MEMORANDUM

Date: 16 February 2016

To: M. Acreman, P.E. – City of Gulf Shores, AL

From: Albert E. Browder, Ph.D., P.E. AEB
Senior Engineer, Project Manager

Re: Task Order 2016-01:
Year-3 Annual monitoring
Engineered beach nourishment project – Gulf Shores, AL

Please see the attached Task Order for the Year-3 physical monitoring survey of engineered beach conditions along the East and West Beach Gulf Shores segments of the Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project, as described in the project permits and associated physical monitoring plan. In addition, the project borrow areas utilized in the 2012-2013 project will be re-surveyed to assess their condition and any changes that may have occurred at these sites.

The beach profile survey and analyses will update the condition of the engineered beach and will document conditions prior to the 2016 storm season. As in previous efforts, surveys will be performed by a professional survey firm, under the direction of a Certified Hydrographic Surveyor. That survey is currently scheduled to occur in May 2016.

The subtasks and cost listed in the Task Order represent the Gulf Shores share of the monitoring work proposed for the entire three-party project. The survey profiles and digital aerial orthophotography has been divided amongst the three parties based upon shoreline length, while the borrow area surveys and analysis for the unified project report are split evenly into thirds. The Task Order is thus written for the Gulf Shores portion of the annual monitoring.

NOTE: in accordance with communication from the USFWS after the 2015 beach tilling operations, tilling is no longer required for the project until it is once again renourished.

Please do not hesitate to contact us with any questions. Thank you.

olsen associates, inc. | 2618 Herschel Street | Jacksonville, FL 32204 | 904.387.6114 | FAX 904.384.7368
www.olsen-associates.com

CITY OF GULF SHORES, AL
Task Order Memorandum

To:	Olsen Associates, Inc. 2618 Herschel St. Jacksonville, FL 32204	**Date:**	16 February 2016
		Contract:	Coastal Engineering
		Request Made By:	Mark Acreman, P.E.
		Request Received By:	Albert E. Browder, Ph.D., P.E.
		Task Order No:	2016-01

Task Order: 2016 Year-3 Annual Physical Monitoring for
Engineered Beach Project – Gulf Shores Segments
Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project

Consultant shall complete the 2016 Year-3 post-construction annual physical monitoring of the Gulf Shores segments of the three-party Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project, as described in the attached Scope-of-Work (Exhibit A). Survey work shall include updated hydrographic surveys of the project borrow areas excavated in the 2012-2013 nourishment project. Consultant shall make a site assessment visit as part of the annual monitoring survey.

Deliverables for the physical monitoring task shall include a detailed monitoring report documenting the 2016 pre-storm season condition of the engineered beach segments, including updated analyses of the performance of the beach fill since construction (relative to the March 2013 and/or pre-post restoration surveys, as appropriate) and any changes in borrow area conditions. Any anomalous areas (hot-spots, etc.) observed in the data shall be identified and discussed. Two (2) hardcopies of the report shall be delivered to the City along with an electronic *.PDF copy on CD-ROM disc. A signed/sealed set of the beach profile survey maps shall be provided (survey conducted by licensed subcontractor). Electronic copies of the controlled digital aerial orthophotography shall be provided on CD- or DVD-ROM disc. All work shall be performed on a Lump Sum basis.

Fee: $ 52,800.00 (Lump Sum)

Requested Completion Date: Four (4) months from receipt of survey.

Olsen Associates, Inc.	**City of Gulf Shores, AL**
Albert E. Browder, Ph.D., P.E., V.P.	Mr. Robert Craft, Mayor
Date:	Date:
16 February 2016	

2016 Year-3 Annual Physical Monitoring of Engineered Beach Project
Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project
ADEM Permit No. COE-2011-274-COE
USACE Permit No. SAM-2011-0687-DEM

Annual Monitoring Scope of Work

Scope Prepared by:
Olsen Associates, Inc.
2618 Herschel St.
Jacksonville, FL 32204
(904) 387-6114

Overview & Purpose

The purpose of the task is to conduct the 2016 Year-3 annual physical monitoring of the three-party Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project, as directed by the Alabama Department of Environmental Management Permit #COE-2011-274 and its associated physical monitoring plan. The monitoring likewise is conducted as part of the ongoing Beach Monitoring and Maintenance Plan for the engineered beach project to support and maintain the eligibility of the project for FEMA assistance in the event of a declared disaster (e.g., damaging tropical storm impact). The total monitored area extends over eighteen miles, from just east of the AL/FL State Line, to just beyond the Laguna Key subdivision in Gulf Shores, including established survey monuments B-04 eastward to monument A-97 (98 transects, see **Figure 1**). The project likewise includes periodic surveys of the offshore sand borrow sites (last surveyed post-construction in 2013, next scheduled survey in 2016). The project was last nourished in 2012-2013.

<u>Subtask 1.0 – Beach Profile Surveys</u>

Consistent with the physical monitoring plan and previous surveys of the project shoreline, a certified hydrographic surveyor (subcontractor) will conduct the beach and offshore project surveys for the Year-3 annual monitoring. These data shall be collected in accordance with Standards of Practice for Surveying in the State of Alabama and in general conformance with the Florida Department of Environmental Protection standards for data collection for monitoring projects
www.dep.state.fl.us/beaches/publications/pdf/PhysicalMonitoringStandards.pdf

98 beach and offshore profile lines, B-04 to A-97, shall be surveyed and the data provided to the Engineer (Orange Beach – 39 lines, GSP – 12 lines, Gulf Shores – 47 lines, See **Figure 2**). Engineer shall provide ongoing liaison tasks with Client, survey subcontractor, and with neighboring Bon Secour National Wildlife Refuge personnel (B-04 to A-01).

Concurrent with the beach profile surveys, hydrographic surveys of the three borrow areas (#1, #3, and #5) excavated in the 2012-2013 nourishment project shall be conducted at 200-ft line spacings across the permitted area and the adjacent 500-ft buffer zone.

Continued…

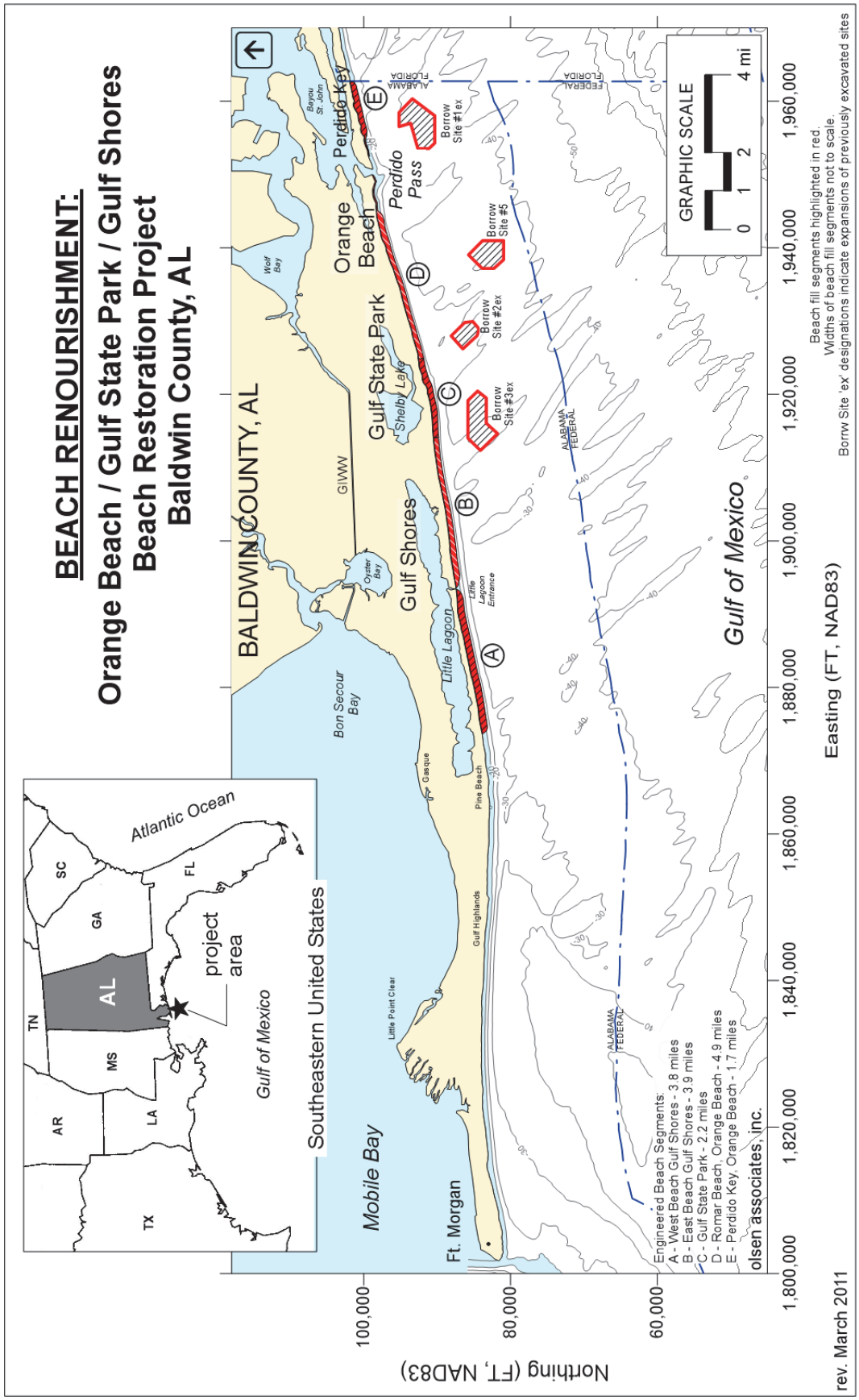

Figure 1 Location map – Orange Beach/Gulf State Park/Gulf Shores Beach Restoration Project – Baldwin County, AL Plotted borrow sites indicate the 2012-2013 site limits (Borrow Site #2 was not utilized in 2012-2013). Monitoring lines extend west and east beyond the fill limits shown.

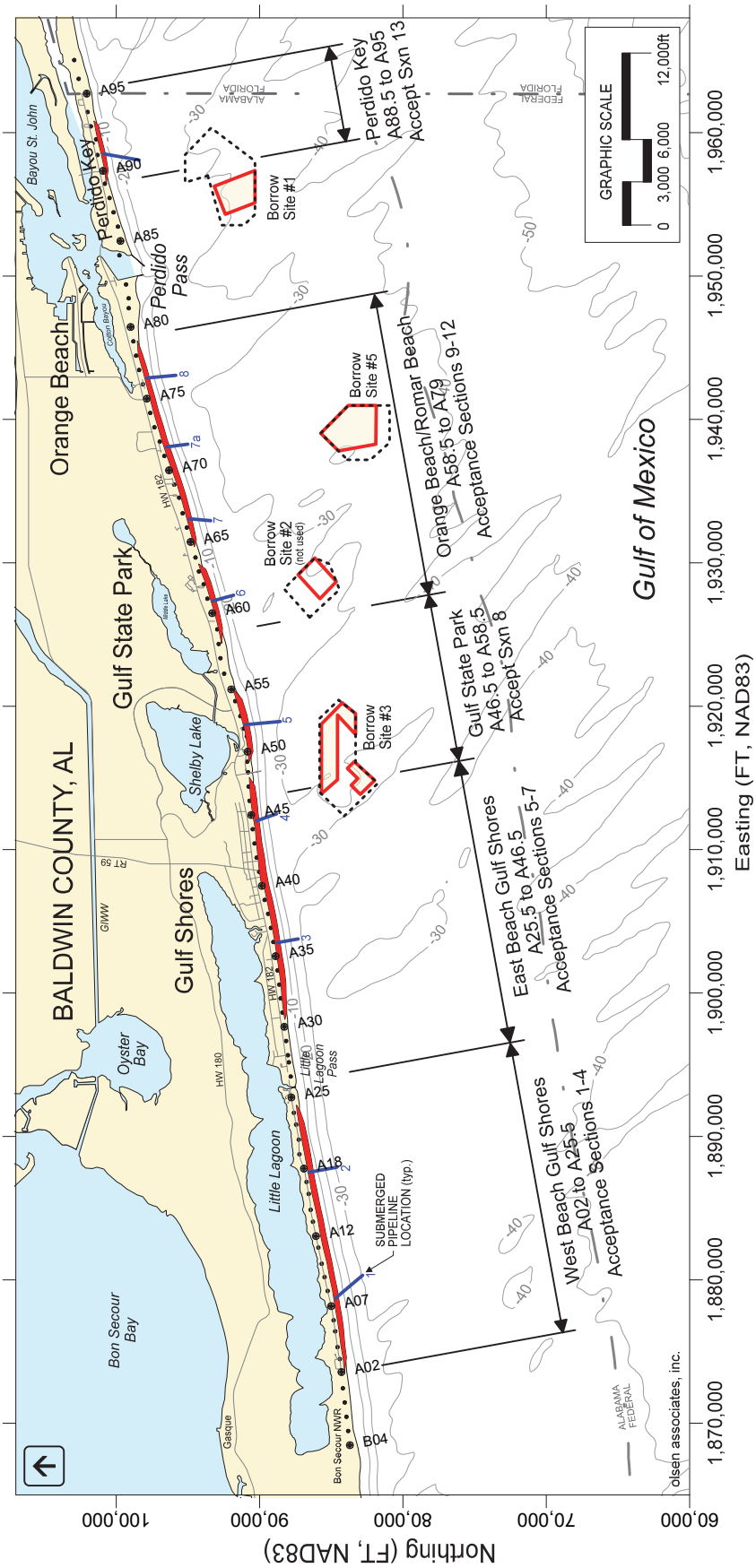

Figure 2 Project Limits and Monument Locations for the 2012/2013 renourishment of the Orange Beach / Gulf State Park / Gulf Shores Beach Restoration Project.

Subtask 1.0 – Deliverables Surveyor shall provide electronic copies of the survey data in the prescribed datums to the Engineer. Surveyor shall likewise provide to Engineer two (2) signed and sealed hardcopies of the survey data for each Owner group, in either planview or beach profile section view format (one set for Engineer's records, one set to be delivered to respective Owner).

Subtask 2.0
Digital Aerial Orthophotography

Utilizing a qualified subcontractor experienced with the area, controlled digital color aerial orthophotography photography at approximately low tide shall be flown at the same approximate time of the annual beach survey. Efforts will be taken to maximize water clarity and light penetration in the shallow nearshore areas (with consideration to the tide stage). These data shall be collected in accordance with the Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems (FDEP BBCS) monitoring standards for beach erosion control projects
www.dep.state.fl.us/beaches/publications/pdf/PhysicalMonitoringStandards.pdf

The limits of photography shall begin at a point approximately one mile west of Laguna Key in Gulf Shores, AL, and shall extend westward along the Gulf of Mexico shoreline to a point approximately one mile east of the AL/FL State Line. Digital orthophotos (tiles, with associated world files) will be produced, corrected to the State Plane Coordinate System (NAD83, Alabama West Zone Zone). Aerials shall be flown at an altitude sufficient to produce an image resolution of 0.4-ft/pixel.

Subtask 2.0 – Deliverables Aerial photography subcontractor shall provide electronic copies of the spatially-referenced imagery (in MrSid and *.TIFF file format, with world files) on DVD-ROM disc. Each of the three Owners will receive copies of all imagery and associated data, similarly provided on DVD-ROM disc. If desired, contact prints of the aerial photos (at 1:6000 scale, similar to 9x9 contact prints) may be obtained at additional cost.

Subtask 3.0
QA/QC, analyses, management, engineering and reporting, regulatory documentation.

The Consultant shall prepare a detailed annual project monitoring report. The purpose of the report shall be to summarize the annual as well as cumulative data base and to assess project performance. The report includes graphic presentations of temporal and cumulative changes of selected beach contours over time. Volumetric changes at each survey profile and throughout the limits of fill shall be computed and presented in tabular and graphic forms. Aerial photography will be utilized to further analyze shoreline changes that may occur between survey lines (beach cusps, rhythmic bar features, etc.). Changes over time within and adjacent to the constructed borrow areas shall be quantified and discussed (when surveyed). Analyses shall discuss shoreline change trends, potential cause and effect relationships, building proximity (and vulnerability) to the MHWL, storm impacts, other littoral impacts, and a local sediment budget for the area of interest. Net changes to the adjacent shorelines shall be assessed.

Major report(s) of findings will be submitted annually approximately 120 days subsequent to each major monitoring survey. The surveys, aerials, and reports have proven invaluable in documenting not only pre-storm conditions for FEMA-declared disasters (Hurricanes Ivan, Dennis, Katrina, Gustav, Ike, Ida, and Isaac), but also providing clear information regarding the efforts of the three-party Owner group

in maintaining an engineered beach eligible for post-disaster assistance from FEMA. This eligibility is critical for the post-storm restoration of the project.

Sub-task includes:

- Contract and Subcontractor management,
- Data quality control and quality assurance,
- Data assimilation/formatting per contract specifications,
- Permit maintenance and annual reporting to regulatory agencies (ADEM, COE, DCNR),
- Update of post-construction history:
    - Overall project history
    - Storms
    - Wave climate for prior year
    - Other beach impacts, such as oil-spill cleanup activities
    - Beach maintenance activities,
- Update of sea turtle nesting activities upon project shoreline,
- Analysis of shoreline position changes (graphical and tabular data created):
    - Most recent annual intersurvey-period
    - Since renourishment (2012-2013)
    - Since restoration (pre-restoration dates vary)
    - Interpretation of aerial photography and effects of alongshore variations
- Analysis of beach volume changes (graphical and tabular data created):
    - Most recent annual intersurvey-period
    - Since renourishment (2012-2013)
    - Since restoration (pre-restoration dates vary)
    - Analysis of percentage of placed sand remaining
    - Interpretation of aerial photography and effects of alongshore variations
- Analysis of borrow area changes and sand volume status (when surveyed: ’13, ’16)
- Interpretation and summary of overall project performance
    - Relative to design intent and local sediment budget
    - Relative to particular beach impacts experienced
- Recommendations for Future Activities,
- Preparation of historical beach profile plots, including most recent survey,
- Preparation of shoreline aerial maps (when aerials flown),
- Assembly of submittals
    - Electronic copy of report (PDF format)
    - Aerial photography (DVD-ROM discs, contact prints, if requested)
- Document preparation, printing, and distribution

<u>Subtask 3.0 – Deliverables</u> As deliverables for subtask 3.0, the three-party Owner group shall each receive two hardcopies of the annual monitoring report (prepared jointly as one report encompassing the entire 18+ miles of monitored shoreline), and an electronic copy of the report in *.PDF format on CD-ROM Disc.