

WORK ORDER NUMBER 23

SECTOR 5 BEACH RESTORATION PROJECT

PERMITTING AND CONSTRUCTION SERVICES

This Work Order Number 23 is entered into as of this ____ day of _____, 2017 pursuant to that certain Continuing Contract Agreement for Professional Services entered into as of March 19, 2013 ("Agreement"), and amended March 17, 2015 and April 11, 2017, by and between Indian River County, a political subdivision of the State of Florida ("COUNTY") and APTIM Coastal Planning & Engineering Inc. f/k/a CB&I Coastal Planning & Engineering, Inc. ("CONSULTANT").

The COUNTY has selected the Consultant to perform the professional services set forth on Exhibit 1, attached to this Work Order and made part hereof by this reference. The professional services will be performed by the Consultant for the fee schedule set forth in Exhibit 2, attached to this Work Order and made a part hereof by this reference. The Consultant will perform the professional services within the timeframe more particularly set forth in Exhibit 2, attached to this Work Order and made a part hereof by this reference all in accordance with the terms and provisions set forth in the Agreement. Pursuant to paragraph 1.4 of the Agreement, nothing contained in any Work Order shall conflict with the terms of the Agreement and the terms of the Agreement shall be deemed to be incorporated in each individual Work Order as if fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Work Order as of the date first written above.

CONSULTANT
APTIM Coastal Planning & Engineering, Inc.

BOARD OF COUNTY COMMISSIONERS
OF INDIAN RIVER COUNTY

By: 
Thomas P. Pierro, P.E., D.CE

By: _____
Peter D. O'Bryan, Chairman

Title: Director of Operations

Attest: Jeffrey R. Smith, Clerk of Court and
Comptroller

Date: 12/11/2017

By: _____
(Seal) Deputy Clerk

Approved:

By: _____
Jason E. Brown, County Administrator

Approved as to form and legal sufficiency:

By: _____
William K. DeBraal, Deputy County Attorney

EXHIBIT 1



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Boca Raton, FL 33431
Tel: +1 561 391 8102
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December 11, 2017

Mr. James Gray
Indian River County
Public Works - Coastal Engineering Division
1801 27th St, Building A
Vero Beach, FL 32960

**Subject: Work Order #23
Sector 5 Permitting and Construction Services
Indian River County, FL**

Dear James:

This proposal outlines a scope of work for Aptim Coastal Planning & Engineering, Inc. (APTIM), f/k/a CB&I and Coastal Planning & Engineering, Inc., to provide professional services for continued development and implementation of the planned Sector 5 Beach Restoration Project, and is in addition to the services provided under approved Work Order No. 12. The work is broken up into ten (10) separate Tasks. APTIM will await the County's approval before proceeding with each Task. Each cost was developed following the provisions of the Professional Coastal Engineering Services Agreement (dated March 19, 2013; amended March 17, 2015) and most recent Contract Renewal (dated April 11, 2017) between Indian River County and APTIM.

- Task 1: Design Update Post-Irma
- Task 2: Hardbottom Edge Delineation
- Task 3: Plans and Specifications
- Task 4: ECL Establishment
- Task 5: Pre-Construction Biological Monitoring
- Task 6: Pre-Construction Services
- Task 7: During Construction Services
- Task 8: Beach Profile Check Surveys
- Task 9: Project Completion Services
- Task 10: Immediate Post-Construction Biological Monitoring

Task 1: Design Update Post-Irma

Per discussion with Florida Department of Environmental Protection (FDEP), it was requested that the proposed Sector 5 beach fill design be evaluated on recent conditions (post-Hurricane Irma) for the purpose of permitting efforts. The proposed Sector 5 project, spanning from R-70 to R-86, was initially designed in the Feasibility Evaluation utilizing the County's March 2017 winter condition survey. As part of the County's post-storm effort

following Hurricane Irma, beach profile transects were surveyed at the FDEP R-monuments by Morgan & Eklund, Inc. in November 2017. Recent design conditions will be required for the purposes of submitting the Joint Coastal Permit application to FDEP. The following services will be provided to update the design on recent conditions and draft a design update memorandum to supplement the Joint Coastal Permit (FDEP) and ENG 4345 (USACE) applications.

Task 1: Scope of Work

The Sector 5 beach fill templates, initially designed based on the March 2017 conditions (Feasibility Evaluation Report, 2017), will be updated based on the updated November 2017 conditions. It is assumed that the November 2017 beach profile survey data collected by Morgan & Eklund, Inc. and provided by the County is considered final, has been processed and does not require additional review. The dune position and berm width for each profile will be reevaluated to ensure the design intentions are still met (i.e. upland protection, no hardbottom impact, recreational beach, etc.). Minor adjustments to the dune position and/or berm width may be made, as deemed appropriate based on recent conditions. The required design fill volume will be recalculated and equilibrated profiles will be developed at each R-monument within the project area based on the recent beach condition. An estimated equilibrium toe of fill (ETOF) will be determined at each profile.

Task 1: Deliverable

A design update memorandum will be developed to briefly describe the fill template and the need for the update. The memorandum will make reference to the Feasibility Evaluation Report, which was the project's initial design document. Included will be a summary table describing the template dimensions and required fill density at each R-monument. Also included will be profile plots portraying the recent November 2017 beach conditions, the updated design template, and the estimated equilibrated fill profile. Maps depicting the estimated ETOF and available hardbottom edge delineations (see Task 2) overlain on the most recent aerial photography (collected in July 2017) will also be included.

Task 1: Schedule

APTIM will provide the deliverable within 30 days of the notice to proceed with this task or Task 2, whichever is later.

Task 1: Cost

The lump sum cost for Task 1 is \$4,398.00.

Task 2: Hardbottom Edge Delineation

Per discussion with FDEP regarding permitting efforts, several years of aerial-delineated hardbottom edge positions can be used to evaluate if the hardbottom resources are stable over time in the Sector 5 project area. The hardbottom edge conditions will be submitted with the JCP application to support the no impact project design. The County has provided georeferenced aerial photographs from 2007 and 2017, along with previously delineated aerials from 2015. If the edge is shown to be stable over time, FDEP has indicated that in-water verification of the edge may not be required as a Request for Additional Information (RAI) item, but may instead

be required as a Notice to Proceed item. The pre-construction biological monitoring survey will include an in situ hardbottom edge survey that should satisfy this in-water verification.

Task 2: Scope of Work

APTIM will delineate hardbottom resources along the proposed Sector 5 project area using the 2007 and 2017 aerials. Additionally, the 2015 aerial delineation will be revisited and revised in more detail along the Sector 5 project area. The delineation will digitize the landward (western) edge of exposed hardbottom between R-69 and R-88 (approximately 3.6 miles). The delineation will be conducted by a GIS Specialist and Marine Biologist with direct experience in hardbottom delineation and characterization. The aerial analyses will be reviewed for quality assurance and quality control (QA/QC) by a Senior Marine Biologist. No field work by APTIM is included in this task.

Task 2: Deliverable

The final deliverables will include a map (PDF format) of the delineated and available nearshore hardbottom edges overlaid on the 2017 aerials and a digital copy of the shapefiles included on a CD, flash drive, or transmitted via email (whichever the County prefers).

Task 2: Schedule

The final deliverable for the work will be submitted within 30 days of receipt of the notice to proceed for this task.

Task 2: Cost

The lump sum cost for Task 2 is \$10,763.00.

Task 3: Plans and Specifications

Construction plans and specifications are required as part of the JCP permit application. However, APTIM will request that these be included as a Notice to Proceed item by the FDEP and United States Army Corps of Engineers (USACE) so that requisite permit conditions can be incorporated directly. Thus, the plans and specifications will be submitted after the Notice of Intent to Issue is received from the permitting agencies. Development of the construction plans and specifications will be initiated once the County has chosen to move forward with construction. The plans and specifications will be developed for the County to include in the bid package, and will be submitted to FDEP and USACE in partial fulfillment of the permit application requirements.

Task 3: Scope of Work

APTIM will develop construction plans and specifications that will provide the necessary details to the Contractor to construct the project, establish payment criteria, and adhere to the permit conditions. It is assumed that the County will provide front-end documents, including general conditions, and provide the overall format of the contract documents such that the technical specifications can be incorporated without duplication or conflict in terms and conditions.

Task 3: Deliverable

1. Draft: One (1) hardcopy and one (1) electronic copy (PDF) of the draft construction plans and specifications for the County's review and comments (11"x17" for the plans and 8.5"x11" for the specifications).
2. Final: Two (2) hard copies and one (1) electronic copy (PDF) of the final version of the construction plans and specifications (11"x17" for the plans and 8.5"x11" for the specifications).

Task 3: Schedule

The draft deliverable for the work will be submitted within 30 days of receipt of the notice to proceed for this task. Once the County's comments are returned to APTIM, the finalized documents addressing the comments will be submitted within 14 days.

Task 3: Cost

The lump sum cost for Task 3 is \$14,959.00.

Task 4: ECL Establishment

As defined in Chapter 161 of the Florida Statutes, prior to construction of the Sector 5 Beach Restoration Project, an Erosion Control Line (ECL) must be established along the shoreline to define the property boundary between sovereign submerged land and upland ownership. In discharging its statutory duties to establish these boundary lines, coordination activities must occur with the FDEP's Division of Water Resource Management (DWRM), Division of State Lands (simply referred to as State Lands) - Bureau of Survey & Mapping (BSM), Office of General Counsel (OGC), local sponsors, consultants and surveyors. There are several steps to establishing an erosion control line, which are described in FDEP's ECL Establishment Checklist, and included as an attachment to this proposal for reference.

Task 4: Scope of Work and Deliverables

APTIM will correspond with State Lands and the County's surveyor, Morgan & Eklund, Inc. (M&E), to facilitate required submittals for the ECL filing process. A previously established ECL may exist within a portion of the project area as a result of the installation of the PEP Reef. The validity of this ECL will be researched for discussion and coordination with State Lands as it pertains to establishing the ECL for the Sector 5 Beach Restoration Project. It is assumed that the County will contract directly with their local surveyor, M&E, to perform the Mean High Water (MHW) survey and produce the requisite documents. No field work by APTIM is included in this task. Applicable items from FDEP's ECL Establishment Checklist are described below. Work for this task primarily consists of meetings, emails, and phone correspondence between APTIM, the County, M&E, FDEP and State Lands.

- APTIM will coordinate with FDEP's Permit Manager to assure notification was given to the ECL Coordinator that a new beach restoration application was submitted and that there will be a proposed ECL established.
- APTIM will assist the County, as needed, in preparing and enacting a local government resolution in support of the proposed ECL.

- Items denoted on the ECL Establishment Checklist as “Contract Surveyor” are assumed to be completed and submitted directly by the County’s surveyor, M&E. APTIM will assist the County and M&E with review and facilitation of required documents for submittal. This includes review by APTIM’s Professional Surveyor and Mapper of the draft MHW survey for correctness and compliance with 161.141 F.S., 177, Part II F.S., and 5J-17 F.A.C. mapping requirements. APTIM’s review comments will be submitted to the County and M&E within 10 days of receipt of the draft MHW survey.
- APTIM will prepare and publish a notice of the ECL workshop/hearing in a local newspaper once a week for three consecutive weeks prior to the workshop/hearing.
- APTIM will prepare and mail public notices of the ECL workshop/hearing to all riparian owners of record of upland property located within 1,000 feet of the proposed ECL.
- APTIM will prepare for, attend, and lead the required workshop and hearing. The ECL workshop and hearing will be scheduled upon submittal of the final MHW survey. The ECL workshop and hearing is to take place within approximately 6 months of the completion of the MHW survey. APTIM will provide the required maps of the MHW line for review during the ECL workshop and hearing.
- APTIM will transmit digital copies of all certified letter receipts, notices, and agendas to the Beaches and Mines Funding Assistance Program Project Manager.
- APTIM will assist the County in facilitating post-ECL hearing coordination in finalizing the ECL. It is assumed that M&E will provide the required Mylar copies of the final ECL survey.

Task 4: Schedule

A fixed schedule cannot be provided for this task because it is unclear when the final permits will be issued, when the project can be awarded, and how the Contractor’s construction schedule will be structured. APTIM will attempt to execute each phase of the work in as expeditious a manner as possible.

Task 4: Cost

The lump sum cost Task 4 is \$9,916.65.

Task 5: Pre-Construction Biological Monitoring

The Biological Monitoring Plan developed for the Sector 5 project during permitting will require pre- and post-construction biological monitoring adjacent to the project area to monitor for potential secondary impacts to nearshore natural hardbottom. The scope for this task is based on early coordination with FDEP and the FDEP Standard Operating Procedures for Nearshore Monitoring of Beach Nourishment Projects (FDEP, 2016). The pre-construction nearshore hardbottom monitoring shall include:

- 1) Hardbottom edge mapping
- 2) Installing and monitoring permanent transects

Task 5: Scope of Work

- **Hardbottom Edge Mapping:**

APTIM shall map the position of the nearshore hardbottom edge for the entire Sector 5 project area, including 1000 feet north and 2000 feet south of the project area (R-69 to R-88) for a length of approximately 3.6 miles (the hardbottom edge is further offshore beyond 2000 feet south of the project area). A buoy with a Differential Global Positioning System (DGPS) antenna linked to a topside laptop computer running HYPACK navigational software will be towed by divers to record the position of the nearshore hardbottom edge. The divers will follow the inshore contour of the most prominent hardbottom-sand border. The purpose of the survey is to provide a comparison for post-construction edge delineations.

- **Installing and Monitoring Permanent Transects:**

Transects will be established at approximately 1000-foot intervals along the length of the project, including within 1000 feet north and 2000 feet south for up to 23 transects. This includes 20 biological monitoring transects and three (3) sediment only transects. All transects will run perpendicular to the shoreline and extend from the nearshore hardbottom edge to a distance of 150 meters seaward. Stainless steel rods will be used to permanently mark the transects to facilitate repeatability for post-construction monitoring. After transect establishment, a biological survey will be conducted to document the pre-construction condition of the hardbottom using quadrat assessments, sediment measurements and video/photo documentation. Additionally, the PEP Reef located near R-81 to R-83 will be qualitatively assessed during this effort.

Up to sixteen (16) 0.75-m² quadrats will be sampled along each transect to quantify the benthic community. Sediment data will be collected using line-intercept and 1-m interval sediment depth measurements, and video documentation will also be collected for the length of each transect. It is anticipated that the effort to delineate the hardbottom edge, install transects and monitor the transects will take up to 17 field days.

Pre-construction data will be compiled and incorporated into an interactive GIS database and *in situ* data will be entered into an Access database. Data entry, reduction, archiving, and analysis time is included in the cost estimate to address the data management and reporting requirements for those 17 days of field operations.

Task 5: Deliverable

Raw data will be provided to FDEP and the County within 45 days of completion of the survey. This includes a PDF of the scanned datasheets, excel spreadsheets with quadrat data, interval sediment depth measurements and line-intercept data, shapefiles of the hardbottom edge survey, video and photo documentation. Additionally, APTIM will provide a map of the project area and adjacent hardbottom resources with the hardbottom edge delineation and monitoring transects overlaid onto recent, clear aerial photographs (in digital format). A report is not proposed for the pre-construction monitoring survey.

Task 5: Schedule

The pre-construction monitoring event will take place during the summer (May – September) prior to project construction. Raw data from field operations will be submitted to the County and FDEP within 45 days of completion of the survey.

Task 5: Cost

The lump sum cost for Task 5 is \$147,166.60.

Task 6: Pre-Construction Services

This task is to provide various services in preparation for construction of the Sector 5 Beach Restoration Project. Work for this task primarily consists of email and phone correspondence between APTIM, the County, M&E, FDEP and the Contractor. The County will be informed and/or copied on all pertinent correspondences. A fixed schedule cannot be provided because it is unclear when the final permits will be issued, when the project can be awarded, and how the Contractor's construction schedule will be structured. APTIM will attempt to execute each phase of the work in as expeditious a manner as possible.

Task 6: Scope of Work

- **Bid Development, Solicitation, and Awarding:** In conjunction with the construction plans and specifications, front-end documents are developed to assist bid solicitation and award. These documents outline contractual obligations, and define the responsible parties and their roles. It is assumed that the County will provide their front-end documents for inclusion into the bid package as in past projects. APTIM will assist the County with the solicitation and award of the project. APTIM will prepare for and attend a pre-bid meeting to describe the project and answer questions for potential bidders. APTIM will respond to questions submitted by potential bidders via an addendum. APTIM will review the bids for completeness; assess the capability of the bidder to complete the work in a timely fashion; assess the capability of the bidder to perform the work within their bid amount; and assess the capability of the bidder to perform the work in compliance with permit conditions and plans and specifications. Following this review, APTIM will provide the County a letter of recommendation, via email, as to whether the low bidder is sufficiently responsive and capable to perform the work as required. This letter will be provided within 5 days of the bid submittals.
- **Pre-Construction Submittals:** The permit conditions and specifications require that the Contractor submit various items for review and approval prior to construction. APTIM will review these submittals for completeness. Correspondence regarding the pre-construction submittals will be via phone and email. The County will be informed and/or copied on correspondences regarding pre-construction submittals.
- **Pre-Construction Meeting:** APTIM will prepare for, attend, and lead a pre-construction meeting with the permitting agencies and the Contractor. Following the meeting with the permitting agencies, the County, APTIM and the Contractor will meet to discuss other aspects of the project. APTIM will take notes from the meetings and distribute draft meeting minutes via email within 10 days of the meeting. If comments are received, the meeting minutes will be revised and redistributed via email.
- **Pre-Construction Design Update:** The Contractor will be required to conduct and submit a pre-construction survey of the project area. APTIM will review this data for accuracy, overlay the bid template on the updated survey data, and calculate the fill volume. The updated fill volume will differ from the bid volume due to inclusion of more closely spaced lines and natural changes in the beach profile since the design survey. APTIM

will discuss the updated fill volume with the County and revise the construction template to meet the County's budget and align with permit conditions. A revised template for each pay profile will be provided to the Contractor via email. The County will be copied on correspondence regarding the design update.

Task 6: Cost

The lump sum cost for Task 6 is \$15,187.65.

Task 7: During Construction Services

This task is to provide various services during construction of the Sector 5 Beach Restoration Project. Work for this task primarily consists of email and phone correspondence between APTIM, the County, FDEP and the Contractor. The County will be informed and/or copied on all pertinent correspondences.

Task 7: Scope of Work and Deliverables

- **Weekly Construction Progress Meetings and Site Observations:** APTIM will coordinate and conduct weekly construction progress meetings with the County and Contractor. APTIM will direct the meeting, covering work progress and schedule, conformance to plans and specifications, and other relevant issues that need to be addressed. APTIM will distribute draft meeting minutes via email within 5 days of the meeting. If comments are received, the meeting minutes will be redistributed via email. The Engineer of Record (EOR) for the project will attend and conduct these weekly meetings. If the EOR is unable to attend, another Professional Engineer registered in the State in the State of FL will attend and conduct the meeting. The Sr. Project Manager or his designee will also be available to attend meetings as needed up to a total of four (4) meetings. Prior to each meeting, APTIM will conduct a site visit to observe areas under active construction, staging areas, and access points. Recently completed beach sections will be observed for general conformance with the plans and specifications. Representative sand samples will be collected within recently completed beach sections. These samples will be visually analyzed for general conformance with the permit conditions, and stored for up to one year. Up to ten (10) samples will be analyzed in APTIM's geotechnical laboratory for grain size, silt content, carbonate content, and Munsell color to ensure conformance of the fill material with permit conditions. The proposed budget for this task accounts for up to twenty (20) construction progress meetings and site observations. All travel costs are based from the Boca Raton office.
- **Construction Administration:**
 - APTIM will make determinations on non-conforming and unauthorized work as described in the project plans and specifications.
 - APTIM will assist the County to prepare field changes or change orders to be executed by the Contractor, recommended for approval by APTIM and agreed to by the County. These documents will be submitted electronically via email unless they must be sealed, at which point a hard copy will be provided along with an electronic copy at the time of issuance. This scope of work is based on the assumption that there will be up to three (3) change orders and two (2) field adjustments.

- APTIM will review and respond to correspondence from the Contractor (through the County) on an as needed basis. APTIM will also respond to Contractor questions via phone. APTIM will provide necessary interpretations or clarifications of the contract documents requested by the Contractor. If the questions are sufficiently technical or the response may deviate from the plans and specifications, APTIM will document these conversations and circulate a summary to the County and Contractor via e-mail.
- APTIM will consult with the County, the Contractor, and requisite regulatory agencies to review and document that the County has fulfilled reporting requirements cited in the permits. APTIM will prepare a summary of specific permit conditions and requirements for each applicable permit and the required date for compliance. APTIM will also assist the County with documentation of permit compliance.
- **Monthly Invoice Recommendations:** APTIM will review monthly invoices submitted by the Contractor, and determine the amount of payment due based on completion of work. Survey data will be analyzed to confirm accuracy, verify the progress, and to ensure compliance with the plans and specifications. A letter of payment recommendation will be submitted to the County along with the Contractor's pay request. Payment recommendations will be submitted to the County within three (3) days of their receipt from the Contractor. Payment recommendation letters will be submitted electronically via email.

Task 7: Schedule

A fixed schedule cannot be provided because it is unclear when the final permits will be issued, when the project can be awarded, and how the Contractor's construction schedule will be structured. APTIM will attempt to execute each phase of the work in as expeditious a manner as possible.

Task 7: Cost

The lump sum cost for Task 7 is \$73,831.00.

Task 8: Beach Profile Check Surveys

APTIM proposes to conduct wading depth beach profile surveys at FDEP R-monuments during construction. The purpose of these surveys is to provide an independent check for the County of the accuracy of the Contractor's surveys.

Task 8: Scope of Work

APTIM will perform wading depth beach profile surveys at FDEP R-monuments. This scope of work assumes no more than one (1) mobilization of APTIM's survey crew will occur, and no more than seventeen (17) survey lines will be collected.

Task 8: Deliverable

APTIM will provide the County with cross-sections showing APTIM's survey, the design template, and, as available at the time of the deliverable, the Contractor's pre and post-construction profiles. This information will be provided electronically via email.

Task 8: Schedule

The final deliverable for the work will be submitted within 7 days of the collection of the survey.

Task 8: Cost

The lump sum cost for Task 8 is \$7,904.65.

Task 9: Project Completion Services

This task is to provide various services near the completion and immediately following construction of the Sector 5 Beach Restoration Project.

Task 9: Scope of Work and Deliverables

- **Substantial Completion and Final Walkthrough:** APTIM will conduct one substantial completion walkthrough with the County and Contractor following beach fill placement. APTIM will assist the County in the preparation of a punch list of items to be completed by the Contractor prior to final acceptance. APTIM will conduct a final walkthrough with the County following site restoration, installation of dune vegetation, completion of punch list items, and demobilization. Upon completion of the project, APTIM will provide recommendations concerning final payment to the Contractor and release of any retained percentage. The Engineer of Record will attend both walkthroughs.
- **Post-Construction Project Report and Certification:** Upon completion of the project, a Post-Construction Project Report will be prepared and submitted to the County. The report will include project personnel, construction methodology, significant construction milestone dates, sediment sample gradation analyses, construction quantities, construction costs, construction deviations and change orders, and beach profiles cross-sections showing pre-construction and final as-built transects. The Post-Construction Project Report will be submitted to the County within thirty (30) days of receiving the post-construction beach profile survey data. APTIM will also facilitate the preparation and submittal of requisite project completion certification letters and/or as-built drawings to the permitting agencies.

Task 9: Schedule

A fixed schedule cannot be provided because it is unclear when the final permits will be issued, when the project can be awarded, and how the Contractor's construction schedule will be structured. APTIM will attempt to execute each phase of the work in as expeditious a manner as possible.

Task 9: Cost

The lump sum cost for Task 9 is \$11,942.30.

Task 10: Immediate Post-Construction Biological Monitoring

The Biological Monitoring Plan developed for the Sector 5 project during permitting will require pre- and post-construction biological monitoring adjacent to the project area to monitor for potential secondary impacts to nearshore natural hardbottom. The scope for this task is based on early coordination with FDEP and the FDEP Standard Operating Procedures for Nearshore Monitoring of Beach Nourishment Projects (FDEP, 2016). The immediately post-construction nearshore hardbottom monitoring shall include:

- 1) Hardbottom edge mapping
- 2) Monitoring permanent transects

Task 10: Scope of Work

- **Hardbottom Edge Mapping:**

APTIM shall map the position of the nearshore hardbottom edge for the entire Sector 5 project area, including 1000 feet north and 2000 feet south of the project area (R-69 to R-88) for a length of approximately 3.6 miles (the hardbottom edge is further offshore beyond 2000 feet south of the project area). A buoy with a Differential Global Positioning System (DGPS) antenna linked to a topside laptop computer running HYPACK navigational software will be towed by divers to record the position of the nearshore hardbottom edge. The divers will follow the inshore contour of the most prominent hardbottom-sand border. The purpose of the survey is to compare the immediate post-construction edge delineation to the pre-construction delineation.

- **Monitoring Permanent Transects:**

The 23 transects established during pre-construction will be monitored to document the immediate post-construction condition of the hardbottom using quadrat assessments, sediment measurements and video/photo documentation. The PEP Reef located near R-81 to R-83 will also be qualitatively assessed during this effort.

Up to sixteen (16) 0.75-m² quadrats will be sampled along each transect to quantify the benthic community. Sediment data will be collected using line-intercept and 1-m interval sediment depth measurements, and video documentation will also be collected for the length of each transect. It is anticipated that the effort to delineate the hardbottom edge and monitor the transects will take up to 12 field days.

Immediate post-construction data will be compiled and incorporated into an interactive GIS database and *in situ* data will be entered into an Access database. Data entry, reduction, archiving, and analysis time is included in the cost estimate to address the data management and reporting requirements for those 12 days of field operations.

Task 10: Deliverable

Raw data will be provided to FDEP and the County within 45 days of completion of the survey. This includes a PDF of the scanned datasheets, excel spreadsheets with quadrat data, interval sediment depth measurements and line-intercept data, shapefiles of the hardbottom edge survey, video and photo documentation. Within 90 days after completion of the immediate post-construction survey, a nearshore hardbottom monitoring report shall be submitted. This report shall provide a comparative analysis of the pre-construction conditions documented on the



hardbottom to the post-construction conditions. The results of the hardbottom edge mapping survey shall also be included in these reports with discussion of changes over time.

Task 10: Schedule

The immediate post-construction monitoring event will take place during the summer (May – September) following project completion. Raw data from field operations will be submitted to the County and FDEP within 45 days of completion of the survey and a monitoring report will be submitted within 90 days of completion of the survey.

Task 10: Cost

The lump sum cost for Task 10 is \$123,022.95.

Summary

Task 1: Design Update Post-Irma	\$ 4,398.00
Task 2: Hardbottom Edge Delineation	\$ 10,763.00
Task 3: Plans and Specifications	\$14,959.00
Task 4: ECL Establishment	\$9,916.65
Task 5: Pre-Construction Biological Monitoring	\$147,166.60
Task 6: Pre-Construction Services	\$15,187.65
Task 7: During Construction Services	\$73,831.00
Task 8: Beach Profile Check Surveys	\$ 7,904.65
Task 9: Project Completion Services	\$11,942.30
Task 10: Immediate Post-Construction Biological Monitoring	\$123,022.95
The total lump sum cost of this proposal for Work Order #23 is	\$419,091.80

Thank you for the opportunity to serve Indian River County. We look forward to continuing to provide successful professional services to the County. Please do not hesitate to call if you have any questions.

Sincerely,

William Reilly, P.E.
Senior Coastal Engineer
Aptim Coastal Planning & Engineering, Inc.

Enclosure

- cc: Thomas Pierro, P.E. D.CE, APTIM
- Michelle Pfeiffer, P.E., APTIM
- Stacy Buck, APTIM
- David Swigler, P.E., APTIM
- Debbie Neese, APTIM

Authorized Corporate Signature

Thomas Pierro

Printed Name

Director of Operations

Title

EXHIBIT 2



SPM REVISION: 2017 - REV 17.3a
PROJECT NUMBER: 636234954
PROPOSAL NUMBER: 636234954.00039410

Work Order #23
Sector 5 Permitting and Construction Services
Indian River County, FL

Summary of Cost by Task

Task Number	Task Name	Labor	Sub-contractors	Equipment	Materials	Mobilization/Travel	Totals
Task 1	Design Update Post-Irma	\$ 4,398.00	\$ -	\$ -	\$ -	\$ -	\$ 4,398.00
Task 2	Hardbottom Edge Mapping	\$ 10,763.00	\$ -	\$ -	\$ -	\$ -	\$ 10,763.00
Task 3	Plans and Specifications	\$ 14,959.00	\$ -	\$ -	\$ -	\$ -	\$ 14,959.00
Task 4	ECL Establishment	\$ 9,726.00	\$ -	\$ 118.65	\$ -	\$ 72.00	\$ 9,916.65
Task 5	Pre-Construction Biological Monitoring	\$ 112,546.00	\$ -	\$ 20,757.60	\$ 5,115.00	\$ 8,748.00	\$ 147,166.60
Task 6	Pre-Construction Services	\$ 14,997.00	\$ -	\$ 118.65	\$ -	\$ 72.00	\$ 15,187.65
Task 7	During Construction Services	\$ 69,658.00	\$ -	\$ 2,373.00	\$ -	\$ 1,800.00	\$ 73,831.00
Task 8	Beach Profile Check Surveys	\$ 7,263.00	\$ -	\$ 533.65	\$ -	\$ 108.00	\$ 7,904.65
Task 9	Project Completion Services	\$ 11,597.00	\$ -	\$ 237.30	\$ -	\$ 108.00	\$ 11,942.30
Task 10	Post-Construction Biological Monitoring	\$ 98,486.00	\$ -	\$ 14,809.95	\$ 3,375.00	\$ 6,352.00	\$ 123,022.95
Totals =		\$ 354,393.00	\$ -	\$ 38,948.80	\$ 8,490.00	\$ 17,260.00	\$ 419,091.80

Submitted By: William Reilly
Submitted To: Indian River County
Submission Date: 12/11/17



SPM REVISION: 2017 - REV 17.3a
 PROJECT NUMBER: 636234954
 PROPOSAL NUMBER: 636234954.00039410

Work Order #23
Sector 5 Permitting and Construction Services
Indian River County, FL

Summary of Labor Hours and Cost

Labor Title	Labor Bill Rate	Design Update Post-Irma		Hardbottom Edge Mapping		Plans and Specifications		ECL Establishment		Pre-Construction Biological Monitoring		Pre-Construction Services		During Construction Services		Beach Profile Check Surveys		Project Completion Services		Post-Construction Biological Monitoring		Totals	
		Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		Task 7		Task 8		Task 9		Task 10		Labor Hours	Cost
		Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost	Labor Hours	Cost		
Senior Project Manager	\$ 185.00	2	\$ 370.00	1	\$ 185.00	4	\$ 740.00	7	\$ 1,295.00	1	\$ 185.00	10	\$ 1,850.00	48	\$ 8,880.00	-	\$ -	12	\$ 2,220.00	1	\$ 185.00	86	\$ 15,910.00
Project Manager/Sr. Coastal En	\$ 165.00	24	\$ 3,960.00	6	\$ 990.00	59	\$ 9,735.00	39	\$ 6,435.00	4	\$ 680.00	44	\$ 7,280.00	240	\$ 39,600.00	4	\$ 660.00	37	\$ 6,105.00	4	\$ 660.00	461	\$ 76,065.00
Senior Coastal Engineer	\$ 165.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
Coastal Engineer I	\$ 105.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	36	\$ 3,780.00	174	\$ 18,270.00	-	\$ -	24	\$ 2,520.00	-	\$ -	234	\$ 24,570.00
Professional Surveyor & Mapped	\$ 125.00	-	\$ -	-	\$ -	2	\$ 250.00	4	\$ 500.00	-	\$ -	-	\$ -	-	\$ -	13	\$ 1,625.00	-	\$ -	-	\$ -	19	\$ 2,375.00
Surveyor	\$ 95.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	26	\$ 2,470.00	-	\$ -	-	\$ -	26	\$ 2,470.00
Survey Technician	\$ 80.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	26	\$ 2,080.00	-	\$ -	-	\$ -	26	\$ 2,080.00
Senior Marine Biologist	\$ 120.00	-	\$ -	10	\$ 1,200.00	-	\$ -	-	\$ -	228	\$ 27,360.00	8	\$ 960.00	-	\$ -	-	\$ -	4	\$ 480.00	208	\$ 24,960.00	458	\$ 54,960.00
Marine Biologist II	\$ 105.00	-	\$ -	45	\$ 4,725.00	-	\$ -	-	\$ -	632	\$ 66,360.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	564	\$ 59,220.00	1,241	\$ 130,305.00
Professional Geologist	\$ 150.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	2	\$ 300.00	4	\$ 600.00	-	\$ -	-	\$ -	-	\$ -	6	\$ 900.00
Geologist I	\$ 95.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	20	\$ 1,900.00	-	\$ -	-	\$ -	-	\$ -	20	\$ 1,900.00
Senior CAD Operator	\$ 125.00	-	\$ -	1	\$ 125.00	2	\$ 250.00	-	\$ -	1	\$ 125.00	1	\$ 125.00	-	\$ -	-	\$ -	-	\$ -	1	\$ 125.00	6	\$ 750.00
CAD Operator	\$ 90.00	-	\$ -	3	\$ 270.00	36	\$ 3,240.00	-	\$ -	-	\$ -	5	\$ 450.00	-	\$ -	4	\$ 360.00	-	\$ -	-	\$ -	48	\$ 4,320.00
GIS Operator	\$ 100.00	-	\$ -	32	\$ 3,200.00	2	\$ 200.00	-	\$ -	8	\$ 800.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	12	\$ 1,200.00	54	\$ 5,400.00
Clerical	\$ 68.00	1	\$ 68.00	1	\$ 68.00	8	\$ 544.00	22	\$ 1,496.00	-	\$ -	4	\$ 272.00	6	\$ 408.00	1	\$ 68.00	4	\$ 272.00	-	\$ -	47	\$ 3,196.00
Boat Captain	\$ 82.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	208	\$ 17,056.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	148	\$ 12,136.00	356	\$ 29,192.00
Equipment	-	-	\$ -	-	\$ -	-	\$ -	-	\$ 118.65	-	\$ 20,757.60	-	\$ 118.65	-	\$ 2,373.00	-	\$ 533.65	-	\$ 237.30	-	\$ 14,809.95	-	\$ 38,948.80
Materials	-	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ 5,115.00	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ 3,375.00	-	\$ 8,490.00
Mobilization/Travel	-	-	\$ -	-	\$ -	-	\$ -	-	\$ 72.00	-	\$ 8,748.00	-	\$ 72.00	-	\$ 1,800.00	-	\$ 108.00	-	\$ 108.00	-	\$ 6,352.00	-	\$ 17,260.00
TOTAL		27	\$ 4,398.00	99	\$ 10,763.00	113	\$ 14,959.00	72	\$ 9,916.65	1,082	\$ 147,166.60	110	\$ 15,187.65	492	\$ 73,831.00	74	\$ 7,904.65	81	\$ 11,942.30	938	\$ 123,022.95	3,088	\$ 419,091.80

Submitted By: William Reilly
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