

CASE STUDY

Duquesne Light Company Prepares for the Future in Pittsburgh's Urban Core

Keeping utility and transportation disruptions to a minimum thanks to a high level of coordination has been critical to the success of Pittsburgh's underground electricity distribution projects.



Challenge

Duquesne Light Company's (DLC) Bus Rapid Transit (BRT) Distribution program aimed to proactively upgrade DLC's underground electric distribution infrastructure in coordination with other utility improvements in advance of the BRT expansion proposed by Pittsburgh Regional Transit (PRT, formerly Port Authority of Allegheny County).

The electrical underground infrastructure improvement program was needed for two reasons. First, DLC's program was necessary to satisfy the growing need for power in a popular Uptown neighborhood with a large increase in residential and commercial customers, including key healthcare facilities. With the BRT program on the horizon, it made sense for all the city's utilities to get their upcoming projects completed before the roadways were redone. To minimize disruptions to utility service and transportation, local utilities, municipalities and transportation entities needed to come together and work in tandem on installations in response to Pittsburgh's broad urban renewal efforts.

Project Stats

Client

Duquesne Light Company

Location

Pittsburgh, Pennsylvania

51K

LINEAR FEET OF
CABLE INSTALLED

216K

FEET OF CONDUIT
INSTALLED

57

MANHOLES NEW,
REPLACED OR REBUILT

Second, the nature of the work — underground excavation in congested urban roadways — presented a unique set of challenges from an execution perspective, with public and worker safety top among the considerations.

Solution

Burns & McDonnell was selected by DLC as the engineer-procure-construct (EPC) firm for this project in the heart of Pittsburgh. The program allows the utility to continue providing the level of service and reliability DLC customers have come to expect while increasing the overall reliability of the electric grid.

The BRT initiative aims to add dedicated bus lanes throughout the city, including in growing Uptown, strategically chosen to reduce congestion. In addition to DLC's electric assets, this initiative also affected critical gas, water and sewer utility components. Each utility was responsible for its respective facilities, but careful coordination was required to align design plans and sequence concurrent construction in congested underground rights-of-way.

During the planning and design phase, the program's engineers worked to obtain and use all available information about existing and planned utilities in the area. This included reviewing utility atlas information, obtaining topographic and subsurface utility surveys, performing manhole inspections and reconciling those observed conditions with records to help confirm routing. This information allowed for a more detailed and well-thought-out engineering design plan for both the civil work and electrical tasks.

Once preliminary routing was established, extensive test hole work was performed to confirm exact locations and depths of utilities at critical areas in the design. Because of the unique hazards when working underground, a focus was placed on addressing risks and identifying internal team members who had the experience to properly manage and mitigate those risks. With coordination of public, municipal and other utilities a key aspect of the project, Burns & McDonnell brought on a full-time utility coordination manager with a critical focus on safety. The program team also worked closely with local subcontractors and selected partners with a track record of safe execution of similar work.

The cable scope included work on dozens of circuits, with voltages ranging from 600 V to 23-kV. In total, this included more than 51,000 linear feet of new cable and associated splices within the new manhole and conduit systems. Complicating the electrical work on the program was the



interconnection of the new cable into the existing system. Many circuits branch off multiple times and are comprised of several different cable types, so special attention had to be paid to successfully re-connect into existing cable.

In some areas, existing underground utility congestion made new cable distribution and manhole installation impossible, such that dozens of existing brick manholes had to be carefully demolished and rebuilt larger in place in order to accommodate the new cables. Engineering and construction teams closely coordinated this effort and others, with safety top of mind at all times.

As a crucial part of the work, installing new manholes, cables and services had to be performed while minimizing customer power outages. Regular status calls and outage tracker technology was used to help the team plan outages in a proactive, strategic way to cause the least amount of disruption to DLC's customers.

To help make working conditions safer, extensive maintenance of traffic planning and close coordination with other entities who shared the right-of-way was critical. Burns & McDonnell and DLC hosted weekly meetings with the City of Pittsburgh and all affected utilities, with the Burns & McDonnell utility coordinator managing the work map for the area. This coordination effort was key to keeping the public safe and informed, in addition to helping all utilities meet their scheduled commitments ahead of the roadway work.

Results

This major infrastructure investment will enable DLC to continue fulfilling the electricity needs of Pittsburgh — home to more than 300,000 residents as well as Duquesne University, University of Pittsburgh and Carnegie Mellon University campuses.

Work to expand electrical subsurface infrastructure included 18 months for planning and permitting, and 30 months for construction. In addition to installing 216,000 feet of conduit and 51,000 feet of new cable, the construction team installed 12 precast manholes, eight new build-in-place brick manholes, and 37 rebuild-in-place brick manholes. With DLC's work taking place in the same footprint and concurrently with gas, water and sewer work, robust utility coordination resulted in safe and successful execution. All work was completed on time and within budget.

About Burns & McDonnell



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