

A Lake to Celebrate – Rehabilitation of the East Fork Above Lavon Dam No. 2 (Known as Highland Lakes Dam) in McKinney, Texas

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Urban residents often take their flooding safety for granted, thinking if they don't live near a river, they aren't at great risk. The truth is, some towns are in low lying areas and residents are at great risk for flooding if preventative measures aren't put in place.

The City of McKinney, Texas is one such town that has taken proactive measures to protect their citizens from would-be flooding events. The City's Storm water Management Team works closely with the USDA's Natural Resources Conservation Service (NRCS) to monitor the agency's 18 flood retention structures that directly affect McKinney residents.

"Public safety is a priority for us," says Michael Hebert, assistant director of engineering for the city of McKinney. "To the greatest extent possible, we want to minimize the impacts of floodwaters and environmental issues through the construction of flood and erosion control structures."

McKinney residents have been brought to a new level of safety thanks to the recent completion of rehabilitation to Highland Lakes dam, technically known as East Fork Above Lavon Dam 2A. The dam was originally constructed in 1958 in a then-rural area of Collin County. The structure exceeded the 50 year life span for which it was designed and required upgrades due to age, sedimentation, and population increases downstream, creating a high hazard classification.

"When the dam was designed this was a rural area, with grass pastures infiltrating much of the rain amounts that fell," says Hebert. "Now we are a very urban area. The rain falls on concrete, rooftops, and asphalt which has no infiltration, causing almost double the amount of storm water flow to this dam. We had to do something to get this dam functioning again as a flood control structure."

The City looked to its long time rehabilitation partner, the NRCS, to help get the project started. Through the NRCS' Watershed Protection Program (WPP), the agency could provide up to 65 percent of the estimated \$3.8 million rehab price tag, and the dam's sponsor, the City of



McKinney in this case, would be responsible for bringing 35 percent of the funds to the table. The Highland Lake project represents the eighth structure the City has worked on through the NRCS' WPP.

"We have been very fortunate to have a visionary city council that recognizes the public benefits these structures provide," Hebert says. "They have a program in place to obtain the needed funds from city bonds and developers for projects like this."

Through funds secured by the McKinney City Council, the City could come up with 17 percent of the total cost. The Texas State Soil and Water Conservation Board (TSSWCB) joined in the effort, providing the remaining 18 percent needed for the rehabilitation. Additional projects partners included the Collin County Soil and Water Conservation District, the local steering committee and the property owner, a development company.

"State funding is essential," says Rex Isom, executive director for the TSSWCB. "Most watershed sponsors do not have the financial ability to fully fund the 35 percent local share of the federally funded dam rehabilitation project."

"These rehab projects not only enhance public safety, they also provide flood damage reduction benefits such as protecting public roads, bridges and other structures, which is a benefit for the whole state of Texas," Isom adds. "NRCS estimates the Highland Lake structure provides \$415,000 in average annual benefits from floodwater damage reduction."

This partnership effort recently received the honor of being named the 2017 Public Works Project of the Year by the Texas Chapter of the American Public Works Association.

"Highland Lakes represents the eighth rehabilitation project we have completed with NRCS," says Hebert. "They have all been great, but this project was extra special and deserving of the award because of the efforts of all the partners in the project."

"The City of McKinney is to be commended for their active pursuit of rehabilitation on these dams," says NRCS State Engineer John Mueller, who provided oversight for the entire project. "They are serving their population well by upgrading the level of safety all residents and protecting the city's infrastructure."

The first phase of the project got underway in 2015 with removal of accumulated sediment in the lake's basin to restore the lake to its original depth. The \$419,000 cost of this phase was funded by the City of McKinney and the landowner.

The second phase was the rehabilitation of the actual dam. NRCS engineers provided the planning and design expertise for the dam, as well as contract administration. The contracting work was performed by Accelerated Critical Path, Inc., a construction company out of Plano.

The rehabilitation work included replacing the principal spillway with a more modern, less maintenance intensive design; widening and armoring the auxiliary spillway to accommodate additional flows due to development; improving the dam's slope to avoid slides and facilitate in maintenance. An innovative aspect of the dam's design included using articulated concrete block with a top soil and grass cover on the auxiliary spillway, instead of roller compacted concrete that is typically used. This method not only reduced costs, it minimizes storm water runoff through its pervious surface while also improving the visual aesthetics of the structure.

According to Hebert, the area received several storms that resulted in 10-year flooding events during the rehabilitation process, activating the city's emergency management plan.

"This created challenges and delays in the process," he explains. "But the storms also served as a very illustrative reminder of why it is important to have these structures in place and functioning properly."

"The NRCS Watershed Program has been in place for over 50 years," Hebert says. "The floods of the 40s have been long enough ago that now most people don't realize how much downstream flooding has been averted by having this structure in place. And with our increased population, it's now more important than ever."

The property owner developed a wetlands area at the upstream end of the lake to enhance water quality and provide for increased recreation and aesthetics. Future plans for the dam include the owner developing a park and recreation area around the lake for the public to enjoy. The City will remain responsible for the maintenance and function of the dam.

"This project is a great example that it really does take a village to get something like this done," says Hebert. "We could not have done this on our own. It would have stressed our funding significantly and these projects most likely would not have gotten done."

The City's efforts for public safety will continue as the City was recently approved for NRCS funding for rehabilitation on East Fork Above Lavon Dam 4. The same partners are teaming up together for this project which is currently in the design phase.

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