

SCOPE OF WORK
NUECES BAY AND NUECES RIVER WATER QUALITY MONITORING,
OSO CREEK WATER LEVEL AND CITY OF CORPUS CHRISTI
METEROLOGICAL MONITORING

January 1, 2021 – December 31, 2023

SUMMARY

This Scope of Work (SOW) provides for the operation, maintenance, and emergency repair of thirteen (13) real-time environmental and meteorological data collection stations located in the Corpus Christi Bay area to include the Nueces River and Bay, Oso Creek, and locations throughout the City of Corpus Christi.

RESEARCH OBJECTIVES

The Conrad Blucher Institute for Surveying and Science (CBI) at Texas A&M University Corpus Christi (TAMU-CC) has been operating and maintaining real-time water quality monitoring stations in the Nueces River Delta for the City of Corpus Christi since November 1991. These systems were installed to assist city personnel with understanding the effects of freshwater inflows on salinity levels in the Nueces Bay system. The data collected at the water quality stations is used to assist City of Corpus Christi personnel in determining effects of fresh water released from the Wesley Seal Dam as part of an amended Agreed Order between the City and the Texas Commission on Environmental Quality (TCEQ). Other benefits of the data collection include collaboration with other researchers in the Nueces delta such as the Coastal Bend Bays and Estuaries Program (CBBEP) and the Nueces River Authority.

Nueces Bay and Nueces River Water Quality Monitoring

Nueces Bay consists of three (3) salinity monitoring stations (*Image 1*):

1. SALT01 (27° 50' 21" N, 97° 26' 38" W)
2. SALT03 (27° 51' 5" N, 97° 28' 55" W)
3. SALT05 (27° 53' 30" N 97° 36' 37" W) in the Nueces River

The primary parameter measured at all three (3) water quality monitoring stations is specific conductance, however, and depending on the capabilities of the datasonde installed, other parameters such as water temperature dissolved oxygen, and Ph (Table 2). The stations are strategically located in the Nueces Delta to provide data directly related to the fresh-water inflows into Nueces Bay using salinity as an indicator.

The City designed and built the Rincon Bayou Pumping station and diversion channel directing freshwater from the Nueces River into the Nueces delta and adjacent wetlands.

Station components and configuration are listed in Table 1 and Table 2, respectively



Image 1: Nueces River Delta, & Bay water quality monitoring locations

Table 1: Water Quality Component List

Component	Type
Water Quality Multiprobe	Hydrolab MS 5/CMS 5
Data logger	CR1000
IP Modem	RV50 w/antenna and booster

Table 2: Water Quality Station Configuration

Station No.	Name	Temp	Specific Conductance	Ph	Do/%sat
072	SALT01	X	X	X	X
074	SALT03	X	X	X	X
076	SALT05	X	X	X	X

Stage Height Monitoring

Three (3) stage height monitoring stations are located on bridges along the Oso Creek (*Image 2*)

1. OCWL01 (~27° 43' 18.26" N 97° 27' 28.55" W) at Saratoga Rd. near Calle Cuernavaca
2. OCWL02: (~27° 41' 19.82" N 97° 25' 45.36" W) at Weber Rd. near Yorktown Blvd.
3. OCWL03: ~27° 39' 24.89" N 97° 24' 5.89" W) at South Staples St. near Oso Pkwy.

These data collection stations will collect stage height, air temperature, precipitation, barometric pressure, and relative humidity (Table 4). The Oso Creek stage height monitoring stations will assist the CCUD in monitoring Oso Creek water levels in relation to adjacent infrastructure.

Station components and configuration are listed in Table 3 and Table 4, respectively

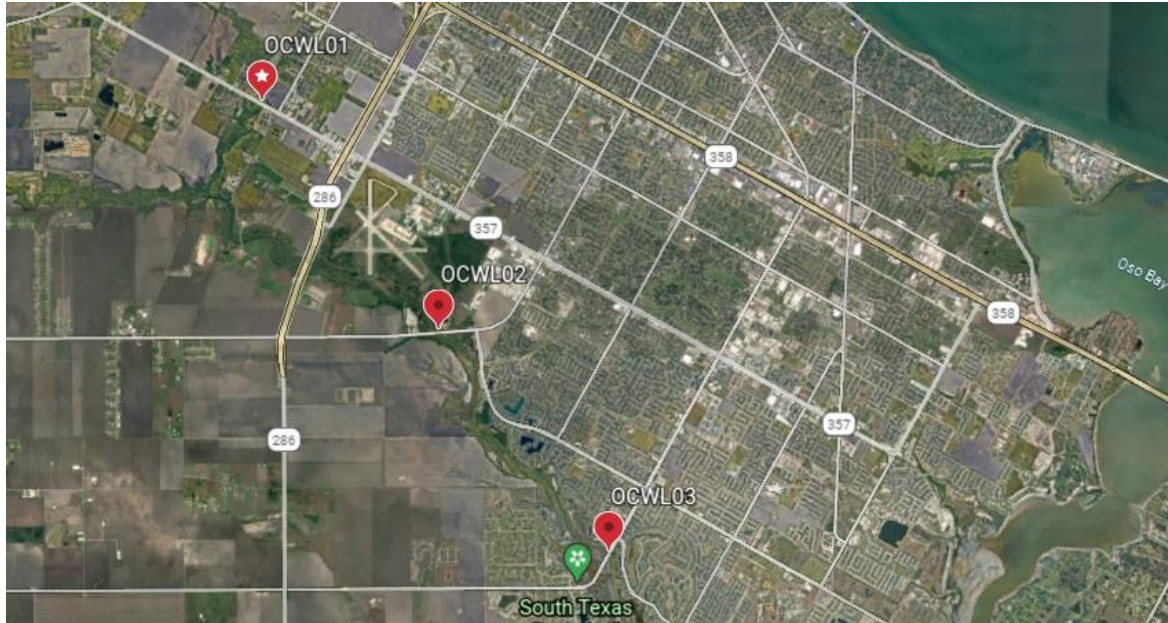


Image 2: Stage Height monitoring locations

Table 3: Stage Height Component List

Component	Type
Radar Water Level sensor	Nile 502
Weather Transmitter	Vaisala WXT-530
Data logger	CR1000
IP Modem	RV50 w/antenna and booster

Table 4: Stage Height Station Configuration

Station No.	Name	Stage Height	Rainfall	Air Pressure	Humidity
242	OCWL01	X	X	X	X
243	OCWL02	X	X	X	X
244	OCWL03	X	X	X	X

METEOROLOGICAL MONITORING

Seven (7) meteorological (MET) stations are located throughout the City of Corpus Christi (Image 3).

These data collection stations provide data to City technicians critical in determine the time and frequency of water samples. During rain events, data are provided via the following web site: <http://www.cbi.tamucc.edu/ccrl>. In addition, an automated notice of rainfall is sent via email to specific city personnel.

Station components and configuration are listed in Table 5 and Table 6, respectively.

1. CCWXAM: (27° 42' 54" N 97° 19' 43" W), TAMUCC
2. CCWXRF: (27° 40' 34" N 97° 21' 9" W), Rodd Field Rd
3. CCWXCM: (27° 43' 54" N 97° 22' 40" W), Carmel Pkwy
4. CCWXCP: (27° 41' 6" N 97° 25' 0" W), Cedar Pass Dr.

5. CCWXDE: (27° 45' 51" N 97° 24' 15" W), Del-Mar College East campus
6. CCWXDW: (27° 46' 24" N 97° 26' 24" W) Del-Mar College West campus
7. CCWX07: (27° 52' 4.2" N 97° 37' 54.5" W) at the Nueces River pump station

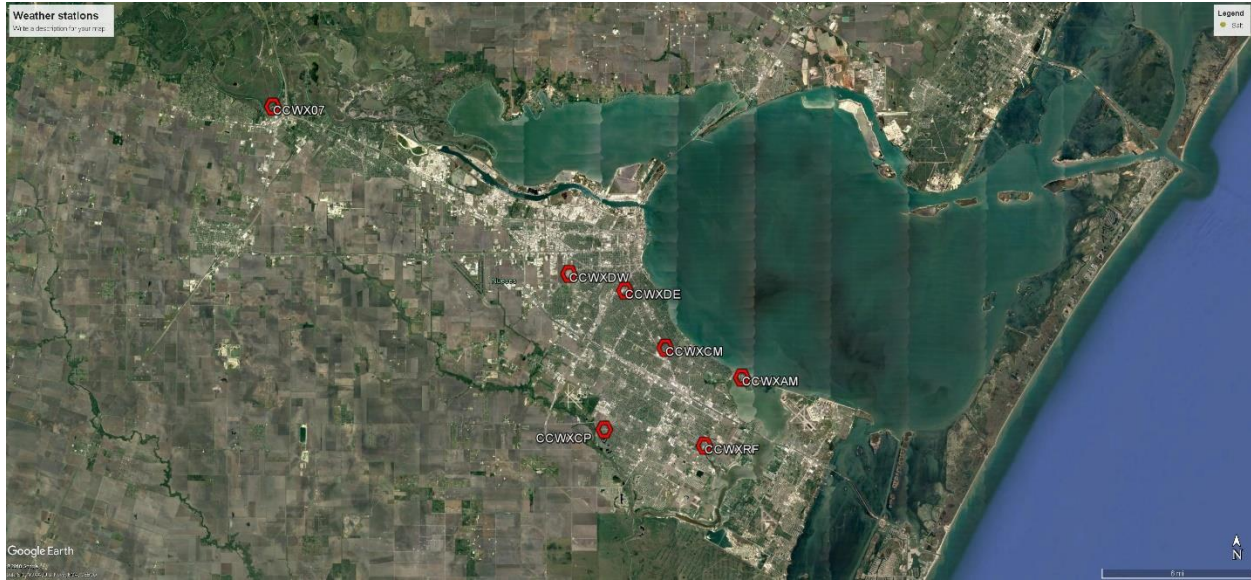


Image 3: Meteorological station location

Table 5: MET Station Component List

Component	Type
Weather Transmitter	Nile 502
Data logger	CR1000
IP Modem	RV50 w/antenna and booster

Table 6: MET Station Configuration

Station No.	Name	Temp	Wind	Rainfall	Air Pressure	Humidity
236	TAMU-CC	X	X	X	X	X
275	Rodd Field	X	X	X	X	X
276	Carmel Parkway	X	X	X	X	X
277	CCWXCP Cedar Pass	X	X	X	X	X
278	CCWXDE Del Mar East	X	X	X	X	X
279	CCWXDW Del Mar West	X	X	X	X	X
256	CCWX07Nueces River	X	X	X	X	X

OPERATION, MAINTENANCE AND MANAGEMENT

Project Management

The Principal Investigator (PI) for this project will be **Ms. Devon Steffan**, designated Co-Principal Investigator will be Mr. James Rizzo (**Co-PI**). The **PI** or his designee shall be responsible for all project management activities of this project to include but not be limited to personnel assignment, scheduling, service, maintenance, accounting, reporting, and invoicing.

General Tasks

TAMU-CC shall designate an operator (or operators) to perform the following local duties:

- a. Perform Quality Assurance/Quality Control checks on all data collected from each station ensuring all data are within expected ranges
- b. Schedule all maintenance activities necessary to include regularly scheduled service and emergency/unscheduled maintenance visits
- c. Maintain field activity logs
- d. Maintain Site Visit logs
- e. Maintain inventory of sensors/components/equipment
- f. Calibrate datasondes prior to field deployment
- g. Clean and post calibrate all datasondes upon removal from the field
- h. Maintain calibration logs for each sensor

Table 7 - Sensor Service schedule

CBI Station No.	Station Name	Sensor	Service Interval
072	SALT01	WQ	2 Weeks (+/- 1 week)
074	SALT03	WQ	2 Weeks (+/- 1 week)
076	SALT05	WQ	2 Weeks (+/- 1 week)
236	CCWXAM	MET	2-month
275	CCWXRF	MET	2-month
276	CCWXCM	MET	2-month
277	CCWXCP	MET	2-month
278	CCWXDE	MET	2-month
279	CCXWDW	MET	2-month
256	CCWX07	MET	2-month
242	OCWL01	WLS	2-month
243	OCWL02	WLS	2-month
244	OCWL03	WLS	2-month

NOTE: The service interval has been changed from the 6-month site visit to a bi-monthly site visit to improve data quality and collection capabilities. The natural flora and fauna in the vicinity of many sites will require a closer monitoring of each data collection site.

Sub Task 1 – Scheduled Maintenance

TAMU-CC will perform the tasks identified below.

Nueces Water Quality Monitoring

Due to the service interval for SALTS 01, 03 and 05, no emergency site visits are budgeted. System or sensor issues will be resolved on the next scheduled site visit.

- a. Upon arrival at each station, readings will be recorded from the datasonde prior to removal
- b. Replace datasonde with a clean, calibrated unit
- c. Upon replacement, readings from the installed datasonde will be recorded.
- d. Independent salinity readings will be taken using a portable refractometer and recorded.

- e. Inspection of all station hardware, cables, antennas, enclosure, and solar panels. Panels will be cleaned and tested, battery tested, and components will receive required maintenance or repair as needed. All sensors and systems will be tested for proper operation
- f. Data will be downloaded from the data collection system for archival
- g. Communications will be checked and verified
- h. If for any reason, CBI is unable to replace or repair damaged or malfunctioning components, Field Operations personnel will notify the **PI** and discuss options for repairs.
- i. Should an Emergency/Unscheduled site visit be required, the PI will contact the City's Project Manager and discuss options.

Oso Creek Stage Height Monitoring

There are no emergency visits are budgeted for the stage height stations.

- a. Regular maintenance will be conducted every two (2) months
- b. Inspection of all station hardware, cables, antennas, enclosure, and solar panels. Panels will be cleaned and tested, battery tested, and components will receive required maintenance or repair as needed. All sensors and systems will be tested for proper operation
- c. Verify stage height offset

Corpus Christi Meteorological (MET) Monitoring

There are no emergency visits are budgeted for the MET stations.

- a. Regular maintenance will be conducted every two (2) months
- b. Inspection of all station hardware, cables, antennas, enclosure, and solar panels. Panels will be cleaned and tested, battery tested, and components will receive required maintenance or repair as needed. All sensors and systems will be tested for proper operation

DATA COLLECTION

CBI has collected data from remote data collection platform (DCP) since 1995 utilizing our internal database and proprietary automated processes. Data are generally collected every 6 minutes from all DCP's via an IP modem installed at each station. Data collection initiates the following process:

- a. Upon acquisition, raw data files are validated ensuring data header files meet archived station information files within the database
- b. Once the data packet is verified, the data are archived in raw form within the database
- c. Data packets are processed for dissemination
- d. Staff generally performs QA/QC checks of all data each morning noting suspect or missing data or sensor malfunction.
- e. Daily and ten-day salinity levels are provided per month via <http://lighthouse.tamucc.edu/salrel>,

INSTRUMENT CALIBRATION

This section provides general tasks how instruments will be calibrated.

Hydrolab Datasonde service

- a. All datasondes are calibrated following procedures established or recommended by the manufacturer
- b. Water quality values from each datasondes are checked and recorded prior to cleaning post deployment.
- c. Datasondes are calibrated using NIST traceable standards after cleaning and servicing each sensor
- d. All post-calibration and calibration records are archived and can made available upon request.

MS5 and CMS5

Datasondes are returned to HydroTech ZS for inspection, repair, and refurbishment annually as part of an Annual Maintenance Agreement. Annual service includes sensor maintenance, adjustment, and recalibration. CBI archives annual maintenance documentation and will be made available upon request.

Vaisala WXT-530 Weather Transmitter

The Vaisala WXT-530 weather transmitter does not require calibration. The WXT-PTUSP contains calibration data and will be replaced every two years as recommended.

Nile 502 Pulse Radar Water Level Sensor

The Nile 502 Radar Water Level Sensor does not require calibration. Sensor accuracy is checked during the annual maintenance. Sensor that do not function properly after the Annual Maintenance will be returned to the manufacture for repair or replacement.

STATION DOCUMENTATION

Following each scheduled or emergency station visit, TAMU-CC shall complete and archive a Site Report, using CBI's proprietary database. Site visit reports contain information related to any service, maintenance, and/or repair action performed.

TAMU-CC will archive station records for a period of three (3) years and available to City personnel upon request.

NOTE: There are no scheduled progress reports required within this SOW

REPLACEMENT PARTS AND EQUIPMENT

Below is a list of spare components on hand and available for this project:

Serial Number	Component	Description	Quantity
48116	CR1000	Data logger	1
89325	CR1000	Data logger	1
48963	MS5	Datasonde	1
48964	MS5	Datasonde	1
48965	MS5	Datasonde	1
48966	MS5	Datasonde	1
H221003	WXT 530	CCTX Spare All in One Weather Transmitter	1
H221004	WXT 530	CCTX Spare All in One Weather Transmitter	1
H221007	WXT 530	CCTX Spare All in One Weather Transmitter	1
H221012	WXT 530	CCTX Spare All in One Weather Transmitter	1

BUDGET SUMMARY

	SUB-TOTALS								
Salaries	\$ 66,691								
Benefits	\$ 21,849								
Travel	\$ 16,931								
Supplies	\$ 2,430								
Other Expenses	\$ 11,380								
<ul style="list-style-type: none"> • Datasonde service contract • AT&T monthly modem cost • Freight 									
Facilities & Administrative Costs (Indirect Direct) at 37.5%	\$ 44,731								
MTDC									
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">TOTAL YEAR 1:</td> <td style="text-align: right;">\$ 164,012</td> </tr> <tr> <td style="text-align: right;">TOTAL YEAR 2:</td> <td style="text-align: right;">\$ 168,932</td> </tr> <tr> <td style="text-align: right;">TOTAL YEAR 3:</td> <td style="text-align: right;">\$ 174,000</td> </tr> <tr> <td style="text-align: right;">GRAND TOTAL:</td> <td style="text-align: right;">\$ 506,944</td> </tr> </table>		TOTAL YEAR 1:	\$ 164,012	TOTAL YEAR 2:	\$ 168,932	TOTAL YEAR 3:	\$ 174,000	GRAND TOTAL:	\$ 506,944
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GRAND TOTAL:	\$ 506,944								

Year 1 (January 1, 2021-December 31, 2021) award amount will be invoiced in equal, monthly installments over the first 12-month period of this contract and in subsequent budget years.

TAMU-CC anticipates continuing service for up to three (3) years, and the annual project budget will not increase by more than 3% percent per year.

TAMU-CC's DHHS-approved Facilities and Administrative Cost rate will be applied in Budget Years 2 and 3 at 38.0% of a Modified Total Direct Cost base.