



# VILLAGE OF KEY BISCAIYNE

Office of the Village Manager

## MEMORANDUM

### *Village Council*

Franklin H. Caplan, *Mayor*

Michael E. Kelly, *Vice Mayor*

Michael W. Davey

Enrique Garcia

Robert Gasman

Mayra P. Lindsay

James S. Taintor

DATE: February 7<sup>th</sup>, 2012

TO: Honorable Mayor and Members of the Village Council

FROM: John C. Gilbert, Village Manager

### *Village Manager*

John C. Gilbert

RE: Sand Source Evaluation Proposal

## RECOMMENDATION

It is recommended that the Village Council approve the attached Resolution and award the proposal for Sand Source Evaluation in the amount not to exceed \$20,810 to Coastal Systems International, Inc. (CSI), attached as Exhibit "A".

## BACKGROUND

As discussed in previous Council meetings, an alternate source of beach compatible sand for the Key Biscayne Beach Renourishment Project is the excavated material from the construction site of the Consultation Project.

On October 21<sup>st</sup>, 2011, the Mayor, along with Village Staff and Coastal Systems International, Inc. (CSI) met with the developer to discuss the use of this sand. CSI reviewed the excavation plans provided by Consultation and their initial investigation indicates the majority of the material would be beach compatible.

In order to confirm beach compatibility, a series of additional studies are required to be done by a professional geologist. The scope of service includes core borings, sampling, analysis and reporting in accordance with Florida Department of Environmental Protection (DEP) standards to confirm the limits and quantities based on the revised configuration of the site plan.

Approximately 31,000 cubic yards are required for the Beach Renourishment Project. The use of this sand could result in cost savings to the Village in excess of \$500,000.

CSI works extensively with Scientific Environmental Application, Inc. (SEA) on beach management projects throughout Florida, and SEA has demonstrated a track record

with DEP in evaluating both upland and offshore sand sources for beach compatible sand. CSI will retain SEA as a subconsultant under the existing agreement. The use of the sand would be subject to approval by the DEP in accordance with the environmental permits.

Funding for this project will be obtained from the Reservations, Designations, Capital Outlay Allocations line item "Reserved Carry Forward" line item.

RESOLUTION NO. 2012 - \_\_\_\_\_

**A RESOLUTION OF THE VILLAGE COUNCIL OF THE VILLAGE OF KEY BISCAYNE, FLORIDA, APPROVING THE PROPOSAL BY COASTAL SYSTEMS INTERNATIONAL, INC. ATTACHED AS EXHIBIT "A" RELATING TO UPLAND BEACH SAND SOURCE TESTING FOR THE BEACH RENOURISHMENT PROJECT; AUTHORIZING THE VILLAGE MANAGER TO EXECUTE A WORK ORDER CONSISTENT WITH THE TERMS OF THE PROPOSAL; PROVIDING FOR IMPLEMENTATION; AND PROVIDING FOR AN EFFECTIVE DATE.**

**WHEREAS**, pursuant to a contractual agreement previously entered into between the Village of Key Biscayne (the "Village") and Coastal Systems International, Inc. (the "Engineer"), the Engineer has been retained by the Village in connection with services needed for the Village of Key Biscayne Beach Renourishment Projects; and

**WHEREAS**, the Engineer, pursuant to its continuing contract, has submitted the proposal attached as Exhibit "A," proposed to perform certain sand source testing (geologic) and reporting by Scientific Environmental Applications, Inc. (SEA) for alternate sources of beach compatible sand for the beach renourishment project available from planned excavations (the "Proposal"); and

**WHEREAS**, the Village Council desires to authorize the Village Manager to execute a work authorization consistent with the Proposal; and

**WHEREAS**, the Village Council finds that this Resolution is in the best interest and welfare of the residents of the Village.

**NOW, THEREFORE, BE IT RESOLVED BY THE VILLAGE COUNCIL OF THE VILLAGE OF KEY BISCAYNE, FLORIDA, AS FOLLOWS:**

**Section 1. Recitals Adopted.** Each of the above stated recitals are hereby adopted, confirmed and incorporated herein.

**Section 2. Proposal Approved.** The Village Council hereby approves the Proposal attached as Exhibit "A" submitted by the Engineer.

**Section 3. Village Manager Authorized.** The Village Manager is hereby authorized to execute a work authorization with the Engineer, consistent with the proposal attached hereto as Exhibit "A," subject to approval as to form, content, and legal sufficiency by the Village Attorney.

**Section 4. Implementation.** The Village Manager is hereby authorized to take any and all necessary action to implement the purposes of this Resolution and the Proposal.

**Section 5. Effective Date.** This Resolution shall be effective immediately upon adoption.

PASSED AND ADOPTED this \_\_\_\_ day of February, 2012.

\_\_\_\_\_  
FRANK CAPLAN, MAYOR

ATTEST:

\_\_\_\_\_  
CONCHITA H. ALVAREZ, MMC  
VILLAGE CLERK

APPROVED AS TO FORM AND  
LEGAL SUFFICIENCY

\_\_\_\_\_  
Village Attorney

# Exhibit "A"



COASTAL SYSTEMS INTERNATIONAL, INC.  
464 South Dixie Highway • Coral Gables, Florida 33146  
Tel: 305-661-3655 • Fax: 305-661-1914  
www.coastalsystemsint.com

### WORK AUTHORIZATION CONFIRMATION

**Date:** January 31, 2012 **Project No.:** 135040.02

**From:** Coastal Systems International, Inc.  
464 South Dixie Highway  
Coral Gables, Florida 33146

**To:** Mr. John Gilbert  
VILLAGE OF KEY BISCAIYNE  
88 West McIntyre Street  
Key Biscayne, Florida 33149

**RE:** VILLAGE OF KEY BISCAIYNE BEACH MAINTENANCE PROJECT, MIAMI-DADE COUNTY,  
FLORIDA

- This is to confirm that verbal authorization was given to Coastal Systems International to proceed according to the terms of our proposal (or part(s) \_\_\_\_\_ only) to you dated \_\_\_\_\_.
- This is to confirm authorization for Coastal Systems International, Inc. to provide the following services:

#### PART 12 – UPLAND SAND SOURCE INVESTIGATION

Coastal Systems will retain Scientific Environmental Applications (SEA) as a subconsultant to conduct the beach sand compatibility testing and reporting as outlined in the attached scope of services. The sand to be excavated as part of the Sonesta development will be sampled and tested in accordance with Florida DEP requirements by a Professional Geologist to evaluate the sand for use in the Key Biscayne Beach Renourishment Project.

Fees for these additional services are:

- Lump Sum at \$20,810.

Expenses will be invoiced in accordance with our approved agreement terms. Please execute and return one original copy of this work authorization for our files. Should you have any questions regarding this authorization, please contact me at (305) 669-8650 or [tblankenship@coastalsystemsint.com](mailto:tblankenship@coastalsystemsint.com).

**For:** Coastal Systems International, Inc.

**For:** Village of Key Biscayne

**Signed:**

**Signed:**

\_\_\_\_\_  
Timothy K. Blankenship, Director

**Date:** January 31, 2012

**Date:** \_\_\_\_\_

# **Methods Proposed for Sand Source Evaluation of an Inland Project Site in Key Biscayne, Florida**

**Scientific Environmental Applications, Inc. (S.E.A.), Melbourne, FL**

## **Introduction**

In order to characterize the sand resources within the Key Biscayne project site for beach compatibility twelve core borings will be extracted and analyzed for stratigraphic and textural properties. The goal of the analysis is to assemble all information required by the permitting agencies to allow beach quality sand to be excavated from the project site and placed on the adjacent beach. Methods and procedures of the analysis are listed below.

## **Core Borings**

The core boring method will consist of a hydraulically operated rotary drill head capable of a continuous cut through unconsolidated and semi-consolidated sediments. The total length of each core boring will be approximately 25 feet below the topographic surface. Previous work in the project area has shown that the Key Largo Limestone is at an approximate elevation of -20 ft NAVD. The topographic surface of the project site varies between about 0 and +5 ft. NGVD. Thus, the core boring of 25 feet will penetrate through all of the sandy overburden and at some points reach into the upper few feet of the limestone. This will assure the ability to characterize the entire thickness of sandy sediments above the limestone.

During the coring process samples will be taken continuously along the core using a split spoon sampler. The samples will be placed in stratigraphic order in archive boxes for transport to the laboratory.

## **Core Logs**

The core borings will be visually inspected, and logged in detail according to ASTM D2488, the standard practice for visual descriptions of the stratigraphic soil layers. Results of the logging procedure will be coded into the gINT™ software customized for the Florida Department of Environmental Protection (FDEP) ROSS database. The gINT™ software includes Engineering

Form 1836 commonly used by the U.S. Army Corps of Engineers for core log presentation. During the logging procedure, particular attention will be paid to lithology, texture, silt and clay content, shell content, and Munsell color. Samples for grain-size analysis will be taken at intervals warranted by changes in lithology. A composite sample of each core will also be taken to represent the interval that corresponds to beach quality sand. Results of the grain-size analysis procedure described below will be compared with the core logs to insure consistency between the soil classification listed on the core logs and the classification of individual samples. An example of a core log from a borrow area offshore of Broward County, FL is shown in Figure 1. Figure 2 shows the corresponding grain size distribution plot for a sample from core BC09-01.

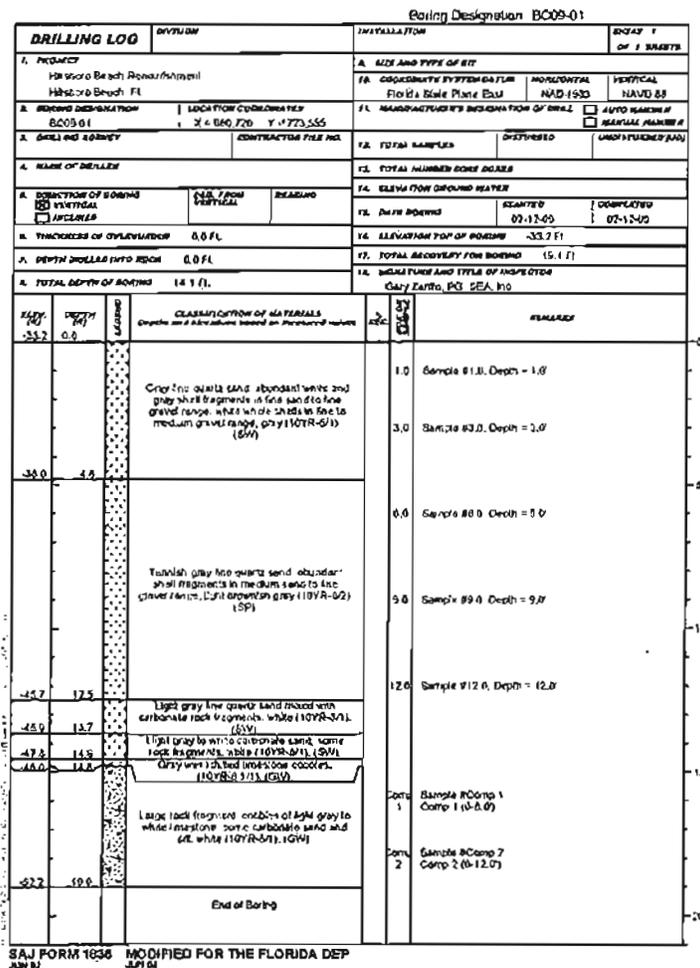


Figure 1. Example of a core log on Engineering Form 1836 modified for FDEP.



## Sample Analysis

Each sample will be split into two sub-samples. One of the two sub-samples will be used to perform the various analyses and the second sub-sample will be archived. Grain size analysis will be according to ASTM Standard D-422 for mechanical particle size analysis of the soils. Analysis will be conducted by mechanical sieving using a set of nested screens that divide sediments at phi intervals from -4 to +3.5 phi and will include the +3.75 phi (#200 mesh screen) required by the FDEP. Weight retained on each sieve is used to compute grain-size distribution in terms of weight percent of sample in each size class. Weights are recorded on a Lab Grain Size Data Sheet. For bulk fine (silt and clay fraction) and coarse content, the ASTM D1140 (ASTM, 2008) and the Wentworth (1929) procedures of determining percent fine fraction will be followed. The percent fine sediment retained on #230 and #200 sieves is also reported on Lab Grain Size Data Sheet generated from the gINT™ software.

Grain size distribution of samples processed in accordance with the above procedures will be analyzed using the method of moments and graphic methods as described by Folk (1974). The software platform used for the calculation is the gINT™ geotechnical software. This software is guided by a software library developed specifically for the Florida DEP by gINT™. Tabular summaries of each sample will be generated for sieve size, phi size, and mesh opening size in millimeters, weight of sediment retained in grams, cumulative percent retained, and cumulative percent passing. Sample statistics (e.g., mean, standard deviation, skewness, and kurtosis) are displayed in the summary tables. The sample classification according to the USCS is automatically generated by the gINT™ software. A frequency plot of grain size distribution is provided for each sample in accordance with USACE Form 2087. Figure 2 is an example of the grain size frequency plot generated by the gINT™ software. Figure 3 is an example of the corresponding data table.

A high temperature burn method will be used to determine the carbonate content of each discrete and composite sample. This method involves igniting a pre-weighed sample at 1080C° for 8 hours. During ignition, the carbonate (calcite) crystal lattice is broken down, carbon dioxide

released, and only the calcium atoms remain. Thus, the weight percent carbonate can be easily calculated knowing the atomic weights of the atoms that form the calcite lattice.

### Final Report

The final report will describe the goals, methods, results and include a series of appendices listing the core logs and grain size analysis of the discrete and composite samples. An assessment will be made of the beach quality of the sand source. Interpretation of the results will include sand volume calculations. Additional products will include the data set presented in the various database formats required by the FDEP. Among these products are the ACCESS Database file exported from the gINT™ software, GIS layers depicting the location of the core borings and volume of the beach quality sand. Figure 4 is an example of a stratigraphic model produced from a series of core borings from an upland sand mine located in Indian River County. From the model developed for the Key Biscayne project site volumes of individual layers will be calculated, as well as the volume of the entire sand body.

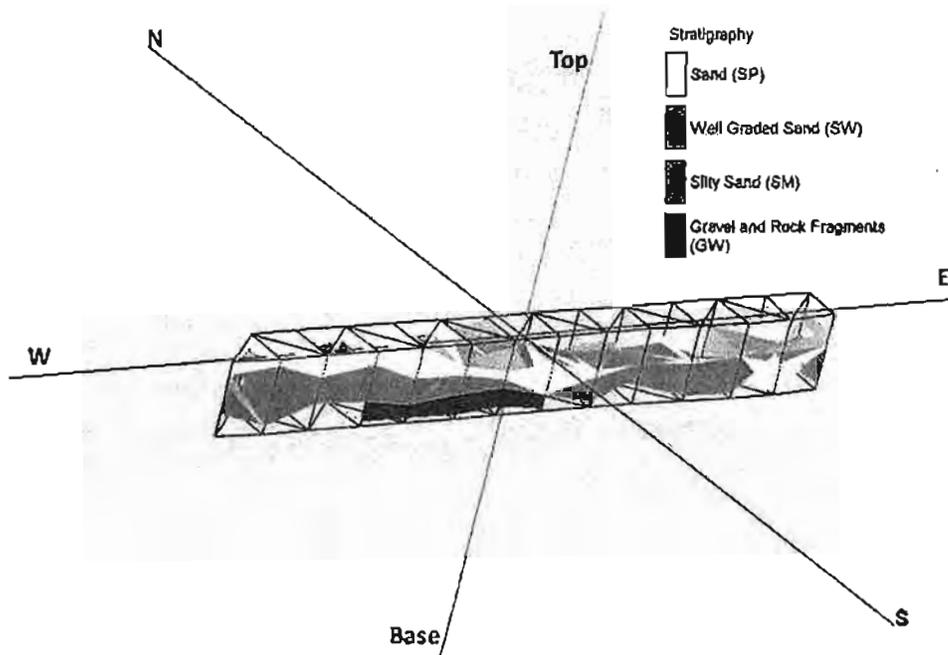


Figure 4. Example of a 3D geologic model generated from geotechnical data collected from core borings within an upland sand mine in Indian River County, FL.

## Project Costs

Table 1 list the proposed project costs by tasks. The costs are based on a total of ten 25-foot core borings. From each core 5 samples will be analyzed including a composite of the beach quality interval. Unit costs for the analysis are provided along with labor costs from assembling the final products to complete the final report. The proposed cost for the 10 core borings includes mobilization costs.

Table1. Proposed Project Costs

<b>Sand Source Evaluation</b>			
<b>Tasks</b>	<b>Hours/units</b>	<b>Rate</b>	<b>Total</b>
<b>Task 1 Core Borings</b>			
Ten core borings (Ardaman)	1		\$7,200.00
Gary Zarillo, Supervision	40	\$92.00	\$3,680.00
<b>Task 2 Core Logs</b>			
Core Logs in FDEP format	10	\$115.00	\$1,150.00
<b>Task 3 Sample Processing</b>			
Sample Processing for grain size to FDEP specs.	50	\$46.00	\$2,300.00
Percent Carbonate testing on discrete and composite samples	50	\$14.00	\$700.00
Percent Organic testing on discrete and composite samples	50	\$14.00	\$700.00
Wet sieving on discrete and composite samples	50	\$14.00	\$700.00
Color code according to Munsell	50	\$14.00	\$700.00
<b>Task 4 Final Report</b>			
Final Report including all FDEP products and 3D model of sand resource	40	\$92.00	\$3,680.00
Total (S.E.A., Inc.)			\$20,810.00