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SUPPORTING INNOVATION

Case Study

ST. AUGUSTINE, FL, POOL DECK UNDERPINNING DURING HOME RENOVATION

SITUATION

The listed project consists of a solar facility, approximately 6.0 MW in size on a 16 acre track of land, in rural North Carolina.

This case study involves remediation of the pre- cast concrete inverter and transformer pads which settled, compromising the equipment and wiring for the solar facility.

There were 4 pad groups for this project, three of which had 3 separate pads, with two individual pads at the fourth location. Thus, there were a total of 7 inverter pads measuring 8′ x 14′ x 6″ and 4 transformer pads measuring 8′ x 8′ x 6″.

The Contractor noticed the pads had experienced settlement within the first year that ranged from 1″ to 3.5″, except for one inverter pad which showed no signs of settlement.

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Conventional construction methods were applied for the inverter and transformers placed on pre-cast concrete pads. That is, the wiring is run in conduit to the specific pad locations.

Gravel backfill was used for pad support in addition to raising the elevations for the pads. Each pad in the group was placed to within 12" of each other to create a cluster for consolidating the equipment.

The pads are set in place with the assistance of a lift, or crane, depending upon the actual loads. The wiring is extended through pre-cut openings for connection to the equipment. Photo 1 below illustrates the pad condition at one of the locations – typical of others.

SCOPE OF WORK

The repair work consisted of installing Cantsink Helical Piles with remedial underpinning brackets to stabilize and lift the settled concrete pads to an original level state.

The pile used was a 2.5" schedule 40, pipe pile with load capacities of 60 Kips. A standard underpinning bracket by Cantsink was used.

All materials installed were hot dipped galvanized in accordance with industry specifications.

The piles were positioned at key load points to insure uniform lifting capabilities were achieved. Pile depths for the 1st pad location were all at 14 feet with only one pile requiring 17 feet to meet the minimum torque requirements. Pile depths for the 2nd and 3rd pad location ranged from 21' to 28'. At pad #4, all piles were installed to 28' in order to meet the torque requirements.

Once the piles were properly founded, Cantsink remedial underpinning brackets were installed to transfer the bearing loads to the piling system. Hydraulic jacks (20 ton capacity) were placed on each piling system for lifting. Systematically, load was applied to each pile and the individual pads were raised to a level condition.

RESULT

The photograph below depicts the work in progress with piles, brackets and jacks in place ready to lift the settled pads. The end results were characteristic of all pads – level equipment and level pre-cast concrete pads. The work was completed in 5 business days involving a 4 man crew for 3 days followed by an additional 2 men the other 2 days. Completion was made only days prior to Hurricane Matthew striking the North Carolina Coast, which resulted in flooding for most of the Eastern half of North Carolina.