Appendix B Cost Estimating Worksheets

ESTIMATE WORKSHEET BUREAU OF RECLAMATION SHEET_1_ OF _2_ PROJECT: FEATURE: Alternative 1: Lake Powell Source to Cameron North Central Arizona Water Supply Study plus Bitter Springs Spur REGION PRICE LEVEL: Jan 06 Appraisal Level Estimate FILE: H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water Supply\New Est\(\NCAWSS Round 3 - Total Est.xls)\Alt. 1 PLANT QUANTITY UNIT UNIT PRICE CODE DESCRIPTION PAY The estimates for the nine options are strictly comparative in nature, and represent costs only as an order of magnitude. They should not be taken to represent actual construction costs in any manner whatsoever. Refinements would be required for each option before an actual appraisal level cost estimate could be represented. D-8140 \$595,000.00 \$1,785,000.00 Fach 330 foot inclined bore 3 990 Lin Ft Included in Item Above 30 inch bore holes with 18-inch casings and Included in Item Above 12 inch Carrier Pipe 990 Lin Ft Included in Item Above Submersible Pump/Motor, 3600 gpm, 300 ft lift 3 Each D-8140 Forebay Tank, 10 FT Dia. X 20 FT High, Concrete, \$60,000.00 \$660,000.00 11 Each 11 required CY Included in Item Above 88 Total Concrete 38,500 LB Included in Item Above Total Steel, Reinforcement Pumping plants: D-8140 5 Each \$1,150,000.00 \$5,750,000.00 22.51 CFS, 400 FT Head 22.51 CFS, 387 FT Head D-8140 1 LS \$1,150,000.00 \$1,150,000.00 D-8140 1 LS \$670,000.00 \$670,000.00 22.51 CFS, 153 FT Head D-8140 1 LS \$920,000.00 \$920,000.00 17.42 CFS, 400 FT Head D-8140 1 LS \$430,000.00 \$430,000.00 17.42 CFS, 82 FT Head D-8140 1 LS \$180,000.00 \$180,000.00 1.38 CFS, 400 FT Head \$160,000.00 1.38 CFS, 305 FT Head D-8140 1 LS \$160,000.00 Air Chamber, Tank, Steel, Spherical, 20 FT Dia., 10 D-8420 11 required, Total Weight 671,000 LBS \$4.50 \$3,019,500.00 \$9,780,000.00 Excavation, Rock (assuming 60%) D-8140 978,000 CY \$10.00 \$2,608,000.00 652,000 CY \$4.00 Excavation D-8140 \$5,247,000.00 D-8140 1,166,000 CY \$4.50 Backfill CY \$11,520,000.00 D-8140 384,000 \$30.00 Embedment to O.D.+3", assumed commercial Furnishing and Installing the following diameters of steel pipe (all 500 ft. head class): 356,347 \$131.00 \$46,681,457.00 D-8140 30", .1875" Thick, 63 lb/ft 57,341 Ft \$87.00 \$4,988,667.00 D-8140 24", .1466" Thick, 40 lb/ft 74,659 Ft D-8140 \$39.00 \$2,911,701.00 10", .1345" Thick, 14.77 lb/ft 39,600 Ft \$35.00 \$1,386,000.00 D-8140 8", .1345" Thick, 11.89 lb/ft 96,730 \$28.00 \$2,708,440.00 6", .1345" Thick, 9.01 lb/ft D-8141 624,677 Subtotal this Sheet \$102,555,765.00 QUANTITIES PRICES CHECKED DK/ BON 7/18/06 Art Streifel DATE PREPARED DATE PREPARED PEER REVIEW 7/18/06 07-18-06 July 18, 200

ESTIMATE WORKSHEET

SHEET_2_ OF _2 _

FEAT	EATURE:				PROJECT:					
	Altern	ative 1: Lake Powe	ll Source to Cameron gs Spur		No	orth Centra	entral Arizona Water Supply Study			
1	Appra	isal Level Estimate	•	REGION	LC	PI	RICE LEVEL:	Jan 06		
				FILE:	H\D8170/EST\S	nreadsheet\Zar	nder\2006 JWZ Estimates\	N Central AZ Water		
							nd 3 - Total Est.xls]Alt. 1	Total and a state of the state		
PLANT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		should not be take	the nine options are strictly con en to represent actual construc ctual appraisal level cost estim	tion costs in any	manner what					
		Characa Taraka St		D-8140						
	-	Storage Tanks, St		D-0140	1	LS	\$700,000.00	\$700,000.0		
	-		100 ft Dia. X 25 ft High	_	1	LS	\$2,200,000.00	\$2,200,000.0		
	\vdash		p, 200 ft Dia. X 20 ft High penkopi, 500 ft Dia. X 25 ft High	.	1	LS	\$13,000,000.00	\$13,000,000.0		
			0 ft Dia. X 20 ft High		1	LS	\$2,200,000.00	\$2,200,000.0		
		Pressure Reducin	g Station					THE		
			30 Inch Diameter	D-8140	3	Each	\$80,000.00	\$240,000.0		
11110		Designing, furnish	ing and erecting		3	Each	\$60,000.00	\$180,000.0		
		One steel tank -								
		height: 10 feet								
		diameter: 20 fe	et							
		Power lines		D-8140	118	Miles	\$200,000.00	\$23,600,000.0		
		SCADA/Control S	ystems	D-8140						
		(Approx. 3%	of construction cost)		1	LS	\$4,340,000.00	\$4,340,000.0		
		Corrosion Monitor	ing	D-8140	1	LS	\$1,490,000.00	\$1,490,000.0		
			of construction cost)							
			Subtotal this Sheet					\$47,950,000.0		
	_							50.0084		
		Subtotal all Sheets	3					\$150,505,765.0		
		Mobiliza	ition @ 5%					\$7,500,000.0		
		Subtotal w/ Mobilization						\$158,005,765.0		
		Unlisted	I Items @ 15%			constanta		\$21,994,235.0		
		Allowan	ce for Procurement Strategies	@ 0%						
		Contract Cost						\$180,000,000.0		
		Conting	encies @ 25%			2-7-2-11 1-e		\$50,000,000.0		
	-	Field Cost						\$230,000,000.0		
		NOTE: Non-contra	act costs are to be provided by	others. This est	imate does n	ot include n	on-contract costs at	this time.		
		QUANTITIES					RICES			
54	_	QUA		ву			- aura			
BY	Art Strei	fel	CHECKED	Dan Mar	AN	СНЕ	BO	18/06		
DATE PREP	PARED	July 18, 20	PEER REVIEW 06	DATE PREPAR	7-/8-06	PEE	R REVIEW 7/	18/06		

ESTIMATE WORKSHEET SHEET_1_ OF _2_ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 1: Two Guns Wellfield to Flagstaff North Central Arizona Water Supply Study C Aquifer PRICE LEVEL: Jan 06 REGION Appraisal Level Estimate FILE: H:\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water SupplyNew Est\NCAWSS Round 3 - Total Est.xis]Alt. 1-Xii(X) PLANT PAY ITEM UNIT PRICE AMOUNT CODE QUANTITY UNIT DESCRIPTION The estimates for the nine options are strictly comparative in nature, and represent costs only as an order of magnitude. They should not be taken to represent actual construction costs in any manner whatsoever. Refinements would be required for each option before an actual appraisal level cost estimate could be represented. D-8140 Well Field Gathering System \$83.00 \$438,240.00 5,280 Lin Ft 24" PVC Pipe, DR25 C905 \$580,800.00 \$55.00 10,560 Lin Ft 18" PVC Pipe, DR25 C905 \$35.00 \$184,800.00 5,280 Lin Ft 14" PVC Pipe, DR25 C905 \$26.00 \$411,840.00 15,840 Lin Ft 12" PVC Pipe, DR25 C900 \$601,920.00 10" PVC Pipe, DR25 C900 31,680 Lin Ft \$19.00 \$14.00 \$443,520.00 31,680 Lin Ft 8" PVC Pipe, DR25 C900 31,680 Lin Ft \$12.00 \$380,160.00 6" PVC Pipe, DR25 C900 Storage Tank, Steel, 500 ft Dia. X 38 ft High LS \$17,500,000.00 \$17,500,000.00 (8,835,729 ft3) Wells with Pumps 12" Wells - 1200ft deep D-8140 26 Ea \$360,000.00 \$9,360,000.00 150 hp Submersible pumps, 500 gpm Wellfield: D-8140 126,120 CY \$10.00 \$1,261,200.00 Excavation, Rock (assuming 60%) 84,080 CY \$4.00 \$336,320.00 D-8140 Excavation \$793,098.00 D-8140 176,244 CY \$4.50 Backfill \$903,960.00 30,132 CY \$30.00 Embedment to O.D.+3", assume commercial D-8140 D-8140 Forebay Tank, 10 FT Dia. X 20 FT High, Concrete, \$60,000.00 \$300,000.00 5 Each 5 required 50 CY Included in Item Above **Total Concrete** 17,500 LB Included in Item Above Total Steel, Reinforcement Pumping plants: \$5,600,000.00 D-8140 4 Each \$1,400,000.00 28.43 CFS, 400 FT Head 1 LS \$520,000.00 \$520,000.00 28.43 CFS, 42 FT Head D-8140 Air Chamber, Tank, Steel, Spherical, 20 FT Dia., D-8420 305,000 LBS \$4.50 \$1,372,500.00 5 required, Total Weight \$40,988,358.00 Subtotal this Sheet PRICES QUANTITIES CHECKED DV for CHECKED BOV 7/18/06 D.L. Maag Art Streifel PEER REVIEW DATE PREPARED 7/18/06 DATE PREPARED 07-18-06 July 18, 200

ESTIMATE WORKSHEET

SHEET_2_ OF _2_

FEATURE:			PROJECT:						
	Alterna C Aqui	ative 1: Two Guns Wo ifer	ellfield to Flagstaff	North Central Arizona Water Supply Study					
	Apprai	sal Level Estimate		REGION	LC		PRICE LEVEL:	Jan 06	
				FILE:				ALL TENNOT V VALUE OF THE	
							\Zander\2006 JWZ Estimate Round 3 - Total Est.xls]Alt. 1		
PLANT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT		AMOUNT	
		should not be taken	e nine options are strictly con to represent actual construct ual appraisal level cost estim	ion costs in any	manner wha	resent co atsoever	osts only as an order . Refinements would	of magnitude. They be required for each	
		Pipeline:							
		Excavation, Rock (a	ssuming 100%)	D-8140	701,000	CY	\$10.00	\$7,010,000.00	
	- Inches			D 0140	440,000	CY	\$4.50	\$2,020,500.00	
	-	Backfill Embedment to O.D.	+3", assumed commercial	D-8140 D-8140	449,000 202,000	CY	\$30.00	\$6,060,000.00	
		Embedment to 0.5.	70 , document commercial						
		Furnishing and Insta	illing the following diameters						
		of steel pipe (all 50	0 ft. head class):						
		36", .25" Thick	100 lb/ft	D-8140	184,694	Ft	\$202.00	\$37,308,188.00	
		Power lines		D-8140	35	Miles	\$200,000.00	\$7,000,000.00	
				D-8140		100			
		SCADA/Control Sys					60.040.000.00		
		(3% of constru	ction cost)		1	LS	\$3,010,000.00	\$3,010,000.00	
1100	-	Corrosion Monitoring		D-8140	1	LS	\$1,030,000.00	\$1,030,000.0	
		(1% of constru							
	-	ļ				-			
			Subtotal this Sheet					\$63,438,688.00	
	-	-						1000	
		Subtotal all Sheets						\$104,427,046.00	
		Mobilizati	on @ 5%					\$5,200,000.00	
		Subtotal w/ Mobiliza	tion					\$109,627,046.00	
			tems @ 15%			_		\$15,372,954.00	
	_	-	for Procurement Strategies	@ 0%				6405 000 000 00	
-		Contract Cost				-		\$125,000,000.00 \$35,000,000.00	
9	+-	Field Cost	ncies @ 25%					\$160,000,000.00	
	NOTE: Non-contract costs are to be provided		t costs are to be provided by	led by others. This estimate does not include non-contract costs at this time.					
		QUAN	TITIES				PRICES		
ву	Art Strait		CHECKED	BY D.L. Maag	for			7/18/06	
Art Streifel DATE PREPARED July 18, 2006		PEER REVIEW	DATE PREPAR	B-06		PEER REVIEW	7/18/06		

BUREAU OF RECLAMATION ESTIMATE W					PRKSH	EET	S	HEET_1_ OF _1_			
FEAT	FEATURE:				PROJECT:						
Alternative 1				l	No	rth Central	n Central Arizona Water Supply Study				
		ns - R Aquifer		REGION	LC	PF	RICE LEVEL:	Jan 06			
				FILE:							
	Appra	isal Level Estimate		A CONTRACTOR OF THE PARTY OF TH	H:\D8170\EST\S Supply\New Est\	oreadsheet\Zan NCAWSS Rou	ider\2006 JWZ Estimates\I nd 3 - Total Est.xls]Alt. 1-R	N Central AZ Water Aquiter			
PLANT	рау пем		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT			
		should not be take	the nine options are strictly compa en to represent actual construction actual appraisal level cost estimate	costs in any	manner wha	esent costs itsoever. R	only as an order of efinements would b	magnitude. They e required for each			
	-	Well Field Gatheri	ng System	D-8140							
			e, DR25 C900		5,280	Lin Ft	\$19.00	\$100,320.00			
	1	8" PVC Pipe			10,560	Lin Ft	\$14.00	\$147,840.00			
_	1	6" PVC Pipe			10,560	Lin Ft	\$12.00	\$126,720.00			
		4" PVC Pipe			31,680	Lin Ft	\$8.00	\$253,440.00			
1000	-	Storage Tan	k, Steel, 200 ft Dia. X 28 ft High		1	LS	\$2,200,000.00	\$2,200,000.0			
			6 ft ³ , 200 ft Dial.x28 ft High)								
		Wells with Pumps						10/2			
		12" Wells - 4000ft	deep (Use \$5,000,000. per well)								
	150 hp Submersible pumps, 250 gpm			D-8140	6	Ea	\$5,000,000.00	\$30,000,000.0			
		Excavation,Rock	(assuming 60%)	D-8140	25,200	CY	\$10.00	\$252,000.0			
		Excavation		D-8140	16,800	CY	\$4.00	\$67,200.0			
		Backfill	0-1	D-8140	38,000	CY	\$4.50	\$171,000.0			
			D.+3", assume commercial	D-8140	3,000	CY	\$30.00	\$90,000.0			
		Power lines		D-8140	6	Miles	\$200,000.00	\$1,200,000.0			
		SCADA/Control S	ystems	D-8140				49 - 19			
		(3% of const	ruction cost)		1	LS	\$1,040,000.00	\$1,040,000.0			
		Subtotal all Sheet	9					\$35,648,520.0			
			ation @ 5%					\$1,800,000.0			
		Subtotal w/ Mobili						\$37,448,520.0			
	-		d Items @ 15%					\$5,551,480.0			
			nce for Procurement Strategies @	0%							
		Contract Cost		T				\$43,000,000.0			
			encies @ 25%					\$11,000,000.0			
- 10000	Field Cost							\$54,000,000.0			
		NOTE: Non-contra	act costs are to be provided by oth	l ners. This es	timate does	not include	non-contract costs a	at this time.			
	_	OUA	NTITIES			P	RICES				
ву		407	CHECKED	BY DW	for			7/18/04			
DATE PREF	Art Strei	fel	PEER REVIEW	D.L. Maag DATE PREPAR		PE	ER REVIEW 7/1	10/10			
DATE PREPARED					8-06		911	18/06			

ESTIMATE WORKSHEET BUREAU OF RECLAMATION SHEET_1_ OF _2_ PROJECT: FEATURE: Alternative 1 Grand Canyon/Tusayan -Phantom Ranch Infiltration North Central Arizona Water Supply Project Gallery REGION PRICE LEVEL: Jan 06 Grand Canyon Pipeline Project Bright Angel Creek Infiltration Gallery FILE: H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water Supply\New Est[\NCAWSS Round 3 - Total Est.xis]GC-TUSAYAN Appraisal Level Estimate PLANT QUANTITY UNIT PRICE AMOUNT DESCRIPTION UNIT CODE PAY 1,858 \$353,020.00 D-8140 CY \$190.00 Assume 100% rock, trail 5 ft wide(cover=3 ft over pipe) 1,752 \$227,760.00 \$130.00 2 Backfill, Pipeline D-8140 CY 96 \$880.00 \$84,480.00 Backfill, Select, Pipeline D-8140 CY 3 Excavation, Power Cable D-8140 574 CY \$640.00 \$367,360.00 546 \$546,000.00 D-8140 CY \$1,000.00 Backfill, Select, Power Cable 5 D-8140 6 Pipe, Steel 1,500 \$150,000.00 \$100.00 12B100, t=0.1345, 17.64 lb/ft FT 4,000 \$140,000.00 4B200, t=.1345, 6.14 lb/ft FT \$35.00 15.500 \$465,000.00 FT \$30.00 Power Cable - medium voltage 5 Kv line Installed in pipe trench and along existing pipeline Trench depth = 2 ft. & width = 6*, backfill with select backfill Pumping Plant D-8140 \$1,800,000.00 \$1,800,000.00 8 Concrete = 100 CY Excavation = 1,130 CY Backfill, Compacted = 785 CY 2 pumps: Q=3.36 cfs, H=4938 ft Infiltration Gallery D-8140 \$700,000.00 \$700,000.00 36D25 concrete pipe = 85 ft. Concrete = 10 CY Uniformly graded gravel = 90 CY Excavation = 290 CY Backfill, Compacted = 50 CY Riprap = 165 CY Conventional Treatment Plant at South Rim D-8140 \$5,000,000.00 \$5,000,000.00 10 \$50,000.00 D-8140 \$50,000.00 11 Treatment Plant, Package @ Phantom Ranch LS Q = 14,000 gal/day D-8140 LS \$130,000.00 \$130,000.00 12 Tank, Storage, Concrete (65,000 gal., 23' high, 22' dia.) \$10,013,620.00 Subtotal this Sheet PRICES QUANTITIES CHECKED D.L. Maag BON 7/18/06 DATE PREPARED DATE PREPARED PEER REVIEW 07-18.06

ESTIMATE WORKSHEET SHEET_2_ OF _2_ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 1 Grand Canyon/Tusayan -Phantom Ranch Infiltration North Central Arizona Water Supply Project Gallery REGION PRICE LEVEL: Jan 06 Grand Canyon Pipeline Project Bright Angel Creek Infiltration Gallery FILE: H:\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water Supply\New Est\NCAWSS Round 3 - Total Est.xls]GC-TUSAYAN Appraisal Level Estimate TEM QUANTITY UNIT UNIT PRICE AMOUNT DESCRIPTION CODE PAY \$360,000.00 \$360,000.00 LS D-8140 13 SCADA/Control Systems (3% of construction cost) \$1,400,000.00 \$200,000.00 Power lines D-8140 MI 14 \$140,000.00 \$140,000.00 D-8140 15 Corrosion Monitoring (1% of construction cost) Grand Canyon to Tusayan Forebay Tank, 10 FT Dia. X 20 FT High, Concrete, D-8140 16 \$60,000.00 1 Each \$60,000.00 1 required 8 CY Included in Item Above Total Concrete LB Total Steel, Reinforcement 3,500 Included in Item Above 17 Pumping plants: 1 LS \$150,000.00 D-8140 \$150,000.00 1.17 CFS, 284 FT Head D-8420 Air Chamber, Tank, Steel, Spherical, 20 FT Dia., 10 \$4.50 \$274,500.00 61,000 LBS 1 required, Total Weight Excavation, Rock (assuming 60%) D-8140 25,800 CY \$10.00 \$258,000.00 19 \$68,800.00 17,200 CY D-8140 \$4.00 Excavation 20 39,000 CY \$4.50 \$175,500.00 D-8140 21 Backfill 4,000 CY \$30.00 \$120,000.00 D-8140 Embedment to O.D.+3", native material 22 Furnishing and Installing the following diameters of steel pipe (all 500 ft. head class): 34,400 FT \$28.00 \$963,200.00 D-8140 6", .1345" Thick, 9.01 lb/ft \$3,970,000.00 Subtotal This Sheet \$13,983,620.00 Subtotal all Sheets \$4,900,000.00 Mobilization @ 35% (Helicopter Influenced) \$18,883,620.00 Subtotal w/ Mobilization \$3,116,380.00 Unlisted Items @ 15% Allowance for Procurement Strategies @ 0% \$22,000,000.00 Contract Cost \$5,000,000.00 Contingencies @ 25% \$27,000,000.00 Field Cost NOTE: Non-contract costs are to be provided by others. This estimate does not include non-contract costs at this time. PRICES QUANTITIES De for CHECKED BM 7/18/00 CHECKED DATE PREPARED PEER REVIEW DATE PREPARED 7/18/06 07-18-06

ESTIMATE WORKSHEET SHEET_1_OF_2_

FEATURE:		PROJECT:							
Alternati	ve 2: Ho	pi/Navajo/Flagstaff - plus Bitter Springs	Lake Powell Pipeline		Nor	th Centra	al Arizona Water Su	pply Study	
		p p 3.	1.76	REGION	LC	T,	PRICE LEVEL: J	an 06	
Appraisa	Appraisal Level Estimate			FILE: H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Wat SupplyNew Est\NCAWSS Round 3 - Total Est xis All 2					
PLANT	PAY ITEM	4	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		should not be taken	ne nine options are strictly compa to represent actual construction tual appraisal level cost estimate	costs in any	manner wha	resent cos atsoever.	sts only as an order of Refinements would	of magnitude. They be required for each	
		7.40		D-8140					
A	-	Intakes (7 of these		D-6140	7	Each	\$505,000,00	\$4,165,000.00	
		330 foot incline					\$595,000.00 Included in Item		
	-		ole with 18-inch casings and		2,310	Lin Ft	Included in Item /		
		12 inch carrier Submersible P	ump/Motor, 3600 gpm, 300 ft lift		7	LS	Included in Item		
		Forebay Tank, 10 F	T Dia. X 20 FT High, Concrete,	D-8140					
		19 required	2 10 ATT 2 ATT	on and a second	19	Each	\$60,000.00	\$1,140,000.00	
		Total Concrete			152	CY	Included in Item	Above	
		Total Steel, Re	einforcement		66,500	LB	Included in Item	Above	
		Pumping plants:							
		50.95 CFS, 40	0 FT Head	D-8140	6	Each	\$2,400,000.00	\$14,400,000.00	
		50.95 CFS, 40	0 FT Head	D-8140	1	LS	\$2,400,000.00	\$2,400,000.00	
		28.43 CFS, 40	0 FT Head	D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
		28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
2000	1	28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
	1	28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
		28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
		28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
		28.43 CFS, 40		D-8140	1	LS	\$1,400,000.00	\$1,400,000.00	
		28.43 CFS, 21		D-8140	1	LS	\$950,000.00	\$950,000.00	
		17.42 CFS, 40		D-8140	1	LS	\$920,000.00	\$920,000.00	
- ×1:		17.42 CFS, 10	9 FT Head	D-8140	1	LS	\$480,000.00	\$480,000.00	
		1.38 CFS, 400	FT Head	D-8140	1	LS	\$180,000.00	\$180,000.00	
		1.38 CFS, 293	FT Head	D-8141	1	LS	\$160,000.00	\$160,000.00	
	1	Air Chamber, Tank,	Steel, Spherical, 20 FT Dia.,	D-8420					
	1	19 required, To	Control of the Contro	3007777	1,159,000	LBS	\$4.50	\$5,215,500.00	
	1	Excavation, Rock (as		D-8140	1,975,200	CY	\$10.00	\$19,752,000.00	
	1	Excavation		D-8140	1,316,800	CY	\$4.00	\$5,267,200.00	
		Backfill		D-8140	2,112,000	CY	\$4.50	\$9,504,000.00	
	Embedment to O.D.+3", assume commercial		D-8140	937,000	CY	\$30.00	\$28,110,000.00		
Subtotal this Sheet							\$102,443,700.00		
		QUAN	TITIES			_	PRICES		
ву	Art Streif	el	CHECKED	BY Dan Mar	3K/	C	HECKED BON S	7/18/06	
DATE PREPARED PEER REVIEW July 18, 2006		#17999##01107#1093#7011	DATE PREPAR	8-06	Р	EER REVIEW	18/06		

174 Miles

LS

LS

\$200,000.00

\$10,300,000.00

\$3,540,000.00

\$34,800,000.00

\$10,300,000.00

\$3,540,000.00

\$254,675,250.00

\$357,118,950.00

\$18,000,000.00

\$375,118,950.00

\$54,881,050.00

\$430,000,000.00

\$110,000,000.00

ESTIMATE WORKSHEET SHEET_2_ OF _2 _ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 2: Hopi/Navajo/Flagstaff - Lake Powell Pipeline North Central Arizona Water Supply Study plus Bitter Springs Spur PRICE LEVEL: REGION FILE: Appraisal Level Estimate H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estirnates\N Central AZ Water SupplyNew Est\NCAWSS Round 3 - Total Est.xis]Alt. 2 PLANT QUANTITY UNIT UNIT PRICE AMOUNT DESCRIPTION PAY The estimates for the nine options are strictly comparative in nature, and represent costs only as an order of magnitude. They should not be taken to represent actual construction costs in any manner whatsoever. Refinements would be required for each option before an actual appraisal level cost estimate could be represented. Furnishing and Installing the following diameters of steel pipe (all 500 ft. head class): \$291.00 \$103.696.977.00 D-8140 356,347 Lin Ft 42", .3125" Thick, 146 lb/ft \$202.00 \$74,595,166.00 36", .25" Thick, 100 lb/ft D-8140 369,283 Lin Ft \$87.00 \$4,988,667.00 D-8140 57,341 Lin Ft 24", .1466" Thick, 40 lb/ft D-8140 39,600 Lin Ft \$35.00 \$1,386,000.00 8", .1345" Thick, 11.89 lb/ft \$2,708,440.00 6", .1345" Thick, 9.01 lb/ft D-8140 96,730 Lin Ft \$28.00 919,301 D-8140 Storage Tanks, Steel \$700,000.00 \$700,000.00 1 LS Coppermine, 100 ft Dia. X 25 ft High Bodaway Gap, 200 ft Dia. X 20 ft High \$2,200,000.00 1 LS \$2,200,000.00 \$13,000,000.00 Tuba City/Moenkopi, 500 ft Dia. X 25 ft High 1 LS \$13,000,000.00 \$2,200,000.00 \$2,200,000.00 1 LS Cameron, 200 ft Dia. X 20 ft High Pressure Reducing Station \$320,000.00 D-8140 4 LS \$80,000.00 In-line PRV, 30 Inch Diameter 4 Each \$60,000.00 \$240,000.00 Designing, furnishing and erecting One steel tank height: 10 feet; Diameter: 20 feet

D-8140

D-8140

NOTE: Non-contra	ct costs are to be provide	ded by others. This estimate does r	not include non-contract costs at this time.				
QUAN	NTITIES	PRICES					
BY Art Streifel	CHECKED	BY Dan Mar	CHECKED BW 7/18/00				
DATE PREPARED July 18, 200	PEER REVIEW	DATE PREPARED	PEER REVIEW 7/18/06				

Power lines

Subtotal all Sheets

Contract Cost

Field Cost

Subtotal w/ Mobilization

SCADA/Control Systems (3% of Constr. costs)

Subtotal this Sheet

Allowance for Procurement Strategies @ 0%

Corrosion Monitoring (1% of Constr. costs)

Mobilization @ 5%

Unlisted Items @ 15%

Contingencies @ 25%

FEAT	URE:			PROJE	CT:				
	Altern	ative 2			Nor	rth Central Arizona Water Supply Study			
	7.0000000000000000000000000000000000000	ns - R Aquifer		REGION	LC	Р	RICE LEVEL: J	an 06	
Appraisal Level Estimate			FILE:	H:\D8170\EST\S	preadsheet/Z	ander/2006 JWZ Estimates\ und 3 - Total Est.xls]Alt. 2-R	N Central AZ Water		
PLANT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
- A	à	should not be taken	ne nine options are strictly compa to represent actual construction tual appraisal level cost estimate	costs in any	manner wha	esent cost	s only as an order of Refinements would b	magnitude. They e required for each	
	-	Well Field Gatherin		D-8140	5.000		640.00	£400 000 00	
	-	10" PVC Pipe,			5,280		\$19.00	\$100,320.00	
	-	8" PVC Pipe, I			10,560	Lin Ft	\$14.00 \$12.00	\$147,840.00 \$126,720.00	
		6" PVC Pipe, I 4" PVC Pipe, I			31,680	Lin Ft	\$8.00	\$253,440.00	
			Steel, 200 ft Dia. X 28 ft High ft ³ , 200 ft Dial.x28 ft High)		1	LS	\$2,200,000.00	\$2,200,000.00	
		Wells with Pumps							
		150 hp Submersible	deep (Use \$5,000,000. per well) e pumps, 250 gpm	D-8140	6	Ea	\$5,000,000.00	\$30,000,000.00	
	1	Excavation,Rock (a	ssuming 60%)	D-8140	25,200	CY	\$10.00	\$252,000.00	
		Excavation		D-8140	16,800	CY	\$4.00	\$67,200.00	
		Backfill		D-8140	38,000	CY	\$4.50	\$171,000.00	
		Embedment to O.D	.+3", assume commercial	D-8140	3,000	CY	\$30.00	\$90,000.00	
		Power lines		D-8140	6	Miles	\$200,000.00	\$1,200,000.00	
		SCADA/Control Sys	stems	D-8140					
		(3% of constru			1	LS	\$1,040,000.00	\$1,040,000.00	
		Subtotal all Sheets						\$35,648,520.00	
		Mobilizat	ion @ 5%					\$1,800,000.00	
		Subtotal w/ Mobiliza	ation					\$37,448,520.00	
	-		Items @ 15%	00/				\$5,551,480.00	
-	-		e for Procurement Strategies @	U%		-	-	\$43,000,000.00	
		Contract Cost	ncies @ 25%	-			-	\$11,000,000.00	
		Field Cost	TICIES & 2376					\$54,000,000.00	
		11000 0001							
	ļ	NOTE: Non-contract	ct costs are to be provided by oth	ners. This es	timate does	not include	non-contract costs a	at this time.	
	-								
	_	QUAN	TITIES			F	PRICES		
зү	Art Strei	el	CHECKED	BY X D.L. Maag	for	C	BOV 5	7/18/06	
			PEER REVIEW	DATE PREPARED			PEER REVIEW 7/18/06		

DATE PREPARED

ESTIMATE WORKSHEET SHEET_1_ OF _2_ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 2 Grand Canyon/Tusayan -Phantom Ranch Infiltration North Central Arizona Water Supply Project Gallery REGION PRICE LEVEL: Jan 06 Grand Canyon Pipeline Project FILE: Bright Angel Creek Infiltration Gallery H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water Supply\New Est\\NCAWSS Round 3 - Total Est xls]GC-TUSAYAN (2) Appraisal Level Estimate PLANT UNIT PRICE CODE QUANTITY UNIT AMOUNT DESCRIPTION PAY 1,858 \$353,020.00 CY \$190.00 Excavation, Pipeline D-8140 1 Assume 100% rock, trail 5 ft wide(cover=3 ft over pipe) D-8140 1,752 CY \$130.00 \$227,760.00 Backfill, Pipeline 2 96 \$880.00 \$84,480.00 CY Backfill, Select, Pipeline D-8140 3 D-8140 574 CY \$640.00 \$367,360.00 Excavation, Power Cable 4 \$546,000.00 546 \$1,000.00 CY 5 Backfill, Select, Power Cable D-8140 D-8140 6 Pipe, Steel 1.500 FT \$100.00 \$150,000.00 12B100, t=0.1345, 17.64 lb/ft 4.000 \$35.00 \$140,000.00 4B200, t=.1345, 6.14 lb/ft FT 15,500 \$30.00 \$465,000.00 D-8140 Power Cable - medium voltage 5 Kv line Installed in pipe trench and along existing pipeline Trench depth = 2 ft. & width = 6", backfill with select backfill \$1,800,000.00 \$1,800,000.00 D-8140 LS Pumping Plant Concrete = 100 CY Excavation = 1,130 CY Backfill, Compacted = 785 CY 2 pumps: Q=3.36 cfs, H=4938 ft \$700,000.00 \$700,000.00 D-8140 Infiltration Gallery 9 36D25 concrete pipe = 85 ft. Concrete = 10 CY Uniformly graded gravel = 90 CY Excavation = 290 CY Backfill, Compacted = 50 CY Riprap = 165 CY \$5,000,000.00 \$5,000,000.00 Conventional Treatment Plant at South Rim D-8140 LS 10 11 Treatment Plant, Package @ Phantom Ranch D-8140 LS \$50,000.00 \$50,000.00 Q = 14,000 gal/day \$130,000.00 D-8140 LS \$130,000.00 12 Tank, Storage, Concrete (65,000 gal., 23' high, 22' dia.) \$10,013,620.00 Subtotal this Sheet PRICES QUANTITIES BY DW for CHECKED D.L. Maag DATE PREPARED PEER REVIEW DATE PREPARED 7/18/06 07-18-06

ESTIMATE WORKSHEET SHEET_2_ OF _2_ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 2 Grand Canyon/Tusayan -Phantom Ranch Infiltration North Central Arizona Water Supply Project Gallery REGION PRICE LEVEL Jan 06 Grand Canyon Pipeline Project Bright Angel Creek Infiltration Gallery FILE: H\D8170\EST\Spreadshee\Zander\2006 JWZ Estimates\N Central AZ Water SupplyNew Est\NCAWSS Round 3 - Total Est.xls]GC-TUSAYAN (2) Appraisal Level Estimate TEM UNIT PRICE AMOUNT DESCRIPTION CODE QUANTITY UNIT PAY \$360,000.00 \$360,000.00 D-8140 LS SCADA/Control Systems (3% of construction cost) Power lines D-8140 MI \$200,000.00 \$1,400,000.00 14 \$140,000.00 \$140,000.00 D-8140 LS 15 Corrosion Monitoring (1% of construction cost) Grand Canyon to Tusayan D-8140 Forebay Tank, 10 FT Dia. X 20 FT High, Concrete, 16 \$60,000.00 \$60,000.00 1 required 1 Each 8 CY Total Concrete Included in Item Above 3,500 LB Included in Item Above Total Steel, Reinforcement 17 Pumping plants: 1 LS \$150,000.00 \$150,000.00 1.17 CFS, 284 FT Head D-8140 Air Chamber, Tank, Steel, Spherical, 20 FT Dia., 10 D-8420 61,000 LBS \$4.50 \$274,500.00 1 required, Total Weight 25,800 CY D-8140 \$10.00 \$258,000.00 Excavation, Rock (assuming 60%) 19 17,200 CY D-8140 \$68,800.00 Excavation \$4.00 20 D-8140 39,000 CY \$4.50 \$175,500.00 21 Backfill 4,000 CY \$120,000.00 Embedment to O.D.+3*, native material D-8140 \$30.00 Furnishing and Installing the following diameters of steel pipe (all 500 ft. head class): 6", .1345" Thick, 9.01 lb/ft D-8140 34,400 FT \$28.00 \$963,200.00 Subtotal This Sheet \$3,970,000.00 \$13,983,620.00 Subtotal all Sheets \$4,900,000.00 Mobilization @ 35% (Helicopter Influenced) \$18,883,620.00 Subtotal w/ Mobilization \$3,116,380.00 Unlisted Items @ 15% Allowance for Procurement Strategies @ 0% Contract Cost \$22,000,000.00 \$5,000,000.00 Contingencies @ 25% \$27,000,000.00 Field Cost NOTE: Non-contract costs are to be provided by others. This estimate does not include non-contract costs at this time. QUANTITIES PRICES BY ST for CHECKED CHECKED BAV 7/18/06 D.L. Maag DATE PREPARED DATE PREPARED PEER REVIEW 2/18/06

07-18-06

ESTIMATE WORKSHEET SHEET_1_OF _2_ BUREAU OF RECLAMATION PROJECT: FEATURE: Alternative 3: Navajo/Hopi/Flagstaff/Williams/ North Central Arizona Water Supply Study Grand Canyon/Tusayan - Lake Powell Pipeline REGION PRICE LEVEL: Jan 06 LC plus Bitter Spings Spur FILE: Appraisal Level Estimate H\D8170\EST\Spreadsheet\Zander\2006 JWZ Estimates\N Central AZ Water Supply\New Est\[\NCAWSS Round 3 - Total Est.xls]Alt. 3-1 Ea PLANT DESCRIPTION CODE QUANTITY UNIT UNIT PRICE AMOUNT PAY The estimates for the nine options are strictly comparative in nature, and represent costs only as an order of magnitude. They should not be taken to represent actual construction costs in any manner whatsoever. Refinements would be required for each option before an actual appraisal level cost estimate could be represented. D-8140 Intakes (8 of these required) \$595,000.00 \$4,760,000.00 8 Each 330 foot inclined bore 2,640 included in Item Above Lin Ft 30-inch bore hole with 18-inch casings and 2,640 Included in Item Above Lin Ft 12 inch carrier pipes Submersible Pump/Motor, 3600 gpm, 300 ft lift 8 LS Included in Item Above Forebay Tank, 10 FT Dia. X 20 FT High, Concrete, D-8140 \$1,860,000.00 31 Each \$60,000.00 31 required CY 248 Included in Item Above **Total Concrete** 108,500 LB Included in Item Above Total Steel, Reinforcement Pumping plants: D-8140 \$13,500,000.00 \$2,700,000.00 57.63 CFS, 400 FT Head 5 Each \$2,900,000.00 \$2,900,000.00 1 LS 57.63 CFS, 446 FT Head 8 LS \$1,550,000.00 \$12,400,000.00 31.76 CFS, 400 FT Head \$1,050,000.00 31.76 CFS, 206 FT Head 1 LS \$1,050,000.00 \$280,000.00 \$280,000.00 3.33 CFS, 418 FT Head 1 118 1 LS \$220,000.00 \$220,000,00 3.33 CFS, 258 FT Head 1 LS \$170,000.00 \$170,000.00 1.36 CFS, 400 FT Head 1 LS \$150,000.00 \$150,000.00 1.36 CFS, 239 FT Head 9 LS \$270,000.00 \$2,430,000.00 3.36 CFS, 400 FT Head 1 LS \$210,000.00 \$210,000.00 3.36 CFS, 224 FT Head 1 LS \$190,000.00 \$190,000.00 3.36 CFS, 158 FT Head 1 LS \$960,000.00 \$960,000.00 17.42 CFS, 410 FT Head 31 D-8420 Air Chamber, Tank, Steel, Spherical, 20 FT Dia., 18 \$8,509,500.00 1,891,000 LBS \$4.50 31 required, Total Weight \$10.00 \$26,040,000.00 D-8140 2,604,000 CY Excavation, Rock (assuming 60%) D-8140 1,736,000 CY \$4.00 \$6,944,000.00 Excavation 2,883,000 CY \$12,973,500.00 Backfill D-8140 \$4.50 1,157,000 CY \$30.00 \$34,710,000.00 D-8140 Embedment to O.D.+3", assumed commercial \$130,257,000.00 Subtotal this Sheet PRICES QUANTITIES CHECKED 200 CHECKED BOV 7/18/06 Art Streife DATE PREPARED PEER REVIEW DATE PREPARED 07-18-06 July 18, 200

ESTIMATE WORKSHEET SHEET_2_OF_2_

FEAT	JRE:		PROJECT:					
	ve 3: Na	vajo/Hopi/Flagstaff/Williams/ Canyon/Tusayan - Lake Powell Pipeline		No	rth Cent	entral Arizona Water Supply Study		
ā.		itter Spings Spur	REGION	LC		PRICE LEVEL:	Jan 06	
Appraisa			FILE:					
Appraisa				H:\D8170\EST\Si Supply\New Est\	ncadsheet NCAWSS F	Zander\2006 JWZ Estimates Round 3 - Total Est.xls\Alt. 3-	N Central AZ Water 1 Ea	
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT		AMOUNT	
		The estimates for the nine options are strictly com should not be taken to represent actual construction option before an actual appraisal level cost estima	on costs in any	manner what	sent cos soever.	ts only as an order of Refinements would be	magnitude. They e required for each	
		Funciables and lesselling the following diameters		- No.				
	-	Furnishing and Installing the following diameters			_			
	-	of steel pipe (all 500 ft. head class):	D-8140	356,347	Ft	\$322.00	\$114,743,734.00	
	_	48", .3125" Thick, 166 lb/ft 36", .25" Thick, 100 lb/ft	D-8140	369,283	Ft	\$202.00	\$74,595,166.00	
	-	24", .1466" Thick, 40 lb/ft	D-8140	57,341	Ft	\$87.00	\$4,988,667.00	
		12", .1345" Thick, 17.64 lb/ft	D-8141	472,666	Ft	\$44.00	\$20,797,304.00	
		8", .1345" Thick, 11.89 lb/ft	D-8142	39,600	Ft	\$35.00	\$1,386,000.00	
		6", .1345" Thick, 9.01 lb/ft	D-8143	123,764	Ft	\$28.00	\$3,465,392.00	
_	-	Storage Tanks, Steel	D-8140					
		Coppermine, 100 ft Dia. X 20 ft High		1	LS	\$700,000.00	\$700,000.00	
	_	Bodaway Gap, 200 ft Dia. X 20 ft High		1	LS	\$2,200,000.00	\$2,200,000.00	
		Tuba City/Moenkopi, 500 ft Dia. X 25 ft High		1	LS	\$13,000,000.00	\$13,000,000.00	
		Cameron, 200 ft Dia. X 20 ft High		1	LS	\$2,200,000.00	\$2,200,000.0	
_	Pressure Reducing Station							
		In-line PRV, 36 Inch Diameter	D-8140	4	Each	\$100,000.00	\$400,000.00	
		Designing, furnishing and erecting		4	Each	\$60,000.00	\$240,000.0	
		One steel tank -						
		height: 10 feet ; diameter: 20 feet			-			
			D-8140	269	Miles	\$200,000.00	\$53,800,000.0	
	-	Power lines	D-8140	209	ivilles	\$200,000.00	\$33,000,000.0	
		SCADA/Control Systems (3% of Constr. Costs)	D-8140	1	LS	\$4,460,000.00	\$4,460,000.0	
	1	Corrosion Monitoring (1% of Constr. Costs)	D-8140	1	LS	\$1,530,000.00	\$1,530,000.0	
	1	Subtotal this Sheet					\$298,506,263.0	
	1	Subtotal all Sheets					\$428,763,263.0	
		Mobilization @ 5%					\$21,000,000.0	
		Subtotal w/ Mobilization					\$449,763,263.0	
		Unlisted Items @ 15%					\$70,236,737.0	
		Allowance for Procurement Strategies	@ 0%					
		Contract Cost					\$520,000,000.0	
	1	Contingencies @ 25%					\$130,000,000.0	
		Field Cost					\$650,000,000.0	
		NOTE: Non-contract costs are to be provided by	others. This es	timate does r	ot includ	le non-contract costs	at this time.	
		QUANTITIES				PRICES		
ву		CHECKED	ву 🔉	er			- / /	
o1	Art Strei	PONTO CONT.	Dan Mar	-0.0		DW	1/18/06	
DATE PRE	PARED	PEER REVIEW July 18, 2006	DATE PREPA	B. U.L		PEER REVIEW 7/	8/06	
	_	And the state of t	_			//		