

# RED•E•DUCT®

Precast Electrical Duct Bank

OFFSHORE WIND FARM CABLING PROJECT

## CASE STUDY





## RED-E-DUCT SPEEDS INSTALLATION, REDUCES CHALLENGES FOR OFFSHORE WIND FARM CABLING PROJECT



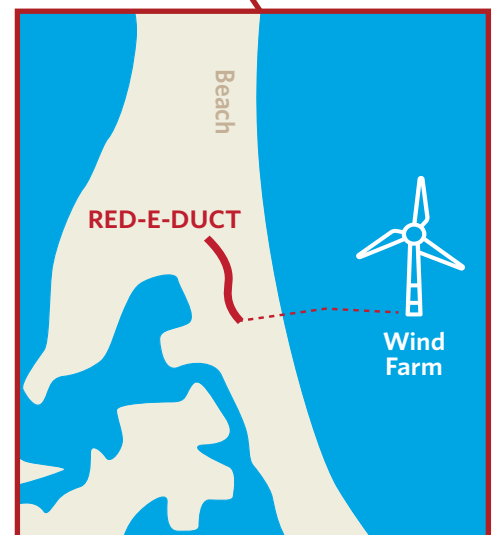
From underwater installation to tidal action to a tight winter construction window, the New England offshore wind farm's recent cable replacement project had challenges and then some. Innovative thinking on the part of the contractor and a new product from Contech helped ease the roadblocks to decrease labor and time while boosting safety on site.

The original electrical infrastructure for the offshore wind farm needed replacement as cabling from the turbines had become exposed due to sand movement over time. The project team was charged with installing new cabling deep enough to provide sufficient coverage offshore, then tie it into the existing infrastructure onshore. In all, the installation stretched from the beach parking lot about a half mile into the Atlantic Ocean.

The new underwater conduit was installed alongside the original lines, which were about 4 to 5 feet deep, but buried much farther underground. A horizontal directional drill (HDD) buried the cables 25 to 50 feet under the seafloor, where they'll be better protected.

Onshore, the conduit runs behind the barrier dunes, parallel to the beach between two electric manholes along the beach. The original project plan called for cast-in-place concrete to encase and protect the conduit and cabling. But this method presented a number of issues, from sourcing and delivering concrete to battling tidal action on the beach with flooding twice a day.

Instead, the contractor brought an innovative new solution—Contech RED-E-DUCT precast concrete duct banks—to the attention of the power company engineers. Prefabricated in the factory and installed with a backhoe, the duct banks allow more than 150 feet of conduit in full concrete encasement to be installed in less than two minutes.





The project used 3H x 2W duct bank straight sections (three conduits high by two conduits wide). RED-E-DUCT's factory prefabrication and fast installation procedures offered numerous advantages over cast-in-place concrete for the wind farm project, including requiring a smaller trench and minimizing the need for a silt fence and a dewatering system; the larger trench needed for cast-in-place methods (likely about two to three times the size) would have had greater environmental impacts and been harder to maintain and keep free of water.

"The only time the trench was free of water was for about a half an hour at low tide, so trying to get a stable work base to pour and set concrete would have created a significant logistics problem," said George Armstrong, Contech's Field Service Engineer who provided technical support during the installation. In addition, the soil is in a liquid state, causing sides of the trench to collapse, further compounding the issues. In a cast-in-place setup, sand and silt would have filled the spaces between conduits, requiring the contractor to remove it with a vacuum truck, a time-consuming process that can take several days to complete.

Water depth in the trench varied from a few inches to a few feet depending on the tide and tidal surge. Installation of the RED-E-DUCT precast duct bank was uninhibited due to water infiltration, whereas cast-in-place would have required well pointing and pumping to provide a dry work front. With RED-E-DUCT, installers were able to excavate a smaller section of trench, install multiple precast duct bank sections, and backfill all in the same day, reducing the risk of exposure for an open excavation and the work required to install temporary barriers. The ability to backfill the precast duct banks as soon as they were installed minimized open trench excavations that required safety barricades. Additionally, narrow trench widths reduced the spoil pile size and amount of hay bales required to surround the stored soil.

On many occasions, the RED-E-DUCT sections could be placed on screeded sand, whereas cast-in-place would have required coarse aggregate.

In addition to reducing the size of the trench, RED-E-DUCTs fast installation minimizes the time workers are in the trench and the number of required installers, improving safety. The overall time savings helped the project owner meet the tight construction schedule, which took place in the winter during freezing temperatures to avoid having an impact on vacationers and tourists.



Contech not only provided the materials, but also offered essential evaluation and design support along with expedited shipments to meet a tight winter construction window. Matthew Pearson, Product Applications Engineer for Contech, applauded the contractor and engineer who evaluated and implemented the use of RED-E-DUCT on the project. "Project site conditions presented difficult working conditions, and time was of the essence," Pearson said. "The contractor and engineer worked together and took a hard look at alternative solutions. By implementing the use of RED-E-DUCT, project timetables were reduced, and worker safety was improved. The project was a great example of implementing advanced construction methods and products"



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