

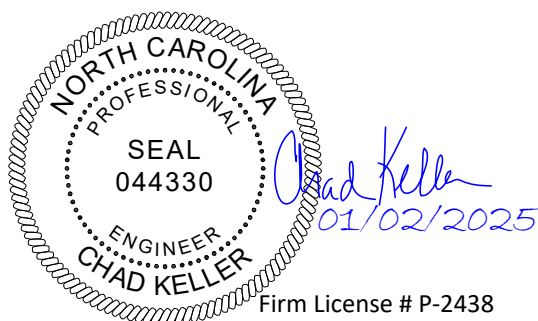
Date: January 2, 2025  
Project: Horne Residence  
Address: 16 Starboard Tack  
Sanford, NC 27332

### Foundation Support Systems Analysis

This report is prepared for Southeast Foundation Repair (contractor) by FDN Engineering (engineer). Helical piers and push piers are proposed for installation at the above referenced project. The foundation support system is intended to stabilize and potentially lift the existing foundation structure – reducing pressure on existing soils. Load requirements for the systems were calculated at areas shown on repair plan. Engineer performed design for this project - see pages 2-3 for engineering notes and results. See pages 4-5 for details of the repair systems. See page 6 for a repair plan of the foundation support systems on the structure.

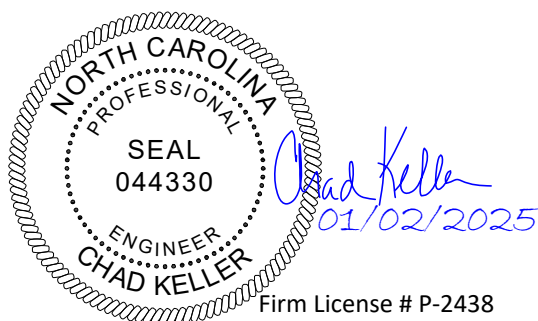
To the best of my professional knowledge, the design of the foundation support systems meets the structural requirements of the 2018 North Carolina State Building Code to the extent that it applies to our scope of work. Engineer is retained in a limited capacity for this project. No responsibility and/or liability is assumed by, nor shall be assigned to engineer for items beyond the proposed scope as shown herein.

Upon completion of the foundation support systems, the contractor shall supply engineer a log of the installed locations, depth, and final torque of the helical piers; and a log of the installed locations, depth, and final drive pressure of the push piers, as well as photos of completed work. Engineer will evaluate the field data and prepare a letter of completion for closeout, if necessary.



Pier Project Notes (contractor to inform engineer if assumptions are inaccurate):

1. Structure is two-story, residential with 5 in garage slab floor & wood-framed walls.
2. Contractor will install push piers, brackets, and all related components per the support manufacturer's current installation instructions, technical manual, & UES Evaluation Report 289.
3. Contractor will install helical piers, brackets, and all related components per the support manufacturer's current installation instructions and technical manual, and according to the latest ICC-ES AC358 & ESR-3074.
4. Helical piers shall have a center-to-center spacing at the helix depth of at least three (3) times the diameter of the largest helix plate.
5. Pier shall not be installed in recently backfilled sites, in bedrock soils, or where there is possible sinkhole activity. Notify engineer if foundation is cracked between piers.
6. The pier was designed as plain steel corroded with capacities assuming a 50-year scheduled sacrificial loss in thickness per ICC-ES AC406. Contractor may galvanize the system for added corrosion protection.
7. Only local effects have been checked on existing structural members (e.g., concrete bearing at pier bracket). The integrity of the existing supported structure is outside of our scope of work.
8. The systems should be used on structures that are fixed from translation or braced to prevent translation of the foundation. The surrounding soil must provide continuous lateral support.
9. Where voids are created below the slab during lifting, it is recommended to fill with PolyLevel. Use compacted soil around the footing.
10. Do not place pier directly under door/window (w/in 24" from footing). Contact engineer if condition exists.

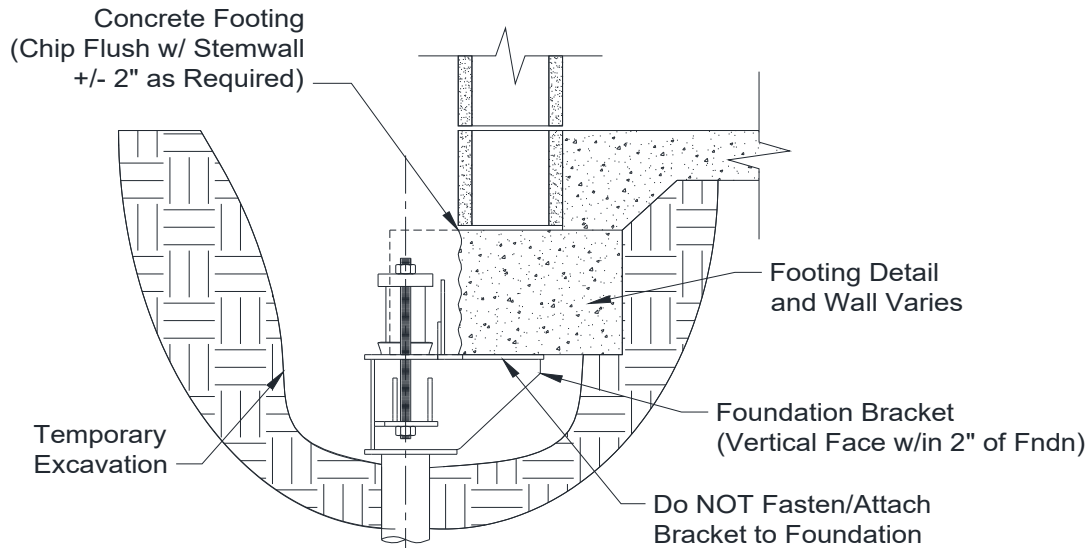


Helical Pier Analysis and Results:

1. All design loads are based on guidance from the applicable building code.
2. Piers are designed to support axial compression load only.
3. Maximum, worst-case, total load on a helical pier is **13,900 lbs** (allowable stress combinations).
4. We recommend installation of piers with a 2-7/8" diameter shaft (HP288) with 8" and 10" diameter (minimum) helix plates.
5. Minimum helical pier tip depth is 8 ft.
6. An installation torque of **3,100 ft-lbs** should be applied to achieve an allowable capacity greater than the total load.
7. Helical pier spacing along the foundation shall not exceed 6'-0" O.C. and 2-ft from a corner, typ.
8. A factor of safety of 2 is used to calculate the allowable soil bearing capacity.
9. Contractor may use up to 5 ft long spreader beams to improve the footing's spanning capability by carrying load from the footing to the pier (HSS4x2x1/4, ASTM A500 Grade 46). Always, use below doors and windows cut to within 2 ft of footing.

Push Pier Analysis and Results:

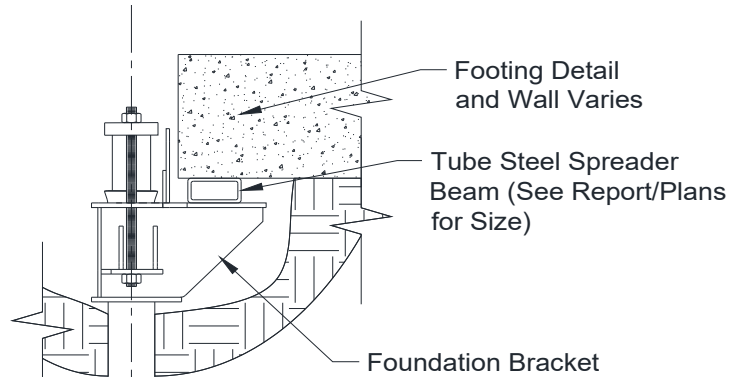
1. Maximum, worst-case, total load on a push pier is **15,700 lbs** (allowable stress combinations).
2. We recommend installing push piers with a 2-7/8" dia. shaft (PP288) and a 48" external sleeve.
3. Add/drive pier sections until a suitable load bearing stratum is encountered. The structure will lift **OR** target pressure is achieved.
4. An install hydraulic drive pressure of **3,300 psi** using drive cylinder FS35DC (288 - Red) should achieve the desired ultimate load or lift the structure. If the structure begins to lift prior to hitting the target pressure w/ depth greater than 5 ft, stop driving - pier is adequate for structure support.
5. Push pier spacing along the foundation shall not exceed 6'-0" O.C. and 2-ft from a corner.
6. A factor of safety of 2 is conservatively used for push pier systems. The drive and lock-off loads are easily measured indicating the actual supported load.



Helical Pier  
Locate Per Plan  
(See Report for Shaft Size  
and Blade Configuration)

Note:  
See manufacturer's specifications  
for more information regarding the  
shaft, sleeve and bracket's material  
and capacities.

**HELICAL PIER TO FOOTING DETAIL**



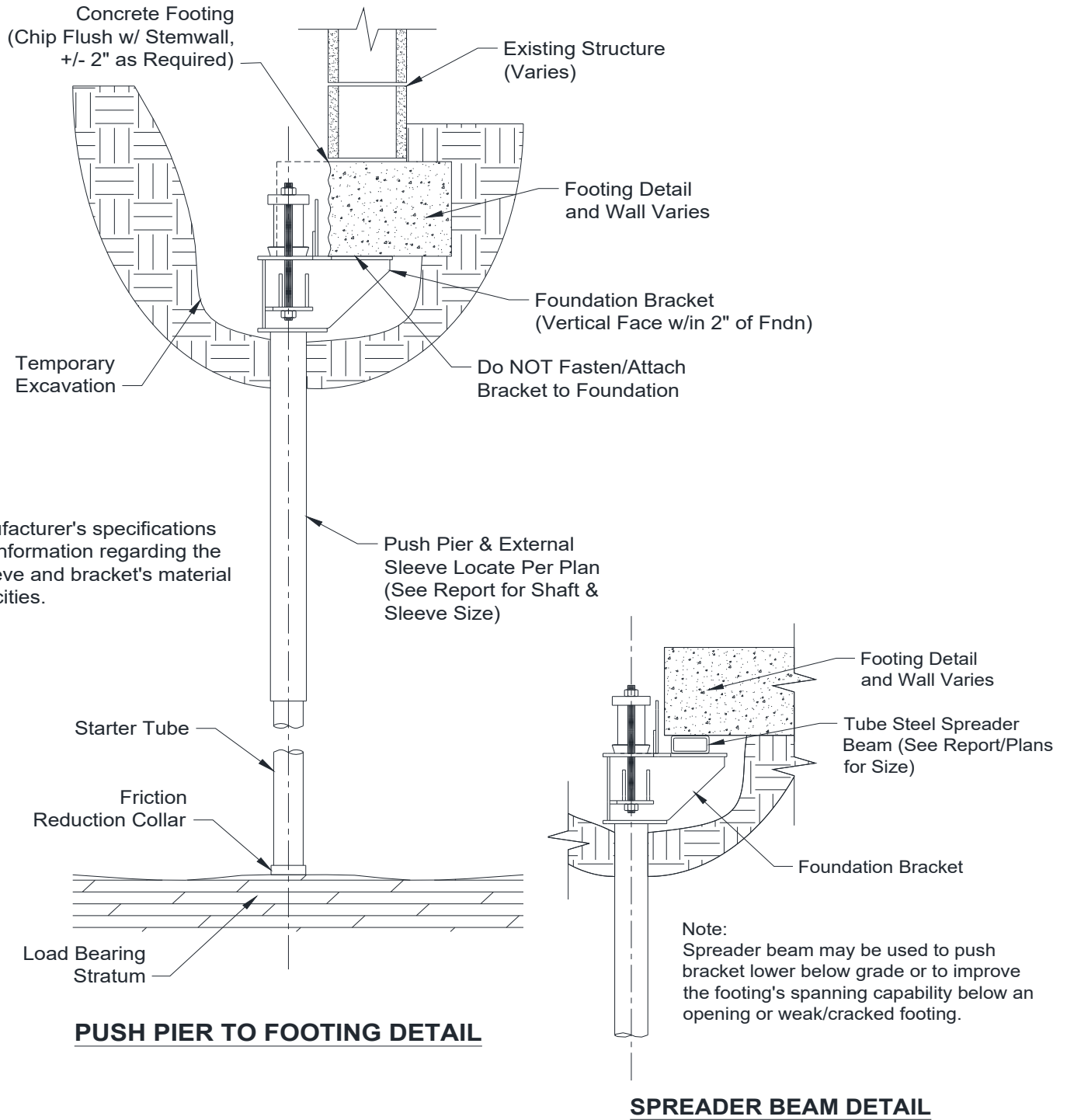
Note:  
Spreader beam may be used to push bracket  
lower below grade or to improve the footing's  
spanning capability below an opening or  
weak/cracked footing.

**SPREADER BEAM DETAIL**

**FDN Engineering, PLLC**  
2412 N 179th St.  
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*Chad Keller*  
01/02/2025  
Firm License # P-2438



**Pier Notes:**

1. Residential construction, two-story.
2. Layout of (8) Helical Piers, Model HP288 for foundation support - 8'-0" min depth.
3. Installation torque = **3,100 ft-lbs.**
4. Helical pier max spacing is 6'-0", UNO. Start 2' from corners.
5. Layout of (8) push piers, Model PP288.
6. Calculated ultimate load = **31,400 lbs**
7. Push pier max spacing is 6'-0", UNO. Start 2' from corners.
8. Spacing may vary based on field conditions. +/- 1 ft from noted
9. Install per pier manufacturer's instructions and technical specifications.

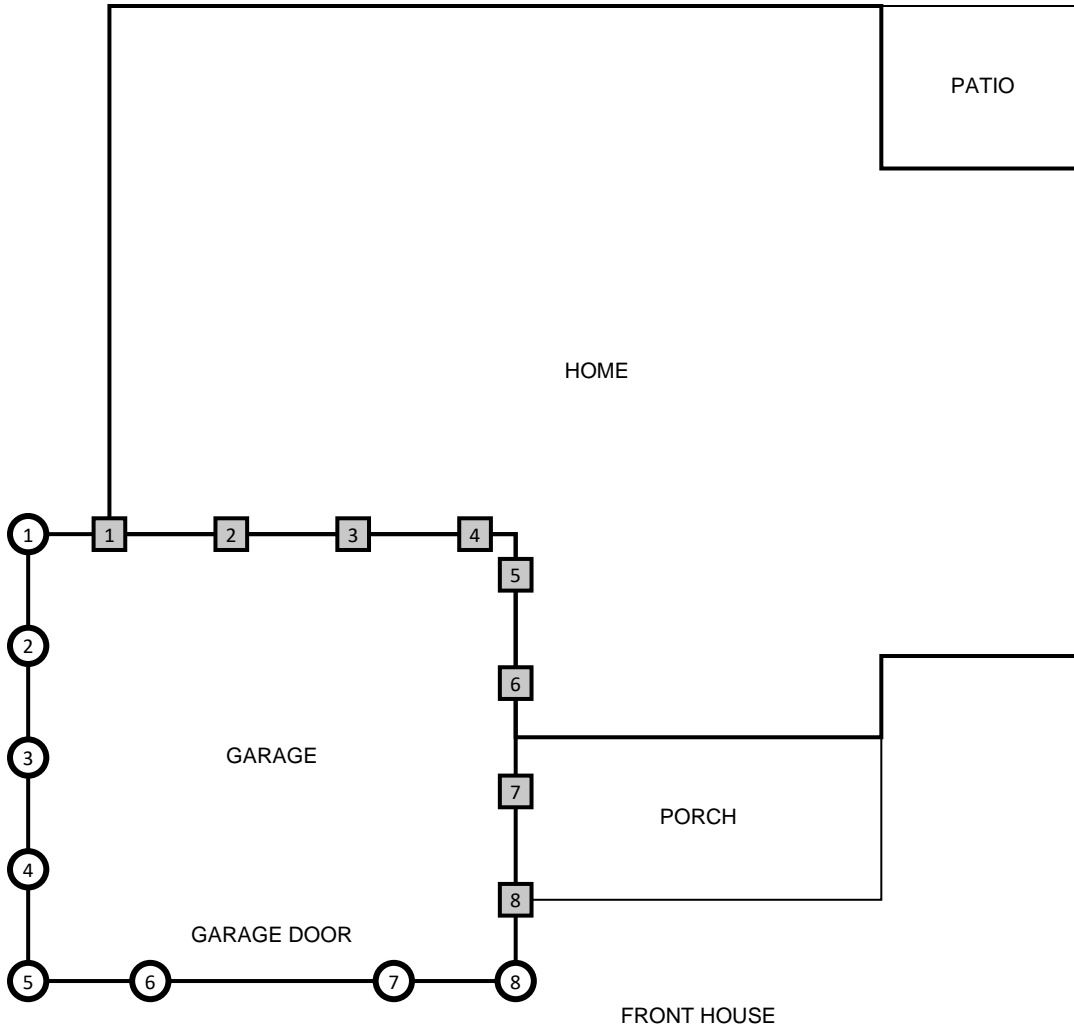
**LEGEND:**



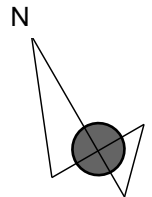
Indicates Helical Pier and Mark Number



Indicates Push Pier and Mark Number



**REPAIR PLAN**



DRAWING NOT TO SCALE

**Project:**

Horne Residence  
16 Starboard Tack  
Sanford, NC 27332

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