



VILLAGE OF KEY BISCAYNE

Office of the Village Manager

MEMORANDUM

Village Council
Franklin H. Caplan, *Mayor*
Michael E. Kelly, *Vice Mayor*
Michael W. Davey
Enrique Garcia
Robert Gusman
Mayra P. Lindsay
James S. Taintor

DATE: June 28, 2011

TO: Honorable Mayor and Members of the Village Council

FROM: Genaro "Chip" Iglesias, Village Manager

RE: Beach Renourishment- Beach Management Options

Village Manager
Genaro "Chip" Iglesias

The purpose of this discussion is to review and analyze different beach renourishment options and provide direction to staff on project approach. A permit has been submitted and the first round of Requests for Additional Information (RAI's) have already been provided to our consultant by the reviewing agencies. The environmental conditions in the project area provide for a myriad of challenges and the project approach selected will also determine permitting challenges, project duration, and costs. The enclosed information provides different options with construction costs. Please refer to the enclosed letter and spreadsheets for further information. Based on Council direction the permit would be amended to reflect the updated project approach.



COASTAL SYSTEMS INTERNATIONAL, INC.
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135040.02

June 8, 2011

Mr. Genaro "Chip" Iglesias
Village Manager
VILLAGE OF KEY BISCAYNE
88 West McIntyre Street, Suite 210
Key Biscayne, Florida 33149

RE: KEY BISCAYNE BEACH RENOURISHMENT MAINTENANCE EVENT – BEACH MANAGEMENT ALTERNATIVES

Dear Mr. Iglesias:

As requested in the last beach nourishment progress meeting at the Village, we have compiled the enclosed spreadsheets for the beach renourishment options with construction budgets. The options are outlined in the enclosed Table 1 – Cost Comparison relative to Various Project Volumes and Potential Mitigation Costs. We also compiled beach management costs over a 10-year period for each option as requested by the Village, and these costs are summarized in the enclosed Table 2 - Preliminary Maintenance Event Schedule. The 10-year period was selected based on the assumption that maintenance permits will be obtained for this period, allowing beach renourishment events to be conducted without processing new environmental permits. Please note these are approximate costs over the 10-year period with some allowance for cost, and a more detailed and precise long-range budget can be prepared under a separate scope of services.

We compiled the following paragraphs to summarize the options, and additional footnotes on included in Table 1:

Option 1 – Minimized Impact Potential Design

- 29,000 cubic yard (cy) truck haul project
- Recommended option to avoid/minimize impacts to nearshore seagrass
- This option "pushes the envelope" to provide as much sand on the beach as possible with minimal risk to nearshore seagrass impacts
- Beach erosion from an extreme storm could impact seagrass, and therefore a contingency for seagrass mitigation is incorporated into the budget.
- Two (2) areas of beach do not have the minimum shore protection
- Two (2) events to be constructed over the ten (10) year period

Option 2 – Original Project Design (2010)

- 75,000 cubic yard (cy) truck haul project
- Original design submitted to the environmental agencies in 2010 based on older seagrass (2004) and beach survey data provided by Miami-Dade DERM.
- Option would impact nearshore seagrass, requiring an estimated 3.4 acres of seagrass mitigation.

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- Option essentially restores the beach design from the 2002 beach nourishment project, and the shore protection requirements are provided for all areas of the beach.
- Option will significantly increase the permitting costs and timelines, and an extensive lobbying effort, at local, state and federal levels, will be required.
- One (1) event to be constructed over the ten (10) year period; with new permit application processing commencing in Years 9 and 10.

Option 3 – Seagrass Impact Avoidance (25 to 50 foot seagrass buffer)

- 7,200 cubic yard (cy) truck haul project
- Design provides the agency-requested 25 to 50 foot buffer between the equilibrium toe of fill (ETOF) and the nearshore seagrass
- Minimal amount of fill, and approximately four (4) locations will not have the minimum shore protection requirement
- Four (4) events are anticipated over the 10-year cycle

Please note spreadsheets and estimated costs over the 10-year period are approximate, as there are many variables associated not only with environmental permitting of beach renourishment projects but also due to coastal processes that can include hurricanes and other storm events. A more detailed and precise long-range budget can be prepared under a separate scope of services.

Coastal Systems is available to meet with the Village to discuss the spreadsheet in detail. Should you have any questions or require additional information, please contact me at (305) 669-8650 or email to tblankenship@coastalsystemsint.com or Penny Cutt at (561) 478-1004 x 311 or pcutt@coastalsystemsint.com.

Sincerely,
COASTAL SYSTEMS INTERNATIONAL, INC.



Timothy K. Blankenship, P.E.
Director of Engineering

TKB:mr

Enclosures

cc: Mr. Armando Nunez, Director of Public Works, Village of Key Biscayne



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Key Biscayne Beach Renourishment Project Cost Comparison relative to Various Project Volumes and Potential Mitigation Costs¹

Option 1 - Minimized Impact Potential Design²				
Description	Quantity	Unit	Unit Cost	Estimated Total
1. Contingency Mitigation Plan	1	each	\$ 50,000	\$50,000
2. Material, Haul, Place & Grade ²	29,000	cubic yard	\$ 47	\$1,363,000
3. Construction Administration	1	estimated	\$ 40,000	\$40,000
4. Beach Tilling/Scarp Removal	5,425	l.f.	\$ 5	\$24,413
5. Vibration Control & Monitoring	5,425	l.f.	\$ 7	\$37,975
6. Turbidity Monitoring	29	day	\$ 800	\$23,200
7. Endangered Species Monitoring	29	day	\$ 1,500	\$43,500
8. Construction Surveying	1	estimated	\$ 40,000	\$40,000
9. Post-Construction Physical Monitoring	1	estimated	\$ 110,000	\$110,000
10. Post-Construction Bio Monitoring	1	estimated	\$ 300,000	\$300,000
11. Potential Extreme Storm Impact Mitigation	0.5	acre	\$ 1,500,000	\$750,000
SUBTOTAL ESTIMATED COST :				\$2,782,088
Construction Contingency (10%) :				\$278,200
General Conditions, Bond, etc. (5%) :				\$139,100
TOTAL ESTIMATED COST :				\$3,199,388



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Key Biscayne Beach Renourishment Project

Cost Comparison relative to Various Project Volumes and Potential Mitigation Costs¹

Option 2 - Original Project Design (2010)				
Description	Quantity	Unit	Unit Cost	Estimated Total
1. Additional Permitting and Design Costs ⁴	1	estimated	\$ 200,000	\$200,000
2. Material, Haul, Place & Grade ²	75,000	cubic yard	\$ 45	\$3,375,000
3. Construction Administration	1	estimated	\$ 80,000	\$80,000
4. Seagrass Mitigation Construction ⁴	3.4	acre	\$ 1,500,000	\$5,100,000
5. Beach Tilling/Scarp Removal	7,000	l.f.	\$ 5	\$31,500
6. Vibration Control & Monitoring	7,000	l.f.	\$ 7	\$49,000
7. Turbidity Monitoring	75	day	\$ 800	\$60,000
8. Endangered Species Monitoring	75	day	\$ 1,500	\$112,500
9. Construction Surveying	1	estimated	\$ 60,000	\$60,000
10. Post-Construction Physical Monitoring	1	estimated	\$ 140,000	\$140,000
11. Post-Construction Bio Monitoring Onsite	1	estimated	\$ 340,000	\$340,000
SUBTOTAL ESTIMATED COST :				\$9,548,000
Construction Contingency (10%) :				\$954,800
General Conditions, Bond, etc. (5%) :				\$477,400
TOTAL ESTIMATED COST :				\$10,980,200



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Key Biscayne Beach Renourishment Project Cost Comparison relative to Various Project Volumes and Potential Mitigation Costs¹

Option 3 - Seagrass Impact Avoidance (25 to 50-foot seagrass buffer)³				
Description	Quantity	Unit	Unit Cost	Estimated Total
1. Contingency Mitigation Plan	1	each	\$ 25,000	\$25,000
2. Material, Haul, Place & Grade ²	7,200	cubic yard	\$ 47	\$338,400
3. Construction Administration	1	estimated	\$ 15,000	\$15,000
4. Beach Tilling/Scarp Removal	2,500	l.f.	\$ 5	\$11,250
5. Vibration Control & Monitoring	2,500	l.f.	\$ 7	\$17,500
6. Turbidity Monitoring	8	day	\$ 800	\$6,400
7. Endangered Species Monitoring	8	day	\$ 1,500	\$12,000
8. Construction Surveying	1	estimated	\$ 15,000	\$15,000
9. Post-Construction Physical Monitoring	1	estimated	\$ 80,000	\$80,000
10. Post-Construction Bio Monitoring	1	estimated	\$ 160,000	\$160,000
SUBTOTAL ESTIMATED COST :				\$680,550
Construction Contingency (10%) :				\$68,100
General Conditions, Bond, etc. (5%) :				\$34,000
TOTAL ESTIMATED COST⁵:				\$782,650

NOTES:

- 1 Assumes all projects are truck haul with upland (Ortona) sand source. Quantities approximated based on information available to date. Final construction quantities may vary based on final pre-construction survey data, design configuration(s) and environmental permits. The cost estimates provided herein are made on the basis of Coastal Systems' experience and qualifications, and represent Coastal Systems' best judgment as an experienced and qualified professional generally familiar with the industry. However, Coastal Systems has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions. Coastal Systems cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from the above estimates.
- 2 The "Minimized Impact Potential Design" does not provide minimum federal design berm elevation/width along approximately 600 linear feet of shoreline near R-103 and approximately 400 linear feet near R-105. It is assumed that no impacts to seagrass will actually occur and no mitigation will be required; please note, however, that the regulatory agencies will likely require mitigation if an extreme storm event deposits sand on seagrass beds.
- 3 25- to 50-foot seagrass buffer estimate is based on consideration of previously permitted project design (with 25-foot buffer) and current standard agency policies to request minimum 100-foot buffer; actual seagrass buffer to be negotiated with the environmental permitting agencies. Please note that the regulatory agencies will likely require mitigation if an extreme storm or other unusual erosion event deposits sand on seagrass beds. Quantity and construction/implementation costs for potential seagrass mitigation are roughly estimated as an allowance based on 0.25 acre of impact (this quantity is a placeholder and is not based on engineering impact models associated with a specific return-period storm event), 2:1 mitigation ratio, and the most recent unit costs provided by Biscayne National Park for their implementation of mitigation; actual impact area, mitigation requirement, mitigation project and additional permitting negotiations, if required, are not yet defined/quantified.
- 4 Additional permit/mitigation negotiation costs are estimated based on our experience but are subject to many variables including but not limited to agency procedures, public comments, degree of lobbying support provided by the Village. Quantity and construction/implementation costs are roughly estimated based on 1.7 acres of ETOF-predicted impact, a 2:1 mitigation ratio, and the most recent unit costs provided by Biscayne National Park for their implementation of mitigation on the Village's behalf; actual impact area, mitigation requirement, mitigation project and additional permitting negotiations, if required, are not yet defined/quantified.



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Key Biscayne Beach Renourishment Project
Table 2 - Preliminary Maintenance Event Schedule

TASK	Cost Per Year										TOTAL COST	COMMENTS	
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10			
Option 1 - Minimized Impact Potential Design (29,000 cy)													
a) Maintenance Event Design/Permitting						\$70,000	\$90,000					\$160,000	
b) Construction	\$1,700,000								\$1,800,000			\$3,500,000	Assumes 2 events
c) Monitoring	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000			\$110,000	\$110,000	\$110,000	\$930,000	
d) Mitigation Allowance				\$750,000								\$750,000	Extreme Storm Impacts
OPTION 1 TOTAL COST:											\$5,340,000		
Option 2 - Original Project Design (75,000 cy)													
a) Maintenance Event Design/Permitting	\$150,000	\$175,000							\$110,000	\$110,000		\$545,000	Year 9, 10 permit applications
b) Construction			\$3,800,000									\$3,800,000	Assume one event
c) Monitoring			\$140,000	\$120,000	\$120,000	\$120,000	\$130,000	\$130,000				\$760,000	
d) Mitigation (required)				\$5,100,000								\$5,100,000	
OPTION 2 TOTAL COST:											\$10,205,000		
Option 3 - Seagrass Impact Avoidance (7,200 cy)													
a) Maintenance Event Design/Permitting			\$30,000	\$50,000		\$35,000	\$55,000		\$40,000	\$60,000		\$270,000	
b) Construction	\$420,000			\$440,000			\$460,000					\$1,800,000	Assumes 4 events
c) Monitoring	\$50,000	\$50,000	\$50,000	\$60,000	\$60,000	\$60,000	\$70,000	\$70,000	\$70,000	\$70,000		\$610,000	
OPTION 3 TOTAL COST:											\$2,680,000		

June 8, 2011 - Preliminary Cost Estimates