

APPENDIX A

PLANNING LEVEL COST ESTIMATES

The following pages provide more information concerning the cost estimates for the alternatives described in Chapter Two. These “planning level” cost estimates are considered sufficiently detailed for the comparative environmental analysis used in the JNU EIS. They are not, however, representative of “design level” cost estimates, in that they would not be used to develop final budgets for project implementation. A few additional notes about the costing methods are warranted.

Two types of cost estimates are supplied for runway safety area alternatives. Tables A-1.1 through A-1.5 disclose the major component costs to construct each alternative. These tables are based on various sources of information obtained or derived during development of the EIS. The next set of RSA tables, A-1.6 through A-1.10, provides life cycle costs for each of the alternatives. The formulas used in these tables, which illustrate the estimated costs to maintain runway safety area and EMAS systems through a 20-year life cycle, were developed to comply with FAA Order 5200.9 *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems* (2004).

Most cost estimates for actions other than runway safety area represent one-time, construction costs only, either because there are no real comparative differences in long-term maintenance requirements between alternatives (such as for the SREF alternatives) or because there is little maintenance cost that would be borne by CBJ once implemented (such as with the MALSR). The costs to construct aviation facilities have been estimated using an inflation factor, because it is likely that hangars and apron would be constructed at stages over the net 15 to 20 years, rather than in a one-time expenditure.

Two other assumptions are inherent in these cost estimates. First, CBJ would not have to reimburse the State of Alaska for any lands needed to implement alternatives that may encroach on the Refuge. Compensatory mitigation costs associated with the RSA alternatives are incorporated into the cost tables in this appendix. These mitigation costs reflect a compensatory mitigation method including ratios developed in consultation between the FAA, CBJ, and Federal and State agencies.

Table A-1.1. RSA-1 Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$280,000	1	\$280,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2136	\$14,952	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	37	\$55,800	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	29846	\$358,152	RSA/Lateral RSA area clearing. Assume 0.5-foot depth (37 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	473345	\$5,680,140	Fill from float plane pond; sub base represents ~85% of total fill less cut volume available from Mendenhall River, slough channels, etc.
7	Class III RipRap	cubic yard	\$35	7260	\$254,100	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 1.5 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	30156	\$1,206,240	From off-site permitted borrow source. Assume RSA revegetated. Based on 6" application rate. 5% of total fill
9	Seeding	acre	\$4,000	25	\$100,000	Average estimate; see DEIS for veg mix. Non-lateral RSA only
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	70815	\$424,890	Estimated Volume of channel in ft ³ : (3000x120x5)+(2800x40x1)=1912000 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches
13	8" D1 Base Course	cubic yard	\$35	26674	\$933,590	Combined estimate, from screened float plane pond material, drainage excavations, and off-site permitted borrow source. Includes near surface layer for RSA (3535 ft x 138 ft + 1461 ft x 500 ft = 1,075,500 sq. ft x 0.67 ft/27 cu. ft/yd) No taxiway or increased runway
14	Asphalt Pavement	ton	\$95	0	\$0	5" coating, calculate at 2 x area for runway connection, plus 2 x taxiway area
15	Grooving	square yard	\$2	0	\$0	Used on runway and taxiway

Table A-1.1. RSA-1 Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
16	Float Pond Access Road	linear foot	\$200	2442	\$488,400	Estimate 20 ft paved access road at 2,360 ft long; includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	2360	\$283,200	Estimate 14 ft paved surface to support emergency vehicles at 2,360 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$250,000	1	\$250,000	Master Plan plus contingency for river work, coffer dam - increase for work in river
19	Power Conduit and Cable Install	linear foot	\$30	1461	\$43,830	Linear disturbance for RSA plus taxiway used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	0	\$0	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	0	\$0	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	0	\$0	not applicable, no new taxiway
24	Runway Painting	lump sum	\$50,000	0	\$0	not applicable, no change in thresholds
25	Signs	each	\$5,000	0	\$0	No new signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	700	\$63,000	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary
27	Mendenhall/ Hydrologic Control	square foot	\$20	116000	\$2,320,000	Estimate based on use of sheet piling to temporarily divert water from construction zones. 2900' length of pile at average 40' depth
Construction Total					\$13,218,230	
Overhead @ 3% of Construction					\$396,547	
Design @ 10% of Construction					\$1,321,823	
Construction Admin/Management @ 15% of Construction					\$1,982,735	
Total Estimate - Construction Cost					\$16,919,334	
28	Compensatory Mitigation	FCUs	\$238	5501	\$2,618,666	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$19,538,001	

Table A-1.2. RSA-5C Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2936	\$20,552	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	37	\$55,500	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	31460	\$377,520	RSA/Lateral RSA area clearing, taxiway. Assume 0.5-foot depth (39 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	495768	\$5,949,216	Fill from float plane pond; sub base represents ~85% of total fill less cut volumes from slough channel
7	Class III RipRap	cubic yard	\$35	9680	\$338,800	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 2.0 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	29760	\$1,190,400	From off-site permitted borrow source. Assume RSA revegetated. Based on 6" application rate. 5% of total fill
9	Seeding	acre	\$4,000	26	\$104,000	Average estimate; see DEIS for veg mix. Non-lateral RSA only
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	13333	\$79,998	Estimated Volume of channel in ft ³ : (600x120x5) = 360000 ft ³ (based on connection to Sunny Slough)
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches
13	8" D1 Base Course	cubic yard	\$35	37111	\$1,298,885	Combined estimate from screening of float plane pond materials, drainage excavations and off-site permitted borrow source. Includes new taxiway (7433 sq yd Txyway A, 2916 sq yd connecting txyway) and runway/RSA (4008 ft x 138 ft + 1157 ft x 500 ft + 304ft x 500ft = 1213500 sq. ft x 0.67 ft/27 cu. ft/yd)
14	Asphalt Pavement	ton	\$95	6300	\$598,500	5" coating. One ton cover approximately 26 ft sq, (446 x 150 x 2 + 200 x 150) sq ft taxiways and runway combined)

Table A-1.2. RSA-5C Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
15	Grooving	square yard	\$2	18200	\$36,400	Used on runway and taxiway. $446 \times 150 \times 2 + 200 \times 150 = 163,800/9$
16	Float Pond Access Road	linear foot	\$140	1455	\$203,700	Estimate 20 ft paved access road at 1455 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1522	\$182,640	Estimate 14 ft paved surface to support emergency vehicles, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation
19	Power Conduit and Cable Install	linear foot	\$30	2107	\$63,210	Linear disturbance for RSA, runway, taxiway and 200 ft taxiway connector used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	32	\$16,000	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	48	\$48,000	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALS Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	1	\$35,000	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds if applicable
25	Signs	each	\$5,000	5	\$25,000	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	450	\$40,500	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary
27	Mendenhall East Bank	square foot	\$20	0	\$0	Estimate based on use of sheet piling to temporarily divert water from construction zones. Not needed for 5C
Construction Total					\$11,490,757	
Overhead @ 3% of Construction					\$344,723	
Design @ 10% of Construction					\$1,149,076	
Construction Admin/Management @ 15% of Construction					\$1,723,614	
Total Estimate - Construction Cost					\$14,708,169	
28	Compensatory Mitigation	FCUs	\$238	5289	\$2,517,612	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$17,225,781	

Table A-1.3. RSA-5D Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2266	\$15,862	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	36	\$54,000	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	29040	\$348,480	RSA/Lateral RSA area clearing, taxiway. Assume 0.5-foot depth (36 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	362593	\$4,351,116	Fill from float plane pond; sub base represents ~85% of total fill less cut volume available from Mendenhall River west bank, east runway slough.
7	Class III RipRap	cubic yard	\$35	9680	\$338,800	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 2.0 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	25584	\$1,023,360	From off-site permitted borrow source. Assume RSA revegetated. Based on 6" application rate. 5% of total fill
9	Seeding	acre	\$4,000	21	\$84,000	Average estimate; see DEIS for veg mix. Non-lateral RSA only. (36-13.6-1.8=20.6 acres)
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	70815	\$424,890	Estimated Volume of channel in ft ³ : (3000x120x5)+(2800x40x1)=1912000 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches

Table A-1.3. RSA-5D Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	36113	\$1,263,955	Combined estimate from screening of float plane pond materials, drainage excavations and off-site permitted borrow source. Includes new taxiway (6,667 sq yd Txyw A, 2,916 sq yd connecting txyw) and runway/RSA for RSA (3942 ft x 138 ft + 1061 x 500 ft = 1,013,500 sq. ft x 0.67 ft/27 cu. ft./yard)
14	Asphalt Pavement	ton	\$95	5769	\$548,055	5" coating. One ton cover approximately 26 ft sq, (400 x 150 x 2 + 200 x 150) 150,000 sq ft taxiways and runway combined)
15	Grooving	square yard	\$2	16249	\$32,498	Used on runway and taxiway. 400 x 150 = 60000/9 = 6667 sq yd runway, + 6,667 + 2916 = 16,249 sq yd
16	Float Pond Access Road	linear foot	\$200	1850	\$370,000	Estimate 70 ft paved access road at 1850 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1885	\$226,200	Estimate 14 ft paved surface to support emergency vehicles at 1,885 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation
19	Power Conduit and Cable Install	linear foot	\$30	1661	\$49,830	Linear disturbance for RSA plus runway and taxiway plus 200 foot taxiway connector used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	26	\$13,000	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	40	\$40,000	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	1	\$35,000	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds if applicable
25	Signs	each	\$5,000	4	\$20,000	New signs or relocation of existing signs (average cost)

Table A-1.3. RSA-5D Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
26	2.4 Meter Chain Link Fence	meter	\$90	482	\$43,380	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary
27	Mendenhall East Bank	square foot	\$20	54000	\$1,080,000	Estimate based on use of sheet piling to temporarily divert water from construction zones. 300 length of pile at average 40' depth
28	Mendenhall Channel West Bank	cubic yard	\$15	38887	\$583,305	Removal of portion west bank Mendenhall for channel control, geomorphologic consistency
Construction Total					\$11,772,667	
Overhead @ 3% of Construction					\$353,180	
Design @ 10% of Construction					\$1,177,267	
Construction Admin/Management @ 15% of Construction					\$1,765,900	
Total Estimate - Construction Cost					\$15,069,014	
29	Compensatory Mitigation	FCUs	\$238	5582	\$2,657,222	Assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$17,726,236	

Table A-1.4. RSA-5E Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2936	\$20,552	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	35	\$52,500	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	28233	\$338,796	RSA/Lateral RSA area clearing, taxiway. Assume 0.5-foot depth (35 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	368901	\$4,426,812	Fill from float plane pond; sub base represents ~85% of total fill less cut volumes from slough channel (434002 x 0.85)
7	Class III RipRap	cubic yard	\$35	12100	\$423,500	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 2.5 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	21700	\$868,000	From off-site permitted borrow source. Assume RSA revegetated. Based on 6" application rate. 5% of total fill
9	Seeding	acre	\$4,000	21	\$84,000	Average estimate; see DEIS for veg mix. Non-lateral RSA only
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	79704	\$478,224	Estimated Volume of channel in ft ³ : (3400x120x5)+(2800x40x1)=2152000 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing, underground drains or concrete ditches

Table A-1.4. RSA-5E Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	38657	\$1,352,995	Combined estimate from screening of float plane pond materials, drainage excavations and off-site permitted borrow source. Includes new taxiway (8667 sq yd Txyw A, 2916 sq yd connecting txyw) and runway/RSA (4062 ft x 138 ft + 831 ft x 500 ft + 230ft x500ft = 1091056 sq. ft x 0.67 ft/27 cu. ft/yard
14	Asphalt Pavement	ton	\$95	7154	\$679,630	5" coating. One ton cover approximately 26 ft sq, (520 x 150 x 2 + 200 x 150) sq ft taxiways and runway combined)
15	Grooving	square yard	\$2	20667	\$41,334	Used on runway and taxiway. 520 x 150 x 2 + 200 x 150 = 186,000/9
16	Float Pond Access Road	linear foot	\$200	1580	\$316,000	Estimate 70 ft paved access road at 1580 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1700	\$204,000	Estimate 14 ft paved surface to support emergency vehicles, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation
19	Power Conduit and Cable Install	linear foot	\$30	1781	\$53,430	Linear disturbance for RSA, runway, taxiway and 200 ft taxiway connector used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	32	\$16,000	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	48	\$48,000	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	1	\$35,000	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds if applicable
25	Signs	each	\$5,000	5	\$25,000	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	468	\$42,120	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary

Table A-1.4. RSA-5E Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes	
27	Mendenhall East Bank	square foot	\$20	0	\$0	Estimate based on use of sheet piling to temporarily divert water from construction zones. Not needed for 5E	
	Construction Total					\$10,332,829	
	Overhead @ 3% of Construction					\$309,985	
	Design @ 10% of Construction					\$1,033,283	
	Construction Admin/Management @ 15% of Construction					\$1,549,924	
	Total Estimate - Construction Cost					\$13,226,021	
28	Compensatory Mitigation	FCUs	\$238	4673	\$2,224,538	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)	
	Total Cost					\$15,450,560	

Table A-1.5. RSA-6A Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2236	\$15,652	Minor pavement removal at buildout areas, including removal of existing west runway end RSA and access road
4	Clear and Grub	acre	\$1,500	25	\$37,950	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	20408	\$244,896	RSA/Lateral RSA area clearing. Assume 0.5-foot depth (25 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	256020	\$3,072,240	Fill from float plane pond; sub base represents ~85% of total fill less cut volumes from east slough channel
7	Class III RipRap	cubic yard	\$35	5808	\$203,280	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 1.2 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	9036	\$361,440	From off-site permitted borrow source. Assume non-EMAS RSA (23 acres) revegetated. Based on 6" application rate. 3% of total fill
9	Seeding	acre	\$4,000	10.5	\$42,000	Average estimate; see DEIS for veg mix. Non-lateral and non-EMAS RSA only. (25.3-12.2-2.6=10.5 acres
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	29796	\$178,776	Estimated Volume of channel in ft ³ : (1385x100x5)+(2800x40)=804500 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches

Table A-1.5. RSA-6A Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	22579	\$790,265	EMAS and RSA subgrade. EMAS 2 x (337ft x170 ft) +.RSA = 138 x 3535 + 950(500-170) = 911080 sq. ft x 0.67 ft/27 cu. ft/yd No new taxiway pavement.
14	Asphalt Pavement	ton	\$95	1084	\$102,980	5" coating. One ton cover approximately 26 ft sq, calculate Limited new runway about 188 ft x 150 = 28199 sq. ft. No new taxiway
15	Grooving	square yard	\$2	3133	\$6,266	Used on runway. 188 x 150/9 = 3133 sq yd
16	Float Pond Access Road	linear foot	\$200	1290	\$258,000	Estimate 20 ft paved access road at 1290 ft long, includes 3" asphalt, 8" D1 base course amd 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1297	\$155,640	Estimate 14 ft paved surface to support emergency vehicles at 1,297 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation
19	Power Conduit and Cable Install	linear foot	\$30	435	\$13,050	Linear disturbance for RSA and runway (no new taxiway) used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	12	\$6,000	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	12	\$12,000	Shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in EMAS and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	0	\$0	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds
25	Signs	each	\$5,000	1	\$5,000	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	380	\$34,200	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary
27	Mendenhall East Bank	square foot	\$20	0	\$0	Estimate based on use of sheet piling to temporarily divert water from construction zones. Not needed for 6A.

Table A-1.5. RSA-6A Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
28	EMAS Materials and Install	square foot	\$102	114580	\$11,687,160	Based on EMAS dimensions for two runway ends. Includes materials at \$60/sq ft, shipping at \$20/sq ft, other materials and installation at \$12/sq ft, and fees at \$10/sq ft. No site preparation charges since fill, sub-base, excavation and other charges included in items 1-6, 13.
29	EMAS Chevron Paint	lump sum	\$10,000	1	\$10,000	
Construction Total					\$18,063,731	
Overhead @ 3% of Construction					\$541,912	Not applied to EMAS unit rate; already incorporates overhead, etc.
Design @ 10% of Construction					\$1,806,373	Not applied to EMAS unit rate; already incorporates overhead, etc.
Construction Admin/Management @ 15% of Construction					\$2,709,560	Not applied to EMAS unit rate; already incorporates overhead, etc.
Total Estimate - Construction Cost					\$23,121,576	
30	Compensatory Mitigation	FCUs	\$238	3334	\$1,586,794	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$24,708,369	

Table A-1.6. RSA-6B Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2236	\$15,652	Minor pavement removal at buildout areas, including removal of existing east runway end RSA and access road
4	Clear and Grub	acre	\$1,500	27	\$40,500	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	21780	\$261,360	RSA/Lateral RSA area clearing. Assume 0.5-foot depth (27 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	268757	\$3,225,084	Fill from float plane pond; sub base represents ~85% of total fill less cut volume available from Mendenhall River west bank, east runway slough.
7	Class III RipRap	cubic yard	\$35	5808	\$203,280	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 1.2 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	9485	\$379,400	From off-site permitted borrow source. Assume non-EMAS RSA (24 acres) revegetated. Based on 6" application rate. 3% of total fill
9	Seeding	acre	\$4,000	13	\$52,000	Average estimate; see DEIS for veg mix. Non-lateral and non-EMAS RSA only. (27.2-11.6-2.6=13 acres)
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans. unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	29796	\$178,776	Estimated Volume of channel in ft ³ : (1385x100x5)+(2800x40)=804500 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches

Table A-1.6. RSA-6B Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	22596	\$790,860	EMAS and RSA subgrade. EMAS 2 x (337ft x170 ft) + RSA = 138 x 3560 + 600 x (500-170) + 350 (500-170) = 911080 sq. ft x 0.67 ft/ 27 cu. ft./yard No new taxiway pavement.
14	Asphalt Pavement	ton	\$95	1084	\$102,980	5" coating. One ton cover approximately 26 ft sq, calculate Limited new runway about 188 ft x 150 = 28199 sq. ft. No new taxiway
15	Grooving	square yard	\$2	3133	\$6,266	Used on runway. 188 x 150/9 = 3133 sq yd
16	Float Pond Access Road	linear foot	\$200	1850	\$370,000	Estimate 70 ft paved access road at 1850 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1885	\$226,200	Estimate 14 ft paved surface to support emergency vehicles at 1,885 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation.
19	Power Conduit and Cable Install	linear foot	\$30	485	\$14,550	Linear disturbance for RSA and runway (no new taxiway) used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	12	\$6,000	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	12	\$12,000	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in EMAS and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	0	\$0	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds
25	Signs	each	\$5,000	1	\$5,000	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	482	\$43,380	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary
27	Mendenhall East Bank	square foot	\$20	54000	\$1,080,000	Estimate based on use of sheet piling to temporarily divert water from construction zones. 1350 length of pile at average 40' depth

Table A-1.6. RSA-6B Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
28	EMAS Materials and Install	square foot	\$102	114580	\$11,687,160	Based on EMAS dimensions for two runway ends. Includes materials at \$60/sq ft, shipping at \$20/sq ft, other materials and installation at \$12/sq ft, and fees at \$10/sq ft. No site preparation charges since fill, sub-base, excavation and other charges included in items 1-6, 13.
29	EMAS Chevron Paint	lump sum	\$10,000	1	\$10,000	
30	Mendenhall Channel West Bank	cubic yard	\$15	38887	\$583,305	Removal of portion west bank Mendenhall for channel control, geomorphologic consistency
Construction Total					\$20,120,689	
Overhead @ 3% of Construction					\$603,621	
Design @ 10% of Construction					\$2,012,069	
Construction Admin/Management @ 15% of Construction					\$3,018,103	
Total Estimate - Construction Cost					\$25,754,482	
31	Compensatory Mitigation	FCU	\$238	3990	\$1,899,288	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$27,653,770	

Table A-1.7. RSA-6C Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2236	\$15,652	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	33	\$49,500	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	26620	\$319,440	RSA/Lateral RSA area clearing, taxiways. Assume 0.5-foot depth (33 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	344412	\$4,132,944	Fill from float plane pond; sub base represents ~85% of total fill less cut volume available from Mendenhall River west bank, east runway slough.
7	Class III RipRap	cubic yard	\$35	5808	\$203,280	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 1.2 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	19611	\$784,440	From off-site permitted borrow source. Assume non-EMAS RSA (31.5acres) revegetated. Based on 6" application rate. 4% of total fill
9	Seeding	acre	\$4,000	20	\$80,000	Average estimate; see DEIS for veg mix. Non-lateral and non-EMAS RSA only. (33.7-12.2-1.5=20.0 acres
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	70815	\$424,890	Estimated Volume of channel in ft ³ : (3000x120x5)+(2800x40x1)=1912000 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches

Table A-1.7. RSA-6C Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	25143	\$880,005	EMAS and RSA subgrade. 138 x 3535 + 350 x 500 + 711 x 500 = 1,018,330 sq. ft x 0.67 ft/27 cu. ft/yd No new taxiway or runway pavement.
14	Asphalt Pavement	ton	\$95	0	\$0	5" coating. One ton cover approximately 26 ft sq, No new taxiway or runway
15	Grooving	square yard	\$2	0	\$0	Used on runway and taxiway. No grooving required, no new taxiway or runway.
16	Float Pond Access Road	linear foot	\$200	1850	\$370,000	Estimate 70 ft paved access road at 1850 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1885	\$226,200	Estimate 14 ft paved surface to support emergency vehicles at 1,885 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan estimate plus inflation
19	Power Conduit and Cable Install	linear foot	\$30	1061	\$31,830	Linear disturbance for RSA (no new taxiway) used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	0	\$0	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	0	\$0	taxiway lights and shifted runway lights, if applicable
22	Runway 08 M/ALS Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and EMAS and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	0	\$0	New paint for taxiway direction and marker
24	Runway Painting	lump sum	\$50,000	0	\$0	New paint for thresholds if applicable
25	Signs	each	\$5,000	0	\$0	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	482	\$43,380	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary

Table A-1.7. RSA-6C Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
27	Mendenhall East Bank	square foot	\$20	54000	\$1,080,000	Estimate based on use of sheet piling to temporarily divert water from construction zones. 300 length of pile at average 40' depth
28	EMAS Materials and Install	square foot	\$102	57290	\$5,843,580	Based on EMAS dimensions for one runway end. Includes materials at \$60/sq ft, shipping at \$20/sq ft, other materials and installation at \$12/sq ft, and fees at \$10/sq ft. No site preparation charges since fill, sub-base, excavation and other charges included in items 1-6, 13.
29	EMAS Chevron Paint	lump sum	\$5,000	1	\$5,000	
30	Mendenhall Channel West Bank	cubic yard	\$15	38887	\$583,305	Removal of portion west bank Mendenhall for channel control, geomorphologic consistency
Construction Total					\$15,850,382	
Overhead @ 3% of Construction					\$475,511	
Design @ 10% of Construction					\$1,585,038	
Construction Admin/Management @ 15% of Construction					\$2,377,557	
Total Estimate - Construction Cost					\$20,288,489	
31	Compensatory Mitigation	FCUs	\$238	4937	\$2,349,869	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$22,638,358	

Table A-1.8. RSA-6D Construction Cost

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
1	Mobilization/ Demobilization	lump sum	\$180,000	1	\$180,000	
2	Construction Surveys	lump sum	\$32,000	1	\$32,000	
3	Pavement Removal	square yard	\$7	2236	\$15,652	Minor pavement removal at buildout areas and from access road removal
4	Clear and Grub	acre	\$1,500	29	\$43,500	RSA/Lateral RSA area clearing
5	Unclassified Excavation and Grading	cubic yard	\$12	23393	\$280,716	RSA/Lateral RSA area clearing. Assume 0.5-foot depth (29 acre x 43560 ft ² /acre x 1/2 foot depth by 27 ft ³ per yard)
6	Fill/Sub-Base	cubic yard	\$12	294765	\$3,537,180	Fill from float plane pond; sub base represents ~85% of total fill less cut volume available from Mendenhall River west bank, east runway slough.
7	Class III RipRap	cubic yard	\$35	7260	\$254,100	Riprap from off-site borrow source. Used on 1:1 lateral RSA toe slope only. 1.5 Acres x 43,560/9
8	Top Soil	cubic yard	\$40	20092	\$803,680	From off-site permitted borrow source. Assume RSA revegetated. Based on 6" application rate. 5% of total fill
9	Seeding	acre	\$4,000	17	\$68,000	Average estimate; see DEIS for veg mix. Non-lateral RSA only
10	Jordan Creek Culvert	segment	\$2,572	138	\$354,936	Based on proposed action description of arch culvert connections on north and south side of runway to existing CMP. Estimated about 138 feet of 12 x 10 ft spans, unit rate includes spans, fill, culverts, and fish rock
11	East Runway Slough	cubic yard	\$6	29796	\$178,776	Estimated Volume of channel in ft ³ : (1385x100x5)+(2800x40)=804500 ft ³
12	CMP (storm drainage)	linear foot	\$60	0	\$0	Incorporated in WHMP alternative costing; underground drains or concrete ditches

Table A-1.8. RSA-6D Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
13	8" D1 Base Course	cubic yard	\$35	20205	\$707,175	Combined estimate, from screened float plane pond material, drainage excavations and off-site permitted borrow source. Includes near surface layer for RSA (3535 ft x 138 ft + 661 ft x 500 ft) = 818,330 sq. ft x 0.67 ft/27 cu. ft/yard
14	Asphalt Pavement	ton	\$95	2659	\$252,605	5" coating, calculate for additional full-strength runway, 461 x 150 = 69,150 sq ft/26 sq ft/ton
15	Grooving	square yard	\$2	7683	\$15,366	Used on runway, grooving for increased departure distances
16	Float Pond Access Road	linear foot	\$200	1850	\$370,000	Estimate 70 ft paved access road at 1850 ft long, includes 3" asphalt, 8" D1 base course and 2' select borrow
17	Dike Trail/EVAR Access	linear foot	\$120	1885	\$226,200	Estimate 14 ft paved surface to support emergency vehicles at 1,885 long, includes 3" asphalt, 8" D1 base course, and 2' select borrow
18	Erosion Control	lump sum	\$135,000	1	\$135,000	Master Plan plus contingency for river work, coffer dam - increase for work in river
19	Power Conduit and Cable Install	linear foot	\$30	661	\$19,830	Linear disturbance for RSA used to calculate lengths. Average unit rate including jacketed shielded cable, rigid steel conduit, and HDPE conduit
20	Remove Lights	each	\$500	0	\$0	Removal of existing taxiway and runway lights, if applicable
21	Install Lights	each	\$1,000	0	\$0	taxiway lights and shifted runway lights, if applicable
22	Runway 08 MALSR Lights	lump sum	\$75,000	1	\$75,000	Replacement of light stands with frangible supports in RSA and addition or removal of new support depending on threshold shift
23	Taxiway Painting	lump sum	\$35,000	0	\$0	not applicable, no new taxiway
24	Runway Painting	lump sum	\$50,000	1	\$50,000	New paint for thresholds if applicable
25	Signs	each	\$5,000	0	\$0	New signs or relocation of existing signs (average cost)
26	2.4 Meter Chain Link Fence	meter	\$90	482	\$43,380	Estimate for new fence along west runway RSA end, Airport/Refuge Boundary

Table A-1.8. RSA-6D Construction Cost, continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost	Notes
27	Mendenhall East Bank	square foot	\$20	54000	\$1,080,000	Estimate based on use of sheet piling to temporarily divert water from construction zones. 300 length of pile at average 40' depth
28	Mendenhall Channel West Bank	cubic yard	\$15	38887	\$583,305	Removal of portion west bank Mendenhall for channel control, geomorphologic consistency
Construction Total					\$9,306,401	
Overhead @ 3% of Construction					\$279,192	
Design @ 10% of Construction					\$930,640	
Construction Admin/Management @ 15% of Construction					\$1,395,960	
Total Estimate - Construction Cost					\$11,912,193	
29	Compensatory Mitigation	FCUs	\$238	4189	\$1,993,916	assume 2:1 mitigation ration (i.e., 2 x FCUs x \$238)
Total Cost					\$13,906,110	

Table A-1.9. RSA-1 Life Cycle Cost

RSA-1 Costs:		Givens:	
RSA Alternative Construction Cost	\$16,919,334	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$0	RSA/EMAS replaced at year:	0
Annual maintenance cost:	\$18,000		
Annual snow removal cost:	\$4,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
	$P(m9) = ((\$18000 + \$4000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$143,335	
Year 11-20			
	$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$72,864	
Snow Removal Years 10 & 20			
	$P(sr10) = \$4000 / (1 + 0.07)^{10}$	\$2,033	
	$P(sr20) = \$4000 / (1 + 0.07)^{20}$	\$1,034	
Total Maintenance & snow removal costs:		\$219,266	
Cost to Replace RSA Year 10:			
	$P(repl) = \$0 / (1 + 0.07)^{10}$	\$0	
Cost to Construct RSA Year 1:			
	$P(emas) = \$16919334$	\$16,919,334	
TOTAL RSA LIFE CYCLE COST:		\$17,138,600	

Table A-1.10. RSA-5C Life Cycle Cost

RSA-5C Costs:		Givens:	
RSA Alternative Construction Cost		\$14,708,169	Annual discount rate (assume 7%):
Replacement cost:		\$0	RSA/EMAS replaced at year:
Annual maintenance cost:		\$18,000	7.0%
Annual snow removal cost:		\$1,000	0
Maintenance & Snow Removal Cost:			
Year 1-9			
	$P(m9) = ((\$18000 + \$1000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$123,789	
Year 11-20			
	$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$62,928	
Snow Removal Years 10 & 20			
	$P(sr10) = \$1000 / (1 + 0.07)^{10}$	\$508	
	$P(sr20) = \$1000 / (1 + 0.07)^{20}$	\$258	
Total Maintenance & snow removal costs:		\$187,484	
Cost to Replace RSA Year 10:			
	$P(repl) = \$0 / (1 + 0.07)^{10}$	\$0	
Cost to Construct RSA Year 1:			
	$P(emas) = \$14708169$	\$14,708,169	
TOTAL RSA LIFE CYCLE COST:		\$14,895,653	

Table A-1.11. RSA-5D Life Cycle Cost

RSA-5D Costs:		Givens:	
RSA Alternative Construction Cost	\$15,069,014	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$0	RSA/EMAS replaced at year:	0
Annual maintenance cost:	\$18,000		
Annual snow removal cost:	\$1,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
	$P(m9) = ((\$18000 + \$1000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$123,789	
Year 11-20			
	$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$62,928	
Snow Removal Years 10 & 20			
	$P(sr10) = \$1000 / (1 + 0.07)^{10}$	\$508	
	$P(sr20) = \$1000 / (1 + 0.07)^{20}$	\$258	
Total Maintenance & snow removal costs:		\$187,484	
Cost to Replace RSA Year 10:		\$0	
	$P(repl) = \$0 / (1 + 0.07)^{10}$	\$0	
Cost to Construct RSA Year 1:		\$15,069,014	
	$P(emas) = \$15069014$	\$15,069,014	
TOTAL RSA LIFE CYCLE COST:		\$15,256,498	

Table A-1.12. RSA-5E Life Cycle Cost

RSA-5E Costs:		Givens:	
RSA Alternative Construction Cost	\$13,226,021	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$0	RSA/EMAS replaced at year:	0
Annual maintenance cost:	\$18,000		
Annual snow removal cost:	\$1,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
$P(m9) = ((\$18000 + \$1000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$123,789		
Year 11-20			
$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$62,928		
Snow Removal Years 10 & 20			
$P(sr10) = \$1000 / (1 + 0.07)^{10}$	\$508		
$P(sr20) = \$1000 / (1 + 0.07)^{20}$	\$258		
Total Maintenance & snow removal costs:	\$187,484		
Cost to Replace RSA Year 10:			
$P(rep) = \$0 / (1 + 0.07)^{10}$	\$0		
Cost to Construct RSA Year 1:			
$P(emas) = \$13226021$	\$13,226,021		
TOTAL RSA LIFE CYCLE COST:	\$13,413,505		

Table A-1.13. RSA-6A Life Cycle Cost

RSA-6A Costs:		Givens:	
RSA Alternative Construction Cost	\$23,121,576	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$11,687,160	RSA/EMAS replaced at year:	10
Annual maintenance cost:	\$40,000		
Annual snow removal cost:	\$10,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
$P(m9) = (\$40000 + \$10000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$325,762		
Year 11-20			
$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$165,601		
Snow Removal Years 10 & 20			
$P(sr10) = \$10000 / (1 + 0.07)^{10}$	\$5,083		
$P(sr20) = \$10000 / (1 + 0.07)^{20}$	\$2,584		
Total Maintenance & snow removal costs:	\$499,030		
Cost to Replace RSA Year 10:			
$P(rep) = \$11687160 / (1 + 0.07)^{10}$	\$5,941,160		
Cost to Construct RSA Year 1:			
$P(emas) = \$23121576$	\$23,121,576		
TOTAL RSA LIFE CYCLE COST:	\$29,561,765		

Table A-1.14. RSA-6B Life Cycle Cost

RSA-6B Costs:		Givens:	
RSA Alternative Construction Cost	\$25,754,482	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$11,687,160	RSA/EMAS replaced at year:	10
Annual maintenance cost:	\$40,000		
Annual snow removal cost:	\$10,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
$P(m9) = (\$40000 + \$10000)(1 + 0.07)^9 - 1 / 0.07(1 + 0.07)^9$	\$325,762		
Year 11-20			
$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$165,601		
Snow Removal Years 10 & 20			
$P(sr10) = \$10000 / (1 + 0.07)^{10}$	\$5,083		
$P(sr20) = \$10000 / (1 + 0.07)^{20}$	\$2,584		
Total Maintenance & snow removal costs:	\$499,030		
Cost to Replace RSA Year 10:			
$P(rep) = \$11687160 / (1 + 0.07)^{10}$	\$5,941,160		
Cost to Construct RSA Year 1:			
$P(emas) = \$25754482$	\$25,754,482		
TOTAL RSA LIFE CYCLE COST:	\$32,194,671		

Table A-1.15. RSA-6C Life Cycle Cost

RSA-6C Costs:		Givens:	
RSA Alternative Construction Cost	\$20,288,489	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$5,843,580	RSA/EMAS replaced at year:	10
Annual maintenance cost:	\$28,000		
Annual snow removal cost:	\$6,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
	$P(m9) = ((\$28000 + \$6000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$221,518	
Year 11-20			
	$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$112,608	
Snow Removal Years 10 & 20			
	$P(sr10) = \$6000 / (1 + 0.07)^{10}$	\$3,050	
	$P(sr20) = \$6000 / (1 + 0.07)^{20}$	\$1,551	
Total Maintenance & snow removal costs:		\$338,727	
Cost to Replace RSA Year 10:			
	$P(rep) = \$5843580 / (1 + 0.07)^{10}$	\$2,970,580	
Cost to Construct RSA Year 1:			
	$P(emas) = \$20288489$	\$20,288,489	
TOTAL RSA LIFE CYCLE COST:		\$23,597,796	

Table A-1.16. RSA-6D Life Cycle Cost

RSA-6D Costs:		Givens:	
RSA Alternative Construction Cost	\$11,912,193	Annual discount rate (assume 7%):	7.0%
Replacement cost:	\$0	RSA/EMAS replaced at year:	0
Annual maintenance cost:	\$18,000		
Annual snow removal cost:	\$1,000		
Maintenance & Snow Removal Cost:			
Year 1-9			
	$P(m9) = ((\$18000 + \$1000)(1 + 0.07)^9 - 1) / 0.07(1 + 0.07)^9$	\$123,789	
Year 11-20			
	$P(m19) = P(m9) / (1 + 0.07)^{10}$	\$62,928	
Snow Removal Years 10 & 20			
	$P(sr10) = \$1000 / (1 + 0.07)^{10}$	\$508	
	$P(sr20) = \$1000 / (1 + 0.07)^{20}$	\$258	
Total Maintenance & snow removal costs:		\$187,484	
Cost to Replace RSA Year 10:			
	$P(repl) = \$0 / (1 + 0.07)^{10}$	\$0	
Cost to Construct RSA Year 1:			
	$P(emas) = \$11912193$	\$11,912,193	
TOTAL RSA LIFE CYCLE COST:		\$12,099,677	

Table A-2. Snow Removal Equipment Facility Construction Cost Estimate (2005 Dollars)

Item No.	Item	Unit	Unit Price	Quantity	Item Cost
	Site				
1	Site Preparation	lump sum	\$50,428	1	\$50,428
2	Site Improvements	lump sum	\$1,570,804	1	\$1,570,804
3	Utilities	lump sum	\$580,573	1	\$580,573
	Urea/CC-90 Storage				
4	Substructure	lump sum	\$155,580	1	\$155,580
5	Storage Shell	lump sum	\$544,293	1	\$544,293
6	Interior	lump sum	\$3,445	1	\$3,445
7	Services	lump sum	\$504,572	1	\$504,572
8	Equipment	lump sum	\$161,528	1	\$161,528
	Vehicle Warm Storage				
9	Substructure	lump sum	\$359,159	1	\$359,159
10	Shell	lump sum	\$1,055,974	1	\$1,055,974
11	Interior	lump sum	\$2,791	1	\$2,791
12	Services	lump sum	\$577,399	1	\$577,399
13	Equipment and Furnishings	lump sum	\$53,100	1	\$53,100
	Administration and Shops				
14	Substructure	lump sum	\$226,543	1	\$226,543
15	Shell	lump sum	\$970,191	1	\$970,191
16	Interior	lump sum	\$186,980	1	\$186,980
17	Services	lump sum	\$1,054,282	1	\$1,054,282
18	Equipment and Furnishings	lump sum	\$139,474	1	\$139,474
	Sand Storage				
19	Substructure	lump sum	\$199,456	1	\$199,456
20	Shell	lump sum	\$554,920	1	\$554,920
21	Interior	lump sum	\$3,445	1	\$3,445
22	Services	lump sum	\$128,174	1	\$128,174
	Fueling Facility				
23	Slabs	lump sum	\$33,450	1	\$33,450
24	Fuel Islands	lump sum	\$14,615	1	\$14,615

Table A-2. Snow Removal Equipment Facility Construction Cost Estimate (2005 Dollars), continued

Item No.	Item	Unit	Unit Price	Quantity	Item Cost
25	Canopy	lump sum	\$112,625	1	\$112,625
26	Storage Tanks	lump sum	\$108,014	1	\$108,014
27	Fuel Piping	lump sum	\$130,475	1	\$130,475
28	Plumbing Piping	lump sum	\$4,666	1	\$4,666
29	Service/Distribution Systems	lump sum	\$24,826	1	\$24,826
	Access Road Demo/Recon.				
30	Site Preparation	lump sum	\$16,885	1	\$16,885
31	Site Improvements	lump sum	\$70,903	1	\$70,903
32	Asphalt and Base	lump sum	\$35,622	1	\$35,622
	Taxiway E Construction				
33	Taxiway	lump sum	\$122,731	1	\$122,731
34	Storm Drainage	lump sum	\$26,270	1	\$26,270
35	Taxiway Lights	lump sum	\$84,169	1	\$84,169
Construction Total *					\$9,868,363
General Requirements @ 12% of Costs					\$1,184,204
General Contractor Overhead and Profit @ 10% of Costs					\$986,836
General Contractor Bond and Insurance @ 2% of Costs					\$197,367
Construction Total					\$12,236,770
Contingency @ 10% of Construction					\$1,223,677
Inflation @ 5.3% of Construction					\$648,549
Construction Admin/Management @ 15% of Construction **					\$1,480,254
Total Estimate - Construction Cost					\$15,589,251

Source: Estimations 2004. SREF Construction Cost Estimate Conceptual Estimated. Prepared for USKH. May 6.

* Construction Total and subsequent costs vary slightly from Estimation 2004 due to rounding.

**Construction Admin/Management Factor included based on recommendation from T. Stone 2004

Table A-3. Fuel Farm Alternatives Budget Estimates (2005 Dollars)

Item Description	Unit Rate	Amount	Cost	Subtotal
Fuel Farm Access Road, Alt FF-1				
Double Lane Asphalt	\$350	535	\$187,122	
Arch Culvert	\$1,115	30	\$33,453	
Miscellaneous (paint, curb, signs)			\$16,142	
				\$236,717
project budget including design, admin, inspection, etc @ 28%			\$302,998	
Fuel Farm Access Road with Bridge (no culvert)				
Double Lane Asphalt	\$350	535	\$187,122	
Bridge (assume 30 ft long, 16 ft wide)	\$186	480	\$89,208	
Miscellaneous (paint, curb, signs)			\$16,142	
				\$292,472
project budget including design, admin, inspection, etc @ 28%			\$374,364	
Fuel Pipelines, Alt FF-2 (Trench and Fill)				
24-inch pipe	\$27	600	\$15,930	
6-inch pipes (6 total, \$6/per/ft each)	\$38	600	\$22,939	
Materials, reclamation	0	0	\$25,488	
Refueling Station (see below)		1	\$484,803	
Security Fencing (including gate)	\$48	300	\$14,337	
				\$563,497
project budget including design, admin, inspection, etc @ 28%			\$721,276	
Fuel Pipelines, Alt FF-2 (Directional Drill)				
24-inch pipe	\$573	600	\$344,088	
6-inch pipes (6 total, \$22/per/ft each install)	\$140	600	\$84,110	
Materials, reclamation	0	0	\$8,496	
Refueling Station (see below)		1	\$484,803	
Security Fencing (including gate)	\$48	300	\$14,337	
				\$935,834
project budget including design, admin, inspection, etc @ 28%			\$1,197,868	

Table A-3. Fuel Farm Alternatives Budget Estimates (2005 Dollars), continued

Item Description	Unit Rate	Amount	Cost	Subtotal
Refueling Station Estimates for Alt FF-2 (Trench and Fill)				
Concrete Slabs (8", 4,000 SF)	\$12	4000	\$46,728	
Fuel Islands (on 4,000 SF, 3 islands)	\$7,328	3	\$21,983	
Canopy (include lighting)	\$51	3300	\$168,221	
Fuel Piping above grade (dispensers, etc)	\$65,207	3	\$195,620	
Plumbing Piping (400 LF of 4" w/fittings, cast iron)	\$19	400	\$7,646	
Service, Distribution (Electrical, Panels, Ground)	\$44,604	1	\$44,604	
				\$484,803
project budget including design, admin, inspection, etc @ 28%			\$620,548	

Notes: Unit costs for refueling station based on probable size and number of fuel ports.
Basis for costing from Fueling Facility estimates prepared for SREF by Estimations 2004.

Table A-4. Planning Level Cost Estimates for Aviation Facilities and Apron (2005 Dollars)

Fixed-wing/Rotary-wing Apron Alternative	Base Cost 1998 Dollars	Mobilization	Acres or Units	cost each Unit	1998 const Cost	Adjust/ Infl	Total Cost	Source of Beginning Cost
		beg. x 10%		beg. x 90%/ JAMP Units	Mob+(cost each x units prov)			
FW/RW-1: Apron Dev.	\$16,773,860						\$18,052,163	Sum
All Land Dev. Costs	\$7,099,360	\$709,936	42	\$113,087	\$5,459,596	\$1,201,111	\$6,660,708	Sum
Fixed Wing Apron	\$4,699,360	\$469,936						Sum
West GA Paving	\$1,684,000	\$168,400						JIA AMP (Table 6-A, pg 6-2)
Site Prep for NW quad Dev.	\$1,507,360	\$150,736						JIA AMP (Table 6-A, pg 6-2)
GA Auto Park Expansion	\$1,508,000	\$150,800						JIA AMP (Table 6-A, pg 6-2)
Rotary Wing Apron	\$2,400,000	\$240,000						JIA AMP (Table 6-A, pg 6-2)
Hangers and Tiedowns	\$9,674,500	\$967,450		\$482,179	\$8,383,941	\$1,844,467	\$10,228,408	Sum
Executive Hangers	\$4,417,500	\$441,750	9	\$361,432	\$3,694,636	\$812,820	\$4,507,456	JIA AMP (Table 6-A, pg 6-2)
T-Hangers	\$2,850,000	\$285,000	37	\$82,742	\$3,346,452	\$736,219	\$4,082,671	JIA AMP (Table 6-A, pg 6-2)
Tiedowns	\$2,407,000	\$240,700	29	\$38,005	\$1,342,853	\$295,428	\$1,638,280	JIA AMP (Table 6-A, pg 6-2)
RCO & ASOS Relocation							\$1,163,048	FAA/NOAA/NWS staff, 2003
FW/RW-2: Apron Dev/Reloc.	\$17,366,500						\$18,597,930	Sum
All Land Dev. Costs	\$7,099,360	\$709,936	42	\$113,087	\$5,459,596	\$1,201,111	\$6,660,708	Sum
Fixed Wing Apron	\$4,699,360	\$469,936						Sum
West GA Paving	\$1,684,000	\$168,400						JIA AMP (Table 6-A, pg 6-2)
Site Prep for NW quad Dev.	\$1,507,360	\$150,736						JIA AMP (Table 6-A, pg 6-2)
GA Auto Park Expansion	\$1,508,000	\$150,800						JIA AMP (Table 6-A, pg 6-2)
Rotary Wing Apron	\$2,400,000	\$240,000						JIA AMP (Table 6-A, pg 6-2)
Hangers and Tiedowns	\$9,674,500	\$967,450		\$482,179	\$8,238,651	\$1,812,503	\$10,051,154	Sum
Executive Hangers	\$4,417,500	\$441,750	9	\$361,432	\$3,694,636	\$812,820	\$4,507,456	JIA AMP (Table 6-A, pg 6-2)
T-Hangers	\$2,850,000	\$285,000	38	\$82,742	\$3,429,194	\$754,423	\$4,183,616	JIA AMP (Table 6-A, pg 6-2)
Tiedowns	\$2,407,000	\$240,700	23	\$38,005	\$1,114,821	\$245,261	\$1,360,082	JIA AMP (Table 6-A, pg 6-2)
RCO & ASOS Relocation							\$1,163,048	FAA/NOAA/NWS staff, 2003
Duck Creek Relocation	\$592,640				\$592,640	\$130,381	\$723,021	EIS Consulting Team

Table A-5.1. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1a - pave infield areas						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$84,000	\$84,000	
2	clear/grub	acre	77	\$1,500	\$115,500	
3	fill	cy	216,000	\$12	\$2,592,000	
4	base material	cy	62,000	\$20	\$1,240,000	
5	asphalt	ton	55,902	\$95	\$5,310,690	
6	construction	ls	1	\$22,000	\$22,000	\$9,364,190
project construction cost					\$9,364,190	
project budget including design, admin, inspection, etc @ 28%					\$11,986,163	
notes and assumptions:						
fill price includes cost for dewatering & handling material from float plane pond						
base material is 6" thick (base plus fill = 278,000 cu. Yd.)						
asphalt assumed 2" layer, one ton covers 60 sq. ft						
Planning level cost estimate for Project WH-2a - synthetic turf on infield						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$128,000	\$128,000	
2	clear/grub	acre	77	\$1,500	\$115,500	
3	fill	cy	278,000	\$12	\$3,336,000	
4	synthetic turf	sf	3,354,120	\$4.00	\$13,416,480	
5	construction	ls	1	\$22,000	\$22,000	\$17,017,980
project					\$17,017,980	
project budget including design, admin, inspection, etc @ 28%					\$21,783,014	
notes and assumptions:						
fill price includes cost for dewatering & handling material from float plane pond						
Planning level cost estimate for Project WH-3a - alter veg management						
See text in Section 2.9.3 for a description of the estimated labor and materials costs associated with this alternative.						

Table A-5.2. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1b – fill wetlands on Airport						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$52,000	\$52,000	
2	clear/grub	acre	3	\$1,500	\$4,050	
3	fill	cy	32,500	\$12	\$390,000	
4	Class III rip	cy	4,833	\$35	\$169,155	
5	construction	ls	1	\$13,000	\$13,000	\$628,205
project construction cost					\$628,205	
project budget including design, admin, inspection, etc @ 28%					\$804,102	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond class III rip rap from off-site source						
Planning level cost estimate for Project WH-2b - regrade wetlands on Airport						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$32,000	\$32,000	
2	clear/grub	acre	3	\$1,500	\$4,050	
3	fill	cy	12,500	\$12	\$150,000	
4	Class III rip	cy	1,650	\$35	\$57,750	
5	construction	ls	1	\$13,000	\$13,000	\$256,800
project construction cost					\$256,800	
project budget including design, admin, inspection, etc @ 28%					\$328,704	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond class III rip rap from off-site source						
Planning level cost estimate for Project WH-3b – increase wildlife hazing						
See text in Section 2.9.3 for a description of the estimated labor and materials costs associated with this alternative.						

Table A-5.3. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1c - fill wetlands on Refuge west of Airport						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$52,000	\$52,000	
2	clear/grub	acre	10	\$1,500	\$15,300	
3	fill	cy	108,000	\$12	\$1,296,000	
4	Class III rip	cy	16,456	\$35	\$575,960	
5	construction	ls	1	\$17,000	\$17,000	\$1,956,260
project construction cost					\$1,956,260	
project budget including design, admin, inspection, etc @ 28%					\$2,504,013	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond class III rip rap from off-site source						
Planning level cost estimate for Project WH-2c - regrade, dredge and fill wetlands west of Airport						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$32,000	\$32,000	
2	clear/grub	acre	3	\$1,500	\$4,950	
3	fill	cy	17,500	\$12	\$210,000	
4	class III rip rap	cy	4,840.0	\$35	\$169,400	
5	construction	ls	1	\$17,000	\$17,000	\$433,350
project construction cost					\$17,017,980	
project budget including design, admin, inspection, etc @ 28%					\$21,783,014	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond class III rip rap from off-site source						
Planning level cost estimate for Project WH-3c - Increase wildlife hazing						
See text in Section 2.9.3 for a description of the estimated labor and materials costs associated with this alternative.						

Table A-5.4. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1d - relocate Duck Creek to north Apt Boundary						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$84,000	\$84,000	
2	clear/grub	acre	1	\$1,500	\$1,500	
3	fill	cy	3,000	\$12	\$36,000	
4	channel	ls	1	\$410,000	\$410,000	
5	concrete liner	ton	4,375	\$60	\$262,500	
6	fish rock	cy	2,850	\$45	\$128,250	
7	revegetation	ls	1	\$41,000	\$41,000	
8	construction	ls	1	\$32,000	\$32,000	\$995,250
	project				\$995,250	
	project budget including design, admin, inspection, etc @ 28%				\$1,273,920	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond most sections of new channel lined with fish cobble and gravels initially see text for revegetation mix concrete liner assumed 4"thick, one ton covers 40 sq. ft						
Planning level cost estimate for Project WH-2d - relocate limited reach of Duck Creek						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$48,000	\$48,000	
2	clear/grub	acre	1	\$1,500	\$1,500	
3	fill	cy	500	\$12	\$6,000	
4	channel	ls	1	\$92,000	\$92,000	
5	fish rock	cy	284	\$45	\$12,780	
6	revegetation	ls	1	\$4,500	\$4,500	
7	construction	ls	1	\$16,000	\$16,000	\$180,780
	project construction cost				\$180,780	
	project budget including design, admin, inspection, etc @ 28%				\$231,398	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond new channel lined with fish cobble and gravels initially see text for revegetation mix no liner installed for limited channel relocation						
Planning level cost estimate for Project WH-3d - increase hazing along lower Duck Creek						
See text in Section 2.9.3 for a description of the estimated labor and materials costs associated with this alternative.						

Table A-5.5. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1e - convert drainage ditches into underground drains						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$41,000	\$41,000	
2	clear/grub/	acre	16	\$1,500	\$23,550	
3	fill	cy	80,000	\$12	\$960,000	
4	30" pipe	lf	5,000	\$60	\$300,000	
5	drain inlets	ea	30	\$1,500	\$45,000	
6	hydroseed	ac	15.7	\$4,000	\$62,800	
7	construction	ls	1	\$16,000	\$16,000	\$1,448,350
project construction cost					\$1,448,350	
project budget including design, admin, inspection, etc @ 28%					\$1,853,888	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond						
Planning level cost estimate for Project WH-2e - regrade ditches and line with concrete						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$31,000	\$31,000	
2	clear/grub/	acre	16	\$1,500	\$23,550	
3	fill	cy	18,000	\$12	\$216,000	
4	concrete liner	ton	6,534	\$60	\$392,040	
5	hydroseed	ac	9.7	\$4,000	\$38,800	
6	construction	ls	1	\$16,000	\$16,000	\$717,390
project construction cost					\$717,390	
project budget including design, admin, inspection, etc @ 28%					\$918,259	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond concrete liner assumed 4"thick, one ton covers 40 sq. ft						
Planning level cost estimate for Project WH-3e - regrade ditches and manage vegetation						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$22,000	\$22,000	
2	clear/grub/	acre	16	\$1,500	\$23,550	
3	fill	cy	13,000	\$12	\$156,000	
4	hydroseed	ac	16.0	\$4,000	\$64,000	
5	construction	ls	1	\$8,000	\$8,000	\$273,550
project construction cost					\$273,550	
project budget including design, admin, inspection, etc @ 28%					\$350,144	
notes and assumptions: fill price includes cost for dewatering & handling material from float plane pond cost does not include annual maintenance costs for vegetation management						

Table A5.6. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1f, 2f, 3f - remove pavement, grade, and pave						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$41,000	\$41,000	
2	asphalt	sy	64,200	\$7	\$449,400	
3	asphalt	ton	1,605	\$95	\$152,475	
4	construction	ls	1	\$12,000	\$12,000	\$654,875
project construction cost					\$654,875	
project budget including design, admin, inspection, etc @ 28%					\$838,240	
notes and assumptions: asphalt assumed 4" layer, one ton covers 40 sq. ft area in feet is 125 by 4500 between pond & runway and 10 by 1000 east of Jordan Creek						

Table A-5.7. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1g - Remove vegetation from Float Plane Pond						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$26,000	\$26,000	
2	veg removal	acre	83	\$2,400	\$198,720	
3	veg disposal	lump sum	1	\$500	\$500	\$225,220
project construction cost					\$225,220	
project budget including design, admin, inspection, etc @ 28%					\$288,282	
notes and assumptions: mobilization cost assumes that large dredge would be used to remove vegetation within pond dredge equipment would be moved to site up River and through temporary breach in dike						
Planning level cost estimate for Project WH-2g -fill float plane pond fingers						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$114,000	\$114,000	
2	clear/grub	acre	2	\$1,500	\$3,000	
3	fill	cy	136,000	\$12	\$1,632,000	
4	revegetation	acre	16	\$6,400	\$102,400	
5	construction	ls	1	\$18,000	\$18,000	\$1,869,400
project					\$1,869,400	
project budget including design, admin, inspection, etc @ 28%					\$2,392,832	
notes and assumptions: fill price includes cost for purchase and transport to Airport (not from Refuge dredge piles)						

Table A-5.8. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1h, 2h, 3h - remove dam at mouth of Jordan Creek						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	mob/demob	lump sum	1	\$2,124	\$2,124	
2	Clear dam	lump sum	1	\$4,248	\$4,248	
3	Reshape	lump	1	\$3,186	\$3,186	\$9,558
project construction cost					\$9,558	
project budget including design, admin, inspection, etc @ 28%					\$12,234	

Table A-5.9. Planning Level Cost Estimates for Wildlife Hazard Management Alternatives

Planning level cost estimate for Project WH-1i - thin spruce trees, clear understory, and install fence						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	clear	acre	44	\$6,000	\$264,000	
2	remove 1/3 spruce trees	acre	15	\$0	\$0	
3	clear fence	lin ft	7,055	\$1	\$7,761	
4	fence	lin foot	7,055	\$30	\$211,650	
5	construction	ls	1	\$14,000	\$14,000	\$497,411
project construction cost					\$497,411	
project budget including design, admin, inspection, etc @ 28%					\$636,685	
notes and assumptions: it is assumed that the removal of spruce trees would have no cost since the wood would be sold fence is 8' high, 9-gauge chain with 3 strand barbed wire on top						
Planning level cost estimate for Project WH-2i - nest removal and fence installation						
Item #	Item	Unit	Unit Volume	Cost/Unit	Cost	Calculations
1	clear fence	lin ft	7,055	\$1	\$7,761	
2	fence	lin foot	7,055	\$30	\$211,650	
3	remove nests	lump sum	1	\$20,000	\$20,000	
4	construction	ls	1	\$14,000	\$14,000	\$253,411
project					\$253,411	
project budget including design, admin, inspection, etc @ 28%					\$324,365	
notes and assumptions: nest removal would occur twice in the construction season fence is 8' high, 9-gauge chain with 3 strand barbed wire on top						
Planning level cost estimate for Project WH-3d - increase hazing along lower Duck Creek						
See text in Section 2.9.3 for a description of the estimated labor and materials costs associated with this alternative.						

Table A-6. RCO Budget Estimate

Item Description	Per Diem Man Days	Non Per Diem Man Days	Cost	Subtotal
F&E PLANT ENGINEERING:				
A/E task order for design and drafting (TSSC)			\$40,973	
A/E task order oversight and support	5	5	\$11,150	
Resident Engineer for construction contract (TSSC)			\$27,000	
Clear JAI exceptions, as-builts, etc.		5	\$5,200	
As-built drawings (TSSC)			\$1,200	
Airfare, 2 RT			\$1,000	\$89,205
F&E PLANT CONSTRUCTION:				
Upgrade utility service at Eng's Cut (allowance)			\$10,620	
New utility service at SREB site (allowance)			\$2,655	
Antenna tower, 60', 2 ea. (RCO)			\$53,100	
Antenna tower, 20' 1 ea. (ATIS)			\$5,310	
Clearing			\$332	
Gravel fill and place, 300 cy			\$4,301	
D-1 surface topping, 50 cy			\$1,593	
Chainlink fence, 250' w/ 12' wide gate			\$13,275	
Prefabricated building, 8'x10' (ATIS)			\$13,275	
Building, wood frame, steel siding, 20'x34' (RCO)			\$157,070	
Relocate generator from airport to Eng's Cut			\$8,602	
Demo. RTR building, 5,440 cf			\$1,805	
Demo. RTR building foundation, 680 sf			\$3,359	
Dump fees, 10 tons			\$929	
Demo RTR towers, lead base paint, 2 ea. (allowance)			\$2,124	
15% contingency on construction (Lines 13 - 27)			\$41,753	
28% contractor overhead, profit, and bond			\$89,629	\$409,731
F&E ELECTRONICS ENGINEERING:				
Design		30	\$31,200	
Drafting (TSSC)			\$6,000	

Table A-6. RCO Budget Estimate, continued

Item Description	Per Diem Man Days	Non Per Diem Man Days	Cost	Subtotal
Technical supervision and support	5	5	\$11,150	
Clear JAI exceptions, as-builts, etc.		5	\$5,200	
As-built drawings (TSSC)			\$2,000	
Airfare, 2 RT			\$1,000	\$58,303
F&E ELECTRONIC INSTALLATION:				
Supervisor for installation crew	40	10	\$58,000	
Install racks, radios, cable tray, etc.	80		\$95,200	
Clear JAI exceptions, as-builts, etc.	5	5	\$11,150	
Telecommunications non-recurring costs (allowance)			\$10,000	
Other installation costs (allowance)			\$2,500	
Airfare, 6 RT			\$3,000	\$185,425
Total				\$742,665

Table A-7. ASOS Cost Estimate

Item Description	Unit	Unit Rate	Amount	Cost	Subtotal
Clear and Grub	acre	\$1,500	2	\$3,000	
Unclassified Excavation	acre	\$1,500	2	\$3,000	
Fill/sub base	yard	\$12	2732	\$32,784	
D1 base course and road cover, 8"	yard	\$35	1200	\$42,000	
Remove ASOS from NE Development Area	lump sum			\$41,240	
Building construction w/wiring	lump sum			\$212,400	
					\$328,424
project budget including design, admin, inspection, etc @ 28%				\$420,383	
Notes:					
Access road 600 x 12 x 4ft high base = 1066 yd					
ASOS Pad 150 x 50 x 6 ft base = 1666 yd					
Building construction estimate provided by NWS as lump sum, based on costs for similar facilities					

Table A-8. Cost Estimates for Jordan Creek Culvert Options (2005 dollars)

Option 1 - Culvert Extension with 8-foot CMP			
Additional Culvert	138	LF	8-foot CMP per existing pipe
Unit Cost	\$273	/LF	Pipe Installation
	\$37,709		
Fill Volume	1010	CY	Fill to 19 feet
Unit Cost	\$5	/CY	Select Fill From Site
	\$5,520		
Fish Rock	45	CY	Line culvert with fish cobble/gravels
Unit Cost	\$49	/CY	Imported Juneau vicinity
	\$2,213		
Option 1 Estimated Cost	\$45,441		
Option 2 - Culvert Extension with Concrete Arch Culvert (Proposed Action)			
Additional Culvert	138	LF	12-foot x 10-foot spans
Unit Cost	\$2,733	/LF	Pipe Installation
	\$377,085		
Fill Volume	1010	CY	Fill to 19 feet
Unit Cost	\$12	/CY	Select Fill From Site
	\$12,120		
Fish Rock	45	CY	Line culvert with fish cobble/gravels
Unit Cost	\$49	/CY	Imported Juneau vicinity
	\$2,213		
Option 2 Estimated Cost	\$391,418		
Option 3 - Culvert Replacement with Concrete Arch Culvert			
Additional Culvert	770	LF	12-foot x 10-foot span
Unit Cost	\$2,733	/LF	Pipe Installation
	\$2,104,025		
Excavate Existing Pipe	3,040	CY	Remove Existing CMP
Unit Cost	\$3	/CY	Excavation
	\$9,968		
Shoring Installation	10,800	SF	Shoring Installation
Unit Cost	\$33	/SF	Shoring Installation (no salvage)
	\$354,132		
Fill Volume	640	CY	Fill to 19 feet
Unit Cost	\$12	/CY	Select Fill From Site
	\$7,680		
Fish Rock	342	CY	Line culvert with fish cobble/gravels
Unit Cost	\$49	/CY	Imported Juneau vicinity
	\$16,821		
Option 3 Estimated Cost	\$2,492,626		

Table A-9. Estimated Costs for East Runway Slough Options (2005 dollars)

Option 1 - CON/SPAN Arch Culvert			
Con/span Arch Culvert	300	EA	42' x 12' x 6' sections
Unit Cost	\$43,720	/EA	Includes delivery, Installation labor, and backfill materials
	\$13,116,000		
Culvert Footings	925	CY	(5) 500' x 10' x 12"
Unit Cost	\$273	/CY	Reinforced concrete spread footing sections
	\$252,756		
Culvert Channel Material	12,500	CY	4' depth of material (4X42'x4'x500')
Unit Cost	\$12	CY	Select Fill from site and/or import
	\$150,000		
Runway Fill	120,000		Same as Alt 1 minus culvert void (4x45'x4'x10'x500')
Unit Cost	\$12	/CY	Select Fill from Site
	\$1,440,000		
Option 1 Estimated Cost	\$14,958,756		
Option 2 - Corrugated Metal Pipe Culverts			
12' Culvert Pipe	20,000	LF	40 pipes 500' long x 12-ft OD
Unit Cost	\$328	/LF	
	\$6,558,000		
Engr Bedding and Backfill	38,500	CY	520'x500'x4'
Unit Cost	\$12	CY	3/4"-0 gravel
	\$462,000		
Culvert Channel Material	17,000	CY	4' depth of material in each pipe
Unit Cost	\$12	CY	Select Fill from site and/or import
	\$204,000		
Runway Fill	143,750	CY	Same as Alt 1 minus culvert void (480'x10'x500')
Unit Cost	\$12	/CY	Select Fill from site
	\$1,725,000		
Option 2 Estimated Cost	\$8,949,000		
Option 3 - Reconstructing an equivalent channel beyond the Constructed RS			
Length of new Channel	3,500	LF	
	48,500	CY	75 feet wide by 5 feet deep channel
Unit Cost	\$4	/CY	Excavators & 6-wheel drive dumpers w/ low grd. press. tires
	\$212,042		
Runway Fill	153,000	CY	750' x 500' x 11'
Unit Cost	\$12	/CY	Select Fill from Site
	\$1,836,000		
Erosion Control	175,000	SF	Heavy weight coir erosion control blanket with wood stakes
Unit Cost	\$0.55	/SF	
	\$95,638		
Option 3 Estimated Cost	\$2,143,680		

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