

## **Texas State University – San Marcos**

### **Water Quality Monitoring of River Basins and Edwards Aquifer Recharge Zone**

#### **Project Description:**

##### **I. Continuous Water Quality Monitoring of Selected Texas River Basins**

###### *A. Continuation of Existing Monitoring Stations*

Texas State previously established and has been operating and maintaining three continuous water quality monitoring stations in Trimmier Creek ("Trimmier Station"), the San Antonio River at the Witte Museum ("Witte Station"), and the City of La Coste ("La Coste Station") (collectively, "Monitoring Stations"). This Project will extend the Monitoring Stations by continuing the collection of water quality monitoring data.

The Trimmier Station is located on Trimmier Creek in Segment 1216 of the Lampasas River Watershed that is in the Brazos River Basin at Latitude 31°01'52.2" N, Longitude 97°39'54.1" W. The Trimmier Station provides data to the Brazos River Basin Continuous Water Quality Monitoring Network.

The Witte Station is located on the east bank of the San Antonio River at the Witte Museum, Latitude 29°27'42.0" N, Longitude 98°28'6.0" W. The Witte Station provides data to the San Antonio River Basin Continuous Water Quality Monitoring Network. In addition to providing water quality data, the Witte Station also has an educational component, as it has been incorporated into the Witte Museum's "Take it to the River" exhibit and HEB's Science Treehouse, both located near the Witte Station.

The La Coste Station is located in the Medina River, near the City of La Coste's wastewater treatment plant, Latitude 29°19'27.0" N, Longitude 98°48'47.0" W. The La Coste Station provides data to the San Antonio River Basin Continuous Water Quality Monitoring Network.

The Monitoring Stations use YSI 6920 V2 multi-parameter sondes to collect water quality data every fifteen minutes with the Zeno Data logger and report data to the TCEQ Leading Environmental Analysis Display System ("LEADS") every hour using cellular telemetry. The sondes are replaced every two weeks. Each sonde is taken to Texas State's lab for post-sampling calibration and analysis. The following water quality parameters are measured: dissolved oxygen, temperature, specific conductance, pH, turbidity, and water level. Water quality data collected at the Monitoring Sites is made available to the public through the TCEQ Continuous Water Quality Monitoring Program website. Texas State shall also provide contact information on the TCEQ website to answer questions in a timely manner (during normal business hours) regarding data quality from the measurements obtained from the stations.

Texas State's personnel will travel to the Monitoring Stations every two weeks to replace the sondes and bring samples to the Edwards Aquifer Research & Data Center ("EARDC") for analyses. Texas State personnel will also travel to the Monitoring Stations to perform any necessary repairs to equipment or communication infrastructure. A portion of the personnel's salary will be paid with SEP Funds to cover this work. SEP Funds will also be used to cover travel expenses up to \$.55 per mile. Texas State shall use SEP Funds to pay for wireless service at the Monitoring Stations so that data may be continuously uploaded. SEP Funds will also be used for annual LEADS renewal fees. All operation and maintenance will be conducted consistent with established Standard Operating Procedures: Continuous Water Monitoring Network ("SOPs") approved by TCEQ.

### *B. Addition of New Monitoring Stations*

The Project will also involve development of two new monitoring stations ("New Stations") to be located in any River Basin within 100 miles of San Marcos, Texas. The New Stations will provide additional data to support the Continuous Water Quality Monitoring Network by collecting water quality data every fifteen minutes and reporting data to the TCEQ LEADS system every hour using cellular telemetry.

Typically continuous monitoring is accomplished by deploying a station consisting of: sampling equipment for the parameter(s) of interest, a data logger to store and relay collected data to the TCEQ, telemetry such as cellular, radio, satellite, or landline telephone infrastructure capable of transmitting collected data to TCEQ, and a power source to run all monitoring and communication instrumentation. A structure must be erected at the station to house communication, monitoring, and power equipment. The station may be deployed at any water body where a need for detailed water quality information is identified, access to the site is granted by a public or private landowner, and logistical requirements for the establishment of power, communication, and monitoring at the site can be satisfied.

The locations of the new sites will be determined by Texas State by working with TCEQ, local river authorities, and city governments to determine the need for additional continuous water quality monitoring stations. Preference will be given to former United States Geological Survey sites where communications infrastructure is already in place.

Texas State shall use SEP Funds to establish, operate, and maintain the two New Stations. The New Stations will consist of ambient water quality monitoring instruments and ancillary equipment. The information collected will be non-regulatory and will be used to monitor the quality and safety of Texas surface waters with real-time monitoring data.

Texas State shall use SEP Funds to pay a contractor, IPS Meteostar, to build a communications board that is customized for the conditions at the station and the parameters to be measured and to integrate the board with the LEADS system. SEP Funds will also be used for IPS Meteostar communications support, which includes remote technical support services and on-site repairs to the communications board. Texas State's personnel shall install the communications infrastructure at the New Stations, which may involve clearing brush, running cables, building a traffic box, and installing solar panels, among other activities. Texas State shall also use SEP Funds to pay for the materials necessary to collect data, including sondes and ancillary equipment, and materials necessary to install the New Stations, such as nuts, bolts, spray insulation, cables and communication lines, batteries, and solar panels.

### **II. Effect of Reuse Water and Dense Urbanization on Edwards Aquifer Recharge Zone**

The Project will also involve water quality monitoring and sampling over the Edwards Aquifer Recharge Zone. A 1,300 acre housing development ("Paso Robles") and an associated golf course are planned for construction just north of Hunter Road (Farm-to-Market Road 2439) in the southwestern outskirts of San Marcos, Texas. The housing development and golf course will span environmentally sensitive recharge and contributing zones of the Edwards Aquifer within the structurally complex Balcones Fault Zone in Hays County, Texas. Paso Robles plans to use reuse water, also known as effluent, from the City of San Marcos Wastewater Treatment Plant for irrigation of the golf course. This is the first

time that effluent has been used in proximity to the recharge zone over strata that may allow migration into the recharge zone. Construction activities, the use of effluent for irrigation, and the residential and golf course use of pesticides and herbicides could potentially influence the quality of the Edwards Aquifer. In addition, United States Fish and Wildlife Service ("USFW") wells are fed by the recharge zone in this area. The wells serve the USFW hatchery and other operations.

The collected data will provide baseline water quality trends for the sensitive area before construction begins. As data is continually collected, it will also show the effects of construction activities and the post-construction effects of irrigating the golf course with effluent, and the application of chemicals, such as those found in insecticides and herbicides, on lawns and the golf course.

Texas State has secured access to monitoring wells from the City of San Marcos (2 wells) and USFW (2 wells). The four wells are located upgradient and downgradient of the Paso Robles development. Each monitoring well will be sampled every two months for a three year period with an additional six rain events to be included in the sampling. Each site will be equipped with a semi-permeable Gore survey module within airtight flow-through chambers to detect the presence of volatile organic compounds, semi-volatile organic compounds, and polycyclic aromatic hydrocarbons that may be byproducts of the construction process. Analysis of total alkalinity, total dissolved solids, total hardness, and total coliform bacteria will also be performed. Field parameters such as pH, dissolved oxygen, water temperature, and specific conductance will be obtained for the wells upon each collection event. Water levels in the wells will be measured with an electronic water level meter. Measurements will be taken prior to well pumping at the time of sampling. Each site will be equipped with a conductivity and temperature sonde that will take continuous measurements. Attached to each well will be a sampling apparatus to hold the Gore samples.

To evaluate the surface runoff that could pick up contaminants and introduce them into the Edwards Aquifer, an ISCO-6712 Portable Stormwater sampler will be deployed at the lower end of a tributary to Cottonwood Creek that runs through the Paso Robles development site toward Hunter Road. Each surface runoff sample collected will be analyzed for total suspended solids, nitrate, calcium, magnesium, sodium, potassium, sulfate, chloride, dissolved organic carbon, alkalinity, and conductivity. In addition, discharge of the drainage basin will be calculated through the implementation of a sharp-crested weir, which will be placed at the base of the drainage where water exits the Paso Robles site. During each measured storm event, water levels will be continuously recorded as water flows over the weir. A crest-stage gage will also be installed with the weir to measure the water level at the peak of each storm. Texas State shall display data obtained from the monitors directly into the EARDC website to be viewed by the public. The information collected will be non-regulatory. All operations and maintenance will be conducted consistent with established SOPs approved by TCEQ.

Texas State shall use SEP Funds to pay for sampling equipment, including the portable stormwater sampler, Gore bags, and calibration standards kits. Texas State shall also use SEP Funds for travel expenses up to \$.55 per mile for traveling to the wells and to collect data during storm events. SEP Funds will also be used for lab analyses of Gore bag samples and field parameters and to pay a portion of Texas State personnel's salary for time spent collecting samples and calibrating instruments.

**Environmental Benefit:**

The continuation of the Trimmier, Witte, and La Coste Stations and the implementation of two new stations will provide valuable data for assessing water quality. Continuous monitoring of these sites will provide the public with knowledge of basic water quality in their watershed. These data will provide useful information in determining baseline conditions, long term trends, and real-time water quality for the area.

The Edwards Aquifer monitoring sites will collect data to measure the water quality of the sensitive area before, during, and after construction of the Paso Robles development and associated golf course. The Project will also monitor the surface runoff following significant rain events to determine the effects of construction activities, the use of effluent, and the application of insecticides and herbicides in the community and golf course. Further, these monitoring sites will identify any contamination of this sensitive recharge area of the Edwards Aquifer Recharge Zone and help prevent possible further introduction of contaminants.

**Eligible Areas and Counties:**

Archer, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Brazoria, Brazos, Brown, Burleson, Burnet, Calhoun, Callahan, Castro, Cochran, Comal, Comanche, Coryell, Crosby, Dawson, DeWitt, Dickens, Eastland, Edwards, Erath, Falls, Fayette, Fisher, Floyd, Fort Bend, Freestone, Garza, Goliad, Grimes, Guadalupe, Hale, Hamilton, Haskell, Hays, Hill, Hockley, Hood, Jack, Johnson, Jones, Karnes, Kendall, Kent, Kerr, King, Kinney, Knox, Lamb, Lampasas, Lee, Leon, Limestone, Lubbock, Lynn, Madison, McLennan, Medina, Milam, Mills, Nolan, Palo Pinto, Parker, Parmer, Real, Refugio, Robertson, Scurry, Shackelford, Somervell, Stephens, Stonewall, Swisher, Taylor, Terry, Throckmorton, Travis, Uvalde, Victoria, Waller, Washington, Williamson, Wilson, and Young Counties

**Minimum Contribution Amount:**

\$100