

# TechBrief

The Texas Department of Transportation implemented utility conflict management statewide to identify and resolve potential utility obstacles much earlier in a project's life cycle.

The method equips the project team with data models, templates, and other tools for documenting all utilities sharing the right of way of an infrastructure construction project.

Before construction begins, the project team also coordinates with the utility on plans for how to Avoid, Minimize, or Accommodate (AMA) the conflict during design.

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## Texas Saves \$23M Through SHRP2 Approach to Identifying and Managing Utility Conflicts

*This Technical Brief provides an overview of benefits and practical implementation of utility conflict management during the design phase of highway construction projects in Texas. Except for the statutes and regulations cited within, the contents of this document do not have the force and effect of law and are not meant to bind the public in any way.*

### Introduction

Utility coordination and subsurface utility engineering in Texas were occurring too late in a highway construction project cycle, contributing to unexpected costs and project delays.

The Texas Department of Transportation (TxDOT) saw an opportunity to pilot the Strategic Highway Research Program (SHRP2) "Identifying and Managing Utility Conflicts" series of products. In 2016, TxDOT implemented the pilot in five metropolitan districts: Austin, Dallas, Fort Worth, Houston, and San Antonio.

The TxDOT Right of Way division, Federal Highway Administration, and Texas A&M Transportation Institute found that the utility conflict management (UCM) approach contributed to cost savings of close to \$10 million and time savings of as much as 38 months after implementing the UCM at the five pilot projects. The savings were primarily the result of identifying changes in project design that avoided utility relocations. TxDOT also identified additional benefits totaling \$13 million from projects elsewhere in the State that started using the UCM approach.

Building off demonstrated success, Texas continues to phase in and expand on UCM statewide with continuing benefits that include improved relationships with its utility partners.



**Figure 1. A project to widen U.S. 281 in San Antonio, Texas, needed a plan for relocating nearly 400 overhead electric poles along the right of way.**

*Photo: Anna Pulido, TxDOT*

## The Challenge

A critical component in rebuilding or upgrading highways is to develop a plan for existing electric wires, poles, telecommunications equipment, pipes, railroads, or other utilities that share the project site. Highway departments must coordinate with utility owners if equipment needs to be moved, bypassed, or protected to allow for a highway to be widened or heavy construction equipment to operate above it or in the vicinity. (23 CFR 645, Subpart A)

Delays can occur when a highway contractor needs to begin or continue work and the utility is still in conflict with the proposed construction.

Unknown utilities pose risks to safety for the contractor and the public. They can add unforeseen or extra costs. They also are a leading cause of construction delays in the United States.

## A Solution — A Systematic Approach to Engaging With Utilities

The Texas Department of Transportation (TxDOT) looked at data on its highway construction projects in the mid-2010s and realized it needed a new approach for managing utility conflicts.

“We were spending millions of dollars on utility delay claims,” Anna Pulido, Utility Portfolio Section Director for TxDOT’s Right of Way division said in an interview. “A lot of that had to do with utility coordination happening too late or lack of coordination.”

TxDOT began in 2016 to apply the Strategic Highway Research Program (SHRP2) utility conflict management (UCM) approach in the design phase of major construction projects to ensure that potential utility conflicts are addressed and planned for earlier in highway and infrastructure construction by using the AMA (Avoid, Minimize, Accommodate) process. TxDOT documented that the approach resulted in millions of dollars in savings and shortened construction time on numerous projects. The initiative also has helped improve the transportation department’s relationships with regional utilities.

In the past, “unfortunately, we were asking utilities to just get out of the way,” Pulido said. “Now we are hearing, ‘Can we work with the utility on avoiding the conflict first, minimizing the conflict, or accommodating where needed?’ The culture has shifted into a partnership effort by all parties involved.”

These positive outcomes encouraged TxDOT to implement the UCM program statewide in fall 2019.

### What Is Utility Conflict Management?

UCM provides a systematic way for project designers to identify utilities that are within the right of way of a planned infrastructure construction project. It includes practical tools for working with utility owners on resolving those obstacles at the design stage by using the AMA approach. These tools, which help project managers keep track and keep organized, include templates, sample certification letters, and work matrices.

Texas built on the “Identifying and Managing Utility Conflicts” series of products from SHRP2, a partnership of the Federal

The image shows a 'Utility Conflict Matrix' form. At the top, it has fields for 'Project Name', 'Project No.', 'Utility Conflict Matrix Developed/Revised By', and 'Date'. Below these are instructions: 'This matrix is required for utility conflict and analysis.' and 'Marked as the date'. The main body of the form is a table with the following columns: 'Utility Name/Conflict Name', 'Conflict ID', 'Conflict Location', 'Utility Type', 'How Utility Interacts', 'Utility Conflict Description', 'Start Date', 'End Date', 'Risk Rating', 'Last Status', 'UCM Management Level/Status', 'Start Date', 'Recommended Action or Resolution', 'Current Resolution Status', and 'Resolution Status'. The table has approximately 15 rows for data entry.

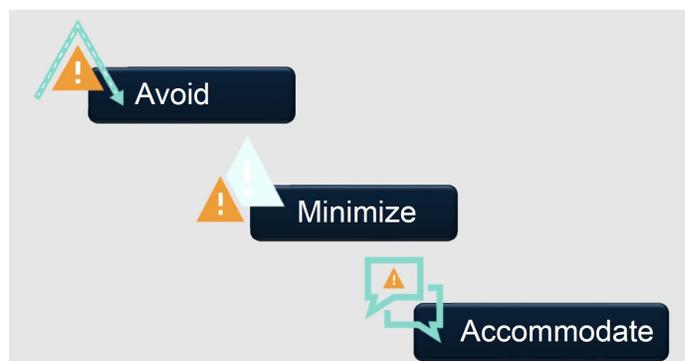
**Figure 2. A customizable utility conflict matrix is among the templates and forms in the package of tools distributed as part of UCM training**

Source: TxDOT

Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the Transportation Board (TRB). The SHRP2 products also are implemented in other States; Texas was among the earliest to document the outcomes and apply UCM more broadly.

Texas used a SHRP2 grant to pilot the approach in Austin, Dallas, Fort Worth, Houston, and San Antonio. The pilot included providing training and then monitoring several projects in those districts. For the pilot, TxDOT spent \$860,000 to train 2,000 people through full-day workshops that included problem-solving in small groups and practice using the matrices and worksheets. Participants were everyone who had some role in highway project development, from design technicians, right of way agents, transportation engineers, and utility coordinators to external consultants and representatives of the utility and local public agencies. An additional \$500,000 has been spent for the statewide implementation phase. TxDOT found that the cost (\$1.4 M) to benefit (\$23 M) ratio made this program well worth the effort.

Texas also customized UCM in training and in practice to add an emphasis on finding alternatives to AMA the utility during construction.



**Figure 3. The TxDOT Avoid, Minimize, Accommodate approach.**

*Source: TxDOT*

### **Achieving Buy-In**

The new approach was a change for project development teams and initially there was some pushback, according to Pulido. Project teams were accustomed to a fast pace to meet deadlines for ensuring project financing from Federal-aid programs or to meet the public need the construction was expected to resolve. They voiced concern about slowing down the process with new layers of meetings, checklists, and certifications. They also wondered if utility companies would show up to so many meetings months before construction even began.

Helping to bring project teams on board was a strong signal from leadership. In March 2016, the State’s Chief Engineer issued a memo to district engineers that before a project would be advertised for construction companies to bid on—or considered “ready to let”—they must certify as completed or resolved specific milestones related to right of way acquisition, utility agreements being in place, and utility relocations completed.

The memo “helped to shift the culture and start focusing on our project delivery process related to utility relocations,” Pulido said.

### **Benefits**

The TxDOT Right of Way division, FHWA, and the Texas A&M Transportation Institute (TTI) tracked the use of UCM in the five pilot districts and found that UCM contributed to saving nearly \$10 million and as much as 38 months, compared to strategies of previous years. They documented

another \$13 million in savings from other projects that were not part of the pilot, Pulido said.

Instead of telling utility owners to move a pipeline by a certain date, for example, the highway department uses the AMA technique to work with owners to avoid the relocation, minimize impact to the line, or work together on relocating the line using a realistic schedule. (See Example Project below.)

“This is a lot of up-front work, but redesigning around utilities pays off,” Pulido said. Utilities are no longer the No. 1 reason for change orders in Texas highway construction. She added that another important result is “TxDOT and utility owners now talk to each other early on in the project delivery process.”

*“Early utility coordination pays off.”*

— Anna Pulido, Utility Portfolio Section Director, TxDOT

**Table 1. Cost and Time Savings From Utility Conflict Management Pilot in Texas**

<b>District</b>	<b>Estimated Identified Savings</b>	<b>Identified Time Savings</b>
Austin	\$0.09 million	—
Dallas	\$0.5 million	15 months
Fort Worth	\$1.8 million	38 months
Houston	\$2.9 million	—
San Antonio	\$4.6 million	24 months

*Source: Anna Pulido, TxDOT Utility Program: Utility Conflict Management Implementation presentation, September 2019*

### **Example Project: U.S. 281 Segment 2, North of Stone Oak Parkway to the County Line, San Antonio**

This portion of a \$179 million project added two general lanes and one HOV lane in each direction on 4 miles of U.S. 281, a major south-north corridor. The project involved right of way acquisition on both sides of the road, with acquisition of 54 parcels. The project team had identified approximately 500 utility conflicts on this project. They looked at different ways to address several of the conflicts, comparing cost savings and time savings. In one case, the team needed a plan to move nearly 400 overhead electric power poles that were alongside the original roadway. (See Figure 1, page 1.) Coordination was not just with the power company, but with the four separate owners of the telecommunications attached to the poles. The relocation of the poles was phased and tied to phasing of the parcel acquisition as well as of the project’s traffic control.

To accomplish the move and keep to the construction schedule, TxDOT came up with a plan—agreed to by the utilities—to *accommodate* the utilities by arranging to clear out the vegetation for new corridors for the poles and mapping where each pole would be relocated. While the plan called for TxDOT to pay for clearing the vegetation and setting up the corridors, TxDOT estimated \$1.8 million in utility cost savings compared with having utilities manage the move themselves. In addition, it allowed TxDOT to control the schedule.

As an example of how TxDOT avoided a utility conflict on this project, TxDOT lowered the profile of the highway southbound frontage road by 5 feet to *avoid* an overhead electric transmission line adjustment. This saved the utility and the State \$3 million and overall time of approximately 2 years. If the transmission line had to be adjusted, the project would not have met the letting date.

The project also included TxDOT shifting the frontage road alignment 5 feet closer to the main lanes

to *avoid* approximately 1 mile of a 24-inch transmission water line from being adjusted. This saved the utility and the State \$1.8 million in costs and approximately 4 months.

## What TxDOT Learned

TxDOT identified the following steps as key to broad implementation of utility conflict management techniques.

- **Start with a pilot.** “We wanted to see how it was going to work,” Pulido said. “We have 25 districts statewide and Texas is a big state. Therefore, piloting is always our best approach.”
- **Ensure leadership buy-in.** Leadership can help change policies, authorize funding, and increase resources in support of the new process. The “Ready to Let” memo from the TxDOT Chief Engineer in March 2016 reinforced the process change needed, Pulido said.
- **Provide training and include everyone who has a role.** TxDOT spent \$860,000 to train about 2,000 participants for the pilot, and another \$500,000 on training for implementing the approach statewide. TxDOT now offers that training through its training institute as a 1-day course: ROW 100, “Identifying and Managing Utility Conflicts.” TxDOT also developed an additional course ROW 101, “TxDOT Utility Coordination,” which is a 1.5-day course for internal and external stakeholders.
- **Document outcomes.** Statistical proof that a new process works is key to winning over staff, leadership, and the public. This can lead to more funding and policy changes.

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## **Texas Saves \$23M Through SHRP2 Approach to Identifying and Managing Utility Conflicts**

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