

## A Mitigation Measure Designed to Save Lives

**HAYS COUNTY, TX** – Every year, approximately eight flood-related fatalities occur in the state of Texas, according to a report published by the Texas Department of Transportation Research and Technology Implementation Office. Seventy-six percent of those accidents involve vehicles washed away or motorists trapped in their vehicles. Hays County is in one of several Texas districts that have developed signing strategies to warn motorists of low-water crossings.

“Hays County is in the heart of ‘Flash Flood Alley.’ During even small rain events, road conditions can change for the worse within minutes,” said San Marcos Emergency Management Coordinator Kenneth Bell. “There have been several fatalities, numerous accidents and close calls along low-water crossings within the county.”

Prior to 2006, Hays County had two U.S. Geological Survey (USGS) systems, one in Wimberley and one in Kyle. There were concerns regarding both. The unit in Kyle would almost be completely under water in a small rain event. The Wimberley unit transmitted rain event data on an hourly basis, when the county really needed “real time” information to accurately assess flash flooding issues.

“We wanted flood warning systems designed specifically to notify motorists of danger at low-water crossings and to alert authorities if the situation warranted barricades,” said Bell.

Hays County identified and prioritized 42 low-water crossings based on three criteria: the number of events between 1998 and 2005, the number of accidents from 2001 to 2005, and the need based on area growth.

The county applied for and received a \$600,000 grant from the Federal Emergency Management Agency’s Hazard Mitigation Grant Program (HMGP) to install Flood Warning Systems. Another \$200,000 came from local funds.

Between 2007 and 2008, at a cost a little over \$800,000, Bell said Hays County installed 16 low-water crossing warning systems at high-hazard road crossing locations in county road rights-of way. No acquisition of additional property was necessary.

Each all-in-one system contained one high water warning sensor and two flashing “Watch for Water on Road” post-mounted signs. The devices were designed to flash warning when two inches of water overtopped the low point of the road surface and a second indication when the depth reached six inches.

Data could be relayed by radio, cellular or satellite, whichever functioned better at the targeted sites. Each unit was equipped with a solar charging system with a 72-hour battery reserve.

In 2015, central and south Texas were hit by a devastating flood. Referred to as the Memorial Day Flood, it wreaked havoc in Hays County. According to Bell, an estimated 400 homes, most of them in the Wimberley and San Marcos areas, were destroyed by the raging Blanco River. Bridges also sustained damage.

The low-water crossing warning signs were fully functional. To alert motorists of bridge closures, San Marcos ensured its manually operated warning signals were operational. Barricades also were in place. As a result, no deaths were reported near the crossings.

In evaluating the need for localized flood warnings, the USGS suggests agencies consider several factors: the hydrologic characteristics of the watershed; the frequency of flooding; the potential loss of life and property when flooding occurs; and the amount of warning time that can be provided.

Each watershed has unique hydrologic characteristics (stream slope, soil type, amount of channel debris, etc.) that dictate its response to surface water runoff. These characteristics can be used to determine the extent and magnitude of the flooding threat at a crossing.

For additional information on Flood Warning Mitigation Systems, visit: [www.usgs.gov/](http://www.usgs.gov/) and <http://www.co.hays.tx.us/>.



A low water crossing signal located in San Marcos closure (Photo by Bonnie Hanchett)



Manually operated warning sign regarding bridge closure (Photo by Bonnie Hanchett)



Barricade used to deter motorists away from crossing (Photo by Bonnie Hanchett)