



5363-Stuart-16-015

January 29, 2016

James W. Bouquet P.E.  
Director of Engineering  
City of Key West  
3140 Flagler Ave Key West, FL 33040

**Subject: Revised Cost Proposal for Sloped Shoreline Armoring Planning, Engineering, Design and Permitting Rest Beach, Key West**

Dear Mr. Bouquet:

Please find attached our statement of work for services pertaining to the installation of sloped shoreline armoring (a revetment) along the Rest Beach shoreline. This proposal has been revised and prepared in accordance with the executed General Environmental Engineering Services agreement between the City of Key West and Tetra Tech, Inc. dated January 13, 2015.

The scope of services includes the following:

- geotechnical investigation (Ardaman and Associates);
- topographic, boundary and FDEP permit surveys (AVIROM);
- sloped armoring alternative evaluations (materials of construction and siting);
- high-frequency storm erosion modeling;
- pre-application meeting with the Florida Department of Environmental Protection to discuss the project in advance of an application for a Coastal Construction Control Line/50-ft Setback permit;
- conceptual design, preliminary design, permit application and processing, and final design;
- preparation of construction plans and technical/environmental specifications for inclusion in City bid documents; and,
- bid phase support services up to and through the point of contract award.

We have attached copies of the price quotes for the geotechnical investigation and topographic, boundary and FDEP permit surveys for your convenience.

**Tetra Tech, Inc.**

759 South Federal Highway, Suite 314, Stuart, FL 34994  
Tel 772.781.3400 Fax 772.781.3411 [www.tetratech.com](http://www.tetratech.com)

Please review the attached scope of work and contact me if you have any questions or require any additional information.

Sincerely,



Shauna Stotler-Hardy  
Project Manager

cc: Devon Steckly, City of Key West  
Brian Proctor, Tetra Tech  
Stuart McGahee, Tetra Tech

If this cost estimate is acceptable please confirm with signatures below.

For TetraTech, Inc.:

For City of Key West:



01/29/16

Authorized Signature

Date

Shauna Stotler-Hardy – Project Manager

Authorized Signature

Date

Jim Scholl - City Manager

**Tetra Tech, Inc.**

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## PROPOSAL STATEMENT OF WORK

### PROJECT: TR1503 SHORELINE ARMORING REST BEACH

Key West, FL

This proposal has been prepared in accordance with executed General Environmental Engineering Services Agreement between the City of Key West and Tetra Tech, Inc. dated January 13, 2015. The work described herein will be performed on a Time and Materials basis in accordance with the General Services agreement between Tetra Tech Inc. and the City of Key West, authorized by Resolution 14-359 executed February 23, 2015.

Prepared by: TETRA TECH, Inc.  
January 29, 2016



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## PROPOSAL / STATEMENT OF WORK

### Project Understanding

The City of Key West recently received regulatory authorization to construct a beach restoration project along the approximately 660 ft. of shoreline between 1326 Atlantic Boulevard and the White Street Pier; this shoreline comprises the Rest Beach shoreline armoring project area that is the subject of this proposal. The shoreline is currently (November 2015) experiencing erosional stress that appears to be principally the result of storm activity and which is exacerbated by a lack of active sediment transport along the shoreline to ‘feed’ the system. As a result, there are vertical escarpments along most of the shoreline segment that has prompted the City to prohibit access/viewing platforms that still reside on the upland and which formerly connected pedestrian access to the shoreline.

The shoreline is presently not anchored by any hardened structures except at the western limits of the project area – the White Street Pier – which serves as a partial barrier to littoral transport to the west. This City desires to provide long-term protection of the Rest Beach shoreline (and the adjacent upland park infrastructure and, ultimately, Atlantic Boulevard) once the beach restoration project has been constructed. The City wishes to obtain engineering and environmental services directly pertaining to the design, permitting and preparation of engineering drawings and specifications of a sloped configuration shoreline armoring feature. The plans and specifications will be included in bid documents to be prepared by the City.

It is our understanding that the City would like an alternative analysis performed for a sloped structure at or near the existing escarpment which exists along the shoreline; alternative materials for construction under consideration will be reviewed for City selection of the preferred configuration (and material type) for further engineering analysis and design services. In order to minimize regulatory requirements for the State of Florida, Department of Environmental Protection (FDEP) permit authorization, as well as to optimize state regulatory review and approval timeframes, the structure toe (seaward extent) cannot encroach beyond/seaward of the current Mean High Water Line (MHWL).

### Scope of Services

#### Task 1 – Geotechnical Investigation

The geotechnical investigation includes soil borings/sampling, laboratory testing and engineering analysis to support studies that will evaluate the subgrade/foundational characteristics of the underlying soils. We will perform two Standard Penetration Test (SPT) borings to approximately 30 feet below existing grade. Three surficial sediment samples will be obtained for grain size distribution analysis (in support of erosion modeling, described in Task 3).

We understand that the boring locations will be accessible to our subcontractor’s (Anderson Andre Consulting Engineers) truck-mounted drilling equipment. We will coordinate the geotechnical exploration work with the City’s designated site representative to ensure both protection of the public and to minimize damage to existing park infrastructure – as well as to ensure that the borings are collected at locations along the shoreline that meet the project objectives.

The geotechnical services included in this task are mobilization, utility clearance; drilling (2 SPT borings to 30 feet); collection and analysis of three surface sediment samples; engineering analysis and reporting. The SPT logs will be provided, along with any recommendations from the geotechnical subcontractor regarding the site conditions encountered.

***Task 1 Geotechnical Investigation Subtotal: \$12,255.00***



## **Task 2 – Topographic, Boundary and FDEP Permit Survey of the Project Shoreline**

Tetra Tech subconsultant Avirom & Associates will conduct a topographic survey of the Rest Beach project area. Topographic survey limits will extend from the crown of Atlantic Boulevard waterward to about the -4 ft NAVD contour (as shallow a water depth as can be readily and reliably measured by a hydrographic survey vessel). The topographic survey limits will include wading profile shots to provide some overlap with the historic bathymetric survey, with the bulk of the data collected north of the approximate Mean High Water (MHW) shoreline to the approximate south edge of pavement of Atlantic Boulevard, and will extend from the approximate centerline of the White Street Pier approach to the western boundary of the multifamily dwelling/property to the east of the park property. Existing features (trees, sidewalks, concrete and timber decks and viewing platforms, parking areas and curbing) will be identified.

A boundary survey and ties of the 50-ft setback distance from the MHW line on the property (as well as other site-specific features, inclusive of the seaward limits of improvements to the parcels adjacent to Rest Beach). Data collection will be performed in the field in order to conform to the requirements of 62B-33.0081, F.A.C. A contour plot and plan view location rendering will be prepared that will serve as the baseline information for positioning of the alternative armoring configurations.

In order to support the high-frequency storm erosion modeling effort (described further in Task 3, below), as well as to give the FDEP information regarding the current condition of the Rest Beach shoreline and nearshore zone, data will be collected along 20-foot interval transects as measured along the Rest Beach shoreline. Each transect shall extend approximately 1,000 feet seaward of the existing shoreline. Data will be collected at five foot intervals along each transect; a Digital Terrain Model with one-foot contour intervals will be generated subsequent to the collection and post-processing of the field data.

No new bathymetric survey will be completed as part of this scope. However 62B-33.008(3)(f) requires two copies of a “...signed and sealed survey of the subject property. The information depicted on the drawing shall be from a field survey conducted not more than six months prior to the date of the application. The survey shall comply with the requirements given in Rule 62B-33.0081, F.A.C.” Given the nature of the project, it is still possible that the FDEP could require the bathymetric survey information to be ‘current’. We understand that we will need to combine older bathymetric data that will have to come from other sources in order to establish an input profile (cross-section) to run the pre-storm existing/baseline condition as one of the inputs into SBEACH. This is not the ideal method and it may come into question by the FDEP’s coastal engineering staff who will be asked to review the modeling aspect of an application for sloped armoring along this shoreline. We will have to qualify/caveat the data compilation and assumptions in preparation of such a discussion.

***Task 2 Topographic, Boundary and FDEP Permit Survey Subtotal: \$14,703.00***

## **Task 3 – Sloped Armoring Preliminary Evaluation – Conceptual Design and Cost Evaluation, Modeling and Pre-Application Meeting with Florida Department of Environmental Protection**

### ***General Sloped Armoring (Revetment) Information***

Sloped shoreline armoring, commonly referred to as a revetment, is one alternative configuration for providing a degree of storm protection to an eroding shoreline. These structures serve to ‘fix’ the shoreline location coincident with the presence of the structure toe (seaward extent), given adequate design allowances for scour attributed to waves and currents interacting with the structure, particularly during storm events. A sloped armoring installation, if properly sited, designed and constructed, serves to dissipate incident wave energy with less reflection when compared to a vertical structure (a seawall).



Typically, and in accordance with prudent engineering practice as well as guidance offered by the U.S. Army Corps of Engineers (USACE) Shore Protection Manual and other similar design documents, such a structure is typically constructed with either available, appropriately sized armor ‘units’ comprised of rock/stone, or with pre-cast units that allow for a stable configuration and/or ease of installation and constructability.

Design practice as well as Florida laws and rules dictate that the structure be located as far landward as practical to provide both storm protection for the upland infrastructure as well as allowing for sediment movement to occur seaward of the structure without undermining the structure. Depending on the erosional stress that Rest Beach may be under as measured over time, there may or may not be any emergent (sandy) beach seaward of the structure for either recreational use/enjoyment by the public or for nesting marine turtles. The optimal location of the revetment will be likely be determined to be landward of the existing MHWL (i.e., at, near or possibly even slightly landward of the current vertical escarpment that exists at the shoreline). This process will be based in part on the results of the topographic/bathymetric survey, with additional consideration given to minimizing the need for grade changes or adverse impacts to existing upland infrastructure along the shoreline. It is noted that the existing shoreline is not perfectly linear along its entire footprint between the access way at the east and the White Street Pier and its infrastructure/foundational features to the west. There may be a logical ‘tie-in’ around the base of the Pier, but the parcel boundary and abrupt shoreline position change on the east side of the property may warrant consideration of an alignment shift (i.e., a transition/seaward ‘jog’ of the revetment as compared to the majority of its position along the shoreline to the west) at that location, if a direct connection to the (apparent) coastal armoring on the adjacent private property is not feasible.

#### ***Conceptual Design Alternatives and Cost Estimates***

Tetra Tech will perform structural calculations sufficient for preparing preliminary typical sections of alternatives for quarried limestone and one alternative material of construction (cable-stayed, “Armorflex” or similar system). The conceptual design typical sections will be CAD drafted on 8½ x 11 inch size sheets for presentation and cost estimating purposes. The typical sections will not be construction quality and detailed specifications will not be included; however, the section drawings will contain material notes sufficient for cost estimating. Our initial (in advance of more detailed engineering evaluation) estimate of probable revetment construction cost will be presented in “dollars per linear foot of revetment” installed, including excavation of existing uplands to establish a reasonable final alignment, materials and equipment needed to place the armor units, backfilling, and (as an optional item) a thin cover of sand placed over the top of the structure at the time of construction – which would include some filling of voids between armor units.

#### ***Storm Erosion Modeling and Analysis***

Tetra Tech understands that the FDEP will require, among other submittal requirements in order to process and approve an application for shoreline armoring, a demonstration of the vulnerability of Atlantic Boulevard to erosional impacts associated with a high-frequency (15-year return interval) storm event. The input parameters to a storm erosion model that will simulate changes to the beach and dune (upland) features will require a current beach profile (cross-section), which will be generated from the topographic and bathymetric survey data; input waves (which will be transformed from USACE Wave Information Study (WIS) hindcast offshore wave data; the median grain size of the sand on the existing shoreline will be determined by analyzing a surface grab of sediment obtained during the geotechnical investigation; design water level, which will be extrapolated from FEMA data; and, a storm hydrograph, which will be developed/scaled from the best available data or storms of record at or near the Rest Beach shoreline.



Preliminary discussion with engineering staff at the FDEP Bureau of Beaches and Coastal Systems suggests that SBEACH will be acceptable for conducting the simulation. SBEACH requires calibration of model coefficients through use of pre- and post-storm beach profiles together with storm characteristics that resulted in the erosion of the beach to yield the post-storm profile. We will search for such data, but do not anticipate finding any that will meet the modeling requirements. We therefore will run the model with developer-recommended default coefficient values and a range of coefficient values that ‘bracket’ the default values to provide a sensitivity analysis of the effects on beach profile erosion related to changes in the coefficient values. Depending upon the results, the sensitivity analysis may help in the discussion and interpretation of the model results with FDEP.

The beach and dune erosion model will be set up with the input parameters computed and acquired as described above, the model simulation will be conducted, and the model output will be summarized in a letter report. This report will include a brief description of the model and all input parameters, any assumptions made (where data gaps exist), and the findings of the model output. The latter will include plan and section view schematics showing the resultant shoreline impacts simulated by the high-frequency storm event.

#### ***Pre-Application Meeting with FDEP***

Assuming the proposed armoring does not encroach to the current MHWL, authorization from the regulatory agencies will be limited to processing and (if favorably received and reviewed) issuance of a Coastal Construction Control Line (CCCL) permit issued by the FDEP Tallahassee office. The project would fall within the 50-ft setback as described in s. 161.052, F.S., and will require a variance from the Department.

Owing to the vital importance of the demonstration of vulnerability of Atlantic Boulevard, as the hurricane evacuation route for this shoreline segment, to damage from a 15-year return interval storm event, a meeting with FDEP CCCL Program and Engineering Program staff is critical to moving forward with preliminary and final design and permitting. Tetra Tech will organize, prepare for and lead/attend a pre-application meeting (conference) in Tallahassee. Staff of the Florida Fish and Wildlife Conservation Commission will also be included in the meeting owing to their review capacity with respect to marine turtle nesting habitat impacts that might be imposed by the structure. City staff attendance is *strongly* encouraged. Tetra Tech will prepare an agenda and exhibits to review with Department staff. The principal objective of this meeting is to obtain a clear understanding and confirmation of Department submittal requirements, issues/concerns with the proposed activity, and likely review and processing timelines. Following the meeting, Tetra Tech will prepare a meeting summary report for distribution to all attendees.

***Task 3 Sloped Armoring Preliminary Evaluation Subtotal: \$53,823.00***

#### **Task 4 – Preliminary Design and Permitting**

##### ***Preliminary Design of Sloped Armoring***

The conceptual design analysis of Task 3 will identify the preferred alternative for the sloped armoring. With the City’s acceptance of the conceptual design analysis, we will proceed with the preparation of a 60% design development package for the sloped armoring. We will apply the USACE design guidance as found in the latest edition of their online *Coastal Engineering Manual*. Based upon the site conditions and design storm condition data gathered as part of the Task 3 modeling analysis, we will calculate the stability of armor and sublayer revetment elements as appropriate. Calculations will be provided as appendices to the preliminary design report.



The 60% design will include armor unit sizing, a general arrangement of the revetment system in the Rest Beach site, a typical revetment section and a compilation of primary revetment element specification requirements. These components will provide sufficient information to develop a 60% design opinion of the probable construction cost of the proposed armoring concept. We will document the results of the preliminary design work in a letter report. The drawings developed during this preliminary design will be suitable for use in the preparation of the FDEP permit preparation as outlined in the following subtask description.

#### ***FDEP Permit Application and Processing***

At the pre-application meeting detailed in Task 3 above, we will confirm the submittal requirements with Department staff. As indicated, owing to the location of the proposed armoring, a CCCL Permit will be required. The state has jurisdiction under 161.052, Florida Statutes, for proposed construction along the beach/dune system within fifty feet of the MHW shoreline in Monroe County – as there is no actual established CCCL in the County. Our staff is quite familiar with both process and personnel associated with this program. However, as with any regulatory process, should there be concerns and/or if staff does not find the submitted application complete in accordance with both statute and Rule 62B-33, Florida Administrative Code, the Department will issue a Request for Additional Information (RAI) within 30 days of receipt of an application; all responses would be reviewed with the City and staff concurrence obtained prior to submittal.

Tetra Tech will prepare and transmit a draft of the CCCL/Fifty-Foot Setback application to the City for review and comment prior to transmittal to the Department. **The City shall be responsible for the application/processing fee, estimated at \$8,600; the fee amount will be verified with Department staff at the pre-application meeting.**

While we will prepare as thorough an application as practicable, it is possible that the Department will submit a Request for Additional Information (RAI) pertaining to the file. We have assumed for this proposal that Tetra Tech will respond to one (1) RAI, and that such RAI will consist of minor, clarification-type questions. Should more detailed informational request(s) ensue, we would need to provide a separate labor hour estimate to respond to such. This task also assumes that a USACE Dredge and Fill permit will not be required. Due to the variability of the permitting process, this level of effort does not guarantee permit issuance.

Once the Department deems the application complete and begins to process the file, a Tetra Tech Senior Coastal Engineer will request information from Department staff regarding the anticipated conditions to be included in the permit. A brief review of the permit will be conducted and the City will be notified of any conditions that appear to be problematic or unreasonable; should this be the case, an attempt will be made to negotiate the final permit conditions with the permit processor and senior Department management.

**Task 4 Preliminary Design and Permitting Subtotal: \$51,686.00**





## Task 5 – Final Design/Plans and Specifications

The preliminary design for the shoreline armoring project (developed under Task 4) represents a nominal 60% design development package. The design will be further developed under this task. Tetra Tech will refine the design drawings and will develop the technical and environmental specifications for the revetment construction document package. It is assumed that the administrative sections of the project contract documents (“front-end” components – e.g., advertisement, payment and performance bonds, and liquidated damages) will be developed by the City based upon its standard construction contract requirements. Tetra Tech will submit the following packages to the City of Key West for review and comment:

- 90% design drawings and draft technical and environmental specifications based upon City comments on the preliminary design package of Task 4; and,
- 100% design drawings and final specifications that incorporate the City review comments on the 90% design package and draft technical/environmental specifications.

**Task 5 Final Design/Plans and Specifications Subtotal: \$27,807.00**

## Task 6 – Bid Phase Support

In preparation of advertising the project to prospective bidders, Tetra Tech will provide assistance to the City during the bid phase. We will assist the City with the preparation of the bid notice. This will include development of the bid schedule (and bid alternative, if identified as prudent), and preparation of a certification statement that the plans and specifications have been prepared under the direction of a registered Florida Professional Engineer.

Tetra Tech will assist the City in preparation for, and conduct of, a (presumed at this writing to be) mandatory Pre-Bid Meeting. This will include a PowerPoint presentation summarizing the proposed Project and highlighting certain relevant permit conditions. Tetra Tech will provide responses to prospective bidders at the meeting if such questions can be reasonably answered at the meeting. Should additional research be required, written responses will be provided within a reasonable period of time after the Pre-Bid.

Should questions posed either at the Pre-Bid or within a stipulated timeframe during the bid solicitation period that warrant clarification or additional details, Tetra Tech will prepare the necessary documents to be included by the City in a bid addendum. It is anticipated for budget purposes that the scope and scale of this project is such that a single addendum may be required.

Upon receipt of sealed bids and confirmation of bid pricing by City staff is complete, Tetra Tech will review the bid schedule tabulation and will conduct telephone checks on two to four references furnished by the apparent lowest responsible/responsive bidder. Should these actions indicate favorably, Tetra Tech will prepare a written recommendation of award to the City.

**Task 6 Bid Phase Support Subtotal: \$12,053.00**



## Project Deliverables

The following work products will be provided to the City:

Task 1 – SPT boring logs (2) and surficial sediment grab samples (3) analysis;

Task 2 – Topographic, boundary and FDEP Permit surveys

Task 3 – Conceptual design drawings and preliminary/initial estimate of probable construction cost; storm erosion modeling letter report; pre-application meeting summary report

Task 4 – Preliminary design letter report and drawings; FDEP permit application

Task 5 – Final design drawings and technical/environmental specifications

Task 6 – Pre-Bid Meeting preparation and attendance; preparation of bid addendum; review of submitted bids and recommendation of contract award

## Fee Estimate

We propose to complete this scope of services on a time and materials basis in accordance with our contract terms and conditions. A detailed breakdown of costs is provided as Attachment 1.

Attachment 1

City of Key West			Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		TOTAL	
Shoreline Armoring Rest Beach 1/29/16			Geotechnical Investigation		Topographic, Boundary, FDEP Permit Surveys		Sloped Armoring Evaluations		Preliminary Design and Permit Services		Final Design		Bid Support			
BILLING CLASS	NAME	UNIT RATE	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST
<b>Tetra Tech Staff</b>																
Tech Prof I	S. Stotler-Hardy	\$ 95.00	3.0	\$285	3.0	\$285	5.0	\$475	5.0	\$475	12.0	\$1,140	6.0	\$570	34.0	\$3,230
Tech Prof I	R. Garland	\$ 95.00	5.0	\$475	5.0	\$475	-	\$0	-	\$0	-	\$0	-	\$0	10.0	\$950
Sr. Tech Prof II	T. Malone	\$ 158.00	6.0	\$948	4.0	\$632	-	\$0	-	\$0	-	\$0	-	\$0	10.0	\$1,580
Sr. Project Manager	S. McGahee	\$ 192.00	-	\$0	-	\$0	8.0	\$1,536	8.0	\$1,536	8.0	\$1,536	24.0	\$4,608	48.0	\$9,216
Tech Prof I	F. Martinez-Rivera	\$ 95.00	12.0	\$1,140	12.0	\$1,140	24.0	\$2,280	-	\$0	24.0	\$2,280	-	\$0	72.0	\$6,840
Sr. Tech Prof III	A. McDonald	\$ 179.00	3.0	\$537	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	3.0	\$537
Sr. Project Manager	M. Barnett	\$ 192.00	2.0	\$384	2.0	\$384	56.0	\$10,752	48.0	\$9,216	16.0	\$3,072	24.0	\$4,608	148.0	\$28,416
Sr. Tech Prof II	D. Czapinski	\$ 158.00	-	\$0	-	\$0	80.0	\$12,640	56.0	\$8,848	36.0	\$5,688	-	\$0	172.0	\$27,176
Sr. Tech Prof I	J. Davis	\$ 125.00	-	\$0	-	\$0	184.0	\$23,000	176.0	\$22,000	76.0	\$9,500	8.0	\$1,000	444.0	\$55,500
Tech Prof I	A. Rinne	\$ 95.00	-	\$0	-	\$0	32.0	\$3,040	84.0	\$7,980	30.0	\$2,850	-	\$0	146.0	\$13,870
-	-	\$ -	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0
<b>TOTAL LABOR COST</b>			<b>31.0</b>	<b>\$3,769</b>	<b>26.0</b>	<b>\$2,916</b>	<b>389.0</b>	<b>\$53,723</b>	<b>377.0</b>	<b>\$50,055</b>	<b>202.0</b>	<b>\$26,066</b>	<b>62.0</b>	<b>\$10,786</b>	<b>1,087.0</b>	<b>\$147,315</b>
<b>EXTERNAL SUBCONTRACTOR</b>																
Ardaman and Associates		\$ 7,650.00	1.0	\$7,650	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	1.0	\$7,650
AVIROM Land Surveying		\$ 10,964.00	-	\$0	1.0	\$10,964	-	\$0	-	\$0	-	\$0	-	\$0	1.0	\$10,964
-	-	\$ -	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0
<b>TOTAL EXTERNAL SUBCONTRACTOR</b>				<b>\$7,650</b>		<b>\$10,964</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$18,614</b>
<b>TRAVEL</b>																
R/T Airfare		\$ 650.00	-	\$0	-	\$0	-	\$0	-	\$0	1.0	\$650	1.0	\$650	2.0	\$1,300
Mileage/Gas		\$ 0.54	550.0	\$297	550.0	\$297	-	\$0	700.0	\$378	-	\$0	-	\$0	1,800.0	\$972
Rental Car w/Fuel		\$ 75.00	1.0	\$75	1.0	\$75	-	\$0	3.0	\$225	2.0	\$150	1.0	\$75	8.0	\$600
Misc Travel Costs		\$ 50.00	1.0	\$50	1.0	\$50	-	\$0	3.0	\$150	1.0	\$50	1.0	\$50	7.0	\$350
Lodging		\$ 265.00	1.0	\$265	1.0	\$265	-	\$0	2.0	\$530	2.0	\$530	1.0	\$265	7.0	\$1,855
Meals & IE		\$ 71.00	1.0	\$71	1.0	\$71	-	\$0	3.0	\$213	2.0	\$142	1.0	\$71	8.0	\$568
<b>TOTAL TRAVEL COSTS</b>				<b>\$758</b>		<b>\$758</b>		<b>\$0</b>		<b>\$1,496</b>		<b>\$1,522</b>		<b>\$1,111</b>		<b>\$5,645</b>
<b>OTHER DIRECT COSTS</b>																
Shipping/Postage		\$ 5.00	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0
Information Services		\$ 2.70	29.0	\$78	24.0	\$65	37.0	\$100	13.0	\$35	44.0	\$119	30.0	\$81	177.0	\$478
Reproduction - B&W		\$ 0.08	-	\$0	-	\$0	-	\$0	200.0	\$16	200.0	\$16	150.0	\$12	550.0	\$44
Reproduction - Color		\$ 0.42	-	\$0	-	\$0	-	\$0	200.0	\$84	200.0	\$84	150.0	\$63	550.0	\$231
Misc. Equip & Supplies		\$ 150.00	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0	-	\$0
<b>TOTAL OTHER DIRECT COSTS</b>				<b>\$78</b>		<b>\$65</b>		<b>\$100</b>		<b>\$135</b>		<b>\$219</b>		<b>\$156</b>		<b>\$753</b>
<b>GRAND TOTAL</b>				<b>\$12,255</b>		<b>\$14,703</b>		<b>\$53,823</b>		<b>\$51,686</b>		<b>\$27,807</b>		<b>\$12,053</b>		<b>\$172,327</b>



**Ardaman & Associates, Inc.**

Geotechnical, Environmental and  
Materials Consultants

2608 W 84 Street, Hialeah, FL 33016  
PH 305-825-2683, FX 305-825-2686

January 28, 2016  
Proposal No.: 16-3044

Mr. Stuart E. McGahee, P.E.  
Tetra Tech  
759 S. Federal Highway, Suite 314  
Stuart, FL 34994

**PROPOSAL FOR GEOTECHNICAL ENGINEERING SERVICES  
BEACH RESTORATION  
KEY WEST, FL**

In accordance with your request, we are pleased to submit our proposal to perform subsurface explorations and geotechnical studies for the above project. The purpose of the exploration is to obtain general subsurface soil information so that recommendations can be provided for geotechnical properties, and other geotechnical aspects of the project.

We understand that your project will consist of a Beach Restoration / Armoring project. Based on our experience with subsurface conditions in the general site vicinity and your request, we will perform two (2) Standard Penetration Test (SPT) borings to a depth of about 30 feet below existing ground surface. In addition, we will obtain three (3) grab samples of the beach/dune material for laboratory testing.

An engineering report will be prepared which will present the findings of our exploration and our recommendations for site preparation and foundation design.

It is our understanding that the boring locations will be accessible to our truck-mounted drilling equipment. Also notice that clearance for utilities within the subject property will be provided prior to drilling operations. Ardaman & Associates, Inc will not be responsible for repair, damage or lack of service to utilities caused by our drilling operations inside a private property on a utility not clearly marked by the utility company.

The estimated cost of our geotechnical services for this project is as follows:

- Mobilization (include round trip, hotel, per diem).....\$2,000
- Utility Clearance/Staking/Site Coordination.....\$800
- Drilling SPT boring with casing  
2 SPTs to 30'.....\$1,500
- Coring  
2 cores per boring, total 20' of casing.....\$750
- Laboratory.....\$1,600
  - Grain Size (3)
  - Organic Content (1)
  - Moisture Content (6)
  - Unconfined Compression (4)
  - Carbonate Content (2)
  - Engineering/ description/ statistical analysis
- Engineering Report.....\$1,000
- **Total.....\$7,650**

Weather conditions permitting, we will start the field exploration program within ten working days after receiving your authorization to proceed.

Should we encounter conditions on the site that warrant more investigative effort than anticipated, we will inform you immediately. We will not proceed with additional work without your approval.

Please contact us if you should have any questions concerning the scope of work or the fee estimate.

If the terms above are acceptable to you, please return one signed copy of our Proposal Acceptance Form as an indication of your acceptance and authorization to proceed with the work.

Very truly yours,

**ARDAMAN & ASSOCIATES, INC.**

Evelio Horta, Ph.D., P.E., G.E.

Vice President





## PROPOSAL/PROJECT ACCEPTANCE AND AGREEMENT

### PROJECT INFORMATION:

Project Name Restoration / Armoring Project  
Project Location Key West, FL  
Proposal Number and Date 16-3044, January 28, 2016  
Description of Services Geotechnical Engineering Services  
Estimated Fee \$7,650.00

### PROPERTY OWNER IDENTIFICATION: (who we will invoice for the work)

Name \_\_\_\_\_  
Property Identification Number \_\_\_\_\_  
Address \_\_\_\_\_  
City/State \_\_\_\_\_ Zip Code \_\_\_\_\_ Phone \_\_\_\_\_  
Attention \_\_\_\_\_ Title \_\_\_\_\_

### SPECIAL INSTRUCTIONS:

### PAYMENT TERMS:

Payment shall be due within 30 days after date of invoice. Interest at the rate of 18% per annum (or the highest rate allowable by law) shall accrue on all amounts not paid within 30 days after date of invoice. All attorney fees and expenses associated with collection of past due invoices will be paid by Client. Failure to timely pay any invoice shall constitute a waiver of any and all claims against Ardaman & Associates, Inc.

### PROPOSAL ACCEPTANCE:

By accepting this Proposal, the Terms and Conditions of this Proposal, including the Terms on this page, and Ardaman & Associates, Inc.'s General Conditions appearing on the following page of this Proposal, including Ardaman & Associates, Inc.'s limitation of liability provision, are incorporated herein by reference. In the event this Proposal Acceptance was received by facsimile, Client hereby confirms that the above described Proposal, the Terms and Conditions of this Proposal, including the Terms on this page, and Ardaman & Associates, Inc.'s General Conditions have been made available and are incorporated in this agreement.

Accepted this \_\_\_\_\_ day of \_\_\_\_\_, 2016

\_\_\_\_\_  
(Print or type individual, firm or corporate body name)

\_\_\_\_\_  
(Signature of authorized representative)

\_\_\_\_\_  
(Print or type name of authorized representative and title)

## GENERAL CONDITIONS – LOUISIANA

**Parties And Scope Of Work:** Ardaman & Associates, Inc. (hereinafter referred to as “A&A”) shall include said company, its individual professionals, employees, agents, division, subsidiary, parent or affiliate performing the Work. “Work” means the specific services to be performed by A&A as set forth in A&A’s proposal, the Client’s acceptance thereof, both incorporated herein by this reference, and these General Conditions. “Client” refers to the person or business entity ordering the Work to be done by A&A. If the client is ordering the Work on behalf of a third party, the Client represents and warrants that the Client is the duly authorized agent of said third party for the purpose of ordering and directing said Work. In the event Client is not the authorized agent of said third party, Client agrees that he shall be individually liable hereunder. Further, Client shall disclose any such agency relationship to A&A in writing before the commencement of A&A’s Work hereunder. Client agrees that A&A’s professional duties are specifically limited to the Work as set forth in A&A’s proposal. The Client assumes sole responsibility for determining whether the quantity and the nature of the Work ordered by the Client is adequate and sufficient for the Client’s intended purpose. A&A’s Work is for the exclusive use of client, and its properly disclosed principal. In no event shall A&A have any duty or obligation to any third party. Directing A&A to proceed with the Work shall constitute acceptance of the terms of A&A’s proposal and these General Conditions.

**On-Call Services** – In the event A&A is retained to perform construction materials testing (“CMT”), including but not limited to proctor and soil density tests, concrete tests, etc., on an On-Call basis such that A&A is not retained to perform continuous observations of construction, Client assumes sole responsibility for determining the location and frequency of sampling and testing. In such On-Call testing, A&A’s test results are only representative of conditions at the test location and elevation, and different conditions may exist at other locations and other elevations. Furthermore, in the event Client fails to properly determine the location or frequency of sampling and testing, under no circumstances will A&A assume any duty by performing its CMT services.

**Right-of-Entry** – Unless otherwise agreed, Client will furnish right-of-entry on the property for A&A to make the planned borings, surveys, and/or explorations. A&A will take reasonable precautions to minimize damage to the property caused by its equipment and sampling procedures, but the cost of restoration or damage which may result from the planned operations is not included in the contracted amount.

**Damage to Existing Man-made Objects** – It shall be the responsibility of the Client to disclose the presence and accurate location of all hidden or obscure man-made objects relative to field tests, sampling, or boring locations. Client waives any claim against A&A arising from any damage to existing man-made objects. In addition, Client shall defend, indemnify and hold A&A harmless from any third party claim arising from damage to existing man-made objects.

**Warranty and Limitation of Liability** - A&A shall perform services for Client in a professional manner, using that degree of care and skill ordinarily exercised by and consistent with the standards of competent consultants practicing in the same or a similar locality as the project. In the event any portion of the services fails to comply with this warranty obligation and A&A is promptly notified in writing prior to one year after completion of such portion of the services, A&A will re-perform such portion of the services, or if re-performance is impracticable, A&A will refund the amount of compensation paid to A&A for such portion of the services.

This warranty is in lieu of all other warranties. No other warranty, expressed or implied, including warranties of merchantability and fitness for a particular purpose is made or intended by the proposal for consulting services, by furnishing an oral response of the findings made or by any representations made regarding the services included in this agreement. In no event shall A&A be liable for any special, indirect, incidental, or consequential loss or delay or time-related damages or lost profits, loss of business, loss of financing, or loss of bonding capacity or loss of reputation damages. The remedies set forth herein are exclusive and the total liability of consultant whether in contract, tort (including negligence whether sole or concurrent), or otherwise arising out of, connected with or resulting from the services provided pursuant to this Agreement shall not exceed the total fees paid by Client or \$50,000.00, whichever is greater. Client may, upon written request received within five days of Client’s acceptance hereof, increase the limit of A&A’s liability by agreeing to pay A&A an additional sum as agreed in writing prior to the commencement of A&A’s services. This charge is not to be construed as being a charge for insurance of any type, but is increased consideration for the greater liability involved. Client affirmatively represents that Client understands this warranty and limitation of liability provision.

**Sampling or Testing Location** – Unless specifically stated to the contrary, the unit fees included in this proposal do not include costs associated with professional land surveying of the site or the accurate horizontal and vertical locations of tests. Field tests or boring locations described in our report or shown on our sketches are based on specific information furnished to us by others or estimates made in the field by our technicians. Such dimensions, depths or elevations should be considered as approximations unless otherwise stated in the report.

**Sample Handling and Retention** – Generally test samples or specimens are consumed and/or substantially altered during the conduct of tests and A&A, at its sole discretion, will dispose (subject to the following) of any remaining residue immediately upon completion of test unless required in writing by the Client to store or otherwise handle the samples. (a) NON HAZARDOUS SAMPLES: At Client’s written request, A&A will maintain preservable test samples and specimens or the residue therefrom for thirty (30) days after submission of A&A’s report to Client free of storage charges. After the initial 30 days and upon written request, A&A will retain test specimens or samples for a mutually acceptable storage charge and period of time. (b) HAZARDOUS OR POTENTIALLY HAZARDOUS SAMPLES: In the event that samples contain substances or constituents hazardous or detrimental to human health, safety or the environment as defined by federal, state or local statutes, regulations, or ordinances (“Hazardous Substances” and “Hazardous Constituents”, respectively), A&A will, after completion of testing and at Client’s expense: (i) return such samples to Client; (ii) using a manifest signed by Client as generator, will have such samples transported to a location selected by Client for final disposal. Client agrees to pay all costs associated with the storage, transport, and disposal of such samples. Client recognizes and agrees that A&A is acting as a bailee and at no time does A&A assume title of said waste.

**Discovery of Unanticipated Hazardous Materials** – Hazardous materials or certain types of hazardous materials may exist at a site where there is no reason to believe they could or should be present. A&A and Client agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work or termination of services. A&A and Client also agree that the discovery of unanticipated hazardous materials may make it necessary for A&A to take immediate measures to protect health and safety. A&A agrees to notify Client as soon as practicable should unanticipated hazardous materials or suspected hazardous materials be encountered. Client encourages A&A to take any and all measures that, in A&A’s professional opinion, are justified to preserve and protect the health and safety of A&A’s personnel and the public. Client agrees to compensate A&A for the additional cost of working to protect employees’ and the public’s health and safety. In addition, Client waives any claim against A&A arising from A&A’s discovery of unanticipated hazardous materials or suspected hazardous materials.

**Indemnification** – To the greatest extent permitted by law, Client agrees to defend, indemnify and save harmless A&A from all claims, including negligence claims, suits, losses, personal injuries, death and property liability resulting from the actions or inactions of Client, Client’s contractors, representatives, agents and employees.

**Legal Jurisdiction** – The parties agree that any actions brought to enforce any provision of this Agreement shall only be brought in a court of competent jurisdiction located in Orlando, Orange County, Florida. All causes of action, including but not limited to actions for indemnification, arising out of A&A’s Work shall be deemed to have accrued and the applicable statutes of limitation shall commence to run not later than either the date of substantial completion of the Work for acts or failures to act occurring prior to substantial completion, or the date of issuance of A&A’s final invoice for acts or failures to act occurring after substantial completion of the Work. Both A&A and Client agree that the laws of the State of Florida shall govern any disputes arising from this Agreement without regard to principles of conflicts of law. Each of the parties hereto irrevocably waives any and all right to trial by jury in any legal proceeding arising out of or relating to this agreement.

**Force Majeure** - A&A shall not be held responsible for any delay or failure in performance caused by fire, flood, explosion, war, strike, embargo, government requirement, civil or military authority, acts of God, act or omission of subcontractors, carrier, clients or other similar causes beyond its control.

**Drafting and Severability** – This Agreement has been drafted by all Parties hereto and shall not be construed against one Party or in favor of any other Party. In the event that any provision of this Agreement is held invalid, the remainder of this Agreement shall be fully enforceable.

1/22/16





**AVIROM & ASSOCIATES, INC.**  
SURVEYING & MAPPING

January 28, 2016

Via E-Mail- [Michael.Barnett@TetraTech.com](mailto:Michael.Barnett@TetraTech.com)

Michael R. Barnett, P.E., D.CE  
Senior Coastal Engineer & Project Manager

**Tetra Tech**

61 St. Joseph Street, Suite 550  
Mobile, AL 36602

*Re: Rest Beach Park, Key West, Monroe County Florida 33040 – Revision 3  
Boundary Survey, DEP Permit Survey and Topographic Survey.*

Dear Mike:

Subsequent to your request, we will provide a Boundary Survey, DEP Permit Survey, and Topographic Survey at the following site:

Rest Beach, (Alternate Key 1065021, Monroe County Property Appraiser) located at 1300 Atlantic Boulevard, Key West, Monroe County, Florida.

*Scope*

*Limits*

The limits shall be from the north edge of White Street Pier to the south, extending westerly to the centerline of Atlantic Boulevard, extending easterly beyond the Mean High Water Line of the Atlantic Ocean to a depth of -4.00 feet and extending northerly to the north line of the parcel boundary.

*Upland Boundary Survey*

Boundary Survey shall be performed and certified in accord with Chapter 472, Florida Statutes and will meet Florida Minimum Technical Standards, Chapter 5J-17 F.A.C. This proposal does not include obtaining a title report or researching the public records for easements. If easements created by instruments are provided to us, we shall delineate them on the survey if applicable. Legal Descriptions of the properties to be surveyed shall be provided by the client prior to

mobilization; otherwise we shall utilize the most current legal descriptions available from the Monroe County Property Appraiser's Office.

#### *DEP Permit Survey*

We will provide a DEP Permit Survey based on the Survey Requirements according to Rule 62B-33.0081, Florida Administrative Code. We will map the seaward limits of improvements on the adjacent properties immediately to the north and south of the project (as required by the FDEP).

We shall establish the 50 foot setback line relative to the location of the Mean High Water Line, because the CCCL has not been established in Monroe County.

We are not qualified to identify or determine the categories of the seaward line of vegetation; however we will coordinate with the client's consultant to locate the various seaward limits of vegetation, which will be added to our survey.

Obtain necessary spot elevations to map a 1' contour. Cut and obtain cross sections along transects perpendicular to the centerline of the adjacent roadway (including crown of road elevations) on 100 foot stations, extending easterly to the mean high water line (continuing to a depth of -4.00). This survey will not be a Mean High Water Survey pursuant to the Coastal Mapping Act of 1974, Chapter 177, Part II Florida Statutes. We will map the Mean High Water Line as a contour, plot the 0' contour line, calculate and delineate on our drawing the Seasonal High Water Line.

#### *Upland Topographic Survey*

Establish a minimum of two (2) North American Vertical Datum of 1988 (NAVD 88) benchmarks at the site, referenced to a published Benchmark Network by the National Geodetic Survey (NGS). The benchmarks shall also be horizontally referenced to the North American Datum of 1983 (NAD 83-2011) Epoch 2010.00, and tied to the National Geodetic Survey Geodetic Control Network.

Obtain sufficient elevations to define the existing topography in detail, including significant grade changes, finish floor and garage elevations, if any. The elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD 88) and tied to the National Geodetic Survey (NGS) benchmark network as required by the Department of Environmental Protection. Spot elevations shall be taken along the crown of the adjacent road to define the highest point.

We shall locate all above ground improvements including, but not limited to buildings, pavement, ramps, driveways, steps, doors, gates, top of curb, bottom of curb, flow line, edge of pavement, bottom of gutter, front of walk, back of walk, finish floor and above ground evidence of utility. Utility locations will include rim elevations, fire hydrants, water valves, meter boxes,

vaults, electrical outlets and irrigation system. We will also locate wells and main irrigation valves, but will not locate individual sprinkler heads.

*There is no provision for the excavation, probing or location of underground utilities, structures or improvements. Utilities shall be located to the extent that they are above ground and visible. There is no provision in this contract to enter structures to obtain information.*

All work shall be performed in accordance with the Standards of Practice as defined in Chapter 5J-17, Florida Administrative Code.

*Deliverable*

We shall provide four (4) signed and sealed hard copies of the survey, including an electronic PDF file and an AutoCAD 2014 or lower drawing file of the survey.

*Time Frame*

We can have the project completed within four (4) weeks from a Notice to Proceed.

*Fee:*

The itemized fees to perform the above services are:

1. <u>Boundary Survey</u>	
Survey Field Crew – 4.48 hours @ \$125.00 per hour .....	\$ 560.00
CADD Drafting – 4 hours @ \$85.00 per hour .....	\$ 340.00
Professional Land Surveyor – 1 hour @ \$100.00 per hour .....	\$ 100.00
2. <u>DEP Permit Survey in accord with Rule 62B-33.0081</u>	
Survey Field Crew – 17.72 hours @ \$125.00 per hour .....	\$ 2,215.00
CADD Drafting – 11 hours @ \$85.00 per hour .....	\$ 935.00
Professional Land Surveyor – 3.5 hour @ \$100.00 per hour .....	\$ 350.00
3. <u>Topographic Survey</u>	
Survey Field Crew – 29 hours @ \$125.00 per hour .....	\$3,625.00
CADD Drafting – 25 hours @ \$85.00 per hour .....	\$ 2,125.00
Professional Land Surveyor – 4.14 hour @ \$100.00 per hour .....	\$ 414.00
4. <u>Principal</u>	
Administrative/Billing – 2 hours @ \$150.00 per hour .....	\$ 300.00
	TOTAL .....
	\$10,964.00

The above costs are based on performing the above survey services in conjunction with each other. Additional mobilization costs will incur if individual items are performed separately.

*General Conditions:*

1. *All invoices are due and payable in full upon receipt. Surveyor reserves the right to withhold certified prints and files to client or client's consultants until payment is made in full. If payment is not received within 10 days of the invoice date, a late charge may be added to the invoice in an amount not to exceed 1½ percent per month on the outstanding balance. If payment is not received within 45 days of the invoice date, Surveyor may terminate this agreement or suspend work under the agreement until payments have been made in full. The undersigned agrees to pay reasonable attorney fees up to 50% and all costs and expenses incurred by Avirom & Associates, Inc. in the collection of any past due obligation of the undersigned pursuant hereto.*
2. *Electronic data files furnished by Avirom & Associates, Inc. in connection with this project are instruments of service. All original instruments of service shall be retained by Avirom & Associates, Inc. and will remain their property, with all common law, statutory and other reserved rights, including copyright, in those instruments. This information provided in the instruments of service is proprietary and will not be shared with others without prior written consent. The client may request reproducible copies, and all original documents upon payment of all outstanding invoices, and expenses.*
3. *Copies in excess of four prints, Federal Express, deliveries and out-of-pocket expenses will be charged to client at cost. Additional prints will be charged at \$5.00 per print.*
4. *Revisions to survey requested by governmental agencies that are more stringent than Standards of Practice as set forth in Chapter 5J-17 FAC pursuant to Section 472 Florida Statutes will be an additional expense to client based on our current hourly rates.*

We thank you for the opportunity to submit this proposal and we look forward to working with you on this project.

Should you have any questions or comments, please feel free to contact me.

Respectfully,



Keith M. Chee-A-Tow, P.L.S.  
Project Surveyor

*If this proposal is acceptable, please execute the signature below and return one (1) copy for our files.*

**THESE CONDITIONS ARE ACCEPTABLE, AND I HEREBY AUTHORIZE YOU TO PROCEED.**

---

Michael R. Barnett, P.E., D.CE  
**Tetra Tech**

---

Date

*Keith's Documents\Proposal\Keys\City of Key West\Current\Rest Beach\Rest Beach R-3.docx*