STARK FOUNDATIONS

4400 NE 77th Ave, Suite 275
Vancouver, WA 98662
P: 360.566.7343
E: starkd@starkfdn.com

STRUCTURAL CALCULATIONS

PREPARED FOR

TARHEEL BASEMENT SYSTEMS

FOR

ADAMS RESIDENCE

FOUNDATION REPAIR

386 CAMELIA RD

ANGIER, NC

PROJECT NUMBER: 21.083.TBS

DATE: March 19, 2021

PROJECT MANAGER: DANIEL STARK, P.E.

STARK FOUNDATIONS

4400 NE 77th Ave, Suite 275
Vancouver, WA 98662
P: 360.566.7343
E: starkd@starkfdn.com

March 19, 2021

Project No.: 21.083.TBS

Tonya Gunn
Tarheel Basement Systems
2910 Griffith Road
Winston-Salem, North Carolina 27103

RE: Foundation repair - 386 Camelia Rd, Angier, NC

PROJECT BACKGROUND

We understand that the structure is a single-family residence and has experienced settlement at the front elevation of the structure . A recent floor level survey (attached) indicates as much as ~1" of differential settlement may have occurred. It is our understanding that (2) 2 7/8 inch diameter push piers have been proposed to provide additional foundation support.

Image 1: Front Elevation

GEOLOGIC SETTING

The existing structure is located in Angier, NC. The geologic structure in the area is comprised of silty loam and the site is relatively flat. It is our opinion that the localized settlement is a result of improper foundation drainage and/or undersized footings. We believe that suitable support can be achieved by installing helical and/or push piers.

SUMMARY

The ultimate load requirement for the push piers is 20000 lbs, and based on the geologic setting, we expect the piers to achieve adequate capacity at approximately 8 – 25 feet. We recommend that the piers with a 2 7/8 inch shaft and be installed to a minimum depth of 8 feet and a minimum installation pressure of 2100 psi, or refusal, using a 9.62 square inch hydraulic ram.

Regards,

Daniel Stark, P.E.
Stark Foundations

STARK FOUNDATIONS

PROJECT

Foundation Underpinning
386 Camelia Rd
Angier, NC

Date: 19-Mar-21
Designed by: NDS

Project No.: 21.083.TBS

Design Criteria

Code(s):

International Building Code (IBC) 2015/2018
ASCE 7-10

Design Loads:

Dead:

Roof =	15	psf
Chimney =	45	psf
Third Floor =	15	psf
Second Floor =	15	psf
First Floor =	15	psf
Walls =	50	psf
8" Foundation Wall =	100	psf
Soil =	110	psf

Live:

Roof (snow) =	25	psf
Third Floor =	40	psf
Second Floor =	40	psf
First Floor =	40	psf

Soil:

Allow Lateral Bearing Pressure =	200	psf/ft
Active Pressure =	60	psf/ft

Wind: (not applicable)

Exposure =	C	
Wind Speed, V =	120	mph
Gust Effect Factor, G =	0.85	
Internal Pressure Coefficient, GC_{pi} =	-0.18	
External Pressure Coefficient, C_p =	0.8	

Risk Category =	II
K_{zt} =	1.0
K_d =	0.85
K_z =	0.98
Height, h_z =	30 ft

Design Wind Pressure:

where: $p_w = q_z (GCp - GC_{pi})$

$q_z = 0.00256 K_z K_{zt} K_d V^2$

Therefore:

q_z = 30.7 psf

p_w = 26.4 psf

Factored Wind Pressure, p'_w = 15.8 psf (say 16 psf)

Design Load Combo = D + 0.6W

$\omega = 0.6$

STARK FOUNDATIONS

PROJECT

Foundation Underpinning
386 Camelia Rd
Angier, NC

Date: 19-Mar-21
Designed by: NDS

Project No.: 21.083.TBS

Push Pier Design - Worst Case

Vertical Design Loads:

Tributary Widths:

Roof =	11	ft	------->	165	plf
Third Floor =	0	ft	------->	0	plf
Second Floor =	4	ft	------->	60	plf
First Floor =	4	ft	------->	60	plf
Walls =	12	ft	------->	600	plf
Foundation Wall (height) =	2	ft	------->	200	plf
Soil (height) =	0.5	ft	------->	55	plf
			ΣDL =	1140	plf

Live:

Roof (snow) =	11	ft	------->	275	plf
Third Floor =	0	ft	------->	0	plf
Second Floor =	4	ft	------->	160	plf
First Floor =	4	ft	------->	160	plf
			ΣLL =	595	plf

Max Pier Spacing or Trib = 6 ft

Pier Working Loads:

P_{DL} =	6840	lbs
0.75*P_{LL} =	2678	lbs
Working Load, P_{TL} =	10000	lbs
Ultimate Load, P_{ULT} =	20000	lbs

Pier Design:

Pier Type: Push Pier

Bracket: PP21617-34 Bracket Cap = 29340 lbs Therefore ok Reference ICC report (attached)

Shaft Diameter: 2.875"

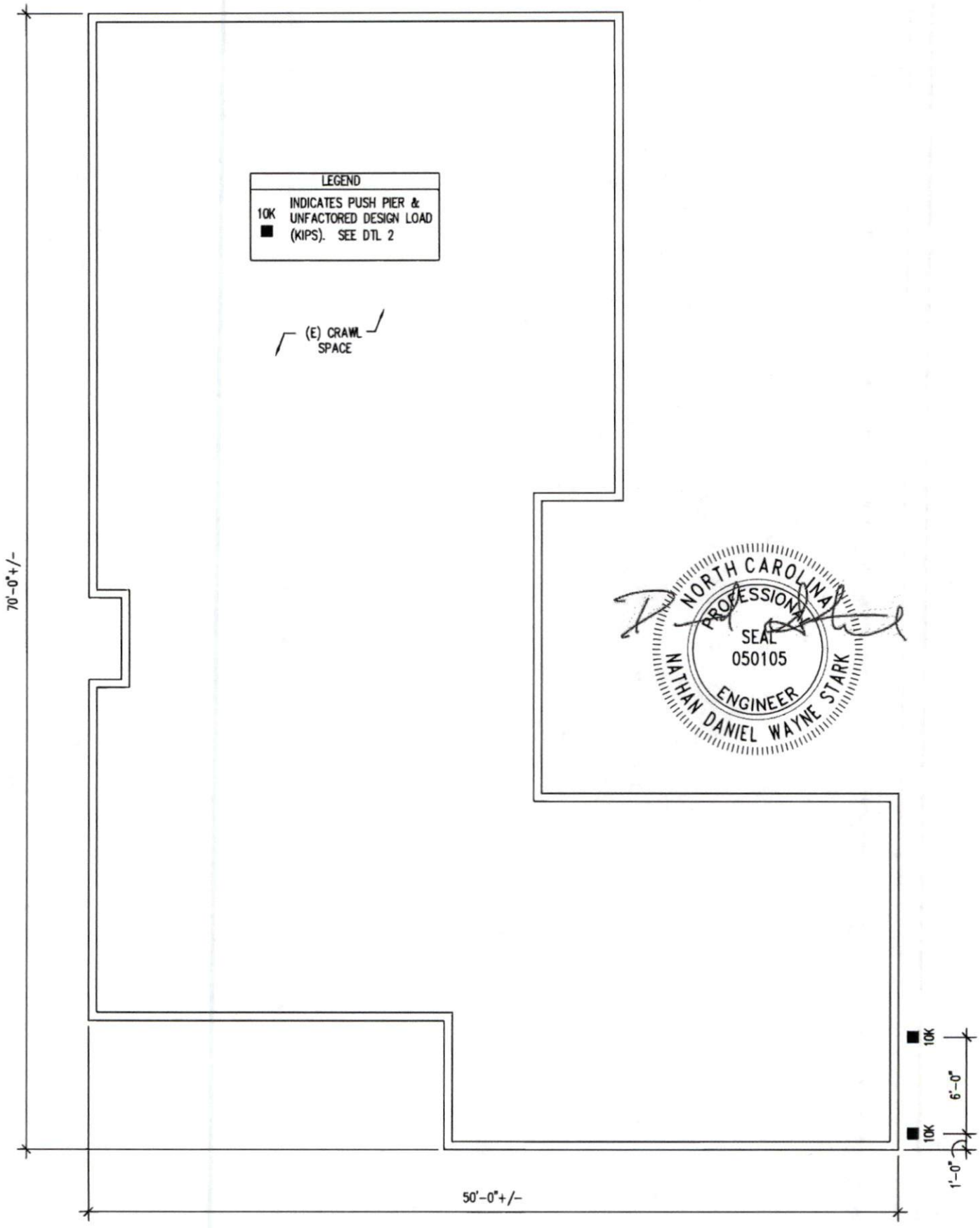
Installation Pressure, P:

$Q_{ult} = 2 (P_{TL})$
20000 lbs

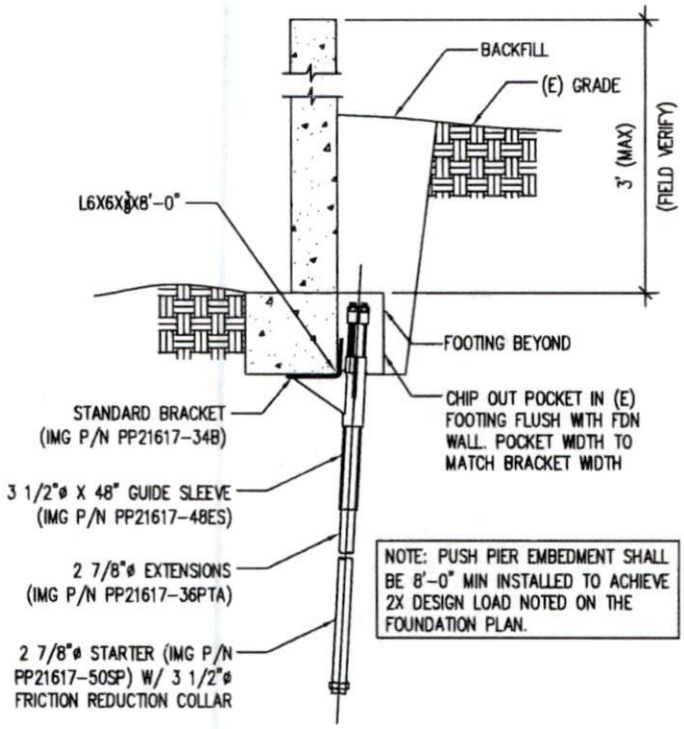
$Q_{ult} = A_{cyl} (P)$ where A_{cyl} = working area of the dual bore installation cylinder

A_{cyl} = 9.62 in^2

Therefore, $P_{REQ} = Q_{ult} / A_{cyl}$
2100 psi



1 FOUNDATION REPAIR PLAN



2 2 7/8"ø PUSH PIER DETAIL
SCALE: 1/2"=1'-0"