Appendix – Cost Estimates

Cost Assumptions

All costs are in 2005 dollars

Cost Per Horse Power

The required horsepower was calculated with the power routine in the spreadsheet. It accounts for static and dynamic heads. A redundancy factor of 1.25 was used.

New Installation
Full cost of pumps, controls and structures.
East Juab Study[22] (Draft) $1150/HP (SBWSS[34]) $1340/HP
Using the cost curve in Sanks[33] (corrected with ENR-CCI) which was based on gallons per minute EC Intake $1,500/HP LC Intake $1,300/HP
Sanks was determined to be reasonable due to the respective difficulties building the inlet structures. For booster pump plants, $1,150/HP was used.

Upgrade Horse Power
Full cost of pumps and controls installed only. No structure
East Juab Study $500/HP (SBWSS[34]) $440/HP Used $490/HP

On Option 5, it was assumed that the intake plant and booster pump plant would be built in their entirety at the beginning of the project, with the pumping capacity added as needed. Therefore, for the 8,750 acre-feet and 12,500 acre-feet estimates, the pump plant costs were calculated as the new horsepower cost, minus the upgrade horsepower cost. This provides the cost of the buildings, which would be built at the beginning of the project. Then the pump horsepower was added at the upgrade cost as needed.

Treatment Plant

Treatment Plant and upgrade capital costs were taken from actual costs of the existing facilities. This is reasonable for cost comparison purposes. Actual costs would probably be higher.
Building 0.40 $/gpd = $400,000 /mgd
WTP Expansion 0.90 $/gpd = $900,000 /mgd
It was assumed that treatment costs would be equal for each Option for comparison purposes. In reality the costs would differ somewhat due to different water characteristics.
Sanks uses 5 percent of capitol cost for pumps and controls as a reasonable estimate of maintenance costs. Treatment maintenance was calculated at 5 percent of equipment which was calculated as capacity times the WTP expansion cost, plus 1 percent of building cost (1 percent is a real estate industry standard for building maintenance costs).
Treatment Plant wastewater disposal costs were not included. It was assumed that these costs would be equal, and could be ignored for comparison purposes.

East Canyon Pipeline Costs

Ductile iron pipe prices are from a supplier.
Butterfly valve price is from a supplier.

Tees and elbows are a multiple of the per foot pipe price. The multiple was obtained from RSMeans 24 inch pipe prices.
Installation costs per piece is estimated from RSMeans 24 inch pipe costs.

Power Costs

Pump and pipeline power costs were calculated using Utah Power's Schedule No. 8 rates for high demand uses, and Schedule No. 6 for moderate demand uses (less than 1,000 kW). Historical water demand for Park City was used for monthly demand distribution. Water demand was phased in at 525 acre-feet per year until capacity was reached.
Treatment plant power costs were determined by calculating the high month power cost using Schedule No. 8, and dividing that by the plant capacity for a unit cost, which is included in the treatment costs. SWDC's power requirements were used, and the calculated unit cost matched the unit cost provided by MRSSD. This does not account for lower costs during lower usage months, but since both water treatment plants have the same treatment costs applied, this was acceptable for comparison purposes.

Treatment Costs

SWDC's power use estimate for the highest month was used to determine a unit cost of power for treatment. This corresponded closely with the power costs estimated by MRWSSD. For other treatment costs, $50 per thousand gallons was used.

Life Cycle Costs

Life cycle costs include capital costs (both new facilities and sunk cost in existing facilities), use of facilities charges, operation maintenance and replacement costs, and the cost of water. The life cycle costs were calculated at present worth using the rates from Office of Management and Budget Circular No. A-94 dated January 2005. Since the design life is 50 years, the 30 year rates of 5.2 percent nominal interest rate and 3.1 percent real interest rate were used to discount future expenditures. An exception to this was necessary for use of facilities for the options involving JSSD. JSSD imposed a 4 percent escalator to their use of facilities charges. Using the 4 percent as the inflation factor yields a 1.2 percent real interest rate for discounting the JSSD use of facilities costs. This significantly increases the life cycle costs for the JSSD options. If real inflation exceeds the projected inflation of 2.1 percent, or JSSD reduces their escalation factor to match the inflation projection, the JSSD life cycle costs would decrease significantly to where the JSSD Option could be competitive.

Deferred construction costs and pump replacement costs were discounted using Equation 1 below. Annual operation and maintenance costs were discounted using Equation 2 below.

Equation 1 $$P = \frac{A}{(1+r)^n}$$

Equation 2 $$P = \frac{A}{r} * \left(1 - (1+r)^{-n}\right)$$

Where: P = present value
A = amount discounted

r = discount rate (real interest rate)
n = number of years

For power, treatment, and water costs, both equations were used. Each cost was calculated using Equation 1 in tabular form in 525 acre-feet per year increments until capacity was reached. From the year capacity was reached to year 50, Equation 2 was used. The 525 acre-feet per year increment was used to reach the projected need in 2030.

Pump Replacement

Recommended replacement frequency is from 10 to 20 years depending on use.
Moderate use is expected, so a replacement frequency of 13 years was chosen, requiring 3 replacements in 50 years.
Replacement cost per HP was calculated as 40 percent of the upgrade cost per HP.

O&M

Sanks uses 5 percent of capitol cost for pumps and controls as a reasonable estimate of maintenance costs. Maintenance of equipment is calculated at 5 percent of cost throughout these estimates. One percent is a real estate industry standard for building maintenance costs, and is used for that purpose throughout these estimates.
Pipeline costs were calculated as 5 percent of the pipeline fitting cost, 5 percent of the horsepower upgrade cost, and 1 percent of building costs. Pump plant equipment costs were determined by using upgrade horsepower costs as equipment costs. Pump plant building costs were determined by subtracting pump upgrade cost from new pump installation cost.

Cost to Water Provider

For Option 5, East Canyon Pipeline, a cost of $15,150 per acre-foot of capacity was used in place of capital costs and use of facilities. This cost was applied at 525 acre-feet per year until the 12,500 acre-feet of capacity was reached, and then discounted to present value. This total replaced capital costs and use of facilities costs. There is no financing component to these calculations.

For Option 7, Lost Creek Canyon Pipeline, the applicable portions of the existing bond payments were discounted to present value. Future construction costs and bonding costs were calculated and a 30 year bond payment schedule at 5.1 percent was calculated. These future payments were discounted to present value. This total replaced capital costs and cost of existing facilities.

Cost of Water

For Option 5, East Canyon Pipeline, a cost of $160 per acre-foot was applied to the first 5,000 acre feet used, and $20.70 was applied to each additional acre foot. This reflects SWDC's contract with Davis & Weber Counties Canal Company for 5,000 acre feet, and the annual assessment on SWDC's Davis & Weber Counties Canal Company water shares.
For Option 7, Lost Creek Canyon Pipeline, a cost of $110 per acre-foot was the price quoted by WBWCD, the water supplier.

Table 6- 3

Method 1 includes capital costs for new facilities only, using Reclamation's estimating standards which include an additional 10 percent for unlisted contract items, 20 percent for contingencies, and 12 percent for engineering design and construction oversight.
Method 2 includes capital costs for new and existing facilities using Reclamtion's estimating standards.
Method 3 includes capital costs for new facilities, and the actual costs for the existing facilities updated to 2005 using the ENR-CCI Index.
Method 4 is the contract cost of new facilities only.
Method 5 attempts to capture the difference in business plans of the public and private water suppliers. Option 5 capital costs were calculated using $15,000 per "A" share of SWDC plus the $150 conversion fee. Purchases were phased at 525 shares per year until a total of 12,500 shares were purchased. No provision was made to finance these purchases. Option 7 capital costs were calculated using 5,000/6,600 times the bond payments for the existing facilities (the reduction factor reflects the 1,600 acre-feet of existing capacity). Additional bonds were calculated such that 85 percent of the bond proceeds would cover construction costs, and equal annual payments were made at 5.2 percent, over 30 years. The accuracy of the representation of costs for Method 5 is suspect and therefore this method is not included in the body of the report.

Cost of Right of Way Easements

Right of way easements across private lands would need to be obtained for Options 5 and 7. For Option 7, a 30 feet by 4,200 feet right of way from Promontory Development to Highway 40 is required. Current land sales in the area have been for approximately two dollars per square foot. A worst case of 80 percent of this cost would be required for a perpetual easement for a total of $201,600. For Option 5, Reclamation estimated a 30 feet by 24,000 feet perpetual land easement containing approximately 16.53 acres of recreational property in Morgan County would cost $27,000. Recently a 7,200 acre Ranch (Clayton Macfarlane Company) sold a conservation easement that covers a portion of the County road along East Canyon Creek in Summit and Morgan counties. Right of Way across this conservation easement will also have to be negotiated, but this cost is not included in these estimates.

Acre-Feet Delivered

To reach the 2030 demand from the 2005 supply, 525 acre-feet per year increments were used. Life cycle cost estimates assume this 525 acre-feet per year increment until the option reaches capacity, then the system operates at capacity the remainder of the 50 year lifecycle.

The cost per acre-foot delivered calculation takes the total lifecycle cost and divides it by the total number of acre-feet delivered over the 50 year lifecycle. The calculated acre-feet delivered for all Options, except Options 3 and 4, are:

Acre-Foot Capacity	Acre-Feet Delivered	Discounted Acre-Feet Delivered
2,500	120,250	60,461
5,000	228,625	110,326
8,750	374,800	168,308
12,500	488,300	209,625

Options 3 and 4 were calculated as though the full capacity was delivered the entire 50 years:

Acre-Foot Capacity	Acre-Feet Delivered	Discounted Acre-Feet Delivered
500	25,000	13,015
3,600	180,000	93,711

Cost Tables

OPTION 3 - COMBINED WATER REUSE PIPELINE
(3600 Ac-Ft)
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
SCWRF to Quinns Junction				
12" PVC Pipe Installed	10,000	LF	$47	$472,100
14" PVC Pipe Installed	17,500	LF	$61	$1,059,275
16" PVC Pipe Installed	4,600	LF	$69	$317,354
Fittings @ 15%	1	LS	$277,309	$277,309
Jack 24" under Hiwy40&189	1,600	LF	$284	$454,400
Jacking Pits	4	EA	$12,000	$48,000
Pumping HP	330	EA	$1,150	$379,500
Asphalt @ 10%of pipeline length	3,050	LF	$65	$198,403
Mobilization @ 5%	1	LS	$160,317	$160,317
			Subtotal	$3,366,658
ECWRF to Park Meadows GC				
8" PVC Pipe Installed	10,500	LF	$25	$262,805
10" PVC Pipe Installed	8,500	LF	$34	$287,725
12" PVC Pipe Installed	46,500	LF	$47	$2,195,265
Fittings @ 15%	1	LS	$411,869	$411,869
Asphalt @ 10%	6,550	LF	$65	$426,078
Pumping HP	600	EA	$1,150	$690,000
Mobilization @ 5%	1	LS	$213,687	$213,687
			Subtotal	$4,487,428
Interconnection				
12" PVC Pipe Installed	8,500	LF	$47	$401,285
Fittings @ 15%	1	LS	$60,193	$60,193
Asphalt @ 10% of pipeline length	822	LF	$65	$53,439
Pumping HP	285	EA	$1,150	$327,750
Mobilization @ 5%	1	LS	$42,133	$42,133
			Subtotal	$884,800
Membrane Treatment Facilities				
Membrane Filtration Facilities	3	MGD	$1,300,000	$3,900,000
Mobilization @ 5%	1	LS	$268,611	$268,611
			Subtotal	$4,168,611
			Subtotal	$12,907,497
Unlisted Items @		10%		$1,290,750
			Contract Cost	$14,198,247
Contingency @		20%		$2,839,649
			Field Cost	$17,037,896
Engineering Design & Construction Oversight @		12%		$2,044,548
			Total Cost =	**$19,100,000**
2/23/2006			COST PER ACRE FOOT	$5,306

Costs are appraisal level and are to be used for option comparisons only

LIFE CYCLE COST ANALYSIS
OPTION 3 - COMBINED WATER REUSE PIPELINE
(3600 Ac-Ft)

	Rate / Yrs.	0.031 / 50		Present Value
Capital Costs				$19,100,000
Replacement @ 40% of Original Installation At 13, 26, and 39 years			$238,140	$340,203
O & M @ 5% of Original Installation			$67,236	$1,697,595
Power Present Annual Cost			$152,017	$3,838,170
Treatment of Silver Creek WRF Water	161	$/Ac-Ft		$6,498,552
Cost of Water		0	0	$0
Cost of Existing Facilities (PV)				$750,000
			Total Present Worth =	$32,200,000

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 3 - SILVER CREEK WRF WATER REUSE PIPELINE
(1600 Ac-Ft))
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
SCWRF TO Park Meadows GC				
12" PVC Pipe Installed	10,000	LF	$47	$472,100
14" PVC Pipe Installed	17,500	LF	$61	$1,059,275
16" PVC Pipe Installed	4,600	LF	$69	$317,354
Fittings @ 15%	1	LS	$277,309	$277,309
Pumping HP	330	EA	$1,150	$379,500
Asphalt @ 10%	3,210	LF	$65	$208,811
Jack 24" under Hiwy40&189	1,600	LF	$284	$454,400
Jacking Pits	4	EA	$12,000	$48,000
Membrane Filtration Facilities	3	MGD	$1,300,000	$3,900,000
Mobilization @ 5%	1	LS	$135,717	$135,717
			Subtotal	$7,252,466
Unlisted Items @		10%		$725,247
			Contract Cost	$7,977,713
Contingency @		20%		$1,595,543
			Field Cost	$9,573,256
Engineering Design & Construction Oversight @		12%		$1,148,791
			Total Cost =	**$10,700,000**
			COST PER ACRE FOOT	$5,350

LIFE CYCLE COST ANALYSIS

	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs				$10,700,000
Replacement @ 40% of Original Installation			$64,680	$92,401
At 13, 26, and 39 years				
O & M @ 5% of Original Installation			$21,950	$554,211
Power Present Annual Cost			$67,563	$1,705,853
Treatment of Silver Creek WRF Water	$161	$/Ac-Ft		$6,498,552
Cost of Water		0	0	$0
Use of Existing Facilities				$0
			Total Present Worth	$19,600,000

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 3 - EAST CANYON WRF WATER REUSE PIPELINE
(2000 Ac-Ft)
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
8" PVC Pipe Installed	10,500	LF	$25	$262,805
10" PVC Pipe Installed	8,500	LF	$34	$287,725
12" PVC Pipe Installed	46,500	LF	$47	$2,195,265
Fittings @ 15%	1	LS	$411,869	$411,869
Asphalt @ 10%	6,550	LF	$65	$426,078
Pumping HP	600	EA	$1,150	$690,000
Mobilization @ 5%	1	LS	$213,687	$213,687
			Subtotal	$4,487,428
Unlisted Items @		10%		$448,743
			Contract Cost	$4,936,171
Contingency @		20%		$987,234
			Field Cost	$5,923,405
Engineering Design & Construction Oversight @		12%		$710,809
			Total Cost =	**$6,600,000**
			COST PER ACRE FOOT	$4,125

LIFE CYCLE COST ANALYSIS

	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs				$6,600,000
Replacement @ 40% of Original Installation			$117,600	$168,001
At 13, 26, and 39 years				
O & M @ 5% of Original Installation			$35,293	$891,099
Power Present Annual Cost			$84,454	$2,132,317
Cost of Water		0	0	$0
Cost of Existing Facilities (PV)				$750,000
			Total Present Worth =	$10,500,000

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 4 - JSSD TANK TO PARK CITY AT QUINN'S JUNCTION
500 AC-FT JSSD WATER
CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Cost
12" DIP	18,000	LF	$74	$1,326,780
Fittings @ 15%	1	LS	$199,017	$199,017
Pumping HP	150	EA	$1,300	$195,000
Mobilization @ 5%	1	LS	$86,040	$86,040
			Subtotal	$1,806,837
Unlisted Items @		10%		$180,684
			Contract Cost	$1,987,521
Contingency @		20%		$397,504
			Field Cost	$2,385,025
Engineering Design & Construction Oversight @		12%		$286,203
			Total Cost =	**$2,700,000**
			COST PER ACRE FOOT	$5,400

OPTION 4 - JSSD TANK TO PARK CITY AT QUINN'S JUNCTION
500 AC-FT JSSD WATER
LIFE CYCLE COST ANALYSIS

	I	0.031		Present Value
	N	50		
Capital Costs				$2,700,000
Replacement @ 40% of Original Installation At 13, 26, and 39 years			$29,400	$42,000
O & M @ 5% of Original Installation			$14,841	$374,706
Power Present Cost			$6,819	$172,180
Cost of Water		0	$/Ac-Ft	$0
Use of Existing Facilities		820/Ac-Ft	plus 4%/yr./Ac-Ft	$15,348,514
			Total Present Worth	$18,600,000

2/23/2006
Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
5,000 Ac-Ft
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
Intake Pump Plant (HP)	2,000	HP	$1,500	$3,000,000
Booster Pump Plant	1,500	HP	$1,150	$1,725,000
24" pipeline	1	LS	$11,420,063	$11,420,063
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$811,003	$811,003
Substation	1	LS	$2,500,000	$2,500,000
Right of Way	1	LS	$27,000	$27,000
			Subtotal	$19,558,067
Park City Connection				
16" PVC Pipeline	5680	LF	$100	$567,233
Fittings	1	LS	$85,085	$85,085
Upgrade Pump Capacity	800	HP	$490	$392,000
Mobilization @ 5%	1	LS	$52,216	$52,216
			Subtotal	$1,096,534
Treatment				
Plant Expansion	3.5	mgd	$900,000	$3,150,000
			Subtotal	$23,804,601
Unlisted Items @		10%		$2,380,460
			Contract Cost	$26,185,061
Contingency @		20%		$5,237,012
			Field Cost	$31,422,073
Engineering Design & Construction Oversight @		12%		$3,770,649
			Total Cost =	**$35,200,000**
			COST PER ACRE FOOT	$7,040

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
5,000 Ac-Ft
LIFE CYCLE COST ANALYSIS

	Rate Yrs.	0.031 50			Present Value
Capital Costs					$35,200,000
Pipeline Pump Replacement @ 40% of Original Installation At 13, 26, and 39 years				$842,800	$1,204,010
Pipeline O & M @ 5% of Original Installation				$225,355	$5,689,818
Pipeline Power Cost					$20,110,881
Treatment Cost	$161	/Ac-Ft	+ Maint.		$29,758,740
Cost of water					$17,218,122
Cost of Existing Facilities (2005 $)					$15,553,276
			Total Present Worth		$124,700,000

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
8,750 Ac-Ft
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
Phase 1				
Intake Pump Plant	1	LS	$3,535,000	$3,535,000
Booster Pump Plant	1	LS	$1,650,000	$1,650,000
Intake Pump Plant Pumps (HP)	2,000	HP	$490	$980,000
Booster Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
30" pipeline	1	LS	$13,440,051	$13,440,051
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$1,020,753	$1,020,753
Substation	1	LS	$3,000,000	$3,000,000
Treatment Plant Expansion	3.5	mgd	$900,000	$3,150,000
Right of Way	1	LS	$27,000	$27,000
			Subtotal	$27,612,803
Park City Connection				
16" PVC Pipeline	5680	LF	$100	$567,233
Fittings	1	LS	$85,085	$85,085
Upgrade Pump Capacity	800	HP	$490	$392,000
Mobilization @ 5%	1	LS	$52,216	$52,216
			Subtotal	$1,096,534
Phase 2				
Intake Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
Booster Pump Plant Pumps (HP)	1,000	HP	$490	$490,000
Mobilization @ 5%	1	LS	$61,250	$61,250
Treatment Plant Expansion	7	mgd	$900,000	$6,300,000
			Subtotal	$7,586,250
			Subtotal	$36,295,587
Unlisted Items @		10%		$3,629,559
			Contract Cost	$39,925,146
Contingency @		20%		$7,985,029
			Field Cost	$47,910,175
Engineering Design & Construction Oversight @		12%		$5,749,221
			Total Cost =	**$53,700,000**
			COST PER ACRE FOOT	$6,137

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
8,750 Ac-Ft
LIFE CYCLE COST ANALYSIS

		Rate Yrs.	0.031 50		Present Value
Capital Costs Phase 1					$45,750,997
Capital Costs Phase 2			9	$7,949,003	$6,039,273
Transmission Pump Replacement @ 40% of Original Installation at 13 year intervals					
Phase 1	AT 13,26 AND 39 YEARS		13,26,39	$842,800	$1,204,010
Phase 2	AT 22,35 AND 48 YEARS		22,35,48	$490,000	$1,470,000
Pipeline O & M @ 5% of Original Installation					$7,693,251
Pipeline Power Cost					$12,292,184
Treatment Cost		$161	/Ac-Ft	+ Maint.	$44,476,672
Cost of water					$19,090,235
Method 1	**(New Facilities)**		**Life Cycle Present Worth**		$138,000,000
Cost of Existing Facilities (Reclamation estimate)					$22,300,000
Method 2			**Total Life Cycle Present Worth**		$160,300,000
Actual Cost of Existing Facilities (2005 $)					$15,600,000
Method 3			**Total Life Cycle Present Worth**		$153,600,000
Method 4			**Life Cycle Present Worth**		$124,700,000
Method 5			**Cost to Wholesaler**		$191,500,000
			Cost Per Ac-Ft Delivered (PV)		$511

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
12,500 Ac-Ft
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
Phase 1				
Intake Pump Plant	1	LS	$5,050,000	$5,050,000
Booster Pump Plant	1	LS	$2,640,000	$2,640,000
Intake Pump Plant Pumps (HP)	2,000	HP	$490	$980,000
Booster Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
30" pipeline	1	LS	$13,440,051	$13,440,051
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$1,146,003	$1,146,003
Electrical Substation	1	LS	$3,870,000	$3,870,000
Treatment Plant Expansion	3.5	mgd	$900,000	$3,150,000
Right of Way	1	LS	$27,000	$27,000
			Subtotal	$31,113,053
Park City Connection				
16" PVC Pipeline	5680	LF	$100	$567,233
Fittings	1	LS	$85,085	$85,085
Upgrade Pump Capacity	800	HP	$490	$392,000
Mobilization @ 5%	1	LS	$52,216	$52,216
			Subtotal	$1,096,534
Phase 2				
Intake Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
Booster Pump Plant Pumps (HP)	1,000	HP	$490	$490,000
Mobilization @ 5%	1	LS	$61,250	$61,250
Treatment Plant Expansion	7	mgd	$900,000	$6,300,000
			Subtotal	$7,586,250
Phase3				
Intake Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
Booster Pump Plant Pumps (HP)	1,500	HP	$490	$735,000
Mobilization @ 5%	1	LS	$73,500	$73,500
Treatment Plant Expansion	6	mgd	$900,000	$5,400,000
			Subtotal	$6,943,500
			Subtotal	$46,739,337
Unlisted Items @		10%		$4,673,934
			Contract Cost	$51,413,271
Contingency @		20%		$10,282,654
			Field Cost	$61,695,925
Engineering Design & Construction Oversight @		12%		$5,608,720
			Total Cost =	**$67,300,000**
			COST PER ACRE FOOT	$5,384

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 5 - EAST CANYON PIPELINE
12,500 Ac-Ft
LIFE CYCLE COST ANALYSIS

		Rate Yrs.	0.031 50		Present Value
Capital Costs	Phase 1				$49,565,903
Capital Costs	Phase 2		9	$10,923,446	$8,299,113
Capital Costs	Phase 3		16	$6,810,651	$4,178,785
Transmission Pump Replacement @ 40% of Original Installation at 13 year intervals					
Phase 1	AT 13,26 AND 39 YEARS		13,26,39	$842,800	$1,204,010
Phase 2	AT 22,35 AND 48 YEARS		22,35,48	$490,000	$531,831
Phase 3	AT 31 AND 44 YEARS		29,42	$588,000	$405,714
				Annual	
Pipeline O & M @ 5% of Original Installation					$9,495,551
Pipeline Power Cost					$17,511,105
Treatment Cost		$161	/Ac-Ft	+ Maint.	$54,572,800
Cost of water					$20,027,913
Method 1		**(New Facilities)**		**Life Cycle Present Worth**	$165,800,000
Cost of Existing Facilities (Reclamation estimate)					$22,300,000
Method 2			**Total**	**Life Cycle Present Worth**	$188,100,000
Actual Cost of Existing Facilities (2005 $)					$15,600,000
Method 3			**Total**	**Life Cycle Present Worth**	$181,400,000
Method 4				**Life Cycle Present Worth**	$151,146,765.53
Method 5				**Cost to Provider**	$240,200,000
				Cost Per Ac-Ft Delivered (PV)	$492

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTIONS 7 AND 9 - LOST CREEK CANYON PIPELINE
Increase capacity by 2500 ac-ft from 1600 to 4100 ac-ft
Capital Costs

Item	Quantity	Unit	Unit Cost	Cost
Phase 1				
Diversion to Pump Plant				
Diversion dam w/ Coanda screen	1	LS	$200,000	$200,000
24" pipeline	830	LF	$115	$95,583
12" DI Pipeline to MR 20" @ Hiwy 40	16,500	LF	$74	$1,216,215
Fittings @ 15%	1	LS	$196,769.7	$196,770
Intake Pump Plant (HP)	150	HP	$1,300	$195,000
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$98,928	$98,928
Right of Way	1	LS	$201,600	$201,600
			Subtotal	$2,279,096
Phase 2				
Treatment Plant Expansion	3	mgd	$900,000	$2,700,000
Phase 3				
New Treatment Plant	1.5	mgd	$1,300,000	$1,950,000
			Subtotal	$6,929,096
Unlisted Items @ 10%		10%		$692,910
			Contract Cost	$7,622,005
Contingency @ 20%		20%		$1,524,401
			Field Cost	$9,146,407
Engineering Design & Construction Oversight @		12%		$1,097,569
			Total Cost =	**$10,200,000**
			$/Ac-Ft Capacity	$4,080

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTIONS 7 AND 9 - LOST CREEK CANYON PIPELINE
Increase capacity by 2500 ac-ft from 1600 to 4100 ac-ft
LIFE CYCLE COST ANALYSIS

Life Cycle Costs For 2500 Ac-Ft Portion	Rate / Yrs.	0.031 / 50		Present Value
Capital Costs Phase 1				$3,354,951
Capital Costs Phase 2		4	$3,974,545	$3,517,651
Capital Costs Phase 3		7	$2,870,504	$2,318,182
Transmission Pump Replacement @ 40% of Original Installation At 13, 26, and 39 years			$370,010	$528,590
Pipeline O & M @ 5% of Original Installation			Annual $50,001	$1,262,444
Transmission Power Cost				$3,670,222
Treatment Cost	$161 /Ac-Ft		+ OM	$16,106,198.17
Note: Treatment costs assumes1200 ac-ft for Irrigation				
Cost of Water	110 $/Ac-Ft			$6,467,061
Cost of Existing Facilities (PV)				$9,915,284
		Total Present Worth		$47,100,000

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 7 - LOST CREEK CANYON PIPELINE
Increase capacity by 5000 ac-ft from 1600 to 6600 ac-ft
Capital Costs - Phased

Item	Quantity	Unit	Unit Cost	Cost
Phase 1				
Diversion to Pump Plant				
Diversion dam w/ Coanda screen	1	LS	$250,000	$250,000
24" pipeline	830	LF	$115	$95,583
12" DI Pipeline to MR 20" @ Hiwy 40	16,500	LF	$74	$1,216,215
Fittings @ 15%	1	LS	$196,770	$196,770
Intake Pump Plant	150	HP	$1,300	$195,000
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$101,428	$101,428
Right of Way	1	LS	$201,600	$201,600
			Subtotal	$2,331,596
Promontory to Park City				
16" DI Pipeline	13000	LF	$100	$1,298,245
Fittings @ 15%	1	LS	$194,737	$194,737
Mobilization @ 5%	1	LS	$74,649	$74,649
			Subtotal	$1,567,631
Phase 2				
Booster Pump Plant Upgrade				
Pump Upgrade	3,800	HP	$490	$1,862,000
Surge Tank	1	LS	$300,000	$300,000
Mobilization @ 5%	1	LS	$108,100	$108,100
Treatment Plant Expansion	3	mgd	$900,000	$2,700,000
			Subtotal	$4,970,100
Phase 3				
3 MG Raw Water Storage Pond	1	LS	$600,000	$600,000
New Treatment Plant	6.0	mgd	$1,300,000	$7,800,000
			Subtotal	$8,400,000
			Total	$17,269,327
Unlisted Items @ 10%		10%		$1,726,933
			Contract Cost	$18,996,259
Contingency @ 20%		20%		$3,799,252
			Field Cost	$22,795,511
Engineering Design & Construction Oversight @		12%		$2,735,461
			Total Cost =	**$25,500,000**
			$/Ac-Ft Capacity	$5,100

2/28/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 7 - LOST CREEK CANYON PIPELINE
Increase capacity by 5000 ac-ft from 1600 to 6600 ac-ft
LIFE CYCLE COST ANALYSIS - PHASED

Life Cycle Costs for 5000 Ac-Ft Portion	Rate	Yrs.		Present Value
	0.031	50		
Capital Costs Phase 1				$5,757,623
Capital Costs Phase 2		4	$7,338,882	$6,495,241
Capital Costs Phase 3		7	$12,403,495	$10,016,902
Transmission Pump Replacement @ 40% of Original Installation at 13 year intervals				
Phase 1 AT 13,26 AND 39 YEARS		13,26,39	$29,400	$42,000
Phase 2 AT 17,30 AND 43 YEARS		17,30,43	$564,242	$713,406
Pipeline O & M @ 5% of Original Installation			$74,205	$2,344,299
Transmission Power Cost			$6,682,035	$6,682,035
Treatment Cost	$161 /Ac-Ft		$28,158,606	$28,158,606
Note: Treatment costs assumes1200 ac-ft for Irrigation				
Cost of Water	$110 /Ac-Ft		$11,837,459	$11,837,459
Method 1	**(New Facilities)**	**Life Cycle Present Worth**		$72,100,000
Cost of Existing Facilities (Reclamation estimate)				$14,800,000
Method 2	**Total**	**Life Cycle Present Worth**		$86,900,000
Actual Cost of Existing Facilities (2005 $)				12,300,000
Method 3	**Total**	**Life Cycle Present Worth**		$84,400,000
Method 4		**Life Cycle Present Worth**		$66,400,000
Method 5			**Cost to Provider**	$108,200,000
	$/Ac-Ft Delivered		$467	

2/28/2006

Costs are appraisal level and are to be used for option comparisons only

OPTION 7 - LOST CREEK CANYON PIPELINE
Increase capacity by 5900 ac-ft from 1600 to 7500 ac-ft
Capital Costs - Phased

Item	Quantity	Unit	Unit Cost	Cost
Phase 1				
Diversion to Pump Plant				
Diversion dam w/ Coanda screen	1	LS	$275,000	$275,000
24" pipeline	830	LF	$115	$95,583
12" DI Pipeline to MR 20" @ Hiwy 40	16,500	LF	$74	$1,216,215
Fittings @ 15%	1	LS	$196,770	$196,770
Intake Pump Plant	200	HP	$1,300	$260,000
Ultrasonic Flow Meter w/ Vault	1	LS	$75,000	$75,000
Mobilization @ 5%	1	LS	$105,928	$105,928
Right of Way	1	LS	$201,600	$201,600
			Subtotal	$2,426,096
Promontory to Park City				
16" DI Pipeline	13000	LF	$100	$1,298,245
Fittings @ 15%	1	LS	$194,737	$194,737
Mobilization @ 5%	1	LS	$74,649	$74,649
			Subtotal	$1,567,631
Phase 2				
Booster Pump Plant Upgrade				
Pump Upgrade	4,200	HP	$490	$2,058,000
Surge Tank	1	LS	$300,000	$300,000
Mobilization @ 5%	1	LS	$117,900	$117,900
Treatment Plant Expansion	3	mgd	$900,000	$2,700,000
			Subtotal	$5,175,900
Phase 3				
3 MG Raw Water Storage Pond	1	LS	$600,000	$600,000
New Treatment Plant	7.5	mgd	$1,300,000	$9,750,000
			Subtotal	$10,350,000
			Total	$19,519,627
Unlisted Items @		10%		$1,951,963
			Contract Cost	$21,471,589
Contingency @		20%		$4,294,318
			Field Cost	$25,765,907
Engineering Design & Construction Oversight @		12%		$3,091,909
			Total Cost =	**$28,900,000**
			$/Ac-Ft Capacity	$4,898

2/28/2006
Costs are appraisal level and are to be used for option comparisons only

OPTION 7 - LOST CREEK CANYON PIPELINE
Increase capacity by 5900 ac-ft from 1600 to 7500 ac-ft
LIFE CYCLE COST ANALYSIS - PHASED

Life Cycle Costs for 5000 Ac-Ft Portion	Rate	Yrs.		Present Value
	0.031	50		
Capital Costs Phase 1				$5,912,956
Capital Costs Phase 2		4	$7,663,236	$6,782,309
Capital Costs Phase 3		7	$15,323,807	$12,375,308
Transmission Pump Replacement @ 40% of Original Installation at 13 year intervals				
Phase 1 AT 13,26 AND 39 YEARS		13,26,39	$39,200	$56,000
Phase 2 AT 17,30 AND 43 YEARS		17,30,43	$647,584	$818,780
			Annual	
Pipeline O & M @ 5% of Original Installation				
Years 1 - 4		4	$51,226	$189,958
Years 5 - 50			$89,598	$1,929,945
Transmission Power Cost				$8,010,734
Treatment Cost	$161 /Ac-Ft			$25,042,289
Note: Treatment costs assumes1200 ac-ft for Irrigation				
Cost of water	$110 /Ac-Ft			$13,534,546
Cost of Existing Facilities				$12,318,989
			Total Present Worth	$87,000,000

2/28/2006
Costs are appraisal level and are to be used for option comparisons only

OPTION 8 - JSSD TANKS TO QUINN'S JUNCTION AND PARK CITY
5000 AC-FT WEBER BASIN WATER
CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Cost
16" DI Pipe Installed	28,000	LF	$113	$3,159,940
Fittings @ 15%	1	LS	$473,991	$473,991
Jack 24" under Hiwy189	700	LF	$284	$198,800
Jacking Pits	2	EA	$12,000	$24,000
Pumping HP	600	EA	$1,300	$780,000
Mobilization @ 5%	1	LS	$231,837	$231,837
			Subtotal	$4,868,568
Unlisted Items @		10%		$486,857
			Contract Cost	$5,355,424
Contingency @		20%		$1,071,085
			Field Cost	$6,426,509
Engineering Design & Construction Oversight @		12%		$771,181
			Total Cost =	**$7,200,000**
			$/Ac-Ft Capacity	$1,440

OPTION 8 - JSSD TANKS TO QUINN'S JUNCTION AND PARK CITY
5000 AC-FT WEBER BASIN WATER
LIFE CYCLE COST ANALYSIS

	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs				$7,200,000
Replacement @ 40% of Original Installation			$117,600	$168,001
At 13, 26, and 39 years				
O & M @ 5% of Original Installation			$43,260	$1,092,229
Power Present Annual Cost				$1,467,733
Cost of Water		110	$/Ac-Ft	$11,837,459
Use of Existing Facilities		500/Ac-Ft	plus 4%/yr./Ac-Ft	$83,469,455
			Total Present Worth	$105,200,000

2/23/2006
Costs are appraisal level and are to be used for option comparisons only
No costs included for use of the Weber-Provo Canal or Jordanelle Reservoir.

OPTION 9 - JSSD TANK TO PARK CITY
2500 AC-FT WEBER BASIN WATER
CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Cost
16" DIP	18000	LF	112.855	$2,031,390
Fittings @ 15%	1	LS	304708.5	$304,709
Pumping HP	300	EA	1300	$390,000
Mobilization @ 5%	1	LS	136304.925	$136,305
			Subtotal	$2,862,403
Unlisted Items @		10%		$286,240
			Contract Cost	$3,148,644
Contingency @		0%		$0
			Field Cost	$3,148,644
Engineering Design & Construction Oversight @		0%		$0
			Total Cost =	**$3,100,000**

OPTION 9 - JSSD TANK TO PARK CITY
2500 AC-FT WEBER BASIN WATER
LIFE CYCLE COST ANALYSIS

	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs				$3,100,000
Replacement @ 40% of Original Installation			58800	$84,001
At 13, 26, and 39 years				
O & M @ 5% of Original Installation			25015.425	$631,596
Power Present Cost				$801,854
Cost of Water		110	$/Ac-Ft	$6,705,487
Use of Existing Facilities		500/Ac-Ft	plus 4%/yr./Ac-Ft	$44,504,023
			Total Present Worth	$55,800,000

1/30/2006
Costs are appraisal level and are to be used for option comparisons only
No costs included for use of the Weber-Provo Canal or Jordanelle Reservoir.

OPTION 9 - JSSD TANK TO PARK CITY
2500 AC-FT WEBER BASIN WATER
LIFE CYCLE COST ANALYSIS

	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs				$4,200,000
Replacement @ 40% of Original Installation			$58,800	$84,001
At 13, 26, and 39 years				
O & M @ 5% of Original Installation			$25,015	$631,596
Power Present Cost				$801,854
Cost of Water		110	$/Ac-Ft	$5,918,729
Use of Existing Facilities		500/Ac-Ft	plus 4%/yr./Ac-Ft	$41,734,728
JSSD			Total Present Worth	$53,400,000

OPTION 9 - LOST CREEK CANYON PIPELINE
Increase capacity by 2500 ac-ft from 1600 to 4100 ac-ft
LIFE CYCLE COST ANALYSIS

Life Cycle Costs For 2500 Ac-Ft Portion	Rate	0.031		Present Value
	Yrs.	50		
Capital Costs Phase 1				$3,354,951
Capital Costs Phase 2		8	$3,974,545	$3,113,279
Capital Costs Phase 3		14	$2,870,504	$1,872,134
Transmission Pump Replacement @ 40% of Original Installation			$370,010	$528,590
At 13, 26, and 39 years				
			Annual	
Pipeline O & M @ 5% of Original Installation			$50,001	$1,262,444
Transmission Power Cost				$3,670,222
Treatment Cost	$161	/Ac-Ft	+ OM	$15,522,461
Note: Treatment costs assumes1200 ac-ft for Irrigation				
Cost of Water	110	$/Ac-Ft		$5,918,729
Cost of Existing Facilities (PV)				$9,915,284
Lost Creek Canyon Pipeline			Total Present Worth	$45,200,000

Option 9	Total Present Worth	$98,600,000

2/23/2006
Costs are appraisal level and are to be used for option comparisons only

Annual Operating Costs at Capacity (does not include capital or replacement costs)

	Option 5			Option 7	
Acre-Feet	5000	8750	12500	2500	5000
Pipeline Power	$373,588	$670,766	$1,098,835	$156,178	$322,886
($/ac-ft)	$75	$77	$88	$62	$65
Treatment	$804,331	$1,407,580	$2,010,828	$402,166	$804,331
($/ac-ft)	$161	$161	$161	$161	$161
Cost of water	$800,000	$877,663	$955,325	$275,000	$550,000
($/ac-ft)	$160	$100	$76	$110	$110
Maintenance	$738,501	$1,151,651	$1,520,201	$351,228	$595,932
($/ac-ft)	$148	$132	$122	$140	$119
Total	$2,716,964	$4,108,129	$5,585,636	$1,185,045	$2,273,604
($/ac-ft)	$543	$470	$447	$474	$455

Table 6-3	Method 1 New Facilities	Method 2 All Facilities (USBR)	Method 3 All Facilities	Method 4 (Contract Cost)	Method 5 Cost to Supplier
Option 5 - East Canyon Pipeline (8,750 Ac-Ft)					
Capital Costs					
Contract Cost	$53,700,000	$76,000,000	$69,300,000	$39,900,000	$132,300,000
Contract Cost per Ac-Ft Capacity	$6,137	$8,686	$7,920	$4,560	$15,125
Contract Cost per Ac-Ft Delivered	$143	$203	$185	$106	$353
Option 5 - East Canyon Pipeline (12,500 Ac-Ft)					
Capital Costs					
Contract Cost	$67,300,000	$89,600,000	$82,900,000	$51,400,000	$189,100,000
Contract Cost per Ac-Ft Capacity	$5,384	$7,168	$6,632	$4,112	$15,125
Contract Cost per Ac-Ft Delivered	$138	$183	$170	$105	$387
Option 7 - Lost Creek Canyon Pipeline (5,000 Ac-Ft)					
Capital Costs					
Contract Cost	$25,500,000	$40,300,000	$37,800,000	$19,000,000	$92,100,000
Contract Cost per Ac-Ft Capacity	$5,100	$8,060	$7,560	$3,800	$18,420
Contract Cost per Ac-Ft Delivered	$112	$176	$165	$83	$403

2/23/2006

Costs are appraisal level and are to be used for option comparisons only

TOTAL LIFE CYCLE COSTS

	Option 3 Water Reuse	Option 4 Provo River (JSSD)	Option 5	Canyon Pipeline	East	Option 7 Lost Creek Canyon Pipeline	Option 8 Weber Provo Canal	Option 9 L.C., W.P. Canal
Capacity (Acre-feet)	3600	500		8750	12500	5000	5000	5000
Capital Cost of New Facilities								
Contract Cost	$14,200,000	$2,000,000		$39,900,000	$51,400,000	$19,000,000	$5,400,000	$10,800,000
Field Cost	$17,000,000	$2,400,000		$47,900,000	$61,700,000	$22,800,000	$6,400,000	$12,900,000
Total Cost	$19,100,000	$2,700,000		$53,700,000	$67,300,000	$25,500,000	$7,200,000	$14,400,000
Contract Cost per Acre-foot Capacity	$3,944	$4,000		$4,560	$4,112	$3,800	$1,080	$2,160
Capital Cost per Acre-foot Capacity	$5,306	$5,400		$6,137	$5,384	$5,100	$1,440	$2,880
Life Cycle Cost (Present Value)								
New Facilities								
Capital Cost (PV)	$19,100,000	$2,700,000		$51,800,000	$62,000,000	$22,300,000	$7,200,000	$12,500,000
O,M&R	$12,400,000	$600,000		$67,100,000	$83,700,000	$37,900,000	$2,700,000	$22,500,000
Cost of Water	$0	$0		$19,100,000	$20,000,000	$11,800,000	$11,800,000	$11,800,000
Total Cost	$31,450,000	$3,300,000		$138,000,000	$165,800,000	$72,100,000	$21,700,000	$44,200,000
Use of Existing Facilities								
Sunk Capital Costs	$750,000	$0		$15,600,000	$15,600,000	$12,300,000	$0	$9,900,000
Use of Facilities Charges	$0	$15,300,000		$0	$0	$0	$83,500,000	$44,500,000
Total Life Cycle Cost	$32,200,000	$18,600,000		$153,600,000	$181,400,000	$84,400,000	$105,200,000	$98,600,000
Life Cycle Cost Per Acre-foot Delivered	$179	$744		$410	$371	$369	$460	$431

2/28/2006

Costs are appraisal level and are to be used for option comparisons only