EXECUTIVE SUMMARY

Recommendation for the TDC to approve Work Order under Contract 09-5262 to evaluate conceptual design and modeling of alternatives as outlined in the attached CP&E proposal dated October 8, 2010 not to exceed $147,602.

OBJECTIVE: Approve Work Order to evaluate conceptual design and modeling of alternative as outlined in the proposal dated October 8, 2010 by CP&E

CONSIDERATIONS: The purpose of this study is to evaluate the effectiveness of existing structures and beach fill design templates, and changes needed to solve hot spots and improve project performance and durability. The services include a sediment budget, conceptual design, cost estimate and modeling of coastal structure modifications.

This Work Order consists of the following three (3) phases:

Phase1 Coastal Processes Analysis consists of developing a long term (starting prior to 2005) and post construction (since 2006) sediment budget for the region extending from Wiggins Pass to Gordon's Pass including the interior passes.

Phase II Model Setup and Initial Runs will set up and calibrate the model based on existing conditions with structures, and also run it with no shoreline structures except at inlets.

Phase III Run Alternatives, the model will be used to simulate shoreline and/or sediment transport changes associated with structural modifications. This phase will include potentially wider and higher beach locations along with the appropriate yearly retention analysis.

ADVISORY COMMITTEE RECOMMENDATIONS: At the CAC meeting on October 14, 2010 this item was approve unanimously 6-0.

FISCAL IMPACT: The Source of funds is from Category "A" Tourist Development.

GROWTH MANAGEMENT IMPACT: There is no impact to the Growth Management Plan related to this action.

LEGAL CONSIDERATIONS: This item has been reviewed and approved by the County Attorney's Office and is legally sufficient for Board action. - CMG

RECOMMENDATION: For the TDC to approve Work Order under Contract 09-5262 to evaluate conceptual design and modeling of alternatives as outlined in the attached CP&E proposal dated October 8, 2010 not to exceed $147,602.

PREPARED BY: Gail Hambright, CZM

COASTAL PLANNING & ENGINEERING, INC.

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Website: www.coastalplanning.net
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October 8, 2010

Gary McAlpin
Collier County Government
W. Harmon Turner Bldg., Suite 103
3301 E. Tamiami Trail
Naples, FL 34112

Subject: Evaluate Conceptual Design and Modeling of Alternatives
Collier County Beach Nourishment Project
Scope of Work under Contract No. 09-5262

Dear Gary:

The attached scope of work describes the evaluation of conceptual structures and beach fill design modifications on three coastal segments along the Collier County coast using models. The purpose of this study is to evaluate the effectiveness of existing structures and beach fill design templates, and changes needed to solve hot spots and improve project performance and durability. With the existing nourishment plan, some structures may no longer be needed. The hourly not to exceed cost for these services is $147,602 in three segments. The services include a sediment budget, conceptual design, cost estimate and modeling of coastal structure modifications.

If you have any questions regarding this scope of work, please call me.

Sincerely,

COASTAL PLANNING & ENGINEERING, INC.

Stephen Keehn, P.E.
Senior Coastal Engineer

cc: Sheri Dindial, CPE

Evaluate Conceptual Design and Modeling of Alternatives
Collier County Beach Nourishment Project
Scope of Work under Contract No. 09-5262
October 8, 2010

Introduction: This scope of work describes the evaluation of conceptual structure and beach fill design modifications on three coastal segments along the Collier County Coast. The purpose of this study is to evaluate the effectiveness of existing structures and beach fill design templates, and changes needed to solve hot spots and improve project performance and durability. Beach fill alternates with a higher and wider beach berm will be evaluated with structural modification to achieve these goals. The segments are located at Vanderbilt Beach, Park Shore and Naples. The work will be completed in three phases consisting of 1) the development of a sediment budget, conceptual fill designs and cost estimate, 2) a numerical modeling study of coastal processes and shoreline change and 3) interrogation of the numerical model to evaluate structural and non-structural alternatives. Permitting complexities will be addressed for each alternative.

Phase I. Coastal Processes Analysis

The initial phase of work consists of developing a long term (starting prior to 2005) and post construction (since 2006) sediment budget for the region extending from Wiggins Pass to Gordon's Pass including the interior passes. Based on the sediment budget, a conceptual beach nourishment plan will be developed. Two fill alternatives will be designed including one that replicates the existing permit design and one that is a larger beach nourishment project than currently in use. The design objective for the larger project is to place a volume of fill that results in no hardbottom impacts but has an equilibrium toe of fill closer to the hardbottom where necessary to achieve a longer project life. The larger fill will also include an increase in equilibrium berm height and alongshore length of the project. The feasibility of nourishment using fill from an alternative sand source at Cape Romano will be evaluated. A cost estimate for a project constructed in 2013-14 will be developed for both beach alternates.

Phase II. Model Setup and Initial Runs

This phase will set up and calibrate the model based on existing conditions with structures, and also run it with no shoreline structures except at inlets. The sediment budget of Phase I, shoreline changes from monitoring reports and aerial photographs, and ADCP (wave and current) measurements from Wiggins (CPE 2008), Clam and Doctors (PBSJ 2009) Passes will be used to calibrate the numerical model set up during Phase II, along with pertinent bathymetries. The modeling will be conducted utilizing the wave model SWAN, the flow and sediment transport model Delft3D and the shoreline change model Unibest. These modeling packages were developed by Deltares (Delft, Netherlands), are supported by a large team of developers and

researchers and are widely applied around the world to evaluate coastal engineering projects. Unibest is a shoreline change model that is driven by the same wave model as Delft3D (SWAN) and utilizes a process-based sediment transport formulation (Transport2004) similar to the one utilized in Delft3D, which most closely mimics coastal processes. It represents an improvement over previous shoreline change models, like Genesis, that utilized empirical sediment transport formulations. It is essential to use a combination of a 3D model and a shoreline change model to get the resolution required for the evaluation of coastal structures along the project reaches with nearshore hardbottom.

Spatial harbottom maps and Lidar surveys will be used as model input in attempt to incorporate hardbottom effects on wave transformation and consequently on coastal dynamics. The model domain will be large enough to include the effects of all the morphological features on nearshore waves. The Delft3D wave, flow and morphological modeling setup calibrated for Wiggins Pass will be used for the coastal processes analysis. The Unibest Shoreline Model will be calibrated to measured shoreline changes and sediment budget results in the project reaches. The model runs will be done by reach. The modeling work proposed in Phase II will include the following tasks:

1. Analysis of existing information
2. Development of numerical modeling grids and boundary conditions
3. Simulation of waves, flows and potential sediment transport with Delft3D for scenarios with/without structures (except at inlets) to evaluate modifications introduced by the existing structures in the coastal processes and to evaluate the spatial variation in wave energy, flows and sediment transport
4. Setup and calibration of the Unibest shoreline change model
5. Simulation of existing conditions showing seasonal variations and reversals
6. Simulation of the no shoreline structure condition (groins removed)
7. Analysis of shoreline or sediment transport change results leading to development of pertinent alternatives for Phase III, including identification of areas where structural removable may be feasible.
8. Reporting and presentation of results and alternatives

Simulations will be conducted for timeframes of 1 year and 5 years, and seasonal variations in waves and winds will be included in the simulations. Engineering and modeling QA of the results is part of this plan. Results will be described in a draft report of activities and presented in a meeting in Collier County to be scheduled by the client.

Phase III. Run Alternatives

In Phase III, the model will be used to simulate shoreline and/or sediment transport changes associated with structural modifications. The results from Phase II will determine what groin

modification scenarios are simulated which may include shortening of the groins, lowering the profiles of the groins, making the groins permeable, converting the groins to a pile and panel design, or removing some or all of groins. It is assumed that removal of groins will be feasible in many cases, with a corresponding modification to beach fill placement. Up to 10 hot spots will be evaluated with a modified structural alternative. Additionally, modeling alternative solutions for the Doctors Pass hot spot will include a breakwater or spur off of the existing terminal groin. Based on these results, a solution will be recommended for each reach and at each structure location. The complexity of permitting will be discussed for each selected alternate. The results of the simulations and the recommended solutions will be presented to Collier County and incorporated onto a final report.

Structural Modifcation and Beach Fill Desing Analysis and Modeling
Collier County Beach Nourishment Project Fee Proposal

ITEM	LABOR COSTS									DIRECT COST	
	Project Manager (Hours)	Senior Coastal Engineer (Hours)	Senior Inspector CE (Hours)	Senior Designer-Modeler (Hours)/	Senior Designer-Modeler (Hours)/	Junior Modeler (Hours)#	CADD Operator (Hours)	Inspector - Intern	Clerical (Hours)	Item	Cost
Phase I. Coastal Processes Analysis											
A. Sediment Budget	1	10	60	2			20				
B. Conceptual Fill Design & Alt. Borrow Area		20	60				30				
C. Cost Estimate		24	12								
D. Draft Report		8	16						8		
$27,298											
Phase II. Model Setup and Initial Runs											
A. Existing Data Review				12		20		20		Tech. Sub-Consultant	$22,838
B. Grid Development and Boundary Conditions				10		40		20			
C. Calibration of Delft3D model				10		30		40			
D. Setup and Calibration of Unibest				20		40		40		License Fee	$3,000
E. Simulation of Existing Conditions & No groin				10		30		40			
G. Results Analysis				10		60		20			
H. Draft Report Preparation and Presentation	1	16	4	20	32	24	12	20	12	Report & Travel	$450
$76,556											
Phase III. Run Alternatives											
A. Simulation of Existing Groin Modifications				20		60		40			
B. Simulation of Additional Fill Alternative				10		20		20			
C. Simulation of Doctors Pass Hot Spot Alternatives				20		40		40			
D. Simulation of Recommended Solution by Reach				10		20		36			
E. Final Report Preparation and Presentaion	1	24	4	20	30	40	10	40	10	Report & Travel	$500
$43,748											
Total =	3	102	156	174	62	424	72	376	30		$26,788
Labor Rate/ Hour =	$148	$155	$85	$115	$115	$75	$85	$65	$60		
Labor Cost =	$444	$15,810	$13,260	$20,010	$7,130	$31,800	$6,120	$24,440	$1,800		

LABOR COST = $120,814
DIRECT COST = $26,788

TOTAL $147,602

Schedule B

Contract No: 09-5262 "County Wide Engineering Services"

Standard Hourly Rate Schedule for all disciplines

Personnel Category	Standard Hourly Rate
Principal	$195
Senior Project Manager	$165
Project Manager	$148
Senior Engineer	$155
Engineer	$119
Senior Inspector	$85
Inspector	$65
Senior Planner	$140
Planner	$110
Senior Designer	$115
Designer	$100
Environmental Specialist	$115
Senior GIS Specialist	$145
GIS Specialist	$100
Clerical	$60
Surveyor and Mapper	$130
CADD Technician	$85
Survey Crew - 2 man	$130
Survey Crew - 3 man	$160
Survey Crew - 4 man	$180

This list is not intended to be all-inclusive. Hourly rate fees for other categories of professional, support and other services shall be mutually negotiated by the County and firm on a project by project basis as needed.