

## 0-6631: Best Practices for Utility Investigations in the TxDOT Project Development Process

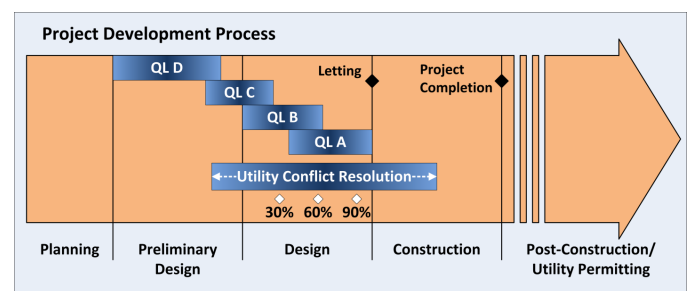
### Background

The lack of adequate information about the location and characteristics of utility facilities can result in a number of problems, including damages to utilities, disruptions to utility services and traffic, lost utility facilities as construction alters the landscape and preexisting benchmarks are removed, and delays to highway projects. This is one of the reasons subsurface utility engineering (SUE) has become a critical tool to help identify and locate utility installations within the right of way. To address this issue, the research team reviewed the state of the practice in utility investigations, and developed best practices for timing and use of utility investigation services in the Texas Department of Transportation (TxDOT) project development process.

A critical component of SUE data is a quality level (QL) attribute, which can be one of the following:

- QLD, which involves data collection from existing records or oral recollections.
- QLC, which involves surveying and plotting of utility appurtenances that are visible at ground level.
- QLB, which involves the use of surface geophysical methods to determine the approximate *horizontal* position of subsurface utilities.
- QLA, which involves the precise *horizontal* and *vertical* location through exposure of utilities at certain locations.

Figure 1 shows the points in which various data are collected during the project development process.



**Figure 1. Utility Conflict Resolution during Project Development.**

### What the Researchers Did

During the project, the research team:

- Reviewed current utility investigation techniques and technologies.
- Reviewed best practices and use of utility investigation practices in other states.
- Reviewed TxDOT project data to examine the effects of utility investigation services.
- Surveyed TxDOT organizational units on current utility investigation practices.

#### Research Performed by:

Texas A&M Transportation Institute

#### Research Supervisor:

Edgar Kraus, TTI

#### Researchers:

Yingfeng (Eric) Li, TTI

John Overman, TTI

Cesar Quiroga, TTI

#### Project Completed:

8-31-2012

- Developed draft best practices for utility investigations.
- Conducted workshops with practitioners.
- Reviewed and revised draft best practices for utility investigations.
- Developed and tested training materials.
- Developed draft content for inclusion in the *ROW Utility Manual*.

## What They Found

The use of SUE for TxDOT projects has significantly declined over the last few years, due to significant reductions in funding for utility investigations. Utility stakeholders suggested that QLD and QLC data should be collected as early as possible during the project development process and before the detailed design phase, which would allow design engineers to have sufficient information about utilities and avoid major utility relocations. QLB data collection, on the other hand, should be performed starting at the beginning of the detailed design phase up to the 60 percent stage so that unnecessary test holes can be avoided. TxDOT officials routinely collect QLD and QLC data but are often uncertain about the benefits of QLB or QLA data collection, particularly the final benefits in terms of return on investment. An analysis of TxDOT projects that collected QLB and QLA data found that there appear to be benefits with regard to costs associated with change orders, construction duration, and construction delays.

## What This Means

Researchers recommend that TxDOT:

- Implement the best practices identified during this project to improve project development at TxDOT.
- Implement 0-6631-P1 (*Best Practices in Utility Investigation Services—Training Materials*) to improve the utility investigation practices at the department.
- Maintain information about SUE contracts and services performed to enable SUE-related analysis and studies.
- Implement SUE training materials. At a minimum, TxDOT should implement the training materials developed during this project.
- Implement training and education best practices. The need for training of staff involved in utility-related activities in the project development and delivery process was a common theme mentioned during the stakeholder workshops.
- Implement other selected best practices. Unlike the education and training best practices, implementing the best practices of other categories may require changes to current TxDOT business processes, and therefore the implementation process may be more demanding.

### For More Information

#### Project Manager:

Wade Odell, TxDOT, (512) 416-4737

#### Research Supervisor:

Edgar Kraus, TTI, (210) 979-9411

Technical reports when published are available at <http://library.ctr.utexas.edu>.

Research and Technology Implementation Office  
Texas Department of Transportation  
125 E. 11th Street  
Austin, TX 78701-2483

[www.txdot.gov](http://www.txdot.gov)

Keyword: Research