



## Underground Cable Solves Challenges in Area with Existing Utilities and Narrow Roadways

When a utility company in the Midwest needed to connect a newly built substation and an older existing one, it had limited ability to go overhead because of the presence of numerous existing aerial utilities and proximity to the narrow roadway right of way. To meet the challenge, the company decided to use underground cable for the 6600-foot project, and selected Kerite to complete the project under an engineering, procurement, and construction (EPC) contract, taking advantage of Kerite's turnkey capabilities. The project, located in a high-sensitivity/high-visibility area near hospitals, universities, and an older residential area with a number of unknowns, was completed successfully, coming in on time and within budget.

### Substations constructed to improve reliability

System planners for a Midwest utility company identified an area in an Ohio city as needing additional distribution system capacity to improve reliability. During the previous 25 years, there had been no significant improvements made to the transmission system, and the distribution system capacity had reached a point where modifications were necessary to meet demands for the surrounding area.

Improvements were designed to ensure electric system reliability for existing homes and businesses and minimize the chance of service interruption, as well as allow for continued future growth in the area. The project included the construction of a new substation between two older substations.

After evaluating possible route corridors for the new 138,000-volt (138 kV) transmission line that would connect the new substation to the existing 138 kV transmission line network, they decided to use underground cable for the 0.4-mile (6600-foot) 138 kV tap line.

The decision to go underground was made early in the design process. The driving factor for using underground cable was the limited ability to go overhead because of existing aerial utilities in the area, including distribution lines, phone and cable, and electric, as well as densely spaced buildings and proximity to the right of way on the narrow roadways.

## Bringing in the experts with a turnkey solution

The utility company had not done a similar project inside the city core in such a high-load and high-visibility area and was concerned that the cable project be well managed and implemented. They were looking for a turnkey approach, because they lacked the internal staffing and other resources to deal with the inevitable challenges that frequently arise when working underground in cities. These challenges tend to be more prevalent in older residential areas where features not documented on drawings frequently crop up. They decided to bid the project out as an engineering, procurement, and construction (EPC) contract to get the turnkey solution they sought.

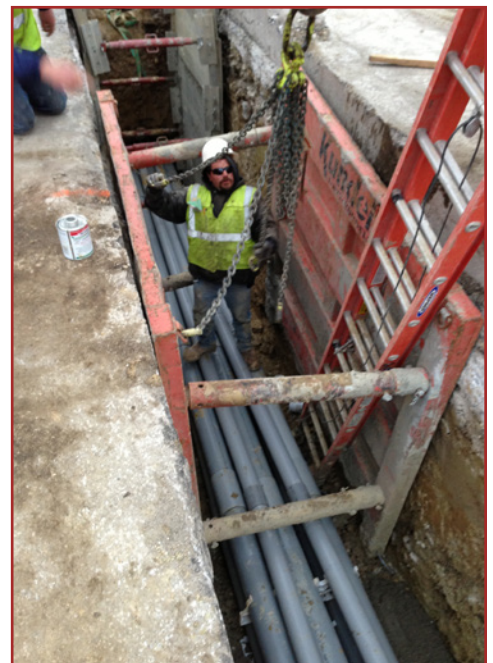
After conducting a value-based analysis of companies competing for the project – considering total cost, team qualifications, and anticipated final cost – they selected Kerite, with whom they had a history of working with on lower-voltage cable. The decision considered past product performance, warranty, and past experience at this voltage class. And for this project, the warranty turned out to be the real deciding factor. Kerite offered a lifetime warranty on the cable and a 10-year warranty on the splices and terminations if the utility used Kerite's KCS (Kerite Cable Services) as a turnkey vendor. The ability to obtain a warranty on the cable for the life of the circuit was a unique benefit, and was a real differentiator among cable offerings in the market.

## Complex project completed on time and within budget

The total circuit length of the project was 6600 linear feet from substation termination to substation termination. There were 15 splices and six terminations as well as testing, including high potting

of cables at the terminations. Kerite also checked the phasing and made sure there were no transpositions in manholes.

Kerite hired a local surveying and engineering firm to prepare the



design for the duct bank necessary for the project, located a below-grade contractor to construct the duct bank, and acted as on-site construction manager for much of the time. The utility coordinated with Kerite and the outside contractors, who ran point on getting permits and conducting negotiations with local governments and institutions in the area. The project was further complicated by the presence of another major public transportation infrastructure project going on simultaneously, and Kerite succeeded in navigating a number of challenging situations.

The subcontractor pulled the cable, and Kerite crews did the actual splicing. The two termination ends were going to substations that were already energized, adding an additional circuit to the substation. The utility had to energize the lines and make the final connections to get the substations connected to their terminations, then test and put all the circuits into service. Kerite worked with the utility throughout the process, coordinating with all disciplines and departments within the organization.

The high-visibility/high-sensitivity project was completed within the original project budget, which included a base bid plus an amount for unknowns centering on the installation of the duct bank in the old residential area. The utility and Kerite worked together using a cost and risk sharing approach. The project was completed on time, within budget, and with very few negative impacts to the neighborhood. The result was a new substation that improves reliability to a major hospital while providing additional distribution feeds to address area demand.

