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WHITE PAPER / **UNDERGROUND FIBER-OPTIC CABLE CONSTRUCTION**

PERMITTING CONSIDERATIONS FOR INSTALLING FIBER-OPTIC CABLE BELOW GROUND

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Before installing fiber-optic cables underground, a utility first needs the support — and often the permission — of many people. By engaging environmental and permitting specialists early and continuing engagement before, during and after construction, utilities can save time and costs associated with complex permitting efforts.

Utility infrastructure projects almost always impact private and public land and can be disruptive to the people and wildlife that reside nearby. Early and frequent outreach to permitting bodies is essential to minimize those impacts and obtain the support, approval and permission of those needed to complete construction in a timely manner. Successful public engagement and open communication with local residents is imperative for implementing and completing a project on time with no surprises.

The permitting and environmental teams work in tandem with the rest of the engineering and construction teams. While much of this collaborative team's effort is concentrated during a project's early stages, its role does not end until the project is complete, restoration of the area has occurred and all necessary permits are closed.

PRE-CONSTRUCTION

Projects benefit when the environmental and permitting specialists get involved during the earliest stages of an underground construction project. One of the first steps is to develop an understanding of the project scope and construction method that will be used to complete the work.

Underground utility projects typically are completed using one of two methods: open-trench construction or horizontal directional drilling (HDD). Open-trench construction is often a faster but more disruptive approach. It involves excavating property along the route to the width and depth needed for the installation. HDD is a less disruptive, trenchless alternative. It involves installing underground conduit using a surface-launched drilling rig.

ROLE OF ENVIRONMENTAL AND PERMITTING TEAM

The environmental and permitting team is typically most active during pre-construction. The foundation laid at this stage will determine the team's assignments for the remainder of the project. Once the project scope, route and construction methods are selected, the pre-construction activities include:

Completing a Permit Assessment

A desktop review of the project route is used to identify sensitive environmental features that may be impacted by construction activities and require special permits. Because of its less disruptive nature, HDD projects tend to be preferred by many regulators and require fewer permits than open-trench projects. In some cases, HDD projects may avoid environmental permits altogether if crews adhere strictly to construction codes and standards.

Open-trench construction in environmentally sensitive areas typically requires greater project controls, special permits and defined restoration requirements. On projects that impact wetlands and river and stream crossings, a timely review of project plans is needed to assess the permitting requirements. Permits with long lead times, such as those required for navigable waterway crossings, may impact the project schedule.

Creating an Environmental Survey Schedule

Early coordination among engineers, environmental specialists and regulators can prevent last-minute survey discoveries of wetlands and other environmental features potentially resulting in budget and schedule impacts.

Typically, survey schedules can be safely developed once the project route is finalized and engineering is 60% complete. By this point, the permitting team can pinpoint the precise spots where surveys are needed and field activities can begin.

When creating the survey schedule, the permitting team not only factors in survey time but also how long it will take to turn survey data into useful project information. In addition, survey schedules include time for permit drafting and approval. Permit applications estimate when construction crews can gain access to the site, how long their work will take and the date construction must be complete. Because permit lead times vary, a permitting matrix that includes all permits, regulatory agencies and approval timelines is created and shared with the entire project team.

Together, these activities can add several months to a project timeline. By building these details into the schedule, the permitting team can look for efficiencies and cost control opportunities.

Conducting Local Permit Outreach

Local permitting outreach typically begins once engineering is complete. Because local roads are often impacted by underground fiber-optic cable construction, a municipality's first concern is often a project's impact on local traffic. The municipality will also review other nearby road improvement or utility projects that are underway at the time, enabling it to coordinate and set staggered schedules for overlapping projects.

While municipalities often own underground utilities near a planned project route, not all have engineering data they can share that clearly indicates their location. Because incomplete or missing data can impact a project route, early communication between a permitting team and municipal groups can help identify gaps to address any necessary route adjustments or changes in permit requirements.

Some projects may also require road use maintenance agreements. Rather than applying for multiple local road use permits, utilities may be expected to enter into a road use maintenance agreement that covers all identified roads, equipment transportation routes, and job site and construction site access related to the project. In some states, these agreements are managed at the county or municipal level.

This process requires that the project route and haul routes be identified early in project development. While fiber projects do not typically trigger hauling requirements, some may require longer bore shots to avoid impacts to environmentally regulated areas. Increased equipment weight is reviewed for such triggers.

Experienced permitting specialists can expedite these processes and reduce the possibility of project delays.

Identifying Environmental Permit Needs

Given the construction methods and other considerations associated with underground installations, permitting requirements can be complex. They can vary between and within states, sometimes even at the municipal level. Bodies of water may be subject to different state and federal regulations that can influence key project decisions. A thorough understanding of regulatory nuances can help utilities successfully navigate complex permit requirements.

For example, few regulations govern the depth at which fiber-optic cables are to be installed under wetlands, water resources and other environmental features. When requirements do exist, however, they can call for a deeper installation depth than a utility might otherwise choose. Upfront understanding of these requirements can significantly improve decision-making and reduce project costs.

Likewise, areas inhabited by threatened and endangered species may impact construction. While work can be performed in wetlands year-round, the presence of protected animal and plant species can limit construction activity to just a few months a year.

Environmental and permitting specialists experienced in working through these processes with regulators can often streamline permitting requirements and avoid scheduling complications. For example, some delays can be avoided with presence/absence studies that determine whether a threatened or endangered species resides in an identified habitat. Because these studies can be expensive, it may be necessary to weigh their cost against the value of keeping the project moving.

Creating a Stormwater Pollution Prevention Plan (SWPPP)

Underground utility projects sometimes require SWPPPs to identify activities and conditions that could cause water pollution at a project site and describe the best management practices (BMPs) for preventing it. SWPPPs are required as part of a National Pollutant Discharge Elimination System (NPDES) permit if a project creates one or more acres of ground disturbance — or potentially less if a county or municipal permit is triggered. In some cases, these permits can be triggered with as little as 5,000 square feet of ground disturbance.

The development, review and approval of an SWPPP can be as time-consuming as that of other permits. It requires consultation with the engineering team, given that open-trench construction calls for a different response then directional drilling. Additionally, HDD requires inadvertent release and frac-out contingency plans, either as an exhibit or addendum to the SWPPP.

CONSTRUCTION

Permitting activities continue throughout construction. By this stage, all necessary and required permits and plans are approved, organized in the permit matrix, and stored in a permit binder that the construction team can easily access and review. The permitting team's focus is now on coordinating construction activities as they pertain to applicable permits.

ROLE OF PERMITTING TEAM

When the required permits have been secured and are in place, the focus shifts to that of compliance with the permit stipulations. Special attention is paid to the utility's contract with the contractor and written commitments on erosion control measures required by permit stipulations or detailed in the contract. Omissions can open a utility to fines, penalties and stop-work orders. Specific responsibilities during construction include:

Monitoring Construction for Permit Compliance

SWPPPs and NPDES permits typically include compliance and monitoring requirements during active construction and following rain events. Inspections often are performed weekly; their frequency may be determined by state and federal agencies.

Construction contractors are expected to review SWPPP and NPDES permits and develop plans for reducing the potential for noncompliance. The environmental specialist assigned to the monitoring role is typically responsible for verifying that the construction team complies with environmental and permitting regulations, limits disturbance to permitted levels, respects the buffer zones and preserves roadway quality.

Environmental specialists often work directly with a construction site manager or foreperson to identify these and other items addressed in weekly compliance reports. Weekly reports are then compiled into monthly reports that track performance and note any adjustments needed to maintain compliance.

Overseeing Inadvertent Release and Frac-Out Contingency Plans

The release of drilling fluid is known as an inadvertent release, or frac-out. When a release occurs in "waters of the U.S.," it is considered fill and regulated by the U.S. Army Corps of Engineers. Discharges of drilling fluids into isolated waters may also be regulated by the state, county or municipality where the project is located. When drilling fluid is discharged into a regulated wetland or body of water, relevant regulatory agencies must be notified and the released drilling fluid must be cleaned up. Frac-outs not contained quickly can spread, dramatically increasing cleanup costs. Improperly cleaned frac-outs can prevent revegetation, which can preclude utilities from closing out permits, leading to violation notices and fines.

An environmental specialist prepares for frac-outs by developing and implementing an HDD contingency plan. The plan should:

Identify and describe characteristics of all regulated areas on a project site. Site characterization studies can be used to identify potential environmental impacts and the tools needed to address a potential release. Assessing the area surrounding regulated areas is also necessary. Steep slopes leading to regulated areas or obstructions that could prevent equipment from accessing an area are typically noted in a contingency plan. Drilling under shallow wetlands, for example, poses fewer frac-out risks than drilling beneath a flowing stream with deep water limits.

List drilling procedures, materials and equipment used to minimize, identify and clean up frac-outs. Early identification of the type and quantity of materials and equipment needed to contain and clean up frac-outs makes it possible for these items to be acquired and brought on-site as well as other materials and hardware delivered at a project's onset. Drilling procedures should identify the drill rig's location for each bore shot and include BMPs for drill rig use, such as interceptor trench and erosion control measures around the bore pit and work area. The plan also identifies frac-out response equipment for various regulated areas. For example, flowing water requires containment via a tin whistle and turbidity curtains, but shallow wetlands may only need erosion control logs and a vacuum truck.

List approved drilling fluid additives. Certain drilling additives can require special permitting or trigger U.S. Environmental Protection Agency concerns. Because regulators will require the list of additives in their notification when a frac-out occurs, additives should be approved for use by the project owner early in the project.

Identify responsible personnel. The plan identifies personnel who have the authority to stop the drill and at least one person dedicated to monitoring for frac-outs. At least two environmental compliance monitors — typically environmental specialists — are necessary when boring beneath wetlands, water resources or other areas that require special management. The environmental specialist confirms that the materials and equipment needed to respond to an inadvertent release are on-site prior to drilling activities. The monitor — or selected environmental specialist — also closely monitor drilling activities and oversee the contractor's implementation of frac-out response procedures, should they be necessary.

Outline the frac-out response procedure and notification plan. An environmental specialist is also responsible for overseeing materials and equipment setup for a frac-out response so that sediment control measures can be deployed quickly if a release occurs.

Agency reporting requirements are noted in the response plan. Federal, state and local authorities often require notification within a day of a release into a regulated area. Given the short window, notification plans typically require the contractor to report a frac-out immediately to a utility so the release, containment measures and cleanup activities can be documented and reported within a 24-hour time frame. Having an environmental compliance monitor on-site during drilling activities to collect and analyze data makes it easier to report inadvertent releases in a timely fashion.

It is invaluable to have an experienced environmental contractor who understands the contingency plan and release management, as well as professionals who can keep the environmental and permitting team informed. Morning safety meetings and monthly on-site refresher sessions on timely environmental topics help minimize compliance violations.

POST-CONSTRUCTION

ROLE OF PERMITTING AND ENVIRONMENTAL PROFESSIONALS

At this stage of the project, permitting and environmental professionals are focused on land restoration and permit closeout.

Once construction activities are complete, permitting and environmental specialists monitor the progress of land restoration efforts. These professionals are responsible for conducting a final site survey to monitor vegetation regrowth in impacted areas and for alerting the restoration team to any areas requiring additional stabilization or replanting.

Open-trench projects require more significant restoration than those completed with directional drilling. However, HDD projects may require frac-out or drilling fluid cleanup. Further environmental feature monitoring may also be required in the event of an inadvertent release.

Once this work is completed, permitting and environmental professionals contact regulatory agencies to close out any outstanding permits. As part of project closeout, the permitting team provides all survey data, permits, maintenance logs and other documentation to the project team. This information can prove valuable should issues arise later by providing documented proof of past activities and strict permit compliance.

CONCLUSION

Few projects trigger a broader spectrum of permits or place more pressure on a permitting and environmental team than underground fiber-optic cable construction projects. Navigating these projects requires a permitting and environmental team that is well-versed and experienced in the many challenges these projects pose. Utilities that engage these teams early and draw on their experience throughout a project can save time and costs on complex permitting efforts.

BIOGRAPHIES

KARI GILES is a senior environmental scientist at Burns & McDonnell who focuses primarily on HDD projects and inadvertent release contingency plans. She has deep knowledge of permitting and environmental compliance as well as erosion and sediment control issues that arise on linear utility projects. Her experience also includes extensive work in habitat restoration and streambank stabilization.

ERIC SOKOL, ENV SP, a public involvement specialist for Burns & McDonnell, has wide-ranging experience with stakeholder engagement, environmental compliance monitoring and permitting coordination for large-scale infrastructure projects. Accredited as an Envision Sustainability Professional through the Institute for Sustainable Infrastructure, Eric takes a holistic approach to addressing sustainability and key environmental concerns on infrastructure projects.

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