ATTACHMENT II

WALTON COUNTY SAND SOURCE INVESTIGATION GEOPHYSICAL AND GEOTECHNICAL DATA ANALYSIS

(Digital data only – CD attached at end of report)

ATTACHMENT III

BEACH MANAGEMENT FEASIBILITY STUDY FOR WALTON COUNTY AND DESTIN FLORIDA, TAYLOR ENGINEERING, INC. APRIL 2003

(Digital data only – CD attached at end of report)

APPENDIX A
SECTION 3

COST ENGINEERING

WALTON COUNTY, FLORIDA
HURRICANE AND STORM DAMAGE REDUCTION

GENERAL INVESTIGATIONS STUDY
FINAL REPORT

APPENDIX A - ENGINEERING DESIGN
SECTION 3 – COST ENGINEERING

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LIST OF ATTACHMENTS

ATTACHMENT I

COST CERTIFICATION

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For

Hurricane and Storm Damage Reduction –
Walton County, Florida

The Hurricane and Storm Damage Reduction – Walton County project, as presented by Mobile District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of October 24, 2012, the Cost MCX certifies the estimated total project cost of:

NED:
FY 2014 Price Level: $148,362,000
Fully Funded Amount: $209,767,000

LPP:
FY 2014 Price Level: $170,197,000
Fully Funded Amount: $239,469,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.

SKARBEK.JOHN.P.1229040665

Digitally signed by SKARBEK.JOHN.P.1229040665
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SKARBEK.JOHN.P.1229040665
Date: 2012.10.24 12:36:49 -07'00'

John P. Skarbek
Chief, Cost Engineering
Walla Walla District

US Army Corps of Engineers®

ATTACHMENT II

TOTAL PROJECT COST SUMMARY

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL

DISTRICT: SAM Mobile
POC: George L. Brown, COST ENGINEERING, SAM
PREPARED: 10/10/2012

This Estimate reflects the scope and schedule per PDT
GI (Feasibility Study)

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1-Oct-12 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	NED INITIAL + RENOURISHMENTS													
17	DREDGING	$100,086	$26,684	27%	$126,770	3.5%	$103,549	$27,607	$131,156			$146,296	$40,389	$186,685
17	BEACH WORK	$4,194	$839	20%	$5,033	3.5%	$4,339	$868	$5,207			$4,392	$878	$5,270
17	PLANTING	$2,875	$575	20%	$3,450	3.5%	$2,974	$595	$3,569			$3,010	$602	$3,612
17	ENVIRONMENTAL	$450	$120	27%	$570	3.5%	$466	$124	$590			$658	$182	$840
			-			-								
	CONSTRUCTION ESTIMATE TOTALS:	$107,605	$28,217		$135,822	3.5%	$111,328	$29,194	$140,522			$154,355	$42,051	$196,407
01	LANDS AND DAMAGES	$589	$147	25%	$736	3.5%	$609	$152	$762			$609	$152	$762
30	PLANNING, ENGINEERING & DESIGN	$3,224	$845	26%	$4,069	4.4%	$3,365	$882	$4,247			$5,868	$1,633	$7,500
31	CONSTRUCTION MANAGEMENT	$2,149	$563	26%	$2,712	4.4%	$2,243	$588	$2,831			$3,989	$1,109	$5,099
	PROJECT COST TOTALS:	$113,567	$29,773	26%	$143,340		$117,545	$30,816	**$148,362**			$164,822	$44,945	$209,767

George L. Brown
George L. Brown, COST ENGINEERING, SAM
mandatory

David Newell
David Newell, PROJECT MANAGER SAM
mandatory

James R. Mullens
James R. Mullens, REAL ESTATE,Chief of PM&C, S.
mandatory

*ESTIMATED FEDERAL COST:	**30.0%**	**$62,930**
*ESTIMATED NON-FEDERAL COST:	**70.0%**	**$146,837**
ESTIMATED TOTAL PROJECT COST:		**$209,767**

NOTES:
***Subject to Cost Share Apportionment**
Based on Economic Analysis.

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL
This Estimate reflects the scope and schedule per PDT
GI (Feasibility Study)

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12 Effective Price Level: 1-Oct-12				Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	NED INITIAL BEACH NOURISHMENT													
17	DREDGING	$33,422	$6,684	20%	$40,106	3.5%	$34,579	$6,916	$41,494	2014Q4	1.2%	$34,996	$6,999	$41,995
17	BEACH WORK	$4,194	$839	20%	$5,033	3.5%	$4,339	$868	$5,207	2014Q4	1.2%	$4,392	$878	$5,270
17	PLANTING	$2,875	$575	20%	$3,450	3.5%	$2,974	$595	$3,569	2014Q4	1.2%	$3,010	$602	$3,612
17	ENVIRONMENTAL	$150	$30	20%	$180	3.5%	$155	$31	$186	2014Q4	1.2%	$157	$31	$188
	CONSTRUCTION ESTIMATE TOTALS:	$40,641	$8,128	20%	**$48,769**		$42,047	$8,409	$50,457			$42,555	$8,511	$51,066
01	LANDS AND DAMAGES	$589	$147	25%	$736	3.5%	$609	$152	$762	2014Q1		$609	$152	$762
	Easement Acquisition ($518) & PPA ($25k)													
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$85	$17	20%	$102	4.4%	$89	$18	$106	2014Q1		$89	$18	$106
0.09%	Planning & Environmental Compliance	$37	$7	20%	$44	4.4%	$39	$8	$46	2014Q1		$39	$8	$46
1.89%	Engineering & Design	$768	$154	20%	$922	4.4%	$802	$160	$962	2014Q1		$802	$160	$962
0.09%	Engineering Tech Review ITR & VE	$37	$7	20%	$44	4.4%	$39	$8	$46	2014Q1		$39	$8	$46
0.24%	Real Estate &Contracting	$98	$20	20%	$118	4.4%	$102	$20	$123	2014Q1		$102	$20	$123
0.21%	Engineering During Construction	$85	$17	20%	$102	4.4%	$89	$18	$106	2014Q4	2.8%	$91	$18	$109
0.18%	Planning During Construction	$73	$15	20%	$88	4.4%	$76	$15	$91	2014Q4	2.8%	$78	$16	$94
0.09%	Project Operations	$37	$7	20%	$44	4.4%	$39	$8	$46	2014Q1		$39	$8	$46
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$569	$114	20%	$683	4.4%	$594	$119	$713	2014Q4	2.8%	$611	$122	$733
0.40%	Project Operation:	$163	$33	20%	$196	4.4%	$170	$34	$204	2014Q4	2.8%	$175	$35	$210
0.20%	Project Management	$81	$16	20%	$97	4.4%	$85	$17	$101	2014Q4	2.8%	$87	$17	$104
	CONTRACT COST TOTALS:	$43,263	$8,682		**$51,945**		$44,778	$8,986	$53,765			$45,315	$9,093	**$54,408**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL
This Estimate reflects the scope and schedule in report;
GI (Feasibility Study)

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared:			1-Sep-12	Program Year (Budget EC):			2014					
		Effective Price Level:			1-Oct-12	Effective Price Level Date:			1 OCT 13					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2024													
17	BEACH REPLENISHMENT	$16,666	$5,000	30%	$21,666	3.5%	$17,243	$5,173	$22,416	2024Q4	21.1%	$20,875	$6,262	$27,137
17	ENVIRONMENTAL	$75	$23	30%	$98	3.5%	$78	$23	$101	2024Q4	21.1%	$94	$28	$122
	CONSTRUCTION ESTIMATE TOTALS:	$16,741	$5,022	30%	**$21,763**		$17,320	$5,196	$22,516			$20,969	$6,291	$27,259
01	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$35	$11	30%	$46	4.4%	$37	$11	$47	2024Q1	41.3%	$52	$15	$67
0.09%	Planning & Environmental Compliance	$15	$5	30%	$20	4.4%	$16	$5	$20	2024Q1	41.3%	$22	$7	$29
1.89%	Engineering & Design	$316	$95	30%	$411	4.4%	$330	$99	$429	2024Q1	41.3%	$466	$140	$606
0.09%	Engineering Tech Review ITR & VE	$15	$5	30%	$20	4.4%	$16	$5	$20	2024Q1	41.3%	$22	$7	$29
0.24%	Contracting & Reprographics	$40	$12	30%	$52	4.4%	$42	$13	$54	2024Q1	41.3%	$59	$18	$77
0.21%	Engineering During Construction	$35	$11	30%	$46	4.4%	$37	$11	$47	2024Q4	44.5%	$53	$16	$69
0.18%	Planning During Construction	$30	$9	30%	$39	4.4%	$31	$9	$41	2024Q4	44.5%	$45	$14	$59
0.09%	Project Operations	$15	$5	30%	$20	4.4%	$16	$5	$20	2024Q1	41.3%	$22	$7	$29
31	CONSTRUCTION MANAGEMENT													
1.4%	Construction Management	$234	$70	30%	$304	4.4%	$244	$73	$317	2024Q4	44.5%	$353	$106	$459
0.4%	Project Operation:	$67	$20	30%	$87	4.4%	$70	$21	$91	2024Q4	44.5%	$101	$30	$131
0.2%	Project Management	$33	$10	30%	$43	4.4%	$34	$10	$45	2024Q4	44.5%	$50	$15	$65
	CONTRACT COST TOTALS:	$17,576	$5,273		**$22,849**		$18,192	$5,458	$23,649			$22,213	$6,664	**$28,877**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL
This Estimate reflects the scope and schedule in report;
GI (Feasibility Study)

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12				Program Year (Budget EC): 2014								
		Effective Price Level: 1-Oct-12				Effective Price Level Date: 1 OCT 13								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2034													
17	BEACH REPLENISHMENT	$16,666	$5,000	30%	$21,666	3.5%	$17,243	$5,173	$22,416	2034Q4	44.7%	$24,951	$7,485	$32,437
17	ENVIRONMENTAL	$75	$23	30%	$98	3.5%	$78	$23	$101	2034Q4	44.7%	$112	$34	$146
	CONSTRUCTION ESTIMATE TOTALS:	$16,741	$5,022	30%	**$21,763**		$17,320	$5,196	$22,516			$25,064	$7,519	$32,583
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.2%	Project Management	$35	$11	30%	$46	4.4%	$37	$11	$47	2034Q1	89.0%	$69	$21	$90
0.1%	Planning & Environmental Compliance	$15	$5	30%	$20	4.4%	$16	$5	$20	2034Q1	89.0%	$30	$9	$38
1.9%	Engineering & Design	$316	$95	30%	$411	4.4%	$330	$99	$429	2034Q1	89.0%	$623	$187	$810
0.1%	Engineering Tech Review ITR & VE	$15	$5	30%	$20	4.4%	$16	$5	$20	2034Q1	89.0%	$30	$9	$38
0.2%	Contracting & Reprographics	$40	$12	30%	$52	4.4%	$42	$13	$54	2034Q1	89.0%	$79	$24	$103
0.2%	Engineering During Construction	$35	$11	30%	$46	4.4%	$37	$11	$47	2034Q4	92.8%	$70	$21	$92
0.2%	Planning During Construction	$30	$9	30%	$39	4.4%	$31	$9	$41	2034Q4	92.8%	$60	$18	$78
0.1%	Project Operations	$15	$5	30%	$20	4.4%	$16	$5	$20	2034Q1	89.0%	$30	$9	$38
31	CONSTRUCTION MANAGEMENT													
1.4%	Construction Management	$234	$70	30%	$304	4.4%	$244	$73	$317	2034Q4	92.8%	$471	$141	$612
0.4%	Project Operation:	$67	$20	30%	$87	4.4%	$70	$21	$91	2034Q4	92.8%	$135	$40	$175
0.2%	Project Management	$33	$10	30%	$43	4.4%	$34	$10	$45	2034Q4	92.8%	$66	$20	$86
	CONTRACT COST TOTALS:	$17,576	$5,273		**$22,849**		$18,192	$5,458	$23,649			$26,727	$8,018	**$34,745**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL
This Estimate reflects the scope and schedule in report;
GI (Feasibility Study)

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12 Effective Price Level: 1-Oct-12				Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13				FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2044													
17	BEACH REPLENISHMENT	$16,666	$5,000	30%	$21,666	3.5%	$17,243	$5,173	$22,416	2044Q4	73.0%	$29,824	$8,947	$38,772
17	ENVIRONMENTAL	$75	$23	30%	$98	3.5%	$78	$23	$101	2044Q4	73.0%	$134	$40	$174
	#N/A													
	#N/A													
	#N/A													
	CONSTRUCTION ESTIMATE TOTALS:	$16,741	$5,022	30%	**$21,763**		$17,320	$5,196	$22,516			$29,959	$8,988	$38,946
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.2%	Project Management	$35	$11	30%	$46	4.4%	$37	$11	$47	2044Q1	138.1%	$87	$26	$113
0.1%	Planning & Environmental Compliance	$15	$5	30%	$20	4.4%	$16	$5	$20	2044Q1	138.1%	$37	$11	$48
1.9%	Engineering & Design	$316	$95	30%	$411	4.4%	$330	$99	$429	2044Q1	138.1%	$785	$236	$1,021
0.1%	Engineering Tech Review ITR & VE	$15	$5	30%	$20	4.4%	$16	$5	$20	2044Q1	138.1%	$37	$11	$48
0.2%	Contracting & Reprographics	$40	$12	30%	$52	4.4%	$42	$13	$54	2044Q1	138.1%	$99	$30	$129
0.2%	Engineering During Construction	$35	$11	30%	$46	4.4%	$37	$11	$47	2044Q4	142.9%	$89	$27	$115
0.2%	Planning During Construction	$30	$9	30%	$39	4.4%	$31	$9	$41	2044Q4	142.9%	$76	$23	$99
0.1%	Project Operations	$15	$5	30%	$20	4.4%	$16	$5	$20	2044Q1	138.1%	$37	$11	$48
31	CONSTRUCTION MANAGEMENT													
1.4%	Construction Management	$234	$70	30%	$304	4.4%	$244	$73	$317	2044Q4	142.9%	$593	$178	$771
0.4%	Project Operation:	$67	$20	30%	$87	4.4%	$70	$21	$91	2044Q4	142.9%	$170	$51	$221
0.2%	Project Management	$33	$10	30%	$43	4.4%	$34	$10	$45	2044Q4	142.9%	$84	$25	$109
	CONTRACT COST TOTALS:	$17,576	$5,273		**$22,849**		$18,192	$5,458	$23,649			$32,054	$9,616	**$41,670**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- NED
LOCATION: Walton County, FL
This Estimate reflects the scope and schedule in report;
GI (Feasibility Study)

DISTRICT: SAM Mobile
POC: George L. Brown, COST ENGINEERING, SAM
PREPARED: 10/10/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12 Effective Price Level: 1-Oct-12				Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13				FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2054													
17	BEACH REPLENISHMENT	$16,666	$5,000	30%	$21,666	3.5%	$17,243	$5,173	$22,416	2054Q4	106.7%	$35,649	$10,695	$46,344
17	ENVIRONMENTAL	$75	$23	30%	$98	3.5%	$78	$23	$101	2054Q4	106.7%	$160	$48	$209
	#N/A													
	#N/A													
	#N/A													
	CONSTRUCTION ESTIMATE TOTALS:	$16,741	$5,022	30%	**$21,763**		$17,320	$5,196	$22,516			$35,810	$10,743	$46,552
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.2%	Project Management	$35	$11	30%	$46	4.4%	$37	$11	$47	2054Q1	207.0%	$112	$34	$146
0.1%	Planning & Environmental Compliance	$15	$5	30%	$20	4.4%	$16	$5	$20	2054Q1	207.0%	$48	$14	$62
1.9%	Engineering & Design	$316	$95	30%	$411	4.4%	$330	$99	$429	2054Q1	207.0%	$1,013	$304	$1,316
0.1%	Engineering Tech Review ITR & VE	$15	$5	30%	$20	4.4%	$16	$5	$20	2054Q1	207.0%	$48	$14	$62
0.2%	Contracting & Reprographics	$40	$12	30%	$52	4.4%	$42	$13	$54	2054Q1	207.0%	$128	$38	$167
0.2%	Engineering During Construction	$35	$11	30%	$46	4.4%	$37	$11	$47	2054Q4	213.8%	$115	$34	$149
0.2%	Planning During Construction	$30	$9	30%	$39	4.4%	$31	$9	$41	2054Q4	213.8%	$98	$29	$128
0.1%	Project Operations	$15	$5	30%	$20	4.4%	$16	$5	$20	2054Q1	207.0%	$48	$14	$62
31	CONSTRUCTION MANAGEMENT													
1.4%	Construction Management	$234	$70	30%	$304	4.4%	$244	$73	$317	2054Q4	213.8%	$766	$230	$996
0.4%	Project Operation:	$67	$20	30%	$87	4.4%	$70	$21	$91	2054Q4	213.8%	$219	$66	$285
0.2%	Project Management	$33	$10	30%	$43	4.4%	$34	$10	$45	2054Q4	213.8%	$108	$32	$140
	CONTRACT COST TOTALS:	$17,576	$5,273		**$22,849**		$18,192	$5,458	$23,649			$38,513	$11,554	**$50,067**

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL

DISTRICT: SAM Mobile
POC: George L. Brown, COST ENGINEERING, SAM
PREPARED: 10/10/2012

This Estimate reflects the scope and schedule per PDT

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1-Oct-11 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*	*O*
	LP INITIAL + 4 RENOURISHMENTS													
17	DREDGING	$113,938	$31,388	28%	$145,326	3.5%	$117,881	$32,474	$150,355			$165,747	$47,264	$213,011
17	BEACH WORK	$4,946	$1,039	21%	$5,985	3.5%	$5,117	$1,075	$6,192			$5,179	$1,088	$6,266
17	PLANTING	$3,325	$698	21%	$4,023	3.5%	$3,440	$722	$4,162			$3,482	$731	$4,213
17	ENVIRONMENTAL	$450	$125	28%	$575	3.5%	$466	$129	$594			$658	$188	$846
				-		-								
	CONSTRUCTION ESTIMATE TOTALS:	$122,659	$33,250		$155,909	3.5%	$126,903	$34,400	$161,304			$175,066	$49,271	$224,337
01	LANDS AND DAMAGES	$589	$147	25%	$736	3.5%	$609	$152	$762			$609	$152	$762
30	PLANNING, ENGINEERING & DESIGN	$3,680	$998	27%	$4,678	4.4%	$3,841	$1,041	$4,882			$6,649	$1,911	$8,560
31	CONSTRUCTION MANAGEMENT	$2,450	$664	27%	$3,114	4.4%	$2,557	$693	$3,250			$4,514	$1,297	$5,811
	PROJECT COST TOTALS:	$129,378	$35,059	27%	$164,437		$133,910	$36,287	**$170,197**			$186,837	$52,631	$239,469

George L. Brown
George L. Brown, COST ENGINEERING, SAM
mandatory

David Newell
David Newell, PROJECT MANAGER SAM
mandatory

James R. Mullens
James R. Mullens, REAL ESTATE,Chief of PM&C, SAI
mandatory

ESTIMATED FEDERAL COST:	**26.0%**	**$62,262**
ESTIMATED NON-FEDERAL COST:	**74.0%**	**$177,207**
ESTIMATED TOTAL PROJECT COST:		**$239,469**

O&M OUTSIDE OF TOTAL PROJECT COST:

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL
GI (Feasibility Study)
This Estimate reflects the scope and schedule per PDT

DISTRICT: SAM Mobile
POC: George L. Brown, COST ENGINEERING, SAM
PREPARED: 10/10/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12				Program Year (Budget EC): 2014								
		Effective Price Level: 1-Oct-12				Effective Price Level Date: 1 OCT 13								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	***B***	***C***	***D***	***E***	***F***	***G***	***H***	***I***	***J***	***P***	***L***	***M***	***N***	***O***
	LP INITIAL BEACH NOURISHMENT													
17	DREDGING	$39,326	$8,258	21%	$47,584	3.5%	$40,687	$8,544	$49,231	2014Q4	1.2%	$41,178	$8,647	$49,825
17	BEACH WORK	$4,946	$1,039	21%	$5,985	3.5%	$5,117	$1,075	$6,192	2014Q4	1.2%	$5,179	$1,088	$6,266
17	PLANTING	$3,325	$698	21%	$4,023	3.5%	$3,440	$722	$4,162	2014Q4	1.2%	$3,482	$731	$4,213
17	ENVIRONMENTAL	$150	$32	21%	$182	3.5%	$155	$33	$188	2014Q4	1.2%	$157	$33	$190
	CONSTRUCTION ESTIMATE TOTALS:	$47,747	$10,027	21%	**$57,774**		$49,399	$10,374	$59,773			$49,996	$10,499	$60,495
01	LANDS AND DAMAGES	$589	$147	25%	$736	3.5%	$609	$152	$762	2014Q1		$609	$152	$762
	Easement Acquisition ($518) & PPA ($25k)													
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$100	$21	21%	$121	4.4%	$104	$22	$126	2014Q1		$104	$22	$126
0.09%	Planning & Environmental Compliance	$43	$9	21%	$52	4.4%	$45	$9	$54	2014Q1		$45	$9	$54
1.89%	Engineering & Design	$902	$189	21%	$1,091	4.4%	$941	$198	$1,139	2014Q1		$941	$198	$1,139
0.09%	Engineering Tech Review ITR & VE	$43	$9	21%	$52	4.4%	$45	$9	$54	2014Q1		$45	$9	$54
0.24%	Contracting & Reprographics	$115	$24	21%	$139	4.4%	$120	$25	$145	2014Q1		$120	$25	$145
0.21%	Engineering During Construction	$100	$21	21%	$121	4.4%	$104	$22	$126	2014Q4	2.8%	$107	$23	$130
0.18%	Planning During Construction	$86	$18	21%	$104	4.4%	$90	$19	$109	2014Q4	2.8%	$92	$19	$112
0.09%	Project Operations	$43	$9	21%	$52	4.4%	$45	$9	$54	2014Q1		$45	$9	$54
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$668	$140	21%	$808	4.4%	$697	$146	$844	2014Q4	2.8%	$717	$151	$867
0.40%	Project Operation:	$191	$40	21%	$231	4.4%	$199	$42	$241	2014Q4	2.8%	$205	$43	$248
0.20%	Project Management	$95	$20	21%	$115	4.4%	$99	$21	$120	2014Q4	2.8%	$102	$21	$123
	CONTRACT COST TOTALS:	$50,722	$10,675		**$61,397**		$52,499	$11,049	$63,548			$53,129	$11,181	**$64,310**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL
GI (Feasibility Study)
This Estimate reflects the scope and schedule per PDT

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			1-Sep-12 / 1-Oct-12	Program Year (Budget EC): / Effective Price Level Date:			2014 / 1 OCT 13					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2024													
17	BEACH REPLENISHMENT	$18,653	$5,782	31%	$24,435	3.5%	$19,298	$5,983	$25,281	2024Q4	21.1%	$23,363	$7,243	$30,606
17	ENVIRONMENTAL	$75	$23	31%	$98	3.5%	$78	$24	$102	2024Q4	21.1%	$94	$29	$123
	CONSTRUCTION ESTIMATE TOTALS:	$18,728	$5,806	31%	**$24,534**		$19,376	$6,007	$25,383			$23,457	$7,272	$30,729
01	LANDS AND DAMAGES													
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$39	$12	31%	$51	4.4%	$41	$13	$53	2024Q1	41.3%	$57	$18	$75
0.09%	Planning & Environmental Compliance	$17	$5	31%	$22	4.4%	$18	$5	$23	2024Q1	41.3%	$25	$8	$33
1.89%	Engineering & Design	$354	$110	31%	$464	4.4%	$369	$115	$484	2024Q1	41.3%	$522	$162	$684
0.09%	Engineering Tech Review ITR & VE	$17	$5	31%	$22	4.4%	$18	$5	$23	2024Q1	41.3%	$25	$8	$33
0.24%	Contracting & Reprographics	$45	$14	31%	$59	4.4%	$47	$15	$62	2024Q1	41.3%	$66	$21	$87
0.21%	Engineering During Construction	$39	$12	31%	$51	4.4%	$41	$13	$53	2024Q4	44.5%	$59	$18	$77
0.18%	Planning During Construction	$34	$11	31%	$45	4.4%	$35	$11	$46	2024Q4	44.5%	$51	$16	$67
0.09%	Project Operations	$17	$5	31%	$22	4.4%	$18	$5	$23	2024Q1	41.3%	$25	$8	$33
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$262	$81	31%	$343	4.4%	$273	$85	$358	2024Q4	44.5%	$395	$123	$518
0.40%	Project Operation:	$75	$23	31%	$98	4.4%	$78	$24	$103	2024Q4	44.5%	$113	$35	$148
0.20%	Project Management	$37	$11	31%	$48	4.4%	$39	$12	$51	2024Q4	44.5%	$56	$17	$73
	CONTRACT COST TOTALS:	$19,664	$6,096		**$25,760**		$20,353	$6,309	$26,662			$24,853	$7,704	**$32,557**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL
GI (Feasibility Study)
This Estimate reflects the scope and schedule per PDT

DISTRICT: SAM Mobile
POC: George L. Brown, COST ENGINEERING, SAM
PREPARED: 10/10/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared:			1-Sep-12	Program Year (Budget EC):			2014					
		Effective Price Level:			1-Oct-12	Effective Price Level Date:			1 OCT 13					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2034													
17	BEACH REPLENISHMENT	$18,653	$5,782	31%	$24,435	3.5%	$19,298	$5,983	$25,281	2034Q4	44.7%	$27,926	$8,657	$36,583
17	ENVIRONMENTAL	$75	$23	31%	$98	3.5%	$78	$24	$102	2034Q4	44.7%	$112	$35	$147
	CONSTRUCTION ESTIMATE TOTALS:	$18,728	$5,806	31%	**$24,534**		$19,376	$6,007	$25,383			$28,039	$8,692	$36,731
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$39	$12	31%	$51	4.4%	$41	$13	$53	2034Q1	89.0%	$77	$24	$101
0.09%	Planning & Environmental Compliance	$17	$5	31%	$22	4.4%	$18	$5	$23	2034Q1	89.0%	$34	$10	$44
1.89%	Engineering & Design	$354	$110	31%	$464	4.4%	$369	$115	$484	2034Q1	89.0%	$698	$216	$915
0.09%	Engineering Tech Review ITR & VE	$17	$5	31%	$22	4.4%	$18	$5	$23	2034Q1	89.0%	$34	$10	$44
0.24%	Contracting & Reprographics	$45	$14	31%	$59	4.4%	$47	$15	$62	2034Q1	89.0%	$89	$28	$116
0.21%	Engineering During Construction	$39	$12	31%	$51	4.4%	$41	$13	$53	2034Q4	92.8%	$78	$24	$103
0.18%	Planning During Construction	$34	$11	31%	$45	4.4%	$35	$11	$46	2034Q4	92.8%	$68	$21	$90
0.09%	Project Operations	$17	$5	31%	$22	4.4%	$18	$5	$23	2034Q1	89.0%	$34	$10	$44
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$262	$81	31%	$343	4.4%	$273	$85	$358	2034Q4	92.8%	$527	$163	$691
0.40%	Project Operation:	$75	$23	31%	$98	4.4%	$78	$24	$103	2034Q4	92.8%	$151	$47	$198
0.20%	Project Management	$37	$11	31%	$48	4.4%	$39	$12	$51	2034Q4	92.8%	$74	$23	$98
	CONTRACT COST TOTALS:	$19,664	$6,096		**$25,760**		$20,353	$6,309	$26,662			$29,903	$9,270	**$39,172**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL
GI (Feasibility Study)
This Estimate reflects the scope and schedule per PDT

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12 Effective Price Level: 1-Oct-12				Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13				FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2044													
17	BEACH REPLENISHMENT	$18,653	$5,782	31%	$24,435	3.5%	$19,298	$5,983	$25,281	2044Q4	73.0%	$33,380	$10,348	$43,728
17	ENVIRONMENTAL	$75	$23	31%	$98	3.5%	$78	$24	$102	2044Q4	73.0%	$134	$42	$176
	CONSTRUCTION ESTIMATE TOTALS:	$18,728	$5,806	31%	**$24,534**		$19,376	$6,007	$25,383			$33,514	$10,389	$43,904
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$39	$12	31%	$51	4.4%	$41	$13	$53	2044Q1	138.1%	$97	$30	$127
0.09%	Planning & Environmental Compliance	$17	$5	31%	$22	4.4%	$18	$5	$23	2044Q1	138.1%	$42	$13	$55
1.89%	Engineering & Design	$354	$110	31%	$464	4.4%	$369	$115	$484	2044Q1	138.1%	$880	$273	$1,152
0.09%	Engineering Tech Review ITR & VE	$17	$5	31%	$22	4.4%	$18	$5	$23	2044Q1	138.1%	$42	$13	$55
0.24%	Contracting & Reprographics	$45	$14	31%	$59	4.4%	$47	$15	$62	2044Q1	138.1%	$112	$35	$146
0.21%	Engineering During Construction	$39	$12	31%	$51	4.4%	$41	$13	$53	2044Q4	142.9%	$99	$31	$130
0.18%	Planning During Construction	$34	$11	31%	$45	4.4%	$35	$11	$46	2044Q4	142.9%	$86	$27	$113
0.09%	Project Operations	$17	$5	31%	$22	4.4%	$18	$5	$23	2044Q1	138.1%	$42	$13	$55
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$262	$81	31%	$343	4.4%	$273	$85	$358	2044Q4	142.9%	$664	$206	$870
0.40%	Project Operation:	$75	$23	31%	$98	4.4%	$78	$24	$103	2044Q4	142.9%	$190	$59	$249
0.20%	Project Management	$37	$11	31%	$48	4.4%	$39	$12	$51	2044Q4	142.9%	$94	$29	$123
	CONTRACT COST TOTALS:	$19,664	$6,096		**$25,760**		$20,353	$6,309	$26,662			$35,863	$11,117	**$46,980**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Walton County Storm Damage Reduction Project- LP
LOCATION: Walton County, FL
GI (Feasibility Study)
This Estimate reflects the scope and schedule per PDT

DISTRICT: SAM Mobile PREPARED: 10/10/2012
POC: George L. Brown, COST ENGINEERING, SAM

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Sep-12 Effective Price Level: 1-Oct-12				Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13				FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	BEACH RENOURISHMENT 2054													
17	BEACH REPLENISHMENT	$18,653	$5,782	31%	$24,435	3.5%	$19,298	$5,983	$25,281	2054Q4	106.7%	$39,899	$12,369	$52,268
17	ENVIRONMENTAL	$75	$23	31%	$98	3.5%	$78	$24	$102	2054Q4	106.7%	$160	$50	$210
	CONSTRUCTION ESTIMATE TOTALS:	$18,728	$5,806	31%	**$24,534**		$19,376	$6,007	$25,383			$40,060	$12,419	$52,478
	LANDS AND DAMAGES			25%										
30	PLANNING, ENGINEERING & DESIGN													
0.21%	Project Management	$39	$12	31%	$51	4.4%	$41	$13	$53	2054Q1	207.0%	$125	$39	$164
0.09%	Planning & Environmental Compliance	$17	$5	31%	$22	4.4%	$18	$5	$23	2054Q1	207.0%	$54	$17	$71
1.89%	Engineering & Design	$354	$110	31%	$464	4.4%	$369	$115	$484	2054Q1	207.0%	$1,134	$352	$1,486
0.09%	Engineering Tech Review ITR & VE	$17	$5	31%	$22	4.4%	$18	$5	$23	2054Q1	207.0%	$54	$17	$71
0.24%	Contracting & Reprographics	$45	$14	31%	$59	4.4%	$47	$15	$62	2054Q1	207.0%	$144	$45	$189
0.21%	Engineering During Construction	$39	$12	31%	$51	4.4%	$41	$13	$53	2054Q4	213.8%	$128	$40	$167
0.18%	Planning During Construction	$34	$11	31%	$45	4.4%	$35	$11	$46	2054Q4	213.8%	$111	$35	$146
0.09%	Project Operations	$17	$5	31%	$22	4.4%	$18	$5	$23	2054Q1	207.0%	$54	$17	$71
31	CONSTRUCTION MANAGEMENT													
1.40%	Construction Management	$262	$81	31%	$343	4.4%	$273	$85	$358	2054Q4	213.8%	$858	$266	$1,124
0.40%	Project Operation:	$75	$23	31%	$98	4.4%	$78	$24	$103	2054Q4	213.8%	$246	$76	$322
0.20%	Project Management	$37	$11	31%	$48	4.4%	$39	$12	$51	2054Q4	213.8%	$121	$38	$159
	CONTRACT COST TOTALS:	$19,664	$6,096		**$25,760**		$20,353	$6,309	$26,662			$43,091	$13,358	**$56,449**

ATTACHMENT III

PROGRAMMING & PLANNING NARRATIVE

NARRATIVE: BASIS of COST ESTIMATE and RATIONALE

Estimates are Comparative-Level Type and are based on Historical Data, Recent Pricing, and Estimator's Judgment. Anticipated bidding conditions and construction duration with reasonable schedules are considered Normal. Unit costs, as shown in estimates, are fair and reasonable rates based on fair market value.

DOCUMENTS

Estimate Format is MII (MCACES) structured by feature accounts, and Corps of Engineer Dredge Estimating Program (CEDEP) incorporated into the Total Project Cost Summary (TPCS).

- A **Schedule** was developed and provided by the Planning Study and Project Manager.

- **MII** 4.1 (MCACES 2nd generation) was structured by feature account incorporating input cost from CEDEP. MII itemized the supporting items for Beach work and Planting cost.

- Corps of Engineers Dredge Estimating Program (**CEDEP**) was used for development of the Dredging Cost. The CEDEP output is only for USACE Cost Engineering. It will be distributed on a per request basis.

- Total Project Cost Summary (**TPCS**) was updated per schedule for both the NED and the LP Plans. The TPCS will be updated pending change to Risk Analysis contingency. The TPCS is based on schedule and the following:
    1. Real Estate Cost (01 feature account) was prepared and provided by the Mobile District Real Estate Division. The costs will not change due to the acquisition opposed to the purchase of the easements.
    2. EIS & Environmental (17 feature account previously 22 account) were provided by Study Manager, Joseph Paine.
    3. Planning, Engineering & Design (30 feature account) was developed and assigned at 3% by the PDT. This is the percentage that has historically been used for these types of civil works projects.
    4. Construction Management (31 feature account) was developed and assigned at 2% by the PDT. This is the percentage that has historically been used for these types of civil works projects.
    5. Escalation factors are based on the CWCCIS and were used to escalate the effective pricing level to the anticipated feature midpoint.
    6. 30 % FEDERAL/ 70% NON-FEDERAL cost-sharing for the NED plan. 26 % FEDERAL/ 74% NON-FEDERAL cost-sharing for the NED plan.

SCHEDULE

All Project items were based on:

- A price level of OCT FY2011
- Program Year Price Level FY 2014
- Initial Construction if FY14
- Renourishment Construction is FY24, 34, 44, 54
- Midpoint is FY 14 last Quarter for Construction for Construction Items (17 Account)
- Midpoint is FY14 1st Quarter for Real Estate (01 Account)
- Midpoint is FY2014 1st Quarter for Design (30 Account)
- Midpoint is FY 14 last Quarter for Construction Management (31 Account)

GENERAL CONSIDERATIONS

A. Acquisition

Estimate is structured and priced as a general prime dredging contractor supported by minor subcontractors for beach crossovers with exception to planting. Planting is structured and priced as a separate contract with a general prime contractor.

B. Markups

For both prime and subcontractors, mark-ups are included in the unit prices and include such items as field overheads, home office expenses, profit, bond and insurance. Detail backup is included in the CEDEP estimates.

C. Risk Analysis

Construction Contingency was developed using the Cost Risk Analysis method. Risk Analysis is a requirement for development of contingency on Civil Works for all decision documents requiring authorization for projects exceeding 40 million dollars. The contingency factor used does not vary throughout the cost estimate except for Real Estate which is 25% determined by the Real Estate team. Risk Analysis was developed as a team effort by the PD Team and Walla Walla DX (Glen Matlock) in 2010 and updated in 2012.

2010 Cost Schedule Risk Analysis (CSRA) was prepared for the Draft Feasibility Report. The 2012 Cost CSRA was an update for cost certification. A Risk Register was developed by the PD Team. The Risk Model was prepared by Walla Walla, Glenn Matlock and was customized using commercially available "Crystal Ball" software. After the model was run the results were documented by extracting the sensitivity chart, the forecast chart and the percentiles table for major items. The percentiles were used to determine the contingency at the 80% confidence level. The CSRA serves for both NED and LP contingency developing.

A separate CSRA was developed for the initial and renourishment years. A separate CSRA was developed for the LP and NED plans.

PROJECT ITEMS

A. DREDGING

1. Mobilization & Demobilization

Reference CEDEP for Cost Derivation. Fuel and Economic Conditions are June 2012 price level.

2. Dredging

Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions are based according to Price level of estiamte. Beach Shaping & Grading is a separate project item of the CEDEP monthly costs based on a crew in the MII software. The latest quantity due to continuing erosion and latest LIDAR surveys was provided by the PDT designers. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The CEDEP program included the additional yardage of dredging required to reach placement quantity.

3. Borrow Area Activities

Quantity and Cost is based on historical data.

4. Beach Shaping & Grading

Land Base Equipment & Labor Unit Costs are based on a crew in the MII software. Duration of beach work is based on 100% dredging duration.

5. Sea Turtle/ Gulf Sturgeon Observer

The item is included in CEDEP as a monthly charge based on $625/ day (historical data). Therefore the MII project item reads as no quantity because this cost is included in CEDEP monthly charges. The duration of the observer varies for each plan based on the dredging duration

Mobilization & Demobilization of the Trawler

Basis is historical data within CEDEP.

6. Sea Turtle/ Gulf Sturgeon Trawling

The Unit Costs is based on historical data. In the current estimate, the duration varies for each plan based on the dredging duration.

B. BEACH WORK ITEMS

1. Crossovers, Composite Wood type

The crossovers are quantified by the PDT. The composite wood (public) crossovers have been identified as 4' width. As the PDT looked more closely, there are many more 10 foot reaches (75%) than 30 foot reaches (25%). The length of crossovers is based on 30' for the 10 foot reaches and 50' for the 30' reaches. The cost is based on the sponsors provided invoice.

2. Crossover, TREX type

The TREX crossovers cost is based on the latest invoice provided by the sponsor (Provided 2012) for a public crossover. The quantity (22) of public crossovers were counted by the PDT and provided which is approximately 5% of the total.

3. Miscellaneous Site Items

Assuming signage, debris removal, storm drainage and small odd jobs that may not be included

C. PLANTINGS

1. Sea Oats

The cost is a result of a quote from a past supplier near the area in the spring 2012. The quote took into consideration the number of sea oats that would be planted.

The quantity provided by the PDT designer was increased 15% for re-plantings. The 15% re-planting is conservative. Pascagoula, Mississippi beaches (W91278-09-D-0001-TO11) (approximately 15 miles west of Walton County) had 10% re-planting built into the estimate.

2. Sand Fencing

The costs of sand fencing is consistent with $15/LF. The latest contract that used the sand fencing is Pascagoula beach- Phase II (W91278-09-D-0001-TO11).

POINTS OF CONTACT

The table below lists the all Cost Engineering Personnel that worked or furnished Cost information.

Joseph H. Ellsworth	Lead Cost Engineer	CESAM	251-690-2628
Rita B.Perkins	Cost Engineer	CESAM	251-694-3749
George F. Rush	Civil Engineer -Dredging	CESAM	251-694-3715
John G. Miller	Hydraulic Engineer	CESAM	251-690-3115
Elizabeth S. Godsey	Hydraulic/Planning Engineer	CESAM	251-694-3848
Russell W Blount	Real Estate Specialist	CESAM	251-694-3675
Joseph W. Paine	Planning Study Manager	CESAM	251-694-3832
Larry E. Parsons	Planning Environmental	CESAM	251-690-3139

ATTACHMENT IV

MCACES (MII) OUTPUT REPORT

Walton County Storm Damage Reduction-Feasibilty, Florida "NED" Beach Nourishment Plan

Walton County is located along the Florida panhandle. The beaches of Walton County encompass approximately 26 miles of shoreline. The proposed project includes periodic nourishments of suitable material on an approximate 16 mile stretch of shoreline at appropriate interval of time to maintain the optimized beach fill design template. The nourishments include an initial along with four smaller nourishments at 10 year intervals. The initial will include the extension of existing beach crossovers as well as beach and dune plantings for protection.

BASIS of COST ESTIMATE and RATIONALE

Revisions made on September 24, 2012 per Cost DX...(requested changes are documented)

Reference excel file:MII-walton-county-fl-storm-damage-reduction-feasibility-summary-ned-initial plan-SEP12.xls

Estimates are Comparative-Level Type and are based on Historical Data, Recent Pricing, and Estimator's Judgment. Estimate is structured and priced as a general prime dredging contractor supported by minor subcontractors, and a separate contract for planting feature. Anticipated bidding conditions and construction duration with reasonable schedules are considered Normal. Unit cost as shown in estimates, are fair and reasonable rates based on fair market value. O&M is outside of total project cost.

-MII (MCACES 2nd generation) was structured by feature account incorporating input cost from CEDEP. MII itemized the supporting items for Beach work and Planting cost.

Construction Start is FY 14

Estimated by	CESAM-EN-E, Cost Engineering Branch
Designed by	CESAM-EN-E, Mobile District, Corps of Engineers
Prepared by	Joseph Ellsworth & Rita Perkins
Preparation Date	9/25/2012
Effective Date of Pricing	10/1/2011
Estimated Construction Time	550 Days

Currency in US dollars

Designed by
CESAM-EN-E, Mobile District, Corps of Engineers
Estimated by
CESAM-EN-E, Cost Engineering Branch
Prepared by
Joseph Ellsworth & Rita Perkins

Design Document	Prepared by Mobile District, CESAM-EN-E
Document Date	9/25/2012
District	Mobile District
Contact	Rita Perkins/ Joseph Ellsworth
Budget Year	2014
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
Unit Cost

Timeline/Currency

Preparation Date	9/25/2012
Escalation Date	10/1/2011
Eff. Pricing Date	10/1/2011
Estimated Duration	550 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB08EB: MII English Cost Book 2008

Labor FL12: SAM2012- Walton County, FL Labor library

ww.wdol.gov is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. Only Land Equipment Operator

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP11R03: MII Equipment 2011 Region 03

03 SOUTHEAST

Sales Tax	8.35
Working Hours per Year	1,530
Labor Adjustment Factor	1.00
Cost of Money	2.00
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.090
Gas	3.550
Diesel Off-Road	3.800
Diesel On-Road	3.800

Shipping Rates

Over 0 CWT	15.58
Over 240 CWT	14.19
Over 300 CWT	12.14
Over 400 CWT	10.20
Over 500 CWT	6.13
Over 700 CWT	6.13
Over 800 CWT	9.25

Currency in US dollars

Date	Author	Note
9/25/2012	Rita Perkins	New Project NotePer Cost DX changes made are the following:Additional notes which most come from other supporting documents.Change the date of price level to October 1 2012 therefore assume a FY 13 price level. cHANGED ALL DOCUMENT DATES TO 9/2012Instead of using current rental contract rates, Cost DX insists to use an equipment and labor library to create a crew for Beach Grading & Shaping.A labor library was created for Walton County, FL. Regional Equipment library and Davis Bacon Wages were utilized . A mark-up of 16% OH % 10% profit was applied.Rates for cross-overs were checked as a sub-bid (Rates are prime cost to government with sub-contractor mark-ups.).CEDEP revised to include Borrow Area Activities. New unit cost applied in MII.Added cost for Environmental Coordination during construction.

Description	UOM	Quantity	Contractor	ContractCost
New Section				107,605,464
Initial Beach Nourishment (2014)	CY	3,273,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	40,640,774
Federal & Non-Federal Costs	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	40,640,774
(Note: Federal & non-Federal construction costs are included)				
NED Initial Beach Nourishment (2014)	CY	2,000,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	40,640,774
Hopper Dredging	CY	3,273,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	33,421,774
(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew from the regional equipment and labor libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling and Borrow Area Activities.)				
(Note: Reference CEDEP for Cost Derivation.)				
(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED initial plan will take approximately 10.5 months. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)				
Beach & Dune Planting	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	2,875,000
(Note: (updated June 2012) Contractor shall be required to guarantee that 80% of the planted vegetation is in good condition one (1) year after initial planting. Planting shall be accomplished by hand. Fertilizer shall be placed in the bottom of hole at required rate. Cost furnished by Miriam Huffstutler June 2012. Quantity provided by EN design. 15% re-planting assumed.)				
Beach Work Items	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	4,194,000
(Note: Quantities for Beach Cross-Overs were furnished by the Project Delivery Team. The type Cross-Overs were based on the Local Sponsors' previously constructed designs. Wood type is estimated at 555ea @30-50 lf/ea @ 95% = 18,480 lf. Trex type is estimated at 555 ea @ 50 lf/ea @ 5% = 1400 lf. Total unit contract cost for material, labor, and equipment was developed and based on reported costs from prior projects from the Local Sponsor and marked. Even though the Cross-Overs are derived from recently constructed projects, the linear foot cost appears to be fair and reasonable as compared to historical data of similar construction along the Gulf Coast Area. It is anticipated that the final unit prices will be updated to reflect the detailed design when completed. ASsumed to be sub-contracted.)				
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	150,000
(Note: Per PDT, the cost incurred by the contractor includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)				
Beach Renourishment Typical Cost (2024, 2034, 2044, 2054)	EA	1.0000		66,964,690
Federal / Non-Federal Costs	EA	1.0000		66,964,690
(Note: Federal & non-Federal construction costs are included)				

Currency in US dollars

Description	UOM	Quantity	Contractor	ContractCost
Beach Renourishment Typical Cost (2024)	CY	1,585,000.0000		16,741,173
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost incurred by the contractor includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Description	UOM	Quantity	Contractor	ContractCost
Hopper Dredging	CY	1,585,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	16,666,173

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

(Note: Reference CEDEP for Cost Derivation.)

(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED renourishment plans will take approximately 5 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)

Description	UOM	Quantity	Contractor	ContractCost
Beach Renourishment Typical Cost (2034)	CY	1,585,000.0000		16,741,173
Hopper Dredging	CY	1,585,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	16,666,173

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

(Note: Reference CEDEP for Cost Derivation.)

(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED renourishment plans will take approximately 5 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)

Description	UOM	Quantity	Contractor	ContractCost
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost incurred by the contractor includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Description	UOM	Quantity	Contractor	ContractCost
Beach Renourishment Typical Cost (2044)	CY	1,585,000.0000		16,741,173
Hopper Dredging	CY	1,585,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	16,666,173

Currency in US dollars

Description	UOM	Quantity	Contractor	ContractCost
(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)				
(Note: Reference CEDEP for Cost Derivation.)				
(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED renourishment plans will take approximately 5 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)				
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000
(Note: Per PDT, the cost incurred by the contractor includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)				
Beach Renourishment Typical Cost (2054)	CY	1,585,000.0000		16,741,173
Hopper Dredging	CY	1,585,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	16,666,173
(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)				
(Note: Reference CEDEP for Cost Derivation.)				
(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED renourishment plans will take approximately 5 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)				
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000
(Note: Per PDT, the cost incurred by the contractor includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)				

Currency in US dollars

Walton County Storm Damage Reduction-Feasibilty, Florida "LP" Beach Nourishment Plan

Walton County is located along the Florida panhandle. The beaches of Walton County encompass approximately 26 miles of shoreline. The proposed project includes periodic nourishments of suitable material on an approximate 16 mile stretch of shoreline at appropriate interval of time to maintain the optimized beach fill design template. The nourishments include an initial along with four smaller nourishments at 10 year intervals. The initial will include the extension of existing beach crossovers as well as beach and dune plantings for protection.

BASIS of COST ESTIMATE and RATIONALE

Revisions made on September 24, 2012 per Cost DX...(requested changes are documented)

Estimates are Comparative-Level Type and are based on Historical Data, Recent Pricing, and Estimator's Judgment. Estimate is structured and priced as a general prime dredging contractor supported by minor beach work subcontractors, and a separate contract for planting feature. Anticipated bidding conditions and construction duration with reasonable schedules are considered Normal. Unit cost as shown in estimates, are fair and reasonable rates based on fair market value. O&M is outside of total project cost.

-MII (MCACES 2nd generation) was structured by feature account incorporating input cost from CEDEP. MII itemized the supporting items for Beach work and Planting cost.

Construction Start is FY 14

Estimated by	CESAM-EN-E, Cost Engineering Branch
Designed by	CESAM-EN-E, Mobile District, Corps of Engineers
Prepared by	Joseph Ellsworth & Rita Perkins
Preparation Date	9/25/2012
Effective Date of Pricing	10/1/2011
Estimated Construction Time	550 Days

Currency in US dollars

Designed by
CESAM-EN-E, Mobile District, Corps of Engineers
Estimated by
CESAM-EN-E, Cost Engineering Branch
Prepared by
Joseph Ellsworth & Rita Perkins

Design Document	Prepared by Mobile District, CESAM-EN-E
Document Date	9/25/2012
District	Mobile District
Contact	Rita Perkins/ Joseph Ellsworth
Budget Year	2014
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
Unit Cost

Timeline/Currency

Preparation Date	9/25/2012
Escalation Date	10/1/2011
Eff. Pricing Date	10/1/2011
Estimated Duration	550 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB08EB: MII English Cost Book 2008

Labor FL12: SAM2012- Walton County, FL Labor library

ww.wdol.gov is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. Only Land Equipment Operator

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP11R03: MII Equipment 2011 Region 03

03 SOUTHEAST

Sales Tax	8.35
Working Hours per Year	1,530
Labor Adjustment Factor	1.00
Cost of Money	2.00
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.087
Gas	3.550
Diesel Off-Road	3.800
Diesel On-Road	3.800

Shipping Rates

Over 0 CWT	15.58
Over 240 CWT	14.19
Over 300 CWT	12.14
Over 400 CWT	10.20
Over 500 CWT	6.13
Over 700 CWT	6.13
Over 800 CWT	9.25

Currency in US dollars

Date	Author	Note
9/25/2012	Rita Perkins	New Project NotePer Cost DX changes made are the following:Additional notes which most come from other supporting documents.Change the date of price level to October 1 2012 therefore assume a FY 13 price level. cHANGED ALL DOCUMENT DATES TO 9/2012Instead of using current rental contract rates, Cost DX insists to use an equipment and labor library to create a crew for Beach Grading & Shaping.A labor library was created for Walton County. Regional Equipment and labor rates were utilized. A mark-up of 16% OH % 10% profit was applied.Rates for cross-overs were a prime contractor rate with subcontractor mark-ups applied.CEDEP revised to include Borrow Area Activities. New unit cost applied in MII.Added cost for Environmental Coordination during construction.

Description	UOM	Quantity	Contractor	ContractCost
New Section				122,660,731
Initial Beach Nourishment (2014)	CY	2,000,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	47,747,102
Federal & Non-Federal Costs	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	47,747,102
(Note: All federal & non-federal construction work included)				
LP Initial Beach Nourishment (2014)	CY	2,000,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	47,747,102
Hopper Dredging	CY	3,868,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	39,326,102
(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on recent (FY 12) rental contracts. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling and Borrow Area Activities.)				
(Note: Reference CEDEP for Cost Derivation.)				
(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. NED initial plan will take approximately 10.5 months. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)				
Beach & Dune Planting	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	3,325,000
(Note: (updated June 2012) Contractor shall be required to guarantee that 80% of the planted vegetation is in good condition one (1) year after initial planting. Planting shall be accomplished by hand. Fertilizer shall be placed in the bottom of hole at required rate. Cost furnished by Miriam Huffstutler June 2012. Quantity provided by EN design. 15% re-planting assumed.)				
Beach Work Items	LS	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	4,946,000
(Note: Quantities for Beach Cross-Overs were furnished by the Project Delivery Team. The type Cross-Overs were based on the Local Sponsors' previously constructed designs. Wood type Estimate is 655 @30-50 lf ea @ 95% = 21,850 lf. Trex type is estimated at 655 cross-overs @ 50 lf ea @ 5% = 1,650 lf. Total unit cost (Cost to Prime) for material, labor, and equipment was developed and based on reported costs from prior projects from the Local Sponsor. Even though the Cross-Overs are derived from recently constructed projects, the linear foot cost appears to be fair and reasonable as compared to historical data of similar construction along the Gulf Coast Area. It is anticipated that the final unit prices will be updated to reflect the detailed design when completed.)				
Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	150,000
(Note: Per PDT, the cost includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)				
Beach Renourishment Typical Cost (2024, 2034, 2044, 2054)	EA	1.0000		74,913,629
Federal & Non-Federal Costs	EA	1.0000		74,913,629
(Note: All federal & non-federal construction work included)				

Labor ID: FL12 EQ ID: EP11R03 Currency in US dollars TRACES MII Version 4.1

Description	UOM	Quantity	Contractor	ContractCost
Beach Renourishment Typical Cost (2024)	CY	1,789,000.0000		18,728,407
Hopper Dredging	CY	1,789,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	18,653,407

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

(Note: Reference CEDEP for Cost Derivation.)

(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. LP renourishment plans will take approximately 5.75 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)

Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Beach Renourishment Typical Cost (2034)	CY	1,789,000.0000		18,728,407
Hopper Dredging	CY	1,789,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	18,653,407

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

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Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Beach Renourishment Typical Cost (2044)	CY	1,789,000.0000		18,728,407
Hopper Dredging	CY	1,789,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	18,653,407

Currency in US dollars

Description	UOM	Quantity	Contractor	ContractCost

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

(Note: Reference CEDEP for Cost Derivation.)

(Note: Land Base Equipment & Labor Unit Costs are based created Walton County Labor Library & Regional Equipment library . Duration of beach work is based on dredging duration. LP renourishment plans will take approximately 5.75 months each. Cost Basis: •working 12 hrs/day 30 days/ mo. •3-D8 Dozers & Operator •1 FE Loader & Operator •5 Laborers)

Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Beach Renourishment Typical Cost (2054)	CY	1,789,000.0000		18,728,407
Hopper Dredging	CY	1,789,000.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	18,653,407

(Note: Assumption remains with a large hopper (7600 CY). Fuel and Economic conditions were changed accordingly in CEDEP to June 2012 level based on www.eia.gov/petroleum/gasdiese prices, http://www.treasurydirect.gov/govt/rates/tcir/tcir_opdprmt2.htm , and APP E of EP-1110-1-8 . Fuel costs were increased. Beach Shaping & Grading are not included in CEDEP dredging monthly costs. The Beach Grading costs are based on a crew using appropriate libraries. The Sea Turtle / Gulf Sturgeon Observer is included in the CEDEP monthly costs. The additional yardage of dredging the contractor will likely incur to meet a placement template is included within CEDEP. Joe Ellsworth validated cost of Sea Turtle Trawling .)

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Environmental	EA	1.0000	[AA] Prime Contractor All Dredging (CEDEP) Markups	75,000

(Note: Per PDT, the cost includes all government agency coordination required during the construction due to environmental windows that may be encountered. Turtle Trawling & Bird Monitoring)

Currency in US dollars

ATTACHMENT V

PROJECT COST AND SCHEDULE RISK ANALYSIS REPORT

US Army Corps
of Engineers®

Walton County Hurricane and Storm Damage Reduction
Walton County, Florida
General Investigations Study
National Economic Development (NED) Plan
Project Cost and Schedule Risk Analysis Report

Prepared for:

U.S. Army Corps of Engineers,
Mobile District

Prepared by:

U.S. Army Corps of Engineers
Cost Engineering Directory of Expertise, Walla Walla

October 12, 2012

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EXECUTIVE SUMMARY

Under the auspices of the U.S. Army Corps of Engineers (USACE), Mobile District, this report presents a recommendation for the total project cost and schedule contingencies for the Walton County Hurricane and Storm Damage Reduction General Investigations Study. In compliance with Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008, a formal risk analysis study was conducted for the development of contingency on the total project cost. The purpose of this risk analysis study was to establish project contingencies by identifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

Specific to the Walton County project, the base case project cost for the National Economic Development (NED) Plan is estimated at approximately $114 Million ($43 Million for the initial construction and $70 Million for the four subsequent nourishment activities). Based on the results of the analysis, the Cost Engineering Mandatory Center of Expertise for Civil Works (Walla Walla District) recommends a contingency value of $30 Million, or 27%. This contingency includes $9 Million (20%) for the initial construction and $21 Million (30%) for the four subsequent nourishment activities.

Walla Walla Cost MCX performed risk analysis using the *Monte Carlo* technique, producing the aforementioned contingencies and identifying key risk drivers.

The following tables ES-1, ES-2, and ES-3 portray the development of contingencies (27% overall). The contingency is based on an 80% confidence level, as per USACE Civil Works guidance.

Table ES-1. Contingency Analysis Table - Overall

Base Case Cost Estimate	**$113,528,738**	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$111,424,376	-1.85%
50%	$132,295,391	16.53%
80%	**$143,734,612**	**26.61%**
95%	$154,652,530	36.22%

Table ES-2. Contingency Analysis Table - Initial

Base Case Cost Estimate	$43,215,813	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$40,771,214	-5.66%
50%	$48,128,699	11.37%
80%	**$52,057,949**	**20.46%**
95%	$55,777,293	29.07%

Table ES-3. Contingency Analysis Table – Out-Years

Base Case Cost Estimate	$70,312,925	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$70,653,162	0.48%
50%	$84,166,693	19.70%
80%	**$91,676,663**	**30.38%**
95%	$98,875,237	40.62%

The following table ES-2 portrays the full costs of the recommended alternative based on the anticipated contracts. The costs are intended to address the congressional request of estimates to implement the project. The contingency is based on an 80% confidence level, as per accepted USACE Civil Works guidance.

Table ES-4. Cost Summary

WALTON COUNTY HURRICANE AND STORM DAMAGE REDUCTION FRM FEATURE ACCOUNTS		COST ($1,000)	CNTG ($1,000)	TOTAL ($1,000)
01	FISH AND WILDLIFE FACILITIES	543	136	679
17	CHANNELS AND CANALS	107,605	28,630	136,235
30	PLANNING, ENGINEERING, AND DESIGN	3,228	859	4,087
31	CONSTRUCTION MANAGEMENT	2,152	573	2,725
	TOTAL PROJECT COSTS	**113,529**	**30,197**	**143,725**

Notes:
1) Costs include the recommended contingency of 27% with the exception of the 01 Account (Lands and Damages), which used a contingency of 25%, as prepared by the District Real Estate Office.
2) Costs exclude O&M and Life Cycle Cost estimates.

KEY FINDINGS/OBSERVATIONS RECOMMENDATIONS

For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

For Risks I-2 (Scope Growth/Reduction) and I-1 (Scope Definition), although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

For Risk I-5 (Fuel Prices), dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 63 percent of the statistical cost variance.

For Risk I-5 (Fuel Prices), dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

For Risk I-2 (Scope Growth/Reduction), although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 62 percent of the statistical schedule variance.

For Risk E-1 (Weather), the PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For Risk E-2 (Funding Delays), the PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

For Risk E-2 (Funding Delays), the PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For Risk E-1 (Weather), the PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

Recommendations, as detailed within the main report, include the implementation of cost and schedule contingencies, further iterative study of risks throughout the project life-cycle, potential mitigation throughout the PED phase, and proactive monitoring and control of risk identified in this study.

MAIN REPORT

1.0 PURPOSE

Under the auspices of the US Army Corps of Engineers (USACE), Mobile District, this report presents a recommendation for the total project cost and schedule contingencies for the Walton County Hurricane and Storm Damage Reduction Project.

2.0 BACKGROUND

Walton County is located approximately 103 miles east of Pensacola, Florida and 98 miles west of Tallahassee, Florida. The beaches of Walton County encompass approximately 26 miles of shoreline extending from the City of Destin in Okaloosa County, Florida (about six miles to the east of East Pass) to the Walton/Bay County line near Phillips Inlet. The western two-thirds of Walton County are comprised of a coastal peninsula extending from the mainland, and the eastern third is comprised of mainland beaches. Choctawhatchee Bay lies north of the peninsula. Walton County includes 11.9 miles of state-designated critically eroding areas and three State of Florida park areas that cover approximately six miles of the 26-mile shoreline.

The Walton County shoreline is characterized by high dune elevations partly due to the presence of Pleistocene bluffs formed as a result of an exposed submarine berm formed during inundation of the Florida Peninsula during that geologic period. Primary dune elevations in Walton County range from 11.5 to 44.5 feet North American Vertical Datum, 1988 (NAVD88) and average 25.5 feet. Along the mid-section of Walton County, Bluff elevations exceed 60 feet in height. Bluff erosion and undercutting occur in this area due to the interface of relatively low flat beaches and the bluff toe. An unusual attribute of the Walton County shoreline is the presence of coastal dune lakes. These lakes are rare worldwide and are almost exclusive to the Gulf Coast within the United States. The lakes are about five feet deep and intermittently breach the dune system and discharge directly into the Gulf of Mexico.

Mild winters and warm hot summers characterize the project area, with an average in excess of 280 days a year of sunshine. The average daily temperature is 67 degrees Fahrenheit and the average water temperature is about 70 degrees Fahrenheit. The months from June through November constitute the hurricane storm season, and this area is subject to tropical storm and strong hurricane conditions. The highest period of rainfall occurs during the storm season, with an average annual rainfall of 64 inches.

Walton County's shoreline is receding; the protective dunes and high bluffs are being destroyed by hurricane and storm forces that are occurring more frequently than before.

The impacts of these storms to property and infrastructure are considerable and can possibly be reduced through a beach restoration and stabilization project.

As a part of this effort, Mobile District requested that the USACE Cost Engineering Mandatory Center of Expertise for Civil Works (Cost Engineering MCX) provide an agency technical review (ATR) of the cost estimate and schedule for Recommended Project Plan. That tasking also included providing a risk analysis study to establish the resulting contingencies.

3.0 REPORT SCOPE

The scope of the risk analysis report is to calculate and present the cost and schedule contingencies at the 80 percent confidence level using the risk analysis processes, as mandated by U.S. Army Corps of Engineers (USACE) Engineer Regulation (ER) 1110-2-1150, Engineering and Design for Civil Works, ER 1110-2-1302, Civil Works Cost Engineering, and Engineer Technical Letter 1110-2-573, Construction Cost Estimating Guide for Civil Works. The report presents the contingency results for cost risks for all project features. The study and presentation does not include consideration for life cycle costs.

3.1 Project Scope

The formal process included extensive involvement of the PDT for risk identification and the development of the risk register. The analysis process evaluated the base case Micro Computer Aided Cost Estimating System (MCACES) cost estimate, schedule, and funding profiles using Crystal Ball software to conduct a *Monte Carlo* simulation and statistical sensitivity analysis, per the guidance in Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

The project technical scope, estimates and schedules were developed and presented by the Mobile District. Consequently, these documents serve as the basis for the risk analysis.

The scope of this study addresses the identification of problems, needs, opportunities and potential solutions that are viable from an economic, environmental, and engineering viewpoint.

3.2 USACE Risk Analysis Process

The risk analysis process for this study follows the USACE Headquarters requirements as well as the guidance provided by the Cost Engineering MCX. The risk analysis process reflected within this report uses probabilistic cost and schedule risk analysis methods within the framework of the Crystal Ball software. Furthermore, the scope of the report includes the identification and communication of important steps, logic, key assumptions, limitations, and decisions to help ensure that risk analysis results can be appropriately interpreted.

Risk analysis results are also intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as the project progresses through planning and implementation. To fully recognize its benefits, cost and schedule risk analysis should be considered as an ongoing process conducted concurrent to, and iteratively with, other important project processes such as scope and execution plan development, resource planning, procurement planning, cost estimating, budgeting and scheduling.

In addition to broadly defined risk analysis standards and recommended practices, this risk analysis was performed to meet the requirements and recommendations of the following documents and sources:

- Cost and Schedule Risk Analysis Process guidance prepared by the USACE Cost Engineering MCX.

- Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008.

- Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

4.0 METHODOLOGY / PROCESS

The Walla Walla Cost Engineering MCX performed the Cost and Schedule Risk Analysis, relying on local Mobile District staff to provide information gathering. The Mobile District PDT conducted risk identification and qualitative analysis to produce a risk register that served as the framework for the risk analysis. Participants in risk identification meeting included the following:

Name	Organization	Title
Joseph H. Ellsworth	USACE - SAM	Lead Cost Engineer
Bernard E. Moseby	USACE - SAM	Planning Economics
Julie M. Watkins	USACE - SAM	Planning Economics
Elizabeth S. Godsey	USACE - SAM	Hydraulic Engineer
Michael A. McKown	USACE - SAM	Structural Engineer - GeoTech
Russell W Blount	USACE - SAM	Real Estate Specialist
Joseph W. Paine	USACE - SAM	Planning Study Manager
Larry E. Parsons	USACE - SAM	Planning Environmental

The first cost risk model was completed February 11, 2010. However, scope and estimate updates since then, as well as agency technical review, necessitated a rerun of the original model. The final results were completed and reported to Mobile on October 5, 2012.

The risk analysis process for this study is intended to determine the probability of various cost outcomes and quantify the required contingency needed in the cost estimate to achieve the desired level of cost confidence. Per regulation and guidance, the P80 confidence level (80% confidence level) is the normal and accepted cost confidence level. District Management has the prerogative to select different confidence levels, pending approval from Headquarters, USACE.

In simple terms, contingency is an amount added to an estimate to allow for items, conditions or events for which the occurrence or impact is uncertain and that experience suggests will likely result in additional costs being incurred or additional time being required. The amount of contingency included in project control plans depends, at least in part, on the project leadership's willingness to accept risk of project overruns. The less risk that project leadership is willing to accept the more contingency should be applied in the project control plans. The risk of overrun is expressed, in a probabilistic context, using confidence levels.

The Cost MCX guidance for cost and schedule risk analysis generally focuses on the 80-percent level of confidence (P80) for cost contingency calculation. It should be noted that use of P80 as a decision criteria is a risk averse approach (whereas the use of P50 would be a risk neutral approach, and use of levels less than 50 percent would be risk seeking). Thus, a P80 confidence level results in greater contingency as compared to a P50 confidence level. The selection of contingency at a particular confidence level is ultimately the decision and responsibility of the project's District and/or Division management.

The risk analysis process uses *Monte Carlo* techniques to determine probabilities and contingency. The *Monte Carlo* techniques are facilitated computationally by a commercially available risk analysis software package (Crystal Ball) that is an add-in to Microsoft Excel. Cost estimates are packaged into an Excel format and used directly for cost risk analysis purposes. The level of detail recreated in the Excel-format schedule is sufficient for risk analysis purposes that reflect the established risk register, but generally less than that of the native format.

The primary steps, in functional terms, of the risk analysis process are described in the following subsections. Risk analysis results are provided in Section 6.

4.1 Identify and Assess Risk Factors

Identifying the risk factors via the PDT is considered a qualitative process that results in establishing a risk register that serves as the document for the quantitative study using the Crystal Ball risk software. Risk factors are events and conditions that may influence or drive uncertainty in project performance. They may be inherent characteristics or conditions of the project or external influences, events, or conditions such as weather or economic conditions. Risk factors may have either favorable or unfavorable impacts on project cost and schedule.

A formal PDT meeting was held with the Mobile District office for the purposes of identifying and assessing risk factors. The meeting included capable and qualified representatives from multiple project team disciplines and functions, including project management, cost engineering, design, environmental compliance, and real estate

The initial formal meetings focused primarily on risk factor identification using brainstorming techniques, but also included some facilitated discussions based on risk factors common to projects of similar scope and geographic location. Subsequent meetings focused primarily on risk factor assessment and quantification.

Additionally, numerous conference calls and informal meetings were conducted throughout the risk analysis process on an as-needed basis to further facilitate risk factor identification, market analysis, and risk assessment.

4.2 Quantify Risk Factor Impacts

The quantitative impacts of risk factors on project plans were analyzed using a combination of professional judgment, empirical data and analytical techniques. Risk factor impacts were quantified using probability distributions (density functions) because risk factors are entered into the Crystal Ball software in the form of probability density functions.

Similar to the identification and assessment process, risk factor quantification involved multiple project team disciplines and functions. However, the quantification process relied more extensively on collaboration between cost engineering and risk analysis team members with lesser inputs from other functions and disciplines. This process used an iterative approach to estimate the following elements of each risk factor:

- Maximum possible value for the risk factor
- Minimum possible value for the risk factor
- Most likely value (the statistical mode), if applicable
- Nature of the probability density function used to approximate risk factor uncertainty
- Mathematical correlations between risk factors

- Affected cost estimate and schedule elements

The resulting product from the PDT discussions is captured within a risk register as presented in section 6 for both cost and schedule risk concerns. Note that the risk register records the PDT's risk concerns, discussions related to those concerns, and potential impacts to the current cost and schedule estimates. The concerns and discussions support the team's decisions related to event likelihood, impact, and the resulting risk levels for each risk event.

4.3 Analyze Cost Estimate and Schedule Contingency

Contingency is analyzed using the Crystal Ball software, an add-in to the Microsoft Excel format of the cost estimate and schedule. *Monte Carlo* simulations are performed by applying the risk factors (quantified as probability density functions) to the appropriate estimated cost and schedule elements identified by the PDT. Contingencies are calculated by applying only the moderate and high level risks identified for each option (i.e., low-level risks are typically not considered, but remain within the risk register to serve historical purposes as well as support follow-on risk studies as the project and risks evolve).

For the cost estimate, the contingency is calculated as the difference between the P80 cost forecast and the baseline cost estimate. Each option-specific contingency is then allocated on a civil works feature level based on the dollar-weighted relative risk of each feature as quantified by *Monte Carlo* simulation. Standard deviation is used as the feature-specific measure of risk for contingency allocation purposes. This approach results in a relatively larger portion of all the project feature cost contingency being allocated to features with relatively higher estimated cost uncertainty.

5.0 PROJECT ASSUMPTIONS

The following data sources and assumptions were used in quantifying the costs associated with the Walton County Hurricane and Storm Damage Reduction project.

a. The Mobile District provided MII MCACES (Micro-Computer Aided Cost Estimating Software) files electronically. The MII and CWE files transmitted and downloaded on October 5, 2012 was the basis for the final cost and schedule risk analyses.

b. The cost comparisons and risk analyses performed and reflected within this report are based on design scope and estimates that are at the feasibility level.

c. Schedules are analyzed for impact to the project cost in terms of both uncaptured escalation (variance from OMB factors and the local market) and unavoidable fixed contract costs and/or languishing federal administration costs incurred throughout delay.

Specific to the Walton County Hurricane and Storm Damage Reduction project, the schedule was analyzed only for impacts due to residual fixed costs.

d. Per the CWCCIS Historical State Adjustment Factors in EM 1110-2-1304, State Adjustment Factor for the State of Florida is 0.93, meaning that the average inflation for the project area is assumed to be 7% lower than the national average for inflation. Therefore, it is assumed that the project inflations experienced are similar (or better) to OMB inflation factors for future construction. Thus, the risk analyses accounted for no escalation over and above the national average.

e. Per the data in the estimate, the Overhead percentage for the Prime Contractor is 16%. The analysis assumed that approximately half of this amount is Job Office Overhead (JOOH). Thus, the assumed residual fixed cost rate for this project is 8%. For the P80 schedule, this comprises approximately 4% of the total contingency for the initial activity and 5% of the total contingency for the subsequent nourishments. This is due to the accrual of residual fixed costs associated with delay associated with the implementation schedule of each nourishment.

f. The Cost MCX guidance generally focuses on the eighty-percent level of confidence (P80) for cost contingency calculation. For this risk analysis, the eighty-percent level of confidence (P80) was used. It should be noted that the use of P80 as a decision criteria is a moderately risk averse approach, generally resulting in higher cost contingencies. However, the P80 level of confidence also assumes a small degree of risk that the recommended contingencies may be inadequate to capture actual project costs.

g. Only high and moderate risk level impacts, as identified in the risk register, were considered for the purposes of calculating cost contingency. Low level risk impacts should be maintained in project management documentation, and reviewed at each project milestone to determine if they should be placed on the risk “watch list”.

6.0 RESULTS

The cost and schedule risk analysis results are provided in the following sections. In addition to contingency calculation results, sensitivity analyses are presented to provide decision makers with an understanding of variability and the key contributors to the cause of this variability.

6.1 Risk Register

A risk register is a tool commonly used in project planning and risk analysis. The actual risk register is provided in Appendix A. The complete risk register includes low level risks, as well as additional information regarding the nature and impacts of each risk.

It is important to note that a risk register can be an effective tool for managing identified risks throughout the project life cycle. As such, it is generally recommended that risk registers be updated as the designs, cost estimates, and schedule are further refined, especially on large projects with extended schedules. Recommended uses of the risk register going forward include:

- Documenting risk mitigation strategies being pursued in response to the identified risks and their assessment in terms of probability and impact.
- Providing project sponsors, stakeholders, and leadership/management with a documented framework from which risk status can be reported in the context of project controls.
- Communicating risk management issues.
- Providing a mechanism for eliciting feedback and project control input.
- Identifying risk transfer, elimination, or mitigation actions required for implementation of risk management plans.

6.2 Cost Contingency and Sensitivity Analysis

The result of risk or uncertainty analysis is quantification of the cumulative impact of all analyzed risks or uncertainties as compared to probability of occurrence. These results, as applied to the analysis herein, depict the overall project cost at intervals of confidence (probability).

Table 1 provides the construction cost contingencies calculated for the P80 confidence level and rounded to the nearest thousand. The construction cost contingencies for the P50 and P100 confidence levels are also provided for illustrative purposes only.

Contingency was quantified as approximately $36 Million at the P80 confidence level (31% of the baseline cost estimate). For comparison, the cost contingency at the P50 and P100 confidence levels was quantified as 19% and 70% of the baseline cost estimate, respectively.

Table 1. Project Cost Contingency Summary

Risk Analysis Forecast	Baseline Estimate	Total Contingency[1,2] ($)	Total Contingency (%)
50% Confidence Level			
Project Cost	$132,295,391	$18,766,653	16.53%
80% Confidence Level			
Project Cost	$143,734,612	$30,205,874	26.61%
100% Confidence Level			
Project Cost	$180,295,353	$66,766,615	58.81%

Notes:
1) These figures combine uncertainty in the baseline cost estimates and schedule.
2) A P100 confidence level is an abstract concept for illustration only, as the nature of risk and uncertainty (specifically the presence of "unknown unknowns") makes 100% confidence a theoretical impossibility.

6.2.1 Sensitivity Analysis

Sensitivity analysis generally ranks the relative impact of each risk/opportunity as a percentage of total cost uncertainty. The Crystal Ball software uses a statistical measure (contribution to variance) that approximates the impact of each risk/opportunity contributing to variability of cost outcomes during *Monte Carlo* simulation.

Key cost drivers identified in the sensitivity analysis can be used to support development of a risk management plan that will facilitate control of risk factors and their potential impacts throughout the project lifecycle. Together with the risk register, sensitivity analysis results can also be used to support development of strategies to eliminate, mitigate, accept or transfer key risks.

6.2.2 Sensitivity Analysis Results

The risks/opportunities considered as key or primary cost drivers are ranked in order of importance in contribution to variance bar charts. Opportunities that have a potential to reduce project cost and are shown with a negative sign; risks are shown with a positive sign to reflect the potential to increase project cost. A longer bar in the sensitivity analysis chart represents a greater potential impact to project cost.

Figure 1 presents a sensitivity analysis for cost growth risk from the high level cost risks identified in the risk register. Likewise, Figure 2 presents a sensitivity analysis for schedule growth risk from the high level schedule risks identified in the risk register.

Figure 1. Cost Sensitivity Analysis - Initial

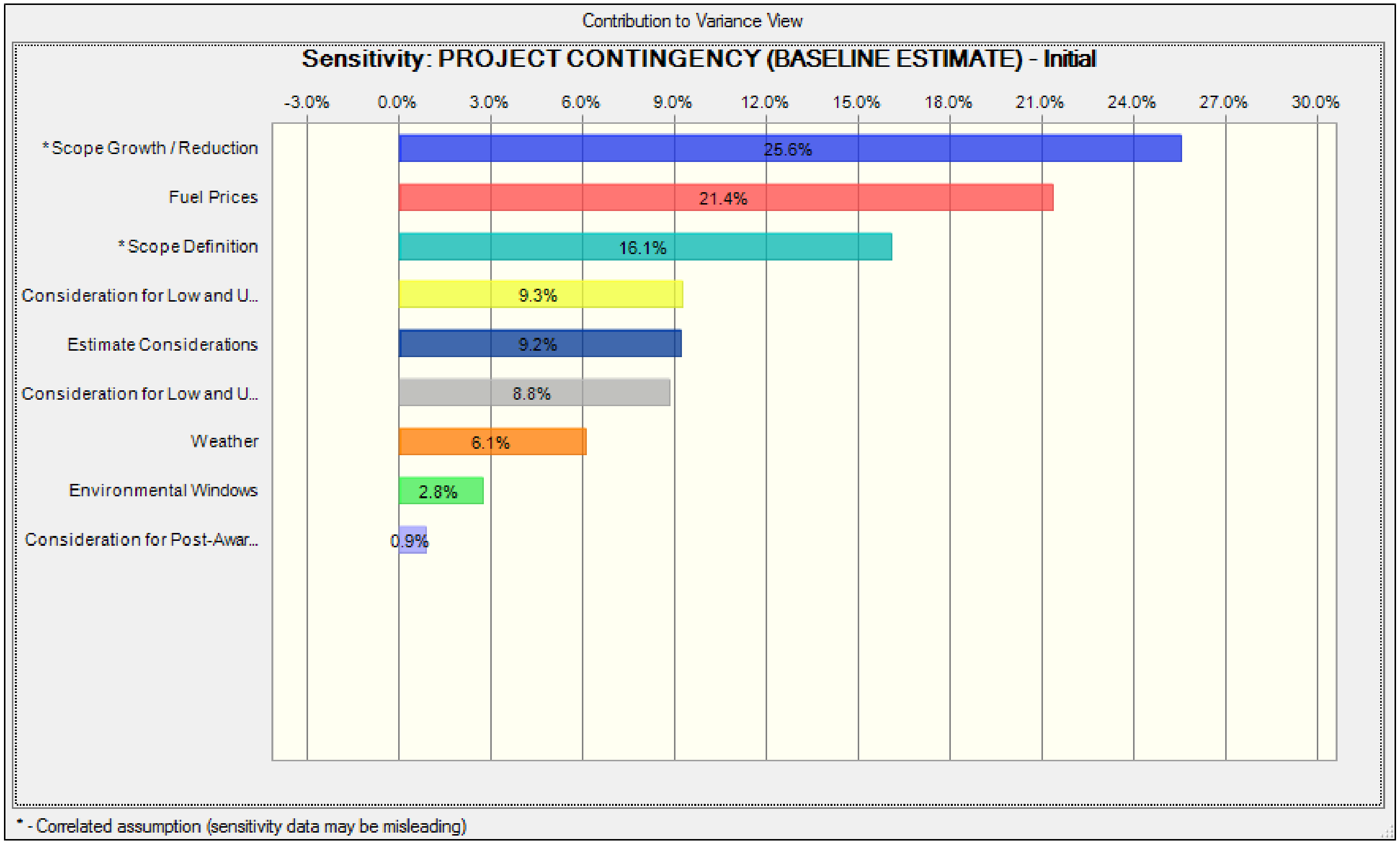


Figure 2. Cost Sensitivity Analysis – Out-Years

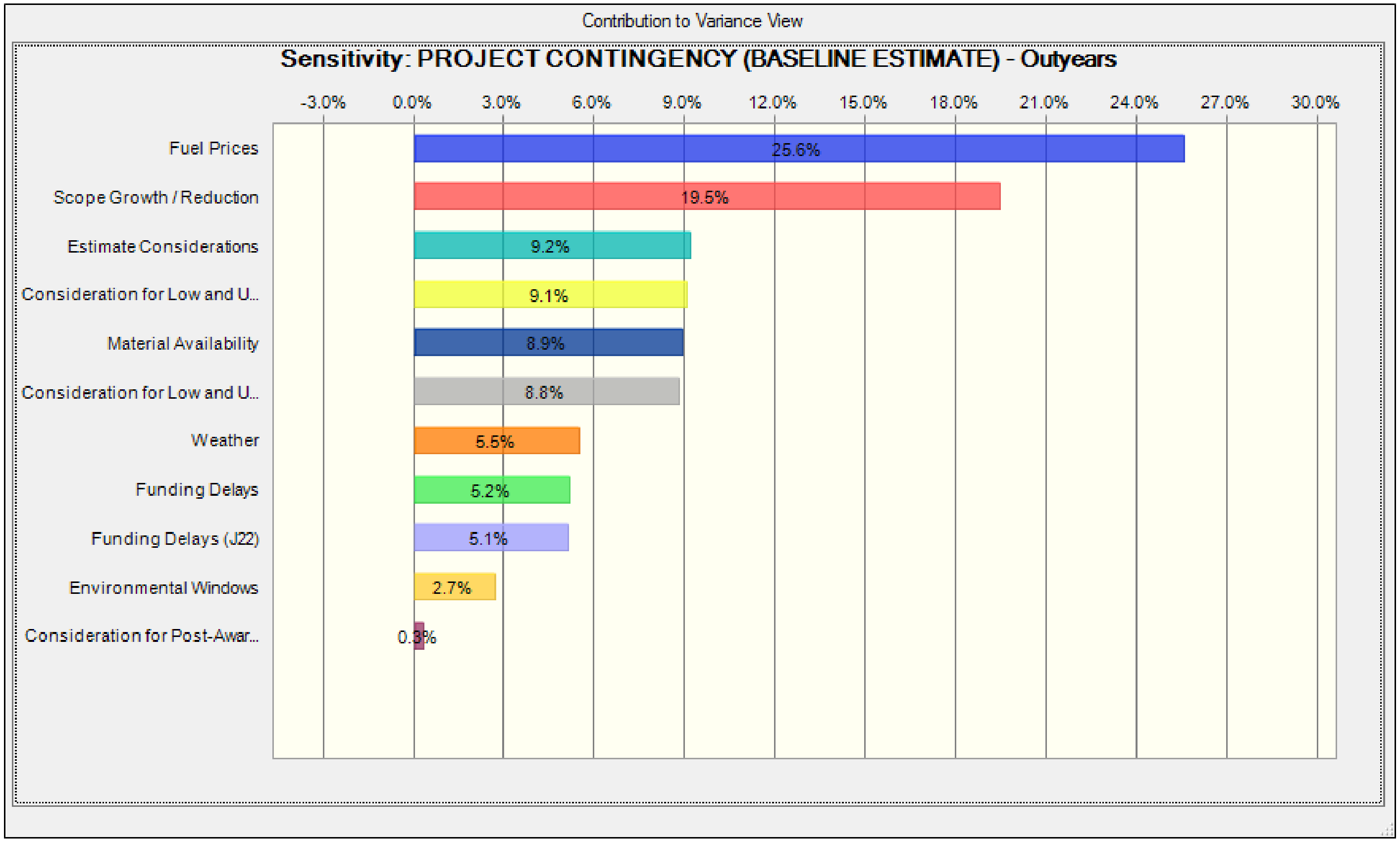


Figure 3. Schedule Sensitivity Analysis - Initial

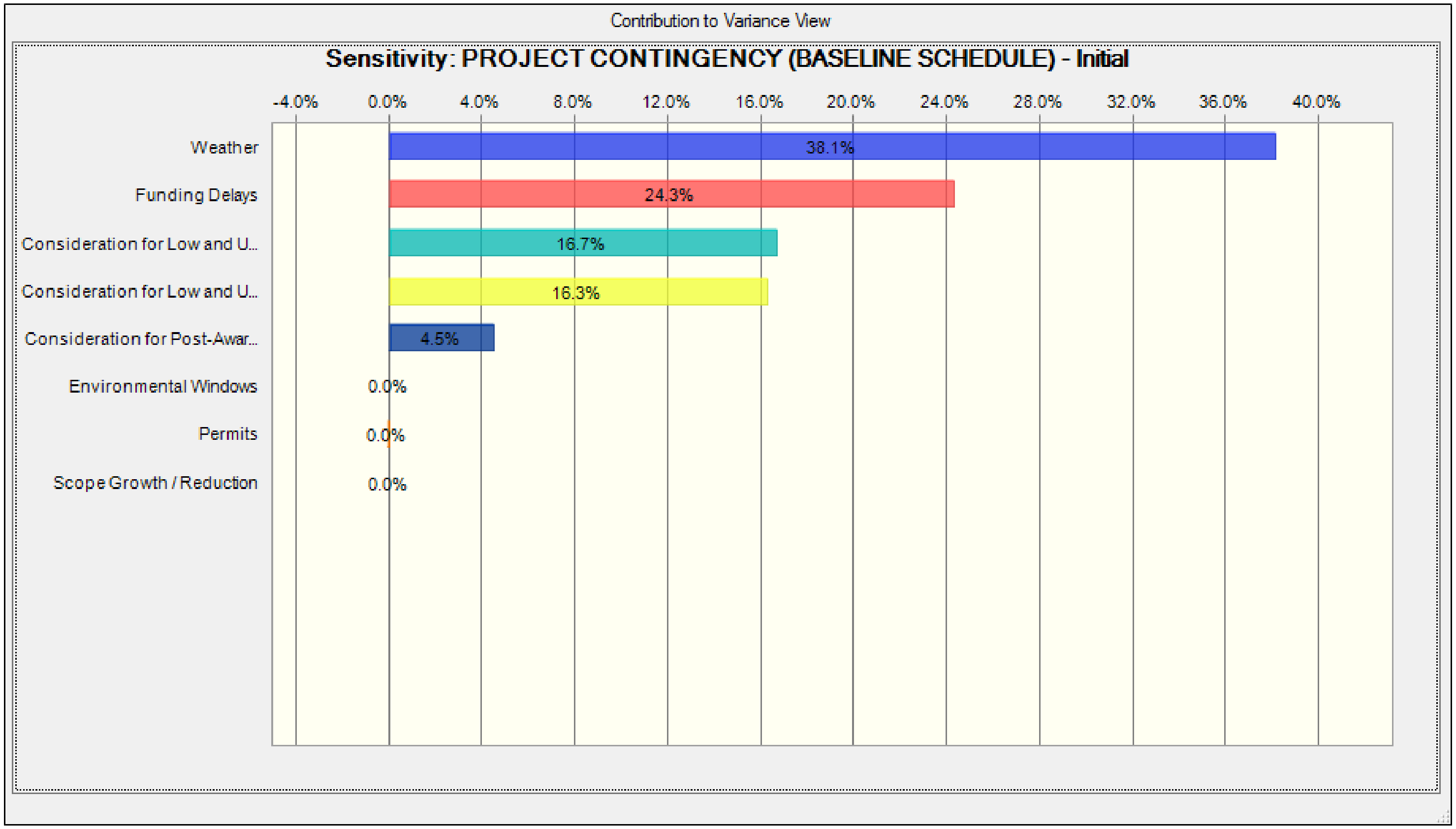
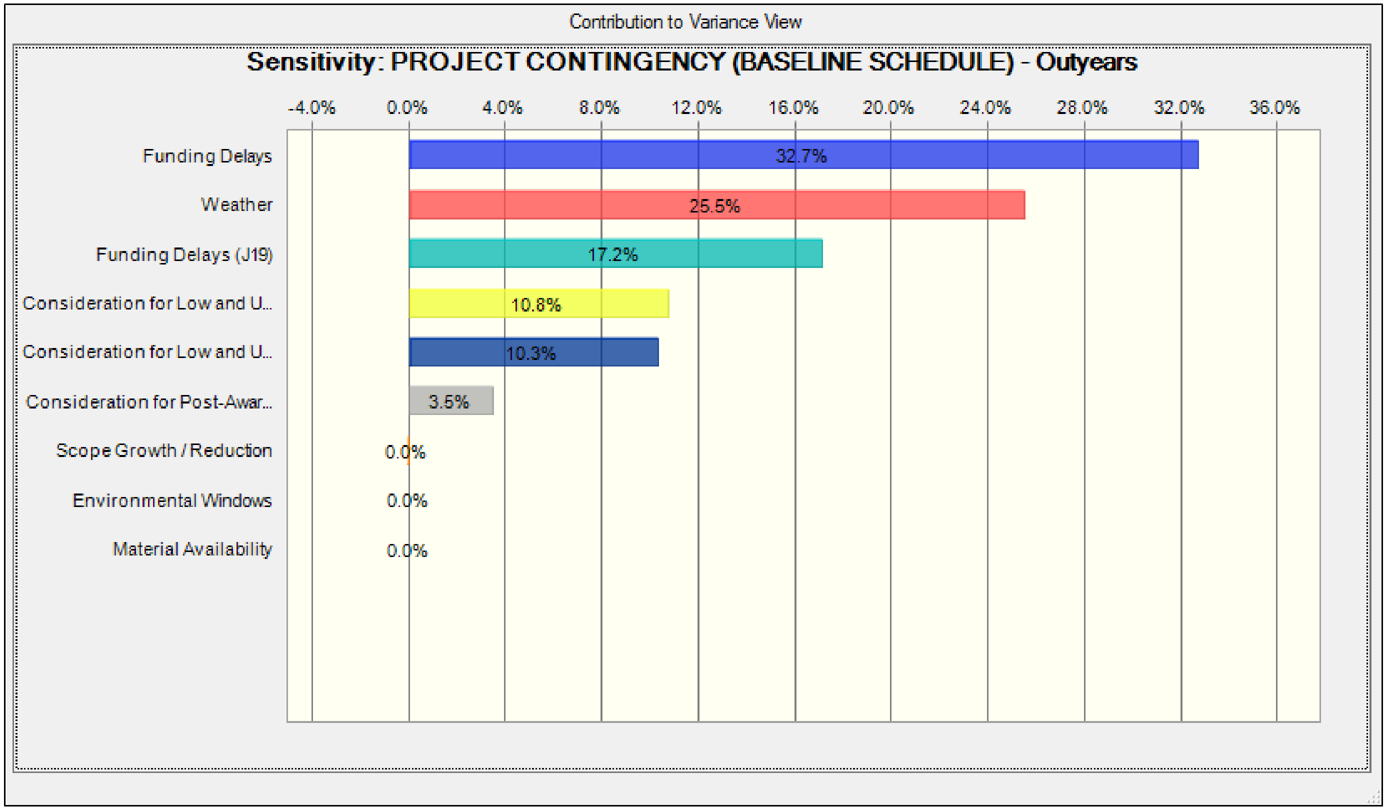


Figure 4. Schedule Sensitivity Analysis – Out-Years



7.0 MAJOR FINDINGS/OBSERVATIONS/RECOMMENDATIONS

This section provides a summary of significant risk analysis results that are identified in the preceding sections of the report. Risk analysis results are intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as projects progress through planning and implementation. Because of the potential for use of risk analysis results for such diverse purposes, this section also reiterates and highlights important steps, logic, key assumptions, limitations, and decisions to help ensure that the risk analysis results are appropriately interpreted.

7.1 Major Findings/Observations

Project cost comparison summaries are provided in Table 3 and Figure 3. Additional major findings and observations of the risk analysis are listed below.

1. For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

2. For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 62 percent of the statistical schedule variance.

3. For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 63 percent of the statistical cost variance.

4. For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

5. Operation and maintenance activities were not included in the cost estimate or schedules. Therefore, a full life cycle risk analysis could not be performed. Risk analysis results or conclusions could be significantly different if the necessary operation and maintenance activities were included.

Table 3. Project Cost Comparison Summary (Uncertainty Analysis)

Confidence Level	Project Cost ($)	Contingency ($)	Contingency (%)
P0	**$88,376,081**	**($25,152,656)**	**-22.16%**
P5	**$111,424,376**	**($2,104,361)**	**-1.85%**
P10	**$115,773,066**	**$2,244,328**	**1.98%**
P15	**$118,834,107**	**$5,305,370**	**4.67%**
P20	**$121,342,374**	**$7,813,636**	**6.88%**
P25	**$123,435,964**	**$9,907,227**	**8.73%**
P30	**$125,326,828**	**$11,798,090**	**10.39%**
P35	**$127,129,811**	**$13,601,073**	**11.98%**
P40	**$128,924,353**	**$15,395,615**	**13.56%**
P45	**$130,591,246**	**$17,062,509**	**15.03%**
P50	**$132,295,391**	**$18,766,653**	**16.53%**
P55	**$133,982,493**	**$20,453,756**	**18.02%**
P60	**$135,679,950**	**$22,151,212**	**19.51%**
P65	**$137,458,028**	**$23,929,290**	**21.08%**
P70	**$139,366,177**	**$25,837,439**	**22.76%**
P75	**$141,396,794**	**$27,868,057**	**24.55%**
P80	**$143,734,612**	**$30,205,874**	**26.61%**
P85	**$146,392,429**	**$32,863,692**	**28.95%**
P90	**$149,796,945**	**$36,268,207**	**31.95%**
P95	**$154,652,530**	**$41,123,792**	**36.22%**
P100	**$180,295,353**	**$66,766,615**	**58.81%**

Figure 3. Project Cost Summary (Uncertainty Analysis)

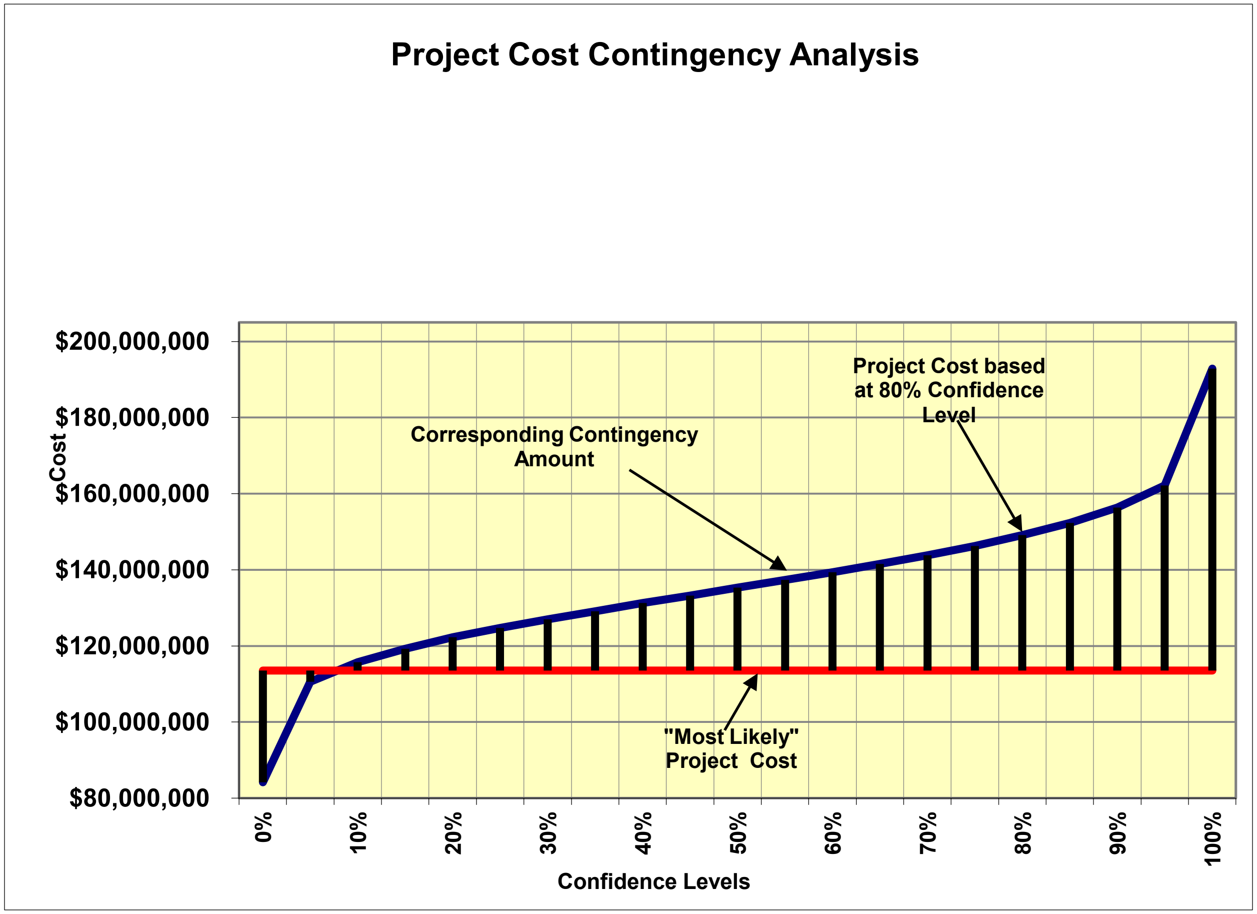
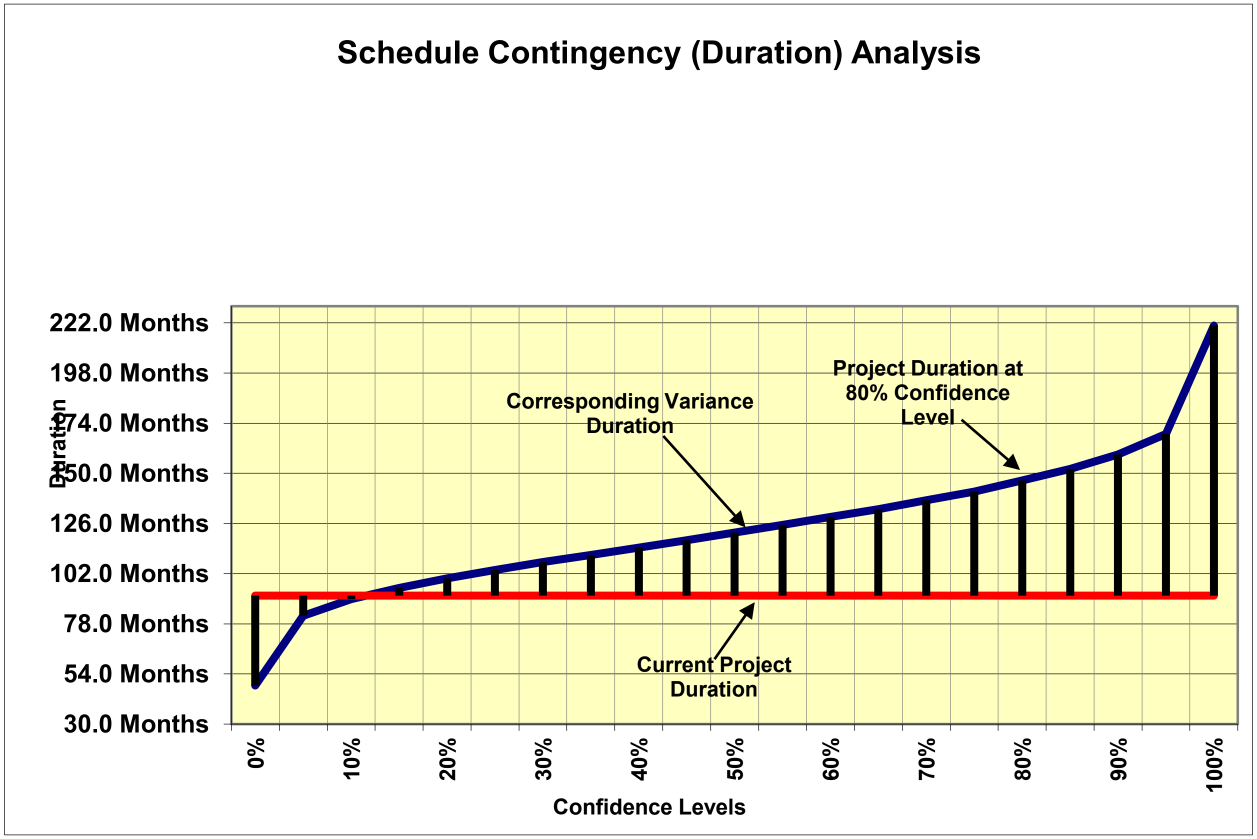


Figure 4. Project Duration Summary (Uncertainty Analysis)



7.2 Recommendations

Risk Management is an all-encompassing, iterative, and life-cycle process of project management. The Project Management Institute's (PMI) *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, *4th edition*, states that "project risk management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project." Risk identification and analysis are processes within the knowledge area of risk management. Its outputs pertinent to this effort include the risk register, risk quantification (risk analysis model), contingency report, and the sensitivity analysis.

The intended use of these outputs is implementation by the project leadership with respect to risk responses (such as mitigation) and risk monitoring and control. In short, the effectiveness of the project risk management effort requires that the proactive management of risks not conclude with the study completed in this report.

The Cost and Schedule Risk Analysis (CSRA) produced by the PDT identifies issues that require the development of subsequent risk response and mitigation plans. This section provides a list of recommendations for continued management of the risks identified and analyzed in this study. Note that this list is not all inclusive and should not substitute a formal risk management and response plan.

1. Key Cost Risk Drivers: For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 63 percent of the statistical cost variance.

a) Scope Growth/Reduction and Scope Definition: Although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

b) Fuel Prices: Dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

2. Key Schedule Risk Drivers: For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 62 percent of the statistical schedule variance.

For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

a) Funding Delays: The PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

b) Weather: The PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

3. Risk Management: Project leadership should use of the outputs created during the risk analysis effort as tools in future risk management processes. The risk register should be updated at each major project milestone. The results of the sensitivity analysis may also be used for response planning strategy and development. These tools should be used in conjunction with regular risk review meetings.

4. Risk Analysis Updates: Project leadership should review risk items identified in the original risk register and add others, as required, throughout the project life-cycle. Risks should be reviewed for status and reevaluation (using qualitative measure, at a minimum) and placed on risk management watch lists if any risk’s likelihood or impact significantly increases. Project leadership should also be mindful of the potential for secondary (new risks created specifically by the response to an original risk) and residual risks (risks that remain and have unintended impact following response).

APPENDIX A

SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Risk Level

Likelihood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	Low	Moderate	High	High	High
Likely	Low	Moderate	High	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Low	High

Impact or Consequence of Occurrence

Risk No.	Risk/Opportunity Event	Concerns	PDT Discussions & Conclusions	Project Cost			Project Schedule			Responsibility/POC	Affected Project Component
				Likelihood*	Impact*	Risk Level*	Likelihood*	Impact*	Risk Level*		
Contract Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)											
INTERNAL RISKS											
I-1	Scope Definition	Scope is fairly well defined for standard civil works features. There is also less uncertainty now than in the first CSRA iteration.	Scope may change based on permitting. The PDT has indicated that the scope definition would not impact the outyears dredging, and if anything, would reduce the structural additions in the initial nourishment.	LIKELY	Marginal	MODERATE	VERY Unlikely	MARGINAL	LOW	Project Manager/Planner	Project Cost & Schedule
I-2	Scope Growth / Reduction	Scope is fairly well defined for standard civil works features. However, there is the chance of experiencing scope growth or reduction due to erosion over time and funding limitations.	The pumping plant has potential of VE savings through better data and VE. While there is confidence in quantities for the initial nourishment, quantities for the out-year renourishments may change significantly.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Project Manager/Planner	Project Cost & Schedule
I-3	Equipment Availability/Pricing	Estimate assumes medium size hopper dredges will performed the subject work. Since this project is planned so far in advance and O&M is already on the industry's radar. The industry will plan accordingly. The contract could even be moved a few months forward to accommodate for the availability if the industry doesn't fit this profitable dredging job into their schedule.	Availability is not a problem. Based on passed similar projects within the area medium size hoppers were used, Panama City Beaches being the most recent.	LIKELY	MARGINAL	MODERATE	UNLIKELY	MARGINAL	LOW	Cost Engineering	Project Cost & Schedule
I-4	Material Availability	Borrow sources are provided and indicated on drawings. However, there may be more concern and risk in the out-year renourishments.	Per the design Engineer and based on current surveys, quality and quantity of beach fill material is available at all sites for the initial nourishment.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Design Engineer	Project Cost & Schedule
I-5	Fuel Prices	$3.45 per gallon was used in the September 2012 updated CEDEP Estimates. Increases in fuel prices will effect equipment and delivery or materials.	Fuel cost fluctuations can significantly impact dredging cost.	VERY LIKELY	SIGNIFICANT	HIGH	UNLIKELY	NEGLIGIBLE	LOW	Cost Engineering	Project Cost & Schedule
I-6	Permits	Permitting delays may occur due to Florida State policy. This is likely to impact the ultimate schedule more so than the costs.	This could impact the cost and schedule.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Planning/Regulatory	Project Cost & Schedule
I-7	Environmental Windows	Project site is a natural habitat for various species of threatened wildlife that utilize the project vicinity during Spring and Winter months.	Gulf sturgeon incidental takes during dredging and Sea Turtle and Bird Nesting may have Impact during Construction. There may also be unknown restrictions for the out-year renourishments.	LIKELY	SIGNIFICANT	HIGH	LIKELY	SIGNIFICANT	HIGH	Project Manager/Planner	Project Cost & Schedule
I-8	Acquisition Plan (Strategy)	The estimate was based on full and open competition, with minimal tiering of contractor subs.	The Acq Plan has not been finalized, therefore there is a potential for additional tiering of the contracts. Since this is dreding work, past experience will likely dictate the most cost effective methodology for contract procurement.	UNLIKELY	MARGINAL	LOW	UNLIKELY	MARGINAL	LOW	Acquisition Strategy Board	Project Cost & Schedule
I-9	VE Study	VE study will be performed prior to Final Feasibility Report.	This could impact the cost and schedule, but likely would not have significant impact.	UNLIKELY	MARGINAL	LOW	UNLIKELY	MARGINAL	LOW	Project Manager/Planner	Project Cost & Schedule
CONSTRUCTION RISKS											
INT-MOD	Consideration for Post-Award Construction Claims and Modifications	There is inherent risk of construction modifications and claims that arise after contract award due to issues such as weather, schedules dictated by O&M cycles, differing site conditions, user directed changes or omissions, inaccurate surveys, and variations in estimated quantities (minor).	Post-award construction contract modifications and claims could impact the ultimate contract costs and delay the overall schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule

	ESTIMATE AND SCHEDULE RISKS										
EST-1	Estimate Considerations	This item is added based on the ATR Cost review. The estimate makes no considerations for labor fluctuations, overtime, soil conditions, productivity, or fluctuating indirect costs (overhead). This is added to the CSRA model for consideration, as these issues may cause a cost variance.	Estimate assumptions may not accurately capture the ultimate costs, therefore this could have an impact either positively or negatively on the costs.	Likely	Significant	HIGH	Very Unlikely	Negligible	LOW	Project Manager/Planner	Project Cost & Schedule
	LOW AND UNKNOWN INTERNAL RISKS										
INT-1	Consideration for Low and Unknown Internal Risk	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns.	This could impact cost and schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule
	Programmatic Risks	(External Risk Items are those that are generated, caused, or controlled exclusively outside the PDT's sphere of influence.)									
E-1	Weather	Florida is subject to bad weather during Hurricane Season which can cause Schedule delays.	Weather days are generally incorporated into schedule.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	N/A	Project Cost & Schedule
E-2	Funding Delays	PM feels Adequate Congressional funding to complete project will be available, particularly for the initial nourishment. However, if the project is delayed, it could increase the quantities to be dredged and delay the overal schedule.	This could impact the cost and schedule for the outyear renourishment cycles.	LIKELY	MARGINAL	MODERATE	LIKELY	Significant	HIGH	Project Manager	Project Cost & Schedule
EXT-1	Consideration for Low and Unknown External Risk	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns.	This could impact cost and schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule

*Likelihood, Impact, and Risk Level to be verified through market research and analysis (conducted by cost engineer).

1. Risk/Opportunity identified with reference to the Risk Identification Checklist and through deliberation and study of the PDT.
2. Discussions and Concerns elaborates on Risk/Opportunity Events and includes any assumptions or findings (should contain information pertinent to eventual study and analysis of event's impact to project).
3. Likelihood is a measure of the probability of the event occurring -- **Very Unlikely**, **Unlikely**, **Moderately Likely**, **Likely**, **Very Likely.** The likelihood of the event will be the same for both Cost and Schedule, regardless of impact.
4. Impact is a measure of the event's effect on project objectives with relation to scope, cost, and/or schedule -- **Negligible**, **Marginal**, **Significant**, **Critical**, or **Crisis.** Impacts on Project Cost may vary in severity from impacts on Project Schedule.
5. Risk Level is the resultant of Likelihood and Impact **Low**, **Moderate**, or **High**. Refer to the matrix located at top of page.
6. Variance Distribution refers to the behavior of the individual risk item with respect to its potential effects on Project Cost and Schedule. For example, an item with clearly defined parameters and a solid most likely scenario would probably follow a triangular or normal distribution. A risk item for which the PDT has little data or probability of modeling with respect to effects on cost or schedule (i.e. "anyone's guess") would probably follow a uniform or discrete uniform distribution.
7. The responsibility or POC is the entity responsible as the Subject Matter Expert (SME) for action, monitoring, or information on the PDT for the identified risk or opportunity.
8. Correlation recognizes those risk events that may be related to one another. Care should be given to ensure the risks are handled correctly without a "double counting."
9. Affected Project Component identifies the specific item of the project to which the risk directly or strongly correlates.
10. Project Implications identifies whether or not the risk item affects project cost, project schedule, or both. The PDT is responsible for conducting studies for both Project Cost and for Project Schedule.
11. Results of the risk identification process are studied and further developed by the Cost Engineer, then analyzed through the Monte Carlo Analysis Method for Cost (Contingency) and Schedule (Escalation) Growth.

SAM - Walton County Storm Damage Reduction Project, GI Study - NE

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$113,528,738**
Baseline Estimate Cost Contingency Amount ->	$24,848,127
Baseline Estimate Construction Cost (80% Confidence) ->	**$138,376,864**

Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**35.7 Months**
Schedule Contingency Duration ->	55.0 Months
Project Schedule Duration (80% Confidence) ->	**90.7 Months**
Project Schedule Contingency Amount (80% Confidence) ->	**$5,357,747**

Project Contingency	80% Confidence Project Cost
Project Contingency Amount (80% Confidence) ->	**$30,205,874**
Project Contingency Percentage (80% Confidence) ->	**27%**

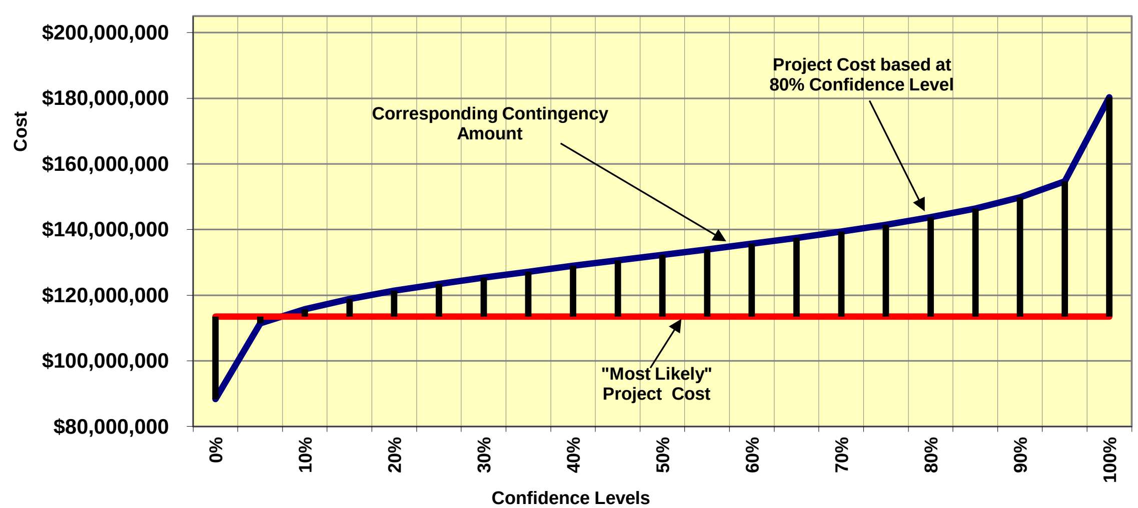
Project Cost (80% Confidence) ->	**$143,734,612**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$113,528,738		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$88,376,081	($25,152,656)	-22.16%
5%	$111,424,376	($2,104,361)	-1.85%
10%	$115,773,066	$2,244,328	1.98%
15%	$118,834,107	$5,305,370	4.67%
20%	$121,342,374	$7,813,636	6.88%
25%	$123,435,964	$9,907,227	8.73%
30%	$125,326,828	$11,798,090	10.39%
35%	$127,129,811	$13,601,073	11.98%
40%	$128,924,353	$15,395,615	13.56%
45%	$130,591,246	$17,062,509	15.03%
50%	$132,295,391	$18,766,653	16.53%
55%	$133,982,493	$20,453,756	18.02%
60%	$135,679,950	$22,151,212	19.51%
65%	$137,458,028	$23,929,290	21.08%
70%	$139,366,177	$25,837,439	22.76%
75%	$141,396,794	$27,868,057	24.55%
80%	$143,734,612	$30,205,874	26.61%
85%	$146,392,429	$32,863,692	28.95%
90%	$149,796,945	$36,268,207	31.95%
95%	$154,652,530	$41,123,792	36.22%
100%	$180,295,353	$66,766,615	58.81%

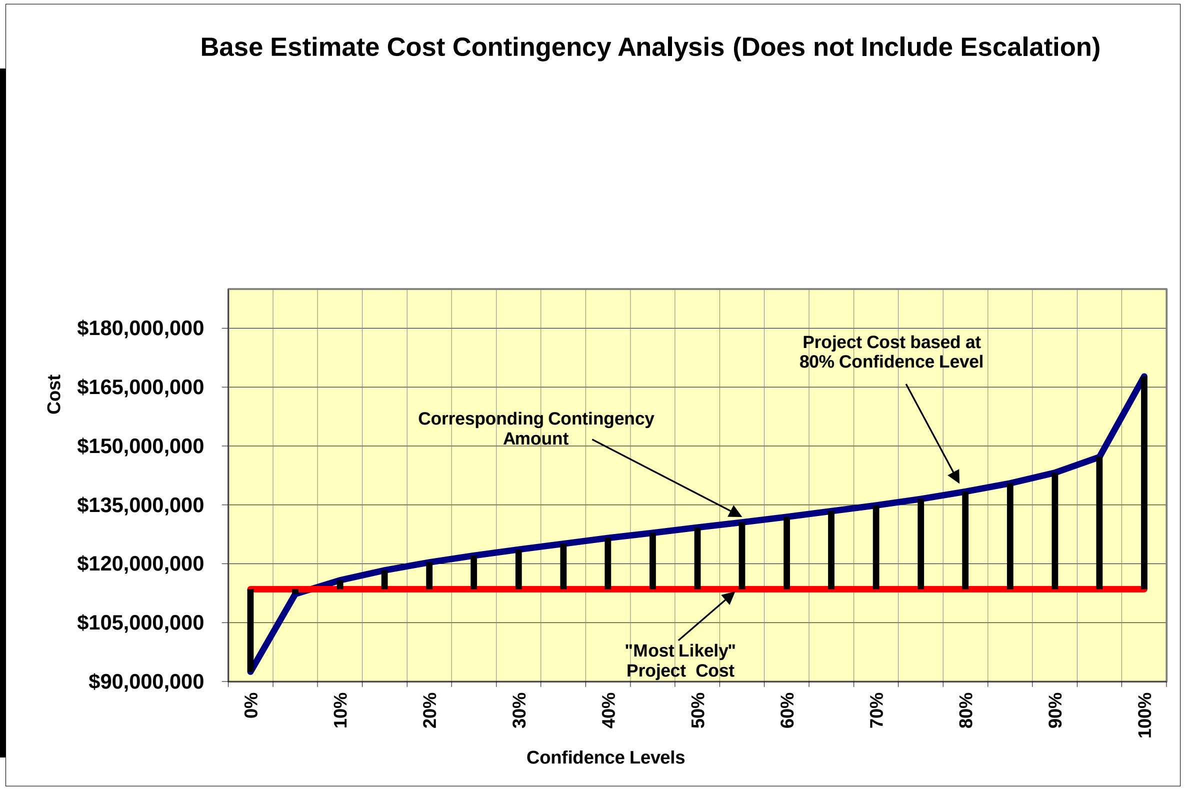
Project Cost Contingency Analysis



- BASE CONTINGENCY DEVELOPMENT -

Contingency Analysis

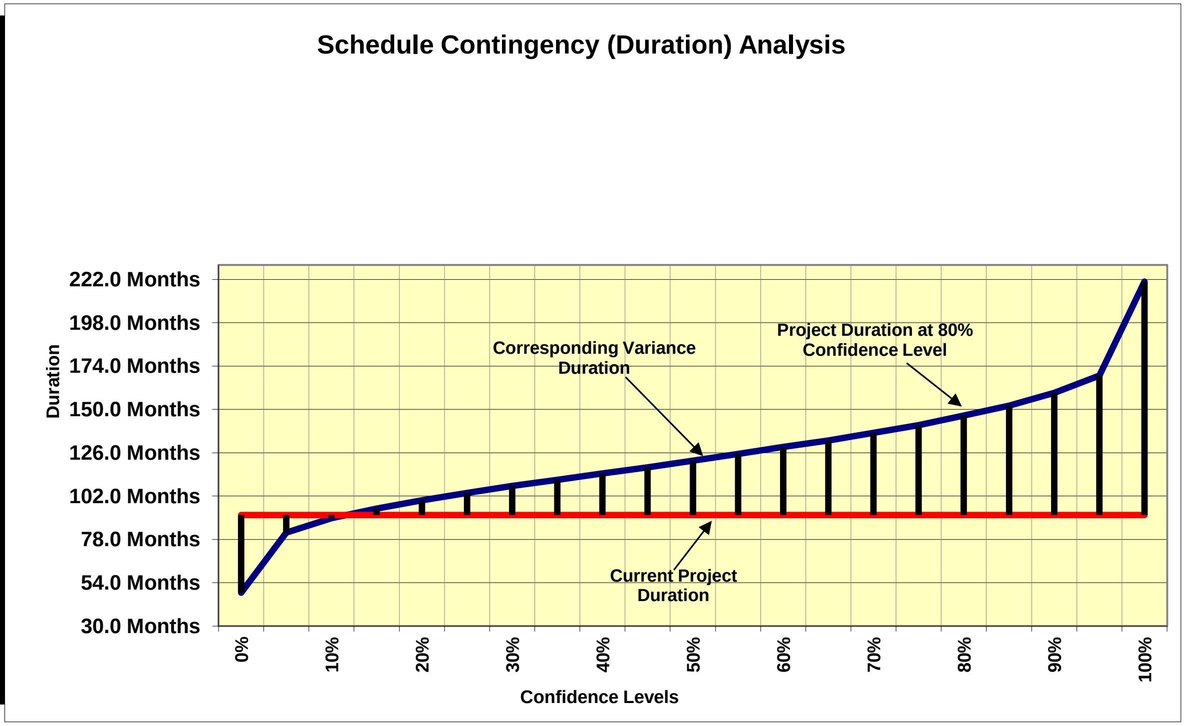
Most Likely Cost Estimate	$113,528,738		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$92,538,306	($20,990,432)	-18.49%
5%	$112,279,315	($1,249,422.81)	-1.10%
10%	$115,841,894	$2,313,156.44	2.04%
15%	$118,374,178	$4,845,440.09	4.27%
20%	$120,429,513	$6,900,774.95	6.08%
25%	$122,136,476	$8,607,738.29	7.58%
30%	$123,655,055	$10,126,316.99	8.92%
35%	$125,129,186	$11,600,448.36	10.22%
40%	$126,589,144	$13,060,406.58	11.50%
45%	$127,925,568	$14,396,830.09	12.68%
50%	$129,285,301	$15,756,563.19	13.88%
55%	$130,617,723	$17,088,985.55	15.05%
60%	$131,964,136	$18,435,397.99	16.24%
65%	$133,393,218	$19,864,480.71	17.50%
70%	$134,900,419	$21,371,681.66	18.82%
75%	$136,533,284	$23,004,546.62	20.26%
80%	$138,376,864	$24,848,126.71	21.89%
85%	$140,499,296	$26,970,558.52	23.76%
90%	$143,241,457	$29,712,719.58	26.17%
95%	$147,170,151	$33,641,413.85	29.63%
100%	$167,736,451	$54,207,713.86	47.75%



- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

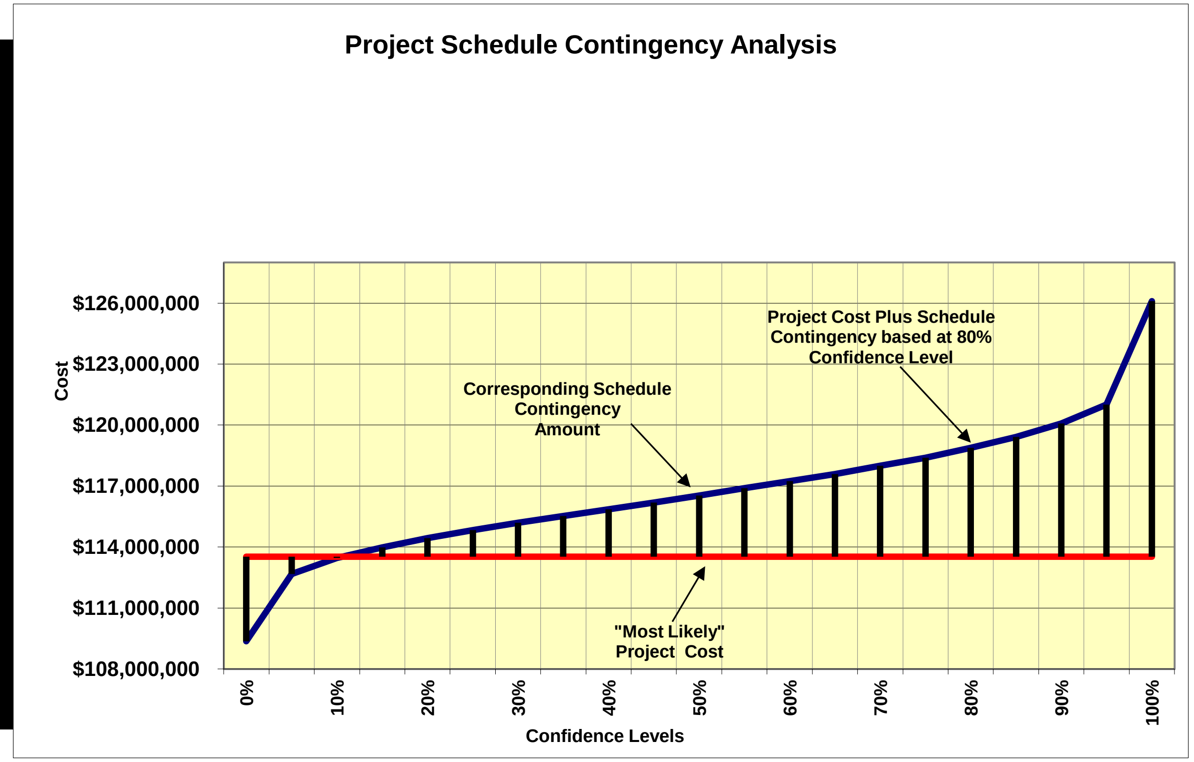
Most Likely Schedule Duration	91.6 Months		
Confidence Level	**Project Duration**	**Contingency**	**Contingency %**
0%	48.4 Months	-43.1 Months	-47.09%
5%	81.9 Months	-9.7 Months	-10.59%
10%	89.8 Months	-1.8 Months	-1.91%
15%	95.1 Months	3.6 Months	3.91%
20%	99.7 Months	8.2 Months	8.95%
25%	103.7 Months	12.1 Months	13.25%
30%	107.6 Months	16.0 Months	17.48%
35%	111.0 Months	19.4 Months	21.24%
40%	114.5 Months	22.9 Months	25.04%
45%	118.0 Months	26.4 Months	28.85%
50%	121.6 Months	30.0 Months	32.82%
55%	125.4 Months	33.8 Months	36.92%
60%	129.2 Months	37.6 Months	41.09%
65%	132.8 Months	41.3 Months	45.11%
70%	137.1 Months	45.5 Months	49.71%
75%	141.3 Months	49.7 Months	54.33%
80%	146.6 Months	55.0 Months	60.09%
85%	152.1 Months	60.6 Months	66.17%
90%	159.1 Months	67.5 Months	73.77%
95%	168.8 Months	77.2 Months	84.33%
100%	220.8 Months	129.2 Months	141.17%



- SCHEDULE CONTINGENCY (AMOUNT) DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$113,528,738		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$109,366,513	($4,162,225)	-3.67%
5%	$112,673,799	($854,938)	-0.75%
10%	$113,459,909	($68,828)	-0.06%
15%	$113,988,667	$459,930	0.41%
20%	$114,441,599	$912,861	0.80%
25%	$114,828,226	$1,299,488	1.14%
30%	$115,200,511	$1,671,774	1.47%
35%	$115,529,362	$2,000,625	1.76%
40%	$115,863,946	$2,335,209	2.06%
45%	$116,194,416	$2,665,679	2.35%
50%	$116,538,828	$3,010,090	2.65%
55%	$116,893,508	$3,364,770	2.96%
60%	$117,244,552	$3,715,814	3.27%
65%	$117,593,547	$4,064,809	3.58%
70%	$117,994,495	$4,465,757	3.93%
75%	$118,392,248	$4,863,510	4.28%
80%	$118,886,485	$5,357,747	4.72%
85%	$119,421,871	$5,893,133	5.19%
90%	$120,084,225	$6,555,487	5.77%
95%	$121,011,116	$7,482,378	6.59%
100%	$126,087,639	$12,558,901	11.06%



SAM - Walton County Storm Damage Reduction Project, GI Study - NE

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$43,215,813**
Baseline Estimate Cost Contingency Amount ->	$6,933,327
Baseline Estimate Construction Cost (80% Confidence) ->	**$50,149,140**

Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**18.3 Months**
Schedule Contingency Duration ->	10.1 Months
Project Schedule Duration (80% Confidence) ->	**28.4 Months**
Project Schedule Contingency Amount (80% Confidence) ->	**$1,908,809**

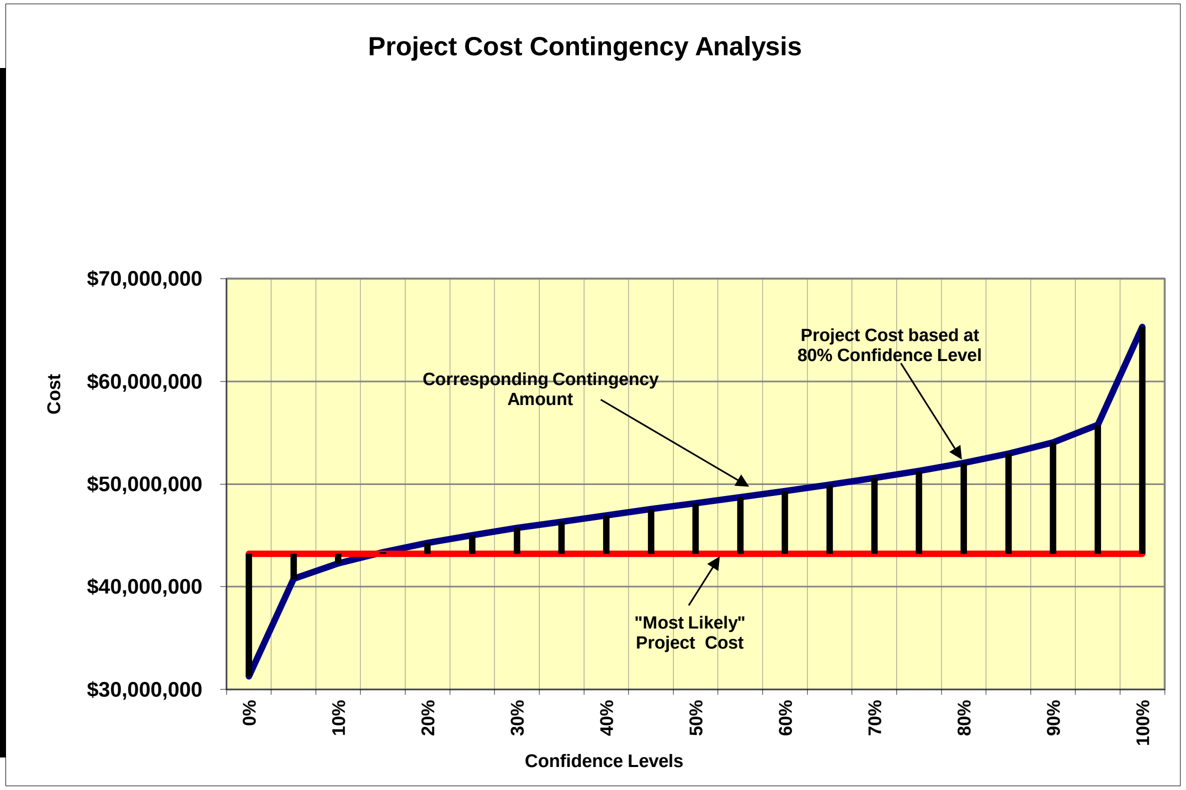
Project Contingency	80% Confidence Project Cost
Project Contingency Amount (80% Confidence) ->	**$8,842,136**
Project Contingency Percentage (80% Confidence) ->	**20%**

Project Cost (80% Confidence) ->	**$52,057,949**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

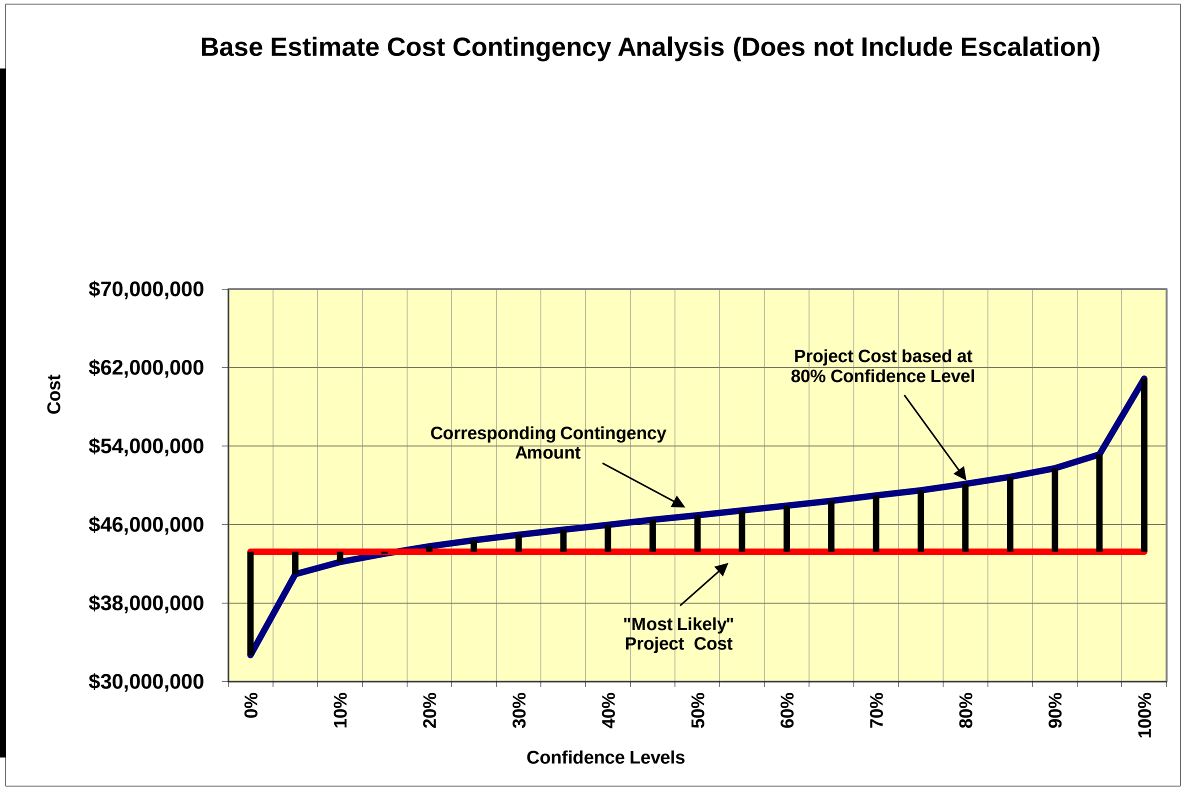
Most Likely Cost Estimate	$43,215,813		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$31,263,060	($11,952,753)	-27.66%
5%	$40,771,214	($2,444,599)	-5.66%
10%	$42,284,567	($931,245)	-2.15%
15%	$43,355,983	$140,171	0.32%
20%	$44,267,582	$1,051,770	2.43%
25%	$45,025,441	$1,809,628	4.19%
30%	$45,722,057	$2,506,244	5.80%
35%	$46,338,482	$3,122,669	7.23%
40%	$46,949,282	$3,733,470	8.64%
45%	$47,563,354	$4,347,541	10.06%
50%	$48,128,699	$4,912,886	11.37%
55%	$48,731,228	$5,515,415	12.76%
60%	$49,305,991	$6,090,179	14.09%
65%	$49,931,763	$6,715,951	15.54%
70%	$50,603,221	$7,387,408	17.09%
75%	$51,267,253	$8,051,440	18.63%
80%	$52,057,949	$8,842,136	20.46%
85%	$52,955,152	$9,739,340	22.54%
90%	$54,057,350	$10,841,537	25.09%
95%	$55,777,293	$12,561,480	29.07%
100%	$65,317,306	$22,101,493	51.14%



- BASE CONTINGENCY DEVELOPMENT -

Contingency Analysis

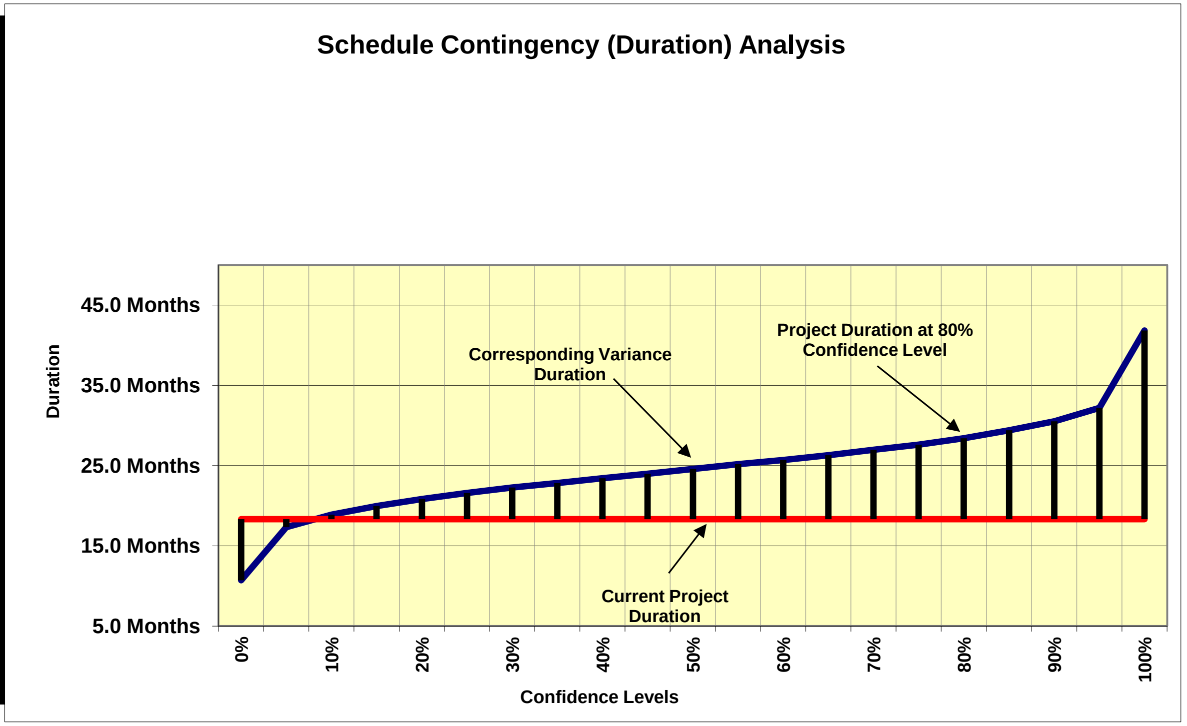
Most Likely Cost Estimate	$43,215,813		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$32,697,930	($10,517,883.00)	-24.34%
5%	$40,956,731	($2,259,081.53)	-5.23%
10%	$42,173,738	($1,042,074.28)	-2.41%
15%	$43,044,571	($171,241.42)	-0.40%
20%	$43,789,421	$573,607.96	1.33%
25%	$44,405,073	$1,189,260.24	2.75%
30%	$44,976,017	$1,760,204.02	4.07%
35%	$45,483,283	$2,267,470.50	5.25%
40%	$45,981,082	$2,765,269.03	6.40%
45%	$46,489,046	$3,273,233.48	7.57%
50%	$46,944,744	$3,728,931.79	8.63%
55%	$47,435,325	$4,219,512.04	9.76%
60%	$47,912,788	$4,696,975.69	10.87%
65%	$48,426,166	$5,210,353.01	12.06%
70%	$48,967,200	$5,751,387.49	13.31%
75%	$49,507,860	$6,292,047.38	14.56%
80%	$50,149,140	$6,933,327.50	16.04%
85%	$50,863,667	$7,647,854.74	17.70%
90%	$51,750,010	$8,534,197.79	19.75%
95%	$53,159,922	$9,944,108.96	23.01%
100%	$60,879,277	$17,663,464.11	40.87%



- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

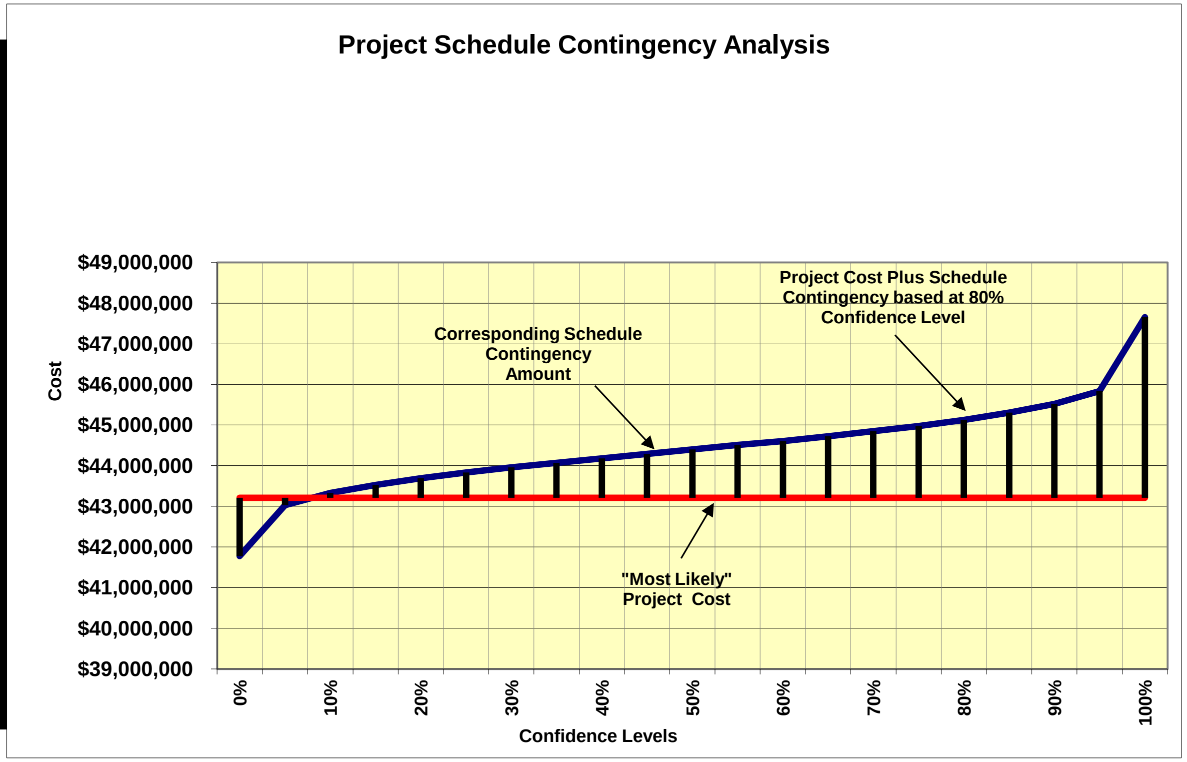
Most Likely Schedule Duration	18.3 Months		
Confidence Level	**Project Duration**	**Contingency**	**Contingency %**
0%	10.7 Months	-7.6 Months	-41.50%
5%	17.3 Months	-1.0 Months	-5.37%
10%	18.9 Months	0.6 Months	3.21%
15%	20.0 Months	1.6 Months	9.01%
20%	20.8 Months	2.5 Months	13.83%
25%	21.6 Months	3.3 Months	17.94%
30%	22.3 Months	4.0 Months	21.58%
35%	22.8 Months	4.5 Months	24.74%
40%	23.4 Months	5.1 Months	28.00%
45%	24.0 Months	5.7 Months	31.07%
50%	24.6 Months	6.3 Months	34.25%
55%	25.2 Months	6.9 Months	37.48%
60%	25.7 Months	7.4 Months	40.30%
65%	26.3 Months	8.0 Months	43.55%
70%	27.0 Months	8.7 Months	47.32%
75%	27.6 Months	9.3 Months	50.89%
80%	28.4 Months	10.1 Months	55.21%
85%	29.4 Months	11.1 Months	60.50%
90%	30.5 Months	12.2 Months	66.74%
95%	32.2 Months	13.9 Months	75.71%
100%	41.8 Months	23.5 Months	128.37%



- SCHEDULE CONTINGENCY (AMOUNT) DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$43,215,813		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$41,780,943	($1,434,870)	-3.32%
5%	$43,030,296	($185,517)	-0.43%
10%	$43,326,642	$110,829	0.26%
15%	$43,527,225	$311,412	0.72%
20%	$43,693,974	$478,162	1.11%
25%	$43,836,181	$620,368	1.44%
30%	$43,961,853	$746,040	1.73%
35%	$44,071,011	$855,199	1.98%
40%	$44,184,013	$968,200	2.24%
45%	$44,290,120	$1,074,308	2.49%
50%	$44,399,767	$1,183,954	2.74%
55%	$44,511,715	$1,295,903	3.00%
60%	$44,609,016	$1,393,203	3.22%
65%	$44,721,410	$1,505,598	3.48%
70%	$44,851,833	$1,636,021	3.79%
75%	$44,975,206	$1,759,393	4.07%
80%	$45,124,621	$1,908,809	4.42%
85%	$45,307,298	$2,091,485	4.84%
90%	$45,523,152	$2,307,339	5.34%
95%	$45,833,184	$2,617,371	6.06%
100%	$47,653,842	$4,438,029	10.27%



SAM - Walton County Storm Damage Reduction Project, GI Study - NE

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$70,312,925**
Baseline Estimate Cost Contingency Amount ->	$17,914,799
Baseline Estimate Construction Cost (80% Confidence) ->	**$88,227,724**

Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**18.3 Months**
Schedule Contingency Duration ->	44.9 Months
Project Schedule Duration (80% Confidence) ->	**63.2 Months**
Project Schedule Contingency Amount (80% Confidence) ->	**$3,448,939**

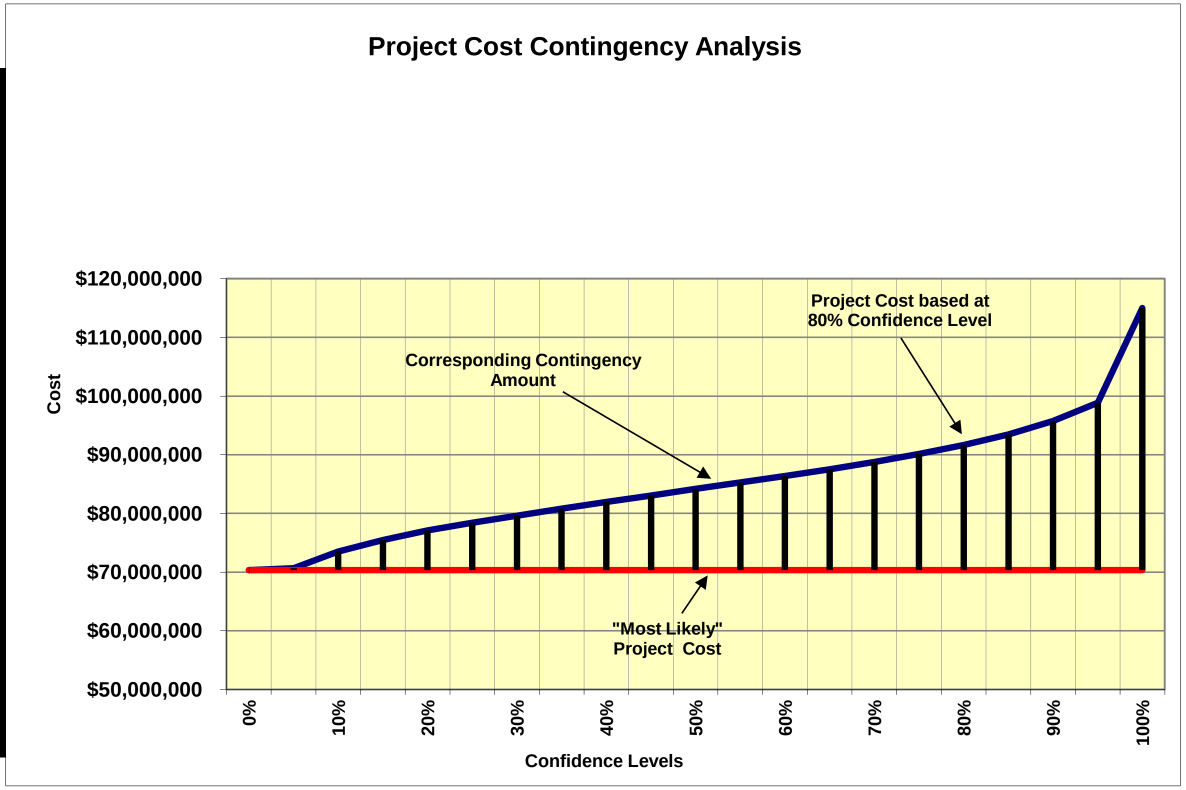
Project Contingency	80% Confidence Project Cost
Project Contingency Amount (80% Confidence) ->	**$21,363,738**
Project Contingency Percentage (80% Confidence) ->	**30%**

Project Cost (80% Confidence) ->	**$91,676,663**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

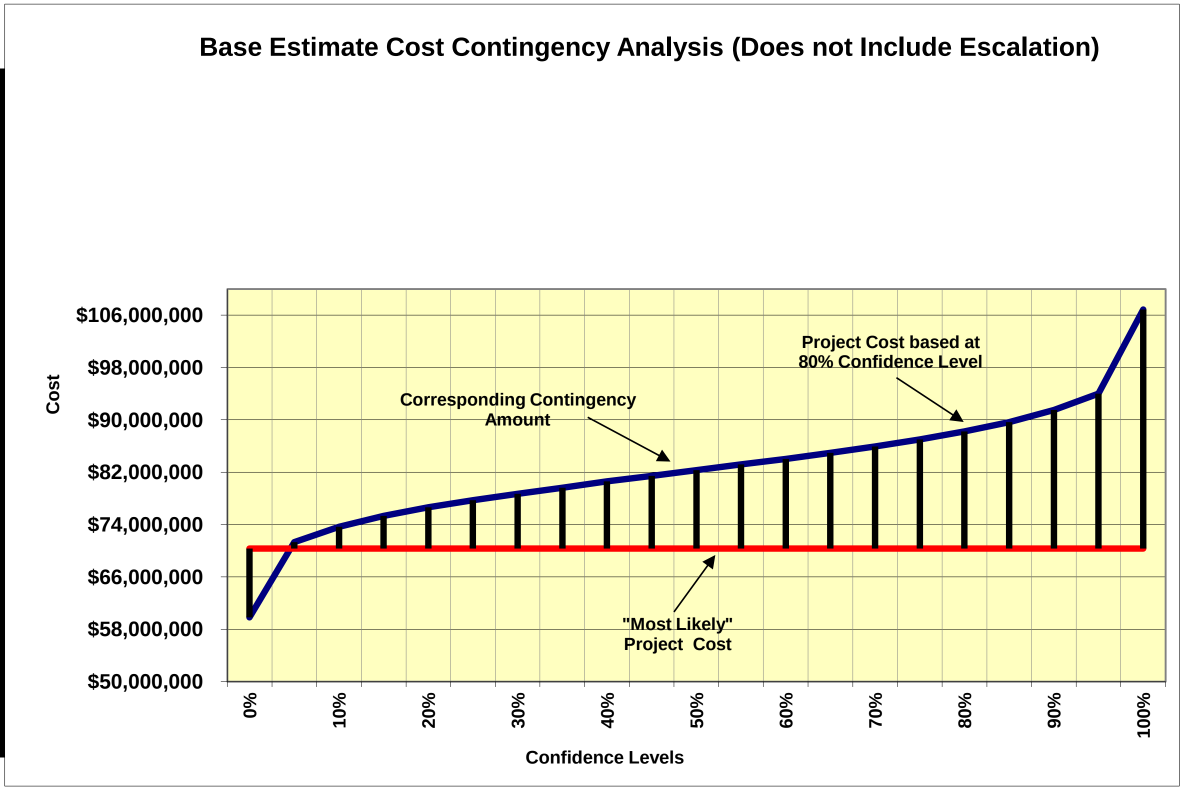
Most Likely Cost Estimate	$70,312,925		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$70,312,925	($13,199,904)	0.00%
5%	$70,653,162	$340,237	0.48%
10%	$73,488,498	$3,175,573	4.52%
15%	$75,478,124	$5,165,199	7.35%
20%	$77,074,792	$6,761,867	9.62%
25%	$78,410,523	$8,097,598	11.52%
30%	$79,604,771	$9,291,846	13.21%
35%	$80,791,329	$10,478,404	14.90%
40%	$81,975,071	$11,662,146	16.59%
45%	$83,027,893	$12,714,968	18.08%
50%	$84,166,693	$13,853,768	19.70%
55%	$85,251,266	$14,938,341	21.25%
60%	$86,373,959	$16,061,034	22.84%
65%	$87,526,264	$17,213,339	24.48%
70%	$88,762,956	$18,450,031	26.24%
75%	$90,129,541	$19,816,616	28.18%
80%	$91,676,663	$21,363,738	30.38%
85%	$93,437,277	$23,124,352	32.89%
90%	$95,739,595	$25,426,670	36.16%
95%	$98,875,237	$28,562,312	40.62%
100%	$114,978,047	$44,665,122	63.52%



- BASE CONTINGENCY DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$70,312,925		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$59,840,376	($10,472,548.90)	-14.89%
5%	$71,322,584	$1,009,658.72	1.44%
10%	$73,668,156	$3,355,230.72	4.77%
15%	$75,329,607	$5,016,681.51	7.13%
20%	$76,640,092	$6,327,166.99	9.00%
25%	$77,731,403	$7,418,478.05	10.55%
30%	$78,679,038	$8,366,112.97	11.90%
35%	$79,645,903	$9,332,977.86	13.27%
40%	$80,608,063	$10,295,137.55	14.64%
45%	$81,436,522	$11,123,596.62	15.82%
50%	$82,340,556	$12,027,631.40	17.11%
55%	$83,182,399	$12,869,473.51	18.30%
60%	$84,051,347	$13,738,422.30	19.54%
65%	$84,967,053	$14,654,127.70	20.84%
70%	$85,933,219	$15,620,294.18	22.22%
75%	$87,025,424	$16,712,499.24	23.77%
80%	$88,227,724	$17,914,799.21	25.48%
85%	$89,635,629	$19,322,703.78	27.48%
90%	$91,491,447	$21,178,521.79	30.12%
95%	$94,010,230	$23,697,304.89	33.70%
100%	$106,857,175	$36,544,249.75	51.97%

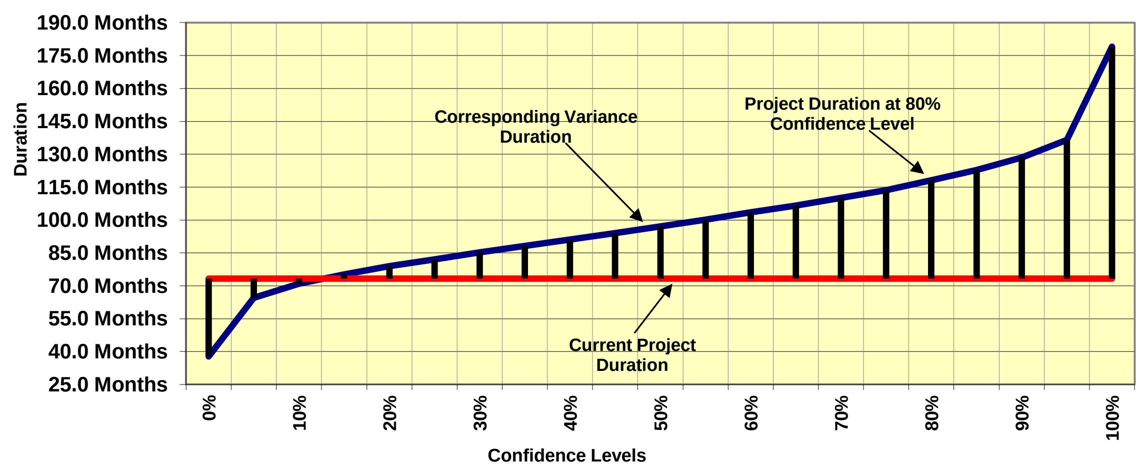


- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

Most Likely Schedule Duration	73.2 Months		
Confidence Level	**Project Duration**	**Contingency**	**Contingency %**
0%	**37.7 Months**	**-35.5 Months**	**-48.49%**
5%	**64.5 Months**	**-8.7 Months**	**-11.90%**
10%	**70.9 Months**	**-2.3 Months**	**-3.19%**
15%	**75.2 Months**	**1.9 Months**	**2.64%**
20%	**78.9 Months**	**5.7 Months**	**7.73%**
25%	**82.1 Months**	**8.8 Months**	**12.07%**
30%	**85.3 Months**	**12.1 Months**	**16.46%**
35%	**88.2 Months**	**14.9 Months**	**20.36%**
40%	**91.0 Months**	**17.8 Months**	**24.30%**
45%	**94.0 Months**	**20.7 Months**	**28.29%**
50%	**97.0 Months**	**23.8 Months**	**32.46%**
55%	**100.2 Months**	**26.9 Months**	**36.78%**
60%	**103.5 Months**	**30.2 Months**	**41.29%**
65%	**106.6 Months**	**33.3 Months**	**45.50%**
70%	**110.1 Months**	**36.8 Months**	**50.31%**
75%	**113.7 Months**	**40.4 Months**	**55.18%**
80%	**118.1 Months**	**44.9 Months**	**61.31%**
85%	**122.7 Months**	**49.5 Months**	**67.58%**
90%	**128.6 Months**	**55.3 Months**	**75.52%**
95%	**136.6 Months**	**63.3 Months**	**86.49%**
100%	**179.0 Months**	**105.7 Months**	**144.37%**

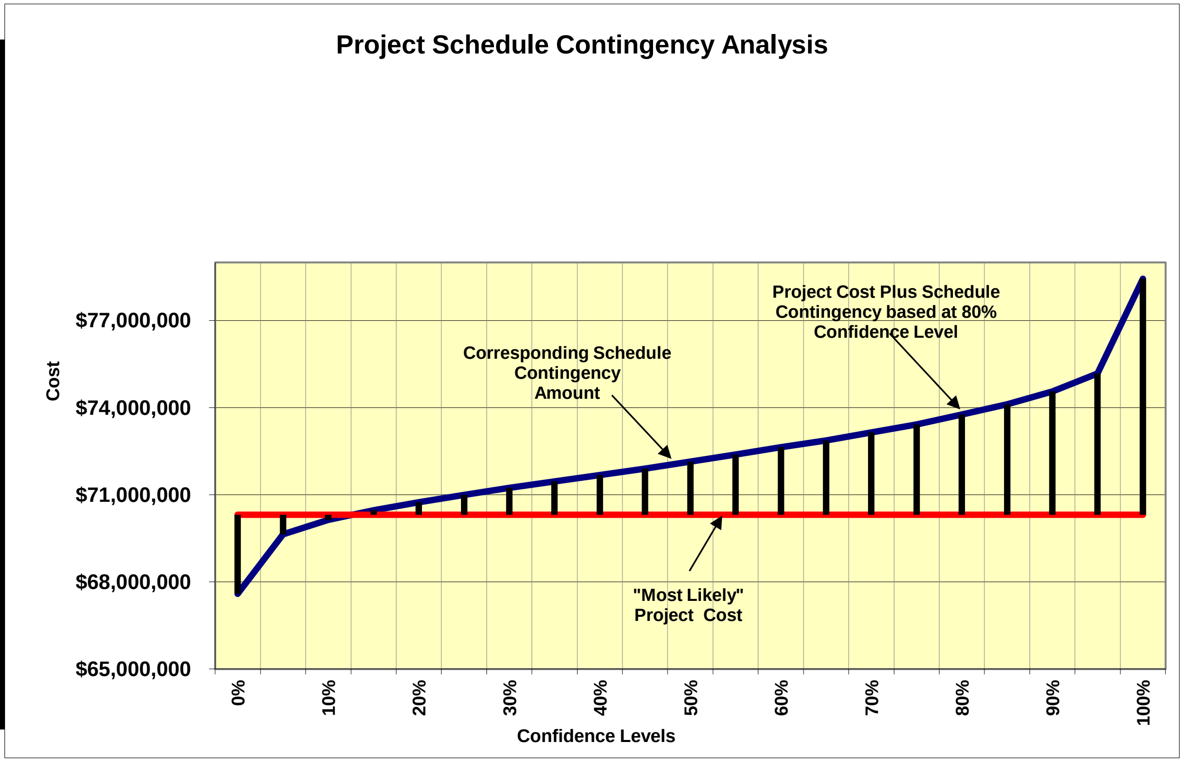
Schedule Contingency (Duration) Analysis



- SCHEDULE CONTINGENCY (AMOUNT) DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$70,312,925		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$67,585,570	($2,727,355)	-3.88%
5%	$69,643,504	($669,421)	-0.95%
10%	$70,133,268	($179,657)	-0.26%
15%	$70,461,443	$148,518	0.21%
20%	$70,747,625	$434,700	0.62%
25%	$70,992,045	$679,120	0.97%
30%	$71,238,658	$925,733	1.32%
35%	$71,458,351	$1,145,426	1.63%
40%	$71,679,933	$1,367,008	1.94%
45%	$71,904,296	$1,591,371	2.26%
50%	$72,139,061	$1,826,136	2.60%
55%	$72,381,792	$2,068,867	2.94%
60%	$72,635,536	$2,322,611	3.30%
65%	$72,872,137	$2,559,212	3.64%
70%	$73,142,662	$2,829,737	4.02%
75%	$73,417,042	$3,104,117	4.41%
80%	$73,761,864	$3,448,939	4.91%
85%	$74,114,573	$3,801,648	5.41%
90%	$74,561,073	$4,248,148	6.04%
95%	$75,177,932	$4,865,007	6.92%
100%	$78,433,797	$8,120,872	11.55%



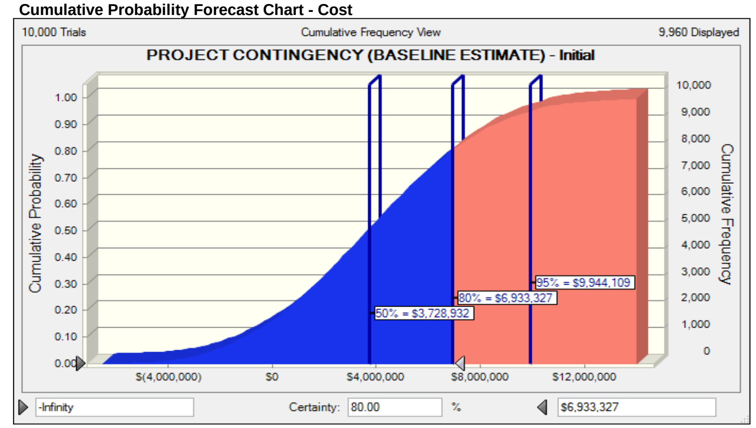
SAM - Walton County Storm Damage Reduction Project, GI Study - NED

								Crystal Ball Simulation							
		Project Cost						Expected Values ($$$)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM INTERNAL RISKS														
I-1	Scope Definition	LIKELY	SIGNIFICANT	HIGH	Yes-No/Uniform	I-2	65%	$ (1,048,500)	$ -	$ -	$ -	*Correlated to Risk I-2 by a factor of 0.75*	-2.43%	0.00%	0.00%
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform	I-1	100%	$ (2,160,791)	$ -	$ 4,321,581	$ -	*Correlated to Risk I-1 by a factor of 0.75*	-5.00%	0.00%	10.00%
I-5	Fuel Prices	VERY LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ (1,407,390)	$ -	$ 4,811,310	$ -		-3.26%	0.00%	11.13%
I-6	Permits	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ -	$ -	$ 2,032,039	$ -		0.00%	0.00%	4.70%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	Moderate	Triangular		100%	$ -	$ -	$ 1,219,223	$ -		0.00%	0.00%	2.82%
	ESTIMATE AND SCHEDULE RISKS														
EST-1	Estimate Considerations	Likely	Significant	HIGH	Triangular		100%	$ (2,032,039)	$ -	$ 2,032,039	$ -		-4.70%	0.00%	4.70%
	LOW AND UNKNOWN INTERNAL RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (2,032,039)	$ -	$ 2,032,039	$ -		-4.70%	0.00%	4.70%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ (1,219,223)	$ -	$ 2,032,039	$ -		-2.82%	0.00%	4.70%
E-2	Funding Delays	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*The original risk register and current assumption indicate this is not high risk for the initial activity, but is for the out-years*	N/A	N/A	N/A
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (2,032,039)	$ -	$ 2,032,039	$ -		-4.70%	0.00%	4.70%
											$ -				

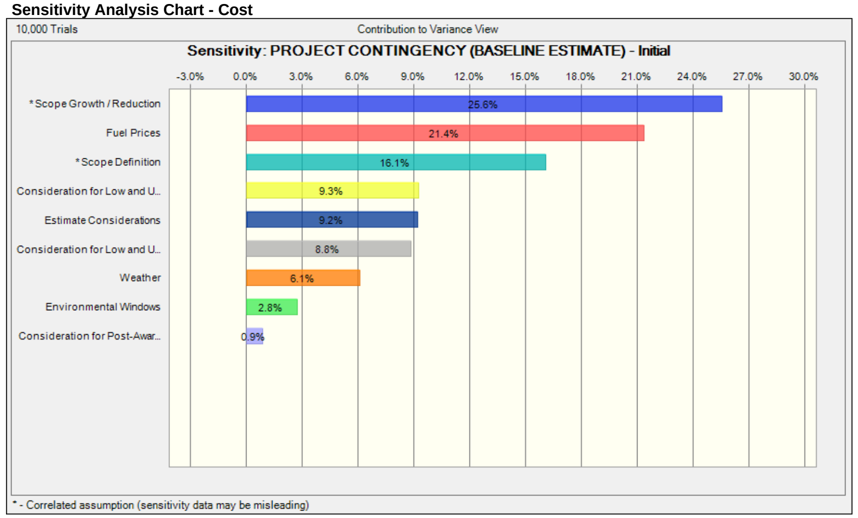
Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	$43,215,813	($10,517,883)	**$32,697,930**	**-24.34%**
	5%	$43,215,813	($2,259,082)	**$40,956,731**	**-5.23%**
	10%	$43,215,813	($1,042,074)	**$42,173,738**	**-2.41%**
	15%	$43,215,813	($171,241)	**$43,044,571**	**-0.40%**
	20%	$43,215,813	$573,608	**$43,789,421**	**1.33%**
	25%	$43,215,813	$1,189,260	**$44,405,073**	**2.75%**
	30%	$43,215,813	$1,760,204	**$44,976,017**	**4.07%**
	35%	$43,215,813	$2,267,471	**$45,483,283**	**5.25%**
	40%	$43,215,813	$2,765,269	**$45,981,082**	**6.40%**
	45%	$43,215,813	$3,273,233	**$46,489,046**	**7.57%**
	50%	$43,215,813	$3,728,932	**$46,944,744**	**8.63%**
	55%	$43,215,813	$4,219,512	**$47,435,325**	**9.76%**
	60%	$43,215,813	$4,696,976	**$47,912,788**	**10.87%**
	65%	$43,215,813	$5,210,353	**$48,426,166**	**12.06%**
	70%	$43,215,813	$5,751,387	**$48,967,200**	**13.31%**
	75%	$43,215,813	$6,292,047	**$49,507,860**	**14.56%**
	80%	$43,215,813	$6,933,327	**$50,149,140**	**16.04%**
	85%	$43,215,813	$7,647,855	**$50,863,667**	**17.70%**
	90%	$43,215,813	$8,534,198	**$51,750,010**	**19.75%**
	95%	$43,215,813	$9,944,109	**$53,159,922**	**23.01%**
	100%	$43,215,813	$17,663,464	**$60,879,277**	**40.87%**

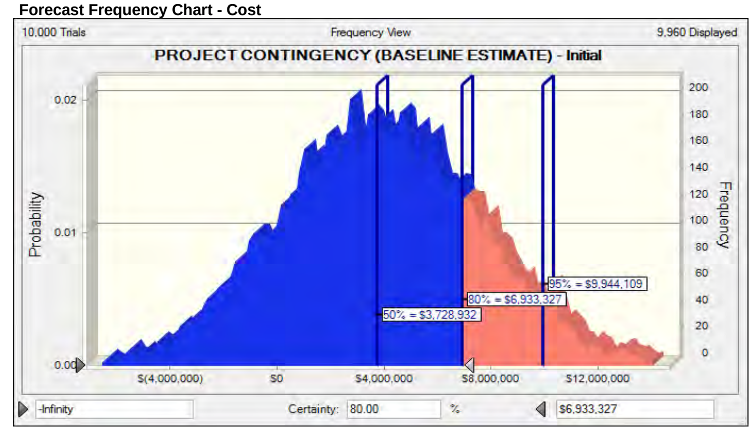
Cumulative Probability Forecast Chart - Cost



Sensitivity Analysis Chart - Cost



Forecast Frequency Chart - Cost



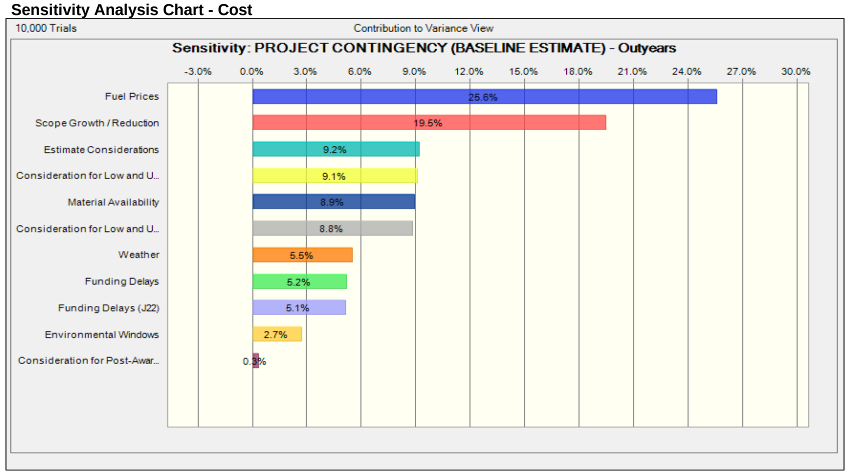
SAM - Walton County Storm Damage Reduction Project, GI Study - NED

								Crystal Ball Simulation							
		Project Cost						Expected Values ($$$)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM INTERNAL RISKS														
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform	I-1	100%	$ (3,515,646)	$ -	$ 7,031,293	$ -		-5.00%	0.00%	10.00%
I-4	Material Availability	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ -	$ -	$ 6,657,000	$ -		0.00%	0.00%	9.47%
I-5	Fuel Prices	VERY LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ (1,997,100)	$ -	$ 9,319,800	$ -		-2.84%	0.00%	13.25%
I-6	Permits	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ -	$ -	$ 3,333,235	$ -		0.00%	0.00%	4.74%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	Moderate	Triangular		100%	$ -	$ -	$ 1,499,956	$ -		0.00%	0.00%	2.13%
	ESTIMATE AND SCHEDULE RISKS														
EST-1	Estimate Considerations	Likely	Significant	HIGH	Triangular		100%	$ (3,333,235)	$ -	$ 3,333,235	$ -		-4.74%	0.00%	4.74%
	LOW AND UNKNOWN INTERNAL RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (3,333,235)	$ -	$ 3,333,235	$ -		-4.74%	0.00%	4.74%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ (1,999,941)	$ -	$ 3,333,235	$ -		-2.84%	0.00%	4.74%
E-2	Funding Delays	LIKELY	MARGINAL	MODERATE	Yes-No/Triangular		65%	$ -	$ -	$ 8,080,330	$ -		0.00%	0.00%	11.49%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (3,333,235)	$ -	$ 3,333,235	$ -		-4.74%	0.00%	4.74%
											$ -				

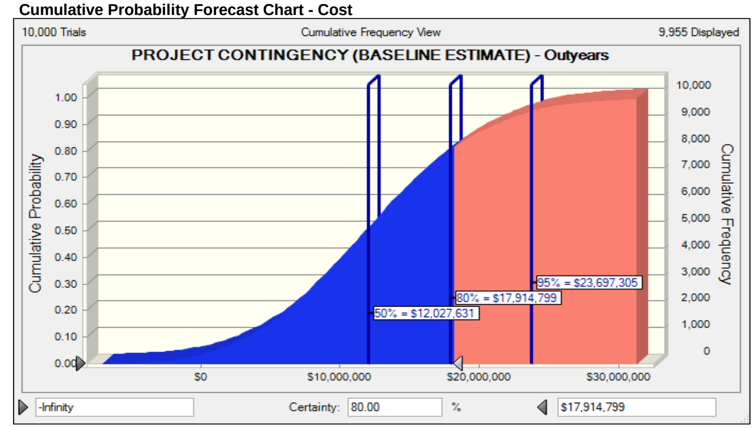
Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	$70,312,925	($10,472,549)	**$59,840,376**	**-14.89%**
	5%	$70,312,925	$1,009,659	**$71,322,584**	**1.44%**
	10%	$70,312,925	$3,355,231	**$73,668,156**	**4.77%**
	15%	$70,312,925	$5,016,682	**$75,329,607**	**7.13%**
	20%	$70,312,925	$6,327,167	**$76,640,092**	**9.00%**
	25%	$70,312,925	$7,418,478	**$77,731,403**	**10.55%**
	30%	$70,312,925	$8,366,113	**$78,679,038**	**11.90%**
	35%	$70,312,925	$9,332,978	**$79,645,903**	**13.27%**
	40%	$70,312,925	$10,295,138	**$80,608,063**	**14.64%**
	45%	$70,312,925	$11,123,597	**$81,436,522**	**15.82%**
	50%	$70,312,925	$12,027,631	**$82,340,556**	**17.11%**
	55%	$70,312,925	$12,869,474	**$83,182,399**	**18.30%**
	60%	$70,312,925	$13,738,422	**$84,051,347**	**19.54%**
	65%	$70,312,925	$14,654,128	**$84,967,053**	**20.84%**
	70%	$70,312,925	$15,620,294	**$85,933,219**	**22.22%**
	75%	$70,312,925	$16,712,499	**$87,025,424**	**23.77%**
	80%	$70,312,925	$17,914,799	**$88,227,724**	**25.48%**
	85%	$70,312,925	$19,322,704	**$89,635,629**	**27.48%**
	90%	$70,312,925	$21,178,522	**$91,491,447**	**30.12%**
	95%	$70,312,925	$23,697,305	**$94,010,230**	**33.70%**
	100%	$70,312,925	$36,544,250	**$106,857,175**	**51.97%**

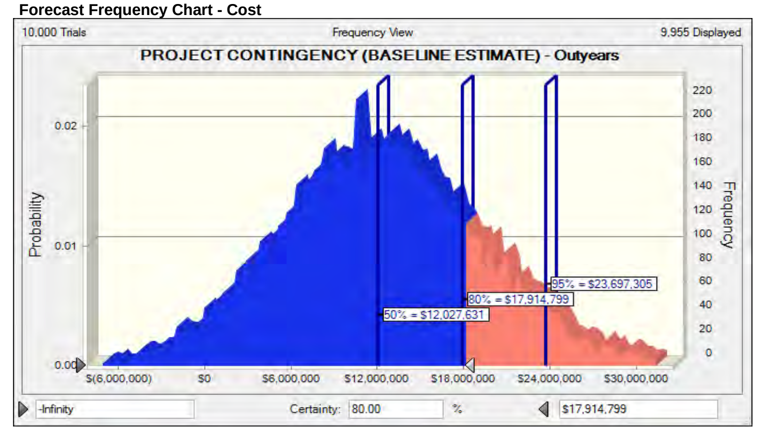
Sensitivity Analysis Chart - Cost



Cumulative Probability Forecast Chart - Cost



Forecast Frequency Chart - Cost



USACE Mobile District District
SAM - Walton County Storm Damage Reduction Project, GI Study - NED

CWWBS No.	Project Cost
01 Lands and Damages	$543,000.00
17 Dredging	$100,086,464.41
17 Beach Work	$4,194,000.00
17 Planting	$2,875,000.00
17 Environmental	$450,000.00
30 Planning, Engineering, and Design	$3,228,163.93
31 Construction Management	$2,152,109.29
Total	$113,528,737.63

Category	Project Cost
Labor Cost	$2,106,212.35
Equipment Cost	$3,253,684.51
Material Cost	$0.00
Sub Bid Cost	$5,269,000.00
User Cost	$95,400,460.00
Direct Cost	$106,029,356.86
Contract Cost	$107,605,464.41
Project Cost	$113,528,737.63

Initial - 2014	Project Cost
01 Lands and Damages	$543,000.00
17 Hopper Dredging	$33,421,773.93
17 Beach & Dune Planting	$2,875,000.00
17 Beach Work Items	$4,194,000.00
17 Environmental	$150,000.00
30 Planning, Engineering, and Design	$1,219,223.22
31 Construction Management	$812,815.48
Total	$43,215,812.63

Out-Years 2024, 2034, 2044, 2054	Project Cost
17 Hopper Dredging	$16,666,172.62
17 Environmental	$75,000.00
30 Planning, Engineering, and Design	$502,235.18
31 Construction Management	$334,823.45
Total	$17,578,231.25

SAM - Walton County Storm Damage Reduction Project, GI Study - NED

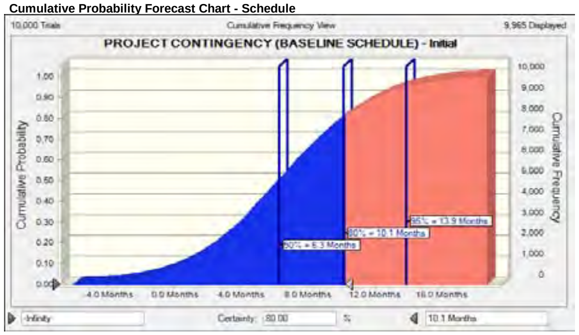
								Crystal Ball Simulation							
		Project Schedule						Expected Values (Months)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM MGMT														
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform		100%	-4.0 Months	0.0 Months	6.0 Months	0.0 Months		-21.85%	0.00%	32.77%
I-6	Permits	LIKELY	MARGINAL	MODERATE	Triangular		100%	0.0 Months	0.0 Months	6.0 Months	0.0 Months		0.00%	0.00%	32.77%
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	MODERATE	Triangular		100%	0.0 Months	0.0 Months	3.0 Months	0.0 Months		0.00%	0.00%	16.38%
	ECONOMICS RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	6.0 Months	0.0 Months		-16.38%	0.00%	32.77%
E-2	Funding Delays	LIKELY	Significant	HIGH	Yes-No/Uniform		65%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
											0.0 Months				

Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

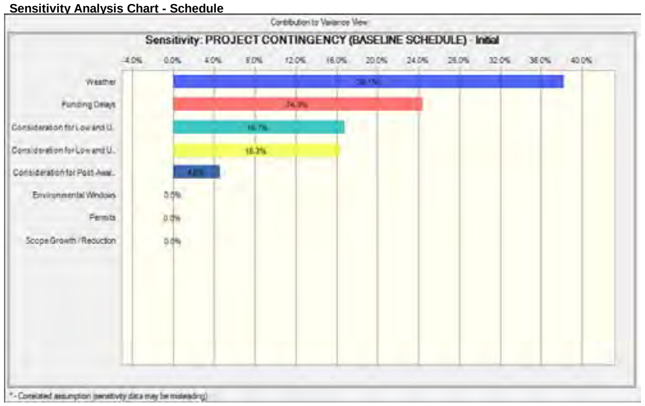
Contingency Summary Table - Schedule

PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	18.3 Months	-7.6 Months	**10.7 Months**	**-41.50%**
	5%	18.3 Months	-1.0 Months	**17.3 Months**	**-5.37%**
	10%	18.3 Months	0.6 Months	**18.9 Months**	**3.21%**
	15%	18.3 Months	1.6 Months	**20.0 Months**	**9.01%**
	20%	18.3 Months	2.5 Months	**20.8 Months**	**13.83%**
	25%	18.3 Months	3.3 Months	**21.6 Months**	**17.94%**
	30%	18.3 Months	4.0 Months	**22.3 Months**	**21.58%**
	35%	18.3 Months	4.5 Months	**22.8 Months**	**24.74%**
	40%	18.3 Months	5.1 Months	**23.4 Months**	**28.00%**
	45%	18.3 Months	5.7 Months	**24.0 Months**	**31.07%**
	50%	18.3 Months	6.3 Months	**24.6 Months**	**34.25%**
	55%	18.3 Months	6.9 Months	**25.2 Months**	**37.48%**
	60%	18.3 Months	7.4 Months	**25.7 Months**	**40.30%**
	65%	18.3 Months	8.0 Months	**26.3 Months**	**43.55%**
	70%	18.3 Months	8.7 Months	**27.0 Months**	**47.32%**
	75%	18.3 Months	9.3 Months	**27.6 Months**	**50.89%**
	80%	18.3 Months	10.1 Months	**28.4 Months**	**55.21%**
	85%	18.3 Months	11.1 Months	**29.4 Months**	**60.50%**
	90%	18.3 Months	12.2 Months	**30.5 Months**	**66.74%**
	95%	18.3 Months	13.9 Months	**32.2 Months**	**75.71%**
	100%	18.3 Months	23.5 Months	**41.8 Months**	**128.37%**

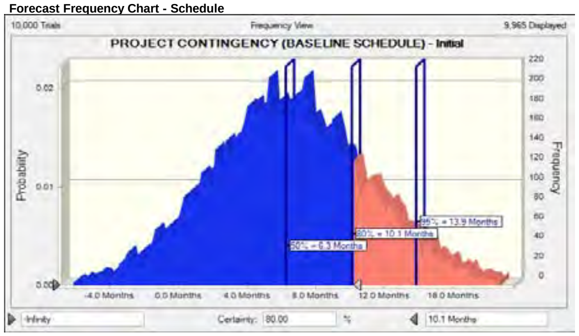
Cumulative Probability Forecast Chart - Schedule



Sensitivity Analysis Chart - Schedule



Forecast Frequency Chart - Schedule



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

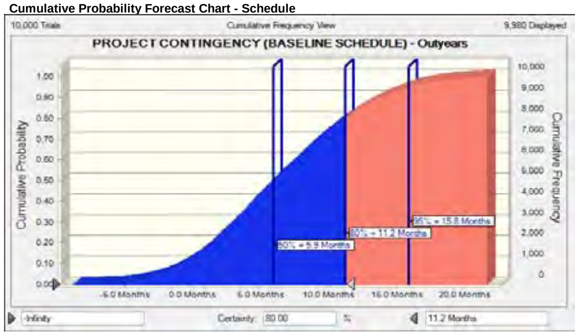
								Crystal Ball Simulation						
		Project Schedule						Expected Values (Months)					Expected Values (%s)	
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM MGMT														
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform		100%	-4.0 Months	0.0 Months	6.0 Months	0.0 Months		-21.85%	0.00%	32.77%
I-4	Material Availability	LIKELY	MARGINAL	MODERATE	Triangular		100%	0.0 Months	0.0 Months	2.0 Months	0.0 Months		0.00%	0.00%	10.92%
I-6	Permits	LIKELY	MARGINAL	MODERATE	Triangular		N/A	N/A	N/A	N/A	N/A	*Removed from Schedule Risk Model, as there will be enough time to obtain permits for outyear nourishments*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	MODERATE	Triangular		100%	0.0 Months	0.0 Months	3.0 Months	0.0 Months		0.00%	0.00%	16.38%
	ECONOMICS RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	6.0 Months	0.0 Months		-16.38%	0.00%	32.77%
E-2	Funding Delays	LIKELY	Significant	HIGH	Yes-No/Uniform		65%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
											0.0 Months				

Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

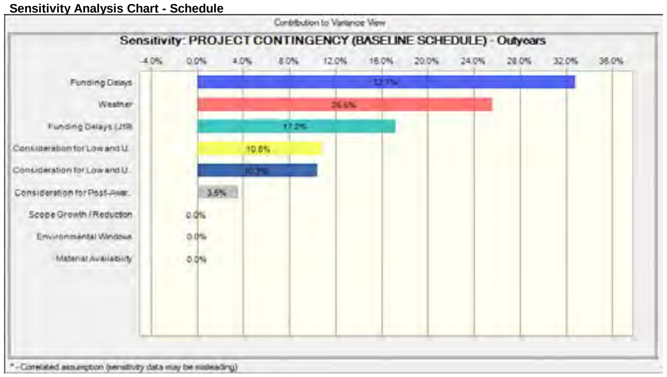
Contingency Summary Table - Schedule

PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	18.3 Months	-8.9 Months	**9.4 Months**	**-48.49%**
	5%	18.3 Months	-2.2 Months	**16.1 Months**	**-11.90%**
	10%	18.3 Months	-0.6 Months	**17.7 Months**	**-3.19%**
	15%	18.3 Months	0.5 Months	**18.8 Months**	**2.64%**
	20%	18.3 Months	1.4 Months	**19.7 Months**	**7.73%**
	25%	18.3 Months	2.2 Months	**20.5 Months**	**12.07%**
	30%	18.3 Months	3.0 Months	**21.3 Months**	**16.46%**
	35%	18.3 Months	3.7 Months	**22.0 Months**	**20.36%**
	40%	18.3 Months	4.4 Months	**22.8 Months**	**24.30%**
	45%	18.3 Months	5.2 Months	**23.5 Months**	**28.29%**
	50%	18.3 Months	5.9 Months	**24.3 Months**	**32.46%**
	55%	18.3 Months	6.7 Months	**25.0 Months**	**36.78%**
	60%	18.3 Months	7.6 Months	**25.9 Months**	**41.29%**
	65%	18.3 Months	8.3 Months	**26.6 Months**	**45.50%**
	70%	18.3 Months	9.2 Months	**27.5 Months**	**50.31%**
	75%	18.3 Months	10.1 Months	**28.4 Months**	**55.18%**
	80%	18.3 Months	11.2 Months	**29.5 Months**	**61.31%**
	85%	18.3 Months	12.4 Months	**30.7 Months**	**67.58%**
	90%	18.3 Months	13.8 Months	**32.1 Months**	**75.52%**
	95%	18.3 Months	15.8 Months	**34.1 Months**	**86.49%**
	100%	18.3 Months	26.4 Months	**44.7 Months**	**144.37%**

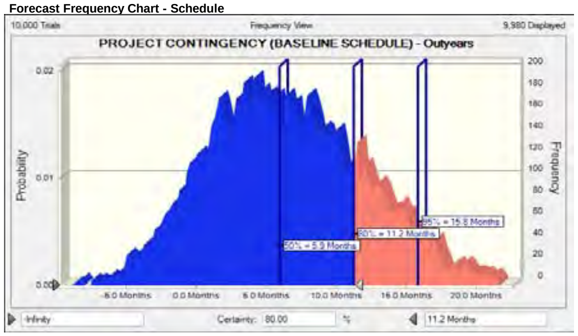
Cumulative Probability Forecast Chart - Schedule



Sensitivity Analysis Chart - Schedule



Forecast Frequency Chart - Schedule



SAM - Walton County Storm Damage Reduction Project, GI Study -

Enter Estimated Total Project Cost (Price Level)	$ 43,215,813
Max. Anticipated Annual Amount	$28,338,556
Enter Current OMB Escalation Rate	1.80%
Enter Current Project Location Escalation Rate	1.80%
Enter Assumed Monthly Recurring Cost Rate	8.00%

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	12-Jul-13			
Enter Baseline Project Completion	20-Jan-15			
Project Completion at 0% Confidence	2-Jun-14		($1,434,869.88)	($1,434,869.88)
Project Completion at 5% Confidence	21-Dec-14		($185,517.11)	($185,517.11)
Project Completion at 10% Confidence	6-Feb-15		$110,829.03	$110,829.03
Project Completion at 15% Confidence	11-Mar-15		$311,411.98	$311,411.98
Project Completion at 20% Confidence	7-Apr-15		$478,161.80	$478,161.80
Project Completion at 25% Confidence	29-Apr-15		$620,367.97	$620,367.97
Project Completion at 30% Confidence	20-May-15		$746,040.27	$746,040.27
Project Completion at 35% Confidence	6-Jun-15		$855,198.64	$855,198.64
Project Completion at 40% Confidence	24-Jun-15		$968,200.49	$968,200.49
Project Completion at 45% Confidence	12-Jul-15		$1,074,307.61	$1,074,307.61
Project Completion at 50% Confidence	29-Jul-15		$1,183,954.18	$1,183,954.18
Project Completion at 55% Confidence	16-Aug-15		$1,295,902.86	$1,295,902.86
Project Completion at 60% Confidence	1-Sep-15		$1,393,202.95	$1,393,202.95
Project Completion at 65% Confidence	19-Sep-15		$1,505,597.77	$1,505,597.77
Project Completion at 70% Confidence	10-Oct-15		$1,636,020.56	$1,636,020.56
Project Completion at 75% Confidence	30-Oct-15		$1,759,392.94	$1,759,392.94
Project Completion at 80% Confidence	23-Nov-15		$1,908,808.83	$1,908,808.83
Project Completion at 85% Confidence	22-Dec-15		$2,091,485.01	$2,091,485.01
Project Completion at 90% Confidence	26-Jan-16		$2,307,339.45	$2,307,339.45
Project Completion at 95% Confidence	16-Mar-16		$2,617,371.21	$2,617,371.21
Project Completion at 100% Confidence	4-Jan-17		$4,438,028.99	$4,438,028.99

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$17,578,231**
Max. Anticipated Annual Amount	**$11,526,838**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	17-Apr-23			
Enter Baseline Project Completion	25-Oct-24			
Project Completion at 0% Confidence	28-Jan-24		($681,838.66)	($681,838.66)
Project Completion at 5% Confidence	19-Aug-24		($167,355.34)	($167,355.34)
Project Completion at 10% Confidence	7-Oct-24		($44,914.37)	($44,914.37)
Project Completion at 15% Confidence	8-Nov-24		$37,129.41	$37,129.41
Project Completion at 20% Confidence	7-Dec-24		$108,674.90	$108,674.90
Project Completion at 25% Confidence	31-Dec-24		$169,780.09	$169,780.09
Project Completion at 30% Confidence	24-Jan-25		$231,433.31	$231,433.31
Project Completion at 35% Confidence	15-Feb-25		$286,356.54	$286,356.54
Project Completion at 40% Confidence	9-Mar-25		$341,752.03	$341,752.03
Project Completion at 45% Confidence	31-Mar-25		$397,842.73	$397,842.73
Project Completion at 50% Confidence	23-Apr-25		$456,534.03	$456,534.03
Project Completion at 55% Confidence	17-May-25		$517,216.82	$517,216.82
Project Completion at 60% Confidence	11-Jun-25		$580,652.81	$580,652.81
Project Completion at 65% Confidence	5-Jul-25		$639,802.89	$639,802.89
Project Completion at 70% Confidence	1-Aug-25		$707,434.21	$707,434.21
Project Completion at 75% Confidence	28-Aug-25		$776,029.28	$776,029.28
Project Completion at 80% Confidence	1-Oct-25		$862,234.64	$862,234.64
Project Completion at 85% Confidence	5-Nov-25		$950,412.00	$950,412.00
Project Completion at 90% Confidence	19-Dec-25		$1,062,037.00	$1,062,037.00
Project Completion at 95% Confidence	18-Feb-26		$1,216,251.79	$1,216,251.79
Project Completion at 100% Confidence	7-Jan-27		$2,030,218.06	$2,030,218.06

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$17,578,231**
Max. Anticipated Annual Amount	**$11,526,838**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	18-Apr-33			
Enter Baseline Project Completion	27-Oct-34			
Project Completion at 0% Confidence	29-Jan-34		($681,838.66)	($681,838.66)
Project Completion at 5% Confidence	21-Aug-34		($167,355.34)	($167,355.34)
Project Completion at 10% Confidence	9-Oct-34		($44,914.37)	($44,914.37)
Project Completion at 15% Confidence	10-Nov-34		$37,129.41	$37,129.41
Project Completion at 20% Confidence	9-Dec-34		$108,674.90	$108,674.90
Project Completion at 25% Confidence	2-Jan-35		$169,780.09	$169,780.09
Project Completion at 30% Confidence	26-Jan-35		$231,433.31	$231,433.31
Project Completion at 35% Confidence	17-Feb-35		$286,356.54	$286,356.54
Project Completion at 40% Confidence	11-Mar-35		$341,752.03	$341,752.03
Project Completion at 45% Confidence	2-Apr-35		$397,842.73	$397,842.73
Project Completion at 50% Confidence	25-Apr-35		$456,534.03	$456,534.03
Project Completion at 55% Confidence	19-May-35		$517,216.82	$517,216.82
Project Completion at 60% Confidence	13-Jun-35		$580,652.81	$580,652.81
Project Completion at 65% Confidence	7-Jul-35		$639,802.89	$639,802.89
Project Completion at 70% Confidence	3-Aug-35		$707,434.21	$707,434.21
Project Completion at 75% Confidence	30-Aug-35		$776,029.28	$776,029.28
Project Completion at 80% Confidence	3-Oct-35		$862,234.64	$862,234.64
Project Completion at 85% Confidence	7-Nov-35		$950,412.00	$950,412.00
Project Completion at 90% Confidence	21-Dec-35		$1,062,037.00	$1,062,037.00
Project Completion at 95% Confidence	20-Feb-36		$1,216,251.79	$1,216,251.79
Project Completion at 100% Confidence	8-Jan-37		$2,030,218.06	$2,030,218.06

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$17,578,231**
Max. Anticipated Annual Amount	**$11,526,838**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	20-Apr-43			
Enter Baseline Project Completion	28-Oct-44			
Project Completion at 0% Confidence	31-Jan-44		($681,838.66)	($681,838.66)
Project Completion at 5% Confidence	22-Aug-44		($167,355.34)	($167,355.34)
Project Completion at 10% Confidence	10-Oct-44		($44,914.37)	($44,914.37)
Project Completion at 15% Confidence	11-Nov-44		$37,129.41	$37,129.41
Project Completion at 20% Confidence	10-Dec-44		$108,674.90	$108,674.90
Project Completion at 25% Confidence	3-Jan-45		$169,780.09	$169,780.09
Project Completion at 30% Confidence	27-Jan-45		$231,433.31	$231,433.31
Project Completion at 35% Confidence	18-Feb-45		$286,356.54	$286,356.54
Project Completion at 40% Confidence	12-Mar-45		$341,752.03	$341,752.03
Project Completion at 45% Confidence	3-Apr-45		$397,842.73	$397,842.73
Project Completion at 50% Confidence	26-Apr-45		$456,534.03	$456,534.03
Project Completion at 55% Confidence	20-May-45		$517,216.82	$517,216.82
Project Completion at 60% Confidence	14-Jun-45		$580,652.81	$580,652.81
Project Completion at 65% Confidence	8-Jul-45		$639,802.89	$639,802.89
Project Completion at 70% Confidence	4-Aug-45		$707,434.21	$707,434.21
Project Completion at 75% Confidence	31-Aug-45		$776,029.28	$776,029.28
Project Completion at 80% Confidence	4-Oct-45		$862,234.64	$862,234.64
Project Completion at 85% Confidence	8-Nov-45		$950,412.00	$950,412.00
Project Completion at 90% Confidence	22-Dec-45		$1,062,037.00	$1,062,037.00
Project Completion at 95% Confidence	21-Feb-46		$1,216,251.79	$1,216,251.79
Project Completion at 100% Confidence	10-Jan-47		$2,030,218.06	$2,030,218.06

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$17,578,231**
Max. Anticipated Annual Amount	**$11,526,838**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	21-Apr-53			
Enter Baseline Project Completion	30-Oct-54			
Project Completion at 0% Confidence	1-Feb-54		($681,838.66)	($681,838.66)
Project Completion at 5% Confidence	24-Aug-54		($167,355.34)	($167,355.34)
Project Completion at 10% Confidence	12-Oct-54		($44,914.37)	($44,914.37)
Project Completion at 15% Confidence	13-Nov-54		$37,129.41	$37,129.41
Project Completion at 20% Confidence	12-Dec-54		$108,674.90	$108,674.90
Project Completion at 25% Confidence	5-Jan-55		$169,780.09	$169,780.09
Project Completion at 30% Confidence	29-Jan-55		$231,433.31	$231,433.31
Project Completion at 35% Confidence	20-Feb-55		$286,356.54	$286,356.54
Project Completion at 40% Confidence	14-Mar-55		$341,752.03	$341,752.03
Project Completion at 45% Confidence	5-Apr-55		$397,842.73	$397,842.73
Project Completion at 50% Confidence	28-Apr-55		$456,534.03	$456,534.03
Project Completion at 55% Confidence	22-May-55		$517,216.82	$517,216.82
Project Completion at 60% Confidence	16-Jun-55		$580,652.81	$580,652.81
Project Completion at 65% Confidence	10-Jul-55		$639,802.89	$639,802.89
Project Completion at 70% Confidence	6-Aug-55		$707,434.21	$707,434.21
Project Completion at 75% Confidence	2-Sep-55		$776,029.28	$776,029.28
Project Completion at 80% Confidence	6-Oct-55		$862,234.64	$862,234.64
Project Completion at 85% Confidence	10-Nov-55		$950,412.00	$950,412.00
Project Completion at 90% Confidence	24-Dec-55		$1,062,037.00	$1,062,037.00
Project Completion at 95% Confidence	23-Feb-56		$1,216,251.79	$1,216,251.79
Project Completion at 100% Confidence	11-Jan-57		$2,030,218.06	$2,030,218.06

Entry Required
Do Not Overwrite
Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-1	Scope Definition - Initial	LIKELY	MARGINAL	MODERATE	Yes-No/Uniform	I-2	0.75	($1,048,500)	$0	$0	*Correlated to Risk I-2 by a factor of 0.75*
I-1	Scope Definition - Out-years	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-1	Scope Definition - Initial	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-1	Scope Definition - Out-years	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	Scope is fairly well defined for standard civil works features. Scope may change based on permitting. The risk of the scope definition has been greatly reduced since the initial risk analysis, as the PDT has well-defined the scope.
Development of Low Values	The best case scenario is that there could be reduction in structural additions in the initial nourishments. Assume up to 25% reduction in the beach work items.
Development of High Values	The worst case scenario is that the scope would be contained to match funding allocation.

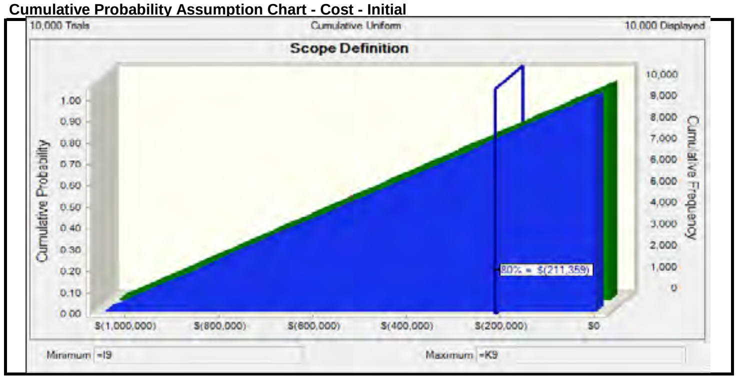
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($1,048,481)	N/A
10%	($941,849)	N/A
20%	($836,443)	N/A
30%	($734,415)	N/A
40%	($630,025)	N/A
50%	($521,656)	N/A
60%	($413,690)	N/A
70%	($307,310)	N/A
80%	($211,359)	N/A
90%	($108,359)	N/A
100%	($175)	N/A

Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

Cumulative Probability Assumption Chart - Cost - Initial



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-2	Scope Growth / Reduction - Initial	LIKELY	MARGINAL	MODERATE	Uniform	I-1	0.75	($2,160,791)	$0	$4,321,581	*Correlated to Risk I-1 by a factor of 0.75*
I-2	Scope Growth / Reduction - Out-years	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	($3,515,646)	$0	$7,031,293	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-2	Scope Growth / Reduction - Initial	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	-4.0 Months	0.0 Months	6.0 Months	
I-2	Scope Growth / Reduction - Out-years	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	-4.0 Months	0.0 Months	6.0 Months	

Description	Scope is fairly well defined for standard civil works features. The pumping plant has potential of VE savings through better data and VE. While there is confidence in quantities for the initial nourishment, quantities for the out-year renourishments may change significantly.
Development of Low Values	The best case scenario is that the current baseline estimate could be reduced by up to 5% and that the project completion date could finish early due to reduction in scope, by up to 4 months.
Development of High Values	The worst case scenario is that the current baseline estimate could increase by up to 10% and that the project completion date could change due to increase in scope, by up to 6 months.

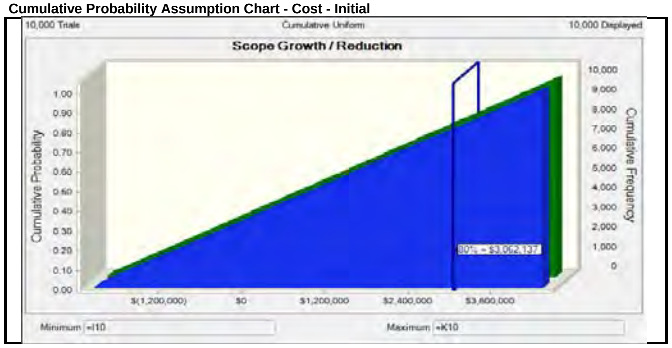
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,160,616)	'-4.0 Months
10%	($1,523,067)	'-3.0 Months
20%	($860,261)	'-2.0 Months
30%	($212,455)	'-1.0 Months
40%	$420,968	'-0.1 Months
50%	$1,087,610	1.0 Months
60%	$1,710,418	2.0 Months
70%	$2,362,568	3.0 Months
80%	$3,062,137	4.0 Months
90%	$3,689,825	5.0 Months
100%	$4,320,758	6.0 Months

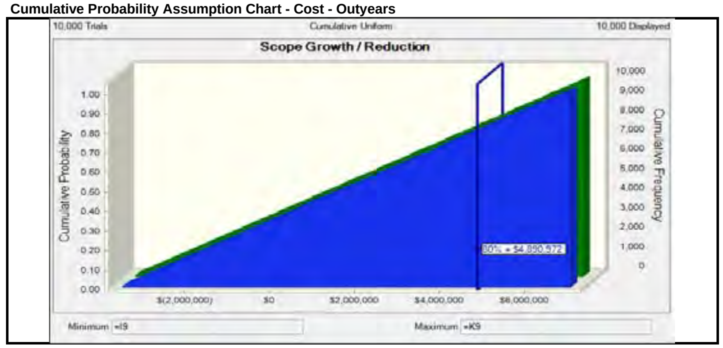
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,515,312)	'-4.0 Months
10%	($2,461,960)	'-3.0 Months
20%	($1,421,004)	'-2.1 Months
30%	($355,961)	'-1.1 Months
40%	$652,232	0.0 Months
50%	$1,739,750	1.0 Months
60%	$2,795,326	2.0 Months
70%	$3,845,523	3.0 Months
80%	$4,890,972	4.0 Months
90%	$5,952,761	5.0 Months
100%	$7,028,361	6.0 Months

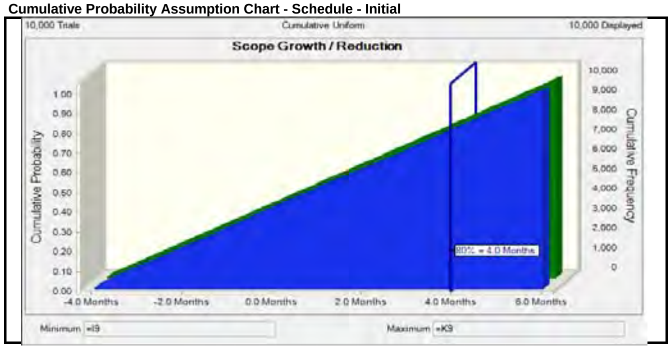
Cumulative Probability Assumption Chart - Cost - Initial



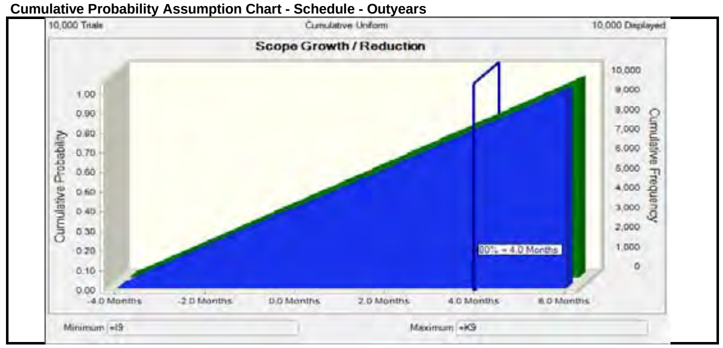
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-4	Material Availability - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-4	Material Availability - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$6,657,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-4	Material Availability - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-4	Material Availability - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	0.0 Months	0.0 Months	2.0 Months	

Description	Borrow sources are provided and indicated on drawings. Per the design Engineer and based on current surveys, quality and quantity of beach fill material is available at all sites.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that issues with material and equipment availability could delay the project completion date by up to 2 months. Assume that the average one-way distance to haul site increases to 16 miles for 2 renourishments.

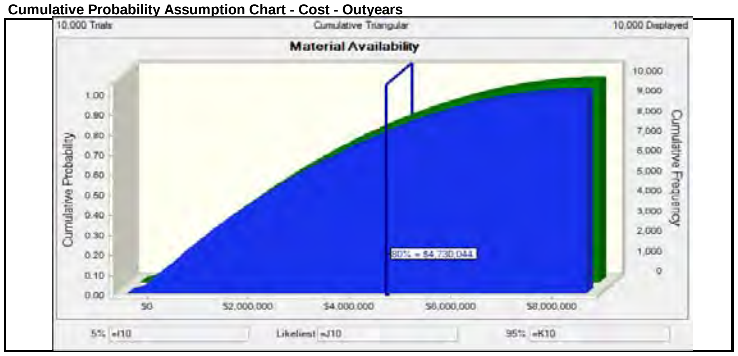
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

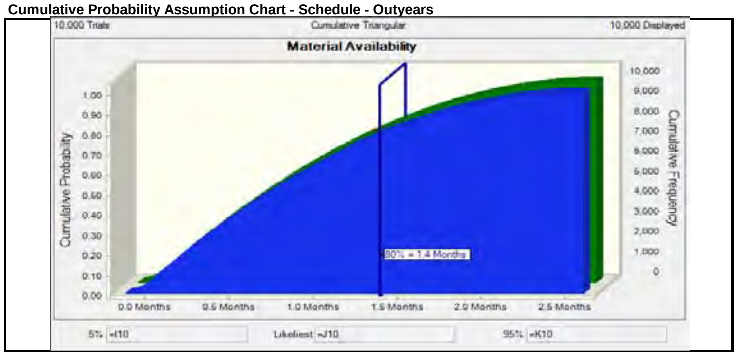
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($430,220)	'-0.1 Months
10%	$223,053	0.1 Months
20%	$681,071	0.2 Months
30%	$1,184,815	0.4 Months
40%	$1,741,576	0.5 Months
50%	$2,359,355	0.7 Months
60%	$3,032,336	0.9 Months
70%	$3,826,345	1.1 Months
80%	$4,730,044	1.4 Months
90%	$5,878,695	1.7 Months
100%	$8,532,940	2.6 Months

Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-5	Fuel Prices - Initial	VERY LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	($1,407,390)	$0	$4,811,310	
I-5	Fuel Prices - Out-years	VERY LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	($1,997,100)	$0	$9,319,800	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-5	Fuel Prices - Initial	UNLIKELY	NEGLIGIBLE	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-5	Fuel Prices - Out-years	UNLIKELY	NEGLIGIBLE	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	$3.45 per gallon was used in the Sep 2012 CEDEP Estimates, increases will effect equipment and delivery or materials. Fuel cost fluctuations can significantly impact dredging cost.
Development of Low Values	The best case scenario is that the cost of fuel adjusted for price level decreases to $3.00/gallon.
Development of High Values	The worst case scenario is that the cost of fuel adjusted for price level increases to $5.00/gallon.

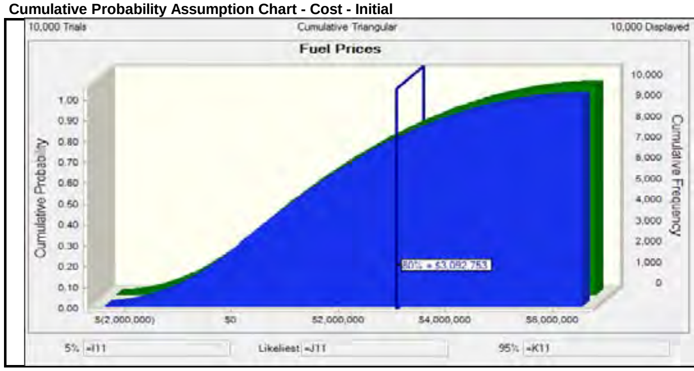
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,406,851)	N/A
10%	($999,483)	N/A
20%	($371,697)	N/A
30%	$122,712	N/A
40%	$614,499	N/A
50%	$1,123,532	N/A
60%	$1,691,274	N/A
70%	$2,317,997	N/A
80%	$3,092,753	N/A
90%	$4,079,540	N/A
100%	$6,494,242	N/A

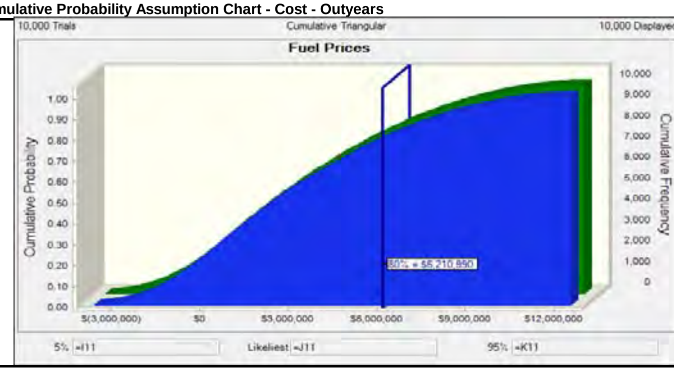
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,642,817)	N/A
10%	($1,256,740)	N/A
20%	($229,044)	N/A
30%	$635,644	N/A
40%	$1,501,186	N/A
50%	$2,421,475	N/A
60%	$3,542,955	N/A
70%	$4,813,078	N/A
80%	$6,210,990	N/A
90%	$8,042,401	N/A
100%	$12,336,371	N/A

Cumulative Probability Assumption Chart - Cost - Initial



Cumulative Probability Assumption Chart - Cost - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-6	Permits - Initial	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*
I-6	Permits - Out-years	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-6	Permits - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	0.0 Months	0.0 Months	6.0 Months	
I-6	Permits - Out-years	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Schedule Risk Model, as there will be enough time to obtain permits for outyear nourishments*

Description	Permitting delays may occur due to Florida State policy. This could impact the cost and schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that issues with issuing of permits from the State of Florida could delay the project completion date by up to 6 months.

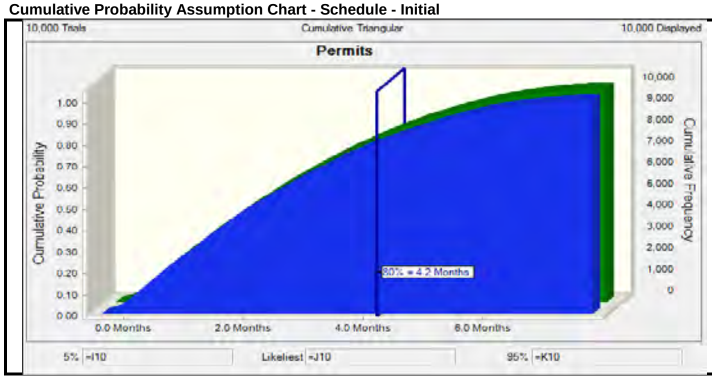
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	'-0.4 Months
10%	N/A	0.2 Months
20%	N/A	0.6 Months
30%	N/A	1.1 Months
40%	N/A	1.6 Months
50%	N/A	2.1 Months
60%	N/A	2.7 Months
70%	N/A	3.4 Months
80%	N/A	4.2 Months
90%	N/A	5.3 Months
100%	N/A	7.6 Months

Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

Cumulative Probability Assumption Chart - Schedule - Initial



SAM - Walton County Storm Damage Reduction Project, GI Study - NED

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-7	Environmental Windows - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$2,032,039	
I-7	Environmental Windows - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$3,333,235	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-7	Environmental Windows - Initial	LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	
I-7	Environmental Windows - Out-years	LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	

Description	The concern is that :Project site is a natural habitat for various species of threatened wildlife that utilize the project vicinity during Spring and Winter months. The PDT feels that :Gulf sturgeon incidental takes during dredging and Sea Turtle and Bird Nesting may have Impact during Construction. There may also be unknown restrictions for the out-year renourishments.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that environmental windows and restrictions to have a significant impact on dredging operations and effective work times, potentially increasing the contract costs by up to 5%. Also, assume that the project completion date could change due to challenges with environmental work windows and restrictions, by up to 12 months.

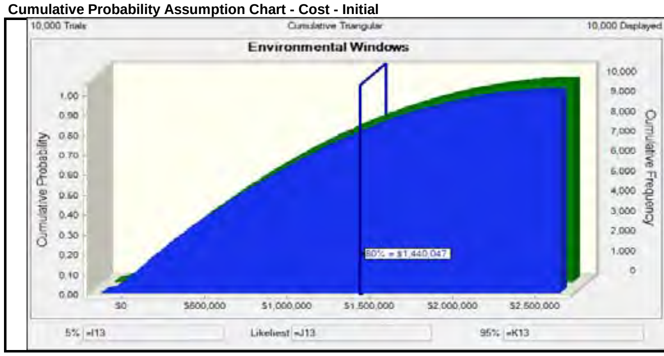
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($132,703)	'-0.8 Months
10%	$70,495	0.4 Months
20%	$212,591	1.3 Months
30%	$365,454	2.2 Months
40%	$543,627	3.2 Months
50%	$729,562	4.2 Months
60%	$938,216	5.4 Months
70%	$1,164,838	6.8 Months
80%	$1,440,047	8.4 Months
90%	$1,783,565	10.5 Months
100%	$2,614,469	15.3 Months

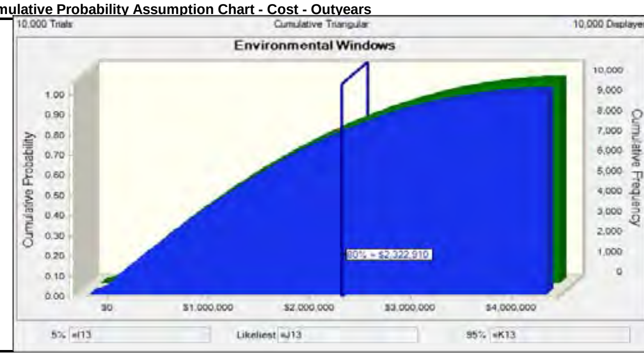
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($204,042)	'-0.8 Months
10%	$104,931	0.4 Months
20%	$356,116	1.3 Months
30%	$611,864	2.2 Months
40%	$886,747	3.2 Months
50%	$1,188,393	4.2 Months
60%	$1,519,035	5.4 Months
70%	$1,877,877	6.7 Months
80%	$2,322,910	8.4 Months
90%	$2,888,443	10.5 Months
100%	$4,315,062	15.5 Months

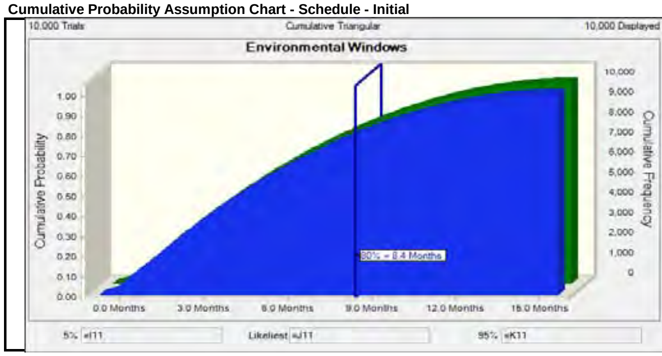
Cumulative Probability Assumption Chart - Cost - Initial



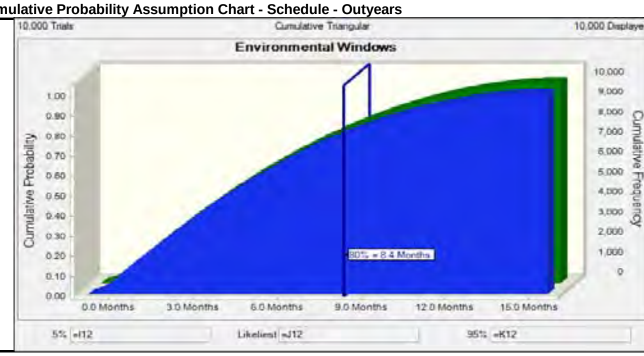
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Initial	Likely	Marginal	Moderate	Triangular	N/A	N/A	$0	$0	$1,219,223	
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Out-years	Likely	Marginal	Moderate	Triangular	N/A	N/A	$0	$0	$1,499,956	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Initial	Likely	Marginal	Moderate	Triangular	N/A	N/A	0.0 Months	0.0 Months	3.0 Months	
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Out-years	Likely	Marginal	Moderate	Triangular	N/A	N/A	0.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk of construction modifications and claims that arise after contract award. Post-award construction contract modifications and claims could impact the ultimate contract costs and delay the overall schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that direct costs increase by up to 3% and the overall schedule is delayed by up to 3 months.

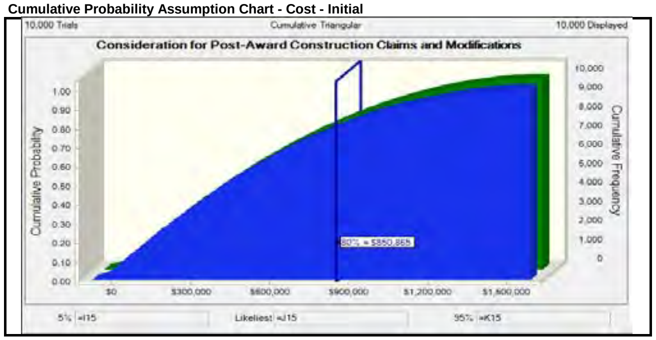
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($80,148)	'-0.2 Months
10%	$41,609	0.1 Months
20%	$126,958	0.3 Months
30%	$221,715	0.5 Months
40%	$321,821	0.8 Months
50%	$424,092	1.1 Months
60%	$548,456	1.4 Months
70%	$679,448	1.7 Months
80%	$850,865	2.1 Months
90%	$1,063,805	2.6 Months
100%	$1,568,903	3.9 Months

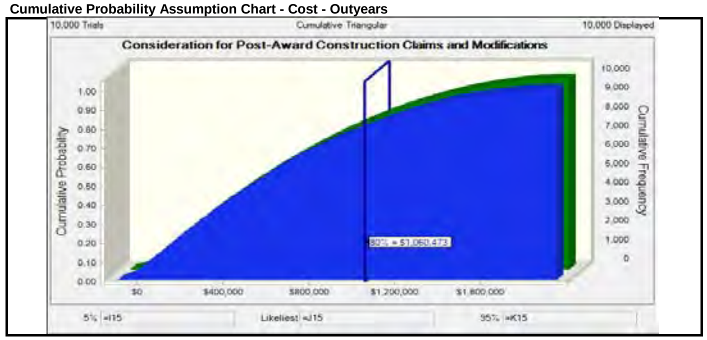
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($95,692)	'-0.2 Months
10%	$52,110	0.1 Months
20%	$161,173	0.3 Months
30%	$274,711	0.5 Months
40%	$395,775	0.8 Months
50%	$531,930	1.1 Months
60%	$667,807	1.4 Months
70%	$844,054	1.7 Months
80%	$1,060,473	2.1 Months
90%	$1,320,767	2.6 Months
100%	$1,919,089	3.9 Months

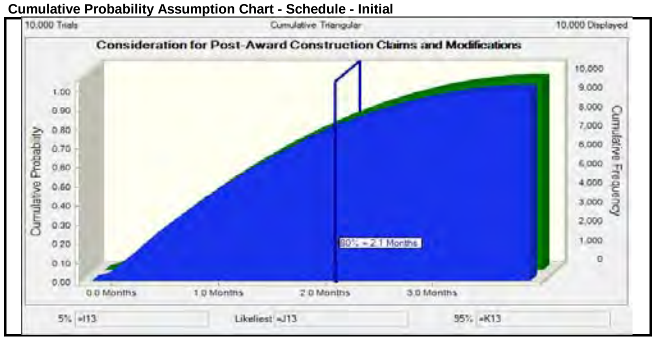
Cumulative Probability Assumption Chart - Cost - Initial



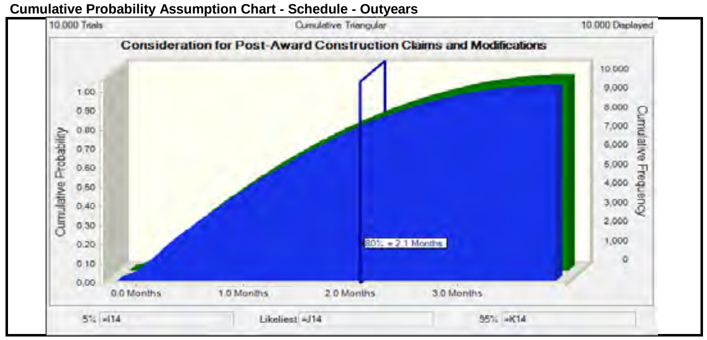
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-1	Estimate Considerations - Initial	Likely	Significant	High	Triangular	N/A	N/A	($2,032,039)	$0	$2,032,039	
EST-1	Estimate Considerations - Out-years	Likely	Significant	High	Triangular	N/A	N/A	($3,333,235)	$0	$3,333,235	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-1	Estimate Considerations - Initial	Very Unlikely	Negligible	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
EST-1	Estimate Considerations - Out-years	Very Unlikely	Negligible	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	This is added to the CSRA model for consideration, as these issues may cause a cost variance. Estimate assumptions may not accurately capture the ultimate costs.
Development of Low Values	The best case scenario is that rates, crews and productivities are either flawed or too optimistic compared to actual ultimate costs, decreasing up to 5% on overall construction productivities.
Development of High Values	The worst case scenario is that rates, crews and productivities are either flawed or too optimistic compared to actual ultimate costs, decreasing up to 5% on overall construction productivities.

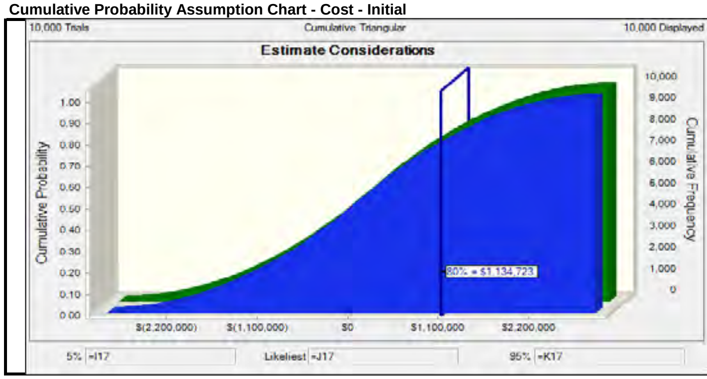
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,938,464)	N/A
10%	($1,660,190)	N/A
20%	($1,095,860)	N/A
30%	($645,511)	N/A
40%	($283,923)	N/A
50%	$21,778	N/A
60%	$337,681	N/A
70%	$698,068	N/A
80%	$1,134,723	N/A
90%	$1,651,086	N/A
100%	$2,939,466	N/A

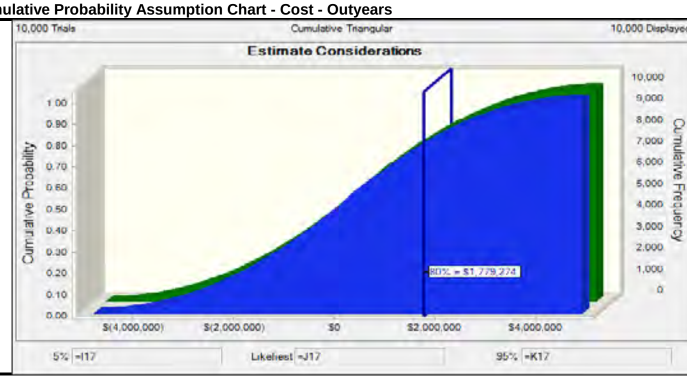
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($4,798,803)	N/A
10%	($2,657,158)	N/A
20%	($1,787,546)	N/A
30%	($1,093,247)	N/A
40%	($501,325)	N/A
50%	$26,126	N/A
60%	$523,331	N/A
70%	$1,124,269	N/A
80%	$1,779,274	N/A
90%	$2,651,445	N/A
100%	$4,804,833	N/A

Cumulative Probability Assumption Chart - Cost - Initial



Cumulative Probability Assumption Chart - Cost - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-1	Consideration for Low and Unknown Internal Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($2,032,039)	$0	$2,032,039	
INT-1	Consideration for Low and Unknown Internal Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($3,333,235)	$0	$3,333,235	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-1	Consideration for Low and Unknown Internal Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	
INT-1	Consideration for Low and Unknown Internal Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns. This could impact cost and schedule.
Development of Low Values	The best case scenario is that costs improve by up to 5% and schedule is improved by up to 3 months.
Development of High Values	The worst case scenario is that project costs increase by up to 5% and the overall schedule is delayed by up to 3 months.

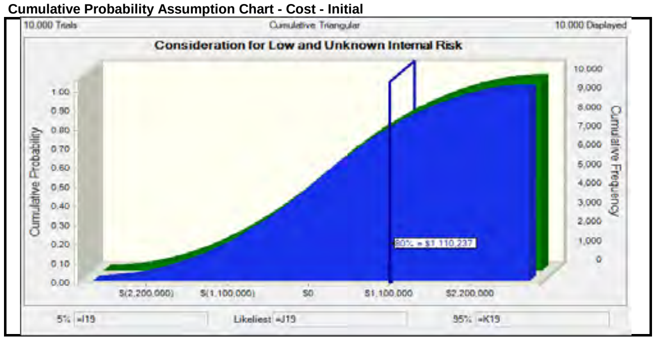
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,926,820)	'-4.4 Months
10%	($1,635,048)	'-2.4 Months
20%	($1,069,535)	'-1.6 Months
30%	($647,724)	'-1.0 Months
40%	($298,993)	'-0.5 Months
50%	$22,731	0.0 Months
60%	$334,370	0.5 Months
70%	$695,828	1.0 Months
80%	$1,110,237	1.6 Months
90%	$1,659,837	2.5 Months
100%	$2,946,390	4.3 Months

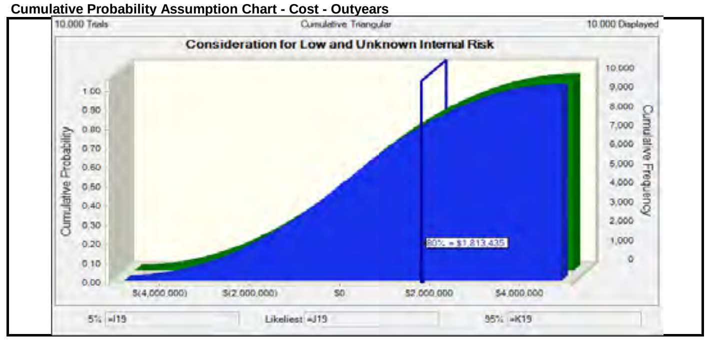
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($4,805,422)	'-4.4 Months
10%	($2,721,105)	'-2.4 Months
20%	($1,840,556)	'-1.6 Months
30%	($1,139,356)	'-1.0 Months
40%	($530,974)	'-0.5 Months
50%	$6,590	0.0 Months
60%	$532,624	0.5 Months
70%	$1,104,296	1.0 Months
80%	$1,813,435	1.6 Months
90%	$2,708,271	2.4 Months
100%	$4,839,952	4.3 Months

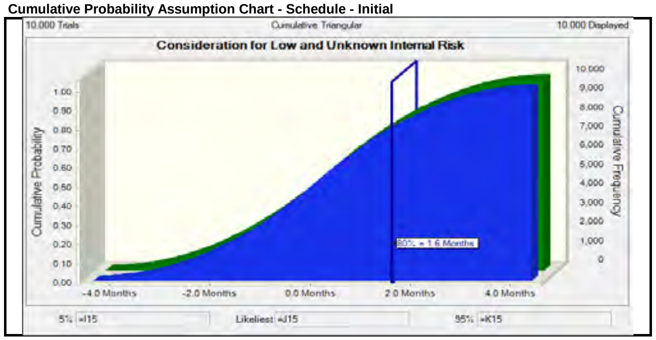
Cumulative Probability Assumption Chart - Cost - Initial



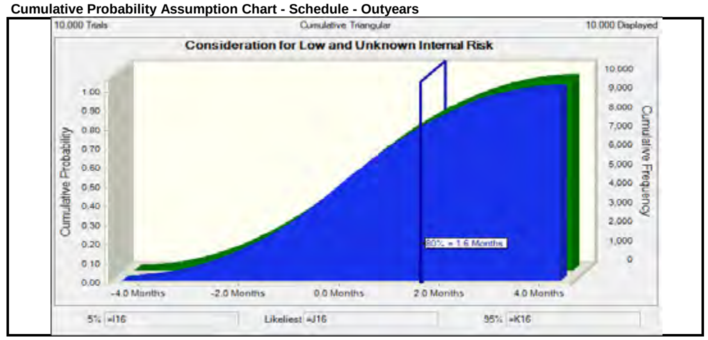
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-1	Weather - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	($1,219,223)	$0	$2,032,039	
E-1	Weather - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	($1,999,941)	$0	$3,333,235	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-1	Weather - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	6.0 Months	
E-1	Weather - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	6.0 Months	

Description	Florida is subject to bad weather during Hurricane Season which can cause Schedule delays. Weather days are generally incorporated into schedule.
Development of Low Values	The best case scenario is that weather has less impact on dredging operations and effective work time than currently contemplated in the current baseline estimate, reducing the overall costs by up to 3%. Also assume that favorable weather conditions could improve the schedule by up to 3 months.
Development of High Values	The worst case scenario is that weather has more impact on dredging operations and effective work time than currently contemplated in the current baseline estimate, increasing the overall costs by up to 5%. Also assume that unfavorable weather conditions could delay the schedule by up to 6 months.

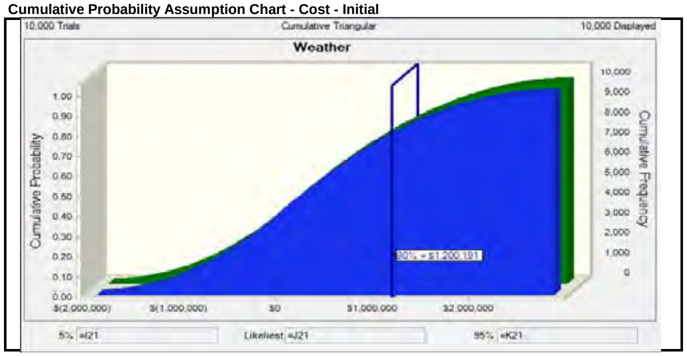
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($1,865,032)	'-4.7 Months
10%	($954,908)	'-2.3 Months
20%	($559,718)	'-1.3 Months
30%	($241,130)	'-0.5 Months
40%	$6,253	0.2 Months
50%	$257,884	0.9 Months
60%	$526,580	1.7 Months
70%	$829,526	2.6 Months
80%	$1,200,191	3.7 Months
90%	$1,670,960	5.1 Months
100%	$2,817,608	8.2 Months

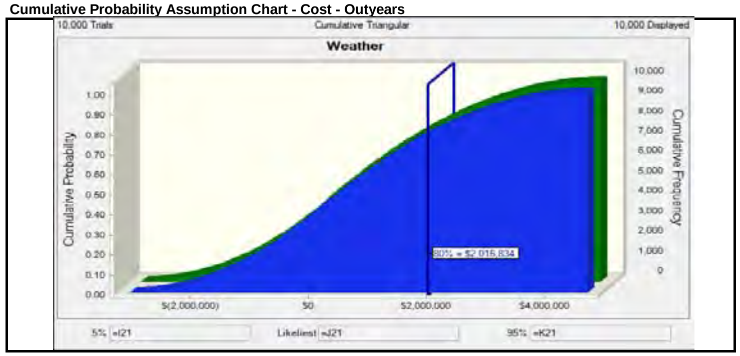
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,053,519)	'-4.7 Months
10%	($1,523,134)	'-2.3 Months
20%	($867,395)	'-1.2 Months
30%	($376,678)	'-0.5 Months
40%	$49,984	0.2 Months
50%	$471,055	0.9 Months
60%	$932,714	1.7 Months
70%	$1,429,097	2.6 Months
80%	$2,016,834	3.6 Months
90%	$2,826,446	5.1 Months
100%	$4,653,244	8.2 Months

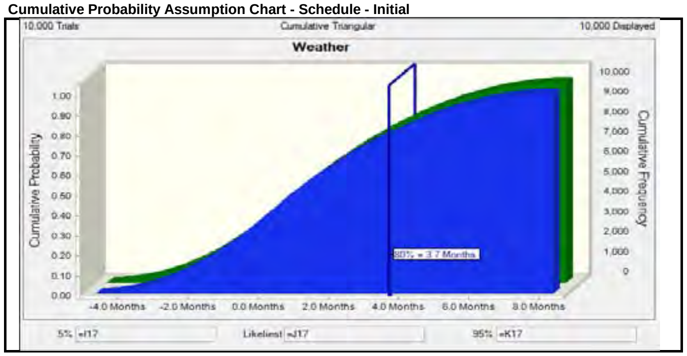
Cumulative Probability Assumption Chart - Cost - Initial



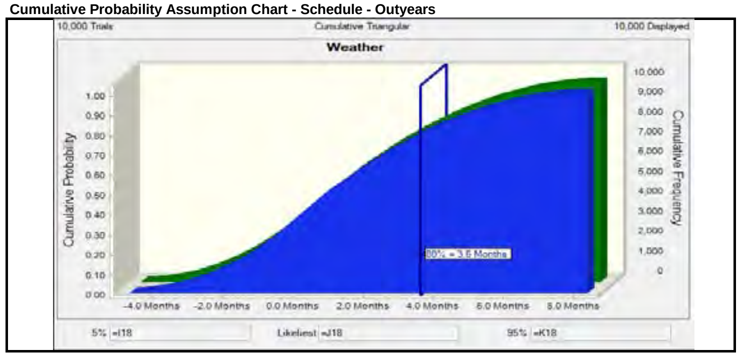
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-2	Funding Delays - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	*The original risk register and current assumption indicate this is not high risk for the initial activity, but is for the out-years*
E-2	Funding Delays - Out-years	LIKELY	MARGINAL	MODERATE	Yes-No/Triangular	N/A	N/A	$0	$0	$8,080,330	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-2	Funding Delays - Initial	LIKELY	Significant	HIGH	Yes-No/Uniform	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	
E-2	Funding Delays - Out-years	LIKELY	Significant	HIGH	Yes-No/Uniform	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	

Description	PM feels Adequate Congressional funding to complete project will be available. However, if the project is delayed, it could increase the quantities to be dredged and delay the overal schedule. This could impact the cost and schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that funding delays experienced for out-year renourishments may make the project vulnerable to accumulation of more dredge material due to prolonged storm surge exposure. Assume up to 15% more material for each nourishment. Also, assume that funding issues could move the entire construction schedule by up to one fiscal year.

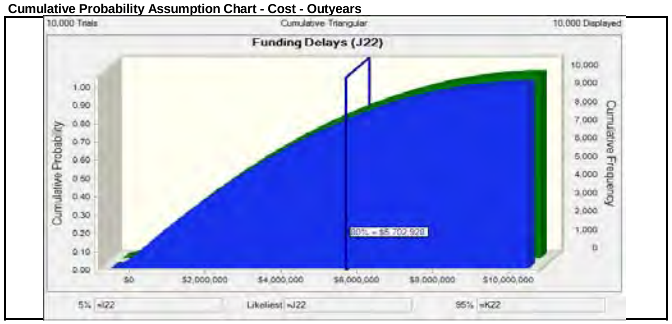
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	0.0 Months
10%	N/A	1.2 Months
20%	N/A	2.4 Months
30%	N/A	3.6 Months
40%	N/A	4.9 Months
50%	N/A	6.1 Months
60%	N/A	7.3 Months
70%	N/A	8.5 Months
80%	N/A	9.7 Months
90%	N/A	10.8 Months
100%	N/A	12.0 Months

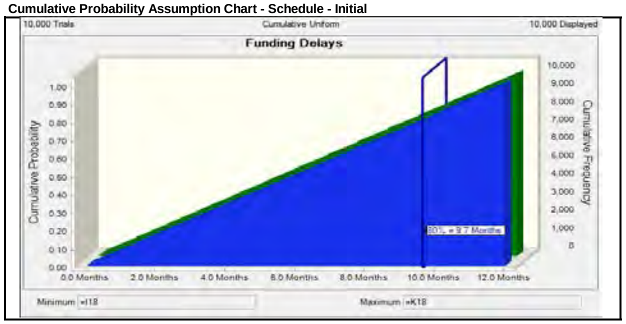
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($535,018)	0.0 Months
10%	$283,368	1.2 Months
20%	$860,761	2.4 Months
30%	$1,477,326	3.7 Months
40%	$2,159,306	4.9 Months
50%	$2,885,780	6.0 Months
60%	$3,697,028	7.2 Months
70%	$4,606,170	8.4 Months
80%	$5,702,928	9.6 Months
90%	$7,051,458	10.8 Months
100%	$10,454,851	12.0 Months

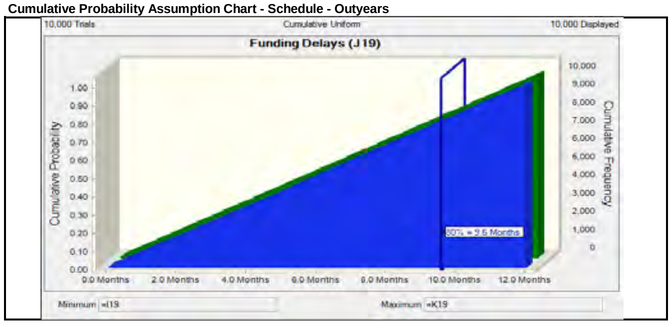
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EXT-1	Consideration for Low and Unknown External Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($2,032,039)	$0	$2,032,039	
EXT-1	Consideration for Low and Unknown External Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($3,333,235)	$0	$3,333,235	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EXT-1	Consideration for Low and Unknown External Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	
EXT-1	Consideration for Low and Unknown External Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns. This could impact cost and schedule.
Development of Low Values	The best case scenario is that costs improve by up to 5% and schedule is improved by up to 3 months.
Development of High Values	The worst case scenario is that project costs increase by up to 5% and the overall schedule is delayed by up to 3 months.

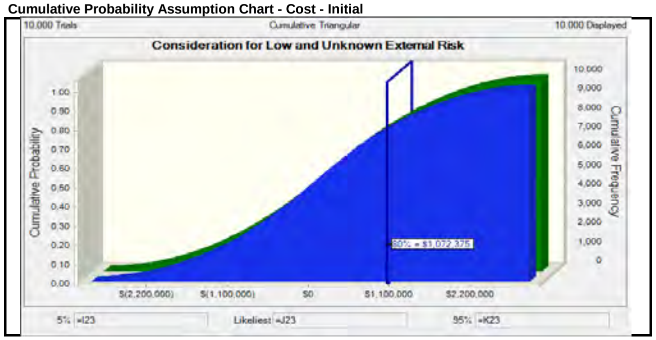
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,956,338)	'-4.3 Months
10%	($1,641,362)	'-2.4 Months
20%	($1,064,986)	'-1.6 Months
30%	($671,079)	'-1.0 Months
40%	($314,763)	'-0.5 Months
50%	($366)	0.0 Months
60%	$308,932	0.5 Months
70%	$646,627	1.0 Months
80%	$1,072,375	1.6 Months
90%	$1,635,380	2.4 Months
100%	$2,918,222	4.3 Months

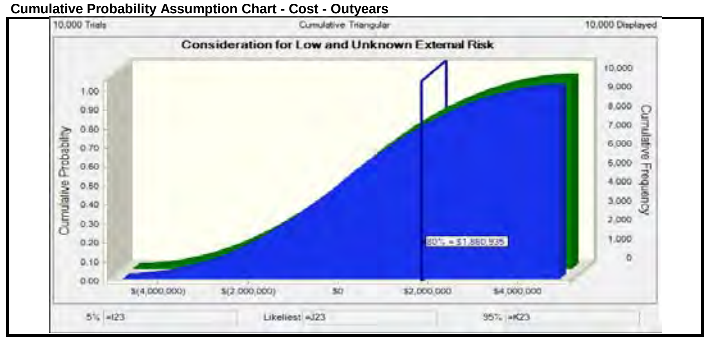
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($4,814,949)	'-4.3 Months
10%	($2,688,463)	'-2.4 Months
20%	($1,811,625)	'-1.6 Months
30%	($1,127,771)	'-1.0 Months
40%	($537,889)	'-0.5 Months
50%	($7,038)	0.0 Months
60%	$528,730	0.5 Months
70%	$1,152,430	1.0 Months
80%	$1,860,935	1.6 Months
90%	$2,746,292	2.4 Months
100%	$4,791,342	4.3 Months

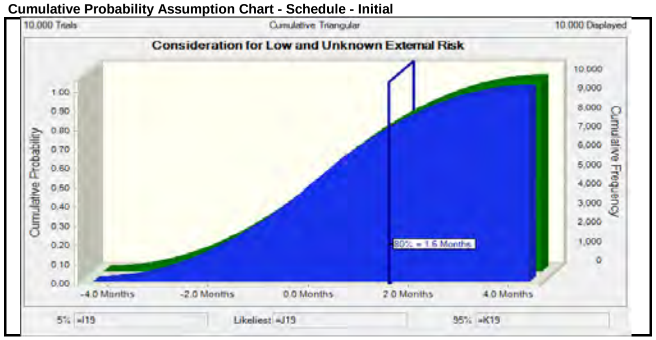
Cumulative Probability Assumption Chart - Cost - Initial



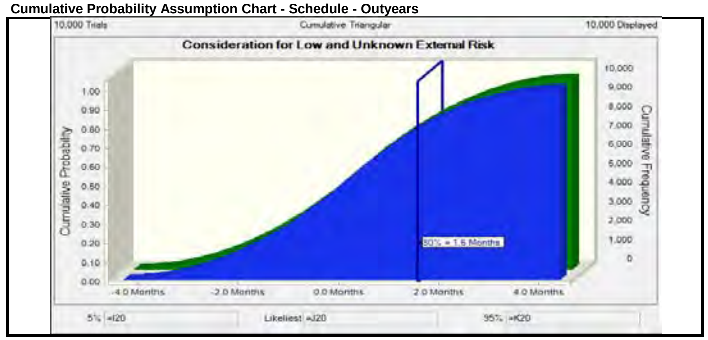
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



Crystal Ball Report - Full
Simulation started on 10/9/2012 at 9:08 PM
Simulation stopped on 10/9/2012 at 9:09 PM

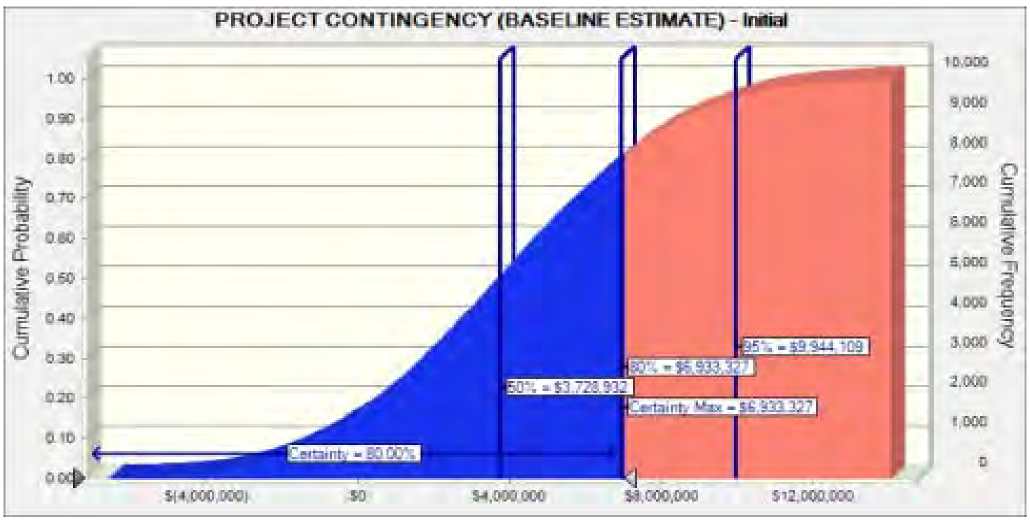
Run preferences:	
Number of trials run	**10,000**
Monte Carlo	
Seed	**999**
Precision control on	
Confidence level	**95.00%**
Run statistics:	
Total running time (sec)	**18.52**
Trials/second (average)	**540**
Random numbers per sec	**20,513**
Crystal Ball data	
Assumptions	**38**
Correlations	**1**
Correlated groups	**1**
Decision variables	**0**
Forecasts	**4**

Forecasts

Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Cost Risk Model - Ir

Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial **Cell: L25**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to $6,933,327
Entire range is from $(10,517,883) to $17,663,464
Base case is $0
After 10,000 trials, the std. error of the mean is $36,989



Statistics:	**Forecast values**
Trials	**10,000**
Base Case	**$0**
Mean	**$3,760,153**
Median	**$3,728,957**
Mode	**---**
Standard Deviation	**$3,698,931**
Variance	**$13,682,090,030,107**
Skewness	**0.0504**
Kurtosis	**2.82**
Coeff. of Variability	**0.9837**
Minimum	**$(10,517,883)**
Maximum	**$17,663,464**
Range Width	**$28,181,347**
Mean Std. Error	**$36,989**

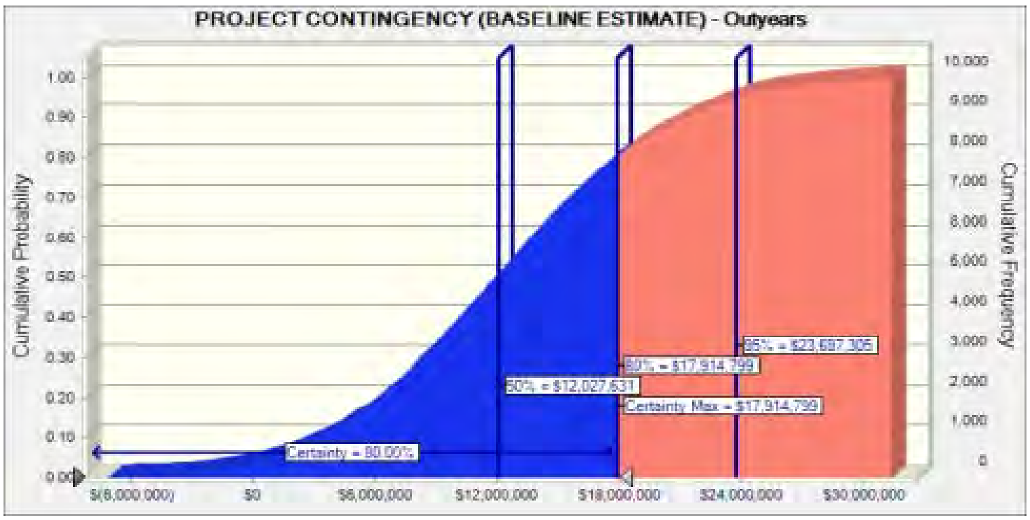
Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial (cont'd) **Cell: L25**

Percentiles:	Forecast values
0%	$(10,517,883)
10%	$(1,042,074)
20%	$573,608
30%	$1,760,204
40%	$2,765,269
50%	$3,728,932
60%	$4,696,976
70%	$5,751,387
80%	$6,933,327
90%	$8,534,198
100%	$17,663,464

Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Cost Risk Model - C

Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears **Cell: L25**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to $17,914,799
Entire range is from $(10,472,549) to $36,544,250
Base case is $0
After 10,000 trials, the std. error of the mean is $69,030



Statistics:	**Forecast values**
Trials	**10,000**
Base Case	**$0**
Mean	**$12,149,281**
Median	**$12,028,400**
Mode	**---**
Standard Deviation	**$6,903,012**
Variance	**$47,651,570,751,271**
Skewness	**0.1384**
Kurtosis	**2.94**
Coeff. of Variability	**0.5682**
Minimum	**$(10,472,549)**
Maximum	**$36,544,250**
Range Width	**$47,016,799**
Mean Std. Error	**$69,030**

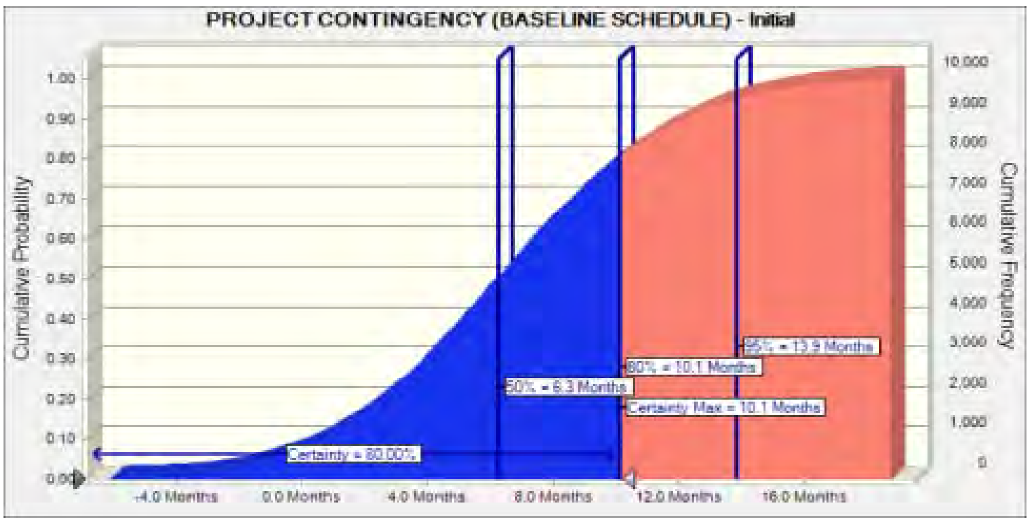
Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears (cont'd) **Cell: L25**

Percentiles:	Forecast values
0%	$(10,472,549)
10%	$3,355,231
20%	$6,327,167
30%	$8,366,113
40%	$10,295,138
50%	$12,027,631
60%	$13,738,422
70%	$15,620,294
80%	$17,914,799
90%	$21,178,522
100%	$36,544,250

Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Schedule Risk Mod

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial **Cell: L21**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to 10.1 Months
Entire range is from -7.6 Months to 23.5 Months
Base case is 0.0 Months
After 10,000 trials, the std. error of the mean is 0.0 Months



Statistics:	**Forecast values**
Trials	**10,000**
Base Case	**0.0 Months**
Mean	**6.3 Months**
Median	**6.3 Months**
Mode	**---**
Standard Deviation	**4.5 Months**
Variance	**20.0 Months**
Skewness	**0.0766**
Kurtosis	**2.85**
Coeff. of Variability	**0.7059**
Minimum	**-7.6 Months**
Maximum	**23.5 Months**
Range Width	**31.1 Months**
Mean Std. Error	**0.0 Months**

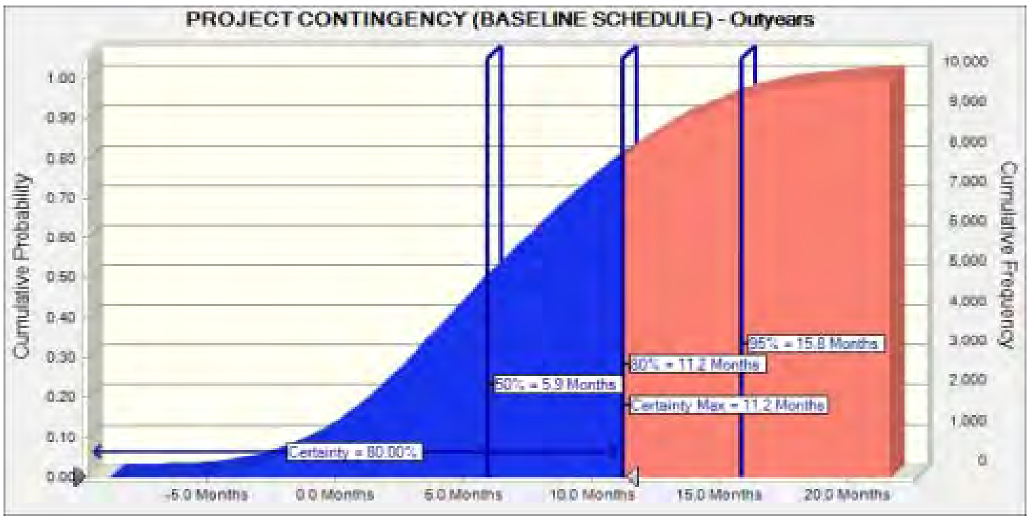
Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial (cont'd) **Cell: L21**

Percentiles:	Forecast values
0%	-7.6 Months
10%	0.6 Months
20%	2.5 Months
30%	4.0 Months
40%	5.1 Months
50%	6.3 Months
60%	7.4 Months
70%	8.7 Months
80%	10.1 Months
90%	12.2 Months
100%	23.5 Months

Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Schedule Risk Mod

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears **Cell: L22**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to 11.2 Months
Entire range is from -8.9 Months to 26.4 Months
Base case is 0.0 Months
After 10,000 trials, the std. error of the mean is 0.1 Months



Statistics:	**Forecast values**
Trials	**10,000**
Base Case	**0.0 Months**
Mean	**6.3 Months**
Median	**5.9 Months**
Mode	**---**
Standard Deviation	**5.5 Months**
Variance	**30.5 Months**
Skewness	**0.2412**
Kurtosis	**2.63**
Coeff. of Variability	**0.8746**
Minimum	**-8.9 Months**
Maximum	**26.4 Months**
Range Width	**35.3 Months**
Mean Std. Error	**0.1 Months**

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears (cont'd **Cell: L22**

Percentiles:	Forecast values
0%	-8.9 Months
10%	-0.6 Months
20%	1.4 Months
30%	3.0 Months
40%	4.4 Months
50%	5.9 Months
60%	7.6 Months
70%	9.2 Months
80%	11.2 Months
90%	13.8 Months
100%	26.4 Months

End of Forecasts

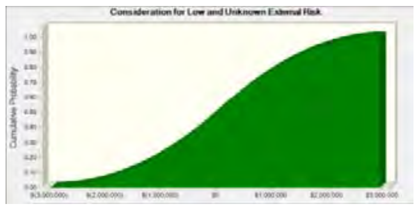
Assumptions

Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Cost Risk Model - Ir

Assumption: Consideration for Low and Unknown External Risk **Cell: J23**

Triangular distribution with parameters:

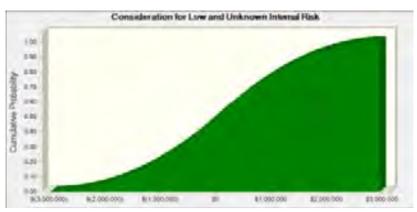
5%	$(2,032,039)	(=I23)
Likeliest	$0	(=J23)
95%	$2,032,039	(=K23)



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J19**

Triangular distribution with parameters:

5%	$(2,032,039)	(=I19)
Likeliest	$0	(=J19)
95%	$2,032,039	(=K19)



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J15**

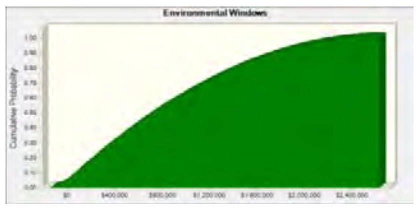
Triangular distribution with parameters:

5%	$0	(=I15)
Likeliest	$0	(=J15)
95%	$1,219,223	(=K15)

Assumption: Consideration for Post-Award Construction Claims and Modifications (cont'd) **Cell: J15**

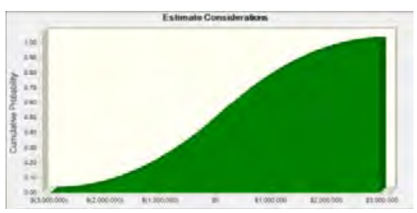
Assumption: Environmental Windows **Cell: J13**

Triangular distribution with parameters:		
5%	**$0**	**(=I13)**
Likeliest	**$0**	**(=J13)**
95%	**$2,032,039**	**(=K13)**



Assumption: Estimate Considerations **Cell: J17**

Triangular distribution with parameters:		
5%	**$(2,032,039)**	**(=I17)**
Likeliest	**$0**	**(=J17)**
95%	**$2,032,039**	**(=K17)**



Assumption: Fuel Prices **Cell: J11**

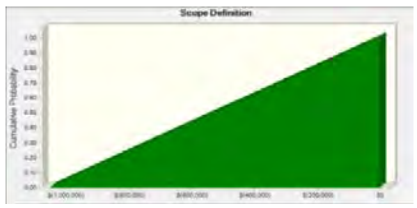
Triangular distribution with parameters:		
5%	**$(1,407,390)**	**(=I11)**
Likeliest	**$0**	**(=J11)**
95%	**$4,811,310**	**(=K11)**

Assumption: Fuel Prices (cont'd) **Cell: J11**

Assumption: Scope Definition **Cell: J9**

Uniform distribution with parameters:

Minimum	**$(1,048,500)**	**(=I9)**
Maximum	**$0**	**(=K9)**

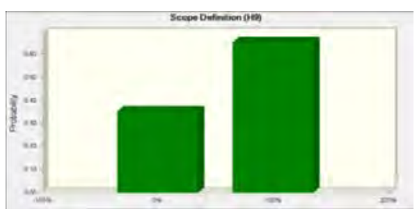


Correlated with:	**Coefficient**
Scope Growth / Reduction (J10)	**0.75**

Assumption: Scope Definition (H9) **Cell: H9**

Yes-No distribution with parameters:

Probability of Yes(1)	**0.65**	**(=H9)**

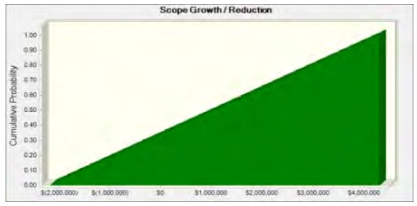


Assumption: Scope Growth / Reduction **Cell: J10**

Uniform distribution with parameters:

Minimum	**$(2,160,791)**	**(=I10)**
Maximum	**$4,321,581**	**(=K10)**

Assumption: Scope Growth / Reduction (cont'd) **Cell: J10**

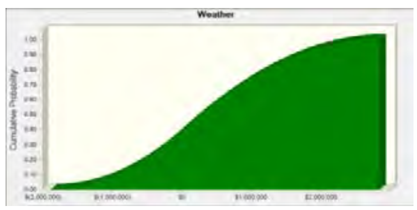


Correlated with: **Coefficient**
Scope Definition (J9) **0.75**

Assumption: Weather **Cell: J21**

Triangular distribution with parameters:

5%	**$(1,219,223)**	**(=I21)**
Likeliest	**$0**	**(=J21)**
95%	**$2,032,039**	**(=K21)**

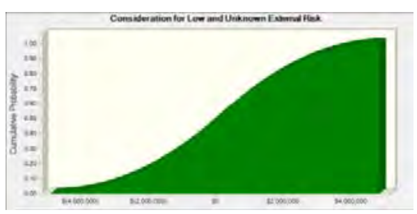


Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Cost Risk Model - C

Assumption: Consideration for Low and Unknown External Risk **Cell: J23**

Triangular distribution with parameters:

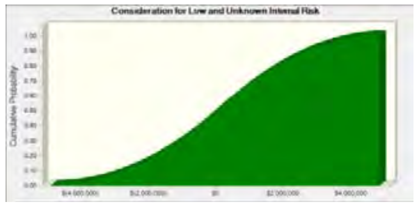
5%	**$(3,333,235)**	**(=I23)**
Likeliest	**$0**	**(=J23)**
95%	**$3,333,235**	**(=K23)**



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J19**

Triangular distribution with parameters:

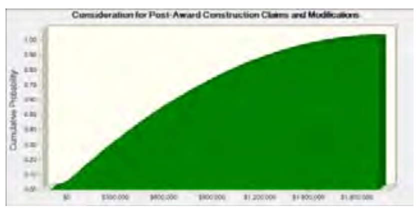
5%	**$(3,333,235)**	**(=I19)**
Likeliest	**$0**	**(=J19)**
95%	**$3,333,235**	**(=K19)**



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J15**

Triangular distribution with parameters:

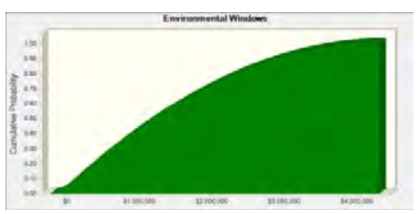
5%	**$0**	**(=I15)**
Likeliest	**$0**	**(=J15)**
95%	**$1,499,956**	**(=K15)**



Assumption: Environmental Windows **Cell: J13**

Triangular distribution with parameters:

5%	**$0**	**(=I13)**
Likeliest	**$0**	**(=J13)**
95%	**$3,333,235**	**(=K13)**



Assumption: Estimate Considerations **Cell: J17**

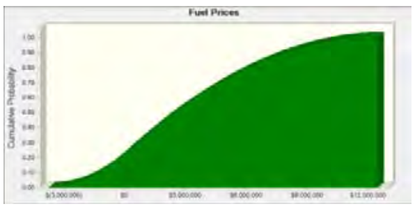
Triangular distribution with parameters:

5%	**$(3,333,235)**	**(=I17)**
Likeliest	**$0**	**(=J17)**
95%	**$3,333,235**	**(=K17)**

Assumption: Fuel Prices **Cell: J11**

Triangular distribution with parameters:

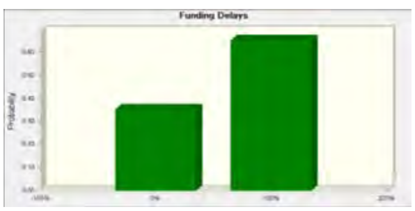
5%	**$(1,997,100)**	**(=I11)**
Likeliest	**$0**	**(=J11)**
95%	**$9,319,800**	**(=K11)**



Assumption: Funding Delays **Cell: H22**

Yes-No distribution with parameters:

Probability of Yes(1)	**0.65**	**(=H22)**



Assumption: Funding Delays (J22) **Cell: J22**

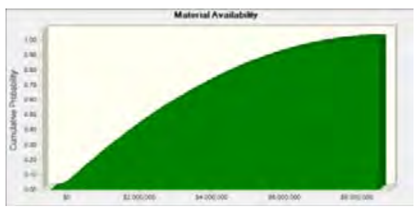
Triangular distribution with parameters:

5%	**$0**	**(=I22)**
Likeliest	**$0**	**(=J22)**
95%	**$8,080,330**	**(=K22)**

Assumption: Material Availability **Cell: J10**

Triangular distribution with parameters:

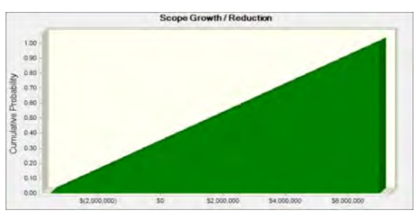
5%	**$0**	**(=I10)**
Likeliest	**$0**	**(=J10)**
95%	**$6,657,000**	**(=K10)**



Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

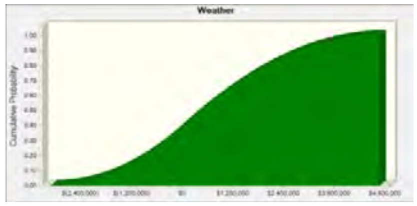
Minimum	**$(3,515,646)**	**(=I9)**
Maximum	**$7,031,293**	**(=K9)**



Assumption: Weather **Cell: J21**

Triangular distribution with parameters:

5%	**$(1,999,941)**	**(=I21)**
Likeliest	**$0**	**(=J21)**
95%	**$3,333,235**	**(=K21)**

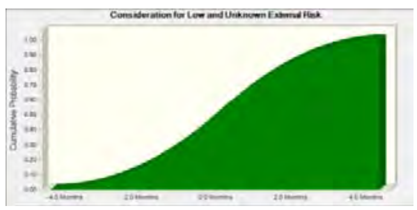


Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Schedule Risk Mod

Assumption: Consideration for Low and Unknown External Risk **Cell: J19**

Triangular distribution with parameters:

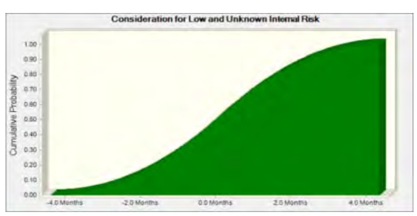
5%	**-3.0 Months**	**(=I19)**
Likeliest	**0.0 Months**	**(=J19)**
95%	**3.0 Months**	**(=K19)**



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J15**

Triangular distribution with parameters:

5%	**-3.0 Months**	**(=I15)**
Likeliest	**0.0 Months**	**(=J15)**
95%	**3.0 Months**	**(=K15)**



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J13**

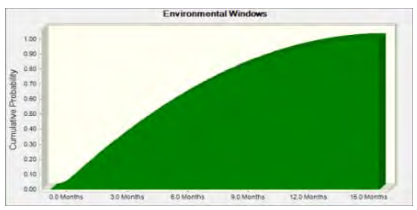
Triangular distribution with parameters:

5%	**0.0 Months**	**(=I13)**
Likeliest	**0.0 Months**	**(=J13)**
95%	**3.0 Months**	**(=K13)**

Assumption: Environmental Windows **Cell: J11**

Triangular distribution with parameters:

5%	**0.0 Months**	**(=I11)**
Likeliest	**0.0 Months**	**(=J11)**
95%	**12.0 Months**	**(=K11)**



Assumption: Funding Delays **Cell: J18**

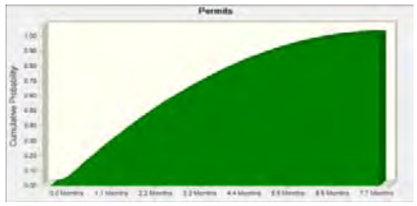
Uniform distribution with parameters:

Minimum	**0.0 Months**	**(=I18)**
Maximum	**12.0 Months**	**(=K18)**

Assumption: Permits **Cell: J10**

Triangular distribution with parameters:

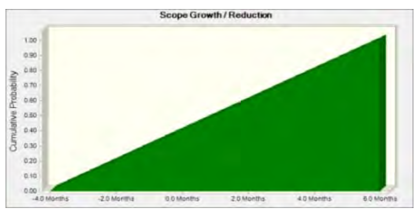
5%	0.0 Months	(=I10)
Likeliest	0.0 Months	(=J10)
95%	6.0 Months	(=K10)



Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

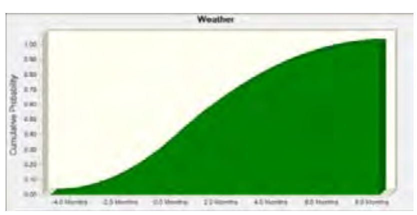
Minimum	-4.0 Months	(=I9)
Maximum	6.0 Months	(=K9)



Assumption: Weather **Cell: J17**

Triangular distribution with parameters:

5%	-3.0 Months	(=I17)
Likeliest	0.0 Months	(=J17)
95%	6.0 Months	(=K17)



Worksheet: [Copy of SAM - Walton County CSRA Updated 10-2012 - Rev. 1.xlsx]Schedule Risk Mod

Assumption: Consideration for Low and Unknown External Risk **Cell: J20**

Triangular distribution with parameters:

5%	**-3.0 Months**	**(=I20)**
Likeliest	**0.0 Months**	**(=J20)**
95%	**3.0 Months**	**(=K20)**

Assumption: Consideration for Low and Unknown Internal Risk **Cell: J16**

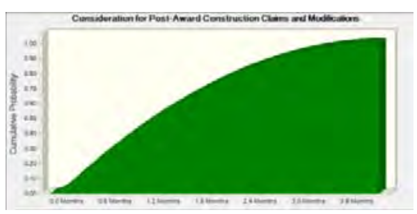
Triangular distribution with parameters:

5%	**-3.0 Months**	**(=I16)**
Likeliest	**0.0 Months**	**(=J16)**
95%	**3.0 Months**	**(=K16)**

Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J14**

Triangular distribution with parameters:

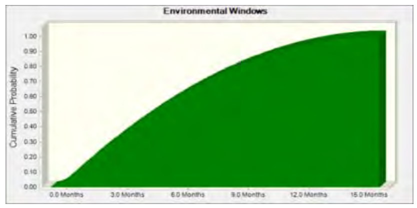
5%	**0.0 Months**	**(=I14)**
Likeliest	**0.0 Months**	**(=J14)**
95%	**3.0 Months**	**(=K14)**



Assumption: Environmental Windows **Cell: J12**

Triangular distribution with parameters:

5%	**0.0 Months**	**(=I12)**
Likeliest	**0.0 Months**	**(=J12)**
95%	**12.0 Months**	**(=K12)**



Assumption: Funding Delays **Cell: H19**

Yes-No distribution with parameters:

Probability of Yes(1)	**0.65**	**(=H19)**

Assumption: Funding Delays (J19) **Cell: J19**

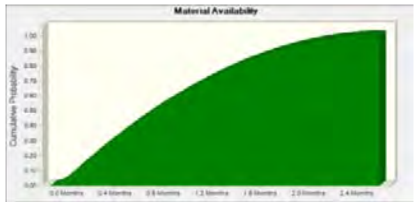
Uniform distribution with parameters:

Minimum	**0.0 Months**	**(=I19)**
Maximum	**12.0 Months**	**(=K19)**

Assumption: Material Availability **Cell: J10**

Triangular distribution with parameters:

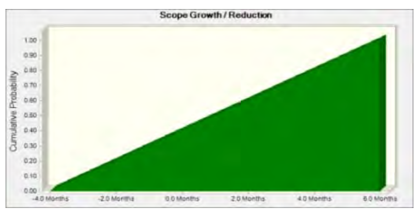
5%	**0.0 Months**	**(=I10)**
Likeliest	**0.0 Months**	**(=J10)**
95%	**2.0 Months**	**(=K10)**



Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

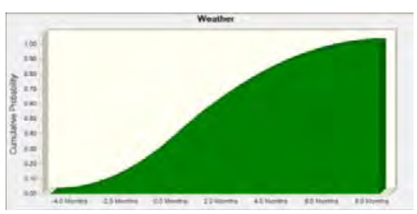
Minimum	**-4.0 Months**	**(=I9)**
Maximum	**6.0 Months**	**(=K9)**



Assumption: Weather **Cell: J18**

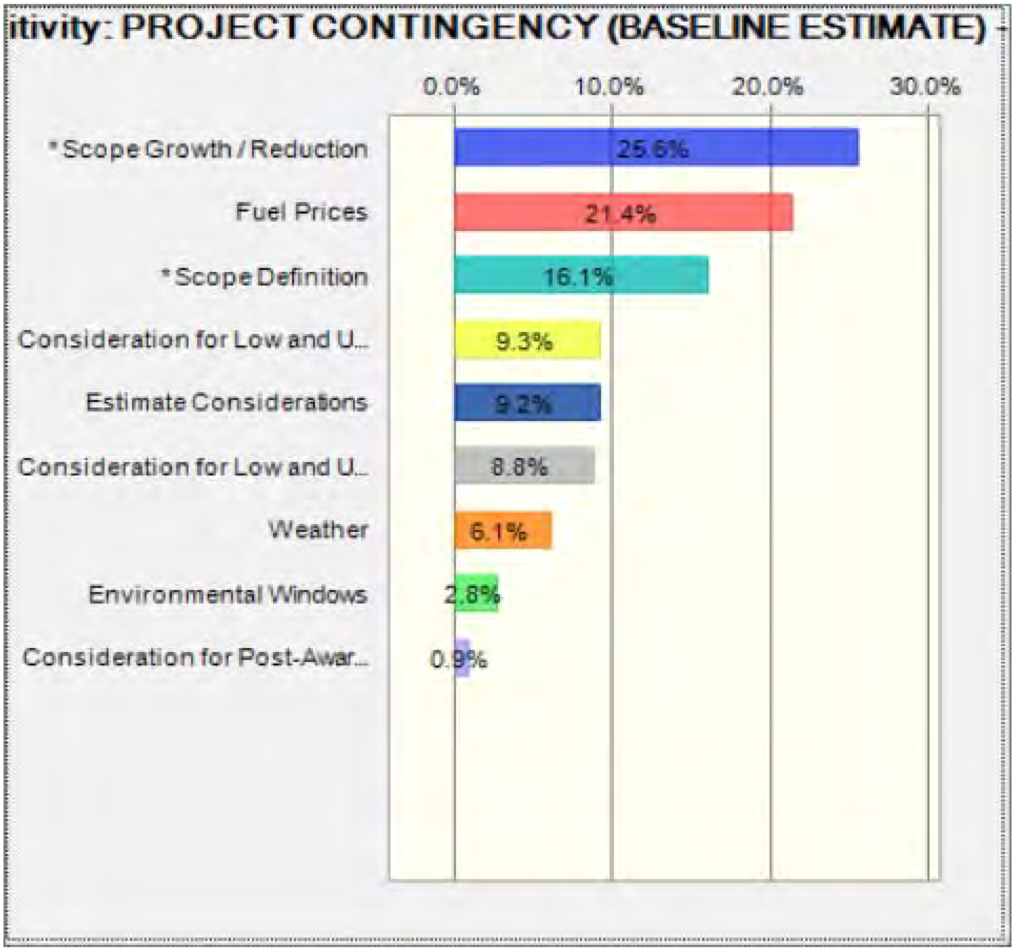
Triangular distribution with parameters:

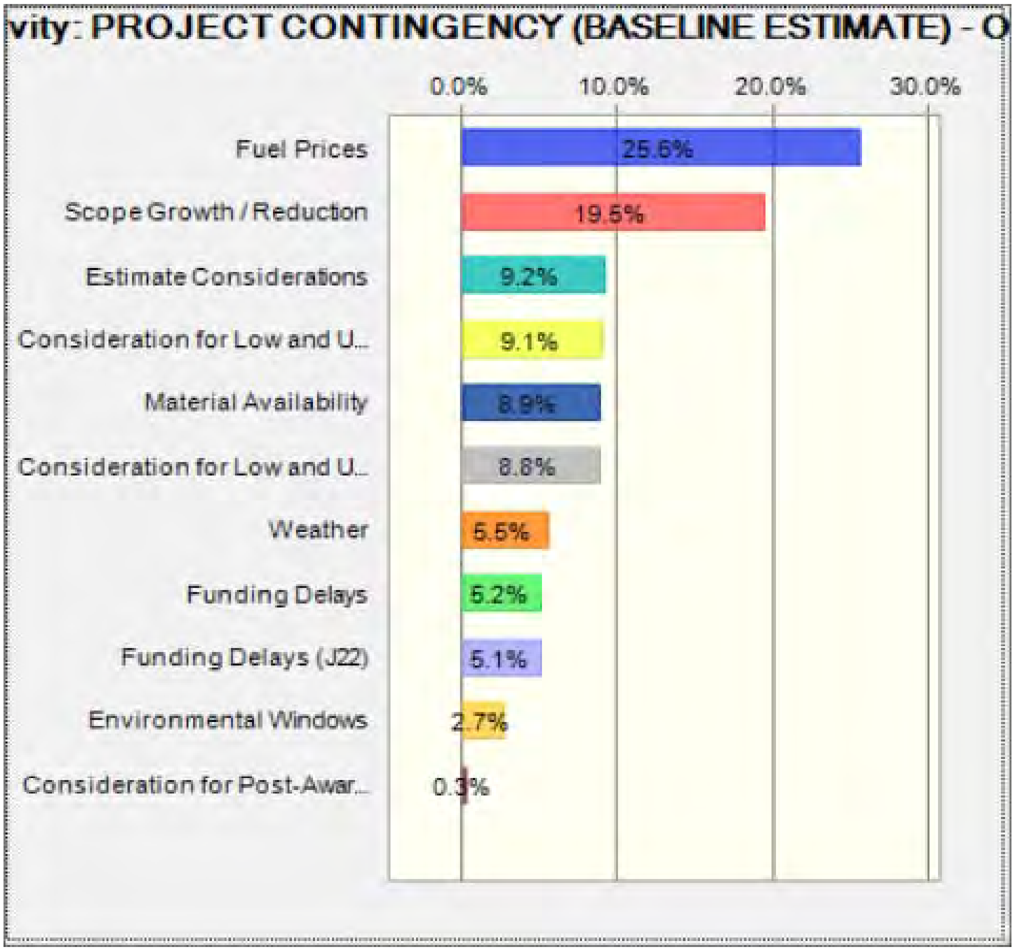
5%	**-3.0 Months**	**(=I18)**
Likeliest	**0.0 Months**	**(=J18)**
95%	**6.0 Months**	**(=K18)**

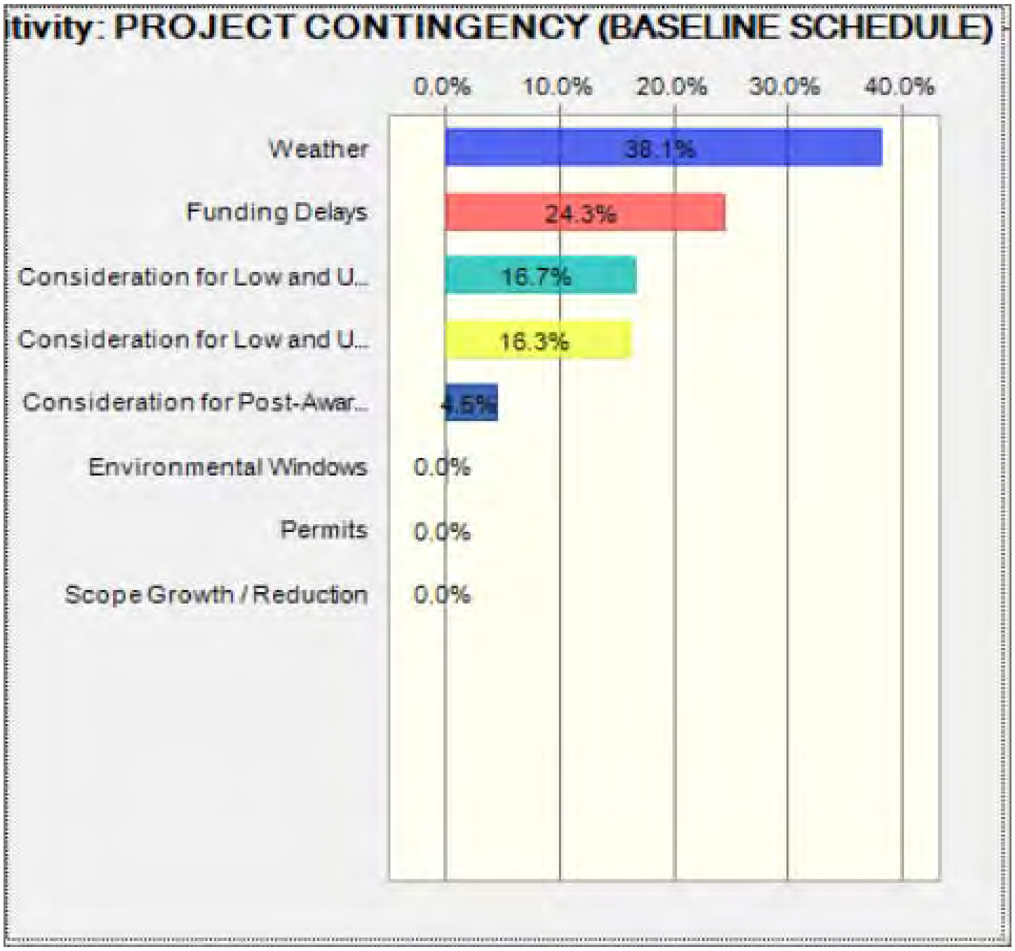


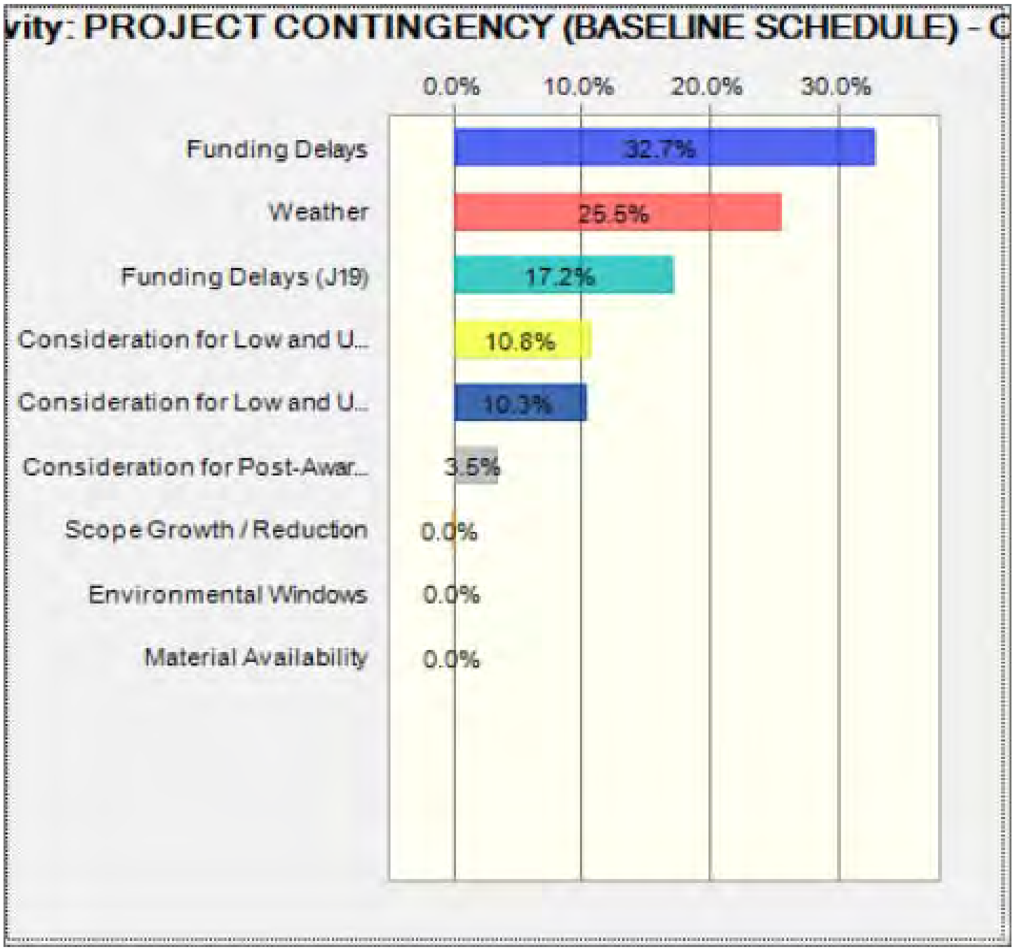
End of Assumptions

Sensitivity Charts




vity: PROJECT CONTINGENCY (BASELINE ESTIMATE) - O
0.0%
10.0%
20.0%
30.0%
Fuel Prices
25.6%
Scope Growth / Reduction
19.5%
Estimate Considerations
9.2%
Consideration for Low and U...
9.1%
Material Availability
8.9%
Consideration for Low and U...
8.8%
Weather
5.5%
Funding Delays
5.2%
Funding Delays (J22)
5.1%
Environmental Windows
2.7%
Consideration for Post-Awar...
0.3%


tivity: PROJECT CONTINGENCY (BASELINE SCHEDULE)
0.0%
10.0%
20.0%
30.0%
40.0%
Weather
38.1%
Funding Delays
24.3%
Consideration for Low and U...
16.7%
Consideration for Low and U...
16.3%
Consideration for Post-Awar...
4.5%
Environmental Windows
0.0%
Permits
0.0%
Scope Growth / Reduction
0.0%



End of Sensitivity Charts

US Army Corps
of Engineers®

Walton County Hurricane and Storm Damage Reduction
Walton County, Florida
General Investigations Study
Locally Preferred Plan (LPP)
Project Cost and Schedule Risk Analysis Report

Prepared for:

U.S. Army Corps of Engineers,
Mobile District

Prepared by:

U.S. Army Corps of Engineers
Cost Engineering Directory of Expertise, Walla Walla

October 12, 2012

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EXECUTIVE SUMMARY

Under the auspices of the U.S. Army Corps of Engineers (USACE), Mobile District, this report presents a recommendation for the total project cost and schedule contingencies for the Walton County Hurricane and Storm Damage Reduction General Investigations Study. In compliance with Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008, a formal risk analysis study was conducted for the development of contingency on the total project cost. The purpose of this risk analysis study was to establish project contingencies by identifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

Specific to the Walton County project, the base case project cost for the Locally Preferred Plan (LPP) is estimated at approximately $129 Million ($51 Million for the initial construction and $79 Million for the four subsequent nourishment activities). Based on the results of the analysis, the Cost Engineering Mandatory Center of Expertise for Civil Works (Walla Walla District) recommends a contingency value of $34 Million, or 27%. This contingency includes $10 Million (21%) for the initial construction and $24 Million (31%) for the four subsequent nourishment activities.

Walla Walla Cost MCX performed risk analysis using the *Monte Carlo* technique, producing the aforementioned contingencies and identifying key risk drivers.

The following tables ES-1, ES-2, and ES-3 portray the development of contingencies (27% overall). The contingency is based on an 80% confidence level, as per USACE Civil Works guidance.

Table ES-1. Contingency Analysis Table - Overall

Base Case Cost Estimate	**$129,336,768**	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$126,907,427	-1.88%
50%	$150,691,083	16.51%
80%	**$163,752,140**	**26.61%**
95%	$176,220,998	36.25%

Table ES-2. Contingency Analysis Table - Initial

Base Case Cost Estimate	$50,677,457	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$47,808,835	-5.66%
50%	$56,451,737	11.39%
80%	**$61,075,892**	**20.52%**
95%	$65,450,609	29.15%

Table ES-3. Contingency Analysis Table – Out-Years

Base Case Cost Estimate	$78,659,310	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$79,098,591	0.56%
50%	$94,239,346	19.81%
80%	**$102,676,248**	**30.53%**
95%	$110,770,388	40.82%

The following table ES-2 portrays the full costs of the recommended alternative based on the anticipated contracts. The costs are intended to address the congressional request of estimates to implement the project. The contingency is based on an 80% confidence level, as per accepted USACE Civil Works guidance.

Table ES-4. Cost Summary

WALTON COUNTY HURRICANE AND STORM DAMAGE REDUCTION FRM FEATURE ACCOUNTS		COST ($1,000)	CNTG ($1,000)	TOTAL ($1,000)
01	FISH AND WILDLIFE FACILITIES	543	136	679
17	CHANNELS AND CANALS	122,661	32,639	155,300
30	PLANNING, ENGINEERING, AND DESIGN	3,680	979	4,659
31	CONSTRUCTION MANAGEMENT	2,453	653	3,106
	TOTAL PROJECT COSTS	**129,337**	**34,407**	**163,744**

Notes:
1) Costs include the recommended contingency of 27% with the exception of the 01 Account (Lands and Damages), which used a contingency of 25%, as prepared by the District Real Estate Office.
2) Costs exclude O&M and Life Cycle Cost estimates.

KEY FINDINGS/OBSERVATIONS RECOMMENDATIONS

For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

For Risks I-2 (Scope Growth/Reduction) and I-1 (Scope Definition), although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

For Risk I-5 (Fuel Prices), dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 45 percent of the statistical cost variance.

For Risk I-5 (Fuel Prices), dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

For Risk I-2 (Scope Growth/Reduction), although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 62 percent of the statistical schedule variance.

For Risk E-1 (Weather), the PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For Risk E-2 (Funding Delays), the PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

For Risk E-2 (Funding Delays), the PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

For Risk E-1 (Weather), the PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

Recommendations, as detailed within the main report, include the implementation of cost and schedule contingencies, further iterative study of risks throughout the project life-cycle, potential mitigation throughout the PED phase, and proactive monitoring and control of risk identified in this study.

MAIN REPORT

1.0 PURPOSE

Under the auspices of the US Army Corps of Engineers (USACE), Mobile District, this report presents a recommendation for the total project cost and schedule contingencies for the Walton County Hurricane and Storm Damage Reduction Project.

2.0 BACKGROUND

Walton County is located approximately 103 miles east of Pensacola, Florida and 98 miles west of Tallahassee, Florida. The beaches of Walton County encompass approximately 26 miles of shoreline extending from the City of Destin in Okaloosa County, Florida (about six miles to the east of East Pass) to the Walton/Bay County line near Phillips Inlet. The western two-thirds of Walton County are comprised of a coastal peninsula extending from the mainland, and the eastern third is comprised of mainland beaches. Choctawhatchee Bay lies north of the peninsula. Walton County includes 11.9 miles of state-designated critically eroding areas and three State of Florida park areas that cover approximately six miles of the 26-mile shoreline.

The Walton County shoreline is characterized by high dune elevations partly due to the presence of Pleistocene bluffs formed as a result of an exposed submarine berm formed during inundation of the Florida Peninsula during that geologic period. Primary dune elevations in Walton County range from 11.5 to 44.5 feet North American Vertical Datum, 1988 (NAVD88) and average 25.5 feet. Along the mid-section of Walton County, Bluff elevations exceed 60 feet in height. Bluff erosion and undercutting occur in this area due to the interface of relatively low flat beaches and the bluff toe. An unusual attribute of the Walton County shoreline is the presence of coastal dune lakes. These lakes are rare worldwide and are almost exclusive to the Gulf Coast within the United States. The lakes are about five feet deep and intermittently breach the dune system and discharge directly into the Gulf of Mexico.

Mild winters and warm hot summers characterize the project area, with an average in excess of 280 days a year of sunshine. The average daily temperature is 67 degrees Fahrenheit and the average water temperature is about 70 degrees Fahrenheit. The months from June through November constitute the hurricane storm season, and this area is subject to tropical storm and strong hurricane conditions. The highest period of rainfall occurs during the storm season, with an average annual rainfall of 64 inches.

Walton County's shoreline is receding; the protective dunes and high bluffs are being destroyed by hurricane and storm forces that are occurring more frequently than before.

The impacts of these storms to property and infrastructure are considerable and can possibly be reduced through a beach restoration and stabilization project.

As a part of this effort, Mobile District requested that the USACE Cost Engineering Mandatory Center of Expertise for Civil Works (Cost Engineering MCX) provide an agency technical review (ATR) of the cost estimate and schedule for Recommended Project Plan. That tasking also included providing a risk analysis study to establish the resulting contingencies.

3.0 REPORT SCOPE

The scope of the risk analysis report is to calculate and present the cost and schedule contingencies at the 80 percent confidence level using the risk analysis processes, as mandated by U.S. Army Corps of Engineers (USACE) Engineer Regulation (ER) 1110-2-1150, Engineering and Design for Civil Works, ER 1110-2-1302, Civil Works Cost Engineering, and Engineer Technical Letter 1110-2-573, Construction Cost Estimating Guide for Civil Works. The report presents the contingency results for cost risks for all project features. The study and presentation does not include consideration for life cycle costs.

3.1 Project Scope

The formal process included extensive involvement of the PDT for risk identification and the development of the risk register. The analysis process evaluated the base case Micro Computer Aided Cost Estimating System (MCACES) cost estimate, schedule, and funding profiles using Crystal Ball software to conduct a *Monte Carlo* simulation and statistical sensitivity analysis, per the guidance in Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

The project technical scope, estimates and schedules were developed and presented by the Mobile District. Consequently, these documents serve as the basis for the risk analysis.

The scope of this study addresses the identification of problems, needs, opportunities and potential solutions that are viable from an economic, environmental, and engineering viewpoint.

3.2 USACE Risk Analysis Process

The risk analysis process for this study follows the USACE Headquarters requirements as well as the guidance provided by the Cost Engineering MCX. The risk analysis process reflected within this report uses probabilistic cost and schedule risk analysis methods within the framework of the Crystal Ball software. Furthermore, the scope of the report includes the identification and communication of important steps, logic, key assumptions, limitations, and decisions to help ensure that risk analysis results can be appropriately interpreted.

Risk analysis results are also intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as the project progresses through planning and implementation. To fully recognize its benefits, cost and schedule risk analysis should be considered as an ongoing process conducted concurrent to, and iteratively with, other important project processes such as scope and execution plan development, resource planning, procurement planning, cost estimating, budgeting and scheduling.

In addition to broadly defined risk analysis standards and recommended practices, this risk analysis was performed to meet the requirements and recommendations of the following documents and sources:

- Cost and Schedule Risk Analysis Process guidance prepared by the USACE Cost Engineering MCX.

- Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008.

- Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

4.0 METHODOLOGY / PROCESS

The Walla Walla Cost Engineering MCX performed the Cost and Schedule Risk Analysis, relying on local Mobile District staff to provide information gathering. The Mobile District PDT conducted risk identification and qualitative analysis to produce a risk register that served as the framework for the risk analysis. Participants in risk identification meeting included the following:

Name	Organization	Title
Joseph H. Ellsworth	USACE - SAM	Lead Cost Engineer
Bernard E. Moseby	USACE - SAM	Planning Economics
Julie M. Watkins	USACE - SAM	Planning Economics
Elizabeth S. Godsey	USACE - SAM	Hydraulic Engineer
Michael A. McKown	USACE - SAM	Structural Engineer - GeoTech
Russell W Blount	USACE - SAM	Real Estate Specialist
Joseph W. Paine	USACE - SAM	Planning Study Manager
Larry E. Parsons	USACE - SAM	Planning Environmental

The first cost risk model was completed February 11, 2010. However, scope and estimate updates since then, as well as agency technical review, necessitated a rerun of the original model. The final results were completed and reported to Mobile on October 5, 2012.

The risk analysis process for this study is intended to determine the probability of various cost outcomes and quantify the required contingency needed in the cost estimate to achieve the desired level of cost confidence. Per regulation and guidance, the P80 confidence level (80% confidence level) is the normal and accepted cost confidence level. District Management has the prerogative to select different confidence levels, pending approval from Headquarters, USACE.

In simple terms, contingency is an amount added to an estimate to allow for items, conditions or events for which the occurrence or impact is uncertain and that experience suggests will likely result in additional costs being incurred or additional time being required. The amount of contingency included in project control plans depends, at least in part, on the project leadership's willingness to accept risk of project overruns. The less risk that project leadership is willing to accept the more contingency should be applied in the project control plans. The risk of overrun is expressed, in a probabilistic context, using confidence levels.

The Cost MCX guidance for cost and schedule risk analysis generally focuses on the 80-percent level of confidence (P80) for cost contingency calculation. It should be noted that use of P80 as a decision criteria is a risk averse approach (whereas the use of P50 would be a risk neutral approach, and use of levels less than 50 percent would be risk seeking). Thus, a P80 confidence level results in greater contingency as compared to a P50 confidence level. The selection of contingency at a particular confidence level is ultimately the decision and responsibility of the project's District and/or Division management.

The risk analysis process uses *Monte Carlo* techniques to determine probabilities and contingency. The *Monte Carlo* techniques are facilitated computationally by a commercially available risk analysis software package (Crystal Ball) that is an add-in to Microsoft Excel. Cost estimates are packaged into an Excel format and used directly for cost risk analysis purposes. The level of detail recreated in the Excel-format schedule is sufficient for risk analysis purposes that reflect the established risk register, but generally less than that of the native format.

The primary steps, in functional terms, of the risk analysis process are described in the following subsections. Risk analysis results are provided in Section 6.

4.1 Identify and Assess Risk Factors

Identifying the risk factors via the PDT is considered a qualitative process that results in establishing a risk register that serves as the document for the quantitative study using the Crystal Ball risk software. Risk factors are events and conditions that may influence or drive uncertainty in project performance. They may be inherent characteristics or conditions of the project or external influences, events, or conditions such as weather or economic conditions. Risk factors may have either favorable or unfavorable impacts on project cost and schedule.

A formal PDT meeting was held with the Mobile District office for the purposes of identifying and assessing risk factors. The meeting included capable and qualified representatives from multiple project team disciplines and functions, including project management, cost engineering, design, environmental compliance, and real estate

The initial formal meetings focused primarily on risk factor identification using brainstorming techniques, but also included some facilitated discussions based on risk factors common to projects of similar scope and geographic location. Subsequent meetings focused primarily on risk factor assessment and quantification.

Additionally, numerous conference calls and informal meetings were conducted throughout the risk analysis process on an as-needed basis to further facilitate risk factor identification, market analysis, and risk assessment.

4.2 Quantify Risk Factor Impacts

The quantitative impacts of risk factors on project plans were analyzed using a combination of professional judgment, empirical data and analytical techniques. Risk factor impacts were quantified using probability distributions (density functions) because risk factors are entered into the Crystal Ball software in the form of probability density functions.

Similar to the identification and assessment process, risk factor quantification involved multiple project team disciplines and functions. However, the quantification process relied more extensively on collaboration between cost engineering and risk analysis team members with lesser inputs from other functions and disciplines. This process used an iterative approach to estimate the following elements of each risk factor:

- Maximum possible value for the risk factor
- Minimum possible value for the risk factor
- Most likely value (the statistical mode), if applicable
- Nature of the probability density function used to approximate risk factor uncertainty
- Mathematical correlations between risk factors

- Affected cost estimate and schedule elements

The resulting product from the PDT discussions is captured within a risk register as presented in section 6 for both cost and schedule risk concerns. Note that the risk register records the PDT's risk concerns, discussions related to those concerns, and potential impacts to the current cost and schedule estimates. The concerns and discussions support the team's decisions related to event likelihood, impact, and the resulting risk levels for each risk event.

4.3 Analyze Cost Estimate and Schedule Contingency

Contingency is analyzed using the Crystal Ball software, an add-in to the Microsoft Excel format of the cost estimate and schedule. *Monte Carlo* simulations are performed by applying the risk factors (quantified as probability density functions) to the appropriate estimated cost and schedule elements identified by the PDT. Contingencies are calculated by applying only the moderate and high level risks identified for each option (i.e., low-level risks are typically not considered, but remain within the risk register to serve historical purposes as well as support follow-on risk studies as the project and risks evolve).

For the cost estimate, the contingency is calculated as the difference between the P80 cost forecast and the baseline cost estimate. Each option-specific contingency is then allocated on a civil works feature level based on the dollar-weighted relative risk of each feature as quantified by *Monte Carlo* simulation. Standard deviation is used as the feature-specific measure of risk for contingency allocation purposes. This approach results in a relatively larger portion of all the project feature cost contingency being allocated to features with relatively higher estimated cost uncertainty.

5.0 PROJECT ASSUMPTIONS

The following data sources and assumptions were used in quantifying the costs associated with the Walton County Hurricane and Storm Damage Reduction project.

a. The Mobile District provided MII MCACES (Micro-Computer Aided Cost Estimating Software) files electronically. The MII and CWE files transmitted and downloaded on October 5, 2012 was the basis for the final cost and schedule risk analyses.

b. The cost comparisons and risk analyses performed and reflected within this report are based on design scope and estimates that are at the feasibility level.

c. Schedules are analyzed for impact to the project cost in terms of both uncaptured escalation (variance from OMB factors and the local market) and unavoidable fixed contract costs and/or languishing federal administration costs incurred throughout delay.

Specific to the Walton County Hurricane and Storm Damage Reduction project, the schedule was analyzed only for impacts due to residual fixed costs.

d. Per the CWCCIS Historical State Adjustment Factors in EM 1110-2-1304, State Adjustment Factor for the State of Florida is 0.93, meaning that the average inflation for the project area is assumed to be 7% lower than the national average for inflation. Therefore, it is assumed that the project inflations experienced are similar (or better) to OMB inflation factors for future construction. Thus, the risk analyses accounted for no escalation over and above the national average.

e. Per the data in the estimate, the Overhead percentage for the Prime Contractor is 16%. The analysis assumed that approximately half of this amount is Job Office Overhead (JOOH). Thus, the assumed residual fixed cost rate for this project is 8%. For the P80 schedule, this comprises approximately 4% of the total contingency for the initial activity and 5% of the total contingency for the subsequent nourishments. This is due to the accrual of residual fixed costs associated with delay associated with the implementation schedule of each nourishment.

f. The Cost MCX guidance generally focuses on the eighty-percent level of confidence (P80) for cost contingency calculation. For this risk analysis, the eighty-percent level of confidence (P80) was used. It should be noted that the use of P80 as a decision criteria is a moderately risk averse approach, generally resulting in higher cost contingencies. However, the P80 level of confidence also assumes a small degree of risk that the recommended contingencies may be inadequate to capture actual project costs.

g. Only high and moderate risk level impacts, as identified in the risk register, were considered for the purposes of calculating cost contingency. Low level risk impacts should be maintained in project management documentation, and reviewed at each project milestone to determine if they should be placed on the risk "watch list".

6.0 RESULTS

The cost and schedule risk analysis results are provided in the following sections. In addition to contingency calculation results, sensitivity analyses are presented to provide decision makers with an understanding of variability and the key contributors to the cause of this variability.

6.1 Risk Register

A risk register is a tool commonly used in project planning and risk analysis. The actual risk register is provided in Appendix A. The complete risk register includes low level risks, as well as additional information regarding the nature and impacts of each risk.

It is important to note that a risk register can be an effective tool for managing identified risks throughout the project life cycle. As such, it is generally recommended that risk registers be updated as the designs, cost estimates, and schedule are further refined, especially on large projects with extended schedules. Recommended uses of the risk register going forward include:

- Documenting risk mitigation strategies being pursued in response to the identified risks and their assessment in terms of probability and impact.
- Providing project sponsors, stakeholders, and leadership/management with a documented framework from which risk status can be reported in the context of project controls.
- Communicating risk management issues.
- Providing a mechanism for eliciting feedback and project control input.
- Identifying risk transfer, elimination, or mitigation actions required for implementation of risk management plans.

6.2 Cost Contingency and Sensitivity Analysis

The result of risk or uncertainty analysis is quantification of the cumulative impact of all analyzed risks or uncertainties as compared to probability of occurrence. These results, as applied to the analysis herein, depict the overall project cost at intervals of confidence (probability).

Table 1 provides the construction cost contingencies calculated for the P80 confidence level and rounded to the nearest thousand. The construction cost contingencies for the P50 and P100 confidence levels are also provided for illustrative purposes only.

Contingency was quantified as approximately $36 Million at the P80 confidence level (31% of the baseline cost estimate). For comparison, the cost contingency at the P50 and P100 confidence levels was quantified as 19% and 70% of the baseline cost estimate, respectively.

Table 1. Project Cost Contingency Summary

Risk Analysis Forecast	Baseline Estimate	Total Contingency[1,2] ($)	Total Contingency (%)
50% Confidence Level			
Project Cost	$154,122,363	$24,785,596	19.16%
80% Confidence Level			
Project Cost	$169,848,864	$40,512,096	31.32%
100% Confidence Level			
Project Cost	$219,864,829	$90,528,061	69.99%

Notes:
1) These figures combine uncertainty in the baseline cost estimates and schedule.
2) A P100 confidence level is an abstract concept for illustration only, as the nature of risk and uncertainty (specifically the presence of “unknown unknowns”) makes 100% confidence a theoretical impossibility.

6.2.1 Sensitivity Analysis

Sensitivity analysis generally ranks the relative impact of each risk/opportunity as a percentage of total cost uncertainty. The Crystal Ball software uses a statistical measure (contribution to variance) that approximates the impact of each risk/opportunity contributing to variability of cost outcomes during *Monte Carlo* simulation.

Key cost drivers identified in the sensitivity analysis can be used to support development of a risk management plan that will facilitate control of risk factors and their potential impacts throughout the project lifecycle. Together with the risk register, sensitivity analysis results can also be used to support development of strategies to eliminate, mitigate, accept or transfer key risks.

6.2.2 Sensitivity Analysis Results

The risks/opportunities considered as key or primary cost drivers are ranked in order of importance in contribution to variance bar charts. Opportunities that have a potential to reduce project cost and are shown with a negative sign; risks are shown with a positive sign to reflect the potential to increase project cost. A longer bar in the sensitivity analysis chart represents a greater potential impact to project cost.

Figure 1 presents a sensitivity analysis for cost growth risk from the high level cost risks identified in the risk register. Likewise, Figure 2 presents a sensitivity analysis for schedule growth risk from the high level schedule risks identified in the risk register.

Figure 1. Cost Sensitivity Analysis - Initial

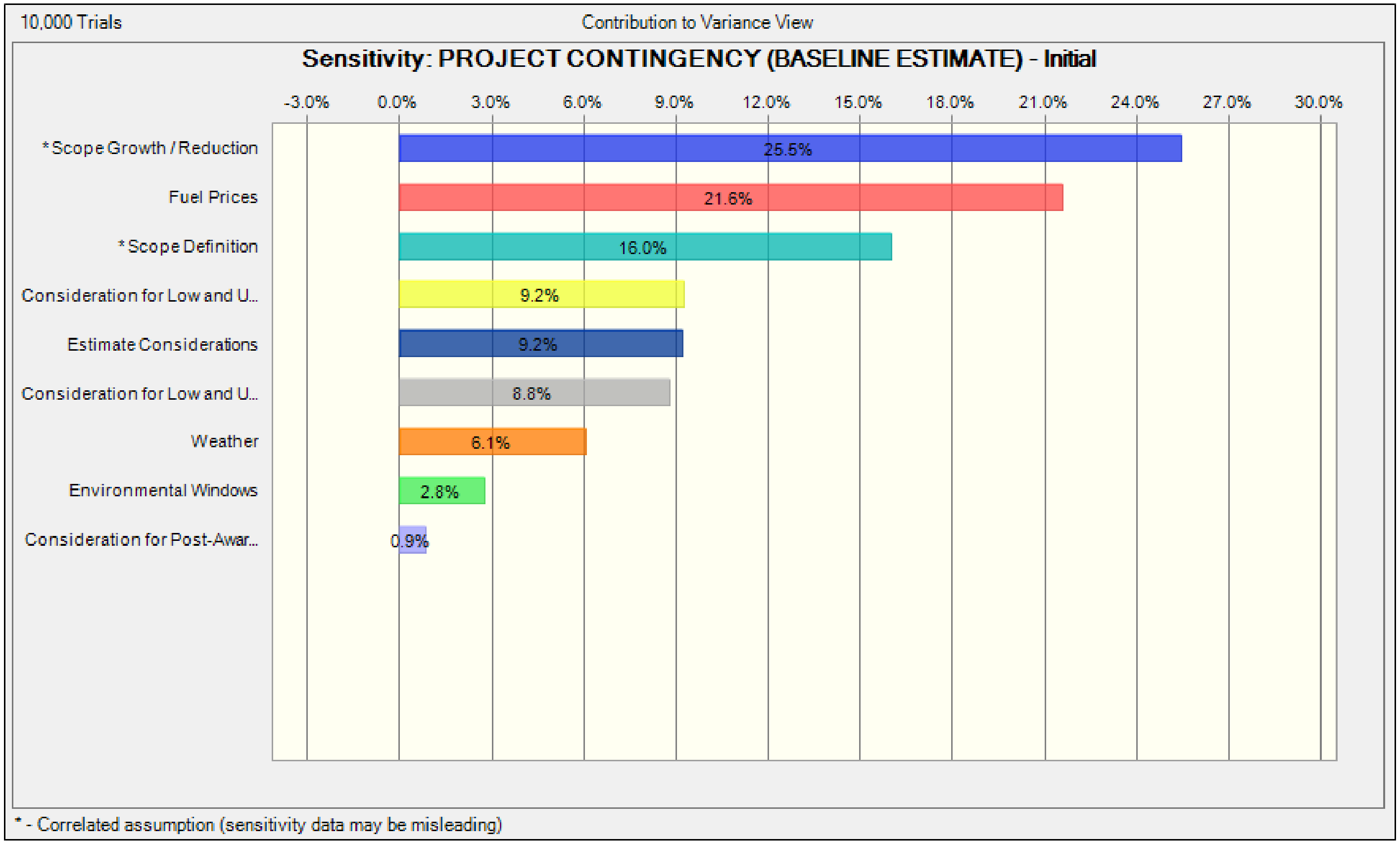


Figure 2. Cost Sensitivity Analysis – Out-Years

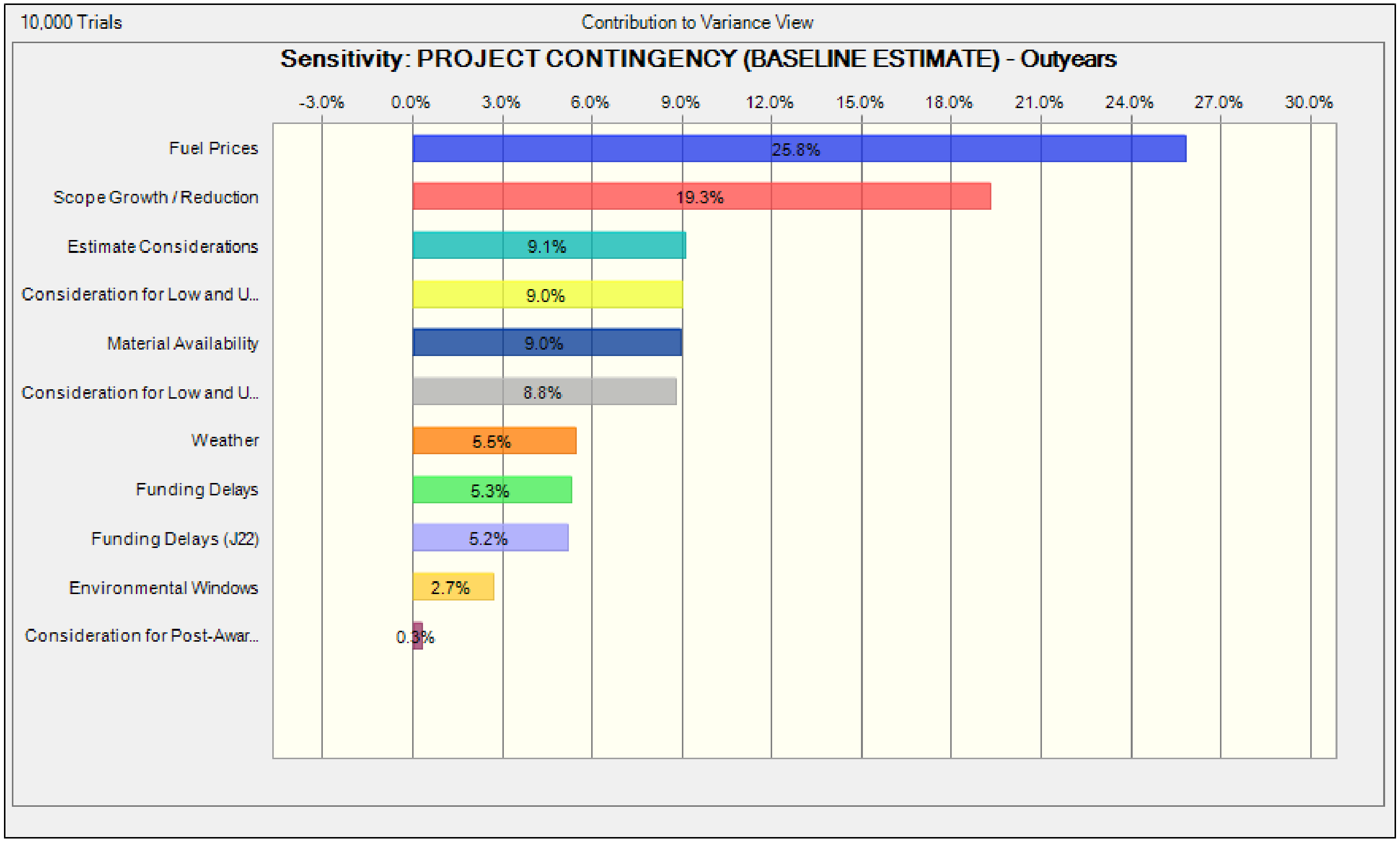


Figure 3. Schedule Sensitivity Analysis – Initial

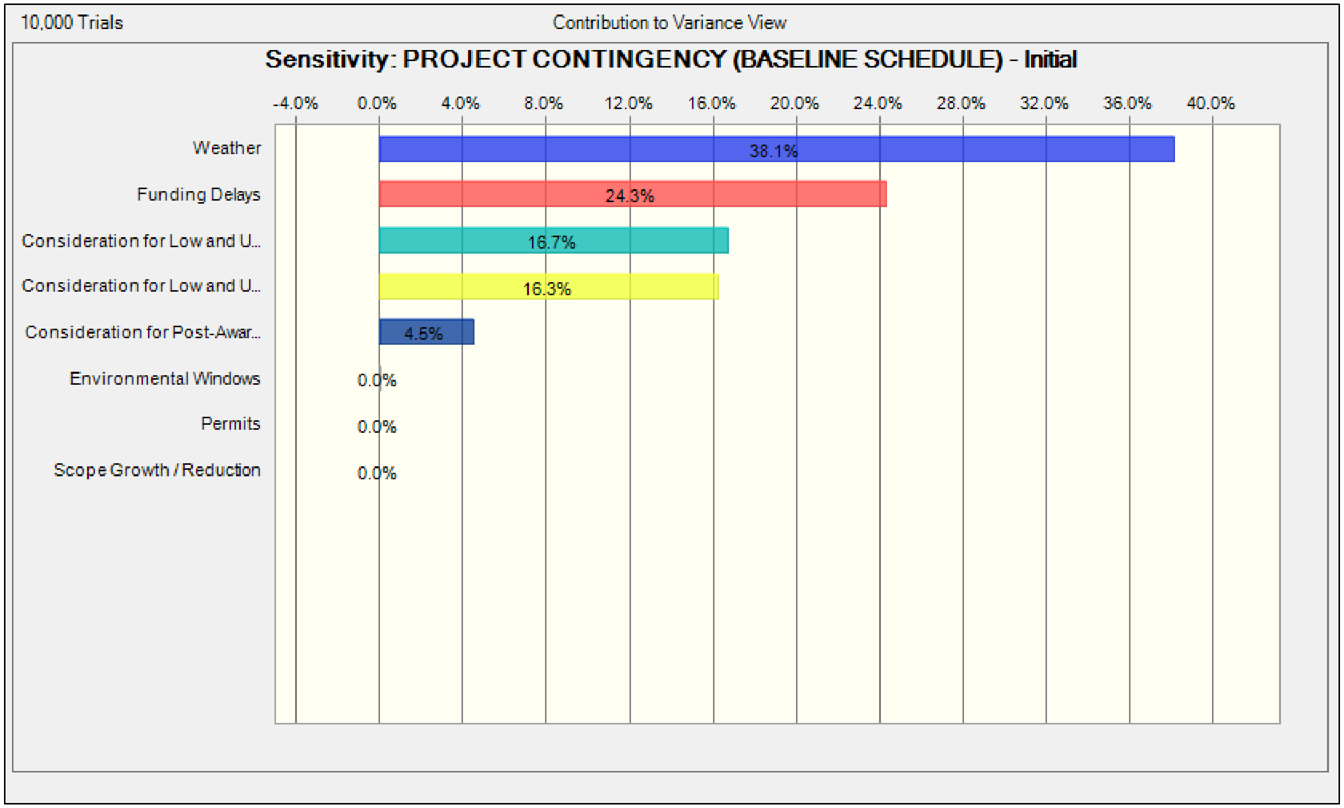
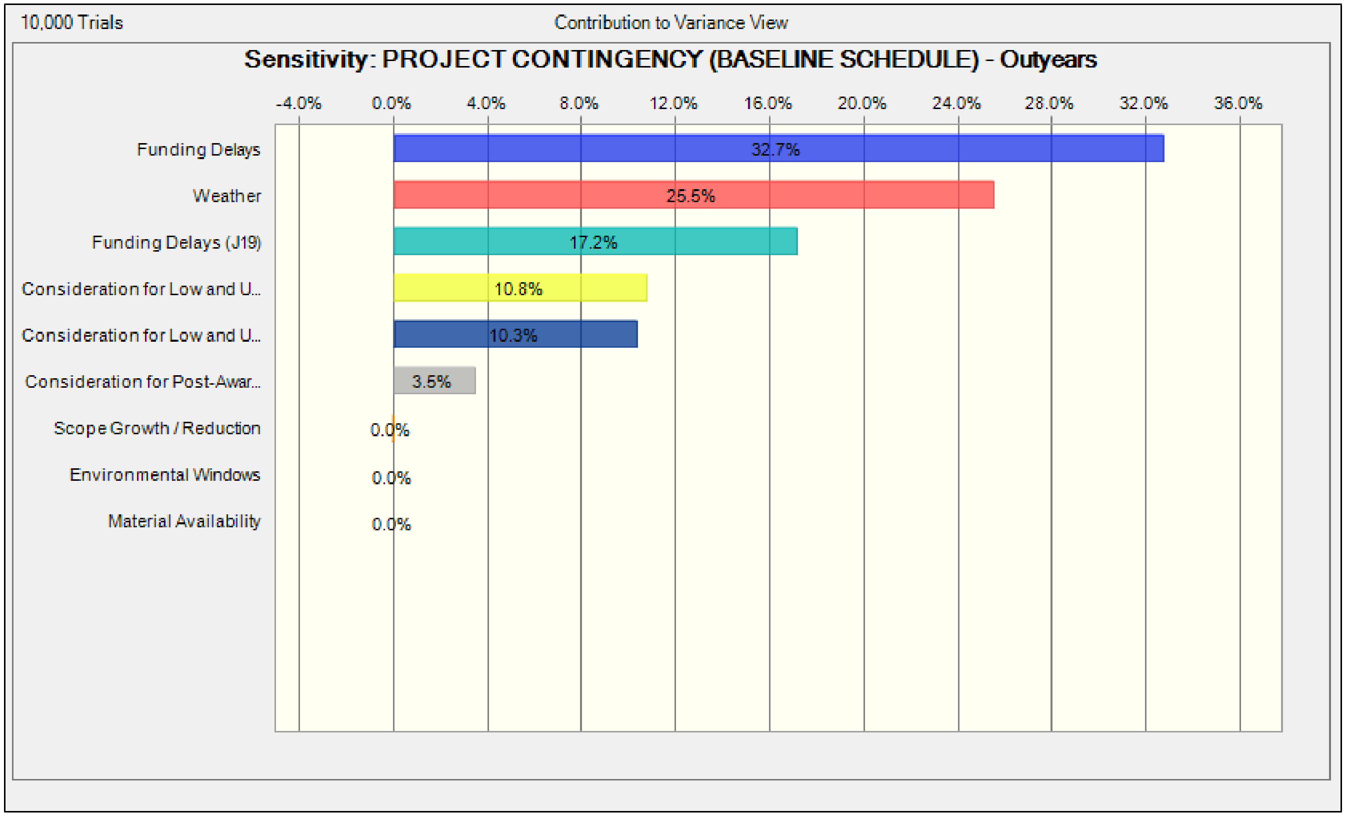


Figure 4. Schedule Sensitivity Analysis – Out-Years



7.0 MAJOR FINDINGS/OBSERVATIONS/RECOMMENDATIONS

This section provides a summary of significant risk analysis results that are identified in the preceding sections of the report. Risk analysis results are intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as projects progress through planning and implementation. Because of the potential for use of risk analysis results for such diverse purposes, this section also reiterates and highlights important steps, logic, key assumptions, limitations, and decisions to help ensure that the risk analysis results are appropriately interpreted.

7.1 Major Findings/Observations

Project cost comparison summaries are provided in Table 3 and Figure 3. Additional major findings and observations of the risk analysis are listed below.

1. For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

2. For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 45 percent of the statistical schedule variance.

3. For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 63 percent of the statistical cost variance.

4. For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

5. Operation and maintenance activities were not included in the cost estimate or schedules. Therefore, a full life cycle risk analysis could not be performed. Risk analysis results or conclusions could be significantly different if the necessary operation and maintenance activities were included.

Table 3. Project Cost Comparison Summary (Uncertainty Analysis)

Confidence Level	Project Cost ($)	Contingency ($)	Contingency (%)
P0	**$95,778,087**	**($33,558,681)**	**-25.95%**
P5	**$125,940,994**	**($3,395,773)**	**-2.63%**
P10	**$131,759,933**	**$2,423,166**	**1.87%**
P15	**$135,859,021**	**$6,522,253**	**5.04%**
P20	**$139,249,288**	**$9,912,520**	**7.66%**
P25	**$142,086,556**	**$12,749,789**	**9.86%**
P30	**$144,660,598**	**$15,323,831**	**11.85%**
P35	**$147,087,096**	**$17,750,329**	**13.72%**
P40	**$149,515,085**	**$20,178,318**	**15.60%**
P45	**$151,784,317**	**$22,447,549**	**17.36%**
P50	**$154,122,363**	**$24,785,596**	**19.16%**
P55	**$156,455,880**	**$27,119,112**	**20.97%**
P60	**$158,786,146**	**$29,449,378**	**22.77%**
P65	**$161,224,719**	**$31,887,951**	**24.65%**
P70	**$163,836,971**	**$34,500,203**	**26.67%**
P75	**$166,614,500**	**$37,277,733**	**28.82%**
P80	**$169,848,864**	**$40,512,096**	**31.32%**
P85	**$173,499,382**	**$44,162,615**	**34.15%**
P90	**$178,165,673**	**$48,828,906**	**37.75%**
P95	**$184,732,784**	**$55,396,017**	**42.83%**
P100	**$219,864,829**	**$90,528,061**	**69.99%**

Figure 3. Project Cost Summary (Uncertainty Analysis)

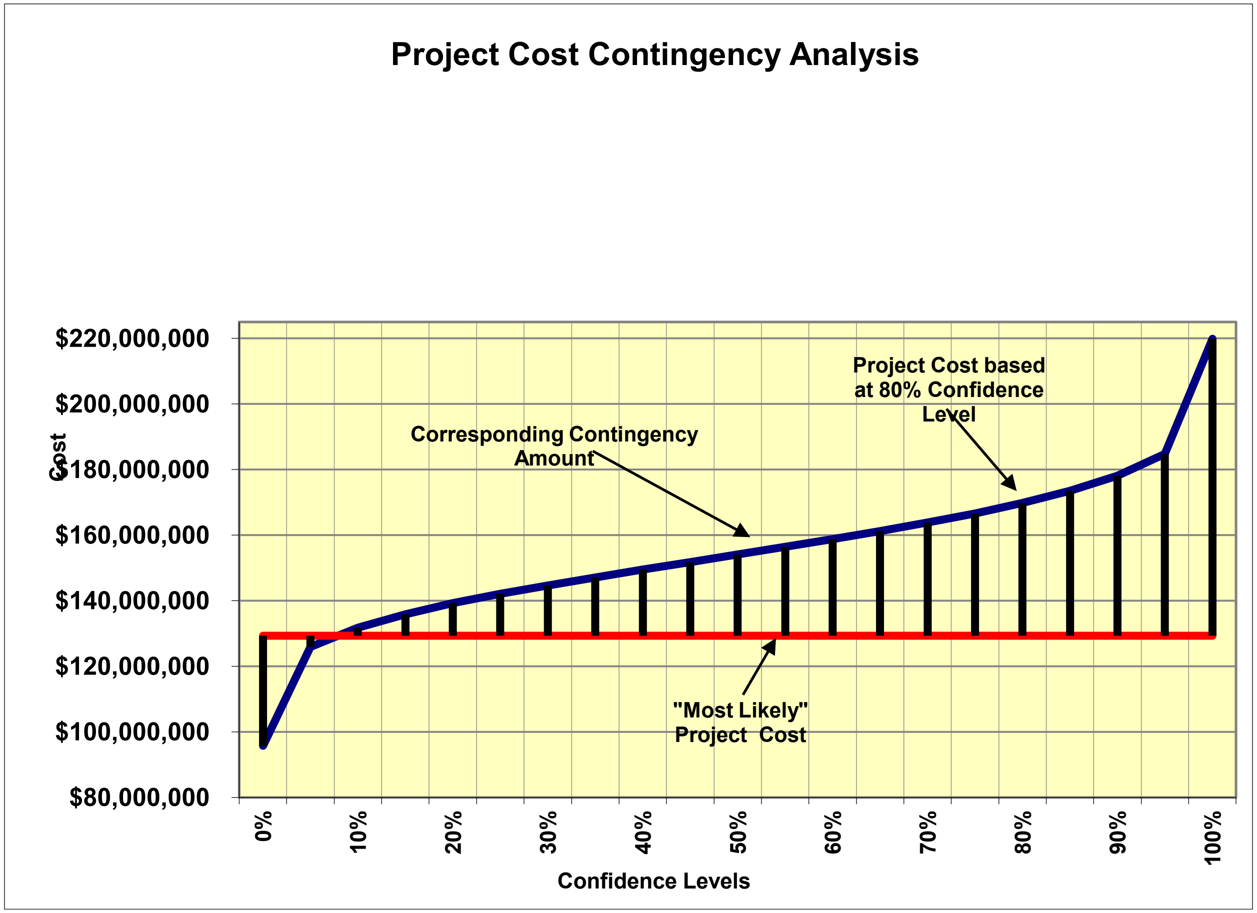
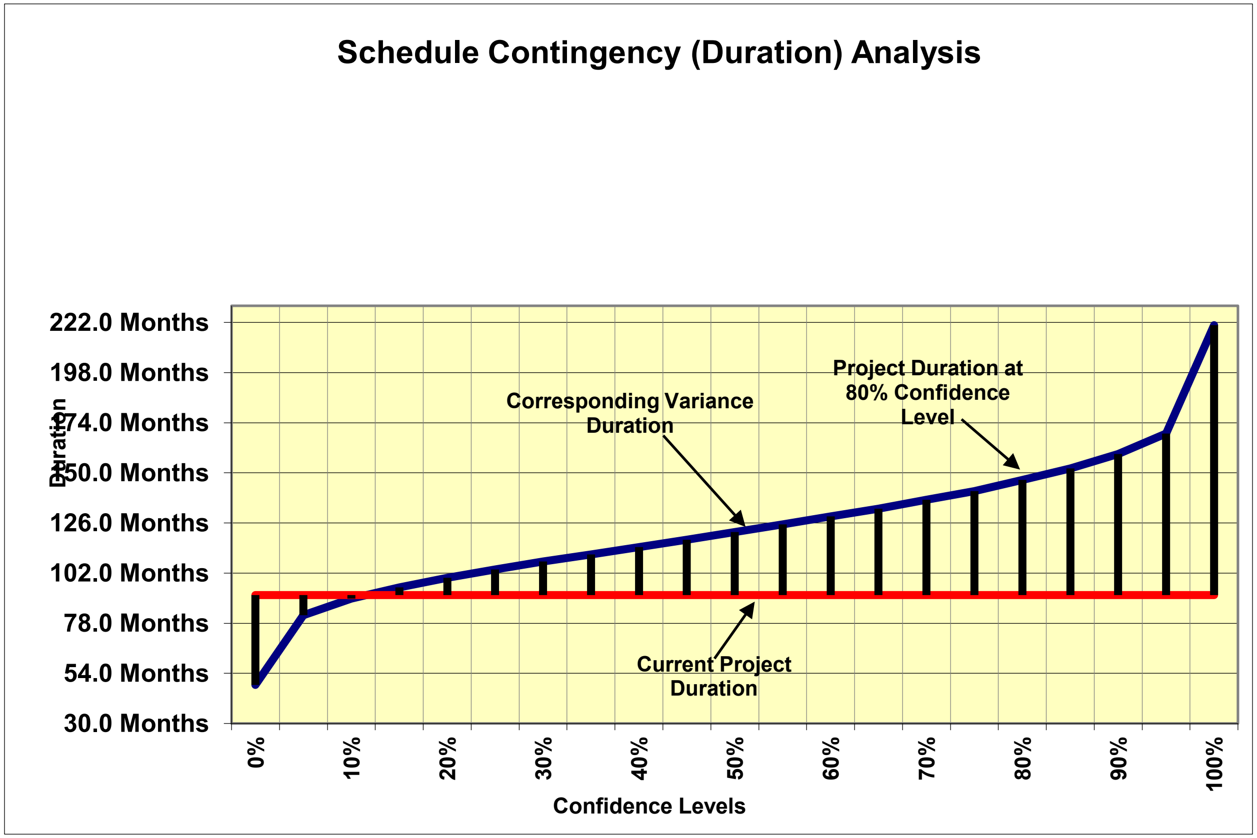


Figure 4. Project Duration Summary (Uncertainty Analysis)



7.2 Recommendations

Risk Management is an all-encompassing, iterative, and life-cycle process of project management. The Project Management Institute's (PMI) *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, *4th edition*, states that "project risk management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project." Risk identification and analysis are processes within the knowledge area of risk management. Its outputs pertinent to this effort include the risk register, risk quantification (risk analysis model), contingency report, and the sensitivity analysis.

The intended use of these outputs is implementation by the project leadership with respect to risk responses (such as mitigation) and risk monitoring and control. In short, the effectiveness of the project risk management effort requires that the proactive management of risks not conclude with the study completed in this report.

The Cost and Schedule Risk Analysis (CSRA) produced by the PDT identifies issues that require the development of subsequent risk response and mitigation plans. This section provides a list of recommendations for continued management of the risks identified and analyzed in this study. Note that this list is not all inclusive and should not substitute a formal risk management and response plan.

1. Key Cost Risk Drivers: For the initial activity, the key cost risk drivers identified through sensitivity analysis are Risks I-2 (Scope Growth/Reduction), I-5 (Fuel Prices), and I-1 (Scope Definition), which together contribute over 63 percent of the statistical cost variance.

For the subsequent nourishments, the key cost risk drivers identified through sensitivity analysis are Risks I-5 (Fuel Prices) and I-2 (Scope Growth/Reduction), which together contribute over 45 percent of the statistical cost variance.

a) Scope Growth/Reduction and Scope Definition: Although the scope has been fairly well defined, there is risk of growth or reduction in scope due to the effects of erosion over time, particularly if the project is delayed. Any necessary reductions in scope would likely impact the amount of structural additions in the initial activity. The PDT should make efforts to minimize uncertainty with project scope, as well as implement a change management process to reduce the quantity and impact of post-awards modifications, equitably adjustments, and/or claims.

b) Fuel Prices: Dredging costs are particularly sensitive to the cost of fuel per gallon (marine diesel). Since the trend is that fuel prices will likely increase, potentially significantly, this will likely increase the overall cost of construction. The PDT should continue to perform market research and analysis of trends within the construction industry. Ultimately, this uncertainty cannot be mitigated until more information is available. This should be communicated to management, and an adequate amount of contingency should be reserved to capture this risk.

2. Key Schedule Risk Drivers: For the initial activity, the key schedule risk drivers identified through sensitivity analysis are Risks E-1 (Weather) and E-2 (Funding Delays), which together contribute over 62 percent of the statistical schedule variance.

For the subsequent nourishments, the key schedule risk drivers identified through sensitivity analysis are Risks E-2 (Funding Delays) and E-1 (Weather), which together contribute over 75 percent of the statistical schedule variance.

a) Funding Delays: The PDT is concerned that the timing and availability of funds for the project may not occur according to current plans, either in terms of schedule or increments. Also, if the project is not funded, it would effectively stop the project. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

b) Weather: The PDT acknowledges that the project area is subject to severe weather, including hurricanes, which could significantly impact the subsurface conditions and prevent or delay work from occurring according to schedule. Project leadership should communicate this risk to management for awareness and assistance. Ultimately, this is an external risk, and an adequate amount of contingency should be reserved to capture this risk.

3. Risk Management: Project leadership should use of the outputs created during the risk analysis effort as tools in future risk management processes. The risk register should be updated at each major project milestone. The results of the sensitivity analysis may also be used for response planning strategy and development. These tools should be used in conjunction with regular risk review meetings.

4. Risk Analysis Updates: Project leadership should review risk items identified in the original risk register and add others, as required, throughout the project life-cycle. Risks should be reviewed for status and reevaluation (using qualitative measure, at a minimum) and placed on risk management watch lists if any risk's likelihood or impact significantly increases. Project leadership should also be mindful of the potential for secondary (new risks created specifically by the response to an original risk) and residual risks (risks that remain and have unintended impact following response).

APPENDIX A

SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Risk Level

Likelihood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	Low	Moderate	High	High	High
Likely	Low	Moderate	High	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Low	High

Impact or Consequence of Occurrence

Risk No.	Risk/Opportunity Event	Concerns	PDT Discussions & Conclusions	Project Cost			Project Schedule			Responsibility/POC	Affected Project Component
				Likelihood*	Impact*	Risk Level*	Likelihood*	Impact*	Risk Level*		
Contract Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)											
INTERNAL RISKS											
I-1	Scope Definition	Scope is fairly well defined for standard civil works features. There is also less uncertainty now than in the first CSRA iteration.	Scope may change based on permitting. The PDT has indicated that the scope definition would not impact the outyears dredging, and if anything, would reduce the structural additions in the initial nourishment.	LIKELY	Marginal	MODERATE	VERY Unlikely	MARGINAL	LOW	Project Manager/Planner	Project Cost & Schedule
I-2	Scope Growth / Reduction	Scope is fairly well defined for standard civil works features. However, there is the chance of experiencing scope growth or reduction due to erosion over time and funding limitations.	The pumping plant has potential of VE savings through better data and VE. While there is confidence in quantities for the initial nourishment, quantities for the out-year renourishments may change significantly.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Project Manager/Planner	Project Cost & Schedule
I-3	Equipment Availability/Pricing	Estimate assumes medium size hopper dredges will performed the subject work. Since this project is planned so far in advance and O&M is already on the industry's radar. The industry will plan accordingly. The contract could even be moved a few months forward to accommodate for the availability if the industry doesn't fit this profitable dredging job into their schedule.	Availability is not a problem. Based on passed similar projects within the area medium size hoppers were used, Panama City Beaches being the most recent.	LIKELY	MARGINAL	MODERATE	UNLIKELY	MARGINAL	LOW	Cost Engineering	Project Cost & Schedule
I-4	Material Availability	Borrow sources are provided and indicated on drawings. However, there may be more concern and risk in the out-year renourishments.	Per the design Engineer and based on current surveys, quality and quantity of beach fill material is available at all sites for the initial nourishment.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Design Engineer	Project Cost & Schedule
I-5	Fuel Prices	$3.45 per gallon was used in the September 2012 updated CEDEP Estimates. Increases in fuel prices will effect equipment and delivery or materials.	Fuel cost fluctuations can significantly impact dredging cost.	VERY LIKELY	SIGNIFICANT	HIGH	UNLIKELY	NEGLIGIBLE	LOW	Cost Engineering	Project Cost & Schedule
I-6	Permits	Permitting delays may occur due to Florida State policy. This is likely to impact the ultimate schedule more so than the costs.	This could impact the cost and schedule.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	Planning/Regulatory	Project Cost & Schedule
I-7	Environmental Windows	Project site is a natural habitat for various species of threatened wildlife that utilize the project vicinity during Spring and Winter months.	Gulf sturgeon incidental takes during dredging and Sea Turtle and Bird Nesting may have Impact during Construction. There may also be unknown restrictions for the out-year renourishments.	LIKELY	SIGNIFICANT	HIGH	LIKELY	SIGNIFICANT	HIGH	Project Manager/Planner	Project Cost & Schedule
I-8	Acquisition Plan (Strategy)	The estimate was based on full and open competition, with minimal tiering of contractor subs.	The Acq Plan has not been finalized, therefore there is a potential for additional tiering of the contracts. Since this is dreding work, past experience will likely dictate the most cost effective methodology for contract procurement.	UNLIKELY	MARGINAL	LOW	UNLIKELY	MARGINAL	LOW	Acquisition Strategy Board	Project Cost & Schedule
I-9	VE Study	VE study will be performed prior to Final Feasibility Report.	This could impact the cost and schedule, but likely would not have significant impact.	UNLIKELY	MARGINAL	LOW	UNLIKELY	MARGINAL	LOW	Project Manager/Planner	Project Cost & Schedule
CONSTRUCTION RISKS											
INT-MOD	Consideration for Post-Award Construction Claims and Modifications	There is inherent risk of construction modifications and claims that arise after contract award due to issues such as weather, schedules dictated by O&M cycles, differing site conditions, user directed changes or omissions, inaccurate surveys, and variations in estimated quantities (minor).	Post-award construction contract modifications and claims could impact the ultimate contract costs and delay the overall schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule

	ESTIMATE AND SCHEDULE RISKS										
EST-1	Estimate Considerations	This item is added based on the ATR Cost review. The estimate makes no considerations for labor fluctuations, overtime, soil conditions, productivity, or fluctuating indirect costs (overhead). This is added to the CSRA model for consideration, as these issues may cause a cost variance.	Estimate assumptions may not accurately capture the ultimate costs, therefore this could have an impact either positively or negatively on the costs.	Likely	Significant	HIGH	Very Unlikely	Negligible	LOW	Project Manager/Planner	Project Cost & Schedule
	LOW AND UNKNOWN INTERNAL RISKS										
INT-1	Consideration for Low and Unknown Internal Risk	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns.	This could impact cost and schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule
	Programmatic Risks	(External Risk Items are those that are generated, caused, or controlled exclusively outside the PDT's sphere of influence.)									
E-1	Weather	Florida is subject to bad weather during Hurricane Season which can cause Schedule delays.	Weather days are generally incorporated into schedule.	LIKELY	MARGINAL	MODERATE	LIKELY	MARGINAL	MODERATE	N/A	Project Cost & Schedule
E-2	Funding Delays	PM feels Adequate Congressional funding to complete project will be available, particularly for the initial nourishment. However, if the project is delayed, it could increase the quantities to be dredged and delay the overal schedule.	This could impact the cost and schedule for the outyear renourishment cycles.	LIKELY	MARGINAL	MODERATE	LIKELY	Significant	HIGH	Project Manager	Project Cost & Schedule
EXT-1	Consideration for Low and Unknown External Risk	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns.	This could impact cost and schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Manager/Planner	Project Cost & Schedule

*Likelihood, Impact, and Risk Level to be verified through market research and analysis (conducted by cost engineer).

1. Risk/Opportunity identified with reference to the Risk Identification Checklist and through deliberation and study of the PDT.
2. Discussions and Concerns elaborates on Risk/Opportunity Events and includes any assumptions or findings (should contain information pertinent to eventual study and analysis of event's impact to project).
3. Likelihood is a measure of the probability of the event occurring -- **Very Unlikely**, **Unlikely**, **Moderately Likely**, **Likely**, **Very Likely.** The likelihood of the event will be the same for both Cost and Schedule, regardless of impact.
4. Impact is a measure of the event's effect on project objectives with relation to scope, cost, and/or schedule -- **Negligible**, **Marginal**, **Significant**, **Critical**, or **Crisis.** Impacts on Project Cost may vary in severity from impacts on Project Schedule.
5. Risk Level is the resultant of Likelihood and Impact **Low**, **Moderate**, or **High**. Refer to the matrix located at top of page.
6. Variance Distribution refers to the behavior of the individual risk item with respect to its potential effects on Project Cost and Schedule. For example, an item with clearly defined parameters and a solid most likely scenario would probably follow a triangular or normal distribution. A risk item for which the PDT has little data or probability of modeling with respect to effects on cost or schedule (i.e. "anyone's guess") would probably follow a uniform or discrete uniform distribution.
7. The responsibility or POC is the entity responsible as the Subject Matter Expert (SME) for action, monitoring, or information on the PDT for the identified risk or opportunity.
8. Correlation recognizes those risk events that may be related to one another. Care should be given to ensure the risks are handled correctly without a "double counting."
9. Affected Project Component identifies the specific item of the project to which the risk directly or strongly correlates.
10. Project Implications identifies whether or not the risk item affects project cost, project schedule, or both. The PDT is responsible for conducting studies for both Project Cost and for Project Schedule.
11. Results of the risk identification process are studied and further developed by the Cost Engineer, then analyzed through the Monte Carlo Analysis Method for Cost (Contingency) and Schedule (Escalation) Growth.

SAM - Walton County Storm Damage Reduction Project, GI Study - LP

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$50,677,457**
Baseline Estimate Cost Contingency Amount ->	$8,160,051
Baseline Estimate Construction Cost (80% Confidence) ->	**$58,837,508**

Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**18.3 Months**
Schedule Contingency Duration ->	10.1 Months
Project Schedule Duration (80% Confidence) ->	**28.4 Months**
Project Schedule Contingency Amount (80% Confidence) ->	**$2,238,384**

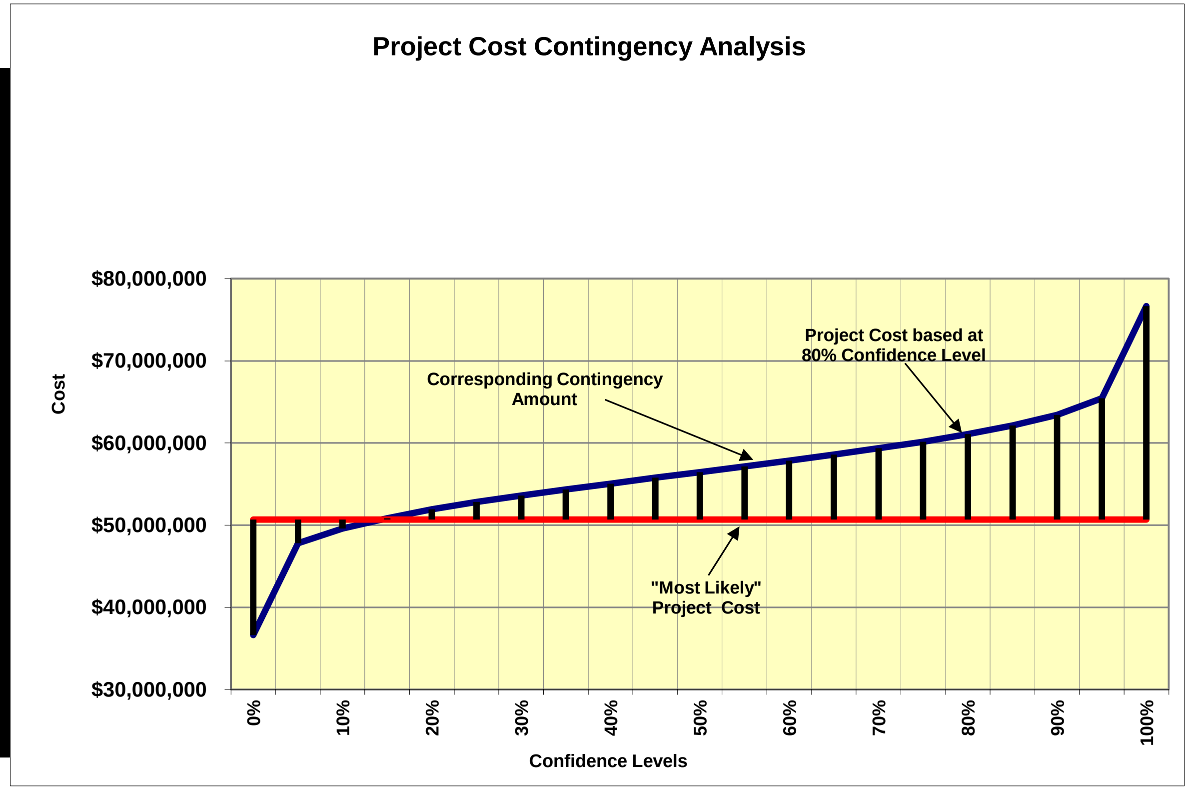
Project Contingency	80% Confidence Project Cost
Project Contingency Amount (80% Confidence) ->	**$10,398,435**
Project Contingency Percentage (80% Confidence) ->	**21%**

Project Cost (80% Confidence) ->	**$61,075,892**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$50,677,457		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$36,626,901	($14,050,557)	-27.73%
5%	$47,808,835	($2,868,622)	-5.66%
10%	$49,577,304	($1,100,154)	-2.17%
15%	$50,844,000	$166,542	0.33%
20%	$51,916,680	$1,239,223	2.45%
25%	$52,804,931	$2,127,474	4.20%
30%	$53,614,518	$2,937,061	5.80%
35%	$54,347,985	$3,670,528	7.24%
40%	$55,059,476	$4,382,019	8.65%
45%	$55,792,589	$5,115,131	10.09%
50%	$56,451,737	$5,774,280	11.39%
55%	$57,158,757	$6,481,300	12.79%
60%	$57,836,635	$7,159,178	14.13%
65%	$58,569,087	$7,891,629	15.57%
70%	$59,353,437	$8,675,980	17.12%
75%	$60,152,222	$9,474,765	18.70%
80%	$61,075,892	$10,398,435	20.52%
85%	$62,125,579	$11,448,122	22.59%
90%	$63,429,620	$12,752,162	25.16%
95%	$65,450,609	$14,773,152	29.15%
100%	$76,658,457	$25,981,000	51.27%

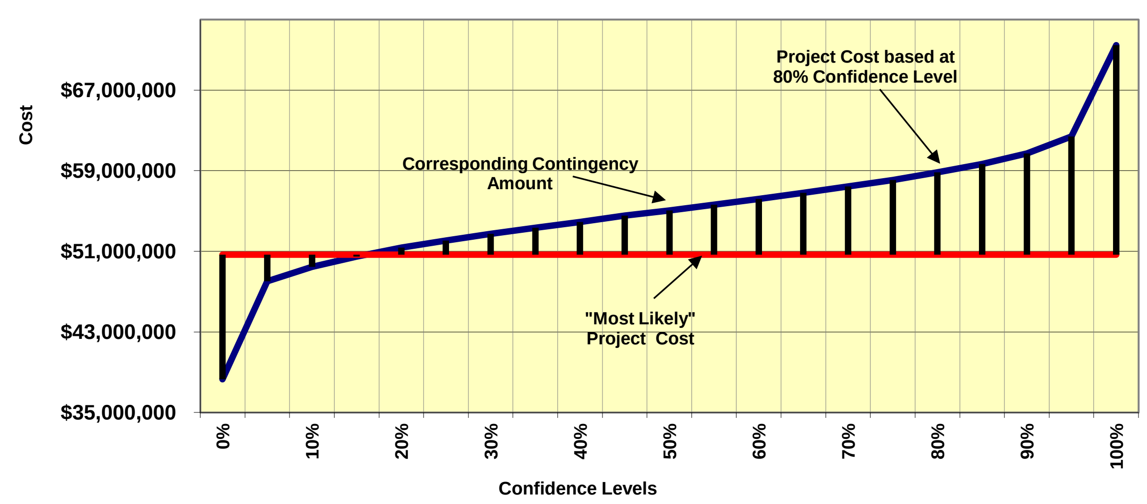


- BASE CONTINGENCY DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$50,677,457		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$38,309,515	($12,367,942.04)	-24.41%
5%	$48,026,384	($2,651,073.46)	-5.23%
10%	$49,447,339	($1,230,118.45)	-2.43%
15%	$50,478,819	($198,637.96)	-0.39%
20%	$51,355,959	$678,501.85	1.34%
25%	$52,077,451	$1,399,993.42	2.76%
30%	$52,739,667	$2,062,209.65	4.07%
35%	$53,345,128	$2,667,670.50	5.26%
40%	$53,924,106	$3,246,648.63	6.41%
45%	$54,532,791	$3,855,333.87	7.61%
50%	$55,063,361	$4,385,903.80	8.65%
55%	$55,639,103	$4,961,646.22	9.79%
60%	$56,202,882	$5,525,424.63	10.90%
65%	$56,803,532	$6,126,075.04	12.09%
70%	$57,434,941	$6,757,483.56	13.33%
75%	$58,089,052	$7,411,595.04	14.63%
80%	$58,837,508	$8,160,050.85	16.10%
85%	$59,672,978	$8,995,520.96	17.75%
90%	$60,723,895	$10,046,437.51	19.82%
95%	$62,381,323	$11,703,865.46	23.09%
100%	$71,454,158	$20,776,700.30	41.00%

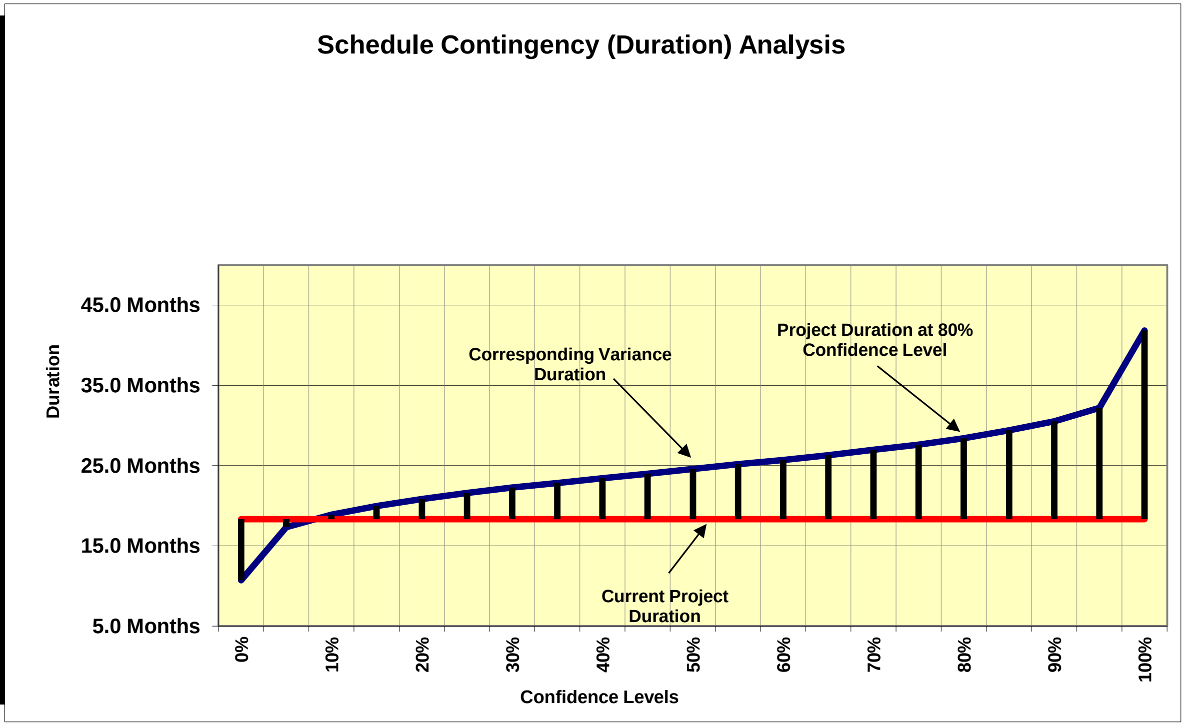
Base Estimate Cost Contingency Analysis (Does not Include Escalation)



- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

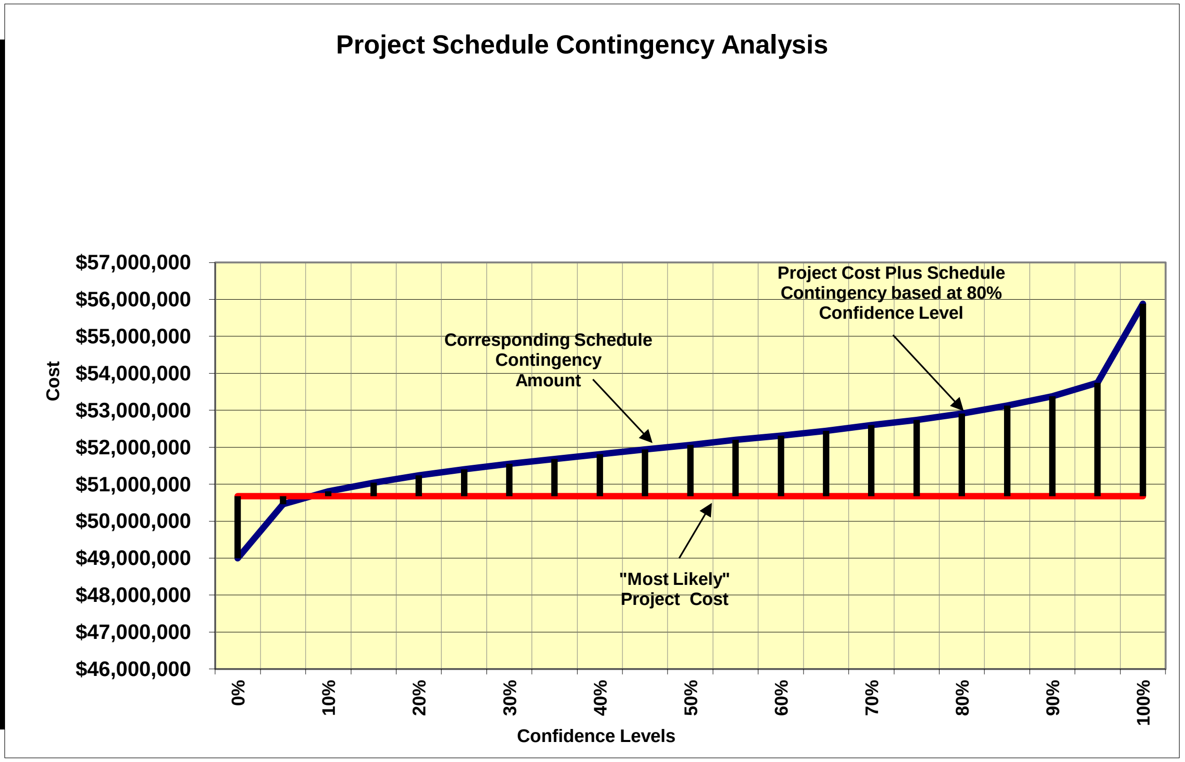
Most Likely Schedule Duration	18.3 Months		
Confidence Level	Project Duration	Contingency	Contingency %
0%	10.7 Months	-7.6 Months	-41.50%
5%	17.3 Months	-1.0 Months	-5.37%
10%	18.9 Months	0.6 Months	3.21%
15%	20.0 Months	1.6 Months	9.01%
20%	20.8 Months	2.5 Months	13.83%
25%	21.6 Months	3.3 Months	17.94%
30%	22.3 Months	4.0 Months	21.58%
35%	22.8 Months	4.5 Months	24.74%
40%	23.4 Months	5.1 Months	28.00%
45%	24.0 Months	5.7 Months	31.07%
50%	24.6 Months	6.3 Months	34.25%
55%	25.2 Months	6.9 Months	37.48%
60%	25.7 Months	7.4 Months	40.30%
65%	26.3 Months	8.0 Months	43.55%
70%	27.0 Months	8.7 Months	47.32%
75%	27.6 Months	9.3 Months	50.89%
80%	28.4 Months	10.1 Months	55.21%
85%	29.4 Months	11.1 Months	60.50%
90%	30.5 Months	12.2 Months	66.74%
95%	32.2 Months	13.9 Months	75.71%
100%	41.8 Months	23.5 Months	128.37%



- SCHEDULE CONTINGENCY (AMOUNT) DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$50,677,457		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$48,994,843	($1,682,615)	-3.32%
5%	$50,459,909	($217,549)	-0.43%
10%	$50,807,422	$129,965	0.26%
15%	$51,042,638	$365,180	0.72%
20%	$51,238,178	$560,721	1.11%
25%	$51,404,938	$727,481	1.44%
30%	$51,552,309	$874,852	1.73%
35%	$51,680,315	$1,002,857	1.98%
40%	$51,812,827	$1,135,370	2.24%
45%	$51,937,255	$1,259,798	2.49%
50%	$52,065,833	$1,388,376	2.74%
55%	$52,197,111	$1,519,654	3.00%
60%	$52,311,211	$1,633,753	3.22%
65%	$52,443,012	$1,765,554	3.48%
70%	$52,595,953	$1,918,496	3.79%
75%	$52,740,627	$2,063,170	4.07%
80%	$52,915,841	$2,238,384	4.42%
85%	$53,130,058	$2,452,601	4.84%
90%	$53,383,182	$2,705,725	5.34%
95%	$53,746,744	$3,069,287	6.06%
100%	$55,881,757	$5,204,299	10.27%



SAM - Walton County Storm Damage Reduction Project, GI Study - LP

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$78,659,310**
Baseline Estimate Cost Contingency Amount ->	$20,158,599
Baseline Estimate Construction Cost (80% Confidence) ->	**$98,817,909**

Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**18.3 Months**
Schedule Contingency Duration ->	44.9 Months
Project Schedule Duration (80% Confidence) ->	**63.2 Months**
Project Schedule Contingency Amount (80% Confidence) ->	**$3,858,339**

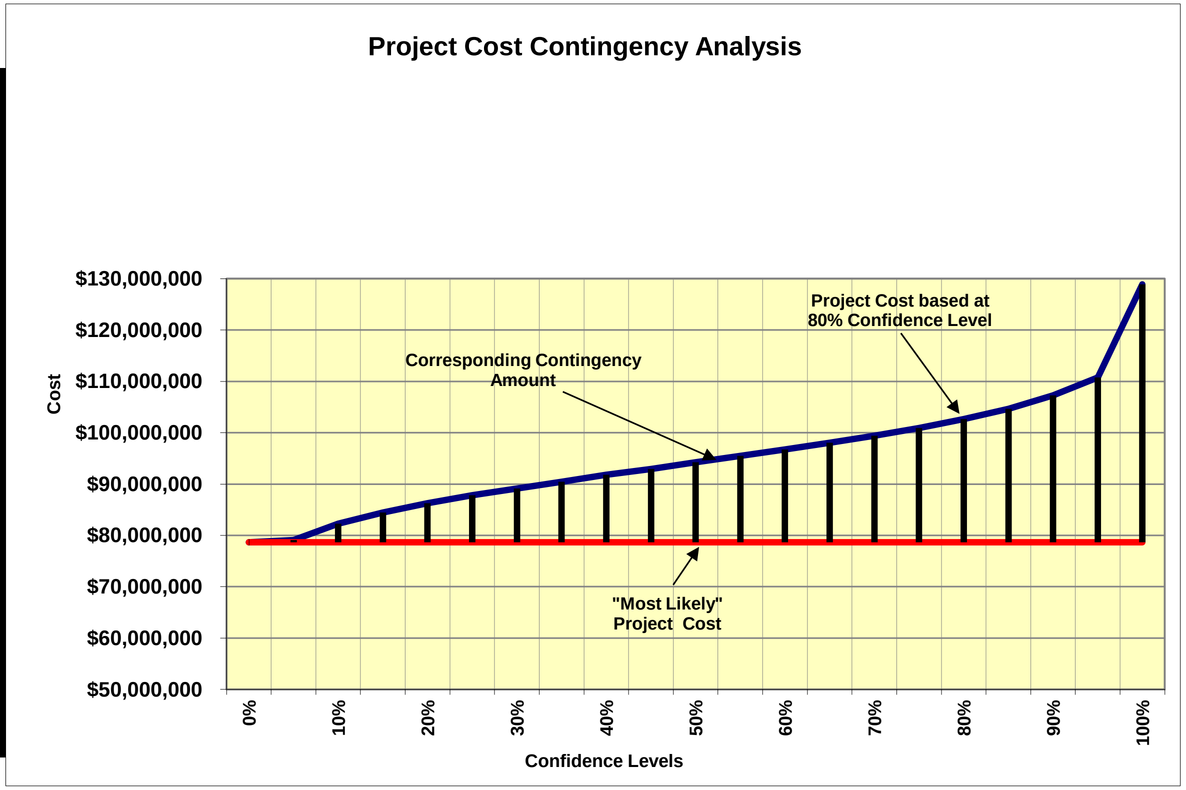
Project Contingency	80% Confidence Project Cost
Project Contingency Amount (80% Confidence) ->	**$24,016,938**
Project Contingency Percentage (80% Confidence) ->	**31%**

Project Cost (80% Confidence) ->	**$102,676,248**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

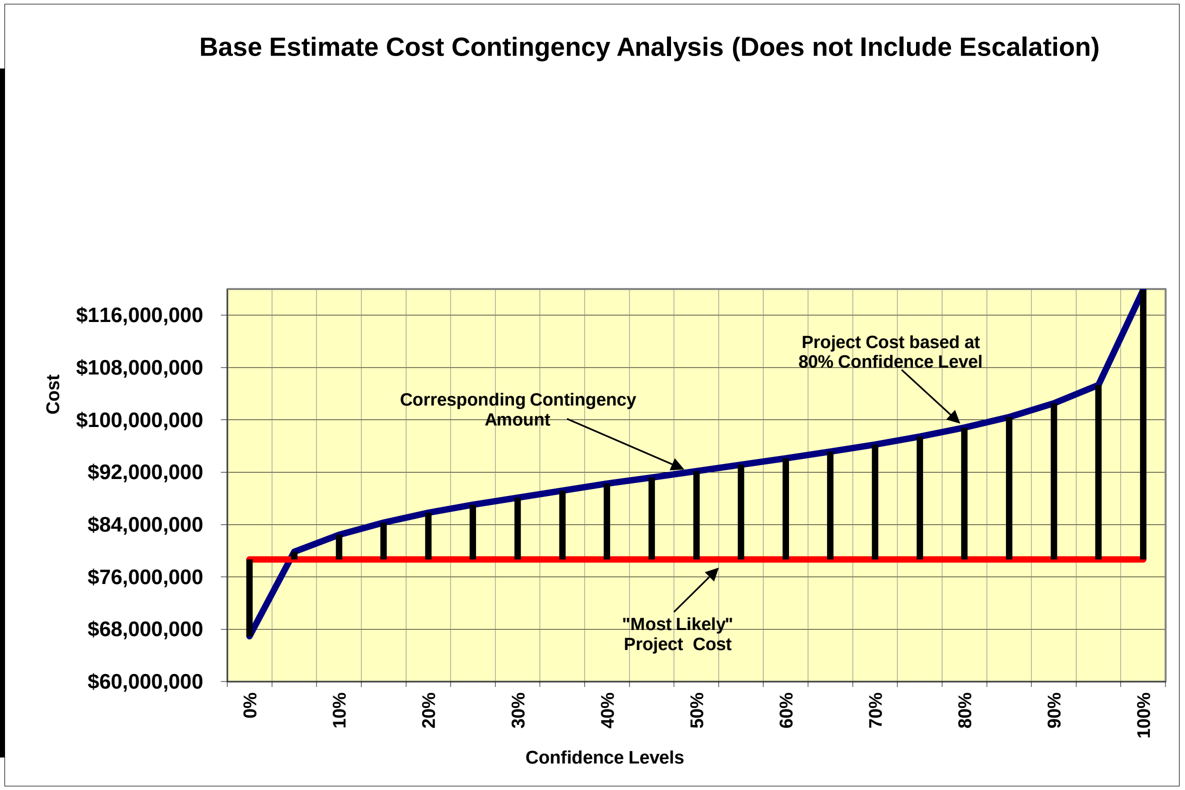
Most Likely Cost Estimate	$78,659,310		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$78,659,310	($14,774,408)	0.00%
5%	$79,098,591	$439,281	0.56%
10%	$82,253,648	$3,594,338	4.57%
15%	$84,483,694	$5,824,383	7.40%
20%	$86,285,586	$7,626,276	9.70%
25%	$87,794,410	$9,135,100	11.61%
30%	$89,135,607	$10,476,297	13.32%
35%	$90,454,862	$11,795,551	15.00%
40%	$91,790,962	$13,131,652	16.69%
45%	$92,951,658	$14,292,348	18.17%
50%	$94,239,346	$15,580,036	19.81%
55%	$95,463,020	$16,803,710	21.36%
60%	$96,717,444	$18,058,133	22.96%
65%	$98,027,079	$19,367,769	24.62%
70%	$99,399,402	$20,740,092	26.37%
75%	$100,926,522	$22,267,211	28.31%
80%	$102,676,248	$24,016,938	30.53%
85%	$104,668,286	$26,008,975	33.07%
90%	$107,277,911	$28,618,601	36.38%
95%	$110,770,388	$32,111,078	40.82%
100%	$128,917,225	$50,257,915	63.89%



- BASE CONTINGENCY DEVELOPMENT -

Contingency Analysis

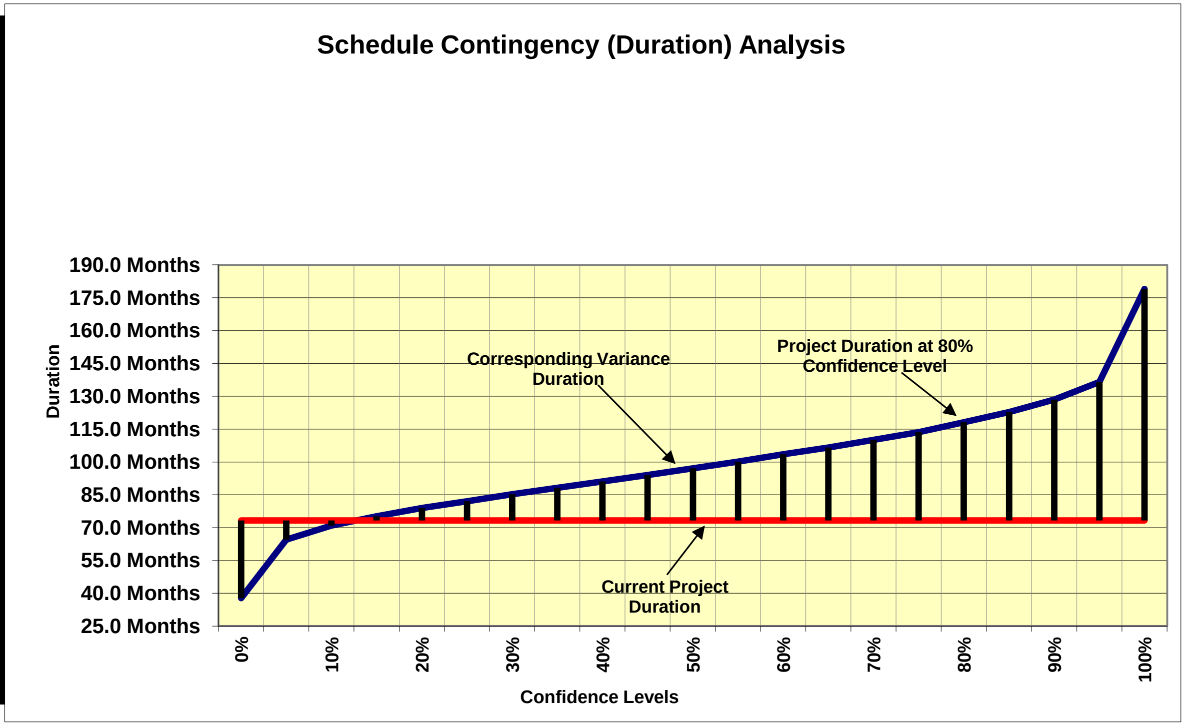
Most Likely Cost Estimate	$78,659,310		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$66,936,003	($11,723,307.41)	-14.90%
5%	$79,847,475	$1,188,164.97	1.51%
10%	$82,454,632	$3,795,321.64	4.83%
15%	$84,317,546	$5,658,236.11	7.19%
20%	$85,799,286	$7,139,976.07	9.08%
25%	$87,034,676	$8,375,365.38	10.65%
30%	$88,099,986	$9,440,675.88	12.00%
35%	$89,173,470	$10,514,159.26	13.37%
40%	$90,261,686	$11,602,375.49	14.75%
45%	$91,171,386	$12,512,076.00	15.91%
50%	$92,196,441	$13,537,130.99	17.21%
55%	$93,148,572	$14,489,261.27	18.42%
60%	$94,119,131	$15,459,820.28	19.65%
65%	$95,164,080	$16,504,770.05	20.98%
70%	$96,233,766	$17,574,455.34	22.34%
75%	$97,453,935	$18,794,625.03	23.89%
80%	$98,817,909	$20,158,598.79	25.63%
85%	$100,415,369	$21,756,058.69	27.66%
90%	$102,525,493	$23,866,183.02	30.34%
95%	$105,327,888	$26,668,577.76	33.90%
100%	$119,832,377	$41,173,067.01	52.34%



- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

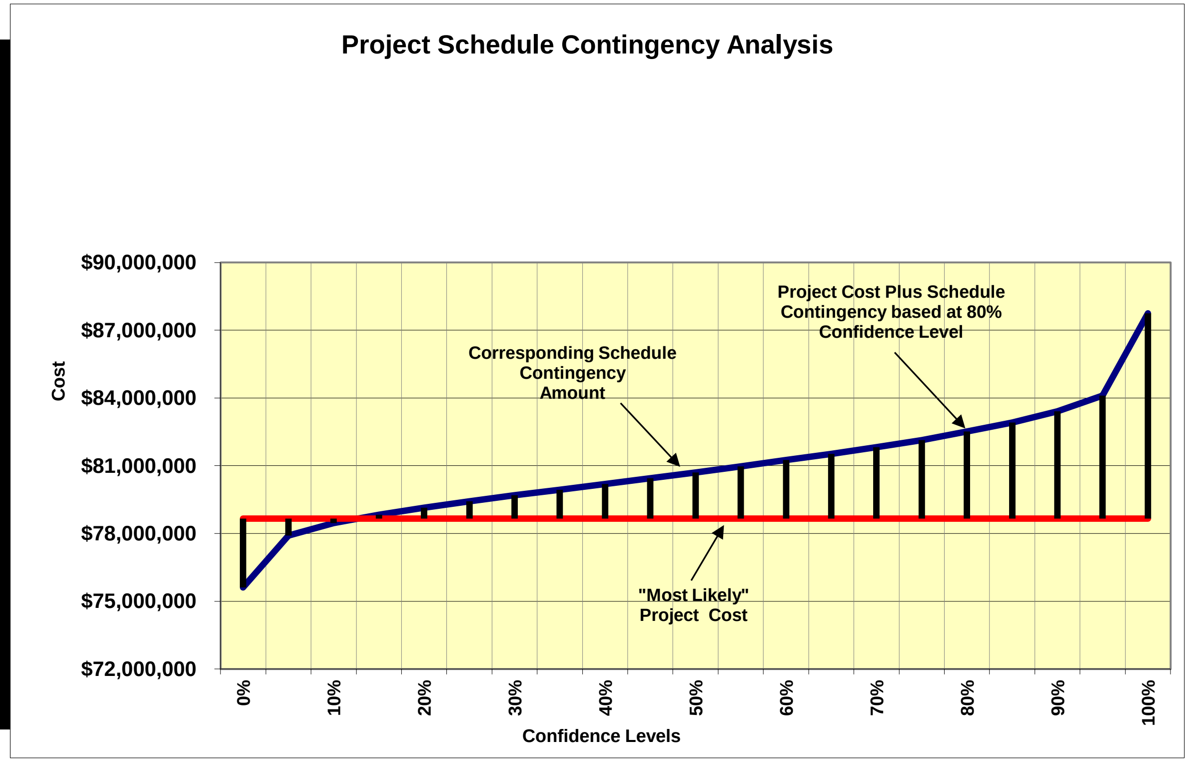
Most Likely Schedule Duration	73.2 Months		
Confidence Level	**Project Duration**	**Contingency**	**Contingency %**
0%	37.7 Months	-35.5 Months	-48.49%
5%	64.5 Months	-8.7 Months	-11.90%
10%	70.9 Months	-2.3 Months	-3.19%
15%	75.2 Months	1.9 Months	2.64%
20%	78.9 Months	5.7 Months	7.73%
25%	82.1 Months	8.8 Months	12.07%
30%	85.3 Months	12.1 Months	16.46%
35%	88.2 Months	14.9 Months	20.36%
40%	91.0 Months	17.8 Months	24.30%
45%	94.0 Months	20.7 Months	28.29%
50%	97.0 Months	23.8 Months	32.46%
55%	100.2 Months	26.9 Months	36.78%
60%	103.5 Months	30.2 Months	41.29%
65%	106.6 Months	33.3 Months	45.50%
70%	110.1 Months	36.8 Months	50.31%
75%	113.7 Months	40.4 Months	55.18%
80%	118.1 Months	44.9 Months	61.31%
85%	122.7 Months	49.5 Months	67.58%
90%	128.6 Months	55.3 Months	75.52%
95%	136.6 Months	63.3 Months	86.49%
100%	179.0 Months	105.7 Months	144.37%



- SCHEDULE CONTINGENCY (AMOUNT) DEVELOPMENT -

Contingency Analysis

Most Likely Cost Estimate	$78,659,310		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	$75,608,209	($3,051,101)	-3.88%
5%	$77,910,426	($748,884)	-0.95%
10%	$78,458,327	($200,983)	-0.26%
15%	$78,825,457	$166,147	0.21%
20%	$79,145,610	$486,300	0.62%
25%	$79,419,045	$759,734	0.97%
30%	$79,694,931	$1,035,621	1.32%
35%	$79,940,702	$1,281,392	1.63%
40%	$80,188,587	$1,529,277	1.94%
45%	$80,439,582	$1,780,272	2.26%
50%	$80,702,215	$2,042,905	2.60%
55%	$80,973,759	$2,314,449	2.94%
60%	$81,257,623	$2,598,313	3.30%
65%	$81,522,309	$2,862,999	3.64%
70%	$81,824,947	$3,165,636	4.02%
75%	$82,131,897	$3,472,586	4.41%
80%	$82,517,650	$3,858,339	4.91%
85%	$82,912,227	$4,252,917	5.41%
90%	$83,411,728	$4,752,418	6.04%
95%	$84,101,810	$5,442,500	6.92%
100%	$87,744,158	$9,084,848	11.55%



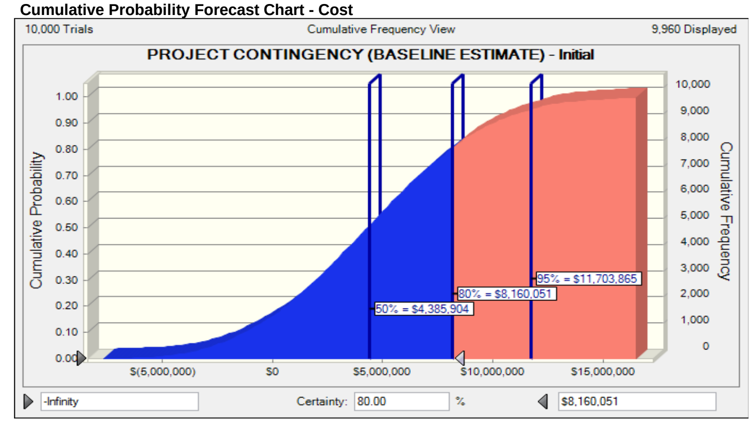
SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Risk No.	Risk/Opportunity Event	Project Cost: Likelihood*	Project Cost: Impact*	Project Cost: Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Crystal Ball Simulation – Expected Values ($$$): Low	Expected Values ($$$): Most Likely	Expected Values ($$$): High	Contingency Model	Notes	Expected Values (%s): Low	Expected Values (%s): Most Likely	Expected Values (%s): High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM INTERNAL RISKS														
I-1	Scope Definition	LIKELY	SIGNIFICANT	HIGH	Yes-No/Uniform	I-2	65%	$ (1,236,500)	$ -	$ -	$ -	*Correlated to Risk I-2 by a factor of 0.75*	-2.44%	0.00%	0.00%
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform	I-1	100%	$ (2,533,873)	$ -	$ 5,067,746	$ -	*Correlated to Risk I-1 by a factor of 0.75*	-5.00%	0.00%	10.00%
I-5	Fuel Prices	VERY LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ (1,663,240)	$ -	$ 5,685,960	$ -		-3.28%	0.00%	11.22%
I-6	Permits	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ -	$ -	$ 2,387,355	$ -		0.00%	0.00%	4.71%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	Moderate	Triangular		100%	$ -	$ -	$ 1,432,413	$ -		0.00%	0.00%	2.83%
	ESTIMATE AND SCHEDULE RISKS														
EST-1	Estimate Considerations	Likely	Significant	HIGH	Triangular		100%	$ (2,387,355)	$ -	$ 2,387,355	$ -		-4.71%	0.00%	4.71%
	LOW AND UNKNOWN INTERNAL RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (2,387,355)	$ -	$ 2,387,355	$ -		-4.71%	0.00%	4.71%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ (1,432,413)	$ -	$ 2,387,355	$ -		-2.83%	0.00%	4.71%
E-2	Funding Delays	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*The original risk register and current assumption indicate this is not high risk for the initial activity, but is for the out-years*	N/A	N/A	N/A
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (2,387,355)	$ -	$ 2,387,355	$ -		-4.71%	0.00%	4.71%
											$ -				

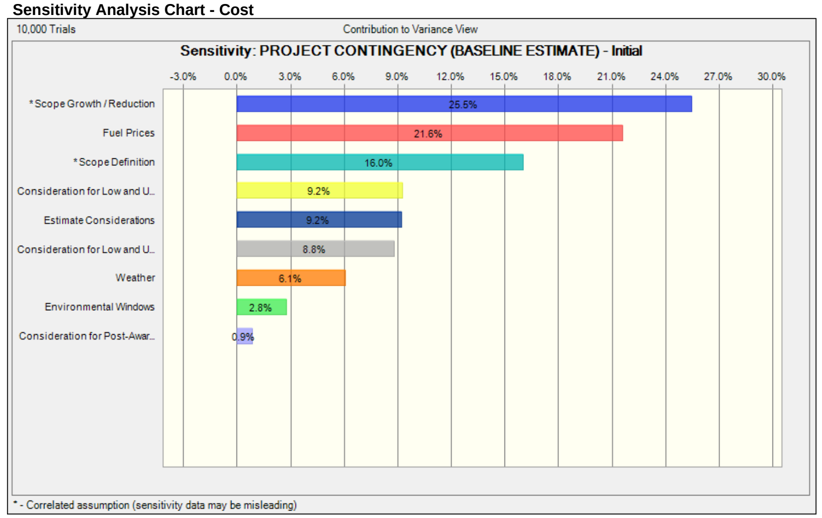
Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	$50,677,457	($12,367,942)	**$38,309,515**	**-24.41%**
	5%	$50,677,457	($2,651,073)	**$48,026,384**	**-5.23%**
	10%	$50,677,457	($1,230,118)	**$49,447,339**	**-2.43%**
	15%	$50,677,457	($198,638)	**$50,478,819**	**-0.39%**
	20%	$50,677,457	$678,502	**$51,355,959**	**1.34%**
	25%	$50,677,457	$1,399,993	**$52,077,451**	**2.76%**
	30%	$50,677,457	$2,062,210	**$52,739,667**	**4.07%**
	35%	$50,677,457	$2,667,671	**$53,345,128**	**5.26%**
	40%	$50,677,457	$3,246,649	**$53,924,106**	**6.41%**
	45%	$50,677,457	$3,855,334	**$54,532,791**	**7.61%**
	50%	$50,677,457	$4,385,904	**$55,063,361**	**8.65%**
	55%	$50,677,457	$4,961,646	**$55,639,103**	**9.79%**
	60%	$50,677,457	$5,525,425	**$56,202,882**	**10.90%**
	65%	$50,677,457	$6,126,075	**$56,803,532**	**12.09%**
	70%	$50,677,457	$6,757,484	**$57,434,941**	**13.33%**
	75%	$50,677,457	$7,411,595	**$58,089,052**	**14.63%**
	80%	$50,677,457	$8,160,051	**$58,837,508**	**16.10%**
	85%	$50,677,457	$8,995,521	**$59,672,978**	**17.75%**
	90%	$50,677,457	$10,046,438	**$60,723,895**	**19.82%**
	95%	$50,677,457	$11,703,865	**$62,381,323**	**23.09%**
	100%	$50,677,457	$20,776,700	**$71,454,158**	**41.00%**

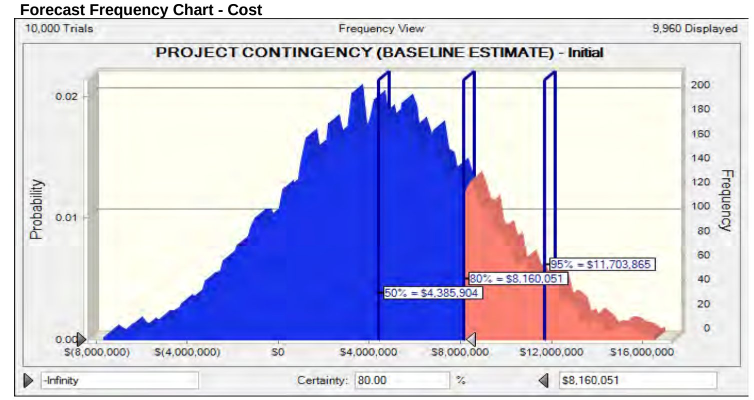
Cumulative Probability Forecast Chart - Cost



Sensitivity Analysis Chart - Cost



Forecast Frequency Chart - Cost



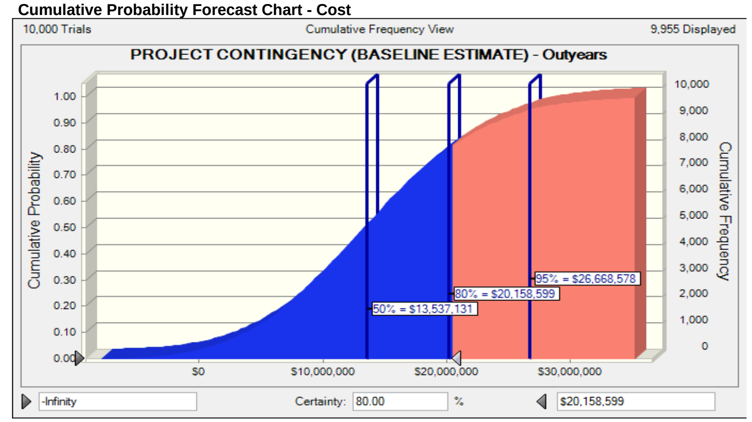
SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

								Crystal Ball Simulation							
		Project Cost						Expected Values ($$$)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM INTERNAL RISKS														
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform	I-1	100%	$ (3,932,966)	$ -	$ 7,865,931	$ -		-5.00%	0.00%	10.00%
I-4	Material Availability	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ -	$ -	$ 7,513,800	$ -		0.00%	0.00%	9.55%
I-5	Fuel Prices	VERY LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ (2,254,140)	$ -	$ 10,519,320	$ -		-2.87%	0.00%	13.37%
I-6	Permits	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	$ -	$ -	$ 3,730,681	$ -		0.00%	0.00%	4.74%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	Moderate	Triangular		100%	$ -	$ -	$ 1,678,807	$ -		0.00%	0.00%	2.13%
	ESTIMATE AND SCHEDULE RISKS														
EST-1	Estimate Considerations	Likely	Significant	HIGH	Triangular		100%	$ (3,730,681)	$ -	$ 3,730,681	$ -		-4.74%	0.00%	4.74%
	LOW AND UNKNOWN INTERNAL RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (3,730,681)	$ -	$ 3,730,681	$ -		-4.74%	0.00%	4.74%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	$ (2,238,409)	$ -	$ 3,730,681	$ -		-2.85%	0.00%	4.74%
E-2	Funding Delays	LIKELY	MARGINAL	MODERATE	Yes-No/Triangular		65%	$ -	$ -	$ 9,170,416	$ -		0.00%	0.00%	11.66%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	$ (3,730,681)	$ -	$ 3,730,681	$ -		-4.74%	0.00%	4.74%
											$ -				

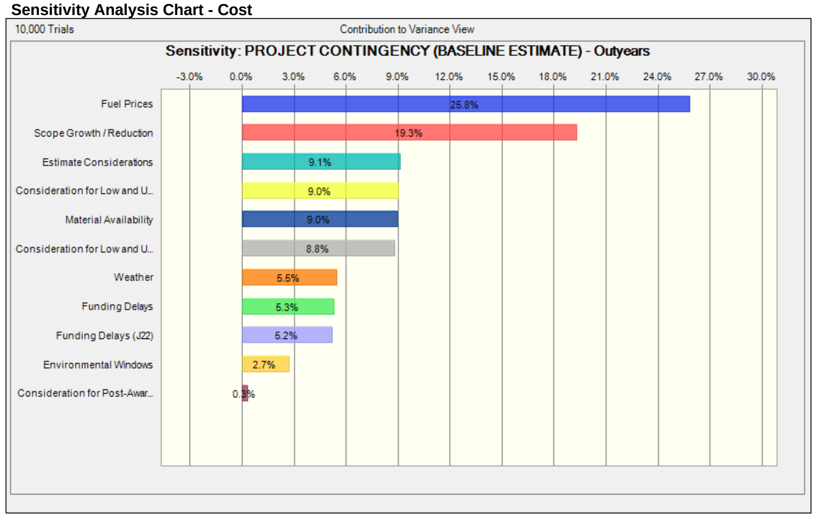
Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	$78,659,310	($11,723,307)	**$66,936,003**	**-14.90%**
	5%	$78,659,310	$1,188,165	**$79,847,475**	**1.51%**
	10%	$78,659,310	$3,795,322	**$82,454,632**	**4.83%**
	15%	$78,659,310	$5,658,236	**$84,317,546**	**7.19%**
	20%	$78,659,310	$7,139,976	**$85,799,286**	**9.08%**
	25%	$78,659,310	$8,375,365	**$87,034,676**	**10.65%**
	30%	$78,659,310	$9,440,676	**$88,099,986**	**12.00%**
	35%	$78,659,310	$10,514,159	**$89,173,470**	**13.37%**
	40%	$78,659,310	$11,602,375	**$90,261,686**	**14.75%**
	45%	$78,659,310	$12,512,076	**$91,171,386**	**15.91%**
	50%	$78,659,310	$13,537,131	**$92,196,441**	**17.21%**
	55%	$78,659,310	$14,489,261	**$93,148,572**	**18.42%**
	60%	$78,659,310	$15,459,820	**$94,119,131**	**19.65%**
	65%	$78,659,310	$16,504,770	**$95,164,080**	**20.98%**
	70%	$78,659,310	$17,574,455	**$96,233,766**	**22.34%**
	75%	$78,659,310	$18,794,625	**$97,453,935**	**23.89%**
	80%	$78,659,310	$20,158,599	**$98,817,909**	**25.63%**
	85%	$78,659,310	$21,756,059	**$100,415,369**	**27.66%**
	90%	$78,659,310	$23,866,183	**$102,525,493**	**30.34%**
	95%	$78,659,310	$26,668,578	**$105,327,888**	**33.90%**
	100%	$78,659,310	$41,173,067	**$119,832,377**	**52.34%**

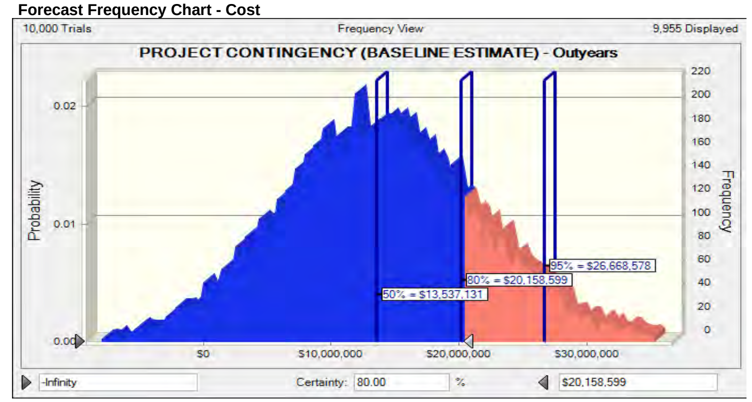
Cumulative Probability Forecast Chart - Cost



Sensitivity Analysis Chart - Cost



Forecast Frequency Chart - Cost



USACE Mobile District District
SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

CWWBS No.	Project Cost
01 Lands and Damages	$543,000.00
17 Dredging	$113,939,730.96
17 Beach Work	$4,946,000.00
17 Planting	$3,325,000.00
17 Environmental	$450,000.00
30 Planning, Engineering, and Design	$3,679,821.93
31 Construction Management	$2,453,214.62
Total	$129,336,767.51

Category	Project Cost
Labor Cost	$2,460,622.61
Equipment Cost	$3,787,689.38
Material Cost	$0.00
Sub Bid Cost	$6,021,000.00
User Cost	$108,556,260.00
Direct Cost	$120,825,571.99
Contract Cost	$122,660,730.96

Initial - 2014	Project Cost
01 Lands and Damages	$543,000.00
17 Hopper Dredging	$39,326,102.12
17 Beach & Dune Planting	$3,325,000.00
17 Beach Work Items	$4,946,000.00
17 Environmental	$150,000.00
30 Planning, Engineering, and Design	$1,432,413.06
31 Construction Management	$954,942.04
Total	$50,677,457.23

Out-Years 2024, 2034, 2044, 2054	Project Cost
17 Hopper Dredging	$18,653,407.21
17 Environmental	$75,000.00
30 Planning, Engineering, and Design	$561,852.22
31 Construction Management	$374,568.14
Total	$19,664,827.57

SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

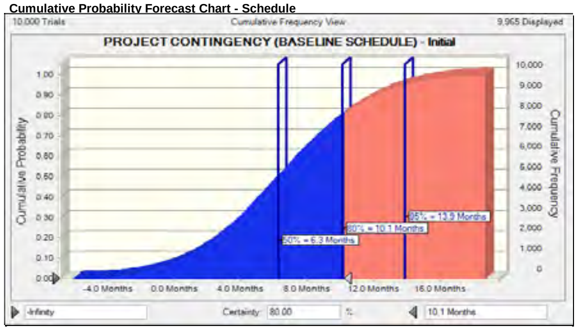
								Crystal Ball Simulation							
		Project Schedule						Expected Values (Months)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM MGMT														
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform		100%	-4.0 Months	0.0 Months	6.0 Months	0.0 Months		-21.85%	0.00%	32.77%
I-6	Permits	LIKELY	MARGINAL	MODERATE	Triangular		100%	0.0 Months	0.0 Months	6.0 Months	0.0 Months		0.00%	0.00%	32.77%
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
	CONSTRUCTION RISKS														
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	MODERATE	Triangular		100%	0.0 Months	0.0 Months	3.0 Months	0.0 Months		0.00%	0.00%	16.38%
	ECONOMICS RISKS														
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
	Programmatic Risks														
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	6.0 Months	0.0 Months		-16.38%	0.00%	32.77%
E-2	Funding Delays	LIKELY	Significant	HIGH	Yes-No/Uniform		65%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
											0.0 Months				

Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

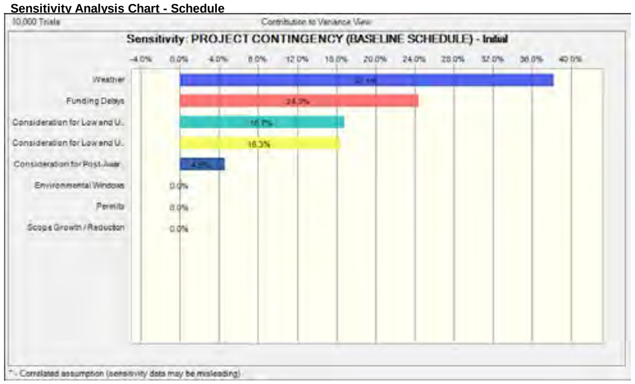
Contingency Summary Table - Schedule

PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	18.3 Months	-7.6 Months	**10.7 Months**	**-41.50%**
	5%	18.3 Months	-1.0 Months	**17.3 Months**	**-5.37%**
	10%	18.3 Months	0.6 Months	**18.9 Months**	**3.21%**
	15%	18.3 Months	1.6 Months	**20.0 Months**	**9.01%**
	20%	18.3 Months	2.5 Months	**20.8 Months**	**13.83%**
	25%	18.3 Months	3.3 Months	**21.6 Months**	**17.94%**
	30%	18.3 Months	4.0 Months	**22.3 Months**	**21.58%**
	35%	18.3 Months	4.5 Months	**22.8 Months**	**24.74%**
	40%	18.3 Months	5.1 Months	**23.4 Months**	**28.00%**
	45%	18.3 Months	5.7 Months	**24.0 Months**	**31.07%**
	50%	18.3 Months	6.3 Months	**24.6 Months**	**34.25%**
	55%	18.3 Months	6.9 Months	**25.2 Months**	**37.48%**
	60%	18.3 Months	7.4 Months	**25.7 Months**	**40.30%**
	65%	18.3 Months	8.0 Months	**26.3 Months**	**43.55%**
	70%	18.3 Months	8.7 Months	**27.0 Months**	**47.32%**
	75%	18.3 Months	9.3 Months	**27.6 Months**	**50.89%**
	80%	18.3 Months	10.1 Months	**28.4 Months**	**55.21%**
	85%	18.3 Months	11.1 Months	**29.4 Months**	**60.50%**
	90%	18.3 Months	12.2 Months	**30.5 Months**	**66.74%**
	95%	18.3 Months	13.9 Months	**32.2 Months**	**75.71%**
	100%	18.3 Months	23.5 Months	**41.8 Months**	**128.37%**

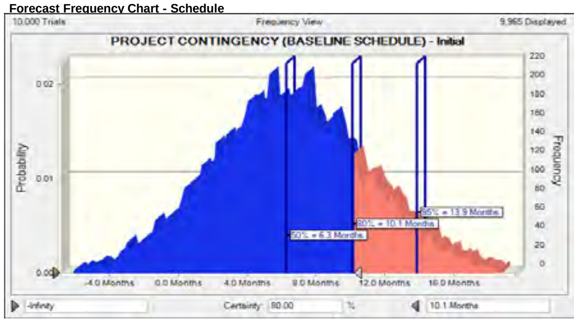
Cumulative Probability Forecast Chart - Schedule



Sensitivity Analysis Chart - Schedule



Forecast Frequency Chart - Schedule



SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

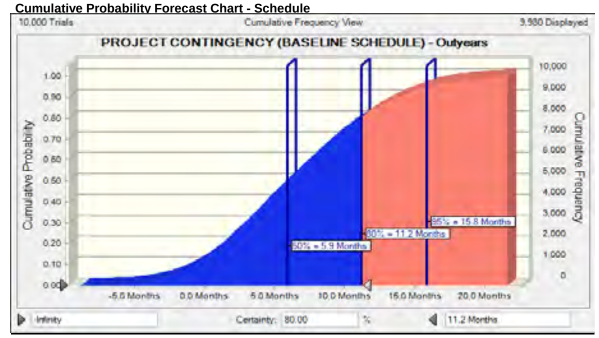
								Crystal Ball Simulation								
		Project Schedule						Expected Values (Months)						Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)																
	PROJECT & PROGRAM MGMT															
I-2	Scope Growth / Reduction	LIKELY	MARGINAL	MODERATE	Uniform		100%	-4.0 Months	0.0 Months	6.0 Months	0.0 Months		-21.85%	0.00%	32.77%
I-4	Material Availability	LIKELY	MARGINAL	MODERATE	Triangular		100%	0.0 Months	0.0 Months	2.0 Months	0.0 Months		0.00%	0.00%	10.92%
I-6	Permits	LIKELY	MARGINAL	MODERATE	Triangular		N/A	N/A	N/A	N/A	N/A	*Removed from Schedule Risk Model, as there will be enough time to obtain permits for outyear nourishments*	N/A	N/A	N/A
I-7	Environmental Windows	LIKELY	SIGNIFICANT	HIGH	Triangular		100%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
	CONSTRUCTION RISKS															
INT-MOD	Consideration for Post-Award Construction Claims and	Likely	Marginal	MODERATE	Triangular		100%	0.0 Months	0.0 Months	3.0 Months	0.0 Months		0.00%	0.00%	16.38%
	ECONOMICS RISKS															
INT-1	Consideration for Low and Unknown Internal Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
	Programmatic Risks															
E-1	Weather	LIKELY	MARGINAL	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	6.0 Months	0.0 Months		-16.38%	0.00%	32.77%
E-2	Funding Delays	LIKELY	Significant	HIGH	Yes-No/Uniform		65%	0.0 Months	0.0 Months	12.0 Months	0.0 Months		0.00%	0.00%	65.54%
EXT-1	Consideration for Low and Unknown External Risk	Likely	Marginal	MODERATE	Triangular		100%	-3.0 Months	0.0 Months	3.0 Months	0.0 Months		-16.38%	0.00%	16.38%
											0.0 Months				

Percentages are calculated as the variance from the assumption value to facilitate iteration of the model should the cost values change throughout the project phases. Uniform distribution percentages reflect variation from the total project cost.

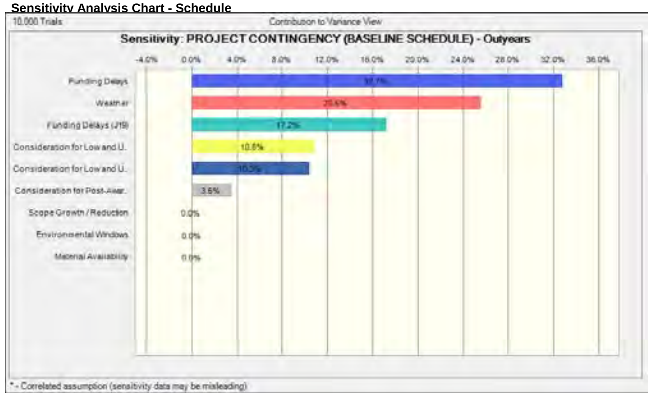
Contingency Summary Table - Schedule

PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears	Percentile	Baseline TPC	Contingency Amount	Baseline w/ Contingency	Contingency %
	0%	18.3 Months	-8.9 Months	**9.4 Months**	**-48.49%**
	5%	18.3 Months	-2.2 Months	**16.1 Months**	**-11.90%**
	10%	18.3 Months	-0.6 Months	**17.7 Months**	**-3.19%**
	15%	18.3 Months	0.5 Months	**18.8 Months**	**2.64%**
	20%	18.3 Months	1.4 Months	**19.7 Months**	**7.73%**
	25%	18.3 Months	2.2 Months	**20.5 Months**	**12.07%**
	30%	18.3 Months	3.0 Months	**21.3 Months**	**16.46%**
	35%	18.3 Months	3.7 Months	**22.0 Months**	**20.36%**
	40%	18.3 Months	4.4 Months	**22.8 Months**	**24.30%**
	45%	18.3 Months	5.2 Months	**23.5 Months**	**28.29%**
	50%	18.3 Months	5.9 Months	**24.3 Months**	**32.46%**
	55%	18.3 Months	6.7 Months	**25.0 Months**	**36.78%**
	60%	18.3 Months	7.6 Months	**25.9 Months**	**41.29%**
	65%	18.3 Months	8.3 Months	**26.6 Months**	**45.50%**
	70%	18.3 Months	9.2 Months	**27.5 Months**	**50.31%**
	75%	18.3 Months	10.1 Months	**28.4 Months**	**55.18%**
	80%	18.3 Months	11.2 Months	**29.5 Months**	**61.31%**
	85%	18.3 Months	12.4 Months	**30.7 Months**	**67.58%**
	90%	18.3 Months	13.8 Months	**32.1 Months**	**75.52%**
	95%	18.3 Months	15.8 Months	**34.1 Months**	**86.49%**
	100%	18.3 Months	26.4 Months	**44.7 Months**	**144.37%**

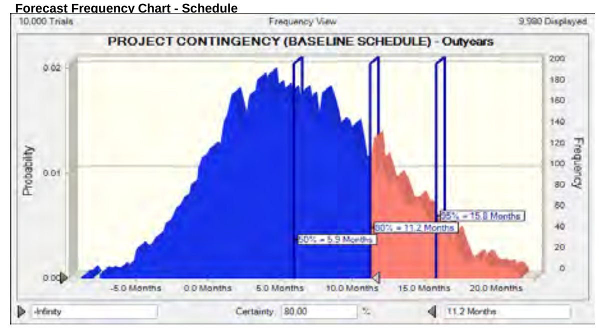
Cumulative Probability Forecast Chart - Schedule



Sensitivity Analysis Chart - Schedule



Forecast Frequency Chart - Schedule



SAM - Walton County Storm Damage Reduction Project, GI Study -

Enter Estimated Total Project Cost (Price Level)	$ 50,677,457
Max. Anticipated Annual Amount	$33,231,492
Enter Current OMB Escalation Rate	1.80%
Enter Current Project Location Escalation Rate	1.80%
Enter Assumed Monthly Recurring Cost Rate	8.00%

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	12-Jul-13			
Enter Baseline Project Completion	20-Jan-15			
Project Completion at 0% Confidence	2-Jun-14		($1,682,614.59)	($1,682,614.59)
Project Completion at 5% Confidence	21-Dec-14		($217,548.50)	($217,548.50)
Project Completion at 10% Confidence	6-Feb-15		$129,964.78	$129,964.78
Project Completion at 15% Confidence	11-Mar-15		$365,180.39	$365,180.39
Project Completion at 20% Confidence	7-Apr-15		$560,721.24	$560,721.24
Project Completion at 25% Confidence	29-Apr-15		$727,480.74	$727,480.74
Project Completion at 30% Confidence	20-May-15		$874,851.63	$874,851.63
Project Completion at 35% Confidence	6-Jun-15		$1,002,857.28	$1,002,857.28
Project Completion at 40% Confidence	24-Jun-15		$1,135,370.04	$1,135,370.04
Project Completion at 45% Confidence	12-Jul-15		$1,259,797.63	$1,259,797.63
Project Completion at 50% Confidence	29-Jul-15		$1,388,375.78	$1,388,375.78
Project Completion at 55% Confidence	16-Aug-15		$1,519,653.52	$1,519,653.52
Project Completion at 60% Confidence	1-Sep-15		$1,633,753.45	$1,633,753.45
Project Completion at 65% Confidence	19-Sep-15		$1,765,554.37	$1,765,554.37
Project Completion at 70% Confidence	10-Oct-15		$1,918,495.97	$1,918,495.97
Project Completion at 75% Confidence	30-Oct-15		$2,063,169.83	$2,063,169.83
Project Completion at 80% Confidence	23-Nov-15		$2,238,383.87	$2,238,383.87
Project Completion at 85% Confidence	22-Dec-15		$2,452,600.93	$2,452,600.93
Project Completion at 90% Confidence	26-Jan-16		$2,705,724.80	$2,705,724.80
Project Completion at 95% Confidence	16-Mar-16		$3,069,286.67	$3,069,286.67
Project Completion at 100% Confidence	4-Jan-17		$5,204,299.32	$5,204,299.32

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$19,664,828**
Max. Anticipated Annual Amount	**$12,895,114**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	17-Apr-23			
Enter Baseline Project Completion	25-Oct-24			
Project Completion at 0% Confidence	28-Jan-24		($762,775.24)	($762,775.24)
Project Completion at 5% Confidence	19-Aug-24		($187,221.00)	($187,221.00)
Project Completion at 10% Confidence	7-Oct-24		($50,245.86)	($50,245.86)
Project Completion at 15% Confidence	8-Nov-24		$41,536.80	$41,536.80
Project Completion at 20% Confidence	7-Dec-24		$121,574.99	$121,574.99
Project Completion at 25% Confidence	31-Dec-24		$189,933.57	$189,933.57
Project Completion at 30% Confidence	24-Jan-25		$258,905.24	$258,905.24
Project Completion at 35% Confidence	15-Feb-25		$320,348.05	$320,348.05
Project Completion at 40% Confidence	9-Mar-25		$382,319.17	$382,319.17
Project Completion at 45% Confidence	31-Mar-25		$445,068.02	$445,068.02
Project Completion at 50% Confidence	23-Apr-25		$510,726.18	$510,726.18
Project Completion at 55% Confidence	17-May-25		$578,612.23	$578,612.23
Project Completion at 60% Confidence	11-Jun-25		$649,578.29	$649,578.29
Project Completion at 65% Confidence	5-Jul-25		$715,749.68	$715,749.68
Project Completion at 70% Confidence	1-Aug-25		$791,409.08	$791,409.08
Project Completion at 75% Confidence	28-Aug-25		$868,146.62	$868,146.62
Project Completion at 80% Confidence	1-Oct-25		$964,584.85	$964,584.85
Project Completion at 85% Confidence	5-Nov-25		$1,063,229.16	$1,063,229.16
Project Completion at 90% Confidence	19-Dec-25		$1,188,104.44	$1,188,104.44
Project Completion at 95% Confidence	18-Feb-26		$1,360,625.05	$1,360,625.05
Project Completion at 100% Confidence	7-Jan-27		$2,271,211.91	$2,271,211.91

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$19,664,828**
Max. Anticipated Annual Amount	**$12,895,114**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	18-Apr-33			
Enter Baseline Project Completion	27-Oct-34			
Project Completion at 0% Confidence	29-Jan-34		($762,775.24)	($762,775.24)
Project Completion at 5% Confidence	21-Aug-34		($187,221.00)	($187,221.00)
Project Completion at 10% Confidence	9-Oct-34		($50,245.86)	($50,245.86)
Project Completion at 15% Confidence	10-Nov-34		$41,536.80	$41,536.80
Project Completion at 20% Confidence	9-Dec-34		$121,574.99	$121,574.99
Project Completion at 25% Confidence	2-Jan-35		$189,933.57	$189,933.57
Project Completion at 30% Confidence	26-Jan-35		$258,905.24	$258,905.24
Project Completion at 35% Confidence	17-Feb-35		$320,348.05	$320,348.05
Project Completion at 40% Confidence	11-Mar-35		$382,319.17	$382,319.17
Project Completion at 45% Confidence	2-Apr-35		$445,068.02	$445,068.02
Project Completion at 50% Confidence	25-Apr-35		$510,726.18	$510,726.18
Project Completion at 55% Confidence	19-May-35		$578,612.23	$578,612.23
Project Completion at 60% Confidence	13-Jun-35		$649,578.29	$649,578.29
Project Completion at 65% Confidence	7-Jul-35		$715,749.68	$715,749.68
Project Completion at 70% Confidence	3-Aug-35		$791,409.08	$791,409.08
Project Completion at 75% Confidence	30-Aug-35		$868,146.62	$868,146.62
Project Completion at 80% Confidence	3-Oct-35		$964,584.85	$964,584.85
Project Completion at 85% Confidence	7-Nov-35		$1,063,229.16	$1,063,229.16
Project Completion at 90% Confidence	21-Dec-35		$1,188,104.44	$1,188,104.44
Project Completion at 95% Confidence	20-Feb-36		$1,360,625.05	$1,360,625.05
Project Completion at 100% Confidence	8-Jan-37		$2,271,211.91	$2,271,211.91

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$19,664,828**
Max. Anticipated Annual Amount	**$12,895,114**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	20-Apr-43			
Enter Baseline Project Completion	28-Oct-44			
Project Completion at 0% Confidence	31-Jan-44		($762,775.24)	($762,775.24)
Project Completion at 5% Confidence	22-Aug-44		($187,221.00)	($187,221.00)
Project Completion at 10% Confidence	10-Oct-44		($50,245.86)	($50,245.86)
Project Completion at 15% Confidence	11-Nov-44		$41,536.80	$41,536.80
Project Completion at 20% Confidence	10-Dec-44		$121,574.99	$121,574.99
Project Completion at 25% Confidence	3-Jan-45		$189,933.57	$189,933.57
Project Completion at 30% Confidence	27-Jan-45		$258,905.24	$258,905.24
Project Completion at 35% Confidence	18-Feb-45		$320,348.05	$320,348.05
Project Completion at 40% Confidence	12-Mar-45		$382,319.17	$382,319.17
Project Completion at 45% Confidence	3-Apr-45		$445,068.02	$445,068.02
Project Completion at 50% Confidence	26-Apr-45		$510,726.18	$510,726.18
Project Completion at 55% Confidence	20-May-45		$578,612.23	$578,612.23
Project Completion at 60% Confidence	14-Jun-45		$649,578.29	$649,578.29
Project Completion at 65% Confidence	8-Jul-45		$715,749.68	$715,749.68
Project Completion at 70% Confidence	4-Aug-45		$791,409.08	$791,409.08
Project Completion at 75% Confidence	31-Aug-45		$868,146.62	$868,146.62
Project Completion at 80% Confidence	4-Oct-45		$964,584.85	$964,584.85
Project Completion at 85% Confidence	8-Nov-45		$1,063,229.16	$1,063,229.16
Project Completion at 90% Confidence	22-Dec-45		$1,188,104.44	$1,188,104.44
Project Completion at 95% Confidence	21-Feb-46		$1,360,625.05	$1,360,625.05
Project Completion at 100% Confidence	10-Jan-47		$2,271,211.91	$2,271,211.91

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study

Enter Estimated Total Project Cost (Price Level)	**$19,664,828**
Max. Anticipated Annual Amount	**$12,895,114**
Enter Current OMB Escalation Rate	**1.80%**
Enter Current Project Location Escalation Rate	**1.80%**
Enter Assumed Monthly Recurring Cost Rate	**8.00%**

	Date	Escalation Delta Amount	Monthly Recurring Cost Amount	Total Schedule Contingency
Enter Current Project Start	21-Apr-53			
Enter Baseline Project Completion	30-Oct-54			
Project Completion at 0% Confidence	1-Feb-54		($762,775.24)	($762,775.24)
Project Completion at 5% Confidence	24-Aug-54		($187,221.00)	($187,221.00)
Project Completion at 10% Confidence	12-Oct-54		($50,245.86)	($50,245.86)
Project Completion at 15% Confidence	13-Nov-54		$41,536.80	$41,536.80
Project Completion at 20% Confidence	12-Dec-54		$121,574.99	$121,574.99
Project Completion at 25% Confidence	5-Jan-55		$189,933.57	$189,933.57
Project Completion at 30% Confidence	29-Jan-55		$258,905.24	$258,905.24
Project Completion at 35% Confidence	20-Feb-55		$320,348.05	$320,348.05
Project Completion at 40% Confidence	14-Mar-55		$382,319.17	$382,319.17
Project Completion at 45% Confidence	5-Apr-55		$445,068.02	$445,068.02
Project Completion at 50% Confidence	28-Apr-55		$510,726.18	$510,726.18
Project Completion at 55% Confidence	22-May-55		$578,612.23	$578,612.23
Project Completion at 60% Confidence	16-Jun-55		$649,578.29	$649,578.29
Project Completion at 65% Confidence	10-Jul-55		$715,749.68	$715,749.68
Project Completion at 70% Confidence	6-Aug-55		$791,409.08	$791,409.08
Project Completion at 75% Confidence	2-Sep-55		$868,146.62	$868,146.62
Project Completion at 80% Confidence	6-Oct-55		$964,584.85	$964,584.85
Project Completion at 85% Confidence	10-Nov-55		$1,063,229.16	$1,063,229.16
Project Completion at 90% Confidence	24-Dec-55		$1,188,104.44	$1,188,104.44
Project Completion at 95% Confidence	23-Feb-56		$1,360,625.05	$1,360,625.05
Project Completion at 100% Confidence	11-Jan-57		$2,271,211.91	$2,271,211.91

Entry Required

Do Not Overwrite

Summary Data -- Do Not Overwrite

SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	I-1	Scope Definition - Initial	LIKELY	MARGINAL	MODERATE	Yes-No/Uniform	I-2	0.75	($1,236,500)	$0	$0	*Correlated to Risk I-2 by a factor of 0.75*
Cost	I-1	Scope Definition - Out-years	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	I-1	Scope Definition - Initial	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
Schedule	I-1	Scope Definition - Out-years	VERY Unlikely	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	Scope is fairly well defined for standard civil works features. Scope may change based on permitting. The risk of the scope definition has been greatly reduced since the initial risk analysis, as the PDT has well-defined the scope.
Development of Low Values	The best case scenario is that there could be reduction in structural additions in the initial nourishments. Assume up to 25% reduction in the beach work items.
Development of High Values	The worst case scenario is that the scope would be contained to match funding allocation.

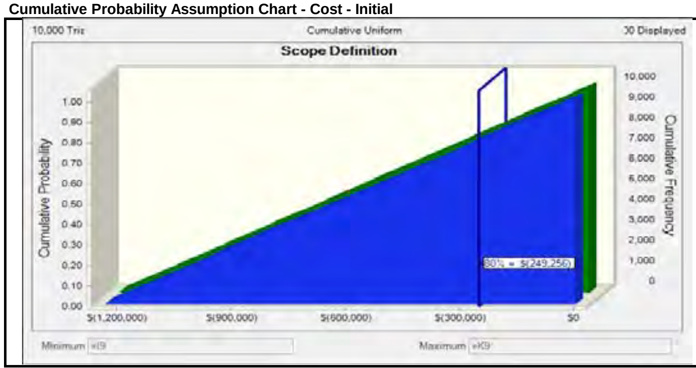
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($1,236,478)	N/A
10%	($1,110,726)	N/A
20%	($986,421)	N/A
30%	($866,098)	N/A
40%	($742,991)	N/A
50%	($615,190)	N/A
60%	($487,867)	N/A
70%	($362,412)	N/A
80%	($249,256)	N/A
90%	($127,789)	N/A
100%	($206)	N/A

Outyears

Confidence	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

Cumulative Probability Assumption Chart - Cost - Initial



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-2	Scope Growth / Reduction - Initial	LIKELY	MARGINAL	MODERATE	Uniform	I-1	0.75	($2,533,873)	$0	$5,067,746	*Correlated to Risk I-1 by a factor of 0.75*
I-2	Scope Growth / Reduction - Out-years	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	($3,932,966)	$0	$7,865,931	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-2	Scope Growth / Reduction - Initial	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	-4.0 Months	0.0 Months	6.0 Months	
I-2	Scope Growth / Reduction - Out-years	LIKELY	MARGINAL	MODERATE	Uniform	N/A	N/A	-4.0 Months	0.0 Months	6.0 Months	

Description	Scope is fairly well defined for standard civil works features. The pumping plant has potential of VE savings through better data and VE. While there is confidence in quantities for the initial nourishment, quantities for the out-year renourishments may change significantly.
Development of Low Values	The best case scenario is that the current baseline estimate could be reduced by up to 5% and that the project completion date could finish early due to reduction in scope, by up to 4 months.
Development of High Values	The worst case scenario is that the current baseline estimate could increase by up to 10% and that the project completion date could change due to increase in scope, by up to 6 months.

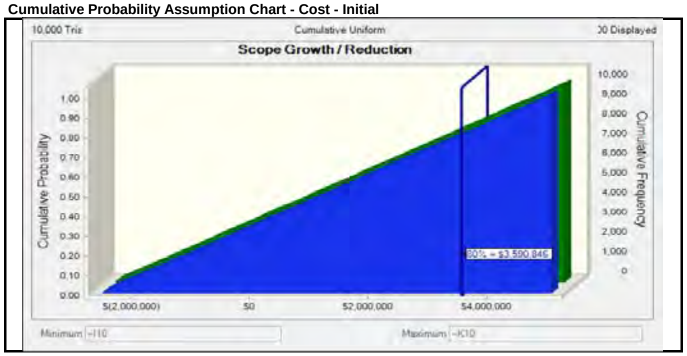
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,533,668)	'-4.0 Months
10%	($1,786,040)	'-3.0 Months
20%	($1,008,793)	'-2.0 Months
30%	($249,137)	'-1.0 Months
40%	$493,653	'-0.1 Months
50%	$1,275,397	1.0 Months
60%	$2,005,739	2.0 Months
70%	$2,770,489	3.0 Months
80%	$3,590,846	4.0 Months
90%	$4,326,910	5.0 Months
100%	$5,066,780	6.0 Months

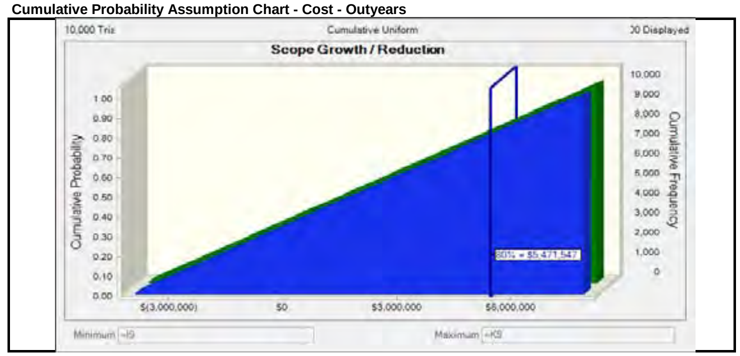
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,932,592)	'-4.0 Months
10%	($2,754,203)	'-3.0 Months
20%	($1,589,682)	'-2.1 Months
30%	($398,215)	'-1.1 Months
40%	$729,654	0.0 Months
50%	$1,946,264	1.0 Months
60%	$3,127,141	2.0 Months
70%	$4,302,000	3.0 Months
80%	$5,471,547	4.0 Months
90%	$6,659,374	5.0 Months
100%	$7,862,652	6.0 Months

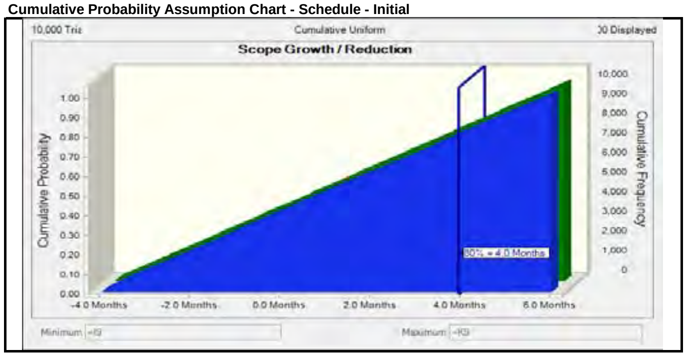
Cumulative Probability Assumption Chart - Cost - Initial



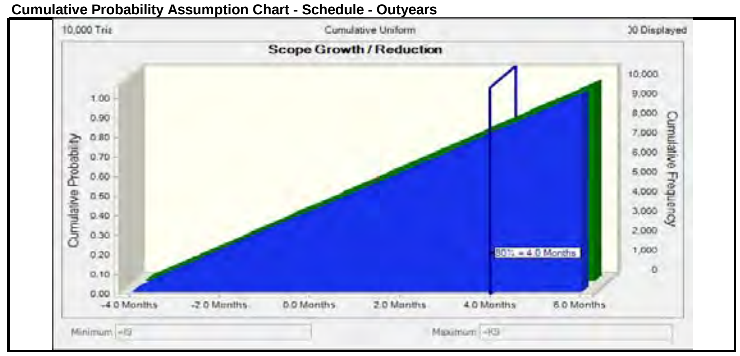
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-4	Material Availability - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-4	Material Availability - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$7,513,800	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-4	Material Availability - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-4	Material Availability - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	0.0 Months	0.0 Months	2.0 Months	

Description	Borrow sources are provided and indicated on drawings. Per the design Engineer and based on current surveys, quality and quantity of beach fill material is available at all sites.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that issues with material and equipment availability could delay the project completion date by up to 2 months. Assume that the average one-way distance to haul site increases to 16 miles for 2 renourishments.

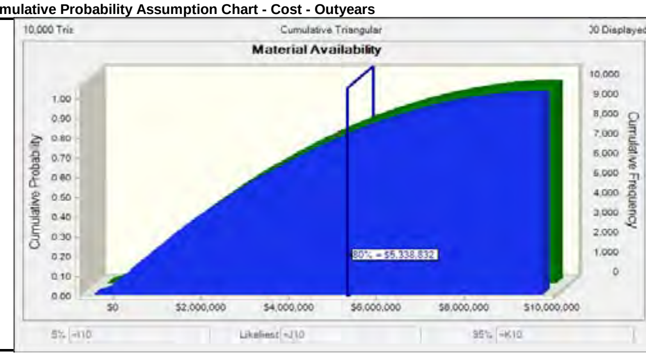
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

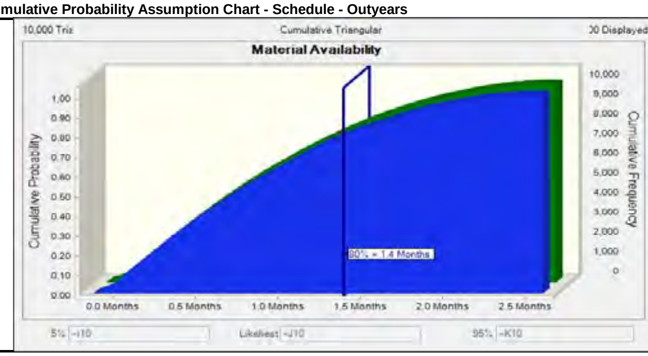
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($485,592)	'-0.1 Months
10%	$251,761	0.1 Months
20%	$768,729	0.2 Months
30%	$1,337,308	0.4 Months
40%	$1,965,729	0.5 Months
50%	$2,663,020	0.7 Months
60%	$3,422,617	0.9 Months
70%	$4,318,821	1.1 Months
80%	$5,338,832	1.4 Months
90%	$6,635,322	1.7 Months
100%	$9,631,186	2.6 Months

Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-5	Fuel Prices - Initial	VERY LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	($1,663,240)	$0	$5,685,960	
I-5	Fuel Prices - Out-years	VERY LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	($2,254,140)	$0	$10,519,320	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-5	Fuel Prices - Initial	UNLIKELY	NEGLIGIBLE	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
I-5	Fuel Prices - Out-years	UNLIKELY	NEGLIGIBLE	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	$3.45 per gallon was used in the Sep 2012 CEDEP Estimates, increases will effect equipment and delivery or materials. Fuel cost fluctuations can significantly impact dredging cost.
Development of Low Values	The best case scenario is that the cost of fuel adjusted for price level decreases to $3.00/gallon.
Development of High Values	The worst case scenario is that the cost of fuel adjusted for price level increases to $5.00/gallon.

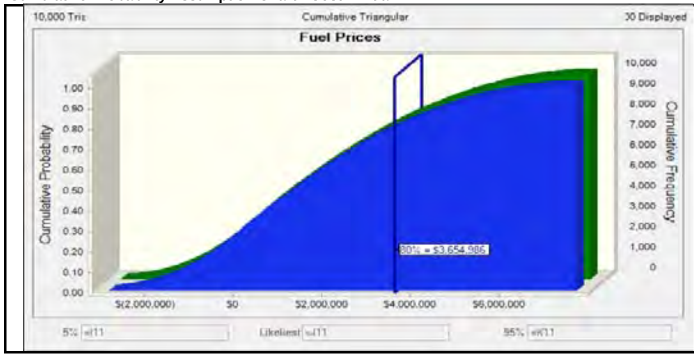
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,844,394)	N/A
10%	($1,181,179)	N/A
20%	($439,267)	N/A
30%	$145,020	N/A
40%	$726,209	N/A
50%	$1,327,779	N/A
60%	$1,998,732	N/A
70%	$2,739,387	N/A
80%	$3,654,986	N/A
90%	$4,821,161	N/A
100%	$7,674,833	N/A

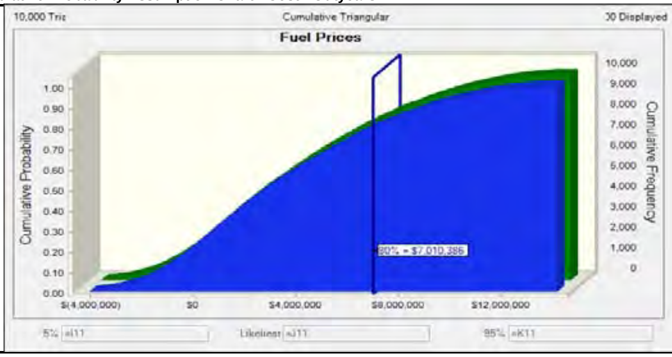
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($4,111,672)	N/A
10%	($1,418,491)	N/A
20%	($258,523)	N/A
30%	$717,456	N/A
40%	$1,694,398	N/A
50%	$2,733,135	N/A
60%	$3,998,957	N/A
70%	$5,432,553	N/A
80%	$7,010,386	N/A
90%	$9,077,511	N/A
100%	$13,924,143	N/A

Cumulative Probability Assumption Chart - Cost - Initial



Cumulative Probability Assumption Chart - Cost - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-6	Permits - Initial	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*
I-6	Permits - Out-years	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Cost Risk Model as this is captured in the Schedule Risk Model*

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-6	Permits - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	0.0 Months	0.0 Months	6.0 Months	
I-6	Permits - Out-years	LIKELY	MARGINAL	MODERATE	N/A	N/A	N/A	N/A	N/A	N/A	*Removed from Schedule Risk Model, as there will be enough time to obtain permits for outyear nourishments*

Description	Permitting delays may occur due to Florida State policy. This could impact the cost and schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that issues with issuing of permits from the State of Florida could delay the project completion date by up to 6 months.

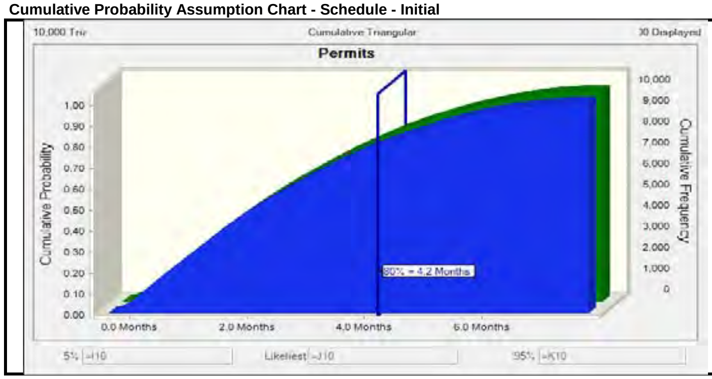
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	'-0.4 Months
10%	N/A	0.2 Months
20%	N/A	0.6 Months
30%	N/A	1.1 Months
40%	N/A	1.6 Months
50%	N/A	2.1 Months
60%	N/A	2.7 Months
70%	N/A	3.4 Months
80%	N/A	4.2 Months
90%	N/A	5.3 Months
100%	N/A	7.6 Months

Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	N/A
10%	N/A	N/A
20%	N/A	N/A
30%	N/A	N/A
40%	N/A	N/A
50%	N/A	N/A
60%	N/A	N/A
70%	N/A	N/A
80%	N/A	N/A
90%	N/A	N/A
100%	N/A	N/A

Cumulative Probability Assumption Chart - Schedule - Initial



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-7	Environmental Windows - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$2,387,355	
I-7	Environmental Windows - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	$0	$0	$3,730,681	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
I-7	Environmental Windows - Initial	LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	
I-7	Environmental Windows - Out-years	LIKELY	SIGNIFICANT	HIGH	Triangular	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	

Description	The concern is that :Project site is a natural habitat for various species of threatened wildlife that utilize the project vicinity during Spring and Winter months. The PDT feels that :Gulf sturgeon incidental takes during dredging and Sea Turtle and Bird Nesting may have Impact during Construction. There may also be unknown restrictions for the out-year renourishments.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that environmental windows and restrictions to have a significant impact on dredging operations and effective work times, potentially increasing the contract costs by up to 5%. Also, assume that the project completion date could change due to challenges with environmental work windows and restrictions, by up to 12 months.

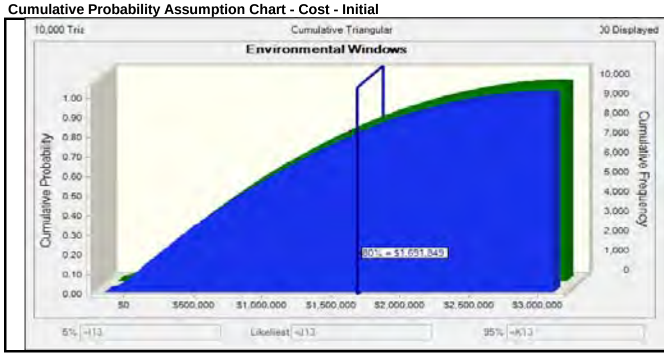
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($155,907)	'-0.8 Months
10%	$82,822	0.4 Months
20%	$249,764	1.3 Months
30%	$429,356	2.2 Months
40%	$638,684	3.2 Months
50%	$857,131	4.2 Months
60%	$1,102,270	5.4 Months
70%	$1,368,518	6.8 Months
80%	$1,691,849	8.4 Months
90%	$2,095,434	10.5 Months
100%	$3,071,627	15.3 Months

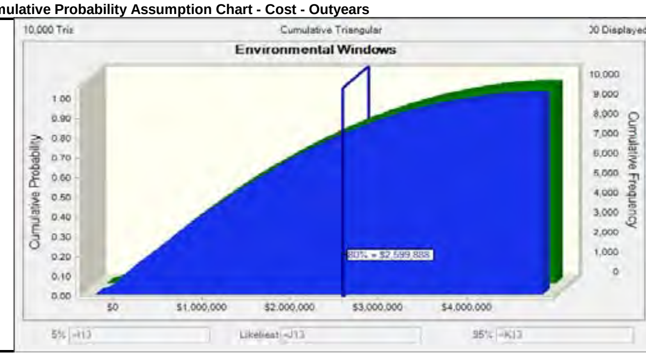
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($228,371)	'-0.8 Months
10%	$117,442	0.4 Months
20%	$398,578	1.3 Months
30%	$684,821	2.2 Months
40%	$992,481	3.2 Months
50%	$1,330,094	4.2 Months
60%	$1,700,161	5.4 Months
70%	$2,101,790	6.7 Months
80%	$2,599,888	8.4 Months
90%	$3,232,854	10.5 Months
100%	$4,829,580	15.5 Months

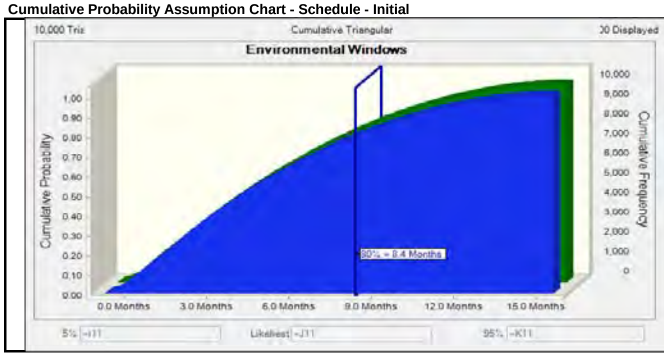
Cumulative Probability Assumption Chart - Cost - Initial



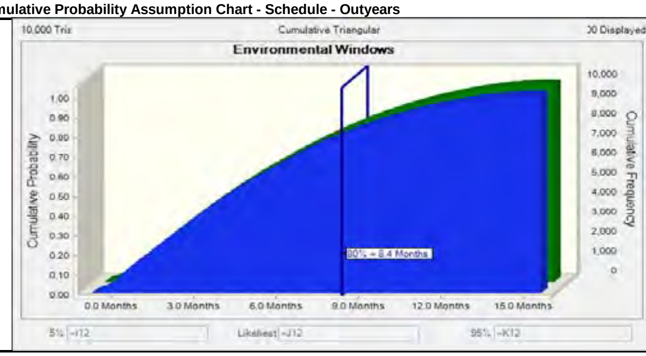
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Initial	Likely	Marginal	Moderate	Triangular	N/A	N/A	$0	$0	$1,432,413	
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Out-years	Likely	Marginal	Moderate	Triangular	N/A	N/A	$0	$0	$1,678,807	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Initial	Likely	Marginal	Moderate	Triangular	N/A	N/A	0.0 Months	0.0 Months	3.0 Months	
INT-MOD	Consideration for Post-Award Construction Claims and Modifications - Out-years	Likely	Marginal	Moderate	Triangular	N/A	N/A	0.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk of construction modifications and claims that arise after contract award. Post-award construction contract modifications and claims could impact the ultimate contract costs and delay the overall schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that direct costs increase by up to 3% and the overall schedule is delayed by up to 3 months.

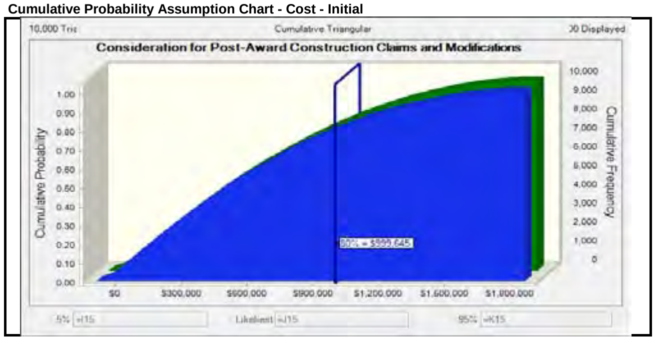
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($94,163)	'-0.2 Months
10%	$48,884	0.1 Months
20%	$149,158	0.3 Months
30%	$260,483	0.5 Months
40%	$378,093	0.8 Months
50%	$498,248	1.1 Months
60%	$644,357	1.4 Months
70%	$798,254	1.7 Months
80%	$999,645	2.1 Months
90%	$1,249,819	2.6 Months
100%	$1,843,237	3.9 Months

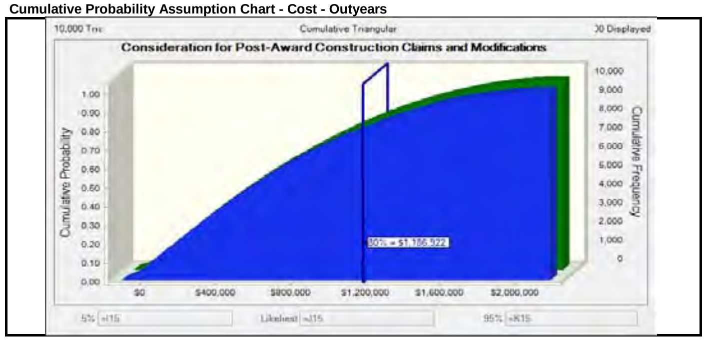
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($107,102)	'-0.2 Months
10%	$58,323	0.1 Months
20%	$180,391	0.3 Months
30%	$307,467	0.5 Months
40%	$442,966	0.8 Months
50%	$595,356	1.1 Months
60%	$747,435	1.4 Months
70%	$944,697	1.7 Months
80%	$1,186,922	2.1 Months
90%	$1,478,252	2.6 Months
100%	$2,147,916	3.9 Months

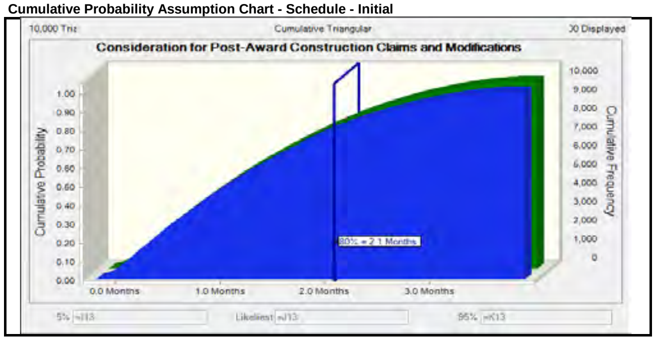
Cumulative Probability Assumption Chart - Cost - Initial



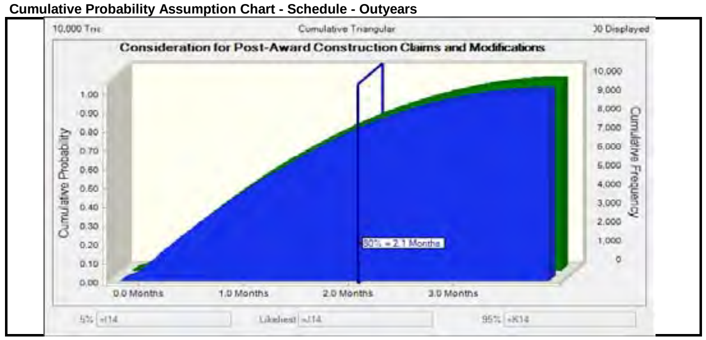
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



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Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-1	Estimate Considerations - Initial	Likely	Significant	High	Triangular	N/A	N/A	($2,387,355)	$0	$2,387,355	
EST-1	Estimate Considerations - Out-years	Likely	Significant	High	Triangular	N/A	N/A	($3,730,681)	$0	$3,730,681	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-1	Estimate Considerations - Initial	Very Unlikely	Negligible	LOW	N/A	N/A	N/A	N/A	N/A	N/A	
EST-1	Estimate Considerations - Out-years	Very Unlikely	Negligible	LOW	N/A	N/A	N/A	N/A	N/A	N/A	

Description	This is added to the CSRA model for consideration, as these issues may cause a cost variance. Estimate assumptions may not accurately capture the ultimate costs.
Development of Low Values	The best case scenario is that rates, crews and productivities are either flawed or too optimistic compared to actual ultimate costs, decreasing up to 5% on overall construction productivities.
Development of High Values	The worst case scenario is that rates, crews and productivities are either flawed or too optimistic compared to actual ultimate costs, decreasing up to 5% on overall construction productivities.

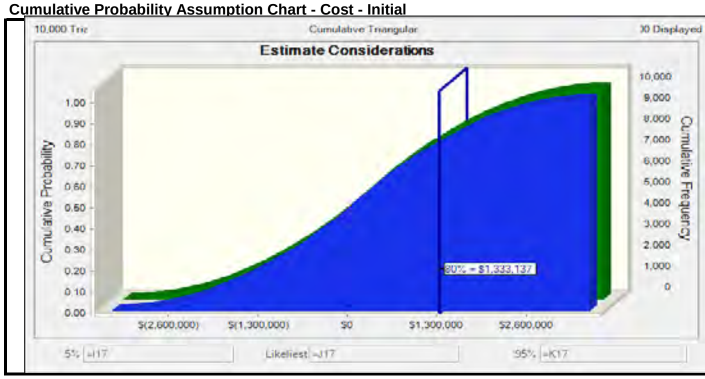
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,452,275)	N/A
10%	($1,950,486)	N/A
20%	($1,287,479)	N/A
30%	($758,384)	N/A
40%	($333,569)	N/A
50%	$25,587	N/A
60%	$396,727	N/A
70%	$820,130	N/A
80%	$1,333,137	N/A
90%	$1,939,790	N/A
100%	$3,453,453	N/A

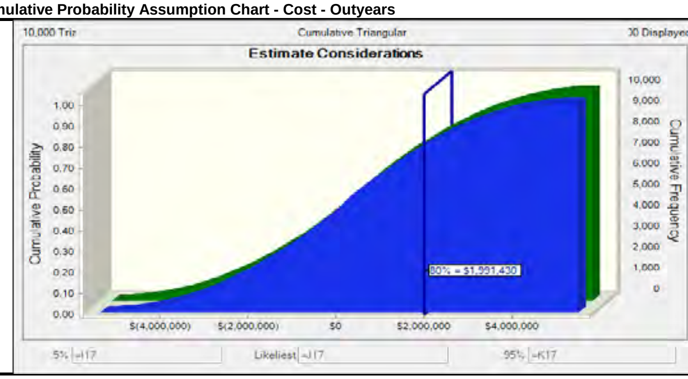
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($5,371,001)	N/A
10%	($2,973,991)	N/A
20%	($2,000,688)	N/A
30%	($1,223,604)	N/A
40%	($561,102)	N/A
50%	$29,241	N/A
60%	$585,732	N/A
70%	$1,258,324	N/A
80%	$1,991,430	N/A
90%	$2,967,597	N/A
100%	$5,377,750	N/A

Cumulative Probability Assumption Chart - Cost - Initial



Cumulative Probability Assumption Chart - Cost - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-1	Consideration for Low and Unknown Internal Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($2,387,355)	$0	$2,387,355	
INT-1	Consideration for Low and Unknown Internal Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($3,730,681)	$0	$3,730,681	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
INT-1	Consideration for Low and Unknown Internal Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	
INT-1	Consideration for Low and Unknown Internal Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns. This could impact cost and schedule.
Development of Low Values	The best case scenario is that costs improve by up to 5% and schedule is improved by up to 3 months.
Development of High Values	The worst case scenario is that project costs increase by up to 5% and the overall schedule is delayed by up to 3 months.

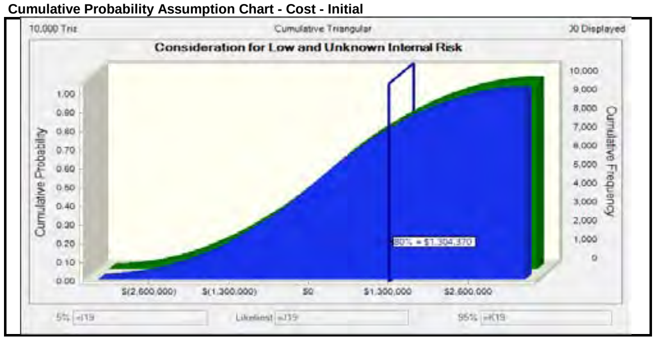
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,438,595)	'-4.4 Months
10%	($1,920,948)	'-2.4 Months
20%	($1,256,551)	'-1.6 Months
30%	($760,984)	'-1.0 Months
40%	($351,274)	'-0.5 Months
50%	$26,706	0.0 Months
60%	$392,837	0.5 Months
70%	$817,499	1.0 Months
80%	$1,304,370	1.6 Months
90%	$1,950,071	2.5 Months
100%	$3,461,587	4.3 Months

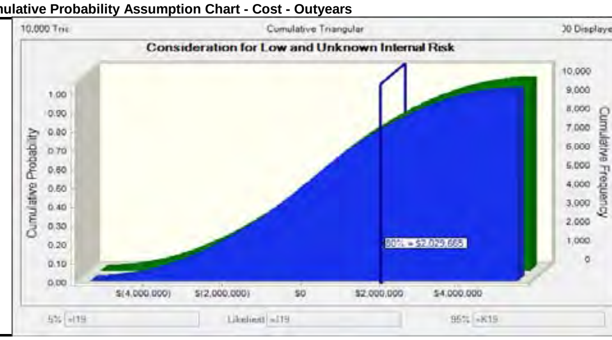
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($5,378,409)	'-4.4 Months
10%	($3,045,563)	'-2.4 Months
20%	($2,060,020)	'-1.6 Months
30%	($1,275,211)	'-1.0 Months
40%	($594,287)	'-0.5 Months
50%	$7,376	0.0 Months
60%	$596,133	0.5 Months
70%	$1,235,970	1.0 Months
80%	$2,029,665	1.6 Months
90%	$3,031,199	2.4 Months
100%	$5,417,057	4.3 Months

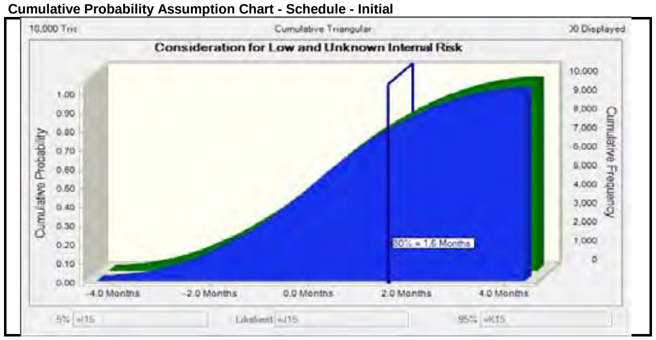
Cumulative Probability Assumption Chart - Cost - Initial



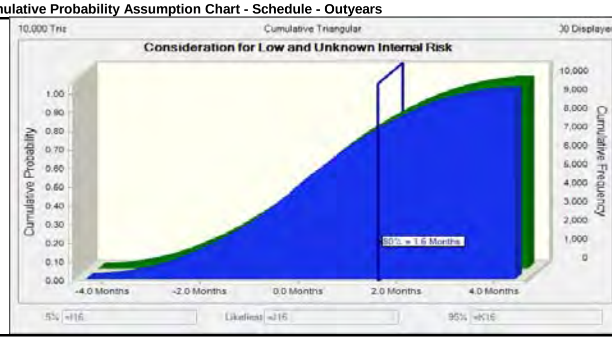
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-1	Weather - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	($1,432,413)	$0	$2,387,355	
E-1	Weather - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	($2,238,409)	$0	$3,730,681	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-1	Weather - Initial	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	6.0 Months	
E-1	Weather - Out-years	LIKELY	MARGINAL	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	6.0 Months	

Description	Florida is subject to bad weather during Hurricane Season which can cause Schedule delays. Weather days are generally incorporated into schedule.
Development of Low Values	The best case scenario is that weather has less impact on dredging operations and effective work time than currently contemplated in the current baseline estimate, reducing the overall costs by up to 3%. Also assume that favorable weather conditions could improve the schedule by up to 3 months.
Development of High Values	The worst case scenario is that weather has more impact on dredging operations and effective work time than currently contemplated in the current baseline estimate, increasing the overall costs by up to 5%. Also assume that unfavorable weather conditions could delay the schedule by up to 6 months.

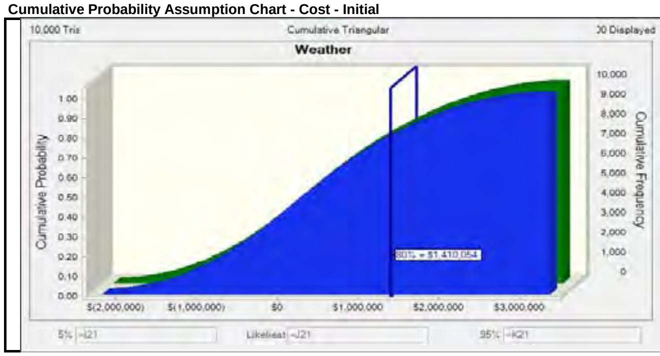
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($2,191,146)	'-4.7 Months
10%	($1,121,880)	'-2.3 Months
20%	($657,588)	'-1.3 Months
30%	($283,293)	'-0.5 Months
40%	$7,346	0.2 Months
50%	$302,977	0.9 Months
60%	$618,657	1.7 Months
70%	$974,574	2.6 Months
80%	$1,410,054	3.7 Months
90%	$1,963,139	5.1 Months
100%	$3,310,286	8.2 Months

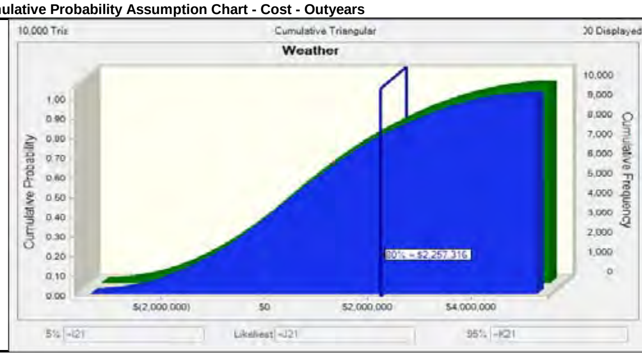
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,417,613)	'-4.7 Months
10%	($1,704,749)	'-2.3 Months
20%	($970,822)	'-1.2 Months
30%	($421,592)	'-0.5 Months
40%	$55,945	0.2 Months
50%	$527,222	0.9 Months
60%	$1,043,929	1.7 Months
70%	$1,599,499	2.6 Months
80%	$2,257,316	3.6 Months
90%	$3,163,465	5.1 Months
100%	$5,208,086	8.2 Months

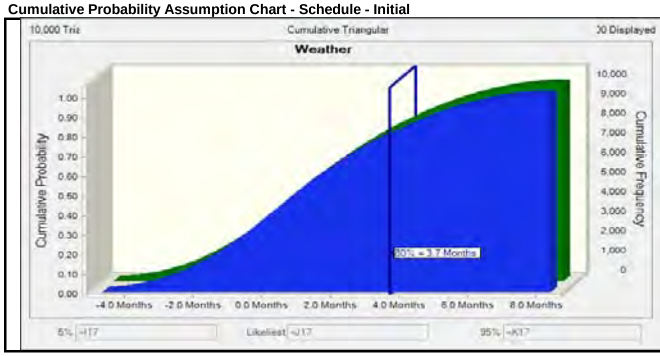
Cumulative Probability Assumption Chart - Cost - Initial



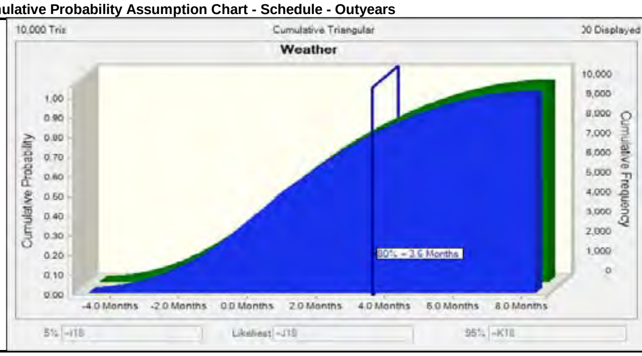
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-2	Funding Delays - Initial	UNLIKELY	MARGINAL	LOW	N/A	N/A	N/A	N/A	N/A	N/A	*The original risk register and current assumption indicate this is not high risk for the initial activity, but is for the out-years*
E-2	Funding Delays - Out-years	LIKELY	MARGINAL	MODERATE	Yes-No/Triangular	N/A	N/A	$0	$0	$9,170,416	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
E-2	Funding Delays - Initial	LIKELY	Significant	HIGH	Yes-No/Uniform	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	
E-2	Funding Delays - Out-years	LIKELY	Significant	HIGH	Yes-No/Uniform	N/A	N/A	0.0 Months	0.0 Months	12.0 Months	

Description	PM feels Adequate Congressional funding to complete project will be available. However, if the project is delayed, it could increase the quantities to be dredged and delay the overal schedule. This could impact the cost and schedule.
Development of Low Values	The best case scenario is that there is no change to the baseline estimate or schedule.
Development of High Values	The worst case scenario is that funding delays experienced for out-year renourishments may make the project vulnerable to accumulation of more dredge material due to prolonged storm surge exposure. Assume up to 15% more material for each nourishment. Also, assume that funding issues could move the entire construction schedule by up to one fiscal year.

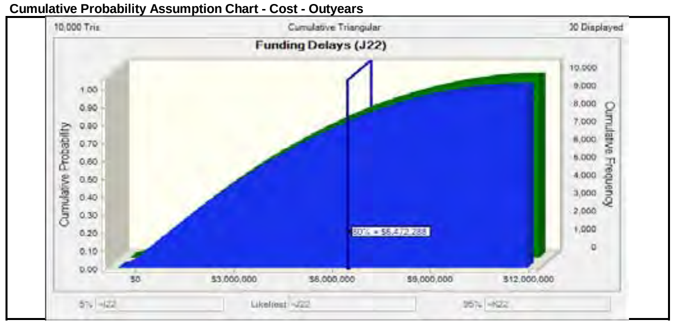
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	N/A	0.0 Months
10%	N/A	1.2 Months
20%	N/A	2.4 Months
30%	N/A	3.6 Months
40%	N/A	4.9 Months
50%	N/A	6.1 Months
60%	N/A	7.3 Months
70%	N/A	8.5 Months
80%	N/A	9.7 Months
90%	N/A	10.8 Months
100%	N/A	12.0 Months

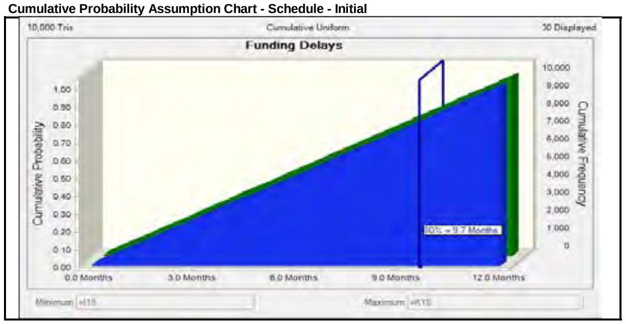
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($607,195)	0.0 Months
10%	$321,596	1.2 Months
20%	$976,883	2.4 Months
30%	$1,676,627	3.7 Months
40%	$2,450,610	4.9 Months
50%	$3,275,090	6.0 Months
60%	$4,195,780	7.2 Months
70%	$5,227,571	8.4 Months
80%	$6,472,288	9.6 Months
90%	$8,002,743	10.8 Months
100%	$11,865,275	12.0 Months

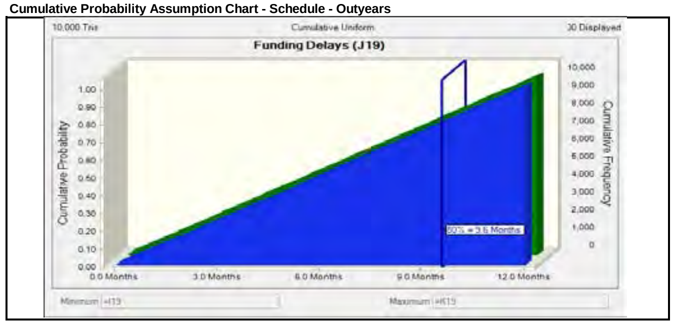
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



SAM - Walton County Storm Damage Reduction Project, GI Study - LPP

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EXT-1	Consideration for Low and Unknown External Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($2,387,355)	$0	$2,387,355	
EXT-1	Consideration for Low and Unknown External Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	($3,730,681)	$0	$3,730,681	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EXT-1	Consideration for Low and Unknown External Risk - Initial	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	
EXT-1	Consideration for Low and Unknown External Risk - Out-years	Likely	Marginal	MODERATE	Triangular	N/A	N/A	-3.0 Months	0.0 Months	3.0 Months	

Description	There is inherent risk in all projects that could contribute to cost and schedule variance due to uknowns. This could impact cost and schedule.
Development of Low Values	The best case scenario is that costs improve by up to 5% and schedule is improved by up to 3 months.
Development of High Values	The worst case scenario is that project costs increase by up to 5% and the overall schedule is delayed by up to 3 months.

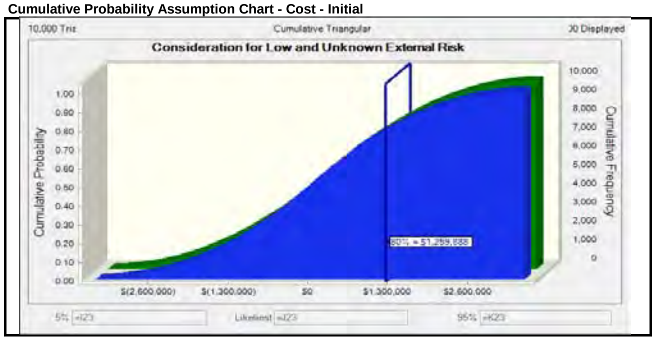
Initial

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($3,473,275)	'-4.3 Months
10%	($1,928,366)	'-2.4 Months
20%	($1,251,206)	'-1.6 Months
30%	($788,422)	'-1.0 Months
40%	($369,802)	'-0.5 Months
50%	($430)	0.0 Months
60%	$362,950	0.5 Months
70%	$759,694	1.0 Months
80%	$1,259,888	1.6 Months
90%	$1,921,338	2.4 Months
100%	$3,428,494	4.3 Months

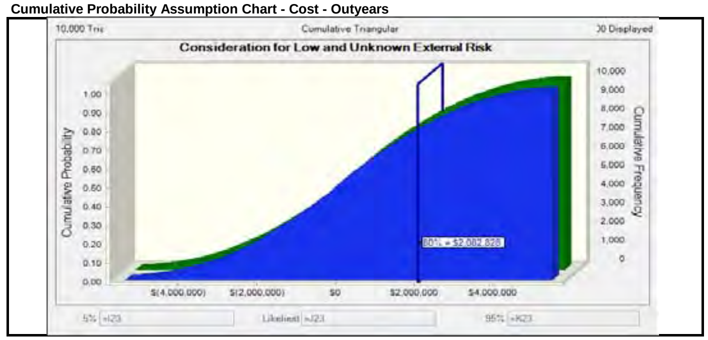
Outyears

Confidence Percentile	Assumption values (in dollars)	Assumption values (in months)
0%	($5,389,073)	'-4.3 Months
10%	($3,009,029)	'-2.4 Months
20%	($2,027,639)	'-1.6 Months
30%	($1,262,243)	'-1.0 Months
40%	($602,026)	'-0.5 Months
50%	($7,877)	0.0 Months
60%	$591,774	0.5 Months
70%	$1,289,843	1.0 Months
80%	$2,082,828	1.6 Months
90%	$3,073,753	2.4 Months
100%	$5,362,650	4.3 Months

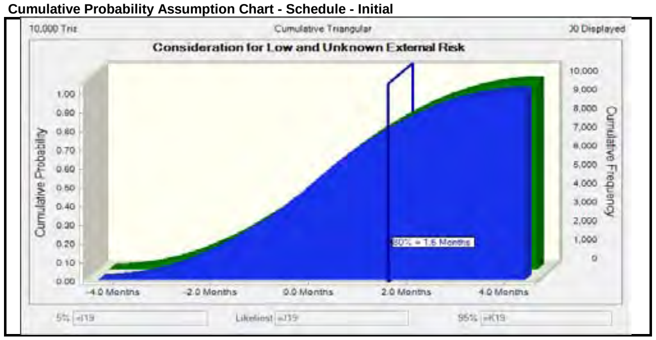
Cumulative Probability Assumption Chart - Cost - Initial



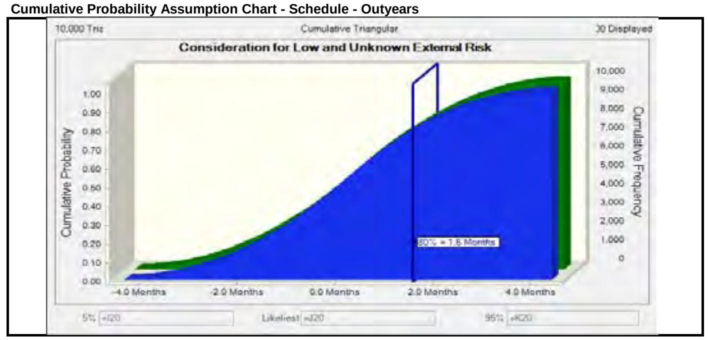
Cumulative Probability Assumption Chart - Cost - Outyears



Cumulative Probability Assumption Chart - Schedule - Initial



Cumulative Probability Assumption Chart - Schedule - Outyears



Crystal Ball Report - Full
Simulation started on 10/10/2012 at 11:12:03
Simulation stopped on 10/10/2012 at 11:13:40

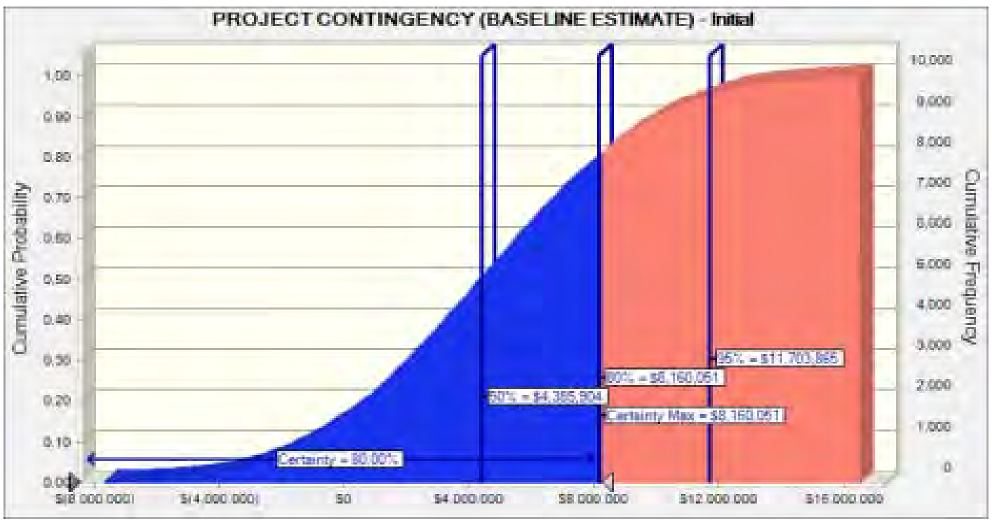
Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	97.44
Trials/second (average)	103
Random numbers per sec	3,900
Crystal Ball data	
Assumptions	38
Correlations	1
Correlated groups	1
Decision variables	0
Forecasts	4

Forecasts

Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Cost Risk Model - Initial

Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial **Cell: L25**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to $8,160,051
Entire range is from $(12,367,942) to $20,776,700
Base case is $0
After 10,000 trials, the std. error of the mean is $43,506



Statistics:	Forecast values
Trials	10,000
Mean	$4,423,081
Median	$4,387,004
Mode	---
Standard Deviation	$4,350,615
Variance	###############
Skewness	0.0510
Kurtosis	2.82
Coeff. of Variability	0.9836
Minimum	$(12,367,942)
Maximum	$20,776,700
Range Width	$33,144,642
Mean Std. Error	$43,506

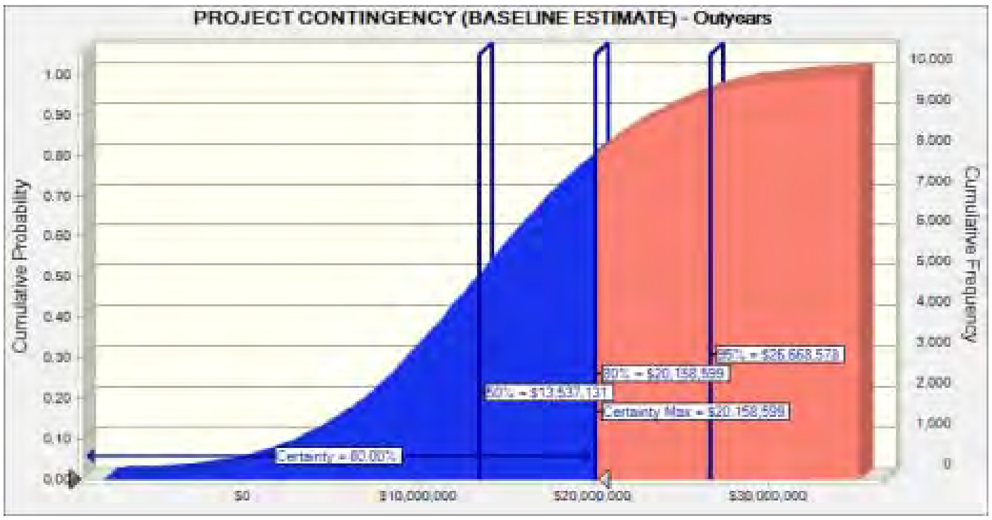
Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Initial (cont'd) **Cell: L25**

Percentiles:	Forecast values
0%	$(12,367,942)
10%	$(1,230,118)
20%	$678,502
30%	$2,062,210
40%	$3,246,649
50%	$4,385,904
60%	$5,525,425
70%	$6,757,484
80%	$8,160,051
90%	$10,046,438
100%	$20,776,700

Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Cost Risk Model - Outyears

Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears **Cell: L25**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to $20,158,599
Entire range is from $(11,723,307) to $41,173,067
Base case is $0
After 10,000 trials, the std. error of the mean is $77,628



Statistics:	**Forecast values**
Trials	**10,000**
Mean	**$13,684,694**
Median	**$13,537,839**
Mode	**---**
Standard Deviation	**$7,762,756**
Variance	**###############**
Skewness	**0.1409**
Kurtosis	**2.94**
Coeff. of Variability	**0.5673**
Minimum	**$(11,723,307)**
Maximum	**$41,173,067**
Range Width	**$52,896,374**
Mean Std. Error	**$77,628**

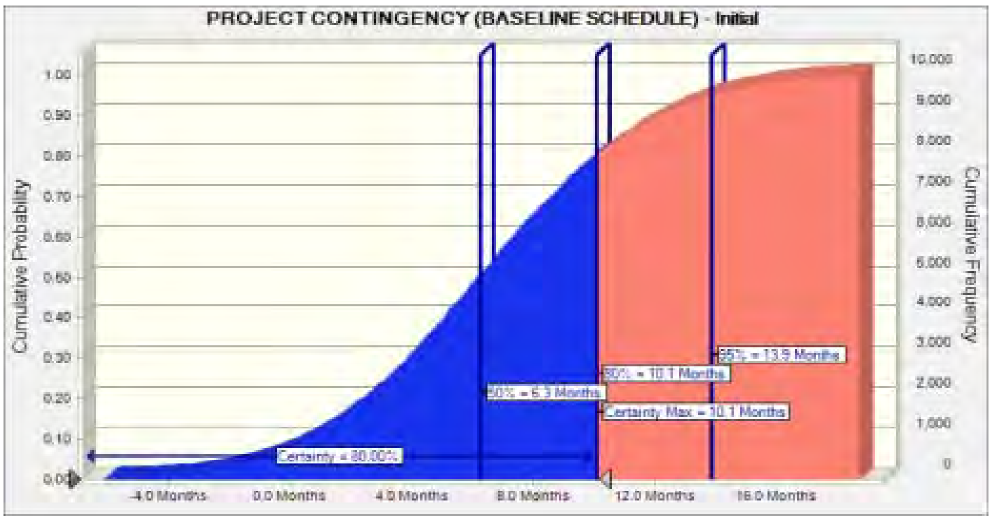
Forecast: PROJECT CONTINGENCY (BASELINE ESTIMATE) - Outyears (cont'd) **Cell: L25**

Percentiles:	Forecast values
0%	$(11,723,307)
10%	$3,795,322
20%	$7,139,976
30%	$9,440,676
40%	$11,602,375
50%	$13,537,131
60%	$15,459,820
70%	$17,574,455
80%	$20,158,599
90%	$23,866,183
100%	$41,173,067

Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Schedule Risk Model - Initi

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial **Cell: L21**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to 10.1 Months
Entire range is from -7.6 Months to 23.5 Months
Base case is 0.0 Months
After 10,000 trials, the std. error of the mean is 0.0 Month



Statistics:	Forecast values
Trials	10,000
Mean	6.3 Months
Median	6.3 Months
Mode	---
Standard Deviation	4.5 Months
Variance	20.0 Months
Skewness	0.0766
Kurtosis	2.85
Coeff. of Variability	0.7059
Minimum	-7.6 Months
Maximum	23.5 Months
Range Width	31.1 Months
Mean Std. Error	0.0 Months

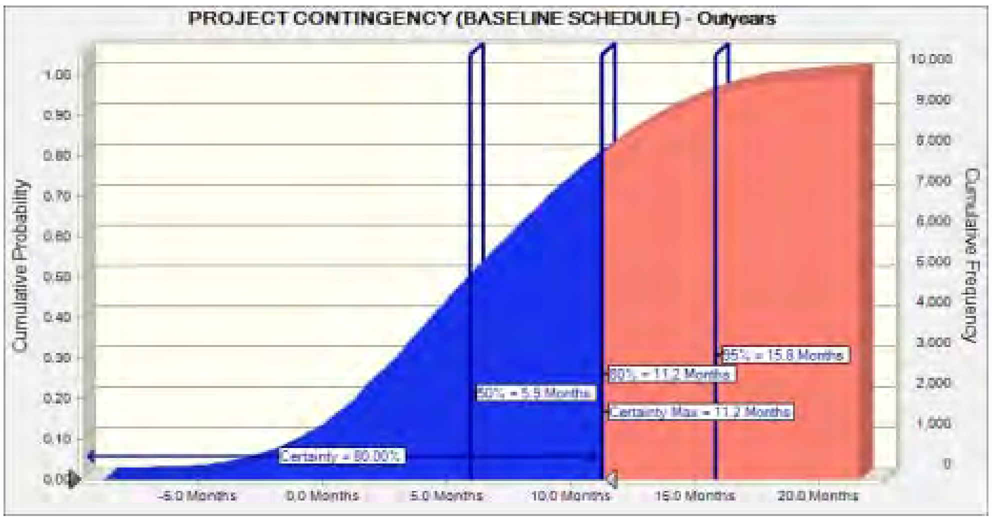
Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Initial (cont'd) **Cell: L21**

Percentiles:	Forecast values
0%	-7.6 Months
10%	0.6 Months
20%	2.5 Months
30%	4.0 Months
40%	5.1 Months
50%	6.3 Months
60%	7.4 Months
70%	8.7 Months
80%	10.1 Months
90%	12.2 Months
100%	23.5 Months

Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Schedule Risk Model - Out

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears **Cell: L22**

Summary:
Certainty level is 80.00%
Certainty range is from -Infinity to 11.2 Months
Entire range is from -8.9 Months to 26.4 Months
Base case is 0.0 Months
After 10,000 trials, the std. error of the mean is 0.1 Month



Statistics:	**Forecast values**
Trials	**10,000**
Mean	**6.3 Months**
Median	**5.9 Months**
Mode	**---**
Standard Deviation	**5.5 Months**
Variance	**30.5 Months**
Skewness	**0.2412**
Kurtosis	**2.63**
Coeff. of Variability	**0.8746**
Minimum	**-8.9 Months**
Maximum	**26.4 Months**
Range Width	**35.3 Months**
Mean Std. Error	**0.1 Months**

Forecast: PROJECT CONTINGENCY (BASELINE SCHEDULE) - Outyears (cont'd) **Cell: L22**

Percentiles:	Forecast values
0%	-8.9 Months
10%	-0.6 Months
20%	1.4 Months
30%	3.0 Months
40%	4.4 Months
50%	5.9 Months
60%	7.6 Months
70%	9.2 Months
80%	11.2 Months
90%	13.8 Months
100%	26.4 Months

End of Forecasts

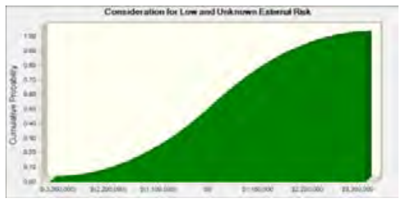
Assumptions

Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Cost Risk Model - Initial

Assumption: Consideration for Low and Unknown External Risk **Cell: J23**

Triangular distribution with parameters:

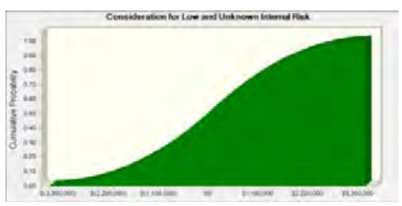
5%	$(2,387,355)	(=I23)
Likeliest	$0	(=J23)
95%	$2,387,355	(=K23)



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J19**

Triangular distribution with parameters:

5%	$(2,387,355)	(=I19)
Likeliest	$0	(=J19)
95%	$2,387,355	(=K19)

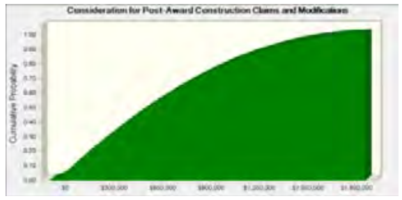


Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J15**

Triangular distribution with parameters:

5%	$0	(=I15)
Likeliest	$0	(=J15)
95%	$1,432,413	(=K15)

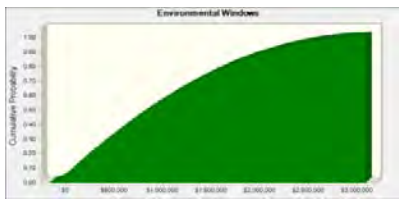
Assumption: Consideration for Post-Award Construction Claims and Modifications (cont'd) **Cell: J15**



Assumption: Environmental Windows **Cell: J13**

Triangular distribution with parameters:

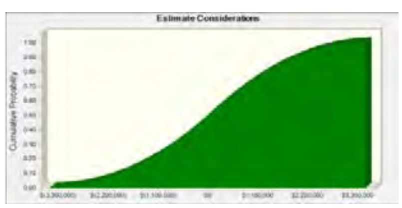
5%	$0	(=I13)
Likeliest	$0	(=J13)
95%	$2,387,355	(=K13)



Assumption: Estimate Considerations **Cell: J17**

Triangular distribution with parameters:

5%	$(2,387,355)	(=I17)
Likeliest	$0	(=J17)
95%	$2,387,355	(=K17)

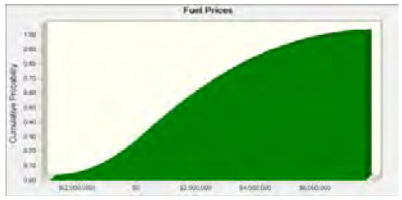


Assumption: Fuel Prices **Cell: J11**

Triangular distribution with parameters:

5%	$(1,663,240)	(=I11)
Likeliest	$0	(=J11)
95%	$5,685,960	(=K11)

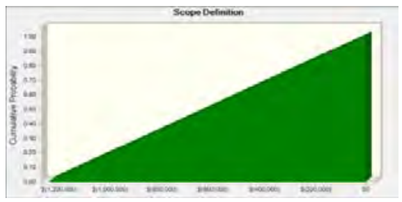
Assumption: Fuel Prices (cont'd) **Cell: J11**



Assumption: Scope Definition **Cell: J9**

Uniform distribution with parameters:

Minimum	$(1,236,500)	(=I9)
Maximum	$0	(=K9)

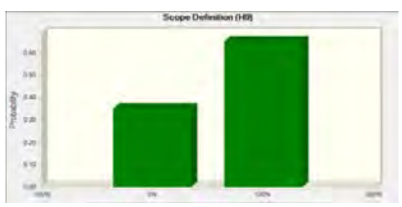


Correlated with:	Coefficient
Scope Growth / Reduction (J10)	0.75

Assumption: Scope Definition (H9) **Cell: H9**

Yes-No distribution with parameters:

Probability of Yes(1)	0.65	(=H9)

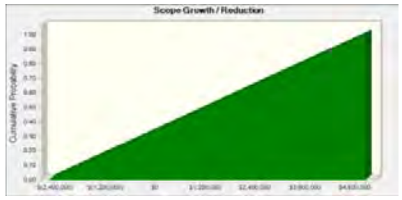


Assumption: Scope Growth / Reduction **Cell: J10**

Uniform distribution with parameters:

Minimum	$(2,533,873)	(=I10)
Maximum	$5,067,746	(=K10)

Assumption: Scope Growth / Reduction (cont'd) **Cell: J10**

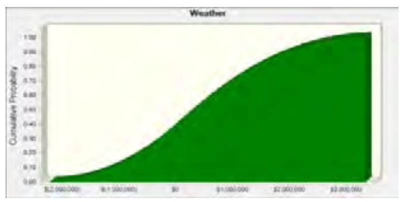


Correlated with:	Coefficient
Scope Definition (J9)	0.75

Assumption: Weather **Cell: J21**

Triangular distribution with parameters:

5%	$(1,432,413)	(=I21)
Likeliest	$0	(=J21)
95%	$2,387,355	(=K21)

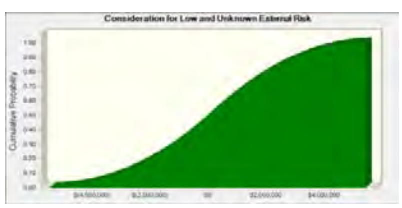


Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Cost Risk Model - Outyears

Assumption: Consideration for Low and Unknown External Risk **Cell: J23**

Triangular distribution with parameters:

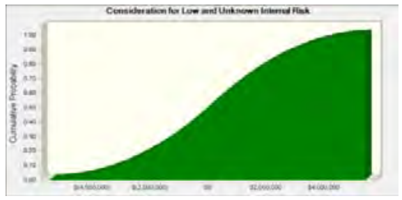
5%	$(3,730,681)	(=I23)
Likeliest	$0	(=J23)
95%	$3,730,681	(=K23)



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J19**

Triangular distribution with parameters:

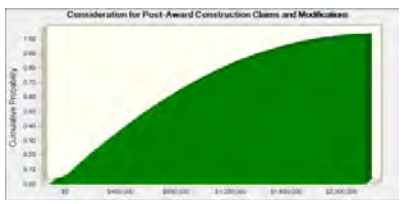
5%	**$(3,730,681)**	**(=I19)**
Likeliest	**$0**	**(=J19)**
95%	**$3,730,681**	**(=K19)**



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J15**

Triangular distribution with parameters:

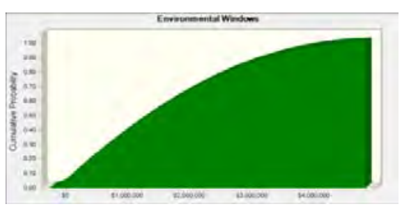
5%	**$0**	**(=I15)**
Likeliest	**$0**	**(=J15)**
95%	**$1,678,807**	**(=K15)**



Assumption: Environmental Windows **Cell: J13**

Triangular distribution with parameters:

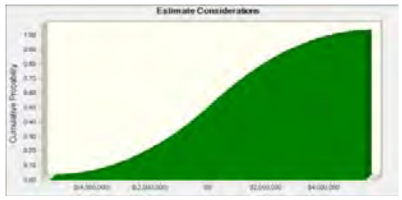
5%	**$0**	**(=I13)**
Likeliest	**$0**	**(=J13)**
95%	**$3,730,681**	**(=K13)**



Assumption: Estimate Considerations **Cell: J17**

Triangular distribution with parameters:

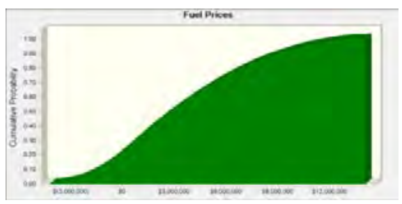
5%	**$(3,730,681)**	**(=I17)**
Likeliest	**$0**	**(=J17)**
95%	**$3,730,681**	**(=K17)**



Assumption: Fuel Prices **Cell: J11**

Triangular distribution with parameters:

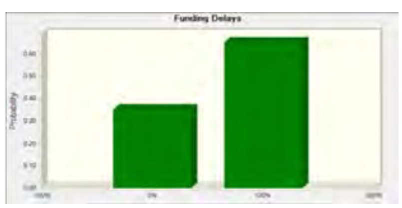
5%	**$(2,254,140)**	**(=I11)**
Likeliest	**$0**	**(=J11)**
95%	**$10,519,320**	**(=K11)**



Assumption: Funding Delays **Cell: H22**

Yes-No distribution with parameters:

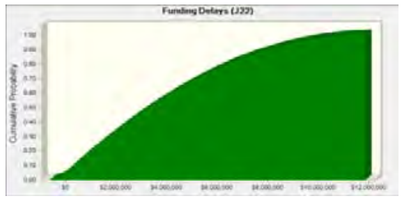
Probability of Yes(1)	**0.65**	**(=H22)**



Assumption: Funding Delays (J22) **Cell: J22**

Triangular distribution with parameters:

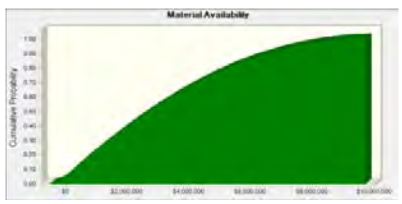
5%	**$0**	**(=I22)**
Likeliest	**$0**	**(=J22)**
95%	**$9,170,416**	**(=K22)**



Assumption: Material Availability **Cell: J10**

Triangular distribution with parameters:

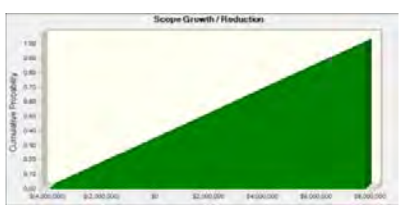
5%	**$0**	**(=I10)**
Likeliest	**$0**	**(=J10)**
95%	**$7,513,800**	**(=K10)**



Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

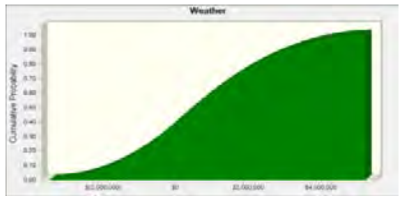
Minimum	**$(3,932,966)**	**(=I9)**
Maximum	**$7,865,931**	**(=K9)**



Assumption: Weather **Cell: J21**

Triangular distribution with parameters:

5%	**$(2,238,409)**	**(=I21)**
Likeliest	**$0**	**(=J21)**
95%	**$3,730,681**	**(=K21)**

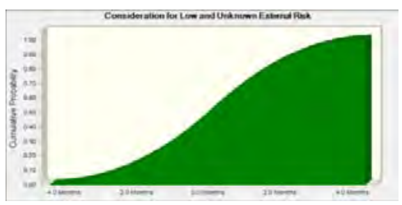


Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Schedule Risk Model - Initi

Assumption: Consideration for Low and Unknown External Risk **Cell: J19**

Triangular distribution with parameters:

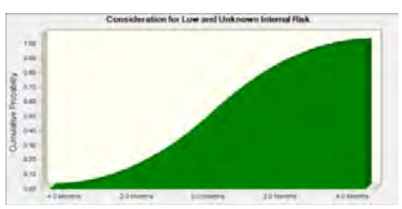
5%	**-3.0 Months**	**(=I19)**
Likeliest	**0.0 Months**	**(=J19)**
95%	**3.0 Months**	**(=K19)**



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J15**

Triangular distribution with parameters:

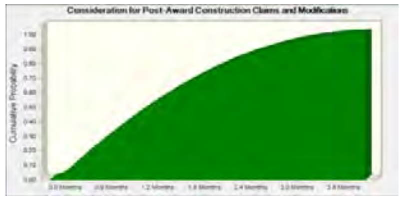
5%	**-3.0 Months**	**(=I15)**
Likeliest	**0.0 Months**	**(=J15)**
95%	**3.0 Months**	**(=K15)**



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J13**

Triangular distribution with parameters:

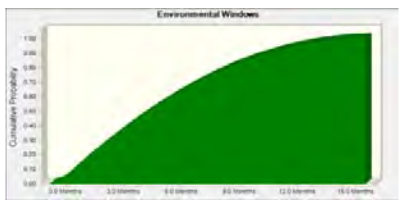
5%	**0.0 Months**	**(=I13)**
Likeliest	**0.0 Months**	**(=J13)**
95%	**3.0 Months**	**(=K13)**



Assumption: Environmental Windows **Cell: J11**

Triangular distribution with parameters:

5%	**0.0 Months**	**(=I11)**
Likeliest	**0.0 Months**	**(=J11)**
95%	**12.0 Months**	**(=K11)**



Assumption: Funding Delays **Cell: J18**

Uniform distribution with parameters:

Minimum	**0.0 Months**	**(=I18)**
Maximum	**12.0 Months**	**(=K18)**

Assumption: Permits **Cell: J10**

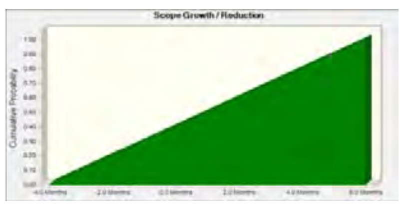
Triangular distribution with parameters:

5%	**0.0 Months**	**(=I10)**
Likeliest	**0.0 Months**	**(=J10)**
95%	**6.0 Months**	**(=K10)**

Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

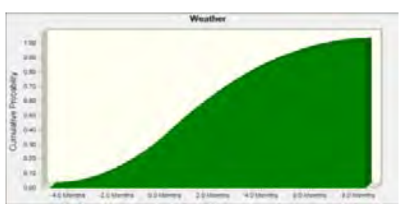
Minimum	**-4.0 Months**	**(=I9)**
Maximum	**6.0 Months**	**(=K9)**



Assumption: Weather **Cell: J17**

Triangular distribution with parameters:

5%	**-3.0 Months**	**(=I17)**
Likeliest	**0.0 Months**	**(=J17)**
95%	**6.0 Months**	**(=K17)**

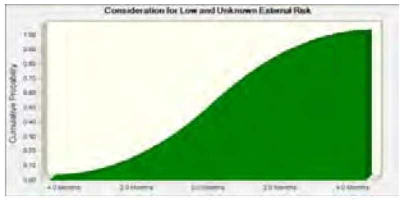


Worksheet: [SAM - Walton County CSRA Updated 10-2012 - LPP.xlsx]Schedule Risk Model - Out

Assumption: Consideration for Low and Unknown External Risk **Cell: J20**

Triangular distribution with parameters:

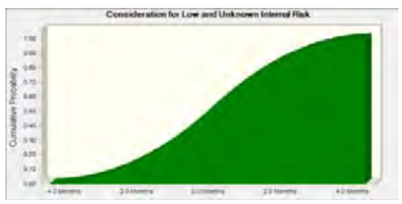
5%	**-3.0 Months**	**(=I20)**
Likeliest	**0.0 Months**	**(=J20)**
95%	**3.0 Months**	**(=K20)**



Assumption: Consideration for Low and Unknown Internal Risk **Cell: J16**

Triangular distribution with parameters:

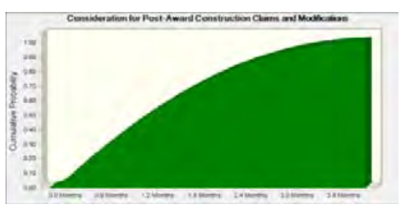
5%	**-3.0 Months**	**(=I16)**
Likeliest	**0.0 Months**	**(=J16)**
95%	**3.0 Months**	**(=K16)**



Assumption: Consideration for Post-Award Construction Claims and Modifications **Cell: J14**

Triangular distribution with parameters:

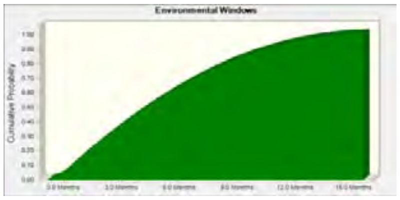
5%	**0.0 Months**	**(=I14)**
Likeliest	**0.0 Months**	**(=J14)**
95%	**3.0 Months**	**(=K14)**



Assumption: Environmental Windows **Cell: J12**

Triangular distribution with parameters:

5%	0.0 Months	(=I12)
Likeliest	0.0 Months	(=J12)
95%	12.0 Months	(=K12)



Assumption: Funding Delays **Cell: H19**

Yes-No distribution with parameters:

Probability of Yes(1)	0.65	(=H19)

Assumption: Funding Delays (J19) **Cell: J19**

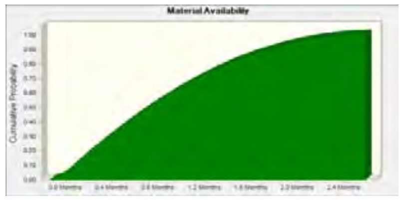
Uniform distribution with parameters:

Minimum	0.0 Months	(=I19)
Maximum	12.0 Months	(=K19)

Assumption: Material Availability **Cell: J10**

Triangular distribution with parameters:

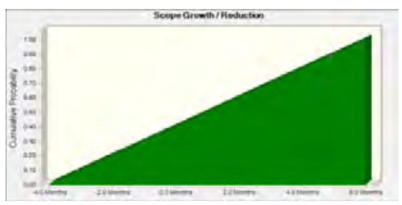
5%	**0.0 Months**	**(=I10)**
Likeliest	**0.0 Months**	**(=J10)**
95%	**2.0 Months**	**(=K10)**



Assumption: Scope Growth / Reduction **Cell: J9**

Uniform distribution with parameters:

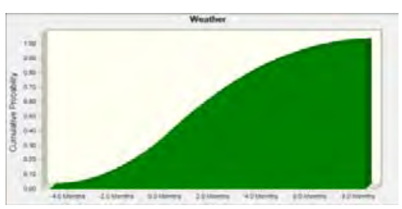
Minimum	**-4.0 Months**	**(=I9)**
Maximum	**6.0 Months**	**(=K9)**



Assumption: Weather **Cell: J18**

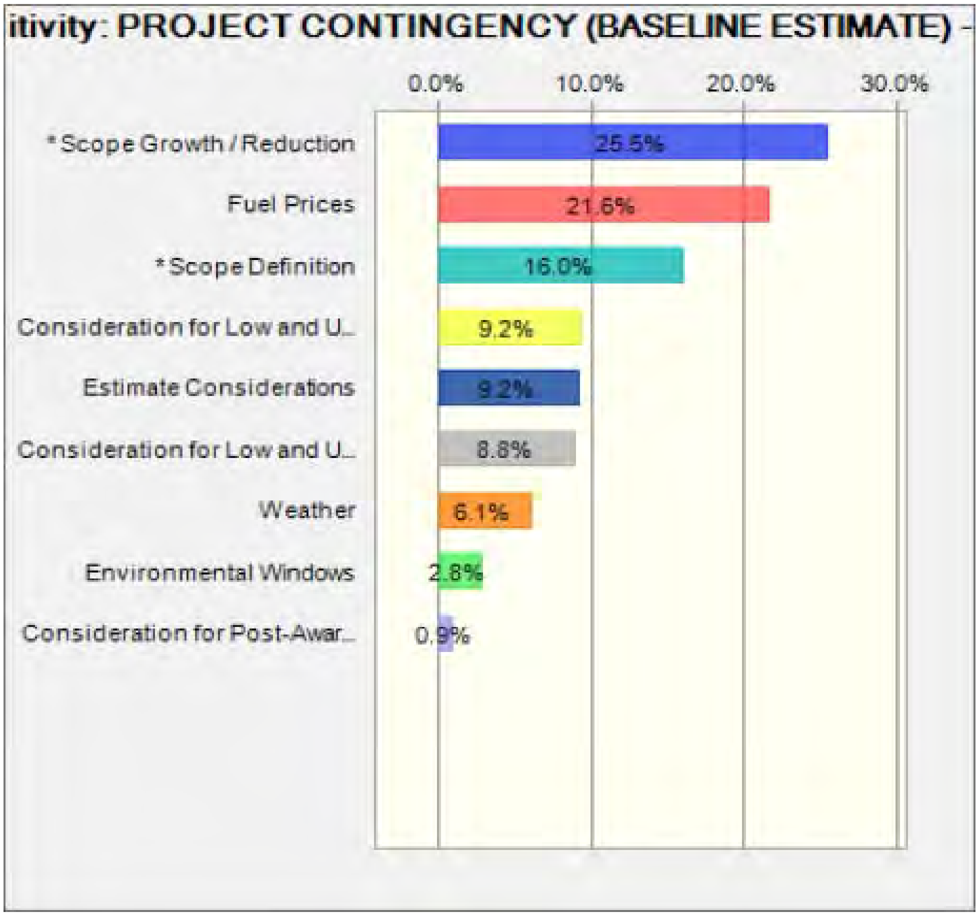
Triangular distribution with parameters:

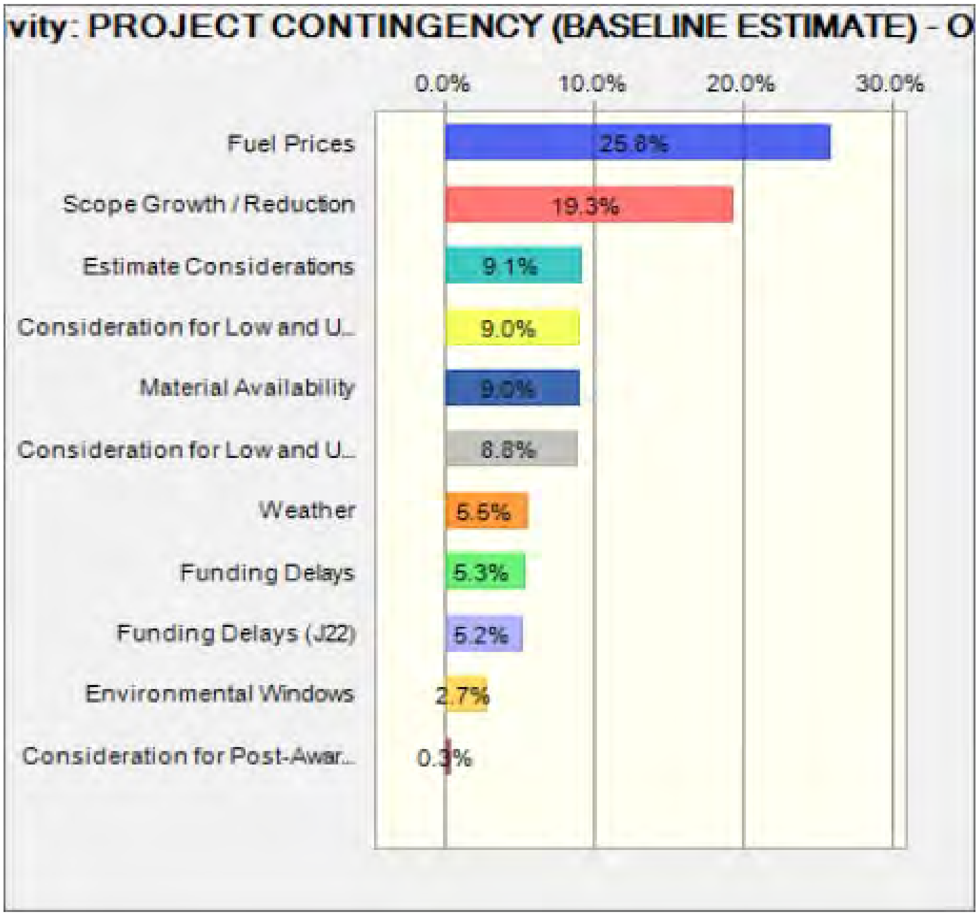
5%	**-3.0 Months**	**(=I18)**
Likeliest	**0.0 Months**	**(=J18)**
95%	**6.0 Months**	**(=K18)**

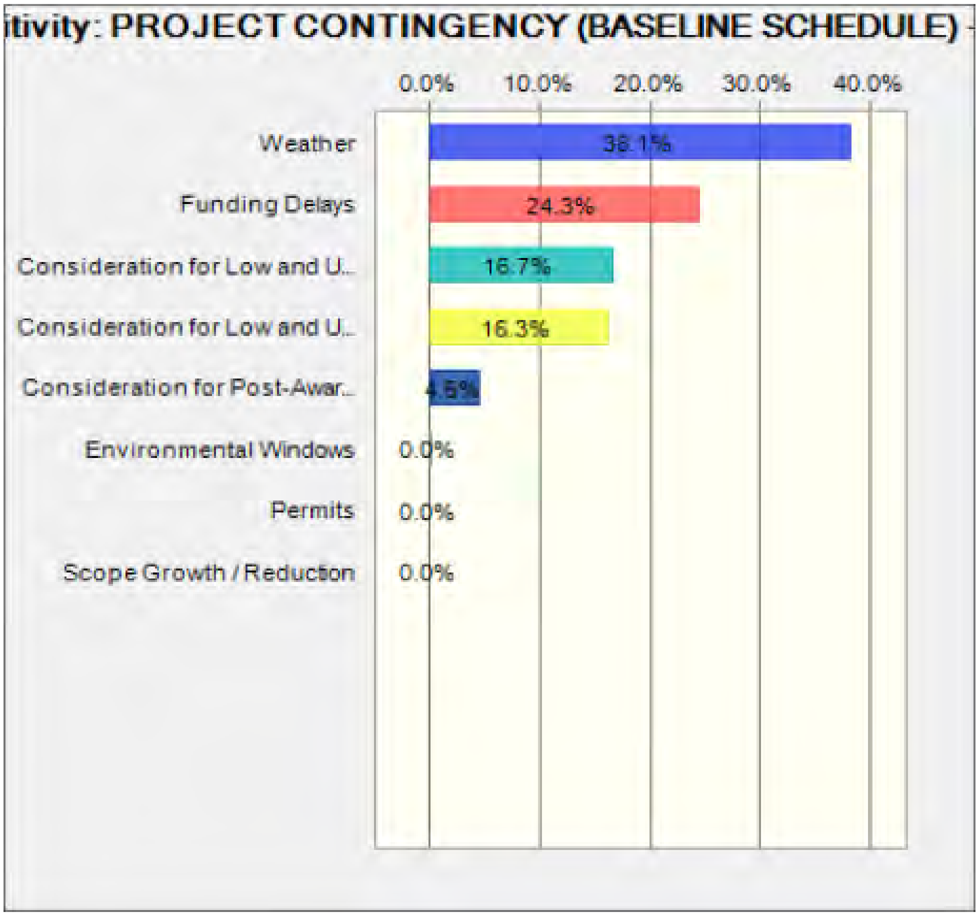


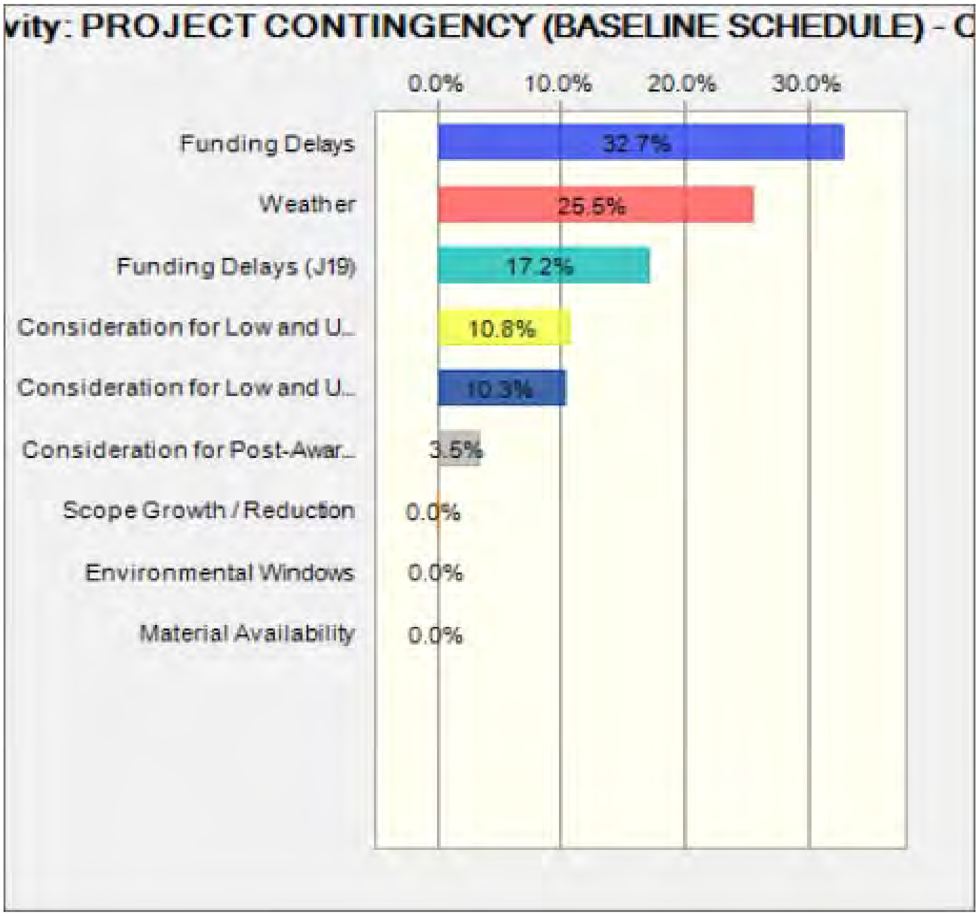
End of Assumptions

Sensitivity Charts




vity: PROJECT CONTINGENCY (BASELINE ESTIMATE) - O
0.0%
10.0%
20.0%
30.0%
Fuel Prices
25.8%
Scope Growth / Reduction
19.3%
Estimate Considerations
9.1%
Consideration for Low and U...
9.0%
Material Availability
9.0%
Consideration for Low and U...
8.8%
Weather
5.5%
Funding Delays
5.3%
Funding Delays (J22)
5.2%
Environmental Windows
2.7%
Consideration for Post-Awar...
0.3%


itivity: PROJECT CONTINGENCY (BASELINE SCHEDULE)
0.0%
10.0%
20.0%
30.0%
40.0%
Weather
38.1%
Funding Delays
24.3%
Consideration for Low and U...
16.7%
Consideration for Low and U...
16.3%
Consideration for Post-Awar...
4.6%
Environmental Windows
0.0%
Permits
0.0%
Scope Growth / Reduction
0.0%



End of Sensitivity Charts

ATTACHMENT V

PROJECT SCHEDULE

Walton County, Florida
Hurricane and Storm Damage Reduction Project
Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Walton County HSDR Project**	**15,144 days**	**Tue, 05/13/2014**	**Fri, 10/30/2043**	
2	**Authorization**	**1 days**	**Tue, 05/13/2014**	**Tue, 05/13/2014**	
3	**Initial Construction**	**397 days**	**Fri, 07/11/2014**	**Mon, 01/18/2016**	
4	Funding	1 days	Fri, 07/11/2014	Fri, 07/11/2014	2
5	Design	120 days	Fri, 08/15/2014	Thu, 01/29/2015	4
6	Advertise	30 days	Mon, 02/16/2015	Fri, 03/27/2015	5
7	Award	1 day	Mon, 04/13/2015	Mon, 04/13/2015	6
8	Construct	200 days	Tue, 04/14/2015	Mon, 01/18/2016	7
9					
10	**First Renourishment**	**400 days**	**Mon, 04/15/2024**	**Tue, 10/14/2025**	
11	**Surveys**	**44 days**	**Mon, 04/15/2024**	**Thu, 06/13/2024**	
12	Borrow Availability	14 days	Mon, 04/15/2024	Thu, 05/2/2024	
13	Beach Template	30 days	Fri, 05/3/2024	Thu, 06/13/2024	12
14	Quantity Estimate	14 days	Fri, 06/14/2024	Wed, 07/3/2024	13
15	**Environmental Coordination**	**156 days**	**Mon, 06/10/2024**	**Mon, 01/13/2025**	
16	Permit Preparation	90 days	Mon, 06/10/2024	Fri, 10/11/2024	
17	Permit Approval	66 days	Mon, 10/14/2024	Mon, 01/13/2025	16
18	Plan Preparation	207 days	Mon, 04/15/2024	Tue, 01/28/2025	
19	Advertise	30 days	Fri, 02/14/2025	Thu, 03/27/2025	18
20	Award Construct	1 day	Tue, 04/1/2025	Tue, 04/1/2025	19
21	Construct	140 days	Wed, 04/2/2025	Tue, 10/14/2025	20
22					
23	**Second Renourishment**	**400 days**	**Mon, 04/17/2034**	**Fri, 10/26/2035**	
24	**Surveys**	**44 days**	**Mon, 04/17/2034**	**Thu, 06/15/2034**	
25	Borrow Availability	14 days	Mon, 04/17/2034	Thu, 05/4/2034	
26	Beach Template	30 days	Fri, 05/5/2034	Thu, 06/15/2034	25
27	Quantity Estimate	14 days	Fri, 06/16/2034	Wed, 07/5/2034	26
28	**Environmental Coordination**	**156 days**	**Mon, 06/12/2034**	**Mon, 01/15/2035**	
29	Permit Preparation	90 days	Mon, 06/12/2034	Fri, 10/13/2034	
30	Permit Approval	66 days	Mon, 10/16/2034	Mon, 01/15/2035	29
31	Plan Preparation	207 days	Mon, 04/17/2034	Tue, 01/30/2035	
32	Advertise	30 days	Fri, 02/16/2035	Thu, 03/29/2035	31
33	Award Construct	1 day	Fri, 04/13/2035	Fri, 04/13/2035	32
34	Construct	140 days	Mon, 04/16/2035	Fri, 10/26/2035	33
35					
36	**Third Renourishment**	**400 days**	**Mon, 04/18/2044**	**Fri, 10/27/2045**	
37	**Surveys**	**44 days**	**Mon, 04/18/2044**	**Thu, 06/16/2044**	
38	Borrow Availability	14 days	Mon, 04/18/2044	Wed, 05/4/2044	
39	Beach Template	30 days	Fri, 05/6/2044	Thu, 06/16/2044	38
40	Quantity Estimate	14 days	Fri, 06/17/2044	Wed, 07/6/2044	39
41	**Environmental Coordination**	**156 days**	**Mon, 06/13/2044**	**Mon, 01/16/2045**	
42	Permit Preparation	90 days	Mon, 06/13/2044	Fri, 10/14/2044	
43	Permit Approval	66 days	Mon, 10/17/2044	Mon, 01/16/2045	42
44	Plan Preparation	207 days	Mon, 04/18/2044	Mon, 01/30/2045	
45	Advertise	30 days	Fri, 02/17/2045	Thu, 03/30/2045	44
46	Award Construct	1 day	Fri, 04/14/2045	Fri, 04/14/2045	45
47	Construct	140 days	Mon, 04/17/2045	Fri, 10/27/2045	46
48					
49	**Fourth Renourishment**	**400 days**	**Mon, 04/20/2054**	**Fri, 10/29/2055**	
50	**Surveys**	**44 days**	**Mon, 04/20/2054**	**Thu, 06/17/2055**	
51	Borrow Availability	14 days	Mon, 04/20/2054	Thu, 05/7/2054	
52	Beach Template	30 days	Fri, 05/8/2054	**Thu, 06/18/2054**	51
53	Quantity Estimate	14 days	Fri, 06/19/2054	Wed, 07/8/2054	52
54	**Environmental Coordination**	**156 days**	**Mon, 06/15/2054**	**Sat, 01/16/2055**	
55	Permit Preparation	90 days	Mon, 06/15/2054	Thu, 10/15/2054	
56	Permit Approval	66 days	Mon, 10/19/2054	Fri, 01/15/2055	55
57	Plan Preparation	207 days	Mon, 04/20/2054	Mon, 02/1/2055	
58	Advertise	30 days	Fri, 02/19/2055	Thu, 04/1/2055	57
59	Award Construct	1 day	Fri, 04/16/2055	Fri, 04/16/2055	58
60	Construct	140 days	Mon, 04/19/2055	Fri, 10/29/2055	59

APPENDIX B

ECONOMIC INVESTIGATIONS

WALTON COUNTY, FLORIDA
HURRICANE AND STORM DAMAGE REDUCTION
GENERAL INVESTIGATIONS STUDY

APPENDIX B – ECONOMIC INVESTIGATIONS

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WALTON COUNTY, FLORIDA
HURRICANE AND STORM DAMAGE REDUCTION
GENERAL INVESTIGATIONS STUDY

APPENDIX B – ECONOMIC INVESTIGATIONS

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (Corps), Mobile District has evaluated the feasibility of a hurricane and storm damage reduction project in Walton County, Florida. The results of those investigations are presented here and in the accompanying attachments.

1.1 PROBLEM STATEMENT

Walton County's shore line is receding; portions of the study area have experienced steady erosion which has resulted in increased exposure and risk of structural damage. The protective dunes and high bluffs are being destroyed by hurricane and storm forces. The impacts of these storms to property and infrastructure are considerable and can possibly be reduced through a beach restoration and stabilization project.

1.2 PURPOSE

The purpose of this Economic Appendix is to document the economic investigations completed to determine the National Economic Development (NED) Plan and to formulate a hurricane and storm damage reduction project for Walton County, Florida, which will reduce the damaging effects of hurricanes and severe storms to properties along the coast and stabilize or restore the shoreline. The project will be constructible, acceptable to the public, environmentally sustainable and justified by an economic evaluation.

1.3 STUDY AREA

Walton County comprises 26 miles of shoreline including six miles of state parks. A coastal peninsula extending west from the mainland characterizes the western two-thirds of the coastline, and a mainland beach characterizes the eastern third. The Walton County shoreline is characterized by high dune elevations along the mid-section of Walton County. Choctawhatchee Bay lies north of the peninsula. Behind the dune system, upland drainage feeds several freshwater lakes that intermittently breach the dune system and discharge directly into the Gulf. Primary dune elevations range from 13 to 45 feet National Geodetic Vertical Datum (NGVD) and average 26 feet NGVD. During the late 1990s, the area endured several strong hurricanes resulting in extensive shoreline erosion (Taylor Engineering, 2003).

In 2004 the area was affected by Hurricane Ivan and early in the 2005 hurricane season it was impacted again by Hurricanes Arlene and Dennis.

1.4 FEDERAL INTEREST

Congress has authorized Federal participation in hurricane and storm damage reduction projects to prevent or reduce damages caused by wind and tidal generated waves and currents along the Nation's ocean coasts and Great Lakes shores.

1.5 ASSUMPTIONS AND CONSTRAINTS

The economic analysis is based on the following assumptions and constraints:

Assumptions:

- The Fiscal Year (FY) 2013 Federal discount rate of 3.75 percent is used in this evaluation. The period of study is 54 years, beginning in 2010 and concludes after the year 2063 there are four pre-base years from 2010 thru 2013. The base year is FY 2014. Benefits begin to accrue to the project in the base year of FY 2014.
- The price level is in constant FY 2013 dollars.
- The analysis will consider expected future beachfront development.
- Critically eroding beach along Reach 1 will be protected to some level by local project to be constructed as a one-time fill funded by state and county jointly.
- Structure values will be based on depreciated replacement costs.
- Land use zoning and construction codes will not change during the period of analysis.
- Damaged or destroyed properties will be repaired to pre-storm conditions.
- Lost land will be valued at near shore prices.
- Empirical storm frequencies based on historical records for the study area are assumed to be predictive of the probability of future events.
- Beach mice will continue to be a protected species and there will be no changes to existing environmental laws.
- Existing state and county owned public park limits would remain the same in the future.

Constraints:

- The analysis recognizes the State of Florida Coastal Zone Management as well as the Threatened and Endangered Species Act and the Coastal Barrier Resources Act.
- The analysis also assumes that there will be a sufficient quantity of suitable sand for placement on the beaches.
- There is a requirement for the benefit-to-cost ratio (BCR) to be greater than 1-to-1.

The project will be formulated to avoid impacts to dune, lake and Gulf connections.

2.0 SOCIO-ECONOMIC OVERVIEW

2.1 DEMOGRAPHICS

Walton County is located in the State of Florida. Today the county incorporates 1,058 square miles the 2010 estimated population is 55,043 persons, a 36 percent increase over the base population estimate of 40,601 in 2000 making it one of the fastest growing counties in Florida. The estimated number of housing units in 2010 was 5,132 and 53 persons per square mile. The median household income was $47,273. Fourteen point six percent of Walton's population was living below the poverty level. The median value of owner-occupied housing was $199,800. The makeup of the county in 2010 was estimated at 89.5 percent white, 6.2 percent African American,.9 percent American Indian and Alaska Native, 1.0 percent Asian, 2.2 percent reported two or more races and there were 5.5 percent of Hispanic or Latino origin. Because the Gulf of Mexico borders Walton County to the south, the county along with neighboring counties share over 200 miles of beautiful beaches. In Figure B-1 starting from the west side of Florida going east, the counties are as followed: Santa Rosa, Okaloosa, Walton, Bay, and Gulf.

2.2 POPULATION

The population of the five counties is shown for 1990, 2000, and 2010, in Table B-1. All five counties experienced population growth from 1990 to 2010. Combined, the counties grew by about 46 percent, roughly equaling the growth rate of Florida for that same timeframe. Out of the five counties, Okaloosa County has the highest population, 180,882, and Gulf County the lowest, 15,863. Most the growth took place in Santa Rosa and Walton Counties. Walton County led in growth from 1990 to 2010 by increasing over 98 percent followed by Santa Rosa County growth of 85 percent.

FIGURE B-1. COUNTIES OF INTEREST

TABLE B-1
SELECTED POPULATION CHARACTERISTICS[1]

Counties				Percent Change		Land Area Year 2010 Sq. Miles	2010 Persons Per Sq. Mile
	1990	2000	2010	1990-2000	1990-2010		
Florida	12,937,926	15,982,378	18,801,311	24%	45%	53,624	351
Santa Rosa	81,608	117,743	151,372	44%	85%	1,011	150
Okaloosa	143,777	170,498	180,882	19%	26%	930	182.2
Walton	27,759	40,601	55,043	46%	98%	1,037	53
Bay	126,994	148,217	168,852	17%	33%	758	223
Gulf	11,504	13,332	15,863	16%	38%	564	28
Total ROI	391,642	490,391	572,012	25%	46%	4,300	636.2

[1] Geostat Center: County and City Data Book
http://fisher.lib.virginia.edu/collections/stats/ccdb/
http://quickfacts.census.gov/qfd/states/12/12131.html

2.3 EMPLOYMENT

From 1990 to 2010 the number of persons in Florida's labor force increased by 49.3 percent. Four of the five counties in the study area exceeded the state's increase except for Gulf County which had only a 31.2 percent increase. The highest percentage labor force increase occurred in Walton County, a 151.4 percent increase, Santa Rosa County was the second highest gaining county with a 91 percent increase. The state's unemployment rate for 2010 was a high 11.3 percent but all five counties in the study area had lower rates. Bay County the highest with 10.3 percent and the lowest was 8.1 percent in Okaloosa County.

TABLE B-2
SELECTED EMPLOYMENT CHARACTERISTICS[2]

Counties	Civil Labor Force				Civil Unemployment	
	1990	2000	2010	1990-2010	2010	rate in 2010
Florida	6,167,236	7,490,307	9,209,000	49.32%	1,024,904	11.30%
Santa Rosa	37,398	53,318	71,449	91.05%	7026	9.80%
Okaloosa	62,371	82,486	96,350	54.48%	7,789	8.10%
Walton	12,354	16,404	31,064	151.45%	2,535	8.20%
Bay	57,068	64,938	90,215	58.08%	9249	10.30%
Gulf	4,834	4,861	6,342	31.20%	684	10.8%
Total	174,025	222,007	295,420	69.76%	27,283	9.24%

2.4 INDUSTRY EMPLOYMENT

Selected employment characteristics by place of work for the state and counties for 2007 are shown in Table B-3. Florida had 10,679,883 non-farm workers employed in 2007. The Finance and Service trade industry leads all industries by having 6,080,653 workers within the state. Similarly, the greatest numbers of non-farm workers for the five counties combined are employed in the Finance and Service trade industry also. Okaloosa County had the highest numbers of non-farm workers employed with 130,560 and Gulf County with least amount with 6,118 non-farm workers employed.

[2] Geostat Center: County and City Data Book
http://fisher.lib.virginia.edu/collections/stats/ccdb/
http://quickfacts.census.gov/qfd/states/12000.html
www.eflorida.com

TABLE B-3
EMPLOYMENT BY INDUSTRY[3]

Counties	2007						
	Total	Agriculture, Mining, & Construction	Manufacturing	Transportation	Wholesale & Retail Trade	Finance and Services	Government
Florida	10,679,883	1,010,779	420,891	350,553	1,608,023	6,080,653	1,208,984
Santa Rosa	51,132	7,337	1,163	1,001	6,926	26,690	8,015
Okaloosa	130,560	10,085	4,641	1,803	16,869	66,057	31,105
Walton	28,759	4,951	639	508	4,407	15,045	3,209
Bay	102,871	10,594	3,597	1,956	15,691	52,890	18,143
Gulf	6,118	940	205	211	665	2,568	1,529
Total	319,440	33,907	10,245	5,479	44,558	163,250	62,001

2.5 HOUSEHOLDS

Table B-4 displays selected household characteristics for Florida and the five counties. All five counties experienced a significant increase in the number of households from 1990 to 2010. Santa Rosa and Walton Counties had the greatest growth in the number of households. Of the five counties, Okaloosa led with 72,400 households in 2010. The median household income also increased from 1989 to 2010 for the five counties. Of the five counties, Okaloosa County had the highest median household income in 2010, but Walton County had the greatest percentage increase from 1989 to 2010, 122 percent. The median household income for Santa Rosa, Bay and Okaloosa Counties were higher than that of the State of Florida in 2010.

2.6 PER CAPITA INCOME

Table B-5 displays the per capita income for Florida and the five counties. In 2010, Okaloosa had the highest per capita income out of the five counties; however, except for Okaloosa and Walton County, the remaining counties had a lower per capita income compared to the State of Florida. Florida per capita income was $ 26,551 in 2010 and Okaloosa County per capita income was $28,621 for that same year. Gulf County had the highest percentage of persons living below the poverty level when compared to the State of Florida.

[3] Bureau of Economic Analysis
http://www.bea.doc.gov/bea/regional/reis/
http://quickfacts.census.gov/qfd/states/12000.html

TABLE B-4
SELECTED HOUSEHOLD CHARACTERISTICS[4]

Counties	Household			Percent Change	Median Household Income			Percent Change
	1990	2000	2010	1990-10	1989	1999	2010	1989-2010
Florida	5,134,869	6,337,929	7,152,844	39%	$27,483	$38,819	$47,661	73.42%
Santa Rosa	29,900	43,793	54,860	83%	$27,584	$41,881	$55,129	99.86%
Okaloosa	53,313	66,269	72,442	36%	$27,941	$41,474	$54,242	94.13%
Walton	11,294	16,548	22,916	103%	$21,297	$32,407	$47,273	121.97%
Bay	48,938	59,597	68,807	41%	$24,684	$36,092	$47,770	93.53%
Gulf	4,324	4,931	5,347	24%	$21,866	$30,276	$39,178	79.17%

TABLE B-5
PER CAPITA INCOME

Counties	Per Capita Income				Percent Change	Percent Change	Percent Change	Percent Persons
	1990	1998	2007	2010	1990-98	1998-2007	2007-2010	Below Poverty Level - 2010
Florida	$18,539	$26,845	$38,417	$26,551	44.80%	43.10%	-30.89%	13.80%
Santa Rosa	$13,565	$21,808	$31,145	$25,382	60.80%	42.80%	-18.50%	11.30%
Okaloosa	$15,803	$24,655	$39,158	$28,621	56.00%	58.80%	-26.91%	10.60%
Walton	$11,588	$16,664	$28,235	$27,746	43.80%	69.40%	-1.73%	12.50%
Bay	$14,814	$22,163	$33,106	$25,003	49.60%	49.40%	-24.48%	12.40%
Gulf	$12,429	$16,754	$23,233	$17,968	34.80%	38.70%	-22.66%	19.50%

[4] Geostat Center: County and City Data Book
http://fisher.lib.virginia.edu/collections/stats/ccdb/
http://quickfacts.census.gov/qfd/states/12000.html

2.7 TRANSPORTATION AND UTILITIES

Walton County is serviced by one Federal Interstate, I-10, and three U.S. Highways; US90, US98 and US331 and four state highways; SR-20, SR81, SR83 and SR-85. One railroad provides rail service, the CSX Main Line. The nearest airport with scheduled commercial airline service is in neighboring Okaloosa Regional Airport. A general aviation airport is located at the DeFuniak Springs Municipal Airport. The local deep water port is 45 miles to the east in neighboring Bay County, the Panama City Port Authority.

There are two natural gas companies providing service, City of DeFuniak Springs and Okaloosa County Gas District. One telephone company, Sprint, provides residential and business services. Five water and sewer companies, City of DeFuniak Springs, City of Freeport, Regional Utilities, South Walton Utilities and Mossy Head Water Works compete in the area.

There are five elementary and five secondary public schools with a current enrollment of 6,522 students served by 323 educators for the county. Okaloosa-Walton Community College and the Walton County Vocational Technical School provide for education beyond the secondary level.

Walton County has three local radio stations two locally printed newspapers 12 banks, three credit unions and two hospitals, Health Mark Regional Medical Center and Sacred Heart Hospital on the Emerald Coast.

3.0 STUDY METHODOLOGY

3.1 EVALUATION FRAMEWORK

Shore protection projects are formulated to provide hurricane and storm damage reduction while recreation benefits are incidental. Engineering Regulation (ER) 1165-2-130 provides policies and guidelines for determining the extent of Federal participation in potential Federal projects for protection from shore erosion, hurricanes, and abnormal tidal and lake flooding that result in damages or losses to coastal resources and/or development. Federal participation in shore protection projects must produce economic justification from storm damage reduction benefits or a combination of damage reduction benefits and recreation benefits not to exceed 50 percent of the total benefits required for justification.

The general economic principles and guidelines for assessing NED benefits are documented in the Water Resources Council's Economic and Environmental Principles and Guidelines (P&G) for Water and Related Land Resources Implementation Studies, Chapter II - National Economic Development Benefit Evaluation Procedures (March 10, 1983).

The specific methodologies that will be used for the benefit study are based on the P&G and are documented in ER 1105-2-100, 22 April 2000, Planning – Planning Guidance Notebook, Section I – Hurricane and Storm Damage Reduction, Appendix D – Economic and Social Considerations, and Appendix E – Civil Works Missions and

Evaluation Procedures. Furthermore, the P&G recommends a life-cycle approach and risk and uncertainty analysis:

> "Storm damage reduction studies should adopt a life cycle approach and probabilistic analysis (and display) of benefits and costs. Key considerations are listed below. At a minimum, those with the greatest effect on plan formulation should be explicitly incorporated in the analysis.
>
> a) The erosion damage function
> b) The stage-damage function
> c) The wave-damage function
> d) Storm-related parameters such as peak wave height and period storm duration, peak surge elevation, and timing with respect to tidal phasing
> e) Wave height above the dune
> f) Wave penetration
> g) The shoreline retreat or eroded volume
> h) The natural post-storm recovery

3.2 INCORPORATING RISK AND UNCERTAINTY

The benefits and costs of shoreline protection and storm damage reduction projects are highly uncertain. Predicted costs and benefits are dependent upon a variety of engineering and economic models and assumptions. Future damages are dependent on the sequence of storms, their characteristics, property inventory, erosion, wind, and wave effects and a multitude of other factors.

In order to provide analytical support for projects involving shoreline protection and storm damage reduction, a unified risk-based engineering-economic model has been developed and is being applied to the Walton County Feasibility Study as a test bed application for the estimation of expected annual benefits of various hurricane and storm damage reduction alternatives using the certified hurricane and storm damage simulation model, Beach-*fx*.

3.3 BEACH-*fx* THE HURRICANE AND STORM DAMAGE SIMULATION MODEL

The Beach-*fx* model is an engineering-economic Monte Carlo simulation model that relates beach profile change to storms, coastal processes, and nourishment programs. It is an event-based, data-driven Monte Carlo simulation model. This structure has been used successfully in the past in a large number of Corps studies.

Beach-*fx* represents an improvement on previous models in this arena by being strongly based on representation of the coastal and engineering processes, incorporating the impact of multiple storms, and incorporating uncertainty in damage functions, physical characteristics of structures, and economic valuations. Expected structural damages generated through the simulations are expressed as losses due to flooding, erosion and waves.

3.4 MONTE CARLO SIMULATION

The complexities of the combined engineering-economic problem of risk-based analysis, in which there are uncertainties associated with the physical performance of systems and the economic consequences of that performance, are typically addressed through the use of Monte Carlo simulation techniques. Monte Carlo simulation is particularly useful for physically based real-world problems, where the results of the simulation can be tested against historical and reasonable behaviors.

3.5 ENGINEERING

3.5.1 Representative Profiles

Costal process models need to use a detailed distance versus elevation (x, z) representation of the shoreline. The amount of data required for such a representation is not needed in an economic-engineering type model such as Beach-*fx* and so a simplified representation for the profile has been adopted. This simplified representation for the profile uses five key features, which are dune width, dune height, dune slope, berm width, and berm height.

Figure B-2 is a depiction of the simplified Beach-*fx* profile. This representation is founded on three assumptions: 1) a single dune, 2) a single berm (no separate construction berm), and 3) an equilibrium submerged profile.

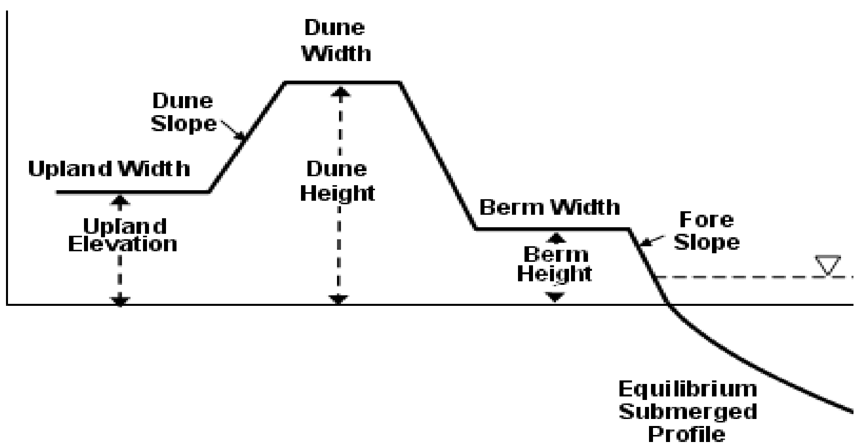


FIGURE B-2. BEACH-*fx* SIMPLIFIED BEACH PROFILE

The beach variables that change with storms are dune width, dune height, berm width, and upland width. Beach variables that are unchanged and remain constant throughout the analysis are upland elevation, dune slope, berm height, foreslope, and shape of the submerged profile. Thus, in response to a given storm, the berm can be eroded or accreted (change in berm width), the dune can change height and/or width, and can translate landward or seaward (change in upland width).

Figure B-3 is a depiction of the simplified Beach-*fx* profile with damage elements viewed in Beach-*fx* model.

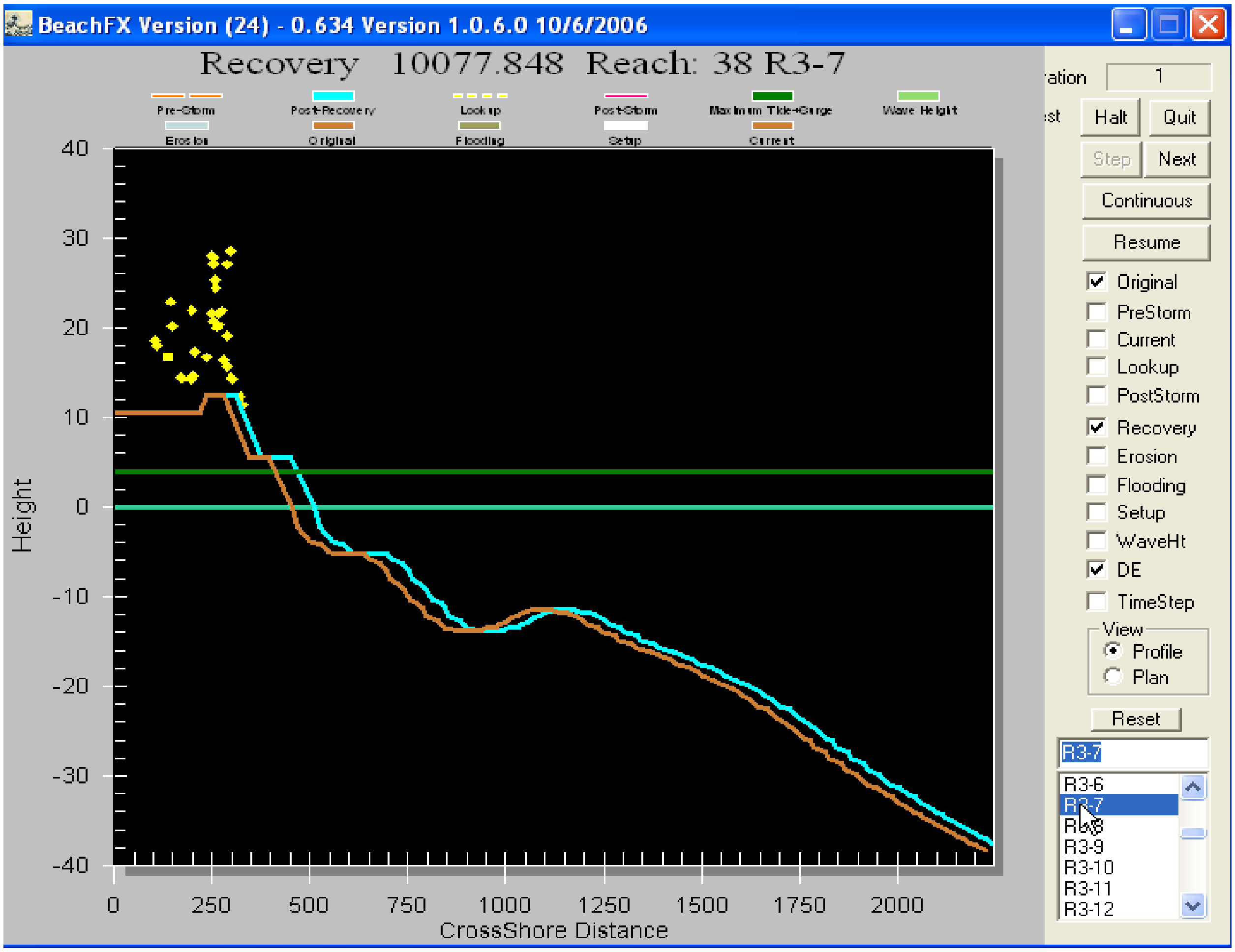


FIGURE B-3. CHARACTERIZATION OF A REPRESENTATIVE PROFILE WITH DAMAGE ELEMENTS IN BEACH-*fx*

3.6 STORM SET

The set of plausible storms include all historical storms that have occurred in the Walton County area and have caused at least one foot of surge.

The Monte Carlo simulation uses the same set of storms that were used to create the Shore Response Database (SRD). As a given storm event from the simulated sequence takes place, the current profile is used to look up the results that are associated with that storm in the SRD for the profile that is ‘closest’ to the pre-storm profile as tracked in the simulation. These results are then used to define the post-storm profile, to track volume changes, and to determine within-storm erosion, wave heights and water elevations due to the storm along the cross-shore profile.

3.6.1 Storm Seasons and Probability

There are three storm seasons for hurricanes season one June and July, season two August and September and season three October and November. The number of storms in a season divided by the number of years gives the probability of a storm in that season (see Table B-6).

TABLE B-6
STORM SEASONS

Storm Seasons						
Description	Start Month	Start Day	End Month	End Day	Probability	Probability Of Tropical Storm
No Storms	December	1	May	31	0	0
June Storms	June	1	June	30	0	0.0252
July Storms	July	1	July	31	0	0.042
August Storms	August	1	August	31	0	0.0672
September Storm	September	1	September	30	0	0.1849
October Storms	October	1	October	31	0	0.0588
November Storms	November	1	November	30	0	0.0084
	0	0	0	0	0	0

3.6.2 Storm-Induced Beach Change Model (SBEACH)

A pre-computed database of beach profile responses to storms for a range of storms and profiles was generated utilizing the Storm-Induced BEAch CHange Model (SBEACH), (Larson and Kraus 1989).

SBEACH provided estimates of the short-term cross-shore response to a suite of plausible tropical storm events derived from the historical record of tropical storms impacting the Walton County area.

3.6.3 Shoreline Response Database (SRD)

The SRD is a relational database used to pre-store results of SBEACH runs for all plausible storms, and a range of pre-defined profiles, as expressed by ranges of berm width, dune width, and dune height. Two kinds of results are stored: changes in berm width, dune width, dune height, and upland width, and cross-shore profiles of erosion, wave height, and water depth. The SRD is site and study specific, that is, it is created for each hurricane and storm damage reduction study. The SRD, once generated, is used as a ‘lookup table’ by the Monte Carlo simulation. Within the Monte Carlo simulation, the shoreline modifications are tracked continuously by the simplified profile representation (primarily dune width and height and berm width). The driving force for profile change is the list of plausible storms. These plausible storms are then used to create SBEACH input, which is run against a range of profiles that is expected to cover the range of natural and managed profiles.

For each such pair (storm and profile), both simplified and detailed SBEACH results are stored in the SRD. The output of SBEACH for a given run is an ASCII file that describes the initial, final, maximum, and minimum cross-shore profiles, and the water and wave heights along the cross-shore. This file must be post-processed by software that extracts the values of changes in berm width, dune width, and dune height, and stores the information in the SRD.

The Monte Carlo simulation uses the same set of storms that were used to create the SRD. As a given storm event from the simulated sequence takes place, the current profile is used to look up the results that are associated with that storm in the SRD for the profile that is 'closest' to the pre-storm profile as tracked in the simulation. These results are then used to define the post-storm profile, to track volume changes, and to determine within-storm erosion, wave heights and water elevations due to the storm along the cross-shore profile.

3.6.4 Generalized Model for Simulating Shoreline Change (GENESIS)

The Generalized Model for Simulating Shoreline Change (GENESIS) (Hanson and Kraus 1989) provided estimates of long-term shoreline response to existing and without project conditions.

The SBEACH and GENESIS models were developed by the Corps Research and Development Center (ERDC-CHL). Beach-*fx* is run for multiple project life-cycles and provides statistics on probable benefits and costs of the evaluated hurricane and storm damage reduction design alternatives, which is used to determine the economic justification of the project.

Beach-*fx* simulates beach response over time as storms, natural recovery, and management methods alter the beach profile. Events of interest (storms, beach nourishment) take place at calculated times. As each event takes place, the model simulates the physical and economic responses associated with that event. A set of simplified beach profiles, as defined by key data points, are tracked by the simulation model as the beach profile evolves over time.

The model makes use of an SRD that is a pre-generated set of beach profile responses to storms, for a range of storms and profiles. The model uses "plausible storms", based on historic storms, as initiating events.

The shoreline modification due to a storm is determined through use of a shoreline response model. The SBEACH, cross-shore storm response model and the GENESIS long-term shoreline response model were used to evaluate existing and without project configurations for this study. The SRD contains information on the input (pre-storm) profile, the storm, and the response (post-storm) profile, for many combinations of storms and pre-storm profiles. Beach-*fx* then reads information from the SRD as needed to determine shoreline change following a storm event.

As each storm is processed, the shoreline response is determined, and a post-storm beach configuration is calculated, as well as profiles of maximum water level, wave height, and erosion during the storm. This information is used to determine economic damages, based on empirical curves (damage functions) relating the percentage loss of value of structure and contents to "damage-driving parameters" calculated from the aforementioned profiles and characteristics of the structure. A flowchart of the Beach-*fx* modeling methodology is provided in Figure B-4.

Beach-*fx* relies on external coastal process models to predict the morphologic response of the beach profile to storm events and shoreline response to long-term processes.

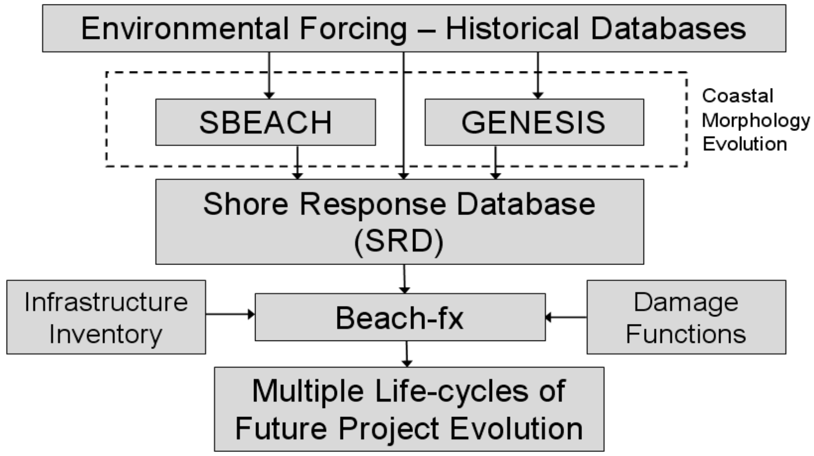


FIGURE B-4. BEACH-*fx* MODELING METHODOLOGY

4.0 EXISTING CONDITIONS

Walton County's 26 miles of coastline initially was subdivided into reaches that very nearly coincided with the neighborhood divisions that already existed in the county's coastal community. That division resulted in 10 major reaches initially formulated for economic reach delineation (see Table B-7).

Due to the effects of Hurricane Ivan on the beach the Project Delivery Team (PDT) decided that the project existing conditions had changed significantly. As a result new surveys of the beach were ordered and obtained. A new existing condition was established and named post-Ivan. That existing condition then became the initial point of beach condition (base condition) for the 54-year period of study accommodating a 50-year period of analysis.

Further the PDT sought out, briefed and obtained from all the affected stakeholders approval of an expedited study plan which resulted in a revised Project Management Plan (PMP). The PMP included reducing the number of study reaches to five. Table B-8 and Figure B-5 lays out the revised major study reaches. Within these reaches there are 117 sub-reaches or Beach-*fx* model reaches, which are the same except for their naming convention. The sub-reaches average about 1,000 feet in length and are numbered from west to east.

TABLE B-7
INITIAL MAJOR STUDY REACHES

Reach	Reach Name
1	Miramar Beach to Sandestin
2	Sandestin and 4 Mile Village
3	Topsail Hill Preserve State Park
4	Beach Highlands and Dune Allen
5	Santa Rosa Beach
6	Blue Mountain Beach
7	Gulf Trace, Grayton Beach, Grayton Beach State Park and Watercolor
8	Seaside and Seagrove
9	Dear Lake State Recreation Area, Watersound and Seacrest West
10	Seacrest West, Rosemary beach and Inlet Beach

TABLE B-8
REVISED MAJOR STUDY REACHES

Reach	Reach Name
1	Miramar Beach, Sandestin and Four Mile Village
2	Topsail Hill Preserve State Park
3	Beach Highlands, Dune Allen, Santa Rosa Beach, Blue Mountain and Gulf Trace
4	Grayton Beach State Park, Grayton Beach,
5	Watercolor, Seaside, Seagrove, Watersound Seacrest Rosemary and Inlet Beach

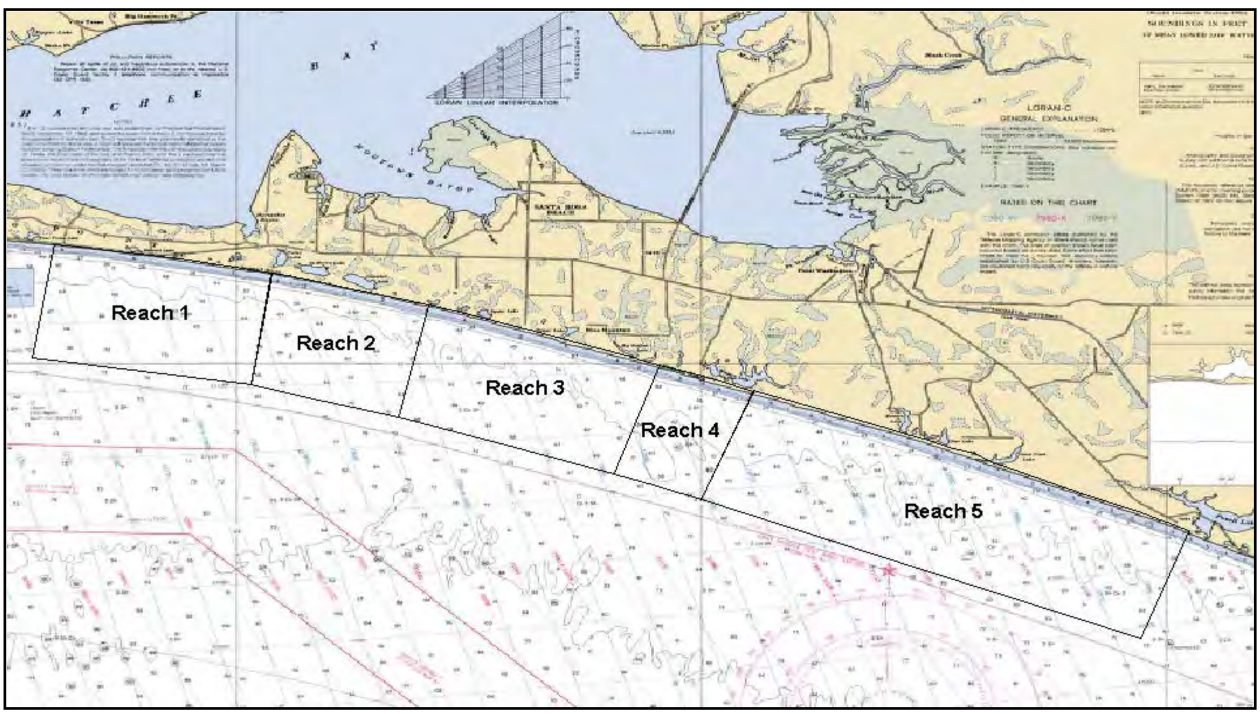


FIGURE B-5. REVISED STUDY REACHES

The post-Ivan survey data was employed to produce revised representative profiles. The result of which reduced the number of representative profiles to 11. Reaches 1, 2, 3, and 4 could be represented by two profiles each while reach 5 required 3 representative profiles. These representative profiles characterized the typical without project beach morphology for input into Beach-*fx*.

In the with project condition these profiles are combined with alternative design templates to characterize that condition for various beach fill alternatives. Table B-9 lists the various reaches and associated profiles.

TABLE B-9
WALTON COUNTY STUDY AREA
SUB-REACHES, MODEL REACHES AND PROFILES

Model Reach	FDEP Monument	Beach-Fx Reach	Representative Profile	Study Reach
1	R-1	R1-1	R1P1	**1**
2	R-2	R1-2	R1P1	**1**
3	R-3	R1-3	R1P1	**1**
4	R-3A	R1-4	R1P1	**1**
5	R-4	R1-5	R1P1	**1**
6	R-5	R1-6	R1P1	**1**
7	R-6	R1-7	R1P1	**1**
8	R-6A	R1-8	R1P1	**1**
9	R-7	R1-9	R1P1	**1**
10	R-8	R1-10	R1P1	**1**
11	R-9	R1-11	R1P1	**1**
12	R-10	R1-12	R1P1	**1**
13	R-11	R1-13	R1P1	**1**
14	R-12	R1-14	R1P1	**1**
15	R-13	R1-15	R1P2	**1**
16	R-14	R1-16	R1P2	**1**
17	R-15	R1-17	R1P2	**1**
18	R-16	R1-18	R1P2	**1**
19	R-17	R1-19	R1P2	**1**
20	R-18	R1-20	R1P2	**1**
21	R-19	R1-21	R1P1	**1**
22	R-20	R1-22	R1P1	**1**
23	R-21	R1-23	R1P1	**1**
24	R-22	R1-24	R1P1	**1**
25	R-23	R2-1	R2P1	**2**
26	R-24	R2-2	R2P1	**2**
27	R-25	R2-3	R2P2	**2**
28	R-27	R2-4	R2P1	**2**
29	R-29	R2-5	R2P2	**2**
30	R-30	R2-6	R2P1	**2**
31	R-40	R2-7	R2P1	**2**
32	R-41	R3-1	R3P1	**3**

TABLE B-9 (CONTINUED)
WALTON COUNTY STUDY AREA
SUB-REACHES, MODEL REACHES AND PROFILES

33	R-42	R3-2	R3P1	**3**
34	R-43	R3-3	R3P1	**3**
35	R-44	R3-4	R3P2	**3**
36	R-45	R3-5	R3P2	**3**
37	R-46	R3-6	R3P2	**3**
38	R-47	R3-7	R3P2	**3**
39	R-48	R3-8	R3P1	**3**
40	R-49	R3-9	R3P1	**3**
41	R-50	R3-10	R3P1	**3**
42	R-51	R3-11	R3P1	**3**
43	R-52	R3-12	R3P1	**3**
44	R-53	R3-13	R3P1	**3**
45	R-54	R3-14	R3P1	**3**
46	R-55	R3-15	R3P1	**3**
47	R-56	R3-16	R3P1	**3**
48	R-57	R3-17	R3P1	**3**
49	R-58	R3-18	R3P1	**3**
50	R-59	R3-19	R3P1	**3**
51	R-60	R3-20	R3P1	**3**
52	R-61	R3-21	R3P1	**3**
53	R-62	R3-22	R3P1	**3**
54	R-63	R3-23	R3P1	**3**
55	R-64	R3-24	R3P2	**3**
56	R-65	R3-25	R3P2	**3**
57	R-66	R3-26	R4P1	**4**
58	R-67	R4-1	R4P1	**4**
59	R-68	R4-2	R4P1	**4**
60	R-69	R4-3	R4P2	**4**
61	R-70	R4-4	R4P2	**4**
62	R-71	R4-5	R4P1	**4**
63	R-72	R4-6	R4P2	**4**
64	R-73	R4-7	R4P2	**4**
65	R-74	R4-8	R4P1	**4**
66	R-76	R4-9	R4P1	**4**
67	R-78	R5-1	R5P2	**5**
68	R-79	R5-2	R5P2	**5**
69	R-80	R5-3	R5P2	**5**
70	R-81	R5-4	R5P2	**5**
71	R-82	R5-5	R5P2	**5**
72	R-83	R5-6	R5P1	**5**
73	R-84	R5-7	R5P1	**5**
74	R-85	R5-8	R5P1	**5**
75	R-86	R5-9	R5P2	**5**
76	R-87	R5-10	R5P2	**5**
77	R-88	R5-11	R5P2	**5**
78	R-89	R5-12	R5P2	**5**
79	R-90	R5-13	R5P2	**5**

TABLE B-9 (CONTINUED)
WALTON COUNTY STUDY AREA
SUB-REACHES, MODEL REACHES AND PROFILES

80	R-91	R5-14	R5P2	**5**
81	R-92	R5-15	R5P2	**5**
82	R-93	R5-16	R5P2	**5**
83	R-94	R5-17	R5P3	**5**
84	R-95	R5-18	R5P2	**5**
85	R-96	R5-19	R5P3	**5**
86	R-97	R5-20	R5P2	**5**
87	R-98	R5-21	R5P2	**5**
88	R-99	R5-22	R5P3	**5**
89	R-100	R5-23	R5P3	**5**
90	R-101	R5-24	R5P2	**5**
91	R-102	R5-25	R5P2	**5**
92	R-103	R5-26	R5P1	**5**
93	R-103A	R5-27	R5P3	**5**
94	R-104	R5-28	R5P3	**5**
95	R-105	R5-29	R5P2	**5**
96	R-106	R5-30	R5P2	**5**
97	R-107	R5-31	R5P2	**5**
98	R-108	R5-32	R5P1	**5**
99	R-109	R5-33	R5P1	**5**
100	R-110	R5-34	R5P1	**5**
101	R-111	R5-35	R5P1	**5**
102	R-112	R5-36	R5P1	**5**
103	R-113	R5-37	R5P1	**5**
104	R-114	R5-38	R5P1	**5**
105	R-115	R5-39	R5P1	**5**
106	R-116	R5-40	R5P2	**5**
107	R-117	R5-41	R5P2	**5**
108	R-118	R5-42	R5P2	**5**
109	R-119	R5-43	R5P2	**5**
110	R-120	R5-44	R5P2	**5**
111	R-121	R5-45	R5P2	**5**
112	R-122	R5-46	R5P2	**5**
113	R-123	R5-47	R5P2	**5**
114	R-124	R5-48	R5P3	**5**
115	R-125	R5-49	R5P3	**5**
116	R-126	R5-50	R5P3	**5**
117	R-127	R5-51	R5P3	**5**

4.1 LAND USE

The coastal beach community layout is somewhat typical of other beach and shoreline development along the Gulf Coast; a checkerboard pattern of single and multi-family residential areas intermixed with few commercial areas. Walton County's beach shore side development has less commercial trade on the front row shoreline probably due to the high cost of the land and real estate taxes which affects profitability. Instead most commercial trade establishments prefer to locate on the north side of the beach road.

The current trend in land use on the shoreline continues to be principally single and multi-family development, with little commercial trade development.

4.2 FUTURE DEVELOPMENT

Development is both ongoing and continuous at Walton County, as it is likely to continue into the immediate and the near future until the small amount of remaining beachfront, save the state and county properties, is completely developed. The characteristic of the existing beachfront is composed of single and multi-family housing. The multi-family housing includes 29 multi-floored condominiums and resort complexes consisting of four floors or more.

4.3 PROPERTY INVENTORY

Recent beach front development in Walton County has predominately been high-rise condominiums, residential-resorts and residential communities. Most of the coastal area that is not state or county property is highly developed. Construction of new single and multi-family residential structures is on-going at a brisk pace. The few remaining undeveloped large private holdings are showing signs of infrastructure preparations for development.

In the spring of 2004 a complete property inventory of existing structures that may benefit from a storm damage reduction project was undertaken. In 2010, a windshield survey of the study area was undertaken. That survey revealed no significant changes had occurred since the last inventory was completed. Some structures that were under construction are now fully constructed. They were already entered in the initial property inventory along with their values. The 2004 property inventory structure values were also updated. A sample of structures by type was collected and an update factor was computed. That factor was used to update structure values. The purpose of this inventory is to gather data required for the Beach-*fx* data inputs and to obtain a database that would facilitate the gathering of critical metrics that locate the structure spatially in relation to the shoreline and the beach profile as well as its elevation.

Beach-*fx* considers the inventory of structures (damage elements) as items that are containerized in 'lots'. Lots form boundaries that contain damage elements. Lots are defined as quadrilaterals that approximate lot parcels as delineated in the tax assessor's files, databases and Geographic Interface Systems (GIS). An aggregation of lots that are for the most part contiguous composes a reach. All reaches taken in aggregate compose the study area.

Photos of structures along with pertinent statistics of construction and foundation type, number of floors, and accompanying detached structures that may benefit from a project were also collected.

The result of that inventory is displayed in Table B-10.

TABLE B-10
STRUCTURE INVENTORY COUNT BY REACH BY TYPE

Damage Element	Major Study Reaches				
	1	2	3	4	5
Commercial	10		1	7	13
Single-Family	99		268	118	348
Multi-Family	62		37	21	99
Walkovers	151		189	20	263
Pool	36		12	9	84
Gazebo	4		7		7
Jacuzzi	4				
Total	366		514	175	814
Grand Total	1869				

4.4 VALUE OF COASTAL INVENTORY

4.4.1 Structure Value

The depreciated replacement cost of structures in the study area is required for the economic analysis to determine NED benefits.

The Mobile District Real Estate Division (RE) conducted investigations to determine the depreciated replacement cost for single family residential structures. Depreciated replacement cost is based on a combination of adjusting criterion using a formula that takes into account the category and age of the structure. Replacement cost is the cost of physically replacing the structure. Depreciation accounts for deterioration occurring prior to flooding and variations in remaining useful life of the structure. Depreciated replacement cost was calculated for a representative sample of fifty structures. Tax assessor assessed values for improvements (net of land value) are compared to the calculated depreciated replacement cost to yield a ratio to estimate that is used to estimate the remaining structures depreciated replacement cost. The point estimate served as the mean or average value random variable in Beach-*fx*. The low and high estimates around the mean were developed by using plus and minus ten percent of the mean value to represent plus and minus one standard deviation's variance around the likely value. Tax assessor's records were examined and studied on the current inventory. Variables of interest relating to assessed value, date of construction, type of construction, number of floors, square footage, recent sales and selling prices, along with other information was analyzed. Sampling techniques, professional judgment, professional guidelines, and consultations with the tax assessor's office and field visits composed of methods used to complete the investigations.

Some of the findings from that analysis were that there were two significantly different classes of valuations between the types of development in Walton County: pre-1990 construction and post-1990 construction. The handful of pre-1990 typical construction was generally less than 1,800 square foot one story structures. Many were on grade and most were of masonry or brick construction and only a few made of wood. Assessed values for these structures were very low when compared to calculated depreciated replacement costs. The value of the land has outgrown the value of the structure. When these structures are sold they are usually torn down for larger and more expensive ones. On average they were assessed about one-half of their depreciated replacement cost. The Walton County inventory for these structures saw their assessed value increased by 200 percent to arrive at their true depreciated replacement cost.

Post-1990 construction was much larger than 1,800 square feet and most are multi-storied structures the majority of which are higher than four floors. The division between masonry, and wood was about equal for the majority of structure while the remaining minority was brick or wood. A representative sample of 51 properties were selected and used by the Mobile District's appraiser to calculate the depreciated replacement cost to determine the ratio to convert the remaining structure to depreciated replacement cost. The agreed upon methodology for determining depreciated replacement cost was to estimate replacement cost as 125 percent of assessed value.

A relationship between assessed values and depreciated replacement cost for multi-family structures was found to be highly variable and not reliable. The methodology that would render the best estimate of depreciated replacement cost for these structures was to begin with current per square foot construction costs and depreciates that value by two percent each year of age. Current construction costs developed from recent activity was estimated to be $160.00 a square foot for construction less than 20,000 square feet and $175.00 per square foot for construction greater than 20,000 square feet.

Telephonic conversations with the Walton County Tax Assessor about trends in the market from 2008 to date reveals that for South Walton County, all lands south of Choctawhatchee Bay, began to show a slight decline of about 5.7 percent. The decline continued into 2009 and 2010 with 22 and 18 percent reductions. The fall slowed in 2011 showing 4.5 percent and increased just slightly in 2012 by one-tenth of one percent, just enough to signal a possible turnaround.

Walkovers were valued at an average $200.00 per linear foot for wood structures and $320.00 per square foot for structures constructed from a commercially produced composite called 'Trex' that was used for public access provided by the Walton County Tourist Development Council's (TDC) public accesses. The TDC obtained these values from recent invoices for walkovers and their own access construction costs. Pool values were based on an average updated composite value obtained by interviews and sampling for an earlier study in neighboring Bay County. The few jacuzzis and tennis court values were based on typical sized units at current costs.

4.4.2 Content Value – Structure-Content Ratio

The National Flood Insurance Agency claims database was searched for paid claim history in Walton and the neighboring counties of Bay, Okaloosa and Fort Walton. These records show the date of the loss and what was paid for building and content loss for each claim. No claims were found for any of these counties.

A web search of trade associations of homeowner casualty underwriters revealed that insurers generally use a content to structure ratio between 50 and 75 percent of replacement cost. The Walton County inventory is valued at depreciated replacement cost not full replacement cost. The average insurer's content to structure ratio of 62.5 percent was used to estimate the value of contents for Walton County based on depreciated structure replacement cost. The range between 50 and 75 percent is 25 percent, so assuming six standard deviations in the range one standard deviation is about 4.16 percent. The Beach-*fx* triangular distribution used the mean structure-to-content ratio, 62.5 percent plus and minus 10 percent, to specify the low and high value, plus and minus 6.25 percent, which is a little larger than the one standard deviation of 4.16 percent.

Table B-11 presents the structure and content value of damageable property value based on depreciated replacement cost. Damageable property value is used here to reflect that only the lower two floors of multi-storied structures were valued in the property inventory as they alone were susceptible to modeling damages.

TABLE B-11
VALUE OF WALTON COUNTY
STRUCTURE AND CONTENT VALUE BY REACH
(DOLLARS IN MILLIONS)

	Reach				
	1	2	3	4	5
Damage Elements	366		514	175	814
Structure Value	$317.3		$164.9	$33.7	$276.9
Content Value	$156.1		$78.9	$16.2	$133.5
Total	$473.4		$243.8	$49.9	$410.4
Grand Total	$1,177.5				

5.0 ECONOMIC BENEFIT EVALUATION

5.1 ASSUMPTIONS

The economic benefits are from four categories: storm damage reduction, lost land reduction, elimination of emergency nourishment costs and recreation. The primary benefit category is the storm damage reduction as mandated in ER 1105-2-100, hurricane and storm damage reduction projects are to be formulated to provide for storm damage reduction.

Benefits are stated in constant FY 2013 dollars. The period of analysis is 50 years from January 2014 through and including all of the year 2063, there are four pre-project base years, 2010 through 2013, making the period of study 54 years. The base year is FY 2014. The structure inventory is valued at FY 2013 dollars.

5.2 STORM DAMAGE REDUCTION

Beach-*fx* calculates the storm damage reduction from inundation, storm-induced erosion, long-term erosion and wave attack on a damage element-by-damage element basis for each storm event for the study period for a large number of iterations.

5.2.1 Damage Functions

The damage functions used in Beach-*fx* are those developed for the Institute for Water Resources (IWR). A Coastal Storm Damage Workshop (CSDW) was held in Alexandria, Virginia to solicit expert-opinion for economic consequence assessment of coastal storm damage. The workshop is part of longer-term research effort whose objective is to develop a peer-reviewed, step-by-step methodology for estimating coastal storm damages.

The objective of that workshop was to discuss and recommend damage relationships needed to predict structural damage from coastal storms as functions of hazard intensity levels, with associated uncertainties, resulting from erosion, waves, inundation, and their combined effects. Because information on the relationship between residential structural damage and storm parameters is limited, this workshop used expert opinion as a means of gaining information on these relationships (see Ayyub 2001). A report describing the results of the workshop both in terms of damage relationships and future information needs identified by the experts at the workshop is included in Attachment II – Coastal Storm Damage Relationships Based on Expert Opinion Elicitation.

The CSDW, resulted in a set of lookup curves, defined for various damage types and foundation types, to calculate percentage loss associated with structure and contents. For each damage type, the input to these curves, or the “damage driving parameter”, has been defined by the CSDW. The appropriate damage-driving parameters for each damage type are:

Flooding:
    Depth of water over walking surface of lowest walking floor
Waves:
    Difference between the top of wave (crest) and the bottom of the lowest horizontal member
Erosion:
    Percent of footprint compromised

Damage functions for each damage type (erosion, inundation, and wave) are currently associated with damage element type (single family residential, multi-family residential, walkway, etc.) foundation type (shallow piles, deep piles, slab, etc.) and construction type (wood frame concrete, masonry, etc.) and armor type (No armor, sheet pile, etc.) are used to select the appropriate damage function.

Damages are calculated at the damage element level, following each storm. For each damage type, a damage driving parameter is calculated for each damage element, and used as a lookup into stored damage functions. The participants in the CSDW developed the triangular distributions using a mid, high and low value to describe each increment of the damage function which is sampled by Beach-*fx* during the simulation runs.

5.2.2 Damage Element

Damages are estimated based on the concept of a "damage element". Damage elements are structures, walkways, etc., anything that can incur economic losses. In Beach-*fx*'s system hierarchy reaches contain lots, and lots contain damage elements. For each storm, damages are estimated by examining the reach, lots, and damage elements within the lots. Thus, the basic unit on which damages are calculated at present is the damage element. Damage elements have attributes relating to type, geographic location, and value. Each damage element has information relating to structure and content value (treated as a three-parameter distribution for purposes of incorporating uncertainty). For location information, a structure's center point is referenced, as well as its width and length. A single value of ground elevation is specified, which also includes a three-parameter distribution for describing the first floor elevation and uncertainty.

5.2.3 Damage Estimation

Damages are estimated, based on calculation of the value of a "damage-driving parameter" for the damage element, which is then used as the independent variable to use for lookup into the stored damage functions. These damage functions provide the percentage loss for structure and contents.

5.2.4 Structure and Content Damages

The determination of structure and content damage was calculated using the IWR damage functions. These damage functions generally give the percent damage as related to a water level for inundation damages, and the percent of structure footprint compromised to calculate storm induced and long-term erosion damages.

5.2.5 Inundation Damages

Inundation damages occur when storm surge elevations exceed the elevation of the dune line, or when waves break over the dunes. Inundation damages were assumed to begin for existing conditions when the maximum water level exceeded the first floor elevation of structure, since there is not always a continuous dune system.

5.3 LOST LAND REDUCTION

The P&G states that erosion protection benefits include loss of land, structural damage prevention, reduced emergency costs, reduced maintenance of existing structures and incidental benefits. The loss of land benefit is measured as the value of near shore upland. Near shore upland is sufficiently removed from the shore to lose its significant increment of value because of its proximity to the shore, when compared to adjacent parcels that are more distant (inland) from the shore.

A hurricane and storm damage reduction project that prevents the loss of land due to erosion accrues benefits to that project alternative. The land lost reduction benefit was calculated for eroding reaches by calculating amount of land that would be lost during the study period times the value of near shore upland.

5.4 LOSS OF LAND BENEFIT

With a project in place land that would be lost in the without project future condition would be preserved by a project. The design template that represents the project that provides full benefits to protected properties would be in place for the period of analysis preserved through of process of periodic renourishment. This benefit is based upon the value of near shore lands. Normally determinations of the market value for the land losses are based on the value of near shore upland. Near shore upland is sufficiently removed from the shore to lose its significant increment of value because of its proximity to the shore, when compared to adjacent parcels that are more distant (inland) from the shore. Other valuation methods could be acceptable, if it can be shown that the use of near shore values does not provide a realistic estimate of the value of lost land. For this project, near shore values were estimated by RE. The criterion used was near shore lands are those parcels that are sufficiently removed from the shore to lose any direct water frontage value. These parcels have; no Gulf frontage, no view of the water, no access point to the Gulf as part of any deeded subdivision rights. The methodology used was to track 2005 and 2006 sales of near shore parcels in Walton County. Since property values varied according to location and sale prices also varied broadly due to the pause in the market caused by the storm activity on the Gulf in 2004 and 2005, a range of values, a low and a high, price per square foot was calculated. Then the average of the high and low was used to estimate the value of land lost. The value used represents a long-term value suitable for the period of evaluation.

Table B-12 shows near shore value, annual erosion rate and land lost benefit by reach. Accreting reaches have positive values and eroding reaches show negative values.

TABLE B-12
VALUE OF LAND LOST BY REACH

Sub-Reach	Model Reach	Reach Length (ft)	Representative Profile	Average Annual Erosion	Near Shore Land Value per Sq. Ft.	Value of Land Loss
1	R1-1	1149.8	R1P1	0.6808	$70.00	$54,794.87
2	R1-2	1101.6	R1P1	0.6435	$70.00	$49,621.57
3	R1-3	1043.6	R1P1	0.5137	$70.00	$37,526.81
4	R1-4	1001.8	R1P1	0.3958	$70.00	$27,755.87
5	R1-5	1061.8	R1P1	0.3077	$70.00	$22,870.11
6	R1-6	1044.6	R1P1	0.0926	$70.00	$6,771.10
7	R1-7	1002.7	R1P1	0.0063	$70.00	$442.19
8	R1-8	1061.4	R1P1	0.0156	$70.00	$1,159.05
9	R1-9	1013.6	R1P1	0.0284	$70.00	$2,015.04
10	R1-10	959.4	R1P1	0.0926	$70.00	$6,218.83
11	R1-11	1021.2	R1P1	0.1216	$70.00	$8,692.45
12	R1-12	1056.7	R1P1	0.0508	$70.00	$3,757.63
13	R1-13	1040.1	R1P2	-0.0008	$70.00	-$58.25
14	R1-14	1050.6	R1P2	-0.1008	$70.00	-$7,413.03
15	R1-15	997.9	R1P2	-0.1155	$70.00	-$8,068.02
16	R1-16	1024.7	R1P2	-0.1263	$85.00	-$11,000.67
17	R1-17	1113.6	R1P2	-0.1183	$85.00	-$11,197.80
18	R1-18	1133.1	R1P2	-0.1323	$85.00	-$12,742.28
19	R1-19	1058.4	R1P2	-0.0633	$85.00	-$5,694.72
20	R1-20	961	R1P1	0.1033	$85.00	$8,438.06
21	R1-21	952.1	R1P1	0.1122	$85.00	$9,080.18
22	R1-22	1028	R1P1	0.2459	$85.00	$21,486.74
23	R1-23	1085.9	R1P1	0.3952	$85.00	$36,477.55
24	R1-24	1038.7	R1P1	0.4652	$85.00	$41,072.28
25	R2-1	990	R2P1	0.3687	$85.00	$31,026.11
26	R2-2	935.5	R2P1	0.2417	$45.00	$10,174.97
27	R2-3	2160.3	R2P2	0.3044	$45.00	$29,591.79
28	R2-4	2065.5	R2P1	0.2417	$45.00	$22,465.41
29	R2-5	1001.3	R2P2	0.1844	$45.00	$8,308.79
30	R2-6	10078.2	R2P1	-0.5495	$45.00	-$249,208.69
31	R2-7	1040.4	R2P1	0.3869	$45.00	$18,113.88
32	R3-1	1147	R3P1	0.4031	$45.00	$20,806.01
33	R3-2	1037.4	R3P1	0.4283	$45.00	$19,994.33
34	R3-3	1051.6	R3P1	0.4316	$45.00	$20,424.18
35	R3-4	1026	R3P2	0.5535	$45.00	$25,555.10
36	R3-5	1120.7	R3P2	0.4180	$45.00	$21,080.37
37	R3-6	1184.9	R3P2	0.2885	$45.00	$15,382.96
38	R3-7	1155.8	R3P2	0.0960	$45.00	$4,993.06
39	R3-8	1102.9	R3P1	-0.2985	$45.00	-$14,814.70

TABLE B-12 (CONTINUED)
VALUE OF LAND LOST BY REACH

Sub-Reach	Model Reach	Reach Length (ft)	Representative Profile	Average Annual Erosion	Near Shore Land Value per Sq. Ft.	Value of Land Loss
40	R3-9	1057.8	R3P1	-0.3588	$45.00	-$17,079.24
41	R3-10	1068.2	R3P1	-0.4446	$45.00	-$21,371.48
42	R3-11	1044.7	R3P1	-0.5076	$45.00	-$23,863.04
43	R3-12	1006.8	R3P1	-0.4978	$75.00	-$37,588.88
44	R3-13	1004	R3P1	-0.5924	$75.00	-$44,607.72
45	R3-14	1345	R3P1	-0.7700	$75.00	-$77,673.75
46	R3-15	1061.8	R3P1	-0.8489	$75.00	-$67,602.15
47	R3-16	731.7	R3P1	-0.9596	$75.00	-$52,660.45
48	R3-17	1016.6	R3P1	-1.0926	$75.00	-$83,305.29
49	R3-18	1039.4	R3P1	-1.1151	$75.00	-$86,927.62
50	R3-19	1036	R3P1	-1.0589	$75.00	-$82,276.53
51	R3-20	1026.7	R3P1	-1.0373	$75.00	-$79,874.69
52	R3-21	1029	R3P1	-1.0106	$75.00	-$77,993.06
53	R3-22	978	R3P1	-0.9243	$75.00	-$67,797.41
54	R3-23	855.4	R3P1	-0.8319	$75.00	-$53,370.54
55	R3-24	1115	R3P2	-0.5435	$75.00	-$45,450.19
56	R3-25	1274	R3P2	-0.3414	$75.00	-$32,620.77
57	R3-26	1082.2	R4P1	-0.3292	$75.00	-$26,719.52
58	R4-1	1082	R4P1	-0.6703	$75.00	-$54,394.85
59	R4-2	1125.7	R4P1	-0.5439	$75.00	-$45,920.12
60	R4-3	981.5	R4P2	0.0509	$75.00	$3,746.88
61	R4-4	942.1	R4P2	0.1131	$75.00	$7,991.36
62	R4-5	998.1	R4P1	-0.2903	$75.00	-$21,731.13
63	R4-6	971.4	R4P2	0.0925	$75.00	$6,739.09
64	R4-7	1060.9	R4P2	-0.1046	$75.00	-$8,322.76
65	R4-8	2119.2	R4P1	-0.5521	$75.00	-$87,750.77
66	R4-9	2074.7	R4P1	-0.9889	$75.00	-$153,875.31
67	R5-1	993.1	R5P2	-0.8973	$112.50	-$100,249.72
68	R5-2	1003	R5P2	-0.6237	$112.50	-$70,376.75
69	R5-3	1039.4	R5P2	-0.3263	$112.50	-$38,155.07
70	R5-4	1303.7	R5P2	-0.0772	$112.50	-$11,322.63
71	R5-5	1009.2	R5P2	0.1001	$112.50	$11,364.85
72	R5-6	1061.5	R5P1	-0.2592	$112.50	-$30,953.34
73	R5-7	1037.5	R5P1	-0.3266	$112.50	-$38,120.34
74	R5-8	991.6	R5P1	-0.4109	$67.50	-$27,502.77
75	R5-9	1026.5	R5P2	-0.2260	$67.50	-$15,659.26
76	R5-10	1010.7	R5P2	-0.2626	$67.50	-$17,915.16
77	R5-11	1022.2	R5P2	-0.2847	$67.50	-$19,643.87

TABLE B-12 (CONTINUED)
VALUE OF LAND LOST BY REACH

Sub-Reach	Model Reach	Reach Length (ft)	Representative Profile	Average Annual Erosion	Near Shore Land Value per Sq. Ft.	Value of Land Loss
78	R5-12	1018	R5P2	-0.2734	$67.50	-$18,786.68
79	R5-13	1016.5	R5P2	-0.2876	$67.50	-$19,733.31
80	R5-14	1005.3	R5P2	-0.2623	$67.50	-$17,799.09
81	R5-15	1011	R5P2	-0.3549	$67.50	-$24,219.26
82	R5-16	1035.2	R5P2	-0.3543	$67.50	-$24,757.07
83	R5-17	942.6	R5P3	-0.2078	$67.50	-$13,221.38
84	R5-18	999.9	R5P2	-0.3578	$67.50	-$24,149.08
85	R5-19	1010.9	R5P3	-0.0820	$35.00	-$2,901.28
86	R5-20	1028.6	R5P2	0.0051	$35.00	$183.61
87	R5-21	1122	R5P2	-0.0141	$35.00	-$553.71
88	R5-22	1029.7	R5P3	-0.0545	$35.00	-$1,964.15
89	R5-23	1013.1	R5P3	-0.0144	$35.00	-$510.60
90	R5-24	1021.7	R5P2	-0.1929	$35.00	-$6,898.01
91	R5-25	1054.4	R5P2	-0.4140	$35.00	-$15,278.26
92	R5-26	884.4	R5P1	-0.4138	$35.00	-$12,808.77
93	R5-27	1044.2	R5P3	-0.2764	$35.00	-$10,101.59
94	R5-28	1058.5	R5P3	-0.3145	$35.00	-$11,651.44
95	R5-29	986.7	R5P2	-0.4391	$87.50	-$37,910.25
96	R5-30	1021.8	R5P2	-0.3674	$87.50	-$32,848.32
97	R5-31	1014.9	R5P2	-0.3815	$87.50	-$33,878.63
98	R5-32	984.6	R5P1	-0.7184	$87.50	-$61,891.96
99	R5-33	1025.3	R5P1	-0.6970	$87.50	-$62,530.48
100	R5-34	1037.8	R5P1	-0.5918	$87.50	-$53,739.88
101	R5-35	1002.2	R5P1	-0.6019	$87.50	-$52,782.12
102	R5-36	943.7	R5P1	-0.6839	$87.50	-$56,472.19
103	R5-37	1019.9	R5P1	-0.9037	$87.50	-$80,647.32
104	R5-38	1094.1	R5P1	-0.9874	$87.50	-$94,527.50
105	R5-39	1024.2	R5P1	-1.1019	$87.50	-$98,749.52
106	R5-40	1009.7	R5P2	-0.5617	$87.50	-$49,625.49
107	R5-41	1003.7	R5P2	-0.5106	$87.50	-$44,842.81
108	R5-42	1022.6	R5P2	-0.3367	$87.50	-$30,127.07
109	R5-43	1002.2	R5P2	-0.2136	$87.50	-$18,731.12
110	R5-44	1000.5	R5P2	-0.0640	$87.50	-$5,602.80
111	R5-45	968.6	R5P2	0.0031	$87.50	$262.73
112	R5-46	987.6	R5P2	0.0848	$87.50	$7,327.99
113	R5-47	1030.6	R5P2	0.0123	$77.50	$982.42
114	R5-48	1026.4	R5P3	0.0289	$77.50	$2,298.88
115	R5-49	1041.1	R5P3	-0.1516	$77.50	-$12,231.88
116	R5-50	1031.8	R5P3	-0.2372	$77.50	-$18,967.58
117	R5-51	1025.9	R5P3	-0.3640	$77.50	-$28,940.64

5.5 RECREATION

To determine the recreation benefits of a plan, an economic value must be placed on the recreation experience at the Walton County beaches. This value can be applied to the visitation which results from the project to determine the NED recreation benefits. For this report, unit day values (UDV) are used to determine the economic value of recreation using a point system that takes into account the following factors: recreation experience, availability of opportunity, carrying capacity, accessibility, and environmental (esthetics) quality. A good deal of judgment is required in the assessment of point values. A group of planning professionals with knowledge of the study area made independent judgments of the UDV values which were averaged. The UDV point totals convert to a recreation value of $5.07 for the without project condition and $5.16 for the with project condition. These values were applied to the visitation over the study period. The difference between the without and with project value of recreation determines the NED and LPP recreation benefits. The complete recreation analysis can to found in the attachments to the Economic Appendix.

5.6 STORM INDUCED AND LONG-TERM EROSION DAMAGES

Storm induced erosion is defined as the horizontal distance from 0 NGVD on the pre-storm profile to the landward most position where vertical erosion during the storm exceeds 0.5 feet. Recession is calculated, averaged and a standard deviation computed for each model reach over the simulation period.

A project-induced planform change rate, which accounts for the longshore dispersion of the beach nourishment material, is specified for each Beach-*fx* reach. GENESIS was used to estimate the long-term planform change rate for the future without and future without project conditions. GENESIS simulates changes in shoreline position due to the presence and combinations of beach fills and near shore structures such as groins, jetties, seawalls, and breakwaters. GENESIS was used to predict and optimize the performance of the NED Plan and renourishment requirements given various design transitions.

5.7 WAVE ATTACK DAMAGES

Wave conditions, which drive the model, consist of wave height, period, and direction and can originate from multiple sources. Predictive simulations estimate the performance of any proposed beach fill or structural modifications.

Damage elements along the shoreline can be damaged from wave run-up or from waves breaking directly on the damage element when storm surge elevations are high. These damages are determined using the IWR expert elicitation damage functions.

5.8 EMERGENCY NOURISHMENT

In the without project condition it is assumed that emergency nourishment will be performed as needed, over the 54-year period of study When a disaster is declared for a particular county, the Federal Emergency Management Agency (FEMA) will provide up to six cubic yards (cy) per square foot to mitigate for loss. There is a cost sharing provision requirement by FEMA that can be as low as zero percent (0%). The non-Federal sponsor indicated that, in the absence of a Federal project, they will, acquire funding to pursue the FEMA renourishing action after each significant storm. Historically, on at least six previous occasions FEMA has provided this emergency nourishment action.

The non-Federal sponsor has completed a dune restoration project to partially replace the erosion losses due to Hurricane Ivan in 2004 to provide storm protection for existing infrastructure, mainly Scenic Highway 98 and Gulf-front development. The current most threatened areas that were the beneficiaries of this effort are; Miramar Beach, Dune Allen and the Inlet Beach areas. The funding was provided by FEMA.

The fact that the non-Federal sponsor has deferred emergency work in anticipation of a project should be viewed as a temporary anomaly that will be accomplished if project implementation is delayed for some reason.

Beach-*fx* executes a nourishing action after each hurricane event, which averages about 125,000 cy of material on the beach. This material is trucked in for placement on the beach and has a cost of about $30 per cy. Reach 2, which is all State Park Lands and Reach 4 which is primarily State Park Lands do not receive emergency nourishment. Table B-13 presents the emergency nourishment template and accompanying nourishment triggers.

TABLE B-13
EMERGENCY NOURISHMENT TRIGGERS AND TEMPLATES

	Emergency Nourishment Trigger			Emergency Template		
Rep Profile	**Dune Width**	**Dune Height**	**Berm Width**	**Dune Width**	**Dune Height**	**Berm Width**
R1P1	0	56	0	22.2	69.7	6.3
R1P2	0	100	0	13.6	128.3	11.7
R2P1	0	0	0	0	0	0
R2P2	0	0	0	0	0	0
R3P1	0	45	0	12.5	79.0	16.0
R3P2	0	76.5	0	23.0	95.0	31.5
R4P1	0	0	0	0	0	0
R4P2	0	0	0	0	0	0
R5P1	0	65	0	24.0	78.5	38.5
R5P2	0	184.3	0	32.0	190.3	34.0
R5P3	0	50	0	15.5	69.5	46.0

5.9 REBUILDING

The model allows the user to define a distribution (triangular, you provide minimum, most likely, and maximum) of the number of days required for rebuilding, at the damage element level, that is, the distribution can be changed for each damage element. Thus, the user might enter 350, 365, or 380 to get a distribution around one year. At the start of each iteration, a value is drawn for the sample, setting the rebuilding time for the damage element for that iteration. The Walton County existing condition rebuilding parameters for single and multi-family construction was 365, 730 and 1,825 days. Walkovers, pools, jacuzzis, were assigned 365, 548 and 730 days. The number of times rebuilding could occur was unlimited if sufficient room on the lot permitted rebuilding.

If a damage element is damaged to any degree, and has not been "rebuilt" more times than the maximum allowable, then a "rebuilding event" is set at a time in the future corresponding to the random rebuilding time. When the simulation reaches that time, the lot on which the damage element exists is checked to see if it is buildable. At present, the model makes a simple check based on whether or not the landward toe of the dune has retreated past the center point of the lot. If so, the lot is not buildable, and rebuilding does not take place.

If the lot is rebuildable at the time of rebuilding, then structure and contents values are restored to their initial values at the start of the simulation, such that they are able to be taken as damages again at the next storm event, and the number of times the damage element is rebuilt is incremented by one.

5.10 COMBINING DAMAGES – COMPOSITE DAMAGE FUNCTION

Total damage element damages are calculated using a composite damage function that takes into account damages for all damage mechanisms present while avoiding double counting. Because a structure may be damaged by more than one storm damage hazard a methodology was needed to be developed for combining the damages. This methodology was defined during the IWR workshop and is included in Attachment II – Coastal Storm Damage Relationships Based on Expert Opinion Elicitation.

6.0 FUTURE WITHOUT PROJECT CONDITION

6.1 DAMAGES

Table B-14 presents the summary statistics from 100 Beach-*fx* iterations showing existing damages to structure and content by model reach. Also shown is the average cost of emergency nourishment. Table B-14A shows average annual damages by type for the future without project condition to illustrate what is being damaged comparatively.

7.0 WITH PROJECT CONDITION

7.1 PLAN FORMULATION

ER 1105-2-100 requires that the effects of alternatives are to be determined and evaluated in terms of four accounts: national economic development (NED); environmental quality (EQ); regional economic development (RED) and other social effects (OSE). The relevant effects of a hurricane and storm damage project for Walton County are: prevention of land loss and other physical damage; reduction in maintenance costs of existing protection works; reduction of emergency costs to structures; increased recreational usage; changes in shore processes and equilibrium conditions; accretion or erosion along down-drift shores and prevention of loss of historic and scenic aspects of the environment.

Various beach fill alternatives were developed based on the experience gained from the Hurricane and storm Damage Reduction Project in neighboring Bay County. Planning Hurricane and storm damage reduction measures developed for evaluation took into account some heuristics and prior experience from similar constructed projects. The PDT decided that any alternative plans would not change the existing natural berm or dune height.

Dune height alternatives were not evaluated because the predominate morphology type was high upland. Walton County beaches are essentially bluff-backed beaches and increasing the elevation of the bluffs was not considered necessary and lowering of the bluff was not considered practical.

Berm height alternatives were not evaluated. Beaches have a natural berm height. Constructing a beach higher than the natural berm height results in scarping; likewise, building a beach lower than the natural berm height results in ponding. The Mobile District has experienced both (severe scarping and ponding) at a nearby project. Historical surveys were used to determine the natural berm elevation at Walton County.

Projects are formulated in accordance with policies, principles and procedures contained in ER 1105-2-100 and related regulations (e.g., ER 200-2-2) describing the planning process developed to implement the Water Resources Council's Principles and Guidelines, the National Environmental Policy Act, Executive Order (EO) 11988, EO 11990 and other requirements. Consideration should be given to structural and nonstructural solutions. Plan formulation should be accomplished systematically to arrive at the best solution, considering all factors, including engineering, economic, environmental, and social.

Hurricane and storm damage reduction projects are formulated first to provide for hurricane and storm damage reduction. Recreation associated with this type of project is considered incidental for cost sharing purposes, although recreation benefits are NED benefits to be included in the economic analysis.

TABLE B-14

WITHOUT PROJECT DAMAGES

AVERAGE VALUES - PER 54-YEAR ITERATION (EXCEPT AVERAGE ANNUAL VALUES)

Sub-Reach	Model Reach	Average Structure Damage	Average Content Damage	Average Total Damage	Average Annual Damages	Average Emergency Nourishment	Average Annual Emergency Nourishment	Average Planned Nourishment
1	R1-1	$50,117	$427	$50,545	$2,715	$210,235	$11,294	$0
2	R1-2	$40,446	$0	$40,446	$2,173	$202,076	$10,856	$0
3	R1-3	$64,666	$0	$64,666	$3,474	$193,084	$10,373	$0
4	R1-4	$32,576	$0	$32,576	$1,750	$188,153	$10,108	$0
5	R1-5	$14,520	$287	$14,807	$795	$202,570	$10,883	$0
6	R1-6	$41,270	$0	$41,270	$2,217	$205,658	$11,048	$0
7	R1-7	$53,340	$0	$53,340	$2,866	$200,548	$10,774	$0
8	R1-8	$30,294	$0	$30,294	$1,627	$211,196	$11,346	$0
9	R1-9	$93,288	$727	$94,015	$5,051	$200,816	$10,788	$0
10	R1-10	$137,835	$0	$137,835	$7,405	$188,602	$10,132	$0
11	R1-11	$1,673,284	$814,249	$2,487,533	$133,636	$199,266	$10,705	$0
12	R1-12	$153,035	$0	$153,035	$8,221	$209,070	$11,232	$0
13	R1-13	$2,483,443	$1,167,888	$3,651,331	$196,158	$207,395	$11,142	$0
14	R1-14	$1,311,396	$623,940	$1,935,337	$103,971	$210,513	$11,309	$0
15	R1-15	$4,145,546	$1,996,276	$6,141,823	$329,953	$227,928	$12,245	$0
16	R1-16	$2,810,420	$1,362,102	$4,172,523	$224,157	$233,960	$12,569	$0
17	R1-17	$81,623	$1,669	$83,291	$4,475	$254,152	$13,654	$0
18	R1-18	$163,611	$18,038	$181,649	$9,759	$258,933	$13,910	$0
19	R1-19	$213,952	$1,878	$215,830	$11,595	$240,546	$12,923	$0
20	R1-20	$292,531	$1,295	$293,825	$15,785	$215,394	$11,571	$0
21	R1-21	$42,898	$0	$42,898	$2,305	$184,809	$9,928	$0
22	R1-22	$109,209	$747	$109,955	$5,907	$194,173	$10,431	$0
23	R1-23	$26,547	$0	$26,547	$1,426	$202,474	$10,877	$0
24	R1-24	$73,102	$21,646	$94,748	$5,090	$192,222	$10,327	$0
25	R2-1	$9,908	$0	$9,908	$532	$181,819	$9,768	$0
26	R2-2	$0	$0	$0	$0	$0	$0	$0
27	R2-3	$0	$0	$0	$0	$0	$0	$0
28	R2-4	$0	$0	$0	$0	$0	$0	$0
29	R2-5	$0	$0	$0	$0	$0	$0	$0
30	R2-6	$0	$0	$0	$0	$0	$0	$0
31	R2-7	$0	$0	$0	$0	$0	$0	$0
32	R3-1	$207,420	$530	$207,950	$11,172	$820,547	$44,082	$0
33	R3-2	$1,932,007	$694,282	$2,626,289	$141,090	$741,838	$39,853	$0
34	R3-3	$247,201	$398	$247,599	$13,302	$751,778	$40,387	$0
35	R3-4	$21,358	$1,229	$22,587	$1,213	$286,621	$15,398	$0
36	R3-5	$280,340	$117	$280,457	$15,067	$314,992	$16,922	$0
37	R3-6	$163,071	$12,307	$175,378	$9,422	$335,789	$18,039	$0
38	R3-7	$147,602	$0	$147,602	$7,930	$337,549	$18,134	$0
39	R3-8	$293,875	$1,778	$295,653	$15,883	$812,055	$43,625	$0
40	R3-9	$735,296	$0	$735,296	$39,502	$780,096	$41,909	$0
41	R3-10	$4,002,045	$1,538,725	$5,540,770	$297,663	$785,917	$42,221	$0
42	R3-11	$961,646	$161,692	$1,123,339	$60,348	$768,099	$41,264	$0

TABLE B-14 (CONTINUED)
WITHOUT PROJECT DAMAGES
AVERAGE VALUES - PER 54-YEAR ITERATION (EXCEPT AVERAGE ANNUAL VALUES)

Sub-Reach	Model Reach	Average Structure Damage	Average Content Damage	Average Total Damage	Average Annual Damages	Average Emergency Nourishment	Average Annual Emergency Nourishment	Average Planned Nourishment
43	R3-12	$2,291,254	$966,434	$3,257,688	$175,010	$738,643	$39,682	$0
44	R3-13	$153,720	$39,309	$193,030	$10,370	$740,706	$39,792	$0
45	R3-14	$1,432,360	$261,037	$1,693,397	$90,973	$1,008,234	$54,165	$0
46	R3-15	$44,152	$0	$44,152	$2,372	$800,802	$43,021	$0
47	R3-16	$17,318	$0	$17,318	$930	$556,499	$29,896	$0
48	R3-17	$152,269	$0	$152,269	$8,180	$778,391	$41,817	$0
49	R3-18	$403,306	$0	$403,306	$21,666	$796,171	$42,772	$0
50	R3-19	$218,233	$42,849	$261,082	$14,026	$790,257	$42,454	$0
51	R3-20	$3,243,409	$1,402,474	$4,645,883	$249,587	$780,754	$41,944	$0
52	R3-21	$1,511,011	$0	$1,511,011	$81,175	$781,102	$41,963	$0
53	R3-22	$442,603	$0	$442,603	$23,778	$739,214	$39,712	$0
54	R3-23	$318,197	$0	$318,197	$17,094	$643,180	$34,553	$0
55	R3-24	$28,729	$0	$28,729	$1,543	$349,327	$18,767	$0
56	R3-25	$305,862	$143,211	$449,074	$24,125	$394,881	$21,214	$0
57	R3-26	$0	$0	$0	$0	$0	$0	$0
58	R4-1	$151,745	$0	$151,745	$8,152	$804,015	$43,194	$0
59	R4-2	$674,262	$0	$674,262	$36,223	$830,989	$44,643	$0
60	R4-3	$0	$0	$0	$0	$0	$0	$0
61	R4-4	$0	$0	$0	$0	$0	$0	$0
62	R4-5	$1,244,757	$590,213	$1,834,970	$98,579	$722,149	$38,795	$0
63	R4-6	$1,792,369	$964,484	$2,756,852	$148,104	$279,394	$15,010	$0
64	R4-7	$0	$0	$0	$0	$306,342	$16,457	$0
65	R4-8	$0	$0	$0	$0	$0	$0	$0
66	R4-9	$0	$0	$0	$0	$0	$0	$0
67	R5-1	$107,028	$0	$107,028	$5,750	$442,843	$23,791	$0
68	R5-2	$45,667	$0	$45,667	$2,453	$416,320	$22,366	$0
69	R5-3	$344,988	$130,902	$475,890	$25,566	$410,365	$22,046	$0
70	R5-4	$52,778	$1,604	$54,381	$2,921	$497,669	$26,736	$0
71	R5-5	$104,374	$28,540	$132,915	$7,140	$372,486	$20,011	$0
72	R5-6	$2,083,512	$772,412	$2,855,923	$153,427	$597,458	$32,097	$0
73	R5-7	$2,627,546	$1,074,778	$3,702,324	$198,897	$588,485	$31,615	$0
74	R5-8	$1,283,261	$478,631	$1,761,892	$94,653	$568,693	$30,551	$0
75	R5-9	$81,080	$0	$81,080	$4,356	$398,857	$21,427	$0
76	R5-10	$100,176	$0	$100,176	$5,382	$394,823	$21,211	$0
77	R5-11	$286,009	$27,790	$313,799	$16,858	$401,084	$21,547	$0
78	R5-12	$172,319	$0	$172,319	$9,257	$398,147	$21,389	$0
79	R5-13	$350,899	$133,846	$484,745	$26,042	$398,685	$21,418	$0
80	R5-14	$129,147	$0	$129,147	$6,938	$391,709	$21,044	$0
81	R5-15	$101,192	$0	$101,192	$5,436	$398,018	$21,382	$0
82	R5-16	$202,544	$72,417	$274,961	$14,772	$406,363	$21,831	$0
83	R5-17	$89,887	$25	$89,913	$4,830	$229,470	$12,328	$0

TABLE B-14 (CONTINUED)
WITHOUT PROJECT DAMAGES
AVERAGE VALUES - PER 54-YEAR ITERATION (EXCEPT AVERAGE ANNUAL VALUES)

Sub-Reach	Model Reach	Average Structure Damage	Average Content Damage	Average Total Damage	Average Annual Damages	Average Emergency Nourishment	Average Annual Emergency Nourishment	Average Planned Nourishment
84	R5-18	$184,933	$1,379	$186,312	$10,009	$393,436	$21,136	$0
85	R5-19	$346,545	$486	$347,031	$18,643	$245,542	$13,191	$0
86	R5-20	$127,695	$8,744	$136,439	$7,330	$375,168	$20,155	$0
87	R5-21	$115,553	$0	$115,553	$6,208	$413,353	$22,206	$0
88	R5-22	$0	$0	$0	$0	$0	$0	$0
89	R5-23	$0	$0	$0	$0	$0	$0	$0
90	R5-24	$0	$0	$0	$0	$0	$0	$0
91	R5-25	$0	$0	$0	$0	$0	$0	$0
92	R5-26	$0	$0	$0	$0	$0	$0	$0
93	R5-27	$0	$0	$0	$0	$0	$0	$0
94	R5-28	$0	$0	$0	$0	$0	$0	$0
95	R5-29	$0	$0	$0	$0	$0	$0	$0
96	R5-30	$104,662	$143	$104,805	$5,630	$397,892	$21,376	$0
97	R5-31	$159,905	$54,514	$214,419	$11,519	$395,055	$21,223	$0
98	R5-32	$1,521,295	$385,609	$1,906,904	$102,443	$572,711	$30,767	$0
99	R5-33	$622,017	$0	$622,017	$33,416	$590,106	$31,702	$0
100	R5-34	$253,618	$0	$253,618	$13,625	$585,324	$31,445	$0
101	R5-35	$407,198	$0	$407,198	$21,876	$566,648	$30,442	$0
102	R5-36	$1,549,347	$504,940	$2,054,288	$110,361	$540,441	$29,034	$0
103	R5-37	$255,864	$0	$255,864	$13,746	$606,722	$32,594	$0
104	R5-38	$619,179	$0	$619,179	$33,264	$659,680	$35,440	$0
105	R5-39	$113,477	$0	$113,477	$6,096	$628,131	$33,745	$0
106	R5-40	$10,764	$0	$10,764	$578	$400,241	$21,502	$0
107	R5-41	$31,317	$0	$31,317	$1,682	$398,352	$21,400	$0
108	R5-42	$13,030	$0	$13,030	$700	$382,964	$20,574	$0
109	R5-43	$25,748	$0	$25,748	$1,383	$368,776	$19,812	$0
110	R5-44	$158,802	$78,936	$237,738	$12,772	$360,811	$19,384	$0
111	R5-45	$748,064	$371,844	$1,119,908	$60,164	$342,801	$18,416	$0
112	R5-46	$229,544	$64,593	$294,137	$15,802	$343,659	$18,462	$0
113	R5-47	$427,506	$178,669	$606,175	$32,565	$362,261	$19,462	$0
114	R5-48	$9,480	$2,929	$12,409	$667	$238,738	$12,826	$0
115	R5-49	$175,814	$87,341	$263,155	$14,137	$243,899	$13,103	$0
116	R5-50	$32,351	$9	$32,360	$1,738	$242,799	$13,044	$0
117	R5-51	$95,314	$20,604	$115,918	$6,227	$239,386	$12,860	$0

TABLE B-14A
AVERAGE ANNUAL WITHOUT PROJECT STRUCTURE AND CONTENT DAMAGES BY TYPE

Type	Average Annual Structure Damage	Average Annual Content Damage
Private Access	$7,835	$0
Public Access	$21,111	$0
Commercial	$14,782	$6,954
Gazebo	$54,185	$4,705
Jacuzzi	$766	$0
Small Multi-Family	$55,580	$22,056
Medium Multi Family	$370,640	$182,143
Large Multi Family	$343	$16,689
Pool	$83,474	$2,914
Single Family Residential	$1,508,554	$707,273
Walkovers	$774,781	$0
Average Annual Damages	$2,892,051	$942,730

7.1.1 Non-Structural Alternatives

Beach nourishment and periodic renourishment will meet the study objectives for shoreline erosion protection in the most economically efficient and environmentally acceptable manner. Hard structures, such as groins, breakwaters and seawalls would have a negative impact on endangered species such as nesting sea turtles, therefore these types of structures were not considered for this analysis.

A non-structural measure, property acquisition, was considered as a hurricane and storm damage reduction measure. Property acquisition would involve the purchase of the damageable property and relocating the residents. This alternative for hurricane and storm damage reduction would eliminate storm damage to approximately 81percent of the approximately 814 damage elements in the study area. To evaluate this alternative the value of the acquisition would have to be determined and compared to other evaluated alternatives to determine if this is a least costly alternative.

The typical 50-foot front row lot averages one million dollars each, appraised value. There are approximately 20 lots per sub-reach, multiplied by 117 sub-reaches equals about 2,340 lots. At one million dollars each lot, multiplied by 2,340 lots yields about $2.34 billion dollars in land value. When this land value is added to $1.18 billion dollars in damageable structure value (remember only the first two floors' value, for multi-storied structures were counted in the damageable structure inventory), the approximate $3.42 billion dollars would more than eclipse the cost of any beach fill alternative. Thus, the alternative measure of property acquisition was dismissed from further consideration

7.1.2 Structural Alternatives - Beach Fill Alternatives

A range of beach fill alternative plans were formulated by the PDT. Since both berm width and dune width alternatives were to be evaluated Phase I would involve maximizing berm width which would be followed by Phase II to optimize dune width.

8.0 NED BENEFIT ANALYSIS

8.1 PHASE I BERM WIDTH OPTIMIZATION

Table B-15 displays the six berm width optimization alternatives that were evaluated and their specifications. The existing dune height was not altered.

TABLE B-15
BERM WIDTH OPTIMIZATION

Reach	Representative Profile	Existing Dune Height (Feet)	Existing Dune Width (Feet)	Alternative Dune Width (Feet)	Alternative Berm Width (Feet)					
					Zero	MiniMin	Min	Small	Medium	Maximum
1	R1P1	22.2	55	75	0	10	25	50	75	100
	R1P2	13.6	100	120	0	25	50	75	100	125
3	R3P1	23	75	95	0	25	50	75	100	125
	R3P2	12.5	45	65	0	25	50	75	100	125
4	R4P1	23	50	70	0	25	50	75	100	125
	R4P2	10	82	100	0	25	50	75	100	125
5	R5P1	32	185	205	0	25	50	75	100	125
	R5P2	24	65	85	0	25	50	75	100	125
	R5P3	15.5	50	70	0	25	50	75	100	125

8.1.1 Berm Width Optimization Alternatives

The Phase I berm width optimization was formulated around six alternative berm width templates; Zero, MiniMin, Minimum, Small, Medium and Maximum. In order to maintain consistency for comparison and evaluation purposes each alternative was run with +20 feet of dune width added to the existing dune width. Phase I berm width alternative specifications are shown in Table B-16.

8.1.2 Results of Berm Width Optimization

The results of these runs indicated that the minimum berm template was the alternative with the greatest net benefits (see Table B-17 – B-22). Also, there were significant added benefits that accrue to alternative designs that included additional dune width. All alternatives were formulated with a +20 added dune width. Table B-23 presents the summarized berm width optimization.

TABLE B-16
BERM WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Zero Berm Width Template	+20 Feet Added Dune Width	MiniMin Berm Width Template	+20 Feet Added Dune Width	Minimum Berm Width Template	+20 Feet Added Dune Width	Small Berm Width Template	+20 Feet Added Dune Width	Medium Berm Width Template	+20 Feet Added Dune Width	Maximum Berm Width Template	+20 Feet Added Dune Width
1	R1-1	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
2	R1-2	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
3	R1-3	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
4	R1-4	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
5	R1-5	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
6	R1-6	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
7	R1-7	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
8	R1-8	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
9	R1-9	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
10	R1-10	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
11	R1-11	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
12	R1-12	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
13	R1-13	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
14	R1-14	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
15	R1-15	R1P2	0	120	25	120	50	120	75	120	100	120	125	120
16	R1-16	R1P2	0	120	25	120	50	120	75	120	100	120	125	120
17	R1-17	R1P2	0	120	25	120	50	120	75	120	100	120	125	120
18	R1-18	R1P2	0	120	25	120	50	120	75	120	100	120	125	120
19	R1-19	R1P2	0	120	25	120	50	120	75	120	100	120	125	120
20	R1-20	R1P2	0	120	10	120	50	120	75	120	100	120	125	120
21	R1-21	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
22	R1-22	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
23	R1-23	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
24	R1-24	R1P1	0	75	10	75	25	75	50	75	75	75	100	75
25	R2-1	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
26	R2-2	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
27	R2-3	R2P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

TABLE B-16 (CONTINUED)
BERM WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Zero Berm Width Template	+20 Feet Added Dune Width	MiniMin Berm Width Template	+20 Feet Added Dune Width	Minimum Berm Width Template	+20 Feet Added Dune Width	Small Berm Width Template	+20 Feet Added Dune Width	Medium Berm Width Template	+20 Feet Added Dune Width	Maximum Berm Width Template	+20 Feet Added Dune Width
28	R2-4	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
29	R2-5	R2P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
30	R2-6	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
31	R2-7	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
32	R3-1	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
33	R3-2	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
34	R3-3	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
35	R3-4	R3P2	0	65	25	65	50	65	75	65	100	65	125	65
36	R3-5	R3P2	0	65	25	65	50	65	75	65	100	65	125	65
37	R3-6	R3P2	0	65	25	65	50	65	75	65	100	65	125	65
38	R3-7	R3P2	0	65	25	65	50	65	75	65	100	65	125	65
39	R3-8	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
40	R3-9	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
41	R3-10	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
42	R3-11	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
43	R3-12	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
44	R3-13	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
45	R3-14	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
46	R3-15	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
47	R3-16	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
48	R3-17	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
49	R3-18	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
50	R3-19	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
51	R3-20	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
52	R3-21	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
53	R3-22	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
54	R3-23	R3P1	0	95	25	95	50	95	75	95	100	95	125	95
55	R3-24	R3P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

TABLE B-16 (CONTINUED)
BERM WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Zero Berm Width Template	+20 Feet Added Dune Width	MiniMin Berm Width Template	+20 Feet Added Dune Width	Minimum Berm Width Template	+20 Feet Added Dune Width	Small Berm Width Template	+20 Feet Added Dune Width	Medium Berm Width Template	+20 Feet Added Dune Width	Maximum Berm Width Template	+20 Feet Added Dune Width
56	R3-25	R3P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
57	R3-26	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
58	R4-1	R4P1	0	70	25	70	50	70	75	70	100	70	125	70
59	R4-2	R4P1	0	70	25	70	50	70	75	70	100	70	125	70
60	R4-3	R4P2	0	105	25	105	50	105	75	105	100	105	125	105
61	R4-4	R4P2	0	105	25	105	50	105	75	105	100	105	125	105
62	R4-5	R4P1	0	70	25	70	50	70	75	70	100	70	125	70
63	R4-6	R4P2	0	105	25	105	50	105	75	105	100	105	125	105
64	R4-7	R4P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
65	R4-8	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
66	R4-9	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
67	R5-1	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
68	R5-2	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
69	R5-3	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
70	R5-4	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
71	R5-5	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
72	R5-6	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
73	R5-7	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
74	R5-8	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
75	R5-9	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
76	R5-10	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
77	R5-11	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
78	R5-12	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
79	R5-13	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
80	R5-14	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
81	R5-15	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
82	R5-16	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
83	R5-17	R5P3	0	70	25	70	50	70	75	70	100	70	125	70

TABLE B-16 (CONTINUED)
BERM WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Zero Berm Width Template	+20 Feet Added Dune Width	MiniMin Berm Width Template	+20 Feet Added Dune Width	Minimum Berm Width Template	+20 Feet Added Dune Width	Small Berm Width Template	+20 Feet Added Dune Width	Medium Berm Width Template	+20 Feet Added Dune Width	Maximum Berm Width Template	+20 Feet Added Dune Width
84	R5-18	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
85	R5-19	R5P3	0	70	25	70	50	70	75	70	100	70	125	70
86	R5-20	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
87	R5-21	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
88	R5-22	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
89	R5-23	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
90	R5-24	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
91	R5-25	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
92	R5-26	R5P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
93	R5-27	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
94	R5-28	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
95	R5-29	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
96	R5-30	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
97	R5-31	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
98	R5-32	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
99	R5-33	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
100	R5-34	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
101	R5-35	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
102	R5-36	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
103	R5-37	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
104	R5-38	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
105	R5-39	R5P1	0	205	25	205	50	205	75	205	100	205	125	205
106	R5-40	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
107	R5-41	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
108	R5-42	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
109	R5-43	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
110	R5-44	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
111	R5-45	R5P2	0	85	25	85	50	85	75	85	100	85	125	85

TABLE B-16 (CONTINUED)
BERM WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Zero Berm Width Template	+20 Feet Added Dune Width	MiniMin Berm Width Template	+20 Feet Added Dune Width	Minimum Berm Width Template	+20 Feet Added Dune Width	Small Berm Width Template	+20 Feet Added Dune Width	Medium Berm Width Template	+20 Feet Added Dune Width	Maximum Berm Width Template	+20 Feet Added Dune Width
112	R5-46	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
113	R5-47	R5P2	0	85	25	85	50	85	75	85	100	85	125	85
114	R5-48	R5P3	0	70	25	70	50	70	75	70	100	70	125	70
115	R5-49	R5P3	0	70	25	70	50	70	75	70	100	70	125	70
116	R5-50	R5P3	0	70	25	70	50	70	75	70	100	70	125	70
117	R5-51	R5P3	0	70	25	70	50	70	75	70	100	70	125	70

Note: Shaded areas are State Park Areas which received neither emergency nor planned nourishments

Alternative Berm Widths

Existing Dune width + 20 feet of additive dune width

TABLE B-17
BERM WIDTH OPTIMIZATION ZERO BERM WIDTH

Model Reach	Damage Reduction ZERO Added Berm Width	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits ZERO Added Berm Width	Summed Net Benefits ZERO Added Berm Width
R1-1	$1,948	$109	$54,795	$109	$50,461	$2,818	0.0386	-$2,709	
R1-2	$3,826	$214	$49,622	$214	$307,103	$17,148	0.0125	-$16,934	
R1-3	$4,595	$257	$37,527	$257	$289,566	$16,169	0.0159	-$15,912	
R1-4	$8,113	$453	$27,756	$453	$315,586	$17,622	0.0257	-$17,169	
R1-5	$2,489	$139	$22,870	$139	$310,413	$17,333	0.0080	-$17,194	
R1-6	$9,389	$524	$6,771	$524	$390,468	$21,803	0.0240	-$21,279	
R1-7	$19,099	$1,066	$442	$1,066	$365,607	$20,415	0.0522	-$19,348	
R1-8	$10,983	$613	$1,159	$613	$369,255	$20,618	0.0297	-$20,005	
R1-9	$20,923	$1,168	$2,015	$1,168	$338,711	$18,913	0.0618	-$17,745	
R1-10	$10,259	$573	$6,219	$573	$290,304	$16,210	0.0353	-$15,637	
R1-11	$1,172,970	$65,496	$8,692	$65,496	$825,107	$46,072	1.4216	$19,424	
R1-12	$84,001	$4,690	$3,758	$4,690	$789,098	$44,062	0.1065	-$39,371	
R1-13	$3,426,140	$191,309	-$58	$191,367	$704,870	$39,359	4.8621	$152,009	
R1-14	$1,919,253	$107,167	-$7,413	$114,580	$773,596	$43,196	2.6526	$71,384	
R1-15	$1,999,896	$111,670	-$8,068	$119,738	$686,273	$38,320	3.1247	$81,418	
R1-16	$2,781,169	$155,295	-$11,001	$166,296	$272,863	$15,236	10.9145	$151,060	**$435,924**
R1-17	$43,837	$2,448	-$11,198	$13,646	$233,472	$13,037	1.0467	$609	
R1-18	$57,515	$3,212	-$12,742	$15,954	$244,312	$13,642	1.1695	$2,312	
R1-19	$44,420	$2,480	-$5,695	$8,175	$284,463	$15,884	0.5147	-$7,709	
R1-20	$47,614	$2,659	$8,438	$2,659	$237,378	$13,255	0.2006	-$10,596	
R1-21	$132	$7	$9,080	$7	$327,538	$18,289	0.0004	-$18,282	
R1-22	$10,380	$580	$21,487	$580	$346,408	$19,343	0.0300	-$18,763	
R1-23	$3,509	$196	$36,478	$196	$319,206	$17,824	0.0110	-$17,628	
R1-24	$69,363	$3,873	$41,072	$3,873	$337,696	$18,856	0.2054	-$14,983	
R2-1	-$113	-$6	$31,026	-$6	$21,736	$1,214	-	-	
R2-2	$0	$0	$10,175	$0	$0	$0	-	-	
R2-3	$0	$0	$29,592	$0	$0	$0	-	-	
R2-4	$0	$0	$22,465	$0	$0	$0	-	-	
R2-5	$0	$0	$8,309	$0	$0	$0	-	-	
R2-6	$0	$0	-$249,209	$249,209	$0	$0	-	-	
R2-7	$0	$0	$18,114	$0	$0	$0	-	-	
R3-1	$180,060	$10,054	$20,806	$10,054	$510,349	$28,497	0.3528	-$18,443	
R3-2	$2,127,566	$118,799	$19,994	$118,799	$420,973	$23,506	5.0539	$95,293	
R3-3	$185,528	$10,360	$20,424	$10,360	$418,120	$23,347	0.4437	-$12,988	
R3-4	$16,961	$947	$25,555	$947	$116,056	$6,480	0.1461	-$5,533	
R3-5	$38,865	$2,170	$21,080	$2,170	$170,861	$9,541	0.2275	-$7,370	
R3-6	$36,127	$2,017	$15,383	$2,017	$180,985	$10,106	0.1996	-$8,089	
R3-7	$49,783	$2,780	$4,993	$2,780	$153,870	$8,592	0.3235	-$5,812	
R3-8	$77,074	$4,304	-$14,815	$19,118	$1,188,033	$66,337	0.2882	-$47,219	
R3-9	$434,870	$24,282	-$17,079	$41,362	$983,765	$54,932	0.7530	-$13,570	
R3-10	$2,275,811	$127,077	-$21,371	$148,448	$871,568	$48,667	3.0503	$99,782	
R3-11	$689,120	$38,479	-$23,863	$62,342	$707,891	$39,527	1.5772	$22,815	
R3-12	$1,301,736	$72,686	-$37,589	$110,275	$627,570	$35,042	3.1469	$75,233	
R3-13	$216,357	$12,081	-$44,608	$56,689	$595,132	$33,231	1.7059	$23,458	

TABLE B-17 (CONTINUED)
BERM WIDTH OPTIMIZATION ZERO BERM WIDTH

Model Reach	Damage Reduction ZERO Added Berm Width	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits ZERO Added Berm Width	Summed Net Benefits ZERO Added Berm Width
R3-14	$1,392,192	$77,737	-$77,674	$155,411	$915,085	$51,097	3.0415	$104,314	
R3-15	$19,409	$1,084	-$67,602	$68,686	$631,136	$35,241	1.9490	$33,444	
R3-16	$5,471	$306	-$52,660	$52,966	$449,998	$25,127	2.1079	$27,839	
R3-17	$112,493	$6,281	-$83,305	$89,587	$704,264	$39,325	2.2781	$50,262	
R3-18	$261,843	$14,621	-$86,928	$101,548	$748,371	$41,788	2.4301	$59,761	
R3-19	$312,734	$17,462	-$82,277	$99,739	$752,150	$41,999	2.3748	$57,740	
R3-20	$3,906,773	$218,147	-$79,875	$298,021	$879,468	$49,108	6.0687	$248,914	
R3-21	$826,335	$46,141	-$77,993	$124,134	$1,095,124	$61,150	2.0300	$62,984	
R3-22	$230,587	$12,876	-$67,797	$80,673	$1,241,432	$69,319	1.1638	$11,354	
R3-23	$198,400	$11,078	-$53,371	$64,449	$577,522	$32,248	1.9986	$32,201	**$904,813**
R3-24	$5,384	$301	-$45,450	$45,751	$0	$0	-	$45,751	
R3-25	$0	$0	-$32,621	$32,621	$0	$0	-	$32,621	
R3-26	$0	$0	-$26,720	$26,720	$0	$0	-	$26,720	
R4-1	-$3,878	-$217	-$54,395	$54,178	$21,736	$1,214	44.6383	$52,965	
R4-2	-$52,104	-$2,909	-$45,920	$43,011	$108,682	$6,069	7.0874	$36,942	
R4-3	$0	$0	$3,747	$0	$131,501	$7,343	0.0000	-$7,343	
R4-4	$0	$0	$7,991	$0	$63,490	$3,545	0.0000	-$3,545	
R4-5	-$7,370	-$412	-$21,731	$21,320	$36,227	$2,023	10.5393	$19,297	
R4-6	$0	$0	$6,739	$0	$7,245	$405	0.0000	-$405	**$97,911**
R4-7	$0	$0	-$8,323	$8,323	$0	$0	-	$8,323	
R4-8	$0	$0	-$87,751	$87,751	$0	$0	-	$87,751	
R4-9	$0	$0	-$153,875	$153,875	$0	$0	-	$153,875	
R5-1	$15,438	$862	-$100,250	$101,112	$610,041	$34,064	2.9683	$67,048	
R5-2	$17,990	$1,005	-$70,377	$71,381	$450,461	$25,153	2.8379	$46,228	
R5-3	$22,538	$1,258	-$38,155	$39,414	$254,921	$14,234	2.7689	$25,179	
R5-4	$15,298	$854	-$11,323	$12,177	$150,467	$8,402	1.4493	$3,775	
R5-5	$88,997	$4,969	$11,365	$4,969	$109,553	$6,117	0.8124	-$1,148	
R5-6	$2,650,675	$148,009	-$30,953	$178,962	$681,942	$38,078	4.6998	$140,884	
R5-7	$3,625,676	$202,451	-$38,120	$240,571	$671,166	$37,477	6.4192	$203,095	
R5-8	$1,610,350	$89,919	-$27,503	$117,422	$666,522	$37,217	3.1550	$80,204	
R5-9	$26,850	$1,499	-$15,659	$17,159	$148,123	$8,271	2.0746	$8,888	
R5-10	$28,066	$1,567	-$17,915	$19,482	$124,348	$6,943	2.8059	$12,539	
R5-11	$162,780	$9,089	-$19,644	$28,733	$154,963	$8,653	3.3207	$20,080	
R5-12	$29,720	$1,660	-$18,787	$20,446	$98,745	$5,514	3.7082	$14,932	
R5-13	$107,222	$5,987	-$19,733	$25,720	$173,554	$9,691	2.6541	$16,030	
R5-14	$36,816	$2,056	-$17,799	$19,855	$143,238	$7,998	2.4824	$11,857	
R5-15	$34,184	$1,909	-$24,219	$26,128	$149,193	$8,331	3.1364	$17,797	
R5-16	$169,360	$9,457	-$24,757	$34,214	$155,831	$8,701	3.9320	$25,512	
R5-17	$11,667	$651	-$13,221	$13,873	$186,092	$10,391	1.3351	$3,482	
R5-18	$55,805	$3,116	-$24,149	$27,265	$231,108	$12,905	2.1128	$14,360	**$710,743**
R5-19	$25,774	$1,439	-$2,901	$4,340	$284,340	$15,877	0.2734	-$11,537	
R5-20	$24,031	$1,342	$184	$1,342	$492,932	$27,524	0.0488	-$26,183	
R5-21	$24,141	$1,348	-$554	$1,902	$52,932	$2,956	0.6434	-$1,054	
R5-22	$0	$0	-$1,964	$1,964	$0	$0	$0	$1,964	
R5-23	$0	$0	-$511	$511	$0	$0	$0	$511	

TABLE B-17 (CONTINUED)
BERM WIDTH OPTIMIZATION ZERO BERM WIDTH

Model Reach	Damage Reduction ZERO Added Berm Width	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits ZERO Added Berm Width	Summed Net Benefits ZERO Added Berm Width
R5-24	$0	$0	-$6,898	$6,898	$0	$0	$0	$6,898	
R5-25	$0	$0	-$15,278	$15,278	$0	$0	$0	$15,278	
R5-26	$0	$0	-$12,809	$12,809	$0	$0	$0	$12,809	
R5-27	$0	$0	-$10,102	$10,102	$0	$0	$0	$10,102	
R5-28	$0	$0	-$11,651	$11,651	$0	$0	$0	$11,651	
R5-29	$0	$0	-$37,910	$37,910	$0	$0	$0	$37,910	
R5-30	$21,881	$1,222	-$32,848	$34,070	$570,396	$31,850	1.0697	$2,220	
R5-31	$190,849	$10,657	-$33,879	$44,535	$445,772	$24,891	1.7892	$19,644	
R5-32	$1,168,474	$65,245	-$61,892	$127,137	$914,183	$51,046	2.4906	$76,091	
R5-33	$448,520	$25,044	-$62,530	$87,575	$810,845	$45,276	1.9342	$42,299	
R5-34	$186,335	$10,405	-$53,740	$64,144	$728,303	$40,667	1.5773	$23,477	
R5-35	$281,354	$15,710	-$52,782	$68,492	$665,830	$37,179	1.8422	$31,314	
R5-36	$1,475,011	$82,362	-$56,472	$138,834	$689,576	$38,505	3.6056	$100,329	
R5-37	$199,615	$11,146	-$80,647	$91,793	$704,586	$39,343	2.3332	$52,451	
R5-38	$462,079	$25,802	-$94,528	$120,329	$822,896	$45,949	2.6188	$74,380	
R5-39	$93,495	$5,221	-$98,750	$103,970	$697,510	$38,948	2.6695	$65,022	
R5-40	$5,107	$285	-$49,625	$49,911	$117,928	$6,585	7.5796	$43,326	
R5-41	$13,715	$766	-$44,843	$45,609	$121,375	$6,777	6.7296	$38,831	
R5-42	$4,930	$275	-$30,127	$30,402	$125,668	$7,017	4.3326	$23,385	
R5-43	$8,731	$488	-$18,731	$19,219	$100,872	$5,632	3.4121	$13,586	
R5-44	$0	$0	-$5,603	$5,603	$98,536	$5,502	1.0183	$101	
R5-45	$0	$0	$263	$0	$101,165	$5,649	0.0000	-$5,649	
R5-46	$151,476	$8,458	$7,328	$8,458	$119,182	$6,655	1.2710	$1,803	
R5-47	$342,659	$19,133	$982	$19,133	$157,559	$8,798	2.1748	$10,336	
R5-48	$1,667	$93	$2,299	$93	$157,803	$8,811	0.0106	-$8,718	
R5-49	$59	$3	-$12,232	$12,235	$251,788	$14,059	0.8703	-$1,824	
R5-50	-$1,386	-$77	-$18,968	$18,890	$414,026	$23,118	0.8171	-$4,228	
R5-51	$15,690	$876	-$28,941	$29,817	$142,154	$7,938	3.7564	$21,879	**$636,087**

TABLE B-18
BERM WIDTH OPTIMIZATION MINIMIN

Model Reach	Damage Reduction MiniMin	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits MiniMin	Summed Net Benefits MiniMin
R1-1	$2,041	$114	$54,795	$114	$274,975	$15,354	0.007	-$15,240	
R1-2	$2,937	$164	$49,622	$164	$259,078	$14,466	0.011	-$14,302	
R1-3	$6,090	$340	$37,527	$340	$262,142	$14,638	0.023	-$14,297	
R1-4	$14,228	$794	$27,756	$794	$260,803	$14,563	0.055	-$13,768	
R1-5	$3,159	$176	$22,870	$176	$289,454	$16,163	0.011	-$15,986	
R1-6	$11,961	$668	$6,771	$668	$319,307	$17,829	0.037	-$17,162	
R1-7	$12,727	$711	$442	$711	$320,142	$17,876	0.040	-$17,165	
R1-8	$6,970	$389	$1,159	$389	$337,451	$18,843	0.021	-$18,453	
R1-9	$45,221	$2,525	$2,015	$2,525	$317,766	$17,743	0.142	-$15,218	
R1-10	$69,776	$3,896	$6,219	$3,896	$290,478	$16,220	0.240	-$12,324	
R1-11	$1,209,040	$67,510	$8,692	$67,510	$305,451	$17,056	3.958	$50,455	
R1-12	$52,096	$2,909	$3,758	$2,909	$326,404	$18,226	0.160	-$15,317	
R1-13	$2,635,212	$147,145	-$58	$147,203	$328,141	$18,323	8.034	$128,881	
R1-14	$1,687,921	$94,250	-$7,413	$101,663	$358,888	$20,040	5.073	$81,624	
R1-15	$2,135,356	$119,234	-$8,068	$127,302	$417,759	$23,327	5.457	$103,975	
R1-16	$1,387,942	$77,500	-$11,001	$88,501	$422,690	$23,602	3.750	$64,898	**$414,516**
R1-17	$22,827	$1,275	-$11,198	$12,472	$449,252	$25,085	0.497	-$12,613	
R1-18	$45,418	$2,536	-$12,742	$15,278	$467,280	$26,092	0.586	-$10,814	
R1-19	$71,857	$4,012	-$5,695	$9,707	$432,380	$24,143	0.402	-$14,436	
R1-20	$86,383	$4,823	$8,438	$4,823	$381,923	$21,326	0.226	-$16,502	
R1-21	$758	$42	$9,080	$42	$298,425	$16,663	0.003	-$16,621	
R1-22	$32,710	$1,826	$21,487	$1,826	$283,634	$15,838	0.115	-$14,011	
R1-23	$3,143	$175	$36,478	$175	$289,250	$16,151	0.011	-$15,976	
R1-24	$78,386	$4,377	$41,072	$4,377	$258,932	$14,458	0.303	-$10,081	
R2-1	$0	$0	$0	$0	$0	$0	-	$0	
R2-2	$0	$0	$0	$0	$0	$0	-	$0	
R2-3	$0	$0	$0	$0	$0	$0	-	$0	
R2-4	$0	$0	$0	$0	$0	$0	-	$0	
R2-5	$0	$0	$0	$0	$0	$0	-	$0	
R2-6	$0	$0	$0	$0	$0	$0	-	$0	
R2-7	$0	$0	$0	$0	$0	$0	-	$0	
R3-1	$152,011	$8,488	$20,806	$8,488	$182,143	$10,171	0.835	-$1,683	
R3-2	$1,580,357	$88,244	$19,994	$88,244	$135,295	$7,555	11.681	$80,689	
R3-3	$142,895	$7,979	$20,424	$7,979	$118,312	$6,606	1.208	$1,373	
R3-4	$4,762	$266	$25,555	$266	$228,754	$12,773	0.021	-$12,507	
R3-5	$35,529	$1,984	$21,080	$1,984	$258,804	$14,451	0.137	-$12,467	
R3-6	$15,315	$855	$15,383	$855	$285,477	$15,940	0.054	-$15,085	
R3-7	$568,877	$31,765	$4,993	$31,765	$300,837	$16,798	1.891	$14,967	
R3-8	$6,113,916	$341,389	-$14,815	$356,204	$144,408	$8,063	44.175	$348,140	
R3-9	$430,930	$24,062	-$17,079	$41,142	$136,660	$7,631	5.391	$33,511	
R3-10	$2,308,403	$128,897	-$21,371	$150,268	$139,959	$7,815	19.228	$142,453	
R3-11	$578,808	$32,320	-$23,863	$56,183	$139,268	$7,776	7.225	$48,406	
R3-12	$1,273,739	$71,123	-$37,589	$108,712	$142,474	$7,955	13.665	$100,757	

TABLE B-18 (CONTINUED)
BERM WIDTH OPTIMIZATION MINIMIN

Model Reach	Damage Reduction MiniMiN	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits MiniMin	Summed Net Benefits MiniMin
R3-13	$126,295	$7,052	-$44,608	$51,660	$151,976	$8,486	6.088	$43,174	
R3-14	$1,006,547	$56,204	-$77,674	$133,877	$235,616	$13,156	10.176	$120,721	
R3-15	$8,570	$479	-$67,602	$68,081	$185,633	$10,365	6.568	$57,715	
R3-16	$1,186	$66	-$52,660	$52,727	$133,781	$7,470	7.058	$45,257	
R3-17	$78,722	$4,396	-$83,305	$87,701	$200,161	$11,177	7.847	$76,524	
R3-18	$213,582	$11,926	-$86,928	$98,854	$212,061	$11,841	8.348	$87,013	
R3-19	$211,341	$11,801	-$82,277	$94,077	$200,097	$11,173	8.420	$82,904	
R3-20	$3,331,546	$186,027	-$79,875	$265,902	$200,283	$11,183	23.776	$254,718	
R3-21	$882,610	$49,283	-$77,993	$127,276	$197,209	$11,012	11.558	$116,265	
R3-22	$271,324	$15,150	-$67,797	$82,948	$180,633	$10,086	8.224	$72,861	
R3-23	$188,911	$10,548	-$53,371	$63,919	$151,593	$8,465	7.551	$55,454	**$1,742,843**
R3-24	-$2,376	-$133	-$45,450	$45,318	-$88,842	-$4,961	-9.135	$50,278	
R3-25	$12,626	$705	-$32,621	$33,326	-$95,074	-$5,309	-6.278	$38,635	
R3-26	$0	$0	-$26,720	$26,720	$0	$0	-	$26,720	
R4-1	$106,031	$5,921	-$54,395	$60,315	-$25,737	-$1,437	-41.970	$61,753	
R4-2	$434,853	$24,281	-$45,920	$70,201	-$35,420	-$1,978	-35.496	$72,179	
R4-3	$0	$0	$3,747	$0	$37,319	$2,084	-	-$2,084	
R4-4	$0	$0	$7,991	$0	$35,780	$1,998	-	-$1,998	
R4-5	$75,567	$4,220	-$21,731	$25,951	-$24,814	-$1,386	-18.730	$27,336	
R4-6	$113,924	$6,361	$6,739	$6,361	-$50,306	-$2,809	-2.265	$9,170	**$166,356**
R4-7	$0	$0	-$8,323	$8,323	-$82,072	-$4,583	-1.816	$12,905	
R4-8	$0	$0	-$87,751	$87,751	$0	$0	-	$87,751	
R4-9	$0	$0	-$153,875	$153,875	$0	$0	-	$153,875	
R5-1	$43,616	$2,435	-$100,250	$102,685	$142,449	$7,954	12.910	$94,731	
R5-2	$19,089	$1,066	-$70,377	$71,443	$132,534	$7,400	9.654	$64,042	
R5-3	$43,477	$2,428	-$38,155	$40,583	$117,872	$6,582	6.166	$34,001	
R5-4	$25,173	$1,406	-$11,323	$12,728	$148,012	$8,265	1.540	$4,464	
R5-5	$77,022	$4,301	$11,365	$4,301	$109,058	$6,090	0.706	-$1,789	
R5-6	$2,699,955	$150,760	-$30,953	$181,714	$263,263	$14,700	12.361	$167,014	
R5-7	$3,750,500	$209,421	-$38,120	$247,541	$256,600	$14,328	17.277	$233,213	
R5-8	$1,579,802	$88,213	-$27,503	$115,716	$246,338	$13,755	8.413	$101,961	
R5-9	$26,153	$1,460	-$15,659	$17,120	$110,886	$6,192	2.765	$10,928	
R5-10	$32,678	$1,825	-$17,915	$19,740	$113,228	$6,322	3.122	$13,417	
R5-11	$157,366	$8,787	-$19,644	$28,431	$115,561	$6,453	4.406	$21,978	
R5-12	$57,724	$3,223	-$18,787	$22,010	$113,589	$6,343	3.470	$15,667	
R5-13	$102,154	$5,704	-$19,733	$25,437	$114,631	$6,401	3.974	$19,037	
R5-14	$45,814	$2,558	-$17,799	$20,357	$112,306	$6,271	3.246	$14,086	
R5-15	$34,303	$1,915	-$24,219	$26,135	$118,865	$6,637	3.938	$19,497	
R5-16	$159,543	$8,909	-$24,757	$33,666	$119,141	$6,653	5.061	$27,013	
R5-17	$14,763	$824	-$13,221	$14,046	$128,126	$7,154	1.963	$6,891	
R5-18	$89,871	$5,018	-$24,149	$29,167	$117,340	$6,552	4.452	$22,615	**$868,767**
R5-19	$65,847	$3,677	-$2,901	$6,578	$125,655	$7,016	0.938	-$438	
R5-20	$48,044	$2,683	$184	$2,683	$115,197	$6,432	0.417	-$3,750	
R5-21	$33,664	$1,880	-$554	$2,433	$130,899	$7,309	0.333	-$4,876	

TABLE B-18 (CONTINUED)
BERM WIDTH OPTIMIZATION MINIMIN

Model Reach	Damage Reduction MiniMiN	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits MiniMin	Summed Net Benefits MiniMin
R5-22	$0	$0	-$1,964	$1,964	$0	$0	-	$1,964	
R5-23	$0	$0	-$511	$511	$0	$0	-	$511	
R5-24	$0	$0	-$6,898	$6,898	$0	$0	-	$6,898	
R5-25	$0	$0	-$15,278	$15,278	$0	$0	-	$15,278	
R5-26	$0	$0	-$12,809	$12,809	$0	$0	-	$12,809	
R5-27	$0	$0	-$10,102	$10,102	$0	$0	-	$10,102	
R5-28	$0	$0	-$11,651	$11,651	$0	$0	-	$11,651	
R5-29	$0	$0	-$37,910	$37,910	$0	$0	-	$37,910	
R5-30	$40,984	$2,288	-$32,848	$35,137	$124,760	$6,966	5.044	$28,170	
R5-31	$243,829	$13,615	-$33,879	$47,494	$121,361	$6,777	7.008	$40,717	
R5-32	$1,311,296	$73,220	-$61,892	$135,112	$242,871	$13,561	9.963	$121,551	
R5-33	$504,917	$28,194	-$62,530	$90,724	$250,355	$13,979	6.490	$76,745	
R5-34	$212,729	$11,878	-$53,740	$65,618	$250,146	$13,968	4.698	$51,651	
R5-35	$323,740	$18,077	-$52,782	$70,859	$243,446	$13,594	5.213	$57,266	
R5-36	$1,566,492	$87,470	-$56,472	$143,942	$232,341	$12,973	11.095	$130,969	
R5-37	$221,294	$12,357	-$80,647	$93,004	$252,865	$14,119	6.587	$78,884	
R5-38	$512,353	$28,609	-$94,528	$123,136	$269,422	$15,044	8.185	$108,092	
R5-39	$100,001	$5,584	-$98,750	$104,333	$257,359	$14,370	7.260	$89,963	
R5-40	$4,749	$265	-$49,625	$49,891	$124,057	$6,927	7.202	$42,964	
R5-41	$12,566	$702	-$44,843	$45,544	$125,219	$6,992	6.514	$38,552	
R5-42	$5,003	$279	-$30,127	$30,406	$110,913	$6,193	4.910	$24,213	
R5-43	$7,974	$445	-$18,731	$19,176	$112,675	$6,292	3.048	$12,885	
R5-44	$1,173	$66	-$5,603	$5,668	$112,664	$6,291	0.901	-$623	
R5-45	$37,031	$2,068	$263	$2,068	$107,526	$6,004	0.344	-$3,936	
R5-46	$124,750	$6,966	$7,328	$6,966	$105,737	$5,904	1.180	$1,062	
R5-47	$299,564	$16,727	$982	$16,727	$121,527	$6,786	2.465	$9,941	
R5-48	-$137	-$8	$2,299	-$8	$132,480	$7,397	-0.001	-$7,405	
R5-49	$9,710	$542	-$12,232	$12,774	$167,165	$9,334	1.369	$3,440	
R5-50	$320	$18	-$18,968	$18,985	$208,754	$11,656	1.629	$7,329	
R5-51	$10,808	$603	-$28,941	$29,544	$168,378	$9,402	3.142	$20,142	**$932,571**

TABLE B-19
BERM WIDTH OPTIMIZATION MINIMUM

Model Reach	Damage Reduction Minimum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Minimum	Summed Net Benefits Minimum
R1-1	$ 7,892	$ 441	$ 54,795	$ 441	$ 503,608	$ 28,121	0.016	$ -27,680	
R1-2	$ 3,206	$ 179	$ 49,622	$ 179	$ 480,331	$ 26,821	0.007	$ -26,642	
R1-3	$ 11,050	$ 617	$ 37,527	$ 617	$ 469,071	$ 26,192	0.024	$ -25,575	
R1-4	$ 16,748	$ 935	$ 27,756	$ 935	$ 462,134	$ 25,805	0.036	$ -24,869	
R1-5	$ 4,134	$ 231	$ 22,870	$ 231	$ 505,522	$ 28,227	0.008	$ -27,997	
R1-6	$ 14,179	$ 792	$ 6,771	$ 792	$ 534,501	$ 29,846	0.027	$ -29,054	
R1-7	$ 13,108	$ 732	$ 442	$ 732	$ 531,757	$ 29,692	0.025	$ -28,960	
R1-8	$ 9,206	$ 514	$ 1,159	$ 514	$ 558,676	$ 31,195	0.016	$ -30,681	
R1-9	$ 50,118	$ 2,799	$ 2,015	$ 2,799	$ 526,231	$ 29,384	0.095	$ -26,585	
R1-10	$ 74,855	$ 4,180	$ 6,219	$ 4,180	$ 488,438	$ 27,273	0.153	$ -23,094	
R1-11	$ 1,425,818	$ 79,615	$ 8,692	$ 79,615	$ 513,690	$ 28,683	2.776	$ 50,931	
R1-12	$ 56,079	$ 3,131	$ 3,758	$ 3,131	$ 543,351	$ 30,340	0.103	$ -27,208	
R1-13	$ 2,671,857	$ 149,191	$ -58	$ 149,250	$ 543,541	$ 30,350	4.918	$ 118,899	
R1-14	$ 1,777,549	$ 99,255	$ -7,413	$ 106,668	$ 587,067	$ 32,781	3.254	$ 73,887	
R1-15	$ 3,078,837	$ 171,916	$ -8,068	$ 179,984	$ 713,334	$ 39,831	4.519	$ 140,153	
R1-16	$ 2,036,531	$ 113,716	$ -11,001	$ 124,717	$ 723,284	$ 40,387	3.088	$ 84,330	$ 440,993
R1-17	$ 25,204	$ 1,407	$ -11,198	$ 12,605	$ 779,482	$ 43,525	0.290	$ -30,920	
R1-18	$ 52,547	$ 2,934	$ -12,742	$ 15,676	$ 800,373	$ 44,691	0.351	$ -29,015	
R1-19	$ 89,401	$ 4,992	$ -5,695	$ 10,687	$ 744,199	$ 41,555	0.257	$ -30,868	
R1-20	$ 121,703	$ 6,796	$ 8,438	$ 6,796	$ 662,742	$ 37,006	0.184	$ -30,211	
R1-21	$ -34	$ -2	$ 9,080	$ -2	$ 502,158	$ 28,040	-0.000	$ -28,041	
R1-22	$ 38,887	$ 2,171	$ 21,487	$ 2,171	$ 492,109	$ 27,478	0.079	$ -25,307	
R1-23	$ 2,995	$ 167	$ 36,478	$ 167	$ 506,191	$ 28,265	0.006	$ -28,098	
R1-24	$ 80,930	$ 4,519	$ 41,072	$ 4,519	$ 461,076	$ 25,746	0.176	$ -21,227	
R2-1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-4	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-5	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-6	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R2-7	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R3-1	$ 150,199	$ 8,387	$ 20,806	$ 8,387	$ 290,733	$ 16,234	0.517	$ -7,847	
R3-2	$ 1,701,715	$ 95,020	$ 19,994	$ 95,020	$ 231,823	$ 12,945	7.341	$ 82,076	
R3-3	$ 152,882	$ 8,537	$ 20,424	$ 8,537	$ 222,029	$ 12,398	0.689	$ -3,861	
R3-4	$ 5,870	$ 328	$ 25,555	$ 328	$ 472,146	$ 26,364	0.012	$ -26,036	
R3-5	$ 48,294	$ 2,697	$ 21,080	$ 2,697	$ 528,293	$ 29,499	0.091	$ -26,802	
R3-6	$ 44,517	$ 2,486	$ 15,383	$ 2,486	$ 573,348	$ 32,015	0.078	$ -29,529	
R3-7	$ 1,065,098	$ 59,473	$ 4,993	$ 59,473	$ 580,324	$ 32,404	1.835	$ 27,069	
R3-8	$ 6,260,926	$ 349,598	$ -14,815	$ 364,413	$ 268,892	$ 15,014	24.271	$ 349,398	
R3-9	$ 454,907	$ 25,401	$ -17,079	$ 42,480	$ 263,438	$ 14,710	2.888	$ 27,770	
R3-10	$ 2,716,745	$ 151,698	$ -21,371	$ 173,069	$ 265,271	$ 14,812	11.684	$ 158,257	
R3-11	$ 647,190	$ 36,138	$ -23,863	$ 60,001	$ 264,251	$ 14,755	4.066	$ 45,246	
R3-12	$ 1,530,959	$ 85,486	$ -37,589	$ 123,075	$ 251,788	$ 14,059	8.754	$ 109,015	
R3-13	$ 131,842	$ 7,362	$ -44,608	$ 51,970	$ 261,368	$ 14,594	3.561	$ 37,375	
R3-14	$ 1,087,125	$ 60,703	$ -77,674	$ 138,377	$ 374,382	$ 20,905	6.619	$ 117,472	

TABLE B-19 (CONTINUED)
BERM WIDTH OPTIMIZATION MINIMUM

Model Reach	Damage Reduction Minimum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Minimum	Summed Net Benefits Minimum
R3-15	$ 7,229	$ 404	$ -67,602	$ 68,006	$ 304,471	$ 17,001	4.000	$ 51,005	
R3-16	$ 17	$ 1	$ -52,660	$ 52,661	$ 217,142	$ 12,125	4.343	$ 40,537	
R3-17	$ 85,986	$ 4,801	$ -83,305	$ 88,107	$ 314,729	$ 17,574	5.014	$ 70,533	
R3-18	$ 235,179	$ 13,132	$ -86,928	$ 100,060	$ 329,401	$ 18,393	5.440	$ 81,666	
R3-19	$ 212,623	$ 11,872	$ -82,277	$ 94,149	$ 314,241	$ 17,547	5.366	$ 76,602	
R3-20	$ 3,461,887	$ 193,305	$ -79,875	$ 273,180	$ 310,874	$ 17,359	15.737	$ 255,821	
R3-21	$ 951,735	$ 53,143	$ -77,993	$ 131,136	$ 309,901	$ 17,304	7.578	$ 113,832	
R3-22	$ 293,381	$ 16,382	$ -67,797	$ 84,179	$ 287,290	$ 16,042	5.248	$ 68,137	
R3-23	$ 204,513	$ 11,420	$ -53,371	$ 64,790	$ 244,743	$ 13,666	4.741	$ 51,124	$1,676,708
R3-24	$ -626	$ -35	$ -45,450	$ 45,415	$ -99,313	$ -5,545	-8.190	$ 50,961	
R3-25	$ -153	$ -9	$ -32,621	$ 32,612	$ -106,985	$ -5,974	-5.459	$ 38,586	
R3-26	$ -	$ -	$ -26,720	$ 26,720	$ -	$ -	-	$ 26,720	
R4-1	$ 106,445	$ 5,944	$ -54,395	$ 60,339	$ 292,684	$ 16,343	3.692	$ 43,996	
R4-2	$ 440,609	$ 24,603	$ -45,920	$ 70,523	$ 295,830	$ 16,519	4.269	$ 54,004	
R4-3	$ -	$ -	$ 3,747	$ -	$ 51,808	$ 2,893	-	$ -2,893	
R4-4	$ -	$ -	$ 7,991	$ -	$ 48,298	$ 2,697	-	$ -2,697	
R4-5	$ 47,026	$ 2,626	$ -21,731	$ 24,357	$ 253,245	$ 14,141	1.722	$ 10,216	
R4-6	$ 4,422	$ 247	$ 6,739	$ 247	$ -8,400	$ -469	-0.526	$ 716	$ 103,342
R4-7	$ -	$ -	$ -8,323	$ 8,323	$ -90,637	$ -5,061	-1.644	$ 13,384	
R4-8	$ -	$ -	$ -87,751	$ 87,751	$ -	$ -	-	$ 87,751	
R4-9	$ -	$ -	$ -153,875	$ 153,875	$ -	$ -	-	$ 153,875	
R5-1	$ 57,546	$ 3,213	$ -100,250	$ 103,463	$ 410,195	$ 22,905	4.517	$ 80,558	
R5-2	$ 18,932	$ 1,057	$ -70,377	$ 71,434	$ 399,628	$ 22,314	3.201	$ 49,119	
R5-3	$ 17,360	$ 969	$ -38,155	$ 39,124	$ 390,896	$ 21,827	1.792	$ 17,298	
R5-4	$ 25,354	$ 1,416	$ -11,323	$ 12,738	$ 472,071	$ 26,360	0.483	$ -13,621	
R5-5	$ 74,997	$ 4,188	$ 11,365	$ 4,188	$ 353,227	$ 19,723	0.212	$ -15,536	
R5-6	$ 2,641,306	$ 147,485	$ -30,953	$ 178,439	$ 495,493	$ 27,667	6.449	$ 150,771	
R5-7	$ 3,653,734	$ 204,017	$ -38,120	$ 242,138	$ 483,558	$ 27,001	8.968	$ 215,137	
R5-8	$ 1,532,336	$ 85,563	$ -27,503	$ 113,065	$ 460,545	$ 25,716	4.397	$ 87,350	
R5-9	$ 25,488	$ 1,423	$ -15,659	$ 17,082	$ 373,027	$ 20,829	0.820	$ -3,747	
R5-10	$ 34,347	$ 1,918	$ -17,915	$ 19,833	$ 371,421	$ 20,739	0.956	$ -906	
R5-11	$ 134,846	$ 7,530	$ -19,644	$ 27,173	$ 378,259	$ 21,121	1.287	$ 6,052	
R5-12	$ 67,648	$ 3,777	$ -18,787	$ 22,564	$ 373,000	$ 20,828	1.083	$ 1,736	
R5-13	$ 87,316	$ 4,876	$ -19,733	$ 24,609	$ 376,788	$ 21,039	1.170	$ 3,570	
R5-14	$ 47,104	$ 2,630	$ -17,799	$ 20,429	$ 369,208	$ 20,616	0.991	$ -187	
R5-15	$ 32,243	$ 1,800	$ -24,219	$ 26,020	$ 379,959	$ 21,216	1.226	$ 4,804	
R5-16	$ 175,148	$ 9,780	$ -24,757	$ 34,537	$ 388,329	$ 21,684	1.593	$ 12,853	
R5-17	$ 18,186	$ 1,015	$ -13,221	$ 14,237	$ 318,052	$ 17,759	0.802	$ -3,523	
R5-18	$ 101,263	$ 5,654	$ -24,149	$ 29,803	$ 375,009	$ 20,940	1.423	$ 8,864	$ 600,593
R5-19	$ 125,484	$ 7,007	$ -2,901	$ 9,908	$ 319,026	$ 17,814	0.556	$ -7,906	
R5-20	$ 50,883	$ 2,841	$ 184	$ 2,841	$ 365,008	$ 20,381	0.139	$ -17,540	
R5-21	$ 42,456	$ 2,371	$ -554	$ 2,924	$ 399,731	$ 22,320	0.131	$ -19,396	
R5-22	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

TABLE B-19 (CONTINUED)
BERM WIDTH OPTIMIZATION MINIMUM

Model Reach	Damage Reduction Minimum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Minimum	Summed Net Benefits Minimum
R5-24	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-25	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-26	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-27	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-28	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-29	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
R5-30	$ 45,922	$ 2,564	$ -32,848	$ 35,413	$ 385,009	$ 21,498	1.647	$ 13,914	
R5-31	$ 209,721	$ 11,710	$ -33,879	$ 45,589	$ 382,832	$ 21,377	2.133	$ 24,212	
R5-32	$ 1,337,460	$ 74,681	$ -61,892	$ 136,573	$ 453,964	$ 25,348	5.388	$ 111,225	
R5-33	$ 493,839	$ 27,575	$ -62,530	$ 90,105	$ 472,323	$ 26,374	3.417	$ 63,732	
R5-34	$ 208,706	$ 11,654	$ -53,740	$ 65,394	$ 475,927	$ 26,575	2.461	$ 38,819	
R5-35	$ 320,502	$ 17,896	$ -52,782	$ 70,678	$ 459,083	$ 25,634	2.757	$ 45,044	
R5-36	$ 1,577,668	$ 88,094	$ -56,472	$ 144,566	$ 435,732	$ 24,330	5.942	$ 120,236	
R5-37	$ 216,881	$ 12,110	$ -80,647	$ 92,758	$ 472,679	$ 26,393	3.514	$ 66,364	
R5-38	$ 503,723	$ 28,127	$ -94,528	$ 122,654	$ 503,394	$ 28,109	4.364	$ 94,546	
R5-39	$ 98,521	$ 5,501	$ -98,750	$ 104,251	$ 473,313	$ 26,429	3.945	$ 77,822	
R5-40	$ 4,536	$ 253	$ -49,625	$ 49,879	$ 392,403	$ 21,911	2.276	$ 27,968	
R5-41	$ 11,686	$ 653	$ -44,843	$ 45,495	$ 385,290	$ 21,514	2.115	$ 23,981	
R5-42	$ 4,836	$ 270	$ -30,127	$ 30,397	$ 381,023	$ 21,276	1.429	$ 9,122	
R5-43	$ 7,069	$ 395	$ -18,731	$ 19,126	$ 362,725	$ 20,254	0.944	$ -1,128	
R5-44	$ -2,515	$ -140	$ -5,603	$ 5,462	$ 353,716	$ 19,751	0.277	$ -14,288	
R5-45	$ 8,139	$ 454	$ 263	$ 454	$ 338,398	$ 18,895	0.024	$ -18,441	
R5-46	$ 126,084	$ 7,040	$ 7,328	$ 7,040	$ 340,711	$ 19,025	0.370	$ -11,984	
R5-47	$ 311,781	$ 17,409	$ 982	$ 17,409	$ 366,202	$ 20,448	0.851	$ -3,039	
R5-48	$ 4,488	$ 251	$ 2,299	$ 251	$ 318,501	$ 17,785	0.014	$ -17,534	
R5-49	$ -5,228	$ -292	$ -12,232	$ 11,940	$ 374,206	$ 20,895	0.571	$ -8,955	
R5-50	$ 3,368	$ 188	$ -18,968	$ 19,156	$ 421,657	$ 23,545	0.814	$ -4,389	
R5-51	$ 11,951	$ 667	$ -28,941	$ 29,608	$ 385,630	$ 21,533	1.375	$ 8,075	$ 645,301

TABLE B-20
SMALL BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Small	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Small	Summed Net Benefits Small
R1-1	$ 9,176	$ 512	$ 54,795	$ 512	$ 1,015,253	$ 56,690	0.009	$ -56,177	
R1-2	$ 3,314	$ 185	$ 49,622	$ 185	$ 948,708	$ 52,974	0.003	$ -52,789	
R1-3	$ 11,797	$ 659	$ 37,527	$ 659	$ 904,743	$ 50,519	0.013	$ -49,860	
R1-4	$ 17,026	$ 951	$ 27,756	$ 951	$ 880,934	$ 49,190	0.019	$ -48,239	
R1-5	$ 4,287	$ 239	$ 22,870	$ 239	$ 946,723	$ 52,863	0.005	$ -52,624	
R1-6	$ 14,393	$ 804	$ 6,771	$ 804	$ 973,586	$ 54,363	0.015	$ -53,559	
R1-7	$ 13,135	$ 733	$ 442	$ 733	$ 948,920	$ 52,986	0.014	$ -52,252	
R1-8	$ 9,594	$ 536	$ 1,159	$ 536	$ 1,000,692	$ 55,877	0.010	$ -55,341	
R1-9	$ 51,309	$ 2,865	$ 2,015	$ 2,865	$ 952,453	$ 53,183	0.054	$ -50,318	
R1-10	$ 77,136	$ 4,307	$ 6,219	$ 4,307	$ 888,389	$ 49,606	0.087	$ -45,299	
R1-11	$ 1,432,725	$ 80,001	$ 8,692	$ 80,001	$ 938,330	$ 52,395	1.527	$ 27,606	
R1-12	$ 56,458	$ 3,152	$ 3,758	$ 3,152	$ 983,136	$ 54,896	0.057	$ -51,744	
R1-13	$ 2,680,629	$ 149,681	$ -58	$ 149,739	$ 977,628	$ 54,589	2.743	$ 95,151	
R1-14	$ 1,783,427	$ 99,583	$ -7,413	$ 106,996	$ 1,020,682	$ 56,993	1.877	$ 50,003	
R1-15	$ 3,219,894	$ 179,793	$ -8,068	$ 187,861	$ 1,094,204	$ 61,098	3.075	$ 126,762	
R1-16	$ 2,055,151	$ 114,756	$ -11,001	$ 125,756	$ 1,113,819	$ 62,194	2.022	$ 63,563	**$ 311,341**
R1-17	$ 24,693	$ 1,379	$ -11,198	$ 12,577	$ 1,204,398	$ 67,251	0.187	$ -54,675	
R1-18	$ 53,453	$ 2,985	$ -12,742	$ 15,727	$ 1,231,009	$ 68,737	0.229	$ -53,010	
R1-19	$ 91,785	$ 5,125	$ -5,695	$ 10,820	$ 1,146,340	$ 64,009	0.169	$ -53,190	
R1-20	$ 126,344	$ 7,055	$ 8,438	$ 7,055	$ 1,035,242	$ 57,806	0.122	$ -50,751	
R1-21	$ -34	$ -2	$ 9,080	$ -2	$ 904,277	$ 50,493	-0.000	$ -50,495	
R1-22	$ 40,372	$ 2,254	$ 21,487	$ 2,254	$ 925,028	$ 51,652	0.044	$ -49,398	
R1-23	$ 3,013	$ 168	$ 36,478	$ 168	$ 989,278	$ 55,239	0.003	$ -55,071	
R1-24	$ 82,307	$ 4,596	$ 41,072	$ 4,596	$ 879,424	$ 49,105	0.094	$ -44,509	
R2-1	-	-	-	-	-	-	-	-	
R2-2	-	-	-	-	-	-	-	-	
R2-3	-	-	-	-	-	-	-	-	
R2-4	-	-	-	-	-	-	-	-	
R2-5	-	-	-	-	-	-	-	-	
R2-6	-	-	-	-	-	-	-	-	
R2-7	-	-	-	-	-	-	-	-	
R3-1	$ 152,810	$ 8,533	$ 20,806	$ 8,533	$ 701,247	$ 39,156	0.218	$ -30,624	
R3-2	$ 1,755,660	$ 98,033	$ 19,994	$ 98,033	$ 588,113	$ 32,839	2.985	$ 65,194	
R3-3	$ 158,305	$ 8,839	$ 20,424	$ 8,839	$ 580,848	$ 32,433	0.273	$ -23,594	
R3-4	$ 5,926	$ 331	$ 25,555	$ 331	$ 866,059	$ 48,359	0.007	$ -48,028	
R3-5	$ 49,758	$ 2,778	$ 21,080	$ 2,778	$ 956,547	$ 53,412	0.052	$ -50,633	
R3-6	$ 51,714	$ 2,888	$ 15,383	$ 2,888	$ 1,026,222	$ 57,302	0.050	$ -54,415	
R3-7	$ 1,258,860	$ 70,292	$ 4,993	$ 70,292	$ 1,019,942	$ 56,952	1.234	$ 13,341	
R3-8	$ 6,281,693	$ 350,758	$ -14,815	$ 365,572	$ 644,847	$ 36,007	10.153	$ 329,565	
R3-9	$ 468,968	$ 26,186	$ -17,079	$ 43,265	$ 623,166	$ 34,796	1.243	$ 8,469	
R3-10	$ 3,037,964	$ 169,634	$ -21,371	$ 191,006	$ 631,892	$ 35,284	5.413	$ 155,722	
R3-11	$ 688,435	$ 38,441	$ -23,863	$ 62,304	$ 625,019	$ 34,900	1.785	$ 27,404	
R3-12	$ 1,716,647	$ 95,854	$ -37,589	$ 133,443	$ 599,084	$ 33,452	3.989	$ 99,991	
R3-13	$ 135,826	$ 7,584	$ -44,608	$ 52,192	$ 604,537	$ 33,756	1.546	$ 18,436	

TABLE B-20 (CONTINUED)
SMALL BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Small	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Small	Summed Net Benefits Small
R3-14	$ 1,115,521	$ 62,289	$ -77,674	$ 139,962	$ 826,607	$ 46,156	3.032	$ 93,806	
R3-15	$ 7,229	$ 404	$ -67,602	$ 68,006	$ 661,119	$ 36,916	1.842	$ 31,090	
R3-16	$ 17	$ 1	$ -52,660	$ 52,661	$ 461,502	$ 25,769	2.044	$ 26,892	
R3-17	$ 90,784	$ 5,069	$ -83,305	$ 88,375	$ 658,922	$ 36,793	2.402	$ 51,582	
R3-18	$ 247,257	$ 13,806	$ -86,928	$ 100,734	$ 681,852	$ 38,073	2.646	$ 62,661	
R3-19	$ 215,887	$ 12,055	$ -82,277	$ 94,331	$ 664,039	$ 37,079	2.544	$ 57,253	
R3-20	$ 3,513,631	$ 196,194	$ -79,875	$ 276,069	$ 656,271	$ 36,645	7.534	$ 239,424	
R3-21	$ 995,982	$ 55,614	$ -77,993	$ 133,607	$ 653,170	$ 36,472	3.663	$ 97,135	
R3-22	$ 304,502	$ 17,003	$ -67,797	$ 84,800	$ 614,639	$ 34,320	2.471	$ 50,480	
R3-23	$ 211,931	$ 11,834	$ -53,371	$ 65,204	$ 530,014	$ 29,595	2.203	$ 35,609	**$ 1,287,383**
R3-24	$ -626	$ -35	$ -45,450	$ 45,415	$ -99,376	$ -5,549	-8.184	$ 50,964	
R3-25	$ -153	$ -9	$ -32,621	$ 32,612	$ -107,041	$ -5,977	-5.456	$ 38,589	
R3-26	$ -	$ -	$ -26,720	$ 26,720	$ -	$ -	-	$ 26,720	
R4-1	$ 104,716	$ 5,847	$ -54,395	$ 60,242	$ 693,703	$ 38,735	1.555	$ 21,507	
R4-2	$ 430,906	$ 24,061	$ -45,920	$ 69,981	$ 710,659	$ 39,682	1.764	$ 30,299	
R4-3	$ -	$ -	$ 3,747	$ -	$ 99,491	$ 5,555	-	$ -5,555	
R4-4	$ -	$ -	$ 7,991	$ -	$ 95,704	$ 5,344	-	$ -5,344	
R4-5	$ 46,487	$ 2,596	$ -21,731	$ 24,327	$ 623,914	$ 34,838	0.698	$ -10,511	
R4-6	$ 4,422	$ 247	$ 6,739	$ 247	$ 138,232	$ 7,719	0.032	$ -7,472	**$ 22,924**
R4-7	$ -	$ -	$ -8,323	$ 8,323	$ -90,640	$ -5,061	-1.644	$ 13,384	
R4-8	$ -	$ -	$ -87,751	$ 87,751	$ -	$ -	-	$ 87,751	
R4-9	$ -	$ -	$ -153,875	$ 153,875	$ -	$ -	-	$ 153,875	
R5-1	$ 59,809	$ 3,340	$ -100,250	$ 103,589	$ 787,654	$ 43,981	2.355	$ 59,608	
R5-2	$ 19,219	$ 1,073	$ -70,377	$ 71,450	$ 780,370	$ 43,574	1.640	$ 27,876	
R5-3	$ 17,377	$ 970	$ -38,155	$ 39,125	$ 783,145	$ 43,729	0.895	$ -4,604	
R5-4	$ 25,904	$ 1,446	$ -11,323	$ 12,769	$ 966,043	$ 53,942	0.237	$ -41,173	
R5-5	$ 74,100	$ 4,138	$ 11,365	$ 4,138	$ 727,985	$ 40,649	0.102	$ -36,512	
R5-6	$ 2,631,049	$ 146,913	$ -30,953	$ 177,866	$ 877,129	$ 48,977	3.632	$ 128,889	
R5-7	$ 3,646,101	$ 203,591	$ -38,120	$ 241,712	$ 854,230	$ 47,699	5.067	$ 194,013	
R5-8	$ 1,520,880	$ 84,923	$ -27,503	$ 112,426	$ 814,236	$ 45,465	2.473	$ 66,960	
R5-9	$ 26,646	$ 1,488	$ -15,659	$ 17,147	$ 1,406,397	$ 78,530	0.218	$ -61,383	
R5-10	$ 34,915	$ 1,950	$ -17,915	$ 19,865	$ 755,797	$ 42,202	0.471	$ -22,337	
R5-11	$ 141,856	$ 7,921	$ -19,644	$ 27,565	$ 763,795	$ 42,649	0.646	$ -15,084	
R5-12	$ 72,145	$ 4,028	$ -18,787	$ 22,815	$ 757,088	$ 42,274	0.540	$ -19,459	
R5-13	$ 86,268	$ 4,817	$ -19,733	$ 24,550	$ 757,425	$ 42,293	0.580	$ -17,743	
R5-14	$ 47,336	$ 2,643	$ -17,799	$ 20,442	$ 747,504	$ 41,739	0.490	$ -21,297	
R5-15	$ 32,476	$ 1,813	$ -24,219	$ 26,033	$ 761,324	$ 42,511	0.612	$ -16,478	
R5-16	$ 170,919	$ 9,544	$ -24,757	$ 34,301	$ 778,288	$ 43,458	0.789	$ -9,157	
R5-17	$ 18,900	$ 1,055	$ -13,221	$ 14,277	$ 668,898	$ 37,350	0.382	$ -23,073	
R5-18	$ 102,312	$ 5,713	$ -24,149	$ 29,862	$ 753,492	$ 42,074	0.710	$ -12,212	**$ 176,833**
R5-19	$ 140,173	$ 7,827	$ -2,901	$ 10,728	$ 697,446	$ 38,944	0.275	$ -28,216	
R5-20	$ 51,526	$ 2,877	$ 184	$ 2,877	$ 750,127	$ 41,886	0.069	$ -39,008	
R5-21	$ 43,232	$ 2,414	$ -554	$ 2,968	$ 821,592	$ 45,876	0.065	$ -42,908	
R5-22	-	-	-	-	-	-	-	-	

TABLE B-20 (CONTINUED)
SMALL BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Small	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Small	Summed Net Benefits Small
R5-23	-	-	-	-	-	-	-	-	
R5-24	-	-	-	-	-	-	-	-	
R5-25	-	-	-	-	-	-	-	-	
R5-26	-	-	-	-	-	-	-	-	
R5-27	-	-	-	-	-	-	-	-	
R5-28	-	-	-	-	-	-	-	-	
R5-29	-	-	-	-	-	-	-	-	
R5-30	$ 46,546	$ 2,599	$ -32,848	$ 35,447	$ 769,230	$ 42,952	0.825	$ -7,505	
R5-31	$ 209,791	$ 11,714	$ -33,879	$ 45,593	$ 764,591	$ 42,693	1.068	$ 2,900	
R5-32	$ 1,315,226	$ 73,440	$ -61,892	$ 135,332	$ 808,247	$ 45,131	2.999	$ 90,201	
R5-33	$ 487,339	$ 27,212	$ -62,530	$ 89,743	$ 841,029	$ 46,961	1.911	$ 42,781	
R5-34	$ 206,178	$ 11,513	$ -53,740	$ 65,252	$ 846,053	$ 47,242	1.381	$ 18,010	
R5-35	$ 317,192	$ 17,711	$ -52,782	$ 70,494	$ 816,666	$ 45,601	1.546	$ 24,892	
R5-36	$ 1,567,713	$ 87,538	$ -56,472	$ 144,010	$ 773,572	$ 43,195	3.334	$ 100,815	
R5-37	$ 214,192	$ 11,960	$ -80,647	$ 92,607	$ 838,153	$ 46,801	1.979	$ 45,807	
R5-38	$ 496,364	$ 27,716	$ -94,528	$ 122,243	$ 895,096	$ 49,980	2.446	$ 72,263	
R5-39	$ 97,773	$ 5,459	$ -98,750	$ 104,209	$ 839,227	$ 46,861	2.224	$ 57,348	
R5-40	$ 4,540	$ 254	$ -49,625	$ 49,879	$ 772,429	$ 43,131	1.156	$ 6,748	
R5-41	$ 11,686	$ 653	$ -44,843	$ 45,495	$ 761,534	$ 42,523	1.070	$ 2,973	
R5-42	$ 4,836	$ 270	$ -30,127	$ 30,397	$ 766,785	$ 42,816	0.710	$ -12,419	
R5-43	$ 7,083	$ 396	$ -18,731	$ 19,127	$ 739,402	$ 41,287	0.463	$ -22,160	
R5-44	$ -2,515	$ -140	$ -5,603	$ 5,462	$ 730,588	$ 40,795	0.134	$ -35,332	
R5-45	$ 8,139	$ 454	$ 263	$ 454	$ 704,259	$ 39,324	0.012	$ -38,870	
R5-46	$ 126,175	$ 7,045	$ 7,328	$ 7,045	$ 709,016	$ 39,590	0.178	$ -32,545	
R5-47	$ 312,126	$ 17,428	$ 982	$ 17,428	$ 755,623	$ 42,193	0.413	$ -24,764	
R5-48	$ 4,488	$ 251	$ 2,299	$ 251	$ 713,208	$ 39,824	0.006	$ -39,574	
R5-49	$ -5,228	$ -292	$ -12,232	$ 11,940	$ 782,716	$ 43,705	0.273	$ -31,765	
R5-50	$ 3,786	$ 211	$ -18,968	$ 19,179	$ 851,822	$ 47,564	0.403	$ -28,385	
R5-51	$ 12,342	$ 689	$ -28,941	$ 29,630	$ 781,092	$ 43,615	0.679	$ -13,985	**$ 177,435**

TABLE B-21
MEDIUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Medium	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Medium	Summed Net Benefits Medium
R1-1	$10,309	$576	$54,795	$576	$1,585,115	$88,510	0.007	-$87,934	
R1-2	$3,393	$189	$49,622	$189	$1,470,574	$82,114	0.002	-$81,925	
R1-3	$12,449	$695	$37,527	$695	$1,388,648	$77,539	0.009	-$76,844	
R1-4	$17,231	$962	$27,756	$962	$1,335,347	$74,563	0.013	-$73,601	
R1-5	$4,439	$248	$22,870	$248	$1,427,171	$79,690	0.003	-$79,443	
R1-6	$14,587	$815	$6,771	$815	$1,448,675	$80,891	0.010	-$80,077	
R1-7	$13,135	$733	$442	$733	$1,403,660	$78,378	0.009	-$77,644	
R1-8	$9,778	$546	$1,159	$546	$1,481,528	$82,726	0.007	-$82,180	
R1-9	$52,220	$2,916	$2,015	$2,916	$1,408,126	$78,627	0.037	-$75,711	
R1-10	$79,279	$4,427	$6,219	$4,427	$1,319,661	$73,687	0.060	-$69,261	
R1-11	$1,432,775	$80,003	$8,692	$80,003	$1,397,684	$78,044	1.025	$1,959	
R1-12	$56,614	$3,161	$3,758	$3,161	$1,457,664	$81,393	0.039	-$78,232	
R1-13	$2,691,015	$150,261	-$58	$150,319	$1,443,421	$80,598	1.865	$69,721	
R1-14	$1,783,738	$99,600	-$7,413	$107,014	$1,497,103	$83,595	1.280	$23,418	
R1-15	$3,211,165	$179,305	-$8,068	$187,373	$1,516,990	$84,706	2.212	$102,667	
R1-16	$2,063,909	$115,245	-$11,001	$126,245	$1,551,061	$86,608	1.458	$39,637	**$159,172**
R1-17	$23,555	$1,315	-$11,198	$12,513	$1,677,084	$93,645	0.134	-$81,132	
R1-18	$18,354	$1,025	-$12,742	$13,767	$1,713,788	$95,695	0.144	-$81,927	
R1-19	$92,392	$5,159	-$5,695	$10,854	$1,597,008	$89,174	0.122	-$78,320	
R1-20	$127,491	$7,119	$8,438	$7,119	$1,443,702	$80,614	0.088	-$73,495	
R1-21	-$34	-$2	$9,080	-$2	$1,345,694	$75,141	-0.000	-$75,143	
R1-22	$41,537	$2,319	$21,487	$2,319	$1,397,060	$78,009	0.030	-$75,690	
R1-23	$3,040	$170	$36,478	$170	$1,522,279	$85,001	0.002	-$84,831	
R1-24	$82,344	$4,598	$41,072	$4,598	$1,340,748	$74,865	0.061	-$70,267	
R2-1	-	-	-	-	-	-	-	-	
R2-2	-	-	-	-	-	-	-	-	
R2-3	-	-	-	-	-	-	-	-	
R2-4	-	-	-	-	-	-	-	-	
R2-5	-	-	-	-	-	-	-	-	
R2-6	-	-	-	-	-	-	-	-	
R2-7	-	-	-	-	-	-	-	-	
R3-1	$156,951	$8,764	$20,806	$8,764	$1,177,095	$65,727	0.133	-$56,963	
R3-2	$1,806,978	$100,898	$19,994	$100,898	$1,011,762	$56,495	1.786	$44,403	
R3-3	$162,447	$9,071	$20,424	$9,071	$1,007,524	$56,258	0.161	-$47,187	
R3-4	$5,955	$333	$25,555	$333	$1,304,791	$72,857	0.005	-$72,525	
R3-5	$49,724	$2,776	$21,080	$2,776	$1,432,849	$80,008	0.035	-$77,231	
R3-6	$54,941	$3,068	$15,383	$3,068	$1,528,578	$85,353	0.036	-$82,285	
R3-7	$1,296,393	$72,388	$4,993	$72,388	$1,507,226	$84,161	0.860	-$11,773	
R3-8	$6,289,117	$351,172	-$14,815	$365,987	$1,088,835	$60,798	6.020	$305,188	
R3-9	$479,887	$26,796	-$17,079	$43,875	$1,050,590	$58,663	0.748	-$14,788	
R3-10	$3,328,224	$185,842	-$21,371	$207,213	$1,057,204	$59,032	3.510	$148,181	
R3-11	$721,598	$40,293	-$23,863	$64,156	$1,036,322	$57,866	1.109	$6,289	
R3-12	$1,915,343	$106,949	-$37,589	$144,538	$995,527	$55,588	2.600	$88,950	
R3-13	$137,873	$7,699	-$44,608	$52,306	$998,387	$55,748	0.938	-$3,442	

TABLE B-21 (CONTINUED)
MEDIUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Medium	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Medium	Summed Net Benefits Medium
R3-14	$1,126,723	$62,914	-$77,674	$140,588	$1,355,326	$75,679	1.858	$64,909	
R3-15	$7,229	$404	-$67,602	$68,006	$1,075,196	$60,037	1.133	$7,969	
R3-16	$17	$1	-$52,660	$52,661	$743,931	$41,540	1.268	$11,122	
R3-17	$93,353	$5,213	-$83,305	$88,518	$1,050,443	$58,655	1.509	$29,863	
R3-18	$255,578	$14,271	-$86,928	$101,199	$1,078,613	$60,228	1.680	$40,971	
R3-19	$217,733	$12,158	-$82,277	$94,434	$1,060,681	$59,226	1.594	$35,208	
R3-20	$3,515,078	$196,275	-$79,875	$276,150	$1,049,099	$58,580	4.714	$217,570	
R3-21	$1,030,080	$57,518	-$77,993	$135,511	$1,050,589	$58,663	2.310	$76,848	
R3-22	$312,382	$17,443	-$67,797	$85,240	$991,818	$55,381	1.539	$29,859	
R3-23	$217,045	$12,119	-$53,371	$65,490	$861,084	$48,081	1.362	$17,409	**$815,509**
R3-24	-$626	-$35	-$45,450	$45,415	-$99,396	-$5,550	-8.183	$50,965	
R3-25	-$153	-$9	-$32,621	$32,612	-$107,051	-$5,978	(5.456	$38,590	
R3-26	$0	$0	-$26,720	$26,720	$0	$0	-	$26,720	
R4-1	$101,999	$5,695	-$54,395	$60,090	$1,145,680	$63,973	0.939	-$3,882	
R4-2	$418,257	$23,355	-$45,920	$69,275	$1,182,108	$66,007	1.050	$3,268	
R4-3	$0	$0	$3,747	$0	$441,076	$24,629	-	-$24,629	
R4-4	$0	$0	$7,991	$0	$417,647	$23,321	-	-$23,321	
R4-5	$46,548	$2,599	-$21,731	$24,330	$1,041,718	$58,167	0.418	-$33,837	
R4-6	$4,422	$247	$6,739	$247	$630,047	$35,181	0.007	-$34,934	**-$117,334**
R4-7	-	-	-	-	-	-	-	-	
R4-8	-	-	-	-	-	-	-	-	
R4-9	-	-	-	-	-	-	-	-	
R5-1	$59,591	$3,327	-$100,250	$103,577	$1,198,561	$66,925	1.548	$36,652	
R5-2	$19,416	$1,084	-$70,377	$71,461	$1,195,167	$66,736	1.071	$4,725	
R5-3	$17,381	$971	-$38,155	$39,126	$1,209,309	$67,525	0.579	-$28,400	
R5-4	$25,665	$1,433	-$11,323	$12,756	$1,504,034	$83,982	0.152	-$71,227	
R5-5	$74,321	$4,150	$11,365	$4,150	$1,152,305	$64,342	0.064	-$60,193	
R5-6	$2,619,573	$146,272	-$30,953	$177,225	$1,320,684	$73,744	2.403	$103,481	
R5-7	$3,639,343	$203,214	-$38,120	$241,334	$1,286,996	$71,863	3.358	$169,471	
R5-8	$1,512,868	$84,476	-$27,503	$111,978	$1,228,020	$68,570	1.633	$43,408	
R5-9	$25,972	$1,450	-$15,659	$17,109	$1,178,196	$65,788	0.260	-$48,679	
R5-10	$35,536	$1,984	-$17,915	$19,899	$1,161,017	$64,829	0.307	-$44,930	
R5-11	$160,038	$8,936	-$19,644	$28,580	$1,174,535	$65,584	0.436	-$37,004	
R5-12	$73,154	$4,085	-$18,787	$22,871	$1,166,462	$65,133	0.351	-$42,262	
R5-13	$86,268	$4,817	-$19,733	$24,550	$1,166,039	$65,109	0.377	-$40,559	
R5-14	$47,431	$2,648	-$17,799	$20,448	$1,150,395	$64,236	0.318	-$43,788	
R5-15	$32,605	$1,821	-$24,219	$26,040	$1,166,474	$65,134	0.400	-$39,094	
R5-16	$170,973	$9,547	-$24,757	$34,304	$1,192,336	$66,578	0.515	-$32,274	
R5-17	$19,071	$1,065	-$13,221	$14,286	$1,043,715	$58,279	0.245	-$43,993	
R5-18	$102,784	$5,739	-$24,149	$29,888	$1,150,078	$64,218	0.465	-$34,330	**-$208,993**
R5-19	$146,130	$8,160	-$2,901	$11,061	$1,100,401	$61,444	0.180	-$50,383	
R5-20	$52,076	$2,908	$184	$2,908	$1,164,980	$65,050	0.045	-$62,142	
R5-21	$43,783	$2,445	-$554	$2,998	$1,268,615	$70,837	0.042	-$67,839	

TABLE B-21 (CONTINUED)
MEDIUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Medium	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Medium	Summed Net Benefits Medium
R5-22	-	-	-	-	-	-	-	-	
R5-23	-	-	-	-	-	-	-	-	
R5-24	-	-	-	-	-	-	-	-	
R5-25	-	-	-	-	-	-	-	-	
R5-26	-	-	-	-	-	-	-	-	
R5-27	-	-	-	-	-	-	-	-	
R5-28	-	-	-	-	-	-	-	-	
R5-29	-	-	-	-	-	-	-	-	
R5-30	$47,012	$2,625	-$32,848	$35,473	$1,173,724	$65,538	0.541	-$30,065	
R5-31	$209,791	$11,714	-$33,879	$45,593	$1,165,878	$65,100	0.700	-$19,507	
R5-32	$1,309,143	$73,100	-$61,892	$134,992	$1,197,146	$66,846	2.019	$68,146	
R5-33	$485,176	$27,091	-$62,530	$89,622	$1,245,693	$69,557	1.288	$20,065	
R5-34	$205,399	$11,469	-$53,740	$65,209	$1,255,449	$70,102	0.930	-$4,893	
R5-35	$315,610	$17,623	-$52,782	$70,405	$1,210,541	$67,594	1.042	$2,811	
R5-36	$1,557,481	$86,967	-$56,472	$143,439	$1,143,984	$63,878	2.246	$79,561	
R5-37	$212,598	$11,871	-$80,647	$92,518	$1,238,610	$69,162	1.338	$23,357	
R5-38	$492,803	$27,517	-$94,528	$122,045	$1,323,893	$73,924	1.651	$48,121	
R5-39	$96,564	$5,392	-$98,750	$104,141	$1,239,818	$69,229	1.504	$34,912	
R5-40	$4,436	$248	-$49,625	$49,873	$1,164,996	$65,051	0.767	-$15,178	
R5-41	$11,110	$620	-$44,843	$45,463	$1,149,689	$64,196	0.708	-$18,733	
R5-42	$4,494	$251	-$30,127	$30,378	$1,158,034	$64,662	0.470	-$34,284	
R5-43	$6,658	$372	-$18,731	$19,103	$1,122,922	$62,702	0.305	-$43,599	
R5-44	-$2,515	-$140	-$5,603	$5,462	$1,112,408	$62,115	0.088	-$56,652	
R5-45	$8,139	$454	$263	$454	$1,072,186	$59,869	0.008	-$59,414	
R5-46	$122,651	$6,849	$7,328	$6,849	$1,089,110	$60,814	0.113	-$53,965	
R5-47	$307,357	$17,162	$982	$17,162	$1,149,106	$64,164	0.267	-$47,002	
R5-48	$4,116	$230	$2,299	$230	$1,112,680	$62,130	0.004	-$61,900	
R5-49	-$5,228	-$292	-$12,232	$11,940	$1,205,108	$67,291	0.177	-$55,351	
R5-50	$3,805	$212	-$18,968	$19,180	$1,291,714	$72,127	0.266	-$52,947	
R5-51	$12,271	$685	-$28,941	$29,626	$1,184,685	$66,151	0.448	-$36,525	**-$313,043**

TABLE B-22
MAXIMUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Maximum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Maximum	Summed Net Benefits Maximum
R1-1	$10,762	$601	$54,795	$601	$2,134,999	$119,214	0.005	-$118,613	
R1-2	$3,432	$192	$49,622	$192	$1,967,387	$109,855	0.002	-$109,663	
R1-3	$12,629	$705	$37,527	$705	$1,845,597	$103,055	0.007	-$102,349	
R1-4	$17,325	$967	$27,756	$967	$1,774,179	$99,067	0.010	-$98,099	
R1-5	$4,474	$250	$22,870	$250	$1,889,553	$105,509	0.002	-$105,259	
R1-6	$14,700	$821	$6,771	$821	$1,902,621	$106,239	0.008	-$105,418	
R1-7	$13,135	$733	$442	$733	$1,837,455	$102,600	0.007	-$101,867	
R1-8	$9,823	$549	$1,159	$549	$1,939,851	$108,318	0.005	-$107,769	
R1-9	$52,475	$2,930	$2,015	$2,930	$1,842,605	$102,888	0.028	-$99,957	
R1-10	$80,208	$4,479	$6,219	$4,479	$1,727,641	$96,468	0.046	-$91,989	
R1-11	$1,432,785	$80,004	$8,692	$80,004	$1,827,729	$102,057	0.784	-$22,053	
R1-12	$56,670	$3,164	$3,758	$3,164	$1,904,588	$106,349	0.030	-$103,184	
R1-13	$2,691,068	$150,264	-$58	$150,322	$1,883,895	$105,193	1.429	$45,129	
R1-14	$1,783,823	$99,605	-$7,413	$107,018	$1,941,226	$108,394	0.987	-$1,376	
R1-15	$3,218,199	$179,698	-$8,068	$187,766	$1,938,980	$108,269	1.734	$79,497	
R1-16	$2,062,817	$115,184	-$11,001	$126,184	$1,983,231	$110,740	1.139	$15,445	$13,458
R1-17	$23,718	$1,324	-$11,198	$12,522	$2,148,197	$119,951	0.104	-$107,429	
R1-18	-$20,081	-$1,121	-$12,742	$11,621	$2,188,694	$122,212	0.095	-$110,591	
R1-19	$92,307	$5,154	-$5,695	$10,849	$2,042,219	$114,034	0.095	-$103,185	
R1-20	$128,005	$7,148	$8,438	$7,148	$1,853,636	$103,503	0.069	-$96,356	
R1-21	-$34	-$2	$9,080	-$2	$1,754,450	$97,965	-0.000	-$97,967	
R1-22	$41,974	$2,344	$21,487	$2,344	$1,846,677	$103,115	0.023	-$100,771	
R1-23	$3,053	$170	$36,478	$170	$2,026,061	$113,131	0.002	-$112,961	
R1-24	$82,352	$4,598	$41,072	$4,598	$1,781,496	$99,475	0.046	-$94,877	
R2-1	-	-	-	-	-	-	-	-	
R2-2	-	-	-	-	-	-	-	-	
R2-3	-	-	-	-	-	-	-	-	
R2-4	-	-	-	-	-	-	-	-	
R2-5	-	-	-	-	-	-	-	-	
R2-6	-	-	-	-	-	-	-	-	
R2-7	-	-	-	-	-	-	-	-	
R3-1	$157,105	$8,772	$20,806	$8,772	$1,694,786	$94,634	0.093	-$85,861	
R3-2	$1,804,751	$100,774	$19,994	$100,774	$1,451,670	$81,058	1.243	$19,715	
R3-3	$162,114	$9,052	$20,424	$9,052	$1,445,742	$80,727	0.112	-$71,675	
R3-4	$5,962	$333	$25,555	$333	$1,738,807	$97,092	0.003	-$96,759	
R3-5	$49,500	$2,764	$21,080	$2,764	$1,905,124	$106,378	0.026	-$103,614	
R3-6	$55,445	$3,096	$15,383	$3,096	$2,024,200	$113,027	0.027	-$109,932	
R3-7	$1,277,146	$71,313	$4,993	$71,313	$1,994,040	$111,343	0.640	-$40,030	
R3-8	$6,282,344	$350,794	-$14,815	$365,609	$1,542,687	$86,141	4.244	$279,468	
R3-9	$476,518	$26,608	-$17,079	$43,687	$1,482,119	$82,759	0.528	-$39,072	
R3-10	$3,298,864	$184,202	-$21,371	$205,574	$1,496,756	$83,576	2.460	$121,998	
R3-11	$712,559	$39,788	-$23,863	$63,651	$1,467,622	$81,949	0.777	-$18,298	
R3-12	$1,881,447	$105,056	-$37,589	$142,645	$1,414,410	$78,978	1.806	$63,667	
R3-13	$136,627	$7,629	-$44,608	$52,237	$1,414,466	$78,981	0.661	-$26,744	

TABLE B-22 (CONTINUED)
MAXIMUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Maximum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Maximum	Summed Net Benefits Maximum
R3-14	$1,123,117	$62,713	-$77,674	$140,386	$1,912,906	$106,813	1.314	$33,574	
R3-15	$7,229	$404	-$67,602	$68,006	$1,515,538	$84,625	0.804	-$16,619	
R3-16	$17	$1	-$52,660	$52,661	$1,047,787	$58,506	0.900	-$5,845	
R3-17	$92,551	$5,168	-$83,305	$88,473	$1,465,190	$81,813	1.081	$6,660	
R3-18	$254,696	$14,222	-$86,928	$101,149	$1,504,550	$84,011	1.204	$17,138	
R3-19	$217,430	$12,141	-$82,277	$94,417	$1,484,583	$82,896	1.139	$11,521	
R3-20	$3,511,646	$196,084	-$79,875	$275,958	$1,468,553	$82,001	3.365	$193,957	
R3-21	$1,031,007	$57,569	-$77,993	$135,562	$1,466,275	$81,874	1.656	$53,688	
R3-22	$312,466	$17,447	-$67,797	$85,245	$1,385,542	$77,366	1.102	$7,879	
R3-23	$216,781	$12,105	-$53,371	$65,475	$1,205,636	$67,320	0.973	-$1,845	**$26**
R3-24	-$626	-$35	-$45,450	$45,415	-$99,388	-$5,550	-8.183	$50,965	
R3-25	-$153	-$9	-$32,621	$32,612	-$107,028	-$5,976	-5.457	$38,588	
R3-26	$0	$0	-$26,720	$26,720	$0	$0	-	$26,720	
R4-1	$101,728	$5,680	-$54,395	$60,075	$1,118,155	$62,436	0.962	-$2,360	
R4-2	$418,852	$23,388	-$45,920	$69,308	$1,153,386	$64,403	1.076	$4,905	
R4-3	$0	$0	$3,747	$0	$433,890	$24,228	-	-$24,228	
R4-4	$0	$0	$7,991	$0	$409,776	$22,881	-	-$22,881	
R4-5	$46,432	$2,593	-$21,731	$24,324	$1,013,088	$56,569	0.430	-$32,245	
R4-6	$4,422	$247	$6,739	$247		$0	-	$247	**-$76,562**
R4-7	$0	$0	-$8,323	$8,323		$0	-	$8,323	
R4-8	$0	$0	-$87,751	$87,751	$0	$0	-	$87,751	
R4-9	$0	$0	-$153,875	$153,875	$0	$0	-	$153,875	
R5-1	$59,698	$3,333	-$100,250	$103,583	$1,588,869	$88,719	1.168	$14,864	
R5-2	$19,564	$1,092	-$70,377	$71,469	$1,587,894	$88,665	0.806	-$17,196	
R5-3	$17,388	$971	-$38,155	$39,126	$1,619,658	$90,439	0.433	-$51,313	
R5-4	$25,685	$1,434	-$11,323	$12,757	$2,015,645	$112,550	0.113	-$99,793	
R5-5	$74,599	$4,165	$11,365	$4,165	$1,547,617	$86,416	0.048	-$82,250	
R5-6	$2,619,442	$146,265	-$30,953	$177,218	$1,738,919	$97,098	1.825	$80,120	
R5-7	$3,639,359	$203,215	-$38,120	$241,335	$1,695,245	$94,659	2.550	$146,676	
R5-8	$1,509,989	$84,315	-$27,503	$111,818	$1,617,198	$90,301	1.238	$21,516	
R5-9	$26,021	$1,453	-$15,659	$17,112	$1,576,822	$88,047	0.194	-$70,934	
R5-10	$35,994	$2,010	-$17,915	$19,925	$1,553,803	$86,761	0.230	-$66,836	
R5-11	$170,531	$9,522	-$19,644	$29,166	$1,570,939	$87,718	0.332	-$58,552	
R5-12	$73,446	$4,101	-$18,787	$22,888	$1,561,285	$87,179	0.263	-$64,291	
R5-13	$85,424	$4,770	-$19,733	$24,503	$1,559,447	$87,076	0.281	-$62,573	
R5-14	$46,453	$2,594	-$17,799	$20,393	$1,539,123	$85,942	0.237	-$65,549	
R5-15	$31,611	$1,765	-$24,219	$25,984	$1,555,814	$86,874	0.299	-$60,889	
R5-16	$170,952	$9,546	-$24,757	$34,303	$1,588,672	$88,708	0.387	-$54,406	
R5-17	$18,616	$1,039	-$13,221	$14,261	$1,403,496	$78,369	0.182	-$64,108	
R5-18	$101,654	$5,676	-$24,149	$29,825	$1,532,922	$85,595	0.348	-$55,770	**-$611,285**
R5-19	$145,101	$8,102	-$2,901	$11,003	$1,484,754	$82,906	0.133	-$71,902	
R5-20	$50,274	$2,807	$184	$2,807	$1,553,799	$86,761	0.032	-$83,954	
R5-21	$42,671	$2,383	-$554	$2,936	$1,692,035	$94,480	0.031	-$91,544	

TABLE B-22 (CONTINUED)
MAXIMUM BERM WIDTH ALTERNATIVE

Model Reach	Damage Reduction Maximum	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Benefits	Additional Cost	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits Maximum	Summed Net Benefits Maximum
R5-22	-	-	-	-	-	-	-	-	
R5-23	-	-	-	-	-	-	-	-	
R5-24	-	-	-	-	-	-	-	-	
R5-25	-	-	-	-	-	-	-	-	
R5-26	-	-	-	-	-	-	-	-	
R5-27	-	-	-	-	-	-	-	-	
R5-28	-	-	-	-	-	-	-	-	
R5-29	-	-	-	-	-	-	-	-	
R5-30	$45,897	$2,563	-$32,848	$35,411	$1,560,078	$87,112	0.407	-$51,701	
R5-31	$208,754	$11,656	-$33,879	$45,535	$1,548,130	$86,445	0.527	-$40,910	
R5-32	$1,284,362	$71,716	-$61,892	$133,608	$1,575,770	$87,988	1.518	$45,620	
R5-33	$476,279	$26,595	-$62,530	$89,125	$1,637,718	$91,447	0.975	-$2,322	
R5-34	$200,403	$11,190	-$53,740	$64,930	$1,650,238	$92,146	0.705	-$27,216	
R5-35	$309,448	$17,279	-$52,782	$70,061	$1,591,104	$88,844	0.789	-$18,783	
R5-36	$1,525,065	$85,157	-$56,472	$141,629	$1,502,376	$83,890	1.688	$57,739	
R5-37	$209,650	$11,706	-$80,647	$92,354	$1,622,994	$90,625	1.019	$1,729	
R5-38	$484,937	$27,078	-$94,528	$121,605	$1,737,112	$96,997	1.254	$24,608	
R5-39	$95,068	$5,308	-$98,750	$104,058	$1,625,177	$90,747	1.147	$13,311	
R5-40	$4,381	$245	-$49,625	$49,870	$1,535,101	$85,717	0.582	-$35,847	
R5-41	$11,110	$620	-$44,843	$45,463	$1,517,212	$84,718	0.537	-$39,255	
R5-42	$4,494	$251	-$30,127	$30,378	$1,538,287	$85,895	0.354	-$55,517	
R5-43	$6,658	$372	-$18,731	$19,103	$1,492,780	$83,354	0.229	-$64,251	
R5-44	-$2,515	-$140	-$5,603	$5,462	$1,480,759	$82,683	0.066	-$77,220	
R5-45	$8,139	$454	$263	$454	$1,431,074	$79,908	0.006	-$79,454	
R5-46	$120,290	$6,717	$7,328	$6,717	$1,454,580	$81,221	0.083	-$74,504	
R5-47	$302,612	$16,897	$982	$16,897	$1,531,887	$85,538	0.198	-$68,640	
R5-48	$4,116	$230	$2,299	$230	$1,495,274	$83,493	0.003	-$83,263	
R5-49	-$5,228	-$292	-$12,232	$11,940	$1,607,225	$89,744	0.133	-$77,804	
R5-50	$4,010	$224	-$18,968	$19,191	$1,717,824	$95,920	0.200	-$76,728	
R5-51	$12,352	$690	-$28,941	$29,630	$1,571,982	$87,776	0.338	-$58,146	**-$788,554**

TABLE B-23
SUMMARIZED BERM WIDTH OPTIMIZATION

Model Reach	Profile	Net Benefits Zero Berm option	Net Benefits MiniMin option	Net Benefits Minimum option	Net Benefits Small Alternative	Net Benefits Medium Alternative	Net Benefits Maximum Alternative	Maximum Net Benefit Alternative
R1-1	R1P1	-$2,709.00	-$15,240.00	-$27,680.00	-$56,177.00	-$87,934.00	-$118,613.00	Zero
R1-2	R1P1	-$16,934.00	-$14,302.00	-$26,642.00	-$52,789.00	-$81,925.00	-$109,663.00	MiniMin
R1-3	R1P1	-$15,912.00	-$14,297.00	-$25,575.00	-$49,860.00	-$76,844.00	-$102,349.00	MiniMin
R1-4	R1P1	-$17,169.00	-$13,768.00	-$24,869.00	-$48,239.00	-$73,601.00	-$98,099.00	MiniMin
R1-5	R1P1	-$17,194.00	-$15,986.00	-$27,997.00	-$52,624.00	-$79,443.00	-$105,259.00	MiniMin
R1-6	R1P1	-$21,279.00	-$17,162.00	-$29,054.00	-$53,559.00	-$80,077.00	-$105,418.00	MiniMin
R1-7	R1P1	-$19,348.00	-$17,165.00	-$28,960.00	-$52,252.00	-$77,644.00	-$101,867.00	MiniMin
R1-8	R1P1	-$20,005.00	-$18,453.00	-$30,681.00	-$55,341.00	-$82,180.00	-$107,769.00	MiniMin
R1-9	R1P1	-$17,745.00	-$15,218.00	-$26,585.00	-$50,318.00	-$75,711.00	-$99,957.00	MiniMin
R1-10	R1P1	-$15,637.00	-$12,324.00	-$23,094.00	-$45,299.00	-$69,261.00	-$91,989.00	MiniMin
R1-11	R1P1	$19,424.00	$50,455.00	$50,931.00	$27,606.00	$1,959.00	-$22,053.00	Minimum
R1-12	R1P1	-$39,371.00	-$15,317.00	-$27,208.00	-$51,744.00	-$78,232.00	-$103,184.00	MiniMin
R1-13	R1P1	$152,009.00	$128,881.00	$118,899.00	$95,151.00	$69,721.00	$45,129.00	Zero
R1-14	R1P1	$71,384.00	$81,624.00	$73,887.00	$50,003.00	$23,418.00	-$1,376.00	MiniMin
R1-15	R1P2	$81,418.00	$103,975.00	$140,153.00	$126,762.00	$102,667.00	$79,497.00	Minimum
R1-16	R1P2	$151,060.00	$64,898.00	$84,330.00	$63,563.00	$39,637.00	$15,445.00	Zero
R1-17	R1P2	$609.00	-$12,613.00	-$30,920.00	-$54,675.00	-$81,132.00	-$107,429.00	Zero
R1-18	R1P2	$2,312.00	-$10,814.00	-$29,015.00	-$53,010.00	-$81,927.00	-$110,591.00	Zero
R1-19	R1P2	-$7,709.00	-$14,436.00	-$30,868.00	-$53,190.00	-$78,320.00	-$103,185.00	Zero
R1-20	R1P2	-$10,596.00	-$16,502.00	-$30,211.00	-$50,751.00	-$73,495.00	-$96,356.00	Zero
R1-21	R1P1	-$18,282.00	-$16,621.00	-$28,041.00	-$50,495.00	-$75,143.00	-$97,967.00	MiniMin
R1-22	R1P1	-$18,763.00	-$14,011.00	-$25,307.00	-$49,398.00	-$75,690.00	-$100,771.00	MiniMin
R1-23	R1P1	-$17,628.00	-$15,976.00	-$28,098.00	-$55,071.00	-$84,831.00	-$112,961.00	MiniMin
R1-24	R1P1	-$14,983.00	-$10,081.00	-$21,227.00	-$44,509.00	-$70,267.00	-$94,877.00	MiniMin
R2-1	R2P1			-	-	-	-	
R2-2	R2P1			-	-	-	-	
R2-3	R2P2			-	-	-	-	
R2-4	R2P1			-	-	-	-	
R2-5	R2P2			-	-	-	-	
R2-6	R2P1			-	-	-	-	
R2-7	R2P1			-	-	-	-	
R3-1	R3P1	-$18,443.00	-$1,683.00	-$7,847.00	-$30,624.00	-$56,963.00	-$85,861.00	MiniMin
R3-2	R3P1	$95,293.00	$80,689.00	$82,076.00	$65,194.00	$44,403.00	$19,715.00	Zero
R3-3	R3P1	-$12,988.00	$1,373.00	-$3,861.00	-$23,594.00	-$47,187.00	-$71,675.00	MiniMin
R3-4	R3P2	-$5,533.00	-$12,507.00	-$26,036.00	-$48,028.00	-$72,525.00	-$96,759.00	Zero
R3-5	R3P2	-$7,370.00	-$12,467.00	-$26,802.00	-$50,633.00	-$77,231.00	-$103,614.00	Zero
R3-6	R3P2	-$8,089.00	-$15,085.00	-$29,529.00	-$54,415.00	-$82,285.00	-$109,932.00	Zero
R3-7	R3P2	-$5,812.00	$14,967.00	$27,069.00	$13,341.00	-$11,773.00	-$40,030.00	Minimum
R3-8	R3P1	-$47,219.00	$348,140.00	$349,398.00	$329,565.00	$305,188.00	$279,468.00	Minimum
R3-9	R3P1	-$13,570.00	$33,511.00	$27,770.00	$8,469.00	-$14,788.00	-$39,072.00	MiniMin
R3-10	R3P1	$99,782.00	$142,453.00	$158,257.00	$155,722.00	$148,181.00	$121,998.00	Minimum

TABLE B-23 (CONTINUED)
SUMMARIZED BERM WIDTH OPTIMIZATION

Model Reach	Profile	Net Benefits Zero Berm option	Net Benefits MiniMin option	Net Benefits Minimum option	Net Benefits Small Alternative	Net Benefits Medium Alternative	Net Benefits Maximum Alternative	Maximum Net Benefit Alternative
R3-11	R3P1	$22,815.00	$48,406.00	$45,246.00	$27,404.00	$6,289.00	-$18,298.00	MiniMin
R3-12	R3P1	$75,233.00	$100,757.00	$109,015.00	$99,991.00	$88,950.00	$63,667.00	Minimum
R3-13	R3P1	$23,458.00	$43,174.00	$37,375.00	$18,436.00	-$3,442.00	-$26,744.00	MiniMin
R3-14	R3P1	$104,314.00	$120,721.00	$117,472.00	$93,806.00	$64,909.00	$33,574.00	MiniMin
R3-15	R3P1	$33,444.00	$57,715.00	$51,005.00	$31,090.00	$7,969.00	-$16,619.00	MiniMin
R3-16	R3P1	$27,839.00	$45,257.00	$40,537.00	$26,892.00	$11,122.00	-$5,845.00	MiniMin
R3-17	R3P1	$50,262.00	$76,524.00	$70,533.00	$51,582.00	$29,863.00	$6,660.00	MiniMin
R3-18	R3P1	$59,761.00	$87,013.00	$81,666.00	$62,661.00	$40,971.00	$17,138.00	MiniMin
R3-19	R3P1	$57,740.00	$82,904.00	$76,602.00	$57,253.00	$35,208.00	$11,521.00	MiniMin
R3-20	R3P1	$248,914.00	$254,718.00	$255,821.00	$239,424.00	$217,570.00	$193,957.00	Minimum
R3-21	R3P1	$62,984.00	$116,265.00	$113,832.00	$97,135.00	$76,848.00	$53,688.00	MiniMin
R3-22	R3P1	$11,354.00	$72,861.00	$68,137.00	$50,480.00	$29,859.00	$7,879.00	MiniMin
R3-23	R3P1	$32,201.00	$55,454.00	$51,124.00	$35,609.00	$17,409.00	-$1,845.00	MiniMin
R3-24	R3P2	-	-	-	-	-	-	
R3-25	R3P2	-	-	-	-	-	-	
R3-26	R4P1	-	-	-	-	-	-	
R4-1	R4P1	$52,965.00	$61,753.00	$43,996.00	$21,507.00	-$3,882.00	-$2,360.00	MiniMin
R4-2	R4P1	$36,942.00	$72,179.00	$54,004.00	$30,299.00	$3,268.00	$4,905.00	MiniMin
R4-3	R4P2	-$7,343.00	-$2,084.00	-$2,893.00	-$5,555.00	-$24,629.00	-$24,228.00	MiniMin
R4-4	R4P2	-$3,545.00	-$1,998.00	-$2,697.00	-$5,344.00	-$23,321.00	-$22,881.00	MiniMin
R4-5	R4P1	$19,297.00	$27,336.00	$10,216.00	-$10,511.00	-$33,837.00	-$32,245.00	MiniMin
R4-6	R4P2	-$405.00	$9,170.00	$716.00	-$7,472.00	-$34,934.00	$247.00	MiniMin
R4-7	R4P2	-	-	-	-	-	-	
R4-8	R4P1	-	-	-	-	-	-	
R4-9	R4P1	-	-	-	-	-	-	
R5-1	R5P2	$67,048.00	$94,731.00	$80,558.00	$59,608.00	$36,652.00	$14,864.00	MiniMin
R5-2	R5P2	$46,228.00	$64,042.00	$49,119.00	$27,876.00	$4,725.00	-$17,196.00	MiniMin
R5-3	R5P2	$25,179.00	$34,001.00	$17,298.00	-$4,604.00	-$28,400.00	-$51,313.00	MiniMin
R5-4	R5P2	$3,775.00	$4,464.00	-$13,621.00	-$41,173.00	-$71,227.00	-$99,793.00	MiniMin
R5-5	R5P2	-$1,148.00	-$1,789.00	-$15,536.00	-$36,512.00	-$60,193.00	-$82,250.00	Zero
R5-6	R5P1	$140,884.00	$167,014.00	$150,771.00	$128,889.00	$103,481.00	$80,120.00	MiniMin
R5-7	R5P1	$203,095.00	$233,213.00	$215,137.00	$194,013.00	$169,471.00	$146,676.00	MiniMin
R5-8	R5P1	$80,204.00	$101,961.00	$87,350.00	$66,960.00	$43,408.00	$21,516.00	MiniMin
R5-9	R5P2	$8,888.00	$10,928.00	-$3,747.00	-$61,383.00	-$48,679.00	-$70,934.00	MiniMin
R5-10	R5P2	$12,539.00	$13,417.00	-$906.00	-$22,337.00	-$44,930.00	-$66,836.00	MiniMin
R5-11	R5P2	$20,080.00	$21,978.00	$6,052.00	-$15,084.00	-$37,004.00	-$58,552.00	MiniMin
R5-12	R5P2	$14,932.00	$15,667.00	$1,736.00	-$19,459.00	-$42,262.00	-$64,291.00	MiniMin
R5-13	R5P2	$16,030.00	$19,037.00	$3,570.00	-$17,743.00	-$40,559.00	-$62,573.00	MiniMin
R5-14	R5P2	$11,857.00	$14,086.00	-$187.00	-$21,297.00	-$43,788.00	-$65,549.00	MiniMin
R5-15	R5P2	$17,797.00	$19,497.00	$4,804.00	-$16,478.00	-$39,094.00	-$60,889.00	MiniMin
R5-16	R5P2	$25,512.00	$27,013.00	$12,853.00	-$9,157.00	-$32,274.00	-$54,406.00	MiniMin
R5-17	R5P3	$3,482.00	$6,891.00	-$3,523.00	-$23,073.00	-$43,993.00	-$64,108.00	MiniMin

TABLE B-23 (CONTINUED)
SUMMARIZED BERM WIDTH OPTIMIZATION

Model Reach	Profile	Net Benefits Zero Berm option	Net Benefits MiniMin option	Net Benefits Minimum option	Net Benefits Small Alternative	Net Benefits Medium Alternative	Net Benefits Maximum Alternative	Maximum Net Benefit Alternative
R5-18	R5P2	$14,360.00	$22,615.00	$8,864.00	-$12,212.00	-$34,330.00	-$55,770.00	MiniMin
R5-19	R5P3	-$11,537.00	-$438.00	-$7,906.00	-$28,216.00	-$50,383.00	-$71,902.00	MiniMin
R5-20	R5P2	-$26,183.00	-$3,750.00	-$17,540.00	-$39,008.00	-$62,142.00	-$83,954.00	MiniMin
R5-21	R5P2	-$1,054.00	-$4,876.00	-$19,396.00	-$42,908.00	-$67,839.00	-$91,544.00	Zero
R5-22	R5P3	$1,964.00	$1,964.00	$1,964.00	$1,964.00	$1,964.00	$1,964.00	Zero
R5-23	R5P3	$511.00	$511.00	$511.00	$511.00	$511.00	$511.00	Minimum
R5-24	R5P2	$6,898.00	$6,898.00	$6,898.00	$6,898.00	$6,898.00	$6,898.00	Zero
R5-25	R5P2	$15,278.00	$15,278.00	$15,278.00	$15,278.00	$15,278.00	$15,278.00	Zero
R5-26	R5P1	$12,809.00	$12,809.00	$12,809.00	$12,809.00	$12,809.00	$12,809.00	Minimum
R5-27	R5P3	$10,102.00	$10,102.00	$10,102.00	$10,102.00	$10,102.00	$10,102.00	Minimum
R5-28	R5P3	$11,651.00	$11,651.00	$11,651.00	$11,651.00	$11,651.00	$11,651.00	Zero
R5-29	R5P2	$37,910.00	$37,910.00	$37,910.00	$37,910.00	$37,910.00	$37,910.00	Zero
R5-30	R5P2	$2,220.00	$28,170.00	$13,914.00	-$7,505.00	-$30,065.00	-$51,701.00	MiniMin
R5-31	R5P2	$19,644.00	$40,717.00	$24,212.00	$2,900.00	-$19,507.00	-$40,910.00	MiniMin
R5-32	R5P1	$76,091.00	$121,551.00	$111,225.00	$90,201.00	$68,146.00	$45,620.00	MiniMin
R5-33	R5P1	$42,299.00	$76,745.00	$63,732.00	$42,781.00	$20,065.00	-$2,322.00	MiniMin
R5-34	R5P1	$23,477.00	$51,651.00	$38,819.00	$18,010.00	-$4,893.00	-$27,216.00	MiniMin
R5-35	R5P1	$31,314.00	$57,266.00	$45,044.00	$24,892.00	$2,811.00	-$18,783.00	MiniMin
R5-36	R5P1	$100,329.00	$130,969.00	$120,236.00	$100,815.00	$79,561.00	$57,739.00	MiniMin
R5-37	R5P1	$52,451.00	$78,884.00	$66,364.00	$45,807.00	$23,357.00	$1,729.00	MiniMin
R5-38	R5P1	$74,380.00	$108,092.00	$94,546.00	$72,263.00	$48,121.00	$24,608.00	MiniMin
R5-39	R5P1	$65,022.00	$89,963.00	$77,822.00	$57,348.00	$34,912.00	$13,311.00	MiniMin
R5-40	R5P2	$43,326.00	$42,964.00	$27,968.00	$6,748.00	-$15,178.00	-$35,847.00	Zero
R5-41	R5P2	$38,831.00	$38,552.00	$23,981.00	$2,973.00	-$18,733.00	-$39,255.00	Zero
R5-42	R5P2	$23,385.00	$24,213.00	$9,122.00	-$12,419.00	-$34,284.00	-$55,517.00	MiniMin
R5-43	R5P2	$13,586.00	$12,885.00	-$1,128.00	-$22,160.00	-$43,599.00	-$64,251.00	Zero
R5-44	R5P2	$101.00	-$623.00	-$14,288.00	-$35,332.00	-$56,652.00	-$77,220.00	Zero
R5-45	R5P2	-$5,649.00	-$3,936.00	-$18,441.00	-$38,870.00	-$59,414.00	-$79,454.00	MiniMin
R5-46	R5P2	$1,803.00	$1,062.00	-$11,984.00	-$32,545.00	-$53,965.00	-$74,504.00	Zero
R5-47	R5P2	$10,336.00	$9,941.00	-$3,039.00	-$24,764.00	-$47,002.00	-$68,640.00	Zero
R5-48	R5P3	-$8,718.00	-$7,405.00	-$17,534.00	-$39,574.00	-$61,900.00	-$83,263.00	MiniMin
R5-49	R5P3	-$1,824.00	$3,440.00	-$8,955.00	-$31,765.00	-$55,351.00	-$77,804.00	MiniMin
R5-50	R5P3	-$4,228.00	$7,329.00	-$4,389.00	-$28,385.00	-$52,947.00	-$76,728.00	MiniMin
R5-51	R5P3	$21,879.00	$20,142.00	$8,075.00	-$13,985.00	-$36,525.00	-$58,146.00	Zero

8.2 FORMULATION OF CONSTRUCTION REACHES

Another revelation from the runs was that not all model reaches were going to be cost justified. When the cost of construction per unit of benefited shore length is not reasonable uniform for the entire project area, the project should be subdivided into elements (reaches) within which this condition is met.

Five possible construction reaches (Table B-24) were forming as candidates for economic justification. Those five construction reaches were identified, numbered 1 through 5 from the west to east which formed the basis for subsequent alternative analyses.

8.3 BERM WIDTH OPTIMIZATION BY CONSTRUCTION REACH

The PDT team noted that the MiniMin Berm width alternative maximized net benefits when all construction reaches as a whole are evaluated, but the minimum alternative maximized net benefits in Construction Reach 1.

TABLE B-24
WALTON COUNTY CONSTRUCTION REACHES

Construction Reach	Beginning Model Reach	Ending Model Reach
1	R1-11	R1-16
2	R3-2	R3-23
3	R4-1	R4-6
4	R5-1	R5-18
5	R5-30	R5-51

TABLE B-25
MINIMIN AND MINIMUM DESIGN ALTERNATIVES

Representative Profile	ZERO	MiniMin	Minimum	Small	Medium	Maximum
R1P1	0	10	25	50	75	100
R1P2	0	25	50	75	100	125
R2P1	0	25	50	75	100	125
R2P2	0	25	50	75	100	125
R3P1	0	25	50	75	100	125
R3P2	0	25	50	75	100	125
R4P1	0	25	50	75	100	125
R4P2	0	25	50	75	100	125
R5P1	0	25	50	75	100	125
R5P2	0	25	50	75	100	125
R5P3	0	25	50	75	100	125

8.4 THE OPTIMIZED BERM WIDTH ALTERNATIVE

A comparison of the net benefits, Table B-26, between the MiniMin and the Minimum Alternative reveals that in Construction Reach 1 the Minimum alternative maximizes net benefits and the MiniMin alternative maximizes net benefits in Construction Reaches 2, 3, 4 and 5. Construction Reach 1 is composed of profiles R1P1 and R1P2. R1P1 in the Minimum alternative has a berm width of 25 feet whereas profile R1P1 in the MiniMin alternative has a berm width of 10 feet.

TABLE B-26
WALTON COUNTY CONSTRUCTION REACHES BERM WIDTH OPTIMIZATION

Construction Reach	Beginning Model Reach	Ending Model Reach	Net Benefits Zero Berm	Net Benefits MiniMin Berm	Net Benefits Minimum Berm	Net Benefits Small Berm	Net Benefits Medium Berm	Net Benefits Maximum Berm
1	R1-11	R1-16	$435,924	$414516	$440,993	$311,341	$159,172	$13,458
2	R3-2	R3-23	$904,813	$1,742,843	$1,676,708	$1,287,383	$815,509	$26
3	R4-1	R4-6	$97,911	$166,356	$103,342	$22,924	-$117,384	-$76,562
4	R5-1	R5-18	$710,743	$868,767	$600,593	$176,833	-$208,993	-$611,285
5	R5-30	R5-51	$636,087	$932,571	$645,701	$177,435	-$313,043	-$788,554
Total NED			**$2,785,478**	**$4,125,053**	**$3,467,337**	**$1,975,916**	**$335,261**	**-$1,462,917**

Table B-27 shows the Optimized Berm Width Alternative is the minimum beach fill in Construction Reach 1 and the MiniMin beachfill in Construction Reaches 2 through 5. The optimized berm width alternative then is one with berm widths of 25 feet in all construction reaches as illustrated in the next table.

TABLE B-27
OPTIMIZED BERM WIDTH ALTERNATIVE

Representative Profile	Zero Berm Width	MiniMin Berm Width	Minimum Berm Width	Optimized Berm Width
R1P1	0	10	25	25
R1P2	0	25	50	25
R2P1	0	25	50	25
R2P2	0	25	50	25
R3P1	0	25	50	25
R3P2	0	25	50	25
R4P1	0	25	50	25
R4P2	0	25	50	25
R5P1	0	25	50	25
R5P2	0	25	50	25
R5P3	0	25	50	25

8.5 PHASE II OPTIMIZED DUNE WIDTH FORMULATION

A second round of alternatives was formulated to optimize on added dune width.

8.5.1 Optimized Dune Width Alternatives

Added dune width alternatives of 0, 10, 20, 30 and 40 feet were run with the optimized berm width alternative of 25 feet (Optimized berm template of 50 feet, 25 berm width plus 25 feet of advanced nourishment).

Table B-28 lays out the four dune width optimization alternatives.

8.5.2 Results of Dune Width Optimization

The results of the dune width optimization runs are presented in Table B-29. The maximized net benefit by model reach column identifies the added dune width alternative for each reach.

8.6 DUNE WIDTH OPTIMIZATION BY MODEL REACH

The best alternative plan based solely on an economic criterion is based on net excess benefits defines. The suggested NED Plan would be the maximized net benefits dune and berm width optimization. The optimization by model reach NED Plan describes an alternative with jagged added dune widths.

On the other hand the project must also be constructible, publicly acceptable and environmentally sustainable. Coastal engineering and constructability issues would point to a uniform smoothed and connected robust beach fill.

An additional beach fill question that arose while evaluating the results of the dune width optimization results was what would be the smallest segment of beach fill that could be constructed and yet perform adequately. Coastal engineering experience suggests that a beach fills as small as 2,000 feet would perform very poorly due to their small size.

If material is placed irregularly alongshore, i.e. gaps along the placement, then the near shore contours will be altered by the presence of the fill. Wave refraction over irregular contours will tend to cause a systematic pattern of convergence and divergence of breaking waves. Different wave heights and directions along the beach will produce areas of varying erosion and accretion. If the material is not placed over a sufficient length of beach, the material will diffuse or spread laterally to the adjacent areas and the project will perform poorly. The longer the original fill distance, the longer the material will remain in the original fill area.

Using both engineering and sound coastal engineering principles and previous experience a constructible NED Plan was formulated. That plan modified the economic NED Plan in the following attributes.

TABLE B-28
DUNE WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Optimized Berm Template	+00 Feet Added Dune Width	Optimized Berm Template	+10 Feet Added Dune Width	Optimized Berm Template	+20 Feet Added Dune Width	Optimized Berm Template	+30 Feet Added Dune Width	Optimized Berm Template	+40 Feet Added Dune Width
1	R1-1	R1P1	50	55	50	65	50	75	50	85	50	95
2	R1-2	R1P1	50	55	50	65	50	75	50	85	50	95
3	R1-3	R1P1	50	55	50	65	50	75	50	85	50	95
4	R1-4	R1P1	50	55	50	65	50	75	50	85	50	95
5	R1-5	R1P1	50	55	50	65	50	75	50	85	50	95
6	R1-6	R1P1	50	55	50	65	50	75	50	85	50	95
7	R1-7	R1P1	50	55	50	65	50	75	50	85	50	95
8	R1-8	R1P1	50	55	50	65	50	75	50	85	50	95
9	R1-9	R1P1	50	55	50	65	50	75	50	85	50	95
10	R1-10	R1P1	50	55	50	65	50	75	50	85	50	95
11	R1-11	R1P1	50	55	50	65	50	75	50	85	50	95
12	R1-12	R1P1	50	55	50	65	50	75	50	85	50	95
13	R1-13	R1P1	50	55	50	65	50	75	50	85	50	95
14	R1-14	R1P1	50	55	50	65	50	75	50	85	50	95
15	R1-15	R1P2	50	100	50	110	50	120	50	130	50	140
16	R1-16	R1P2	50	100	50	110	50	120	50	130	50	140
17	R1-17	R1P2	50	100	50	110	50	120	50	130	50	140
18	R1-18	R1P2	50	100	50	110	50	120	50	130	50	140
19	R1-19	R1P2	50	100	50	110	50	120	50	130	50	140
20	R1-20	R1P2	50	100	50	110	50	120	50	130	50	140
21	R1-21	R1P1	50	55	50	65	50	75	50	85	50	95
22	R1-22	R1P1	50	55	50	65	50	75	50	85	50	95
23	R1-23	R1P1	50	55	50	65	50	75	50	85	50	95
24	R1-24	R1P1	50	55	50	65	50	75	50	85	50	95
25	R2-1	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
26	R2-2	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
27	R2-3	R2P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
28	R2-4	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
29	R2-5	R2P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
30	R2-6	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
31	R2-7	R2P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

TABLE B-28 (CONTINUED)
DUNE WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Optimized Berm Template	+00 Feet Added Dune Width	Optimized Berm Template	+10 Feet Added Dune Width	Optimized Berm Template	+20 Feet Added Dune Width	Optimized Berm Template	+30 Feet Added Dune Width	Optimized Berm Template	+40 Feet Added Dune Width
32	R3-1	R3P1	50	75	50	85	50	95	50	105	50	115
33	R3-2	R3P1	50	75	50	85	50	95	50	105	50	115
34	R3-3	R3P1	50	75	50	85	50	95	50	105	50	115
35	R3-4	R3P2	50	45	50	55	50	65	50	75	50	85
36	R3-5	R3P2	50	45	50	55	50	65	50	75	50	85
37	R3-6	R3P2	50	45	50	55	50	65	50	75	50	85
38	R3-7	R3P2	50	45	50	55	50	65	50	75	50	85
39	R3-8	R3P1	50	75	50	85	50	95	50	105	50	115
40	R3-9	R3P1	50	75	50	85	50	95	50	105	50	115
41	R3-10	R3P1	50	75	50	85	50	95	50	105	50	115
42	R3-11	R3P1	50	75	50	85	50	95	50	105	50	115
43	R3-12	R3P1	50	75	50	85	50	95	50	105	50	115
44	R3-13	R3P1	50	75	50	85	50	95	50	105	50	115
45	R3-14	R3P1	50	75	50	85	50	95	50	105	50	115
46	R3-15	R3P1	50	75	50	85	50	95	50	105	50	115
47	R3-16	R3P1	50	75	50	85	50	95	50	105	50	115
48	R3-17	R3P1	50	75	50	85	50	95	50	105	50	115
49	R3-18	R3P1	50	75	50	85	50	95	50	105	50	115
50	R3-19	R3P1	50	75	50	85	50	95	50	105	50	115
51	R3-20	R3P1	50	75	50	85	50	95	50	105	50	115
52	R3-21	R3P1	50	75	50	85	50	95	50	105	50	115
53	R3-22	R3P1	50	75	50	85	50	95	50	105	50	115
54	R3-23	R3P1	50	75	50	85	50	95	50	105	50	115
55	R3-24	R3P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
56	R3-25	R3P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
57	R3-26	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
58	R4-1	R4P1	50	50	50	60	50	70	50	80	50	90
59	R4-2	R4P1	50	50	50	60	50	70	50	80	50	90
60	R4-3	R4P2	50	85	50	95	50	105	50	115	50	125
61	R4-4	R4P2	50	85	50	95	50	105	50	115	50	125
62	R4-5	R4P1	50	50	50	60	50	70	50	80	50	90

TABLE B-28 (CONTINUED)
DUNE WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Optimized Berm Template	+00 Feet Added Dune Width	Optimized Berm Template	+10 Feet Added Dune Width	Optimized Berm Template	+20 Feet Added Dune Width	Optimized Berm Template	+30 Feet Added Dune Width	Optimized Berm Template	+40 Feet Added Dune Width
63	R4-6	R4P2	50	85	50	95	50	105	50	115	50	125
64	R4-7	R4P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
65	R4-8	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
66	R4-9	R4P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
67	R5-1	R5P2	50	65	50	75	50	85	50	95	50	105
68	R5-2	R5P2	50	65	50	75	50	85	50	95	50	105
69	R5-3	R5P2	50	65	50	75	50	85	50	95	50	105
70	R5-4	R5P2	50	65	50	75	50	85	50	95	50	105
71	R5-5	R5P2	50	65	50	75	50	85	50	95	50	105
72	R5-6	R5P1	50	185	50	195	50	205	50	215	50	225
73	R5-7	R5P1	50	185	50	195	50	205	50	215	50	225
74	R5-8	R5P1	50	185	50	195	50	205	50	215	50	225
75	R5-9	R5P2	50	65	50	75	50	85	50	95	50	105
76	R5-10	R5P2	50	65	50	75	50	85	50	95	50	105
77	R5-11	R5P2	50	65	50	75	50	85	50	95	50	105
78	R5-12	R5P2	50	65	50	75	50	85	50	95	50	105
79	R5-13	R5P2	50	65	50	75	50	85	50	95	50	105
80	R5-14	R5P2	50	65	50	75	50	85	50	95	50	105
81	R5-15	R5P2	50	65	50	75	50	85	50	95	50	105
82	R5-16	R5P2	50	65	50	75	50	85	50	95	50	105
83	R5-17	R5P3	50	50	50	60	50	70	50	80	50	90
84	R5-18	R5P2	50	65	50	75	50	85	50	95	50	105
85	R5-19	R5P3	50	50	50	60	50	70	50	80	50	90
86	R5-20	R5P2	50	65	50	75	50	85	50	95	50	105
87	R5-21	R5P2	50	65	50	75	50	85	50	95	50	105
88	R5-22	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
89	R5-23	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
90	R5-24	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
91	R5-25	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
92	R5-26	R5P1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
93	R5-27	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
94	R5-28	R5P3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

TABLE B-28 (CONTINUED)
DUNE WIDTH OPTIMIZATION TEMPLATE

Sub-Reach	Model Reach	Profile	Optimized Berm Template	+00 Feet Added Dune Width	Optimized Berm Template	+10 Feet Added Dune Width	Optimized Berm Template	+20 Feet Added Dune Width	Optimized Berm Template	+30 Feet Added Dune Width	Optimized Berm Template	+40 Feet Added Dune Width
95	R5-29	R5P2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
96	R5-30	R5P2	50	65	50	75	50	85	50	95	50	105
97	R5-31	R5P2	50	65	50	75	50	85	50	95	50	105
98	R5-32	R5P1	50	185	50	195	50	205	50	215	50	225
99	R5-33	R5P1	50	185	50	195	50	205	50	215	50	225
100	R5-34	R5P1	50	185	50	195	50	205	50	215	50	225
101	R5-35	R5P1	50	185	50	195	50	205	50	215	50	225
102	R5-36	R5P1	50	185	50	195	50	205	50	215	50	225
103	R5-37	R5P1	50	185	50	195	50	205	50	215	50	225
104	R5-38	R5P1	50	185	50	195	50	205	50	215	50	225
105	R5-39	R5P1	50	185	50	195	50	205	50	215	50	225
106	R5-40	R5P2	50	65	50	75	50	85	50	95	50	105
107	R5-41	R5P2	50	65	50	75	50	85	50	95	50	105
108	R5-42	R5P2	50	65	50	75	50	85	50	95	50	105
109	R5-43	R5P2	50	65	50	75	50	85	50	95	50	105
110	R5-44	R5P2	50	65	50	75	50	85	50	95	50	105
111	R5-45	R5P2	50	65	50	75	50	85	50	95	50	105
112	R5-46	R5P2	50	65	50	75	50	85	50	95	50	105
113	R5-47	R5P2	50	65	50	75	50	85	50	95	50	105
114	R5-48	R5P3	50	50	50	60	50	70	50	80	50	90
115	R5-49	R5P3	50	50	50	60	50	70	50	80	50	90
116	R5-50	R5P3	50	50	50	60	50	70	50	80	50	90
117	R5-51	R5P3	50	50	50	60	50	70	50	80	50	90

TABLE B-29
DUNE WIDTH OPTIMIZATION

Model Reach	Summed Net Benefits No Added Dune Width	Summed Net Benefits 10 feet of Added Dune Width	Summed Net Benefits 20 feet of Added Dune Width	Summed Net Benefits 30 feet of Added Dune Width	Summed Net Benefits 40 feet of Added Dune Width	Profile	Constructible Added Dune Width
R1-1	-21973	-24268	-29633	-32663	-$70,656	R1P1	
R1-2	-20560	-23275	-28261	-31277	-$64,626	R1P1	
R1-3	-19452	-22450	-26062	-28842	-$59,847	R1P1	
R1-4	-20515	-21875	-26597	-29331	-$59,152	R1P1	
R1-5	-22644	-24528	-27754	-30620	-$62,686	R1P1	
R1-6	-26738	-25173	-31575	-34387	-$66,491	R1P1	
R1-7	-25776	-24932	-30447	-33119	-$64,351	R1P1	
R1-8	-27070	-26652	-31812	-34591	-$67,592	R1P1	
R1-9	-23183	-23071	-27636	-30195	-$60,899	R1P1	
R1-10	-19414	-20251	-22745	-25250	-$53,615	R1P1	
R1-11	30826	56895	68085	66491	$34,057	R1P1	10
R1-12	-24859	-21595	-29833	-32618	-$64,658	R1P1	10
R1-13	163848	164890	159465	156755	$120,973	R1P1	10
R1-14	74404	76523	72382	69860	$34,592	R1P1	10
R1-15	108037	131552	189573	212157	$204,933	R1P2	30
R1-16	108817	119998	151449	162735	$137,214	R1P2	30
R1-17	-10947	-8672	-12337	-13249	-$44,213	R1P2	
R1-18	-6686	-4787	-8185	-10136	$12,779	R1P2	
R1-19	-16464	-11762	-16353	-16455	-$44,967	R1P2	
R1-20	-18102	-14543	-17092	-16619	-$41,608	R1P2	
R1-21	-23864	-24628	-28267	-30742	-$60,704	R1P1	
R1-22	-22459	-22298	-26891	-29509	-$59,756	R1P1	
R1-23	-22482	-24929	-28360	-31250	-$65,072	R1P1	
R1-24	-18535	-19329	-25302	-28140	-$58,971	R1P1	
R2-1	-	-	-	-		R2P1	
R2-2	-	-	-	-		R2P1	
R2-3	-	-	-	-		R2P2	
R2-4	-	-	-	-		R2P1	
R2-5	-	-	-	-		R2P2	
R2-6	-	-	-	-		R2P1	
R2-7	-	-	-	-		R2P1	
R3-1	-6480	-1676	-523	-1133	-$48,529	R3P1	
R3-2	60918	88440	99635	105914	$67,319	R3P1	10
R3-3	-3637	2903	495	-467	-$39,895	R3P1	10
R3-4	-8604	-8046	-11455	-12306	-$36,443	R3P2	10
R3-5	-10952	-7497	-13443	-14081	-$40,631	R3P2	10
R3-6	-13879	-9546	-16724	-17106	-$44,795	R3P2	10

TABLE B-29 (CONTINUED)
DUNE WIDTH OPTIMIZATION

Model Reach	Summed Net Benefits No Added Dune Width	Summed Net Benefits 10 feet of Added Dune Width	Summed Net Benefits 20 feet of Added Dune Width	Summed Net Benefits 30 feet of Added Dune Width	Summed Net Benefits 40 feet of Added Dune Width	Profile	Constructible Added Dune Width
R3-7	-12437	-9368	-15972	-16624	-$44,681	R3P2	10
R3-8	6269	10978	10427	10154	-$33,177	R3P1	10
R3-9	21777	33172	32887	33918	-$7,904	R3P1	30
R3-10	54721	115738	157575	194603	$178,292	R3P1	30
R3-11	29313	44573	49252	53628	$13,442	R3P1	30
R3-12	46295	80649	104132	127568	$103,900	R3P1	30
R3-13	37990	42943	42354	41955	$656	R3P1	30
R3-14	107187	125032	125659	128119	$74,087	R3P1	30
R3-15	53578	57577	56864	56257	$11,006	R3P1	30
R3-16	42516	44866	45067	44743	$13,220	R3P1	30
R3-17	70535	75378	76840	77139	$32,760	R3P1	30
R3-18	76242	84878	86728	88165	$42,842	R3P1	30
R3-19	77587	81617	83045	82970	$38,210	R3P1	30
R3-20	239534	274140	287533	294440	$252,339	R3P1	30
R3-21	90529	112124	118304	123926	$80,356	R3P1	30
R3-22	60602	71894	70982	72274	$30,460	R3P1	30
R3-23	45841	55004	53541	54111	$17,947	R3P1	30
R3-24	-	-	-	-		R3P2	
R3-25	-	-	-	-		R3P2	
R3-26	-	-	-	-		R4P1	
R4-1	57579	60774	59376	59220	-$1,796	R4P1	10
R4-2	56114	69534	65479	66614	-$9,366	R4P1	10
R4-3	-5402	-1372	-6935	-7651	$1,532	R4P2	10
R4-4	-1736	-1313	-3208	-3895	$1,471	R4P2	10
R4-5	22248	25615	23096	22401	-$848	R4P1	10
R4-6	-405	3772	3267	2791	-$3,672	R4P2	10
R4-7	-	-	-	-		R4P2	
R4-8	-	-	-	-		R4P1	
R4-9	-	-	-	-		R4P1	
R5-1	101205	98415	95873	95109	$5,332	R5P2	10
R5-2	70355	68018	64932	63312	$5,423	R5P2	10
R5-3	37513	37398	33074	31024	$4,439	R5P2	10
R5-4	11335	10860	6833	3971	$4,502	R5P2	10
R5-5	1	3602	-1157	-3562	$1,157	R5P2	10
R5-6	140226	157419	154409	151764	-$14,183	R5P1	10
R5-7	200024	214153	209752	206797	-$9,729	R5P1	10
R5-8	86384	100229	95839	93221	-$9,455	R5P1	10

TABLE B-29 (CONTINUED)
DUNE WIDTH OPTIMIZATION

Model Reach	Summed Net Benefits No Added Dune Width	Summed Net Benefits 10 feet of Added Dune Width	Summed Net Benefits 20 feet of Added Dune Width	Summed Net Benefits 30 feet of Added Dune Width	Summed Net Benefits 40 feet of Added Dune Width	Profile	Constructible Added Dune Width
R5-9	12641	15448	8646	6694	$3,995	R5P2	10
R5-10	16735	17865	12965	11068	$3,770	R5P2	10
R5-11	22492	25100	18724	16681	$3,768	R5P2	10
R5-12	19276	19473	16094	14321	$3,182	R5P2	10
R5-13	17898	23227	15965	13943	$1,934	R5P2	10
R5-14	15842	18371	12358	10452	$3,484	R5P2	10
R5-15	22419	23919	18097	15770	$4,322	R5P2	10
R5-16	25421	31720	27972	26043	-$2,551	R5P2	10
R5-17	6949	10436	4477	3815	$2,472	R5P3	10
R5-18	24250	25944	22209	20851	$2,041	R5P2	10
R5-19	462	4253	70	647	$392	R5P3	10
R5-20	-563	825	-3538	-5666	$2,975	R5P2	10
R5-21	135	985	-3266	-5468	$3,401	R5P2	10
R5-22						R5P3	
R5-23						R5P3	
R5-24						R5P2	
R5-25						R5P2	
R5-26						R5P1	
R5-27						R5P3	
R5-28						R5P3	
R5-29						R5P2	
R5-30	31359	32542	27446	25763	-$4,716	R5P2	10
R5-31	39204	40628	34506	32596	$2,163	R5P2	10
R5-32	93797	116901	120434	119260	$77,242	R5P1	10
R5-33	70338	76230	72162	69274	$25,221	R5P1	10
R5-34	47939	51558	46369	43212	-$235	R5P1	10
R5-35	52939	56658	52726	49924	$8,037	R5P1	10
R5-36	97937	124305	126632	126125	$83,916	R5P1	10
R5-37	76094	79651	74974	71484	$28,353	R5P1	10
R5-38	97013	107768	99436	95873	$48,203	R5P1	10
R5-39	90626	91422	88855	86031	$41,575	R5P1	10
R5-40	49424	47040	44289	42296	$11,247	R5P2	10
R5-41	44150	42989	39376	37311	$6,701	R5P2	10
R5-42	28280	28539	23859	21635	-$8,858	R5P2	10
R5-43	17851	17377	13587	11494	-$17,881	R5P2	10
R5-44	3985	4253	-3	-2204	-$26,622	R5P2	10
R5-45	-1618	-1157	-5345	-7562	-$15,038	R5P2	10

TABLE B-29 (CONTINUED)
DUNE WIDTH OPTIMIZATION

Model Reach	Summed Net Benefits No Added Dune Width	Summed Net Benefits 10 feet of Added Dune Width	Summed Net Benefits 20 feet of Added Dune Width	Summed Net Benefits 30 feet of Added Dune Width	Summed Net Benefits 40 feet of Added Dune Width	Profile	Constructible Added Dune Width
R5-46	621	6642	2709	408	-$27,913	R5P2	10
R5-47	2923	17635	15037	13057	-$1,926	R5P2	10
R5-48	-4635	-3737	-7661	-8418	-$31,424	R5P3	10
R5-49	5033	4860	3240	2480	-$20,329	R5P3	10
R5-50	9987	9714	7843	7514	-$20,651	R5P3	10
R5-51	21836	23141	19461	18844	-$6,300	R5P3	10

LEGEND

CONSTRUCTION TEMPLATE 10 FEET OF ADDED DUNE WIDTH	+10
CONSTRUCTION TEMPLATE 30 FEET OF ADDED DUNE WIDTH	+30
ECONOMICALLY JUSTIFIED MODEL REACHES	

8.6.1 Constructible Dune Width Alternative

In construction reach 1, (R1-1 to R1-16), unjustified reach R1-12 was added for constructability reasons. Filling this reach ties R1-11 into the larger neighboring reach which would present a robust beach fill of about 6,000 feet. Dune widths were standardized, 10 feet of added dune width in reaches R1-11 to R1-14 and 30 feet of added dune width for reaches R1-15 and R1-16.

In Construction Reach 2, (R3-2 to R3-23), the 2000-foot justified segment R3-2 and R3-3 is too small of a beach fill segment and would perform too poorly to provide a robust hurricane and storm reduction project. Filling the unjustified reaches R3-4 to R3-7 would tie this smaller segment in with the larger segment Reach R3-9 through R3-23. A robust beach fill segment from R3-2 to R3-23 would be constructed. Two uniform dune widths would be constructed, 10 feet of added dune with in reaches R3-2 to R3-8 and 30 feet of added dune width in reaches R3-9 to R3-23.

In Construction Reach 3, (R4-1 to R4-6), the unjustified reaches R4-3 and R4-4 would be filled to provide a uniform and high performing beach fill. This would also eliminate the need for transitions that would have been required in the unjustified reaches. The predominate 10 feet of added dune width is recommended for this construction reach.

In Construction Reach 4, (R5-1 to R5-21), reaches R5-1 to R5-4 would receive 10 feet of added dune width based on constructability and engineering performance reasons to match the 10 feet of added dune with optimized for the remainder of this construction segment.

In construction reach 5, (R5-30 to R5-51), unjustified reaches R5-45 and R5-48 would receive full beach fill based on engineering and constructability reasons.

8.7 THE CONSTRUCTIBLE NED PLAN

In Table B-29 the constructible added dune width column identifies the constructible economic NED Plan. This plan is a robust design, it is based on economics, engineering performance characteristics, and constructability and beach fill uniformity.

Table B-30 summarizes the optimum added dune width within the five construction reaches by representative profile.

TABLE B-30
OPTIMUM ADDED DUNE WIDTH – REPRESENTATIVE PROFILE

Construction Reach	Representative Profile	Existing Dune Width	Optimum Added Dune Width	Construction Reach Length w/o transitions (feet)	Construction Reach Length w/o transitions (miles)
CR1	R1P1	55	+10		
	R1P2	100	+30		
				6,191	1.2
CR2	R3P1	76	+10 & +30		
	R3P2	45	+10		
				22,980	4.4
CR3	R4P1	50	+10		
	R4P2	85	+10		
				6,101	1.2
CR4	R5P1	185	+10		
	R5P2	65	+10		
	R5P3	50	+10		
				21,688	4.1
CR5	R5P1	185	+10		
	R5P2	65	+10		
	R5P3	50	+10		
				22,319	4.2

8.8 PERIODIC NOURISHMENT – CONSTRUCTIBLE NED PLAN

Periodic nourishment is placement of suitable material on a beach at appropriate intervals of time to maintain the design template. Periodic nourishment plans for Walton County do not include any form of retaining structures that would reduce littoral drift from reaching down-drift beaches.

Beach-*fx* examines all reaches to be nourished to determine if mobilization is warranted. The existing reach profile is compared to the design template, and a nourishment volume is determined. If the total nourishment volume for all reaches exceeds a user-defined threshold, then mobilization and nourishment take place. If nourishment is required, then nourishment time is determined based on placement rates. A start nourishment and end nourishment event for the first reach are created. At the end nourishment event, the reach profile is set to the design template, and the next reach in processing order is examined, to see if nourishment is required. The process continues until all reaches have been handled. The cost of nourishment, including mobilization and placement costs, is calculated based on nourishment volumes and user-defined cost-related parameters.

Once the NED template was determined then GENESIS runs were undertaken to determine the effect of longshore transport on the constructed project. These results were incorporated into the Beach-*fx* model and rerun then re-examined to determine renourishment quantities and cycles.

The results of the Beach-*fx* runs with GENESIS information for the NED constructible alternative revealed that the renourishment cycle would average one initial fill and four renourishments during the life of the project. That would suggest a 10-year renourishment cycle. From the 100 different realizations of alternative futures came the total project life volume of 9,613,000 cy for five nourishment cycles, the initial and four renourishments.

The initial fill is estimated to require on average 3,273,000 cy and each of the four renourishments averaging 1,585,000 cy. Renourishment summary statistics are presented in Tables B-31 and B-32. A frequency distribution of renourishment cycles obtained from one hundred possible realizations is produced in Table B-33.

8.8.1 Comparison With Other Renourishment Projects

With the determination that the renourishment cycle for this project will be a 10-year cycle, it would be prudent to compare this with any adjacent renourishment projects to insure that they will perform in concert with this project. The only adjacent Federal project is Panama City Beach, which is immediately updrift in Bay County. The average renourishment interval of five years was found to produce the lowest total average equivalent cost in the 1996 Panama City Beaches, Florida General Reevaluation Report (GRR). However, the Panama City Beaches, Florida Beach Erosion Control and Storm Damage Reduction Project 5-year Monitoring Report showed that the 1998/1999 constructed beach project (R-l to R- 91.5) performed above expectations. The 5-year monitoring data showed that the project had retained 85 percent of the as-built fill within the Federal project limits and suggested that the design standard had been violated only at R-84, R-85 and R-86. The post-construction monitoring supports the notion that the average beach nourishment cycle for the project is much greater than five years. In addition, the 2009 limited reevaluation study for Carillon Beach and Pinnacle Port updated the economics to determine whether the currently authorized yet federally un-constructed Carillon Beach and Pinnacle Port portion of the Panama City Beaches, Florida Beach Erosion Control and Storm Damage Reduction project was still economically justified. To calculate erosion, wave attack and inundation benefits the engineering-economic Monte Carlo simulation model, Beach-*fx*, which relates beach profile change to storms, coastal processes and nourishment programs was used. The average periodic nourishment for this reach was determined to be on average every 10 years based on 100 iterations in Beach-*fx*.· Initially 300 iterations were simulated. Convergence appeared acceptable at about 100 iterations. Typically, early estimates are close to the starting value. Discarding the first 25 iterations found the recalculated average differed by two percent.

TABLE B-31
NED PLAN PERIODIC NOURISHMENT SUMMARY STATISTICS
(VOLUMES IN CUBIC YARDS)

	Average	Standard Deviation
Average Total Nourishment Volume	9,613,000	3,828,971
Average Initial Construction Volume	3,273,000	1,418,378
Average Total Renourishment Volume	6,340,000	3,525,053
Average Number of Renourishment	4	
Average Renourishment Volume	1,585,000	

TABLE B-32
NED PLAN PERIODIC NOURISHMENT CONFIDENCE INTERVALS
(VOLUMES IN CUBIC YARDS)

Average Initial Construction Volume	2,639,000	
Standard Deviation	1,418,378	
95% Confidence Interval	1,534,626	2,090,620
90% Confidence Interval	1,579,321	2,045,926
Average Total Renourishment Volume	6,341,000	
Standard Deviation	3,525,053	
95% Confidence Interval	5,182,321	6,564,117
90% Confidence Interval	5,293,399	6,453,038

TABLE B-33
NOURISHMENT FREQUENCY DISTRIBUTION
100 POSSIBLE FUTURE REALIZATIONS

Number of renourishment	Number of Occurrences
0	0
1	0
2	1
3	11
4	32
5	30
6	19
7	7
8	0
9	0
10	0

8.9 SUMMARY BENEFIT ANALYSIS – CONSTRUCTIBLE NED PLAN

Table B-34 presents the benefits by reach, profile and added dune width for the NED Plan. Total project benefits are $7,365,000.

TABLE B-34
WALTON COUNTY - NATIONAL ECONOMIC DEVELOPMENT PLAN
HSDR BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R1-1	R1P1		
R1-2	R1P1		
R1-3	R1P1		
R1-4	R1P1		
R1-5	R1P1		
R1-6	R1P1		
R1-7	R1P1		
R1-8	R1P1		
R1-9	R1P1		
R1-10	R1P1		
R1-11	R1P1	+10	$98,294
R1-12	R1P1	+10	$9,794
R1-13	R1P1	+10	$296,297
R1-14	R1P1	+10	$215,054
R1-15	R1P2	+30	$317,002
R1-16	R1P2	+30	$281,671
R1-17	R1P2		
R1-18	R1P2		
R1-19	R1P2		
R1-20	R1P2		
R1-21	R1P1		
R1-22	R1P1		
R1-23	R1P1		
R1-24	R1P1		
SUBTOTALS CONSTRUCTION REACH 1			**$1,218,113**

TABLE B-34 (CONTINUED)
WALTON COUNTY - NATIONAL ECONOMIC DEVELOPMENT PLAN
HSDR BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R2-1	R2P1		
R2-2	R2P1		
R2-3	R2P2		
R2-4	R2P1		
R2-5	R2P2		
R2-6	R2P1		
R2-7	R2P1		
R3-1	R3P1		
R3-2	R3P1	+10	$169,461
R3-3	R3P1	+10	$37,805
R3-4	R3P2	+10	$7,948
R3-5	R3P2	+10	$10,704
R3-6	R3P2	+10	$10,761
R3-7	R3P2	+10	$15,941
R3-8	R3P1	+10	$59,368
R3-9	R3P1	+30	$89,601
R3-10	R3P1	+30	$289,553
R3-11	R3P1	+30	$122,795
R3-12	R3P1	+30	$224,146
R3-13	R3P1	+30	$115,949
R3-14	R3P1	+30	$264,479
R3-15	R3P1	+30	$138,857
R3-16	R3P1	+30	$105,845
R3-17	R3P1	+30	$170,314
R3-18	R3P1	+30	$189,434
R3-19	R3P1	+30	$182,301
R3-20	R3P1	+30	$456,390
R3-21	R3P1	+30	$222,335
R3-22	R3P1	+30	$158,430
R3-23	R3P1	+30	$126,316
R3-24	R3P2		
R3-25	R3P2		
R3-26	R4P1		
SUBTOTALS CONSTRUCTION REACH 2			**$3,168,734**

TABLE B-34 (CONTINUED)
WALTON COUNTY - NATIONAL ECONOMIC DEVELOPMENT PLAN
HSDR BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R4-1	R4P1	+10	$76,345
R4-2	R4P1	+10	$58,509
R4-3	R4P2	+10	$0
R4-4	R4P2	+10	$0
R4-5	R4P1	+10	$38,623
R4-6	R4P2	+10	$6,393
R4-7	R4P2		
R4-8	R4P1		
R4-9	R4P1		
SUBTOTALS CONSTRUCTION REACH 3			**$179,869**
R5-1	R5P2	+10	$117,676
R5-2	R5P2	+10	$82,862
R5-3	R5P2	+10	$50,371
R5-4	R5P2	+10	$22,137
R5-5	R5P2	+10	$16,725
R5-6	R5P1	+10	$233,802
R5-7	R5P1	+10	$331,560
R5-8	R5P1	+10	$151,955
R5-9	R5P2	+10	$27,704
R5-10	R5P2	+10	$30,968
R5-11	R5P2	+10	$42,879
R5-12	R5P2	+10	$32,155
R5-13	R5P2	+10	$39,259
R5-14	R5P2	+10	$31,682
R5-15	R5P2	+10	$37,354
R5-16	R5P2	+10	$47,849
R5-17	R5P3	+10	$24,884
R5-18	R5P2	+10	$39,545
R5-19	R5P3	+10	$14,251
R5-20	R5P2	+10	$12,748
R5-21	R5P2	+10	$13,455

TABLE B-34 (CONTINUED)
WALTON COUNTY - NATIONAL ECONOMIC DEVELOPMENT PLAN
HSDR BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R5-22	R5P3		
R5-23	R5P3		
R5-24	R5P2		
R5-25	R5P2		
R5-26	R5P1		
R5-27	R5P3		
R5-28	R5P3		
R5-29	R5P2		
SUBTOTALS CONSTRUCTION REACH 4			**$1,401,821**
R5-30	R5P2	+10	$44,418
R5-31	R5P2	+10	$65,465
R5-32	R5P1	+10	$155,933
R5-33	R5P1	+10	$100,098
R5-34	R5P1	+10	$71,709
R5-35	R5P1	+10	$77,531
R5-36	R5P1	+10	$167,208
R5-37	R5P1	+10	$104,887
R5-38	R5P1	+10	$134,131
R5-39	R5P1	+10	$112,222
R5-40	R5P2	+10	$60,081
R5-41	R5P2	+10	$57,009
R5-42	R5P2	+10	$40,735
R5-43	R5P2	+10	$28,111
R5-44	R5P2	+10	$12,618
R5-45	R5P2	+10	$9,751
R5-46	R5P2	+10	$18,854
R5-47	R5P2	+10	$32,467
R5-48	R5P3	+10	$7,395
R5-49	R5P3	+10	$23,488
R5-50	R5P3	+10	$29,643
R5-51	R5P3	+10	$42,392
SUBTOTALS CONSTRUCTION REACH 5			**$1,396,145**
TOTALS ALL CONSTRUCTION REACHES			**$7,364,682**

8.10 CONSTRUCTIBLE NED PLAN AND RENOURISHMENTS

Modeling with Beach-*fx* began in January 2005 using the post-Hurricane Ivan surveys. Post Ivan, the very active 2005 hurricane season sent five named storms to the State of Florida. In the Gulf of Mexico, Hurricane Katrina, which made landfall in Mississippi and several other storms since then, Hurricane Dennis for example, have devastated the beaches of Northwest Florida of which Walton County is no exception. These conditions have changed the morphology of the study area in significant ways since the post Hurricane Ivan surveys.

The Beach-*fx* modeling efforts have predicted an initial fill requirement of 2,639,000 cy for the NED Plan. However, surveys have shown that the erosion activity that has occurred since the post Hurricane Ivan surveys would require an equivalent NED placement of approximately 3,273,000 cy to fill the initial construction template. Renourishments will still be on a 10-year cycle and the renourishment volume is 1,585,000 for the NED Plan.

The FY 2013 initial construction costs are $51,945,000 and a single renourishment FY 2013 cost is $22,849,000. Renourishment costs for each fill are lower than the FY 2014 cost due to present worthing. Total project first cost including Interest during construction for this plan is $90,724,000. The annualized cost including Operation, Maintenance, Repair, Rehabilitation and Replacement (OMRR&R) is $4,168,000. The annualized benefits, $7,380,000include both HSDR benefits of about $7,365,000 and recreation benefits of about $15,000. The benefit-to-cost ratio (BCR) is 1.77 to 1 which yields net benefits of about $3,212,000.

Table B-35 summarized the costs, benefits and other pertinent information on project justification for the NED Plan without recreation benefits.

TABLE B-35
SUMMARY BENEFITS NED PLAN WITHOUT RECREATION BENEFITS
WALTON COUNTY, FLORIDA – FEASIBILITY

	$51,945,000	2014 Initial Construction
	$15,240,459	2024 Renourishment
	$10,546,710	2034 Renourishment
	$7,298,539	2044 Renourishment
	$5,050,738	2054 Renourishment
Total Economic First Cost	$90,081,000	
Interest During Construction	$643,000	
Total Project Economic First Cost	$90,724,000	
Average Annual Economic First Cost	$4,044,000	
Annual OMRR&R	$124,500	
Total Average Annual Economic Cost	$4,168,000	
Average Annual HSDR Benefits	$7,365,000	
Benefit-to-Cost Ratio	1.77	
Net Benefits	$3,197,000	

Table B-35A summarizes the costs, benefits and other pertinent information on project justification for the NED Plan with recreation benefits. There is a small amount of recreation benefits because the future with project is characterized by added dune width. The added dune width is gained at the expense of berm width which results in less beach to recreate on and no recreation is permitted on the dunes.

TABLE B-35A
SUMMARY BENEFITS NED PLAN
WALTON COUNTY, FLORIDA – FEASIBILITY

	FY 2013 Dollars	Category
	$51,945,000	2014 Initial Construction
	$15,240,459	2024 Renourishment
	$10,546,710	2034 Renourishment
	$7,298,539	2044 Renourishment
	$5,050,738	2054 Renourishment
Total Economic First Cost	$90,081,000	
Interest During Construction	$643,000	
Total Project Economic First Cost	$90,724,000	
Average Annual Economic First Cost	$4,044,000	
Annual OMRR&R	$124,500	
Total Average Annual Economic Cost	$4,168,000	
Average Annual HSDR Benefits	$7,365,000	
Average Annual Recreation Benefits	$15,000	
Total Average Annual Benefits	$7,380,000	
Benefit-to-Cost Ratio	1.77	
Net Benefits	$3,212,000	

8.11 RECREATION BENEFITS

In order to determine the recreation benefits of the selected plan an economic value must be placed on the recreation experience at the Walton County beaches. This value can then be applied to visitation of the project to determine the NED recreation benefits. For this report, UDV are used to determine the economic value of recreation at Walton County beaches. The UDV are administratively determined values which represent the NED recreation values for typical types of recreation. Guidance for their use is provided by ER 1105-2-100.

The UDV are determined using a point system that takes into account the following factors: recreation experience, availability of opportunity, carrying capacity, accessibility, and environmental (esthetics) quality. A good deal of judgment is required in the assessment of point values. A group of planning professionals with knowledge of the study area made independent judgments of the UDV values which were averaged. The UDV point totals convert to a recreation value of $5.07 for the without project condition and $5.16 for the with project condition. There values were applied to the increase in visitation over the study period. The difference between the without and with project value of recreation determines the NED and LPP recreation benefits. The complete recreation analysis can to found in the attachments to the Economic Appendix.

8.12 LOCALLY PREFERRED PLAN (LPP)

The PDT met with the non-Federal sponsor and presented the Constructible NED Plan. The non-Federal sponsor approved of the plan and committed to supporting that conclusion. When asked if that plan was also the non-Federal sponsor's preferred plan, the non-Federal sponsor indicated that they would like to have added to the project the unjustified reaches R1-1 to R1-10. The non-Federal sponsor has just recently constructed a similar project in those reaches. Also they would like to have Reaches R1-17 to R1-24 added to the project. The beach fill will match the neighboring recommended beach fill, a 50-foot berm width and 30 feet of added dune in profile R1P2 and 10 feet of added dune width in profile R1P1. Table B-36 outlines the features of the Locally Preferred Plan.

TABLE B-36
LOCALLY PREFERRED PLAN
ADDED REACHES R1-1 TO R1-10 AND R1-17 TO R1-24

Model Reach	Summed Net Benefits No added Dune Width	Summed Net Benefits 10-ft added Dune Width	Summed Net Benefits 20-ft added Dune Width	Summed Net Benefits 30-ft added Dune Width	Summed Net Benefits 40-ft added Dune Width	Maximized Added Dune width by Sub-Reach	Profile	LPP Added Dune Width
R1-1	-$21,973	-$24,268	-$29,633	-$32,663	-$70,656	+00	R1P1	+10
R1-2	-$20,560	-$23,275	-$28,261	-$31,277	-$64,626	+00	R1P1	+10
R1-3	-$19,452	-$22,450	-$26,062	-$28,842	-$59,847	+00	R1P1	+10
R1-4	-$20,515	-$21,875	-$26,597	-$29,331	-$59,152	+00	R1P1	+10
R1-5	-$22,644	-$24,528	-$27,754	-$30,620	-$62,686	+00	R1P1	+10
R1-6	-$26,738	-$25,173	-$31,575	-$34,387	-$66,491	+10	R1P1	+10
R1-7	-$25,776	-$24,932	-$30,447	-$33,119	-$64,351	+10	R1P1	+10
R1-8	-$27,070	-$26,652	-$31,812	-$34,591	-$67,592	+10	R1P1	+10
R1-9	-$23,183	-$23,071	-$27,636	-$30,195	-$60,899	+10	R1P1	+10
R1-10	-$19,414	-$20,251	-$22,745	-$25,250	-$53,615	+00	R1P1	+10
R1-11	$30,826	$56,895	$68,085	$66,491	$34,057	+20	R1P1	+10
R1-12	-$24,859	-$21,595	-$29,833	-$32,618	-$64,658	+10	R1P1	+10
R1-13	$163,848	$164,890	$159,465	$156,755	$120,973	+10	R1P1	+10
R1-14	$74,404	$76,523	$72,382	$69,860	$34,592	+10	R1P1	+10
R1-15	$108,037	$131,552	$189,573	$212,157	$204,933	+30	R1P2	+30
R1-16	$108,817	$119,998	$151,449	$162,735	$137,214	+30	R1P2	+30
R1-17	-$10,947	-$8,672	-$12,337	-$13,249	-$44,213	+10	R1P2	+30
R1-18	-$6,686	-$4,787	-$8,185	-$10,136	$12,779	+10	R1P2	+30
R1-19	-$16,464	-$11,762	-$16,353	-$16,455	-$44,967	+10	R1P2	+30
R1-20	-$18,102	-$14,543	-$17,092	-$16,619	-$41,608	+10	R1P2	+30
R1-21	-$23,864	-$24,628	-$28,267	-$30,742	-$60,704	+00	R1P1	+10
R1-22	-$22,459	-$22,298	-$26,891	-$29,509	-$59,756	+10	R1P1	+10
R1-23	-$22,482	-$24,929	-$28,360	-$31,250	-$65,072	+00	R1P1	+10
R1-24	-$18,535	-$19,329	-$25,302	-$28,140	-$58,971	+00	R1P1	+10

TABLE B-36 CONTINUED)
LOCALLY PREFERRED PLAN
ADDED REACHES R1-1 TO R1-10 AND R1-17 TO R1-24

Model Reach	Summed Net Benefits No added Dune Width	Summed Net Benefits 10-ft added Dune Width	Summed Net Benefits 20-ft added Dune Width	Summed Net Benefits 30-ft added Dune Width	Summed Net Benefits 40-ft added Dune Width	Maximized Added Dune width by Sub-Reach	Profile	LPP Added Dune Width
R3-1	-$6,480	-$1,676	-$523	-$1,133	-$48,529	+20	R3P1	
R3-2	$60,918	$88,440	$99,635	$105,914	$67,319	+30	R3P1	+10
R3-3	-$3,637	$2,903	$495	-$467	-$39,895	+10	R3P1	+10
R3-4	-$8,604	-$8,046	-$11,455	-$12,306	-$36,443	+10	R3P2	+10
R3-5	-$10,952	-$7,497	-$13,443	-$14,081	-$40,631	+10	R3P2	+10
R3-6	-$13,879	-$9,546	-$16,724	-$17,106	-$44,795	+10	R3P2	+10
R3-7	-$12,437	-$9,368	-$15,972	-$16,624	-$44,681	+10	R3P2	+10
R3-8	$6,269	$10,978	$10,427	$10,154	-$33,177	+10	R3P1	+10
R3-9	$21,777	$33,172	$32,887	$33,918	-$7,904	+30	R3P1	+30
R3-10	$54,721	$115,738	$157,575	$194,603	$178,292	+30	R3P1	+30
R3-11	$29,313	$44,573	$49,252	$53,628	$13,442	+30	R3P1	+30
R3-12	$46,295	$80,649	$104,132	$127,568	$103,900	+30	R3P1	+30
R3-13	$37,990	$42,943	$42,354	$41,955	$656	+10	R3P1	+30
R3-14	$107,187	$125,032	$125,659	$128,119	$74,087	+30	R3P1	+30
R3-15	$53,578	$57,577	$56,864	$56,257	$11,006	+10	R3P1	+30
R3-16	$42,516	$44,866	$45,067	$44,743	$13,220	+20	R3P1	+30
R3-17	$70,535	$75,378	$76,840	$77,139	$32,760	+30	R3P1	+30
R3-18	$76,242	$84,878	$86,728	$88,165	$42,842	+30	R3P1	+30
R3-19	$77,587	$81,617	$83,045	$82,970	$38,210	+20	R3P1	+30
R3-20	$239,534	$274,140	$287,533	$294,440	$252,339	+30	R3P1	+30
R3-21	$90,529	$112,124	$118,304	$123,926	$80,356	+30	R3P1	+30
R3-22	$60,602	$71,894	$70,982	$72,274	$30,460	+30	R3P1	+30
R3-23	$45,841	$55,004	$53,541	$54,111	$17,947	+10	R3P1	+30
R4-1	$57,579	$60,774	$59,376	$59,220	-$1,796	+10	R4P1	+10
R4-2	$56,114	$69,534	$65,479	$66,614	-$9,366	+10	R4P1	+10
R4-3	-$5,402	-$1,372	-$6,935	-$7,651	$1,532	+10	R4P2	+10
R4-4	-$1,736	-$1,313	-$3,208	-$3,895	$1,471	+10	R4P2	+10
R4-5	$22,248	$25,615	$23,096	$22,401	-$848	+10	R4P1	+10
R4-6	-$405	$3,772	$3,267	$2,791	-$3,672	+10	R4P2	+10

TABLE B-36 (CONTINUED)
LOCALLY PREFERRED PLAN
ADDED REACHES R1-1 TO R1-10 AND R1-17 TO R1-24

Model Reach	Summed Net Benefits No added Dune Width	Summed Net Benefits 10-ft added Dune Width	Summed Net Benefits 20-ft added Dune Width	Summed Net Benefits 30-ft added Dune Width	Summed Net Benefits 40-ft added Dune Width	Maximized Added Dune width by Sub-Reach	Profile	LPP Added Dune Width
R5-1	$101,205	$98,415	$95,873	$95,109	$5,332	+00	R5P2	+10
R5-2	$70,355	$68,018	$64,932	$63,312	$5,423	+00	R5P2	+10
R5-3	$37,513	$37,398	$33,074	$31,024	$4,439	+00	R5P2	+10
R5-4	$11,335	$10,860	$6,833	$3,971	$4,502	+00	R5P2	+10
R5-5	$1	$3,602	-$1,157	-$3,562	$1,157	+10	R5P2	+10
R5-6	$140,226	$157,419	$154,409	$151,764	-$14,183	+10	R5P1	+10
R5-7	$200,024	$214,153	$209,752	$206,797	-$9,729	+10	R5P1	+10
R5-8	$86,384	$100,229	$95,839	$93,221	-$9,455	+10	R5P1	+10
R5-9	$12,641	$15,448	$8,646	$6,694	$3,995	+10	R5P2	+10
R5-10	$16,735	$17,865	$12,965	$11,068	$3,770	+10	R5P2	+10
R5-11	$22,492	$25,100	$18,724	$16,681	$3,768	+10	R5P2	+10
R5-12	$19,276	$19,473	$16,094	$14,321	$3,182	+10	R5P2	+10
R5-13	$17,898	$23,227	$15,965	$13,943	$1,934	+10	R5P2	+10
R5-14	$15,842	$18,371	$12,358	$10,452	$3,484	+10	R5P2	+10
R5-15	$22,419	$23,919	$18,097	$15,770	$4,322	+10	R5P2	+10
R5-16	$25,421	$31,720	$27,972	$26,043	-$2,551	+10	R5P2	+10
R5-17	$6,949	$10,436	$4,477	$3,815	$2,472	+10	R5P3	+10
R5-18	$24,250	$25,944	$22,209	$20,851	$2,041	+10	R5P2	+10
R5-19	$462	$4,253	$70	$647	$392	+10	R5P3	+10
R5-20	-$563	$825	-$3,538	-$5,666	$2,975	+10	R5P2	+10
R5-21	$135	$985	-$3,266	-$5,468	$3,401	+10	R5P2	+10
R5-30	$31,359	$32,542	$27,446	$25,763	-$4,71	+10	R5P2	+10
R5-31	$39,204	$40,628	$34,506	$32,596	$2,163	+10	R5P2	+10
R5-32	$93,797	$116,901	$120,434	$119,260	$77,242	+20	R5P1	+10
R5-33	$70,338	$76,230	$72,162	$69,274	$25,221	+10	R5P1	+10
R5-34	$47,939	$51,558	$46,369	$43,212	-$235	+10	R5P1	+10
R5-35	$52,939	$56,658	$52,726	$49,924	$8,037	+10	R5P1	+10
R5-36	$97,937	$124,305	$126,632	$126,125	$83,916	+20	R5P1	+10
R5-37	$76,094	$79,651	$74,974	$71,484	$28,353	+10	R5P1	+10
R5-38	$97,013	$107,768	$99,436	$95,873	$48,203	+10	R5P1	+10
R5-39	$90,626	$91,422	$88,855	$86,031	$41,575	+10	R5P1	+10
R5-40	$49,424	$47,040	$44,289	$42,296	$11,247	+00	R5P2	+10

TABLE B-36 (CONTINUED)
LOCALLY PREFERRED PLAN
ADDED REACHES R1-1 TO R1-10 AND R1-17 TO R1-24

Model Reach	Summed Net Benefits No added Dune Width	Summed Net Benefits 10-ft added Dune Width	Summed Net Benefits 20-ft added Dune Width	Summed Net Benefits 30-ft added Dune Width	Summed Net Benefits 40-ft added Dune Width	Maximized Added Dune width by Sub-Reach	Profile	LPP Added Dune Width
R5-41	$44,150	$42,989	$39,376	$37,311	$6,701	+00	R5P2	+10
R5-42	$28,280	$28,539	$23,859	$21,635	-$8,858	+10	R5P2	+10
R5-43	$17,851	$17,377	$13,587	$11,494	-$17,881	+00	R5P2	+10
R5-44	$3,985	$4,253	-$3	-$2,204	-$26,622	+10	R5P2	+10
R5-45	-$1,618	-$1,157	-$5,345	-$7,562	-$15,038	+10	R5P2	+10
R5-46	$621	$6,642	$2,709	$408	-$27,913	+10	R5P2	+10
R5-47	$2,923	$17,635	$15,037	$13,057	-$1,926	+10	R5P2	+10
R5-48	-$4,635	-$3,737	-$7,661	-$8,418	-$31,424	+10	R5P3	+10
R5-49	$5,033	$4,860	$3,240	$2,480	-$20,329	+00	R5P3	+10
R5-50	$9,987	$9,714	$7,843	$7,514	-$20,651	+00	R5P3	+10
R5-51	$21,836	$23,141	$19,461	$18,844	-$6,300	+10	R5P3	+10

LEGEND

CONSTRUCTION TEMPLATE 10 FEET OF ADDED DUNE WIDTH	+10
CONSTRUCTION TEMPLATE 30 FEET OF ADDED DUNE WIDTH	+30
ECONOMICALLY JUSTIFIED MODEL REACHES	

8.13 PERIODIC NOURISHMENT – LOCALLY PREFERRED PLAN

The results of the Beach-*fx* runs with GENESIS information for the LPP alternative revealed that the nourishment cycle would also average five cycles, the initial fill and four renourishments suggesting a 10-year renourishment cycle.

From the 100 different realizations of alternative futures came the total project life nourishment volume of 11,024,000 cy and five nourishment cycles, the initial and four renourishments. The initial fill is estimated to require on average 3,868,000 cy and 7,156,000 cy total for the four renourishments an average 1,789,000 cy each. Renourishment summary statistics are presented in Tables B-37 and B-38. A frequency distribution of renourishment cycles obtained from one hundred possible realizations is produced in Table B-39.

TABLE B-37
LOCALLY PREFERRED PLAN PERIODIC NOURISHMENT
SUMMARY STATISTICS (VOLUMES IN CUBIC YARDS)

	Average
Average Total Nourishment Volume	11,024,000
Average Initial Construction Volume	3,868,000
Average Total Renourishment Volume	7,156,000
Average Number of Renourishments	4
Average Renourishment Volume	1,789,000

TABLE B-38
LOCALLY PREFERRED PLAN PERIODIC NOURISHMENT
CONFIDENCE INTERVALS (VOLUMES IN CUBIC YARDS)

Average Initial Construction Volume	3,152,000	
Standard Deviation	1,599,545	
95% Confidence Interval	1,913,051	2,237,091
90% Confidence Interval	1,862,647	2,287,494
Average Total Renourishment Volume	7,156,000	
Standard Deviation	4,088,020	
95% Confidence Interval	5,388,314	6,990,788
90% Confidence Interval	5,517,131	6,861,970

TABLE B-39
NOURISHMENT FREQUENCY DISTRIBUTION
100 POSSIBLE FUTURE REALIZATIONS

Number of Nourishments	Number of Occurrences
0	0
1	0
2	0
3	14
4	34
5	29
6	19
7	4
8	0
9	0
10	0

8.14 LOCALLY PREFERRED PLAN AND RENOURISHMENTS

Beach-*fx* simulation runs supplemented with the GENESIS long-term transport data suggested an average of four renourishment cycles over the 50-year project life for the LPP.

8.15 SUMMARY BENEFIT ANALYSIS – LOCALLY PREFERRED PLAN

The NED Plan and the LPP maintain the same placement template (see Figure B-6) but the LPP extends the coverage area to the westernmost limits of the county where the NED Plan could not justify the coverage. Table B-40 presents the LPP benefits by reach and Table B-41 summarized the costs, benefits and other pertinent information on project justification for the LPP.

The Beach-*fx* modeling efforts have predicted initial fill requirements of 3,152,000 cy for the LPP. Recent surveys have shown that the erosion activity that has occurred since the post-Hurricane Ivan surveys would require an equivalent LPP placement. If the long-term erosion rate is applied to the predicted construction timeframe of FY 14, then the necessary beach fill requirements will be 3,868,000 cy. Renourishments will still be on a 10-year cycle and the renourishment volume is 1,789,000 for the LPP.

The FY 2013 initial construction costs are $61,397,000 and a single renourishment FY 2013 cost is $26,760,000. Renourishment costs for each fill are lower than the FY 2013 cost due to present worthing. Total project cost including interest during construction for this plan is $103,598,300. The average annual construction cost is about $4,618,000 and annual OMRR&R is $168,000 making total average annual costs of $4,786,000. The annualized benefits, $7,570,000, include both HSDR benefits of about $7,555,000 and recreation benefits of about $15,000. The BCR is 1.58 to 1 which yields net benefits of about $2,784,000. Tables B-40 and B-41 summarize the costs, benefits and other pertinent information on project justification for the LPP.

The average annual incremental cost of the LPP over the NED Plan is $618,000. The average annual incremental benefits of the LPP verses the NED Plan is $190,000. The incremental cost between the LPP and the NED Plan is 100 percent non-Federal responsibility.

TABLE B-40
WALTON COUNTY - LOCALLY PREFERRED PLAN
BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R1-1	R1P1	+10	$2,968
R1-2	R1P1	+10	$1,996
R1-3	R1P1	+10	$2,193
R1-4	R1P1	+10	$2,328
R1-5	R1P1	+10	$2,021
R1-6	R1P1	+10	$2,809
R1-7	R1P1	+10	$3,555
R1-8	R1P1	+10	$3,116
R1-9	R1P1	+10	$3,833
R1-10	R1P1	+10	$2,655
R1-11	R1P1	+10	$120,608
R1-12	R1P1	+10	$9,880
R1-13	R1P1	+10	$299,683
R1-14	R1P1	+10	$217,062
R1-15	R1P2	+30	$341,492
R1-16	R1P2	+30	$280,917
R1-17	R1P2	+30	$32,987
R1-18	R1P2	+30	$38,156
R1-19	R1P2	+30	$26,922
R1-20	R1P2	+30	$9,227
R1-21	R1P1	+10	$1,880
R1-22	R1P1	+10	$2,732
R1-23	R1P1	+10	$2,028
R1-24	R1P1	+10	$10,942
R2-1	R2P1		
R2-2	R2P1		
R2-3	R2P2		
R2-4	R2P1		
R2-5	R2P2		
R2-6	R2P1		
R2-7	R2P1		
R3-1	R3P1		
R3-2	R3P1	+10	$151,815
R3-3	R3P1	+10	$36,755
R3-4	R3P2	+10	$7,900

TABLE B-40 (CONTINUED)
WALTON COUNTY - LOCALLY PREFERRED PLAN
BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R3-5	R3P2	+10	$10,419
R3-6	R3P2	+10	$10,386
R3-7	R3P2	+10	$15,819
R3-8	R3P1	+10	$60,253
R3-9	R3P1	+30	$90,386
R3-10	R3P1	+30	$294,486
R3-11	R3P1	+30	$122,825
R3-12	R3P1	+30	$223,182
R3-13	R3P1	+30	$115,932
R3-14	R3P1	+30	$264,362
R3-15	R3P1	+30	$138,857
R3-16	R3P1	+30	$105,845
R3-17	R3P1	+30	$170,269
R3-18	R3P1	+30	$189,346
R3-19	R3P1	+30	$182,292
R3-20	R3P1	+30	$456,983
R3-21	R3P1	+30	$222,634
R3-22	R3P1	+30	$158,622
R3-23	R3P1	+30	$126,427
R3-24	R3P2		
R3-25	R3P2		
R3-26	R4P1		
R4-1	R4P1	+10	$74,910
R4-2	R4P1	+10	$54,127
R4-3	R4P2	+10	$0
R4-4	R4P2	+10	$0
R4-5	R4P1	+10	$36,920
R4-6	R4P2	+10	$6,393
R4-7	R4P2		
R4-8	R4P1		
R4-9	R4P1		
R5-1	R5P2	+10	$117,769
R5-2	R5P2	+10	$82,853
R5-3	R5P2	+10	$50,375
R5-4	R5P2	+10	$22,139
R5-5	R5P2	+10	$16,720

TABLE B-40 (CONTINUED)
WALTON COUNTY - LOCALLY PREFERRED PLAN
BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R5-6	R5P1	+10	$233,335
R5-7	R5P1	+10	$331,279
R5-8	R5P1	+10	$151,886
R5-9	R5P2	+10	$27,686
R5-10	R5P2	+10	$30,961
R5-11	R5P2	+10	$42,883
R5-12	R5P2	+10	$32,159
R5-13	R5P2	+10	$39,251
R5-14	R5P2	+10	$31,676
R5-15	R5P2	+10	$37,350
R5-16	R5P2	+10	$47,828
R5-17	R5P3	+10	$24,882
R5-18	R5P2	+10	$39,531
R5-19	R5P3	+10	$14,183
R5-20	R5P2	+10	$12,654
R5-21	R5P2	+10	$13,454
R5-22	R5P3		
R5-23	R5P3		
R5-24	R5P2		
R5-25	R5P2		
R5-26	R5P1		
R5-27	R5P3		
R5-28	R5P3		
R5-29	R5P2		
R5-30	$41,615	+10	$44,315
R5-31	$54,424	+10	$65,452
R5-32	$135,413	+10	$155,318
R5-33	$89,447	+10	$100,014
R5-34	$64,991	+10	$71,684
R5-35	$68,957	+10	$77,470
R5-36	$147,407	+10	$166,641
R5-37	$98,230	+10	$104,860
R5-38	$123,595	+10	$134,036

TABLE B-40 (CONTINUED)
WALTON COUNTY - LOCALLY PREFERRED PLAN
BENEFITS

Model Reach	Profile	Constructed Added Dune Width	Average Annual Benefits
R5-39	$108,862	+10	$112,205
R5-40	$57,539	+10	$60,081
R5-41	$54,804	+10	$57,009
R5-42	$39,019	+10	$40,735
R5-43	$26,194	+10	$28,107
R5-44	$11,719	+10	$12,618
R5-45	$8,952	+10	$9,751
R5-46	$15,328	+10	$18,678
R5-47	$24,451	+10	$32,068
R5-48	$6,763	+10	$7,394
R5-49	$23,356	+10	$23,588
R5-50	$29,212	+10	$29,640
R5-51	$41,083	+10	$42,370
Average Annual Benefits LPP			**$7,554,927**

TABLE B-41
SUMMARY BENEFITS LPP
WALTON COUNTY, FLORIDA – FEASIBILITY

	FY 2013 Dollars	Category
	$61,397,000	2014 Initial Construction
	$16,561,078	2024 Renourishment
	$11,460,605	2034 Renourishment
	$7,930,973	2044 Renourishment
	$5,488,396	2054 Renourishment
Total Economic First Cost	$102,838,052	
Interest During Construction	$760,000	
Total Project Economic First Cost	$103,598,000	
Average Annual Economic First Cost	$4,618,000	
Annual OMRR&R	$168,000	
Total Average Annual Economic Cost	$4,786,000	
Average Annual HSDR Benefits	$7,555,000	
Average Annual Recreation Benefits	$15,000	
Total Average Annual Benefits	$7,570,000	
Benefit-to-Cost Ratio	1.58	
Net Benefits	$2,784,000	

Attachment IV of this Appendix displays access points and associated parking.

8.16 SYSTEM OF ACCOUNTS

Principles and Guidelines prescribe for an evaluation of project benefits for the final array of alternatives and the selected plan according to the four accounts: National Economic Development (NED), Regional Economic Development (RED), Other Social Effects (OSE), and Environmental Quality (EQ).

The NED benefits were fully and illustratively presented throughout the economic analysis. Regional Economic Development Benefits are calculated using the Economic Impact Forecasting System (EIFS). EIFS is an regional economic impact assessment model that uses economic multipliers and a database of economic and financial statistics by county to measure the economic and financial impact to a community through various increases and/or decreases in economic activity in that community.

The evaluation of the System of Accounts is displayed in Table B-42.

TABLE B-42
SYSTEM OF ACCOUNTS

Item	No Action	Acquisition	NED Plan	LPP
Problem Area: Walton County, Florida				
Problems ID: Damages suffered by hurricane-induced surge and wave attack; Potential future damages from storm and hurricane events.				
Item	**No Action**	**Acquisition**	**NED Plan**	**LPP**
A. PLAN DESCRIPTION	No Federal Action	Buyout all row one damageable elements and land	Construct a 50-foot beach fill project in five reaches	Construct a 50-foot beach fill project in five reaches
B. IMPACT ASSESSMENT				
1. National Economic Development				
a. Beneficial Impacts				
(1) Damages Prevented	$0	$3,106,000	$7,365,000	$7,555,000
(2) Emergency Costs Avoided	$0	$0	$0	$0
(3) Recreation	$0	$0	$15,000	$15,000
(4) Total Beneficial Impacts	None.	$3,106,000	$7,380,000	$7,570,000
b. Adverse Impacts				
(1) Project Cost	$0	$3,420,000,000	$90,081,000	$102,838,000
(2) Interest During Construction	$0	$32,665,600	$643,000	$760,000
(3) Average Annual First Cost	N/A	$193,303,000	$4,044,000	$4,618,000
(4) Annual OMRR&R	$0		$124,500	$168,000
(5) Total Avg. Annual Costs	$0	$193,303,000	$4,168,000	$4,786,000
2. Environmental Quality (EQ)				
(1) Ecosystem Restoration	No ecosystem restoration benefits.	Significantly Increased dune habitat from added dune width	Increased habitat from added dune and berm width	Increased habitat from added dune and berm width
(2) Water Circulation	No anticipated effect on water circulation.	No anticipated effect on water circulation.	No anticipated effect on water circulation.	No anticipated effect on water circulation.
(3) Noise Level Changes	No change in noise levels	No change in noise levels	Temporary increase in noise levels during construction	Temporary increase in noise levels during construction
(4) Public Facilities	N/A	N/A	N/A	N/A
(5) Aesthetic Values	No significant change in aesthetic values	Significant increase to aesthetic improvement	Significant increase to aesthetic improvement	Significant increase to aesthetic improvement
(6) Natural Resources	No impact.	Alternative would result in restoration of coastal marsh resources.	Alternative would result in restoration of coastal marsh resources.	Alternative would result in restoration of coastal marsh resources.
(7) Biological Resources	No impact.	Biological resources would be improved versus the no-action alternative.	Biological resources would be improved versus the no-action alternative.	Biological resources would be improved versus the no-action alternative.
(8) Air Quality	Alternative would have no anticipated effect on air quality	Air emission would be de minimus	Air emission would be de minimus	Air emission would be de minimus

TABLE B-42 (CONTINUED)
SYSTEM OF ACCOUNTS

Problem Area: Walton County, Florida				
Problems ID: Damages suffered by hurricane-induced surge and wave attack; Potential future damages from storm and hurricane events.				
Item	**No Action**	**Acquisition**	**NED Plan**	**LPP**
(9) Water Quality	No impact.	No impact.	Temporary negative impacts to water quality due to construction.	Temporary negative impacts to water quality due to construction.
(10) Public Services	Public services to community would continue to be interrupted during storm events	Public services to community would continue to be interrupted during storm events	Public services to community would continue to be interrupted during storm events	Public services to community would continue to be interrupted during storm events
(11) Cultural and Historical Preservation	No impact.	No impact.	No impact.	No impact.
(12) Total Quality of the Environment	No impact.	Environmental quality would be improved.	Environmental quality would be improved.	Environmental quality would be improved.
3. Regional Economic Development (RED)				
(1) Impact on Sales Volume	No impact.	Decrease of **$47,819,840** in sales volume.	Increase of **$167,576,000** in additional sales volume.	Increase of **$192,354,000** in additional sales volume.
(2) Impact on Income	No impact.	Decrease of **$35,723,610** in local income.	Increase of **$30,595,000** in additional local income.	Increase of **$35,119,000** in additional local income.
(3) Impact on Employment	No impact.	Decrease of **1141** jobs.	Increase of **1055** new jobs.	Increase of **1210** new jobs.
(4) Tax Changes	No impact.	Would result in loss of some local tax revenue due to acquisition of properties.	No Change	No Change
4. Other Social Effects (OSE)				
a. Beneficial Impacts				
(1) Security of Life, Health, and Safety	Continued risks to life, health and safety	Major reduction in potential loss of life of persons and property.	No appreciable difference	No appreciable difference
(2) Community Cohesion	No negative impact on community cohesion.	Community would be dispersed and/or relocated	No negative impact on community cohesion.	No negative impact on community cohesion.
(3) Tax Values	No Impact.	Ownership and land use changes would impact tax value	Increase due to enhanced property values	Increase due to enhanced property values
(4) Community Growth	No Impact.	No Impact.	No Impact.	No Impact.

TABLE B-42 (CONTINUED)
SYSTEM OF ACCOUNTS

Problem Area: Walton County, Florida				
Problems ID: Damages suffered by hurricane-induced surge and wave attack; Potential future damages from storm and hurricane events.				
Item	**No Action**	**Acquisition**	**NED Plan**	**LPP**
(5) Property Values	No Impact.	Minor temporary negative impact to adjacent properties during acquisition phase.	Minor Positive impact to protected properties.	Minor Positive impact to protected properties.
(6) Displacement of Businesses	N/A	N/A	N/A	N/A
(7) Public Facilities	N/A	Enhances opportunities for additional public facilities for recreation	Minor improvement to recreational activities from increased beach	Minor improvement to recreational activities from increased beach
(8) Injurious Displacement of Farms	N/A	N/A	N/A	N/A
b. Preservation of loss of life	No Impact.	Some reduction in potential loss of life.	No Change	No Change
C. PLAN EVALUATION				
1. Contributions to Planning Objectives				
a. Flood, Hurricane and/or Storm Damage Reduction	No Improvement.	Total reduction in damages at project site and less stress on dune system.	Significant reduction of storm damages and loss of land	Significant reduction of storm damages and loss of land
b. Recovery of lost environmental resources	Continued loss of environmental resources.	Significant opportunity to recover environmental resources negatively impacted in past	Some Recovery of environmental resources through additional dune area for nesting birds, beach mice and turtles	Some Recovery of environmental resources through additional dune area for nesting birds, beach mice and turtles
2. Response to Planning Constraints				
a. Avoid environmental impacts and minimize induced damages	Continued loss of environmental resources.	Positive effect on environmental resources.	Positive effect on environmental resources.	Positive effect on environmental resources.
b. Institutional Acceptability	Not supported by state or local government	Not supported by state or local government	Is supported by local and state governments	Is supported by local and state governments
3. Response to Evaluation Criteria				
a. Acceptability	NO	NO	YES	YES
b. Completeness	NO	YES	YES	YES
c. Effectiveness	NO	YES	YES	YES
d. Efficiency (Cost-Effectiveness; i.e., most efficient use of Federal and Non-Federal Funds)	NO	NO	YES	Yes
e. Integration	N/A	N/A	N/A	N/A
f. Reversibility	N/A	NO - land could not be resold for development	YES - project nourishment can be abandoned	YES - project nourishment can be abandoned

TABLE B-42 (CONTINUED)
SYSTEM OF ACCOUNTS

Problem Area: Walton County, Florida				
Problems ID: Damages suffered by hurricane-induced surge and wave attack; Potential future damages from storm and hurricane events.				
Item	**No Action**	**Acquisition**	**NED Plan**	**LPP**
4. Stakeholder Preference Score (From MCDA weightings analysis)				
a. Summary Score	N/A	N/A	N/A	N/A
Cluster Group A	N/A	N/A	N/A	N/A
Cluster Group B	N/A	N/A	N/A	N/A
Cluster Group C	N/A	N/A	N/A	N/A
Cluster Group D	N/A	N/A	N/A	N/A
b. Stakeholder Preference	NO	NO	Stakeholder would approve.	Stakeholder Preference
D. Implementation Responsibility	No implementation responsibilities	Joint Federal/Non-Federal implementation responsibility.	Joint Federal/Non-Federal implementation responsibility.	Joint Federal/Non-Federal implementation responsibility.
E. State and other Non-Federal Coordination	No State or other Non-Federal coordination activities	Would require State or other Non-Federal coordination activities	Would require State or other Non-Federal coordination activities	Would require State or other Non-Federal coordination activities
F. Risk Evaluation				
1. Risk and Vulnerabilities				
a. Risk of Failure	N/A	Very low risk of failure	Moderate risk of failure.	Moderate risk of failure.
b. Residual Risk	Residual risk of all actions will remain substantial due to storm surge.	Residual risk of all properties purchased virtually eliminated	Residual risk of all actions will remain substantial due to storm surge.	Residual risk of all actions will remain substantial due to storm surge.
c. Reliability	N/A	This plan would provide a significant degree of reliability to properties purchased. Residents are moved out of harm's way.	This plan would provide a significant degree of reliability, would receive damage from storm events, and would require maintenance.	This plan would provide a significant degree of reliability, would receive damage from storm events, and would require maintenance.
d. Relative Sea Level Rise	Problems will be substantially exacerbated by an increasing relative rise of sea level	This Plan will be minimally impacted by an increasing relative rise of sea level over the period of analysis	This Plan will be minimally impacted by an increasing relative rise of sea level over the period of analysis	This Plan will be minimally impacted by an increasing relative rise of sea level over the period of analysis
e. Risk of Ecosystem Damage	Ecosystem damage will continue to accrue at a rate at least that of recent history with substantial negative outcomes.	Ecosystem damage will continue to accrue at a rate at least that of recent history with substantial negative outcomes.	Ecosystem damage will continue to accrue at a rate at less than that of recent history with less substantial negative outcomes.	Ecosystem damage will continue to accrue at a rate at less than that of recent history with less substantial negative outcomes.

TABLE B-42 (CONTINUED)
SYSTEM OF ACCOUNTS

Problem Area: Walton County, Florida				
Problems ID: Damages suffered by hurricane-induced surge and wave attack; Potential future damages from storm and hurricane events.				
Item	**No Action**	**Acquisition**	**NED Plan**	**LPP**
f. Risk to Life and Safety	Significant threats to Life and Safety from storm surge will continue. Damages to front row structures and contents will be substantial.	Significant threats to Life and Safety from storm surge will continue. Damages to front row structures would be eliminated.	Significant threats to Life and Safety from storm surge will continue. Damages to front row structures and contents substantially reduced.	Significant threats to Life and Safety from storm surge will continue. Damages to front row structures and contents substantially reduced.
g. Risk to Mental and Physical Health	N/A	N/A	N/A	N/A
2. Recommendations and Preferences				
a. Federal Recommendation			The NED Plan is the plan that maximizes net benefits	
b. Stakeholder Preference	No clear stakeholder preference indicated, but all action plans preferred to no action plan.			The Locally Preferred Plan provides a higher level of protection over the NED Plan but is more costly. The sponsor is willing to pay 100 percent of the additional cost for this added level of protection

9.0 SELECTING A PLAN

Based on plan comparison, it is apparent that implementation of a beach fill plan will satisfy the study objectives and provide hurricane and storm damage reduction and environmental restoration along the coastline of Walton County, Florida. Further, both the NED and LPP beach fill plans were found superior to the Acquisition and No Action plans in each of the System of Accounts. Of the plans considered the non-Federal sponsor has expressed their desire to implement the LPP. Projects may deviate from the NED Plan if requested by the non-Federal sponsor and approved by the Assistant Secretary of the Army for Civil Works (ASA (CW)). A waiver, that the LPP be considered for recommendation, was requested and on February 7, 2012, was approved by the ASA (CW). As such, the LPP is the selected plan.

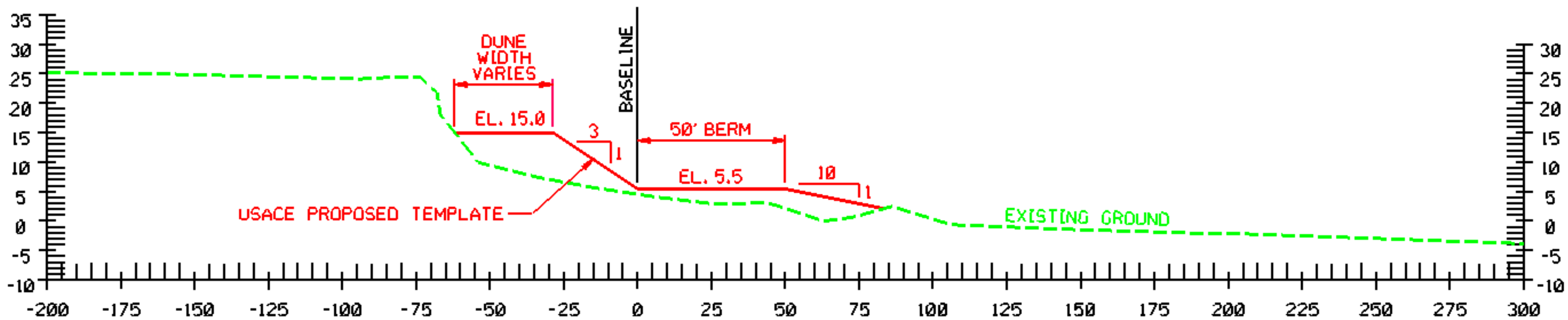
9.1 PLAN DETAILS

9.1.1 NED and Selected Plan for Construction with Renourishments

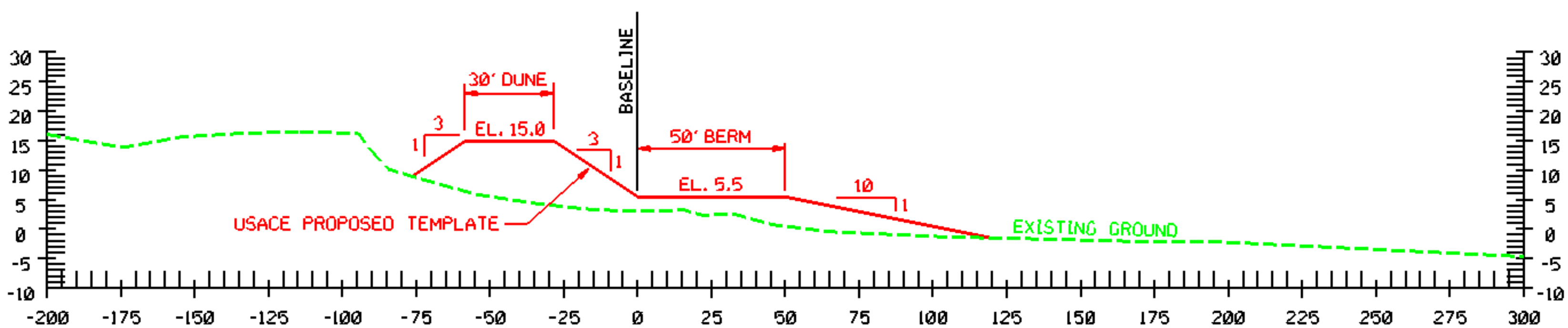
The modeling efforts have predicted initial fill requirements of 2,639,000 cy for the NED Plan and a selected plan requirement of 3,152,000 cy. The two plans maintain the same placement template (see Figure B-6) but the selected plan extends the coverage area to the westernmost limits of the county where the NED Plan could not justify the coverage. If this condition accounts for depletion rates to the predicted construction timeframe of FY 14, then the necessary beach fill requirements will be 3,273,000 cy and 3,868,000 cy for the NED and selected plan, respectively.

Renourishments will still be on a 10-year cycle and the renourishment volumes are 1,585,000 and 1,789,000 for the NED and selected plan, respectively. The nearness of the renourishment volumes for both plans is explained by the characteristics of the 18 added selected plan reaches on the western end of the project which is a generally accreting area. Only three of the 18 reaches are eroding while the remaining are generally accreting.

Approved and sufficient borrow sources lie offshore within the State of Florida waters.



TYPICAL SECTION "A"



TYPICAL SECTION "B"

FIGURE B-6. TYPICAL PROJECT SECTIONS TO BE CONSTRUCTED

10.0 COST SHARE

Federal cost sharing in the ratio of 65 to 35 on developed private land, 0 to 100 percent on undeveloped private lands, 50 to 50 on undeveloped public land 65 to 35 on developed public lands, is authorized when reaches are found to be constructible, environmentally sustainable and economically justified. Portions of the project which do not meet these criteria are a 100 percent non-Federal partner's expense. The NED cost share percentages are 30 percent Federal and 70 percent non-Federal. The selected plan cost share percentages are 26 percent Federal and 74 percent non-Federal. Tables B-43 and B-44 present the calculated Federal and non-Federal cost share both plans. Tables B-45 and B-45A exhibit the difference between the NED and the selected plan. Note that while some sub-reaches qualify for Federal participation based on parking and access, sub-reaches that contain an asterisk in the last column designate that all or a portion of the reach is in a CBRA zone. Only work outside the CBRA zone can be cost shared. Any work within the CBRA would be 100 percent non-Federal funded.

Table B-46 demonstrates if a particular reach qualifies for cost share based on adequacy of public access and parking. The analysis of adequate parking along the beaches requires either a beach capacity or peak user day point of view. Since the beach capacity is greater than the peak day visitation, the peak user day analysis is used. The most recent peak day visitation at Walton County beaches, which occurred on the past July 4, 2009 holiday, was estimated at 13,537 visits. The location of beach access points is publicly available on the World Wide Web supported by Walton County. Assumptions of the analysis are (1) The demand for public parking originates from both resident and non-residents population; (2) Beach rentals on the beach that have access to the beach contribute to the supply of parking in absolute parking space terms without turnover; (3) The large county beach access and parking available at Miramar Beach and other such large day use areas, are very popular and highly attended areas. These will on peak day operate at full parking capacity; the average daily turnover rate on purely public parking is 1.5 times. Assuming 4.5 persons per vehicle each parking space accommodates 6.75 visits per day[5]. Surplus and deficits in any reach is available to be used within a quarter mile radius of the loci of the parking supply except near the large day use areas whose supply is completely used.

Parking and access reflected in this report is what is anticipated at the time of project implementation and the non-Federal sponsor has accepted the requirement to fund those reaches that do not provide adequate parking. The non-Federal sponsor has indicated that over the project life it is possible that additional parking and access may be provided which would change cost sharing in the future.

[5] Statistics obtained from on the ground observations in neighboring Bay County Florida and used in the Panama City Beach, Florida Hurricane and Storm Damage Feasibility Report, revised 1996

TABLE B-43
NED PLAN COST SHARE FEDERAL AND NON-FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
			65%	0%	50%	65%	65%	0%	50%	65%					
			35%	100%	50%	35%	35%	100%	50%	35%					
1	R1-1	1150	1,150	0	0	0	0	0%	0%	0%		0.0%	0.0000		
2	R1-2	1102	560	0	0	0	0	0%	0%	0%		0.0%	0.0000		
3	R1-3	1044	0	0	0	0	0	0%	0%	0%		0.0%	0.0000		
4	R1-4	1002	102	0	0	0	0	0%	0%	0%		0.0%	0.0000		
5	R1-5	1062	1,062	0	0	0	0	0%	0%	0%		0.0%	0.0000		
6	R1-6	1045	998	0	0	0	0	0%	0%	0%		0.0%	0.0000		
7	R1-7	1003	1,003	0	0	0	0	0%	0%	0%		0.0%	0.0000		
8	R1-8	1061	984	0	0	0	0	0%	0%	0%		0.0%	0.0000		
9	R1-9	1014	984	0	0	0	0	0%	0%	0%		0.0%	0.0000		
10	R1-10	959	100	0	0	0	0	0%	0%	0%	0.0012	0.0%	0.0000	100.00%	
11	R1-11	1021	955	66	0	0	94%	6%	0%	0%	0.0127	0.0%	0.0000	100.00%	Construction Reach One
12	R1-12	1057	1057	0	0	0	100%	0%	0%	0%	0.0132	65.0%	0.0086	35.00%	
13	R1-13	1040	1,040	0	0	0	100%	0%	0%	0%	0.0130	65.0%	0.0084	35.00%	
14	R1-14	1051	1,051	0	0	0	100%	0%	0%	0%	0.0131	65.0%	0.0085	35.00%	
15	R1-15	998	923	75	0	0	92%	8%	0%	0%	0.0124	60.1%	0.0075	39.89%	
16	R1-16	1025	883	142	0	0	86%	14%	0%	0%	0.0128	56.0%	0.0071	44.01%	
17	R1-17	1114	100	0	0	0	0	0%	0%	0%	0.0012	62.3%	0.0080	37.66%	
18	R1-18	1133	1,033	100	0	0	0	9%	0%	0%		0.0%	0.0000		
19	R1-19	1058	1,058	0	0	0	0	0%	0%	0%		0.0%	0.0000		
20	R1-20	961	961	0	0	0	0	0%	0%	0%		0.0%	0.0000		
21	R1-21	952	952	0	0	0	0	0%	0%	0%		0.0%	0.0000		
22	R1-22	1028	1,028	0	0	0	0	0%	0%	0%		0.0%	0.0000		
23	R1-23	1086	956	130	0	0	0	12%	0%	0%		0.0%	0.0000		
24	R1-24	1139	1139	0	0	0	0	0%	0%	0%		0.0%	0.0000		
Construction Reach One Sub Totals													0.0481		6391.2

TABLE B-43 (CONTINUED)
NED PLAN COST SHARE FEDERAL AND NON-FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
25	R2-1	495	0	0	0	0	0%	0%	0%	0%					
26	R2-2	936	0	0	0	0	0%	0%	0%	0%					
27	R2-3	2160	0	0	0	0	0%	0%	0%	0%					
28	R2-4	2066	0	0	0	0	0%	0%	0%	0%					
29	R2-5	1001	0	0	0	0	0%	0%	0%	0%					
30	R2-6	10078	0	0	0	0	0%	0%	0%	0%					
31	R2-7	1040	0	0	0	0	0%	0%	0%	0%					
32	R3-1	1147	0	0	100	0	0%	0%	9%	0%	0.0012	0.0%	0.0000	100.00%	*
33	R3-2	1037	838	199	0	0	81%	19%	0%	0%	0.0129	0.0%	0.0000	100.00%	Construction Reach Two
34	R3-3	1052	904	148	0	0	86%	14%	0%	0%	0.0131	0.0%	0.0000	100.00%	
35	R3-4	1026	914	112	0	0	89%	11%	0%	0%	0.0128	57.9%	0.0074	42.10%	
36	R3-5	1121	1,121	0	0	0	100%	0%	0%	0%	0.0140	65.0%	0.0091	35.00%	
37	R3-6	1185	1,115	70	0	0	94%	6%	0%	0%	0.0148	0.0%	0.0000	100.00%	
38	R3-7	1156	1,120	36	0	0	97%	3%	0%	0%	0.0144	0.0%	0.0000	100.00%	
39	R3-8	1103	909	194	0	0	82%	18%	0%	0%	0.0137	53.6%	0.0074	46.43%	
40	R3-9	1058	875	183	0	0	83%	17%	0%	0%	0.0132	53.8%	0.0071	46.25%	
41	R3-10	1068	1,068	0	0	0	100%	0%	0%	0%	0.0133	65.0%	0.0086	35.00%	
42	R3-11	1045	794	55	196	0	76%	5%	19%	0%	0.0130	58.8%	0.0076	41.24%	
43	R3-12	1007	824	100	83	0	82%	10%	8%	0%	0.0125	57.3%	0.0072	42.69%	
44	R3-13	1004	716	288	0	0	71%	29%	0%	0%	0.0125	46.4%	0.0058	53.65%	
45	R3-14	1345	960	385	0	0	71%	29%	0%	0%	0.0168	46.4%	0.0078	53.61%	
46	R3-15	1062	997	65	0	0	94%	6%	0%	0%	0.0132	0.0%	0.0000	100.00%	*
47	R3-16	732	732	0	0	0	100%	0%	0%	0%	0.0091	0.0%	0.0000	100.00%	*
48	R3-17	1017	758	259	0	0	75%	25%	0%	0%	0.0127	0.0%	0.0000	100.00%	
49	R3-18	1039	667	372	0	0	64%	36%	0%	0%	0.0129	0.0%	0.0000	100.00%	
50	R3-19	1036	1,036	0	0	0	100%	0%	0%	0%	0.0129	0.0%	0.0000	100.00%	
51	R3-20	1027	922	0	105	0	90%	0%	10%	0%	0.0128	63.5%	0.0081	36.53%	
52	R3-21	1029	903	126	0	0	88%	12%	0%	0%	0.0128	57.0%	0.0073	42.96%	

TABLE B-43 (CONTINUED)
NED PLAN COST SHARE FEDERAL AND NON-FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
53	R3-22	978	978	0	0	0	100%	0%	0%	0%	0.0122	65.0%	0.0079	35.00%	
54	R3-23	855	775	80	100	0	91%	9%	12%	0%	0.0107	0.0%	0.0000	100.00%	
55	R3-24	1115	0	200	100	0	0%	18%	9%	0%	0.0139	4.5%	0.0006	95.52%	
Construction Reach Two Sub Totals													0.0913		23,180.4
56	R3-25	1274	0	200	0	0	0%	16%	0%	0%	0.0159	0.0%	0.0000	100.00%	
57	R3-26	1082	0	100	0	0	0%	9%	0%	0%	0.0135	0.0%	0.0000	100.00%	
58	R4-1	1082	922	160	100	0	85%	15%	9%	0%	0.0135	0.0%	0.0000	100.00%	Construction Reach Three
59	R4-2	1126	970	156	0	0	86%	14%	0%	0%	0.0140	0.0%	0.0000	100.00%	
60	R4-3	982	0	0	982	0	0%	0%	100%	0%	0.0122	0.0%	0.0000	100.00%	
61	R4-4	942	0	0	942	0	0%	0%	100%	0%	0.0117	0.0%	0.0000	100.00%	
62	R4-5	998	786	70	142	0	79%	7%	14%	0%	0.0124	58.3%	0.0072	41.70%	
63	R4-6	971	0	0	971	0	0%	0%	100%	0%	0.0121	50.0%	0.0061	50.00%	
64	R4-7	1061	0	0		100	0%	0%	0%	9%	0.0000	0.0%	0.0000	100.00%	
Construction Reach Three Sub Totals													0.0139		6,300.8
65	R4-8	2119	0				0%	0%	0%	0%					
66	R4-9	2075	0			100	0%	0%	0%	5%	0.0000	0.0%	0.0000	100.00%	*
67	R5-1	993	993	0	100	0	100%	0%	10%	0%	0.0124	0.0%	0.0000	100.00%	Construction Reach Four
68	R5-2	1003	805	198	0	0	80%	20%	0%	0%	0.0125	52.2%	0.0065	47.83%	
69	R5-3	1039	809	230	0	0	78%	22%	0%	0%	0.0129	50.6%	0.0066	49.38%	
70	R5-4	1304	1,224	80	0	0	94%	6%	0%	0%	0.0162	61.0%	0.0099	38.99%	
71	R5-5	1009	773	236	0	0	77%	23%	0%	0%	0.0126	49.8%	0.0063	50.20%	
72	R5-6	1062	858	204	0	0	81%	19%	0%	0%	0.0132	52.5%	0.0069	47.49%	
73	R5-7	1038	1,038	0	0	0	100%	0%	0%	0%	0.0129	65.0%	0.0084	35.00%	
74	R5-8	992	992	0	0	0	100%	0%	0%	0%	0.0124	0.0%	0.0000	100.00%	
75	R5-9	1027	881	146	0	0	86%	14%	0%	0%	0.0128	55.8%	0.0071	44.25%	
76	R5-10	1011	744	129	138	0	74%	13%	14%	0%	0.0126	54.7%	0.0069	45.34%	

TABLE B-43 (CONTINUED)
NED PLAN COST SHARE FEDERAL AND NON-FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
77	R5-11	1022	1,022	0	0	0	100%	0%	0%	0%	0.0127	65.0%	0.0083	35.00%	
78	R5-12	1018	578	440	0	0	57%	43%	0%	0%	0.0127	36.9%	0.0047	63.09%	
79	R5-13	1017	965	52	0	0	95%	5%	0%	0%	0.0127	61.7%	0.0078	38.33%	
80	R5-14	1005	876	129	0	0	87%	13%	0%	0%	0.0125	56.7%	0.0071	43.34%	
81	R5-15	1011	744	267	0	0	74%	26%	0%	0%	0.0126	47.8%	0.0060	52.17%	
82	R5-16	1035.2	443	592	0	0	43%	57%	0%	0%	0.0129	27.8%	0.0036	72.17%	
83	R5-17	942.6	824	119	0	0	87%	13%	0%	0%	0.0117	56.8%	0.0067	43.21%	
84	R5-18	999.9	689	311	0	0	69%	31%	0%	0%	0.0125	44.8%	0.0056	55.22%	
85	R5-19	1010.9	719	292	0	0	71%	29%	0%	0%	0.0126	46.2%	0.0058	53.78%	
86	R5-20	1028.6	487	168	374	0	47%	16%	36%	0%	0.0128	0.0%	0.0000	100.00%	*
87	R5-21	1122	684	438	100	0	61%	39%	9%	0%	0.0140	0.0%	0.0000	100.00%	*
88	R5-22	1029.7	0		100		0%	0%	10%	0%	0.0012	0.0%	0.0000	100.00%	
Construction Reach Four Sub Totals													0.1141		21,888.4
89	R5-23	1013	0				0%	0%	0%	0%					
90	R5-24	1022	0				0%	0%	0%	0%					
91	R5-25	1054	0				0%	0%	0%	0%					
92	R5-26	884	0				0%	0%	0%	0%					
93	R5-27	1044	0				0%	0%	0%	0%					
94	R5-28	1059	0				0%	0%	0%	0%					
95	R5-29	987	0	0	100		0%	0%	10%	0%	0.0000	0.0%	0.0000	100.00%	*
96	R5-30	1022	556	466	100		54%	46%	10%	0%	0.0127	0.0%	0.0000	100.00%	Construction Reach Five
97	R5-31	1015	737	278	0		73%	27%	0%	0%	0.0126	0.0%	0.0000	100.00%	
98	R5-32	985	985	0	0		100%	0%	0%	0%	0.0123	0.0%	0.0000	100.00%	
99	R5-33	1025	854	171	0		83%	17%	0%	0%	0.0128	54.2%	0.0069	45.84%	
100	R5-34	1038	936	102	0		90%	10%	0%	0%	0.0129	58.6%	0.0076	41.39%	
101	R5-35	1002	945	57	0		94%	6%	0%	0%	0.0125	61.3%	0.0077	38.70%	
102	R5-36	944	826	118	0		87%	13%	0%	0%	0.0118	0.0%	0.0000	100.00%	
103	R5-37	1020	820	200	0		80%	20%	0%	0%	0.0127	0.0%	0.0000	100.00%	

TABLE B-43 (CONTINUED)
NED PLAN COST SHARE FEDERAL AND NON-FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
104	R5-38	1094	945	149	0		86%	14%	0%	0%	0.0136	0.0%	0.0000	100.00%	
105	R5-39	1024	925	99	0		90%	10%	0%	0%	0.0128	0.0%	0.0000	100.00%	
106	R5-40	1010	848	162	0		84%	16%	0%	0%	0.0126	0.0%	0.0000	100.00%	
107	R5-41	1004	274	730	0		27%	73%	0%	0%	0.0125	0.0%	0.0000	100.00%	
108	R5-42	1023	0	1,023	0		0%	100%	0%	0%	0.0127	0.0%	0.0000	100.00%	
109	R5-43	1002	918	84	0		92%	8%	0%	0%	0.0125	0.0%	0.0000	100.00%	
110	R5-44	1001	1,001	0	0		100%	0%	0%	0%	0.0125	0.0%	0.0000	100.00%	
111	R5-45	969	969	0	0		100%	0%	0%	0%	0.0121	0.0%	0.0000	100.00%	
112	R5-46	988	682	306	0		69%	31%	0%	0%	0.0123	44.9%	0.0055	55.14%	
113	R5-47	1031	675	356	0		65%	35%	0%	0%	0.0128	42.5%	0.0055	57.45%	
114	R5-48	1026	1,026	0	0		100%	0%	0%	0%	0.0128	65.0%	0.0083	35.00%	
115	R5-49	1041	1,041	0	0		100%	0%	0%	0%	0.0130	65.0%	0.0084	35.00%	
116	R5-50	1032	862	170	0		84%	16%	0%	0%	0.0129	54.3%	0.0070	45.71%	
117	R5-51	1126	943	83	100		84%	7%	9%	0%	0.0140	58.9%	0.0083	41.12%	
Construction Reach Five Sub Totals													0.0651		22,519.2
	Reach with Transition Zone														
* Designates that all or portion of reach is in a CBRA zone (all work in CBRA zone will be 100% non-Federal funded)															
TOTAL FEDERAL COST SHARE													0.3320		
TOTAL NON FEDERAL COST SHARE													0.6680		
TOTAL CONSTRUCTED PROJECT LENGTH							80,280								80280.0

TABLE B-44
SELECTED PLAN COST SHARE FEDERAL AND NON FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
			65%	0%	50%	65%	65%	0%	50%	65%					
			35%	100%	50%	35%	35%	100%	50%	35%					
1	R1-1	1250	1,250	0	0	0	100%	0%	0%	0%	0.0127	0.0%	0.0000	100.00%	*
2	R1-2	1102	560	0	542	0	51%	0%	49%	0%	0.0112	0.0%	0.0000	100.00%	*
3	R1-3	1044	0	0	1,044	0	0%	0%	100%	0%	0.0106	0.0%	0.0000	100.00%	*
4	R1-4	1002	102	0	900	0	10%	0%	90%	0%	0.0102	0.0%	0.0000	100.00%	*
5	R1-5	1062	1,062	0	0	0	100%	0%	0%	0%	0.0108	0.0%	0.0000	100.00%	
6	R1-6	1045	998	47	0	0	96%	4%	0%	0%	0.0106	0.0%	0.0000	100.00%	
7	R1-7	1003	1,003	0	0	0	100%	0%	0%	0%	0.0102	0.0%	0.0000	100.00%	
8	R1-8	1061	984	77	0	0	93%	7%	0%	0%	0.0108	0.0%	0.0000	100.00%	
9	R1-9	1014	984	30	0	0	97%	3%	0%	0%	0.0103	0.0%	0.0000	100.00%	
10	R1-10	959	761	198	0	0	79%	21%	0%	0%	0.0097	0.0%	0.0000	100.00%	
11	R1-11	1021	955	66	0	0	94%	6%	0%	0%	0.0104	0.0%	0.0000	100.00%	Construction Reach One
12	R1-12	1057	1,057	0	0	0	100%	0%	0%	0%	0.0107	65.0%	0.0070	35.00%	
13	R1-13	1040	1,040	0	0	0	100%	0%	0%	0%	0.0106	65.0%	0.0069	35.00%	
14	R1-14	1051	1,051	0	0	0	100%	0%	0%	0%	0.0107	65.0%	0.0069	35.00%	
15	R1-15	998	923	75	0	0	92%	8%	0%	0%	0.0101	60.1%	0.0061	39.89%	
16	R1-16	1025	883	142	0	0	86%	14%	0%	0%	0.0104	56.0%	0.0058	44.01%	
17	R1-17	1114	667	447	0	0	60%	40%	0%	0%	0.0113	0.0%	0.0000	100.00%	
18	R1-18	1133	1,033	100	0	0	91%	9%	0%	0%	0.0115	0.0%	0.0000	100.00%	
19	R1-19	1058	1,058	0	0	0	100%	0%	0%	0%	0.0107	0.0%	0.0000	100.00%	
20	R1-20	961	961	0	0	0	100%	0%	0%	0%	0.0098	0.0%	0.0000	100.00%	
21	R1-21	952	952	0	0	0	100%	0%	0%	0%	0.0097	0.0%	0.0000	100.00%	
22	R1-22	1028	1,028	0	0	0	100%	0%	0%	0%	0.0104	0.0%	0.0000	100.00%	
23	R1-23	1086	956	130	0	0	88%	12%	0%	0%	0.0110	0.0%	0.0000	100.00%	
24	R1-24	1039	1039	0	0	0	100%	0%	0%	0%	0.0105	0.0%	0.0000	100.00%	
25	R2-1	495	100	0	0	0	20%	0%	0%	0%	0.0010	13.1%	0.0001	86.87%	
Construction Reach One Sub Totals															25,202.3

TABLE B-44 (CONTINUED)
SELECTED PLAN COST SHARE FEDERAL AND NON FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
26	R2-2	936	0	0	0	0	0%	0%	0%	0%					
27	R2-3	2160	0	0	0	0	0%	0%	0%	0%					
28	R2-4	2066	0	0	0	0	0%	0%	0%	0%					
29	R2-5	1001	0	0	0	0	0%	0%	0%	0%					
30	R2-6	10078	0	0	0	0	0%	0%	0%	0%					
31	R2-7	1040	0	0	0	0	0%	0%	0%	0%					
32	R3-1	1147	0	0	100	0	0%	0%	9%	0%	0.0012	0.0%	0.0000	100.00%	*
33	R3-2	1037	838	199	0	0	81%	19%	0%	0%	0.0129	0.0%	0.0000	100.00%	Construction Reach Two
34	R3-3	1052	904	148	0	0	86%	14%	0%	0%	0.0131	0.0%	0.0000	100.00%	
35	R3-4	1026	914	112	0	0	89%	11%	0%	0%	0.0128	57.9%	0.0074	42.10%	
36	R3-5	1121	1,121	0	0	0	100%	0%	0%	0%	0.0140	65.0%	0.0091	35.00%	
37	R3-6	1185	1,115	70	0	0	94%	6%	0%	0%	0.0148	0.0%	0.0000	100.00%	
38	R3-7	1156	1,120	36	0	0	97%	3%	0%	0%	0.0144	0.0%	0.0000	100.00%	
39	R3-8	1103	909	194	0	0	82%	18%	0%	0%	0.0137	53.6%	0.0074	46.43%	
40	R3-9	1058	875	183	0	0	83%	17%	0%	0%	0.0132	53.8%	0.0071	46.25%	
41	R3-10	1068	1,068	0	0	0	100%	0%	0%	0%	0.0133	65.0%	0.0086	35.00%	
42	R3-11	1045	794	55	196	0	76%	5%	19%	0%	0.0130	58.8%	0.0076	41.24%	
43	R3-12	1007	824	100	83	0	82%	10%	8%	0%	0.0125	57.3%	0.0072	42.69%	
44	R3-13	1004	716	288	0	0	71%	29%	0%	0%	0.0125	46.4%	0.0058	53.65%	
45	R3-14	1345	960	385	0	0	71%	29%	0%	0%	0.0168	46.4%	0.0078	53.61%	
46	R3-15	1062	997	65	0	0	94%	6%	0%	0%	0.0132	0.0%	0.0000	100.00%	*
47	R3-16	732	732	0	0	0	100%	0%	0%	0%	0.0091	0.0%	0.0000	100.00%	*
48	R3-17	1017	758	259	0	0	75%	25%	0%	0%	0.0127	0.0%	0.0000	100.00%	
49	R3-18	1039	667	372	0	0	64%	36%	0%	0%	0.0129	0.0%	0.0000	100.00%	
50	R3-19	1036	1,036	0	0	0	100%	0%	0%	0%	0.0129	0.0%	0.0000	100.00%	
51	R3-20	1027	922	0	105	0	90%	0%	10%	0%	0.0128	63.5%	0.0081	36.53%	
52	R3-21	1029	903	126	0	0	88%	12%	0%	0%	0.0128	57.0%	0.0073	42.96%	

TABLE B-44 (CONTINUED)
SELECTED PLAN COST SHARE FEDERAL AND NON FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
53	R3-22	978	978	0	0	0	100%	0%	0%	0%	0.0122	65.0%	0.0079	35.00%	
54	R3-23	855	775	80	100	0	91%	9%	12%	0%	0.0107	0.0%	0.0000	100.00%	
55	R3-24	1115	0	200	100	0	0%	18%	9%	0%	0.0139	4.5%	0.0006	95.52%	
Construction Reach Two Sub Totals															23,180.4
56	R3-25	1274	0	200	0	0	0%	16%	0%	0%	0.0159	0.0%	0.0000	100.00%	
57	R3-26	1082	0	100	0	0	0%	9%	0%	0%	0.0135	0.0%	0.0000	100.00%	
58	R4-1	1082	922	160	100	0	85%	15%	9%	0%	0.0135	0.0%	0.0000	100.00%	Construction Reach Three
59	R4-2	1126	970	156	0	0	86%	14%	0%	0%	0.0140	0.0%	0.0000	100.00%	
60	R4-3	982	0	0	982	0	0%	0%	100%	0%	0.0122	0.0%	0.0000	100.00%	
61	R4-4	942	0	0	942	0	0%	0%	100%	0%	0.0117	0.0%	0.0000	100.00%	
62	R4-5	998	786	70	142	0	79%	7%	14%	0%	0.0124	58.3%	0.0072	41.70%	
63	R4-6	971	0	0	971	0	0%	0%	100%	0%	0.0121	50.0%	0.0061	50.00%	
64	R4-7	1061	0	0		100	0%	0%	0%	9%	0.0000	0.0%	0.0000	100.00%	
Construction Reach Three Sub Totals															6,300.8
65	R4-8	2119	0				0%	0%	0%	0%					
66	R4-9	2075	0			100	0%	0%	0%	5%	0.0000	0.0%	0.0000	100.00%	*
67	R5-1	993	993	0	100	0	100%	0%	10%	0%	0.0124	0.0%	0.0000	100.00%	Construction Reach Four
68	R5-2	1003	805	198	0	0	80%	20%	0%	0%	0.0125	52.2%	0.0065	47.83%	
69	R5-3	1039	809	230	0	0	78%	22%	0%	0%	0.0129	50.6%	0.0066	49.38%	
70	R5-4	1304	1,224	80	0	0	94%	6%	0%	0%	0.0162	61.0%	0.0099	38.99%	
71	R5-5	1009	773	236	0	0	77%	23%	0%	0%	0.0126	49.8%	0.0063	50.20%	
72	R5-6	1062	858	204	0	0	81%	19%	0%	0%	0.0132	52.5%	0.0069	47.49%	
73	R5-7	1038	1,038	0	0	0	100%	0%	0%	0%	0.0129	65.0%	0.0084	35.00%	
74	R5-8	992	992	0	0	0	100%	0%	0%	0%	0.0124	0.0%	0.0000	100.00%	
75	R5-9	1027	881	146	0	0	86%	14%	0%	0%	0.0128	55.8%	0.0071	44.25%	
76	R5-10	1011	744	129	138	0	74%	13%	14%	0%	0.0126	54.7%	0.0069	45.34%	

TABLE B-44 (CONTINUED)
SELECTED PLAN COST SHARE FEDERAL AND NON FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
77	R5-11	1022	1,022	0	0	0	100%	0%	0%	0%	0.0127	65.0%	0.0083	35.00%	
78	R5-12	1018	578	440	0	0	57%	43%	0%	0%	0.0127	36.9%	0.0047	63.09%	
79	R5-13	1017	965	52	0	0	95%	5%	0%	0%	0.0127	61.7%	0.0078	38.33%	
80	R5-14	1005	876	129	0	0	87%	13%	0%	0%	0.0125	56.7%	0.0071	43.34%	
81	R5-15	1011	744	267	0	0	74%	26%	0%	0%	0.0126	47.8%	0.0060	52.17%	
82	R5-16	1035.2	443	592	0	0	43%	57%	0%	0%	0.0129	27.8%	0.0036	72.17%	
83	R5-17	942.6	824	119	0	0	87%	13%	0%	0%	0.0117	56.8%	0.0067	43.21%	
84	R5-18	999.9	689	311	0	0	69%	31%	0%	0%	0.0125	44.8%	0.0056	55.22%	
85	R5-19	1010.9	719	292	0	0	71%	29%	0%	0%	0.0126	46.2%	0.0058	53.78%	
86	R5-20	1028.6	487	168	374	0	47%	16%	36%	0%	0.0128	0.0%	0.0000	100.00%	*
87	R5-21	1122	684	438	100	0	61%	39%	9%	0%	0.0140	0.0%	0.0000	100.00%	*
88	R5-22	1029.7	0		100		0%	0%	10%	0%	0.0012	0.0%	0.0000	100.00%	
Construction Reach Four Sub Totals															21,888.4
89	R5-23	1013	0				0%	0%	0%	0%					
90	R5-24	1022	0				0%	0%	0%	0%					
91	R5-25	1054	0				0%	0%	0%	0%					
92	R5-26	884	0				0%	0%	0%	0%					
93	R5-27	1044	0				0%	0%	0%	0%					
94	R5-28	1059	0				0%	0%	0%	0%					
95	R5-29	987	0	0	100		0%	0%	10%	0%	0.0000	0.0%	0.0000	100.00%	*
96	R5-30	1022	556	466	100		54%	46%	10%	0%	0.0127	0.0%	0.0000	100.00%	Construction Reach Five
97	R5-31	1015	737	278	0		73%	27%	0%	0%	0.0126	0.0%	0.0000	100.00%	
98	R5-32	985	985	0	0		100%	0%	0%	0%	0.0123	0.0%	0.0000	100.00%	
99	R5-33	1025	854	171	0		83%	17%	0%	0%	0.0128	54.2%	0.0069	45.84%	
100	R5-34	1038	936	102	0		90%	10%	0%	0%	0.0129	58.6%	0.0076	41.39%	
101	R5-35	1002	945	57	0		94%	6%	0%	0%	0.0125	61.3%	0.0077	38.70%	
102	R5-36	944	826	118	0		87%	13%	0%	0%	0.0118	0.0%	0.0000	100.00%	
103	R5-37	1020	820	200	0		80%	20%	0%	0%	0.0127	0.0%	0.0000	100.00%	

TABLE B-44 (CONTINUED)
SELECTED PLAN COST SHARE FEDERAL AND NON FEDERAL

Reach	Model Reach	Reach Length (ft)	Developed Private	Un Developed Private	Undeveloped Public	Developed Public	Percent Developed Private	Percent Undeveloped Private	Percent Undeveloped Public	Percent Developed Public	Ratio of Reach length	Federal Participation	Federal Share	Non Federal Participation	Construction Reach Length (FEET)
104	R5-38	1094	945	149	0		86%	14%	0%	0%	0.0136	0.0%	0.0000	100.00%	
105	R5-39	1024	925	99	0		90%	10%	0%	0%	0.0128	0.0%	0.0000	100.00%	
106	R5-40	1010	848	162	0		84%	16%	0%	0%	0.0126	0.0%	0.0000	100.00%	
107	R5-41	1004	274	730	0		27%	73%	0%	0%	0.0125	0.0%	0.0000	100.00%	
108	R5-42	1023	0	1,023	0		0%	100%	0%	0%	0.0127	0.0%	0.0000	100.00%	
109	R5-43	1002	918	84	0		92%	8%	0%	0%	0.0125	0.0%	0.0000	100.00%	
110	R5-44	1001	1,001	0	0		100%	0%	0%	0%	0.0125	0.0%	0.0000	100.00%	
111	R5-45	969	969	0	0		100%	0%	0%	0%	0.0121	0.0%	0.0000	100.00%	
112	R5-46	988	682	306	0		69%	31%	0%	0%	0.0123	44.9%	0.0055	55.14%	
113	R5-47	1031	675	356	0		65%	35%	0%	0%	0.0128	42.5%	0.0055	57.45%	
114	R5-48	1026	1,026	0	0		100%	0%	0%	0%	0.0128	65.0%	0.0083	35.00%	
115	R5-49	1041	1,041	0	0		100%	0%	0%	0%	0.0130	65.0%	0.0084	35.00%	
116	R5-50	1032	862	170	0		84%	16%	0%	0%	0.0129	54.3%	0.0070	45.71%	
117	R5-51	1126	943	83	100		84%	7%	9%	0%	0.0140	58.9%	0.0083	41.12%	
Construction Reach Five Sub Totals															22,519.2
	Reach with Transition Zone														
* Designates that all or portion of reach is in a CBRA zone (all work in CBRA zone will be 100% non-Federal funded)															
TOTAL CONSTRUCTED PROJECT LENGTH							99,091								99,091

TABLE B-45						
NED AND SELECTED PLAN - COSTS AND COST SHARE						
	NED Plan ($)	Percent	Selected Plan ($)	Percent	Change ($)	Change (%)
Initial Construction Cost	$51,945,000		$61,397,000		$9,452,000	
Federal	$17,298,000	33%	$17,298,000	28%	$0	-5%
Non-Federal	$34,647,000	67%	$44,099,000	72%	$9,452,000	5%
Total Renourishment Cost	$38,136,000		$41,441,000		$3,305,000	0%
Federal	$9,915,000	26%	$9,915,000	23%	$0	-2%
Non-Federal	$28,221,000	74%	$31,526,000	77%	$3,305,000	2%
Total Construction Cost	$90,081,000		$102,838,000		$12,757,000	0%
Federal	$27,072,000	30%	$27,072,000	26%	$0	-4%
Non-Federal	$63,009,000	70%	$75,766,000	74%	$12,757,000	4%

TABLE B-45A						
NED AND SELECTED PLAN AVERAGE ANNUAL EQUIVALENT COSTS AND COST SHARE						
	NED Plan ($)	Percent	Selected Plan ($)	Percent	Change ($)	Change (%)
Initial Construction Cost	$2,418,000		$2,858,000		$440,000	
Federal	$805,000	33%	$805,000	28%	$0	-2.5%
Non-Federal	$1,613,000	67%	$2,053,000	72%	$440,000	2.5%
Total Renourishment Cost	$1,775,000		$1,929,000		$154,000	
Federal	$462,000	26%	$462,000	23%	$0	-2.0%
Non-Federal	$1,314,000	74%	$1,468,000	77%	$154,000	2.0%
Total Construction Cost	$4,193,000		$4,787,000		$594,000	
Federal	$1,260,000	30%	$1,260,000	26%	$0	-2.3%
Non-Federal	$2,933,000	70%	$3,527,000	74%	$594,000	2.3%

Table B-46

Parking - Access - Cost Sharing Qualifying

Sub Reach	Model Reach	MAP ID	GIS -Database Access Name	GIS - Database Address	Large Day Use Public Areas and Access Points	Day Use Parking Spaces	Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)	Peak Day Parking Demand*	Rental Parking Spaces	Visits Rental Parking Will Support (4.5 persons per Vehicle)	Total Parking	Parking Adequate or Not Adequate	Neighboring Reaches Requisite Parking Provided From	Access Adequate or Not Adequate	Qualify for Cost Sharing Yes/No
1	R1-1					0	0	55	0	0	0	Not Adequate		Not Adequate	No ***
2	R1-2					0	0	55	22	99	99	Not Adequate		Adequate	No ***
3	R1-3	A1a	Miramar Beach Regional Access W (Parking/Access)	2375 Scenic Gulf Drive	2375 Scenic Gulf Drive	85	574	574	28	126	700	Adequate		Adequate	No ***
4	R1-4	A1b	Miramar Beach Regional Access E (Parking/Access)	2375 Scenic Gulf Drive		85	574	55	15	68	641	Adequate		Adequate	No ***
5	R1-5					0	0	55	16	72	72	Adequate		Adequate	No ***
6	R1-6					0	0	55	18	81	0	Not Adequate		Not Adequate	No ***
7	R1-7					0	0	55	0	0	0	Not Adequate		Not Adequate	No ***
8	R1-8					0	0	55	10	45	0	Not Adequate		Not Adequate	No ***
9	R1-9					0	0	55	3	14	14	Adequate	R1-10	Adequate	No ***
10	R1-10	A2	Scenic Gulf Drive Access ROW (Parking/Access)	Scenic Gulf Drive		100	675	55	33	149	824	Adequate		Adequate	No ***
11	R1-11					0	0	55	16	72	0	Not Adequate		Not Adequate	No
12	R1-12					0	0	55	31	140	140	Adequate		Adequate	Yes
13	R1-13	A3	Geronimo Street (Access)	735 Scenic Gulf Drive	735 Scenic Gulf Drive	0	0	55	76	342	342	Adequate		Adequate	Yes
14	R1-14					0	0	55	33	149	149	Adequate		Adequate	Yes
15	R1-15	A4	Norwood Drive (Access)	132 Norwood Drive	132 Norwood Drive	0	0	55	77	347	347	Adequate		Adequate	Yes

Table B-46 (Continued)															
Parking - Access - Cost Sharing Qualifying															
Sub Reach	**Model Reach**	**MAP ID**	**GIS -Database Access Name**	**GIS - Database Address**	**Large Day Use Public Areas and Access Points**	**Day Use Parking Spaces**	**Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)**	**Peak Day Parking Demand***	**Rental Parking Spaces**	**Visits Rental Parking Will Support (4.5 persons per Vehicle)**	**Total Parking**	**Parking Adequate or Not Adequate**	**Neighboring Reaches Requisite Parking Provided From**	**Access Adequate or Not Adequate**	**Qualify for Cost Sharing Yes/No**
16	R1-16	A5	Open Gulf (Access)	213 Open Gulf St.	Open Gulf Street	6	41	55	103	464	504	Adequate		Adequate	Yes
17	R1-17	A6, A7	Sand Trap & Tango De Mer (Parking & Access)	253 Sand Trap Rd & End of Tango De Mer	253 Sand Trap Road	3	20	55	4	18	38	Adequate	R1-16	Adequate	No ***
18	R1-18		Access at End of Tango De Mer	Access at End of Tango De Mer	End of Tango De Mer	0	0	55	0	0	0	Adequate	R1-19	Adequate	No ***
19	R1-19					0	0	55	55	248	0	Not Adequate		Not Adequate	No ***
20	R1-20					0	0	55	81	365	0	Not Adequate		Not Adequate	No ***
21	R1-21					0	0	55	146	657	657	Adequate		Adequate	No ***
22	R1-22	A8	Sand Destin Day Use Area (Parking & Access)		San Destin Day Use Area	110	743	743	92	414	1,157	Adequate		Adequate	No ***
23	R1-23					0	0	55	155	698	698	Adequate		Not Adequate	No ***
24	R1-24					0	0	55	0	0	0	Adequate	R1-23	Not Adequate	No ***
25	R2-1					0	0	55	0	0	0				
26	R2-2					0	0	55	0	0	0				
27	R2-3					0	0	55	0	0	0				
28	R2-4					0	0	55	0	0	0				
29	R2-5		State Park (Parking & Access)	719 Top Sail Hill Road		0	0	55	0	0	0				
30	R2-6					0	0	55	0	0	0				
31	R2-7					0	0	55	0	0	0				
32	R3-1	A10	Stallworth Preserve North (Access)	140 Stallworth Blvd.		5	34	55	0	0	34				

Table B-46 (Continued)

Parking - Access - Cost Sharing Qualifying

Sub Reach	Model Reach	MAP ID	GIS -Database Access Name	GIS - Database Address	Large Day Use Public Areas and Access Points	Day Use Parking Spaces	Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)	Peak Day Parking Demand*	Rental Parking Spaces	Visits Rental Parking Will Support (4.5 persons per Vehicle)	Total Parking	Parking Adequate or Not Adequate	Neighboring Reaches Requisite Parking Provided From	Access Adequate or Not Adequate	Qualify for Cost Sharing Yes/No
33	R3-2	A11, A12	Beach Highland & Bullard Beach Neighborhood Access (Parking & Access)	127 & 363 Highland Avenue	127 & 363 Highland Avenue	3	20	55	0	0	20	Not Adequate		Adequate	No
34	R3-3					0	0	55	5	23	23	Not Adequate		Adequate	No
35	R3-4					5	34	55	7	32	65	Adequate		Adequate	Yes
36	R3-5	A13	Dune Allen (Parking & Access)	5753 W. Co Hwy 30A	Dune Allen 5753 W. Co Hwy 30A	75	506	506	0	0	506	Adequate		Adequate	Yes
37	R3-6	A14	West Allen (Access)	5605 Co. Hwy 30-A		0	0	55	0	0	55	Adequate	R3-5	Adequate	Yes
38	R3-7	A15	Palms Ave W (Parking & Access)	4850 W. Co Hwy 30A		0	0	55	0	0	0	Not Adequate		Adequate	No
39	R3-8	A16a	Palms Ave E (Parking & Access)	4850 W. Co Hwy 30A		0	0	55	12	54	54	Adequate	R3-9	Adequate	Yes
40	R3-9	A16b	Lake Causeway (Access)	5173 Co Hwy 30A	4850 & 4991 & 5605 Co Hwy 30A	15	101	55	0	0	101	Adequate		Adequate	Yes
41	R3-10	A17a, A17b	Gulf Place West and Middle (Access)		4850 w. Co Hwy 30A	5	34	55	0	0	34	Adequate	R3-9	Adequate	Yes
42	R3-11	A17c, A18	Gulf Place East & Ed Walline Regional Beach Access (Parking & Access)	4447 W Co Hwy 30A	4447 W Co Hwy 30A & Gulf Place West Access Point	55	371	55	13	59	430	Adequate		Adequate	Yes
43	R3-12	A19	Spooky Lane & Shellseekers (Access and Parking)	92 South Spooky Lane & 4201 W. Co. Rd. Hwy 30-A	92 South Spooky Lane & Gulf Place East Access Point	13	88	55	0	0	88	Adequate		Adequate	Yes

Table B-46 (Continued)															
Parking - Access - Cost Sharing Qualifying															
Sub Reach	**Model Reach**	**MAP ID**	**GIS -Database Access Name**	**GIS - Database Address**	**Large Day Use Public Areas and Access Points**	**Day Use Parking Spaces**	**Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)**	**Peak Day Parking Demand***	**Rental Parking Spaces**	**Visits Rental Parking Will Support (4.5 persons per Vehicle)**	**Total Parking**	**Parking Adequate or Not Adequate**	**Neighboring Reaches Requisite Parking Provided From**	**Access Adequate or Not Adequate**	**Qualify for Cost Sharing Yes/No**
44	R3-13	A20				14	95	55	16	72	167	Adequate		Adequate	Yes
45	R3-14	A21	Gulfview Heights (Parking & Access)	186 Gulfview Heights St	4201 Co. Hwy 30A & 186 Gulf View Heights Street	30	203	55	0	0	203	Adequate		Adequate	Yes
46	R3-15					0	0	55	0	0	0	Adequate	R3-14	Not Adequate	No
47	R3-16					0	0	55	0	0	0	Not Adequate		Not Adequate	No
48	R3-17					0	0	55	0	0	0	Not Adequate		Not Adequate	No
49	R3-18					0	0	55	24	108	0	Not Adequate		Not Adequate	No
50	R3-19					0	0	55	111	500	0	Not Adequate		Not Adequate	No
51	R3-20					0	0	55	23	104	104	Adequate		Adequate	Yes
52	R3-21	A22, A23	Blue Mountain and Gulf Point (Parking & Access)	2365 S Co Hwy 83 & 446 Blue Mountain Road	2365 S. Co Hwy 83 & 446, 590 and 726 Blue Mountain Road	37	250	55	0	0	250	Adequate		Adequate	Yes
53	R3-22	A24	Seagrade Road Neighborhood Access (Access)	590 Blue Mountain Road		0	0	55	0	0	0	Adequate	R3-21	Adequate	Yes
54	R3-23	A25	Blue Lake (Access)	726 Blue Mountain Road		0	0	55	0	0	0	Not Adequate		Adequate	No
55	R3-24					0	0	55	0	0	0				
56	R3-25					0	0	55	0	0	0				
57	R3-26					0	0	55	0	0	0				
58	R4-1	A26	Grayton State Park (Access & Parking)			0	0	55	0	0	0	Not Adequate		Adequate	No
59	R4-2					0	0	55	0	0	0	Not Adequate		Not Adequate	No

Table B-46 (Continued)															
Parking - Access - Cost Sharing Qualifying															
Sub Reach	**Model Reach**	**MAP ID**	**GIS -Database Access Name**	**GIS - Database Address**	**Large Day Use Public Areas and Access Points**	**Day Use Parking Spaces**	**Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)**	**Peak Day Parking Demand***	**Rental Parking Spaces**	**Visits Rental Parking Will Support (4.5 persons per Vehicle)**	**Total Parking**	**Parking Adequate or Not Adequate**	**Neighboring Reaches Requisite Parking Provided From**	**Access Adequate or Not Adequate**	**Qualify for Cost Sharing Yes/No**
60	R4-3					0	0	55	0	0	0	Not Adequate		Not Adequate	No
61	R4-4					0	0	55	0	0	0	Not Adequate	R4-5	Not Adequate	No
62	R4-5	A27	Ray's Multi-Moutain (Access)	125 Sandy Lane	125 Sandy Lane	12	81	55	0	0	81	Adequate		Adequate	Yes
63	R4-6	A28, A29	Grayton Dunes and Weston (Parking & Access)	288 Garfield St & 208 Holtz Ave	288 Garfield St. & 199 Banfill St.& 208 Holtz Avenue & 913 Main Park Road	82	554	554	0	0	554	Adequate		Adequate	Yes
64	R4-7				91 Boat Ramp Road	0	0	55	0	0	0		R4-6		
65	R4-8	A301, A30B, A30C	Grayton State Park (Access & Parking)			0	0	55	0	0	0				
66	R4-9					0	0	55	0	0	0				
67	R5-1					0	0	55	0	0	0	Not Adequate		Not Adequate	No
68	R5-2	A31	Van Ness Butler (Parking and Access)	1931 E Co Hwy 30A	Dune Allen 5753 W. Co Hwy 30A & Water Color Park Gargae and Access	100	675	675	11	50	725	Adequate		Adequate	Yes
69	R5-3					0	0	0	0	0	0	Adequate	R5-4	Adequate	Yes
70	R5-4	A32	Seaside (Access and Parking)			60	405	55	0	0	405	Adequate		Adequate	No
71	R5-5	A33	Dogwood/Thyme (Access)	2560 E. Co Hwy 30A	2560 Co Hwy 30A	0	0	55	0	0	0	Adequate	R5-6	Adequate	Yes

Table B-46 (Continued)

Parking - Access - Cost Sharing Qualifying

Sub Reach	Model Reach	MAP ID	GIS -Database Access Name	GIS - Database Address	Large Day Use Public Areas and Access Points	Day Use Parking Spaces	Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)	Peak Day Parking Demand*	Rental Parking Spaces	Visits Rental Parking Will Support (4.5 persons per Vehicle)	Total Parking	Parking Adequate or Not Adequate	Neighboring Reaches Requisite Parking Provided From	Access Adequate or Not Adequate	Qualify for Cost Sharing Yes/No
72	R5-6	A34, A35, A36	Nightcap, Live Oak, Hickory (Access)	30A at End of Nightcap Street, 2680 E. Co Hwy 30A, 2624 E. Co Hwy 30A	2624, 2680, ~2750 and 2790 Co Hwy 30 A	32	216	55	0	0	216	Adequate		Adequate	Yes
73	R5-7	A37, A38, A39	Hollywood, Azela, Hwy 395 (Access)	2790, 2845, 2920 E. Co. Hwy 30-A	2845 and 2920 Co Hwy 30A	0	0	55	0	0	0	Adequate	R5-6	Adequate	Yes
74	R5-8	A40, A41, A42	Headland, Greenwood, Gardenia (Access)	3020 Co Hwy 30A, 30 & 118 Montgomery	3020 Co Hwy 30A	4	27	55	0	0	27	Not Adequate		Adequate	No
75	R5-9	A43, A44	Dothan and Andalusia (Access)	52 South Andalusia St and South End of Dothan Ave on Montgomery St.	52 South Andalusia St and South End of Dothan Ave on Montgomery St.	0	0	55	0	0	0	Adequate	R5-9	Adequate	Yes
76	R5-10	A45, A46, A47	Santa Clara, Santa Juan, Pelayo & Montego (Parking & Access)	3458, 3512, 3468, & 3576 E. Co Hwy 30A	3458, 3512 and 3576 E. Co Hwy 30A - San Juan & Pelaya Neighborhood G A	20	135	55	0	0	135	Adequate		Adequate	Yes
77	R5-11	A48, A49	Campbell	3694 E Co Hwy 30A		0	0	55	71	320	320	Adequate		Adequate	Yes
78	R5-12	A50	Beachwood villas (Access)	3874 E. Co Hwy 30A	3694 and 3874 E. Co Hwy 30 A - (Campbell Street)	95	641	641	50	225	866	Adequate		Adequate	Yes
79	R5-13	A51	One Seagrove (Access)		57 Seagrove Place	9	61	55	70	315	376	Adequate		Adequate	Yes
80	R5-14	A52	Sugar Cliffs (Access)			0	0	55	137	617	617	Adequate		Adequate	Yes

Table B-46 (Continued)															
Parking - Access - Cost Sharing Qualifying															
Sub Reach	**Model Reach**	**MAP ID**	**GIS -Database Access Name**	**GIS - Database Address**	**Large Day Use Public Areas and Access Points**	**Day Use Parking Spaces**	**Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)**	**Peak Day Parking Demand***	**Rental Parking Spaces**	**Visits Rental Parking Will Support (4.5 persons per Vehicle)**	**Total Parking**	**Parking Adequate or Not Adequate**	**Neighboring Reaches Requisite Parking Provided From**	**Access Adequate or Not Adequate**	**Qualify for Cost Sharing Yes/No**
81	R5-15					0	0	55	0	0	0	Adequate	R5-14	Adequate	Yes
82	R5-16	A53	Ramsgate (Access)	679 Eastern Lake Rd	679 and 491 Eastern Lake Road	0	0	55	2	9	9	Adequate	R5-17	Adequate	Yes
83	R5-17	A54	Eastern Lake (Parking & Access)	28 Lakewood Dr		0	0	55	36	162	162	Adequate		Adequate	Yes
84	R5-18	A55	Port Property (Access)	188 San Roy Rd	188 San Roy Road	6	41	55	0	0	41	Adequate	R5-17, R5-19	Adequate	Yes
85	R5-19	A56	Sugar Dunes (Access)	11 Beachside Drive	11 Beachside Dune - Sugar Dune	16	108	55	0	0	108	Adequate		Adequate	Yes
86	R5-20					10	68	55	51	230	297	Adequate		Adequate	Yes
87	R5-21	A57	Walton Dunes (Access)	258 Beachfront Taril - Walton Dune	258 Beachfront Taril - Walton Dune - Beachside Drive & Deer Lake State Park	0	0	55	9	41	41	Adequate	R5-20, R5-22	Adequate	Yes
88	R5-22					27	182	55	0	0	182				
89	R5-23					0	0	55	0	0	0				
90	R5-24					0	0	55	0	0	0				
91	R5-25					0	0	55	0	0	0				
92	R5-26					0	0	55	0	0	0				
93	R5-27					0	0	55	0	0	0				
94	R5-28					0	0	55	0	0	0				
95	R5-29					0	0	55	0	0	0				
96	R5-30					0	0	55	0	0	0	Not Adequate		Not Adequate	No
97	R5-31					0	0	55	0	0	0	Not Adequate		Adequate	No

Table B-46 (Continued)

Parking - Access - Cost Sharing Qualifying

Sub Reach	Model Reach	MAP ID	GIS -Database Access Name	GIS - Database Address	Large Day Use Public Areas and Access Points	Day Use Parking Spaces	Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)	Peak Day Parking Demand*	Rental Parking Spaces	Visits Rental Parking Will Support (4.5 persons per Vehicle)	Total Parking	Parking Adequate or Not Adequate	Neighboring Reaches Requisite Parking Provided From	Access Adequate or Not Adequate	Qualify for Cost Sharing Yes/No
98	R5-32	A58	Gulf Lake (Access)	8040 E. Co Highway 30A	8040 E Co Hwy 30A - Gulf Lakes Neighborhood	0	0	55	0	0	0	Not Adequate		Adequate	No
99	R5-33	A59	Sea Breeze (Access)	8286 E. Co Hwy 30A	8286 E. Co. Hwy 30A - Seabreeze Neighborhood B A	0	0	55	13	59	59	Adequate		Adequate	Yes
100	R5-34		Seacrest (Access)	8520 E Co Hwy 30A	Saint Lucia Lane & Rosemary Avenue & 8520 E Co Hwy30A - Seacrest Dr.	10	68	55	4	18	86	Adequate		Adequate	Yes
101	R5-35					100	675	675	6	27	702	Adequate		Adequate	Yes
102	R5-36					0	0	55	0	0	0	Not Adequate		Not Adequate	No
103	R5-37					0	0	55	0	0	0	Not Adequate		Not Adequate	No
104	R5-38					0	0	55	0	0	0	Not Adequate		Not Adequate	No
105	R5-39					0	0	55	0	0	0	Not Adequate		Not Adequate	No
106	R5-40					0	0	55	0	0	0	Not Adequate		Not Adequate	No
107	R5-41					0	0	55	0	0	0	Not Adequate		Not Adequate	No
108	R5-42					0	0	55	13	59	0	Not Adequate		Not Adequate	No
109	R5-43					0	0	55	0	0	0	Not Adequate		Not Adequate	No
110	R5-44					0	0	55	0	0	0	Not Adequate		Not Adequate	No
111	R5-45					0	0	55	0	0	0	Not Adequate		Not Adequate	No

Table B-46 (Continued)

Parking - Access - Cost Sharing Qualifying

Sub Reach	Model Reach	MAP ID	GIS -Database Access Name	GIS - Database Address	Large Day Use Public Areas and Access Points	Day Use Parking Spaces	Visits Parking Will Support (4.5 persons per Vehicle multiplied by 1.5 Turnover Rate)	Peak Day Parking Demand*	Rental Parking Spaces	Visits Rental Parking Will Support (4.5 persons per Vehicle)	Total Parking	Parking Adequate or Not Adequate	Neighboring Reaches Requisite Parking Provided From	Access Adequate or Not Adequate	Qualify for Cost Sharing Yes/No
112	R5-46	A61	Inlet beach Neighborhood (Access)	188 Winston Lane	188 Winstor Lane	105	709	709	0	0	709	Adequate		Adequate	Yes
113	R5-47	A62	Wall Street (Access)	264 South Wall Street	435 West Park Place Ave. & 264 South Wall Street	76	513	513	0	0	513	Adequate		Adequate	Yes
114	R5-48	A63A	Inlet Beach Regional Access West (Parking & Access)	438 South Orange Street Center	438 South Orange Street	67	452	452	0	0	452	Adequate		Adequate	Yes
115	R5-49	A63B	Inlet Beach Regional Access Middle & East (Parking and Access)	438 South Orange Street Center	118 West Park Place Avenue FL #20	67	452	452	0	0	452	Adequate		Adequate	Yes
116	R5-50	A64	Philips Inlet (Access)	202 South Walton Lakeshore Drive	202 South Walton Lakeshore Drive Phillips Inlet Access	15	101	55	0	0	101	Adequate		Adequate	Yes
117	R5-51					0	0	55	0	0	0	Adequate	R5-49, R5-50	Adequate	Yes
TOTALS						1,559	10,523	13537**	1,698	7,641	16,743				

* Assuming Large Public Day Use Area Parking is fully utilized and remainder of parking demand is distributed uniformly throughout the study area

** Peak Day Demand (July 4th)

*** LPP Reaches not economically justified, not eligible for cost sharing

Rental Parking disqualified - No Public Access Available

LPP Construction Reaches

11.0 RESIDUAL DAMAGES AND RISK

With a project in place to reduce hurricane and storm damage not all damages will be prevented only reduced. It is important to provide information on residual damages to demonstrate project performance and communicate that fact that the project will not eliminate all risks. Table B-47 shows the average annual remaining damages that were returned by the Beach-*fx* model provided as output from the Beach-*fx* model runs. No alternatives investigated changed the natural berm or dune heights. Therefore, there is no significant reduction in water levels with and without a plan in place. This results in virtually no inundation or wave attack reduction in damages with a plan in place. However, all measurable damage categories from Beach-*fx* including wave attack, inundation and erosion are accounted for in the residual damages. Table B-47A presents risk damages, risk benefits, and the respective mean and standard deviation of these values. Table B-47B displays the structure and content damages by damaging mechanism, inundation, erosion and wave attack, for each of the 100 life cycle iterations. It should be noted that the values presented in these tables are from Beach-*fx* output which is subject to slight variation due to the 100 life cycle iterations.

TABLE B-47
AVERAGE ANNUAL RESIDUAL DAMAGES - BY REACH
SELECTED PLAN

R1-1	$1,269	CONSTRUCTION REACH ONE
R1-2	$191	
R1-3	$850	
R1-4	$424	
R1-5	$152	
R1-6	$399	
R1-7	$91	
R1-8	$170	
R1-9	$1,079	
R1-10	$2,078	
R1-11	$33,131	
R1-12	$355	
R1-13	$2,002	
R1-14	$2,454	
R1-15	$67,074	
R1-16	$35,344	
R1-17	$391	
R1-18	$2,813	
R1-19	$3,363	
R1-20	$6,797	
R1-21	$1	
R1-22	$1,591	
R1-23	$105	
R1-24	$161	
R3-1	$0	CONSTRUCTION REACH TWO
R3-2	$56,062	
R3-3	$4,591	
R3-4	$206	

TABLE B-47
AVERAGE ANNUAL RESIDUAL DAMAGES - BY REACH
SELECTED PLAN

R3-5	$3,390	
R3-6	$4,858	
R3-7	$1,401	
R3-8	$9,174	
R3-9	$4,088	
R3-10	$74,956	
R3-11	$10,543	
R3-12	$52,398	
R3-13	$890	
R3-14	$5,541	
R3-15	$0	
R3-16	$0	
R3-17	$1,096	
R3-18	$2,634	
R3-19	$609	
R3-20	$11,506	
R3-21	$9,640	
R3-22	$2,553	
R3-23	$1,216	
R4-1	$13,929	CONSTRUCTION REACH THREE
R4-2	$14,809	
R4-3	$0	
R4-4	$0	
R4-5	$12,246	
R4-6	$2,127	
R5-1	$108,531	CONSTRUCTION REACH FOUR
R5-2	$85,810	
R5-3	$60,595	
R5-4	$53,694	
R5-5	$33,177	
R5-6	$81,725	
R5-7	$80,035	
R5-8	$77,521	
R5-9	$36,777	
R5-10	$36,976	
R5-11	$37,804	
R5-12	$37,415	
R5-13	$37,577	
R5-14	$36,863	
R5-15	$39,364	
R5-16	$41,784	
R5-17	$26,918	
R5-18	$55,236	
R5-19	$48,618	
R5-20	$87,777	
R5-21	$27,361	

TABLE B-47
AVERAGE ANNUAL RESIDUAL DAMAGE – BY REACH
SELECTED PLAN

R5-30	$1,848	CONSTRUCTION REACH FIVE
R5-31	$178	
R5-32	$21,344	
R5-33	$2,550	
R5-34	$852	
R5-35	$2,384	
R5-36	$19,174	
R5-37	$735	
R5-38	$1,918	
R5-39	$308	
R5-40	$26	
R5-41	$54	
R5-42	$28	
R5-43	$37	
R5-44	$0	
R5-45	$0	
R5-46	$2,706	
R5-47	$8,699	
R5-48	$290	
R5-49	$0	
R5-50	$895	
R5-51	$652	
Total	$637,201	

TABLE B-47A
RISK DAMAGES*

	WITHOUT PROJECT	NED	SELECTED PLAN/LPP
AVERAGE	$88,495,000	$14,974,942	$13,688,459
STANDARD DEVIATION	$746,000	$139,000	$145,000
RISK BENEFITS**			
	WITHOUT PROJECT	NED	SELECTED PLAN/LPP
AVERAGE		$7,344,000	$7,485,000
STANDARD DEVIATION		$36,000	$36,000
RISK BENEFIT TO COST RATIO (BCR)			
		NED	LPP
PROBABILITY BCR < 1.0		26%	38%
PROBABILITY BCR > 1.0		74%	62%

* Present Worth Value 50-year Period of Analysis
**Average Annual Values Fiscal Year 2014
Discounting

TABLE B-47B
STRUCTURE AND CONTENT DAMAGES BY DAMAGING MECHANISM
(VALUES ARE PRESENT WORTH OF LIFE-CYCLE DAMAGES IN THE WITHOUT PROJECT CONDITION)

Iteration	Structure Flood Loss Present Value	Structure Wave Loss Present Value	Structure Erosion Loss Present Value	Contents Flood Loss Present Value	Contents Wave Loss Present Value	Contents Erosion Loss Present Value	Contents Combined Present Value	Structure Combined Present Value
1	$18,453	$452,788	$7,128,710	$19,525	$496	$3,608,939	$3,628,798	$7,568,330
2	$256,459	$1,846,023	$73,502,176	$246,135	$407,243	$28,526,904	$29,006,498	$75,228,740
3	$704,478	$4,548,799	$67,832,307	$577,394	$1,216,865	$24,437,308	$25,823,957	$72,353,339
4	$29,094	$743,651	$7,954,276	$31,577	$896	$3,757,297	$3,789,500	$8,635,453
5	$133,848	$2,048,661	$22,187,070	$124,440	$2,509	$7,983,403	$8,109,401	$24,293,458
6	$68	$444,738	$18,183,705	$90	$345	$5,648,901	$5,649,246	$18,603,280
7	$702,570	$2,961,835	$90,344,932	$616,848	$986,198	$42,539,392	$43,797,902	$93,422,569
8	$7	$131,480	$3,345,951	$12	$0	$1,849,668	$1,849,680	$3,477,384
9	$902	$1,510,963	$14,867,534	$740	$1,996	$5,642,976	$5,644,979	$16,325,780
10	$509,770	$2,847,332	$212,051,012	$467,230	$848,560	$92,459,877	$93,537,201	$214,595,833
11	$230,554	$1,128,962	$16,926,361	$213,075	$418,729	$6,507,411	$7,010,283	$18,026,268
12	$39,412	$1,761,406	$104,005,283	$34,063	$2,976	$43,628,988	$43,665,110	$105,491,530
13	$13,861	$1,150,633	$63,725,945	$14,224	$3,288	$27,550,257	$27,566,937	$64,676,578
14	$1,328,206	$4,654,426	$90,421,783	$1,133,801	$2,793,994	$37,450,873	$40,277,682	$95,039,081
15	$331,009	$1,995,843	$15,382,467	$290,623	$378,274	$5,322,258	$5,871,852	$17,534,343
16	$62,425	$1,640,684	$26,274,449	$71,557	$2,627	$8,920,037	$8,993,431	$27,784,172
17	$237,588	$2,288,492	$85,786,311	$233,503	$366,571	$33,361,307	$33,564,303	$87,878,757
18	$1,295,622	$6,804,348	$100,907,707	$1,115,050	$1,964,162	$45,873,878	$48,221,892	$107,639,605
19	$85,472	$2,906,170	$76,510,878	$85,863	$5,224	$33,075,677	$33,165,605	$78,999,100
20	$655	$1,093,924	$6,683,493	$470	$1,374	$2,942,781	$2,944,155	$7,747,681
21	$654	$1,080,857	$12,737,893	$524	$1,442	$4,747,448	$4,748,890	$13,794,470
22	$147,215	$2,359,894	$117,936,462	$151,284	$2,959	$50,725,974	$50,879,336	$119,843,662
23	$390	$695,753	$18,498,332	$344	$1,470	$6,023,856	$6,025,342	$19,192,228
24	$1,562	$2,050,395	$88,263,126	$1,147	$4,405	$39,145,967	$39,150,377	$90,151,830
25	$25,854	$824,833	$62,180,109	$26,662	$1,150	$24,452,862	$24,480,185	$62,866,652
26	$405,000	$3,124,723	$161,653,181	$308,327	$3,491	$72,289,376	$72,599,930	$164,174,499
27	$530,414	$2,215,227	$51,925,174	$499,734	$715,959	$21,295,356	$22,217,153	$54,201,724
28	$73,470	$2,702,972	$87,082,581	$74,937	$2,655	$36,267,564	$36,344,189	$88,951,051
29	$1,109,846	$5,859,217	$89,873,150	$913,126	$1,613,086	$39,700,816	$41,602,546	$95,412,879
30	$268	$490,729	$5,572,601	$201	$550	$2,632,063	$2,632,624	$6,045,399
31	$1,514,843	$5,412,437	$19,464,142	$1,343,262	$2,151,449	$9,069,395	$11,393,429	$24,942,458
32	$63,214	$1,617,531	$51,210,819	$54,924	$2,740	$18,692,689	$18,749,434	$52,787,042
33	$3,410,063	$9,753,280	$131,022,845	$1,962,076	$4,721,017	$58,540,491	$62,508,204	$137,426,825
34	$245,875	$1,074,904	$19,694,993	$202,076	$313,233	$7,486,359	$7,886,242	$20,760,367
35	$733	$1,422,110	$77,978,071	$709	$2,128	$34,165,992	$34,168,128	$79,199,567
36	$63,713	$2,437,495	$25,336,615	$64,635	$2,895	$9,824,604	$9,891,168	$27,661,021
37	$278,999	$2,051,005	$18,291,960	$251,784	$294,601	$8,052,428	$8,501,823	$20,360,618
38	$202,815	$3,112,884	$30,565,645	$169,716	$3,074	$12,703,257	$12,875,055	$33,563,139
39	$2,525	$3,978,698	$141,840,027	$1,870	$5,438	$60,797,920	$60,803,374	$145,233,727
40	$46,005	$1,994,548	$25,618,359	$41,036	$2,799	$11,182,869	$11,225,758	$27,379,616
41	$101,676	$1,716,526	$33,764,350	$93,754	$2,520	$15,002,322	$15,097,597	$35,284,328
42	$347	$697,950	$16,151,654	$351	$1,123	$6,710,604	$6,711,770	$16,756,037
43	$1,207,706	$5,185,324	$186,182,541	$935,720	$1,983,801	$84,440,396	$85,882,459	$189,698,897
44	$26,740	$713,099	$18,730,171	$23,070	$1,709	$7,658,213	$7,682,482	$19,419,663
45	$1	$159,524	$31,489,882	$2	$565	$11,109,951	$11,110,517	$31,644,200
46	$209,398	$1,677,645	$13,163,783	$185,126	$321,666	$5,735,268	$6,137,745	$14,783,406
47	$784,897	$2,708,303	$18,212,820	$670,573	$1,393,141	$8,365,358	$9,670,569	$20,960,589
48	$93,609	$1,925,663	$76,443,079	$99,210	$2,301	$30,791,104	$30,891,803	$78,289,171
49	$619	$1,235,975	$18,483,551	$502	$1,847	$6,156,970	$6,158,857	$19,578,780
50	$139,094	$2,171,809	$38,442,212	$119,133	$4,197	$16,847,069	$16,968,902	$40,503,798

TABLE B-47B
STRUCTURE AND CONTENT DAMAGES BY DAMAGING MECHANISM
(VALUES ARE PRESENT WORTH OF LIFE-CYCLE DAMAGES IN THE WITHOUT PROJECT CONDITION)

Iteration	Structure Flood Loss Present Value	Structure Wave Loss Present Value	Structure Erosion Loss Present Value	Contents Flood Loss Present Value	Contents Wave Loss Present Value	Contents Erosion Loss Present Value	Contents Combined Present Value	Structure Combined Present Value
51	$1,054,307	$4,192,655	$48,886,163	$862,509	$1,634,898	$19,351,505	$21,274,693	$53,229,968
52	$834,429	$3,702,952	$26,467,048	$731,145	$1,453,093	$10,785,427	$12,284,021	$30,137,669
53	$950	$1,485,485	$68,765,223	$781	$2,650	$31,655,237	$31,657,939	$70,091,375
54	$953,668	$2,388,920	$157,479,665	$904,963	$2,812,387	$74,860,467	$76,186,028	$159,371,820
55	$21,017	$783,315	$19,708,671	$19,305	$1,005	$7,912,895	$7,932,825	$20,449,502
56	$29,812	$665,314	$6,274,793	$27,089	$1,079	$3,029,961	$3,057,790	$6,905,504
57	$127	$278,315	$3,884,563	$117	$484	$2,037,200	$2,037,683	$4,162,568
58	$1,020	$1,982,444	$24,180,096	$753	$2,099	$7,508,391	$7,510,491	$26,016,550
59	$93	$161,270	$63,227,587	$122	$442	$22,582,641	$22,583,134	$63,376,757
60	$11,623	$743,674	$87,956,889	$12,253	$1,724	$40,807,886	$40,821,336	$88,479,650
61	$1,507,550	$5,314,485	$81,613,496	$1,345,203	$3,657,939	$35,776,425	$38,795,034	$86,648,467
62	$85,448	$1,735,936	$41,054,564	$86,758	$6,502	$14,517,985	$14,608,803	$42,635,326
63	$1,075	$1,702,409	$117,335,550	$790	$2,374	$54,730,210	$54,732,644	$118,979,956
64	$670	$1,050,365	$21,277,597	$558	$1,769	$7,563,633	$7,565,402	$22,269,261
65	$370,192	$1,846,180	$83,195,133	$320,865	$509,551	$32,646,073	$33,278,200	$84,852,064
66	$76,889	$1,247,745	$24,849,415	$75,908	$124,090	$9,456,449	$9,613,300	$26,154,820
67	$1,250	$1,322,337	$36,322,652	$918	$2,844	$12,744,851	$12,747,776	$37,495,090
68	$616,945	$4,523,870	$95,522,243	$531,547	$1,026,968	$42,339,836	$43,553,215	$99,503,982
69	$150,877	$1,077,524	$10,234,969	$135,739	$228,948	$4,746,511	$5,031,713	$11,281,218
70	$20,514	$607,689	$60,743,608	$22,577	$1,348	$23,997,400	$24,021,020	$61,263,609
71	$733,179	$2,427,347	$133,647,740	$596,121	$1,480,012	$56,144,521	$57,078,635	$135,678,269
72	$42,985	$1,133,825	$21,655,911	$42,945	$1,319	$8,228,659	$8,272,433	$22,767,964
73	$483,707	$2,971,744	$183,312,973	$386,220	$749,257	$86,925,918	$87,480,041	$185,357,823
74	$209	$334,133	$8,818,281	$216	$693	$3,777,335	$3,778,029	$9,126,016
75	$895,983	$3,372,183	$13,165,218	$745,775	$1,267,507	$5,304,442	$6,838,517	$16,745,104
76	$16,525	$380,613	$5,457,196	$18,072	$522	$2,750,546	$2,769,088	$5,849,706
77	$425	$752,893	$52,582,998	$439	$1,422	$19,446,777	$19,448,238	$53,251,401
78	$863,904	$3,763,366	$126,417,671	$721,078	$1,317,509	$51,983,828	$53,498,433	$129,779,560
79	$1,066,854	$4,449,825	$112,162,906	$981,200	$1,695,113	$48,009,776	$49,921,131	$115,908,152
80	$57,552	$1,518,588	$112,784,517	$60,396	$2,655	$44,412,396	$44,474,312	$113,977,489
81	$71,705	$1,667,948	$49,394,306	$72,759	$2,261	$23,473,994	$23,548,361	$50,976,476
82	$16,760	$480,663	$10,218,823	$18,873	$730	$4,667,319	$4,686,537	$10,692,393
83	$411,735	$2,072,898	$22,174,176	$348,658	$732,448	$8,190,828	$9,058,903	$24,188,183
84	$152,343	$2,592,608	$100,978,137	$150,668	$4,552	$44,110,521	$44,262,819	$103,203,456
85	$1,013,417	$4,149,306	$54,010,961	$838,832	$1,244,786	$21,650,108	$23,217,248	$58,035,586
86	$567	$670,190	$19,733,962	$472	$1,811	$6,985,467	$6,987,278	$20,366,137
87	$92,294	$1,673,762	$23,715,202	$71,403	$1,709	$8,985,507	$9,058,039	$25,347,191
88	$366,186	$2,271,287	$19,338,576	$313,968	$411,939	$7,178,103	$7,738,670	$21,601,217
89	$163	$380,876	$32,536,956	$213	$789	$12,955,104	$12,955,938	$32,889,529
90	$229,524	$2,878,555	$74,832,358	$188,748	$282,997	$31,378,426	$31,737,383	$77,472,461
91	$167	$394,897	$9,327,148	$157	$605	$3,797,900	$3,798,511	$9,692,099
92	$1,992,097	$3,056,682	$182,806,143	$1,698,841	$734,402	$75,317,630	$77,327,714	$186,898,589
93	$1,262,334	$5,403,022	$180,691,400	$962,387	$1,682,158	$78,596,685	$79,906,297	$184,336,766
94	$322	$600,282	$10,640,437	$288	$1,070	$4,602,468	$4,603,538	$11,206,632
95	$1,468,963	$2,356,134	$65,775,381	$1,292,312	$2,442	$26,695,248	$27,980,245	$69,206,747
96	$3,359,518	$10,917,698	$151,621,572	$2,454,576	$4,665,965	$66,572,559	$70,288,094	$159,911,757
97	$844,410	$4,918,407	$64,636,732	$748,206	$1,526,932	$28,528,056	$30,245,652	$69,383,896
98	$875,318	$4,118,596	$115,131,422	$753,214	$1,501,849	$51,655,801	$53,390,008	$119,148,583
99	$2,520,356	$8,100,535	$84,088,693	$1,950,566	$4,678,100	$38,072,395	$41,466,101	$90,795,863
100	$288	$514,569	$105,802,633	$318	$1,506	$47,656,298	$47,657,642	$106,299,044

12.0 SENSITIVITY ANALYSIS – WORST CASE IMPACTS OF ECONOMIC DOWNTURN (2009-2010) ON PROJECT JUSTIFICATION

12.1 BACKGROUND

The economic downturn and subsequent contraction of economic activity whose full effects were measured during the years 2009 and 2010 show strong signs that a full recovery is under way. Recovery is showing up in the majority of economic activity indicators which have enjoyed a steady upwards trend but for the unemployment rates and the very low number of housing starts. This current ongoing recovery has been termed a jobless recovery. The seasonally adjusted annual unemployment rate for the Nation was 9.6 percent in 2010, 9.3 percent in 2009 and 5.8 percent in 2008. The State of Florida unemployment rate for 2009 was 12.0 percent in December of 2010, ranking 49th of 50 states and the District of Columbia. Only California and Nevada were higher with 12.5 percent and 14.5 percent respectively. Florida's historical highest unemployment rate was recorded in March of 2010 at 12.3 percent and its lowest was 3.3 percent in May of 2006.

Our analyses are performed over a 50-year time frame horizon which assumes the expansions and contractions in the economy would be smoothed out over that time and short term phenomena like the economy is experiencing now would be mostly balanced by an expansion some time later which would generally act as a canceling if not damping force. Our Planning and Guidance directs us to assume full employment in our analyses, therefore, this sensitivity analysis is to serve as an economic check to answer the question, what if this current condition, near the historical high rate of unemployment, were to continue throughout the period of analysis would the project still be economically justified?

Manufacturing has recorded six consecutive months of expansion and the stock market indices have returned to their pre-recession levels or just a few percentages points below. The national economy is moving from contraction to expansion. The state of the housing market across the nation is marked by large devaluations to residential and commercial properties created by large surpluses as a result of a heavily oversold market, this is true as well as in Walton County. Because of the impact on formulation of the NED and selected plan from changes in added dune width optimization and the subsequent impacts which were to occur if engineering design were likewise reformulated; this sensitivity analysis is performed to determine if the project continues to be justified. If so, then the recommendation will be to keep the formulation of the project engineering and design as is as formulated in the draft General Investigation (GI) Study in the pre 2009 -2010 economic downturn.

12.2 GENERAL

The proposed Walton County's Hurricane and Storm Damage Prevention project will provide National Economic Development (NED) benefits to the Nation in special accounts: Hurricane and Storm Damage Reduction to property, the berm and dune structure, prevention of land loss and emergency nourishment cost avoidance.

12.3 OBJECTIVE

This sensitivity analysis will estimate the impact to the justification of the proposed project using the post 2009 – 2010 inventory depreciated replacement costs and the updated near shore land values.

The near shore land value which is used to measure the land loss benefit has been significantly reduced. The near shore land value in some project reaches have declined by as much as 68 percent. Depreciated replacement costs (DRC) of single family residences on the beach have remained at relatively the same as they were before the 2009 – 2010 economic downturn but have increased somewhat for multi-family residences. Investors and homeowners of structures on the beach have not panicked because of the economic downturn. Relatively few structures have been sold indicating that the belief is that values are where they should be. Most of the properties do not have year round occupancy by the owner or investor. Principally they are income producing properties that are rented or leased. The DRC for walkways and dune crossovers have increased due to the rise on construction material costs the Federal discount rate has reduced to four and one-eighth percent, which is used in this sensitivity analysis. Table B-48 compares the before 2009 and 2010 near shore land values and the current estimate of near shore values as impacted by the oversold condition in the housing sector of the economy.

Project benefits are also dependent upon the prevention of emergency nourishment costs. Emergency nourishment volumes have not changed because the same historical storm sets are used in both the with and without project conditions. Fuel prices used in estimating truck haul of fill in the without project condition have held at relatively the same price level, just below three dollars per gallon used in the GI study, therefore the truck haul cost remained at $30 dollars per cy.

12.4 METHODOLOGY

The total project cost estimate was certified by the Corps' Cost Directorate of Expertise in Walla Walla, Washington. The price level of project benefits and the total project cost estimate are adjusted to comparable price levels.

TABLE B-48
UPDATED NEAR SHORE LAND VALUES

Identifier	Reach Name	Near Shore land value pre 2009//2010 per square foot	Current Estimated Near Shore land value per square foot	Difference per square foot/ % decrease
A	Miramar Beach/Scenic Gulf Drive east to Highway 98	$70.00	$30.00	-$40.00/ - 57%
B	Scenic Gulf Drive and Highway 98 east to east side of Topsail Hill Preserve State Park and Stallworth Lake	$85.00	$32.50	-$52.50/ - 62%
C	Stallworth Lake east to Highway 393	$45.00	$16.00	-$29.00/ - 64%
D	Hwy 393 east to Watercolor	$75.00	$27.50	-$47.50/ - 63%
E	West side of Watercolor to Highway 395	$112.50	$75.00	-$37.50/ - 33%
F	Highway 395 east to Eastern Lake	$67.50	$35.00	-$32.50/ - 48%
G	East side of Eastern Lake to Rosemary Beach	$35.00	$30.00	-$5.00/ - 14%
H	West side of Rosemary Beach to convergence of Highway 30A and Highway 98	$87.50	$87.50	$0.00/ - 0%
I	Highway 30A/98 Fork east to Bay County line	$77.50	$25.00	-$52.50/ - 68%
J	The west line of Bay County through Carillon Beach	$32.50	$25.00	-$7.50/ - 23%

12.5 PREVENTION OF LAND LOST BENEFITS

Average annual erosion rates are calculated in the execution of the future without project condition. With a hurricane and storm damage project properly maintained in place, land loss to erosion is prevented and valued as a benefit. Tables B-49 and B-50 show the land lost benefit for the pre 2009 – 2010 valuations and the updated reduced current valuations.

TABLE B-49
VALUE OF LAND LOST BY REACH
PRE 2009 - 2010 NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
1	R1-1	1149.8	R1P1	0.6808	$70.00	$54,794.87
2	R1-2	1101.6	R1P1	0.6435	$70.00	$49,621.57
3	R1-3	1043.6	R1P1	0.5137	$70.00	$37,526.81
4	R1-4	1001.8	R1P1	0.3958	$70.00	$27,755.87
5	R1-5	1061.8	R1P1	0.3077	$70.00	$22,870.11
6	R1-6	1044.6	R1P1	0.0926	$70.00	$6,771.10
7	R1-7	1002.7	R1P1	0.0063	$70.00	$442.19
8	R1-8	1061.4	R1P1	0.0156	$70.00	$1,159.05
9	R1-9	1013.6	R1P1	0.0284	$70.00	$2,015.04
10	R1-10	959.4	R1P1	0.0926	$70.00	$6,218.83
11	R1-11	1021.2	R1P1	0.1216	$70.00	$8,692.45
12	R1-12	1056.7	R1P1	0.0508	$70.00	$3,757.63
13	R1-13	1040.1	R1P2	-0.0008	$70.00	-$58.25
14	R1-14	1050.6	R1P2	-0.1008	$70.00	-$7,413.03
15	R1-15	997.9	R1P2	-0.1155	$70.00	-$8,068.02
16	R1-16	1024.7	R1P2	-0.1263	$85.00	-$11,000.67
17	R1-17	1113.6	R1P2	-0.1183	$85.00	-$11,197.80
18	R1-18	1133.1	R1P2	-0.1323	$85.00	-$12,742.28
19	R1-19	1058.4	R1P2	-0.0633	$85.00	-$5,694.72
20	R1-20	961	R1P1	0.1033	$85.00	$8,438.06
21	R1-21	952.1	R1P1	0.1122	$85.00	$9,080.18
22	R1-22	1028	R1P1	0.2459	$85.00	$21,486.74
23	R1-23	1085.9	R1P1	0.3952	$85.00	$36,477.55
24	R1-24	1038.7	R1P1	0.4652	$85.00	$41,072.28
25	R2-1	990	R2P1	0.3687	$85.00	$31,026.11
26	R2-2	935.5	R2P1	0.2417	$45.00	$10,174.97
27	R2-3	2160.3	R2P2	0.3044	$45.00	$29,591.79
28	R2-4	2065.5	R2P1	0.2417	$45.00	$22,465.41
29	R2-5	1001.3	R2P2	0.1844	$45.00	$8,308.79
30	R2-6	10078.2	R2P1	-0.5495	$45.00	-$249,208.69
31	R2-7	1040.4	R2P1	0.3869	$45.00	$18,113.88
32	R3-1	1147	R3P1	0.4031	$45.00	$20,806.01
33	R3-2	1037.4	R3P1	0.4283	$45.00	$19,994.33
34	R3-3	1051.6	R3P1	0.4316	$45.00	$20,424.18
35	R3-4	1026	R3P2	0.5535	$45.00	$25,555.10
36	R3-5	1120.7	R3P2	0.4180	$45.00	$21,080.37

TABLE B-49 (CONTINUED)
VALUE OF LAND LOST BY REACH
PRE 2009 - 2010 NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
37	R3-6	1184.9	R3P2	0.2885	$45.00	$15,382.96
38	R3-7	1155.8	R3P2	0.0960	$45.00	$4,993.06
39	R3-8	1102.9	R3P1	-0.2985	$45.00	-$14,814.70
40	R3-9	1057.8	R3P1	-0.3588	$45.00	-$17,079.24
41	R3-10	1068.2	R3P1	-0.4446	$45.00	-$21,371.48
42	R3-11	1044.7	R3P1	-0.5076	$45.00	-$23,863.04
43	R3-12	1006.8	R3P1	-0.4978	$75.00	-$37,588.88
44	R3-13	1004	R3P1	-0.5924	$75.00	-$44,607.72
45	R3-14	1345	R3P1	-0.7700	$75.00	-$77,673.75
46	R3-15	1061.8	R3P1	-0.8489	$75.00	-$67,602.15
47	R3-16	731.7	R3P1	-0.9596	$75.00	-$52,660.45
48	R3-17	1016.6	R3P1	-1.0926	$75.00	-$83,305.29
49	R3-18	1039.4	R3P1	-1.1151	$75.00	-$86,927.62
50	R3-19	1036	R3P1	-1.0589	$75.00	-$82,276.53
51	R3-20	1026.7	R3P1	-1.0373	$75.00	-$79,874.69
52	R3-21	1029	R3P1	-1.0106	$75.00	-$77,993.06
53	R3-22	978	R3P1	-0.9243	$75.00	-$67,797.41
54	R3-23	855.4	R3P1	-0.8319	$75.00	-$53,370.54
55	R3-24	1115	R3P2	-0.5435	$75.00	-$45,450.19
56	R3-25	1274	R3P2	-0.3414	$75.00	-$32,620.77
57	R3-26	1082.2	R4P1	-0.3292	$75.00	-$26,719.52
58	R4-1	1082	R4P1	-0.6703	$75.00	-$54,394.85
59	R4-2	1125.7	R4P1	-0.5439	$75.00	-$45,920.12
60	R4-3	981.5	R4P2	0.0509	$75.00	$3,746.88
61	R4-4	942.1	R4P2	0.1131	$75.00	$7,991.36
62	R4-5	998.1	R4P1	-0.2903	$75.00	-$21,731.13
63	R4-6	971.4	R4P2	0.0925	$75.00	$6,739.09
64	R4-7	1060.9	R4P2	-0.1046	$75.00	-$8,322.76
65	R4-8	2119.2	R4P1	-0.5521	$75.00	-$87,750.77
66	R4-9	2074.7	R4P1	-0.9889	$75.00	-$153,875.31
67	R5-1	993.1	R5P2	-0.8973	$112.50	-$100,249.72
68	R5-2	1003	R5P2	-0.6237	$112.50	-$70,376.75
69	R5-3	1039.4	R5P2	-0.3263	$112.50	-$38,155.07
70	R5-4	1303.7	R5P2	-0.0772	$112.50	-$11,322.63
71	R5-5	1009.2	R5P2	0.1001	$112.50	$11,364.85
72	R5-6	1061.5	R5P1	-0.2592	$112.50	-$30,953.34
73	R5-7	1037.5	R5P1	-0.3266	$112.50	-$38,120.34
74	R5-8	991.6	R5P1	-0.4109	$67.50	-$27,502.77
75	R5-9	1026.5	R5P2	-0.2260	$67.50	-$15,659.26
76	R5-10	1010.7	R5P2	-0.2626	$67.50	-$17,915.16
77	R5-11	1022.2	R5P2	-0.2847	$67.50	-$19,643.87

TABLE B-49 (CONTINUED)
VALUE OF LAND LOST BY REACH
PRE 2009 - 2010 NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
78	R5-12	1018	R5P2	-0.2734	$67.50	-$18,786.68
79	R5-13	1016.5	R5P2	-0.2876	$67.50	-$19,733.31
80	R5-14	1005.3	R5P2	-0.2623	$67.50	-$17,799.09
81	R5-15	1011	R5P2	-0.3549	$67.50	-$24,219.26
82	R5-16	1035.2	R5P2	-0.3543	$67.50	-$24,757.07
83	R5-17	942.6	R5P3	-0.2078	$67.50	-$13,221.38
84	R5-18	999.9	R5P2	-0.3578	$67.50	-$24,149.08
85	R5-19	1010.9	R5P3	-0.0820	$35.00	-$2,901.28
86	R5-20	1028.6	R5P2	0.0051	$35.00	$183.61
87	R5-21	1122	R5P2	-0.0141	$35.00	-$553.71
88	R5-22	1029.7	R5P3	-0.0545	$35.00	-$1,964.15
89	R5-23	1013.1	R5P3	-0.0144	$35.00	-$510.60
90	R5-24	1021.7	R5P2	-0.1929	$35.00	-$6,898.01
91	R5-25	1054.4	R5P2	-0.4140	$35.00	-$15,278.26
92	R5-26	884.4	R5P1	-0.4138	$35.00	-$12,808.77
93	R5-27	1044.2	R5P3	-0.2764	$35.00	-$10,101.59
94	R5-28	1058.5	R5P3	-0.3145	$35.00	-$11,651.44
95	R5-29	986.7	R5P2	-0.4391	$87.50	-$37,910.25
96	R5-30	1021.8	R5P2	-0.3674	$87.50	-$32,848.32
97	R5-31	1014.9	R5P2	-0.3815	$87.50	-$33,878.63
98	R5-32	984.6	R5P1	-0.7184	$87.50	-$61,891.96
99	R5-33	1025.3	R5P1	-0.6970	$87.50	-$62,530.48
100	R5-34	1037.8	R5P1	-0.5918	$87.50	-$53,739.88
101	R5-35	1002.2	R5P1	-0.6019	$87.50	-$52,782.12
102	R5-36	943.7	R5P1	-0.6839	$87.50	-$56,472.19
103	R5-37	1019.9	R5P1	-0.9037	$87.50	-$80,647.32
104	R5-38	1094.1	R5P1	-0.9874	$87.50	-$94,527.50
105	R5-39	1024.2	R5P1	-1.1019	$87.50	-$98,749.52
106	R5-40	1009.7	R5P2	-0.5617	$87.50	-$49,625.49
107	R5-41	1003.7	R5P2	-0.5106	$87.50	-$44,842.81
108	R5-42	1022.6	R5P2	-0.3367	$87.50	-$30,127.07
109	R5-43	1002.2	R5P2	-0.2136	$87.50	-$18,731.12
110	R5-44	1000.5	R5P2	-0.0640	$87.50	-$5,602.80
111	R5-45	968.6	R5P2	0.0031	$87.50	$262.73
112	R5-46	987.6	R5P2	0.0848	$87.50	$7,327.99
113	R5-47	1030.6	R5P2	0.0123	$77.50	$982.42
114	R5-48	1026.4	R5P3	0.0289	$77.50	$2,298.88
115	R5-49	1041.1	R5P3	-0.1516	$77.50	-$12,231.88
116	R5-50	1031.8	R5P3	-0.2372	$77.50	-$18,967.58
117	R5-51	1025.9	R5P3	-0.3640	$77.50	-$28,940.64

TABLE B-50
VALUE OF LAND LOST BY REACH
CURRENT UPDATED NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
1	R1-1	1149.8	R1P1	0.6808	$30.00	$23,483.52
2	R1-2	1101.6	R1P1	0.6435	$30.00	$21,266.39
3	R1-3	1043.6	R1P1	0.5137	$30.00	$16,082.92
4	R1-4	1001.8	R1P1	0.3958	$30.00	$11,895.37
5	R1-5	1061.8	R1P1	0.3077	$30.00	$9,801.48
6	R1-6	1044.6	R1P1	0.0926	$30.00	$2,901.90
7	R1-7	1002.7	R1P1	0.0063	$30.00	$189.51
8	R1-8	1061.4	R1P1	0.0156	$30.00	$496.74
9	R1-9	1013.6	R1P1	0.0284	$30.00	$863.59
10	R1-10	959.4	R1P1	0.0926	$30.00	$2,665.21
11	R1-11	1021.2	R1P1	0.1216	$30.00	$3,725.34
12	R1-12	1056.7	R1P1	0.0508	$30.00	$1,610.41
13	R1-13	1040.1	R1P2	-0.0008	$30.00	-$24.96
14	R1-14	1050.6	R1P2	-0.1008	$30.00	-$3,177.01
15	R1-15	997.9	R1P2	-0.1155	$30.00	-$3,457.72
16	R1-16	1024.7	R1P2	-0.1263	$32.50	-$4,206.14
17	R1-17	1113.6	R1P2	-0.1183	$32.50	-$4,281.51
18	R1-18	1133.1	R1P2	-0.1323	$32.50	-$4,872.05
19	R1-19	1058.4	R1P2	-0.0633	$32.50	-$2,177.39
20	R1-20	961	R1P1	0.1033	$32.50	$3,226.32
21	R1-21	952.1	R1P1	0.1122	$32.50	$3,471.83
22	R1-22	1028	R1P1	0.2459	$32.50	$8,215.52
23	R1-23	1085.9	R1P1	0.3952	$32.50	$13,947.30
24	R1-24	1038.7	R1P1	0.4652	$32.50	$15,704.11
25	R2-1	990	R2P1	0.3687	$32.50	$11,862.92
26	R2-2	935.5	R2P1	0.2417	$16.00	$3,617.77
27	R2-3	2160.3	R2P2	0.3044	$16.00	$10,521.53
28	R2-4	2065.5	R2P1	0.2417	$16.00	$7,987.70
29	R2-5	1001.3	R2P2	0.1844	$16.00	$2,954.24
30	R2-6	10078.2	R2P1	-0.5495	$16.00	-$88,607.53
31	R2-7	1040.4	R2P1	0.3869	$16.00	$6,440.49
32	R3-1	1147	R3P1	0.4031	$16.00	$7,397.69
33	R3-2	1037.4	R3P1	0.4283	$16.00	$7,109.09
34	R3-3	1051.6	R3P1	0.4316	$16.00	$7,261.93
35	R3-4	1026	R3P2	0.5535	$16.00	$9,086.26
36	R3-5	1120.7	R3P2	0.4180	$16.00	$7,495.24
37	R3-6	1184.9	R3P2	0.2885	$16.00	$5,469.50
38	R3-7	1155.8	R3P2	0.0960	$16.00	$1,775.31
39	R3-8	1102.9	R3P1	-0.2985	$16.00	-$5,267.45
40	R3-9	1057.8	R3P1	-0.3588	$16.00	-$6,072.62
41	R3-10	1068.2	R3P1	-0.4446	$16.00	-$7,598.75

TABLE B-50 (CONTINUED)
VALUE OF LAND LOST BY REACH
CURRENT UPDATED NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
42	R3-11	1044.7	R3P1	-0.5076	$16.00	-$8,484.64
43	R3-12	1006.8	R3P1	-0.4978	$27.50	-$13,782.59
44	R3-13	1004	R3P1	-0.5924	$27.50	-$16,356.16
45	R3-14	1345	R3P1	-0.7700	$27.50	-$28,480.38
46	R3-15	1061.8	R3P1	-0.8489	$27.50	-$24,787.46
47	R3-16	731.7	R3P1	-0.9596	$27.50	-$19,308.83
48	R3-17	1016.6	R3P1	-1.0926	$27.50	-$30,545.27
49	R3-18	1039.4	R3P1	-1.1151	$27.50	-$31,873.46
50	R3-19	1036	R3P1	-1.0589	$27.50	-$30,168.06
51	R3-20	1026.7	R3P1	-1.0373	$27.50	-$29,287.39
52	R3-21	1029	R3P1	-1.0106	$27.50	-$28,597.45
53	R3-22	978	R3P1	-0.9243	$27.50	-$24,859.05
54	R3-23	855.4	R3P1	-0.8319	$27.50	-$19,569.20
55	R3-24	1115	R3P2	-0.5435	$27.50	-$16,665.07
56	R3-25	1274	R3P2	-0.3414	$27.50	-$11,960.95
57	R3-26	1082.2	R4P1	-0.3292	$27.50	-$9,797.16
58	R4-1	1082	R4P1	-0.6703	$27.50	-$19,944.78
59	R4-2	1125.7	R4P1	-0.5439	$27.50	-$16,837.38
60	R4-3	981.5	R4P2	0.0509	$27.50	$1,373.85
61	R4-4	942.1	R4P2	0.1131	$27.50	$2,930.17
62	R4-5	998.1	R4P1	-0.2903	$27.50	-$7,968.08
63	R4-6	971.4	R4P2	0.0925	$27.50	$2,471.00
64	R4-7	1060.9	R4P2	-0.1046	$27.50	-$3,051.68
65	R4-8	2119.2	R4P1	-0.5521	$27.50	-$32,175.28
66	R4-9	2074.7	R4P1	-0.9889	$27.50	-$56,420.95
67	R5-1	993.1	R5P2	-0.8973	$75.00	-$66,833.15
68	R5-2	1003	R5P2	-0.6237	$75.00	-$46,917.83
69	R5-3	1039.4	R5P2	-0.3263	$75.00	-$25,436.72
70	R5-4	1303.7	R5P2	-0.0772	$75.00	-$7,548.42
71	R5-5	1009.2	R5P2	0.1001	$75.00	$7,576.57
72	R5-6	1061.5	R5P1	-0.2592	$75.00	-$20,635.56
73	R5-7	1037.5	R5P1	-0.3266	$75.00	-$25,413.56
74	R5-8	991.6	R5P1	-0.4109	$35.00	-$14,260.70
75	R5-9	1026.5	R5P2	-0.2260	$35.00	-$8,119.62
76	R5-10	1010.7	R5P2	-0.2626	$35.00	-$9,289.34
77	R5-11	1022.2	R5P2	-0.2847	$35.00	-$10,185.71
78	R5-12	1018	R5P2	-0.2734	$35.00	-$9,741.24
79	R5-13	1016.5	R5P2	-0.2876	$35.00	-$10,232.09
80	R5-14	1005.3	R5P2	-0.2623	$35.00	-$9,229.16
81	R5-15	1011	R5P2	-0.3549	$35.00	-$12,558.14
82	R5-16	1035.2	R5P2	-0.3543	$35.00	-$12,837.00

TABLE B-50 (CONTINUED)
VALUE OF LAND LOST BY REACH
CURRENT UPDATED NEAR SHORE LAND VALUES

Reach	Model Reach	Reach Length -ft	Representative Profile	Average Annual Erosion	Land Value per Sq. Ft.	Value of Land Loss -
83	R5-17	942.6	R5P3	-0.2078	$35.00	-$6,855.53
84	R5-18	999.9	R5P2	-0.3578	$35.00	-$12,521.75
85	R5-19	1010.9	R5P3	-0.0820	$30.00	-$2,486.81
86	R5-20	1028.6	R5P2	0.0051	$30.00	$157.38
87	R5-21	1122	R5P2	-0.0141	$30.00	-$474.61
88	R5-22	1029.7	R5P3	-0.0545	$30.00	-$1,683.56
89	R5-23	1013.1	R5P3	-0.0144	$30.00	-$437.66
90	R5-24	1021.7	R5P2	-0.1929	$30.00	-$5,912.58
91	R5-25	1054.4	R5P2	-0.4140	$30.00	-$13,095.65
92	R5-26	884.4	R5P1	-0.4138	$30.00	-$10,978.94
93	R5-27	1044.2	R5P3	-0.2764	$30.00	-$8,658.51
94	R5-28	1058.5	R5P3	-0.3145	$30.00	-$9,986.95
95	R5-29	986.7	R5P2	-0.4391	$87.50	-$37,910.25
96	R5-30	1021.8	R5P2	-0.3674	$87.50	-$32,848.32
97	R5-31	1014.9	R5P2	-0.3815	$87.50	-$33,878.63
98	R5-32	984.6	R5P1	-0.7184	$87.50	-$61,891.96
99	R5-33	1025.3	R5P1	-0.6970	$87.50	-$62,530.48
100	R5-34	1037.8	R5P1	-0.5918	$87.50	-$53,739.88
101	R5-35	1002.2	R5P1	-0.6019	$87.50	-$52,782.12
102	R5-36	943.7	R5P1	-0.6839	$87.50	-$56,472.19
103	R5-37	1019.9	R5P1	-0.9037	$87.50	-$80,647.32
104	R5-38	1094.1	R5P1	-0.9874	$87.50	-$94,527.50
105	R5-39	1024.2	R5P1	-1.1019	$87.50	-$98,749.52
106	R5-40	1009.7	R5P2	-0.5617	$87.50	-$49,625.49
107	R5-41	1003.7	R5P2	-0.5106	$87.50	-$44,842.81
108	R5-42	1022.6	R5P2	-0.3367	$87.50	-$30,127.07
109	R5-43	1002.2	R5P2	-0.2136	$87.50	-$18,731.12
110	R5-44	1000.5	R5P2	-0.0640	$87.50	-$5,602.80
111	R5-45	968.6	R5P2	0.0031	$87.50	$262.73
112	R5-46	987.6	R5P2	0.0848	$87.50	$7,327.99
113	R5-47	1030.6	R5P2	0.0123	$25.00	$316.91
114	R5-48	1026.4	R5P3	0.0289	$25.00	$741.57
115	R5-49	1041.1	R5P3	-0.1516	$25.00	-$3,945.77
116	R5-50	1031.8	R5P3	-0.2372	$25.00	-$6,118.57
117	R5-51	1025.9	R5P3	-0.3640	$25.00	-$9,335.69

12.6 DUNE WIDTH OPTIMIZATION FUTURE WITH PROJECT CONDITION

Sensitivity runs were performed on all of the dune optimization alternatives to determine if the project remains justified and indicate any the impacts upon formulation. The alternatives evaluated are added dune width on the previously optimized berm width alternative. Early on, while evaluating additional berm width alternatives, only the results showed that justified reaches were very small and there were wide gaps of unjustified reaches. There was maybe only one somewhat contiguous reach that could have been economically justified. Then added dune width was added as a damage reducing mechanism to protect the toe of the dune which was showing evidence of erosion from wave attack. All berm widths were evaluated with a constant 20 feet of added dune width, and it was noticed that numerous reaches were justified so added dune width protected the toe of the dune very well protecting the dunes of Walton County and gave significant protection to the project. The key to storm damage reduction in the high dune climate at Walton County was to protect the toe of the dune which helps in preventing dune sloughing. Since the majority of storm damage reduction benefits are rooted in additional dune width, those alternatives were re-evaluated for justification. The results are presented in the following tables. Added dune widths of 0, 10, 20, 30 and 40 feet were evaluated and the statistics are presented in Tables B-51 to B-56.

TABLE B-51
OPTIMIZED BERM WIDTH – NO ADDED DUNE WIDTH

Reach	Damage Reduction DW00	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW00	Summed Net Benefits DW00
R1-1	$13,790	$656	$22,628	$1,658	$2,314	$722,786	$34,369	0.067	-$32,055	
R1-2	$17,542	$834	$21,746	$760	$1,594	$690,370	$32,828	0.049	-$31,234	
R1-3	$23,522	$1,118	$16,531	$860	$1,979	$637,849	$30,330	0.065	-$28,352	
R1-4	$19,128	$910	$12,262	$947	$1,856	$652,415	$31,023	0.060	-$29,167	
R1-5	$8,308	$395	$10,066	$1,097	$1,492	$667,846	$31,757	0.047	-$30,265	
R1-6	$20,314	$966	$3,040	$1,220	$2,186	$777,559	$36,974	0.059	-$34,788	
R1-7	$33,893	$1,612	$271	$1,260	$2,871	$754,123	$35,859	0.080	-$32,988	
R1-8	$20,627	$981	$732	$1,320	$2,301	$779,792	$37,080	0.062	-$34,779	
R1-9	$38,660	$1,838	$1,125	$1,261	$3,100	$731,033	$34,761	0.089	-$31,662	
R1-10	$29,025	$1,380	$2,792	$1,128	$2,508	$639,046	$30,387	0.083	-$27,879	
R1-11	$2,111,260	$100,393	$3,707	$1,198	$101,590	$721,411	$34,304	2.961	$67,286	
R1-12	$134,057	$6,375	$1,807	$1,275	$7,650	$803,442	$38,204	0.200	-$30,555	
R1-13	$2,621,829	$124,671	-$31	$1,351	$126,052	$744,773	$35,415	3.559	$90,638	
R1-14	$2,490,545	$118,428	-$3,467	$1,641	$123,536	$810,607	$38,545	3.205	$84,991	
R1-15	$997,740	$47,444	-$4,550	$2,177	$54,171	$503,268	$23,931	2.264	$30,240	
R1-16	$1,846,130	$87,785	-$5,362	$2,224	$95,371	$539,581	$25,658	3.717	$69,713	**$312,314**
R1-17	$48,323	$2,298	-$5,465	$2,412	$10,175	$548,009	$26,058	0.390	-$15,883	
R1-18	$97,210	$4,622	-$6,187	$2,457	$13,266	$553,880	$26,338	0.504	-$13,071	
R1-19	$83,170	$3,955	-$3,233	$2,285	$9,473	$574,029	$27,296	0.347	-$17,822	
R1-20	$95,810	$4,556	$2,311	$2,005	$6,561	$137,207	$6,524	1.006	$37	
R1-21	$9,520	$453	$3,589	$1,095	$1,548	$699,267	$33,251	0.047	-$31,703	
R1-22	$34,889	$1,659	$8,653	$1,035	$2,694	$689,029	$32,764	0.082	-$30,070	
R1-23	$13,903	$661	$14,399	$1,013	$1,674	$717,604	$34,123	0.049	-$32,449	
R1-24	$142,497	$6,776	$16,204	$866	$7,641	$611,333	$29,070	0.263	-$21,428	

TABLE B-51 (CONTINUED)
OPTIMIZED BERM WIDTH – NO ADDED DUNE WIDTH

Reach	Damage Reduction DW00	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW00	Summed Net Benefits DW00
R2-1	$2,270	$0	$13,063	$598	$598	$0	$0	0.000	$0	
R2-2	$0	$0	$4,236	$0	$0	$0	$0	0.000	$0	
R2-3	$0	$0	$11,959	$0	$0	$0	$0	0.000	$0	
R2-4	$0	$0	$9,353	$0	$0	$0	$0	0.000	$0	
R2-5	$0	$0	$3,573	$0	$0	$0	$0	0.000	$0	
R2-6	$0	$0	-$83,044	$0	$83,044	$0	$0	0.000	$0	
R2-7	$0	$0	$7,141	$0	$0	$0	$0	0.000	$0	
R3-1	$199,810	$9,501	$5,891	$24,947	$34,448	$1,191,330	$56,649	0.608	-$22,201	
R3-2	$2,357,436	$112,098	$5,627	$23,658	$135,756	$1,007,056	$47,886	2.835	$87,870	
R3-3	$333,777	$15,871	$5,906	$24,046	$39,917	$947,403	$45,050	0.886	-$5,133	
R3-4	$10,947	$521	$8,487	$4,945	$5,466	$289,544	$13,768	0.397	-$8,303	
R3-5	$96,900	$4,608	$6,688	$5,603	$10,211	$380,855	$18,110	0.564	-$7,899	
R3-6	$108,389	$5,154	$4,474	$6,233	$11,387	$433,586	$20,617	0.552	-$9,230	
R3-7	$65,911	$3,134	$703	$6,395	$9,529	$433,330	$20,605	0.462	-$11,076	
R3-8	$117,844	$5,604	-$9,617	$26,457	$41,678	$1,039,621	$49,435	0.843	-$7,757	
R3-9	$596,952	$28,386	-$9,884	$25,180	$63,450	$1,046,856	$49,779	1.275	$13,670	
R3-10	$2,794,558	$132,884	-$12,203	$25,793	$170,880	$1,102,238	$52,413	3.260	$118,468	
R3-11	$860,940	$40,939	-$13,222	$25,305	$79,466	$1,066,094	$50,694	1.568	$28,772	
R3-12	$1,706,825	$81,161	-$21,956	$24,328	$127,445	$1,033,505	$49,144	2.593	$78,301	
R3-13	$1,156,401	$54,988	-$25,401	$24,456	$104,846	$1,016,554	$48,338	2.169	$56,508	
R3-14	$1,700,341	$80,853	-$44,459	$33,306	$158,618	$1,508,733	$71,742	2.211	$86,876	
R3-15	$33,003	$1,569	-$38,631	$26,434	$66,635	$1,141,150	$54,263	1.228	$12,372	
R3-16	$9,434	$449	-$30,464	$18,467	$49,380	$800,063	$38,044	1.298	$11,336	
R3-17	$161,310	$7,670	-$47,442	$25,790	$80,903	$1,153,330	$54,842	1.475	$26,061	
R3-18	$400,038	$19,022	-$49,993	$26,381	$95,396	$1,225,524	$58,275	1.637	$37,121	
R3-19	$1,513,857	$71,985	-$46,980	$26,270	$145,236	$1,163,552	$55,328	2.625	$89,908	
R3-20	$4,040,625	$192,136	-$46,022	$26,011	$264,168	$1,203,450	$57,225	4.616	$206,943	
R3-21	$1,119,176	$53,218	-$44,965	$26,018	$124,201	$1,240,216	$58,974	2.106	$65,227	
R3-22	$301,930	$14,357	-$39,078	$24,496	$77,932	$1,142,968	$54,349	1.434	$23,583	
R3-23	$276,630	$13,154	-$30,816	$21,282	$65,252	$979,392	$46,571	1.401	$18,681	**$912,297**
R3-24	$10,225	$0	-$18,581	$7,322	$0	$0	$0	0.000	$0	
R3-25	-$10,198	$0	-$13,979	$7,972	$0	$0	$0	0.000	$0	
R3-26	$0	$0	-$7,529	$0	$0	$0	$0	0.000	$0	
R4-1	$22,624	$1,076	-$22,733	$26,171	$49,980	$190,124	$9,041	5.528	$40,939	
R4-2	$82,816	$3,938	-$17,522	$26,718	$48,178	$293,418	$13,952	3.453	$34,225	$75,165
R4-3	$0	$0	$2,348	$0	$0	$142,320	$0	0.000	$0	
R4-4	$0	$0	$3,860	$0	$0	$59,895	$0	0.000	$0	
R4-5	$212,312	$10,096	-$7,878	$23,197	$41,170	$174,258	$8,286	4.969	$32,884	
R4-6	$32,526	$1,547	$2,378	$5,399	$6,946	$29,204	$1,389	5.002	$5,557	$38,441
R4-7	$0	$0	-$3,297	$5,986	$0	$0	$0	0.000	$0	
R4-8	$0	$0	-$27,507	$0	$0	$0	$0	0.000	$0	
R4-9	$0	$0	-$52,376	$0	$0	$0	$0	0.000	$0	

TABLE B-51 (CONTINUED)
OPTIMIZED BERM WIDTH – NO ADDED DUNE WIDTH

Reach	Damage Reduction DW00	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW00	Summed Net Benefits DW00
R5-1	$28,547	$1,357	-$65,843	$13,267	$80,467	$435,289	$20,698	3.888	$59,768	
R5-2	$32,644	$1,552	-$45,737	$12,035	$59,324	$380,502	$18,093	3.279	$41,231	
R5-3	$33,389	$1,588	-$23,776	$10,917	$36,281	$339,095	$16,124	2.250	$20,157	
R5-4	$28,153	$1,339	-$5,084	$12,065	$18,488	$330,158	$15,699	1.178	$2,789	
R5-5	$100,252	$4,767	$10,142	$8,641	$13,408	$260,402	$12,382	1.083	$1,026	
R5-6	$3,224,682	$153,337	-$10,350	$17,186	$180,873	$911,755	$43,355	4.172	$137,518	
R5-7	$4,372,101	$207,898	-$15,952	$17,083	$240,932	$905,590	$43,062	5.595	$197,870	
R5-8	$1,928,218	$91,689	-$10,377	$16,855	$118,921	$896,122	$42,611	2.791	$76,309	
R5-9	$49,174	$2,338	-$7,078	$10,125	$19,541	$364,118	$17,314	1.129	$2,227	
R5-10	$55,733	$2,650	-$8,738	$10,268	$21,656	$333,174	$15,843	1.367	$5,813	
R5-11	$215,229	$10,234	-$9,588	$10,496	$30,319	$368,517	$17,523	1.730	$12,795	
R5-12	$64,935	$3,088	-$9,121	$10,424	$22,633	$310,603	$14,769	1.532	$7,864	
R5-13	$130,073	$6,185	-$9,535	$10,403	$26,123	$392,444	$18,661	1.400	$7,462	
R5-14	$72,686	$3,456	-$8,691	$10,083	$22,231	$357,647	$17,006	1.307	$5,224	
R5-15	$63,395	$3,014	-$11,925	$10,730	$25,670	$371,512	$17,666	1.453	$8,004	
R5-16	$220,428	$10,482	-$11,884	$10,950	$33,316	$358,687	$17,056	1.953	$16,260	
R5-17	$26,962	$1,282	-$7,819	$2,956	$12,057	$233,169	$11,087	1.087	$969	
R5-18	$107,934	$5,132	-$11,759	$10,445	$27,336	$162,674	$7,735	3.534	$19,601	
R5-19	$147,232	$7,001	-$3,184	$3,047	$13,233	$219,156	$10,421	1.270	$2,811	
R5-20	$44,560	$2,119	$1,142	$9,036	$11,155	$271,148	$12,893	0.865	-$1,738	
R5-21	$54,067	$2,571	$202	$9,963	$12,534	$289,990	$13,789	0.909	-$1,255	**$622,705**
R5-22	$0	$0	-$1,853	$0	$0	$0	$0	0.000	$0	
R5-23	$0	$0	-$699	$0	$0	$0	$0	0.000	$0	
R5-24	$0	$0	-$4,659	$0	$0	$0	$0	0.000	$0	
R5-25	$0	$0	-$11,704	$0	$0	$0	$0	0.000	$0	
R5-26	$0	$0	-$9,313	$0	$0	$0	$0	0.000	$0	
R5-27	$0	$0	-$8,897	$0	$0	$0	$0	0.000	$0	
R5-28	$0	$0	-$10,193	$0	$0	$0	$0	0.000	$0	
R5-29	$0	$0	-$34,189	$0	$0	$0	$0	0.000	$0	
R5-30	$40,237	$1,913	-$31,024	$10,827	$43,764	$367,222	$17,462	2.506	$26,302	
R5-31	$316,946	$15,071	-$31,703	$10,722	$57,496	$385,074	$18,311	3.140	$39,185	
R5-32	$1,736,474	$82,571	-$52,553	$17,647	$152,771	$922,089	$43,846	3.484	$108,925	
R5-33	$713,989	$33,951	-$51,765	$18,446	$104,162	$933,718	$44,399	2.346	$59,763	
R5-34	$291,574	$13,865	-$41,227	$18,079	$73,170	$933,207	$44,375	1.649	$28,795	
R5-35	$426,201	$20,266	-$40,514	$17,448	$78,228	$887,506	$42,202	1.854	$36,026	
R5-36	$4,116,646	$195,751	-$45,746	$16,745	$258,241	$926,362	$44,049	5.863	$214,192	
R5-37	$313,694	$14,916	-$71,304	$19,309	$105,529	$973,843	$46,307	2.279	$59,222	
R5-38	$677,501	$32,216	-$85,107	$21,213	$138,536	$1,150,877	$54,725	2.531	$83,810	
R5-39	$133,767	$6,361	-$88,452	$20,024	$114,838	$957,806	$45,545	2.521	$69,293	
R5-40	$8,089	$385	-$47,885	$11,375	$59,645	$359,529	$17,096	3.489	$42,549	
R5-41	$23,257	$1,106	-$41,980	$11,011	$54,097	$359,413	$17,090	3.165	$37,006	
R5-42	$9,355	$445	-$28,454	$10,512	$39,411	$345,235	$16,416	2.401	$22,995	

TABLE B-51 (CONTINUED)
OPTIMIZED BERM WIDTH – NO ADDED DUNE WIDTH

Reach	Damage Reduction DW00	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW00	Summed Net Benefits DW00
R5-43	$15,851	$754	-$16,135	$9,713	$26,602	$290,822	$13,829	1.924	$12,773	
R5-44	-$5,731	-$273	-$2,976	$9,075	$11,779	$272,058	$12,937	0.910	-$1,158	
R5-45	-$25,142	-$1,196	$3,051	$8,380	$7,184	$252,172	$11,991	0.599	-$4,807	
R5-46	$183,046	$8,704	$10,715	$8,307	$17,011	$264,720	$12,588	1.351	$4,423	
R5-47	$394,981	$18,782	$1,211	$8,628	$27,410	$320,987	$15,263	1.796	$12,146	
R5-48	$3,159	$150	$334	$2,950	$3,100	$197,382	$9,386	0.330	-$6,285	
R5-49	-$7,508	-$357	-$4,633	$3,115	$7,390	$299,078	$14,221	0.520	-$6,831	
R5-50	$3,059	$145	-$6,629	$3,149	$9,923	$17,717	$842	11.779	$9,081	
R5-51	$14,052	$668	-$9,926	$3,288	$13,882	$294,107	$13,985	0.993	-$103	**$847,304**

TABLE B-52
OPTIMIZED BERM WIDTH – 10 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW10	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW10	Summed Net Benefits DW10
R1-1	$26,440	$1,257	$22,628	$1,659	$2,916	$1,093,581	$52,001	0.056	-$49,085	
R1-2	$49,159	$2,338	$21,746	$760	$3,097	$1,028,476	$48,905	0.063	-$45,808	
R1-3	$52,516	$2,497	$16,531	$861	$3,358	$954,802	$45,402	0.074	-$42,044	
R1-4	$17,581	$836	$12,262	$947	$1,783	$960,314	$45,664	0.039	-$43,881	
R1-5	$14,089	$670	$10,066	$1,097	$1,767	$999,252	$47,515	0.037	-$45,748	
R1-6	$34,475	$1,639	$3,040	$1,220	$2,859	$1,120,972	$53,303	0.054	-$50,444	
R1-7	$67,234	$3,197	$271	$1,260	$4,457	$1,092,591	$51,954	0.086	-$47,497	
R1-8	$34,319	$1,632	$732	$1,321	$2,953	$1,135,924	$54,014	0.055	-$51,062	
R1-9	$43,779	$2,082	$1,125	$1,261	$3,343	$1,067,820	$50,776	0.066	-$47,433	
R1-10	$29,995	$1,426	$2,792	$1,128	$2,555	$950,394	$45,192	0.057	-$42,638	
R1-11	$2,375,937	$112,978	$3,707	$1,198	$114,176	$1,046,053	$49,741	2.295	$64,435	
R1-12	$192,388	$9,148	$1,807	$1,275	$10,424	$1,141,243	$54,267	0.192	-$43,844	
R1-13	$2,893,878	$137,607	-$31	$1,351	$138,989	$1,074,718	$51,104	2.720	$87,885	
R1-14	$2,802,156	$133,245	-$3,467	$1,642	$138,354	$1,182,862	$56,246	2.460	$82,108	
R1-15	$2,594,956	$123,393	-$4,550	$2,177	$130,121	$823,993	$39,182	3.321	$90,939	
R1-16	$1,727,363	$82,138	-$5,362	$2,224	$89,723	$862,881	$41,031	2.187	$48,693	
R1-17	$80,973	$3,850	-$5,465	$2,412	$11,728	$893,116	$42,469	0.276	-$30,741	$330,215
R1-18	$139,801	$6,648	-$6,187	$2,458	$15,292	$908,943	$43,221	0.354	-$27,929	

TABLE B-52 (CONTINUED)
OPTIMIZED BERM WIDTH – 10 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW10	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW10	Summed Net Benefits DW10
R1-19	$102,174	$4,858	-$3,233	$2,285	$10,377	$908,084	$43,180	0.240	-$32,803	
R1-20	$115,838	$5,508	$2,311	$2,006	$7,514	$805,427	$38,299	0.196	-$30,785	
R1-21	$53,711	$2,554	$3,589	$1,095	$3,649	$1,030,529	$49,003	0.074	-$45,354	
R1-22	$63,455	$3,017	$8,653	$1,035	$4,052	$1,011,988	$48,121	0.084	-$44,069	
R1-23	$35,235	$1,675	$14,399	$1,013	$2,688	$1,074,825	$51,109	0.053	-$48,421	
R1-24	$163,796	$7,789	$16,204	$866	$8,654	$987,550	$46,959	0.184	-$38,305	
R2-1	$0	$0	$13,063	$598	$598	$0	$0	$ -	$0	
R2-2	$0	$0	$4,236	$0	$0	$0	$0	$ -	$0	
R2-3	$0	$0	$11,959	$0	$0	$0	$0	$ -	$0	
R2-4	$0	$0	$9,353	$0	$0	$0	$0	$ -	$0	
R2-5	$0	$0	$3,573	$0	$0	$0	$0	$ -	$0	
R2-6	$0	$0	-$83,044	$0	$83,044	$0	$0	$ -	$0	
R2-7	$0	$0	$7,141	$0	$0	$0	$0	$ -	$0	
R3-1	$177,922	$8,460	$5,891	$24,947	$33,408	$1,462,820	$69,559	0.480	-$36,151	
R3-2	$2,002,561	$95,224	$5,627	$23,658	$118,882	$1,242,625	$59,088	2.012	$59,794	
R3-3	$294,588	$14,008	$5,906	$24,046	$38,054	$1,181,366	$56,175	0.677	-$18,121	
R3-4	$17,007	$809	$8,487	$4,945	$5,754	$437,513	$20,804	0.277	-$15,050	
R3-5	$248,251	$11,805	$6,688	$5,603	$17,408	$553,079	$26,299	0.662	-$8,892	
R3-6	$89,741	$4,267	$4,474	$6,233	$10,501	$623,339	$29,640	0.354	-$19,140	
R3-7	$138,507	$6,586	$703	$6,395	$12,982	$627,010	$29,815	0.435	-$16,833	
R3-8	$143,276	$6,813	-$9,617	$26,457	$42,888	$1,298,951	$61,766	0.694	-$18,879	
R3-9	$617,467	$29,361	-$9,884	$25,180	$64,425	$1,292,794	$61,474	1.048	$2,952	
R3-10	$2,220,756	$105,599	-$12,203	$25,793	$143,596	$1,351,515	$64,266	2.234	$79,330	
R3-11	$761,321	$36,202	-$13,222	$25,306	$74,729	$1,307,998	$62,197	1.201	$12,532	
R3-12	$1,156,397	$54,988	-$21,956	$24,329	$101,272	$1,265,086	$60,156	1.683	$41,116	
R3-13	$1,150,851	$54,724	-$25,401	$24,457	$104,582	$1,249,851	$59,432	1.760	$45,150	
R3-14	$1,771,935	$84,257	-$44,459	$33,306	$162,022	$1,827,405	$86,895	1.865	$75,127	
R3-15	$71,684	$3,409	-$38,631	$26,435	$68,474	$1,397,560	$66,455	1.030	$2,019	
R3-16	$28,074	$1,335	-$30,464	$18,467	$50,266	$977,658	$46,489	1.081	$3,778	
R3-17	$149,792	$7,123	-$47,442	$25,790	$80,355	$1,402,687	$66,699	1.205	$13,656	
R3-18	$363,284	$17,275	-$49,993	$26,381	$93,648	$1,480,541	$70,401	1.330	$23,247	
R3-19	$1,504,492	$71,540	-$46,980	$26,271	$144,791	$1,414,296	$67,251	2.153	$77,540	
R3-20	$4,192,109	$199,339	-$46,022	$26,011	$271,372	$1,452,029	$69,045	3.930	$202,326	
R3-21	$1,095,868	$52,110	-$44,965	$26,018	$123,092	$1,487,321	$70,724	1.740	$52,369	
R3-22	$329,407	$15,664	-$39,078	$24,497	$79,239	$1,378,488	$65,548	1.209	$13,690	

TABLE B-52 (CONTINUED)
OPTIMIZED BERM WIDTH – 10 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW10	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW10	Summed Net Benefits DW10
R3-23	$252,654	$12,014	-$30,816	$21,282	$64,112	$1,184,704	$56,334	1.138	$7,778	$615,488
R3-24	$0	$0	-$18,581	$7,322	$25,904	$0	$0	$ -	$0	
R3-25	$0	$0	-$13,979	$7,973	$21,951	$0	$0	$ -	$0	
R3-26	$0	$0	-$7,529	$0	$7,529	$0	$0	$ -	$0	
R4-1	-$21,012	-$999	-$22,733	$26,171	$47,905	$245,679	$11,682	4.101	$36,223	
R4-2	-$122,806	-$5,840	-$17,522	$26,718	$38,400	$342,575	$16,290	2.357	$22,111	$58,334
R4-3	$0	$0	$2,348	$0	$0	$175,936	$8,366	-	-$8,366	
R4-4	$0	$0	$3,860	$0	$0	$91,479	$4,350	-	-$4,350	
R4-5	$1,077,211	$51,222	-$7,878	$23,197	$82,297	$209,879	$9,980	8.246	$72,317	
R4-6	$1,850,336	$87,985	$2,378	$5,399	$93,385	$41,227	$1,960	47.636	$91,424	$163,741
R4-7	$0	$0	-$3,297	$5,986	$9,283	$0	$0	$ -	$0	
R4-8	$0	$0	-$27,507	$0	$27,507	$0	$0	$ -	$0	
R4-9	$0	$0	-$52,376	$0	$52,376	$0	$0	$ -	$0	
R5-1	$84,950	$4,039	-$65,843	$13,267	$83,149	$713,056	$33,907	2.452	$49,242	
R5-2	$57,623	$2,740	-$45,737	$12,036	$60,512	$647,081	$30,769	1.967	$29,743	
R5-3	$376,455	$17,901	-$23,776	$10,917	$52,594	$603,128	$28,679	1.834	$23,915	
R5-4	$45,627	$2,170	-$5,084	$12,065	$19,319	$643,329	$30,591	0.632	-$11,272	
R5-5	$127,442	$6,060	$10,142	$8,641	$14,701	$492,487	$23,418	0.628	-$8,717	
R5-6	$3,312,541	$157,515	-$10,350	$17,186	$185,051	$1,257,820	$59,811	3.094	$125,240	
R5-7	$4,486,827	$213,353	-$15,952	$17,083	$246,388	$1,242,966	$59,104	4.169	$187,283	
R5-8	$2,009,656	$95,561	-$10,377	$16,855	$122,794	$1,219,582	$57,992	2.117	$64,801	
R5-9	$98,195	$4,669	-$7,078	$10,125	$21,872	$615,973	$29,290	0.747	-$7,418	
R5-10	$100,125	$4,761	-$8,738	$10,268	$23,767	$586,293	$27,879	0.853	-$4,112	
R5-11	$251,739	$11,970	-$9,588	$10,496	$32,055	$625,738	$29,754	1.077	$2,300	
R5-12	$123,463	$5,871	-$9,121	$10,424	$25,416	$564,827	$26,858	0.946	-$1,442	
R5-13	$408,697	$19,434	-$9,535	$10,403	$39,372	$647,180	$30,774	1.279	$8,598	
R5-14	$132,942	$6,322	-$8,691	$10,084	$25,096	$608,596	$28,939	0.867	-$3,843	
R5-15	$124,312	$5,911	-$11,925	$10,731	$28,566	$628,575	$29,889	0.956	-$1,323	
R5-16	$217,711	$10,352	-$11,884	$10,950	$33,187	$621,296	$29,543	1.123	$3,644	
R5-17	$70,512	$3,353	-$7,819	$2,956	$14,128	$344,141	$16,364	0.863	-$2,237	
R5-18	$135,727	$6,454	-$11,759	$10,445	$28,658	$595,140	$28,299	1.013	$359	
R5-19	$166,733	$7,928	-$3,184	$3,047	$14,160	$325,160	$15,462	0.916	-$1,302	

TABLE B-52 (CONTINUED)
OPTIMIZED BERM WIDTH – 10 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW10	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW10	Summed Net Benefits DW10
R5-20	$104,648	$4,976	$1,142	$9,036	$14,013	$512,478	$24,369	0.575	-$10,356	
R5-21	$81,619	$3,881	$202	$9,963	$13,844	$555,388	$26,409	0.524	-$12,565	**$430,539**
R5-22	$0	$0	-$1,853	$0	$1,853	$0	$0	$ -	$0	
R5-23	$0	$0	-$699	$0	$699	$0	$0	$ -	$0	
R5-24	$0	$0	-$4,659	$0	$4,659	$0	$0	$ -	$0	
R5-25	$0	$0	-$11,704	$0	$11,704	$0	$0	$ -	$0	
R5-26	$0	$0	-$9,313	$0	$9,313	$0	$0	$ -	$0	
R5-27	$0	$0	-$8,897	$0	$8,897	$0	$0	$ -	$0	
R5-28	$0	$0	-$10,193	$0	$10,193	$0	$0	$ -	$0	
R5-29	$0	$0	-$34,189	$0	$34,189	$0	$0	$ -	$0	
R5-30	$83,019	$3,948	-$31,024	$10,827	$45,799	$627,438	$29,835	1.535	$15,963	
R5-31	$361,948	$17,211	-$31,703	$10,722	$59,636	$643,549	$30,601	1.949	$29,034	
R5-32	$1,934,825	$92,003	-$52,553	$17,647	$162,203	$1,245,685	$59,234	2.738	$102,969	
R5-33	$806,800	$38,364	-$51,765	$18,447	$108,576	$1,268,632	$60,325	1.800	$48,251	
R5-34	$327,300	$15,563	-$41,227	$18,079	$74,869	$1,271,420	$60,457	1.238	$14,412	
R5-35	$473,196	$22,501	-$40,514	$17,448	$80,463	$1,212,663	$57,663	1.395	$22,800	
R5-36	$3,941,642	$187,429	-$45,746	$16,745	$249,920	$1,233,004	$58,631	4.263	$191,289	
R5-37	$340,379	$16,185	-$71,304	$19,309	$106,798	$1,304,941	$62,051	1.721	$44,747	
R5-38	$754,159	$35,861	-$85,107	$21,213	$142,181	$1,506,116	$71,617	1.985	$70,564	
R5-39	$142,335	$6,768	-$88,452	$20,025	$115,245	$1,299,624	$61,798	1.865	$53,447	
R5-40	$13,212	$628	-$47,885	$11,376	$59,889	$623,337	$29,640	2.021	$30,249	
R5-41	$41,435	$1,970	-$41,980	$11,011	$54,961	$620,092	$29,486	1.864	$25,475	
R5-42	$16,598	$789	-$28,454	$10,513	$39,756	$604,228	$28,732	1.384	$11,024	
R5-43	$33,357	$1,586	-$16,135	$9,713	$27,434	$538,230	$25,593	1.072	$1,841	
R5-44	$157,552	$7,492	-$2,976	$9,075	$19,543	$510,440	$24,272	0.805	-$4,729	
R5-45	$756,356	$35,966	$3,051	$8,380	$44,346	$480,652	$22,855	1.940	$21,490	
R5-46	$238,025	$11,318	$10,715	$8,307	$19,625	$490,658	$23,331	0.841	-$3,706	
R5-47	-$285,593	-$13,580	$1,211	$8,628	-$4,952	$247,219	$11,756	(0.421)	-$16,708	
R5-48	$6,644	$316	$334	$2,950	$3,266	$314,980	$14,978	0.218	-$11,711	
R5-49	$178,689	$8,497	-$4,633	$3,115	$16,244	$465,180	$22,120	0.734	-$5,875	
R5-50	$8,676	$413	-$6,629	$3,149	$10,191	$551,821	$26,240	0.388	-$16,049	
R5-51	$83,695	$3,980	-$9,926	$3,288	$17,194	$450,823	$21,437	0.802	-$4,243	$620,533

TABLE B-53
OPTIMIZED BERM WIDTH – 20 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW20	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW20	Summed Net Benefits DW20
R1-1	$27,980	$1,330	$22,628	$646	$1,976	$1,417,319	$67,395	0.029	-$65,419	
R1-2	$49,220	$2,340	$21,746	$760	$3,100	$1,338,060	$63,626	0.049	-$60,526	
R1-3	$53,244	$2,532	$16,531	$861	$3,392	$1,249,540	$59,417	0.057	-$56,025	
R1-4	$17,630	$838	$12,262	$947	$1,785	$1,242,814	$59,097	0.030	-$57,312	
R1-5	$14,194	$675	$10,066	$1,097	$1,772	$1,298,303	$61,736	0.029	-$59,964	
R1-6	$34,534	$1,642	$3,040	$1,220	$2,862	$1,415,470	$67,307	0.043	-$64,445	
R1-7	$67,280	$3,199	$271	$1,260	$4,459	$1,374,242	$65,347	0.068	-$60,887	
R1-8	$34,303	$1,631	$732	$1,321	$2,952	$1,433,949	$68,186	0.043	-$65,234	
R1-9	$46,163	$2,195	$1,125	$1,261	$3,457	$1,352,355	$64,306	0.054	-$60,849	
R1-10	$31,880	$1,516	$2,792	$1,128	$2,644	$1,219,726	$57,999	0.046	-$55,355	
R1-11	$2,669,471	$126,936	$3,707	$1,198	$128,134	$1,332,714	$63,372	2.022	$64,762	
R1-12	$192,771	$9,166	$1,807	$1,275	$10,442	$1,437,794	$68,369	0.153	-$57,927	
R1-13	$2,896,636	$137,738	-$31	$1,351	$139,120	$1,366,592	$64,983	2.141	$74,137	
R1-14	$2,805,319	$133,396	-$3,467	$1,642	$138,504	$1,475,949	$70,183	1.973	$68,322	
R1-15	$3,461,218	$164,584	-$4,550	$2,177	$171,312	$1,089,928	$51,827	3.305	$119,485	
R1-16	$2,191,508	$104,208	-$5,362	$2,224	$111,794	$1,133,670	$53,907	2.074	$57,887	
R1-17	$81,805	$3,890	-$5,465	$2,412	$11,767	$1,186,113	$56,401	0.209	-$44,634	**$326,666**
R1-18	$140,865	$6,698	-$6,187	$2,458	$15,342	$1,207,197	$57,403	0.267	-$42,061	
R1-19	$104,693	$4,978	-$3,233	$2,285	$10,497	$1,186,587	$56,423	0.186	-$45,926	
R1-20	$91,942	$4,372	$2,311	$2,006	$6,378	$240,270	$11,425	0.558	-$5,048	
R1-21	$53,711	$2,554	$3,589	$1,095	$3,649	$1,294,685	$61,564	0.059	-$57,914	
R1-22	$65,519	$3,115	$8,653	$1,035	$4,150	$1,298,117	$61,727	0.067	-$57,576	
R1-23	$35,259	$1,677	$14,399	$1,013	$2,690	$1,376,251	$65,442	0.041	-$62,753	
R1-24	$164,180	$7,807	$16,204	$866	$8,673	$1,276,311	$60,690	0.143	-$52,017	
R2-1	$0	$0	$13,063	$598	$598	$0	$0	$ -	$0	
R2-2	$0	$0	$4,236	$0	$0	$0	$0	$ -	$0	
R2-3	$0	$0	$11,959	$0	$0	$0	$0	$ -	$0	
R2-4	$0	$0	$9,353	$0	$0	$0	$0	$ -	$0	
R2-5	$0	$0	$3,573	$0	$0	$0	$0	$ -	$0	
R2-6	$0	$0	-$83,044	$0	$83,044	$0	$0	$ -	$0	
R2-7	$0	$0	$7,141	$0	$0	$0	$0	$ -	$0	
R3-1	$208,887	$9,933	$5,891	$24,947	$34,880	$1,763,852	$83,873	0.416	-$48,993	
R3-2	$2,409,584	$114,578	$5,627	$23,658	$138,236	$1,505,664	$71,596	1.931	$66,640	
R3-3	$349,155	$16,603	$5,906	$24,046	$40,649	$1,453,579	$69,119	0.588	-$28,470	
R3-4	$17,353	$825	$8,487	$4,945	$5,770	$711,435	$33,829	0.171	-$28,059	
R3-5	$252,656	$12,014	$6,688	$5,603	$17,617	$852,962	$40,559	0.434	-$22,942	
R3-6	$94,574	$4,497	$4,474	$6,233	$10,730	$940,961	$44,744	0.240	-$34,013	
R3-7	$140,222	$6,668	$703	$6,395	$13,063	$941,171	$44,754	0.292	-$31,691	
R3-8	$205,512	$9,772	-$9,617	$26,457	$45,847	$1,585,621	$75,398	0.608	-$29,551	
R3-9	$758,155	$36,051	-$9,884	$25,180	$71,115	$1,571,916	$74,746	0.951	-$3,631	
R3-10	$3,481,788	$165,562	-$12,203	$25,793	$203,559	$1,631,281	$77,569	2.624	$125,990	
R3-11	$993,154	$47,225	-$13,222	$25,306	$85,753	$1,586,476	$75,439	1.137	$10,314	
R3-12	$1,921,570	$91,373	-$21,956	$24,329	$137,657	$1,532,643	$72,879	1.889	$64,778	
R3-13	$1,183,206	$56,263	-$25,401	$24,457	$106,120	$1,512,571	$71,924	1.475	$34,196	
R3-14	$1,970,212	$93,686	-$44,459	$33,306	$171,451	$2,189,298	$104,103	1.647	$67,347	
R3-15	$71,684	$3,409	-$38,631	$26,435	$68,474	$1,678,647	$79,821	0.858	-$11,347	
R3-16	$28,074	$1,335	-$30,464	$18,467	$50,266	$1,172,519	$55,754	0.902	-$5,488	

TABLE B-53 (CONTINUED)
OPTIMIZED BERM WIDTH – 20 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW20	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW20	Summed Net Benefits DW20
R3-17	$181,481	$8,630	-$47,442	$25,790	$81,862	$1,673,978	$79,599	1.028	$2,263	
R3-18	$456,492	$21,707	-$49,993	$26,381	$98,080	$1,757,530	$83,572	1.174	$14,508	
R3-19	$1,528,670	$72,690	-$46,980	$26,271	$145,940	$1,691,568	$80,436	1.814	$65,505	
R3-20	$4,643,380	$220,797	-$46,022	$26,011	$292,830	$1,728,797	$82,206	3.562	$210,624	
R3-21	$1,400,046	$66,574	-$44,965	$26,018	$137,556	$1,765,395	$83,946	1.639	$53,610	
R3-22	$417,501	$19,853	-$39,078	$24,497	$83,428	$1,642,616	$78,108	1.068	$5,320	
R3-23	$314,983	$14,978	-$30,816	$21,282	$67,076	$1,414,807	$67,275	0.997	-$200	$525,703
R3-24	$0	$0	-$18,581	$7,322	$25,904	$0	$0	$ -	$0	
R3-25	$0	$0	-$13,979	$7,973	$21,951	$0	$0	$ -	$0	
R3-26	$0	$0	-$7,529	$0	$7,529	$0	$0	$ -	$0	
R4-1	-$11,245	-$535	-$22,733	$26,171	$48,370	$312,455	$14,858	3.256	$33,512	
R4-2	-$113,998	-$5,421	-$17,522	$26,718	$38,819	$413,011	$19,639	1.977	$19,180	$52,692
R4-3	$0	$0	$2,348	$0	$0	$213,448	$10,150	-	-$10,150	
R4-4	$0	$0	$3,860	$0	$0	$126,787	$6,029	-	-$6,029	
R4-5	$1,079,036	$51,309	-$7,878	$23,197	$82,384	$266,759	$12,685	6.495	$69,699	
R4-6	$1,850,336	$87,985	$2,378	$5,399	$93,385	$64,677	$3,075	30.365	$90,309	$160,008
R4-7	$0	$0	-$3,297	$5,986	$9,283	$0	$0	$ -	$0	
R4-8	$0	$0	-$27,507	$0	$27,507	$0	$0	$ -	$0	
R4-9	$0	$0	-$52,376	$0	$52,376	$0	$0	$ -	$0	
R5-1	$89,008	$4,232	-$65,843	$13,267	$83,342	$993,899	$47,261	1.763	$36,081	
R5-2	$58,491	$2,781	-$45,737	$12,036	$60,554	$928,665	$44,159	1.371	$16,395	
R5-3	$376,433	$17,900	-$23,776	$10,917	$52,593	$893,959	$42,509	1.237	$10,085	
R5-4	$46,797	$2,225	-$5,084	$12,065	$19,375	$1,007,036	$47,886	0.405	-$28,511	
R5-5	$130,998	$6,229	$10,142	$8,641	$14,870	$774,082	$36,808	0.404	-$21,938	
R5-6	$3,380,304	$160,737	-$10,350	$17,186	$188,273	$1,593,353	$75,766	2.485	$112,507	
R5-7	$4,528,238	$215,322	-$15,952	$17,083	$248,357	$1,571,556	$74,729	3.323	$173,628	
R5-8	$2,051,984	$97,574	-$10,377	$16,855	$124,806	$1,532,547	$72,874	1.713	$51,932	
R5-9	$99,714	$4,741	-$7,078	$10,125	$21,944	$900,572	$42,823	0.512	-$20,879	
R5-10	$104,205	$4,955	-$8,738	$10,268	$23,961	$867,429	$41,247	0.581	-$17,286	
R5-11	$237,962	$11,315	-$9,588	$10,496	$31,400	$910,575	$43,299	0.725	-$11,899	
R5-12	$125,965	$5,990	-$9,121	$10,424	$25,535	$848,683	$40,356	0.633	-$14,820	
R5-13	$411,749	$19,579	-$9,535	$10,403	$39,517	$930,104	$44,227	0.893	-$4,710	
R5-14	$135,467	$6,442	-$8,691	$10,084	$25,216	$887,775	$42,215	0.597	-$16,999	
R5-15	$125,861	$5,985	-$11,925	$10,731	$28,640	$909,784	$43,261	0.662	-$14,621	
R5-16	$251,385	$11,954	-$11,884	$10,950	$34,788	$909,322	$43,239	0.805	-$8,451	
R5-17	$71,553	$3,402	-$7,819	$2,956	$14,177	$531,333	$25,265	0.561	-$11,088	
R5-18	$119,286	$5,672	-$11,759	$10,445	$27,876	$451,732	$21,480	1.298	$6,396	
R5-19	$197,669	$9,399	-$3,184	$3,047	$15,631	$519,605	$24,708	0.633	-$9,077	
R5-20	$110,187	$5,240	$1,142	$9,036	$14,276	$798,624	$37,975	0.376	-$23,699	
R5-21	$87,636	$4,167	$202	$9,963	$14,130	$866,094	$41,184	0.343	-$27,053	**$175,992**
R5-22	$0	$0	-$1,853	$0	$1,853	$0	$0	$ -	$0	
R5-23	$0	$0	-$699	$0	$699	$0	$0	$ -	$0	
R5-24	$0	$0	-$4,659	$0	$4,659	$0	$0	$ -	$0	
R5-25	$0	$0	-$11,704	$0	$11,704	$0	$0	$ -	$0	
R5-26	$0	$0	-$9,313	$0	$9,313	$0	$0	$ -	$0	
R5-27	$0	$0	-$8,897	$0	$8,897	$0	$0	$ -	$0	
R5-28	$0	$0	-$10,193	$0	$10,193	$0	$0	$ -	$0	

TABLE B-53 (CONTINUED)
OPTIMIZED BERM WIDTH – 20 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW20	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW20	Summed Net Benefits DW20
R5-29	$0	$0	-$34,189	$0	$34,189	$0	$0	$ -	$0	
R5-30	$87,314	$4,152	-$31,024	$10,827	$46,003	$911,052	$43,321	1.062	$2,681	
R5-31	$362,887	$17,256	-$31,703	$10,722	$59,680	$925,122	$43,990	1.357	$15,690	
R5-32	$2,110,678	$100,365	-$52,553	$17,647	$170,565	$1,554,802	$73,932	2.307	$96,632	
R5-33	$832,606	$39,591	-$51,765	$18,447	$109,803	$1,597,136	$75,945	1.446	$33,857	
R5-34	$336,523	$16,002	-$41,227	$18,079	$75,308	$1,604,235	$76,283	0.987	-$975	
R5-35	$490,293	$23,314	-$40,514	$17,448	$81,276	$1,534,699	$72,976	1.114	$8,300	
R5-36	$4,167,716	$198,179	-$45,746	$16,745	$260,670	$1,534,802	$72,981	3.572	$187,688	
R5-37	$348,726	$16,582	-$71,304	$19,309	$107,195	$1,632,304	$77,618	1.381	$29,577	
R5-38	$777,585	$36,975	-$85,107	$21,213	$143,295	$1,858,566	$88,377	1.621	$54,918	
R5-39	$145,910	$6,938	-$88,452	$20,025	$115,415	$1,623,051	$77,178	1.495	$38,237	
R5-40	$13,244	$630	-$47,885	$11,376	$59,890	$903,780	$42,976	1.394	$16,915	
R5-41	$41,483	$1,973	-$41,980	$11,011	$54,964	$896,665	$42,637	1.289	$12,326	
R5-42	$16,613	$790	-$28,454	$10,513	$39,756	$887,569	$42,205	0.942	-$2,448	
R5-43	$33,370	$1,587	-$16,135	$9,713	$27,435	$816,019	$38,802	0.707	-$11,368	
R5-44	$157,552	$7,492	-$2,976	$9,075	$19,543	$786,707	$37,409	0.522	-$17,866	
R5-45	$756,356	$35,966	$3,051	$8,380	$44,346	$748,279	$35,581	1.246	$8,764	
R5-46	$259,633	$12,346	$10,715	$8,307	$20,653	$764,609	$36,358	0.568	-$15,705	
R5-47	$453,840	$21,581	$1,211	$8,628	$30,209	$852,338	$40,530	0.745	-$10,321	
R5-48	$7,293	$347	$334	$2,950	$3,297	$512,971	$24,392	0.135	-$21,095	
R5-49	$178,689	$8,497	-$4,633	$3,115	$16,244	$686,751	$32,656	0.497	-$16,411	
R5-50	$7,867	$374	-$6,629	$3,149	$10,152	$775,706	$36,886	0.275	-$26,733	
R5-51	$84,237	$4,006	-$9,926	$3,288	$17,220	$675,405	$32,116	0.536	-$14,897	**$367,768**

TABLE B-54
OPTIMIZED BERM WIDTH – 30 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW30	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW30	Summed Net Benefits DW30
R1-1	$11,501	$547	$22,628	$646	$1,193	$1,522,275	$72,386	0.016	-$71,193	
R1-2	$10,254	$488	$21,746	$760	$1,247	$1,440,805	$68,512	0.018	-$67,264	
R1-3	$17,004	$809	$16,531	$861	$1,669	$1,346,456	$64,025	0.026	-$62,356	
R1-4	$17,593	$837	$12,262	$947	$1,783	$1,333,467	$63,408	0.028	-$61,624	
R1-5	$7,189	$342	$10,066	$1,097	$1,439	$1,391,941	$66,188	0.022	-$64,749	
R1-6	$16,490	$784	$3,040	$1,220	$2,004	$1,498,667	$71,263	0.028	-$69,259	
R1-7	$26,440	$1,257	$271	$1,260	$2,517	$1,450,241	$68,960	0.037	-$66,443	
R1-8	$18,457	$878	$732	$1,321	$2,198	$1,515,263	$72,052	0.031	-$69,854	
R1-9	$35,807	$1,703	$1,125	$1,261	$2,964	$1,431,202	$68,055	0.044	-$65,091	
R1-10	$22,931	$1,090	$2,792	$1,128	$2,219	$1,297,438	$61,694	0.036	-$59,476	
R1-11	$2,659,517	$126,463	$3,707	$1,198	$127,660	$1,417,532	$67,405	1.894	$60,255	
R1-12	$123,289	$5,863	$1,807	$1,275	$7,138	$1,524,599	$72,496	0.098	-$65,358	
R1-13	$2,834,338	$134,776	-$31	$1,351	$136,157	$1,451,695	$69,030	1.972	$67,128	
R1-14	$2,798,976	$133,094	-$3,467	$1,642	$138,203	$1,545,167	$73,474	1.881	$64,729	
R1-15	$3,838,772	$182,537	-$4,550	$2,177	$189,265	$1,151,418	$54,751	3.457	$134,514	
R1-16	$2,294,935	$109,126	-$5,362	$2,224	$116,712	$1,201,735	$57,144	2.042	$59,568	
R1-17	$40,409	$1,921	-$5,465	$2,412	$9,799	$1,263,497	$60,081	0.163	-$50,282	**$320,836**
R1-18	$84,027	$3,996	-$6,187	$2,458	$12,640	$1,284,458	$61,077	0.207	-$48,437	
R1-19	$71,581	$3,404	-$3,233	$2,285	$8,923	$1,257,326	$59,787	0.149	-$50,865	
R1-20	$79,631	$3,787	$2,311	$2,006	$5,792	$1,122,553	$53,378	0.109	-$47,586	
R1-21	$963	$46	$3,589	$1,095	$1,141	$1,359,991	$64,669	0.018	-$63,528	
R1-22	$28,072	$1,335	$8,653	$1,035	$2,370	$1,383,721	$65,797	0.036	-$63,427	
R1-23	$8,969	$426	$14,399	$1,013	$1,439	$1,461,055	$69,475	0.021	-$68,035	
R1-24	$135,454	$6,441	$16,204	$866	$7,307	$1,369,576	$65,125	0.112	-$57,818	
R2-1	$0	$0	$13,063	$598	$598	$0	$0	$ -	$0	
R2-2	$0	$0	$4,236	$0	$0	$0	$0	$ -	$0	
R2-3	$0	$0	$11,959	$0	$0	$0	$0	$ -	$0	
R2-4	$0	$0	$9,353	$0	$0	$0	$0	$ -	$0	
R2-5	$0	$0	$3,573	$0	$0	$0	$0	$ -	$0	
R2-6	$0	$0	-$83,044	$0	$83,044	$0	$0	$ -	$0	
R2-7	$0	$0	$7,141	$0	$0	$0	$0	$ -	$0	
R3-1	$210,031	$9,987	$5,891	$24,947	$34,934	$1,812,616	$86,192	0.405	-$51,257	
R3-2	$2,549,759	$121,244	$5,627	$23,658	$144,902	$1,569,252	$74,619	1.942	$70,282	
R3-3	$343,083	$16,314	$5,906	$24,046	$40,360	$1,525,766	$72,552	0.556	-$32,192	
R3-4	$9,270	$441	$8,487	$4,945	$5,386	$833,654	$39,641	0.136	-$34,255	

TABLE B-54 (CONTINUED)
OPTIMIZED BERM WIDTH – 30 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW30	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW30	Summed Net Benefits DW30
R3-5	$55,342	$2,632	$6,688	$5,603	$8,235	$984,495	$46,814	0.176	-$38,579	
R3-6	$62,337	$2,964	$4,474	$6,233	$9,198	$1,076,646	$51,196	0.180	-$41,998	
R3-7	$46,542	$2,213	$703	$6,395	$8,609	$1,067,547	$50,763	0.170	-$42,154	
R3-8	$169,099	$8,041	-$9,617	$26,457	$44,116	$1,654,181	$78,658	0.561	-$34,542	
R3-9	$719,242	$34,201	-$9,884	$25,180	$69,265	$1,636,120	$77,799	0.890	-$8,534	
R3-10	$4,296,347	$204,296	-$12,203	$25,793	$242,292	$1,691,388	$80,427	3.013	$161,865	
R3-11	$1,049,678	$49,913	-$13,222	$25,306	$88,441	$1,641,532	$78,056	1.133	$10,384	
R3-12	$2,430,196	$115,558	-$21,956	$24,329	$161,843	$1,586,018	$75,417	2.146	$86,426	
R3-13	$1,171,493	$55,706	-$25,401	$24,457	$105,564	$1,564,251	$74,382	1.419	$31,182	
R3-14	$1,790,465	$85,138	-$44,459	$33,306	$162,903	$2,246,256	$106,812	1.525	$56,092	
R3-15	$25,013	$1,189	-$38,631	$26,435	$66,255	$1,727,551	$82,147	0.807	-$15,892	
R3-16	$5,706	$271	-$30,464	$18,467	$49,203	$1,200,159	$57,069	0.862	-$7,866	
R3-17	$174,047	$8,276	-$47,442	$25,790	$81,508	$1,709,505	$81,289	1.003	$220	
R3-18	$436,849	$20,773	-$49,993	$26,381	$97,146	$1,794,370	$85,324	1.139	$11,822	
R3-19	$1,527,392	$72,629	-$46,980	$26,271	$145,880	$1,729,073	$82,219	1.774	$63,661	
R3-20	$4,800,326	$228,260	-$46,022	$26,011	$300,293	$1,763,809	$83,871	3.580	$216,422	
R3-21	$1,420,738	$67,558	-$44,965	$26,018	$138,540	$1,801,358	$85,656	1.617	$52,884	
R3-22	$420,524	$19,996	-$39,078	$24,497	$83,571	$1,677,869	$79,784	1.047	$3,787	
R3-23	$304,369	$14,473	-$30,816	$21,282	$66,571	$1,451,311	$69,011	0.965	-$2,440	$506,573
R3-24	$0	$0	-$18,581	$7,322	$25,904	$0	$0	$ -	$0	
R3-25	$0	$0	-$13,979	$7,973	$21,951	$0	$0	$ -	$0	
R3-26	$0	$0	-$7,529	$0	$7,529	$0	$0	$ -	$0	
R4-1			-$22,733	$26,171	$48,904					
R4-2	-$130,192	-$6,191	-$17,522	$26,718	$38,049	$440,125	$20,928	1.818	$17,121	
R4-3	$0	$0	$2,348	$0	$0	$239,742	$11,400	-	-$11,400	$5,721
R4-4	$0	$0	$3,860	$0	$0	$150,944	$7,178	-	-$7,178	
R4-5	-$18,332	-$872	-$7,878	$23,197	$30,203	$299,381	$14,236	2.122	$15,967	
R4-6	-$24,942	-$1,186	$2,378	$5,399	$4,213	$93,950	$4,467	0.943	-$254	$15,713
R4-7	$0	$0	-$3,297	$5,986	$9,283	$0	$0	$ -	$0	
R4-8	$0	$0	-$27,507	$0	$27,507	$0	$0	$ -	$0	
R4-9	$0	$0	-$52,376	$0	$52,376	$0	$0	$ -	$0	
R5-1	$65,042	$3,093	-$65,843	$13,267	$82,202	$1,110,458	$52,803	1.557	$29,399	
R5-2	$30,922	$1,470	-$45,737	$12,036	$59,243	$1,056,960	$50,260	1.179	$8,983	
R5-3	$22,336	$1,062	-$23,776	$10,917	$35,756	$1,036,890	$49,305	0.725	-$13,549	
R5-4	$26,425	$1,257	-$5,084	$12,065	$18,406	$1,196,625	$56,901	0.323	-$38,495	

TABLE B-54 (CONTINUED)
OPTIMIZED BERM WIDTH – 30 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW30	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW30	Summed Net Benefits DW30
R5-5	$96,490	$4,588	$10,142	$8,641	$13,229	$927,103	$44,085	0.300	-$30,855	
R5-6	$3,335,466	$158,605	-$10,350	$17,186	$186,141	$1,689,746	$80,349	2.317	$105,792	
R5-7	$4,458,437	$212,003	-$15,952	$17,083	$245,038	$1,666,685	$79,253	3.092	$165,785	
R5-8	$2,016,728	$95,897	-$10,377	$16,855	$123,130	$1,621,908	$77,123	1.597	$46,007	
R5-9	$40,116	$1,908	-$7,078	$10,125	$19,110	$1,043,589	$49,624	0.385	-$30,514	
R5-10	$48,751	$2,318	-$8,738	$10,268	$21,324	$1,008,641	$47,962	0.445	-$26,638	
R5-11	$154,743	$7,358	-$9,588	$10,496	$27,443	$1,051,715	$50,010	0.549	-$22,567	
R5-12	$52,644	$2,503	-$9,121	$10,424	$22,049	$989,626	$47,058	0.469	-$25,009	
R5-13	$122,049	$5,804	-$9,535	$10,403	$25,742	$1,070,559	$50,906	0.506	-$25,165	
R5-14	$60,975	$2,899	-$8,691	$10,084	$21,674	$1,027,806	$48,873	0.443	-$27,199	
R5-15	$51,966	$2,471	-$11,925	$10,731	$25,126	$1,046,479	$49,761	0.505	-$24,635	
R5-16	$228,916	$10,885	-$11,884	$10,950	$33,720	$1,050,669	$49,960	0.675	-$16,241	
R5-17	$19,614	$933	-$7,819	$2,956	$11,707	$671,888	$31,949	0.366	-$20,241	
R5-18	$114,969	$5,467	-$11,759	$10,445	$27,671	$1,010,005	$48,027	0.576	-$20,356	
R5-19	$164,885	$7,840	-$3,184	$3,047	$14,072	$672,742	$31,990	0.440	-$17,917	
R5-20	$55,043	$2,617	$1,142	$9,036	$11,654	$951,767	$45,257	0.257	-$33,604	
R5-21	$47,328	$2,250	$202	$9,963	$12,214	$1,032,518	$49,097	0.249	-$36,883	**$16,584**
R5-22	$0	$0	-$1,853	$0	$1,853	$0	$0	$ -	$0	
R5-23	$0	$0	-$699	$0	$699	$0	$0	$ -	$0	
R5-24	$0	$0	-$4,659	$0	$4,659	$0	$0	$ -	$0	
R5-25	$0	$0	-$11,704	$0	$11,704	$0	$0	$ -	$0	
R5-26	$0	$0	-$9,313	$0	$9,313	$0	$0	$ -	$0	
R5-27	$0	$0	-$8,897	$0	$8,897	$0	$0	$ -	$0	
R5-28	$0	$0	-$10,193	$0	$10,193	$0	$0	$ -	$0	
R5-29	$0	$0	-$34,189	$0	$34,189	$0	$0	$ -	$0	
R5-30	$50,301	$2,392	-$31,024	$10,827	$44,243	$1,050,897	$49,971	0.885	-$5,728	
R5-31	$307,935	$14,643	-$31,703	$10,722	$57,067	$1,063,438	$50,568	1.129	$6,500	
R5-32	$1,969,176	$93,636	-$52,553	$17,647	$163,836	$1,641,498	$78,055	2.099	$85,781	
R5-33	$748,613	$35,597	-$51,765	$18,447	$105,809	$1,681,725	$79,968	1.323	$25,841	
R5-34	$302,561	$14,387	-$41,227	$18,079	$73,693	$1,690,822	$80,400	0.917	-$6,708	
R5-35	$442,419	$21,037	-$40,514	$17,448	$78,999	$1,620,643	$77,063	1.025	$1,936	
R5-36	$4,158,831	$197,757	-$45,746	$16,745	$260,247	$1,615,725	$76,829	3.387	$183,418	
R5-37	$320,099	$15,221	-$71,304	$19,309	$105,834	$1,711,560	$81,386	1.300	$24,447	
R5-38	$699,372	$33,256	-$85,107	$21,213	$139,576	$1,946,362	$92,551	1.508	$47,025	
R5-39	$137,642	$6,545	-$88,452	$20,025	$115,022	$1,703,368	$80,997	1.420	$34,025	

TABLE B-54 (CONTINUED)
OPTIMIZED BERM WIDTH – 30 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW30	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW30	Summed Net Benefits DW30
R5-40	$7,160	$340	-$47,885	$11,376	$59,601	$1,033,144	$49,127	1.213	$10,474	
R5-41	$18,545	$882	-$41,980	$11,011	$53,873	$1,028,757	$48,918	1.101	$4,954	
R5-42	$6,844	$325	-$28,454	$10,513	$39,292	$1,026,267	$48,800	0.805	-$9,508	
R5-43	$11,178	$532	-$16,135	$9,713	$26,380	$956,378	$45,477	0.580	-$19,097	
R5-44	-$5,731	-$273	-$2,976	$9,075	$11,779	$931,602	$44,299	0.266	-$32,520	
R5-45	-$20,906	-$994	$3,051	$8,380	$7,386	$889,630	$42,303	0.175	-$34,917	
R5-46	$162,751	$7,739	$10,715	$8,307	$16,046	$910,725	$43,306	0.371	-$27,260	
R5-47	$386,800	$18,393	$1,211	$8,628	$27,021	$620,858	$29,522	0.915	-$2,502	
R5-48	$2,886	$137	$334	$2,950	$3,087	$666,610	$31,698	0.097	-$28,611	
R5-49	-$7,508	-$357	-$4,633	$3,115	$7,391	$817,214	$38,859	0.190	-$31,469	
R5-50	-$1,637	-$78	-$6,629	$3,149	$9,700	$892,448	$42,437	0.229	-$32,736	
R5-51	$15,569	$740	-$9,926	$3,288	$13,954	$810,140	$38,523	0.362	-$24,569	**$168,779**

TABLE B-55
OPTIMIZED BERM WIDTH – 40 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW40	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW40	Summed Net Benefits DW40
R1-1	$23,090	$1,098	$22,628	$1,658	$2,756	$2,060,250	$97,967	0.028	-$95,211	
R1-2	$18,067	$859	$21,746	$760	$1,619	$1,955,573	$92,989	0.017	-$91,371	
R1-3	$28,093	$1,336	$16,531	$860	$2,196	$1,834,152	$87,216	0.025	-$85,020	
R1-4	$20,442	$972	$12,262	$947	$1,919	$1,804,627	$85,812	0.022	-$83,893	
R1-5	$9,138	$435	$10,066	$1,097	$1,531	$1,893,254	$90,026	0.017	-$88,495	
R1-6	$22,998	$1,094	$3,040	$1,220	$2,314	$1,999,827	$95,094	0.024	-$92,780	
R1-7	$33,643	$1,600	$271	$1,260	$2,860	$1,935,231	$92,022	0.031	-$89,163	
R1-8	$21,576	$1,026	$732	$1,320	$2,346	$2,026,988	$96,385	0.024	-$94,039	
R1-9	$43,850	$2,085	$1,125	$1,261	$3,346	$1,918,321	$91,218	0.037	-$87,872	
R1-10	$34,650	$1,648	$2,792	$1,128	$2,776	$1,754,866	$83,446	0.033	-$80,670	
R1-11	$2,738,287	$130,208	$3,707	$1,198	$131,406	$1,902,011	$90,443	1.453	$40,963	
R1-12	$137,166	$6,522	$1,807	$1,275	$7,797	$2,027,074	$96,389	0.081	-$88,592	
R1-13	$2,820,802	$134,132	-$31	$1,351	$135,514	$1,946,909	$92,577	1.464	$42,936	
R1-14	$2,800,613	$133,172	-$3,467	$1,641	$138,280	$2,058,601	$97,889	1.413	$40,392	
R1-15	$4,062,754	$193,188	-$4,550	$2,177	$199,916	$1,552,831	$73,839	2.707	$126,077	

TABLE B-55 (CONTINUED)
OPTIMIZED BERM WIDTH – 40 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW40	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW40	Summed Net Benefits DW40
R1-16	$2,254,822	$107,219	-$5,362	$2,224	$114,804	$1,610,772	$76,594	1.499	$38,211	
R1-17	$48,473	$2,305	-$5,465	$2,412	$10,182	$1,705,260	$81,087	0.126	-$70,905	**$199,987**
R1-18	$108,630	$5,165	-$6,187	$2,457	$13,810	$1,735,040	$82,503	0.167	-$68,693	
R1-19	$93,405	$4,442	-$3,233	$2,285	$9,960	$1,677,852	$79,784	0.125	-$69,823	
R1-20	$109,855	$5,224	$2,311	$2,005	$7,229	$1,503,201	$71,479	0.101	-$64,250	
R1-21	$9,520	$453	$3,589	$1,095	$1,548	$1,817,549	$86,426	0.018	-$84,879	
R1-22	$43,736	$2,080	$8,653	$1,035	$3,114	$1,863,693	$88,620	0.035	-$85,506	
R1-23	$14,130	$672	$14,399	$1,013	$1,685	$1,969,959	$93,673	0.018	-$91,989	
R1-24	$140,276	$6,670	$16,204	$866	$7,536	$1,845,218	$87,742	0.086	-$80,206	
R2-1	$2,412	$0	$13,063	$598	$598	$0	$0	$ -	$0	
R2-2	$0	$0	$4,236	$0	$0	$0	$0	$ -	$0	
R2-3	$0	$0	$11,959	$0	$0	$0	$0	$ -	$0	
R2-4	$0	$0	$9,353	$0	$0	$0	$0	$ -	$0	
R2-5	$0	$0	$3,573	$0	$0	$0	$0	$ -	$0	
R2-6	$0	$0	-$83,044	$0	$83,044	$0	$0	$ -	$0	
R2-7	$0	$0	$7,141	$0	$0	$0	$0	$ -	$0	
R3-1	$221,465	$10,531	$5,891	$24,947	$35,478	$2,384,526	$113,387	0.313	-$77,909	
R3-2	$2,685,250	$127,686	$5,627	$23,658	$151,344	$2,071,302	$98,492	1.537	$52,852	
R3-3	$366,723	$17,438	$5,906	$24,046	$41,484	$2,023,980	$96,242	0.431	-$54,758	
R3-4	$10,968	$522	$8,487	$4,945	$5,466	$1,189,013	$56,539	0.097	-$51,072	
R3-5	$107,028	$5,089	$6,688	$5,603	$10,692	$1,375,035	$65,384	0.164	-$54,692	
R3-6	$115,225	$5,479	$4,474	$6,233	$11,712	$1,493,451	$71,015	0.165	-$59,303	
R3-7	$67,927	$3,230	$703	$6,395	$9,625	$1,479,887	$70,370	0.137	-$60,745	
R3-8	$216,008	$10,271	-$9,617	$26,457	$46,346	$2,192,530	$104,257	0.445	-$57,911	
R3-9	$779,707	$37,076	-$9,884	$25,180	$72,140	$2,152,736	$102,365	0.705	-$30,225	
R3-10	$4,878,109	$231,959	-$12,203	$25,793	$269,955	$2,216,023	$105,374	2.562	$164,581	
R3-11	$1,140,404	$54,227	-$13,222	$25,305	$92,754	$2,157,173	$102,576	0.904	-$9,821	
R3-12	$2,797,284	$133,014	-$21,956	$24,328	$179,298	$2,088,249	$99,298	1.806	$80,000	
R3-13	$1,185,068	$56,351	-$25,401	$24,456	$106,209	$2,069,751	$98,419	1.079	$7,790	
R3-14	$1,888,815	$89,815	-$44,459	$33,306	$167,580	$2,934,560	$139,541	1.201	$28,039	
R3-15	$33,043	$1,571	-$38,631	$26,434	$66,637	$2,267,701	$107,831	0.618	-$41,195	
R3-16	$9,434	$449	-$30,464	$18,467	$49,380	$1,573,874	$74,839	0.660	-$25,459	
R3-17	$189,742	$9,022	-$47,442	$25,790	$82,255	$2,233,793	$106,219	0.774	-$23,965	
R3-18	$479,216	$22,787	-$49,993	$26,381	$99,161	$2,329,256	$110,758	0.895	-$11,598	
R3-19	$1,540,627	$73,258	-$46,980	$26,270	$146,509	$2,260,325	$107,481	1.363	$39,028	

TABLE B-55 (CONTINUED)
OPTIMIZED BERM WIDTH – 40 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW40	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW40	Summed Net Benefits DW40
R3-20	$4,913,751	$233,654	-$46,022	$26,011	$305,686	$2,287,769	$108,786	2.810	$196,901	
R3-21	$1,539,747	$73,217	-$44,965	$26,018	$144,199	$2,326,458	$110,625	1.303	$33,574	
R3-22	$448,633	$21,333	-$39,078	$24,496	$84,908	$2,172,493	$103,304	0.822	-$18,396	
R3-23	$325,922	$15,498	-$30,816	$21,282	$67,596	$1,880,715	$89,430	0.756	-$21,834	$81,788
R3-24	$4,940	$235	-$18,581	$7,322	$26,138	$0	$0	$ -	$0	
R3-25	-$10,198	-$485	-$13,979	$7,972	$21,466	$0	$0	$ -	$0	
R3-26	$0	$0	-$7,529	$0	$7,529	$0	$0	$ -	$0	
R4-1	$38,627	$1,837	-$22,733	$26,171	$50,741	$478,569	$22,756	2.230	$27,984	
R4-2	$145,281	$6,908	-$17,522	$26,718	$51,148	$568,518	$27,034	1.892	$24,114	$52,099
R4-3	$0	$0	$2,348	$0	$0	$328,547	$15,623	-	-$15,623	
R4-4	$0	$0	$3,860	$0	$0	$233,262	$11,092	-	-$11,092	
R4-5	$216,661	$10,302	-$7,878	$23,197	$41,377	$397,997	$18,925	2.186	$22,452	
R4-6	$32,526	$1,547	$2,378	$5,399	$6,946	$171,987	$8,178	0.849	-$1,232	$21,219
R4-7	$0	$0	-$3,297	$5,986	$9,283	$0	$0	$ -	$0	
R4-8	$0	$0	-$27,507	$0	$27,507	$0	$0	$ -	$0	
R4-9	$0	$0	-$52,376	$0	$52,376	$0	$0	$ -	$0	
R5-1	$74,649	$3,550	-$65,843	$13,267	$82,659	$1,549,637	$73,687	1.122	$8,972	
R5-2	$37,561	$1,786	-$45,737	$12,035	$59,558	$1,490,537	$70,877	0.840	-$11,318	
R5-3	$34,275	$1,630	-$23,776	$10,917	$36,323	$1,473,678	$70,075	0.518	-$33,752	
R5-4	$32,992	$1,569	-$5,084	$12,065	$18,718	$1,734,708	$82,487	0.227	-$63,769	
R5-5	$104,462	$4,967	$10,142	$8,641	$13,608	$1,338,038	$63,625	0.214	-$50,017	
R5-6	$3,345,811	$159,097	-$10,350	$17,186	$186,633	$2,260,344	$107,482	1.736	$79,151	
R5-7	$4,471,976	$212,647	-$15,952	$17,083	$245,681	$2,228,398	$105,963	2.319	$139,719	
R5-8	$2,022,516	$96,173	-$10,377	$16,855	$123,405	$2,157,998	$102,615	1.203	$20,790	
R5-9	$50,121	$2,383	-$7,078	$10,125	$19,586	$1,471,028	$69,949	0.280	-$50,363	
R5-10	$63,281	$3,009	-$8,738	$10,268	$22,015	$1,432,063	$68,096	0.323	-$46,081	
R5-11	$169,837	$8,076	-$9,588	$10,496	$28,160	$1,481,172	$70,431	0.400	-$42,271	
R5-12	$71,415	$3,396	-$9,121	$10,424	$22,941	$1,418,258	$67,440	0.340	-$44,498	
R5-13	$128,840	$6,126	-$9,535	$10,403	$26,064	$1,498,215	$71,242	0.366	-$45,177	
R5-14	$78,276	$3,722	-$8,691	$10,083	$22,496	$1,450,069	$68,952	0.326	-$46,456	
R5-15	$65,173	$3,099	-$11,925	$10,730	$25,754	$1,473,184	$70,051	0.368	-$44,297	
R5-16	$232,425	$11,052	-$11,884	$10,950	$33,886	$1,486,229	$70,672	0.479	-$36,785	
R5-17	$35,252	$1,676	-$7,819	$2,956	$12,451	$989,022	$47,029	0.265	-$34,578	
R5-18	$136,495	$6,490	-$11,759	$10,445	$28,694	$1,429,088	$67,955	0.422	-$39,260	
R5-19	$283,773	$13,494	-$3,184	$3,047	$19,725	$1,007,426	$47,904	0.412	-$28,179	

TABLE B-55 (CONTINUED)
OPTIMIZED BERM WIDTH – 40 FEET OF ADDED DUNE WIDTH

Reach	Damage Reduction DW40	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost (Planned Nourishment Plus Crossover Work)	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits DW40	Summed Net Benefits DW40
R5-20	$72,339	$3,440	$1,142	$9,036	$12,476	$1,369,629	$65,127	0.192	-$52,651	
R5-21	$64,889	$3,086	$202	$9,963	$13,049	$1,488,267	$70,769	0.184	-$57,720	**-$478,541**
R5-22	$0	$0	-$1,853	$0	$1,853	$0	$0	$ -	$0	
R5-23	$0	$0	-$699	$0	$699	$0	$0	$ -	$0	
R5-24	$0	$0	-$4,659	$0	$4,659	$0	$0	$ -	$0	
R5-25	$0	$0	-$11,704	$0	$11,704	$0	$0	$ -	$0	
R5-26	$0	$0	-$9,313	$0	$9,313	$0	$0	$ -	$0	
R5-27	$0	$0	-$8,897	$0	$8,897	$0	$0	$ -	$0	
R5-28	$0	$0	-$10,193	$0	$10,193	$0	$0	$ -	$0	
R5-29	$0	$0	-$34,189	$0	$34,189	$0	$0	$ -	$0	
R5-30	$64,882	$3,085	-$31,024	$10,827	$44,936	$1,476,885	$70,227	0.640	-$25,291	
R5-31	$314,708	$14,965	-$31,703	$10,722	$57,389	$1,487,399	$70,727	0.811	-$13,338	
R5-32	$1,994,943	$94,862	-$52,553	$17,647	$165,061	$2,181,877	$103,750	1.591	$61,311	
R5-33	$767,311	$36,486	-$51,765	$18,446	$106,698	$2,245,575	$106,779	0.999	-$82	
R5-34	$308,874	$14,687	-$41,227	$18,079	$73,993	$2,260,091	$107,470	0.688	-$33,477	
R5-35	$457,837	$21,771	-$40,514	$17,448	$79,732	$2,166,464	$103,017	0.774	-$23,285	
R5-36	$4,289,689	$203,979	-$45,746	$16,745	$266,470	$2,131,470	$101,354	2.629	$165,116	
R5-37	$325,896	$15,497	-$71,304	$19,309	$106,109	$2,274,156	$108,138	0.981	-$2,029	
R5-38	$713,775	$33,941	-$85,107	$21,213	$140,261	$2,543,815	$120,961	1.160	$19,300	
R5-39	$139,349	$6,626	-$88,452	$20,024	$115,103	$2,271,087	$107,992	1.066	$7,111	
R5-40	$8,036	$382	-$47,885	$11,375	$59,643	$1,458,882	$69,371	0.860	-$9,729	
R5-41	$22,721	$1,080	-$41,980	$11,011	$54,071	$1,449,635	$68,932	0.784	-$14,860	
R5-42	$9,035	$430	-$28,454	$10,512	$39,396	$1,449,324	$68,917	0.572	-$29,521	
R5-43	$15,449	$735	-$16,135	$9,713	$26,583	$1,365,501	$64,931	0.409	-$38,348	
R5-44	-$5,731	-$273	-$2,976	$9,075	$11,779	$1,336,670	$63,560	0.185	-$51,781	
R5-45	-$25,142	-$1,196	$3,051	$8,380	$7,184	$1,279,403	$60,837	0.118	-$53,652	
R5-46	$179,383	$8,530	$10,715	$8,307	$16,837	$1,306,232	$62,113	0.271	-$45,276	
R5-47	$409,155	$19,456	$1,211	$8,628	$28,084	$985,240	$46,849	0.599	-$18,765	
R5-48	$3,643	$173	$334	$2,950	$3,123	$1,003,688	$47,726	0.065	-$44,603	
R5-49	-$7,508	-$357	-$4,633	$3,115	$7,390	$1,179,714	$56,097	0.132	-$48,706	
R5-50	$4,719	$224	-$6,629	$3,149	$10,002	$1,262,758	$60,045	0.167	-$50,043	
R5-51	$16,436	$782	-$9,926	$3,288	$13,995	$1,165,307	$55,411	0.253	-$41,416	**-$291,366**

12.7 FORMULATION OF CONSTRUCTION REACHES

The added dune width alternatives were formulated to first bracket the NED Plan and secondly to assist in building an optimized project. The same optimization procedure is applied at this point by comparing net benefits among the alternatives. In the next step benefits from the optimized alternatives are summed and project benefits are combined with the project's construction costs to calculate the project BCR.

Table B-56 collects and displays the net benefits alternatives with various added dune width and the optimized berm width identified in the Main Report. Each reach is evaluated to select which alternative maximized net benefits for that reach.

TABLE B-56

MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits -7 + -8	Average Annual Damage Reduction & Land Loss Benefits -7	Average Annual With Project Emergency Nourishment Cost Avoidance -8	Construction Reach
R1-1	-$32,055	-$49,085	-$65,419	-$71,193	-$95,211	+00	$3,972	$2,314	$1,658	
R1-2	-$31,234	-$45,808	-$60,526	-$67,264	-$91,371	+00	$2,353	$1,594	$760	
R1-3	-$28,352	-$42,044	-$56,025	-$62,356	-$85,020	+00	$2,839	$1,979	$860	
R1-4	-$29,167	-$43,881	-$57,312	-$61,624	-$83,893	+00	$2,803	$1,856	$947	
R1-5	-$30,265	-$45,748	-$59,964	-$64,749	-$88,495	+00	$2,589	$1,492	$1,097	
R1-6	-$34,788	-$50,444	-$64,445	-$69,259	-$92,780	+00	$3,406	$2,186	$1,220	
R1-7	-$32,988	-$47,497	-$60,887	-$66,443	-$89,163	+00	$4,131	$2,871	$1,260	
R1-8	-$34,779	-$51,062	-$65,234	-$69,854	-$94,039	+00	$3,622	$2,301	$1,320	
R1-9	-$31,662	-$47,433	-$60,849	-$65,091	-$87,872	+00	$4,361	$3,100	$1,261	
R1-10	-$27,879	-$42,638	-$55,355	-$59,476	-$80,670	+00	$3,636	$2,508	$1,128	
R1-11	$67,286	$64,435	$64,762	$60,255	$40,963	+00	$102,788	$101,590	$1,198	Construction Reach One
R1-12	-$30,555	-$43,844	-$57,927	-$65,358	-$88,592	+00	$8,925	$7,650	$1,275	
R1-13	$90,638	$87,885	$74,137	$67,128	$42,936	+00	$127,403	$126,052	$1,351	
R1-14	$84,991	$82,108	$68,322	$64,729	$40,392	+00	$125,178	$123,536	$1,641	
R1-15	$30,240	$90,939	$119,485	$134,514	$126,077	+30	$191,443	$189,265	$2,177	
R1-16	$69,713	$48,693	$57,887	$59,568	$38,211	+00	$97,594	$95,371	$2,224	
R1-17	-$15,883	-$30,741	-$44,634	-$50,282	-$70,905	+00	$12,587	$10,175	$2,412	
R1-18	-$13,071	-$27,929	-$42,061	-$48,437	-$68,693	+00	$15,724	$13,266	$2,457	
R1-19	-$17,822	-$32,803	-$45,926	-$50,865	-$69,823	+00	$11,759	$9,473	$2,285	
R1-20	$37	-$30,785	-$5,048	-$47,586	-$64,250	+00	$8,567	$6,561	$2,005	
R1-21	-$31,703	-$45,354	-$57,914	-$63,528	-$84,879	+00	$2,643	$1,548	$1,095	
R1-22	-$30,070	-$44,069	-$57,576	-$63,427	-$85,506	+00	$3,729	$2,694	$1,035	
R1-23	-$32,449	-$48,421	-$62,753	-$68,035	-$91,989	+00	$2,687	$1,674	$1,013	
R1-24	-$21,428	-$38,305	-$52,017	-$57,818	-$80,206	+00	$8,507	$7,641	$866	
R2-1	$0	$0	$0	$0	$0	+00	$1,195	$598	$598	
R2-2	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R2-3	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R2-4	$0	$0	$0	$0	$0	+00	$0	$0	$0	

TABLE B-56 (CONTINUED)

MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits -7 + -8	Average Annual Damage Reduction & Land Loss Benefits -7	Average Annual With Project Emergency Nourishment Cost Avoidance -8	Construction Reach
R2-5	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R2-6	$0	$0	$0	$0	$0	+00	$83,044	$83,044	$0	
R2-7	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R3-1	-$22,201	-$36,151	-$48,993	-$51,257	-$77,909	+00	$59,395	$34,448	$24,947	
R3-2	$87,870	$59,794	$66,640	$70,282	$52,852	+00	$159,414	$135,756	$23,658	Construction Reach Two
R3-3	-$5,133	-$18,121	-$28,470	-$32,192	-$54,758	+00	$63,963	$39,917	$24,046	
R3-4	-$8,303	-$15,050	-$28,059	-$34,255	-$51,072	+00	$10,410	$5,466	$4,945	
R3-5	-$7,899	-$8,892	-$22,942	-$38,579	-$54,692	+00	$15,813	$10,211	$5,603	
R3-6	-$9,230	-$19,140	-$34,013	-$41,998	-$59,303	+00	$17,620	$11,387	$6,233	
R3-7	-$11,076	-$16,833	-$31,691	-$42,154	-$60,745	+00	$15,925	$9,529	$6,395	
R3-8	-$7,757	-$18,879	-$29,551	-$34,542	-$57,911	+00	$68,135	$41,678	$26,457	
R3-9	$13,670	$2,952	-$3,631	-$8,534	-$30,225	+00	$88,629	$63,450	$25,180	
R3-10	$118,468	$79,330	$125,990	$161,865	$164,581	+40	$295,748	$269,955	$25,793	
R3-11	$28,772	$12,532	$10,314	$10,384	-$9,821	+00	$104,771	$79,466	$25,305	
R3-12	$78,301	$41,116	$64,778	$86,426	$80,000	+30	$186,171	$161,843	$24,328	
R3-13	$56,508	$45,150	$34,196	$31,182	$7,790	+00	$129,302	$104,846	$24,456	
R3-14	$86,876	$75,127	$67,347	$56,092	$28,039	+00	$191,923	$158,618	$33,306	
R3-15	$12,372	$2,019	-$11,347	-$15,892	-$41,195	+00	$93,069	$66,635	$26,434	
R3-16	$11,336	$3,778	-$5,488	-$7,866	-$25,459	+00	$67,847	$49,380	$18,467	
R3-17	$26,061	$13,656	$2,263	$220	-$23,965	+00	$106,692	$80,903	$25,790	
R3-18	$37,121	$23,247	$14,508	$11,822	-$11,598	+00	$121,776	$95,396	$26,381	
R3-19	$89,908	$77,540	$65,505	$63,661	$39,028	+00	$171,506	$145,236	$26,270	
R3-20	$206,943	$202,326	$210,624	$216,422	$196,901	+30	$326,304	$300,293	$26,011	
R3-21	$65,227	$52,369	$53,610	$52,884	$33,574	+00	$150,218	$124,201	$26,018	
R3-22	$23,583	$13,690	$5,320	$3,787	-$18,396	+00	$102,428	$77,932	$24,496	
R3-23	$18,681	$7,778	-$200	-$2,440	-$21,834	+00	$86,534	$65,252	$21,282	
R3-24	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R3-25	$0	$0	$0	$0	$0	+00	$0	$0	$0	

TABLE B-56 (CONTINUED)

MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits -7 + -8	Average Annual Damage Reduction & Land Loss Benefits -7	Average Annual With Project Emergency Nourishment Cost Avoidance -8	Construction Reach
R3-26	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R4-1	$40,939	$36,223	$33,512	$0	$27,984	+00	$76,151	$49,980	$26,171	Construction Reach Three
R4-2	$34,225	$22,111	$19,180	$17,121	$24,114	+00	$74,896	$48,178	$26,718	
R4-3	$0	-$8,366	-$10,150	-$11,400	-$15,623	+00	$0	$0	$0	
R4-4	$0	-$4,350	-$6,029	-$7,178	-$11,092	+00	$0	$0	$0	
R4-5	$32,884	$72,317	$69,699	$15,967	$22,452	+10	$105,494	$82,297	$23,197	
R4-6	$5,557	$91,424	$90,309	-$254	-$1,232	+10	$98,784	$93,385	$5,399	
R4-7	$0	$0	$0	$0	$0	+00	$5,986	$0	$5,986	
R4-8	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R4-9	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-1	$59,768	$49,242	$36,081	$29,399	$8,972	+00	$93,733	$80,467	$13,267	Construction Reach Four
R5-2	$41,231	$29,743	$16,395	$8,983	-$11,318	+00	$71,360	$59,324	$12,035	
R5-3	$20,157	$23,915	$10,085	-$13,549	-$33,752	+10	$63,512	$52,594	$10,917	
R5-4	$2,789	-$11,272	-$28,511	-$38,495	-$63,769	+00	$30,553	$18,488	$12,065	
R5-5	$1,026	-$8,717	-$21,938	-$30,855	-$50,017	+00	$22,049	$13,408	$8,641	
R5-6	$137,518	$125,240	$112,507	$105,792	$79,151	+00	$198,059	$180,873	$17,186	
R5-7	$197,870	$187,283	$173,628	$165,785	$139,719	+00	$258,015	$240,932	$17,083	
R5-8	$76,309	$64,801	$51,932	$46,007	$20,790	+00	$135,776	$118,921	$16,855	
R5-9	$2,227	-$7,418	-$20,879	-$30,514	-$50,363	+00	$29,665	$19,541	$10,125	
R5-10	$5,813	-$4,112	-$17,286	-$26,638	-$46,081	+00	$31,924	$21,656	$10,268	
R5-11	$12,795	$2,300	-$11,899	-$22,567	-$42,271	+00	$40,815	$30,319	$10,496	
R5-12	$7,864	-$1,442	-$14,820	-$25,009	-$44,498	+00	$33,057	$22,633	$10,424	
R5-13	$7,462	$8,598	-$4,710	-$25,165	-$45,177	+10	$49,775	$39,372	$10,403	
R5-14	$5,224	-$3,843	-$16,999	-$27,199	-$46,456	+00	$32,314	$22,231	$10,083	
R5-15	$8,004	-$1,323	-$14,621	-$24,635	-$44,297	+00	$36,400	$25,670	$10,730	
R5-16	$16,260	$3,644	-$8,451	-$16,241	-$36,785	+00	$44,266	$33,316	$10,950	
R5-17	$969	-$2,237	-$11,088	-$20,241	-$34,578	+00	$15,013	$12,057	$2,956	
R5-18	$19,601	$359	$6,396	-$20,356	-$39,260	+00	$37,781	$27,336	$10,445	

TABLE B-56 (CONTINUED)

MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits -7 + -8	Average Annual Damage Reduction & Land Loss Benefits -7	Average Annual With Project Emergency Nourishment Cost Avoidance -8	Construction Reach
R5-19	$2,811	-$1,302	-$9,077	-$17,917	-$28,179	+00	$16,280	$13,233	$3,047	
R5-20	-$1,738	-$10,356	-$23,699	-$33,604	-$52,651	+00	$20,191	$11,155	$9,036	
R5-21	-$1,255	-$12,565	-$27,053	-$36,883	-$57,720	+00	$22,497	$12,534	$9,963	
R5-22	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-23	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-24	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-25	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-26	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-27	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-28	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-29	$0	$0	$0	$0	$0	+00	$0	$0	$0	
R5-30	$26,302	$15,963	$2,681	-$5,728	-$25,291	+00	$54,591	$43,764	$10,827	Construction Reach Five
R5-31	$39,185	$29,034	$15,690	$6,500	-$13,338	+00	$68,218	$57,496	$10,722	
R5-32	$108,925	$102,969	$96,632	$85,781	$61,311	+00	$170,418	$152,771	$17,647	
R5-33	$59,763	$48,251	$33,857	$25,841	-$82	+00	$122,609	$104,162	$18,446	
R5-34	$28,795	$14,412	-$975	-$6,708	-$33,477	+00	$91,249	$73,170	$18,079	
R5-35	$36,026	$22,800	$8,300	$1,936	-$23,285	+00	$95,676	$78,228	$17,448	
R5-36	$214,192	$191,289	$187,688	$183,418	$165,116	+00	$274,986	$258,241	$16,745	
R5-37	$59,222	$44,747	$29,577	$24,447	-$2,029	+00	$124,838	$105,529	$19,309	
R5-38	$83,810	$70,564	$54,918	$47,025	$19,300	+00	$159,748	$138,536	$21,213	
R5-39	$69,293	$53,447	$38,237	$34,025	$7,111	+00	$134,862	$114,838	$20,024	
R5-40	$42,549	$30,249	$16,915	$10,474	-$9,729	+00	$71,021	$59,645	$11,375	
R5-41	$37,006	$25,475	$12,326	$4,954	-$14,860	+00	$65,108	$54,097	$11,011	
R5-42	$22,995	$11,024	-$2,448	-$9,508	-$29,521	+00	$49,924	$39,411	$10,512	
R5-43	$12,773	$1,841	-$11,368	-$19,097	-$38,348	+00	$36,314	$26,602	$9,713	
R5-44	-$1,158	-$4,729	-$17,866	-$32,520	-$51,781	+00	$20,853	$11,779	$9,075	
R5-45	-$4,807	$21,490	$8,764	-$34,917	-$53,652	+10	$52,726	$44,346	$8,380	
R5-46	$4,423	-$3,706	-$15,705	-$27,260	-$45,276	+00	$25,317	$17,011	$8,307	

TABLE B-56 (CONTINUED)

MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits -7 + -8	Average Annual Damage Reduction & Land Loss Benefits -7	Average Annual With Project Emergency Nourishment Cost Avoidance -8	Construction Reach
R5-47	$12,146	-$16,708	-$10,321	-$2,502	-$18,765	+00	$36,038	$27,410	$8,628	
R5-48	-$6,285	-$11,711	-$21,095	-$28,611	-$44,603	+00	$6,050	$3,100	$2,950	
R5-49	-$6,831	-$5,875	-$16,411	-$31,469	-$48,706	+10	$19,359	$16,244	$3,115	
R5-50	$9,081	-$16,049	-$26,733	-$32,736	-$50,043	+00	$13,072	$9,923	$3,149	
R5-51	-$103	-$4,243	-$14,897	-$24,569	-$41,416	+00	$17,170	$13,882	$3,288	

12.8 GEOMORPHIC OPTIMIZATION

The economic optimization of added dune width suggests construction of disparate added dune widths within the construction reaches. A final optimization needs to be applied using geomorphic and engineering construction limitations to recommend a robust beach fill design. Long contiguous same sized beach fill perturbations perform best according to observed and established geomorphic science. Each construction reach must be evaluated and adjusted to yield that robustness.

The reformulated construction reaches based on maximized benefits and geomorphic considerations is presented in Table B-57.

TABLE B-57
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R1-1	-$32,055	-$49,085	-$65,419	-$71,193	-$95,211	+00	$3,972	$2,314	$1,658			
R1-2	-$31,234	-$45,808	-$60,526	-$67,264	-$91,371	+00	$2,353	$1,594	$760			
R1-3	-$28,352	-$42,044	-$56,025	-$62,356	-$85,020	+00	$2,839	$1,979	$860			
R1-4	-$29,167	-$43,881	-$57,312	-$61,624	-$83,893	+00	$2,803	$1,856	$947			
R1-5	-$30,265	-$45,748	-$59,964	-$64,749	-$88,495	+00	$2,589	$1,492	$1,097			
R1-6	-$34,788	-$50,444	-$64,445	-$69,259	-$92,780	+00	$3,406	$2,186	$1,220			
R1-7	-$32,988	-$47,497	-$60,887	-$66,443	-$89,163	+00	$4,131	$2,871	$1,260			
R1-8	-$34,779	-$51,062	-$65,234	-$69,854	-$94,039	+00	$3,622	$2,301	$1,320			
R1-9	-$31,662	-$47,433	-$60,849	-$65,091	-$87,872	+00	$4,361	$3,100	$1,261			
R1-10	-$27,879	-$42,638	-$55,355	-$59,476	-$80,670	+00	$3,636	$2,508	$1,128			
R1-11	$67,286	$64,435	$64,762	$60,255	$40,963	+00	$102,788	$101,590	$1,198	NED Construction Reach One		
R1-12	-$30,555	-$43,844	-$57,927	-$65,358	-$88,592	+00	$8,925	$7,650	$1,275			
R1-13	$90,638	$87,885	$74,137	$67,128	$42,936	+00	$127,403	$126,052	$1,351			
R1-14	$84,991	$82,108	$68,322	$64,729	$40,392	+00	$125,178	$123,536	$1,641			
R1-15	$30,240	$90,939	$119,485	$134,514	$126,077	+00	$56,348	$54,171	$2,177			
R1-16	$69,713	$48,693	$57,887	$59,568	$38,211	+00	$97,594	$95,371	$2,224		$518,236	
R1-17	-$15,883	-$30,741	-$44,634	-$50,282	-$70,905	+00	$12,587	$10,175	$2,412			
R1-18	-$13,071	-$27,929	-$42,061	-$48,437	-$68,693	+00	$15,724	$13,266	$2,457			
R1-19	-$17,822	-$32,803	-$45,926	-$50,865	-$69,823	+00	$11,759	$9,473	$2,285			
R1-20	$37	-$30,785	-$5,048	-$47,586	-$64,250	+00	$8,567	$6,561	$2,005			
R1-21	-$31,703	-$45,354	-$57,914	-$63,528	-$84,879	+00	$2,643	$1,548	$1,095			
R1-22	-$30,070	-$44,069	-$57,576	-$63,427	-$85,506	+00	$3,729	$2,694	$1,035			
R1-23	-$32,449	-$48,421	-$62,753	-$68,035	-$91,989	+00	$2,687	$1,674	$1,013			
R1-24	-$21,428	-$38,305	-$52,017	-$57,818	-$80,206	+00	$8,507	$7,641	$866			$619,345

TABLE B-57 (CONTINUED)
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R2-1	$0	$0	$0	$0	$0	+00	$1,195	$598	$598			
R2-2	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R2-3	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R2-4	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R2-5	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R2-6	$0	$0	$0	$0	$0	+00	$83,044	$83,044	$0			
R2-7	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R3-1	-$22,201	-$36,151	-$48,993	-$51,257	-$77,909	+00	$59,395	$34,448	$24,947			
R3-2	$87,870	$59,794	$66,640	$70,282	$52,852	+00	$159,414	$135,756	$23,658	Construction Reach Two		
R3-3	-$5,133	-$18,121	-$28,470	-$32,192	-$54,758	+00	$63,963	$39,917	$24,046			
R3-4	-$8,303	-$15,050	-$28,059	-$34,255	-$51,072	+00	$10,410	$5,466	$4,945			
R3-5	-$7,899	-$8,892	-$22,942	-$38,579	-$54,692	+00	$15,813	$10,211	$5,603			
R3-6	-$9,230	-$19,140	-$34,013	-$41,998	-$59,303	+00	$17,620	$11,387	$6,233			
R3-7	-$11,076	-$16,833	-$31,691	-$42,154	-$60,745	+00	$15,925	$9,529	$6,395			
R3-8	-$7,757	-$18,879	-$29,551	-$34,542	-$57,911	+00	$68,135	$41,678	$26,457			
R3-9	$13,670	$2,952	-$3,631	-$8,534	-$30,225	+00	$88,629	$63,450	$25,180			
R3-10	$118,468	$79,330	$125,990	$161,865	$164,581	+00	$196,673	$170,880	$25,793			
R3-11	$28,772	$12,532	$10,314	$10,384	-$9,821	+00	$104,771	$79,466	$25,305			
R3-12	$78,301	$41,116	$64,778	$86,426	$80,000	+00	$151,774	$127,445	$24,328			
R3-13	$56,508	$45,150	$34,196	$31,182	$7,790	+00	$129,302	$104,846	$24,456			
R3-14	$86,876	$75,127	$67,347	$56,092	$28,039	+00	$191,923	$158,618	$33,306			
R3-15	$12,372	$2,019	-$11,347	-$15,892	-$41,195	+00	$93,069	$66,635	$26,434			
R3-16	$11,336	$3,778	-$5,488	-$7,866	-$25,459	+00	$67,847	$49,380	$18,467			
R3-17	$26,061	$13,656	$2,263	$220	-$23,965	+00	$106,692	$80,903	$25,790		$2,404,605	$2,404,605

TABLE B-57 (CONTINUED)
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R3-18	$37,121	$23,247	$14,508	$11,822	-$11,598	+00	$121,776	$95,396	$26,381			
R3-19	$89,908	$77,540	$65,505	$63,661	$39,028	+00	$171,506	$145,236	$26,270			
R3-20	$206,943	$202,326	$210,624	$216,422	$196,901	+00	$290,179	$264,168	$26,011			
R3-21	$65,227	$52,369	$53,610	$52,884	$33,574	+00	$150,218	$124,201	$26,018			
R3-22	$23,583	$13,690	$5,320	$3,787	-$18,396	+00	$102,428	$77,932	$24,496			
R3-23	$18,681	$7,778	-$200	-$2,440	-$21,834	+00	$86,534	$65,252	$21,282			
R3-24	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R3-25	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R3-26	$0	$0	$0	$0	$0	+00	$0	$0	$0			

TABLE B-57 (CONTINUED)
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R4-1	$40,939	$36,223	$33,512	$0	$27,984	+10	$74,076	$47,905	$26,171	Construction Reach Three		
R4-2	$34,225	$22,111	$19,180	$17,121	$24,114	+10	$65,119	$38,400	$26,718			
R4-3	$0	-$8,366	-$10,150	-$11,400	-$15,623	+10	$0	$0	$0			
R4-4	$0	-$4,350	-$6,029	-$7,178	-$11,092	+10	$0	$0	$0			
R4-5	$32,884	$72,317	$69,699	$15,967	$22,452	+10	$105,494	$82,297	$23,197			
R4-6	$5,557	$91,424	$90,309	-$254	-$1,232	+10	$98,784	$93,385	$5,399		$343,473	$261,987
R4-7	$0	$0	$0	$0	$0	+00	$5,986	$0	$5,986			
R4-8	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R4-9	$0	$0	$0	$0	$0	+00	$0	$0	$0			
R5-1	$59,768	$49,242	$36,081	$29,399	$8,972	+10	$96,415	$83,149	$13,267	Construction Reach Four		
R5-2	$41,231	$29,743	$16,395	$8,983	-$11,318	+10	$72,548	$60,512	$12,035			
R5-3	$20,157	$23,915	$10,085	-$13,549	-$33,752	+10	$63,512	$52,594	$10,917			
R5-4	$2,789	-$11,272	-$28,511	-$38,495	-$63,769	+10	$31,384	$19,319	$12,065			
R5-5	$1,026	-$8,717	-$21,938	-$30,855	-$50,017	+10	$23,342	$14,701	$8,641			
R5-6	$137,518	$125,240	$112,507	$105,792	$79,151	+10	$202,237	$185,051	$17,186			
R5-7	$197,870	$187,283	$173,628	$165,785	$139,719	+10	$263,471	$246,388	$17,083			
R5-8	$76,309	$64,801	$51,932	$46,007	$20,790	+10	$139,649	$122,794	$16,855			
R5-9	$2,227	-$7,418	-$20,879	-$30,514	-$50,363	+10	$31,997	$21,872	$10,125			
R5-10	$5,813	-$4,112	-$17,286	-$26,638	-$46,081	+10	$34,035	$23,767	$10,268			
R5-11	$12,795	$2,300	-$11,899	-$22,567	-$42,271	+10	$42,551	$32,055	$10,496			
R5-12	$7,864	-$1,442	-$14,820	-$25,009	-$44,498	+10	$35,840	$25,416	$10,424			
R5-13	$7,462	$8,598	-$4,710	-$25,165	-$45,177	+10	$49,775	$39,372	$10,403			
R5-14	$5,224	-$3,843	-$16,999	-$27,199	-$46,456	+10	$35,179	$25,096	$10,083			
R5-15	$8,004	-$1,323	-$14,621	-$24,635	-$44,297	+10	$39,297	$28,566	$10,730		$1,325,619	$1,325,619

TABLE B-57 (CONTINUED)
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R5-16	$16,260	$3,644	-$8,451	-$16,241	-$36,785	+10	$44,137	$33,187	$10,950			
R5-17	$969	-$2,237	-$11,088	-$20,241	-$34,578	+10	$17,084	$14,128	$2,956			
R5-18	$19,601	$359	$6,396	-$20,356	-$39,260	+10	$39,103	$28,658	$10,445			
R5-19	$2,811	-$1,302	-$9,077	-$17,917	-$28,179	+10	$17,207	$14,160	$3,047			
R5-20	-$1,738	-$10,356	-$23,699	-$33,604	-$52,651	+10	$23,049	$14,013	$9,036			
R5-21	-$1,255	-$12,565	-$27,053	-$36,883	-$57,720	+10	$23,807	$13,844	$9,963			
R5-22	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-23	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-24	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-25	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-26	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-27	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-28	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-29	**$0**	**$0**	**$0**	**$0**	**$0**	**+00**	**$0**	**$0**	**$0**			
R5-30	**$26,302**	**$15,963**	**$2,681**	**-$5,728**	**-$25,291**	**+10**	**$56,625**	**$45,799**	**$10,827**	**Construction Reach Five**		
R5-31	**$39,185**	**$29,034**	**$15,690**	**$6,500**	**-$13,338**	**+10**	**$70,358**	**$59,636**	**$10,722**			
R5-32	**$108,925**	**$102,969**	**$96,632**	**$85,781**	**$61,311**	**+10**	**$179,849**	**$162,203**	**$17,647**			
R5-33	**$59,763**	**$48,251**	**$33,857**	**$25,841**	**-$82**	**+10**	**$127,022**	**$108,576**	**$18,446**			
R5-34	**$28,795**	**$14,412**	**-$975**	**-$6,708**	**-$33,477**	**+10**	**$92,948**	**$74,869**	**$18,079**			
R5-35	**$36,026**	**$22,800**	**$8,300**	**$1,936**	**-$23,285**	**+10**	**$97,911**	**$80,463**	**$17,448**			
R5-36	**$214,192**	**$191,289**	**$187,688**	**$183,418**	**$165,116**	**+10**	**$266,664**	**$249,920**	**$16,745**			
R5-37	**$59,222**	**$44,747**	**$29,577**	**$24,447**	**-$2,029**	**+10**	**$126,107**	**$106,798**	**$19,309**			
R5-38	**$83,810**	**$70,564**	**$54,918**	**$47,025**	**$19,300**	**+10**	**$163,394**	**$142,181**	**$21,213**			
R5-39	**$69,293**	**$53,447**	**$38,237**	**$34,025**	**$7,111**	**+10**	**$135,270**	**$115,245**	**$20,024**		**$1,713,147**	**$1,713,147**

TABLE B-57 (CONTINUED)
MAXIMIZED DUNE WIDTH BY CONSTRUCTION REACH

Reach	ZERO ADDED DUNE WIDTH Net Benefits DW00 -1	10 FEET ADDED DUNE WIDTH Net Benefits DW10 -2	20 FEET ADDED DUNE WIDTH Net Benefits DW20 -3	30 FEET ADDED DUNE WIDTH Net Benefits DW30 -4	40 FEET ADDED DUNE WIDTH Net Benefits DW40 -5	ADDED DUNE WIDTH Maximized Net Benefits by Model Reach MAX-1,2,3,4	Total Benefits - 7 + -8	Average Annual Damage Reduction & Land Loss Benefits - 7	Average Annual With Project Emergency Nourishment Cost Avoidance - 8	Construction Reach	NED Benefits - per Construction Reach	LPP Benefits - per Construction Reach
R5-40	**$42,549**	**$30,249**	**$16,915**	**$10,474**	**-$9,729**	**+10**	**$71,264**	**$59,889**	**$11,375**			
R5-41	**$37,006**	**$25,475**	**$12,326**	**$4,954**	**-$14,860**	**+10**	**$65,972**	**$54,961**	**$11,011**			
R5-42	**$22,995**	**$11,024**	**-$2,448**	**-$9,508**	**-$29,521**	**+10**	**$50,268**	**$39,756**	**$10,512**			
R5-43	**$12,773**	**$1,841**	**-$11,368**	**-$19,097**	**-$38,348**	**+10**	**$37,147**	**$27,434**	**$9,713**			
R5-44	**-$1,158**	**-$4,729**	**-$17,866**	**-$32,520**	**-$51,781**	**+10**	**$28,618**	**$19,543**	**$9,075**			
R5-45	**-$4,807**	**$21,490**	**$8,764**	**-$34,917**	**-$53,652**	**+10**	**$52,726**	**$44,346**	**$8,380**			
R5-46	**$4,423**	**-$3,706**	**-$15,705**	**-$27,260**	**-$45,276**	**+10**	**$27,932**	**$19,625**	**$8,307**			
R5-47	**$12,146**	**-$16,708**	**-$10,321**	**-$2,502**	**-$18,765**	**+10**	**$3,676**	**-$4,952**	**$8,628**			
R5-48	**-$6,285**	**-$11,711**	**-$21,095**	**-$28,611**	**-$44,603**	**+10**	**$6,216**	**$3,266**	**$2,950**			
R5-49	**-$6,831**	**-$5,875**	**-$16,411**	**-$31,469**	**-$48,706**	**+10**	**$19,359**	**$16,244**	**$3,115**			
R5-50	**$9,081**	**-$16,049**	**-$26,733**	**-$32,736**	**-$50,043**	**+10**	**$13,339**	**$10,191**	**$3,149**			
R5-51	**-$103**	**-$4,243**	**-$14,897**	**-$24,569**	**-$41,416**	**+10**	**$20,482**	**$17,194**	**$3,288**			
Total Project Benefits NED / LPP											**$6,305,080**	**$6,324,703**

12.9 UPDATED ECONOMIC JUSTIFICATION OF NED PLAN AND LPP

Note (December 2012): As this report was being drafted in 2011, concern was expressed that a sensitivity analysis should be conducted for the plans being developed to assure economic justification because of reduced values resulting from an economic downturn that began in 2008. The cost and benefits for the NED and LPP noted in this and the next two sections are those that were under consideration at the time of the analysis. They have not been updated for the Final Report as the assumption that the downturn was a temporary phenomenon was valid as local values have stabilized and have even begun to rise. An update of the values at this time would continue to demonstrate economic justification for the NED and LPP.

Two final runs were made to determine if the NED Plan and the LPP as formulated are still justified when considering the changed cost estimate, adjustments to the structure inventory and near shore land values. If the NED Plan and the LPP continue to be justified then the recommendation will be to keep the formulation and the selected plan as is, realizing that the current economic down turn and its impacts are a temporary phenomena which will not remain at these levels for the 50-year period of analysis.

Tables B-58 and B-59 show that HSDR benefits are $5,704,945 for the NED Plan and $5,833,482 for the LPP.

TABLE B-58
NED PLAN UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction NED	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits NED	NED Summed Benefits	Profile
R1-1	$9,620	$457	$23,484	$1,658	$2,116	$53,151	$2,527	0.837	-$412		R1P1
R1-2	$8,387	$399	$21,266	$760	$1,158	$44,293	$2,106	0.550	-$948		R1P1
R1-3	$14,359	$683	$16,083	$860	$1,543	$17,717	$842	1.832	$701		R1P1
R1-4	$8,307	$395	$11,895	$947	$1,342	$44,293	$2,106	0.637	-$764		R1P1
R1-5	$6,086	$289	$9,801	$1,097	$1,386	$8,859	$421	3.291	$965		R1P1
R1-6	$12,885	$613	$2,902	$1,220	$1,833	$79,727	$3,791	0.483	-$1,958		R1P1
R1-7	$25,236	$1,200	$190	$1,260	$2,460	$62,010	$2,949	0.834	-$489		R1P1
R1-8	$14,769	$702	$497	$1,320	$2,023	$53,151	$2,527	0.800	-$505		R1P1
R1-9	$30,853	$1,467	$864	$1,261	$2,728	$44,293	$2,106	1.295	$622		R1P1
R1-10	$23,201	$1,103	$2,665	$1,128	$2,231	$8,859	$421	5.297	$1,810		R1P1
R1-11	$2,415,519	$114,860	$3,725	$1,198	$116,058	$2,219,920	$105,559	1.099	$10,499	CONSTRUCTION REACH ONE	R1P1
R1-12	$137,766	$6,551	$1,610	$1,275	$7,826	$2,097,534	$99,740	0.078	-$91,914		R1P1
R1-13	$3,203,676	$152,338	-$25	$1,351	$153,713	$1,942,066	$92,347	1.665	$61,366		R1P1
R1-14	$3,085,015	$146,696	-$3,177	$1,641	$151,514	$2,097,129	$99,721	1.519	$51,793		R1P1
R1-15	$3,964,781	$188,529	-$3,458	$2,177	$194,164	$2,359,005	$112,173	1.731	$81,991		R1P2
R1-16	$2,554,768	$121,482	-$4,206	$2,224	$127,912	$1,310,098	$62,296	2.053	$65,615	$ 807,937	R1P2
R1-17	$31,014	$1,475	-$4,282	$2,412	$8,169	$53,151	$2,527	3.232	$5,641		R1P2
R1-18	$77,316	$3,676	-$4,872	$2,457	$11,006	$44,293	$2,106	5.226	$8,900		R1P2
R1-19	$56,388	$2,681	-$2,177	$2,285	$7,144	$97,444	$4,634	1.542	$2,510		R1P2
R1-20	$61,402	$2,920	$3,226	$2,005	$4,925	$70,868	$3,370	1.462	$1,555		R1P2
R1-21	$9,166	$436	$3,472	$1,095	$1,531	$26,576	$1,264	1.211	$267		R1P1
R1-22	$17,545	$834	$8,216	$1,035	$1,869	$44,293	$2,106	0.887	-$237		R1P1

TABLE B-58 (CONTINUED)
NED PLAN UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction NED	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits NED	NED Summed Benefits	Profile
R1-23	$7,600	$361	$13,947	$1,013	$1,374	$17,717	$842	1.631	$532		R1P1
R1-24	$22,024	$1,047	$15,704	$866	$1,913	$0	$0	$ -	$1,913		R1P1
R2-1	$0	$0	$11,863	$0	$0	$0	$0	$ -	$0		R2P1
R2-2	$0	$0	$3,618	$0	$0	$0	$0	$ -	$0		R2P1
R2-3	$0	$0	$10,522	$0	$0	$0	$0	$ -	$0		R2P2
R2-4	$0	$0	$7,988	$0	$0	$0	$0	$ -	$0		R2P1
R2-5	$0	$0	$2,954	$0	$0	$0	$0	$ -	$0		R2P2
R2-6	$0	$0	-$88,608	$0	$0	$0	$0	$ -	$0		R2P1
R2-7	$0	$0	$6,440	$0	$0	$0	$0	$ -	$0		R2P1
R3-1	-$97,784	-$4,650	$7,398	$24,947	$20,297	$0	$0	$ -	$20,297		R3P1
R3-2	$2,485,270	$118,177	$7,109	$23,658	$141,835	$1,126,056	$53,545	2.649	$88,290	CONSTRUCTION REACH TWO	R3P1
R3-3	$319,955	$15,214	$7,262	$24,046	$39,260	$1,124,852	$53,488	0.734	-$14,228		R3P1
R3-4	$11,415	$543	$9,086	$4,945	$5,488	$418,842	$19,916	0.276	-$14,429		R3P2
R3-5	$98,291	$4,674	$7,495	$5,603	$10,277	$501,307	$23,838	0.431	-$13,561		R3P2
R3-6	$121,728	$5,788	$5,469	$6,233	$12,021	$519,290	$24,693	0.487	-$12,671		R3P2
R3-7	$65,939	$3,135	$1,775	$6,395	$9,531	$479,041	$22,779	0.418	-$13,248		R3P2
R3-8	$138,425	$6,582	-$5,267	$26,457	$38,307	$2,500,452	$118,899	0.322	-$80,592		R3P1
R3-9	$761,061	$36,189	-$6,073	$25,180	$67,442	$2,696,168	$128,205	0.526	-$60,764		R3P1
R3-10	$5,150,797	$244,925	-$7,599	$25,793	$278,317	$2,436,378	$115,852	2.402	$162,465		R3P1
R3-11	$1,171,549	$55,708	-$8,485	$25,305	$89,498	$2,187,485	$104,017	0.860	-$14,519		R3P1
R3-12	$3,044,179	$144,754	-$14,284	$24,328	$183,366	$2,024,457	$96,265	1.905	$87,101		R3P1
R3-13	$1,493,055	$70,996	-$16,951	$24,456	$112,404	$1,961,846	$93,288	1.205	$19,116		R3P1
R3-14	$1,994,340	$94,833	-$29,516	$33,306	$157,655	$2,762,244	$131,347	1.200	$26,307		R3P1

TABLE B-58 (CONTINUED)
NED PLAN UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction NED	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits NED	NED Summed Benefits	Profile
R3-15	$33,043	$1,571	-$25,689	$26,434	$53,694	$2,131,967	$101,377	0.530	-$47,683		R3P1
R3-16	$9,434	$449	-$20,011	$18,467	$38,927	$1,484,287	$70,579	0.552	-$31,653		R3P1
R3-17	$189,234	$8,998	-$31,656	$25,790	$66,444	$2,125,876	$101,088	0.657	-$34,643		R3P1
R3-18	$478,323	$22,745	-$33,032	$26,381	$82,158	$2,259,579	$107,445	0.765	-$25,287		R3P1
R3-19	$1,678,176	$79,799	-$31,265	$26,270	$137,334	$2,280,429	$108,437	1.266	$28,898		R3P1
R3-20	$5,327,669	$253,336	-$30,352	$26,011	$309,699	$2,507,067	$119,214	2.598	$190,486		R3P1
R3-21	$1,512,469	$71,919	-$29,637	$26,018	$127,575	$2,884,265	$137,150	0.930	-$9,575		R3P1
R3-22	$433,629	$20,619	-$25,763	$24,496	$70,879	$3,169,557	$150,716	0.470	-$79,837		R3P1
R3-23	$328,938	$15,641	-$20,281	$21,282	$57,204	$1,779,034	$84,595	0.676	-$27,391	$ 2,089,314	R3P1
R3-24	$10,281	$0	-$17,271	$7,322	$0	$0	$0	$ -	$0		R3P2
R3-25	-$10,198	$0	-$12,396	$7,972	$0	$0	$0	$ -	$0		R3P2
R3-26	$0	$0	-$10,153	$0	$0	$0	$0	$ -	$0		R4P1
R4-1	$16,652	$792	-$20,670	$26,171	$47,633	$197,031	$9,369	5.084	$38,264	CONSTRUCTION REACH THREE	R4P1
R4-2	$79,725	$3,791	-$17,450	$26,718	$47,959	$317,117	$15,079	3.180	$32,880		R4P1
R4-3	$0	$0	$1,424	$0	$0	$174,722	$0	$ -	$0		R4P2
R4-4	$0	$0	$3,037	$0	$0	$91,574	$0	$ -	$0		R4P2
R4-5	$241,255	$11,472	-$8,258	$23,197	$42,927	$201,632	$9,588	4.477	$33,339		R4P1
R4-6	$35,284	$1,678	$2,561	$5,399	$7,077	$35,480	$1,687	4.195	$5,390	$ 145,596	R4P2
R4-7	$0	$0	-$3,163	$5,986	$0	$0	$0	$ -	$0		R4P2
R4-8	$0	$0	-$33,345	$0	$0	$0	$0	$ -	$0		R4P1
R4-9	$0	$0	-$58,473	$0	$0	$0	$0	$ -	$0		R4P1
R5-1	$50,054	$2,380	-$66,833	$13,267	$82,480	$1,750,822	$83,253	0.991	-$773	CONS TRUCT ION REAC H FOUR	R5P2
R5-2	$34,073	$1,620	-$46,918	$12,035	$60,573	$1,395,810	$66,372	0.913	-$5,799		R5P2

TABLE B-58 (CONTINUED)
NED PLAN UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction NED	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits NED	NED Summed Benefits	Profile
R5-3	$33,924	$1,613	-$25,437	$10,917	$37,967	$1,015,440	$48,285	0.786	-$10,318		R5P2
R5-4	$29,812	$1,418	-$7,548	$12,065	$21,031	$881,157	$41,900	0.502	-$20,869		R5P2
R5-5	$105,362	$5,010	$7,577	$8,641	$13,651	$590,797	$28,093	0.486	-$14,442		R5P2
R5-6	$3,602,197	$171,288	-$20,636	$17,186	$209,110	$1,326,375	$63,070	3.315	$146,039		R5P1
R5-7	$4,865,320	$231,351	-$25,414	$17,083	$273,847	$1,300,624	$61,846	4.428	$212,001		R5P1
R5-8	$2,179,789	$103,651	-$14,261	$16,855	$134,767	$1,269,820	$60,381	2.232	$74,386		R5P1
R5-9	$48,619	$2,312	-$8,120	$10,125	$20,556	$670,787	$31,897	0.644	-$11,340		R5P2
R5-10	$54,486	$2,591	-$9,289	$10,268	$22,148	$641,153	$30,487	0.726	-$8,339		R5P2
R5-11	$218,207	$10,376	-$10,186	$10,496	$31,058	$680,573	$32,362	0.960	-$1,304		R5P2
R5-12	$67,097	$3,191	-$9,741	$10,424	$23,356	$618,727	$29,421	0.794	-$6,065		R5P2
R5-13	$138,895	$6,605	-$10,232	$10,403	$27,240	$700,896	$33,328	0.817	-$6,089		R5P2
R5-14	$72,992	$3,471	-$9,229	$10,083	$22,783	$663,490	$31,550	0.722	-$8,766		R5P2
R5-15	$63,158	$3,003	-$12,558	$10,730	$26,292	$692,853	$32,946	0.798	-$6,654		R5P2
R5-16	$223,961	$10,650	-$12,837	$10,950	$34,437	$721,798	$34,322	1.003	$115		R5P2
R5-17	$29,325	$1,394	-$6,856	$2,956	$11,206	$454,596	$21,616	0.518	-$10,411		R5P3
R5-18	$110,804	$5,269	-$12,522	$10,445	$28,236	$934,693	$44,446	0.635	-$16,210		R5P2
R5-19	$216,156	$10,278	-$2,487	$3,047	$15,812	$810,062	$38,519	0.411	-$22,707		R5P3
R5-20	$53,301	$2,535	$157	$9,036	$11,571	$1,485,337	$70,629	0.164	-$59,058		R5P2
R5-21	$52,645	$2,503	-$475	$9,963	$12,941	$471,610	$22,426	0.577	-$9,484	$ 1,121,062	R5P2
R5-22	$0	$0	-$1,684	$0	$0	$0	$0	$ -	$0		R5P3
R5-23	$0	$0	-$438	$0	$0	$0	$0	$ -	$0		R5P3
R5-24	$0	$0	-$5,913	$0	$0	$0	$0	$ -	$0		R5P2
R5-25	$0	$0	-$13,096	$0	$0	$0	$0	$ -	$0		R5P2
R5-26	$0	$0	-$10,979	$0	$0	$0	$0	$ -	$0		R5P1
R5-27	$0	$0	-$8,659	$0	$0	$0	$0	$ -	$0		R5P3

TABLE B-58 (CONTINUED)
NED PLAN UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction NED	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits NED	NED Summed Benefits	Profile
R5-28	$0	$0	-$9,987	$0	$0	$0	$0	$ -	$0		R5P3
R5-29	$0	$0	-$37,910	$0	$0	$0	$0	$ -	$0		R5P2
R5-30	$47,602	$2,264	-$32,848	$10,827	$45,938	$1,604,072	$76,275	0.602	-$30,337	CONSTRUCTION REACH FIVE	R5P2
R5-31	$345,353	$16,422	-$33,879	$10,722	$61,022	$1,359,284	$64,635	0.944	-$3,613		R5P2
R5-32	$1,933,757	$91,952	-$61,892	$17,647	$171,491	$1,709,931	$81,309	2.109	$90,182		R5P1
R5-33	$751,701	$35,744	-$62,530	$18,446	$116,721	$1,519,045	$72,232	1.616	$44,489		R5P1
R5-34	$307,967	$14,644	-$53,740	$18,079	$86,463	$1,393,904	$66,281	1.304	$20,181		R5P1
R5-35	$445,780	$21,197	-$52,782	$17,448	$91,427	$1,287,290	$61,212	1.494	$30,215		R5P1
R5-36	$4,569,570	$217,288	-$56,472	$16,745	$290,504	$1,289,036	$61,295	4.739	$229,209		R5P1
R5-37	$325,474	$15,477	-$80,647	$19,309	$115,433	$1,364,144	$64,866	1.780	$50,566		R5P1
R5-38	$711,049	$33,811	-$94,528	$21,213	$149,551	$1,567,523	$74,537	2.006	$75,014		R5P1
R5-39	$139,002	$6,610	-$98,750	$20,024	$125,384	$1,355,066	$64,435	1.946	$60,949		R5P1
R5-40	$8,174	$389	-$49,625	$11,375	$61,390	$676,365	$32,162	1.909	$29,228		R5P2
R5-41	$23,301	$1,108	-$44,843	$11,011	$56,962	$671,353	$31,923	1.784	$25,038		R5P2
R5-42	$9,385	$446	-$30,127	$10,512	$41,086	$657,037	$31,243	1.315	$9,843		R5P2
R5-43	$15,873	$755	-$18,731	$9,713	$29,199	$590,384	$28,073	1.040	$1,125		R5P2
R5-44	-$5,731	-$273	-$5,603	$9,075	$14,405	$565,175	$26,875	0.536	-$12,470		R5P2
R5-45	-$25,142	-$1,196	$263	$8,380	$7,184	$537,137	$25,541	0.281	-$18,357		R5P2
R5-46	$181,668	$8,639	$7,328	$8,307	$16,945	$565,047	$26,869	0.631	-$9,923		R5P2
R5-47	$390,378	$18,563	$317	$8,628	$27,191	$686,496	$32,644	0.833	-$5,453		R5P2
R5-48	$3,752	$178	$742	$2,950	$3,129	$473,867	$22,533	0.139	-$19,404		R5P3
R5-49	-$7,508	-$357	-$3,946	$3,115	$6,703	$782,524	$37,210	0.180	-$30,506		R5P3
R5-50	$6,151	$292	-$6,119	$3,149	$9,560	$1,169,915	$55,631	0.172	-$46,071		R5P3
R5-51	$15,225	$724	-$9,336	$3,288	$13,348	$340,821	$16,206	0.824	-$2,858	$ 1,541,035	R5P3
NED SUMMED BENEFITS--------------------->										$5,704,945	

TABLE B-59
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R1-1	$13,149	$625	$23,484	$1,658	$2,284	$959,993	$45,649	0.050	-$43,365	CONSTRUCTION REACH ONE	R1P1
R1-2	$17,556	$835	$21,266	$760	$1,594	$902,116	$42,896	0.037	-$41,302		R1P1
R1-3	$23,567	$1,121	$16,083	$860	$1,981	$834,489	$39,681	0.050	-$37,700		R1P1
R1-4	$19,327	$919	$11,895	$947	$1,866	$842,705	$40,071	0.047	-$38,206		R1P1
R1-5	$8,704	$414	$9,801	$1,097	$1,511	$872,093	$41,469	0.036	-$39,958		R1P1
R1-6	$20,390	$970	$2,902	$1,220	$2,190	$987,277	$46,946	0.047	-$44,756		R1P1
R1-7	$33,916	$1,613	$190	$1,260	$2,872	$960,262	$45,661	0.063	-$42,789		R1P1
R1-8	$20,689	$984	$497	$1,320	$2,304	$996,894	$47,403	0.049	-$45,099		R1P1
R1-9	$37,640	$1,790	$864	$1,261	$3,051	$936,399	$44,527	0.069	-$41,476		R1P1
R1-10	$27,897	$1,327	$2,665	$1,128	$2,455	$829,503	$39,444	0.062	-$36,989		R1P1
R1-11	$3,040,594	$144,583	$3,725	$1,198	$145,781	$919,706	$43,733	3.333	$102,048		R1P1
R1-12	$137,993	$6,562	$1,610	$1,275	$7,837	$1,009,498	$48,003	0.163	-$40,166		R1P1
R1-13	$3,212,573	$152,761	-$25	$1,351	$154,137	$944,689	$44,921	3.431	$109,216		R1P1
R1-14	$3,137,802	$149,206	-$3,177	$1,641	$154,024	$1,035,520	$49,240	3.128	$104,784		R1P1
R1-15	$4,822,253	$229,303	-$3,458	$2,177	$234,938	$721,578	$34,312	6.847	$200,626		R1P2
R1-16	$2,728,699	$129,752	-$4,206	$2,224	$136,182	$761,163	$36,194	3.763	$99,988		R1P2
R1-17	$49,610	$2,359	-$4,282	$2,412	$9,053	$785,242	$37,339	0.242	-$28,286		R1P2
R1-18	$117,512	$5,588	-$4,872	$2,457	$12,917	$797,897	$37,941	0.340	-$25,024		R1P2
R1-19	$91,895	$4,370	-$2,177	$2,285	$8,832	$803,973	$38,230	0.231	-$29,397		R1P2
R1-20	$71,126	$3,382	$3,226	$2,005	$5,388	$711,085	$33,813	0.159	-$28,425		R1P2
R1-21	$9,520	$453	$3,472	$1,095	$1,548	$901,612	$42,873	0.036	-$41,325		R1P1
R1-22	$34,341	$1,633	$8,216	$1,035	$2,668	$887,741	$42,213	0.063	-$39,545		R1P1

TABLE B-59 (CONTINUED)
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R1-23	$13,768	$655	$13,947	$1,013	$1,667	$939,091	$44,655	0.037	-$42,987		R1P1
R1-24	$161,596	$7,684	$15,704	$866	$8,550	$869,858	$41,363	0.207	-$32,813	$ 905,628	R1P1
R2-1	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P1
R2-2	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P1
R2-3	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P2
R2-4	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P1
R2-5	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P2
R2-6	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P1
R2-7	$0	$0	$0	$0	$0	$0	$0	0	$0		R2P1
R3-1	-$59,050	-$2,808	$7,398	$24,947	$22,139	$1,277,161	$60,730	0.365	-$38,591		R3P1
R3-2	$2,384,316	$113,377	$7,109	$23,658	$137,034	$1,092,091	$51,930	2.639	$85,104	CONSTRUCTION REACH TWO	R3P1
R3-3	$296,817	$14,114	$7,262	$24,046	$38,160	$1,039,846	$49,446	0.772	-$11,286		R3P1
R3-4	$10,856	$516	$9,086	$4,945	$5,461	$383,597	$18,240	0.299	-$12,779		R3P2
R3-5	$93,019	$4,423	$7,495	$5,603	$10,026	$492,286	$23,409	0.428	-$13,383		R3P2
R3-6	$122,608	$5,830	$5,469	$6,233	$12,063	$555,796	$26,429	0.456	-$14,365		R3P2
R3-7	$63,720	$3,030	$1,775	$6,395	$9,425	$555,580	$26,418	0.357	-$16,993		R3P2
R3-8	$159,817	$7,599	-$5,267	$26,457	$39,324	$1,137,770	$54,102	0.727	-$14,778		R3P1
R3-9	$774,468	$36,827	-$6,073	$25,180	$68,079	$1,138,093	$54,117	1.258	$13,962		R3P1
R3-10	$5,585,285	$265,586	-$7,599	$25,793	$298,978	$1,191,546	$56,659	5.277	$242,318		R3P1
R3-11	$1,202,340	$57,172	-$8,485	$25,305	$90,963	$1,150,204	$54,693	1.663	$36,269		R3P1
R3-12	$3,280,288	$155,981	-$14,284	$24,328	$194,593	$1,112,806	$52,915	3.677	$141,678		R3P1
R3-13	$1,492,409	$70,966	-$16,951	$24,456	$112,373	$1,093,836	$52,013	2.160	$60,360		R3P1

TABLE B-59 (CONTINUED)
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R3-14	$1,993,234	$94,780	-$29,516	$33,306	$157,602	$1,609,707	$76,543	2.059	$81,059		R3P1
R3-15	$33,043	$1,571	-$25,689	$26,434	$53,694	$1,221,427	$58,080	0.924	-$4,386		R3P1
R3-16	$9,434	$449	-$20,011	$18,467	$38,927	$853,193	$40,570	0.959	-$1,644		R3P1
R3-17	$188,572	$8,967	-$31,656	$25,790	$66,413	$1,224,753	$58,238	1.140	$8,174		R3P1
R3-18	$476,567	$22,661	-$33,032	$26,381	$82,075	$1,297,156	$61,681	1.331	$20,394		R3P1
R3-19	$1,676,841	$79,735	-$31,265	$26,270	$137,271	$1,234,871	$58,719	2.338	$78,552		R3P1
R3-20	$5,393,166	$256,450	-$30,352	$26,011	$312,813	$1,274,585	$60,608	5.161	$252,206		R3P1
R3-21	$1,511,988	$71,897	-$29,637	$26,018	$127,552	$1,311,034	$62,341	2.046	$65,211		R3P1
R3-22	$436,987	$20,779	-$25,763	$24,496	$71,039	$1,213,908	$57,723	1.231	$13,316		R3P1
R3-23	$329,306	$15,659	-$20,281	$21,282	$57,222	$1,043,882	$49,638	1.153	$7,584	$ 2,121,086	R3P1
R3-24	$0	$0	$0	$0	$0	$0	$0	$ -	$0	CONSTRUCTION REACH THREE	R3P2
R3-25	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R3P2
R3-26	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R4P1
R4-1	-$28,753	-$1,367	-$20,670	$26,171	$45,474	$217,520	$10,343	4.396	$35,131		R4P1
R4-2	-$66,325	-$3,154	-$17,450	$26,718	$41,014	$315,625	$15,008	2.733	$26,006		R4P1
R4-3	$0	$0	$1,424	$0	$0	$166,991	$7,941	-	-$7,941		R4P2
R4-4	$0	$0	$3,037	$0	$0	$83,142	$3,953	-	-$3,953		R4P2
R4-5	$296,627	$14,105	-$8,258	$23,197	$45,560	$188,599	$8,968	5.080	$36,592		R4P1
R4-6	$93,818	$4,461	$2,561	$5,399	$9,860	$37,068	$1,763	5.594	$8,098	$ 141,908	R4P2
R4-7	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R4P2
R4-8	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R4P1
R4-9	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R4P1

TABLE B-59 (CONTINUED)
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R5-1	$50,088	$2,382	-$66,833	$13,267	$82,481	$622,597	$29,605	2.786	$52,876	CONSTRUCTION REACH FOUR	R5P2
R5-2	$33,465	$1,591	-$46,918	$12,035	$60,545	$566,239	$26,925	2.249	$33,619		R5P2
R5-3	$33,823	$1,608	-$25,437	$10,917	$37,962	$530,213	$25,212	1.506	$12,750		R5P2
R5-4	$29,982	$1,426	-$7,548	$12,065	$21,039	$562,980	$26,770	0.786	-$5,731		R5P2
R5-5	$108,820	$5,174	$7,577	$8,641	$13,815	$436,065	$20,735	0.666	-$6,920		R5P2
R5-6	$3,638,134	$172,997	-$20,636	$17,186	$210,819	$1,108,799	$52,725	3.998	$158,094		R5P1
R5-7	$4,901,507	$233,072	-$25,414	$17,083	$275,568	$1,095,852	$52,109	5.288	$223,459		R5P1
R5-8	$2,206,097	$104,902	-$14,261	$16,855	$136,018	$1,076,607	$51,194	2.657	$84,824		R5P1
R5-9	$48,622	$2,312	-$8,120	$10,125	$20,556	$548,236	$26,069	0.789	-$5,513		R5P2
R5-10	$54,465	$2,590	-$9,289	$10,268	$22,147	$517,816	$24,623	0.899	-$2,475		R5P2
R5-11	$222,152	$10,564	-$10,186	$10,496	$31,245	$555,609	$26,420	1.183	$4,826		R5P2
R5-12	$67,076	$3,190	-$9,741	$10,424	$23,355	$495,694	$23,571	0.991	-$216		R5P2
R5-13	$141,831	$6,744	-$10,232	$10,403	$27,379	$577,709	$27,471	0.997	-$91		R5P2
R5-14	$72,962	$3,469	-$9,229	$10,083	$22,782	$540,668	$25,709	0.886	-$2,927		R5P2
R5-15	$63,142	$3,002	-$12,558	$10,730	$26,291	$556,942	$26,483	0.993	-$192		R5P2
R5-16	$240,746	$11,448	-$12,837	$10,950	$35,235	$548,322	$26,073	1.351	$9,162		R5P2
R5-17	$29,445	$1,400	-$6,856	$2,956	$11,211	$311,306	$14,803	0.757	-$3,591		R5P3
R5-18	$111,682	$5,311	-$12,522	$10,445	$28,277	$524,388	$24,935	1.134	$3,342		R5P2
R5-19	$213,591	$10,156	-$2,487	$3,047	$15,690	$293,626	$13,962	1.124	$1,728		R5P3
R5-20	$50,575	$2,405	$157	$9,036	$11,441	$452,349	$21,510	0.532	-$10,068		R5P2
R5-21	$52,584	$2,500	-$475	$9,963	$12,938	$488,609	$23,234	0.557	-$10,296	$ 1,126,797	R5P2
R5-22	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P3

TABLE B-59 (CONTINUED)
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R5-23	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P3
R5-24	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P2
R5-25	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P2
R5-26	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P1
R5-27	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P3
R5-28	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P3
R5-29	$0	$0	$0	$0	$0	$0	$0	$ -	$0		R5P2
R5-30	$44,493	$2,116	-$32,848	$10,827	$45,790	$554,812	$26,382	1.736	$19,409	CONSTRUCTION REACH FIVE	R5P2
R5-31	$345,328	$16,421	-$33,879	$10,722	$61,021	$571,129	$27,158	2.247	$33,863		R5P2
R5-32	$2,022,512	$96,172	-$61,892	$17,647	$175,711	$1,097,078	$52,167	3.368	$123,544		R5P1
R5-33	$748,163	$35,576	-$62,530	$18,446	$116,553	$1,114,803	$53,010	2.199	$63,543		R5P1
R5-34	$307,009	$14,599	-$53,740	$18,079	$86,417	$1,118,372	$53,180	1.625	$33,238		R5P1
R5-35	$444,499	$21,136	-$52,782	$17,448	$91,366	$1,064,885	$50,636	1.804	$40,730		R5P1
R5-36	$4,660,489	$221,611	-$56,472	$16,745	$294,828	$1,091,714	$51,912	5.679	$242,916		R5P1
R5-37	$323,556	$15,385	-$80,647	$19,309	$115,341	$1,146,445	$54,515	2.116	$60,827		R5P1
R5-38	$704,787	$33,513	-$94,528	$21,213	$149,253	$1,334,296	$63,447	2.352	$85,806		R5P1
R5-39	$138,667	$6,594	-$98,750	$20,024	$125,368	$1,136,118	$54,024	2.321	$71,344		R5P1
R5-40	$8,174	$389	-$49,625	$11,375	$61,390	$544,407	$25,887	2.371	$35,503		R5P2
R5-41	$23,301	$1,108	-$44,843	$11,011	$56,962	$543,856	$25,861	2.203	$31,101		R5P2
R5-42	$9,385	$446	-$30,127	$10,512	$41,086	$532,308	$25,312	1.623	$15,774		R5P2
R5-43	$15,871	$755	-$18,731	$9,713	$29,198	$472,514	$22,468	1.300	$6,730		R5P2
R5-44	-$5,731	-$273	-$5,603	$9,075	$14,405	$449,433	$21,371	0.674	-$6,966		R5P2

TABLE B-59 (CONTINUED)
LPP UPDATED BENEFITS BY CONSTRUCTION REACH

Reach	Damage Reduction LPP	Average Annual Damage Reduction	Average Annual Erosion Benefits	Average Annual Emergency Nourishment Cost Avoidance	Average Annual Benefits	Additional Cost -Planned Nourishment Plus Crossover Work	Average Annual Cost	Benefit-to-Cost Ratio	Net Benefits LPP	LPP Summed Benefits	Profile
R5-45	-$25,142	-$1,196	$263	$8,380	$7,184	$423,472	$20,136	0.357	-$12,952		R5P2
R5-46	$195,538	$9,298	$7,328	$8,307	$17,605	$434,469	$20,659	0.852	-$3,055		R5P2
R5-47	$432,393	$20,561	$317	$8,628	$29,189	$224,561	$10,678	2.734	$18,511		R5P2
R5-48	$3,828	$182	$742	$2,950	$3,132	$279,061	$13,270	0.236	-$10,137		R5P3
R5-49	-$7,508	-$357	-$3,946	$3,115	$6,703	$407,677	$19,385	0.346	-$12,682		R5P3
R5-50	$6,144	$292	-$6,119	$3,149	$9,559	$483,178	$22,976	0.416	-$13,416		R5P3
										$ 1,538,063	
LPP SUMMED BENEFITS--------->										$5,833,482	

12.10 CONSTRUCTION COSTS

The following tables display the FY 2014 construction costs for the NED Plan and the LPP from the total project cost summary.

TABLE B-60
NED CONSTRUCTION COSTS

Account	NED	Initial Nourishment ($K) (2014)	Renourishment ($K) (2024, 2034, 2044, 2054)
01	Lands & Damages	762	
17	Initial Beach Nourishment	50,720	22416
22	Environmental	186	101
30	Planning Engineering &Design	1526	678
31	Construction Management	1018	453
	Total NED Cost	**53,765**	**23,649**

TABLE B-61
LPP CONSTRUCTION COSTS

Account	LPP	Initial Nourishment ($K) (2014)	Renourishment ($K) (2024, 2034, 2044, 2054)
01	Lands & Damages	762	
17	Initial Beach Nourishment	59585	25,281
22	Environmental	188	102
30	Planning Engineering &Design	1,807	767
31	Construction Management	1,205	512
	Total LPP Cost	**63,548**	**26,662**

Table B-62 shows the economic justification for the NED Plan and LPP from the Draft Final Report compared to the results of this sensitivity. The average annual benefits for the NED Plan reduce by $1,632,000, the BCR drops from 1.66 to 1.29 and net benefits decrease from $2,924,000 to $1,292,000. The average annual benefits for the LPP reduce by $1,684,000, the BCR falls from 1.46 to 1.13 and the net benefits decrease from $2,374,000 to $690,000.

TABLE B-62
SUMMARY BENEFITS COMPARISONS – FEASIBILITY AND SENSITIVITY

	NED - Feasibility	NED - Sensitivity
Total First Cost	$91,252,000	$91,252,000
Interest During Construction	$1,204,100	$1,204,100
Total Project First Cost	$92,456,100	$92,456,100
Average Annual First Cost	$4,303,850	$4,303,850.0
Annual OMRR&R	$124,500	$124,500
Total Average Annual Cost	$4,428,350	$4,428,350
Average Annual HSDR Benefits	$7,337,000	$5,705,000
Average Annual Recreation Benefits	$16,000	$16,000
Total Average Annual Benefits	$7,353,000	$5,721,000
Benefit-to-Cost Ratio	1.66	1.29
Net Benefits	$2,924,700	$1,292,650
	LPP - Feasibility	LPP - Sensitivity
Total First Cost	$105,811,342	$105,811,342
Interest During Construction	$1,396,200	$1,396,200
Total Project First Cost	$107,207,542	$107,207,542
Average Annual First Cost	$4,990,533	$4,990,533
Annual OMRR&R	$168,000	$168,000
Total Average Annual Cost	$5,158,533	$5,158,533
Average Annual HSDR Benefits	$7,517,000	$5,833,000
Average Annual Recreation Benefits	$16,000	$16,000
Total Average Annual Benefits	$7,533,000	$5,849,000
Benefit-to-Cost Ratio	1.46	1.13
Net Benefits	$2,374,467	$690,467

12.11 CONCLUSION

The NED Plan and the LPP (the selected plan) remain justified even considering the effects of the economic downturn throughout the full period of analysis. Therefore the formulation in the feasibility study should remain and go forward for recommendation.

ATTACHMENT I

RECREATION ANALYSIS

BACKGROUND

Walton County Beaches are ranked among the top 20 destinations in the world by Frommers.

FROMMERS TOP 20 DESTINATIONS 2010
Florida Panhandle Beaches, United States

”Northwest Florida contains some of the most diverse recreation choices along Florida's drastically under-appreciated Gulf Coast, and some of the best options for visitors seeking an affordable family vacation. From Destin to the west, where you can hire fishing or sailing charter, to the smattering of National Seashores as you move east, there's really something for everyone. Seaside's planned community is so "perfect" it was the setting for the *Truman Show*, yet you'll also find old-school Florida towns with funky shops, tiny hotels, pristine beaches, and the perfect cottage to rent. ("Stunning beaches, nature trails, great restaurants, and a cozy, yet quirky, sense of community." -- Lesley Abravanel, author *Frommer's Florida)*

SOURCE:
http://www.frommers.com/trip_ideas/arts_and_culture/article.cfm?ideaID=ARTCULTURE&articleID=6469&t=Frommer%27s%20Top%20Destinations%202010

RECREATIONAL FACILITIES

Recreation at Walton County Beaches occurs along the entire length of the beach which extends for the 26 miles. In addition to the beach, there are a variety of recreation facilities.

STATE PARKS

There are three State Parks in the Walton County Study area. They feature great diversity and natural beauty.

Grayton Beach State Park

Grayton Beach State Park is located south of U.S. Highway 98 approximately halfway between Panama City Beach and Destin. Grayton Beach State Park offers a wide variety of activities for the visitor. Along with the beaches, there are two trails in the 2,228-acre coastal park. There are also 35 campsites with camping and cabin rentals with an additional 22 campsites to be provided in a renovation project that also includes a new ranger station and enhanced American Disabilities Act accessibility and boardwalks.

Topsail Hill Preserve State Park

Topsail Hill Preserve State Park features one of the most diverse natural ecosystems in the state, with wet prairies, scrub, pine flatwoods, marshes and cypress domes. The park has more than three miles of beaches and five dune lakes. The lakes total more than 170 acres within the 1,637-acre park. In addition to the beaches, this recreation area provides opportunities for bicycling, camping, fishing, nature trails, picnicking, scuba, and swimming. The park has a 2.5-mile long maritime nature trail which traverses ancient dunes and scrub communities. The park has Recreational Vehicle (RV) accommodations, with 156 sites and 16 rental cabins. Topsail Hill Preserve State Park is located in Santa Rosa Beach about 10 miles east of Destin, Florida.

Deer Lake State Park

The Deer Lake State Park on County Highway 30A, just west of Watersound, offers park goers a look at intact ancient sand dunes and vast ecosystems. The park has an area of approximately 2,000 acres, the majority of which lies on the north side of the park across County Highway 30A. A walking trail approximately one mile long is located in the wooded area in the northern portion of the park. The recreation area has recently completed a remodeling project on the walkway to the beach providing ADA accessibility.

RECREATION BENEFITS

In order to determine the recreation benefits of the selected plan an economic value must be placed on the recreation experience at the Walton County Beaches. This value can then be applied to the increase in visitation which results from the project to determine the National Economic Development (NED) recreation benefits. For this report, general unit day values (UDV) are used to determine the economic value of recreation at Walton County Beaches. UDV are administratively determined values which represent the NED recreation values for typical types of recreation. Guidance for their use is provided by Engineering Regulation (ER) 1105-2-100.

The UDV are determined using a point system that takes into account the following factors: recreation experience, availability of opportunity, carrying capacity, accessibility, and environmental (esthetics) quality. A good deal of judgment is required in the assessment of point values. A group of planning professionals with knowledge of the study area made independent judgments of the UDV values which were averaged. The UDV point totals convert to a recreation value of $5.07 for the without project condition and $5.16 for the with project condition. There values were applied to the increase in visitation over the study period. The difference between the without and with project value of recreation determines the NED and LPP recreation benefits. The source of the value of recreation is obtained from Economic Guidance Memorandum, 12-03, Unit Day Values for Recreation, Fiscal Year 2010.

Current Visitation

The Walton County Beaches area had 2,300,000 beach visitors in 2004. This estimate is based on data provided by the Beaches of South Walton. In 2009, the peak day estimate was July 4, 2009 weekend when an estimated 13,537 visits occurred. The peak recreation season is from 15 May thru 8 September each year (a total of 15 weeks). Recreational visitation reaches a peak four times during the year. These times are Spring Break, Memorial Day, Independence Day, and Labor Day.

TABLE B-1-1
2004 BEACH VISITATION SUMMARY

According to 2004 Census		
Month	Average Monthly Visitation	Average Daily Visitation
January	34000	1097
February	34000	1172
March	50000	1613
Peak Day	Spring Break	10830
April	40000	1333
May	300000	9677
Peak Day	Memorial Day	13537
June	520000	17333
July	540000	17419
Peak Day	4th of July	13537
August	520000	16774
September	160000	5333
Peak Day	Labor Day	13537
October	34000	1097
November	34000	1133
December	34000	1097
Yearly Total	2,300,000	

SOURCE: Beaches of Walton County

PARKING

Lack of parking may constitute a restriction on public access and use. Therefore, eligibility for Federal participation is precluded in areas where there is a lack of sufficient parking facilities provided for the general public (including non-resident users) reasonably near and accessible to the project beaches according to the ER 1105-2-100.

Access

According to the ER 1105-2-100, reasonable access is approximately every one-half mile or less. Provision of reasonable public access rights-of-way, consistent with attendance used in benefit evaluation is a condition of Corps participation.

Capacity Constraints

The actual capacity of the beach is limited by several types of constraints. These include public access to the beach, availability of parking, and the size of the beach area. Thus the unconstrained visitation forecast must be limited by these capacity considerations. There are a total of 73 access points along the beach. There are over 10,000 public and private parking spaces within the beach. Assuming an average of 4.5 persons per automobile and a turnover rate of 1.5 cars per parking space per day, these 10,000 spaces will support visitation of over 67,000 persons per day.

TABLE B-1-2
ACCESS POINTS AND PARKING

Construction Reach	Model Reach	Access Points	Parking Spaces	Visits Parking Will Support
1	R1-3	2375 Scenic Gulf Drive	170	1,148
1	R1-12	735 Scenic Gulf Drive	0	0
1	R1-14	132 Norwood Drive	0	0
1	R1-15	Open Gulf Street	0	0
1	R1-16	~ 90 Beach Drive	6	41
1	R1-17	253 Sand Trap Road	3	20
1	R1-18	End of Tango De Mer	0	0
1	R1-22	San Destin Day Use Area	110	743
1	R2-1	719 Top Sail Hill Road	0	0
2	R3-4	363 Highland Avenue	5	34
2	R3-4	127 Highland Avenue	0	0
2	R3-5	Dune Allen 5753 W. Co Hwy 30A	75	506
2	R3-9	5605 Co Hwy 30A	0	0
2	R3-9	5173 Co Hwy 30A	15	101
2	R3-9	4991 W. Co Hwy 30A	0	0
2	R3-10	4850 W. Co Hwy 30A	5	34
2	R3-11	Gulf Place West Access Point	13	88
2	R3-12	Gulf Place Middle Access Point	13	88
2	R3-13	Gulf Place East Access Point	14	95
2	R3-11	4447 W Co Hwy 30A	42	284
2	R3-13	92 South Spooky Lane	0	0
2	R3-14	4201 Co. Hwy 30A	0	0
2	R3-14	186 Gulf View Heights Street	30	203
2	R3-21	2365 S. Co Hwy 83	22	149
2	R3-21	446 Blue Mountain Road	5	34
2	R3-21	590 Blue Mountain Road	5	34
2	R3-21	726 Blue Mountain Road	5	34
3	R4-5	125 Sandy Lane	12	81
3	R4-6	288 Garfield St.	41	277
3	R4-6	199 Banfill Street	41	277
3	R4-6	208 Holtz Avenue	0	0
3	R4-7	91 Boat Ramp Road	0	0
3	R4-6	913 Main Park Road	0	0
4	R5-2	Water Color Park Garage and Access	100	675
4	R5-3	1931 E. Co Hwy 30A Van Ness Butler Beach Access	101	682

TABLE B-1-2 (CONTINUED)
ACCESS POINTS AND PARKING

Construction Reach	Model Reach	Access Points	Parking Spaces	Visits Parking Will Support
4	R5-5	2560 Co Hwy 30A	0	0
4	R5-6	2624 Co Hwy 30A	2	14
4	R5-6	2680 Co Hwy 30A	0	0
4	R5-6	~ 2750 Co Hwy 30A	0	0
4	R5-6	2790 Co Hwy 30A	30	203
4	R5-7	2845 Co Hwy 30A	0	0
4	R5-7	2920 Co Hwy 30A	0	0
4	R5-8	3020 Co Hwy 30A	4	27
4	R5-9	118 Montgomery Street	0	0
4	R5-9	52 S Andalusia St	0	0
4	R5-9	South end of Dothan Avenue on Montgomery Street	0	0
4	R5-10	3458 E. Co Hwy 30A - San Juan Neighborhood B A	20	135
4	R5-10	3512 E. Co. Hwy 30A	0	0
4	R5-10	3576 E. Co Hwy 30A - Pelaya Neighborhood B A	0	0
4	R5-12	3694 E. Co Hwy 30 A - Campbell Street Neighborhood	75	506
4	R5-12	3874 E. Co Hwy 30A	20	135
4	R5-13	57 Seagrove Place	9	61
4	R5-18	679 Eastern Lake Road	6	41
4	R5-18	491 Eastern Lake Road #33 - Eastern Lake N B A	0	0
4	R5-18	188 San Roy Road - neighborhood come out to helio	0	0
4	R5-19	11 Beachside Dune - Sugar Dune	16	108
4	R5-20	258 Beachfront Trail - Walton Dune	10	68
4	R5-22	308 Beachfront Trail	10	68
4	R5-22	Beachside Drive	16	108
5	R5-22	Deer Lake State Park	1	7
5	R5-32	8040 E. Co Hwy 30A - Gulf Lakes Neighborhood B A	0	0
5	R5-34	8286 E. Co. Hwy 30A - Seabreeze Neighborhood B A	10	68
5	R5-35	Saint Lucia Lane	100	675
5	R5-35	Rosemary Avenue	0	0
5	R5-35	8520 E. Co Hwy 30A - Seacrest Drive Neighborhood B A	0	0
5	R5-46	East Water Street	50	338
5	R5-46	East Water Street	50	338

TABLE B-1-2 (CONTINUED)
ACCESS POINTS AND PARKING

Construction Reach	Model Reach	Access Points	Parking Spaces	Visits Parking Will Support
5	R5-46	188 Winston Lane Beach Access	5	34
5	R5-47	264 South Wall Street - Wall Street Neighborhood	9	61
5	R5-47	435 West Park Place Ave.	67	452
5	R5-48	139 South Orange Street	67	452
5	R5-49	118 West Park Place Avenue FL #20	67	452
5	R5-50	202 South Walton Lakeshore Drive Phillips Inlet Access	15	101
TOTALS		73 Access Points	1,492	10,071

BEACH AREA AND CAPACITY

Beach area acts as a constraint on the number of visitors that will visit the Walton County beaches during peak days. Measurements of the beach were taken using 2007 aerial photographs. These measurements indicated that there were over 14.6 million square feet of beach. In this report, it is assumed that visitors will each require 100 square feet of beach per day. Because some visitors spend only part of the day at the beach, a turnover rate of 1.5 visitors per 100 square feet of beach is used as an adjustment. Thus, in 2004, the Walton County beaches were capable of supporting 219,967 visitors per day. Beach area and visitation capacity for 2004 are displayed in Table B-1-3.

TABLE B-1-3
WALTON COUNTY BEACHES BEACH AREA AND VISITATION CAPACITY YEAR 2010

Sub-Reach	Beach Area 2010 (sq. ft.)	2010 Beach Visitation Capacity
1	144,647	2,170
2	193,884	2,908
3	118,450	1,777
4	143,759	2,156
5	151,095	2,266
6	81,688	1,225
7	144,038	2,161
8	150,241	2,254
9	98,015	1,470
10	142,423	2,136
11	102,325	1,535
12	138,375	2,076
13	108,430	1,626
14	145,981	2,190
15	132,471	1,987
16	118,250	1,774
17	120,825	1,812
18	186,678	2,800
19	99,066	1,486
20	117,002	1,755
21	117,680	1,765
22	126,239	1,894
23	146,109	2,192
24	138,097	2,071
25	-	-
26	-	-
27	-	-
28	-	-
29	-	-
30	-	-
31	-	-
32	196,081	2,941
33	94,405	1,416
34	104,320	1,565
35	106,244	1,594
36	148,886	2,233
37	169,797	2,547
38	160,194	2,403
39	123,744	1,856
40	129,262	1,939
41	111,145	1,667
42	132,414	1,986
43	139,742	2,096
44	105,268	1,579
45	168,190	2,523

TABLE B-1-3 (CONTINUED)
WALTON COUNTY BEACHES BEACH AREA AND VISITATION CAPACITY YEAR 2010

Sub-Reach	Beach Area 2010 (sq. ft.)	2010 Beach Visitation Capacity
46	181,141	2,717
47	119,447	1,792
48	144,862	2,173
49	162,923	2,444
50	146,073	2,191
51	151,948	2,279
52	176,213	2,643
53	160,927	2,414
54	133,953	2,009
55	-	-
56	-	-
57	-	-
58	152,398	2,286
59	147,409	2,211
60	147,225	2,208
61	141,315	2,120
62	153,307	2,300
63	204,820	3,072
64	-	-
65	-	-
66	-	-
67	159,837	2,398
68	139,515	2,093
69	151,024	2,265
70	235,318	3,530
71	180,143	2,702
72	197,863	2,968
73	192,040	2,881
74	152,606	2,289
75	171,220	2,568
76	169,494	2,542
77	177,249	2,659
78	197,338	2,960
79	187,086	2,806
80	159,641	2,395
81	181,271	2,719
82	186,231	2,793
83	164,059	2,461
84	198,929	2,984
85	172,004	2,580
86	178,565	2,678
87	220,361	3,305
88	-	-
89	-	-
90	-	-

TABLE B-1-3 (CONTINUED)
WALTON COUNTY BEACHES BEACH AREA AND VISITATION CAPACITY YEAR 2010

Sub-Reach	Beach Area 2010 (sq. ft.)	2010 Beach Visitation Capacity
91	-	-
92	-	-
93	-	-
94	-	-
95	-	-
96	173,143	2,597
97	169,589	2,544
98	163,392	2,451
99	178,913	2,684
100	180,108	2,702
101	165,461	2,482
102	153,915	2,309
103	163,946	2,459
104	173,029	2,595
105	181,690	2,725
106	177,504	2,663
107	157,027	2,355
108	149,656	2,245
109	141,009	2,115
110	136,468	2,047
111	123,157	1,847
112	131,154	1,967
113	140,728	2,111
114	137,897	2,068
115	157,622	2,364
116	174,941	2,624
117	182,917	2,744
TOTALS	14,664,482	219,967

WITHOUT AND WITH PROJECT VALUES

In order to determine the recreation benefits of the selected plan an economic value must be placed on the recreation experience at the Walton County beaches. This value can then be applied to the increase in beach area which results from the project to determine the NED recreation benefits. For this report, unit day values (UDV) are used to determine the economic value of recreation at Walton County beaches. UDV are administratively determined values which represent the NED recreation values for typical types of recreation. They should not be confused with regional economic impact values, which are not appropriate measures of economic benefits for use in a study of this type. UDV were originally set by the U.S. Water Resources Council based on studies of recreation value. Guidance for their use is provided by ER 1105-2-100.

Point System

UDV are determined using a point system that takes into account the following factors: recreation experience, availability of opportunity, carrying capacity, accessibility, and environmental (esthetics) quality. A good deal of judgment is required in the assessment of point values. A group of planning professionals with knowledge of the study area made independent judgments of the UDV values. These values varied somewhat within categories, but were remarkably similar over all. They were averaged for the use in this study.

Recreation Experience. Under the without project condition, Walton County beaches has several general recreation activities including swimming, boating, picnicking, and sunbathing, providing a recreation experience equivalent to 10 points out of 30.

Availability of Opportunity. Availability of opportunity is considered high because there are several similar beaches within 30 minutes to one hour driving time. Because of the large number of competing recreation opportunities, this category was limited to 3 points out of a total of 18.

Carrying Capacity. The carrying capacity of the facilities is considered adequate to conduct recreation during peak demand days, although facilities can certainly be strained at those times. This equates to 7 points out of a total of 14. Note that carrying capacity in the future with project condition is characterized by added dune width. The added dune width is gained at the expense of berm width resulting in less beach in which to recreate.

Accessibility. The project is considered very accessible, with high quality roads to the site and 73 access points within the site. This equates to 15 points out of a total of 18.

Environment. The area has exceptional esthetic value due to the beautiful white sand and clear, warm water of the Gulf of Mexico. Some reduction was made in this category due to the close proximity of commercial development. A rating of 13 out of a total of 16 points was awarded. Under the width project condition, it was felt that the additional 50-foot beach width would result in a slight increase esthetic value during peak days, so one additional point was awarded, for a total of 14 points.

The UDV point totals convert to a recreation value of $5.07 for the without project condition and $5.16 for the with project condition per Economics Guidance Memorandum, 10-03, Unit Day Values for Recreation, Fiscal Year 2010.

TABLE B-1-4
WALTON COUNTY BEACHES WITHOUT AND WITH PROJECT UNIT DAY VALUES

Criteria	W/O Project Points	W/ Project Points
Recreation Experience	10	10
Availability of Opportunity	3	3
Carrying Capacity	8	7
Accessibility	15	15
Environment (Esthetics)	13	14
Total Points	49	49
General Recreation Value	$5.07	$5.16

Future Visitation

Visitation to the Walton County Beach study area has increased rapidly, and this trend is expected to continue as the population of the tributary area increases. For this study, an unconstrained visitation growth forecast was developed for both annual visitation and peak day visitation by applying three percent annual historic increases in visitation. The unconstrained forecast identifies the maximum potential recreation demand for the study area. Limiting factor such as availability of parking and beach area are not considered under this unconstrained forecast.

TABLE B-1-5
WALTON COUNTY BEACHES PROJECTED UNCONSTRAINED VISITATION
2004-2063

Year	Unconstrained Total Annual Visitation	Unconstrained Peak Day Visitation Per Day
2004	2,300,000	13,537
2010	2,746,320	16,164
2014	3,091,008	18,193
2020	3,690,825	21,723
2030	4,960,160	29,194
2040	6,666,040	39,234
2050	8,958,601	52,727
2060	12,039,610	70,861
2063	13,156,007	77,432

Erosion and Accretion

Because the beach is eroding in some areas and accreting in others, total beach area will vary over time in the without project condition.

TABLE B-1-6
WITHOUT PROJECT CONDITION - BEACH AREA STATION (2010 - 2063)

Sub-Reach	Model Reach	2010 (sq. ft)	2020 (sq. ft.)	2030 (sq. ft)	2040 (sq. ft)	2050 (sq. ft)	2060 (sq. ft)	2063 (sq. ft)
1	R1-1	144,647	144,654	144,660	144,667	144,674	144,681	144,688
2	R1-2	193,884	193,890	193,896	193,903	193,909	193,916	193,922
3	R1-3	118,450	118,455	118,460	118,466	118,471	118,476	118,481
4	R1-4	143,759	143,763	143,767	143,771	143,775	143,779	143,783
5	R1-5	151,095	151,098	151,101	151,104	151,107	151,110	151,114
6	R1-6	81,688	81,689	81,690	81,691	81,692	81,693	81,694
7	R1-7	144,038	144,038	144,038	144,038	144,038	144,038	144,038
8	R1-8	150,241	150,241	150,242	150,242	150,242	150,242	150,242
9	R1-9	98,015	98,015	98,016	98,016	98,016	98,017	98,017
10	R1-10	142,423	142,424	142,425	142,426	142,427	142,428	142,429
11	R1-11	102,325	102,326	102,327	102,328	102,329	102,331	102,332
12	R1-12	138,375	138,376	138,376	138,377	138,377	138,378	138,378

TABLE B-1-6 WITHOUT PROJECT CONDITION - BEACH AREA STATION (2010 - 2063)								
Sub-Reach	Model Reach	2010 (sq. ft)	2020 (sq. ft.)	2030 (sq. ft)	2040 (sq. ft)	2050 (sq. ft)	2060 (sq. ft)	2063 (sq. ft)
13	R1-13	108,430	108,430	108,430	108,430	108,430	108,430	108,430
14	R1-14	145,981	145,980	145,979	145,978	145,977	145,976	145,975
15	R1-15	132,471	132,470	132,469	132,467	132,466	132,465	132,464
16	R1-16	118,250	118,249	118,247	118,246	118,245	118,244	118,242
17	R1-17	120,825	120,824	120,823	120,822	120,821	120,819	120,818
18	R1-18	186,678	186,677	186,675	186,674	186,673	186,671	186,670
19	R1-19	99,066	99,065	99,065	99,064	99,064	99,063	99,062
20	R1-20	117,002	117,003	117,004	117,005	117,006	117,007	117,008
21	R1-21	117,680	117,681	117,682	117,683	117,684	117,686	117,687
22	R1-22	126,239	126,242	126,244	126,247	126,249	126,251	126,254
23	R1-23	146,109	146,113	146,117	146,121	146,125	146,129	146,133
24	R1-24	138,097	138,101	138,106	138,111	138,115	138,120	138,124
25	R2-1	-	-	-	-	-	-	-
26	R2-2	-	-	-	-	-	-	-
27	R2-3	-	-	-	-	-	-	-
28	R2-4	-	-	-	-	-	-	-
29	R2-5	-	-	-	-	-	-	-
30	R2-6	-	-	-	-	-	-	-
31	R2-7	-	-	-	-	-	-	-
32	R3-1	196,081	196,085	196,089	196,093	196,097	196,101	196,105
33	R3-2	94,405	94,409	94,413	94,418	94,422	94,426	94,430
34	R3-3	104,320	104,324	104,329	104,333	104,337	104,342	104,346
35	R3-4	106,244	106,249	106,255	106,261	106,266	106,272	106,277
36	R3-5	148,886	148,890	148,895	148,899	148,903	148,907	148,911
37	R3-6	169,797	169,800	169,803	169,806	169,809	169,811	169,814
38	R3-7	160,194	160,195	160,196	160,197	160,198	160,199	160,200
39	R3-8	123,744	123,741	123,739	123,736	123,733	123,730	123,727
40	R3-9	129,262	129,258	129,255	129,251	129,248	129,244	129,241
41	R3-10	111,145	111,140	111,136	111,132	111,127	111,123	111,118
42	R3-11	132,414	132,409	132,404	132,399	132,394	132,389	132,384
43	R3-12	139,742	139,737	139,732	139,727	139,722	139,717	139,712
44	R3-13	105,268	105,262	105,256	105,250	105,244	105,238	105,232
45	R3-14	168,190	168,182	168,175	168,167	168,159	168,151	168,144
46	R3-15	181,141	181,132	181,124	181,115	181,107	181,098	181,090
47	R3-16	119,447	119,438	119,428	119,418	119,409	119,399	119,390
48	R3-17	144,862	144,851	144,840	144,829	144,819	144,808	144,797
49	R3-18	162,923	162,911	162,900	162,889	162,878	162,867	162,856
50	R3-19	146,073	146,062	146,052	146,041	146,030	146,020	146,009
51	R3-20	151,948	151,938	151,928	151,917	151,907	151,897	151,886
52	R3-21	176,213	176,203	176,193	176,183	176,173	176,163	176,153
53	R3-22	160,927	160,918	160,909	160,899	160,890	160,881	160,872
54	R3-23	133,953	133,945	133,937	133,928	133,920	133,912	133,903
55	R3-24	-	-	-	-	-	-	-
56	R3-25	-	-	-	-	-	-	-

TABLE B-1-6 WITHOUT PROJECT CONDITION - BEACH AREA STATION (2010 - 2063)								
Sub-Reach	Model Reach	2010 (sq. ft)	2020 (sq. ft.)	2030 (sq. ft)	2040 (sq. ft)	2050 (sq. ft)	2060 (sq. ft)	2063 (sq. ft)
57	R3-26	-	-	-	-	-	-	-
58	R4-1	152,398	152,391	152,384	152,378	152,371	152,364	152,357
59	R4-2	147,409	147,403	147,398	147,392	147,387	147,382	147,376
60	R4-3	147,225	147,226	147,226	147,227	147,227	147,228	147,228
61	R4-4	141,315	141,316	141,318	141,319	141,320	141,321	141,322
62	R4-5	153,307	153,304	153,301	153,299	153,296	153,293	153,290
63	R4-6	204,820	204,821	204,822	204,823	204,824	204,825	204,826
64	R4-7	-	-	-	-	-	-	-
65	R4-8	-	-	-	-	-	-	-
66	R4-9	-	-	-	-	-	-	-
67	R5-1	159,837	159,828	159,819	159,810	159,801	159,792	159,783
68	R5-2	139,515	139,509	139,503	139,497	139,490	139,484	139,478
69	R5-3	151,024	151,021	151,017	151,014	151,011	151,008	151,004
70	R5-4	235,318	235,317	235,316	235,315	235,315	235,314	235,313
71	R5-5	180,143	180,144	180,145	180,146	180,147	180,148	180,149
72	R5-6	197,863	197,860	197,858	197,855	197,852	197,850	197,847
73	R5-7	192,040	192,037	192,034	192,030	192,027	192,024	192,021
74	R5-8	152,606	152,602	152,598	152,594	152,590	152,585	152,581
75	R5-9	171,220	171,217	171,215	171,213	171,210	171,208	171,206
76	R5-10	169,494	169,491	169,488	169,486	169,483	169,480	169,478
77	R5-11	177,249	177,246	177,243	177,240	177,237	177,234	177,232
78	R5-12	197,338	197,336	197,333	197,330	197,328	197,325	197,322
79	R5-13	187,086	187,083	187,080	187,077	187,074	187,072	187,069
80	R5-14	159,641	159,638	159,636	159,633	159,630	159,628	159,625
81	R5-15	181,271	181,268	181,264	181,261	181,257	181,253	181,250
82	R5-16	186,231	186,228	186,224	186,221	186,217	186,214	186,210
83	R5-17	164,059	164,057	164,055	164,053	164,051	164,049	164,046
84	R5-18	198,929	198,925	198,922	198,918	198,915	198,911	198,908
85	R5-19	172,004	172,004	172,003	172,002	172,001	172,000	171,999
86	R5-20	178,565	178,565	178,565	178,565	178,565	178,565	178,565
87	R5-21	220,361	220,361	220,360	220,360	220,360	220,360	220,360
88	R5-22	-	-	-	-	-	-	-
89	R5-23	-	-	-	-	-	-	-
90	R5-24	-	-	-	-	-	-	-
91	R5-25	-	-	-	-	-	-	-
92	R5-26	-	-	-	-	-	-	-
93	R5-27	-	-	-	-	-	-	-
94	R5-28	-	-	-	-	-	-	-
95	R5-29	-	-	-	-	-	-	-
96	R5-30	173,143	173,139	173,136	173,132	173,128	173,125	173,121
97	R5-31	169,589	169,585	169,581	169,577	169,573	169,570	169,566
98	R5-32	163,392	163,385	163,378	163,371	163,363	163,356	163,349
99	R5-33	178,913	178,906	178,899	178,892	178,885	178,878	178,871
100	R5-34	180,108	180,102	180,097	180,091	180,085	180,079	180,073

TABLE B-1-6 WITHOUT PROJECT CONDITION - BEACH AREA STATION (2010 - 2063)								
Sub-Reach	Model Reach	2010 (sq. ft)	2020 (sq. ft.)	2030 (sq. ft)	2040 (sq. ft)	2050 (sq. ft)	2060 (sq. ft)	2063 (sq. ft)
101	R5-35	165,461	165,455	165,449	165,443	165,437	165,431	165,425
102	R5-36	153,915	153,909	153,902	153,895	153,888	153,881	153,874
103	R5-37	163,946	163,937	163,928	163,919	163,910	163,901	163,892
104	R5-38	173,029	173,019	173,009	172,999	172,989	172,980	172,970
105	R5-39	181,690	181,679	181,668	181,657	181,646	181,635	181,624
106	R5-40	177,504	177,498	177,492	177,487	177,481	177,475	177,470
107	R5-41	157,027	157,022	157,017	157,012	157,007	157,002	156,997
108	R5-42	149,656	149,653	149,650	149,646	149,643	149,640	149,636
109	R5-43	141,009	141,007	141,005	141,002	141,000	140,998	140,996
110	R5-44	136,468	136,467	136,467	136,466	136,465	136,465	136,464
111	R5-45	123,157	123,158	123,158	123,158	123,158	123,158	123,158
112	R5-46	131,154	131,154	131,155	131,156	131,157	131,158	131,159
113	R5-47	140,728	140,729	140,729	140,729	140,729	140,729	140,729
114	R5-48	137,897	137,897	137,898	137,898	137,898	137,898	137,899
115	R5-49	157,622	157,621	157,619	157,618	157,616	157,615	157,613
116	R5-50	174,941	174,939	174,936	174,934	174,931	174,929	174,927
117	R5-51	182,917	182,913	182,910	182,906	182,902	182,899	182,895
TOTALS		14,664,482	14,664,257	14,664,033	14,663,808	14,663,583	14,663,358	14,663,133

Visitation Constraints

Because beach visitation can be affected not only by demand, but also by access constraints, parking constraints, and beach area, all factors are considered in determining actual visitation. Note that parking is a critical constraint when using a beach capacity methodology. The peak user day methodology will be employed to determine the adequacy of parking for the project.

TABLE B-1-7 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2010							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2010 Beach Capacity	Daily Visits For 2010	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,908	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,156	68	$342	Parking
5	R1-5	16	72	2,266	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking

TABLE B-1-7 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2010							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2010 Beach Capacity	Daily Visits For 2010	Daily Value @ $5.07	Critical Constraint
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,071	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,233	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,579	167	$844	Parking
45	R3-14	30	203	2,523	203	$1,027	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,792	0	$0	Parking
48	R3-17	0	0	2,173	0	$0	Parking
49	R3-18	24	108	2,444	108	$548	Parking
50	R3-19	111	500	2,191	500	$2,532	Parking
51	R3-20	23	104	2,279	104	$525	Parking
52	R3-21	37	250	2,643	250	$1,266	Parking
53	R3-22	0	0	2,414	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking

TABLE B-1-7 **HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2010**							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2010 Beach Capacity	Daily Visits For 2010	Daily Value @ $5.07	Critical Constraint
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,300	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,398	0	$0	Parking
68	R5-2	111	725	2,093	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,881	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,659	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,395	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,451	0	$0	Parking
99	R5-33	13	59	2,684	59	$297	Parking

TABLE B-1-7 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2010							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2010 Beach Capacity	Daily Visits For 2010	Daily Value @ $5.07	Critical Constraint
100	R5-34	14	86	2,702	86	$433	Parking
101	R5-35	106	702	2,482	702	$3,559	Parking
102	R5-36	0	0	2,309	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,663	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,967	17,712	$89,800	

2020

TABLE B-1-8 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2020							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2020 Beach Capacity	Daily Visits For 2020	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,908	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,156	68	$342	Parking
5	R1-5	16	72	2,266	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking

TABLE B-1-8 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2020							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2020 Beach Capacity	Daily Visits For 2020	Daily Value @ $5.07	Critical Constraint
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,233	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,579	167	$844	Parking
45	R3-14	30	203	2,523	203	$1,027	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,792	0	$0	Parking
48	R3-17	0	0	2,173	0	$0	Parking
49	R3-18	24	108	2,444	108	$548	Parking
50	R3-19	111	500	2,191	500	$2,532	Parking
51	R3-20	23	104	2,279	104	$525	Parking
52	R3-21	37	250	2,643	250	$1,266	Parking
53	R3-22	0	0	2,414	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking

TABLE B-1-8 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2020							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2020 Beach Capacity	Daily Visits For 2020	Daily Value @ $5.07	Critical Constraint
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,300	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	111	725	2,093	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,881	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,659	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,395	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,451	0	$0	Parking
99	R5-33	13	59	2,684	59	$297	Parking
100	R5-34	14	86	2,702	86	$433	Parking
101	R5-35	106	702	2,482	702	$3,559	Parking
102	R5-36	0	0	2,309	0	$0	Parking

TABLE B-1-8 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2020							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2020 Beach Capacity	Daily Visits For 2020	Daily Value @ $5.07	Critical Constraint
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,964	17,712	$89,800	

2030

TABLE B-1-9 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2030							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2030 Beach Capacity	Daily Visits For 2030	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,908	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,157	68	$342	Parking
5	R1-5	16	72	2,267	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,233	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking

TABLE B-1-9 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2030							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2030 Beach Capacity	Daily Visits For 2030	Daily Value @ $5.07	Critical Constraint
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,579	167	$844	Parking
45	R3-14	30	203	2,523	203	$1,027	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,791	0	$0	Parking
48	R3-17	0	0	2,173	0	$0	Parking
49	R3-18	24	108	2,444	108	$548	Parking
50	R3-19	111	500	2,191	500	$2,532	Parking
51	R3-20	23	104	2,279	104	$525	Parking
52	R3-21	37	250	2,643	250	$1,266	Parking
53	R3-22	0	0	2,414	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,300	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	111	725	2,093	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,881	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,659	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,395	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking

TABLE B-1-9 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2030							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2030 Beach Capacity	Daily Visits For 2030	Daily Value @ $5.07	Critical Constraint
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,451	0	$0	Parking
99	R5-33	13	59	2,683	59	$297	Parking
100	R5-34	14	86	2,701	86	$433	Parking
101	R5-35	106	702	2,482	702	$3,559	Parking
102	R5-36	0	0	2,309	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,960	17,712	$89,800	

2040

TABLE B-1-10 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2040							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2040 Beach Capacity	Daily Visits For 2040	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	0	0	2,909	0	$0	Parking
3	R1-3	170	1,148	1,777	1,148	$5,818	Parking
4	R1-4	0	0	2,157	0	$0	Parking
5	R1-5	0	0	2,267	0	$0	Parking
6	R1-6	0	0	1,225	0	$0	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	0	0	2,254	0	$0	Parking
9	R1-9	0	0	1,470	0	$0	Parking
10	R1-10	0	0	2,136	0	$0	Parking
11	R1-11	0	0	1,535	0	$0	Parking
12	R1-12	0	0	2,076	0	$0	Parking
13	R1-13	0	0	1,626	0	$0	Parking
14	R1-14	0	0	2,190	0	$0	Parking
15	R1-15	0	0	1,987	0	$0	Parking
16	R1-16	6	41	1,774	41	$205	Parking
17	R1-17	3	20	1,812	20	$103	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	0	0	1,486	0	$0	Parking
20	R1-20	0	0	1,755	0	$0	Parking
21	R1-21	0	0	1,765	0	$0	Parking
22	R1-22	110	743	1,894	743	$3,764	Parking
23	R1-23	0	0	2,192	0	$0	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	0	0	1,565	0	$0	Parking
35	R3-4	5	34	1,594	34	$171	Parking
36	R3-5	75	506	2,233	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	0	0	1,856	0	$0	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	55	371	1,986	371	$1,882	Parking

TABLE B-1-10 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2040							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2040 Beach Capacity	Daily Visits For 2040	Daily Value @ $5.07	Critical Constraint
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	14	95	1,579	95	$479	Parking
45	R3-14	30	203	2,523	203	$1,027	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,791	0	$0	Parking
48	R3-17	0	0	2,172	0	$0	Parking
49	R3-18	0	0	2,443	0	$0	Parking
50	R3-19	0	0	2,191	0	$0	Parking
51	R3-20	0	0	2,279	0	$0	Parking
52	R3-21	37	250	2,643	250	$1,266	Parking
53	R3-22	0	0	2,413	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,299	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	100	675	2,092	675	$3,422	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,880	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	0	0	2,659	0	$0	Parking
78	R5-12	95	641	2,960	641	$3,251	Parking
79	R5-13	9	61	2,806	61	$308	Parking
80	R5-14	0	0	2,394	0	$0	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	0	0	2,793	0	$0	Parking
83	R5-17	0	0	2,461	0	$0	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	10	68	2,678	68	$342	Parking

TABLE B-1-10 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2040							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2040 Beach Capacity	Daily Visits For 2040	Daily Value @ $5.07	Critical Constraint
87	R5-21	0	0	3,305	0	$0	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,451	0	$0	Parking
99	R5-33	0	0	2,683	0	$0	Parking
100	R5-34	10	68	2,701	68	$342	Parking
101	R5-35	100	675	2,482	675	$3,422	Parking
102	R5-36	0	0	2,308	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	0	0	2,245	0	$0	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,957	10,071	$51,060	

2050

TABLE B-1-11 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2050							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2050 Beach Capacity	Daily Visits For 2050	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,909	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,157	68	$342	Parking
5	R1-5	16	72	2,267	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,234	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking

TABLE B-1-11 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2050							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2050 Beach Capacity	Daily Visits For 2050	Daily Value @ $5.07	Critical Constraint
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,579	167	$844	Parking
45	R3-14	30	203	2,522	203	$1,027	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,791	0	$0	Parking
48	R3-17	0	0	2,172	0	$0	Parking
49	R3-18	24	108	2,443	108	$548	Parking
50	R3-19	111	500	2,190	500	$2,532	Parking
51	R3-20	23	104	2,279	104	$525	Parking
52	R3-21	37	250	2,643	250	$1,266	Parking
53	R3-22	0	0	2,413	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,299	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	111	725	2,092	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,880	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,659	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,394	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking

TABLE B-1-11 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2050							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2050 Beach Capacity	Daily Visits For 2050	Daily Value @ $5.07	Critical Constraint
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,450	0	$0	Parking
99	R5-33	13	59	2,683	59	$297	Parking
100	R5-34	14	86	2,701	86	$433	Parking
101	R5-35	106	702	2,482	702	$3,559	Parking
102	R5-36	0	0	2,308	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,954	17,712	$89,800	

2060

TABLE B-1-12 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2060							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2060 Beach Capacity	Daily Visits For 2060	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,909	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,157	68	$342	Parking
5	R1-5	16	72	2,267	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,942	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,234	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking

TABLE B-1-12 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2060							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2060 Beach Capacity	Daily Visits For 2060	Daily Value @ $5.07	Critical Constraint
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,579	167	$844	Parking
45	R3-14	30	203	2,522	203	$1,027	Parking
46	R3-15	0	0	2,716	0	$0	Parking
47	R3-16	0	0	1,791	0	$0	Parking
48	R3-17	0	0	2,172	0	$0	Parking
49	R3-18	24	108	2,443	108	$548	Parking
50	R3-19	111	500	2,190	500	$2,532	Parking
51	R3-20	23	104	2,278	104	$525	Parking
52	R3-21	37	250	2,642	250	$1,266	Parking
53	R3-22	0	0	2,413	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,285	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,299	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	111	725	2,092	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,880	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,659	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,394	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking

TABLE B-1-12 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2060							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2060 Beach Capacity	Daily Visits For 2060	Daily Value @ $5.07	Critical Constraint
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,450	0	$0	Parking
99	R5-33	13	59	2,683	59	$297	Parking
100	R5-34	14	86	2,701	86	$433	Parking
101	R5-35	106	702	2,481	702	$3,559	Parking
102	R5-36	0	0	2,308	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,743	0	$0	Parking
TOTAL		3,190	17,712	219,950	17,712	$89,800	

2063

TABLE B-1-13 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2063							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2063 Beach Capacity	Daily Visits For 2063	Daily Value @ $5.07	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,909	99	$502	Parking
3	R1-3	198	1,274	1,777	1,274	$6,457	Parking
4	R1-4	15	68	2,157	68	$342	Parking
5	R1-5	16	72	2,267	72	$365	Parking
6	R1-6	18	81	1,225	81	$411	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$228	Parking
9	R1-9	3	14	1,470	14	$68	Parking
10	R1-10	33	149	2,136	149	$753	Parking
11	R1-11	16	72	1,535	72	$365	Parking
12	R1-12	31	140	2,076	140	$707	Parking
13	R1-13	76	342	1,626	342	$1,734	Parking
14	R1-14	33	149	2,190	149	$753	Parking
15	R1-15	77	347	1,987	347	$1,757	Parking
16	R1-16	109	504	1,774	504	$2,555	Parking
17	R1-17	7	38	1,812	38	$194	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,255	Parking
20	R1-20	81	365	1,755	365	$1,848	Parking
21	R1-21	146	657	1,765	657	$3,331	Parking
22	R1-22	202	1,157	1,894	1,157	$5,863	Parking
23	R1-23	155	698	2,192	698	$3,536	Parking
24	R1-24	0	0	2,072	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,942	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$114	Parking
35	R3-4	12	65	1,594	65	$331	Parking
36	R3-5	75	506	2,234	506	$2,567	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$274	Parking
40	R3-9	15	101	1,939	101	$513	Parking
41	R3-10	5	34	1,667	34	$171	Parking
42	R3-11	68	430	1,986	430	$2,179	Parking

TABLE B-1-13 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2063							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2063 Beach Capacity	Daily Visits For 2063	Daily Value @ $5.07	Critical Constraint
43	R3-12	13	88	2,096	88	$445	Parking
44	R3-13	30	167	1,578	167	$844	Parking
45	R3-14	30	203	2,522	203	$1,027	Parking
46	R3-15	0	0	2,716	0	$0	Parking
47	R3-16	0	0	1,791	0	$0	Parking
48	R3-17	0	0	2,172	0	$0	Parking
49	R3-18	24	108	2,443	108	$548	Parking
50	R3-19	111	500	2,190	500	$2,532	Parking
51	R3-20	23	104	2,278	104	$525	Parking
52	R3-21	37	250	2,642	250	$1,266	Parking
53	R3-22	0	0	2,413	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,285	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,299	81	$411	Parking
63	R4-6	82	554	3,072	554	$2,806	Parking
64	R4-7	0	0	-	0	$0	Parking
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,397	0	$0	Parking
68	R5-2	111	725	2,092	725	$3,673	Parking
69	R5-3	101	682	2,265	682	$3,456	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,095	Parking
73	R5-7	0	0	2,880	0	$0	Parking
74	R5-8	4	27	2,289	27	$137	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$684	Parking
77	R5-11	71	320	2,658	320	$1,620	Parking
78	R5-12	145	866	2,960	866	$4,392	Parking
79	R5-13	79	376	2,806	376	$1,905	Parking
80	R5-14	137	617	2,394	617	$3,126	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$821	Parking
84	R5-18	6	41	2,984	41	$205	Parking
85	R5-19	16	108	2,580	108	$548	Parking
86	R5-20	61	297	2,678	297	$1,506	Parking

TABLE B-1-13 HISTORIC PEAK DAY CONSTRAINED VISITATION CAPACITY - 2063							
Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	2063 Beach Capacity	Daily Visits For 2063	Daily Value @ $5.07	Critical Constraint
87	R5-21	9	41	3,305	41	$205	Parking
88	R5-22	27	182	-	182	$924	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,543	0	$0	Parking
98	R5-32	0	0	2,450	0	$0	Parking
99	R5-33	13	59	2,683	59	$297	Parking
100	R5-34	14	86	2,701	86	$433	Parking
101	R5-35	106	702	2,481	702	$3,559	Parking
102	R5-36	0	0	2,308	0	$0	Parking
103	R5-37	0	0	2,458	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,724	0	$0	Parking
106	R5-40	0	0	2,662	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking
108	R5-42	13	59	2,245	59	$297	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,593	Parking
113	R5-47	76	513	2,111	513	$2,601	Parking
114	R5-48	67	452	2,068	452	$2,293	Parking
115	R5-49	67	452	2,364	452	$2,293	Parking
116	R5-50	15	101	2,624	101	$513	Parking
117	R5-51	0	0	2,743	0	$0	Parking
TOTAL		3,190	17,712	219,947	17,712	$89,800	

Table B-1-14 presents a summary data for visitation capacity by year for the without project condition.

TABLE B-1-14
WITHOUT PROJECT CONDITION SUMMARY VISITATION CAPACITY BY YEAR

Year	Maximum Peak Day Visits	Daily Parking Capacity	Daily Beach Capacity	Daily Constrained Visits		Daily Parking Capacity
2010	16,164	17,712	219,967	17,712		17,712
2020	18,193	17,712	219,964	17,712		17,712
2030	21,723	17,712	219,960	17,712		17,712
2040	29,194	17,712	219,957	17,712		17,712
2050	39,234	17,712	219,954	17,712		17,712
2060	52,727	17,712	219,950	17,712		17,712
2063	70,861	17,712	219,947	17,712		17,712

Table B-1-15 presents a summary of peak day recreation value by reach and year for the without project condition.

TABLE B-1-15
WITHOUT PROJECT PEAK DAY VISITATION VALUE BY REACH AND YEAR

Sub-Reach	Model Reach	2020	2030	2040	2050	2060	2063
1	R1-1	$0	$0	$0	$0	$0	$0
2	R1-2	$502	$502	$502	$502	$502	$502
3	R1-3	$6,457	$6,457	$6,457	$6,457	$6,457	$6,457
4	R1-4	$342	$342	$342	$342	$342	$342
5	R1-5	$365	$365	$365	$365	$365	$365
6	R1-6	$411	$411	$411	$411	$411	$411
7	R1-7	$0	$0	$0	$0	$0	$0
8	R1-8	$228	$228	$228	$228	$228	$228
9	R1-9	$68	$68	$68	$68	$68	$68
10	R1-10	$753	$753	$753	$753	$753	$753
11	R1-11	$365	$365	$365	$365	$365	$365
12	R1-12	$707	$707	$707	$707	$707	$707
13	R1-13	$1,734	$1,734	$1,734	$1,734	$1,734	$1,734
14	R1-14	$753	$753	$753	$753	$753	$753
15	R1-15	$1,757	$1,757	$1,757	$1,757	$1,757	$1,757
16	R1-16	$2,555	$2,555	$2,555	$2,555	$2,555	$2,555
17	R1-17	$194	$194	$194	$194	$194	$194
18	R1-18	$0	$0	$0	$0	$0	$0
19	R1-19	$1,255	$1,255	$1,255	$1,255	$1,255	$1,255

TABLE B-1-15 (CONTINUED)
WITHOUT PROJECT PEAK DAY VISITATION VALUE BY REACH AND YEAR

Sub-Reach	Model Reach	2020	2030	2040	2050	2060	2063
20	R1-20	$1,848	$1,848	$1,848	$1,848	$1,848	$1,848
21	R1-21	$3,331	$3,331	$3,331	$3,331	$3,331	$3,331
22	R1-22	$5,863	$5,863	$5,863	$5,863	$5,863	$5,863
23	R1-23	$3,536	$3,536	$3,536	$3,536	$3,536	$3,536
24	R1-24	$0	$0	$0	$0	$0	$0
25	R2-1	$0	$0	$0	$0	$0	$0
26	R2-2	$0	$0	$0	$0	$0	$0
27	R2-3	$0	$0	$0	$0	$0	$0
28	R2-4	$0	$0	$0	$0	$0	$0
29	R2-5	$0	$0	$0	$0	$0	$0
30	R2-6	$0	$0	$0	$0	$0	$0
31	R2-7	$0	$0	$0	$0	$0	$0
32	R3-1	$0	$0	$0	$0	$0	$0
33	R3-2	$0	$0	$0	$0	$0	$0
34	R3-3	$114	$114	$114	$114	$114	$114
35	R3-4	$331	$331	$331	$331	$331	$331
36	R3-5	$2,567	$2,567	$2,567	$2,567	$2,567	$2,567
37	R3-6	$0	$0	$0	$0	$0	$0
38	R3-7	$0	$0	$0	$0	$0	$0
39	R3-8	$274	$274	$274	$274	$274	$274
40	R3-9	$513	$513	$513	$513	$513	$513
41	R3-10	$171	$171	$171	$171	$171	$171
42	R3-11	$2,179	$2,179	$2,179	$2,179	$2,179	$2,179
43	R3-12	$445	$445	$445	$445	$445	$445
44	R3-13	$844	$844	$844	$844	$844	$844
45	R3-14	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027
46	R3-15	$0	$0	$0	$0	$0	$0
47	R3-16	$0	$0	$0	$0	$0	$0
48	R3-17	$0	$0	$0	$0	$0	$0
49	R3-18	$548	$548	$548	$548	$548	$548
50	R3-19	$2,532	$2,532	$2,532	$2,532	$2,532	$2,532
51	R3-20	$525	$525	$525	$525	$525	$525
52	R3-21	$1,266	$1,266	$1,266	$1,266	$1,266	$1,266
53	R3-22	$0	$0	$0	$0	$0	$0
54	R3-23	$0	$0	$0	$0	$0	$0
55	R3-24	$0	$0	$0	$0	$0	$0
56	R3-25	$0	$0	$0	$0	$0	$0
57	R3-26	$0	$0	$0	$0	$0	$0
58	R4-1	$0	$0	$0	$0	$0	$0
59	R4-2	$0	$0	$0	$0	$0	$0
60	R4-3	$0	$0	$0	$0	$0	$0
61	R4-4	$0	$0	$0	$0	$0	$0
62	R4-5	$411	$411	$411	$411	$411	$411
63	R4-6	$2,806	$2,806	$2,806	$2,806	$2,806	$2,806

TABLE B-1-15 (CONTINUED)
WITHOUT PROJECT PEAK DAY VISITATION VALUE BY REACH AND YEAR

Sub-Reach	Model Reach	2020	2030	2040	2050	2060	2063
64	R4-7	$0	$0	$0	$0	$0	$0
65	R4-8	$0	$0	$0	$0	$0	$0
66	R4-9	$0	$0	$0	$0	$0	$0
67	R5-1	$0	$0	$0	$0	$0	$0
68	R5-2	$3,673	$3,673	$3,673	$3,673	$3,673	$3,673
69	R5-3	$3,456	$3,456	$3,456	$3,456	$3,456	$3,456
70	R5-4	$0	$0	$0	$0	$0	$0
71	R5-5	$0	$0	$0	$0	$0	$0
72	R5-6	$1,095	$1,095	$1,095	$1,095	$1,095	$1,095
73	R5-7	$0	$0	$0	$0	$0	$0
74	R5-8	$137	$137	$137	$137	$137	$137
75	R5-9	$0	$0	$0	$0	$0	$0
76	R5-10	$684	$684	$684	$684	$684	$684
77	R5-11	$1,620	$1,620	$1,620	$1,620	$1,620	$1,620
78	R5-12	$4,392	$4,392	$4,392	$4,392	$4,392	$4,392
79	R5-13	$1,905	$1,905	$1,905	$1,905	$1,905	$1,905
80	R5-14	$3,126	$3,126	$3,126	$3,126	$3,126	$3,126
81	R5-15	$0	$0	$0	$0	$0	$0
82	R5-16	$46	$46	$46	$46	$46	$46
83	R5-17	$821	$821	$821	$821	$821	$821
84	R5-18	$205	$205	$205	$205	$205	$205
85	R5-19	$548	$548	$548	$548	$548	$548
86	R5-20	$1,506	$1,506	$1,506	$1,506	$1,506	$1,506
87	R5-21	$205	$205	$205	$205	$205	$205
88	R5-22	$924	$924	$924	$924	$924	$924
89	R5-23	$0	$0	$0	$0	$0	$0
90	R5-24	$0	$0	$0	$0	$0	$0
91	R5-25	$0	$0	$0	$0	$0	$0
92	R5-26	$0	$0	$0	$0	$0	$0
93	R5-27	$0	$0	$0	$0	$0	$0
94	R5-28	$0	$0	$0	$0	$0	$0
95	R5-29	$0	$0	$0	$0	$0	$0
96	R5-30	$0	$0	$0	$0	$0	$0
97	R5-31	$0	$0	$0	$0	$0	$0
98	R5-32	$0	$0	$0	$0	$0	$0
99	R5-33	$297	$297	$297	$297	$297	$297
100	R5-34	$433	$433	$433	$433	$433	$433
101	R5-35	$3,559	$3,559	$3,559	$3,559	$3,559	$3,559
102	R5-36	$0	$0	$0	$0	$0	$0
103	R5-37	$0	$0	$0	$0	$0	$0
104	R5-38	$0	$0	$0	$0	$0	$0
105	R5-39	$0	$0	$0	$0	$0	$0
106	R5-40	$0	$0	$0	$0	$0	$0
107	R5-41	$0	$0	$0	$0	$0	$0

TABLE B-1-15 (CONTINUED)
WITHOUT PROJECT PEAK DAY VISITATION VALUE BY REACH AND YEAR

Sub-Reach	Model Reach	2020	2030	2040	2050	2060	2063
108	R5-42	$297	$297	$297	$297	$297	$297
109	R5-43	$0	$0	$0	$0	$0	$0
110	R5-44	$0	$0	$0	$0	$0	$0
111	R5-45	$0	$0	$0	$0	$0	$0
112	R5-46	$3,593	$3,593	$3,593	$3,593	$3,593	$3,593
113	R5-47	$2,601	$2,601	$2,601	$2,601	$2,601	$2,601
114	R5-48	$2,293	$2,293	$2,293	$2,293	$2,293	$2,293
115	R5-49	$2,293	$2,293	$2,293	$2,293	$2,293	$2,293
116	R5-50	$513	$513	$513	$513	$513	$513
117	R5-51	$0	$0	$0	$0	$0	$0
TOTAL		$89,800	$89,800	$89,800	$89,800	$89,800	$89,800

SELECTED PLAN

Only one alternative, the selected plan, is evaluated under the with project condition.

TABLE B-1-16
WITH PROJECT PEAK DAY VISITATION CAPACITY AND VALUE - 2010

Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	With Project Beach Capacity	Daily Visits With Project	Daily Value @ $5.16	Critical Constraint
1	R1-1	0	0	2,170	0	$0	Parking
2	R1-2	22	99	2,908	99	$511	Parking
3	R1-3	198	1,274	1,777	1,274	$6,571	Parking
4	R1-4	15	68	2,156	68	$348	Parking
5	R1-5	16	72	2,266	72	$372	Parking
6	R1-6	18	81	1,225	81	$418	Parking
7	R1-7	0	0	2,161	0	$0	Parking
8	R1-8	10	45	2,254	45	$232	Parking
9	R1-9	3	14	1,470	14	$70	Parking
10	R1-10	33	149	2,136	149	$766	Parking
11	R1-11	16	72	1,535	72	$372	Parking
12	R1-12	31	140	2,076	140	$720	Parking
13	R1-13	76	342	1,626	342	$1,765	Parking
14	R1-14	33	149	2,190	149	$766	Parking
15	R1-15	77	347	1,987	347	$1,788	Parking
16	R1-16	109	504	1,774	504	$2,601	Parking
17	R1-17	7	38	1,812	38	$197	Parking
18	R1-18	0	0	2,800	0	$0	Parking
19	R1-19	55	248	1,486	248	$1,277	Parking
20	R1-20	81	365	1,755	365	$1,881	Parking
21	R1-21	146	657	1,765	657	$3,390	Parking

TABLE B-1-16 (CONTINUED)
WITH PROJECT PEAK DAY VISITATION CAPACITY AND VALUE - 2010

Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	With Project Beach Capacity	Daily Visits With Project	Daily Value @ $5.16	Critical Constraint
22	R1-22	202	1,157	1,894	1,157	$5,968	Parking
23	R1-23	155	698	2,192	698	$3,599	Parking
24	R1-24	0	0	2,071	0	$0	Parking
25	R2-1	0	0	-	0	$0	Parking
26	R2-2	0	0	-	0	$0	Parking
27	R2-3	0	0	-	0	$0	Parking
28	R2-4	0	0	-	0	$0	Parking
29	R2-5	0	0	-	0	$0	Parking
30	R2-6	0	0	-	0	$0	Parking
31	R2-7	0	0	-	0	$0	Parking
32	R3-1	0	0	2,941	0	$0	Parking
33	R3-2	0	0	1,416	0	$0	Parking
34	R3-3	5	23	1,565	23	$116	Parking
35	R3-4	12	65	1,594	65	$337	Parking
36	R3-5	75	506	2,233	506	$2,612	Parking
37	R3-6	0	0	2,547	0	$0	Parking
38	R3-7	0	0	2,403	0	$0	Parking
39	R3-8	12	54	1,856	54	$279	Parking
40	R3-9	15	101	1,939	101	$522	Parking
41	R3-10	5	34	1,667	34	$174	Parking
42	R3-11	68	430	1,986	430	$2,218	Parking
43	R3-12	13	88	2,096	88	$453	Parking
44	R3-13	30	167	1,579	167	$859	Parking
45	R3-14	30	203	2,523	203	$1,045	Parking
46	R3-15	0	0	2,717	0	$0	Parking
47	R3-16	0	0	1,792	0	$0	Parking
48	R3-17	0	0	2,173	0	$0	Parking
49	R3-18	24	108	2,444	108	$557	Parking
50	R3-19	111	500	2,191	500	$2,577	Parking
51	R3-20	23	104	2,279	104	$534	Parking
52	R3-21	37	250	2,643	250	$1,289	Parking
53	R3-22	0	0	2,414	0	$0	Parking
54	R3-23	0	0	2,009	0	$0	Parking
55	R3-24	0	0	-	0	$0	Parking
56	R3-25	0	0	-	0	$0	Parking
57	R3-26	0	0	-	0	$0	Parking
58	R4-1	0	0	2,286	0	$0	Parking
59	R4-2	0	0	2,211	0	$0	Parking
60	R4-3	0	0	2,208	0	$0	Parking
61	R4-4	0	0	2,120	0	$0	Parking
62	R4-5	12	81	2,300	81	$418	Parking
63	R4-6	82	554	3,072	554	$2,856	Parking
64	R4-7	0	0	-	0	$0	Parking

TABLE B-1-16 (CONTINUED)
WITH PROJECT PEAK DAY VISITATION CAPACITY AND VALUE - 2010

Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	With Project Beach Capacity	Daily Visits With Project	Daily Value @ $5.16	Critical Constraint
65	R4-8	0	0	-	0	$0	Parking
66	R4-9	0	0	-	0	$0	Parking
67	R5-1	0	0	2,398	0	$0	Parking
68	R5-2	111	725	2,093	725	$3,738	Parking
69	R5-3	101	682	2,265	682	$3,518	Parking
70	R5-4	0	0	3,530	0	$0	Parking
71	R5-5	0	0	2,702	0	$0	Parking
72	R5-6	32	216	2,968	216	$1,115	Parking
73	R5-7	0	0	2,881	0	$0	Parking
74	R5-8	4	27	2,289	27	$139	Parking
75	R5-9	0	0	2,568	0	$0	Parking
76	R5-10	20	135	2,542	135	$697	Parking
77	R5-11	71	320	2,659	320	$1,649	Parking
78	R5-12	145	866	2,960	866	$4,470	Parking
79	R5-13	79	376	2,806	376	$1,939	Parking
80	R5-14	137	617	2,395	617	$3,181	Parking
81	R5-15	0	0	2,719	0	$0	Parking
82	R5-16	2	9	2,793	9	$46	Parking
83	R5-17	36	162	2,461	162	$836	Parking
84	R5-18	6	41	2,984	41	$209	Parking
85	R5-19	16	108	2,580	108	$557	Parking
86	R5-20	61	297	2,678	297	$1,533	Parking
87	R5-21	9	41	3,305	41	$209	Parking
88	R5-22	27	182	-	182	$940	Parking
89	R5-23	0	0	-	0	$0	Parking
90	R5-24	0	0	-	0	$0	Parking
91	R5-25	0	0	-	0	$0	Parking
92	R5-26	0	0	-	0	$0	Parking
93	R5-27	0	0	-	0	$0	Parking
94	R5-28	0	0	-	0	$0	Parking
95	R5-29	0	0	-	0	$0	Parking
96	R5-30	0	0	2,597	0	$0	Parking
97	R5-31	0	0	2,544	0	$0	Parking
98	R5-32	0	0	2,451	0	$0	Parking
99	R5-33	13	59	2,684	59	$302	Parking
100	R5-34	14	86	2,702	86	$441	Parking
101	R5-35	106	702	2,482	702	$3,622	Parking
102	R5-36	0	0	2,309	0	$0	Parking
103	R5-37	0	0	2,459	0	$0	Parking
104	R5-38	0	0	2,595	0	$0	Parking
105	R5-39	0	0	2,725	0	$0	Parking
106	R5-40	0	0	2,663	0	$0	Parking
107	R5-41	0	0	2,355	0	$0	Parking

TABLE B-1-16 (CONTINUED)
WITH PROJECT PEAK DAY VISITATION CAPACITY AND VALUE - 2010

Sub-Reach	Model Reach	Parking Spaces	Daily Parking Capacity	With Project Beach Capacity	Daily Visits With Project	Daily Value @ $5.16	Critical Constraint
108	R5-42	13	59	2,245	59	$302	Parking
109	R5-43	0	0	2,115	0	$0	Parking
110	R5-44	0	0	2,047	0	$0	Parking
111	R5-45	0	0	1,847	0	$0	Parking
112	R5-46	105	709	1,967	709	$3,657	Parking
113	R5-47	76	513	2,111	513	$2,647	Parking
114	R5-48	67	452	2,068	452	$2,334	Parking
115	R5-49	67	452	2,364	452	$2,334	Parking
116	R5-50	15	101	2,624	101	$522	Parking
117	R5-51	0	0	2,744	0	$0	Parking
TOTAL		3,190	17,712	219,967	17,712	$91,394	

Benefit Evaluation

The net increase in visitation experience between the without and with project conditions is the basis for determining recreation benefits for the selected plan. Information related to net increases in peak day recreation is provided in Table B-1-17.

TABLE B-1-17
NET INCREASE IN PEAK DAY VISITATION SELECTED PLAN

Year	Without Project Peak Day Visits	With Project Peak Day Visits	Net Peak Day Increased
2010	17,712	17,712	0
2020	17,712	17,712	0
2030	17,712	17,712	0
2040	17,712	17,712	0
2050	17,712	17,712	0
2060	17,712	17,712	0
2063	17,712	17,712	0

Assuming a project life of 50 years and an interest rate of four and three-eight percent, average annual benefits for recreation total approximately $15,800. Average annual recreation value information is presented by reach in Table B-1-18 These benefits are included as incidental benefits in the total benefit accounting, but they are not included in the formulation of the project with respect to size and scope.

TABLE B-1-18 AVERAGE ANNUAL PEAK DAY RECREATION BENEFITS BY REACH				
Sub-Reach	W/O Project Peak Day Benefits	W/ Project Peak Day Benefits	Incremental Peak Day Benefits	Total Annual Benefits
1	$0	$0	$0	$0
2	$502	$511	$9	$89
3	$6,457	$6,571	$115	$1,146
4	$342	$348	$6	$61
5	$365	$372	$6	$65
6	$411	$418	$7	$73
7	$0	$0	$0	$0
8	$228	$232	$4	$40
9	$68	$70	$1	$12
10	$753	$766	$13	$134
11	$365	$372	$6	$65
12	$707	$720	$13	$126
13	$1,734	$1,765	$31	$308
14	$753	$766	$13	$134
15	$1,757	$1,788	$31	$312
16	$2,555	$2,601	$45	$454
17	$194	$197	$3	$34
18	$0	$0	$0	$0
19	$1,255	$1,277	$22	$223
20	$1,848	$1,881	$33	$328
21	$3,331	$3,390	$59	$591
22	$5,863	$5,968	$104	$1,041
23	$3,536	$3,599	$63	$628
24	$0	$0	$0	$0
25	-	-	-	-
26	-	-	-	-
27	-	-	-	-
28	-	-	-	-
29	-	-	-	-
30	-	-	-	-
31	-	-	-	-
32	$0	$0	$0	$0
33	$0	$0	$0	$0
34	$114	$116	$2	$20
35	$331	$337	$6	$59
36	$2,567	$2,612	$46	$456
37	$0	$0	$0	$0
38	$0	$0	$0	$0
39	$274	$279	$5	$49
40	$513	$522	$9	$91
41	$171	$174	$3	$30
42	$2,179	$2,218	$39	$387
43	$445	$453	$8	$79
44	$844	$859	$15	$150

TABLE B-1-18 (CONTINUED) AVERAGE ANNUAL PEAK DAY RECREATION BENEFITS BY REACH				
Sub-Reach	W/O Project Peak Day Benefits	W/ Project Peak Day Benefits	Incremental Peak Day Benefits	Total Annual Benefits
45	$1,027	$1,045	$18	$182
46	$0	$0	$0	$0
47	$0	$0	$0	$0
48	$0	$0	$0	$0
49	$548	$557	$10	$97
50	$2,532	$2,577	$45	$450
51	$525	$534	$9	$93
52	$1,266	$1,289	$22	$225
53	$0	$0	$0	$0
54	$0	$0	$0	$0
55	-	-	-	-
56	-	-	-	-
57	-	-	-	-
58	$0	$0	$0	$0
59	$0	$0	$0	$0
60	$0	$0	$0	$0
61	$0	$0	$0	$0
62	$411	$418	$7	$73
63	$2,806	$2,856	$50	$498
64	-	-	-	-
65	-	-	-	-
66	-	-	-	-
67	$0	$0	$0	$0
68	$3,673	$3,738	$65	$652
69	$3,456	$3,518	$61	$614
70	$0	$0	$0	$0
71	$0	$0	$0	$0
72	$1,095	$1,115	$19	$194
73	$0	$0	$0	$0
74	$137	$139	$2	$24
75	$0	$0	$0	$0
76	$684	$697	$12	$122
77	$1,620	$1,649	$29	$288
78	$4,392	$4,470	$78	$780
79	$1,905	$1,939	$34	$338
80	$3,126	$3,181	$55	$555
81	$0	$0	$0	$0
82	$46	$46	$1	$8
83	$821	$836	$15	$146
84	$205	$209	$4	$36
85	$548	$557	$10	$97
86	$1,506	$1,533	$27	$267
87	$205	$209	$4	$36

TABLE B-1-18 (CONTINUED) AVERAGE ANNUAL PEAK DAY RECREATION BENEFITS BY REACH				
Sub-Reach	W/O Project Peak Day Benefits	W/ Project Peak Day Benefits	Incremental Peak Day Benefits	Total Annual Benefits
88	-	-	-	-
89	-	-	-	-
90	-	-	-	-
91	-	-	-	-
92	-	-	-	-
93	-	-	-	-
94	-	-	-	-
95	-	-	-	-
96	$0	$0	$0	$0
97	$0	$0	$0	$0
98	$0	$0	$0	$0
99	$297	$302	$5	$53
100	$433	$441	$8	$77
101	$3,559	$3,622	$63	$632
102	$0	$0	$0	$0
103	$0	$0	$0	$0
104	$0	$0	$0	$0
105	$0	$0	$0	$0
106	$0	$0	$0	$0
107	$0	$0	$0	$0
108	$297	$302	$5	$53
109	$0	$0	$0	$0
110	$0	$0	$0	$0
111	$0	$0	$0	$0
112	$3,593	$3,657	$64	$638
113	$2,601	$2,647	$46	$462
114	$2,293	$2,334	$41	$407
115	$2,293	$2,334	$41	$407
116	$513	$522	$9	$91
117	$0	$0	$0	$0
TOTALS	$88,876	$90,454	$1,578	$15,777

- Non-Benefiting Reaches

APPENDIX C

REAL ESTATE PLAN

WALTON COUNTY, FLORIDA
HURRICANE AND STORM DAMAGE REDUCTION
GENERAL INVESTIGATIONS STUDY

APPENDIX C – REAL ESTATE PLAN

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APPENDIX C – REAL ESTATE PLAN

1. PURPOSE OF THE REAL ESTATE PLAN

This Real Estate Plan (REP) identifies the real estate requirements for the proposed construction of the various project components for a Federal shore protection project in Walton County, Florida. These real estate requirements are based on a project need to reduce the damaging effects of hurricanes and severe storms to real property along the coast and stabilize or restore the shoreline by eliminating long-term erosion. This REP is tentative in nature for planning purposes only and both the final real property acquisition lines and estimates of value are subject to change even after approval of this report. The REP is written to support the Walton County Hurricane and Storm Damage Reduction Project General Investigations Study and is written to the same level of detail as the Feasibility Report. The author of this report has inspected the project area. The non-Federal sponsor is the Walton County Board of Commissioners, represented by the Director of Beach Management for the Walton County Tourist Development Council (TDC). This REP was last updated on 28 September 2012.

2. PROJECT AUTHORIZATION

This study was authorized both within the United States Senate and the U.S. House of Representatives. In the Senate, the Committee on Environment and Public Works adopted a committee resolution (unnumbered) on July 25, 2002, which reads as follows:

> *"Resolved by the Committee on Environment and Public Works of the United States Senate, That in accordance with Section 110 of the Rivers and Harbors Act of 1962, the Secretary of the Army is requested to review the feasibility of providing beach nourishment, shore protection and related improvements in Walton County, Florida, in the interest of protecting and restoring the environmental resources on and behind the beach, including the feasibility of providing shoreline and erosion protection and related improvements consistent with the unique characteristics of the existing beach sand, and with consideration of the need to develop a comprehensive body of knowledge, information, and data on coastal area changes and processes as well as impacts from Federally constructed projects in the vicinity of Walton County, Florida.*

In the House, the Committee on Transportation and Infrastructure adopted a resolution, Docket 2690, dated July 24, 2002, which reads as follows:

“Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That in accordance with Section 110 of the Rivers and Harbors Act of 1962, the Secretary of the Army is requested to review the feasibility of providing beach nourishment, shore protection and environmental restoration and protection in the vicinity of Walton County, Florida.

3. PROJECT LOCATION AND DESCRIPTION

The project location is located in Walton County, Florida along the coast of the Gulf of Mexico in the northwest Florida panhandle. Walton County is situated approximately 103 miles east of Pensacola, Florida and 98 miles west of Tallahassee, Florida. Walton County beaches extend from Destin, Florida in Okaloosa County, on the west, to Philips Inlet in Bay County, Florida on the east. A vicinity map of Walton County, Florida project limits is shown below as Figure C-1.

Figure C-1. Walton County, Florida Vicinity Map

In April of 2003, Taylor Engineering, Inc. of Jacksonville, Florida conducted a Beach Management Feasibility Study for Walton County, Florida. The results of this coastal processes analysis indicate that the beaches of Walton County have the natural ability to recover from storm events given sufficient time; however, successive storms from 1995 to 1998 have severely eroded the beach and hindered natural recovery process by transporting large volumes of sediment out of the littoral system both onshore and offshore. Furthermore, this study found that the beaches of Walton County have eroded an average of seven feet per year from 1993 to 2003. The beach width, beach elevation, and dune heights and widths have become critically eroded to the point that the beach no longer provides protection to upland structures from the ravages of hurricane driven surges. Without beach restoration, it is estimated that 85 percent of the upland structures will be damaged by a Category 2 or 3 hurricane.

Walton County, Florida encompasses 26 miles of shoreline which includes six miles of State parks. A coastal peninsula extending west from the mainland characterizes the western two-thirds of the coastline, and a mainland beach characterizes the eastern third. Choctawhatchee Bay lies north of the peninsula. Behind the dune system, upland drainage feeds several freshwater lakes that intermittently breach the dune system at seven different intervals throughout the project (See Table C-6). These lake outfalls discharge directly into the Gulf of Mexico. Primary dune elevations range from 11.5 to 44.5 feet North American Vertical Datum 88 (NAVD88) and average 25.5 feet National Geodetic Vertical Datum (NGVD).

An array of plans has been formulated and considered for this project. This REP will focus on the Locally Preferred Plan (LPP) which provides for shore protection measures in the interest of reducing hurricane and storm damages within the aforementioned project location. The LPP varies slightly from the proposed National Economic Development (NED) Plan by extending the berm and dune system horizontally which envelops a diminutive amount of additional coastline within reaches R1-1 – R1-10 and R1-17 – R2-1. In concept, the project will consist of the construction and maintenance of a berm and dune system that will tie into the existing dunes and vegetation line. The LPP is a beach-fill plan with a 30-foot wide dune at elevation 15 feet NGVD, fronted by a 50-foot wide berm at elevation 5.5 feet NGVD. A typical cross section is shown in Exhibit “A”. The project begins in Reach R1-1 and runs eastwardly approximately 137,280 feet or 26 miles to Reach R5-51. Due to breaches in the construction limits caused by dune lake outfalls and State park preserves, the actual dune and berm system constructed will be approximately 77,944 feet in length. The frequency of maintenance is estimated to be every 10 years or four cycles during the 50-year project life. The constructed berm will serve two primary purposes: as a stockpile of sand on the beach to serve as sacrificial material to reduce the erosion of the high ground beach during storm events and to provide storm damage protection to beachfront structures by moving the point of erosion seaward.

4. DESCRIPTION OF LANDS, EASEMENTS, RIGHTS-OF-WAY AND RELOCATIONS, AND DISPOSAL/BORROW AREAS (LERRDS)

The requirements for lands, easements, rights-of-way, relocations, and disposal/borrow areas (LERRDs) include the right to construct a dune and berm system along the shoreline of Walton County from R1-1 to R5-51. Included within these project reaches are single family residential units, multi family and condominium units, and a very limited amount of commercial properties. According to the project maps and site examinations, no dwellings will be impacted by the project. In addition, there are no public or private piers within the existing project limits. The following subsections a – e and accompanying tables detail the LERRDs requirements for the proposed project:

a. **Lands and Easements:** Tables C-1 – C-5 depict the number of parcels which will be impacted by easement acquisition within each reach and the associated average acreage per reach. It is estimated that a total of 179.16 acres will be required in Perpetual Storm Damage Reduction Easements. All estimates are based on the average distance from the landward toe of the proposed dune to the Mean High Water Line (MHWL) which is equivalent to the engineering baseline located at 1.037 NGVD. Refer to Exhibit “A” for a typical cross section of the proposed construction limits. The MHWL normally corresponds with the Erosion Control Line (ECL) and is an estimate of where the ECL will be set. For planning purposes, an average easement width of 80 feet is projected between the MHWL and the landward toe based on typical sections. Refer to Exhibit “B” for an aerial depiction of the typical easement limits. All coordinates are founded on 2007 survey information provided by the non-Federal sponsor.

   The MHWL is used for estimate purposes for this project since an ECL has not been identified and recorded for the entire Walton County coastline; however, recordation of the ECL will be required prior to construction. An ECL does currently exist between Reaches R1-1 and R1-24 of the westernmost portion of the project area. The existing ECL coordinates commence at Northing 506,530.825 feet and Easting 1,369,639.083 feet and runs eastwardly to coordinate N 502,059.76 feet E 1,393,555.83 feet as referenced to the Florida State Plane Coordinate System, North Zone, North American Datum of 1983, 1990 Adjustment.

   As shown in Table C-1, the estimated number of impacted parcels within the proposed project is 960 of which 37 of these are deemed to be publicly-owned. Based on these calculations, 923 Perpetual Storm Damage Reduction Easements will be required on private lands and 37 Perpetual Storm Damage Reduction Easements required for publicly-held lands. All easements will be located landward of the MHWL or the ECL once the ECL is surveyed and recorded. The ECL is expected to be set by the FL Department of Environmental Protection (FDEP) during the Preconstruction, Engineering, and Design (PED) phase of the project.

   Material placed upon public lands seaward of the MHWL or proposed ECL will require a Consent of Use from the State of Florida. The Consent of Use grants the rights to place material on state-owned submerged lands in accordance with the beach nourishment plans submitted with the application for an ECL.

   Based on a ground examination, it appears that there will be no adverse impact to the upland portion of ownership. The only improvements noted in the proposed easement area are access structures, such as walkways and dune crossovers. Damage to any existing structures is not compensable as this would be covered under the easement estate that is acquired by the non-Federal sponsor. Furthermore, this damage is not creditable unless an approved appraisal shows compensation due because of the structure damage. It should be noted that the Perpetual Beach Storm Damage Reduction Easement provided herein allows for landowners to "construct dune over walk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project."

b. **Appraisal:** The proposed shore protection project has been reviewed by Mobile District appraiser. The appraiser has determined that the value of the lands needed for easement purposes are assessed at zero based on the off-setting benefits appraisal method. The proposed project is deemed to be within the purview of EC 405-1-04, Section V, paragraph 4-44(b) which states "Hurricane protection and shore protection projects will generally be treated in a manner as to not allow credit for LERRDs when the project provides direct (off-setting) benefits such as prevention of erosion or re-establishment of beaches, i.e., those lands subject to shore erosion that are required for the project." Although credit is not allowed for LERRDs due to the off-setting benefits valuation, the administrative acquisition expenses incurred by the non-Federal sponsor are allowed for credit purposes.

   It is noted that Florida appraisal laws do not conform completely to the Federal off-setting benefits appraisal methodology described above. Under Florida law, off-setting benefits can be used for damages, but this method cannot be applied to the part taken. While the non-Federal sponsor can issue waivers of payment to the landowners along with the easement document that would specify that the land transaction is a voluntarily made donation for the public project, Federal appraisal rules dictate that no credit will be allowed.

   If in fact the non-Federal sponsor chooses to make land payments for the part taken, then this would be considered a non-creditable item and is strictly the responsibility of the non-Federal sponsor. Further guidance regarding this type of appraisal situation and waiver template is provided for in EC 405-1-04-4-33 and 4-43, dated 30 Dec 2003 which includes Appendix 4-F – USACE Suggested Format for Informal Value Estimates.

In 2007, in support of the economic benefit evaluation of near shore / land loss valuations as previously defined, USACE-SAM-RE-P estimated near shore values of parcels that were sufficiently removed from the shore to lose any direct water frontage value. This valuation estimate, dated 27 February 2007, was performed under jurisdictional exception, 2001 edition of the Uniform Standards of Professional Appraisal Practice and designed for the internal use of USACE and conforms to USACE regulations.

In 2010, in support of the Economic Sensitivity Analysis (Economic Appendix B, Section 12.0) concerning project justification, USACE-SAM-RE-P updated near shore / land loss values which showed a significant reduction in estimated square footage value ranges. All factors used for updating this valuation remained constant. This valuation estimate, effective 8 December 2010, presented a range of values by price per square foot for near shore properties.

On 7 August 2012, market values were again evaluated for properties in South Walton County (i.e. all lands south of Choctawhatchee Bay) from 2008 to 2012 in support of the Economic Sensitivity Analyses and to further gauge market condition trends. In 2008, a noticeable value decline occurred at 5.7% from the previous year. This decline peaked in 2010 at approximately 18%. As of 2nd quarter 2012, a slight increase of 1/10% has occurred showing a leveling off of falling values in this locale. This data is strictly noted for the Economic Analyses since off-setting benefits will be applied and no compensation is deemed necessary for the easement acquisition portion of this project. For further information concerning the inclusion of these valuation estimates and its relation to the formulation of the Economic and Sensitivity Analyses, refer to Appendix B – Economic Investigations.

c. **Borrow Areas:** Only one offshore borrow area has been identified as a source of sand for this project. If required for future renourishment cycles, this site may be expanded further south to accommodate this need. This borrow area is located within State waters which by definition are limited to three nautical miles offshore. A more detailed discussion on the borrow area is found in the Geotechnical Analysis and in the Sand Compatibility Analysis. Permits and/or consent agreements for sand removal from borrow areas will be from appropriate State and/or Federal agencies.

d. **Public Access:** In order to participate in cost sharing with the Federal Government, the non-Federal sponsor must meet certain requirements for public access. Otherwise, the non-Federal sponsor is responsible for 100% of the project cost for that reach where no public access exists. Public access must be available every one-half mile, and parking must be within one-quarter mile. Engineer Regulation 1165-2-130 sets forth the requirements for public access. While Walton County has approximately 50 public access points dispersed across the coastline, the County does not fully meet aforementioned access and parking requirements. If the non-Federal sponsor chooses to acquire additional access points and parking areas, as a pre-requisite for meeting Federal cost-share requirements, then all access and parking sites should be acquired in either fee simple or perpetual easement. Acquisition of public beach access points that are necessary for compliance in cost sharing is strictly a non-Federal sponsor responsibility. Accordingly, any cost incurred with the acquisition of public access points and parking areas cannot be considered a creditable item of cost share. The aforementioned access and parking locations are shown under Exhibit “G” attached hereto.

e. **Construction Access:** Proposed construction access to the project will be via public roads and existing rights-of-way. There are sufficient access corridors along the Walton County coastline located at the ends of public streets and at public access areas for contractors to move pipe and construction equipment onto the beach. Table C-6 lists all known publicly-owned lands within the project area that could be used for such access and Exhibit “G” provides additional mapping of these public access points that could be suitable for construction access purposes.

f. **Staging Areas:** All staging areas for the placement of construction equipment are expected to be within public rights-of-way, public access corridors, seaward of the ECL, and/or within acquired easement limits. If it is later determined that a temporary off-site staging area is required for project purposes, the NFS, in conjunction with the contractor, will secure a temporary work area easement (See Section 21 b. for estate language) that is suitable for project construction. This site will be appraised by the NFS in order to determine a fair market value which will be later reviewed by USACE for crediting purposes.

Table C-1. Reach 1

Project Reaches	Parcels	Estimated Acreage	Project Reaches	Parcels	Estimated Acreage
R1-1 = 549'	6	1.01	R1-13=1040'	5	1.91
R1-2 = 920'	16	1.69	R1-14=1054'	9	1.93
R1-3 = 1182'	3	2.17	R1-15=990'	7	1.82
R1-4 = 975'	1	1.79	R1-16=1027'	11	1.88
R1-5 =1140'	22	2.09	R1-17=1115'	15	2.05
R1-6 = 1035'	37	1.9	R1-18=1135'	11	2.08
R1-7 = 1045'	17	1.92	R1-19=1075'	8	1.97
R1-8 = 1032'	31	1.89	R1-20=960'	9	1.76
R1-9 = 1005'	6	1.84	R1-21=956'	6	1.75
R1-10 = 960'	4	1.76	R1-22=1027'	4	1.88
R1-11 = 1025'	19	1.88	R1-23=1087'	4	2
R1-12 = 1057'	14	1.94	R1-24=1040'	8	1.91
Sub-total:		21.88	Total:		44.82

Table C-2. Reach 2

Project Reaches	Parcels	Estimated Acreage
R2-1=503'	4	0.92
R2-2	0	0
R2-3	0	0
R2-4	0	0
R2-5	0	0
R2-6	0	0
R2-7	0	0
Total:		0.92

Table C-3. Reach 3

Project Reaches	Parcels	Estimated Acreage	Project Reaches	Parcels	Estimated Acreage
R3-1=478'	10	0.87	R3-14=1348'	17	2.48
R3-2=1040'	11	1.91	R3-15=932'	2	1.71
R3-3=1065'	8	1.95	R3-16=732'	5	1.34
R3-4=1035'	11	1.9	R3-17=1020'	15	1.87
R3-5=1125'	12	2.07	R3-18=1040'	15	1.91
R3-6=1002'	17	1.84	R3-19=1037'	5	1.9
R3-7=1163'	21	2.13	R3-20=1029'	11	1.89
R3-8=1105'	3	2.03	R3-21=1032'	11	1.89
R3-9=1061'	14	1.95	R3-22=978'	12	1.79
R3-10=1072'	15	1.97	R3-23=940'	8	1.72
R3-11=950'	9	1.74	R3-24=485'	1	0.89
R3-12=1007'	15	1.85	R3-25=0'	0	0
R3-13=1007'	6	1.85	R3-26=470'	1	0.86
Sub-total:		24.06	Total:		44.31

Table C-4. Reach 4

Project Reaches	Parcels	Estimated Acreage
R4-1=1084'	13	1.99
R4-2=854'	16	1.57
R4-3=961'	3	1.76
R4-4=945'	2	1.73
R4-5=1000'	10	1.84
R4-6=628'	3	1.15
R4-7=479'	2	0.88
R4-8=0'	0	0
R4-9=490'	1	0.9
Total:		11.82

Table C-5. Reach 5

Project Reaches	Parcels	Estimated Acreage	Project Reaches	Parcels	Estimated Acreage
R5-1=1035'	3	1.9	**R5-26=0**	0	0
R5-2=1005'	8	1.84	**R5-27=0'**	0	0
R5-3=1040'	26	1.91	**R5-28=0'**	0	0
R5-4=1035'	12	1.9	**R5-29=496'**	2	0.91
R5-5=1007'	13	1.85	**R5-30=1068'**	15	1.96
R5-6=1064'	1	1.95	**R5-31=969'**	7	1.78
R5-7=1037'	0	0	**R5-32=985'**	14	1.81
R5-8=997'	1	0.79	**R5-33=1028'**	12	1.89
R5-9=1026'	1	0.16	**R5-34=1040'**	21	1.91
R5-10=1015'	16	1.86	**R5-35=1000'**	11	1.84
R5-11=1025'	11	1.88	**R5-36=960'**	24	1.76
R5-12=1018'	8	1.87	**R5-37=1003'**	11	1.84
R5-13=1018'	13	1.87	**R5-38=1094'**	22	2.01
R5-14=1007'	15	1.85	**R5-39=1025'**	4	1.88
R5-15=1007'	18	1.85	**R5-40=1013'**	3	1.86
R5-16=1037'	14	1.9	**R5-41=1001'**	16	1.84
R5-17=900'	13	1.65	**R5-42=1020'**	16	1.87
R5-18=916'	14	1.68	**R5-43=1001'**	12	1.84
R5-19=1010'	10	1.85	**R5-44=1000'**	6	1.84
R5-20=1030'	13	1.89	**R5-45=970'**	3	1.78
R5-21=1125'	12	2.07	**R5-46=990'**	8	1.82
R5-22=469'	2	0.86	**R5-47=1031'**	17	1.89
R5-23=0'	0	0	**R5-48=1027'**	7	1.88
R5-24=0'	0	0	**R5-49=1040'**	3	1.91
R5-25=0'	0	0	**R5-50=1035'**	20	1.9
			R5-51=1030'	7	1.89
			Total:		77.29

Table C-6. Walton County, Florida Parcel Data

Project Reaches		General Reach Description	
R1		Miramar Beach, Sandestin, and Four Mile Village	
R2		Topsail Hill Preserve State Park	
R3		Beach Highlands, Dune Allen, Santa Rosa Beach, Blue Mountain and Gulf Trace	
R4		Grayton Beach State Park, Grayton Beach	
R5		Watercolor, Seaside, Seagrove, Watersound, Seacrest, Rosemary, and Inlet Beach	
Project Sheet #	**Project Reach**	**Publicly-owned Lands w/in Project Area (Public Beach, Access & Parking Areas)**	**Total # of Impacted Parcels**
F-101	R1-1 - R1-7	1)PIDN:30-2S-21-42290-000-1200	101
		Walton County Board of Commissioners	
F-102	R1-8 - R1-16	None Identified	104
F-103	R1-17 - R2-1	1)East of PIDN:34-2S-21-42000-019-0011	53
		Walton County-owned Access Rd. (R1-17)	
		2)East of PIDN:34-2S-21-42080-007-0300	
		Walton County-owned Access Rd. (R1-19)	
F-104	R2-1 - R2-6	1)Topsail State Park (R2-2 thru R2-6)	0
		Florida Board of Trustees of the Internal Improvement Trust Fund (TIITF)/State of FL Forestry Dept. of Ag.&Con.	
		**Breach in Construction limits from R2-1 thru R3-1.*	
F-105	R2-6 - R3-1	1)Topsail State Park (R2-6 thru R3-1)(4 separate parcels)	0
F-106	R3-1 - R3-9	1)PIDN:05-3S-20-34000-001-0010	98
		Walton County-owned parcel (R3-1)	
		(Note: Above parcel marks the end of Topsail State Park and the recommencement of project construction limits.)	
		2)Beach Highlands w/ access (R3-2 thru R3-3) (no PIDN)	
		3)PIDN:04-3S-20-34110-000-0021	
		Walton County-owned parcel in R3-5 (south of Ft.Panic Rd)	
		4)PIDN:04-3S-20-34140-000-0370	
		Dune Allen Regional Beach Access & Parking Area(R3-5)	
		5)Public beach parcel (R3-5 - R3-6) (no PIDN)	
		Walton County-owned(access south of Allen Loop Drive)	
		**Breach in Construction limits in R3-6*	
		6)Public beach access parcel (R3-8) (no PIDN)	
		Walton County-owned parcel	

Table C-6 (Continued). Walton County, Florida Parcel Data

Project Reaches		General Reach Description	
F-107	R3-9 - R3-18	1)PIDN:02-3S-20-34160-000-0680	83
		Ed Walline Regional Beach Access & Parking Area(R3-11)	
		2)PIDN:11-3S-20-34000-003-0000	
		Gulfview Heights Regional Beach Access & Parking(R3-14)	
		3)PIDN:11-3S-20-34000-002-0000	
		TIITF/State of FL Public Lands (R3-12 thru R3-13)	
		**Breach in Construction limits for Draper Lake Outfall(R3-15)*	
F-108	R3-18 - R3-26	1)PIDN:12-3S-20-34000-001-0061	53
		Blue Mountain Regional Beach Access & Parking (R3-20)	
		2)Public beach access parcel w/ parking (R3-21)	
		Walton County-owned - Co. Rd.83 r/w (no PIDN)	
		3) 3 Beach Access parcels (R3-21 thru R3-23) (no PIDN)	
		Located in Blue Mountain Beach Sub. PB2-41	
		4)PIDN:07-3S-19-25000-003-0000	
		Grayton Beach State Park (R3-26)	
		TIITF/St. of FL Dept.Rec&Parks	
		**Breach in Construction limits for Big Redfish Lake Outfall (R3-24 - R3-26)*	
F-109	R3-26 - R4-8	1)PIDN:08-3S-19-25000-017-0000	42
		TIITF/DNR (Rec&Parks Div.)(Abutting SFR/Alligator Lake)	
		**Breach in Construction limits for Alligator Lake Outfall (R4-2 - R4-3)*	
		2)PIDN:08-3S-19-25000-017-0000	
		TIITF/State of FL Public Lands (R4-3 thru R4-5)	
		3)PIDN:17-3S-19-25000-017-0010	
		Walton County-owned access parcel (R4-5)	
		4)PIDN:17-3S-19-25000-016-0000	
		Grayton Dunes Regional Beach Access/Parking/Rec Area	
		TIITF/DNR (Rec&Parks Div.) (R4-5 thru R4-6)	
		5)PIDN:17-3S-19-25040-000-0091	
		Walton County-owned access parcel (R4-6)	
		6)PIDN:17-3S-19-25040-000-0010	
		Grayton Dunes Regional Beach Access/Rec Area	
		TIITF/DNR (Rec&Parks Div.) (R4-6)	
		**Breach in Construction limits due to Western Lake outfall (R4-6)*	
		7)PIDN:17-3S-19-25000-016-0020	
		Grayton Dunes Regional Beach Access/Rec Area	
		TIITF/DNR (Rec&Parks Div.) (R4-6 thru R4-7)	
		8)PIDN:16-3S-19-25000-001-0000	
		Grayton Beach State Park	
		TIITF/DNR (Rec&Parks Div.) (R4-7 thru R4-8)	
		**Breach in Construction limits due to State Park Land (R4-7 - R4-9)*	

Table C-6 (Continued). Walton County, Florida Parcel Data

Project Reaches		General Reach Description	
F-110	R4-8 - R5-7	1)Van Ness Butler, Jr. Regional Beach Access/Rec Area	53
		(No PIDN or Parcel Ownership Information Available)	
		Located in Sec.15-3S-19W	
F-111	R5-7 - R5-16	1)PIDN:23-3S-19-25100-000-00A0	79
		Santa Clara Regional Beach Access/Parking/Rec Area	
		Walton Co. Board of Commissioners (R5-10)	
		2)PIDN:24-3S-19-25120-000-0240	
		Federally-owned by DOI/BLM (1.022 acres)	
		(Accessed via Seagrove Pl.) (R5-13) (Sec.24-3S-19)	
F-112	R5-16 - R5-25	**Breach in Construction limits due to Eastern Lake Outfall (R5-17 - R5-18)*	67
		1)PIDN:19-3S-18-16320-000-00A1(Beachfront Trail r/w)	
		Walton County-owned access r/w w/ parking located @ sw cor of Beachfront Trail & Lakewood Dr. (R5-20)	
		2)PIDN:19-3S-18-16080-000-0340	
		Walton County-owned beach parcel (R5-20 thru R5-21)	
		Public Beach Park w/ access via Beachfront Trail above	
		3)PIDN:19-3S-18-16080-000-0370	
		TIITF/DNR (Rec&Parks Div.) (R5-21 thru R5-22)	
		4)PIDN:20-3S-18-160000-001-0020	
		TIITF/Forestry Dept. of Ag&Con. (R5-22 thru R5-23)	
		**Breach in Construction limits due to Deer Lake Outfall (R5-22 - R5-29)*	
F-113	R5-25 - R5-34	None Identified	41
F-114	R5-34 - R5-43	None Identified	116
F-115	R5-43 - R5-51	1)PIDN:36-3S-18-16100-000-1890	70
		Inlet Beach Regional Beach Access/Parking/Rec Area	
		Walton County-owned beach parcel (R5-47 thru R5-48)	
		2)PIDN:36-3S-18-16100-000-1930	
		Inlet Beach Regional Beach Access/Parking/Rec Area	
		Walton County-owned beach parcel (R5-48 thru R5-49)	
		(Access provided via West Park Place Ave.)	
		Total # of Publicly-owned parcels: 37	
	Total # of Reaches: 117	**Overall Total # of Impacted Parcels:** **Total # of Privately-owned Impacted Parcels:** **Total # of Publicly-owned Impacted Parcels:**	**960** **923** **37**

5. LERRDS OWNED BY NON-FEDERAL SPONSOR

The lands, easements, and rights-of-way that are owned by the non-Federal sponsor are described in Table C-6. An approximate total of 37 parcels have been identified within the project area. This includes both County and State owned lands. Walton County owns numerous regional beach areas, street ends which will be used for access, and parking areas that can be used for staging areas during construction.

State-owned lands within the project area consist of Topsail Hill Preserve State Park, just east of Miramar Beach, Grayton Beach State Park, adjacent to Grayton Beach, and Deer Lake State Park located east of Grayton Beach State Park. In addition, there are numerous other parcels containing dune lake outfalls that are owned and managed by the Florida Board of Trustees of the Internal Improvement Trust Fund (TIITF) and the State of Florida Forestry Department of Agriculture and Conservation. For those areas where the project construction limits transition onto State-owned lands, a Consent of Use or Temporary Work Area Easement will be required from the appropriate State agency.

6. ANY EXISTING FEDERAL PROJECT THAT LIES FULLY OR PARTIALLY WITHIN THE LERRDs REQUIRED FOR THE PROJECT

There are no existing Federal projects that lie fully or partially within the LERRDs required for this project.

7. FEDERALLY OWNED LAND

A Federally-owned parcel was identified and located in Reach 5-13. This parcel is vested in the United States of America as public domain land and currently exempt from State property levy. This parcel is assessed as Parcel Identification Number (PIDN): 24-3S-19-25120-000-0240 containing 1.022 acres and is located in Section 24, 3 South, 19 West. The political subdivision by which this parcel of land is being managed is the United States Department of the Interior, Bureau of Land Management (BLM) and subject land is recognized by BLM as One Seagrove Place beach tract as noted on that Dependent Re-Survey and Subdivision of Section 24, Township 3 South, Range 19 West, of the Tallahassee Meridian, Florida (BLM Plat 9885 Sheet 1), memorandum notes dated July 17, 1947. The surrounding parcels were conveyed by patent by the United States while this particular parcel was never conveyed by patent and left as a remainder under the aforementioned re-survey.

Based on recent correspondence with BLM and the non-Federal Sponsor, this public domain land is currently under a 25-year lease to the Walton County Board of Commissioners under the Recreation and Public Purposes Act (R&PP) (68 Statute 173; 43 United States Code 869 et. seq.) which authorizes the sale or lease of public lands for recreational or public purposes to State and local governments. The subject land is actively managed by the South Walton County Tourism Development Council (SWTDC) which is a legal division under the Walton County Board of Commissioners. At present, BLM is processing Walton County's patent application whereby the subject land would be conveyed in fee to Walton County so long as the land remains accessible to the public for recreational and other public purposes. This conveyance is to be issued by the end of Fiscal Year 2013. The non-Federal Sponsor would not be entitled to credit under this scenario as a patent conveyance for recreation and public purposes is issued without monetary consideration.

8. LERRD THAT LIES BELOW THE ORDINARY HIGH WATER MARK

Under Florida law**,** the boundary between private riparian or littoral property and the State's sovereign land is the Ordinary High Water Mark (also known as the Mean High Water Line which represents the intersection of the land with the water surface at the elevation of mean high water), which migrates over time as sand is added or removed by natural forces.

The State of Florida owns all submerged lands that lie seaward of the Ordinary High Water Mark or the Erosion Control Line (ECL) depending on whether an ECL has been established. According to Florida Statute, submerged lands are defined as: "State lands lying below the ordinary high water line of fresh waters and below the mean high water line of salt waters and any other lands defined as submerged lands in Florida Statute (F.S.) § 253.03. Florida law also requires that an ECL be fixed before a restoration project can proceed. Furthermore, the Federal Government's ability to exercise navigational servitude is not available as the determination has been made that no nexus exists between the proposed project and commercial navigation.

9. MAPS / EXHIBITS / TABLES

- **g.** Refer to Figure 1 for vicinity map of Walton County, Florida.
- **h.** Table C-1 through C-5 details the number of impacted parcels and estimated acreage required for acquisition within Reaches 1 – 5.
- **i.** Table C-6 provides a general description of each reach as well as publicly-owned lands within each reach of the overall project area.
- **j.** Table C-7 – Real Estate Cost Estimate.
- **k.** Table C-8 - Chart of Accounts.
- **l.** Refer to Exhibit "A" for typical cross sections A and B (Proposed Government Template).
- **m.** Refer to Exhibit "B" for an aerial depiction of typical easement limits.
- **n.** Refer to Exhibit "C" for overview map of Reaches 1 – 5.
- **o.** Refer to Exhibit "D" for Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability.
- **p.** Refer to Exhibit "E" for Formal Risk Notification to Non-Federal Sponsor.
- **q.** Refer to Exhibit "F-1 through F-6" for photographs of various locations across the project area.

r. Refer to Exhibit “G” for Master Beach Access Improvement Plan depicting access points and USACE GIS aerial maps depicting beach access/parking
s. Refer to Exhibit “H” for Authorization for Entry for Construction.
t. Refer to Exhibit “I” for Appraisal Waiver Template

10. INDUCED FLOODING

No induced flooding is expected as a result of the proposed storm damage reduction and beach erosion control project.

11. BASELINE COST ESTIMATE FOR REAL ESTATE (BCERE)

The following real estate cost estimate was closely coordinated between Mobile District Real Estate Division and the non-Federal sponsor. It was agreed that the non-Federal sponsor would provide a realistic cost estimate since the non-Federal sponsor will be tasked with all acquisition activities. The non-Federal sponsor estimate included the cost for acquisition of land, relocation costs, and non-Federal administrative costs.

For this particular project, the non-Federal sponsor administrative costs are those costs incurred for verifying ownership of lands, certification of those lands required for project purposes, legal opinions, title insurance, appraisals, condemnations, property analysis and/or other requirements to secure the land interests that will be necessary during the Preconstruction, Engineering and Design (PED) Phase. According to EC 405-1-04, Section V, paragraph 4-44(b), this real estate cost estimate is based on the determination that the value of project lands needed for beach restoration easement purposes are assessed at zero dollars due to the off-setting benefits appraisal methodology. The remaining expense is contained in Federal and non-Federal administrative costs associated with acquisition of approximately 960 perpetual beach restoration easements. Table C-7 is an itemized breakdown of the projected real estate costs.

Table C-7. Baseline Cost Estimate for Real Estate

CATEGORY	COST
A. Lands:	
I. Lands	$0.00
II. Improvements	$0.00
III. Severance Damages	$0.00
IV. Minerals	$0.00
V. Total Lands & Damages	$0.00
B. ADMINISTRATIVE COSTS	
I. Federal Review of Non-Federal Sponsor – Reviews include Cadastral/Appraisal/Title/Acquisition/Condemnation/Crediting	
1. $175.00 x 923 (private lands)	$161,500.00
2. $175.00 x 37 (public lands)	$6,500.00
3. Sub-Total:	$168,000.00
4. Contingency (25%)	$42,000.00
5. Sub-Total:	**$210,000.00**
II. Non-Federal Sponsor Acquisition Costs Estimates based on a total of 960 easement acquisitions	
1. ECL Survey/Mapping/Legal Descriptions	$35,000.00
2. Ownership Verification & Title Insurance (960 x $125.00)	$120,000.00
3. County Atty. Review of Title (960 x $100.00)	$96,000.00
4. Contingency for items 1-3 (25% rounded)	$63,000.00
5. Appraisal Reports (assuming 5% of landowners)	$25,000.00
6. Appraisal Waivers (assuming 95% of landowners)	$5,000.00
7. Contingency for items 5 & 6 (25% rounded)	$8,000.00
8. Condemnation/Quick-Take Process (assuming 1%)	$100,000.00
9. Miscellaneous non-Federal Sponsor Administrative Costs	$40,000.00
10. Contingency (25%)	$35,000.00
11. Sub-Total:	**$527,000.00**
III. Public Law 91-646 Relocation Costs	$0.00
IV. **Total RE Cost Estimate:**	**$737,000.00**

12. RELOCATION ASSISTANCE BENEFITS (P.L. 91-646)

Based on the proposed project construction limits/project alignment and site examinations, no persons or businesses will require relocation assistance benefits as required under Public Law 91-64, Title II.

13. MINERAL ACTIVITY

There are no known mineral activities within the scope of the proposed project.

14. ASSESSMENT OF NON-FEDERAL SPONSOR AND PROJECT SPONSOR RESPONSIBILITIES

The Walton County Board of Commissioners, represented by the Director of Beach Management for the Walton County Tourist Development Council (TDC) is the non-Federal sponsor for this proposed project. The non-Federal sponsor has the responsibility to acquire all real estate interests required for the project. The non-Federal sponsor shall accomplish all alterations and relocations of facilities, structures and improvements (if applicable) determined by the Government to be necessary for construction of the project. Furthermore, the non-Federal sponsor will have operation and maintenance responsibility for the project after construction is completed.

Title to any acquired real estate will be retained by the non-Federal sponsor and will not be conveyed to the United States of America. Prior to advertisement of any construction contracts, the non-Federal sponsor shall furnish to the Government an Authorization for Entry for Construction (See Exhibit “H” attached hereto) to all lands, easements, and rights-of-way, as necessary. The non-Federal sponsor will also furnish to the Government evidence supporting their legal authority to grant rights-of-way to such lands.

The non-Federal sponsor shall comply with applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, and amended by Title IV of the Surface Transportation Uniform Relocation Assistance Act of 1987, Public Law 100-17, effective 2 April 1989, in acquiring real estate interests for the proposed project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act(s).

Mobile District, Real Estate Division has officially inquired into the non-Federal sponsor’s capability to adequately acquire all necessary LERRDs. The non-Federal sponsor has documented this understanding in the Assessment of the Non-Federal Sponsor’s Real Estate Acquisition Capability and has also confirmed said real property acquisition tasks and associated estimate of costs in that letter dated 14 May 2009 attached hereto as Exhibit “D”.

The NFS is not entitled to receive credits against its share of project costs for the value of lands it provides due to the aforementioned Federal rules of offsetting benefits. Documented incidental costs of acquiring land interests, as determined by the Government to be reasonable can be a creditable item. Credit for sponsor owned lands that may have been acquired more than 5 years from the effective date of the Project Partnership Agreement (PPA) cannot include incidental costs and will not be creditable for this particular project. For further information regarding acquisition/relocation and crediting requirements, the sponsor should review the *NFS Guide to Land Acquisition* located at http://www.sam.usace.army.mil/RE/default.htm

15. APPLICATION OF ZONING ORDINANCES

No application or enactment of zoning ordinances is proposed in lieu of, or to facilitate acquisition in connection with this project.

16. LAND ACQUISITION MILESTONES

Commencement of land acquisition hinges on a number of overall project milestones. Specifically, the projected fiscal budget appropriations, anticipated approval of the Chief's Report by the Assistant Secretary of the Army (ASA) Civil Works, and ultimately, the finalization of a Project Partnership Agreement (PPA). That being said, the non-Federal sponsor has made proposals to begin acquisition at the time of feasibility approval and prior to the final execution of PPA. The non-Federal sponsor has been notified of the risks involved as provided for in Exhibit "E" – Formal Risk Notification Letter. However, the land acquisition schedule ultimately centers on the placement and recordation of an ECL which is anticipated for the vast majority of the Walton County coastline. Due to the large number of impacted lands, a minimum of 24 to 36 months for the acquisition process is estimated for this project. It is recommended that the project be constructed in phases to mirror the acquisition timeline. The non-Federal sponsor, USACE Project Manager, and Real Estate Technical Manager will further formulate the milestone schedule upon project approval to allow adequate time to complete real estate acquisition phase in order to meet the advertisement for construction date(s).

It is critical to note some general elements that have an impact on acquisition schedules are landowner attitudes, funding concerns, manpower resources, and title issues. Depending on the nature of some title defects, significant time and efforts should be expected to impact acquisition milestones. In some cases, curative efforts may require condemnation to identify and provide legal notice to all affected landowners. Where negotiations fail and condemnation is required, the non-Federal sponsor should use their quick-take authority in order to expedite the condemnation process and allow for possession of the property for project purposes. The non-Federal sponsor has documented in Exhibit "D" attached hereto that quick-take authority is available for this project.

17. FACILITY OR UTILITY RELOCATIONS

There are no known facilities or utility relocations within the scope of the proposed project.

18. KNOWN CONTAMINANTS

There is no known or suspected presence of Hazardous, Toxic, and Radiological Waste (HTRW) located in, on, under, or adjacent to the LERRDs required for the construction or operation and maintenance of the proposed project.

19. SUPPORT OR OPPOSITION TO THE PROJECT

Based on past meetings with the non-Federal sponsor, it appears the majority of landowners within the project area are supportive of the proposed hurricane and storm damage reduction project since this project will provide much needed protection to upland structures and real property.

However, in 2004, a small group of landowners challenged the establishment of a Walton County Erosion Control Line (applied under the Beach and Shore Preservation Act) claiming that this acquisition affected an unconstitutional taking of their property without just compensation. The importance of citing this case is to point out the possible procedural effects on real estate acquisition for this proposed project. A brief synopsis of this case is as follows:

> Save Our Beaches v. City of Destin, Walton County
> Case No. SC06-1449
> Florida Supreme Court

Walton County, along with the Florida Department of Environmental Protection, the Internal Improvement Trust Fund and the City of Destin, have appealed a decision of the First District Court of Appeal (DCA) finding that the application of Section 161.141, Florida Statutes, and the establishment and recordation of an Erosion Control Line ("ECL"), to the properties of the members of Stop the Beach Renourishment, Inc. ("STBR"), constitutes an unconstitutional taking of private property. Although the DCA decision is couched in terms an "as-applied" constitutional challenge, neither the court nor STBR established how the members of STBR are situated any differently than any other owner of beach front property in the State.

The practical effect of the decision, therefore, is a determination of the facial invalidity of the statute. The decision would then apply to all existing and proposed beach renourishment projects in the State, as each project requires the establishment and recordation of an ECL. The effect of such a decision, therefore, is the requirement that the State and/or the local project sponsor acquire, through eminent domain, all riparian rights to the upland properties included within a project area prior to the issuance of a permit by the Department of Environmental Protection (the "Department").

On 29 September, 2008, the Florida Supreme Court issued an Opinion holding that the Beach and Shore Preservation Act achieves a reasonable balance between public and private interests. Further, the Act, on its face, does not unconstitutionally deprive upland owners of property rights without just compensation when the State is restoring beaches under the aforementioned Act.

After the Florida Supreme Court decision was issued, this case was further elevated to the Supreme Court of the United States (No. 08-1151), argued December 2, 2009 and decided June 17, 2010. The Certiorari affirmed the lower court's decision as stated in the following excerpt:

Florida owns in trust for the public the land permanently submerged beneath navigable waters and the foreshore. The mean high-water line is the ordinary boundary between private beachfront, or littoral property, and state-owned land. Littoral owners have, inter alia, rights to have access to the water, to use the water for certain purposes, to have an unobstructed view of the water, and to receive accretions and relictions (collectively, accretions) to the littoral property. An accretion occurs gradually and imperceptibly, while a sudden change is an avulsion. The littoral owner automatically takes title to dry land added to his property by accretion. With avulsion, however, the seaward boundary of littoral property remains what it was: the mean high-water line before the event. Thus, when an avulsion has added new land, the littoral owner has no right to subsequent accretions, because the property abutting the water belongs to the owner of the seabed (ordinarily the State).

Florida's Beach and Shore Preservation Act establishes procedures for depositing sand on eroded beaches (restoration) and maintaining the deposited sand (nourishment). When such a project is undertaken, the State entity that holds title to the seabed sets a fixed "erosion control line" to replace the fluctuating mean high-water line as the boundary between littoral and state property. Once the new line is recorded, the common law ceases to apply. Thereafter, when accretion moves the mean high-water line seaward, the littoral property remains bounded by the permanent erosion-control line.

Respondents, the city of Destin and Walton County, sought permits to restore 6.9 miles of beach eroded by several hurricanes, adding about 75 feet of dry sand seaward of the mean high-water line (to be denominated the erosion-control line). Petitioner, a nonprofit corporation formed by owners of beachfront property bordering the project (hereinafter Members) brought an unsuccessful administrative challenge. Respondent *the Florida Department of Environmental Protection approved the permits, and this suit followed. The State Court of Appeal concluded that the Department's order had eliminated the Members' littoral rights (1) to receive accretions to their property and (2) to have their property's contact with the water remain intact. Concluding that this would be an unconstitutional taking and would require an additional administrative requirement to be met, it set aside the order, remanded the proceeding, and certified to the Florida Supreme Court the question whether the Act unconstitutionally deprived the Members of littoral rights without just compensation. The State Supreme Court answered "no" and quashed the remand, concluding that the Members did not own the property supposedly taken. Petitioner sought rehearing on the ground that the Florida Supreme Court's decision effected a taking of the Members' littoral rights contrary to the Fifth and Fourteenth Amendments; rehearing was denied.* ***Held: The judgment is affirmed.***

20. STATEMENT THAT NON-FEDERAL SPONSOR HAS BEEN NOTIFIED IN WRITING ABOUT THE RISKS ASSOCIATED WITH ACQUIRING LAND

The non-Federal sponsor has been notified of the risks involved upon acquiring lands required for the project prior to execution of the PPA. Should the non-Federal sponsor proceed with acquisition of lands prior to execution of the PPA, it is at the risk of not receiving credit or reimbursement for any costs incurred in the connection with the acquisition process should the PPA not be signed. There is also risk in acquiring lands either not needed for the project or not acquired in compliance with requirements for crediting purposes in accordance with 49 CFR Part 24, dated March 2, 1989.

The non-Federal sponsor has been notified via email and supplied with a formal notification of the risks involved in acquiring land for the proposed prior to the execution of the PPA and the Government's formal notice to proceed with acquisition. The non-Federal sponsor's formal acknowledgment of these risks as provided for in ER 405-1-12-31 is attached hereto as Exhibit "E".

21. ESTATES TO BE ACQUIRED

It is recommended that the non-Federal sponsor acquire the standard perpetual beach storm damage reduction easement, as is described under item a. below.

a. Perpetual Beach Storm Damage Reduction Easement:

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts No. ___), for use by the Project Sponsor, its representatives, agents, contractors and assigns, to construct; preserve; patrol; operate; maintain; repair; rehabilitate; and replace; a public beach, a dune system, and other erosion control and storm damage reduction measures together with appurtenances thereto, including the right to deposit sand; to accomplish any alterations of contours on said land; to construct berms and dunes; to nourish and renourish periodically; to move, store and remove equipment and supplies; to erect and remove temporary structures; and to perform any other work necessary and incident to the construction, periodic renourishment and maintenance of the Walton County Hurricane and Storm Damage Reduction Project, together with the right of public use and access; to plant vegetation on said dunes and berms; to erect, maintain and remove silt screens and snow fences; to facilitate preservation of dunes and vegetation through the limitation of access to dune areas; to trim, cut, fell, and remove from said land all trees, underbrush, debris, obstructions, and any other vegetation, structures and obstacles within the limits of the easement (except _________); (reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns, the right to construct dune over walk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the Florida Department of Environmental Protection (FDEP) and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project; and further reserving to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easements hereby acquired; subject however to existing easements for public roads and highways, public utilities, railroads and pipelines.

b. Temporary Work Area Easement:

In the event that the non-Federal sponsor encounters difficulties with construction access and staging, it is recommended that the non-Federal sponsor acquire a temporary work area easement. Said temporary easement term should be required for 24 – 36 months in order to provide enough time for the project to be fully constructed unless it is determined later that the easement term can be minimized to reflect construction phases.

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____ and _____), for a period not to exceed____________________, beginning with date possession of the land is granted to the Project Sponsor, for use by the Project Sponsor, its representatives, agents, and contractors as a work area, including the right to deposit backfill, move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Walton County Hurricane and Storm Damage Reduction Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

c. Consent of Use

(1) There is no estate which the sponsors acquire from the State to place material seaward of the ECL, however, the State issues a permit type document known as a "Consent of Use". This consent is issued when the initial Water Quality Certificate is approved by the Florida Department of Environmental Regulation and the ECL is approved by the Governor and Cabinet.

(2) The consent of use basically grants the rights to place sand on state-owned submerged land in accordance with the beach nourishment plans submitted with the application for an ECL. This document must be renewed with the renewal of the Water Quality Certificate.

22. NAVIGATIONAL SERVITUDE

The Federal Navigational Servitude doctrine arises from two related components: navigation power which is derived from the commerce clause of the U.S. Constitution giving Congress regulatory power over navigable waters; and navigation servitude which provides that certain private property may be taken, without compensation to the landowner, if the taking is necessary to exercise the navigation power. Private ownership of land below navigable or tidal waters is acquired and held subject to the dominant public right of navigation. This dominant public right may be exercised by Congress without giving rise to a compensable taking. The Federal Government’s ability to exercise navigational servitude is not available for this project as the determination has been made that no nexus exists between the proposed project and commercial navigation.

23. CHART OF ACCOUNTS

The cost estimate for all Federal and non-Federal real estate activities necessary for implementation of the project after completion of the feasibility study for land acquisition, construction, LERRDs, and other items are codes as delineated in the Cost Work Breakdown Structure (CWBS). This real estate cost estimate is then incorporated into the Total Project Cost Summary utilizing the Microcomputer Aided Cost Engineering System (MCACES).

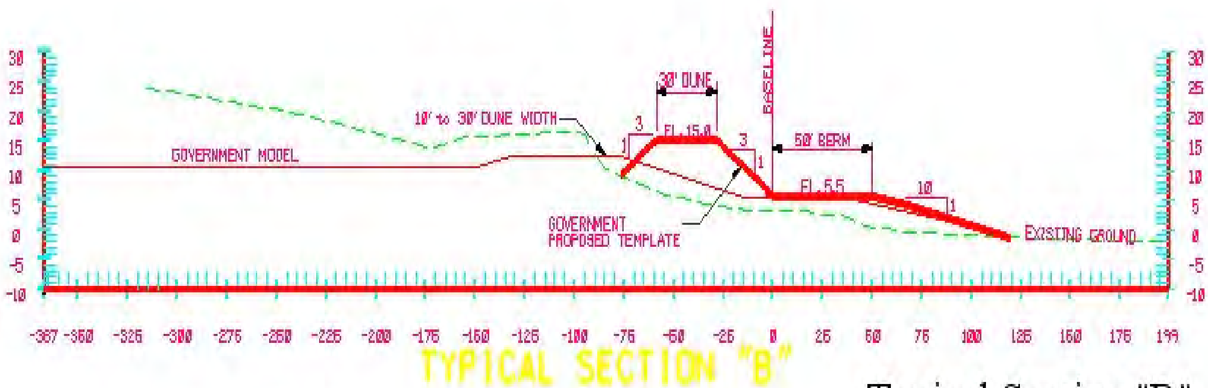
Table C-8. Chart of Accounts

Chart of Accounts				
01A	**PROJECT PLANNING**	**FEDERAL**	**NON-FEDERAL**	**TOTALS**
	Other			
	Project Partnership Agreement (OC)	$ -	$ -	$ -
01AX	Contingencies (25%)	$ -	$ -	$ -
	Subtotal	$ -	$ -	$ -
01B	**LANDS AND DAMAGES**			
01B20	Acquisition by non-Federal sponsor	$ -	$421,000.00	$421,000.00
01B40	Acq/Review of non-Federal sponsor	$168,000.00	$ -	$168,000.00
01BX	Contingencies (25% Rounded)	$ 42,000.00	$106,000.00	$148,000.00
01R	**RE PAYMENTS**	**FEDERAL**	**NON-FEDERAL**	**TOTALS**
01R1	LAND PAYMENTS	$ -	$ -	$ -
01R1A	By Government	$ -	$ -	$ -
01R1B	By non-Federal sponsor	$ -	$ -	$ -
01R1C	By Government on behalf of non-Federal sponsor	$ -	$ -	$ -
01R1D	Review of non-Federal sponsor	$ -	$ -	$ -
01RX	Contingencies (25%)	$ -	$ -	$ -
01R2	**PL 91-646 Assistance Payments**			
01R2A	By Government	$ -	$ -	$ -
01R2B	By non-Federal sponsor	$ -	$ -	$ -
01R2C	By Government on behalf of non-Federal sponsor	$ -	$ -	$ -
01R2D	Review of non-Federal sponsor	$ -	$ -	$ -
	TOTALS	**$210,000.00**	**$527,000.00**	**$737,000.00**

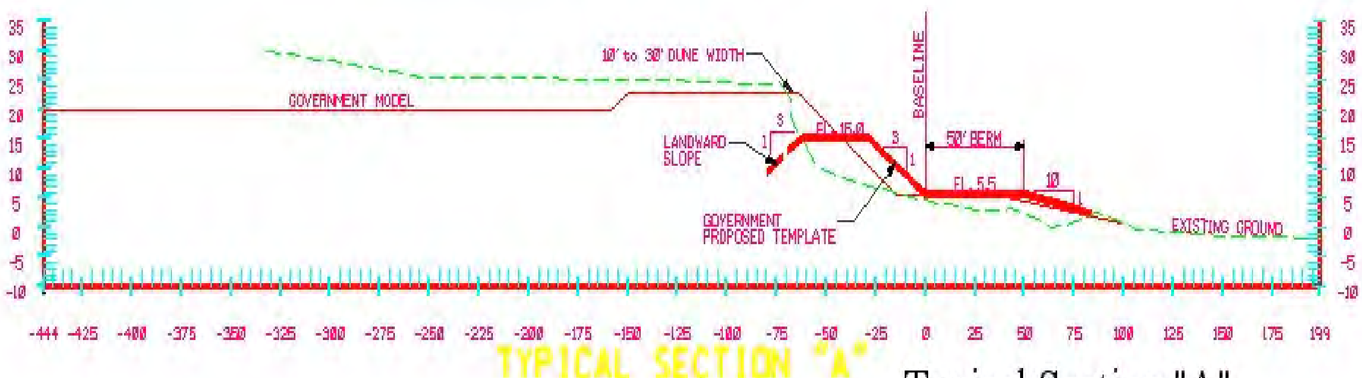
24. OTHER REAL ESTATE ISSUES

No other pertinent real estate issues have been identified for the proposed project.

<u>**EXHIBIT "A"**</u>



Typical Section "B"



Typical Section "A"

EXHIBIT "B"

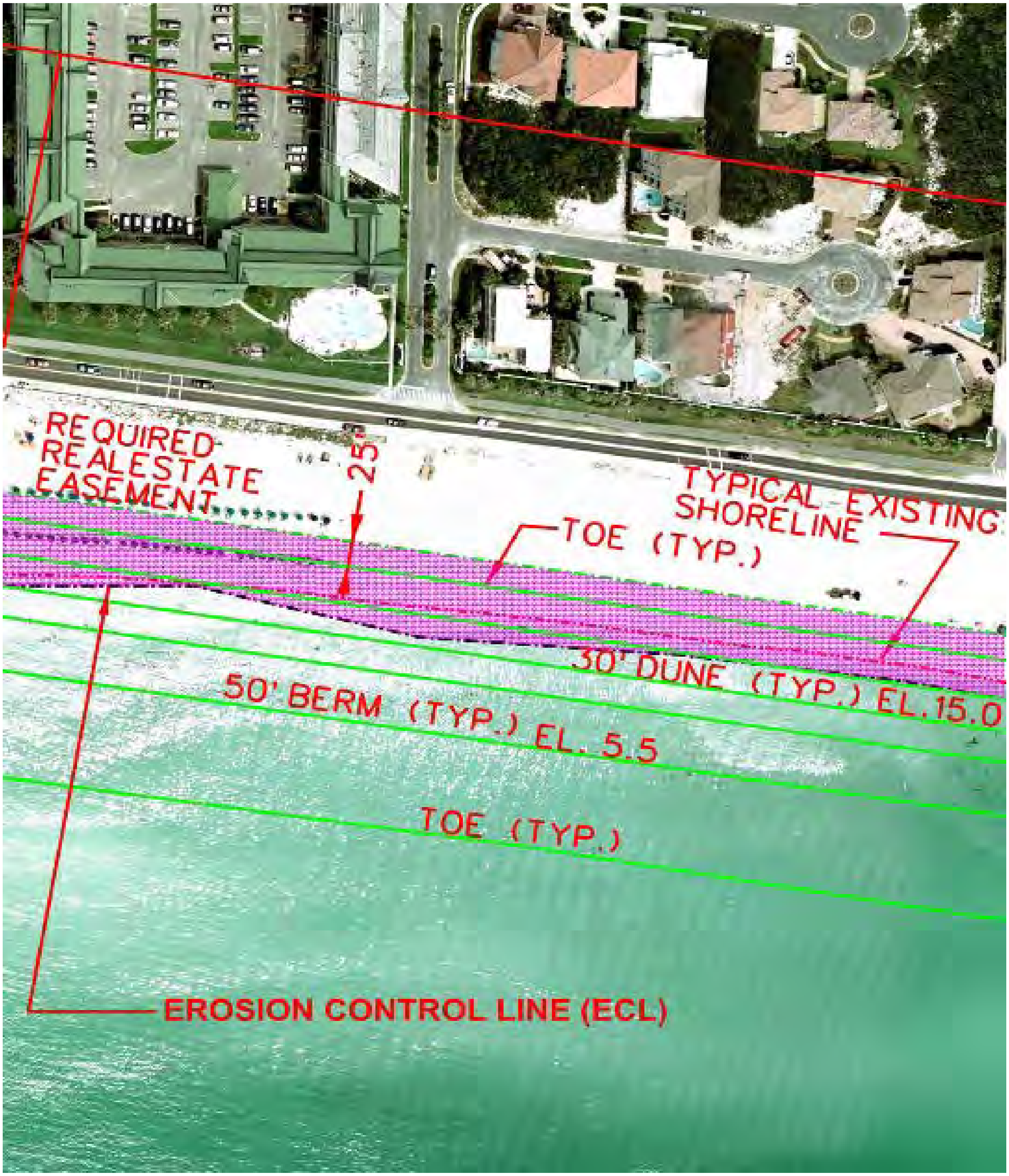
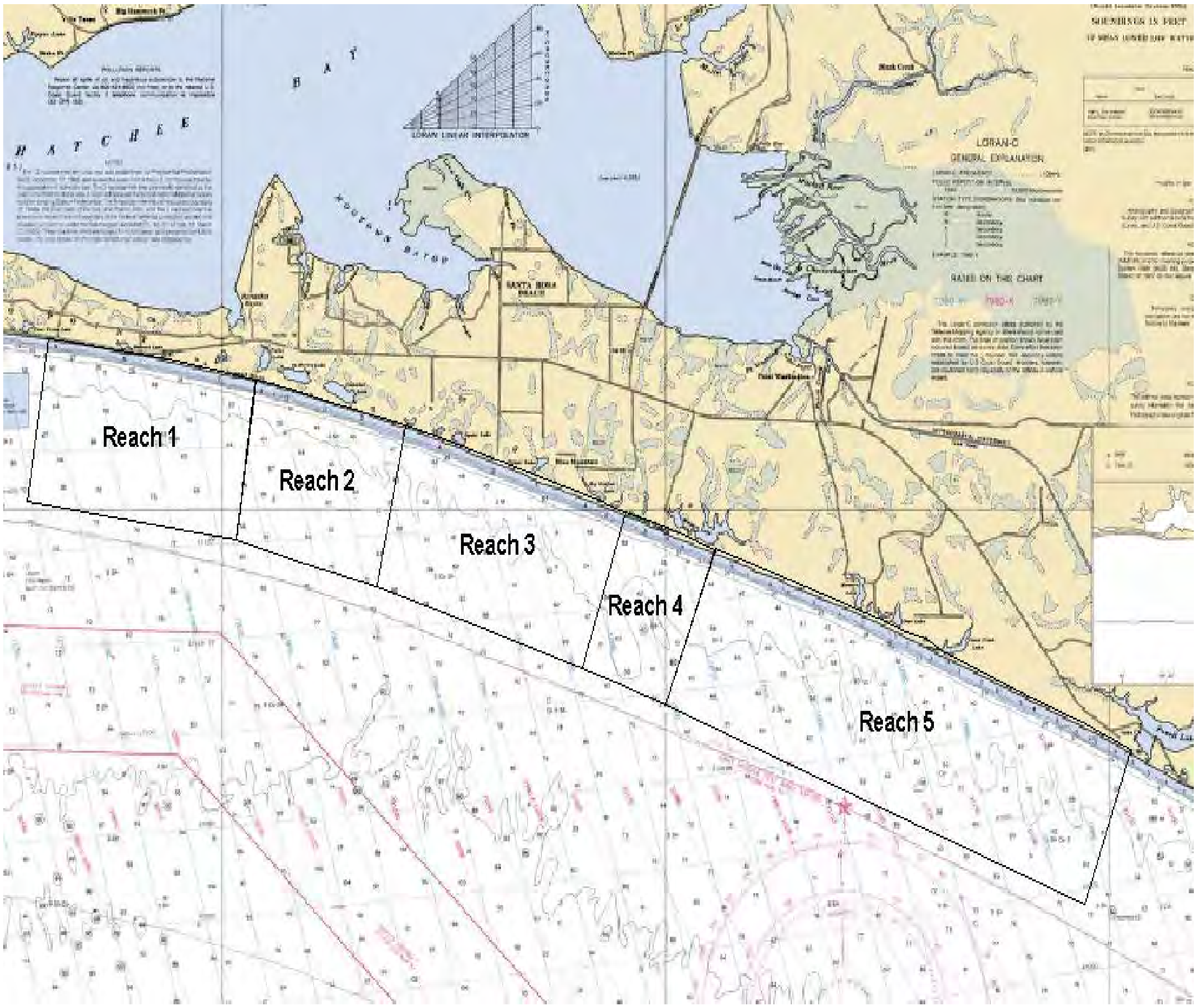

REQUIRED REALESTATE EASEMENT
25'
TYPICAL EXISTING SHORELINE
TOE (TYP.)
30' DUNE (TYP.) EL.15.0
50' BERM (TYP.) EL. 5.5
TOE (TYP.)
EROSION CONTROL LINE (ECL)

EXHIBIT "C"



Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
SANTA ROSA BEACH
LORAN-C
GENERAL EXPLANATION
RATES ON THIS CHART

EXHIBIT "D"

WALTON COUNTY, FLORIDA
STORM DAMAGE REDUCTION AND
BEACH EROSION CONTROL PROJECT

WALTON COUNTY BOARD OF COMMISSIONERS – NON FEDERAL SPONSOR

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

1. **LEGAL AUTHORITY:**

   a. **Does the sponsor have legal authority to acquire and hold title to real property for project purposes? Yes**

   b. **Does the sponsor have the power of eminent domain for this project? Yes**

   c. **Does the sponsor have "quick-take" authority for this project? Yes**

   d. **Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? No**

   e. **Any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn?**
      i. **Private Property: Yes**
      ii. **State-Owned Property: No**

2. **HUMAN RESOURCE REQUIREMENTS:**

   a. **Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? No**

   b. **If the answer to 2(a) is "yes", has a reasonable plan been developed to provide such training? N/A**

   c. **Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? Yes**

   d. **Is the sponsor's projected in-house staffing level sufficient considering its other workload, if any, and the project schedule? Yes**

e. **Can the sponsor obtain contractor support, if required, in a timely fashion? Yes**

f. **Will the sponsor likely request USACE assistance in acquiring real estate? (If "yes", provide description). No, USACE will provide guidance and oversight functions only.**

3. **<u>OTHER PROJECT VARIABLES:</u>**

a. **Will the sponsor's staff be located within reasonable proximity to the project site? Yes**

b. **Has the sponsor approved the project/real estate schedule milestones? The project/real estate schedule milestones have not yet been explicitly defined.**

4. **OVERALL ASSESSMENT:**

a. **Has the sponsor performed satisfactorily on other USACE projects? Yes**

b. **With regard to this project, the sponsor is anticipated to be: ___<u>Highly capable</u>; Fully capable; Moderately capable; Marginally capable; Insufficiently capable. (If sponsor is believed to be insufficiently capable, please provide explanation).**

5. **COORDINATION:**

a. **Has this assessment been coordinated with the sponsor? Yes**

b. **Does the sponsor concur with this assessment? Yes**

Accepted by Non-Federal Sponsor:
Donny Mares **(Signature)**

EXECUTIVE DIRECTOR **(Title)**
WALTON COUNTY TOURIST DEVELOPMENT COUNCIL

2

Prepared by:

_______________ (Signature)
RUSSELL W. BLOUNT III
PLANNING SECTION
REAL ESTATE DIVISION

Reviewed and Approved by:

_______________ (Signature)
FREDERICK D. DAWSON
ACTING CHIEF
REAL ESTATE DIVISION
U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT

May 14, 2009

Russell W. Blount III
U.S. Army Corps of Engineers
Mobile District, Real Estate Division
109 St. Joseph Street
Mobile, AL 36602

Re: Walton County, Florida's Plan regarding Real Estate Acquisition for the Walton County Hurricane and Storm Damage Reduction Project

Mr. Blount,

As you are aware, Walton County has been working with the Mobile District of the U.S Army Corps of Engineers since 2003 with the goal of identifying a federally justified Hurricane and Storm Damage Reduction Protection project for the Walton County shoreline. In this letter, Walton County is proposing how we would approach the real estate acquisition portion of the project based on previous conversations with Mobile team members.

It is our understanding that prior to the initiation of any real estate activities; Walton County will survey and record an Erosion Control Line (ECL) for the entire length of the project. Additional real estate acquisition activities will include identifying the parcels that are within the project area, identifying the ownership of those parcels, securing easements for those parcels that meet or exceed the need of the federal government to construct the federal shore protection project, and obtaining appraisal waivers and appraisal reports (an appraisal report will be required if Walton County is forced to use their quick-take authority due to failed landowner negotiations). Based on previous discussions with Mobile District Real Estate Division, they have identified roughly 960 parcels within the proposed project area. This leaves an explanation of how we would identify ownership of those parcels and securing easements as the remaining two items that we must account for costs and activities. Walton County's proposed plan for those two activities is outlined in the following two sections.

Identification of parcel ownership within the project area

Walton County is in the process of identifying the ownership of the parcels within the project area. Mike Burke, Walton County Attorney, has contacted Fidelity National Title Insurance Company, a major title insurance company in the United States, to obtain a cost estimate for their effort to identify the owners and producing a report for each parcel. The cost for this effort is estimated by Fidelity to be $125 per parcel. In addition to this cost, the County Attorney anticipates a cost of $100 per parcel to review each report from Fidelity to insure accuracy and prepare information to be included for individual easement documents. Based on these estimates, we calculate the local sponsors cost for ownership identification portion of the real estate acquisition program to be $216,000. In addition to the parcel ownership identification process, Walton County has received an estimate of $35,000 for the Erosion Control Line Survey from Morgan & Eklund a registered surveying company in the State of Florida. Assuming a 25% contingency (approximately $63,000), the cost for this activity would be estimated at approximately $314,000.

Securing easements for parcels located within the project area

In conversations with Mobile, Walton County has expressed an interest in moving quickly to begin securing easements for the project area. Walton County has been informed of the risks in moving forward prior to the project being authorized and those risks were noted and accepted in a formal risk notification letter dated July 3, 2008. It is our intention to work closely with Mobile to insure that our easement includes the necessary language to meet or exceed the needs of the project.

The approach by Walton County in this task will be to draft an easement for review by Mobile District Real Estate Division and receive acceptance that the language is sufficient for supporting the needs of the project. Additionally, it is the intention of Walton County to include language within the easement document regarding offsetting benefits in order to alleviate the need of an appraisal for takings claims. In addition, Walton County and Mobile District will draft an appraisal waiver detailing that the easement was voluntarily provided by the landowner for the proposed project and that monetary compensation for said easement will be waived. If the need arises for an appraiser, Walton County will identify an appraiser and submit the necessary documentation to Mobile for review. The appraiser will then be tasked with assisting Walton County through the acquisition process.

Walton County staff will be responsible for formulating, mailing, and recording of easements in the Walton County, FL Clerk of Courts. Moreover, Walton County, through the Tourist Development Council, will conduct an educational campaign to assist the dissemination of information regarding the project and specifically the easement process. Walton County has notified the Mobile District Real Estate Division that the County is highly capable of implementing this acquisition project as noted in that real estate assessment letter dated July 16, 2008. The estimated cost to the non-federal sponsor for administrative duties regarding securing easements for parcels located within the project area is $40,000 plus a 25% contingency for a total administrative cost of $50,000.

Summary

It is our understanding that the current estimate for non-federal sponsor administrative costs related to this project exceeds $3,500,000 including the 25% contingency. Our estimate for the non-federal sponsor administrative cost is $527,000. Therefore, we expect a cost savings of almost $3 million on this item. Refer to the attached itemized chart for the newly proposed real estate cost estimate. We appreciate the opportunity to submit this information in regards to the Walton County, FL Hurricane and Storm Damage Reduction Project.

Sincerely,

Sonny Mares

Sonny Mares
Executive Director

Itemized exhibit referenced in above Sponsor letter dated May 14, 2009

CATEGORY	COST
A. Lands:	
I. Lands	$0.00
II. Improvements	$0.00
III. Severance Damages	$0.00
IV. Minerals	$0.00
V. Total Lands & Damages	$0.00
B. ADMINISTRATIVE COSTS	
I. Federal Review of Non-Federal Sponsor – Reviews include Cadastral/Appraisal/Title/Acquisition/Condemnation/Crediting	
1. $175.00 x 923 (private lands)	$161,500.00
2. $175.00 x 37 (public lands)	$6,500.00
3. Sub-Total:	$168,000.00
4. Contingency (25%)	$42,000.00
5. Sub-Total:	**$210,000.00**
II. Non-Federal Sponsor Acquisition Costs Estimates based on a total of 960 easement acquisitions	
1. ECL Survey/Mapping/Legal Descriptions	$35,000.00
2. Ownership Verification & Title Insurance (960 x $125.00)	$120,000.00
3. County Atty. Review of Title (960 x $100.00)	$96,000.00
4. Contingency for items 1-3 (25% rounded)	$63,000.00
5. Appraisal Reports (assuming 5% of landowners)	$25,000.00
6. Appraisal Waivers (assuming 95% of landowners)	$5,000.00
7. Contingency for items 5 & 6 (25% rounded)	$8,000.00
8. Condemnation/Quick-Take Process (assuming 1%)	$100,000.00
9. Miscellaneous non-Federal Sponsor Administrative Costs	$40,000.00
10. Contingency (25%)	$35,000.00
11. Sub-Total:	**$527,000.00**
III. Public Law 91-646 Relocation Costs	$0.00
IV. **Total RE Cost Estimate:**	**$737,000.00**

EXHIBIT "E"

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

Real Estate Division
Planning Section

South Walton Tourist Development Council
Attn: Sonny Mares, Executive Director
P.O. Box 1248
Santa Rosa Beach, FL 32459

Re: Walton County, FL Storm Damage Reduction and Beach Erosion Control Project; Formal Risk Notification to Non-Federal Sponsor

Dear Mr. Mares,

The intent of this letter is to formally advise Walton County, as potential Non-Federal Sponsor for a proposed project, of the risks associated with land acquisition prior to the execution of a Project Partnership Agreement (PPA) or prior to the Government's formal notice to proceed with acquisition. If a Non-Federal Sponsor deems it necessary to commence acquisition prior to an executed PPA for whatever reason, the Non-Federal Sponsor assumes full and sole responsibility for any and all costs, responsibility, or liability arising out of the acquisition effort.

Generally, these risks include, but may be not be limited to, the following:

(1) Congress may not appropriate funds to construct the proposed project;

(2) The proposed project may otherwise not be funded or approved for construction;

(3) A PPA mutually agreeable to the non-Federal sponsor and the Government may not be executed and implemented;

(4) The non-Federal sponsor may incur liability and expense by virtue of its ownership of contaminated lands, or interests therein, whether such liability should arise out of local, state, or Federal laws or regulations including liability arising out of CERCLA, as amended;

(5) The non-Federal sponsor may acquire interests or estates that are later determined by the Government to be inappropriate, insufficient, or otherwise not required for the project;

(6) The non-Federal sponsor may initially acquire insufficient or excessive real property acreage which may result in additional negotiations and/or benefit payments under P.L. 91-646 as well as the payment of additional fair market value to affected landowners which could

have been avoided by delaying acquisition until after PPA execution and the Government's notice to commence acquisition and performance of LERRD;

(7) The non-Federal sponsor may incur costs or expenses in connection with its decision to acquire or perform LERRD in advance of the executed PPA and the Government's notice to proceed which may not be creditable under the provisions of Public Law 99-662 or the PCA. **(Reference: ER 405-1-12 (Change 31; 1 May 98) Section 12-31. Acquisition Prior to PCA Execution.)**

Please acknowledge that the Non-Federal Sponsor for the proposed project accepts these terms and conditions.

Accepted on behalf of the Non-Federal Sponsor:

Donny Mauer (Signature)

EXECUTIVE DIRECTOR (Title)

Prepared by:

Russell W. Blount III
Planning Section
Real Estate Division
U.S. Army Corps of Engineers

EXHIBIT "F-1"

Facing west at the Miramar Beach Regional Access – This public access is located on the very western end of Walton County, Florida.

EXHIBIT "F-2"

Facing east at the Miramar Beach Regional Access.

EXHIBIT “F-3”

Just south of the intersection of Highland Avenue and Bullard Road. Topsail Hill Preserve State Park is directly to the west and Dune Allen Regional Beach Access is directly to the east.

EXHIBIT “F-4”

Facing northeast at the Ed Walline Regional Beach Access corridor located near the intersection of Walton County Hwy. 393 and Walton County Hwy. 30A.

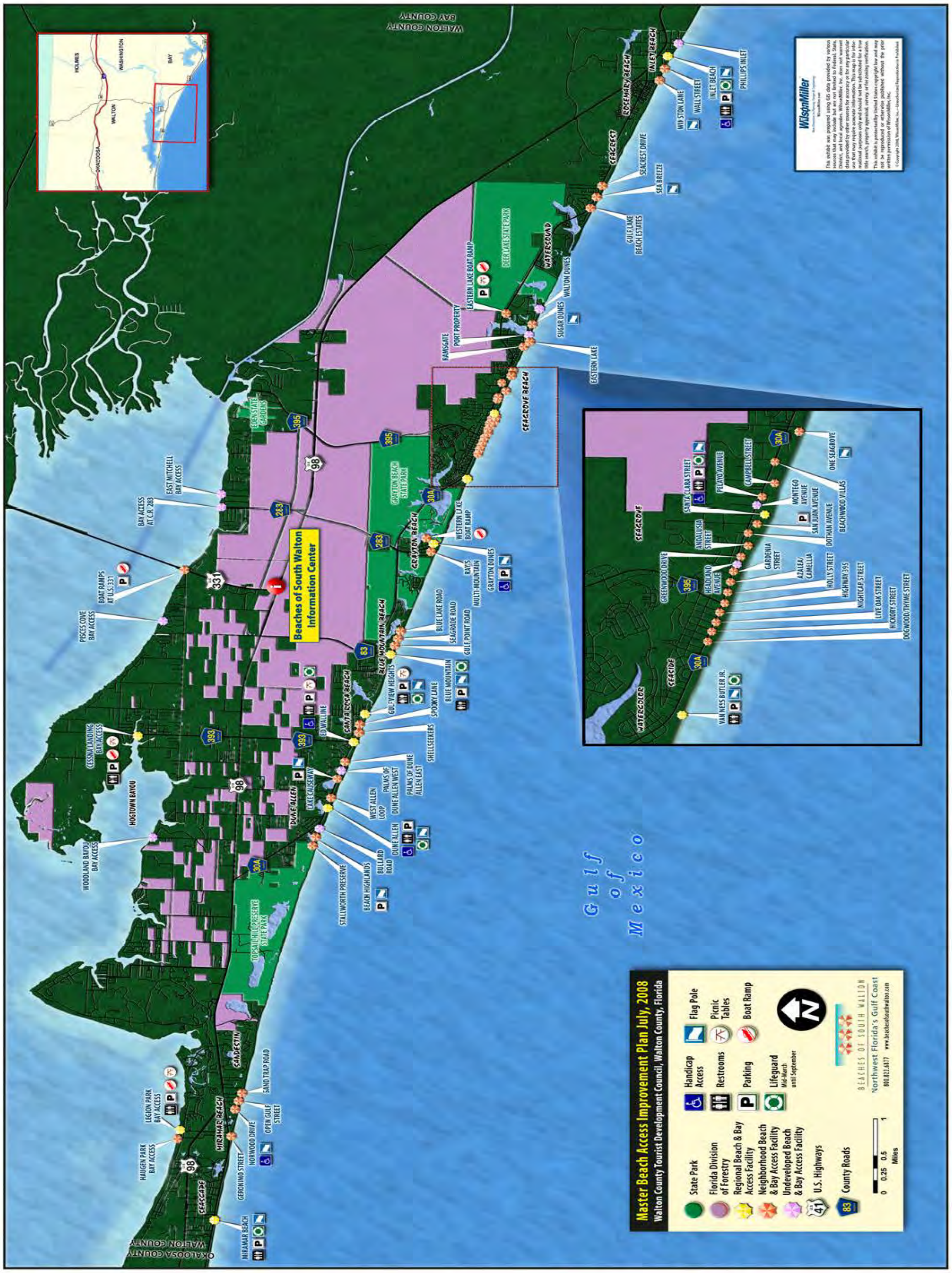
EXHIBIT "F-5"

Facing north at Blue Mountain Regional Beach Access (Note: Construction is privately funded effort to shore up private lands that were critically eroded by Hurricane Ivan.)

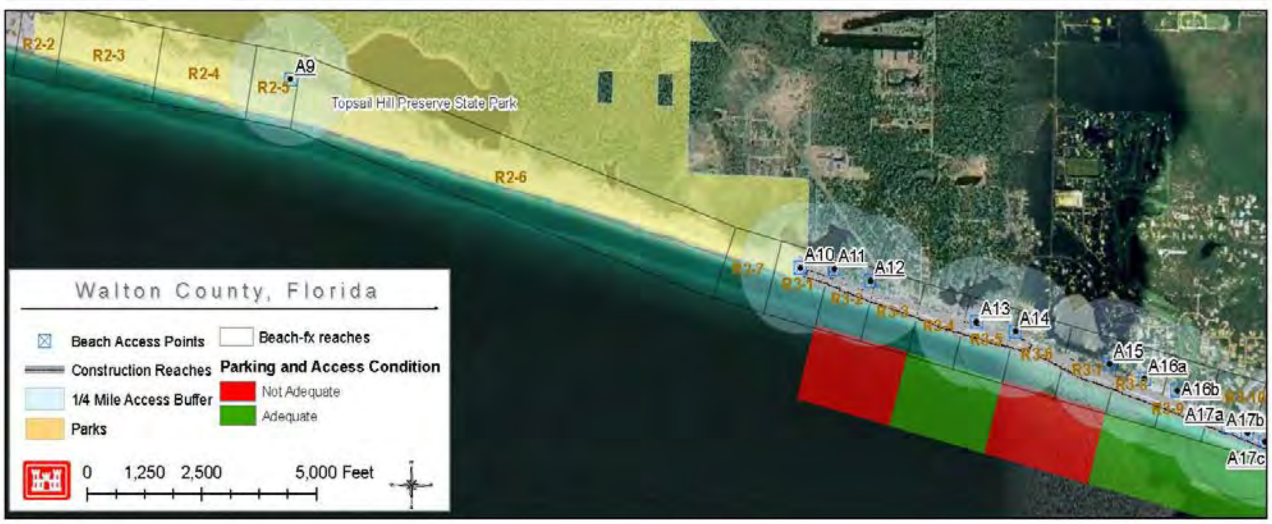
EXHIBIT "F-6"

Facing east at Blue Mountain Regional Beach Access located near the intersection of Walton County Hwy. 30A and State Route 83.

EXHIBIT "G"


Master Beach Access Improvement Plan July, 2008
Walton County Tourist Development Council, Walton County, Florida
Beaches of South Walton Information Center
Gulf of Mexico


Walton County
Okaloosa
Walton
Bay
Gulf of Mexico
A1a
A1b
A2
A3
A4
A5
A6
A7
A8
Gulf of Mexico


R2-2
R2-3
R2-4
R2-5
A9
Topsail Hill Preserve State Park
R2-6
A10
A11
A12
A13
A14
A15
A16a
A16b
A17a
A17b
A17c
Walton County, Florida
Beach Access Points
Construction Reaches
1/4 Mile Access Buffer
Parks
Beach-fx reaches
Parking and Access Condition
Not Adequate
Adequate
0 1,250 2,500 5,000 Feet


Walton County
Okaloosa
Walton
Bay
Gulf of Mexico
A17c
A18
A19
A20
A21
A22
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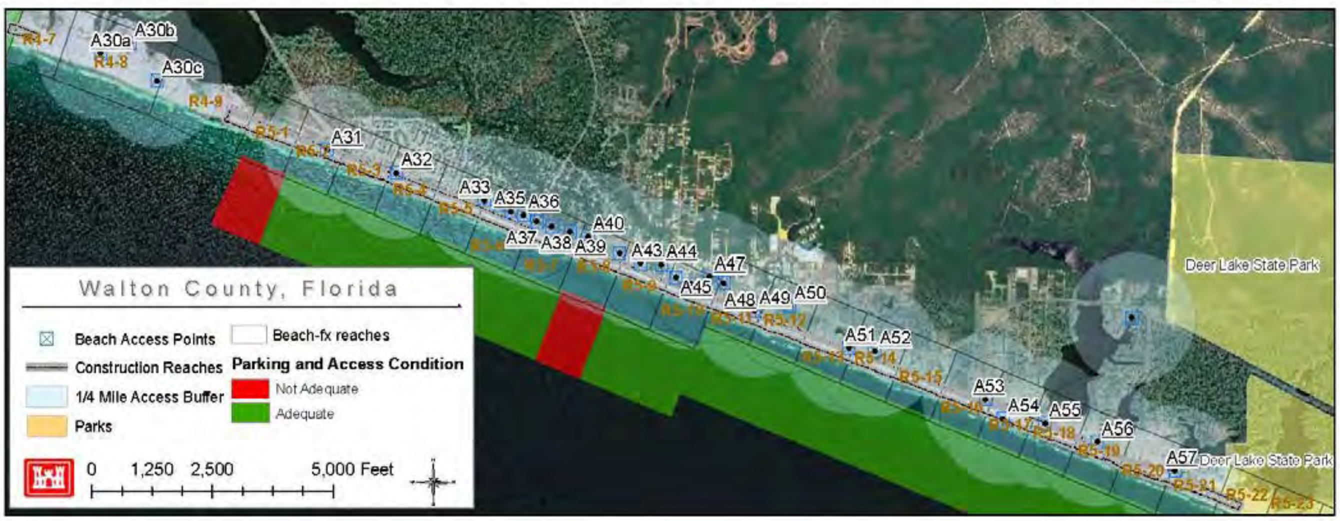
A30a
A30b
A30c
Gulf of Mexico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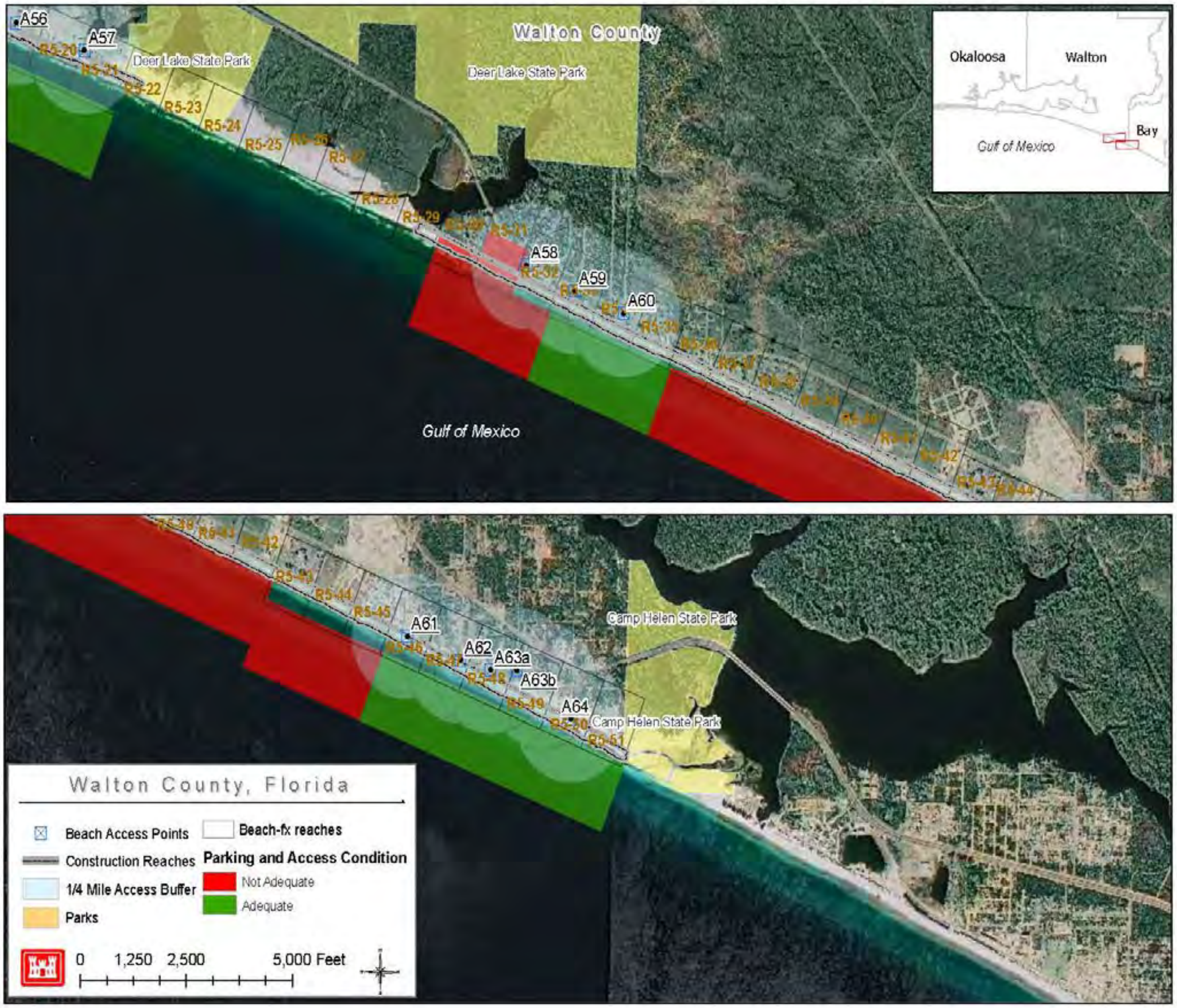
A57
Deer Lake State Park
Deer Lake State Park
Walton County, Florida
Beach Access Points
Construction Reaches
1/4 Mile Access Buffer
Parks
Beach-fx reaches
Parking and Access Condition
Not Adequate
Adequate
0
1,250
2,500
5,000 Feet



A56
A57
Walton County
Deer Lake State Park
Deer Lake State Park
Okaloosa
Walton
Bay
Gulf of Mexico
R5-20
R5-21
R5-22
R5-23
R5-24
R5-25
R5-29
A58
A59
A60
Gulf of Mexico
A61
A62
A63a
A63b
A64
Camp Helen State Park
Camp Helen State Park
Walton County, Florida
Beach Access Points
Construction Reaches
1/4 Mile Access Buffer
Parks
Beach-fx reaches
Parking and Access Condition
Not Adequate
Adequate
0 1,250 2,500 5,000 Feet

EXHIBIT "H"

AUTHORIZATION FOR ENTRY FOR CONSTRUCTION

I ________________________________, __________________________ for the
(Name of accountable official) (Title)

Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners, do hereby certify that the Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners has acquired the real property interest required by the Department of the Army, and otherwise is vested with sufficient title and interest in lands to support construction for Walton County, FL Hurricane and Storm Damage Reduction Project. Further, I hereby authorize the Department of the Army, its agents, employees and contractors, to enter upon ______________________
(Identify tracts)

to construct Walton County, FL Hurricane and Storm Damage Reduction Project as set forth in the plans and specifications held in the U. S. Army Corps of Engineers', Mobile District, Mobile, AL.

WITNESS my signature as _________________________________ for the
(Title)

Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners this ______ day of ___________________, 20__________.

BY: ________________________________
(Name)

____
(Title)

ATTORNEY'S CERTIFICATE OF AUTHORITY

I,___________________________, _________________________________ for the
(Name) (Title of legal officer)

Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners, certify that ________________________________ has
(Name of accountable official)

authority to grant Authorization for Entry; that said Authorization for Entry is executed by the proper duly authorized officer; and that the Authorization for Entry is in sufficient form to grant the authorization therein stated.

WITNESS my signature as ___________________________ for the
(Title)

Walton County Tourist Development Council acting by and through the Walton County Board of Commissioners, this___________day of_______________, 20_____.

BY: ___________________________ (Name)

___________________________ (Title)

APPENDIX D

NON-FEDERAL COORDINATION

WALTON COUNTY, FLORIDA
Board of County Commissioners

Scott A. Brannon, District 1, *Chair*

Kenneth Pridgen, District 2, *Vice-Chair*

Larry D. Jones, District 3,

Sara Comander, District 4

Cecilia Jones, District 5

P.O. Box 1355
DeFuniak Springs, FL 32435

Phone: (850) 892-8155
(850) 892-8156
Fax: (850) 892-8454

July 16, 2012

Curtis M. Flakes
U.S. Army Corps of Engineers
CESAM-PD
109 St Joseph Street
Mobile, AL 36602

RE: Walton County, Florida Hurricane and Storm Damage Reduction Project

Dear Mr. Flakes,

This letter is to advise you that the Walton County Board of Commissioners intends to act as a non-Federal sponsor for the above referenced Hurricane and Storm Damage Reduction Project proposed for Walton County, Florida. The proposed project is to be executed by the U.S. Army Corps of Engineers under the authorization of Section 110 of the Rivers and Harbors Act of 1962. This Letter of Intent is provided as evidence of our continuing support of the project based upon information presented to Walton County Board of Commissioners regarding the General Investigations Study (GIS).

We understand that non-Federal cost sharing will be required for project construction. We are also aware that both the Corps and our responsibilities will be delineated in a Project Partnership Agreement (PPA) which both parties will execute before the design and construction phase commences. Furthermore, we understand that the Walton County Board of Commissioners is in no way obligated to fulfill any of the requirements of the non-Federal sponsor until the PPA is executed.

We understand that upon execution of the PPA, we will be responsible for providing a proportionate share of the project cost as determined by the GIS. We understand that the non-Federal share can be provided in cash and/or in-kind contributions with up to 100 percent of the non-Federal share in in-kind contributions. This share also includes provision of all lands, easements, rights-of-way, necessary relocations and disposal areas that may be required for project implementation. We also understand that the project must be maintained and operated by the local authority after completion without cost to the United States in accordance with regulations prescribed by the Secretary of the Army.

Sincerely,

Scott a. Brannon

Scott Brannon, Chair

NON-FEDERAL SPONSOR'S
SELF-CERTIFICATION OF FINANCIAL CAPABILITY
FOR DECISION DOCUMENTS

I, Wanda J. Quimby, do hereby certify that I am the Interim Financial Director of the Walton County Board of County Commissioners (the "Non-Federal Sponsor"); that I am aware of the financial obligations of the Non-Federal Sponsor for the Walton County, Florida Hurricane and Storm Damage Reduction Project; and that the Non-Federal Sponsor will have the financial capability to satisfy the Non-Federal Sponsor's obligations for that project. I understand that the Government's acceptance of this self-certification shall not be construed as obligating either the Government or the Non-Federal Sponsor to implement a project.

IN WITNESS WHEREOF, I have made and executed this certification this 16th day of October, 2012.

BY: Wanda J. Quimby

TITLE: Interim Finance Director

DATE: October 16, 2012