

6/27/2025

**Subject:** Nexamp-Cemetery Sun LLC  
SB I-3 & Messerrer Lane  
Frederick, IL 62639  
Foundation Load Testing & Corrosion Analysis for Design Life

To Whom it May Concern,

This letter is written to certify that APA Solar reportedly tested the foundations for this project at SB I-3 & Messerrer Lane Frederick, IL 62639 guided by the "Quick Test Method" per ASTM D1143 and D3689. The results of that test are documented in their attached report. The test results provided by APA Solar are within the parameters as set forth by our design.

Additionally, based on The JDI Group Inc.'s review and analysis of the information provided in the ANS GEO geotechnical report prepared for Nexamp for the Cemetery Sun LLC site, our opinion is the solar racking system's structural foundation components will resist the design loading beyond the minimum required design life of 40 years when considering the material loss and a minimum ASTM123 Grade 75 hot dipped galvanizing of the soil screw anchors.

This evaluation is based on the nomograph for estimating the corrosion rate of pile/anchor shafts published in the Chance Technical Design Manual (Edition 5) and the Service Life of Galvanized Steel Articles in Soil Applications Charts published by the American Galvanizers Association (2011).

Sincerely,  
Neo Hadjicharalambous, P.E., S.E.

The JDI Group Inc.



cc: Thomas R. Worline, P.E.  
Sarah Penner, PMP, PM Department Manager

6/26/2025

APA PN: 240822  
Nexamp-Cemetery Sun LLC  
SB I-3 & Messerrer Lane  
Frederick, IL 62639

**Subject: Foundation Design Report**

APA submits the following report to document the site foundation testing & results thereof at the project site located at the above stated address. Information discussed in this report is specific & exclusive to the following parameters:

- |                   |   |
|-------------------|---|
| 1. Pile Type:     | APA Double Helical Pile                     |
| 2. Site Location: | SB I-3 & Messerrer Lane Frederick, IL 62639 |
| 3. Construction:  | APA Solar Racking                           |

Recommendations found in this report are based on empirical data gathered by APA's extensive experience in testing foundations designed for solar racking. Test procedures used to gather data in this report have been guided by ASTM standards D1143\_07 & D3989-07. The methods and calculations in this report are further approved by a state licensed Professional Engineer.

**Site Characterization**

Geotechnical reports, site images, & topographic documents are useful items for pre site visit characterization when provided by the customer. Information from these items are considered as supplemental information, but APA maintain that site testing data & observations will take precedence in the foundation design considerations.

The test site was located East of Messerer Cemetery. The site is located at approximately, 40.089020, -90.442132. The proposed site is currently on undeveloped land. Tree lines and other interfering vegetation is not documented in any tested areas meant for solar at this time.

A Websoil survey has classified the major soil types at the proposed site to be:

- |     |       |     |    |
|-----|-------|-----|----|
| 1.) | CL    | 4.) | ML |
| 2.) | CL-ML |     |    |
| 3.) | CH    |     |    |

## 2. Onsite Observations

*The site had some areas of concerning slopes that should be considered for the final rack design and its tolerances. No underground obstacles were experienced during installation of the test piles but a refusal method shall be provided in the case of refusals. Test piles were able to be installed to the desired embedment depth by method of direct drive.*

## 3. Site Testing

Seven helical piles were installed at select locations throughout the proposed site. The area and quantity of locations were selected to reflect an acceptable sample set given the size and soil variability of the site.

Standard tension tests were performed at each location:

1. **Tension Capacity Test:** Load is applied in the uplift direction in 500 lbs. increments and held for 1 minute each. Pile deflection is recorded simultaneously. Load is increased until ultimate capacity is reached, 1.5X Design Load is reached, or up to the safe working load of the test equipment, whichever occurs first. Ultimate capacity is defined as the load at which the pile deflection is greater than 1".

See test data, maps, and foundation specifications in Appendix A.

## 4. Design Consideration

Based on the customer provided information, APA finds the values below to be within good reason for foundation design consideration for frost heave. These values shall be confirmed by authorities for this site's location or however necessary it may be for permit approvals.

**Frost Depth:** 30  
**Adfreeze Bond:** 10.4 psi

The Engineer of Record has calculated the Design loads per the structural report (ASD values) to be:

Axial Compression Load Value: 2857 lbs.  
Axial Tension Load Value: 5271 lbs.  
Frost Heave Load Value: 2900 lbs.

The Engineer of Record has required testing to be conducted to a minimum of the following values, 1.5X Design Loads & 1.0 Frost Loads:

Axial Tension Load Value: 8000 lbs.

Axial Load is derived from tension or compression, whichever is maximum, but is tested only in tension.

## 5. Results

**Based on the site testing results, on-site observations, and previous experience, APA recommends the foundation setup to be the following:**

Zone	Foundation Type	Embedment Depth	Ultimate Axial Capacity	Recommended Install Method	Refusal Option
Orange & Green	8" x 10" x 0.130" Double Helical	60"	9000 lbs	Direct Drive	Predrill & Backfill
Yellow	8" x 10" x 0.202" Double Helical	60"	9000 lbs	Direct Drive	Predrill & Backfill

$$\begin{aligned}
 Q_{\text{uplift}} &= q_{\text{friction}} \\
 Q_{\text{bearing}} &= q_{\text{friction}} + q_{\text{end bearing}}
 \end{aligned}$$

End bearing capacity was not tested at the time of this report, but will only add to the bearing capacity of the foundation.

$Q_{\text{uplift}}$  = soil capacity to resist uplift loads

$Q_{\text{bearing}}$  = soil capacity to resist bearing loads

$q_{\text{friction}}$  = friction component of soil capacity

$q_{\text{end bearing}}$  = end bearing component of soil capacity

## **6. Report Limitations**

1. APA provides standard galvanized coatings unless otherwise requested by the customer.
2. Foundation design recommendations found in this report are entirely established on the compatibility of the proposed solar racking designed by APA and the foundation testing data gathered by APA. Therefore if racking design or site location(s) change, information from this report must be re-evaluated by APA to be approved as still valid.
3. In the event that sections of the site are not accurately represented in the data found in this report because of soil variability between tested areas, ground water level, construction disturbance, or other reasons, the installer or APA should consult with APA engineering team to determine the most appropriate foundation design alternative.
4. Due to the quantity of test locations in comparison to the quantity of proposed helical pile installations for the final product, refusal frequency cannot be predetermined on the basis of this report.

# APPENDIX



20-345 County Road X, PO Box 326  
Ridgeville Corners, OH 43555

Office: 419.267.5280  
Fax: 419.267.5214

Project Loc. Frederick, IL 62639

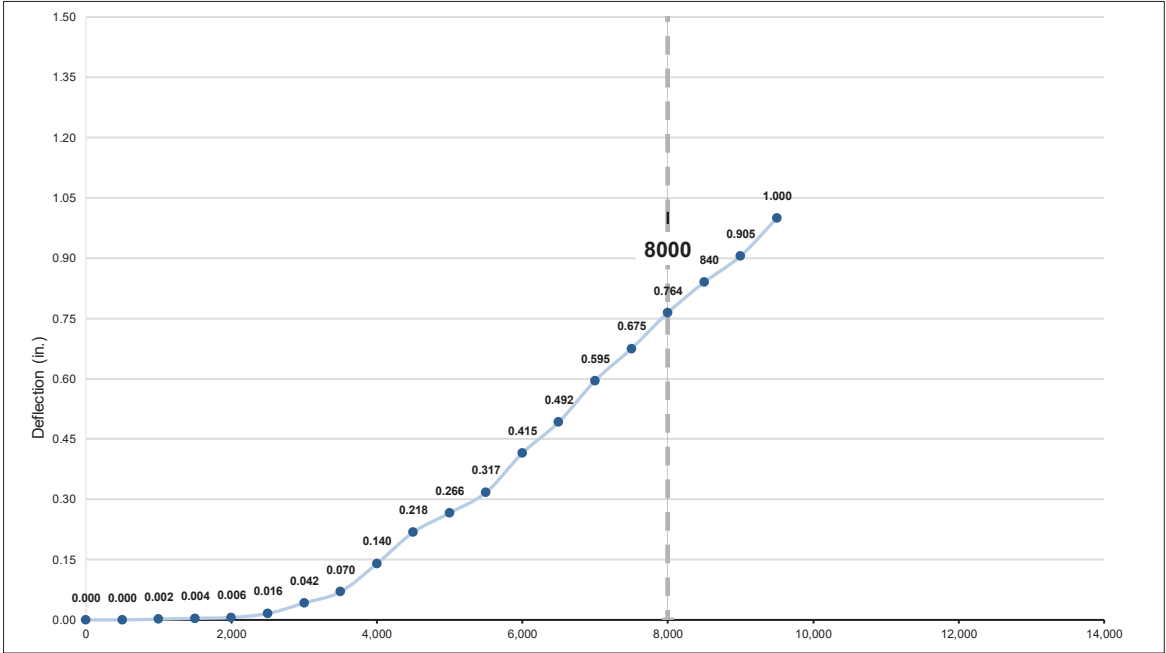
Project No. 240822

Foundation Test No. 240822-1

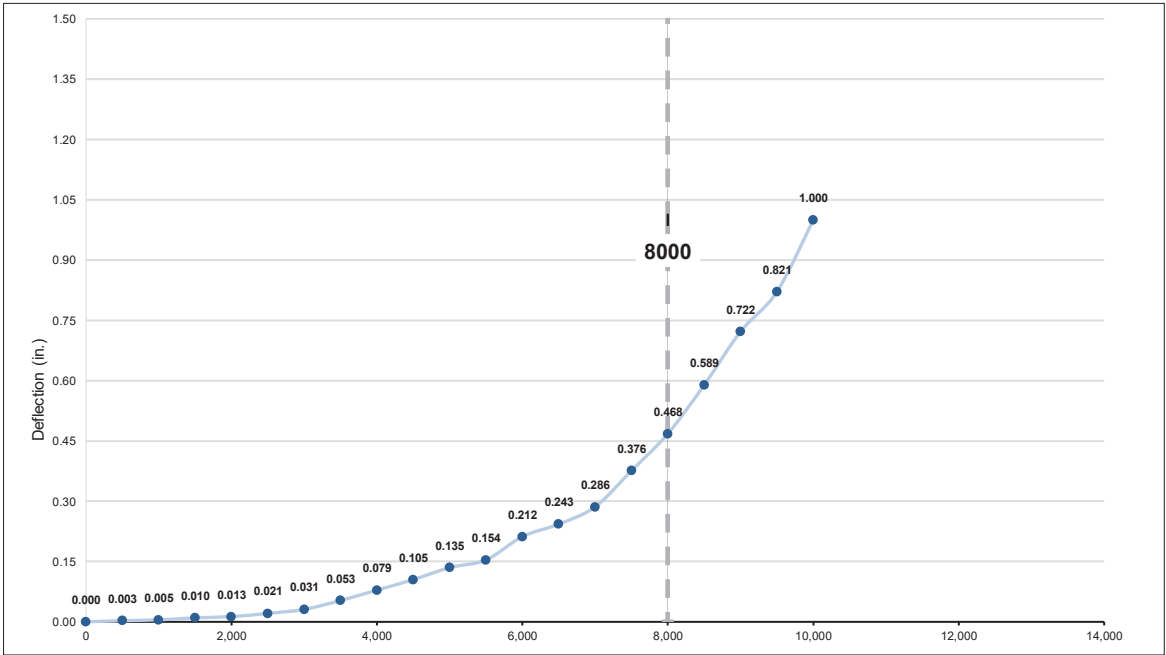
SECTION A: PULL TEST RESULTS

AXIAL TENSION (PULL OUT) TEST(S)

TEST SETUP CONFIGURATION					PASS	279B	
Video ID	Test Loc.	Screw Type	Depth (in.)	Date			
T-01	T-01	8" x 10"	60	11/6/2024			
Time (mins)	Load (lbs)		Deflection (in.)		Time (mins)	Load (lbs)	Deflection (in.)
0:00	0		0.000		13:00	6500	0.492
1:00	500		0.000		14:00	7000	0.595
2:00	1000		0.002		15:00	7500	0.675
3:00	1500		0.004		16:00	8000	0.764
4:00	2000		0.006		17:00	8500	0.840
5:00	2500		0.016		18:00	9000	0.905
6:00	3000		0.042		19:00	9500	1.000
7:00	3500		0.070		20:00	10000	
8:00	4000		0.140		21:00	10500	
9:00	4500		0.218		22:00	11000	
10:00	5000		0.266		23:00	11500	
11:00	5500		0.317		24:00	12000	
12:00	6000		0.415		25:00	12500	



TEST SETUP CONFIGURATION					PASS	17A
Video ID	Test Loc.	Screw Type	Depth (in.)	Date		
T-02	T-02	8" x 10"	60	11/6/2024		
Time (mins)	Load (lbs)		Deflection (in.)	Time (mins)	Load (lbs)	Deflection (in.)
0:00	0		0.000	13:00	6500	0.243
1:00	500		0.003	14:00	7000	0.286
2:00	1000		0.005	15:00	7500	0.376
3:00	1500		0.010	16:00	8000	0.468
4:00	2000		0.013	17:00	8500	0.589
5:00	2500		0.021	18:00	9000	0.722
6:00	3000		0.031	19:00	9500	0.821
7:00	3500		0.053	20:00	10000	1.000
8:00	4000		0.079	21:00	10500	
9:00	4500		0.105	22:00	11000	
10:00	5000		0.135	23:00	11500	
11:00	5500		0.154	24:00	12000	
12:00	6000		0.212	25:00	12500	





20-345 County Road X, PO Box 326  
Ridgeville Corners, OH 43555

Office: 419.267.5280  
Fax: 419.267.5214

Project Loc. Frederick, IL 62639

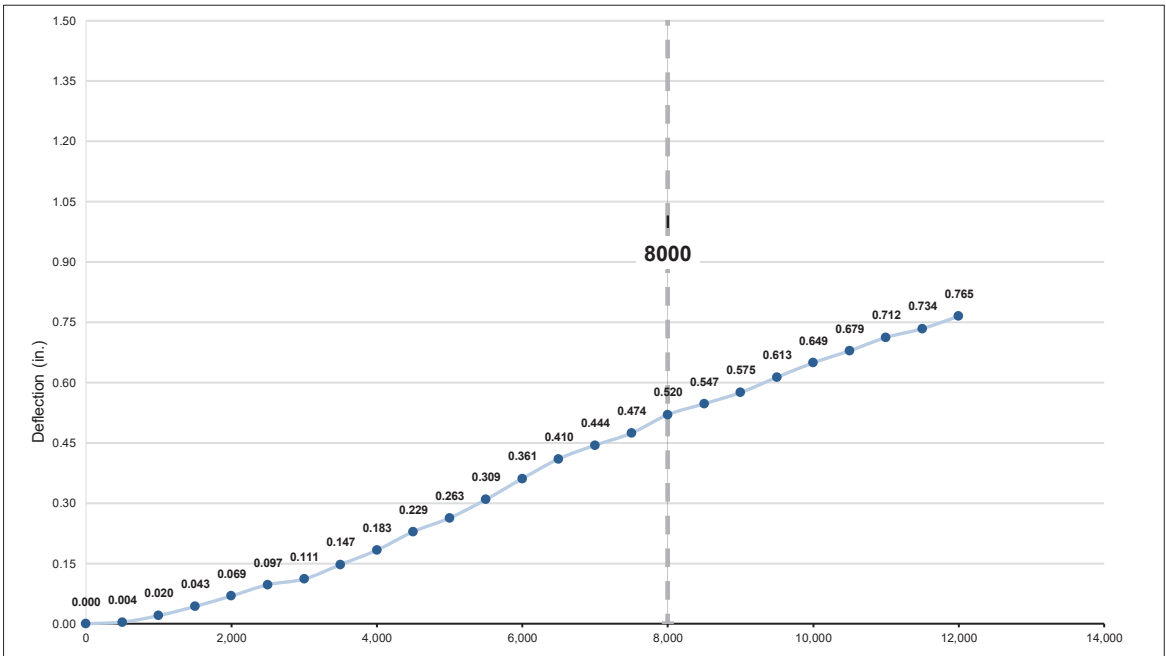
Project No. 240822

Foundation Test No. 240822-1

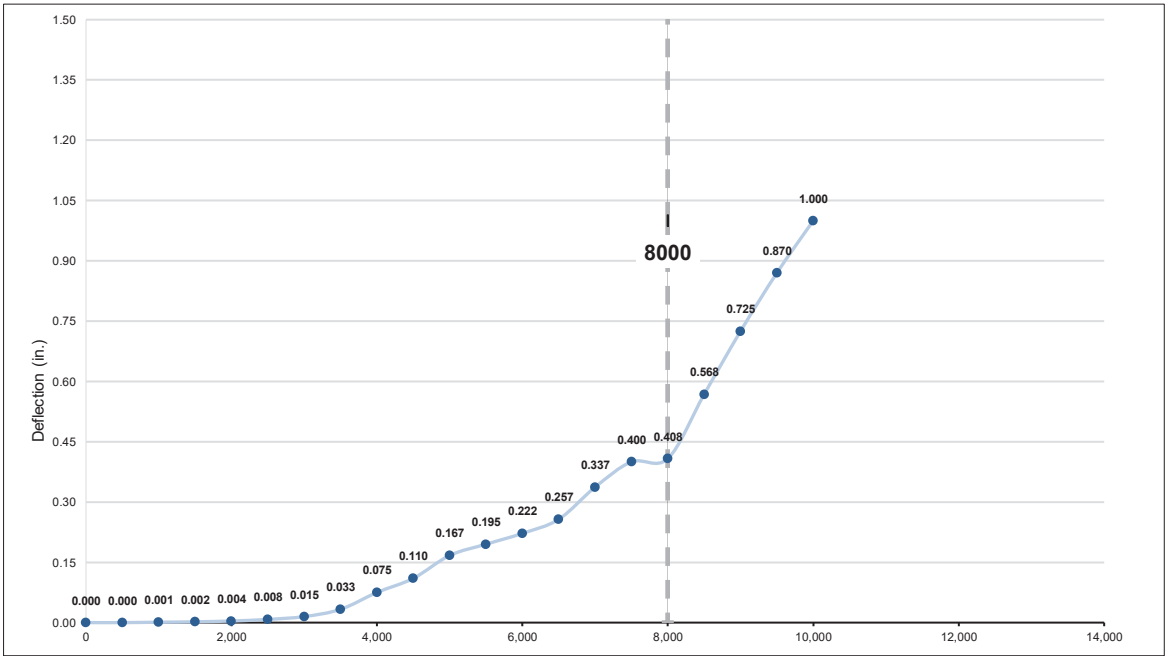
SECTION A: PULL TEST RESULTS

AXIAL TENSION (PULL OUT) TEST(S)

TEST SETUP CONFIGURATION					Passing Load	8000	Soil ID
Video ID	Test Loc.	Screw Type	Depth (in.)	Date			
T-03	T-03	8" x 10"	60	11/6/2024			
Time (mins)	Load (lbs)		Deflection (in.)		Time (mins)	Load (lbs)	Deflection (in.)
0:00	0		0.000		13:00	6500	0.410
1:00	500		0.004		14:00	7000	0.444
2:00	1000		0.020		15:00	7500	0.474
3:00	1500		0.043		16:00	8000	0.520
4:00	2000		0.069		17:00	8500	0.547
5:00	2500		0.097		18:00	9000	0.575
6:00	3000		0.111		19:00	9500	0.613
7:00	3500		0.147		20:00	10000	0.649
8:00	4000		0.183		21:00	10500	0.679
9:00	4500		0.229		22:00	11000	0.712
10:00	5000		0.263		23:00	11500	0.734
11:00	5500		0.309		24:00	12000	0.765
12:00	6000		0.361		25:00	12500	



TEST SETUP CONFIGURATION					PASS	8000	Soil ID 17A
Video ID	Test Loc.	Screw Type	Depth (in.)	Date			
T-04	T-04	8" x 10"	60	11/6/2024			
Time (mins)	Load (lbs)		Deflection (in.)		Time (mins)	Load (lbs)	Deflection (in.)
0:00	0		0.000		13:00	6500	0.257
1:00	500		0.000		14:00	7000	0.337
2:00	1000		0.001		15:00	7500	0.400
3:00	1500		0.002		16:00	8000	0.408
4:00	2000		0.004		17:00	8500	0.568
5:00	2500		0.008		18:00	9000	0.725
6:00	3000		0.015		19:00	9500	0.870
7:00	3500		0.033		20:00	10000	1.000
8:00	4000		0.075		21:00	10500	
9:00	4500		0.110		22:00	11000	
10:00	5000		0.167		23:00	11500	
11:00	5500		0.195		24:00	12000	
12:00	6000		0.222		25:00	12500	







20-345 County Road X, PO Box 326  
Ridgeville Corners, OH 43555

Office: 419.267.5280  
Fax: 419.267.5214

Project Loc. Frederick, IL 62639

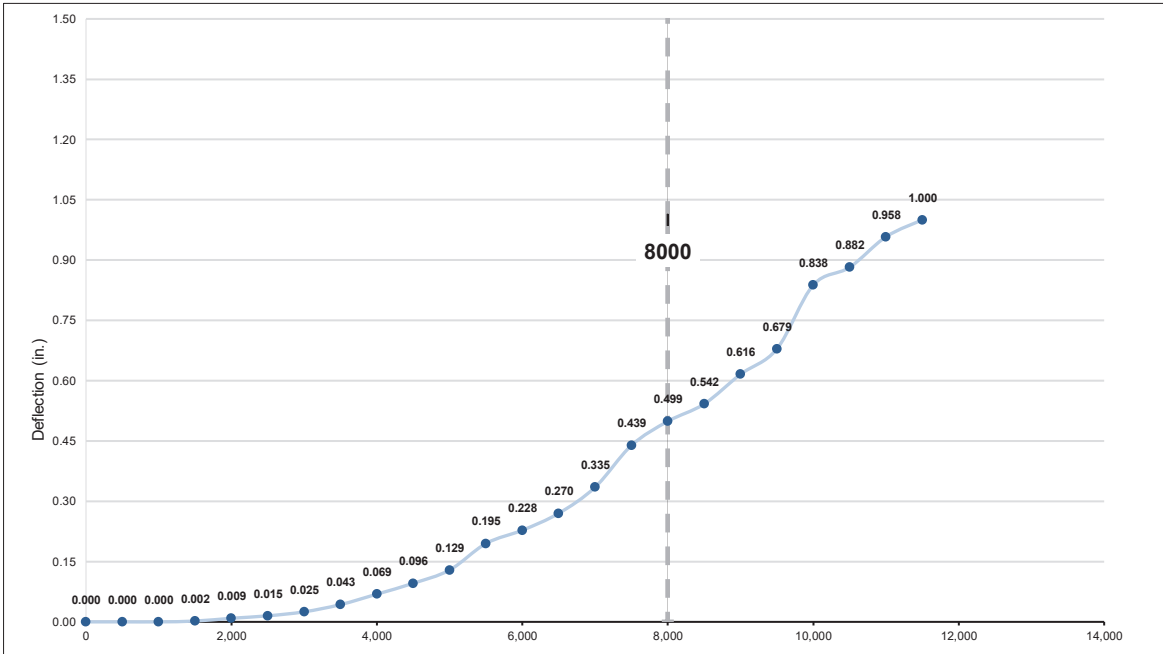
Project No. 240822

Foundation Test No. 240822-1

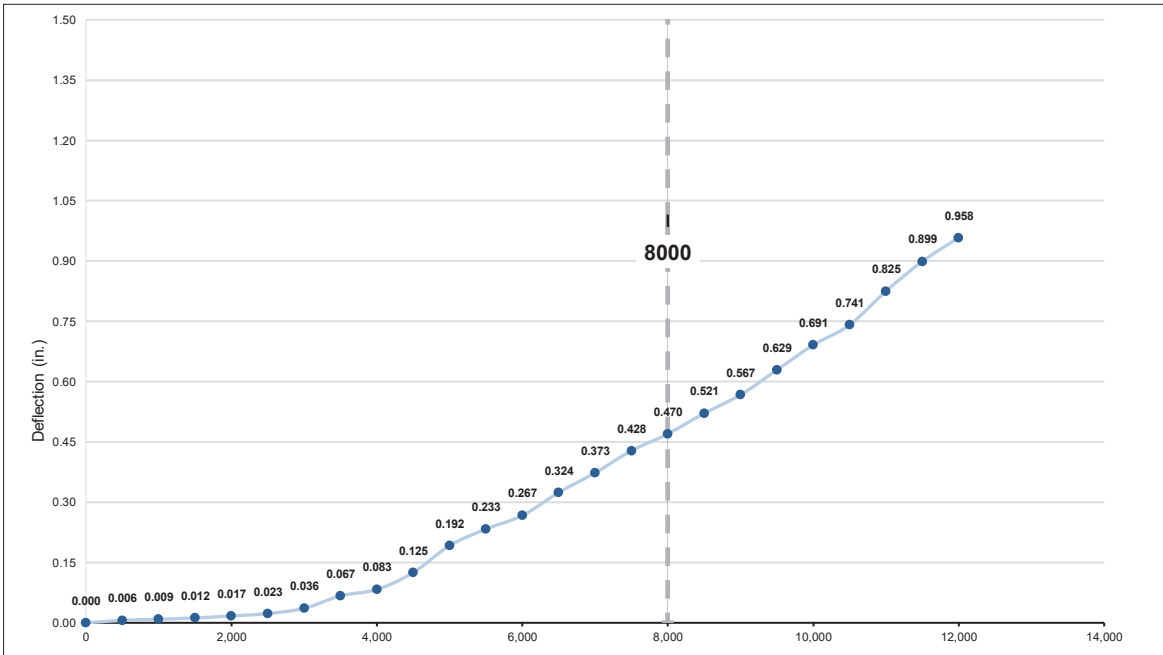
SECTION A: PULL TEST RESULTS

AXIAL TENSION (PULL OUT) TEST(S)

TEST SETUP CONFIGURATION					PASS	Passing Load	8000	Soil ID
Video ID	Test Loc.	Screw Type	Depth (in.)	Date		PASS	17A	
T-05	T-05	8" x 10"	60	11/6/2024				
Time (mins)	Load (lbs)		Deflection (in.)		Time (mins)	Load (lbs)		Deflection (in.)
0:00	0		0.000		13:00	6500		0.270
1:00	500		0.000		14:00	7000		0.335
2:00	1000		0.000		15:00	7500		0.439
3:00	1500		0.002		16:00	8000		0.499
4:00	2000		0.009		17:00	8500		0.542
5:00	2500		0.015		18:00	9000		0.616
6:00	3000		0.025		19:00	9500		0.679
7:00	3500		0.043		20:00	10000		0.838
8:00	4000		0.069		21:00	10500		0.882
9:00	4500		0.096		22:00	11000		0.958
10:00	5000		0.129		23:00	11500		1.000
11:00	5500		0.195		24:00	12000		
12:00	6000		0.228		25:00	12500		



TEST SETUP CONFIGURATION						Passing Load	8000	Soil ID
Video ID	Test Loc.	Screw Type	Depth (in.)	Date		PASS		19D3
T-06	T-06	8" x 10"	60	11/6/2024				
Time (mins)	Load (lbs)		Deflection (in.)		Time (mins)	Load (lbs)		Deflection (in.)
0:00	0		0.000		13:00	6500		0.324
1:00	500		0.006		14:00	7000		0.373
2:00	1000		0.009		15:00	7500		0.428
3:00	1500		0.012		16:00	8000		0.470
4:00	2000		0.017		17:00	8500		0.521
5:00	2500		0.023		18:00	9000		0.567
6:00	3000		0.036		19:00	9500		0.629
7:00	3500		0.067		20:00	10000		0.691
8:00	4000		0.083		21:00	10500		0.741
9:00	4500		0.125		22:00	11000		0.825
10:00	5000		0.192		23:00	11500		0.899
11:00	5500		0.233		24:00	12000		0.958
12:00	6000		0.267		25:00	12500		





20-345 County Road X, PO Box 326  
Ridgeville Corners, OH 43555

Office: 419.267.5280  
Fax: 419.267.5214

Project Loc. Frederick, IL 62639

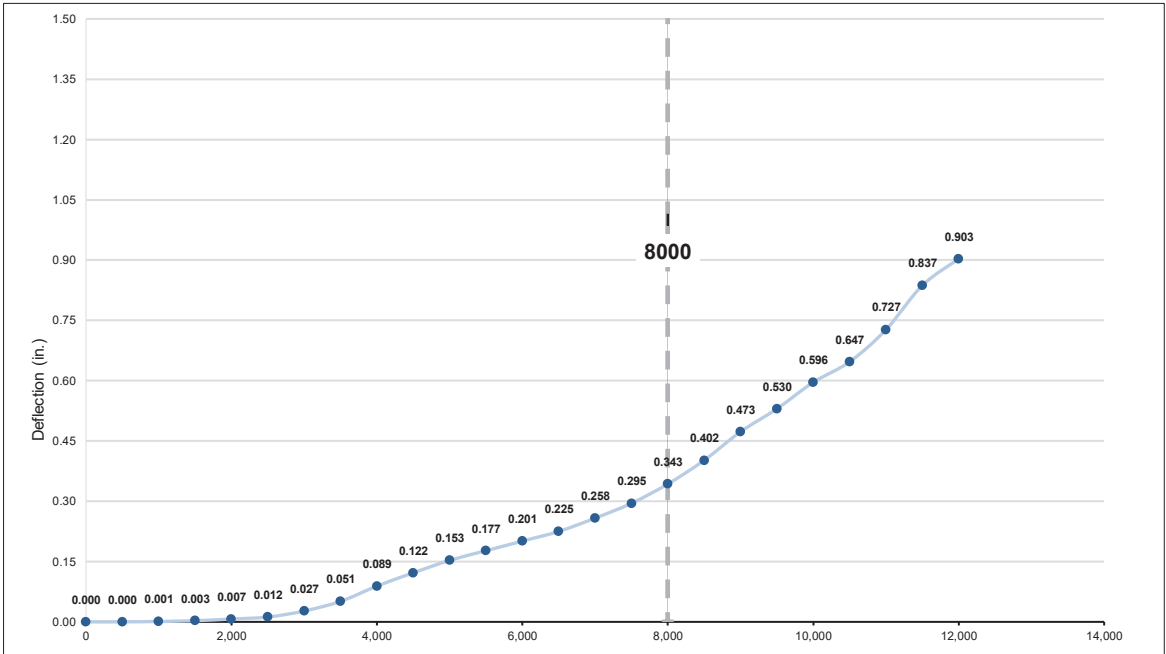
Project No. 240822

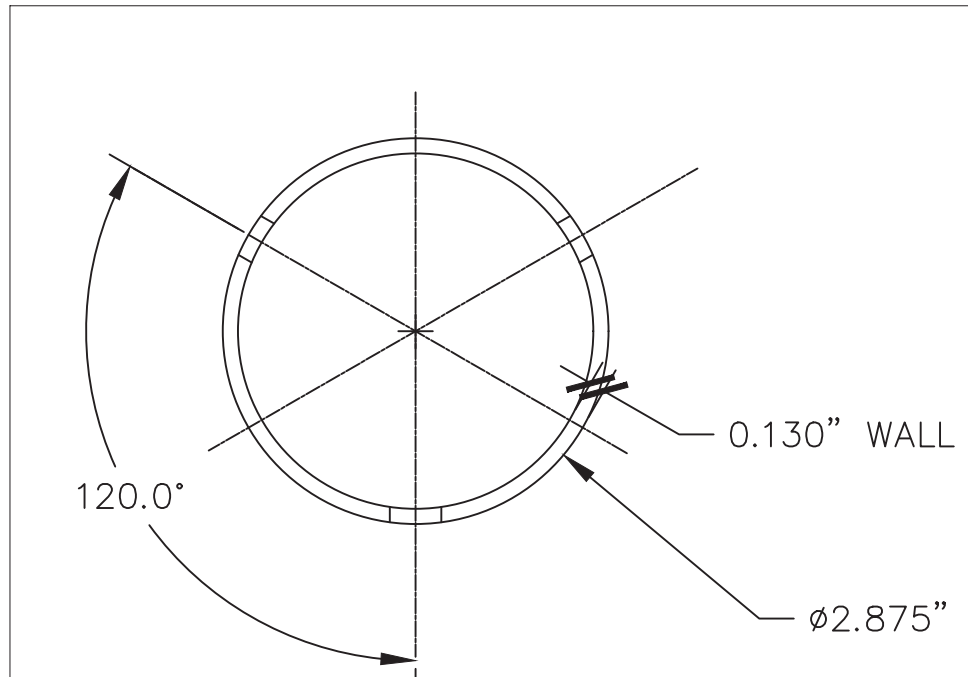
Foundation Test No. 240822-1

SECTION A: PULL TEST RESULTS

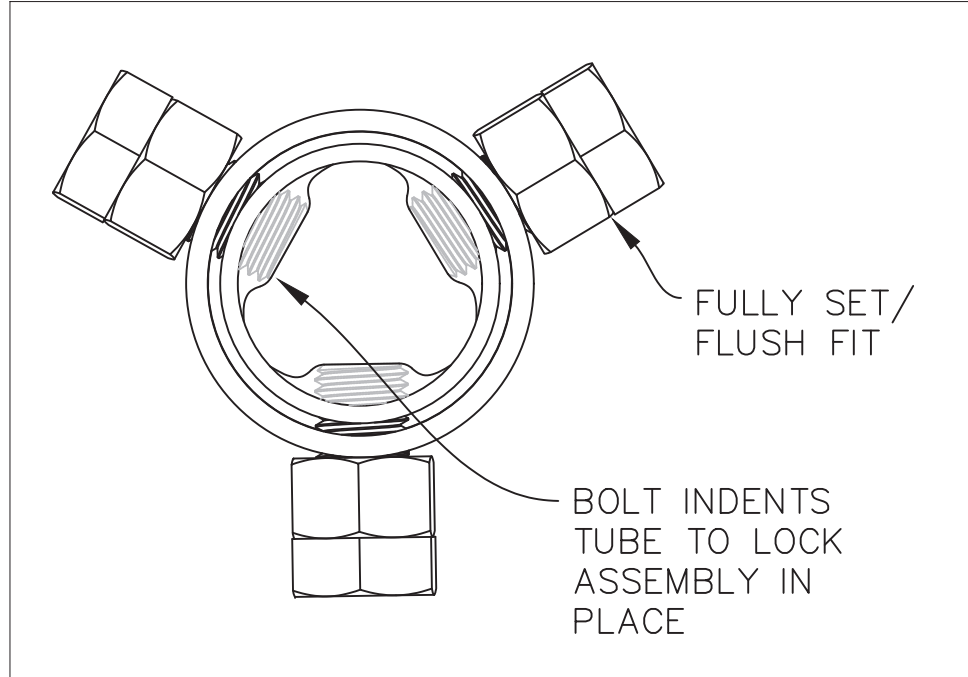
AXIAL TENSION (PULL OUT) TEST(S)

TEST SETUP CONFIGURATION					Passing Load		Soil ID	
Video ID	Test Loc.	Screw Type	Depth (in.)	Date	PASS		280B	
T-07	T-07	8" x 10"	60	11/6/2024				
Time (mins)	Load (lbs)		Deflection (in.)	Time (mins)	Load (lbs)		Deflection (in.)	
0:00	0		0.000	13:00	6500		0.225	
1:00	500		0.000	14:00	7000		0.258	
2:00	1000		0.001	15:00	7500		0.295	
3:00	1500		0.003	16:00	8000		0.343	
4:00	2000		0.007	17:00	8500		0.402	
5:00	2500		0.012	18:00	9000		0.473	
6:00	3000		0.027	19:00	9500		0.530	
7:00	3500		0.051	20:00	10000		0.596	
8:00	4000		0.089	21:00	10500		0.647	
9:00	4500		0.122	22:00	11000		0.727	
10:00	5000		0.153	23:00	11500		0.837	
11:00	5500		0.177	24:00	12000		0.903	
12:00	6000		0.201	25:00	12500			

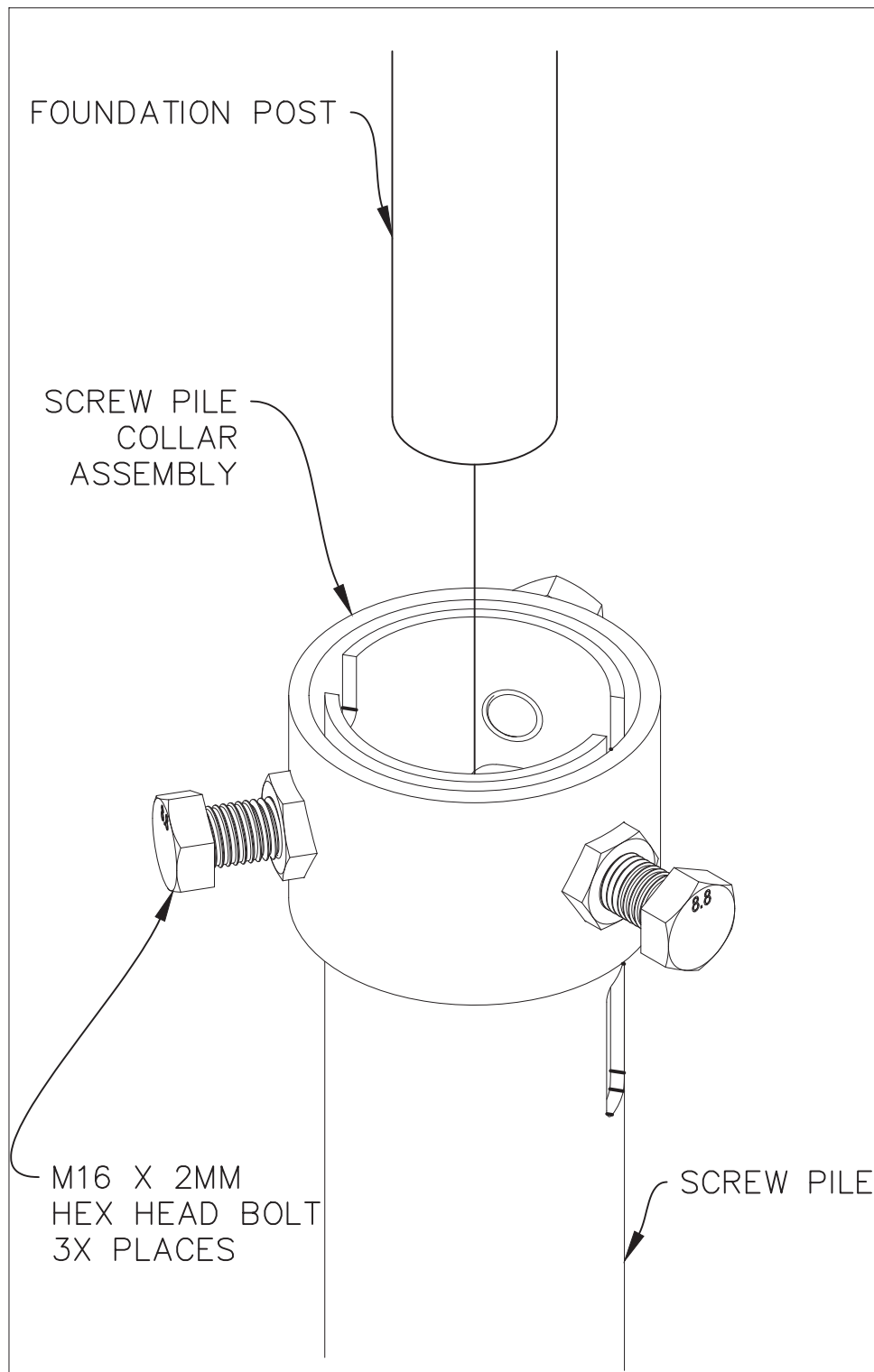




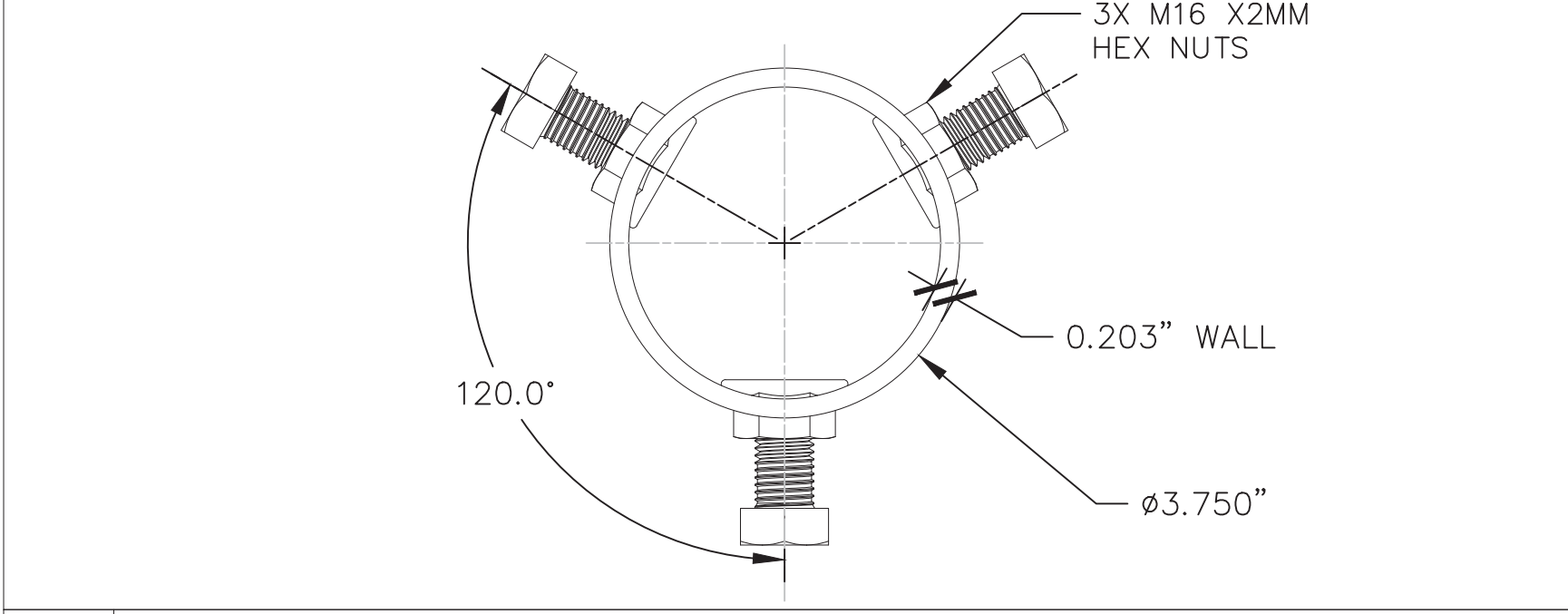
D1 SECTION: SCREW PILE



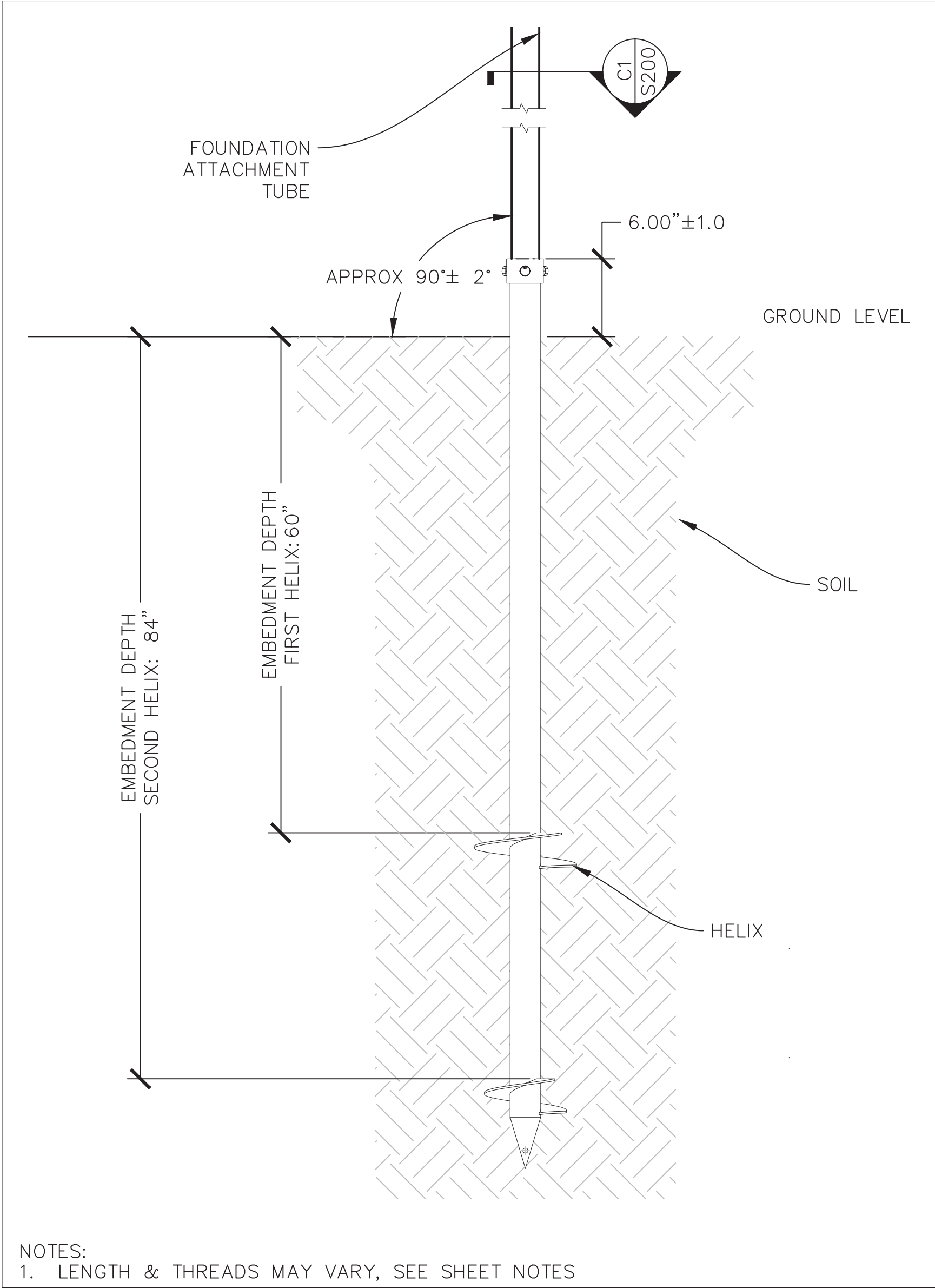
C1 SECTION: PILE ASSEMBLY



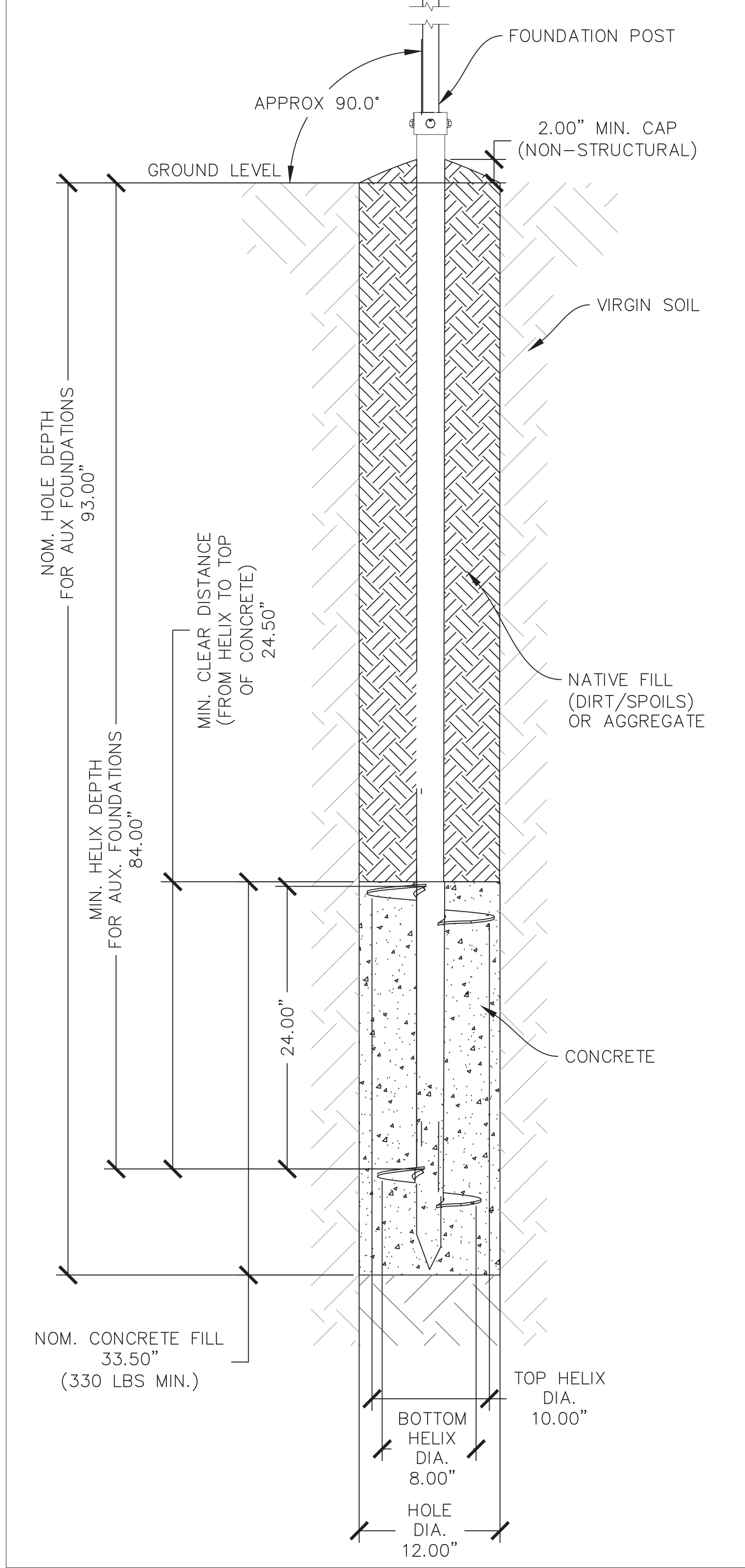
A1 CONNECTION: POST-TO-PILE



D2 SECTION: SCREW PILE COLLAR ASSEMBLY



A2 VIEW: POST EMBEDMENT



A3 REFUSAL INSTALL OPTION 1: PREDRILL OVERSIZED HOLE

- NOTES:
- FOUNDATION POST TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
  - HELICAL PILE TUBE MATERIAL: 60 KSI MIN YIELD STRENGTH STEEL.
  - HELICAL PILE THREAD MATERIAL: 28 KSI MIN YIELD STRENGTH STEEL.
  - HELICAL PILE TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
  - ALL HARDWARE IS 300 SERIES STAINLESS STEEL, A574 ALLOY STEEL, OR MINIMUM 8.8 CLASS METRIC.
  - BOLTS MUST BE FULLY SET INTO WELDED NUTS.
  - BOLTS SHALL BE 35 MM LONG.
  - HELICAL PILE SHALL PENETRATE THE SOIL TO A DEPTH PAST THE FROST LINE, SUCH WHICH THE TOP HELIX IS BELOW THE FROST LINE, OR TO THE DEPTH INDICATED AS MINIMUM PER THE STAMPED FOUNDATION DESIGN REPORT, WHICHEVER IS DEEPER.
  - FOUNDATION POST SHALL EXTEND ABOVE GROUND LEVEL AT MINIMUM OF INDICATED FRONT LIP CLEARANCE, PLUS THE ADDITIONAL LENGTH REQUIRED TO ACHIEVE THE INDICATED TILT ANGLE.
  - MINIMUM ENGAGEMENT BETWEEN HELICAL PILE AND FOUNDATION POST SHALL BE 6".
  - INSTALLERS SHALL REFER TO STRUT AND POST SETUP SHEETS FOR LENGTH AND PLACEMENT DETAILS.
  - FOUNDATION POST INSTALLATION
  - ACCURATELY LOCATE AND INSTALL SCREW PILES BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE PILE STRENGTH OR DAMAGE POSTS OR ADJACENT CONSTRUCTION.
  - INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.
  - DISTURBED GALVANIZED SURFACES SHALL BE TOUCHED UP WITH AN APPROVED COLD GALVANIZING COMPOUND.
  - INSTALL HELICAL PILES TO MINIMUM DEPTH AS INDICATED THIS SHEET OR AS REQUIRED PER THE STAMPED FOUNDATION DESIGN REPORT, WHICHEVER IS GREATER.

- NOTES:
- INSTALLATION PROCEDURE: CONCRETE & NATIVE FILL
  - AUGER HOLE TO MINIMUM HOLE DEPTH AS INDICATED IN DRAWING. HOLE SHOULD BE APPROXIMATELY PLUMB AND A MINIMUM DIAMETER AS INDICATED IN DRAWING.
  - REMOVE THE SPOILS AS BEST AS POSSIBLE. THERE SHOULD BE NO LARGE CLUMPS OR ROCKS AT THE BOTTOM OF THE HOLE.
  - FILL HOLE WITH APPROXIMATELY 9" OF CONCRETE TO ACT AS A BASE LAYER
  - PLACE HELICAL PILE IN HOLE. ENSURE IT IS PLUMB AND AT THE REQUIRED DEPTH. MEASURE TO ENSURE THE PILE IS AT OR BELOW THE REQUIRED HEIGHT. ENSURE THE NORTH-SOUTH DIMENSIONS AND EAST-WEST DIMENSIONS ARE CORRECT.
  - ROTATE PILE BACK AND FORTH TO ELIMINATE ANY GAPS UNDERNEATH THE HELIX AND ENSURE A GOOD SEAT. PUSH DOWN ON THE PILE TO ENSURE IT IS DOWN AS FAR AS POSSIBLE.
  - FILL HOLE WITH MINIMUM CONCRETE, AS SHOWN IN DRAWINGS.
  - FILL REMAINDER OF HOLE WITH FILL IN MAXIMUM 6" LIFTS (12" FOR NATIVE FILL). BE CAREFUL TO PLACE FILL EVENLY AROUND THE HOLE.
  - USING A DIGGING BAR (SPUD BAR) WITH A TAMPING END, TAMP THE FILL UNTIL IT IS FIRM AND NO LONGER MOVES (APPROXIMATELY 50 HITS OR ABOUT 20-30 SECONDS OF TAMPING). TAMPING END SHOULD BE SMALL ENOUGH TO FIT EASILY IN THE HOLE WITH THE PILE INSTALLED, APPROXIMATELY NO LARGER THAN A 3" HEAD FOR A STANDARD 8" DIAMETER HOLE.
  - ONE PERSON SHOULD REMAIN HOLDING THE HELICAL PILE IN PLACE UNTIL THE FIRST FEW LAYERS OF FILL ARE INSTALLED AND TAMPED. THE PILE SHOULD NOT BE MOVED ANY FURTHER DURING THE INSTALLATION PROCEDURE.
  - CONTINUE FILLING & TAMPING FILL IN HOLE UNTIL THE FILL IS AT (FOR AGGREGATE) OR 2" ABOVE (FOR NATIVE FILL) GROUND LEVEL. ADDITIONAL FILL ABOVE GROUND LEVEL WILL DO NO HARM, BUT ALSO DOES NOT CONTRIBUTE TO THE STRUCTURAL STRENGTH.
  - TAMP THE FINAL LAYER AS PREVIOUSLY.

ALLOWABLE FILL:  
REMAINDER OF HOLE (AFTER FILLING WITH CONCRETE) MAY BE EITHER NATIVE FILL OR AGGREGATE.

**NATIVE FILL**

- SHALL NOT CONSIST OF LARGE ROCKS, DEBRIS, OR ORGANIC MATTER.
- LARGE CLUMPS SHALL BE BROKEN UP.
- WATER MAY BE ADDED TO ASSIST INSTALLATION, BUT NO MORE THAN 5% WATER SHOULD BE ADDED TO CREATE SLURRY.

**AGGREGATE**  
EITHER

- #4 (1 1/2" - 3/4")
- #5 (1" - 1/2")
- A COMBINATION OF BOTH #4 & #5
- EQUIVALENT SIZE OF EITHER #4 OR #5.
- DEVIATIONS IN AGGREGATE SIZE, FROM THE ABOVE SPECIFICATIONS, MUST BE APPROVED BY APA SOLAR ENGINEERING BEFORE USING /PURCHASING.

CONCRETE NOTES:  
USE A MIN. 4000 PSI COMPRESSIVE STRENGTH CONCRETE MIX.

PLEASE FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS, ON SIDE OF BAG ("FOR SETTING POSTS").

CUSTOMER

**nexamp**

NEXAMP  
101 NORTH WACKER DRIVE, SU. 200  
CHICAGO, IL 60606  
(P) 617.431.1440

RACKING PROVIDER

**APA**  
SOLAR RACKING

20-345 COUNTY ROAD X  
RIDGEVILLE CORNERS, OHIO 43555  
(P) 419.267.5280  
(F) 419.267.5214  
WWW.APALTERNATIVES.COM

RACKING TYPE

**TITAN**  
RACKING

STRUCTURAL ENGINEER OF RECORD

**the jdl group**  
architects & engineers

360 W. DUSSEL DR.  
MAUMEE, OH 43537  
(P) 419.725.7161 (F) 419.725.7160

PROFESSIONAL SEAL/STAMP

**APRIL L. DUNN**  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF OHIO  
NO. 101055  
EXPIRATION DATE 07-01-2025

SITE NAME

138883 CEMETERY SUN LLC PV

SITE ADDRESS

S B I-3 & MESSERER LANE  
FREDERICK, IL 62639

SHEET REVISIONS

REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/10/2025
B	UPDATED HELICAL	6/28/2025

**APPROVED**

DRAWN

CW

REVIEWED

BR

APPROVED

JDI

SIZE

D

SHEET NAME

HELICAL PILE

PROJECT NUMBER

240822

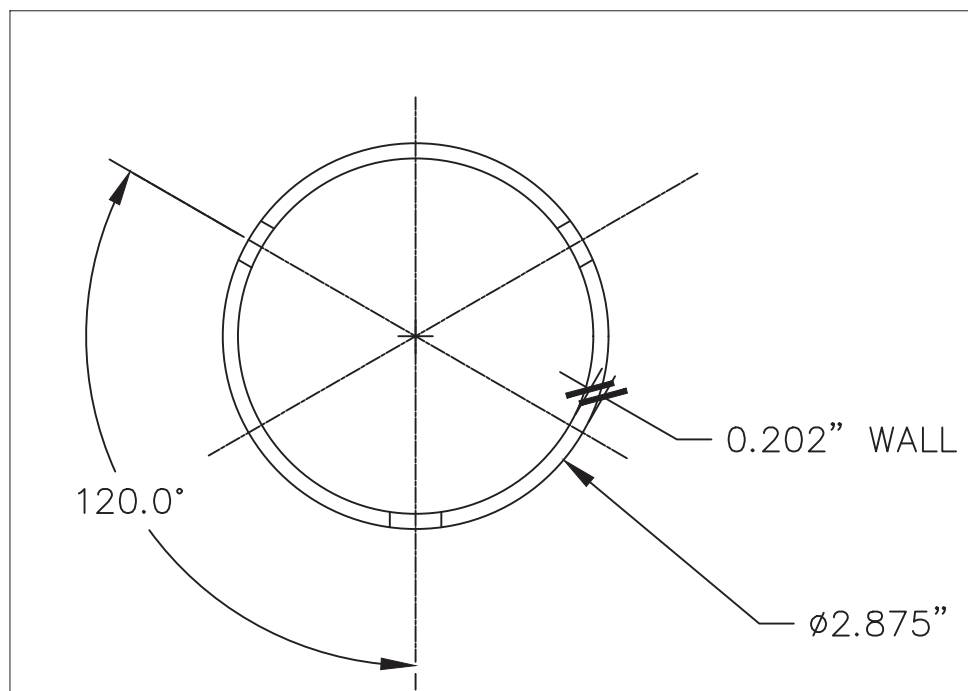
DRAWING NUMBER

S.200

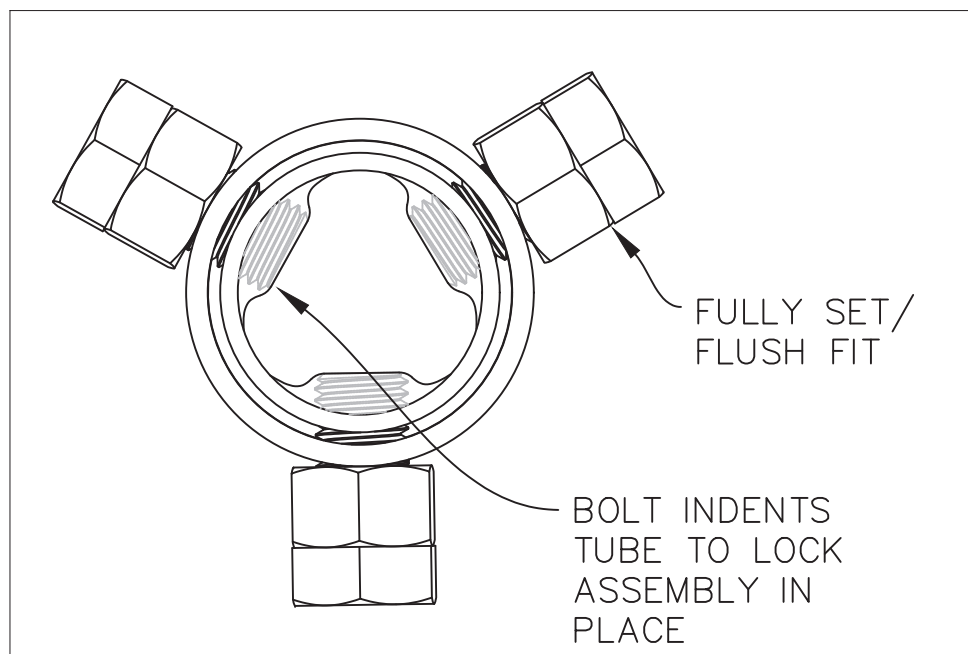
REV.

B

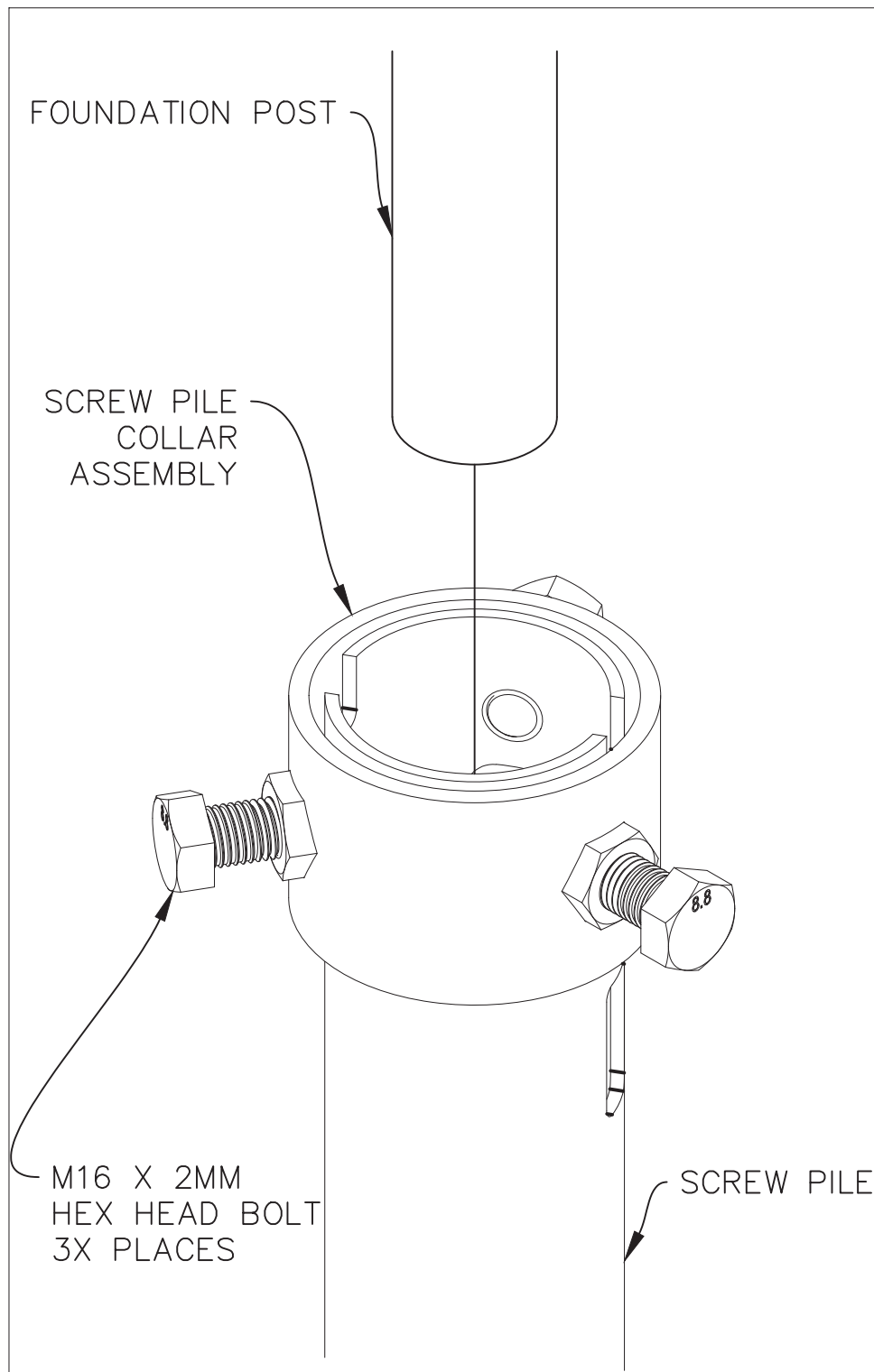




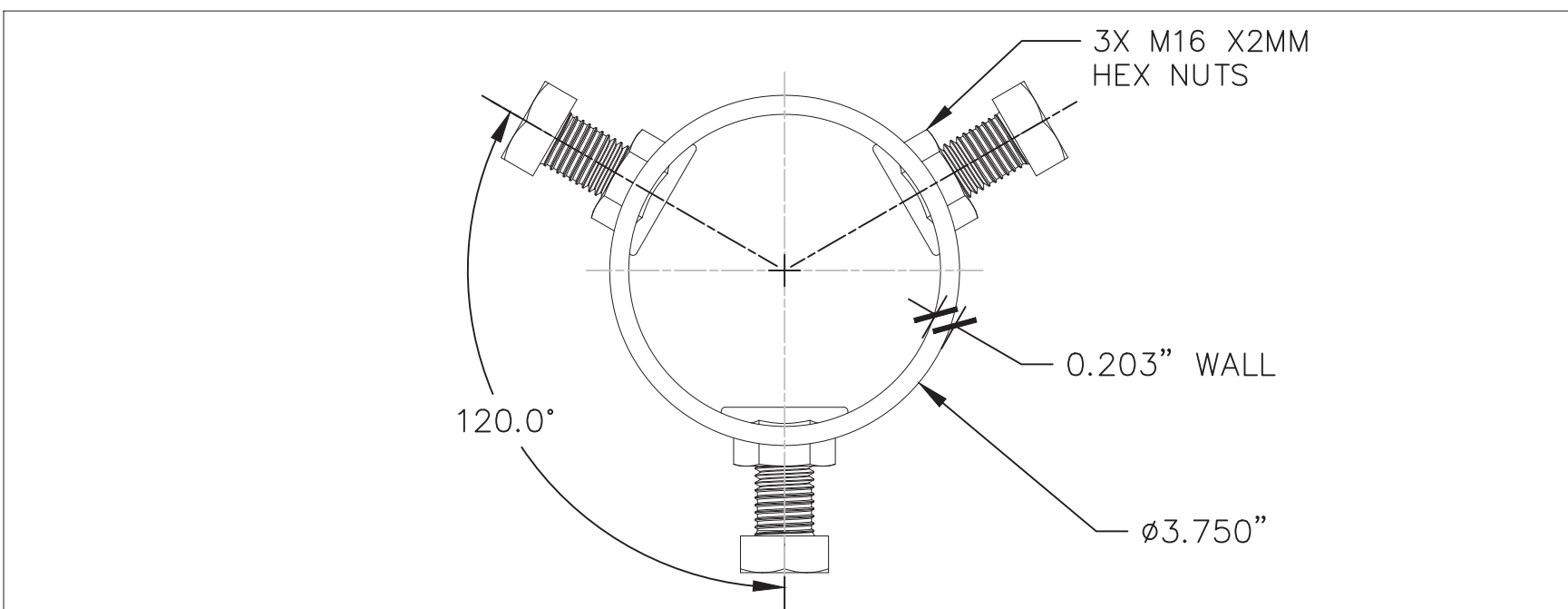
D1	SECTION: SCREW PILE
----	---------------------



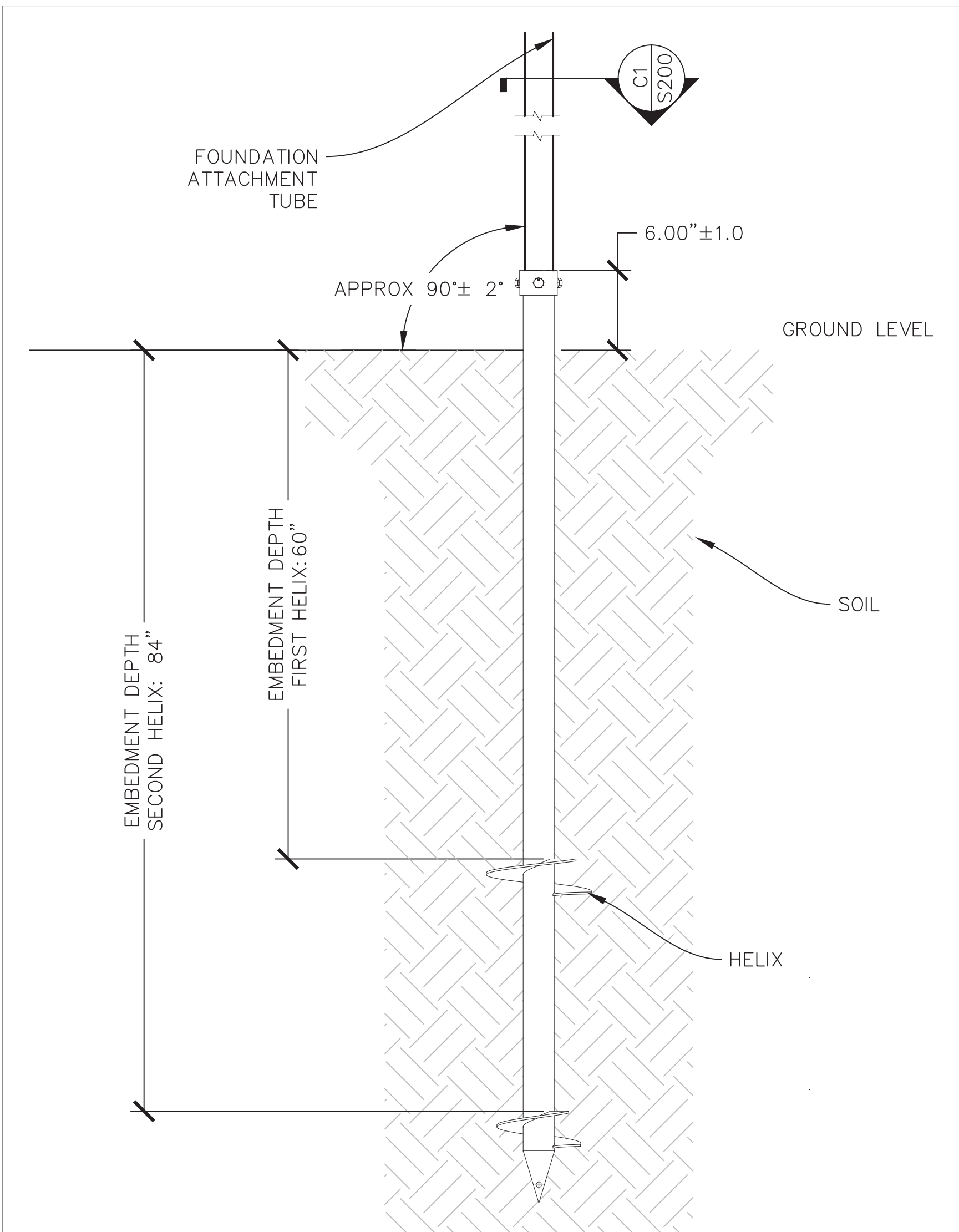
C1	SECTION: PILE ASSEMBLY
----	------------------------



A1	CONNECTION: POST-TO-PILE
----	--------------------------

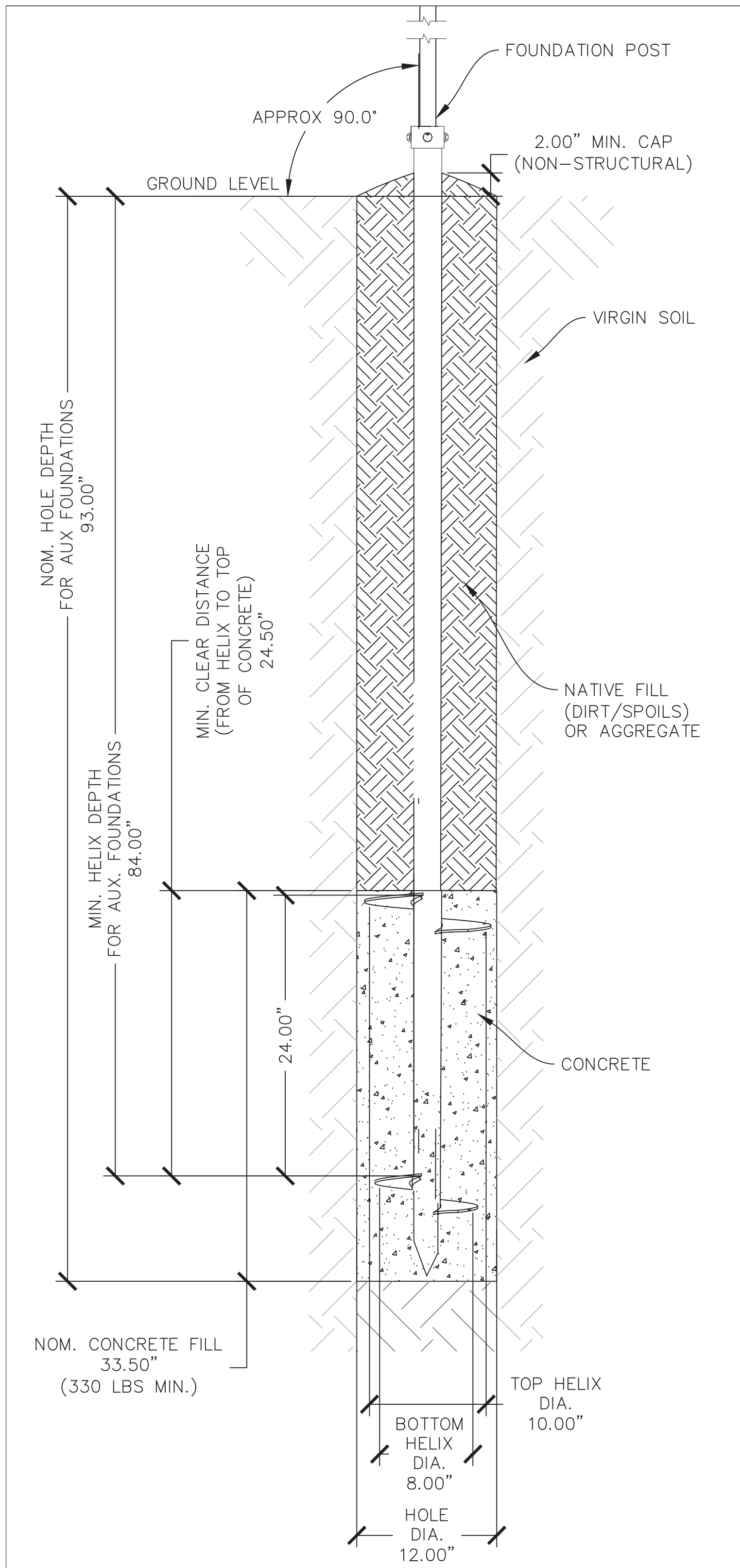


D2	SECTION: SCREW PILE COLLAR ASSEMBLY
----	-------------------------------------



NOTES:  
1. LENGTH & THREADS MAY VARY, SEE SHEET NOTES

A2	VIEW: POST EMBEDMENT
----	----------------------



A3	REFUSAL INSTALL OPTION 1: PREDRILL OVERSIZED HOLE
----	---

NOTES:

1. FOUNDATION POST TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
2. HELICAL PILE TUBE MATERIAL: 60 KSI MIN YIELD STRENGTH STEEL.
3. HELICAL PILE THREAD MATERIAL: 28 KSI MIN YIELD STRENGTH STEEL.
4. HELICAL PILE TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
5. ALL HARDWARE IS 300 SERIES STAINLESS STEEL, A574 ALLOY STEEL, OR MINIMUM 8.8 CLASS METRIC.
6. BOLTS MUST BE FULLY SET INTO WELDED NUTS.
7. BOLTS SHALL BE 35 MM LONG.
8. HELICAL PILE SHALL PENETRATE THE SOIL TO A DEPTH PAST THE FROST LINE, SUCH WHICH THE TOP HELIX IS BELOW THE FROST LINE, OR TO THE DEPTH INDICATED AS MINIMUM PER THE STAMPED FOUNDATION DESIGN REPORT, WHICHEVER IS DEEPER.
9. FOUNDATION POST SHALL EXTEND ABOVE GROUND LEVEL AT MINIMUM OF INDICATED FRONT LIP CLEARANCE, PLUS THE ADDITIONAL LENGTH REQUIRED TO ACHIEVE THE INDICATED TILT ANGLE.
10. MINIMUM ENGAGEMENT BETWEEN HELICAL PILE AND FOUNDATION POST SHALL BE 6".
11. INSTALLERS SHOULD REFER TO STRUT AND POST SETUP SHEETS FOR LENGTH AND PLACEMENT DETAILS.

## FOUNDATION POST INSTALLATION

12. ACCURATELY LOCATE AND INSTALL SCREW PILES BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE PILE STRENGTH OR DAMAGE POSTS OR ADJACENT CONSTRUCTION.
13. INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.
14. DISTURBED GALVANIZED SURFACES SHALL BE TOUCHED UP WITH AN APPROVED COLD GALVANIZING COMPOUND.
15. INSTALL HELICAL PILES TO MINIMUM DEPTH AS INDICATED THIS SHEET OR AS REQUIRED PER THE STAMPED FOUNDATION DESIGN REPORT, WHICHEVER IS GREATER.

NOTES:

1. INSTALLATION PROCEDURE: CONCRETE & NATIVE FILL
- 1.1. AUGER HOLE TO MINIMUM HOLE DEPTH AS INDICATED IN DRAWING. HOLE SHOULD BE APPROXIMATELY PLUMB AND A MINIMUM DIAMETER AS INDICATED IN DRAWING.
- 1.2. REMOVE THE SPOILS AS BEST AS POSSIBLE. THERE SHOULD BE NO LARGE CLUMPS OR ROCKS AT THE BOTTOM OF THE HOLE.
- 1.3. FILL HOLE WITH APPROXIMATELY 9" OF CONCRETE TO ACT AS A BASE LAYER
- 1.4. PLACE HELICAL PILE IN HOLE. ENSURE IT IS PLUMB AND AT THE REQUIRED DEPTH, MEASURE TO ENSURE THE PILE IS AT OR BELOW THE REQUIRED HEIGHT. ENSURE THE NORTH-SOUTH DIMENSIONS AND EAST-WEST DIMENSIONS ARE CORRECT.
- 1.5. ROTATE PILE BACK AND FORTH TO ELIMINATE ANY GAPS UNDERNEATH THE HELIX AND ENSURE A GOOD SEAT. PUSH DOWN ON THE PILE TO ENSURE IT IS DOWN AS FAR AS POSSIBLE.
- 1.6. FILL HOLE WITH MINIMUM CONCRETE, AS SHOWN IN DRAWINGS.
- 1.7. FILL REMAINDER OF HOLE WITH FILL IN MAXIMUM 6" LIFTS (12" FOR NATIVE FILL). BE CAREFUL TO PLACE FILL EVENLY AROUND THE HOLE.
- 1.8. USING A DIGGING BAR (SPUD BAR) WITH A TAMPING END, TAMP THE FILL UNTIL IT IS FIRM AND NO LONGER MOVES (APPROXIMATELY 50 HITS OR ABOUT 20-30 SECONDS OF TAMPING). TAMPING END SHOULD BE SMALL ENOUGH TO FIT EASILY IN THE HOLE WITH THE PILE INSTALLED, APPROXIMATELY NO LARGER THAN A 3" HEAD FOR A STANDARD 8" DIAMETER HOLE.
- 1.9. ONE PERSON SHOULD REMAIN HOLDING THE HELICAL PILE IN PLACE UNTIL THE FIRST FEW LAYERS OF FILL ARE INSTALLED AND TAMPED. THE PILE SHOULD NOT BE MOVED ANY FURTHER DURING THE INSTALLATION PROCEDURE.
- 1.10. CONTINUE FILLING & TAMPING FILL IN HOLE UNTIL THE FILL IS AT (FOR AGGREGATE) OR 2" ABOVE (FOR NATIVE FILL) GROUND LEVEL. ADDITIONAL FILL ABOVE GROUND LEVEL WILL DO NO HARM, BUT ALSO DOES NOT CONTRIBUTE TO THE STRUCTURAL STRENGTH.
- 1.11. TAMP THE FINAL LAYER AS PREVIOUSLY.

ALLOWABLE FILL:  
REMAINDER OF HOLE (AFTER FILLING WITH CONCRETE) MAY BE EITHER NATIVE FILL OR  
AGGREGATE.

NATIVE FILL

- SHALL NOT CONSIST OF LARGE ROCKS, DEBRIS, OR ORGANIC MATTER.
- LARGE CLUMPS SHALL BE BROKEN UP.
- WATER MAY BE ADDED TO ASSIST INSTALLATION, BUT NO MORE THAN 5% WATER SHOULD BE ADDED TO CREATE SLURRY.

AGGREGATE  
EITHER

- #4 (11/2" - 3/4")
- #5 (1" - 1/2"),
- A COMBINATION OF BOTH #4 & #5
- EQUIVALENT SIZE OF EITHER #4 OR #5.
- DEVIATIONS IN AGGREGATE SIZE, FROM THE ABOVE SPECIFICATIONS, MUST BE APPROVED BY APA SOLAR ENGINEERING BEFORE USING /PURCHASING.

CONCRETE NOTES:  
USE A MIN. 4000 PSI COMPRESSIVE STRENGTH CONCRETE MIX.

PLEASE FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS, ON SIDE OF BAG ("FOR SETTING POSTS").

SHEET REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/10/2025
B	UPDATED HELICAL	6/26/2025

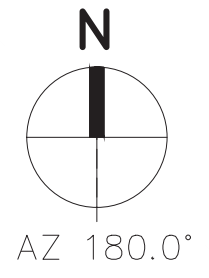
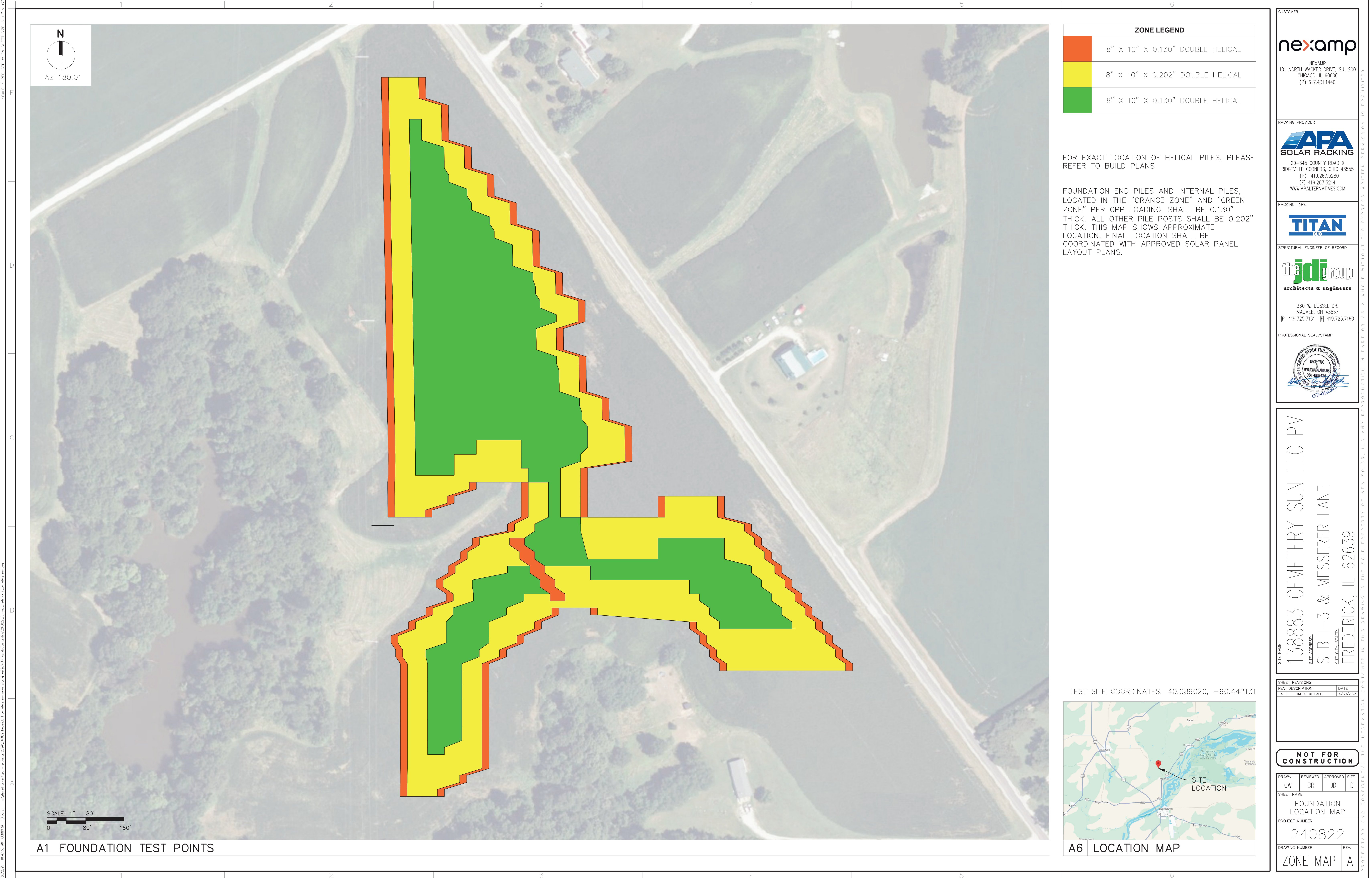
APPROVED

DRAWN CW	REVIEWED BR	APPROVED JDI	SIZE D
SHEET NAME THICK HELICAL PILE			
PROJECT NUMBER 240822			
DRAWING NUMBER S.201			REV. B









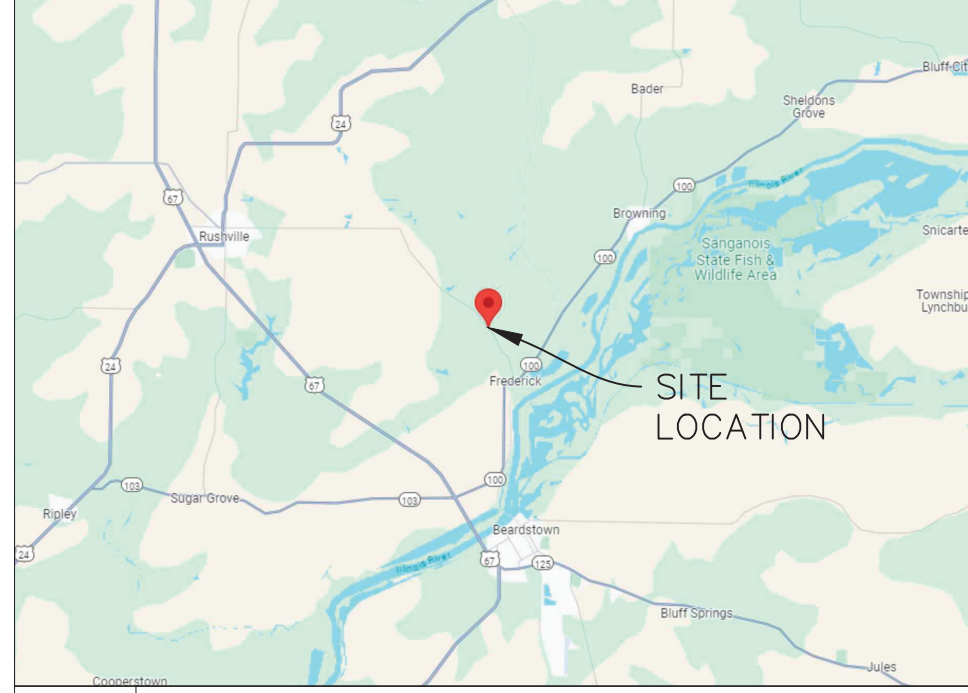
SCALE: 1" = 80'

ZONE LEGEND	
<div></div>	8" X 10" X 0.130" DOUBLE HELICAL
<div></div>	8" X 10" X 0.202" DOUBLE HELICAL
<div></div>	8" X 10" X 0.130" DOUBLE HELICAL

FOR EXACT LOCATION OF HELICAL PILES, PLEASE REFER TO BUILD PLANS

FOUNDATION END PILES AND INTERNAL PILES, LOCATED IN THE "ORANGE ZONE" AND "GREEN ZONE" PER CPP LOADING, SHALL BE 0.130" THICK. ALL OTHER PILE POSTS SHALL BE 0.202" THICK. THIS MAP SHOWS APPROXIMATE LOCATION. FINAL LOCATION SHALL BE COORDINATED WITH APPROVED SOLAR PANEL LAYOUT PLANS.

TEST SITE COORDINATES: 40.089020, -90.442131



CUSTOMER

nexamp

NEXAMP  
101 NORTH WACKER DRIVE, SU. 200  
CHICAGO, IL 60606  
(P) 617.431.1440

RACKING PROVIDER

APA  
SOLAR RACKING

20-345 COUNTY ROAD X  
RIDGEVILLE CORNERS, OHIO 43555  
(P) 419.267.5280  
(F) 419.267.5214  
WWW.APALTERNATIVES.COM

RACKING TYPE

TITAN  
RACK

STRUCTURAL ENGINEER OF RECORD

the jdi group

architects & engineers

360 W. DUSSEL DR.  
MAUMEE, OH 43537  
(P) 419.725.7161 (F) 419.725.7160

PROFESSIONAL SEAL/STAMP

SEAL OF THE STATE OF ILLINOIS  
REGISTERED PROFESSIONAL ENGINEER  
IN THE FIELD OF CIVIL ENGINEERING  
NO. 081-055426  
J. J. DILLON  
07-01-2024

SITE NAME: 138883 CEMETERY SUN LLC PV  
SITE ADDRESS: S B I-3 & MESSERER LANE  
SITE CITY, STATE: FREDERICK, IL 62639

SHEET REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/30/2025

NOT FOR CONSTRUCTION			
DRAWN	REVIEWED	APPROVED	SIZE
CW	BR	JDI	D
SHEET NAME			
FOUNDATION LOCATION MAP			
PROJECT NUMBER			
240822			
DRAWING NUMBER			REV.
ZONE MAP			A





20-345 County Road X, PO Box 326

Ridgeville Corners, OH 43555

Office: 419.267.5280

Fax: 419.267.5214

**Date:** June 26, 2025

**Subject:** SB I-3 & Messerrer Lane  
Frederick, IL 62639  
Nexamp-Cemetery Sun LLC  
APA PN: 240822

Foundation Corrosion Evaluation

pH	6.1	
Soil Resistivity	1,640	ohm * cm

**Bare Steel Lifetime**

Allowable Bare Steel Loss	0.0196	in
Allowable Bare Steel Loss	12.80692257	oz / ft^2
Corrosion Rate	0.75	oz / ft^2 / year
Usable Lifetime	17.07589676	years

**Zinc / Galvanize Coating Lifetime**

Zinc Coating Loss	0.130434783	mils / yr
Zinc Coating Designation	ASTM 123 Gr 75	
Zinc Coating Thickness	3	mils
Usable Lifetime	23	years

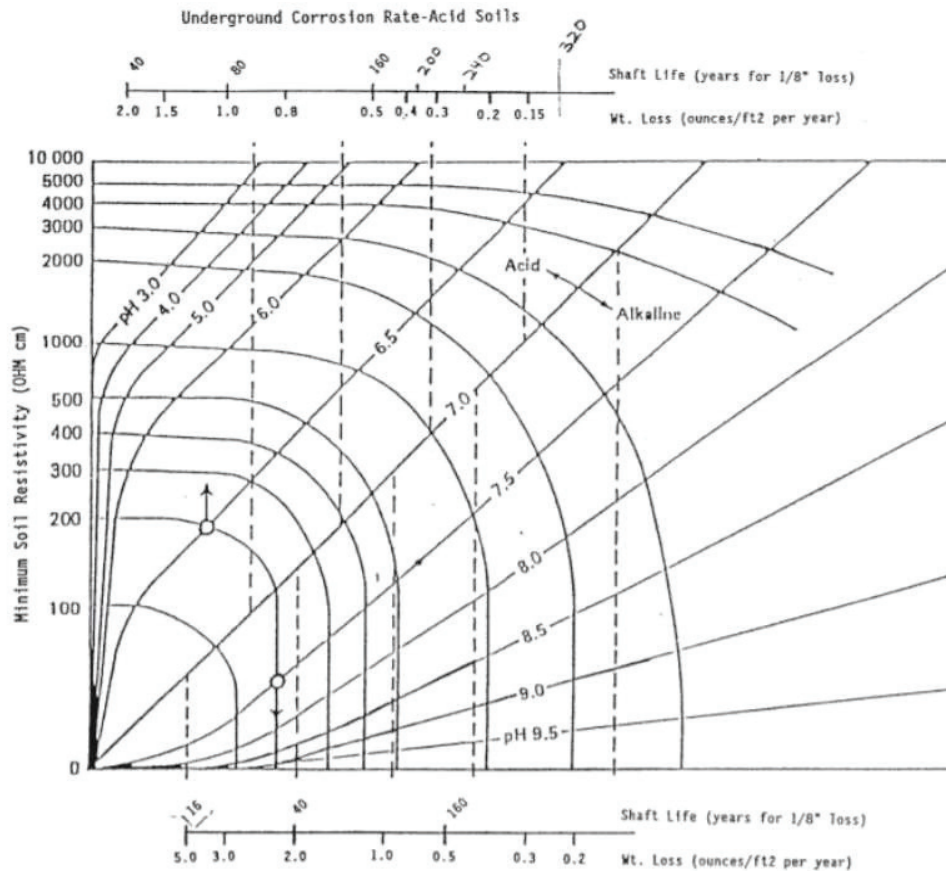
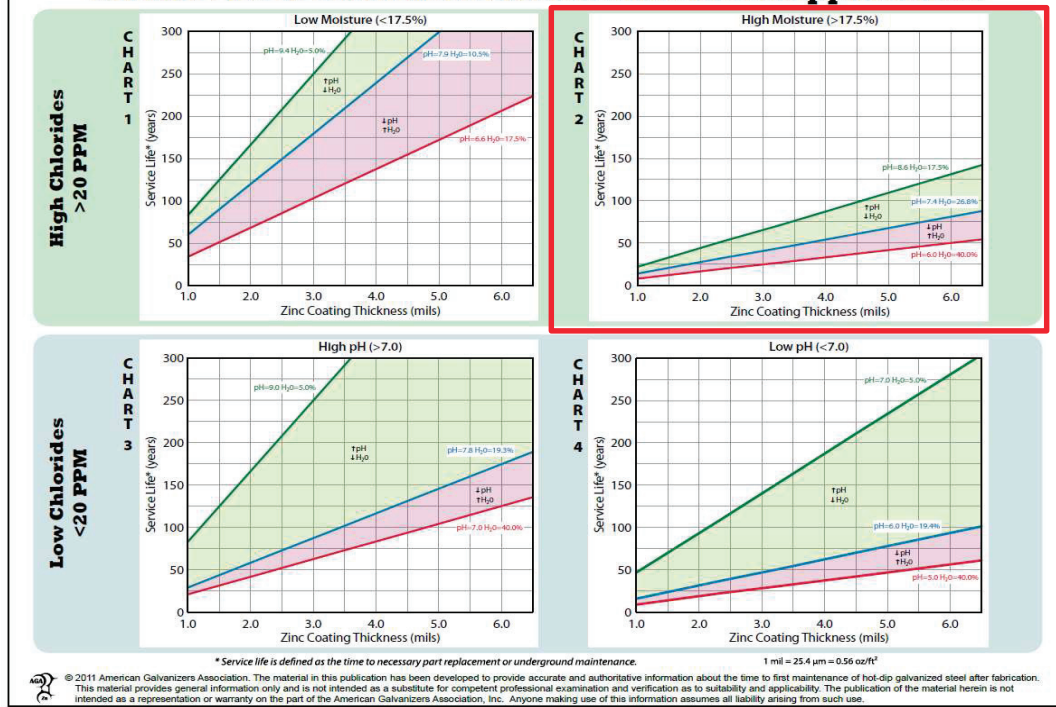
<b>Total Coated Anchor Lifetime</b>	<b>40.08</b>	<b>years</b>
-------------------------------------	--------------	--------------

File(s) referenced:

Cemetery Sun LLC Geotechnical Report (8MAY2024).pdf

\*\* Based on the information provided to APA and the above evaluation we would expect the lifetime given to be accurate\*\*

## Service Life of Galvanized Steel Articles in Soil Applications



**Figure 7.4 - Nomograph for Estimating the Corrosion Rate of Anchor Shafts**

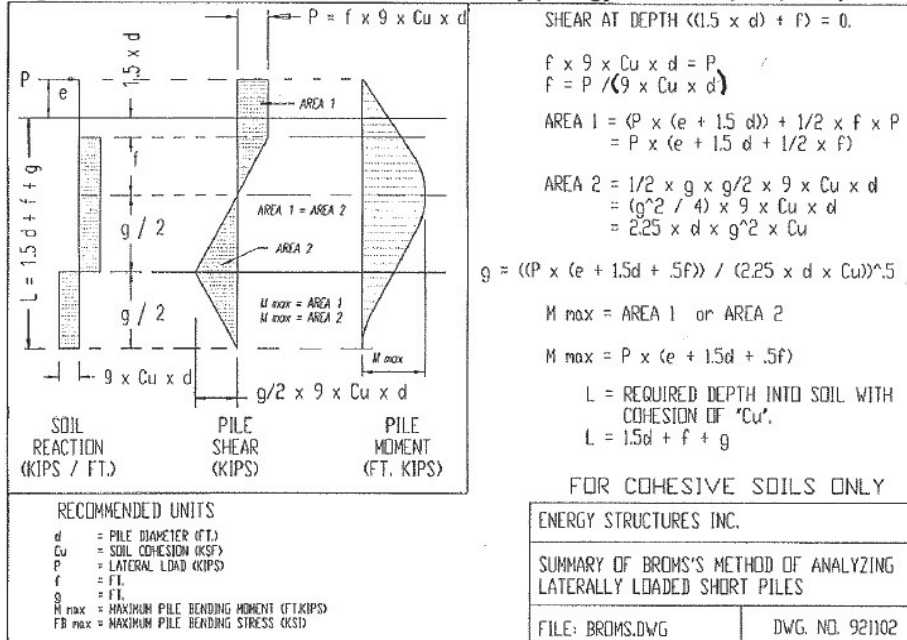


**Lateral Analysis**

Cohesive Soil

8"x10" Double Helical, 2.875" Dia., 0.130" Wall Thickness

Pile Diameter	d =	2.8358	in	Total Zone A Load =	2.431	k
Lateral Load	P =	1.4586	k	60% of the load distribution to the		
cohesion of soil	c =	1.00	ksf	back post and 40% to the front post		
$f = P/(9 \times c \times d)$	f =	0.69	ft			
	e =	6.00	in	Modify cohesion, c to match results		
$g = ((P \times (e + 1.5d + .5f)) / (2.25 \times d \times c))^{.5}$	g =	1.81	ft	of site testing, Lpile or geotechnical		
Area 1 = $P \times (e + 1.5d + .5f)$	Area 1 =	1.746	sf	report		
Area 2 = $2.25 \times d \times g^2 \times c$	Area 2 =	1.746	sf			
Design Length $L = 1.5d + f + g$	L =	2.853	ft			
Actual Depth	h =	7	ft	Allowable Bare Steel Loss		
				0.0196"		

**Lateral Safety Factor = Actual Depth/Design length 2.45****Figure 5.3 – Brom's Method for Short Piles in Clay (Energy Structures, Inc., 1994)**

Wall Thickness=	0.101	in
Inner Pipe Diameter, d1=	2.6332	in
Section Modulus, S=	0.5744525	in <sup>2</sup>
Moment of Inertia, I =	0.81	in <sup>4</sup>
Modulus of Elasticity, E =	29000.00	ksi

**Deflection:**

Fixity Length=	14.37	in
Deflection at point of load application=	1.3404	in
Resisting Deflection=	0.1158	in
Total Deflection=	1.2245	in

**Bending Stress:**

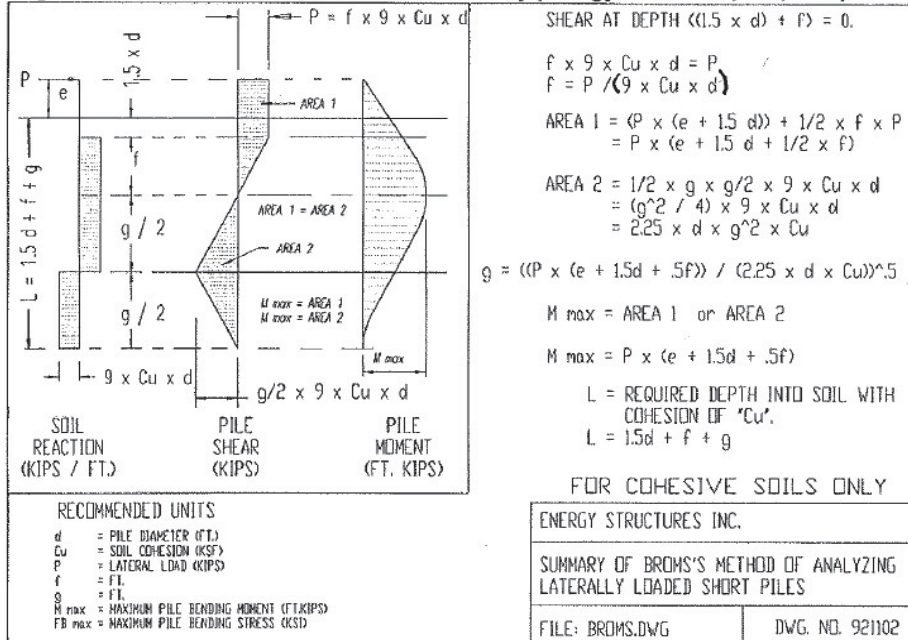
Pile Yield Stress, Fy=	62800	psi
Allowable Bending Stress, Fb=	37680	psi
Maximum Bending Moment, M=	20957.92	in-lbs
Actual Bending Stress, fa=	36483.295	psi OK

**Lateral Analysis**

Cohesive Soil

8"x10" Double Helical, 2.875" Dia., 0.202" Wall Thickness

Pile Diameter	d =	2.8358	in	Total Zone B Load =	2.784	k
Lateral Load	P =	1.6704	k	60% of the load distribution to the		
cohesion of soil	c =	1.00	ksf	back post and 40% to the front post		
$f = P/(9 \times c \times d)$	f =	0.79	ft			
	e =	6.00	in	Modify cohesion, c to match results		
$g = ((P \times (e + 1.5d + .5f)) / (2.25 \times d \times c))^{.5}$	g =	1.98	ft	of site testing, Lpile or geotechnical		
Area 1 = $P \times (e + 1.5d + .5f)$	Area 1 =	2.083	sf	report		
Area 2 = $2.25 \times d \times g^2 \times c$	Area 2 =	2.083	sf			
Design Length $L = 1.5d + f + g$	L =	3.119	ft			
Actual Depth	h =	7	ft	Allowable Bare Steel Loss		
				0.0196"		

**Lateral Safety Factor = Actual Depth/Design length 2.24****Figure 5.3 – Brom's Method for Short Piles in Clay (Energy Structures, Inc., 1994)**

Wall Thickness=	0.168	in
Inner Pipe Diameter, d1=	2.4993	in
Section Modulus, S=	0.8880829	in <sup>2</sup>
Moment of Inertia, I =	1.26	in <sup>4</sup>
Modulus of Elasticity, E =	29000.00	ksi

**Deflection:**

Fixity Length=	14.97	in
Deflection at point of load application=	1.2491	in
Resisting Deflection=	0.1092	in
Total Deflection=	1.1399	in

**Bending Stress:**

Pile Yield Stress, Fy=	62800	psi
Allowable Bending Stress, Fb=	37680	psi
Maximum Bending Moment, M=	24999.242	in-lbs
Actual Bending Stress, fa=	28149.672	psi
	OK	