Gravina Access Project

Appendix F

Updated Cost Estimates

For Alternatives

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A Gateway to the Future

Gravina Access Project

Gravina Island Access

Engineer's Construction Cost Matrix

August 2016

Category	C3-4		F3		G2		G3		G4		G4v	
	Length or Sq Ft	Cost	Length or Sq Ft	Cost	Length or Sq Ft	Cost	Length or Sq Ft	Cost	Length or Sq Ft	Cost	Length or Sq Ft	Cost
ROADWAY												
MAINLINE ROADWAY CONSTRUCTION SUBTOTAL[1]	9,888	$ 11,908,224	30,974	$ 20,351,721	21,675	$ 9,580,297	10,180	$ 3,080,323	0	$ -	0	$ -
Mainline Pavement		$ 536,561		$ 4,178,842		$ 3,539,017		$ 696,332		$ -		$ -
Seley Road Widening[2]	4,230	$ 4,440,039	4,230	$ 4,440,039	11,605	$ 4,928,443	4,230	$ 4,440,039	4,230	$ 4,440,039	4,230	$ 4,440,039
Airport Access Road Paving		$ -	4,300	$ 628,900	4,300	$ 628,900	4,300	$ 628,900		$ -		$ -
Roadway Contingency (15% of Road Construction Subtotal)		$ 2,500,000		$ 4,400,000		$ 2,900,000		$ 1,400,000		$ 700,000		$ 700,000
ROADWAY CONSTRUCTION SUBTOTAL		**$ 19,384,824**		**$ 33,999,502**		**$ 21,576,657**		**$ 10,245,594**		**$ 5,140,039**		**$ 5,140,039**
STRUCTURES												
Government Creek Bridge Widening (Sta 141+50 to Sta 145+00)			4,200	$ 1,185,036				$ 987,530				
Gravina Creek Bridge Widening (Sta 197+40 to Sta 198+20)			960	$ 395,012								
West Channel Bridge			126,639	$ 122,935,850								
East Channel Bridge			101,731	$ 98,756,204								
Tongass Narrows Bridge	214,738	$ 208,458,678										
Airport Creek Bridge	3,060	$ 1,692,232	3,060	$ 1,692,232	3,400	$ 1,566,881	3,060	$ 1,410,193	3,060	$ 1,410,193	3,060	$ 1,410,193
Dredging for West Channel				$ 13,097,530								
STRUCTURE CONSTRUCTION SUBTOTAL[3]		**$ 210,150,910**		**$ 238,061,864**		**$ 1,880,257**		**$ 2,877,268**		**$ 1,692,232**		**$ 1,692,232**
MOBILIZATION & DEMOBILIZATION (10% of Subtotals)		$ 22,900,000		$ 27,200,000		$ 2,400,000		$ 1,400,000		$ 700,000		$ 700,000
ROADWAY CONSTRUCTION SUBTOTAL		**$ 252,435,734**		**$ 299,261,366**		**$ 25,856,914**		**$ 14,522,862**		**$ 7,532,271**		**$ 7,532,271**
FERRIES												
Shuttle Vans						$ 350,000		$ 350,000		$ 350,000		$ 350,000
Two New Ferries						$ 20,000,000		$ 20,000,000		$ 20,000,000		
New Berth										$ 5,492,500		
Upland Reconstruction & Expansion & Berths						$ 25,895,000		$ 25,895,000		$ 12,947,500		
Revilla Reconstruct Existing Ferry Berth						$ 2,887,500		$ 2,887,500		$ 2,887,500		$ 2,887,500
Revilla New Passenger Waiting Facility						$ 2,535,000		$ 2,535,000		$ 2,535,000		$ 2,535,000
Gravina Ferry Layup & Working Berth Facility						$ 14,460,000		$ 14,460,000		$ 14,460,000		$ 14,460,000
Gravina Reconstruct Existing Ferry Berth Facility						$ 4,412,500		$ 4,412,500		$ 4,412,500		$ 4,412,500
Gravina Freight Dock Facility						$ 2,880,000		$ 2,880,000		$ 2,880,000		$ 2,880,000
FERRY CONSTRUCTION SUBTOTAL						**$ 70,190,000**		**$ 70,190,000**		**$ 65,615,000**		**$ 27,175,000**
SEGMENT CONSTRUCTION SUBTOTAL		**$ 252,435,734**		**$ 299,261,366**		**$ 96,046,914**		**$ 84,712,862**		**$ 73,147,271**		**$ 34,707,271**
Land Side CONSTRUCTION ADMINISTRATION (5% of Seg Const Subtotal)		$ 12,620,000		$ 14,960,000		-		-		-		-
Sea Side CONSTRUCTION ADMINISTRATION (10% of Seg Const Subtotal)		-		-		$ 7,570,000		$ 6,440,000		$ 5,280,000		$ 3,440,000
TOTAL CONSTRUCTION AMOUNT		**$ 265,055,734**		**$ 314,221,366**		**$ 103,616,914**		**$ 91,152,862**		**$ 78,427,271**		**$ 38,147,271**
Land Side DESIGN (7% of Total Construction Amount)		$ 18,550,000		$ 21,990,000		-		-		-		-
Sea Side DESIGN (12% of Total Construction Amount)		-		-		$ 10,000,000		$ 8,500,000		$ 6,970,000		$ 4,540,000
UTILITIES		$ 1,000,000		$ 1,000,000		$ 1,000,000		$ 1,000,000		$ 1,000,000		$ 1,000,000
RIGHT-OF-WAY		$ 5,804,628		$ 95,879		$ 1,282,894		$ 752,583		$ -		$ -
PROJECT CONSTRUCTION and DEVELOPMENT SUBTOTAL		**$ 290,410,362**		**$ 337,307,245**		**$ 115,899,808**		**$ 101,405,445**		**$ 86,397,271**		**$ 43,687,271**
ICAP (5.0 % of Total)		$ 14,500,000		$ 16,800,000		$ 5,800,000		$ 5,100,000		$ 4,400,000		$ 2,200,000
GRAND TOTAL		**$ 304,910,362**		**$ 354,107,245**		**$ 121,699,808**		**$ 106,505,445**		**$ 90,797,271**		**$ 45,887,271**

Notes:

(1) Mainline Roadway Construction Subtotal includes all road construction costs (including Seley Road) for each alternative as described in the engineers estimate report from Revilla Island to the airport terminal, except for pavement (as requested by the Regional Director).

(2) The Seley Road costs are to upgrade the existing logging road between the *Airport Creek* bridge and the north Airport reserve (and G2 intersection) to match the existing 36-foot wide gravel Lewis Reef Road.

(3) All structure costs include 20 percent contingency. (Except the detailed construction cost estimation from Armeni Services)

(4) All costs are 2015 dollars.

(5) Historical bid tab data were used to update the unit prices. Only information from projects with similar project location and quantities were used.

(6) Alaska CPI was used as a result of the NCHII price index having a negative trend from 2008-2015. Alaska CPI was used to normalize historic bid tab data in the years between 2003 and 2015

(7) Bridge widening costs were estimated using 2003 lump sum costs normalized to 2015

(8) Airport Creek Bridge cost was determined using a cost per square foot normalized from the 2003 estimate to 2015.

(9) Tongass Narrows Bridge estimate comes from a nominalized detailed estimate from Armeni Consulting Services in 2013.

(10) The Tongass Narrows Bridge estimate was used to come up with a per square foot cost for the west and east channel bridges

(11) All ferry costs were developed by John Barnett from the "Gravina Access Project Costs SEIS Version v4" file.

(12) ROW Costs for all alternatives were taken directly from the Draft SEIS at Appendix B updated to 2014 market value acquisition

(13) All marine and construction cost contingencies do not inclue the shuttle vans and 2 new ferries as those cost are intended to be all inclusive.

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Alternatives 3/23/2017 14:00	No Action	AltC3-4	Alt F3	Alt G2	Alt G3	Alt G4	Alt G4v
Begin Construction - Y = 2022							
Life Span (years) - n2 = 75							
Years to Construct - yc = 7							
Initial Cost, Distributed over the # of Years to Construct (Y/N) n							
Eff. Real Discount Rate/Yr - i = 2.3%							
CASH FLOW (Constant 2014 Dollars):							
LIABILITIES:							
Initial Cost of Construction (including Contingencies)	**$0.00**	**$304,910,362**	**$354,107,244**	**$121,699,808**	**$106,505,444**	**$90,797,270**	**$45,887,270**
Year 2022 to Year 2028 (Beginning of Year)							
Annual Operating & Maintenance Costs:	**$3,549,464**	**$199,577**	**$187,741**	**$5,874,689**	**$5,863,299**	**$5,847,610**	**$3,567,610**
Periodic Maintenance Costs:							
Above ground structure inspections	**$0**	**$40,000**	**$80,000**	**$160,000**	**$160,000**	**$160,000**	**$80,000**
Frequency (Years):	2	2	2	2	2	2	2
Underwater foundations (bridge/tunnel) inspections	**$0**	**$40,000**	**$80,000**	**$0**	**$0**	**$0**	**$0**
Frequency (Years):	5.0	5	5	5	5	5	5
Underwater foundations (dock) inspections	**$0**	**$0**	**$0**	**$100,000**	**$100,000**	**$100,000**	**$50,000**
Frequency (Years):	5	5	5	5	5	5	5
Fendering systems repairs	0	**$0**	**$0**	**$200,000**	**$200,000**	**$200,000**	**$100,000**
Frequency (Years):	5	5	5	5	5	5	5
Guardrail replacement	0	**$733,239**	**$1,687,140**	**$1,463,553**	**$894,465**	**$402,597**	**$402,597**
Frequency (Years):	5	5	5	5	5	5	5
Bridge Rail Replacement	0	**$96,370**	**$102,465**	**$0**	**$0**	**$0**	**$0**
Frequency (Years):	5	5	5	5	5	5	5
Pavement planing and overlay	0	**$1,003,884**	**$3,159,246**	**$2,210,850**	**$1,038,360**	**$0**	**$0**
Frequency (Years):	10	10	10	10	10	10	10
Heavy freight dock resurfacing	0	**$0**	**$0**	**$400,000**	**$400,000**	**$400,000**	**$400,000**
Frequency (Years):	10	10	10	10	10	10	10
Anode replacement (bridge)	0	**$100,000**	**$200,000**	**$0**	**$0**	**$0**	**$0**
Frequency (Years):	10	10	10	10	10	10	10

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Alternatives 3/23/2017 14:00	No Action	AltC3-4	Alt F3	Alt G2	Alt G3	Alt G4	Alt G4v
Anode replacement (ferry dock)	0	$0	$0	$80,000	$80,000	$80,000	$40,000
Frequency (Years):	10	10	10	10	10	10	10
Anode replacement (heavy freight dock)	0	$0	$0	$120,000	$120,000	$120,000	$120,000
Frequency (Years):	10	10	10	10	10	10	10
Neoprene gland expansion joint replacement	0	$500,000	$1,000,000	$0	$0	$0	$0
Frequency (Years):	10	10	10	10	10	10	10
Signing and illumination replacement	0	$35,080	$88,570	$70,905	$51,005	$34,410	$34,410
Frequency (Years):	15	15	15	15	15	15	15
Recoat transfer span	0	$0	$0	$600,000	$600,000	$600,000	$300,000
Frequency (Years):	15	15	15	15	15	15	15
Bridge support-float recoat	0	$0	$0	$300,000	$300,000	$300,000	$150,000
Frequency (Years):	15	15	15	15	15	15	15
Expansion joint assembly replacement	0	$1,400,000	$2,800,000	$0	$0	$0	$0
Frequency (Years):	25	25	25	25	25	25	25
Ferry replacement costs	0	$0	$0	$24,000,000	$24,000,000	$24,000,000	$16,000,000
Frequency (Years):	35	35	35	35	35	35	35
Gerry terminal mooring structure replacement	0	$0	$0	$6,000,000	$6,000,000	$6,000,000	$3,000,000
Frequency (Years):	35	35	35	35	35	35	35
Transfer bridge replacement costs	0	$0	$0	$4,000,000	$4,000,000	$4,000,000	$4,000,000
Frequency (Years):	75	75	75	75	75	75	75
75 YEAR LIFE CYCLE COST (2017 Dollars):							
LIABILITIES:							
Initial Cost of Construction	$0	$304,910,362	$354,107,244	$121,699,808	$106,505,444	$90,797,270	$45,887,270
Annual Operating & Maintenance Costs:	$107,702,083	$6,055,802	$5,696,671	$178,256,856	$177,911,248	$177,435,208	$108,252,712
Periodic Maintenance Costs: Above ground structure (Bridge/dock/tunnel) inspections	$0	$596,901	$1,193,801	$2,387,602	$2,387,602	$2,387,602	$1,193,801
Underwater foundations (bridge/tunnel) inspections	$0	$225,635	$451,270	$0	$0	$0	$0

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Alternatives 3/23/2017 14:00	No Action	AltC3-4	Alt F3	Alt G2	Alt G3	Alt G4	Alt G4v
Underwater foundations (dock) inspections	$0	$0	$0	$564,088	$564,088	$564,088	$282,044
Fendering systems repairs	$0	$0	$0	$1,128,175	$1,128,175	$1,128,175	$564,088
Guardrail replacement	$0	$4,136,111	$9,516,949	$8,255,722	$5,045,567	$2,271,000	$2,271,000
Bridge Replacement	$0	$543,611	$577,992	$0	$0	$0	$0
Pavement planing and overlay	$0	$2,670,605	$8,404,455	$5,881,464	$2,762,321	$0	$0
Heavy freight dock resurfacing	$0	$0	$0	$1,064,109	$1,064,109	$1,064,109	$1,064,109
Anode replacement (bridge)	$0	$266,027	$532,055	$0	$0	$0	$0
Anode replacement (ferry dock)	$0	$0	$0	$212,822	$212,822	$212,822	$106,411
Anode replacement (heavy freight dock)	$0	$0	$0	$384,218	$384,218	$384,218	$384,218
Neoprene gland expansion joint replacement	$0	$1,330,136	$2,660,273	$0	$0	$0	$0
Signing and illumination replacement	$0	$54,793	$138,342	$110,750	$79,667	$53,747	$53,747
Recoat transfer span	$0	$0	$0	$937,173	$937,173	$937,173	$468,586
Bridge support-float recoat	$0	$0	$0	$468,586	$468,586	$468,586	$234,293
Expansion joint assembly replacement	$0	$1,059,267	$2,118,533	$0	$0	$0	$0
Ferry replacement costs	$0	$0	$0	$13,401,606	$13,401,606	$13,401,606	$8,934,404
Gerry terminal mooring structure replacement	$0	$0	$0	$3,350,401	$3,350,401	$3,350,401	$1,675,201
Transfer bridge replacement costs	$0	$0	$0	$0	$0	$0	$0
TOTAL LIFE CYCLE COST OF LIABILITIES :	$107,702,083	$321,849,251	$385,397,585	$338,103,380	$316,203,027	$294,456,005	$171,371,884
OPTION :	NO BUILD	AltC3-4	Alt F3	Alt G2	Alt G3	Alt G4	Alt G4v
EQUITY:							
Salvage Value**:							
Bridge(s):	$0	$0	$0	$0	$0	$0	$0
75 YEAR TOTAL LIFE CYCLE COST OF EQUITY :	$0	$0	$0	$0	$0	$0	$0
75 YEAR TOTAL LIFE CYCLE COST :	($107,702,083)	($321,849,251)	($385,397,585)	($338,103,380)	($316,203,027)	($294,456,005)	($171,371,884)

Gravina Island Access

TOTAL LIFE-TIME COST SUMMARY

January 2017

	ALTERNATIVE (w/o Revenue Adjustment)						
	C3-4	*F3*	*G2*	*G3*	*G4*	*G4v*	*No Action*
Total Life-Time Cost	$ 490,091,010	$ 675,035,614	$ 1,937,405,952	$ 1,862,128,065	$ 1,792,113,114	$ 1,083,542,156	$ 1,023,684,371
Passenger Waiting Terminal, Heavy Freight Dock and Staging Area, and Ferry Layup Berth			$ 79,803,984	$ 79,803,984	$ 79,803,984	$ 79,803,984	
TOTAL:	**$ 490,091,010**	**$ 675,035,614**	**$ 2,017,209,936**	**$ 1,941,932,049**	**$ 1,871,917,098**	**$ 1,163,346,140**	**$ 1,023,684,371**

	ALTERNATIVE (w/ Revenue Adjustment)						
	C3-4	*F3*	*G2*	*G3*	*G4*	*G4v*	*No Action*
Total Life-Time Cost (Revenue Adjusted)	$ 490,091,010	$ 675,035,614	$ 1,937,405,952	$ 1,862,128,065	$ 1,792,113,114	$ 1,083,542,156	$ 1,023,684,371
Passenger Waiting Terminal, Heavy Freight Dock and Staging Area, and Ferry Layup Berth			$ 79,803,984	$ 79,803,984	$ 79,803,984	$ 79,803,984	
Bridge/Ferry Toll	-$63,182,653	-$50,546,122	-$505,461,223	-$505,461,223	-$505,461,223	-$379,095,917	-$379,095,917
TOTAL:	**$ 426,908,358**	**$ 624,489,492**	**$ 1,511,748,713**	**$ 1,436,470,826**	**$ 1,366,455,876**	**$ 784,250,223**	**$ 644,588,454**

	ALTERNATIVE						
	C3-4	*F3*	*G2*	*G3*	*G4*	*G4v*	*No Action*
Total Life-Cycle Cost	**$ (321,849,251)**	**$ (385,397,585)**	**$ (338,103,380)**	**$ (316,203,027)**	**$ (294,456,005)**	**$ (171,371,884)**	**$ (107,702,083)**

Note: All values are for 75 year life, beginning at the completion of the construction (2022).
Forward Inflation Rate = 2.3% (*https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/08-24-BudgetEconUpdate.pdf* , Table B-1).
Annual tolls revenues are $250,000 for C3-4; $200,000 for F3-1; $2,000,000 for G2, G3 and G4; and $1,500,000 for the existing ferries and No Action alternatives.