

# Helical Piles Provide Footing Support for New Building

## Project

Citizens First Credit Union

## Location

Oshkosh, WI

### CHALLENGE ▾

A new Citizens First Credit Union was to be constructed across two previously developed properties with existing structures. The existing structures would be demolished and completely removed to allow for the construction of the new slab-on-grade single-story building, canopy-covered drive-thru lanes and parking areas. A geotechnical investigation included the advancement of four soil borings within the proposed building footprint. The borings identified five to 7.5 feet of very loose to loose uncontrolled fill over stiff to very stiff residual clays. The original geotechnical recommendation for foundation support included over-excavation of the existing fill soils and replacement with compacted and tested engineered fill. However, an excavation made north of the proposed building to remove underground storage tanks raised concern that contaminated soils could exist within the limits of the proposed over-excavation. Excavation and either treatment or disposal of contaminated soils would add significant costs to the project. Helical piles were then considered as an attractive deep foundation option since they do not generate spoils during installation.

### SOLUTION ▾

The foundation design included helical piles with two shaft sizes and three helix plate configurations. The Model 288 (2.875-inch OD by 0.276-inch wall) round shaft with a 10"-12" lead section was selected to support a design working load of 15 kips, the Model 288 shaft with a 12"-14" lead was selected to support a design working load of 27 kips, and the Model 349 (3.50-inch OD by 0.300-inch wall) round shaft with an 8"-10"-12"-14" configuration was selected to support a design working load of 35 kips. The helical piles were designed with a factor of safety of 2.5 due to weaker soil identified at the bottom of one of the borings and the anticipated pile depths being near or below the bottoms of the test borings. The piles were installed to torque values ranging from 4,200 to 12,500 foot-pounds to provide torque-correlated ultimate capacities (based on default torque correlation factors) exceeding the respective design working loads by the factor of safety. Pile depths ranged from about 11.5 feet to 19 feet to achieve the desired torque and to advance all helix plates below the fill.



Helical piles advanced at isolated column location



Helical piles installed at column pad

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## Helical Piles Provide Footing Support for New Building

► *Continued*



New construction brackets tack-welded to piles



Concrete mud mat placed to support forms for grade beams (foundation walls)

Completed pile-supported column pad

### PROJECT SUMMARY ▼

<b>Architect:</b>	Gries Architectural Group
<b>Structural Engineer:</b>	Larson Engineering, Inc.
<b>Geotechnical Engineer:</b>	Midwest Engineering Services
<b>General Contractor:</b>	Miron Construction
<b>Certified Pile Installer:</b>	Foundation Supportworks® of Wisconsin
<b>Products Installed:</b>	(13) FSI Model 288 Helical Piles, 10"-12" Lead Section; (30) FSI Model 288 Helical Piles, 12"-14" Lead Section; (12) FSI Model 349 Helical Piles, 8"-10"-12" Lead Section Followed by Single 14" Extension; Piles Installed to Depths of 11.5 to 19 feet, Design Working Loads of 15, 27 and 35 kips

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