

Going Underground . . .



Power That's Out-of-Sight

What sells a golf course community?

Beyond the opportunity to squeeze in an extra round or two, it's the ambience

— a lifestyle complete with a view of trees, beautiful fairways, and . . . power lines??

Background

Power lines were not what Intell Staley, LLC pictured for Staley Farms, a golf community in suburban Kansas City, Missouri. But a 69-kV overhead line owned by Aquila stood smack in the middle of the proposed golf course, within the trajectory of a well-hit drive — and potentially, in the path of the development's success.

Rerouting the overhead lines wouldn't eliminate the eyesore — only relocate it. Staley made the decision to invest in underground cable. The underground line could be routed alongside an existing roadway to provide future access for utility maintenance vehicles.

Problems

What looked like ordinary vacant ground turned out to be a minefield of permitting and construction difficulties. The right-of-way ran through the Multnomah Plantation Site, listed on the National Register of Historic Places. Early excavation revealed the presence of cultural resources — trails, a limestone dam and three pre-Civil War gravesites.

There were two stream crossings along the route. And, the landscape design called for a stand of mature trees near the proposed trenching area to remain intact. Burns & McDonnell/New River Electrical, LLC and Intell Staley, LLC put their combined resources to work to make the problems — and the overhead lines — disappear.

Solution

First, Burns & McDonnell permitting specialists helped negotiate a memorandum of agreement between Staley Farms, the Missouri Department of Historical Preservation,

and the Corps of Engineers detailing procedures to be followed concerning natural and cultural resources at the site. The agreement helped defuse a potential public relations crisis, and with permits in hand, the project team moved on to installation challenges.

To accommodate future electrical demands, Aquila required the line to be designed for 161-kV upgrade. The underground circuit is approximately 5700 feet long, with a single splice. Planned open-trench installation of the entire cable could have damaged cultural resources and the line of trees edging the green. For this segment, Burns & McDonnell designed a 340-foot-long, three-foot-wide, steel casing to be jacked-and-bored through solid limestone for the conduit. Instead of simply being placed in an open trench, the cable would have to be pulled the length of the casing and grout-filled.

"Improvements in underground transmission line technology make it more feasible to put high-voltage lines underground than in the past," says Burns & McDonnell Project Manager Ron Jenssen. "Experience with the appropriate materials, tools, and techniques is critical."

The team took advantage of cross-linked polyethylene-insulated shielded power cable (XLPE) for the installation. XLPE is lighter and smaller than standard EPR cable, with improved tensile strength. XLPE cable greatly reduces the possibility of shorts developing along the line, increasing reliability.

Computerized cable-pulling techniques also helped installers avoid damaging the cable as it was pulled. A dynamometer continually monitored stress on the line to ensure that the cable's pulling strength was not exceeded.

Outcome

"For our underground transmission line, we sought a company that could provide the right combination of engineering and construction expertise," says Douglas A. Lukenbill, engineering supervisor for Aquila. "Burns & McDonnell and new River Corporation represented that ideal combination." The new line was energized in October 2002. Staley Farms has all the power it needs, now and for the future — and the lines that deliver it are out of sight. ■