CITY OF CORPUS CHRISTI
AMENDMENT NO. 6
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 River Water Quality, Oso Creek Water Level & City of Corpus Christi Meteorological Monitoring 2016-2017 (Project No. 8443):**

Original Contract	August 30, 2011	Motion No. 2011-187	$92,355
Amendment No. 1	February 28, 2012	Motion No. 2012-047	$224,794
Amendment No. 2	April 17, 2013	Administrative Approval	$46,112
Amendment No. 3	November 12, 2013	Motion No. 2013-171	$93,381
Amendment No. 4	September 16, 2014	Motion No. 2014-120	$98,439
Amendment No. 5	August 25, 2015	Motion No. 2015-091	$99,593

In the Original Contract, Exhibit "A", Scope of Services shall be amended as set forth in the attached Amendment No.6, Exhibit "A".

In the Original Contract, Fees shall be amended based on the modified scope of services in the attached Amendment No. 6, Exhibit "A" for a fee not to exceed **$121,022**, for a total restated fee not to exceed **$775,696**.

All other terms and conditions of the August 30, 2011 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

8/8/16
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

8-10-16
Dr. Luis Cifuentes Date
Vice President for Research, Commercialization and Outreach

ATTEST

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City Secretary Date

Project Name Nueces River Water Quality, Oso Creek Water Level & City of Corpus Christi Meteorological Monitoring 2016-2017
Project Number 8443
Accounting Unit 4010-31501-063
Account 530000
Activity 180227014010EXP
Account Category 30000
Fund Name Water Operating
This is Amendment No. 6 for $121,022
FY 2015-2016 partial certification for $22,000
FY 2016-2017 certify $99,022

TEXAS A&M UNIVERSITY CORPUS CHRISTI | CONRAD BLUCHER INSTITUTE FOR SURVEYING AND SCIENCE

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Mr. Gabriel Ramirez
2726 Holly Rd.
City of Corpus Christi
Corpus Christi, TX 78415

27 July, 2016

Dear Gabriel Ramirez:

The statements of work covered herein are submitted to the City of Corpus Christi Utilities Department (CCUD) 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 to maintain operation of environmental monitoring stations in the Nueces River, Oso Creek and within the City of Corpus Christi under. The following scope of work and budget will reflect an amendment to allow for continuation of the project.

PROPOSED SCOPE OF WORK FOR NUECES RIVER WATER QUALITY, OSO CREEK WATER LEVEL AND CITY OF CORPUS CHRISTI METEROLOGICAL MONITORING: 2016-2017

SUMMARY

Thirteen real-time environmental monitoring stations in the Nueces River, Oso Creek and the City of Corpus Christi will continue to be covered under this agreement. Station service includes exchange of water quality datasonde instruments with a freshly calibrated unit and factory recommended maintenance of water level and meteorological monitoring instrumentation. All meteorological monitoring stations will report air temperature, wind speed, wind direction, liquid precipitation, barometric pressure and relative humidity. In addition to these parameters, water level stations will report water level and stage height and water quality stations will report water temperature, salinity, specific conductance, pH, dissolved oxygen and turbidity. All data will be available in graphical and tabular format on CBI's website (http://cbi.tamucc.edu) for the duration of the project period. This proposal covers a period of 14 months.

RESEARCH OBJECTIVES

Nueces River Water Quality Monitoring

Three water quality stations are located along the lower Nueces River at the Wesley Seale Dam (28° 2' 32" N 97° 52' 5" W), Nueces River Estates (27° 56' 4" N 97° 48' 8" W) and at the Nueces River intake station (27° 52' 2" N 97° 38' 1" W). These stations consist of a Hach Hydrolab MS5 datasonde, Vaisala WXT-520 weather transmitter, IP modem, Campbell Scientific CR1000 datalogger, and photovoltaic power system and will report water temperature, salinity, conductivity, pH, dissolved oxygen, turbidity, air temperature, wind speed, wind direction, liquid precipitation, barometric pressure and relative humidity. The Nueces River Water Quality

stations assist the CCUD in more efficiently treating public water through the monitoring of the water quality, specifically the turbidity, entering the O.N Stevens Water Treatment Plant.

Oso Creek Water Level Monitoring

Three water level monitoring stations are located on bridges along the Oso Creek at Saratoga Rd. near Calle Cuermavaca (~27° 43' 18.26" N 97° 27' 28.55" W), Weber Rd. near Yorktown Blvd. (~27° 41' 19.82" N 97° 25' 45.36" W) and at Staples St. near Oso Pkwy. (~27° 39' 24.89" N 97° 24' 5.89" W). These stations consist of a Campbell Scientific CS-475 radar water level sensor, Vaisala WXT-520 weather transmitter, IP modem, Campbell Scientific CR1000 datalogger, and photovoltaic power system and will report water level and stage height, air temperature, liquid precipitation, barometric pressure and relative humidity. The Oso Creek water level stations will assist the CCUD in predicting water consumption rates and provide meteorological information to residents by measuring rainfall and water level.

Corpus Christi Meteorological Monitoring

Seven meteorological stations are located throughout the City of Corpus Christi at TAMUCC (27° 42' 54" N 97° 19' 43" W), Rodd Field Rd near Wooldridge Rd (27° 40' 34" N 97° 21' 9" W), Carmel Pkwy near S Alameda St (27° 43' 54" N 97° 22' 40" W), Cedar Pass Dr near Sun Valley Dr (27° 41' 6" N 97° 25' 0" W), Del-Mar college east campus (27° 45' 51" N 97° 24' 15" W), Del-Mar college west campus (27° 46' 24" N 97° 26' 24" W) and in Calallen at the Nueces River pump station (27° 52' 4.2" N 97° 37' 54.5" W). These stations consist of a Vaisala WXT-520 weather transmitter, IP modem, Campbell Scientific CR1000 datalogger and a photovoltaic power system and reports air temperature, wind speed, wind direction, liquid precipitation, barometric pressure and relative humidity. A webpage is currently being developed to assist city technicians monitor rainfall at http://www.cbi.tamucc.edu/ccrl/. This webpage will continue to be developed through the duration of the project period.

STATION SERVICE AND MAINTENANCE

Nueces River Water Quality Monitoring

Regular site visits will be made to each water quality station monthly 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 turbidity readings will be taken with a portable turbidimeter 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. The weather transmitter on all water quality stations will also be cleaned and the component WXT-PTUSP will be replaced every two years as recommended by the manufacturer. Data from the weather transmitter will be recorded and the air temperature, wind speed and barometric pressure will be measured with an independent instrument and recoded during each site visit. 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.

Oso Creek Water Level Monitoring

Regular maintenance to water level stations will be conducted every six months. Leveling by CBI will be conducted annually during a regular visit at each water level station to ensure accurate data is being reported. During a leveling site visit, a leveling gun will be used to accurately measure the horizontal and vertical distance between a fixed point and a point on the water level sensor so that the sensor location relative to the NAVD88 datum is known. Leveling site visits will continually monitor and document any drift in the distance from the fixed point to the water level sensor so that correction can be made to the data if needed. A full annual inspection will also be made annually during a regular site visit during which the voltage output of every component on the power system will be checked, pictures of every station component will be taken, the sensor orientation will be checked and the desiccant will be replaced. The creek stage height directly below the sensor will also be measured and the stage offset value will be updated in the water level sensor. One emergency site visit has been budgeted to repair damaged station components as needed and will be used in the event that the damaged component prevents proper data collection or transmission. A short summary of each site visit conducted will be placed on the station's website and publically available at all times.

Corpus Christi Meteorological Monitoring

Regular maintenance to meteorological stations will be conducted every 12 months. One site visit has been budgeted by CBI to conduct a full inspection 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. One emergency site visit have been budgeted to repair damaged station components as needed and will be used in the event that the damaged component prevents proper data collection or transmission. A short summary of each site visit conducted will be placed on the station's website and 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 is publically available on the internet at http://cbi.tamucc.edu and will be available for retrieval 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.

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.

Vaisala WXT-520 Weather Transmitter

The Vaisala WXT-520 weather transmitter does not require a regular calibration. However, the replacement part WXT-PTUSP contains calibration data and will be replaced every two years as recommended by the manufacturer for accurate data collection.

Campbell Scientific CS475 Radar Water Level Sensor

The Campbell Scientific CS475 Radar Water Level Sensor does not require a regular calibration. However, the sensor will be checked for accuracy during annual inspections and will be sent back to the manufacturer for a quality check if the data provided by the sensor becomes suspect.

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 CCUD 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 CCUD to replace needed components.

COLLABORATATIVE MONITORING

This proposed installation and maintenance of environmental monitoring stations will be designed to provide data to support those research efforts currently being done by the CCUD and the Nueces River Authority (NRA). The CBI will work with staff at the CCUD and NRA to provide data, information, instructions, etc. that will help them gather the resources needed to conduct research. 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 14 months (1 August, 2016 through 30 September, 2017) to perform all services necessary to provide environmental monitoring, as described in this proposal. The budget for 1 August, 2016 through 30 September, 2017 is $121,022 and is outlined below. The total amount will be invoiced in equal, monthly installments over the 14 month period of this contract. A new proposal will be provided for each year of continuing service.

BUDGET SUMMARY

	TOTAL
Salaries & Benefits	$68,720
Travel Pool	$2,025
Supplies	$8,167
Other Expenses (IP modem fee, freight, service warranty)	$10,734
Indirect	$31,376
TOTAL	$121,022