

APPENDIX E

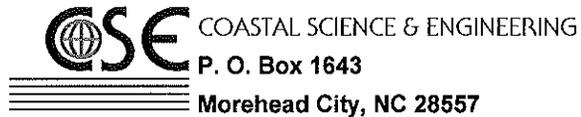
ALTERNATIVES ANALYSES

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TABLE E-1

**NAGS HEAD BEACH NOURISHMENT PROJECT
RETREAT/RELOCATE ALTERNATIVE
RELOCATE HOUSE ON EXISTING LOT**



Date: Apr. 1, 2006
By: J.W. Forman, Jr., P.E.

**COST OPINION FOR RELOCATION OF BEACHFRONT RESIDENTIAL STRUCTURE
BASED ON TYPICAL HOUSE, 1350 S.F. FOOTPRINT
STRUCTURE MOVED ON EXISTING LOT**

#	Item	Quant.	Unit	Unit Cost	Total Costs OH&P
A. ADMINISTRATIVE					
A. SITE WORK AND GENERAL CONSTRUCTION					
1.0	Fees and Permits	1	l.s.	\$650.00	\$650.00
2.0	Site Grading	1	l.s.	\$2,500.00	\$2,500.00
3.0	Demolition and Removal of Old Slab	1	l.s.	\$400.00	\$400.00
4.0	Abandon Old & Install New Septic System	1	l.s.	\$3,800.00	\$3,800.00
5.0	Water & Sewer Plumbing to New Structure	1	l.s.	\$2,500.00	\$2,500.00
SITE WORK & GENERAL CONSTRUCTION TOTAL					\$9,850
B MOVE AND RECONSTRUCT STRUCTURE					
1.0	House Preparation & Moving	1350	s.f.	\$30.00	\$40,500.00
2.0	Pile Driving Mobilization	1	l.s.	\$1,300.00	\$1,300.00
3.0	Treated Timber Piles 8x8x25	500	v.l.f.	\$13.00	\$6,500.00
4.0	Drive Timber Piles	500	v.l.f.	\$16.00	\$8,000.00
5.0	300 s.f. Conc. Slab 4" thk.	4	c.y.	\$150.00	\$600.00
6.0	Underhouse Construction	300	s.f.	\$30.00	\$9,000.00
7.0	Porch Replacement, Piles	125	v.l.f.	\$30.00	\$3,750.00
8.0	Timber Decking, Min. Framing, No Piles	540	s.f.	\$30.00	\$16,200.00
9.0	Electrical Wiring and Service	1	l.s.	\$1,900.00	\$1,900.00
10.0	HVAC Reinstallation	1	l.s.	\$1,900.00	\$1,900.00
MOVE AND RECONSTRUCT STRUCTURE TOTAL					\$87,750.00
CONSTRUCTION TOTAL					\$97,600.00
				USE	\$98,000.00

TABLE E-2

**NAGS HAED BEACH NOURISHMENT PROJECT
RETREAT/RELOCATE ALTERNATIVE
RELOCATE HOUSE TO NON-OCEANFRONT LOT**

CSE COASTAL SCIENCE & ENGINEERING
P. O. Box 1643
Morehead City, NC 28557

By: J.W. Forman, Jr., P.E.

Date: April 1, 2006

**COST OPINION FOR RELOCATION OF BEACHFRONT RESIDENTIAL STRUCTURE
BASED ON TYPICAL HOUSE, 1350 S.F. HEATED FOOTPRINT, 1890 S.F. TOTAL ELEVATED
RELOCATE STRUCTURE TO OFF-SITE LOT, ABANDON EXISTING LAND**

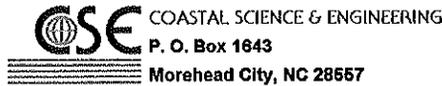
#	Item	Quant.	Unit	Unit Cost	Total Costs
A. LAND PURCHASE AND ABANDONMENT					
TOWN OF NAGS HEAD					
	Cost for Abandonment of Exist Lot*	L.S.	1	\$1,019,000.00	
	Purchase of New Lot**	L.S.	1	\$560,000.00	\$1,579,000.00
B. SITE WORK AND GENERAL CONSTRUCTION, FOUNDATION RETROFIT					
1.0	Fees and Permits	1	l.s.	\$650	\$650
2.0	Site Grading	1	l.s.	\$1,300	\$1,300
3.0	Demolition and Removal of Old Slab	1	l.s.	\$380	\$380
4.0	Abandon Old & Install New Septic System	1	l.s.	\$3,800	\$3,800
5.0	Water & Sewer Plumbing to New Structure	1	l.s.	\$2,500	\$2,500
6.0	Electrical Wiring and Service	1	l.s.	\$3,000	\$3,000
7.0	HVAC Reinstallation	1	l.s.	\$3,000	\$3,000
8.0	Pile Driving Mobilization	1	l.s.	\$1,300	\$1,300
9.0	Treated Timber Piles 8x8x25	625	v.l.f.	\$13	\$8,125
10.0	Drive Timber Piles	400	v.l.f.	\$13	\$5,200
11.0	300 s.f. Conc. Slab 4" thk.	4	c.y.	\$200	\$800
12.0	Underhouse Construction	300	s.f.	\$35	\$10,500
13.0	Timber Decking, Min. Framing, No Piles	540	s.f.	\$35	\$18,900
SITE WORK AND GENERAL CONSTRUCTION, FOUNDATION RETROFIT TOTAL					\$59,000
Cost per Sq. Ft.					\$44
C. PREPARE AND MOVE STRUCTURE					
1.0	House Preparation & Moving	1350	s.f.	\$40	\$54,000
2.0	Electrical Secondary Power Temp Move	1	l.s.	\$11,000	\$11,000
PREPARE AND MOVE STRUCTURE TOTAL					\$65,000
Cost per Sq. Ft.					\$48
CONSTRUCTION TOTAL					\$124,000
COST SUMMARY					
NAGS HEAD - Relocate House to Non-Oceanfront Lot					\$1,579,000

* Abandonment Cost is Lost Value of Existing Homesite

** Based on assumption that replacement oceanfront lots are not available for purchase.
Purchase would of 2nd or 3rd row lot at tax value

TABLE E-3

**TOWN OF NAGS HEAD BEACH NOURISHMENT
RETREAT/RELOCATE ALTERNATIVE
PROPERTY VALUE DATA**



By: J.W. Forman, Jr., P.E. Date: April 2006

**Values for Existing Properties
Based on data from Dare County County Tax Office
Ocean Front Single Family Properties**

Property Pin#	Type	Land Value	Building Value	Total Value	% Land	% Building	Sq. Ft. Land	Land Value per Sq. Ft
989215648810	S.F.	1,012,500	\$87,000	\$ 1,079,500	93.8%	6.2%	21,173.71	\$ 47.82
80109160390	S.F.	892,300	\$158,100	\$ 1,050,400	84.9%	15.1%	17,837.10	\$ 50.02
070908992807	S.F.	966900.00	\$221,100	\$ 1,188,000	81.4%	18.6%	47,374.19	\$ 20.41
70908986953	S.F.	1,226,400	\$1,093,600	\$ 2,320,000	52.9%	47.1%	56,930.97	\$ 21.54
080015649448	S.F.	1,019,900	\$517,800	\$ 1,537,700	66.3%	33.7%	46,269.51	\$ 22.04
71820709953	S.F.	998,600	\$203,900	\$ 1,202,500	83.0%	17.0%	53,842.43	\$ 18.55
Averages		\$ 1,019,433	\$ 376,917	\$ 1,396,350	77.06%	22.94%		\$ 30.06
Std. Deviations		\$ 111,600	\$ 382,500	\$ 484,600	14.82%	14.82%		\$ 14.67
Use		\$ 1,019,000	\$ 375,000	\$ 1,394,000	66%	34%		

Off Beachfront Vacant Lot Values

Nags Head, Second Row Lots PIN	Land		Tax Value (2006)		Average Costs
	Value	Total Value	Sq. Ft. Land	Land Value per Sq. Ft.	
989313223667	\$966,300	\$966,300	22210.99	\$43.51	
989220806248	\$435,500	\$435,500	24118.01	\$18.06	
080109057948	\$476,300	\$476,300	29612.01	\$16.08	
080113138795	\$1,954,600	\$1,954,600	107905.93	\$18.11	
080015731219	\$354,600	\$354,600	8848.39	\$40.08	
Averages		\$637,460	38,539.07	\$27.17	

Nags Head Third Row Lots

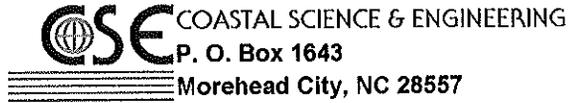
PIN#	Land		Sq. Ft.	Land Value
	Value	Total Value	Land	per Sq. Ft.
989318218483	\$288,800	\$288,800	15,001.55	\$19.25
080109070197	\$153,500	\$153,500	13,319.53	\$11.52
080118225335	\$276,900	\$276,900	11,524.81	\$24.03
080011571117	\$311,000	\$311,000	9,300.96	\$33.44
071909062418	\$355,200	\$355,200	20,220.71	\$17.57
Averages		\$277,080	13,873.51	\$21.16

Nags Head Interior Lots

PIN	Land		Sq. Ft.	Land Value
	Value	Total Value	Land	per Sq. Ft.
989317111200	\$194,200	\$194,200	48124.43	\$4.04
989214236542	\$383,200	\$383,200	119628.62	\$3.20
080117011773	\$1,201,400	\$1,201,400	94785.19	\$12.67
080010471423	\$1,208,700	\$1,208,700	98082.27	\$12.32
080015642479	\$975,000	\$975,000	54125.32	\$18.01
Averages		\$792,500	82,949.17	\$10.05

Table E-4

**NAGS HEAD BEACH NOURISHMENT PROJECT
PROJECT ALTERNATIVE ANALYSES
DO-NOTHING ALTERNATIVE**



Date: April 2006
By: J.W. Forman, Jr., P.E.

**RESIDENTIAL UNITS IDENTIFIED FOR RELOCATION ON-SITE OR
RELOCATION TO OFF-SITE LOT BASED ON DCM EROSION RATES**

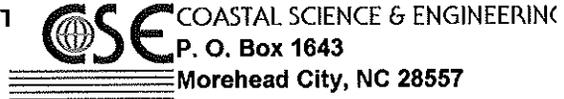
Cash Flow Year	Relocate on Site	Relocated to Off-Site lot
1	13	40
2	5	2
3	2	2
4	1	4
5	6	8
6	4	1
7	1	5
8	3	8
9	2	0
10	15	15
		85

From aerial photographs using dune crest line of post Isabel dune project as 2004 baseline. Study starts in 2006 and extends to 2016 (ten years). Property considered endangered or abandoned if erosion line intersects roof line. Study assumes linear erosion rate for 10 year period.

TABLE E-5

**NAGS HEAD BEACH NOURISHMENT PROJECT
PROJECT ALTERNATIVE ANALYSES
DO-NOTHING ALTERNATIVE**

Date: 1-Apr-06
By: J.W. Forman, Jr., P.E.



**NET PRESENT WORTH OF DO-NOTHING, LOST VALUE
OF PROPERTIES THAT BECOME ABANDONED DUE TO EROSION**

Discount Rate** 5.049% Property inflation rate 4.80%

Cash Flow Year	ANNUAL COSTS OF NO ACTION ALTERNATIVE*		
	Houses lost each year	Unit value of typical property	Abandoned Property Value***
1	40	\$1,394,000	\$55,760,000
2	2	\$1,460,912	\$2,921,824
3	2	\$1,531,036	\$3,062,072
4	4	\$1,604,525	\$6,418,102
5	8	\$1,681,543	\$13,452,342
6	1	\$1,762,257	\$1,762,257
7	5	\$1,846,845	\$9,234,225
8	8	\$1,935,494	\$15,483,949
9	0	\$2,028,397	\$0
10	15	\$2,125,760	\$31,886,406

Present Value \$117,584,698

*Structures lost that are not able to relocate on site

***Property values inflated from 2006 tax values at rate of 4.8% per year

**Discount Rate is Yield on 10 Year Treasury Bond, Latest Auction reported in Wall Street Journal, 4/13/06

TABLE E-6

**NAGS HEAD BEACH NOURISHMENT PROJECT
PROJECT LTERNATIVE ANALYSIS
DO-NOTHING ALTERNATIVE**



COASTAL SCIENCE & ENGINEERING
P. O. BOX 1643
MOREHEAD CITY, NC 28557

By: J.W. Forman, Jr., P.E.
DATE: April 2006

**SUMMARY OF LOST PRESENT WORTH OF TAX REVENUES
ASSOCIATED WITH DO-NOTHING ALTERNATIVE**

Discount Rate** 5.049% Property value Inflation Rate 4.80%

Cash Flow Year	Number of Ocean Front Properties Abandoned	Avg. Unit Property Value	Tax Rate/\$100	0.1475	0.25
			Annual Total Value Abandoned	Nags Head Tax Revenues Annual	Dare Co Tax Revenues Annual
1	40	\$1,019,000	\$40,760,000	\$60,121	\$101,900
2	2	\$1,067,912	\$42,895,824	\$63,271	\$107,240
3	2	\$1,119,172	\$45,134,168	\$66,573	\$112,835
4	1	\$1,172,892	\$46,307,060	\$68,303	\$115,768
5	6	\$1,229,191	\$53,682,205	\$79,181	\$134,206
6	4	\$1,288,192	\$58,834,973	\$86,782	\$147,087
7	1	\$1,350,025	\$60,184,998	\$88,773	\$150,462
8	3	\$1,414,826	\$64,429,477	\$95,033	\$161,074
9	2	\$1,482,738	\$67,394,953	\$99,408	\$168,487
10	15	\$1,553,910	\$90,703,596	\$133,788	\$226,759
TOTAL LOST VALUE			\$90,703,596		
Present Value				\$658,746	\$1,116,518
TOTAL NPV		\$1,775,263			

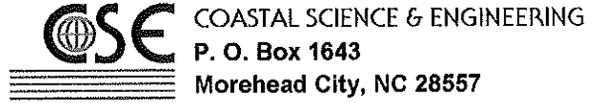
**Discount Rate is Yield on 10 Year Treasury Bond, Latest Auction reported in Wall Street Journal, 4/16/2006

Assumes a constant tax rate for 10 year period

Oceanfront Property value determination from Table F-3

TABLE E-7

NAGS HEAD BEACH NOURISHMENT PROJECT
 PROJECT ALTERNATIVE ANALYSES
 DO-NOTHING ALTERNATIVE



Date: April-06
 By: J.W. Forman, Jr., P.E.

***Summary of Annual and Present Value of Beach Scaping,
 Beach Access Structure Repair***

Discount Rate 5.049%		
Year	Beach Scraping Annual Costs	Structure Repair Annual Costs
1	\$186,500	\$1,044,400
2	\$191,256	\$1,071,032
3	\$196,133	\$1,098,344
4	\$201,134	\$1,126,351
5	\$206,263	\$1,155,073
6	\$211,523	\$1,184,528
7	\$216,917	\$1,214,733
8	\$222,448	\$1,245,709
9	\$228,120	\$1,277,474
10	\$233,937	\$1,310,050
	Pres. Worth \$1,677,504	\$9,394,024
	Total Present Worth	\$11,071,528

TABLE E-8

**NAGS HEAD BEACH NOURISHMENT PROJECT
PROJECT LTERNATIVE ANALYSIS
RELOCATE/RRETREAT ALTERNATIVE**



**COASTAL SCIENCE & ENGINEERING
P.O. BOX 1643
MOREHEAD CITY, CN 28557**

**DATE: APRIL 2006
By: J.W. Forman, Jr., P.E.**

NET PRESENT WORTH OF RELOCATION/RETREAT ALTERNATIVE

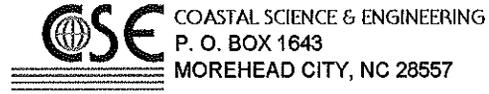
Discount Rate**		5.049%	
ANNUAL COSTS OF RELOCATION, RECONSTRUCTION*			
Cash Flow	Single Family		
Year	Relocate on Site	Relocate Off site	
1	\$1,274,000	\$67,080,000	
2	\$502,495	\$6,917,908	
3	\$206,123	\$10,481,816	
4	\$105,690	\$28,091,448	
5	\$650,309	\$70,438,528	
6	\$444,595	\$10,586,770	
7	\$113,983	\$61,843,620	
8	\$350,669	\$113,205,424	
9	\$239,740	\$31,865,264	
10	\$1,843,904	\$265,718,790	
Present Value	\$4,590,351	\$491,778,564	
TOTAL NPV	\$496,368,915		

* Relocation cost determination from Tables, F-1 and F-2

**Discount Rate is Yield on 10 Year Treasury Bond, Latest Auction reported in Wall Street Journal, 4/13/06

TABLE E-9

**NAGS HEAD BEACH NOURISHMENT PROJECT
PROJECT ALTERNATIVE ANALYSIS
RELOCATE/RETREAT ALTERNATIVE**



DATE: April 2006

BY: J.W. Forman, Jr., P.E.

ANNUAL COSTS ASSOCIATED WITH RETREAT / RELOCATION ALTERNATIVE

Cost of Moving On-Site	\$98,000	Annual Land Appreciation Rate*	4.8%
Cost of Moving Off-Site	\$124,000	Annual Inflation Rate for Construction**	2.6%
Abandoned Land value	\$1,019,000		
New Lot Value	\$560,000		

YEAR	No. of Units Relocate in site	No. of Units Relocate off-site	Unit Cost* Relocate on site	Unit Cost* Relocate Off-site	Total Costs Relocate on site	Total Costs Relocate Off-site
1	13	40	\$98,000	\$ 1,677,000	\$1,274,000	\$67,080,000
2	5	2	\$100,499	\$3,458,954	\$502,495	\$6,917,908
3	2	2	\$103,062	\$5,240,908	\$206,123	\$10,481,816
4	1	4	\$105,690	\$7,022,862	\$105,690	\$28,091,448
5	6	8	\$108,385	\$8,804,816	\$650,309	\$70,438,528
6	4	1	\$111,149	\$10,586,770	\$444,595	\$10,586,770
7	1	5	\$113,983	\$12,368,724	\$113,983	\$81,843,620
8	3	8	\$116,890	\$14,150,678	\$350,669	\$113,205,424
9	2	2	\$119,870	\$15,932,632	\$239,740	\$31,865,264
10	15	15	\$122,927	\$17,714,586	\$1,843,904	\$265,718,790

** Unit costs for construction inflated by average increase in CPI from 1996 to 2005, 2.55% per year
"Inflation is Not Dead Yet", Tim Grogan, Engineering News Record, Cost Report Summary, 9/27/99