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APPENDIX I

Cost Estimate

1.0 INTRODUCTION

The estimated construction cost for these various projects is broken down into construction field cost and construction overhead cost. Section 7.0 of this report gives details. Appendix H details the facilities evaluation procedure that laid the groundwork for this cost estimate.

2.0 UNIT COSTS FOR WORK ITEMS AND FEATURES

The major irrigation facilities needing rehabilitation were all evaluated in the field. This includes mainly diversion and storage facilities. A more detailed scope of work, quantity calculation, and cost estimate was made for some of the major structures. Unit costs were developed from the Reclamation cost data base, the Means Construction Cost Data publication, and contractor's bid prices for the Velarde Community Ditch Project which is ongoing north of Espanola, New Mexico. Tables I-1 through I-22 show these detailed cost estimates for particular structures. Table I-23 summarizes the unit costs which were used in Tables I-1 through I-22.

From these unit costs for the various items of work, a unit cost was developed for structures as shown in Table I-24. Table I-24 is the unit cost summary for common features in this Project.

3.0 LOCATIONS AND QUANTITIES

Tables I-25 through I-39 show the locations and quantities where the unit costs given in Table I-24 were applied.

In the case of the six southern pueblos that are part of MRGCD, information was taken from the HKM report entitled Comprehensive Analysis of Irrigation and Drainage Facilities, Six Southern Pueblos, with Recommended Rehabilitation and Betterment Plan, Volume 1. This report was prepared by HKM Associates of Billings, Montana in November 1984. Only summaries taken from the HKM report are presented here, with costs adjusted for inflation since 1984. A complete description of the costs, quantities, and locations can be obtained from the HKM report. Information from the HKM report was separated out into MRGCD and non-MRGCD, or Indian facilities as shown in Tables I-36 through I-38.

Locations and quantities for basic repair and rehabilitation are in Tables I-25 through I-38. Locations and quantities for water conservation measures are given separately in Table I-39.

4.0 COST SUMMARIES

Tables I-40 through I-44 summarize basic repair and rehabilitation costs by pueblo. Costs for rehabilitation of MRGCD facilities are given separately in Table I-42. There was no ready source of information for non-MRGCD facilities in the six middle Rio Grande pueblos. Since roughly two-thirds of the irrigation facilities in the six middle Rio Grande pueblos are Indian and roughly one-third are MRGCD, the total for MRGCD structural repair and replacement from

Table I-42 was doubled and used as the cost estimate for non-MRGCD structural repair and replacement in Table I-43.

Costs of canal/lateral/drain improvements for non-MRGCD facilities in the six middle Rio Grande pueblos are given in Table I-47 as water conservation measures. There are no water conservation measures given for MRGCD facilities. Tables I-45 through I-47 summarize water conservation costs by pueblo.

Table I-48 summarizes total costs for each pueblo. Table I-49 summarizes total costs for each pueblo grouping, including the facilities of MRGCD. Table I-50 summarizes total costs for each pueblo grouping, excluding the facilities of MRGCD.

Table I-1. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
ACOMA PUEBLO - NEW MEXICO
Sandoval Ditch
Rehabilitate Concrete Lined Ditch with Pipeline

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace severely deteriorated concrete ditch with 42" PVC or HDPE pipe					
		Remove existing concrete lining - 4.5 miles		1	L.S.	$150,000.00	$150,000
		Furnish and install 42-inch PVC or HDPE pipe		23,760	L.F.	$105.00	$2,494,800
		Furnish and install pipe turnouts		100	EACH	$1,000.00	$100,000
		Replace ditch turnouts		85	EACH	$1,000.00	$85,000
		Mobilization & Preparatory Work (5%)		1	L.S,		$141,500
		Sub-Total					$2,972,000
		15% Unlisted Items					$446,000
		Contract Cost					$3,418,000
		25% Contingencies					$855,000
		Field Cost					**$4,273,000**

QUANTITIES		PRICES	
BY **Fred Tan**	CHECKED	BY	CHECKED
DATE PREPARED **OCT. 20, 1998**	APPROVED	DATE **04/23/99**	PRICE LEVEL

Table I-2. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 21-May-99
ACOMA PUEBLO - NEW MEXICO
Estevan Diversion
Replace Intake Ditch with 42" PVC Pipe

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST_BB

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace concrete lined intake ditch with 42-inch dia. PVC or HDPE Pipe					
		Furnish and Install 42-inch PVC or HDPE Pipe		300	L.F.	$105.00	$31,500
		(Earthwork included)					
		Reconstruct Diversion Structure		1	L.S.	$50,000.00	$50,000
		Mobilization & Preparatory Work (5%)		1	L.S,		$4,100
		Sub-Total					$86,000
		15% Unlisted Items					$13,000
		Contract Cost					$99,000
		25% Contingencies					$25,000
		Field Cost					**$124,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 05/21/99	PRICE LEVEL

Table I-3. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE:	PROJECT:
JEMEZ PUEBLO - NEW MEXICO Main Headworks Safety Features 21-May-99	NATIVE AMERICAN IRRIGATION
	DIVISION:
	FILE: H:\HOME\FTAN\NMPUEBLO\COST1C.WK4

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Install additional safety features, such as handrails.					
		Install Safety Features		1	L.S,	$10,000.00	$10,000
		Mobilization & Preparatory Work		1	L.S,	$2,000.00	$2,000
		Sub-Total					$12,000
		25% Unlisted Items					$4,000
		Contract Cost					$16,000
		20% Contingencies					$4,000
		Field Cost					$20,000

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 05/21/99	PRICE LEVEL

Table I-4. Individual Item Cost Estimate Worksheet.

CODE:D-6140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE:	23-Apr-99	PROJECT:
JEMEZ PUEBLO - NEW MEXICO Pecos Diversion Repair Gabion Diversion Structure		NATIVE AMERICAN IRRIGATION
		DIVISION:
		FILE: H:\HOME\FTAN\NMPUEBLO\COST1C.WK4

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Investigate cause of the gabion settlement, whether it is from channel bed erosion or from piping. Repair foundation of the lower gabions and place additional erosion protection.					
		Repair gabion foundation		1	L.S,	$10,000.00	$10,000
		Riprap		300	C.Y.	$30.00	$9,000
		Structure Excavation		1,000	C.Y.	$8.00	$8,000
		Mobilization & Preparatory Work		1	L.S,		$1,000
		Sub-Total					$28,000
		15% Unlisted Items					$5,000
		Contract Cost					$33,000
		25% Contingencies					$9,000
		Field Cost					**$42,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-5. Individual Item Cost Estimate Worksheet.

CODE:D-8140 — **ESTIMATE WORKSHEET** — SHEET ___ OF ___

FEATURE: 23-Apr-99 LAGUNA PUEBLO - NEW MEXICO North Acomita Ditch Ditch Concrete Lining	**PROJECT:** NATIVE AMERICAN IRRIGATION **DIVISION:** **FILE:** H:\HOME\FTAN\NMPUEBLO\COST_AT

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Rehabilitation of 4 miles long existing ditch. Improve conveyance capacity and reliability for delivering water from Acomita Lake to Seama reservoir. Reshape and concrete line the existing ditch.					
		Clean, Reshape, and Prepare Existing Earth Ditch		21,120	L.F.	$2.50	$52,800
		Compacted Backfill		10,000	C.Y.	$20.00	$200,000
		Concrete Line		2,000	C.Y.	$690.00	$1,380,000
		Furnish and Install 400 Turnouts		400	Ea.	$500.00	$200,000
		Furnish and Install 21 Check Slide Gates		21	Ea.	$1,500.00	$31,500
		Mobilization & Preparatory Work (5%)		1	L.S,		$93,250
		Sub-Total					$1,958,000
		15% Unlisted Items					$294,000
		Contract Cost					$2,252,000
		25% Contingencies					$564,000
		Field Cost					**$2,816,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED JAN. 21, 1999	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-6. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET

SHEET____ OF _____

FEATURE: 23-Apr-99
LAGUNA PUEBLO - NEW MEXICO
Mesita Pipeline
Construct New Headgate Control Box and Install 3.5 miles of 12" PVC or HDPE Pipeline from Mesita Dam to Mesita Diversion.

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
H:\HOME\FTAN\NMPUEBLO\COST1C.WK4 AY

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct a new head gate control box and install 3.5 miles of 12" PVC pipeline					
		Furnish and Install 12-inch PVC or HDPE Pipe		18,480	L.F.	$30.00	$554,400
		Construct headgate control box with an 12-inch head gate		1	L.S.	$20,000.00	$20,000
		Mobilization & Preparatory Work		1	L.S,		$28,750
		Sub-Total					$603,150
		15% Unlisted Items					$91,000
		Contract Cost					$694,150
		25% Contingencies					$173,850
		Field Cost					**$868,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-7. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET SHEET ___ OF ___

FEATURE: 23-Apr-99
PICURIS PUEBLO - NEW MEXICO
Highline, Middle, Upper, West, and Jack Rabbit Ditches, and Flume Structure Rehabilitation of Flume Structure. Repair Concrete and Earth Ditches

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST1C.WK4

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace timber planks of flume deck support. Paint flume steel pipe. Install grated metal catwalk with handrail. Structural inspection of supporting structure. Rehabilitate concrete and earth ditches. Repair broken concrete panels. Place concrete lining in problem areas.					
		Repair Concrete Spall and Repair Leaks		1	L.S.	$5,000.00	$5,000
		Replace 30-inch Slide gate		1	Ea.	$4,000.00	$4,000
		Furnish and Install Grated Metal Walkway and Railing (Approximately 3,000 lbs)		80	Lin.Ft.	$150.00	$12,000
		Replace Timber Planks (Includes removal of existing timber planks. Use 4x12's x 8' lengths)		3,200	Board Ft.	$4.00	$12,800
		Install 5-ft Ladder		1	Ea.	$250.00	$250
		Paint Existing Steel Pipe (No stripping of exisiting paint. Surface preparation required)		720	Sq.Ft.	$2.50	$1,800
		Furnish and Install Concrete Lining		1	L.S.	$125,000.00	$125,000
		Concrete Ditch Rehabilitation (Panels removal and replacement)		1	L.S.	$150,000.00	$150,000
		Earth Ditch Rehabilitation (Clean up and reshaping)		1	L.S.	$50,000.00	$50,000
		Culvert Crossing		1	L.S.	$500,000.00	$50,000
		Mobilization & Preparatory Work		1	L.S.		$20,550
		Sub-Total					$432,000
		15% Unlisted Items					$65,000
		Contract Cost					$497,000
		25% Contingencies					$125,000
		Field Cost					**$622,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-8. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE:	PROJECT:
SAN ILDEFONSO PUEBLO - NEW MEXICO Main Diversion In Rio Pojoaque Reconstruct Diversion Structure Install Radial Gate Sluiceway. (23-Apr-99)	NATIVE AMERICAN IRRIGATION
	DIVISION:
	FILE: H:\HOME\FTAN\NMPUEBLO\COST S T

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace the north side of the structure that collapsed with a concrete drop and stilling basin. Set the new concrete structure at slightly higher elevation, which will direct stream flow to the south side. Install sluice gates to pass the stream's silt and minimize siltation.					
		Reinforced Concrete		300	CuYd	$590.00	$177,000
		Structure Excavation		2,000	CuYd	$8.00	$16,000
		Structure backfill		1,500	CuYd	$10.00	$15,000
		8-ft x 20-ft Radial Gate		1	Ea.	$8,000.00	$8,000
		Mobilization & Preparatory Work		1	L.S.	$11,000.00	$11,000
		Sub-Total					$227,000
		15% Unlisted Items					$35,000
		Contract Cost					$262,000
		25% Contingencies					$66,000
		Field Cost					**$328,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 28, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-9. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET

SHEET ___ OF ___

FEATURE:	PROJECT:
SANDIA PUEBLO - NEW MEXICO Main Diversion and Discharge Diversion Pipe Modification 23-Apr-99	NATIVE AMERICAN IRRIGATION
	DIVISION:
	FILE: H:\HOME\FTAN\NMPUEBLO\COST1C.WK4 AT

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Increase flow into the ditch by adding another 48-inch equivalent CMP Arch intake pipe, at the same location and parallel to the exisiting pipe. Additional pipe required at both intake and discharge end. Pipe installation across highway and railroad track.					
		Furnish and Install 48-inch PVC or HDPE Pipe		600	L.F.	$150.00	$90,000
		Furnish and Install 48-inch slide gate		2	EA.	$10,000.00	$20,000
		Structure Excavation		2,400	C.Y.	$8.00	$19,200
		Structure Backfill		1,200	C.Y.	$10.00	$12,000
		Remove and Replace Roadway Pavement		1	L.S.	$40,000.00	$40,000
		Modify Outlet at Ditch		1	L.S.	$10,000.00	$10,000
		Jacking Pipe under Railroad Track		1	L.S.	$30,000.00	$30,000
		Mobilization & Preparatory Work		1	L.S,		$11,100
		Sub-Total					$232,300
		15% Unlisted Items					$35,000
		Contract Cost					$267,300
		25% Contingencies					$67,700
		Field Cost					$335,000

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-10. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
SANTA CLARA PUEBLO - NEW MEXICO
Gauchupangue Ditch
Construct a new 80-ft wide concrete diversion

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST_R

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Remove existing rock wire gabion with concrete cap diversion structure. Construct a new 80-ft wide concrete diversion structure with sluicing capability (radial gate) and headwork for the pipeline (slide gate).					
		Remove existing structure		1	L.S.		$10,000
		(Approximately 150 cy rock and 15 cy concrete to remove. Rock can be left in the river. Concrete and wire baskets to be hauled away and disposed.)					
		Reinforced Concrete		200	CuYd	$590.00	$118,000
		Structure Excavation		300	CuYd	$8.00	$2,400
		Structre Backfill		200	CuYd	$10.00	$2,000
		Furnish and Install 4'x20' Radial Gate		1	Ea.	$8,000.00	$8,000
		Furnish and Install 18-inch Slide Gate		1	Ea.	$1,400.00	$1,400
		Furnish and Install 18-inch PVC pipe		200	LinFt	$45.00	$9,000
		Mobilization & Preparatory Work		1	L.S.		$7,550
		Sub-Total					$158,350
		15% Unlisted Items					$24,000
		Contract Cost					$182,350
		25% Contingencies					$45,650
		Field cost					**$228,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-11. Individual Item Cost Estimate Worksheet.

CODE:D-8148 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE:	PROJECT:
SANTA CLARA PUEBLO - NEW MEXICO Pajarito Ditch Construct spur dikes on river bank 23-Apr-99	NATIVE AMERICAN IRRIGATION DIVISION: FILE: H:\HOME\FTAN\NMPUEBLO\COST Q

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct 3 spur dikes off river bank to redirect flows.					
		Excavation		1,500	Cu.Yd.	$15.00	$22,500
		Compacted Embankment		2,000	Cu.Yd.	$20.00	$40,000
		Furnish and Place Riprap (12 to 48 inch size)		3,000	Cu.Yd.	$45.00	$135,000
		Mobilization & Preparatory Work		1	L.S.		$9,875
		Sub-Total					$207,375
		15% Unlisted Items					$32,000
		Contract Cost					$239,375
		25% Contingencies					$60,625
		Field cost					**$300,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL Appraisal

Table I-12. Individual Item Cost Estimate Worksheet.

CODE:D-8148 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
SANTA CLARA PUEBLO - NEW MEXICO
Santa Clara Main Canal
Modify existing structure -
Install radial gate sluiceway and trash rack.

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Modify existing diversion structure by installing a radial gate sluiceway and a trash rack.					
		Remove portion of existing structure.		1	L.S.	$15,000.00	$15,000
		(Excavate out a sheet piled vertical wall embankment. Cut out 20 ft. long embankment and two - 8' high x 20' long sheet pile.)					
		Reinforced Concrete		80	CuYd	$590.00	$47,200
		(Forms will be required)					
		Furnish and Install 8'x20' wide radial gate		1	Ea.	$12,000.00	$12,000
		(Approximately 3,000 lbs)					
		Structure Excavation		400	CuYd	$20.00	$8,000
		Structure backfill		100	CuYd	$30.00	$3,000
		Furnish and Install Trash Rack		1	Ea.	$5,000.00	$5,000
		(Estimated weight = 2,000 lbs.)					
		Mobilization & Preparatory work		1	L.S.		$4,550
		Sub-Total					$94,750
		15% Unlisted Items					$24,000
		Contract Cost					$118,750
		25% Contingencies					$24,250
		Field cost					**$143,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 28, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-13. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET

SHEET ___ OF ___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
Mexican Ditch
Reconstruct Diversion Structure

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
H:\HOME\FTAN\NMPUEBLO\COST E

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace existing structure with a 50 ft. wide concrete diversion structure with ditch headwork and sluicing capability. Install a slide gate at the inlet with trashrack. Dredge river bed and riprap upstream and downstream banks.					
		Remove Existing Structure		30	Cu.Yd.	$300.00	$9,000
		(10 cy concrete, 20 cy gabion wire basket)					
		Furnish and Install Reinforced Concrete for Diversion Structure		40	Cu.Yd.	$650.00	$26,000
		(4,000 psi concrete and epoxy coated rebars)					
		Furnish and Install 18-inch Dia. Slide Gate		1	Ea.	$1,400.00	$1,400
		(Galvanized slide gate and frame)					
		Channel Dredging		50	Cu.Yd.	$20.00	$1,000
		(Low flow depth (6") and stable channel bed in wet condition)					
		Furnish and Install 18-inch Dia. PVC Pipe		400	Lin.Ft.	$45.00	$18,000
		Structure Excavation (for Diversion Structure)		80	Cu.Yd.	$15.00	$1,200
		Compacted Structure Backfill (for Diversion Structure)		60	Cu.Yd.	$20.00	$1,200
		(Native Material within 3 miles radius)					
		Furnish and Install Riprap		200	Cu.Yd.	$30.00	$6,000
		(12" to 18" size.)					
		Mobilization & Preparatory work		1	L.S.		$6,400
		Sub-Total					$70,200
		15% Unlisted Items					$11,000
		Contract Cost					$81,200
		25% Contingencies					$20,800
		Field cost					**$102,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-14. Individual Item Cost Estimate Worksheet.

CODE:D-8140

ESTIMATE WORKSHEET SHEET ___ OF ___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
Mirabal Acequia
Construct New Diversion Structure with Sluice Gate, PVC Delivery Pipeline, and Dredging

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct a 50 ft. long concrete diversion structure across Rio Pueblo. Install a gated inlet with trashrack and a PVC pipeline. Excavation for river dredging and construct embankment with riprap protection for bank stabilization.					
		Furnish and Install Reinforced Concrete for Diversion Structure		25	Cu.Yd.	$650.00	$16,250
		(4,000 psi concrete and epoxy coated rebars)					
		Furnish and Install 18-inch Dia. Slide Gate		1	Ea.	$1,400.00	$1,400
		(Galvanized slide gate and frame)					
		Furnish and Install 4' H x 20' W Radial Gate		1	Ea.	$8,000.00	$8,000
		Streambed Channel Dredging		400	Cu.Yd.	$20.00	$8,000
		(Low flow depth (6") and stable channel bed in wet condition)					
		Furnish and Install 18-inch Dia. PVC Pipe		400	Lin.Ft.	$45.00	$18,000
		(Includes 200 cy trench excavation and 150 cy backfill)					
		Structure Excavation (for Diversion Structure)		60	Cu.Yd.	$15.00	$900
		Compacted Structure Backfill (for Diversion Structure)		40	Cu.Yd.	$20.00	$800
		(Native Material within 3 miles radius)					
		Furnish and Install Riprap		200	Cu.Yd.	$30.00	$6,000
		(12" to 18" size. Available 6-7 miles. Cost of mat'l only is $18/cy)					
		Mobilization & Preparatory Work		1	L.S.		$6,000
		Sub-Total					$65,350
		15% Unlisted Items					$10,000
		Contract Cost					$75,350
		25% Contingencies					$19,000
		Field Cost					$95,000

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-15. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET

SHEET ___ OF ___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
North Trash Pile Ditch
Construct an 80-ft Concrete Diversion Structure

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Rock berm should be reconstructed and reshaped. Debris removal. Construct a permanent 80-ft long concrete diversion strucutre with sluicing capability.					
		Remove Debris		1	L.S,	$3,000.00	$3,000
		Reconstruct Rock Berm		1	L.S,	$4,000.00	$4,000
		Furnish and Install Reinforced Concrete for Diversion Structure (4,000 psi concrete and epoxy coated rebars)		100	Cu.Yd.	$650.00	$65,000
		Structure Excavation (for Diversion Structure)		150	Cu.Yd.	$15.00	$2,250
		Compacted Structure Backfill (for Diversion Structure)		100	Cu.Yd.	$20.00	$2,000
		Furnish and Install 18-inch Dia. Slide Gate (Galvanized slide gate and frame)		1	Ea.	$1,400.00	$1,400
		Furnish and Install 4' H x 20' W Radial Gate		1	Ea.	$8,000.00	$8,000
		Place Riprap		100	C.Y.	$40.00	$4,000
		Mobilization & Preparatory Work		1	L.S,		$4,500
		Sub-Total					$94,150
		15% Unlisted Items					$15,000
		Contract Cost					$110,000
		25% Contingencies					$28,000
		Field Cost					$138,000

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-16. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET___ OF___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
Pottery Ditch
Provide Water Supply from Cicada Nose Ditch

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST J

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		There is no permanent diversion structure at the headworks of this ditch. Use a more economical alternative to construction of a concrete diversion. Construct a pipeline from Cicada Nose Ditch that will feed this ditch.					
	1	Furnish and Install 18-inch Dia. PVC Pipe		1,000	Lin.Ft.	$45.00	$45,000
		(Includes 200 cy trench excavation and 150 cy backfill)					
	2	Furnish and Install 18-inch Dia. Slide Gate		1	Ea.	$1,400.00	$1,400
		(Galvanized slide gate and frame)					
	3	Mobilization &Preparatory Work		1	L.S.		$5,000
		Sub-Total					$51,400
		15% Unlisted Items					$8,000
		Contract Cost					$59,400
		25% Contingencies					$15,000
		Field Cost					$74,400

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-17. Individual Item Cost Estimate Worksheet.

CODE:D-8148 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
Rio Lucero Indian Ditch
Modify Diversion Structure and Delivery System

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST_N

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace 7,700 lin.ft. of existing concrete lined ditch with 24-inch PVC-80 psi pipe. Modify existing diversion headworks, adding sluicing capability, and repair radial gate seals. Replace head gates.					
		Excavation (for Pipe Trench)		2,500	Cu.Yd.	$4.00	$10,000
		Backfill (for Pipe Trench)		2,000	Cu.Yd.	$6.00	$12,000
		Furnish and Install 24-inch PVC Pipe		7,700	Lin.Ft.	$60.00	$462,000
		Furnish and Install Pipe Lateral Turnout with Risers		20	Ea.	$4,000.00	$80,000
		Replace Radial Gate Seals and Seats		1	Lump Sum	$10,000.00	$10,000
		Furnish and Install 24-inch Slide Gate		1	Ea.	$2,500.00	$2,500
		Mobilization & Preparatory Work		$1.00	L.S.		$28,750
		Sub-Total					$605,250
		15% Unlisted Items					$91,000
		Contract Cost					$696,250
		25% Contingencies					$174,750
		Field Cost					**$871,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-18. Individual Item Cost Estimate Worksheet.

CODE:D-6148 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
TAOS PUEBLO - NEW MEXICO
Tenorio Ditch
Extend and Rehabilitte Delivery Pipeline

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Extend delivery pipeline one mile to the west. Install pipeline with risers for sprinkler and flood irrigation. Replace radial gate seals at diversion structure at Rio Lucero.					
		Excavation (Pipe Trench)		2,500	Cu.Yd.	$4.00	$10,000
		Backfill (Pipe Trench)		2,000	Cu.Yd.	$6.00	$12,000
		Furnish and Install 18-inch PVC Pipe		5,000	Lin.Ft.	$35.00	$175,000
		Furnish and Install Pipe Lateral Turnouts with Risers		20	L.S.	$3,000.00	$60,000
		Replace Radial Gate Seats and Seals		1	L.S.	$10,000.00	$10,000
		Mobilization and Preparatory Work		1	L.S.		$13,350
		Sub-Total					$280,350
		15% Unlisted Items					$43,000
		Contract Cost					$323,350
		25% Contingencies					$81,650
		Field Cost					**$405,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 28, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-19. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
TESUQUE PUEBLO - NEW MEXICO
Navajo Ditch Headworks
Diversion Structure Replacement

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Replace entire structure with a concrete diversion with sluicing capabilties including construction of a stilling basin.					
		Reinforced Concrete		300	CuYd	$590.00	$177,000
		Structure Excavation		1,200	CuYd	$8.00	$9,600
		Structure backfill		600	CuYd	$10.00	$6,000
		Furnish and Install 8-ft x 20-ft Radial Gate		1	Ea.	$8,000.00	$8,000
		Furnish and Install 24-inch Slide Gate		1	Ea.	$2,500.00	$2,500
		Mobilization & Preparatory Work		1	L.S.		$10,050
		Sub-Total					$213,150
		15% Unlisted Items					$32,000
		Contract Cost					$245,150
		25% Contingencies					$61,850
		Field Cost					**$307,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 28, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-20. Individual Item Cost Estimate Worksheet.

CODE:D-8148

ESTIMATE WORKSHEET

SHEET ____ OF ____

FEATURE: 23-Apr-99
ZIA PUEBLO - NEW MEXICO
New Zia Diversion Structure
Structure Modification and Bank Stabilization

PROJECT:
NATIVE AMERICAN IRRIGATION

DIVISION:

FILE:
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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Stability of the the dam should be reviewed, due to the severity of erosion around the structure and the embankment material. Sliding and piping potential should be checked.					
		Construct a concrete stilling basin. It is anticipated that a new stilling basin with cutoff wall will stabilize the dam against sliding and piping problems.					
		Lower the dam crest by 2 feet, to reduce upstream river bed build up. Install a sluiceway in vicinity of the drop inlet headworks, to flush out sediment deposit upstream of structure.					
		Rebuild the upstream berms and place riprap erosion protection. Reshape the downstream river banks and place riprap protection. Adjust headwork structure.					
	1	Reinforced Concrete		500	C.Y.	$590.00	$295,000
	2	Modify Crest of Existing Structure		1	L.S,	$20,000.00	$20,000
	3	Riprap		2,000	C.Y.	$45.00	$90,000
	4	Excavation		700	C.Y.	$25.00	$17,500
	5	Backfill		500	C.Y.	$35.00	$17,500
	6	Embankment		2,000	C.Y.	$20.00	$40,000
	7	Furnish and Install 4-ft x 20-ft Radial Gates		2	EA	$8,000.00	$16,000
	8	Mobilization & Preparatory Work		1	L.S,		$24,050
		Sub-Total					$520,050
		15% Unlisted Items					$79,000
		Contract Cost					$599,050
		25% Contingencies					$149,950
		Field Cost					**$749,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-21. Individual Item Cost Estimate Worksheet.

CODE:D-6148

ESTIMATE WORKSHEET SHEET ___ OF ___

FEATURE: 23-Apr-99
ZIA PUEBLO - NEW MEXICO
Old Zia Diversion Dam
Construct River Grade Control Structure
Rehabilitate Existing Structure

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

FILE: H:\HOME\FTAN\NMPUEBLO\COST AQ

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct River Grade Control Structure. Remove existing collapsed sheet piles. Construct a 3-stepped drop structure. Use sheet piles with riprap scour protection and stilling basin.					
		Remove existing structure			L.S.		
		Reinforced concrete Structure		0	L.S,	$590.00	$0
		Furnish and Install Steel Sheet Piles					
		Riprap		0	C.Y.	$30.00	$0
		Structure Excavation		0	C.Y.	$8.00	$0
		Structure Backfill		0	C.Y.	$10.00	$0
		Furnish and Install Radial Gate		0	EA.	$8,000.00	$0
		Mobilization & Preparatory Work		0	L.S,		$0
		Sub-Total					$0
		25% Unlisted Items					$0
		Contract Cost					$0
		20% Contingencies					$0
		Field Cost					$0

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-22. Individual Item Cost Estimate Worksheet.

CODE:D-8140 **ESTIMATE WORKSHEET** SHEET ___ OF ___

FEATURE: 23-Apr-99
ZIA PUEBLO - NEW MEXICO
Zia Irrigation Flume
Bank Stabilization
Pier Stabilization

PROJECT: NATIVE AMERICAN IRRIGATION

DIVISION:

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PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Investigate the adequacy of the pier base and make necessary modifications to minimize the potential of future pier collapse. Look into river grade control feature at this site, to prevent excessive river bed degradation.					
		Stabilize Pier by installing pile foundation support below existing pier base and install riprap erosion protection.					
		Pier Stabilization		1	L.S,	$50,000.00	$50,000
		Riprap		2,000	C.Y.	$30.00	$60,000
		Structure Excavation		500	C.Y.	$8.00	$4,000
		Reinforced Concrete		50	C.Y.	$590.00	$29,500
		Mobilization & Preparatory Work		1	L.S,		$7,200
		Sub-Total					$150,700
		15% Unlisted Items					$23,000
		Contract Cost					$173,700
		25% Contingencies					$44,300
		Field Cost					**$218,000**

QUANTITIES		PRICES	
BY Fred Tan	CHECKED	BY	CHECKED
DATE PREPARED OCT. 20, 1998	APPROVED	DATE 04/23/99	PRICE LEVEL

Table I-23. Unit costs for various items of work. Developed from detailed costs estimates for several major structures.

1. Furnish and install reinforced concrete for diversion structure, including reinforcing steel. Estimated cost varies from $475 to $650, depending on location of concrete plant and quantity of material.

2. Structure excavation: $ 15 / cu. yd.

3. Streambed dredging: $ 20 / cu. yd.

4. Compacted structure backfill: $ 20 / cu. yd.

5. Furnish and place riprap: $ 40 / cu. yd.

6. Furnish and install the following size PVC pipe, include cost of earthwork excavation and backfill.
12-inch to 18-inch diameter ....$ 45 per lin. ft.
24-inch diameter ..... $ 60 per lin. ft.
30-inch diameter ..... $ 75 per lin. ft.
36-inch diameter ..... $ 90 per lin. ft.
42-inch diameter ..... $ 105 per lin. ft.
48-inch diameter ..... $ 125 per lin. ft.

7. Furnish and install (4-ft high by 20-ft wide) radial gate, including removal and disposal of old gate: $ 8,000 to $ 10,000 each.

8. Furnish and install the following size slide gate (does not include removal of old gate):
18-inch diameter ..... $ 1,400 each
24-inch diameter ..... $ 2,500 each

9. Ditch cleaning and reshaping: $ 5 per lin. ft.
This cost includes clearing and grubbing of area in ditch vicinity and on O&M road.

10. Furnish and place concrete lining for ditches: $1,250 / cu. yd. This work includes foundation preparation, backfill and excavation as required, and clearing and grubbing of the area. The unit cost for ditch with 1-ft wide bottom and 1.5:1 side slope and 3-ft high side walls is $ 100 / lin. ft.

Table I-24. Summary of estimated unit costs for features in this Project (page 1 of 2).

Feature	Tasks	Estimated Construction Cost
Repair damaged concrete lined ditches Table I-25	Grade existing ditch O&M road. Remove and dispose of broken concrete panels. Prepare ditch foundation by backfilling and reshaping ditch prism. Place 3-in thick concrete lining by slip form or shotcrete. 1-ft bottom width, 1:1 side slope of 3-foot high side walls, and 3-inch thick.	$ 100 per lin. ft
Install pipelines to replace deteriorated concrete/earth ditches and pipelines Table I-26	Grade existing ditch O&M road. Remove and dispose of broken concrete panels. Excavate and backfill for pipeline. Install pipeline. (For Sandoval Ditch and Esteban Diversion Intake Ditch in Acoma Pueblo, other items were included. Tables I-1and I-2 give specific cost estimates. Table I-6 gives specific cost estimate for the Mesita Pipeline at Laguna Pueblo.)	$ 45 to $125 per lin. ft depending on pipe diameter
Earth ditch rehabilitation Table I-27	Grading, shaping, and clearing of existing ditch O&M road. Clean and reshape ditch. Remove and dispose of debris.	$ 5 per lin. ft
Concrete lining of earth ditches Tables I-28 and I-37	Grade existing ditch O&M road. Prepare ditch foundation by backfilling and reshaping ditch. Place 3-in thick concrete lining by slip form or shotcrete. For 1-ft bottom width, assume 1.5:1 side slope, 3-ft high side walls, and 3-in thick concrete. For 2-ft bottom width, assume 1.5:1 side slope, 5-ft high side walls, and 4-in thick concrete.	$ 100 per lin. ft for 1-ft bottom $ 200 per lin. ft for 2-ft bottom
Construct new diversion structure Table I-29	Regrade river channel. Excavate and backfill. Place forms for concrete. Place rock gabions and concrete. Install headwork gates and sluice gates. Diversion structures range from 60 to 250 feet long. Cost is $2,000 per foot.	$ 200,000 each
Diversion structure rehabilitation Table I-30	Replace gates. Install sluice gates. Modify structure as required. Stabilize structure. Install riprap protection. Cost varies from $20,000 to $200,000 depending on repair needed.	$ 100,000 each, or amount computed in individual cost estimate
Siphon replacement Table I-31	Excavate and backfill. Install temporary diversion as required. Remove and dispose of damaged siphon pipe. Prepare foundation. Install new siphon pipe. Lengths vary from 60 to 300 ft.	$ 100,000 each
Road crossing culvert replacement Table I-32	Remove and dispose of damaged culvert. Prepare foundation. Excavate and backfill. Install new culvert. Lengths vary from 30 to 50 ft.	$ 3,000 each

Table I-24. Summary of estimated unit costs for features in this Project (continued).

Feature	Tasks	Estimated Construction Cost
Storage pond rehabilitation Table I-33	Dredge and dispose of sediment. Replace clay or plastic liner as required. Ponds vary in size from 10 to 20 acre-ft.	$ 300,000 - $ 500,000 each
Flume rehabilitation Table I-34	Remove and dispose of rotted boards. Install new boards, catwalk, ladder, and railing.	$ 50,000
Bank protection Table I-35	(Zia Pueblo) Place riprap bank protection at flume crossing structure. (New Zia Diversion structure) Place bank protection upstream and downstream of structure. Embankment earthwork. Place rock riprap.	$ 300,000 - $ 500,000 each
Install drainage system Table I-36	Excavate and backfill for pipeline. Install perforated pipe with gravel filter. Assume perforated pipe will be 12- to 24-in diameter size.	Use HKM's estimate, with inflation adjustment

Table I-25. Locations and quantities for repairing concrete lined ditches.

Pueblo	Name of Ditch	Length (ft)	Lengths per Pueblo (ft)
San Ildefonso	Ortiz	500	600
	Middle	100	
Nambe	Highline	2,500	2,800
	Consolidated/Acequia Nueva	300	
Jemez	Various locations	3,500	3,500
Zia	Various locations	3,400	3,400
TOTAL, ALL PUEBLOS			10,300

Table I-26. Locations and quantities for installing new pipelines to replace deteriorated concrete and earth ditches and pipelines. $50/ft for all Pueblos, except $75/ft for Tesuque and $105/ft for Acoma.

Pueblo	Name of Ditch	Length (ft)	Lengths per Pueblo (ft)
Taos	Tenorio	10,000	72,600
	Tenorio Lateral No. 5	6,700	
	Rio Lucero Ditch Extension	8,500	
	Rio Lucero Indian Ditch	13,700	
	1908 Ditch	10,000	
	Alberto Alternate	4,200	
	1915 Ditch	4,500	
	Tin Ditch	5,300	
	Bee-line	7,700	
	Karavas Tract	2,000	
Picuris	Middle	8,000	24,460
	Jack Rabbit	2,600	
	South Buffalo	3,840	
	West Ditch	6,720	
	Upper Ditch	3,300	
Santa Clara	Santa Clara Canyon Ditch (pipeline)	18,480	19,380
	Guachupangue	900	
San Ildefonso	Alamo	2,000	6,500
	Acequia de los Indios	1,500	
	Line 7 Extension	2,800	
	O-See-Bo (Montoya)	200	
Nambe	Nambe Laterals (14)	5,000	6,400
	Chile Line	400	
	Alabama	1,000	
Tesuque	Infiltration Pipeline	3,300	23,800
	Post Ditch Laterals (5)	4,000	
	Pond No. 1	1,000	
	Pond No. 2 - Post ditch	14,000	
	Navajo / Tesuque	1,500	
Laguna	Mesita Pipeline	18,480	18,480
Acoma	Sandoval	24,060	24,060
Santa Ana	Various Locations	10,920	10,920
TOTAL, ALL PUEBLOS			206,600

Table I-27. Locations and quantities for earth ditch rehabilitation.

Pueblo	Name of Ditch	Length (ft)	Lengths per Pueblo (ft)
Taos	White Rock	7,500	125,500
	Rock Bridge	9,500	
	Mountain Wood	3,300	
	Grouse	20,000	
	Rio Pueblo-Elk Horn	5,000	
	Deer Jaw	3,000	
	Cicada	7,500	
	Pottery	10,000	
	Lucero	9,700	
	Buried Roots	8,800	
	A-Ditch	5,000	
	B-Ditch	5,700	
	C-Ditch	2,000	
	Spider Hill	8,000	
	Mexican Ditch	12,500	
	Remijo	5,000	
	Mirabal	3,000	
San Juan	El Guique-San Rafael	2,500	33,700
	Reyes Montoya	1,500	
	Chamita	3,300	
	Aquino	2,400	
	Acequia Madre	19,200	
	Alcalde	4,800	
Pojoaque	Main Ditch	5,300	5,300
Nambe	Standard D	2,640	7,920
	M. Peña	2,640	
	Acequia Nueva	2,640	
Tesuque	Pueblo	5,300	7,300
	Suazo	2,000	
TOTAL, ALL PUEBLOS			179,720

Table I-28. Locations and quantities for rehabilitating earth ditches with concrete lining–all 1-ft bottom width (for repair and rehabilitation, not exclusively for water conservation).

Pueblo	Ditch	Length, ft	Lengths per Pueblo (ft)
San Juan	Middle / Bosque Ditch	2,400	5,150
	El Llano	750	
	San Juan Pueblo	900	
	Acequia Madre Highline	1,100	
Santa Clara	Pajarito	8,500	21,800
	Santa Clara Middle Ditch	4,250	
	Guachupange	2,050	
	Holcomb	1,000	
	Middle Pueblo	4,750	
	East Pueblo	1,250	
Laguna	North Acomita Ditch	21,120	60,520
	New Laguna Ditch	13,000	
	Encinal Canyon Ditch	26,400	
Jemez	Various locations	5,000	5,000
TOTAL, ALL PUEBLOS			92,470

Table I-29. Locations for new diversion structures.

Pueblo	Name of Diversion	Total No. of Diversions
Taos	A-Ditch	1
	B-Ditch	1
	C-Ditch	1
	Mexican	1
	Mirabal	1
	Pottery	1
	Phia-No	1
	South Trash Pile	1
	Pull Leaf	1
Santa Clara	Santa Clara Canyon Ditch	1
San Ildefonso	San Ildefonso Ditch	1
Tesuque	Infiltration Diversion	1
	Navajo Ditch	1
TOTAL, ALL PUEBLOS		13

Table I-30. Locations for diversion structure rehabilitation.

Pueblo	Name of Diversion	Total No. of Diversions
Taos	Rio Lucero/Tenorio	1
	1908 Diversion	1
	Pull Leaf	1
	Buried Roots	1
	Cicada Elk Horn	1
Picuris	Picuris Diversion	1
Santa Clara	Santa Clara Main Canal Diversion	1
San Ildefonso	Rio Pojoaque Main Diversion	1
Laguna	Casa Blanca Ditch	1
	Seama	1
	Mesita	1
Jemez	Pecos Diversion	1
Zia	New Zia Diversion	1
TOTAL, ALL PUEBLOS		13

Table I-31. Locations for siphon replacement.

Pueblo	Name of Diversion	Total No. of Siphons
Taos	Rio Lucero Indian Ditch	1
San Juan	Acequia Madre	1
	Acequia Madre Highline	1
Santa Clara	Santa Clara Main Canal	1
San Ildefonso	West Side Pajarito	4
	Ortiz	1
	Middle Ditch	1
Pojoaque	Main Ditch	1
Nambe	Highline Extension	1
Tesuque	Corral Ditch	1
TOTAL, ALL PUEBLOS		13

Table I-32. Locations for road crossing culverts.

Pueblo	Name of Road Crossings	Total No. of Road Crossing Culverts
All Pueblos	Unnamed	150

Table I-33. Locations for storage pond rehabilitation.

Pueblo	Name of Storage Pond	Total No. of Storage Ponds
Tesuque	Tesuque Ponds	4
Zia	Zia Lake	1
Laguna	Seama	1
Acoma	Acomita	1
TOTAL, ALL PUEBLOS		7

Table I-34. Locations of flume structure rehabilitation.

Pueblo	Name of Flume	Total No. of Flumes
Taos	Rio Lucero Indian Ditch Flume	1
Picuris	Picuris West Ditch	1
Tesuque	Quiyo Ditch	1
Zia	Zia Flume	1
TOTAL, ALL PUEBLOS		4

Table I-35. Bank protection locations.

Pueblo	Location	No. of Locations
Zia	New Zia Diversion	1
	Zia Flume	1
TOTAL, ALL PUEBLOS		2

Table I-36. New open and subsurface drainage systems (non-MRGCD facilities).

Pueblo	Location	No. of Locations
Santo Domingo	See HKM Report	See HKM Report
San Felipe	See HKM Report	See HKM Report
Sandia	See HKM Report	See HKM Report
Isleta	See HKM Report	See HKM Report
TOTAL, ALL PUEBLOS		See HKM Report

Table I-37. MRGCD Canal/Lateral/Drain Improvement. Locations and costs are taken from HKM report and updated to 1999 dollars.

Pueblo	Location	Information
Cochiti	Pueblo-wide	See HKM Report
Santo Domingo	Pueblo-wide	See HKM Report
San Felipe	Pueblo-wide	See HKM Report
Santa Ana	Pueblo-wide	See HKM Report
Sandia	Pueblo-wide	See HKM Report
Isleta	Pueblo-wide	See HKM Report
TOTAL, ALL PUEBLOS		See HKM Report

Table I-38. MRGCD structural repair and replacement. Locations and costs are taken from HKM report and updated to 1999 dollars.

Pueblo	Location	Information
Cochiti	Pueblo-wide	See HKM Report
Santo Domingo	Pueblo-wide	See HKM Report
San Felipe	Pueblo-wide	See HKM Report
Santa Ana	Pueblo-wide	See HKM Report
Sandia	Pueblo-wide	See HKM Report
Isleta	Pueblo-wide	See HKM Report
TOTAL, ALL PUEBLOS		See HKM Report

Table I-39. New concrete lining (for water conservation).

Pueblo	Ditch	Length, ft	Lengths per Pueblo (ft)
San Juan	Middle / Bosque Ditch	2,400	5,150
	El Llano	750	
	San Juan Pueblo	900	
	Acequia Madre Highline	1,100	
Santa Clara	Pajarito	8,500	21,800
	Santa Clara Middle Ditch	4,250	
	Guachupangue	2,050	
	Holcomb	1,000	
	Middle Pueblo	4,750	
	East Pueblo	1,250	
San Ildefonso	West Side / Pajarito	12,300	14,300
	Ortiz	200	
	Middle	300	
	Acequia de los Indios	1,500	
Nambe	Highline	10,000	35,480
	Highline Extension	13,200	
	Chili	5,280	
	Consolidated / Acequia Nuevo	7,000	
Tesuque	Mitchell	4,000	12,000
	Wild Plum	6,500	
	Corral	1,500	
Cochiti	Various Locations (1' bottom)	52,800	52,800
Isleta	Various Locations (1' bottom)	52,800	79,200
	Various Locations (2' bottom)	26,400	
Sandia	Various Locations (1' bottom)	21,120	21,120
San Felipe	Various Locations (1' bottom)	42,240	95,040
	Various Locations (2' bottom)	52,800	
Santa Ana	Various Locations (1' bottom)	23,400	27,224
	Various Locations (2' bottom)	3,824	
Santo Domingo	Various Locations (1' bottom)	52,800	95,040
	Various Locations (2' bottom)	42,240	
Zia	Various Locations (2' bottom)	42,240	42,240
TOTAL, ALL PUEBLOS			501,394

Table I-40. Basic repair and rehabilitation cost - Northern Pueblos.

Pueblo > / Work Feature	Taos	Picuris	San Juan	Santa Clara	San Ildefonso	Pojoaque	Nambe	Tesuque	Totals
	Cost of Material and Labor, plus 5% for mobilization								
Repair Damaged Concrete Lining	0	0	0	0	60,000	0	280,000	0	340,000
Install New Pipelines to Replace Deteriorated Concrete/Earth Ditches and Pipelines	3,630,000	1,223,000	0	969,000	325,000	0	320,000	1,785,000	8,252,000
Earth Ditch Rehabilitation	627,500	0	168,500	0	0	26,500	39,600	36,500	898,600
Concrete Lining of Earth Ditches	0	0	515,000	2,180,000	0	0	0	0	2,695,000
Diversion Structure Installation (Replace Rock & Brush Diversions w/ Concrete Structure)	1,800,000	0	0	200,000	200,000	0	0	400,000	2,600,000
Diversion Structures Rehabilitation	500,000	130,000	30,000	100,000	400,000	0	100,000	0	1,260,000
Replace Siphons	100,000	0	200,000	100,000	600,000	100,000	100,000	100,000	1,300,000
Storage Pond Rehabilitation	0	0	0	0	0	0	0	1,200,000	1,200,000
Rehabilitate Flumes	50,000	50,000	0	0	0	0	0	50,000	150,000
Sub Totals	**$6,707,500**	**$1,403,000**	**$913,500**	**$3,549,000**	**$1,585,000**	**$126,500**	**$839,600**	**$3,571,500**	**$18,695,600**
Add Unlisted Items (15%)	$1,006,125	$210,450	$137,025	$532,350	$237,750	$18,975	$125,940	$535,725	$2,804,340
Sub Totals	**$7,713,625**	**$1,613,450**	**$1,050,525**	**$4,081,350**	**$1,822,750**	**$145,475**	**$965,540**	**$4,107,225**	**$21,499,940**
Add Contingencies (25%)	$1,928,406	$403,363	$262,631	$1,020,338	$455,688	$36,369	$241,385	$1,026,806	$5,374,985
Construction Field Cost	**$9,642,031**	**$2,016,813**	**$1,313,156**	**$5,101,688**	**$2,278,438**	**$181,844**	**$1,206,925**	**$5,134,031**	**$26,874,925**
Add Construction Overhead Cost (45%)	$4,338,914	$907,566	$590,920	$2,295,759	$1,025,297	$81,830	$543,116	$2,310,314	$12,093,716
Total Capital Cost	**$13,980,945**	**$2,924,378**	**$1,904,077**	**$7,397,447**	**$3,303,734**	**$263,673**	**$1,750,041**	**$6,164,095**	**$37,688,391**

Table I-41. Basic repair and rehabilitation cost - Non-MRGCD Southern Pueblos.

Pueblo >	Acoma	Laguna	Jemez	Zia	Totals
Work Feature	*Cost of Material and Labor, plus 5% for mobilization*				
Repair Damaged Concrete Lining			350,000	340,000	690,000
Install New Pipelines to Replace Deteriorated Concrete/Earth Ditches and Pipelines	2,526,300	924,000	0	0	3,450,300
Rehabilitate Earth Ditch with Concrete Lining	0	6,052,000	500,000	0	6,552,000
Repair Diversion Structure		300,000	100,000	100,000	500,000
Storage Reservoir Rehabilitation	300,000	300,000		500,000	1,100,000
Flume Rehabilitation				50,000	50,000
Bank Stabilization				900,000	900,000
Sub Totals	$2,826,300	$7,576,000	$950,000	$1,890,000	$9,102,000
Add Unlisted Items (15%)	$423,945	$1,136,400	$142,500	$283,500	$1,365,300
Sub Totals	**$3,250,245**	**$8,712,400**	**$1,092,500**	**$2,173,500**	**$10,467,300**
Add Contingencies (25%)	$812,561	$2,178,100	$273,125	$543,375	$2,616,825
Construction Field Cost	**$4,062,806**	**$10,890,500**	**$1,365,625**	**$2,716,875**	**$13,084,125**
Add Construction Overhead Cost (45%)	$1,828,263	$4,900,725	$614,531	$1,222,594	$5,887,856
Total Capital Cost	**$5,891,069**	**$15,791,225**	**$1,980,156**	**$3,939,469**	**$18,971,981**

Table I-42. Basic repair and rehabilitation cost - MRGCD Southern Pueblos–MRGCD facilities. Based on HKM Report.

Pueblo >	Cochiti	Isleta	Sandia	San Felipe	Santa Ana	Santo Domingo	Totals
Work Feature	*Cost of Material and Labor, plus 5% for mobilization*						
Canal/Lateral/Drain Improvement	275,000	1,122,000	1,296,000	665,000	173,000	544,000	4,075,000
Structure Repair and Replacement	126,000	288,000	102,000	198,000	146,000	125,000	4,075,000
Sub Totals	**$401,000**	**$1,410,000**	**$1,398,000**	**$863,000**	**$319,000**	**$669,000**	**$8,150,000**
Add Unlisted Items (15%)	$60,150	$211,500	$209,700	$129,450	$47,850	$100,350	$1,222,500
Sub Totals	**$461,150**	**$1,621,500**	**$1,607,700**	**$992,450**	**$366,850**	**$769,350**	**$9,372,500**
Add Contingencies (25%)	$115,288	$405,375	$401,925	$248,113	$91,713	$192,338	$2,343,125
Construction Field Cost	**$576,438**	**$2,026,875**	**$2,009,625**	**$1,240,563**	**$458,563**	**$961,688**	**$11,715,625**
Add Construction Overhead Cost (45%)	$259,397	$912,094	$904,331	$558,253	$206,353	$432,759	$781,200
Total Capital Cost	**$835,834**	**$2,938,969**	**$2,913,956**	**$1,798,816**	**$664,916**	**$1,394,447**	**$12,496,825**

Table I-43. Basic repair and rehabilitation cost - MRGCD Southern Pueblos–Indian (non-MRGCD) facilities. Most is based on HKM Report.

Pueblo > / Work Feature	Cochiti	Isleta	Sandia	San Felipe	Santa Ana	Santo Domingo	Totals
	Cost of Material and Labor, plus 5% for mobilization						
Install New Pipelines to Replace Deteriorated Concrete/Earth Ditches and Pipelines	0	0	0	0	546,000	0	546,000
New Drainage Systems	0	106,800	325,400	33,400	0	335,600	801,200
Structure Repair and Replacement	252,000	576,000	204,000	396,000	292,000	250,000	1,970,000
Sub Totals	**$252,000**	**$682,800**	**$529,400**	**$429,400**	**$838,000**	**$585,600**	**$3,317,200**
Add Unlisted Items (15%)	$37,800	$102,420	$79,410	$64,410	$125,700	$87,840	$497,580
Sub Totals	**$289,800**	**$785,220**	**$608,810**	**$493,810**	**$963,700**	**$673,440**	**$3,814,780**
Add Contingencies (25%)	$72,450	$196,305	$152,203	$123,453	$240,925	$168,360	$953,695
Construction Field Cost	**$362,250**	**$981,525**	**$761,013**	**$617,263**	**$1,204,625**	**$841,800**	**$4,768,475**
Add Construction Overhead Cost (45%)	$163,013	$441,686	$342,456	$277,768	$542,081	$378,810	$781,200
Total Capital Cost	**$525,263**	**$1,423,211**	**$1,103,468**	**$895,031**	**$1,746,706**	**$1,220,610**	**$5,549,675**

Table I-44. Basic repair and rehabilitation cost - All Pueblos.

Work Feature	**Totals for All Pueblos** *Cost of Material and Labor, plus 5% for mobilization*
Road Crossing Culverts Replacement	450,000
Sub Totals	**$450,000**
Add Unlisted Items (15%)	$67,500
Sub Totals	**$517,500**
Add Contingencies (25%)	$129,375
Construction Field Cost	**$646,875**
Add Construction Overhead Cost (45%)	$291,094
Total Capital Cost	**$937,969**

Table I-45. Water conservation measures cost - Northern Pueblos. All work is concrete lining of earth ditches, and all proposed concrete-lined ditches are assumed to have 1-ft bottom widths.

Pueblo >	Taos	Picuris	San Juan	Santa Clara	San Ildefonso	Pojoaque	Nambe	Tesuque	Totals
Work Feature	*Cost of Material and Labor, plus 5% for mobilization*								
Concrete Lining of Earth Ditch	0	0	515,000	2,180,000	1,430,000	0	3,548,000	1,200,000	8,873,000
Sub Totals	**$0**	**$0**	**$515,000**	**$2,180,000**	**$1,430,000**	**$0**	**$3,548,000**	**$1,200,000**	**$8,873,000**
Add Unlisted Items (15%)	$0	$0	$77,250	$327,000	$214,500	$0	$532,200	$180,000	$1,330,950
Sub Totals	**$0**	**$0**	**$592,250**	**$2,507,000**	**$1,644,500**	**$0**	**$4,080,200**	**$1,380,000**	**$10,203,950**
Add Contingencies (25%)	$0	$0	$148,063	$626,750	$411,125	$0	$1,020,050	$345,000	$2,550,988
Construction Field Cost	**$0**	**$0**	**$740,313**	**$3,133,750**	**$2,055,625**	**$0**	**$5,100,250**	**$1,725,000**	**$12,754,938**
Add Construction Overhead Cost (45%)	$0	$0	$333,141	$1,410,188	$925,031	$0	$2,295,113	$776,250	$5,739,722
Total Capital Cost	**$0**	**$0**	**$1,073,453**	**$4,543,938**	**$2,980,656**	**$0**	**$7,395,363**	**$2,501,250**	**$18,494,659**

Table I-46. Water conservation measures cost - Non-MRGCD Southern Pueblos.

Pueblo >	Acoma	Laguna	Jemez	Zia	Totals
Work Feature	*Cost of Material and Labor, plus 5% for mobilization*				
Concrete Lining of Earth Ditch	0	0	0	$8,448,000	8,448,000
Sub Totals	**$0**	**$0**	**$0**	**$8,448,000**	**$8,448,000**
Add Unlisted Items (15%)	$0	$0	$0	$1,267,200	$1,267,200
Sub Totals	**$0**	**$0**	**$0**	**$9,715,200**	**$9,715,200**
Add Contingencies (25%)	$0	$0	$0	$2,428,800	$2,428,800
Construction Field Cost	**$0**	**$0**	**$0**	**$12,144,000**	**$12,144,000**
Add Construction Overhead Cost (45%)	$0	$0	$0	$5,464,800	$5,464,800
Total Capital Cost	**$0**	**$0**	**$0**	**$17,608,800**	**$17,608,800**

Table I-47. Water conservation measures cost - MRGCD Southern Pueblos, Indian Facilities Only.

Pueblo >	Cochiti	Isleta	Sandia	San Felipe	Santa Ana	Santo Domingo	Totals
Work Feature	*Cost of Material and Labor, plus 5% for mobilization*						
Concrete Lining of Earth Ditches, 1-ft bottom width	5,280,000	5,280,000	2,112,000	4,224,000	2,340,000	5,280,000	24,516,000
Concrete Lining of Earth Ditches, 2-ft bottom width	0	5,280,000	0	10,560,000	764,800	8,448,000	25,052,800
Sub Totals	$5,280,000	$10,560,000	$2,112,000	$14,784,000	$3,104,800	$13,728,000	$49,568,800
Add Unlisted Items (15%)	$792,000	$1,584,000	$316,800	$2,217,600	$465,720	$2,059,200	$7,435,320
Sub Totals	$6,072,000	$12,144,000	$2,428,800	$17,001,600	$3,570,520	$15,787,200	$57,004,120
Add Contingencies (25%)	$1,518,000	$3,036,000	$607,200	$4,250,400	$892,630	$3,946,800	$14,251,030
Construction Field Cost	**$7,590,000**	**$15,180,000**	**$3,036,000**	**$21,252,000**	**$4,463,150**	**$19,734,000**	**$71,255,150**
Add Construction Overhead Cost (45%)	$3,415,500	$6,831,000	$1,366,200	$9,563,400	$2,008,418	$8,880,300	$32,064,818
Total Capital Cost	**$11,005,500**	**$22,011,000**	**$4,402,200**	**$30,815,400**	**$6,471,568**	**$28,614,300**	**$103,319,968**

Table I-48. Totals Summarized by Pueblo.

	Indian Facilities			MRGCD Facilities			All Facilities
Pueblo	**Necessary Repair and Rehabilitation**	**Water Conservation**	**Total, Indian Facilities**	**Necessary Repair and Rehabilitation**	**Water Conservation**	**Total, MRGCD Facilities**	**Total, Indian + MRGCD Facilities**
Northern Pueblos							
Taos	13,980,945	0	13,980,945				13,980,945
Picuris	2,924,378	0	2,924,378				2,924,378
San Juan	1,904,077	1,073,453	2,977,530				2,977,530
Santa Clara	7,397,447	4,543,938	11,941,385				11,941,385
San Ildefonso	3,303,734	2,980,656	6,284,390				6,284,390
Nambe	1,750,041	7,395,363	9,145,404				9,145,404
Pojoaque	263,673	0	263,673				263,673
Tesuque	6,164,095	2,501,250	8,665,345				8,665,345
Subtotal, Northern Pueblos	**$37,688,390**	**$18,494,660**	**$56,183,050**				**$56,183,050**
Non-MRGCD Southern Pueblos							
Acoma	5,891,069	0	5,891,069				5,891,069
Laguna	15,791,225	0	15,791,225				15,791,225
Jemez	1,980,156	0	1,980,156				1,980,156
Zia	3,939,469	17,608,800	21,548,269				21,548,269
Subtotal, non-MRGCD Southern Pueblos	**$27,601,919**	**$17,608,800**	**$45,210,719**				**$45,210,719**
MRGCD Southern Pueblos							
Cochiti	525,263	11,005,500	11,530,763	835,834	0	835,834	12,366,597
Santo Domingo	1,220,610	28,614,300	29,834,910	1,394,447	0	1,394,447	31,229,357
San Felipe	895,031	30,815,400	31,710,431	1,798,816	0	1,798,816	33,509,247
Santa Ana	1,746,706	6,471,568	8,218,274	664,916	0	664,916	8,883,190
Sandia	1,103,468	4,402,200	5,505,668	2,913,956	0	2,913,956	8,419,624
Isleta	1,423,211	22,011,000	23,434,211	2,938,969	0	2,938,969	26,373,180
Subtotal, MRGCD Southern Pueblos	**$6,914,289**	**$103,319,968**	**$110,234,257**	**$10,546,938**	**$0**	**$10,546,938**	**$120,781,195**
Road Culverts all Pueblos	937,969	0	937,969	0	0	0	937,969
Total, All Pueblos	**$73,142,567**	**$139,423,428**	**$212,565,995**	**$10,546,938**	**$0**	**$10,546,938**	**$223,112,933**

Table I-49. Estimated capital costs for repair, rehabilitation, and water conservation, including improvements to facilities of the Middle Rio Grande Conservancy District.

Pueblo Grouping	Repair and Rehabilitation	Water Conservation Measures	Total, Repair and Rehabilitation + Water Conservation
Northern Pueblos	$37,688,000	$18,495,000	$56,183,000
Non-MRGCD Southern Pueblos	$18,972,000	$17,609,000	$36,581,000
Southern Pueblos, Including MRGCD Facilities	$17,461,000	$103,320,000	$120,781,000
Items for All Pueblos	$938,000	$0	$938,000
Total, All Pueblos, Including MRGCD Facilities	$75,059,000	$139,424,000	$214,483,000

Table I-50. Estimated capital costs for repair, rehabilitation, and water conservation, excluding improvements to facilities of the Middle Rio Grande Conservancy District.

Pueblo Grouping	Repair and Rehabilitation	Water Conservation Measures	Total, Repair and Rehabilitation + Water Conservation
Northern Pueblos	$37,688,000	$18,495,000	$56,183,000
Non-MRGCD Southern Pueblos	$18,972,000	$17,609,000	$36,581,000
Southern Pueblos, Excluding MRGCD Facilities	$6,914,000	$103,320,000	$110,234,000
Items for All Pueblos	$938,000	$0	$938,000
Total, All Pueblos, Excluding MRGCD Facilities	$64,512,000	$139,424,000	$203,936,000