Cultural Properties would be affected by this river restoration project. All other access and staging areas including overnight equipment and vehicle parking, and rock stockpile and spoil areas, have been previously surveyed for cultural resources and received use clearance, have been previously

disturbed and utilized for similar purposes, or are located within the disturbed 100-year floodplain.

During construction, work operations may be temporarily suspended for Pueblo ceremonies or special functions. Temporary work suspensions would be coordinated through all appropriate project points-of-contact. Should previously unknown artifacts or cultural resource manifestations be encountered during construction, work would cease in the immediate vicinity of the resource, a determination of significance made, and a mitigation plan formulated in consultation with the Pueblo of Santa Ana and the New Mexico State Historic Preservation Officer pursuant to 36 CFR 800.11.

CONCLUSIONS

No artifacts or cultural resource manifestations were observed during the site visit of the construction areas or during the pedestrian surveys of the access roads. Documentary evidence indicates that all other access and staging areas have been previously surveyed for cultural resources, have received use clearance, have been previously disturbed and utilized for similar purposes, or are located within the disturbed 100-year floodplain. No State or Federal Register properties and no Traditional Cultural Properties would be affected by this river restoration project. Based on this information, the Corps is of the opinion that there would be "No Historic Properties Affected" by the proposed river restoration project or on the historic and cultural resources of the region.

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DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, NE
ALBUQUERQUE, NEW MEXICO 87109-3435
FAX (505) 342-3199

Reply to
Attention of

Received 24 JUL 2001
COE

June 6, 2001

Engineering and Construction Division
Environmental Resources Branch

033423

Mr. Elmo Baca
State Historic Preservation Officer
New Mexico State Historic Preservation Bureau
228 East Palace Avenue, Room 101
Santa Fe, New Mexico 87503

Dear Mr. Baca:

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 Historic Properties Affected" for the proposed project entitled, "**Riparian and Wetland Restoration, Pueblo of Santa Ana Reservation, New Mexico.**" The Corps, in cooperation with the Pueblo of Santa Ana, is planning the restoration project under the authority of Section 1135(b) of the Water Resources Development Act of 1986 (Public Law 99-662), as amended.

The project area along the Rio Grande is located in the Ranchiit'u area of the Pueblo of Santa Ana Reservation, Sandoval County, New Mexico. The proposed construction includes the installation of three (3) grade restoration facilities and one (1) downstream bed sill, the reshaping of 6 sand bars, and creation of 17 acres (6.8 hectares) of wetland within cleared overbank areas of the floodplain. Available funding may defer construction of some of the proposed features to a later time. The proposed construction area begins, at the upstream end, at the center of Section 16, Township 13 North, Range 4 East, extending downstream for approximately three (3) miles (4.8 kilometers [km]) and the project ends at a location about 0.7 mile (1.1 km) upstream of the Bernalillo-U.S. Highway 550-Rio Grande bridge.

On May 3, 2001, a Corps archaeologist and project team members conducted a site visit of the project area located along the Rio Grande on Pueblo of Santa Ana Reservation lands. On May 17, 2001, two Corps archaeologists conducted an intensive cultural resources inventory (Class III) of portions of the two west side access roads. No artifacts or cultural resource manifestations were observed during the site visit to the riverside construction areas or during the access road surveys. Information on the project location and dimensions are provided in the enclosed report.

Prior to the site visit and survey, a search of the New Mexico Historic Preservation Division's Archeological Records Management Section database was conducted to identify cultural resources sites reported within the vicinity of the project area. The database search found that no archaeological sites have been reported within the river's 100-year floodplain in the project area; and therefore, no sites are reported to occur in the vicinity of the proposed construction areas along the Rio Grande channel. Documentary evidence and cultural resources survey work in the project area supports the theory that, if cultural resources sites were within the 100-year floodplain, they would have been either washed away by

the river and/or buried by significant sediment deposition. A recent archaeological survey and assessment that considered the potential for cultural resources to occur within the 100-year floodplain came to the same conclusion (as noted in the enclosed report): "Based on aerial photo analysis, preliminary geomorphic studies, and field inspection, it became clear that the low terraces within the bosque represent relatively recent historic period alluvial deposits with little or no potential to contain cultural materials of significant antiquity or archaeological integrity." (Penner *et al.* 2001).

A database search of the State Register of Cultural Properties and of the National Register of Historic Places found that numerous State and National Register properties occur within the historic community of Bernalillo as well as several that are located in the general vicinity of the project area. Of these, Coronado State Monument Museum (State Register No. 1515) and Kuaua Ruin (State Register No. 225) are located downstream of the project area. They are, however, located on gravel terraces well above the river channel (see Photograph No. 1). No State or Federal Register properties would be affected by this river restoration project.

During project planning, long-time Pueblo of Santa Ana Tribal Administrator, Mr. Roy Montoya, in consultation with tribal members, indicated that no Traditional Cultural Properties would be affected by this river restoration project. All other access and staging areas including overnight equipment, vehicle parking, rock stockpile and spoil areas, have been previously surveyed for cultural resources and received use clearance, have been previously disturbed and utilized for similar purposes, or are located within the disturbed 100-year floodplain.

Based on this information, the Corps is of the opinion that there would be "No Historic Properties Affected" by the proposed river restoration project. During construction, work operations may be temporarily suspended for Pueblo ceremonies or special functions. Temporary work suspensions would be coordinated through all appropriate project points-of-contact. Should previously unknown artifacts or cultural resource manifestations be encountered during construction, work would cease in the immediate vicinity of the resource, a determination of significance made, and a mitigation plan formulated in consultation with the Pueblo of Santa Ana and the New Mexico State Historic Preservation Officer pursuant to 36 CFR 800.11. If you have any questions or require additional information, please contact Gregory Everhart of my staff at (505) 342-3352, or John Schelberg, Ph.D. at (505) 342-3359.

Sincerely,

John D. Schelberg

for Mark C. Harberg
Chief, Environmental Resources Branch

Enclosure

Concur with recommendation of eligibility and/or effects as proposed.

_____ for
State Historic Preservation Officer
7/23/01

Copy Furnished w/o enclosure:

Governor Bruce Sanchez
Pueblo of Santa Ana
2 Dove Road
Bernalillo, New Mexico 87004

Mr. Roy Montoya
Tribal Administrator
Pueblo of Santa Ana
2 Dove Road
Bernalillo, New Mexico 87004

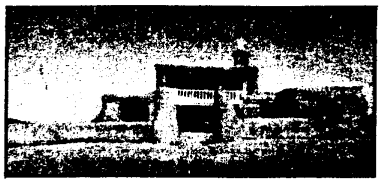
Don Klima, Director
Advisory Council on Historic Preservation
Office of Planning and Review
12136 W. Bayaud Ave., #330
Lakewood, Colorado 80228-2115

I CONCUR _____

ELMO BACA
NEW MEXICO STATE HISTORIC
PRESERVATION OFFICER

SANTA ANA PUEBLO
2 Dove Road
BERNALILLO, NEW MEXICO 87004

Office of the:
Governor
Lt. Governor
Secretary



Phone: (505) 867-3301
(505) 867-3302
Fax: (505) 867-3395

June 14, 2001

Lt. Colonel Raymond G. Midkiff
United States Army Corps of Engineers
Albuquerque District
4101 Jefferson Plaza, N.E.
Albuquerque, NM 87109-3435

Dear Colonel Midkiff:

The Pueblo of Santa Ana has reviewed the cultural resources inventory report entitled "A Cultural Resources Inventory of 29.2 Acres for Riparian and Wetland Restoration, Pueblo of Santa Ana Reservation, New Mexico" and concur with its findings that no cultural resources will be affected by the project.

Please contact me if you need further information or support.

Sincerely,

Roy Montoya
Tribal Administrator