

CITY OF CORPUS CHRISTI

Service Agreement No. 1986
AMENDMENT NO. 3 to the
CONTRACT FOR PROFESSIONAL SERVICES

The City of Corpus Christi, Texas, hereinafter called "CITY," and Texas A & M University Corpus Christi, hereinafter called "TAMU-CC," agree to the following amendment to the Contract for Professional Services for Packery Channel Monitoring Project (Project No. 18140A) as authorized and administratively amended by:

Table with 4 columns: Amendment, Date, Approval, Amount. Rows include Original Contract, Amendment No. 1, and Amendment No. 2.

IN THE ORIGINAL CONTRACT, EXHIBIT A, SCOPE OF SERVICES, shall be modified as shown in the attached Exhibit A.

IN THE ORIGINAL CONTRACT, COMPENSATION shall be modified as shown in the attached Exhibit A for an additional fee not to exceed \$156,472.00 for a total restated fee not to exceed \$401,451.00.

All other terms and conditions of the November 2, 2018 contract between the "CITY" and "TAMU-CC" and of any amendments to that contract which are not specifically addressed herein shall remain in full force and effect.

CITY OF CORPUS CHRISTI

TEXAS A & M UNIVERSITY CORPUS CHRISTI

Michael Rodriguez Date
Chief of Staff

DocuSigned by: Ahmed Mahdy 8/17/2020
Ahmed Mahdy, Ph.D. Date
Vice President for Research and Innovation
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Ahmed.mahdy@tamucc.edu
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APPROVED AS TO FORM

DocuSigned by: Aimee Alcorn-Reed 8/17/2020
9F018BE19AA04DB...
Legal Department Date

ATTEST

City Secretary Date

Authorized By:
Council

**Packery Channel Monitoring Program
Post-Storm (Hurricane Hanna)
Survey, Analysis, and Assessment
and
Structural Surveys**

**Statement of Work:
28 July 2020 (Revised 13 Aug 2020)**

**Submitted to:
City of Corpus Christi
Department of Engineering Services**

**Submitted by:
Deidre D. Williams
Deidre.Williams@tamucc.edu
The Conrad Blucher Institute for Surveying and Science
Texas A&M University-Corpus Christi**

Introduction

Packery Channel and the adjacent beaches within the project footprint along Mustang Island and North Padre Island were impacted by Hurricane Hanna on 25 and 26 July 2020. This proposal outlines the Packery Channel Monitoring Program (PCMP) tasks that will be applied to assess changes driven by the hurricane and how these changes impact ongoing plans for dredging/nourishment and revetment repairs. This proposal also provides a task to acquire surveys for application to structural assessment and debris/obstacle identification in the channel by coastal engineers selected by the City of Corpus Christi.

The City of Corpus Christi is charged with the management and operation and restoration of Packery Channel and the adjacent beaches along Mustang Island and North Padre Island as per agreement with the Department of the Army (DOA 2003) . The information gathered from the emergency post-hurricane survey will support the City of Corpus Christi in decision making related to post-storm restoration and possible FEMA reimbursement for damage. In addition the information gathered from the study will support the City Staff in; 1) revisions to dredge planning, 2) beach nourishment planning including Beneficial Use Dredge Material (BUDM) placement, 3) bollard relocation along North Padre Island (NPI) Seawall, 3) navigation safety (public notices), and 4) forward planning toward long-term sustainable management of coastal resources (channel and beach).

Basis for Monitoring Plan

A successful management plan for inlet and beach systems is location specific and takes into account the following; 1) dynamic needs of each individual location (no two plans are alike as no two systems are identical), 2) inlet age and history of inlet performance, 3) management approach and funding sources, 4) obligations to formal agreements such as with the Department of the Army (DOA) and Texas General Land Office (TGLO), 5) need for periodic public safety (navigation) advisories, 6) application to FEMA's reimbursement process, and 7) support of City Staff in

planning and long-term management decision making on a broad spectrum of management concerns. In addition, plans must be adaptable to support adaptable management in response to gradual and episodic (storms) change in conditions and need for restoration and adaptive design changes for long-term success and resiliency. Packery Channel is a unique case in inlet management as its primary purpose was environmentally specific and focused with recreational (non-commerce related) navigation and recreational development added to complement the project by the City. The channel was constructed as an environmental restoration project with two goals; 1) provide for increased water exchange between the Gulf of Mexico and the Upper Laguna Madre/Corpus Christ Bay and 2) provide a source of BUDM sand to periodically nourish the beach fronting the NPI Seawall toward reducing storm damage to the landward infrastructure. In addition, the inlet is constructed along a path of a former ephemeral inlet rather than long standing naturally open inlet with no long-term performance history to apply to management guidance. The channel serves a tertiary purpose of providing recreational benefits such as navigation between the Gulf and the Upper Laguna Madre for tourists and the local community. The Monitoring Program meets the management needs of the unique inlet. The PCMP initiated as a collaboration between TAMU-CC, the Galveston District United States Army Corps of Engineers (USACE), and the Engineering Research and Development Center (ERDC). The proposed 2020/2021 monitoring plan represents the contributions and recommendations from City Staff, committees such as the Watershore Beach Advisory Committee (WBAC) and the Island Strategic Action Committee (ISAC) and the Conrad Blucher Institute (CBI). The modifications in the program have, to date, been in response to requests from the ISAC to reduce the annual cost of the monitoring program.

The PCMP has performed seasonal assessments of the channel and adjacent beaches since construction was completed in 2006 with baseline monitoring conducted since 2003. The USACE sponsored the PCMP from 2003-2008 with the City of Corpus Christi sponsoring from 2008 to present. In recent years, the number of survey/assessments was reduced from four to three with sub tasks eliminated at the request of City Staff. Each seasonal assessment provides information that City Staff apply to specific aspects of coastal resource management. The proposed annual effort includes: 1) seasonal channel surveys, 2) annual beach profile surveys, 2) trend analysis and 3) assessment of performance. Three channel surveys are proposed to document change in volume and shoal location and extent. The channel surveys document changes over the winter, spring and summer seasons. Each channel survey/assessment serves a specific purpose. The peak summer seasonal survey 1) marks the anniversary of channel construction in 2006 for long-term performance assessment, 2) documents the peak in annual net shoaling in the channel for application to dredge and beach nourishment planning, and 3) provides guidance to mariners regarding navigation safety due to increases in shoaling that area typical over the summer months. The peak winter seasonal survey documents the season when channel scour (removal) dominates and sand is actively transported out of the channel into the Gulf of Mexico. The peak winter survey/assessment has been applied by City Staff to justify dredge deferral in the past. Deferral of dredging has resulted in significant cost savings to the City. The transitional spring seasonal survey/assessment documents a seasonal period of rapid shoaling and the potential for depth limited navigation at the start of the busy summer season and peak usage that has resulted in the City issuing navigation public safety warnings four (4) times since 2006.

Although conducted seasonally in the past, the 2020/2021 monitoring program includes just one annual beach profile survey (since 2018). This survey is conducted during the late summer and

early fall to capture the peak summer condition. The peak summer survey typically documents a more stable beach along Mustang Island and North Padre Island, in the absence of tropical storm activity. Beach profile data is applied to 1) calculate the total beach volume, 2) determine the annual rate of erosion, and 3) to apply as a template to calculate the needed beach nourishment volume to restore the beach to design width (200 ft). Previously additional surveys have been conducted during March/April to document the winter condition and assess BUDM placement performance. The beach profile data is also archived as the pre-storm data for application to FEMA's reimbursement process should the area be damaged by a hurricane. Monitoring and assessment are also included in proposals for CEPRAs funding nourishment the beach south of Whitecap Blvd.

The post-storm survey tasks are identical to the end of summer annual survey conducted since 2008 and most recently Nov 2019; with one exception that additional beach profiles were added north of Packery Channel in order to support the permitting of planned alongshore redistribution of sand. This allows a determination of change along the entire channel and adjacent beaches due to storm focusing to be assessed. In addition to conducting the survey tasks outlined below, the CBI principal investigator provides, data, assessment, graphics and consultation with the structural engineers for the following 1) post-storm restoration actions, 2) revisions pertinent to permit process, 3) revisions pertinent to restoration process and 4) development of long-term resource management plans toward alternate sand management strategies to supplement BUDM placement along NPI. In addition, the CBI principal investigator supports the FEMA reimbursement process and has served as a primary contact for FEMA representatives following hurricanes in the past (Ike and Harvey) and is able to provide concise answers to FEMA questions in the wake of storm impact to the inlet and beach system.

Structural Surveys

Packery Channel and the adjacent wetlands and beaches were inundated with overbank flooding due to sustained onshore flow into the channel occurring between 25 and 27 July 2020. This proposal outlines the abbreviated (due to funding limitations) emergency post-storm survey of the structures and identification of debris/obstacles in the channel. The surveys will document the physical change of the jetties, revetment and structures surrounding the Packery Channel boat ramp as well as identify submerged obstacles within the channel from the Deposition Basin to the channel mouth. Although proposed, no elevation surveys are included at this time due to funding limitations. The deliverable is suitable for visual interpretation of change and comparison to previous similar surveys conducted following Hurricane Harvey.

The City of Corpus Christi is charged with the management and operation and restoration of Packery Channel and the adjacent beaches along Mustang Island and North Padre Island as per agreement with the Department of the Army (DOA 2003). This data will be provided for application to the initial review of structural integrity and identification of obstacles in the channel for both navigation safety and for dredge planning by coastal engineers contracted by the City of Corpus Christ. The data supports assessment of the need for revisions in repair design and dredge planning and basis for identifying the need for more detailed future surveys.

***Packery Channel Monitoring Program Statement of Work:
Post-Storm Emergency Survey Analysis and Assessment of Packery Channel and Adjacent
Beaches along Mustang and North Padre Island***

The 2020/2021 monitoring Program plan consists of the following tasks. For this emergency survey Task 5 and Task 6 were added to the scope.

Task 1. Annual Fall (Peak Summer) Seasonal Survey, Analysis and Assessment:

N/A

Task 2. Peak Winter Seasonal Survey (Task 1):

N/A

Task 3. Transitional Spring Seasonal Survey:

N/A

Task 4. Meetings: Based on 2019/2020 Requests

- City Engineering/Admin Briefing (1)
 - Committee meetings (2) Island Strategic Action Committee (ISAC) and (2) Watershore Beach Advisory Committee (WBAC)
 - Beach Operations Staff (1)
- Total = 4

Task 5. Shoreline Survey and Assessment

N/A

Task 6. Emergency Post-Storm Survey and Assessment of Packery Channel and the Adjacent Beaches of Mustang and North Padre Island

Full Extent Bathymetric Survey (1) Multibeam sonar (channel) single-beam sonar (Gulf)

-**Extent:** Entire Channel footprint from the intersection of the Gulf Intracoastal Waterway (GIWW) to and including the nearshore around the channel mouth

-**Purpose/Application:**

1) **Emergency post-storm assessment**

2) **Post-storm Revisions to Planning:** Dredge and BUDM beach nourishment

2) **Post-Storm Navigation Safety and Public Safety update:** ID of peak shoaling and potential for depth limited navigation

Supports: Post-storm maintenance, post-storm restoration planning and repair and operation (EIS, DOA Cooperative Agreement) as well as guidance for public safety

- **Beach Profile Survey (1)**

-**Extent A (Study Area):** Adjacent beaches along Mustang Island and North Padre Island from north of Fish Pass to approximately 0.5 mile south of Bob Hall pier along previously occupied transects

-**Extent B (Seawall Focused)** Dense transect grid along the NPI Seawall for accurate nourishment planning

Purpose/Application:

1) Identify areas of storm driven erosion and deposition (resource management planning)

2) Calculate rate of erosion and volume loss due to Hurricane Hanna

- 3) Calculate volume estimated to restore beach elevation and design width (200 ft)
- 4) Apply as post-storm documentation for FEMA reimbursement process or for alternate funding resources TBD
- 5) Apply to support Beach Operations in recovery and restoration process
- 6) Apply to long-term sand management strategies and beach nourishment planning over the post-storm recovery period

Supports: City Ordinance (028494), EIS, DOA Cooperative Agreement and TGLO (CEPRA), joint City/Nueces County Erosion Response Plan (2012), City of Corpus Christi Beach and Dune Management Plan

- **Shoreline Position Survey (1)**

-**Extent:** Mustang Island and North Padre Island
(Fish Pass to 1 mile south of Bob Hall Pier)

-**Purpose/Application:**

- 1) Document storm driven change in beach width that trigger nourishment and management planning and action by Beach Operations
- 2) Identify where the beach is less than 150 ft wide to trigger and guide Bollard relocation along NPI Seawall
- 3) Document areas of storm deposition sand redistribution along seawall or other areas of loss due to storm damage/erosion
- 4) Redefine post-storm lateral limits of shoreline widths in excess of 200 ft for permit applications

Supports:

-Post storm recovery efforts

-**Bollard Relocation:** City Ordinance (028494)

-Long-term beach management planning (joint City/Nueces County Erosion Response Plan (2012), City of Corpus Christi Beach and Dune Management Plan)

-**Permit process**

- **Analysis and Assessment**

-**Channel:**

Purpose/Application:

1. Support modification of Dredge/Nourishment Planning based on changes due to storm forcing during Hurricane Hanna and long-term management strategies
- 2) Identify storm driven increases in shoaling along the entire channel and at the channel mouth for dredge planning and navigation safety
3. Calculate post-storm channel volume change
- 3) Revise guidance reporting for application to dredge and nourishment planning
- 4) Post-storm reporting/presentations: Information and education of staff and community Committees (ISAC, WBAC, City Council, Engineering Dept, Parks and Recreation)

-**Channel:** Navigation Safety 1) ID peaks in shoaling, 2) Public warnings

-**Beach:** 1) Document status and performance of beach nourishment and maintenance

Task 7. Emergency Post-Storm Survey of Coastal Structures and Identification of Debris/Obstacles in Packery Channel from the Deposition Basin to the Channel Mouth

1. Side scan survey:

Purpose: Identify debris and obstacles as well as displaced stone or revetment material

Cost: \$5,850

2. UAS Flight-jetties and revetment (High Resolution Orthorectified Aerial Image) Note: No elevation data

Purpose: Visual structural assessment jetty (may be applied to recommend additional more detailed elevation surveys)

Cost: \$6,450

Performance Period and Schedule

This survey is an emergency survey and assessment to provide guidance following damage during Hurricane Hanna. The survey will be scheduled as soon as possible upon authorization to proceed and be conducted within the scheduling constraints of the surveyors and weather/seas limitations. Analysis and reporting will follow with updates to provide most relevant findings in email and presentation format

Deliverables:

- xyz data and shapefiles (ESRI .shp) files
- Summary report and briefing
- Meetings: (1) City Briefing (1) Beach Operations (2) Committee

Structural Surveys

- Map and Debris Report (no elevation measurements)
- Orthorectified Mosaic Aerial Image (no elevation measurements)

Emergency Event Total Estimated Cost: \$156,472

Signature:

Dr. Ahmed Mahdy
Vice President for Research & Innovation

Estimated Budget Next Page

Table 1. Packery Channel Monitoring Program: Seasonal Surveys, Analysis and Assessment 2020/2021	Estimated Cost
Year 1	
Task 1 – Annual Full Survey and Analysis/Assessment (Peak Summer) Channel Bathymetry (GIWW to Gulf) Beach Profile Shoreline Position Survey	\$ 0.0
Task 2 – Abbreviated Peak Winter Survey and Analysis/Assessment Channel Bathymetry (Basin to Entrance Channel and nearshore Gulf)	\$0.0
Task 3- Transitional/Spring Navigation Hazard Survey and Analysis/Assessment Channel Bathymetry (Basin to Entrance Channel and nearshore in Gulf)	\$0.0
Task 4 – Meetings: Beach Operations and Committee Meetings/presentations 1 Beach Operations 1 Committee Meetings 2 City Staff or Council Briefing	\$3,166
Task 5 – Shoreline Survey and Assessment	\$ 0.0
Task 6 – Emergency Post-Storm Survey Analysis/Assessment (Hurricane Hanna) Channel Bathymetry (GIWW to Gulf) Beach Profile Shoreline Position Survey	\$ 141,006
Task 7 – Structural Surveys for Assessment of Damage Aerial Mosaic Side Scan	\$12,300
Total Authorized Fee Emergency Survey/Assessment	\$ 156,472

References:

- Williams, D.D, 2018a. Packery Channel Monitoring Program, Statement of Work: 2018/2019, Project Tasks and Cost Estimate, Proposal submitted July 2018.
- Williams, D.D. 2018b. SOQ for FY2018 Capital Improvement Projects, Group C, Project 3, Packery Channel Monitoring Program submitted Feb 2018
- DOA 2003. Project Cooperation Agreement for Construction of the North Padre Island Storm Damage Reduction and Environmental Restoration Project, Department of the Army and City of Corpus Christi
- Environmental Impact Statement (EIS) 2003. North Padre Island Storm Damage Reduction and Environmental Restoration Project, Nueces County Texas, Final Environmental Impact Statement, 313 pp and appendices.