

**CITY OF CORPUS CHRISTI
AMENDMENT NO. 3
CONTRACT FOR MONITORING SERVICES**

The City of Corpus Christi, Texas, a Texas home-rule municipal corporation ("City") and **Conrad Blucher Institute at Texas A&M University-Corpus Christi** ("Consultant"), agree to the following amendments to the Contract for Monitoring Services for **Nueces Bay System Salinity and Freshwater Inflow Monitoring 2016-2017 (Project No. 8443)**:

Original Contract	November 12, 2013	Motion No. 2013-170	\$94,605.00
Amendment No. 1	September 23, 2014	Motion No. 2014-134	\$97,687.00
Amendment No. 2	August 25, 2015	Motion No. 2015-090	\$96,428.00

In the Original Contract, Exhibit "A", Scope of Services shall be amended as set forth in the attached Amendment No.3, Exhibit "A".

In the Original Contract, Fees shall be amended based on the modified scope of services in the attached Amendment No. 3, Exhibit "A" for a fee not to exceed **\$97,835**, for a total restated fee not to exceed **\$386,555**.

All other terms and conditions of the November 12, 2013 Contract for Monitoring Services between the City and Consultant, and of any amendments to that contract, which are not specifically addressed herein shall remain in full force and effect.

CITY OF CORPUS CHRISTI

J.H. Edmonds, P.E. Date
Director of Engineering Services

RECOMMENDED

Operating Department Date

APPROVED AS TO LEGAL FORM

Assistant City Attorney Date

APPROVED

Office of Management and Budget Date

TEXAS A&M UNIVERSITY CORPUS CHRISTI

Larry Lloyd Date
Research Specialist II
Conrad Blucher Institute for Surveying and Science
6300 Ocean Drive, Unit 5799
Corpus Christi, TX 78412
(361) 825-5759 Office
Larry.Lloyd@tamucc.edu

Dr. Luis Cifuentes Date
Vice President for Research, Commercialization
and Outreach

ATTEST

City Secretary

Date

Project Name Nueces Bay System
Salinity and Freshwater Inflow
Monitoring 2016-2017
Project Number 8443
Accounting Unit 4010-30220-061
Account 530000
Activity 18022701401EXP
Account Category 30000
Fund Name Water Operating
This is Amend. No. 3 for \$97,835



CONRAD BLUCHER INSTITUTE FOR SURVEYING AND SCIENCE

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Jiangang Dang
1201 Leopard
City of Corpus Christi
Corpus Christi, Texas 78401

17 June, 2016

Dear Daniel,

The statements of work covered herein are submitted to the City of Corpus Christi, referred to as "the City", for consideration. These statements will constitute a fee for services rendered by the Conrad Blucher Institute for Surveying and Science (CBI) at Texas A&M University - Corpus Christi (TAMUCC). Included is an outline of our scope of work and budget to continue the ongoing salinity monitoring efforts in Nueces Bay and Nueces River.

PROPOSED SCOPE OF WORK FOR NUECES BAY SYSTEM SALINITY AND FRESHWATER INFLOW MONITORING: 2016-2017

SUMMARY

Two real-time salinity monitoring stations in the Nueces Bay and one real-time salinity monitoring station in the Nueces River will be covered under this agreement. Station service includes exchange of datasonde monitoring instruments with a freshly calibrated unit every 2-3 weeks, repair and maintenance to all station electronics and components as necessary and an annual inspection in which the condition of all station components are documented. In order to reduce costs, station service frequency will be based on observed marine growth fouling the instruments; for example, every 2 weeks when warmer bay waters foster excessive marine growth and every 3 weeks when water temperatures are cooler. All salinity monitoring stations will primarily report salinity, specific conductance and water temperature. Additionally, all monitoring stations will also report ancillary water quality data including dissolved oxygen, pH, and water depth. All data will be available in graphical and tabular format on the CBI website (<http://www.cbi.tamucc.edu/Nueces-BayWater-Quality-Monitoring>). This proposal covers a period of 1 year.

RESEARCH OBJECTIVES

The Conrad Blucher Institute for Surveying and Science (CBI) at TAMUCC has been operating and maintaining real-time salinity monitoring stations in Nueces Bay and in Nueces River for the City of Corpus Christi since November 1991 in order to help better understand the effects of freshwater inflows on salinity into the Nueces Bay system. The data collected will be used to help the City of Corpus Christi water supply managers determine the quantity and frequency of fresh water pass through events required by the amended Agreed Order between the City and the Texas Commission on Environmental Quality (TCEQ) via the Lake Corpus Christi Weasley Seale Dam. Other benefits of the data collection include collaboration with other researchers in the Nueces delta, namely, the Center for Coastal Studies (CCS) and Harte Research Institute for Gulf of

Mexico Studies (HRI) at TAMUCC, the University of Texas Marine Science Institute (UTMSI) at Port Aransas, the Coastal Bend Bays and Estuaries Program (CBBEP) and the U.S. Army Corps of Engineers (USACE) Fort Worth District. This proposal is for continuation of the aforementioned monitoring efforts in Nueces Bay and Nueces River.

Nueces Bay salinity monitoring by CBI consists of 2 monitoring stations: SALT01 (27° 50' 21" N, 97° 26' 38" W) and SALT03 (27° 51' 5" N, 97° 28' 55" W) and one monitoring station in Nueces River: SALT05 (27° 53' 30" N 97° 36' 37" W). These stations consist of a Hach Hydrolab MS5 water quality datasonde, IP modem, Campbell Scientific CR1000 datalogger, and photovoltaic power system. Primary parameters measured at all monitoring stations include salinity, specific conductance and water temperature. Additionally, ancillary parameters are measured including dissolved oxygen, water depth, and pH. The stations are located in such a manner to track fresh water inflows into Nueces Bay using salinity levels as an indicator of freshwater movement. Relief for required freshwater releases may be taken by the City if the salinity levels in Nueces Bay fall below the Upper Salinity Bounds. A daily running report (<http://lighthouse.tamucc.edu/salrel>) produced by CBI and the Nueces River Authority (NRA) shows the current freshwater relief status.

The City has designed and built a diversion channel and pumping system that, when activated, pumps freshwater from the Nueces River into the Nueces delta and adjacent wetlands starting at the head of the Rincon Bayou channel. The freshwater diversion pumping system is designed to redirect freshwater flowing into Nueces Bay proper to the Nueces Delta in order to most effectively utilize available freshwater by diverting it to the area with the most potential for increased biological productivity. Currently, UTMSI, HRI, and CCS are conducting long-term ecological studies of the effects of this diversion. Two salinity monitoring stations (NUDE2: 27° 53' 19" N, 97° 34' 10" W and NUDE3: 27° 53' 1" N, 97° 31' 59" W) located along the Rincon Bayou were established in 2009 to determine the fate of freshwater diversions from the pipeline. The salinity monitoring stations located in the Nueces Delta are funded by the CBBEP and are not covered in the scope of this proposal but are a part of an overarching hydrodynamic monitoring system.

STATION SERVICE AND MAINTENANCE

Regular site visits will be made to each water quality station every 2-3 weeks during which the datasondes will be exchanged to prevent inaccurate data due to biofouling. During the site visit, readings will be recorded from the deployed datasonde which will then be replaced with a clean, calibrated datasonde after which readings from the freshly deployed datasonde will be recorded. Independent salinity readings will be taken with a portable refractometer and recorded. Maintenance to the station hardware including cleaning solar panels and replacing damaged components will also be performed during regular site visits as needed. Full inspections will be made annually during which the voltage output of every component on the power system will be checked, pictures of every station component will be taken and the desiccant will be replaced. Repair of damaged station components will be performed during regular service visits as needed unless the station damage affects data transmission of the primary data parameters in which an emergency site visit will be conducted. Scheduled site visits may be delayed due to foul weather, vehicle repair, flood conditions, etc. In the event that a service trip is delayed, every effort will be made to complete the scheduled site visit as soon

as it is safe and feasible. A short summary of each site visit conducted will be placed on the station's website and made publically available at all times.

DATA COLLECTION

Each real-time environmental monitoring station has its own webpage created within the website <http://cbi.tamucc.edu>. A custom computer program, written by staff at CBI, polls each station every six minutes. During a poll, averaged readings from the datalogger will be requested. The averages are then placed into the CBI database and reported on the station webpage so that each value will represent a six minute average. All data stored in the CBI database will be publically available on the internet at <http://cbi.tamucc.edu> during the duration of the proposal period. CBI staff performs a quality control check (QC) of all real-time data daily. During a QC, the data will be checked for missing transmissions and data anomalies such as readings outside of a feasible range, readings of a constant value, random spikes, etc. Data anomalies, suspect data, missed transmissions and other factors affecting the data will be posted as a message on each station's webpage. Daily salinity reports are produced showing the running ten and seven day averages as well as the daily average (<http://www.nueces-ra.org/CP/CITY/passthru/index.php>). Monthly salinity levels in relation to the upper and lower salinity bounds are found at <http://lighthouse.tamucc.edu/salrel>, and are used to help determine if the City may take credits to offset scheduled freshwater releases from the storage impounds.

INSTRUMENT CALIBRATION

Hach Hydrolab MS5 Datasonde

Hach Hydrolab MS5s will be serviced and calibrated at a wetlab at TAMUCC. Instruments will be calibrated based on manufacturer recommendation during which the instrument will be placed in a known standard for each parameter and set to match its readings to that standard; all calibration standards used will be NIST traceable. The instruments will then be post-calibrated during which the readings for each parameter will be recorded in the same standard in which it was calibrated. The biofouling will then be removed and any maintenance recommended by the manufacturer will be performed. All calibration and post-calibration records will be available upon request. An annual maintenance agreement with HydrotechZS will be purchased which will cover repair/refurbishment to damaged components on the instruments and an annual quality check including a calibration check of the temperature sensor. Documentation from the annual quality check will be retained at CBI and available upon request.

REPLACEMENT PARTS AND EQUIPMENT

TAMUCC owns and maintains the instrumentation and equipment purchased with funds from this project. In the case of damage, TAMUCC will repair or replace instrumentation as needed to ensure a continuous data collection record as long as enough funds are available. If not enough funds are available, the City will be responsible for replacement or repair of instruments. Replacement equipment will be purchased for this

project and kept in inventory until needed. If additional replacement equipment beyond what is kept in inventory is needed, every effort will be made by CBI and the City to replace needed components.

COLLABORATIVE MONITORING

This proposed continuation of the salinity monitoring program is designed to provide data to support those research efforts currently being done by CCS, UTMSI, HRI, COE, CBBEP, USGS and the City. Should the need or occasion arise where additional monitoring efforts are required, CBI will be in a position to support those efforts.

SCHEDULE OF WORK AND FEE FOR SERVICES

The Conrad Blucher Institute for Surveying and Science at Texas A&M University – Corpus Christi hereby agrees for the duration of one year (1 October, 2016 through 30 September, 2017) to perform all services necessary to provide water quality monitoring, as described in this proposal. The budget for 1 October, 2016 through 30 September, 2017 is \$97,835 and is outlined below. The total award amount will be invoiced in equal, monthly installments over the twelve month period of this contract. A new proposal will be provided for each year of continuing service.

Budget Summary

	TOTAL
Salaries & Benefits	\$49,300
Travel Pool	\$6,870
Supplies	\$9,500
Other Expenses (IP modem fee, freight service warranty)	\$6,800
Indirect	\$25,365
TOTAL	\$97,835