



861-E N Dean Road
Auburn, AL 36830
P: 360.566.7343

STRUCTURAL CALCULATIONS
PREPARED FOR
TARHEEL BASEMENT SYSTEMS
FOR
MILBOURN RESIDENCE
FOUNDATION REPAIR
100 MARION DR
ERWIN, NORTH CAROLINA

PROJECT NUMBER: 25.090.TBR

DATE: April 7, 2025

PROJECT MANAGER: Alicia Schumacher, P.E.

COA: C-4876





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Tarheel Basement Systems
3333 Air Park Rd
Fuquay-Varina, North Carolina 27526

RE: Foundation Repair - 100 Marion Dr, Erwin, North Carolina

PROJECT BACKGROUND

We understand the structure is a single-family residence and the owner wishes to provide additional framing support. It is our understanding (3) S4x7.7 supplemental beams and (6) Intellijack systems have been recommended by the contractor. A recent field sketch (attached) indicates the proposed locations of repair.



Image 1: Front Elevation

GEOLOGIC SETTING

The existing structure is located in Erwin, North Carolina. Based on the information provided by the USDA Web Soil Survey, the general site condition in the area is comprised of sandy loam and the site is relatively flat.

SUMMARY

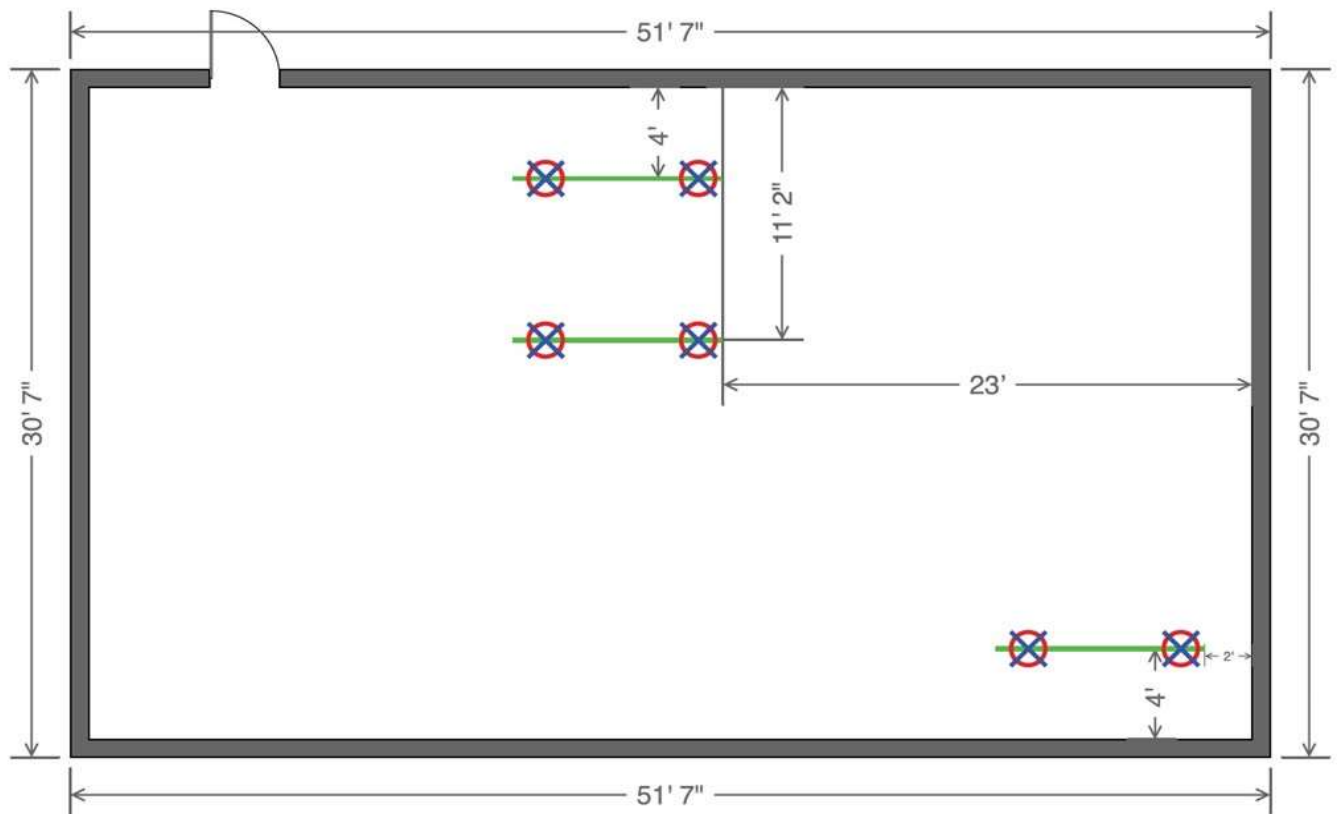
Based on our scope of work, determining the design load, the design load requirement for the Intellijacks is 3000 lbs, and based on the technical manual for the Intellijack system, this is acceptable as the allowable load is 24100 lbs.

Regards,

A handwritten signature in cursive script that reads "A Schumacher".

Alicia Schumacher, P.E.
Stark Foundations

CONTRACTOR-PROVIDED FIELD SKETCH



FRONT



PROJECT

Foundation Repair
100 Marion Dr
Erwin, North Carolina

Date: 7-Apr-25
Designed by: SHA

Project No.: 25.090.TBR

Design Criteria

Code(s):

2018 North Carolina State Building Code
International Building Code (IBC) 2015
International Residential Code (IRC) 2015

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 = 48 psf
8" Foundation Wall = 100 psf
Soil = 110 psf

Soil:

Allow Lateral Bearing Pressure = 100 psf/ft
Active Pressure = 60 psf/ft

Live:

Roof (Snow) = 10 psf
Roof Live Load = 20 psf governs
Third Floor = 40 psf
Second Floor = 40 psf
First Floor = 40 psf

Wind: (not applicable)

Exposure = C Risk Category = II
Wind Speed, V = 119 mph $K_{zt} = 1$
Gust Factor, G = 0.85 $K_d = 0.85$
Int. Pressure Coefficient, $GC_{pi} = -0.18$ $K_z = 1$
Ext. Pressure Coefficient, $C_p = 0.8$ Height, $h_z = 30$ ft

Design Wind Pressure:

Design Load Combo = D + 0.6W

where: $p_w = q_z (GC_p - GC_{pi})$ $\omega = 0.6$
 $q_z = 0.00256 K_z K_{zt} K_d V^2$

Therefore:

$q_z = 30.8$ psf
 $p_w = 26.5$ psf
Factored Wind Pressure, $p'_w = 15.9$ psf (say 16 psf)



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Intellijack Design - Worst Case

Vertical Design Loads:

Tributary Widths:

Dead:

Roof =	0	ft	----->	0	plf
Third Floor =	0	ft	----->	0	plf
Second Floor =	0	ft	----->	0	plf
First Floor =	7.5	ft	----->	112.5	plf
Walls =	0	ft	----->	0	plf
Foundation Wall (height) =	0	ft	----->	0	plf
Soil (height) =	0	ft	----->	0	plf
				$\Sigma DL =$	112.5 plf

Live:

Roof (live) =	0	ft	----->	0	plf
Third Floor =	0	ft	----->	0	plf
Second Floor =	0	ft	----->	0	plf
First Floor =	7.5	ft	----->	300	plf
				$\Sigma LL =$	300 plf

Max Pier Spacing or Trib = 5 ft

Pier Working Loads:

$$\begin{aligned} P_{DL} &= 562.5 \text{ lbs} \\ P_{LL} &= 1500 \text{ lbs} \\ \text{Working Load, } P_{TL} &= 3000 \text{ lbs} \end{aligned} \quad (\text{ASCE 7-16 Load Combo 2 Governs})$$

Pier Type: Intellijack

Intellijack Column: Allowable Compression for system heights up to 9ft = 24.1 kips

Footing Check:

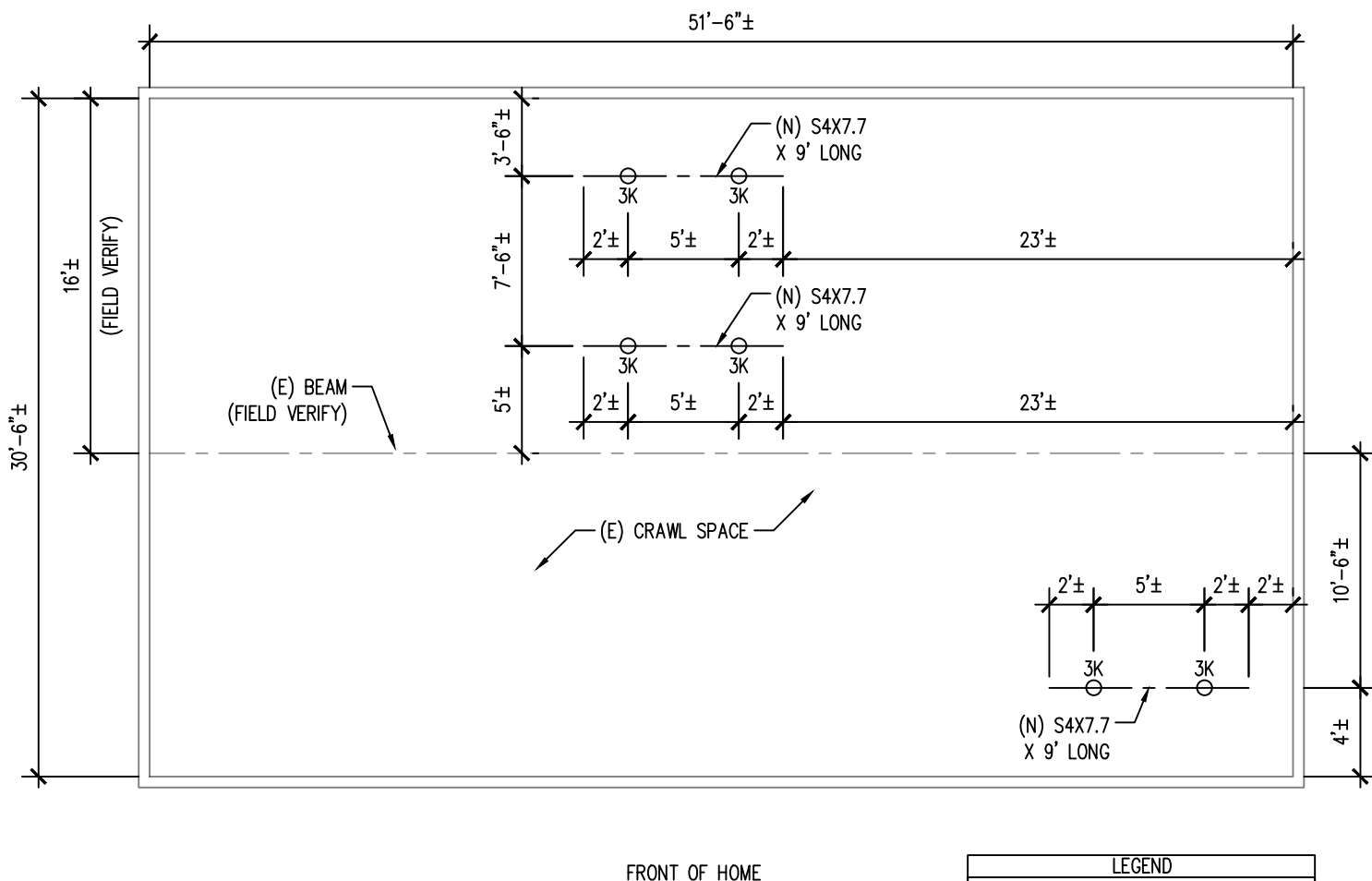
Allowable Bearing Pressure = 1500 psf

Footing Type	Length (in)	Width (in)	Depth (in)	A _{FTG} (ft ²)	Soil Pressure (psf)	
CIP Concrete	18	18	10	2.25	1333	<1500 psf OK
Gravel	24	24	12	4	750	<1500 psf OK
Endurocrete IJ-IC	24	24	12	4	750	<1500 psf OK
-	-	-	-	-	-	

Beam : S4x7.7

Analysis of Section:

$$\begin{aligned} \text{Max. Span} &= 5 \text{ ft} & \text{Allowable Dist. Load} &= 2070 \text{ plf} \\ \text{DL} + \text{LL} &= 412.5 \text{ plf} & \text{ok} & \\ \text{Max. Cantilever} &= 2 \text{ ft} & \text{Span} / 2 &= 2.5 \text{ ft} \quad \text{ok} \end{aligned}$$



LEGEND	
○	INDICATES INTELLIJACK & UNFACTORED DESIGN LOAD (KIPS)
10K	SEE DETAIL 1/S2.0

1 FOUNDATION REPAIR PLAN

SCALE: 1/8"=1'-0"

PLAN NOTES:

1. FIELD VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. NOTIFY STARK FOUNDATIONS OF ANY DISCREPANCIES.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE STRUCTURAL STABILITY OF ALL NEW AND EXISTING STRUCTURES DURING CONSTRUCTION. THIS INCLUDES, BUT NOT LIMITED TO, EXCAVATIONS, COLUMNS, EQUIPMENT LOADS, MATERIAL LOADS, AND OTHERS. BRACING AND SHORING IS TO BE INSTALLED PER THE LATEST OSHA STANDARDS. THE DESIGN AND OBSERVATIONS BY STARK FOUNDATIONS DO NOT INCLUDE INSPECTIONS OF TEMPORARY LOADING AND STABILITY DURING CONSTRUCTION.

<div>STAMP</div> <div></div>	<div>PROJECT</div> <div>FOUNDATION REPAIR MILBOURN RESIDENCE 100 MARION DR ERWIN, NC</div>									
	<div>CLIENT</div> <div>TAR HEEL BASEMENT SYSTEMS 3333 AIR PARK RD FUQUAY-VARINA, NC</div>									
			<div>NO</div>		<div>REVISIONS</div>		<div>BY</div>	<div>DATE</div>		
			<div>ISSUED:</div>		<div>04.07.25</div>		<div>PROJ NO.:</div>		<div>25.090.TBR</div>	
			<div>DRAWN BY:</div>		<div>SHA</div>		<div>CHECKED BY:</div>		<div>ACS</div>	
			<div>SHEET TITLE</div> <div>FDN REPAIR PLAN</div>							
			<div>SHEET NUMBER</div> <div>S1.0</div>							

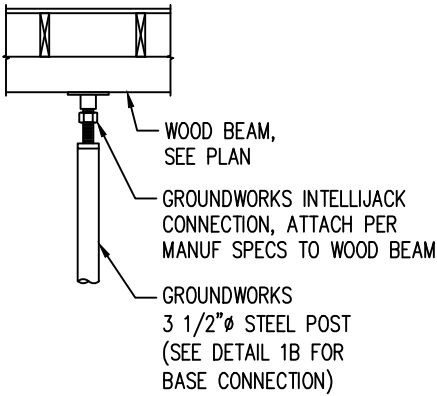
FRONT ELEVATION

NOTES:

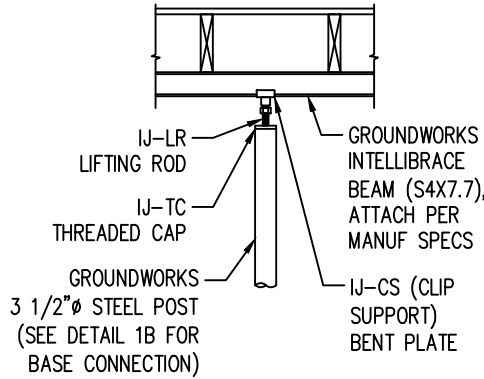
1. HOUSE TO REMAIN UNOCCUPIED DURING THE REPLACEMENT OF EXISTING POSTS W/ NEW INTELLIJACK POSTS.
2. SUPPLEMENTAL/REPLACEMENT WOOD TO BE SOUTHERN PINE/DOUGLAS FIR, NO.2.
3. CAPACITY ASSUMES AN ALLOWABLE SOIL BEARING PRESSURE OF 1500 PSF.
4. CONCRETE COMPRESSIVE STRENGTH, $F_c' = 2,500$ PSI.
5. BOTTOM OF FOOTING SHALL NOT BE LESS THAN THE FROST DEPTH.



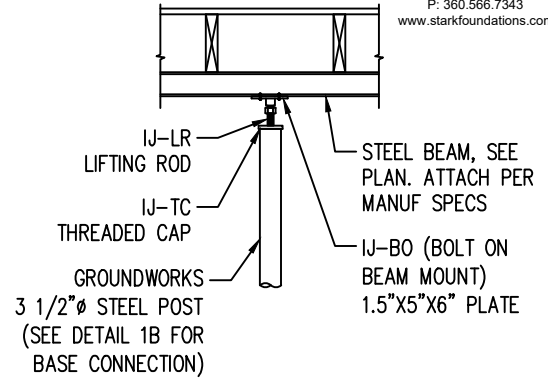
STARK FOUNDATIONS
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www.starkfoundations.com



1A.A: FLAT PLATE W/ WOOD BEAM



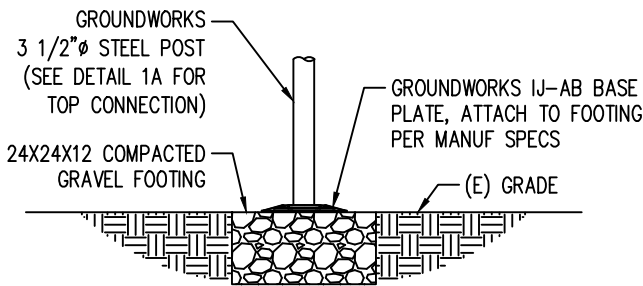
1A.B: BENT PLATE W/ STEEL BEAM



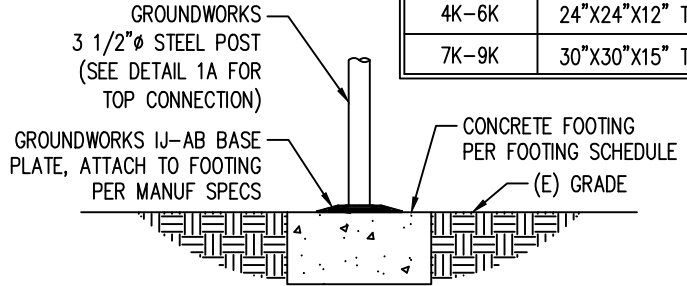
1A.C: FLAT PLATE W/ STEEL BEAM

1A: INTELLIJACK TOP CONNECTIONS

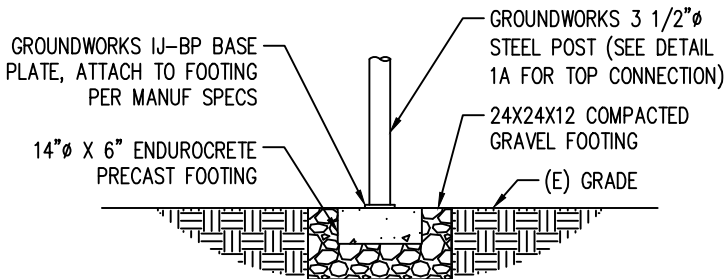
CONCRETE FOOTING SCHEDULE	
DESIGN LOAD	SIZE
1K-3K	18"x18"x10" THK
4K-6K	24"x24"x12" THK
7K-9K	30"x30"x15" THK



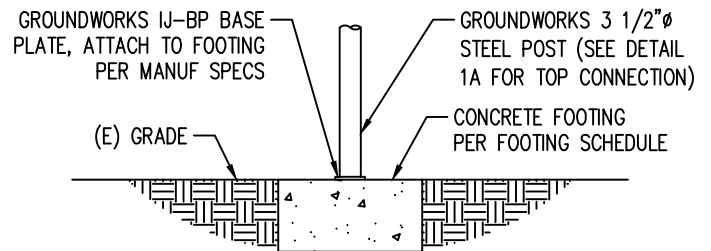
1B.A: BASE PLATE W/ GRAVEL FOOTING



1B.B: IJ-AB BASE PLATE W/ CONCRETE FOOTING



1B.C: ENDURO WHEEL W/ GRAVEL FOOTING



1B.D: IJ-BP BASE PLATE W/ CONCRETE FOOTING

1B: INTELLIJACK BASE CONNECTIONS

1 INTELLIJACK DETAIL

SCALE: 3/8"=1'-0"

STAMP



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CLIENT

TAR HEEL
BASEMENT SYSTEMS
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FRONT ELEVATION

NO	REVISIONS	BY	DATE
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DRAWN BY:	SHA	CHECKED BY:	ACS
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