



Depression Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



G2 observed depression 9 of 11
Approximately 35 feet South and 300 feet West from test pit location PLT-03
Latitude: 37.639186 N
Longitude: 85.271352 W



G2 observed depression No. 10 of 11
Approximately 90 feet North and 400 feet West from test pit T-29
Latitude 37.62480° N
Longitude 85.27308° W



G2 observed depression No. 11 of 11
Approximately 60 feet South and 20 feet West from test pit T-29
Latitude 37.62468° N
Longitude 85.27180° W



Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

APPENDIX C

Pile Load Test Data



Pile Load Test Data Summary
 Proposed Frontier Solar Power Plant
 Marion and Washington Counties, Kentucky
 G2 Project No. 223429

Test Pile ID		Relief Hole Diameter (in.)	Depth to Limestone (ft.)	Embedment Depth (ft.)	Tension Load at Deflection		Lateral Load at Deflection		
					0.25 in.	1.00 in.	0.25 in.	0.50 in.	1.00 in.
PD-01	1 Pile	4.0	5.50	5.50	3,880	4,000	1,570	2,460	3,640
PD-02	1 Pile	6.0	3.50	6.00	4,210	4,500	1,510	2,580	3,870
PD-03	1 Pile	6.0	7.50	7.00	1,440	1,600	860	1,450	2,840
PD-04	1 Pile	6.0	4.00	7.00	10,590	4,700	1,530	2,500	3,950
PD-05	1 Pile	6.0	9.00	6.00	1,290	1,980	1,630	2,990	4,350
PD-06	1 Pile	6.0	> 9.00	7.00	2,990	3,290	1,500	2,290	3,930
PD-07	1 Pile	6.0	8.00	6.00	2,160	2,200	1,470	2,590	3,840
PD-08	1 Pile	6.0	6.00	6.50	7,430	10,960	2,040	2,980	4,280
PD-09	1 Pile	6.0	4.00	7.00	12,000 (0.02 in.)	-	1,790	2,970	4,960
PD-10	1 Pile	6.0	5.00	5.00	1,440	1,500	650	1,080	1,480
PD-11	1 Pile	6.0	4.50	6.00	6,240	6,010	1,490	2,440	4,160
PD-12	1 Pile	4.0	3.50	6.00	7,700	10,480	1,500	2,470	3,910
PD-13	1 Pile	4.0	3.50	5.00	8,320	9,730	1,650	2,950	4,440
PD-14	1 Pile	4.0	3.50	6.00	12,000 (0.13 in.)	-	1,920	3,080	4,930
PD-15	1 Pile	4.0	5.00	6.00	12,000 (0.05 in.)	-	1,580	2,810	4,920
PD-16	1 Pile	4.0	5.00	5.00	2,750	2,120	1,610	2,360	3,380
PD-17	1 Pile	4.0	4.00	5.00	12,000 (0.07 in.)	-	2,130	3,480	5,280
PD-18	1 Pile	4.0	5.50	5.50	4,420	4,700	1,730	3,410	5,260
PLT-01 (2 piles)	Pile A	-	8.00	5.00	5,260	5,590	1,590	2,840	3,880
	Pile B	-	8.00	7.00	9,490	10,000	1,660	3,190	4,960
PLT-02 (2 piles)	Pile A	-	8.00	5.00	4,630	5,380	1,780	2,990	4,180
	Pile B	-	8.00	7.00	6,420	8,100	2,170	3,610	5,750
PLT-03 (2 piles)	Pile A	-	9.00	5.00	6,090	6,680	1,560	2,990	4,370
	Pile B	-	9.00	7.00	7,800	7,810	1,680	3,260	5,480
PLT-04 (2 piles)	Pile A	-	> 10.00	5.00	8,240	8,010	2,310	3,390	4,470
	Pile B	-	> 10.00	7.00	12,000 (0.05 in.)	-	3,190	5,110	7,140

(1) At each test location, the lateral load was applied at 30 inches above grade. The lateral deflection was measured from 6 inches above grade.



Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Axial Uplift (Tension) Pile Load Test Data



Axial Uplift (Tension) Pile Load Test

Test Location: PD-01 (4-in. Relief Hole)	Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9	Project Number: 223429
Embedment Depth: 5.5 feet	GPS Coordinates: 37.62693°, -85.27826°
Load Height: 3.0 feet	Installation Date: 12/16/2023
Gauge Height: 0.5 feet	Test Date: 12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.003	0.005	0.004
8	3,500	0.051	0.055	0.053
9	4,000	0.301	0.320	0.311
10	0	0.264	0.269	0.267
11	4,000 (maximum)	1.012	1.042	1.027 (maximum)
12	0	0.990	0.992	0.991

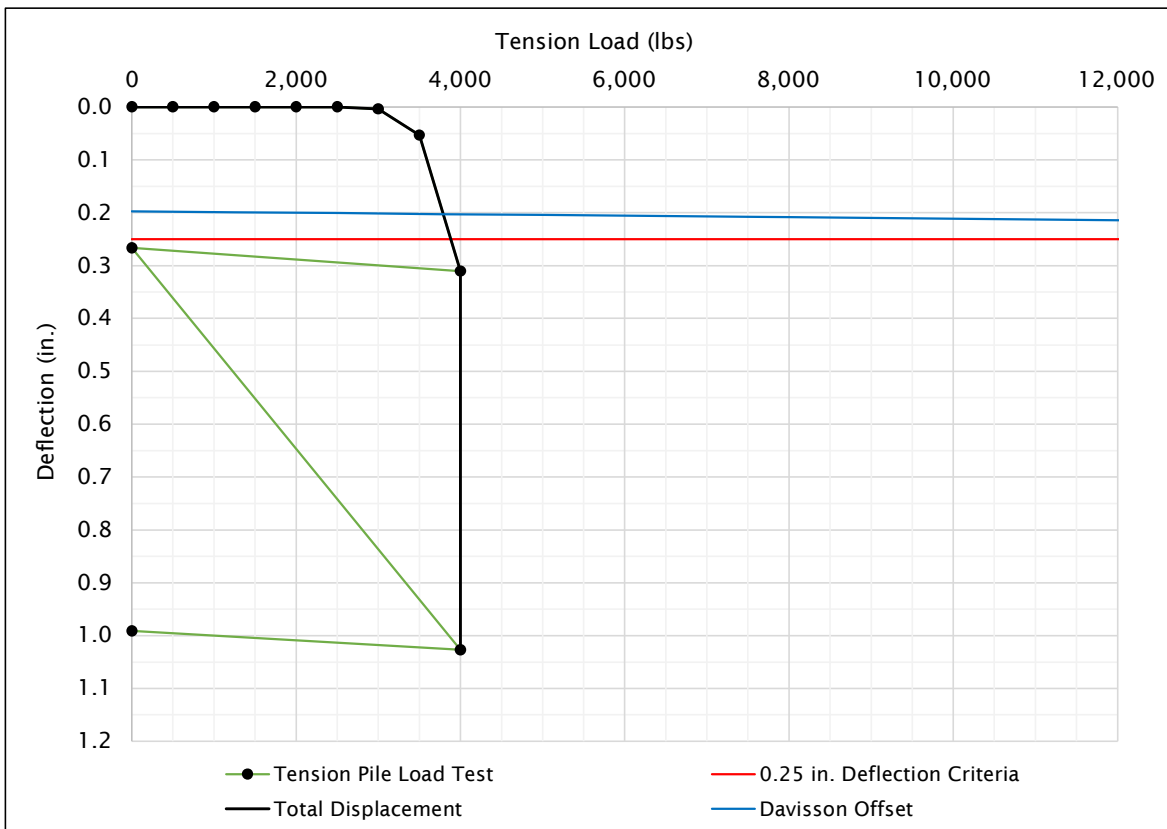


Figure No. 210



Axial Uplift (Tension) Pile Load Test

Test Location: PD-02 (6-in. Relief Hole)	Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9	Project Number: 223429
Embedment Depth: 6.0 feet	GPS Coordinates: 37.65219°, -85.25635°
Load Height: 3.0 feet	Installation Date: 12/20/2023
Gauge Height: 0.5 feet	Test Date: 12/20/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.003	0.003	0.003
4	1,500	0.007	0.007	0.007
5	2,000	0.018	0.018	0.018
6	2,500	0.029	0.029	0.029
7	3,000	0.037	0.039	0.038
8	3,500	0.071	0.075	0.073
9	4,000	0.121	0.127	0.124
10	4,300	0.298	0.307	0.303
11	0	0.291	0.297	0.294
12	4,500 (maximum)	1.002	1.009	1.006 (maximum)
13	0	0.987	0.992	0.990

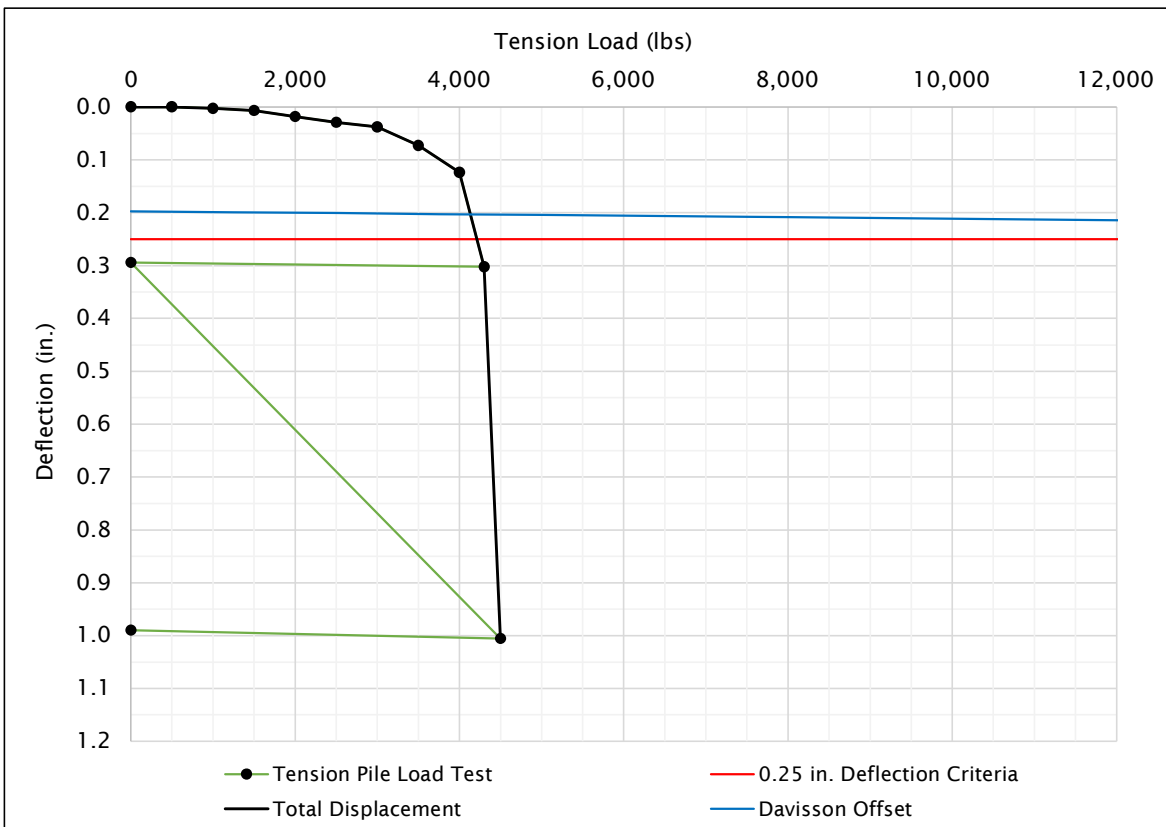


Figure No. 211



Axial Uplift (Tension) Pile Load Test

Test Location:	PD-03 (6-in. Relief Hole)	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	7.0 feet	GPS Coordinates:	37.65641°, -85.26495°
Load Height:	3.0 feet	Installation Date:	12/20/2023
Gauge Height:	0.5 feet	Test Date:	12/20/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.003	0.003	0.003
3	1,000	0.018	0.018	0.018
4	1,500	0.281	0.285	0.283
5	0	0.272	0.272	0.272
6	1,500	0.492	0.495	0.494
7	1,600 (maximum)	1.012	1.022	1.017 (maximum)
8	0	1.001	0.998	1.000

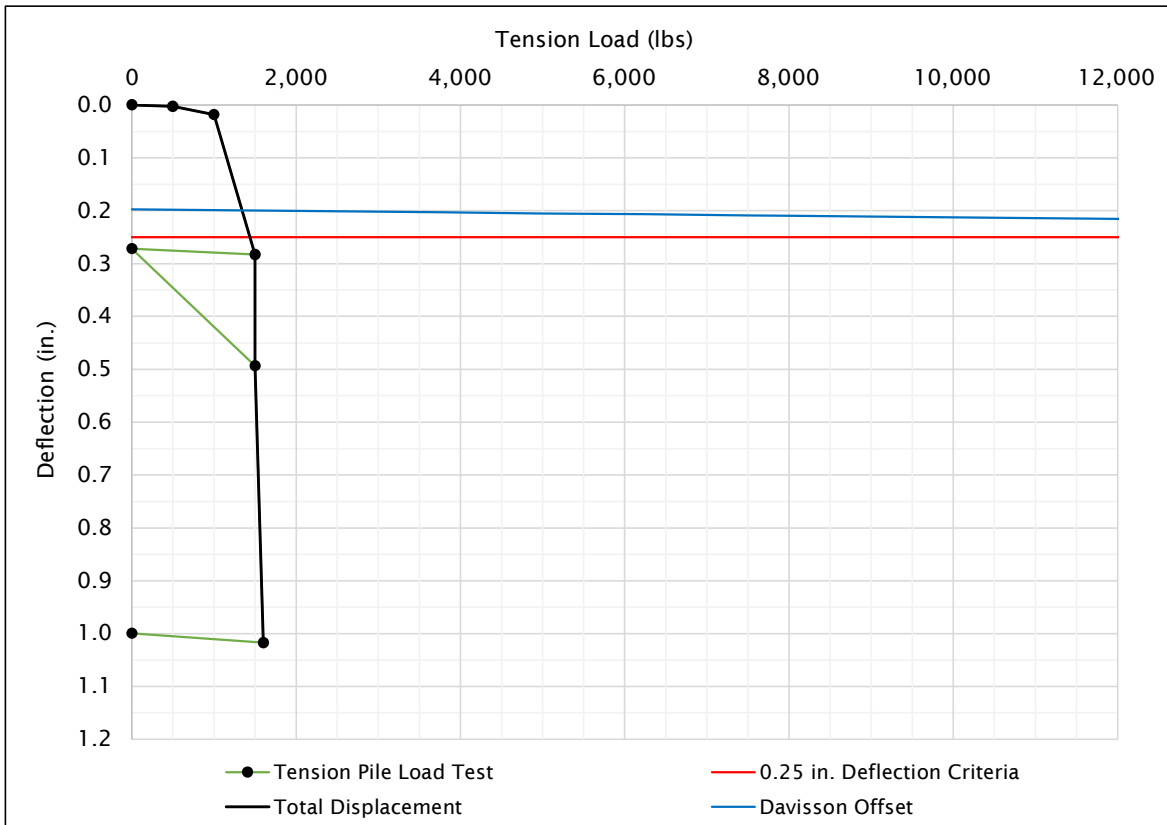


Figure No. 212



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-04 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.63909°, -85.27471°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/19/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/19/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.000	0.000	0.000
8	3,500	0.001	0.001	0.001
9	4,000	0.010	0.010	0.010
10	5,000	0.021	0.022	0.022
11	6,000	0.022	0.026	0.024
12	7,000	0.029	0.030	0.030
13	8,000	0.042	0.041	0.042
14	9,000	0.044	0.046	0.045
15	10,000	0.050	0.050	0.050
16	10,900 (maximum)	0.351	0.355	0.353 (maximum)
17	0	0.350	0.352	0.351
18	4,500	1.021	1.020	1.021
19	0	0.921	0.931	0.926

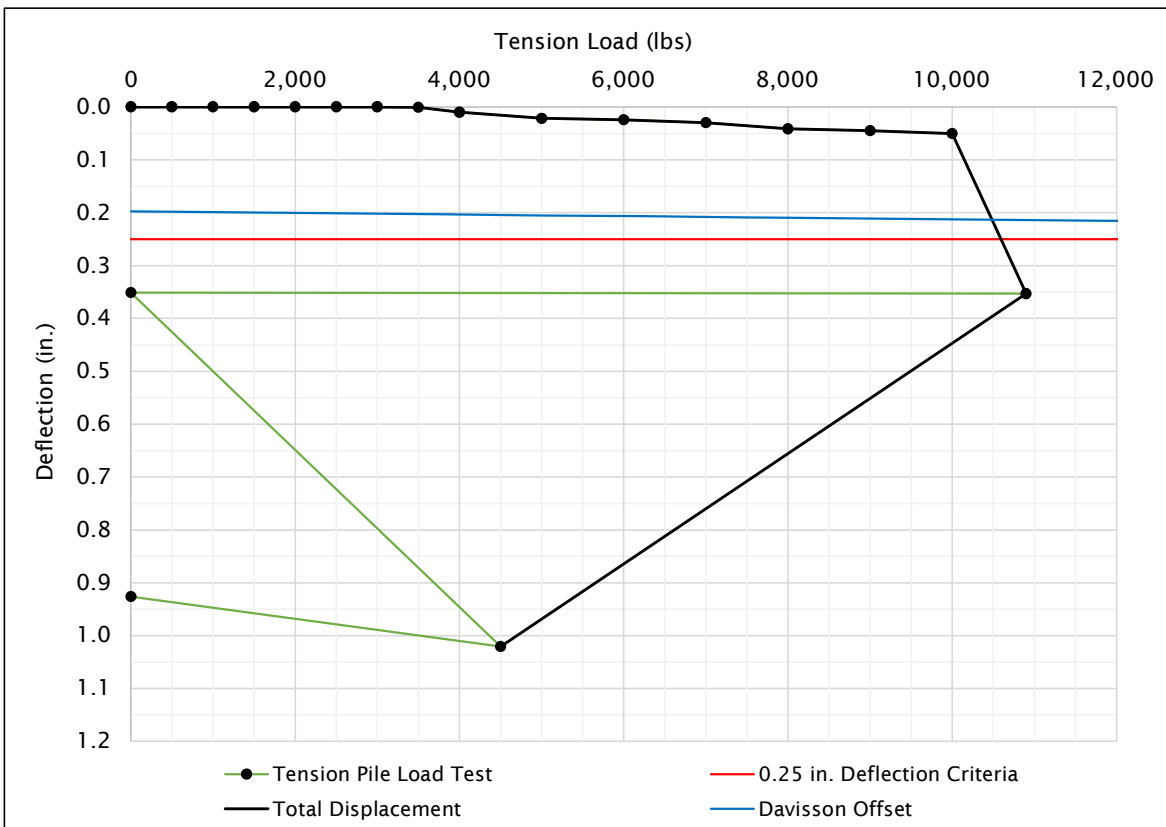


Figure No. 213



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-05 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>6.0 feet</u>	GPS Coordinates: <u>37.65601°; -85.25869°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.001	0.001	0.001
3	1,000	0.009	0.009	0.009
4	1,300	0.251	0.259	0.255
5	0	0.240	0.243	0.242
6	1,500	0.312	0.319	0.316
7	2,000 (maximum)	1.019	1.025	1.022 (maximum)
8	0	0.998	0.999	0.999

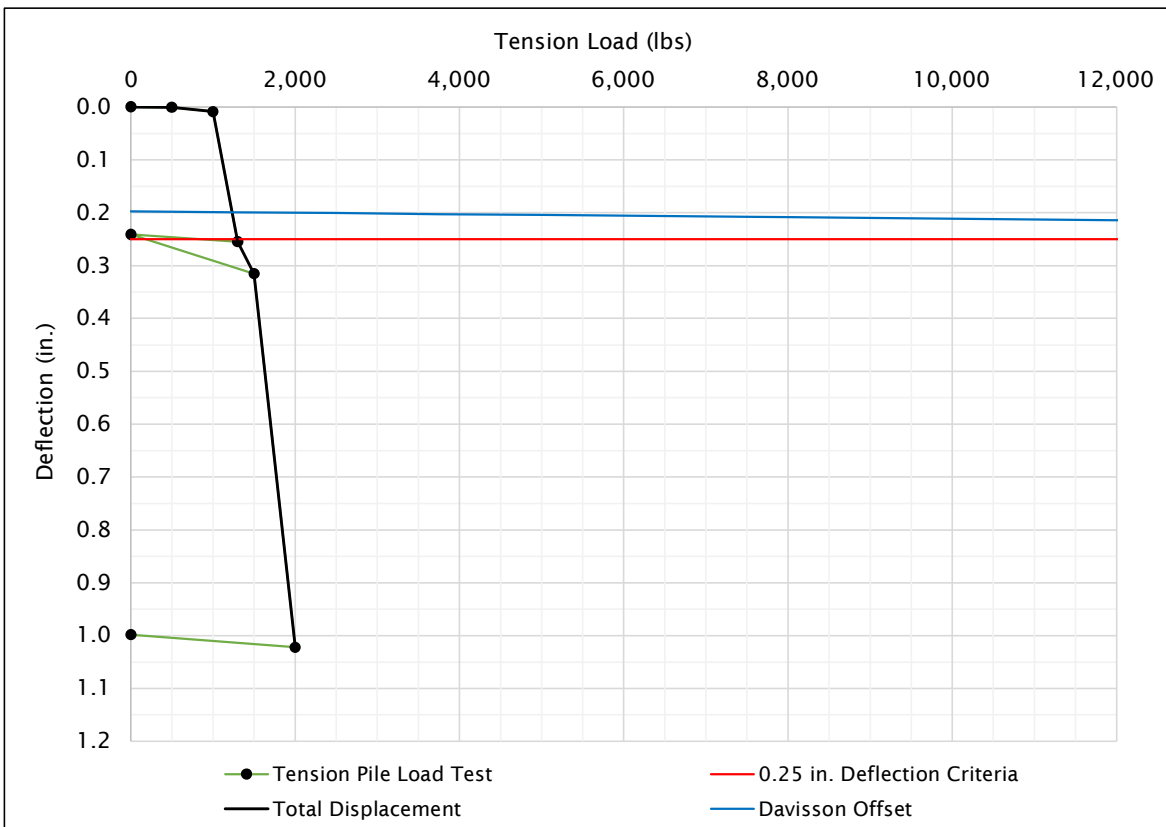


Figure No. 214



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-06 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.65394°, -85.26513°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.001	0.001	0.001
5	2,000	0.003	0.003	0.003
6	2,500	0.017	0.021	0.019
7	3,000	0.251	0.255	0.253
8	0	0.241	0.240	0.241
9	3,300 (maximum)	1.029	1.040	1.035 (maximum)
10	0	1.007	1.003	1.005

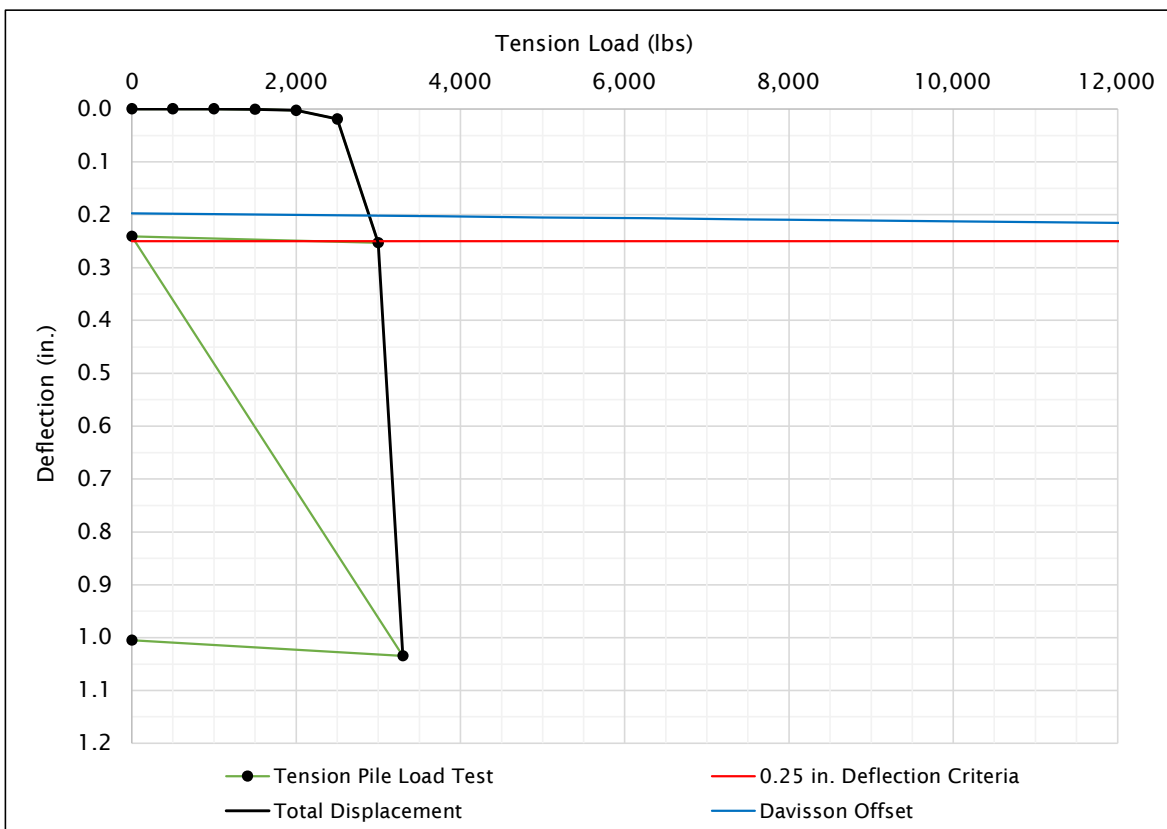


Figure No. 215



CONSULTING
GROUP

Axial Uplift (Tension) Pile Load Test

Test Location:	<u>PD-07 (6-in. Relief Hole)</u>	Project Name:	<u>Frontier Solar</u>
Pile Size:	<u>Non-Galvanized W6x9</u>	Project Number:	<u>223429</u>
Embedment Depth:	<u>6.0 feet</u>	GPS Coordinates:	<u>37.65041°; -85.27135°</u>
Load Height:	<u>3.0 feet</u>	Installation Date:	<u>12/20/2023</u>
Gauge Height:	<u>0.5 feet</u>	Test Date:	<u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.003	0.004	0.004
5	2,000	0.019	0.020	0.020
6	2,200	0.303	0.300	0.302
7	0	0.298	0.299	0.299
8	2,200 (maximum)	1.023	1.025	1.024 (maximum)
9	0	1.001	1.004	1.003

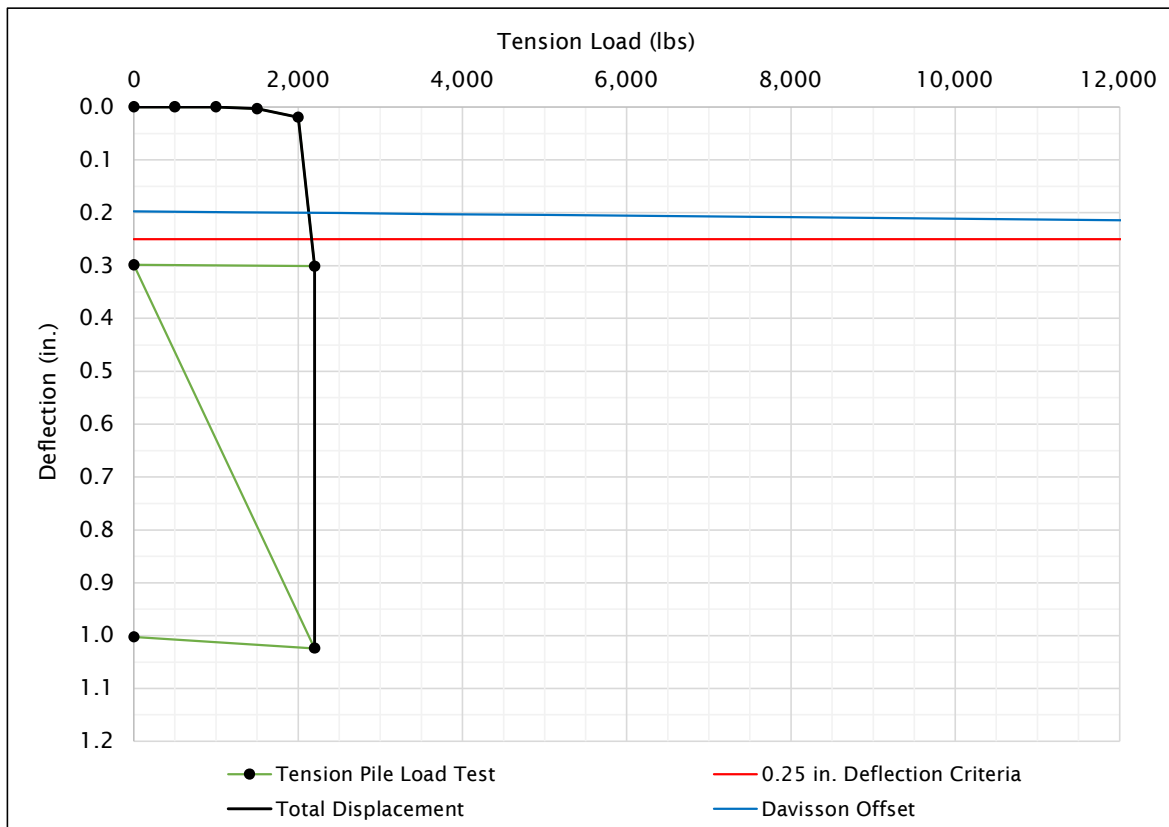


Figure No. 216



Axial Uplift (Tension) Pile Load Test

Test Location: PD-08 (6-in. Relief Hole)	Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9	Project Number: 223429
Embedment Depth: 6.5 feet	GPS Coordinates: 37.65312°, -85.27526°
Load Height: 3.0 feet	Installation Date: 12/20/2023
Gauge Height: 0.5 feet	Test Date: 12/20/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.001	0.001	0.001
8	3,500	0.002	0.002	0.002
9	4,000	0.007	0.007	0.007
10	5,000	0.012	0.013	0.013
11	6,000	0.042	0.042	0.042
12	7,000	0.149	0.151	0.150
13	7,500	0.263	0.267	0.265
14	0	0.251	0.254	0.253
15	7,500	0.392	0.398	0.395
16	8,000	0.532	0.541	0.537
17	9,000	0.721	0.725	0.723
18	10,000	0.869	0.872	0.871
19	11,000 (maximum)	1.002	1.009	1.006 (maximum)
20	0	0.981	0.982	0.982

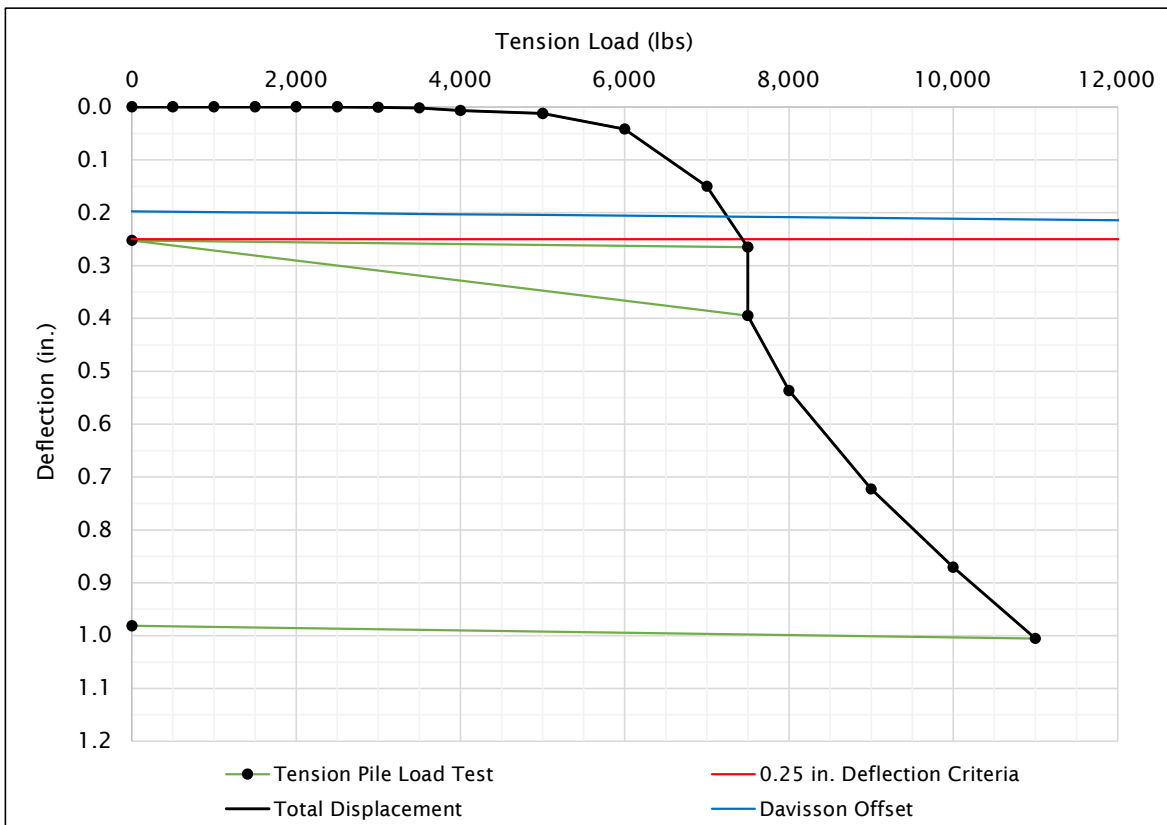


Figure No. 217



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-09 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.64657°, -85.27458°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.001	0.001	0.001
8	3,500	0.005	0.005	0.005
9	4,000	0.007	0.007	0.007
10	5,000	0.008	0.008	0.008
11	6,000	0.009	0.009	0.009
12	7,000	0.012	0.011	0.012
13	8,000	0.014	0.014	0.014
14	9,000	0.017	0.016	0.017
15	10,000	0.017	0.017	0.017
16	11,000	0.018	0.019	0.019
17	12,000 (maximum)	0.020	0.020	0.020 (maximum)
18	0	0.019	0.019	0.019

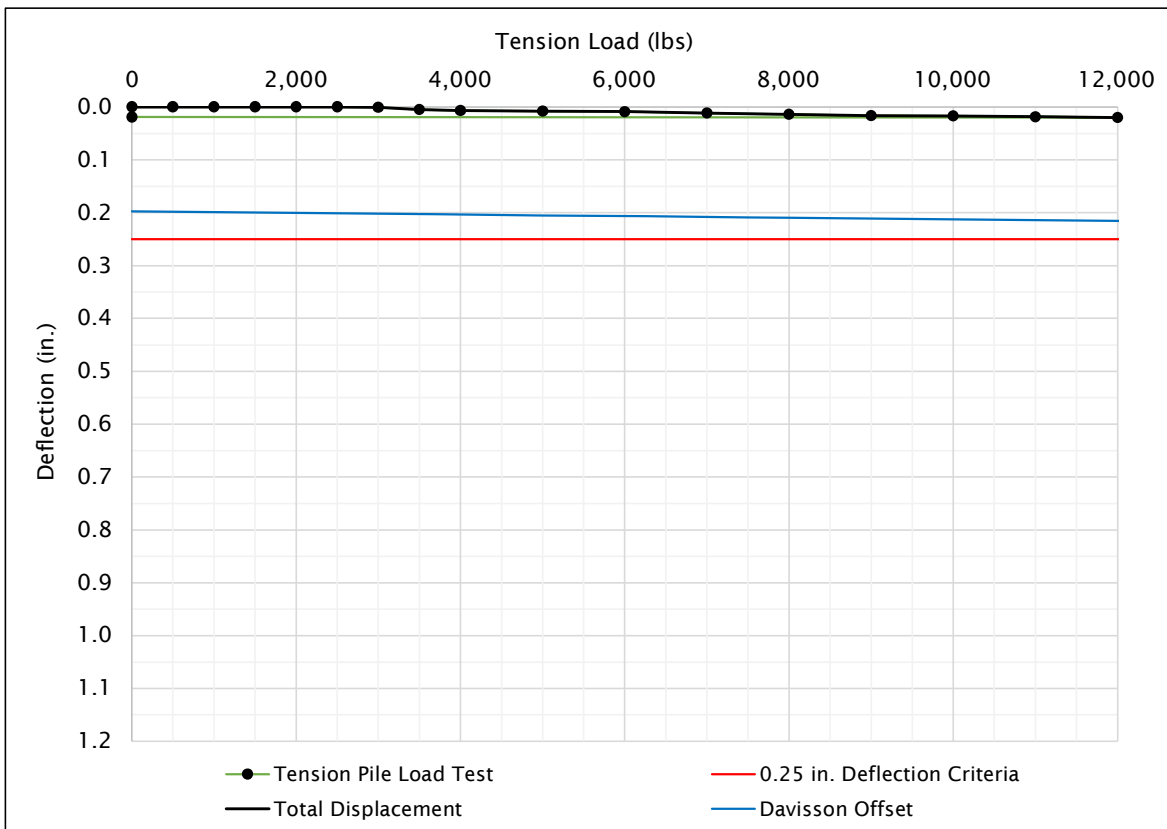


Figure No. 218



CONSULTING GROUP

Axial Uplift (Tension) Pile Load Test

Test Location:	PD-10 (6-in. Relief Hole)	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.0 feet	GPS Coordinates:	37.64298°, -85.27405°
Load Height:	3.0 feet	Installation Date:	12/19/2023
Gauge Height:	0.5 feet	Test Date:	12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.292	0.281	0.287
5	0	0.251	0.250	0.251
6	1,500 (maximum)	1.077	1.071	1.074 (maximum)
7	0	1.063	1.061	1.062

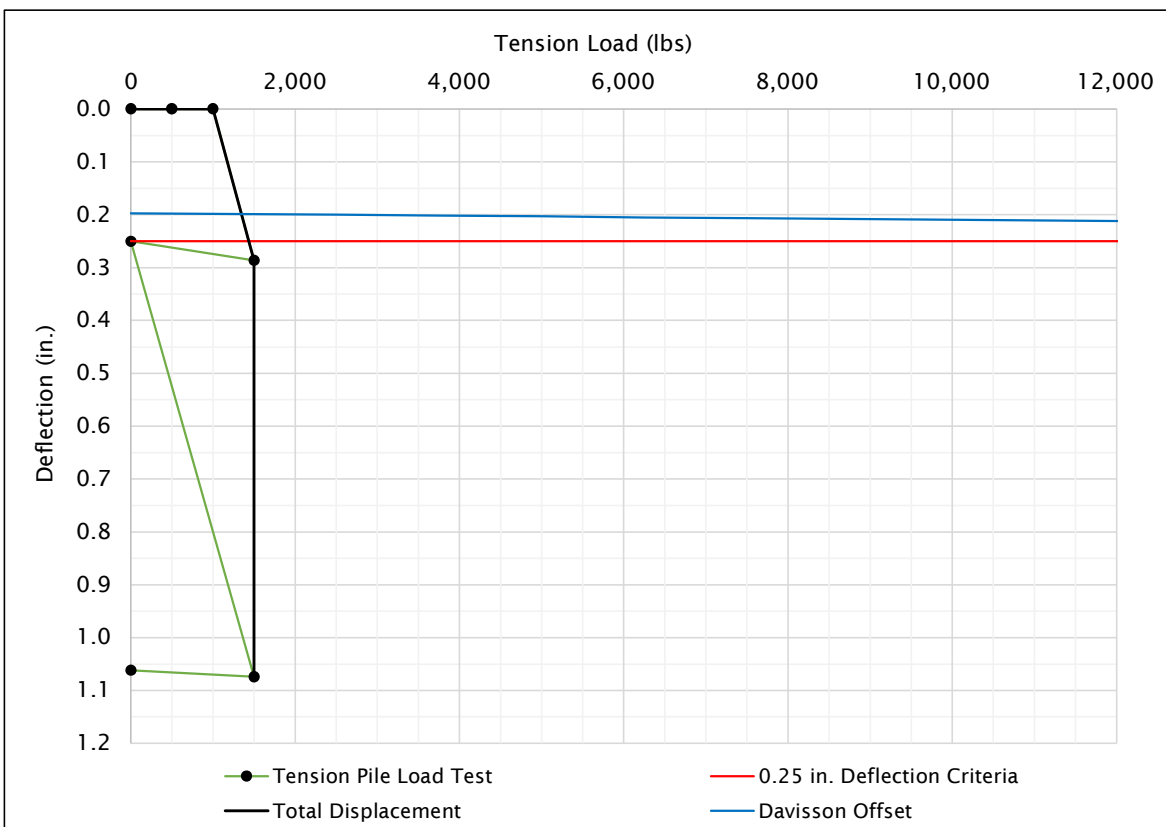


Figure No. 219



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-11 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>6.0 feet</u>	GPS Coordinates: <u>37.64040°, -85.27739°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/19/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/19/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.001	0.001	0.001
8	3,500	0.004	0.004	0.004
9	4,000	0.005	0.005	0.005
10	5,000	0.012	0.012	0.012
11	6,000	0.021	0.022	0.022
12	6,300 (maximum)	0.301	0.309	0.305 (maximum)
13	0	0.291	0.295	0.293
14	6,000	1.021	1.025	1.023
15	0	1.003	1.005	1.004

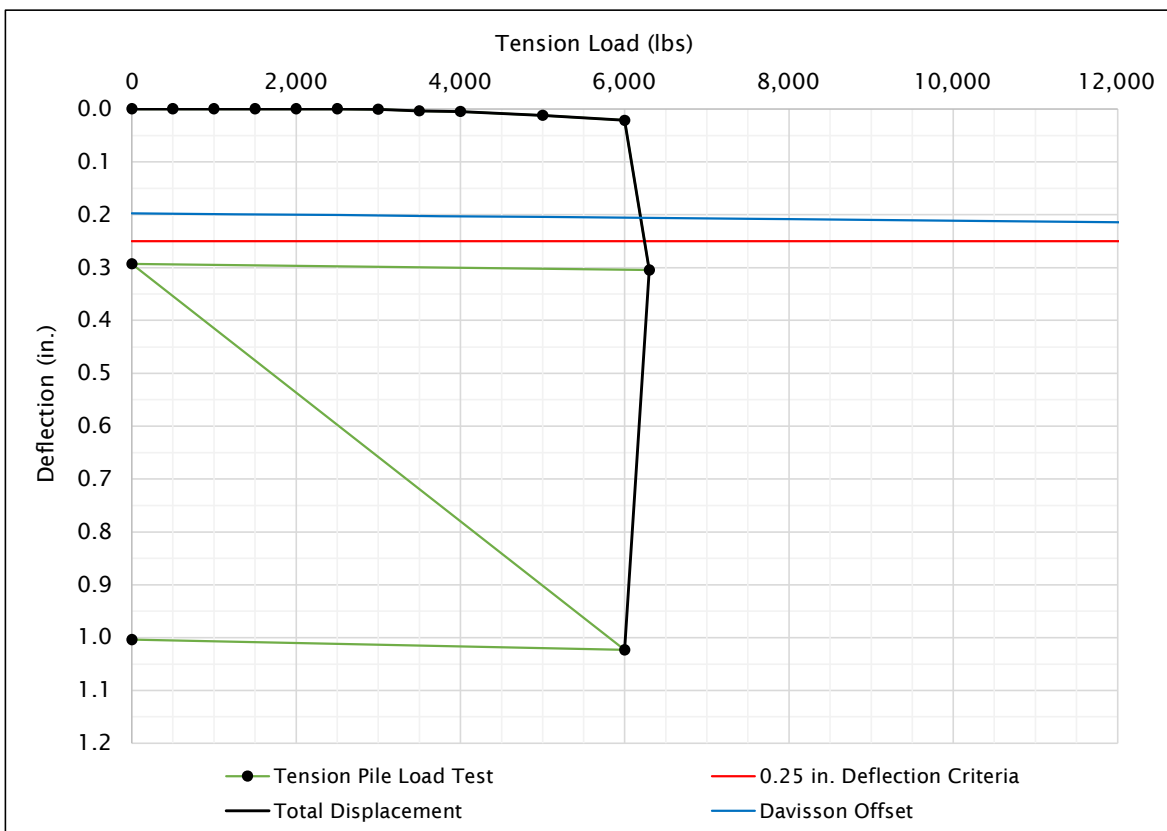


Figure No. 220



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-12 (4-in. Relief Hole)</u> Pile Size: <u>Non-Galvanized W6x9</u> Embedment Depth: <u>6.0 feet</u> Load Height: <u>3.0 feet</u> Gauge Height: <u>0.5 feet</u>	Project Name: <u>Frontier Solar</u> Project Number: <u>223429</u> GPS Coordinates: <u>37.63507°, -85.26615°</u> Installation Date: <u>12/19/2023</u> Test Date: <u>12/19/2023</u>
---	---

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.001	0.001	0.001
8	3,500	0.005	0.005	0.005
9	4,000	0.007	0.007	0.007
10	5,000	0.010	0.010	0.010
11	6,000	0.032	0.031	0.032
12	7,000	0.142	0.146	0.144
13	7,800	0.262	0.269	0.266
14	0	0.240	0.241	0.241
15	8,000	0.290	0.292	0.291
16	9,000	0.415	0.425	0.420
17	10,000	0.700	0.705	0.703
18	10,500 (maximum)	1.007	1.012	1.010 (maximum)
19	0	0.977	0.981	0.979

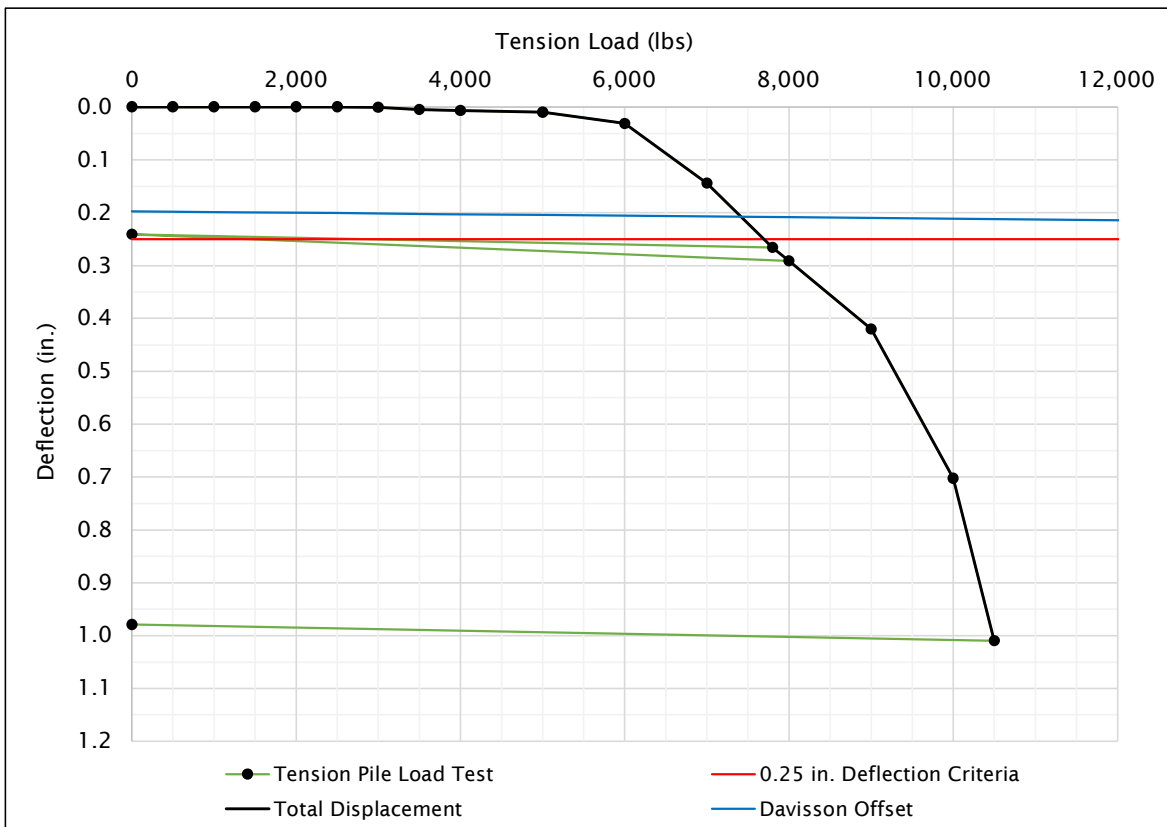


Figure No. 221



Axial Uplift (Tension) Pile Load Test

Test Location: PD-13 (4-in. Relief Hole)	Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9	Project Number: 223429
Embedment Depth: 5.0 feet	GPS Coordinates: 37.63444°, -85.26320°
Load Height: 3.0 feet	Installation Date: 12/19/2023
Gauge Height: 0.5 feet	Test Date: 12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.000	0.000	0.000
8	3,500	0.000	0.000	0.000
9	4,000	0.000	0.000	0.000
10	5,000	0.032	0.033	0.033
11	6,000	0.082	0.081	0.082
12	7,000	0.152	0.159	0.156
13	8,000	0.212	0.215	0.214
14	8,500	0.269	0.272	0.271
15	0	0.241	0.241	0.241
16	8,500	0.312	0.315	0.314
17	9,000	0.390	0.391	0.391
18	10,000 (maximum)	0.812	0.817	0.815 (maximum)
19	9,700	1.012	1.022	1.017
20	0	1.001	1.001	1.001

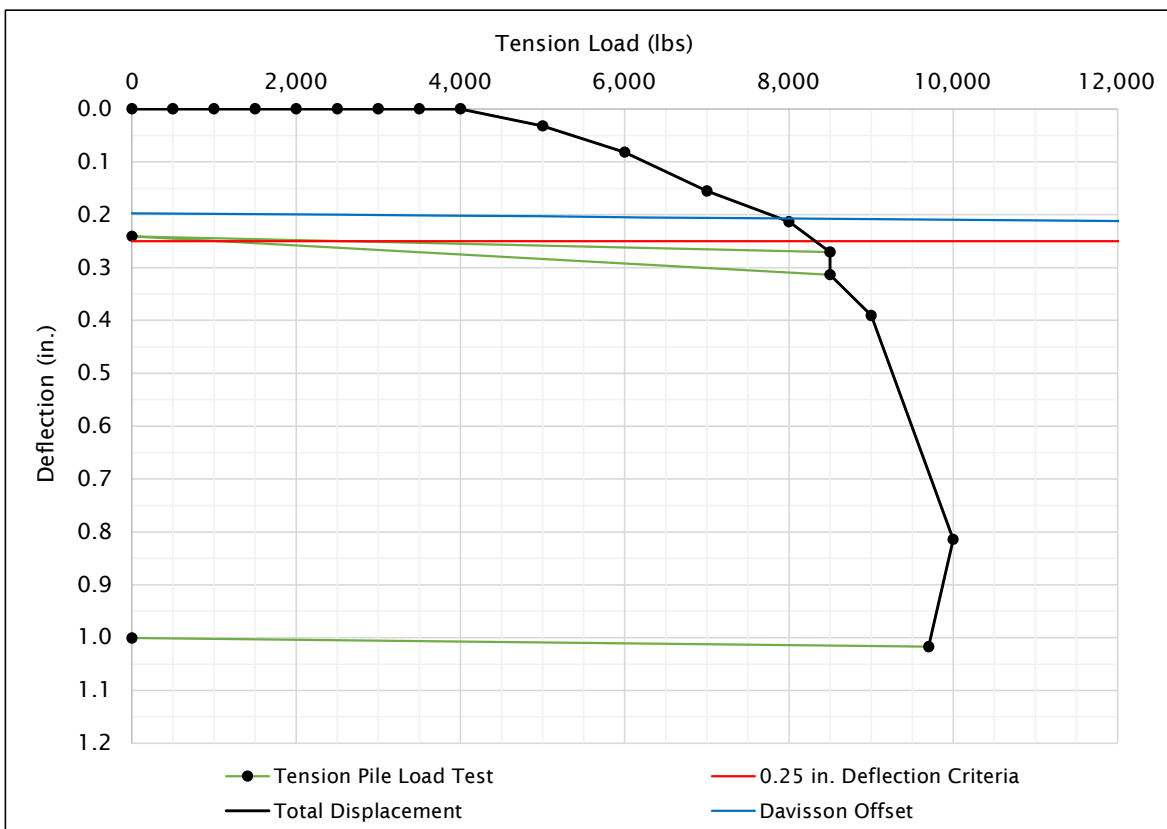


Figure No. 222



Axial Uplift (Tension) Pile Load Test

Test Location: PD-14 (4-in. Relief Hole) Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9 Project Number: 223429
Embedment Depth: 6.0 feet GPS Coordinates: 37.63102°, -85.27242°
Load Height: 3.0 feet Installation Date: 12/18/2023
Gauge Height: 0.5 feet Test Date: 12/18/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.001	0.001	0.001
6	2,500	0.005	0.005	0.005
7	3,000	0.006	0.006	0.006
8	3,500	0.007	0.007	0.007
9	4,000	0.010	0.011	0.011
10	5,000	0.021	0.020	0.021
11	6,000	0.031	0.031	0.031
12	7,000	0.044	0.047	0.046
13	8,000	0.058	0.055	0.057
14	9,000	0.071	0.068	0.070
15	10,000	0.082	0.081	0.082
16	11,000	0.103	0.092	0.098
17	12,000 (maximum)	0.129	0.125	0.127 (maximum)
18	0	0.115	0.107	0.111

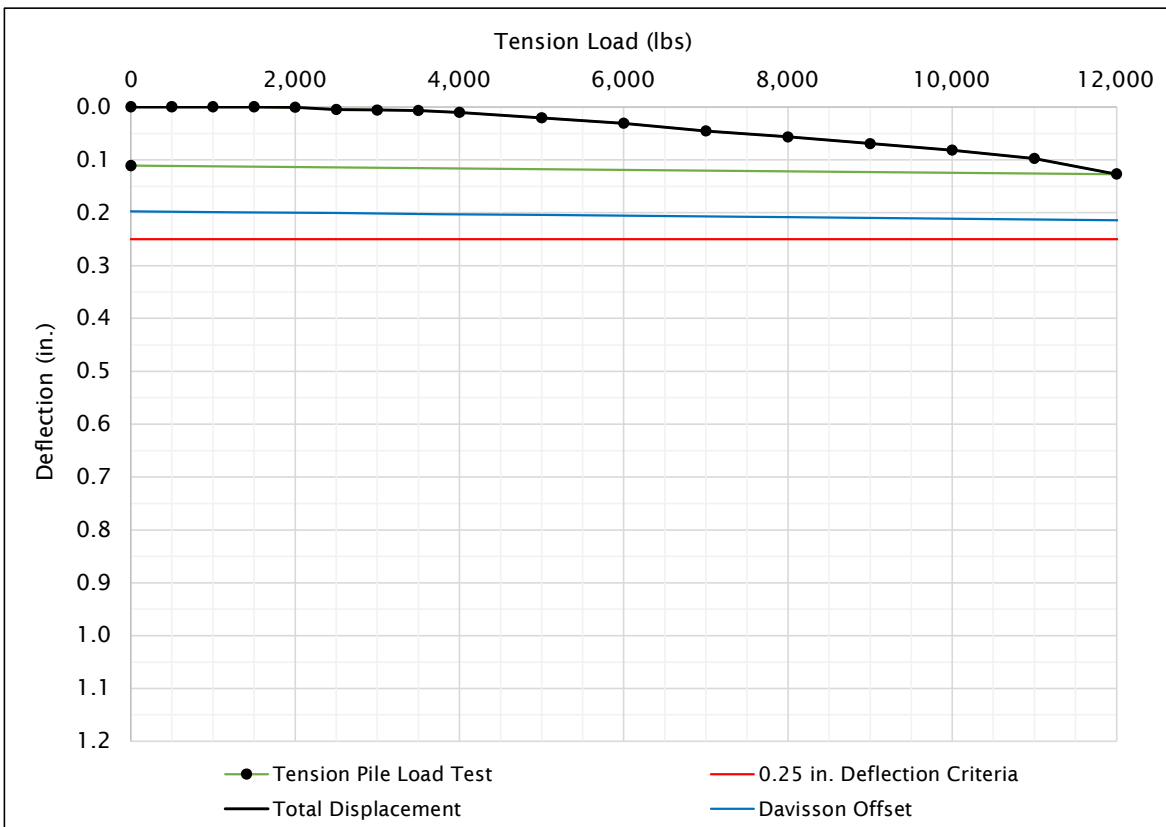


Figure No. 223



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-15 (4-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>6.0 feet</u>	GPS Coordinates: <u>37.62855°, -85.26711°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/16/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/16/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.002	0.002	0.002
4	1,500	0.008	0.007	0.008
5	2,000	0.008	0.008	0.008
6	2,500	0.009	0.010	0.010
7	3,000	0.010	0.011	0.011
8	3,500	0.014	0.015	0.015
9	4,000	0.015	0.015	0.015
10	5,000	0.018	0.019	0.019
11	6,000	0.020	0.021	0.021
12	7,000	0.025	0.028	0.027
13	8,000	0.031	0.032	0.032
14	9,000	0.028	0.030	0.029
15	10,000	0.033	0.035	0.034
16	11,000	0.041	0.042	0.042
17	12,000 (maximum)	0.048	0.047	0.048 (maximum)
18	0	0.012	0.015	0.014

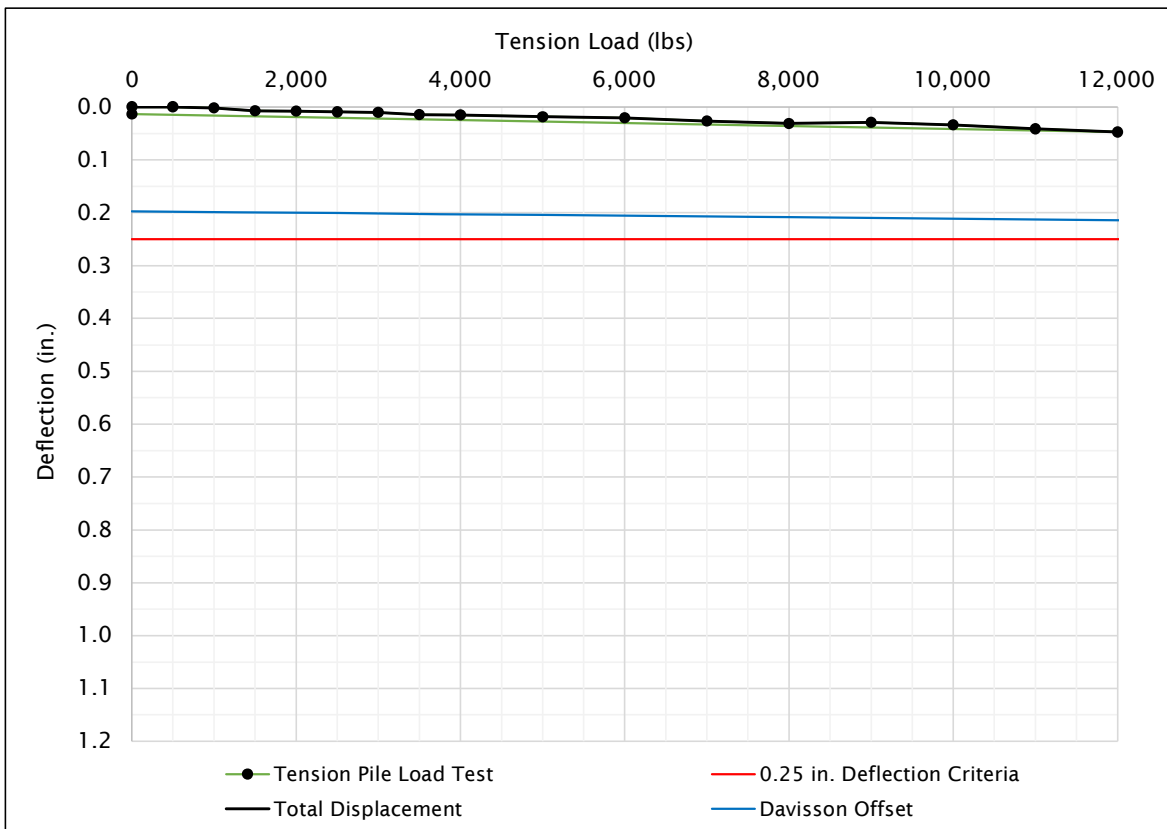


Figure No. 224



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PD-16 (4-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>5.0 feet</u>	GPS Coordinates: <u>37.62629°, -85.27311°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/16/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/16/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.001	0.004	0.003
6	2,500	0.007	0.008	0.008
7	3,000 (maximum)	0.030	0.031	0.031 (maximum)
8	2,700	0.291	0.290	0.291
9	0	0.280	0.280	0.280
10	2,100	1.021	1.025	1.023
11	0	0.987	0.991	0.989

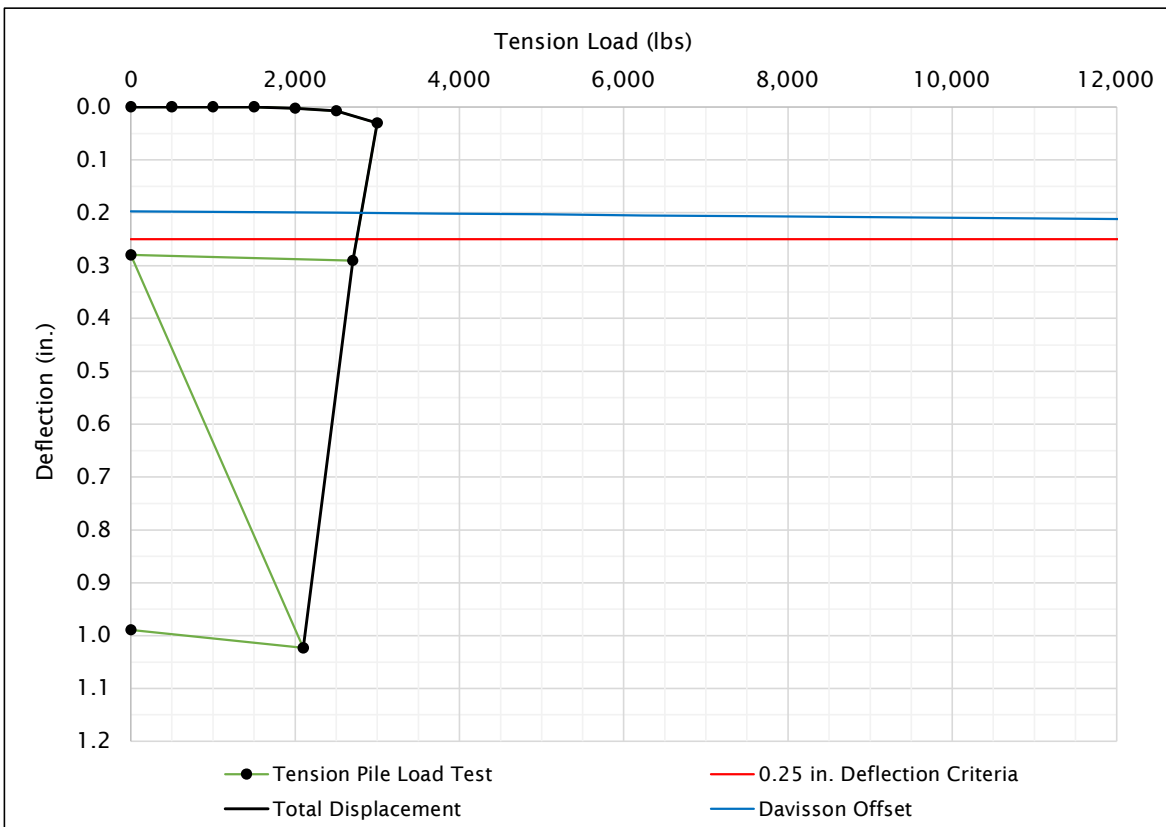


Figure No. 225



Axial Uplift (Tension) Pile Load Test

Test Location: PD-17 (4-in. Relief Hole) Project Name: Frontier Solar
Pile Size: Non-Galvanized W6x9 Project Number: 223429
Embedment Depth: 5.0 feet GPS Coordinates: 37.62369°, -85.27693°
Load Height: 3.0 feet Installation Date: 12/16/2023
Gauge Height: 0.5 feet Test Date: 12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.007	0.003	0.005
4	1,500	0.009	0.005	0.007
5	2,000	0.009	0.007	0.008
6	2,500	0.016	0.017	0.017
7	3,000	0.020	0.021	0.021
8	3,500	0.022	0.025	0.024
9	4,000	0.027	0.031	0.029
10	5,000	0.032	0.035	0.034
11	6,000	0.036	0.039	0.038
12	7,000	0.042	0.041	0.042
13	8,000	0.046	0.047	0.047
14	9,000	0.052	0.051	0.052
15	10,000	0.057	0.057	0.057
16	11,000	0.061	0.062	0.062
17	12,000 (maximum)	0.065	0.065	0.065 (maximum)
18	0	0.051	0.052	0.052

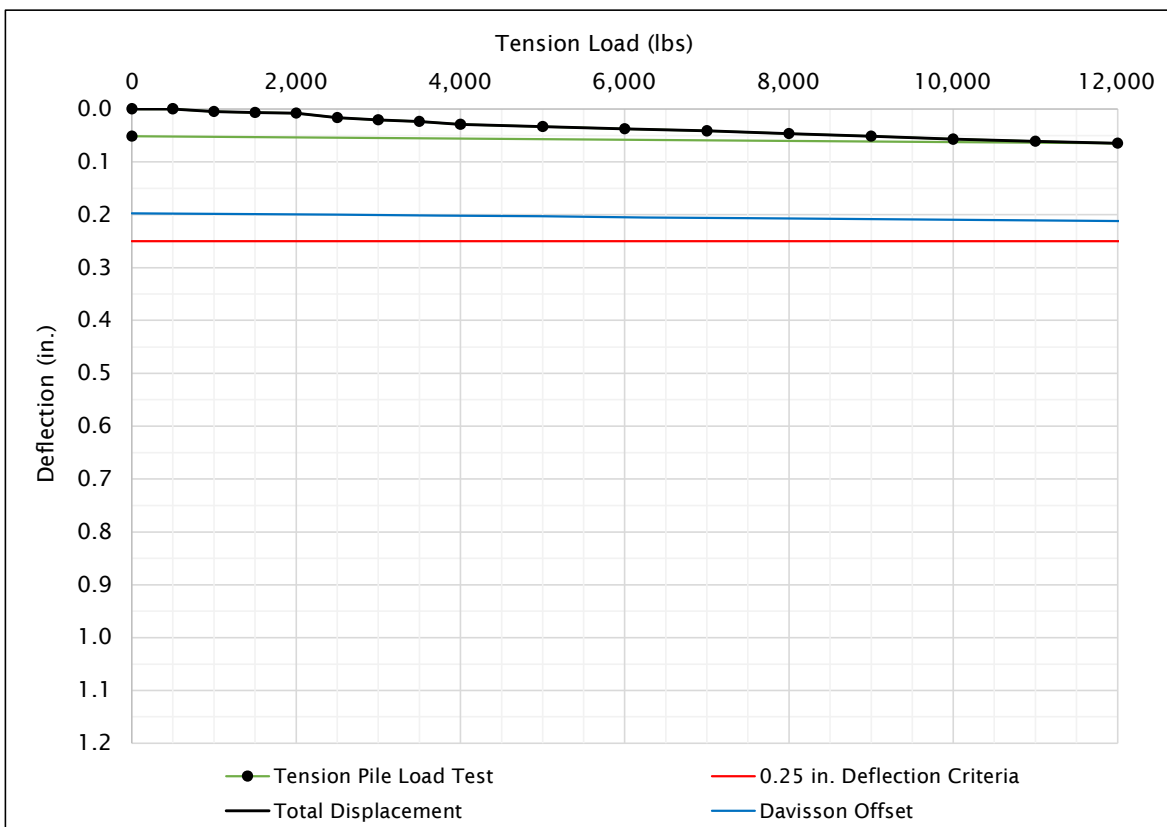


Figure No. 226



CONSULTING GROUP

Axial Uplift (Tension) Pile Load Test

Test Location:	PD-18 (4-in. Relief Hole)	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.5 feet	GPS Coordinates:	37.61847°, -85.27125°
Load Height:	3.0 feet	Installation Date:	12/16/2023
Gauge Height:	0.5 feet	Test Date:	12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.000	0.000	0.000
7	3,000	0.000	0.000	0.000
8	3,500	0.004	0.008	0.006
9	4,000	0.065	0.061	0.063
10	4,500	0.292	0.281	0.287
11	0	0.080	0.277	0.179
12	4,500	0.392	0.383	0.388
13	4,700 (maximum)	1.012	1.001	1.007 (maximum)
14	0	0.962	0.959	0.961

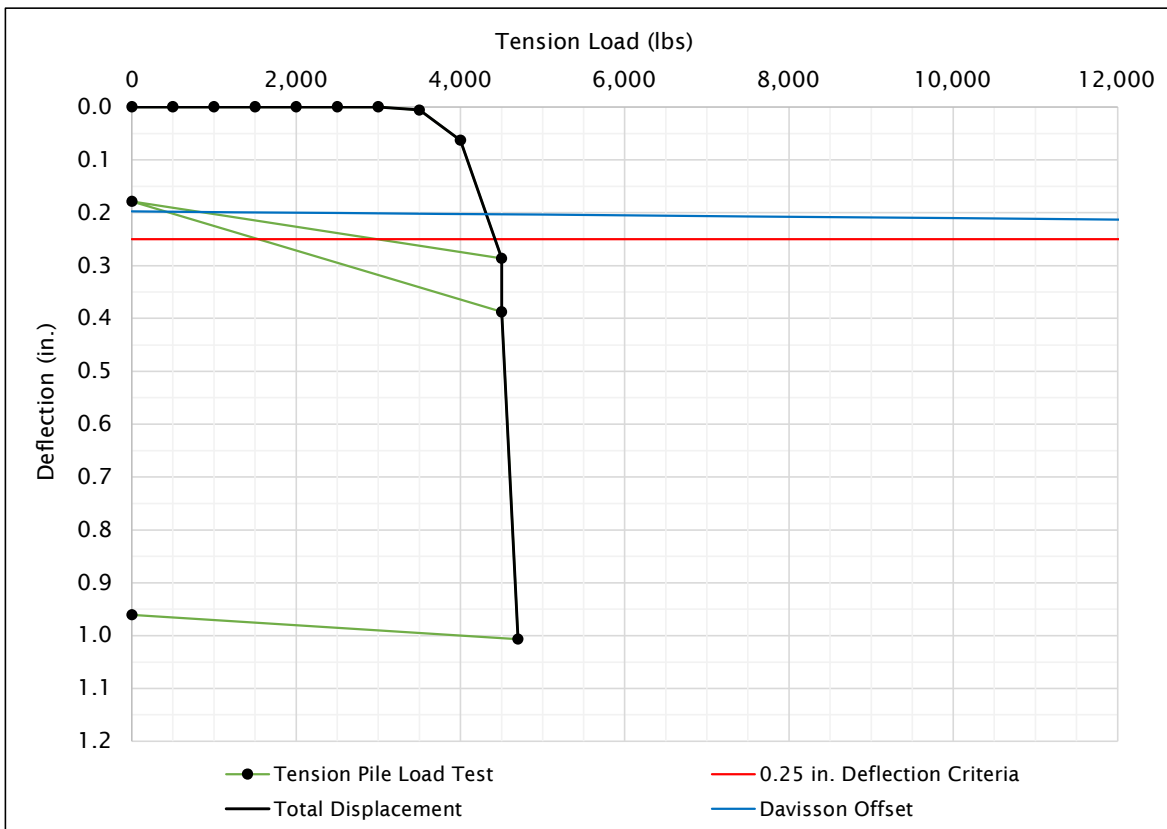


Figure No. 227



Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-01A	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.0 feet	GPS Coordinates:	37.65533°, -85.27485°
Load Height:	3.0 feet	Installation Date:	12/19/2023
Gauge Height:	0.5 feet	Test Date:	12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.006	0.006	0.006
6	2,500	0.008	0.008	0.008
7	3,000	0.010	0.011	0.011
8	3,500	0.017	0.017	0.017
9	4,000	0.040	0.040	0.040
10	5,000	0.172	0.175	0.174
11	5,400	0.289	0.292	0.291
12	0	0.275	0.279	0.277
13	5,500	0.388	0.393	0.391
14	5,600 (maximum)	1.092	1.088	1.090 (maximum)
15	0	1.019	1.022	1.021

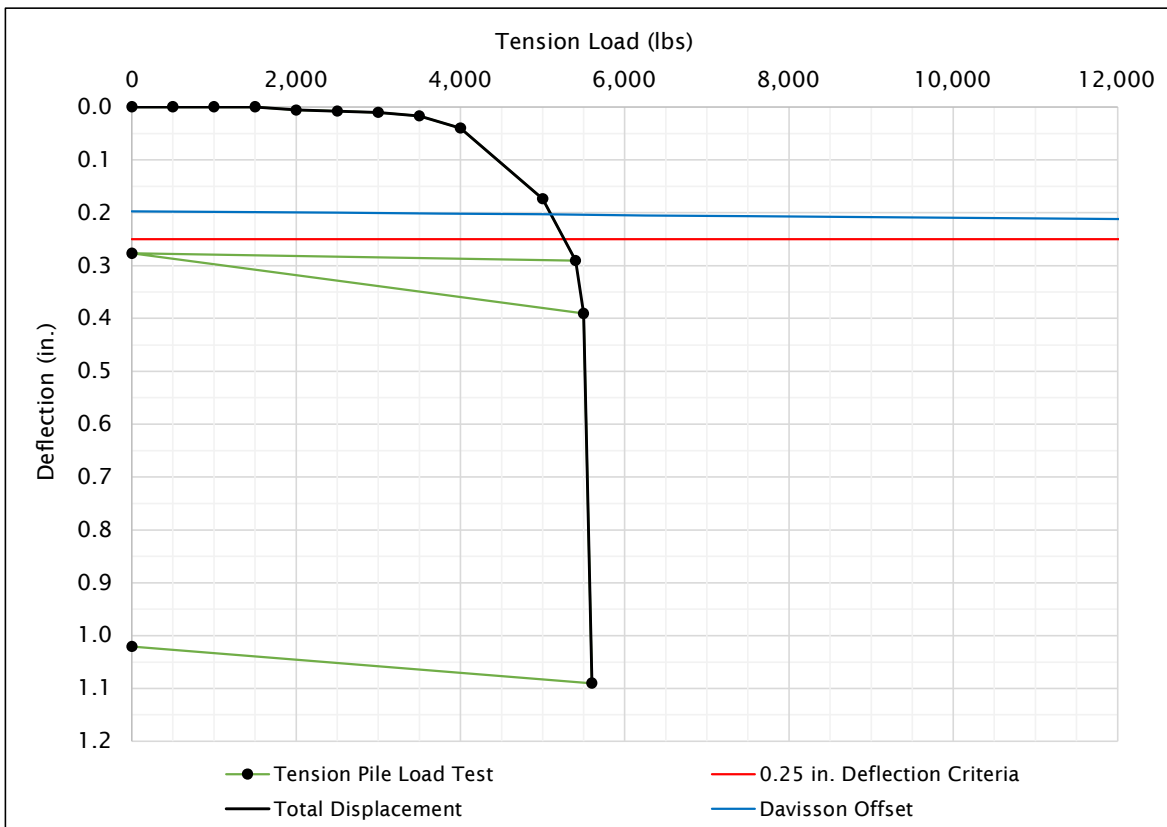


Figure No. 228



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PLT-01B</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.65533°, -85.27485°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/19/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/19/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.010	0.010	0.010
6	2,500	0.011	0.012	0.012
7	3,000	0.016	0.015	0.016
8	3,500	0.018	0.018	0.018
9	4,000	0.020	0.020	0.020
10	5,000	0.025	0.026	0.026
11	6,000	0.030	0.031	0.031
12	7,000	0.038	0.039	0.039
13	8,000	0.055	0.058	0.057
14	9,000	0.138	0.139	0.139
15	9,500	0.251	0.255	0.253
16	0	0.223	0.223	0.223
17	9,500	0.318	0.323	0.321
18	10,000	0.451	0.450	0.451
19	10,000 (maximum)	1.025	1.031	1.028 (maximum)
20	0	0.972	0.981	0.977

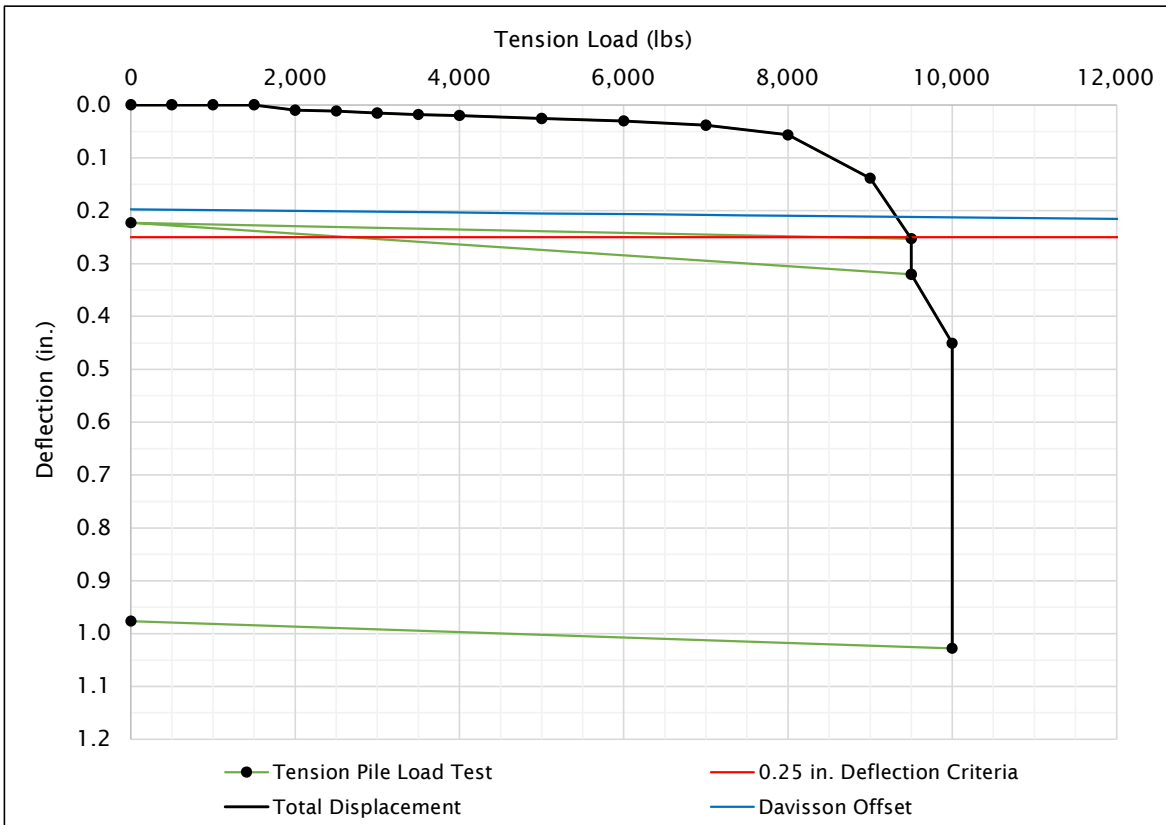


Figure No. 229

Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-02A	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.0 feet	GPS Coordinates:	37.64782°, -85.27938°
Load Height:	3.0 feet	Installation Date:	12/19/2023
Gauge Height:	0.5 feet	Test Date:	12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.007	0.007	0.007
7	3,000	0.035	0.033	0.034
8	3,500	0.061	0.062	0.062
9	4,000	0.121	0.122	0.122
10	5,000	0.321	0.331	0.326
11	0	0.301	0.307	0.304
12	5,000	0.450	0.452	0.451
13	5,400 (maximum)	1.032	1.039	1.036 (maximum)
14	0	1.009	1.007	1.008

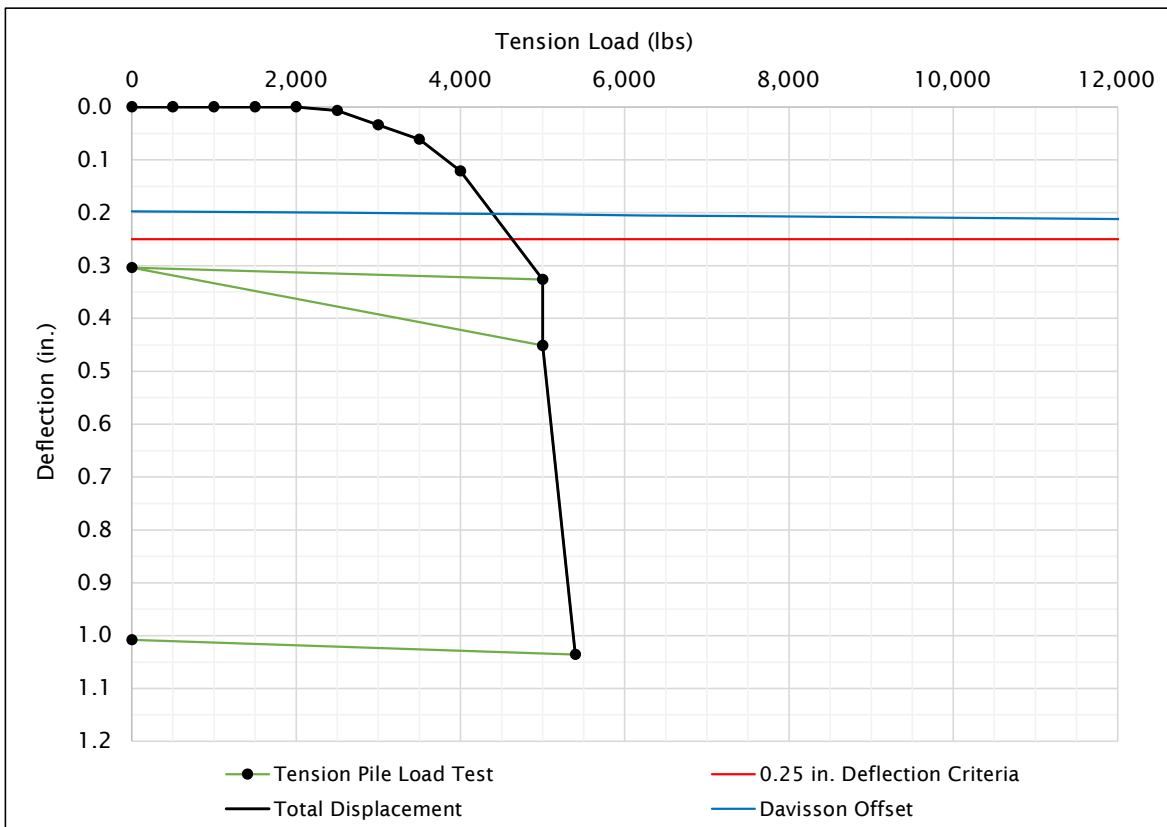


Figure No. 230



Axial Uplift (Tension) Pile Load Test

Test Location: <u>PLT-02B</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.64782°, -85.27938°</u>
Load Height: <u>3.0 feet</u>	Installation Date: <u>12/19/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/19/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.007	0.009	0.008
7	3,000	0.031	0.039	0.035
8	3,500	0.045	0.044	0.045
9	4,000	0.052	0.055	0.054
10	5,000	0.095	0.093	0.094
11	6,000	0.170	0.172	0.171
12	6,500	0.265	0.267	0.266
13	0	0.207	0.209	0.208
14	6,500	0.321	0.325	0.323
15	7,000	0.384	0.394	0.389
16	8,000	0.700	0.703	0.702
17	8,100 (maximum)	1.011	1.015	1.013 (maximum)
18	0	0.959	0.965	0.962

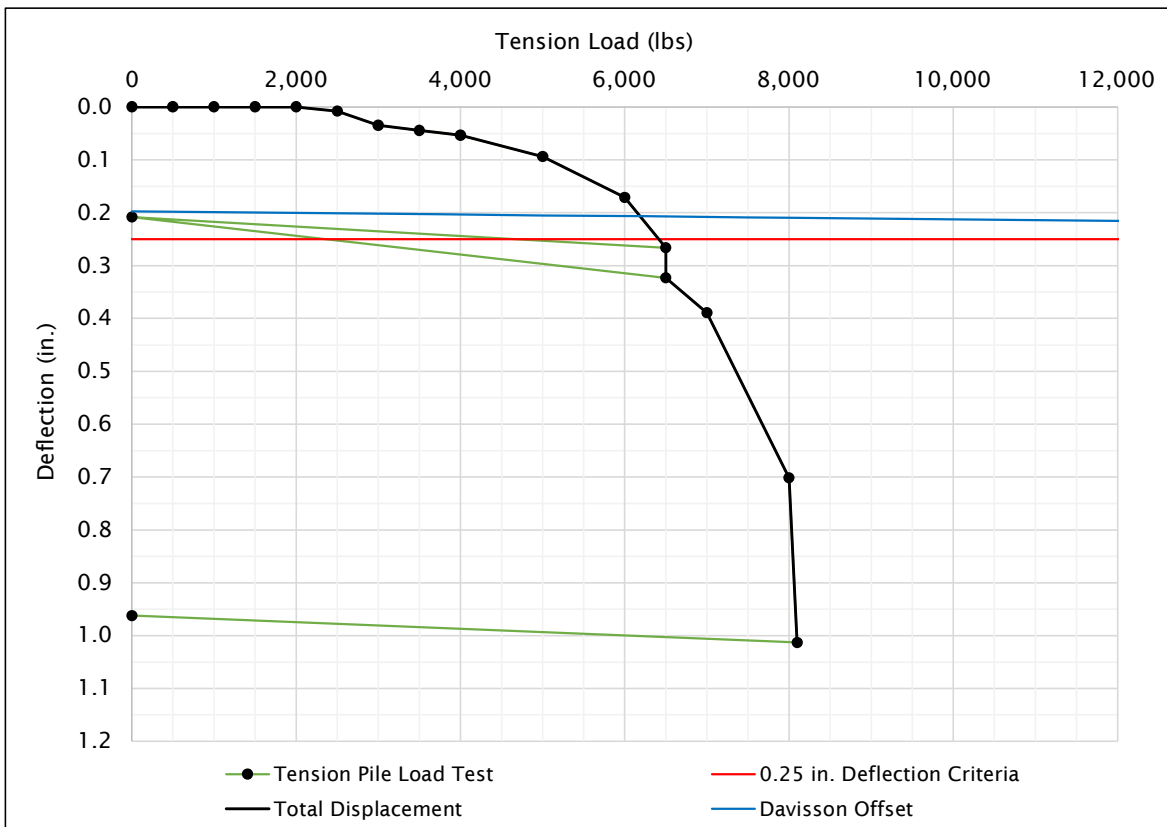


Figure No. 231



Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-03A	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.0 feet	GPS Coordinates:	37.63917°, -85.27029°
Load Height:	3.0 feet	Installation Date:	12/19/2023
Gauge Height:	0.5 feet	Test Date:	12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.003	0.003	0.003
7	3,000	0.006	0.006	0.006
8	3,500	0.009	0.010	0.010
9	4,000	0.010	0.011	0.011
10	5,000	0.081	0.070	0.076
11	6,000	0.211	0.207	0.209
12	6,200	0.301	0.300	0.301
13	0	0.266	0.260	0.263
14	6,200	0.361	0.356	0.359
15	6,700 (maximum)	1.029	1.025	1.027 (maximum)
16	0	1.001	1.003	1.002

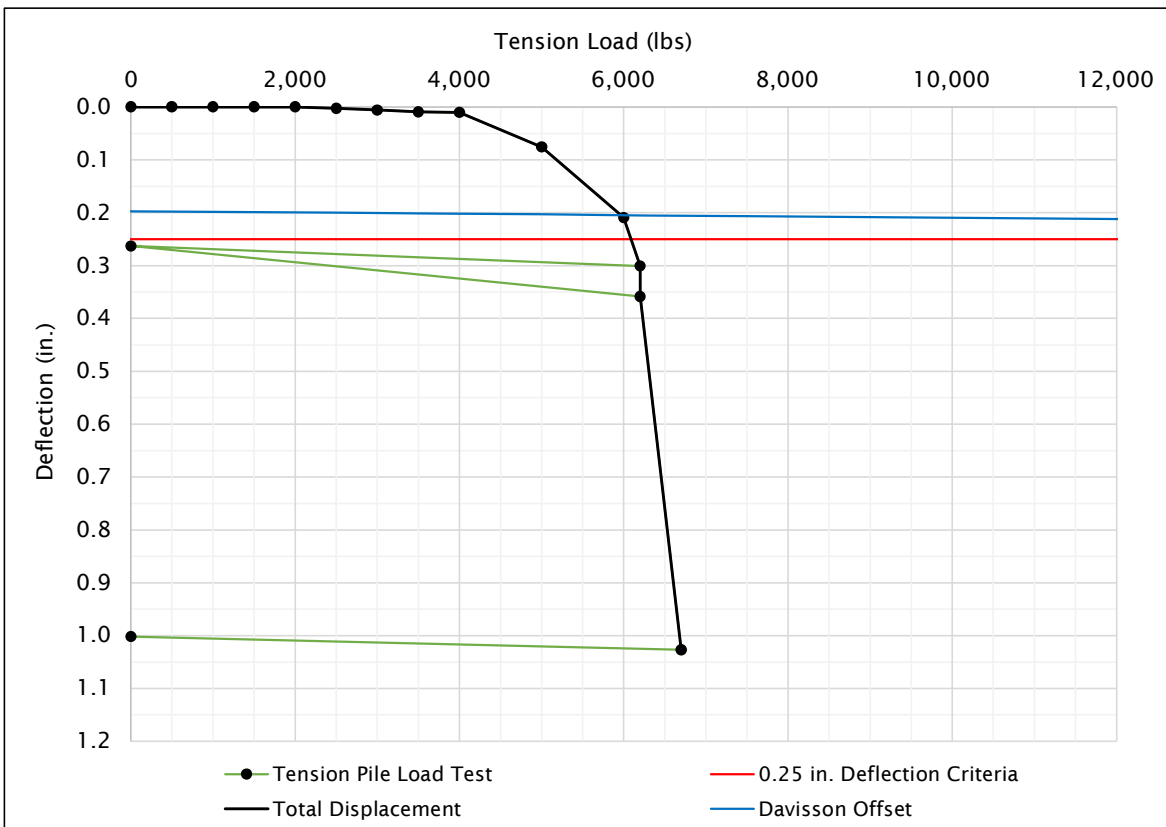


Figure No. 232



Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-03B	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	7.0 feet	GPS Coordinates:	37.63917, -85.27029
Load Height:	3.0 feet	Installation Date:	12/19/2023
Gauge Height:	0.5 feet	Test Date:	12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.000	0.000	0.000
6	2,500	0.001	0.001	0.001
7	3,000	0.002	0.003	0.003
8	3,500	0.005	0.005	0.005
9	4,000	0.010	0.010	0.010
10	5,000	0.021	0.022	0.022
11	6,000	0.034	0.035	0.035
12	7,000	0.081	0.080	0.081
13	8,000	0.295	0.291	0.293
14	0	0.290	0.288	0.289
15	7,800 (maximum)	1.045	1.042	1.044 (maximum)
16	0	1.038	1.033	1.036

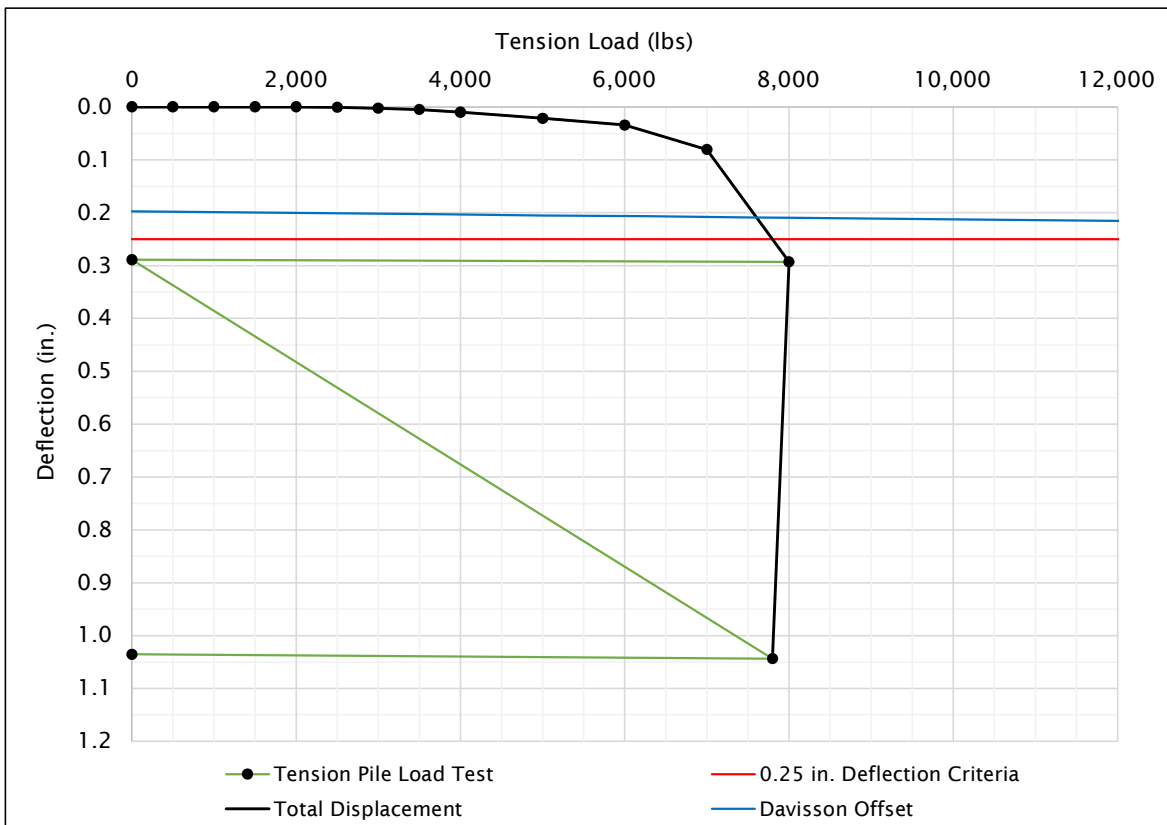


Figure No. 233



Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-04A	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	5.0 feet	GPS Coordinates:	37.62208°, -85.26932°
Load Height:	3.0 feet	Installation Date:	12/16/2023
Gauge Height:	0.5 feet	Test Date:	12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.004	0.006	0.005
5	2,000	0.021	0.027	0.024
6	2,500	0.026	0.043	0.035
7	3,000	0.046	0.055	0.051
8	3,500	0.060	0.061	0.061
9	4,000	0.062	0.070	0.066
10	5,000	0.069	0.079	0.074
11	6,000	0.081	0.085	0.083
12	7,000	0.092	0.099	0.096
13	8,000	0.100	0.102	0.101
14	8,300 (maximum)	0.292	0.281	0.287 (maximum)
15	0	0.281	0.275	0.278
16	8,000	1.009	1.025	1.017
17	0	0.997	0.982	0.990

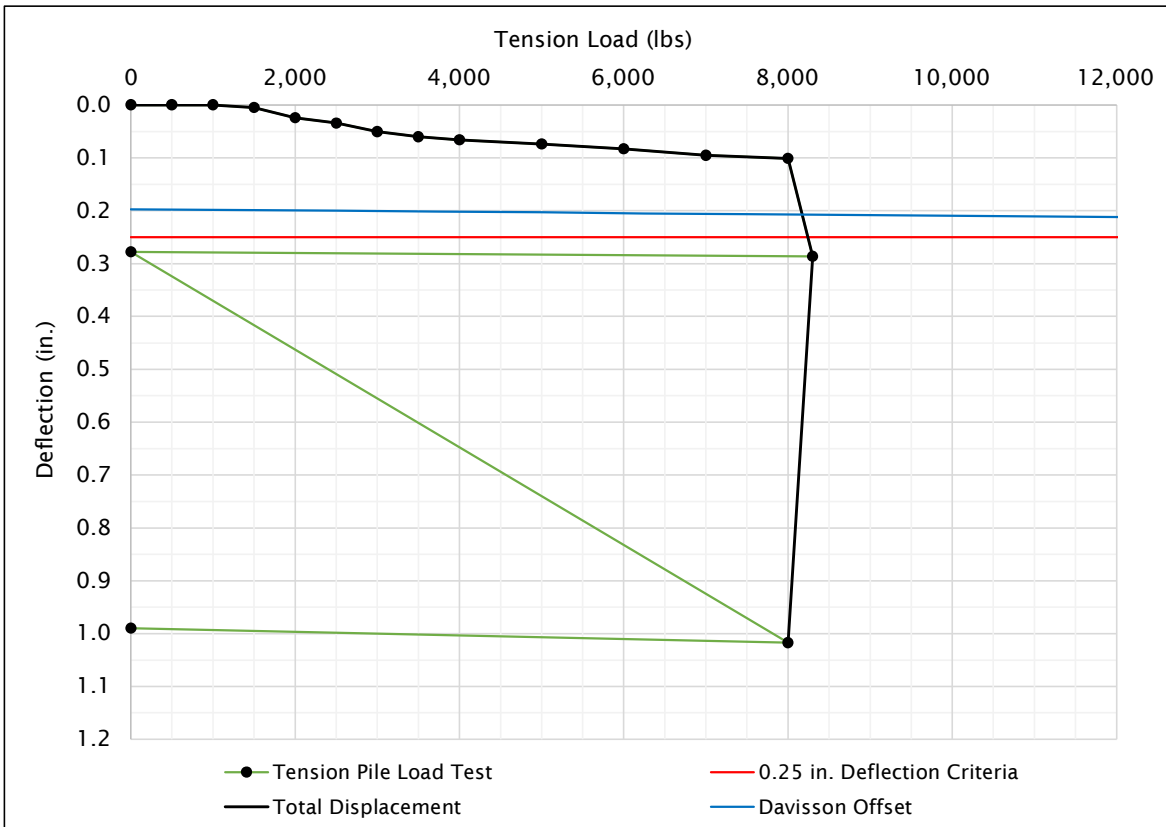


Figure No. 234



Axial Uplift (Tension) Pile Load Test

Test Location:	PLT-04B	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	7.0 feet	GPS Coordinates:	37.62208, -85.26932
Load Height:	3.0 feet	Installation Date:	12/16/2023
Gauge Height:	0.5 feet	Test Date:	12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.000	0.000	0.000
3	1,000	0.000	0.000	0.000
4	1,500	0.000	0.000	0.000
5	2,000	0.001	0.001	0.001
6	2,500	0.003	0.003	0.003
7	3,000	0.004	0.004	0.004
8	3,500	0.007	0.007	0.007
9	4,000	0.012	0.012	0.012
10	5,000	0.016	0.016	0.016
11	6,000	0.024	0.025	0.025
12	7,000	0.029	0.029	0.029
13	8,000	0.031	0.033	0.032
14	9,000	0.033	0.035	0.034
15	10,000	0.041	0.041	0.041
16	11,000	0.048	0.047	0.048
17	12,000 (maximum)	0.052	0.055	0.054 (maximum)
18	0	0.047	0.046	0.047

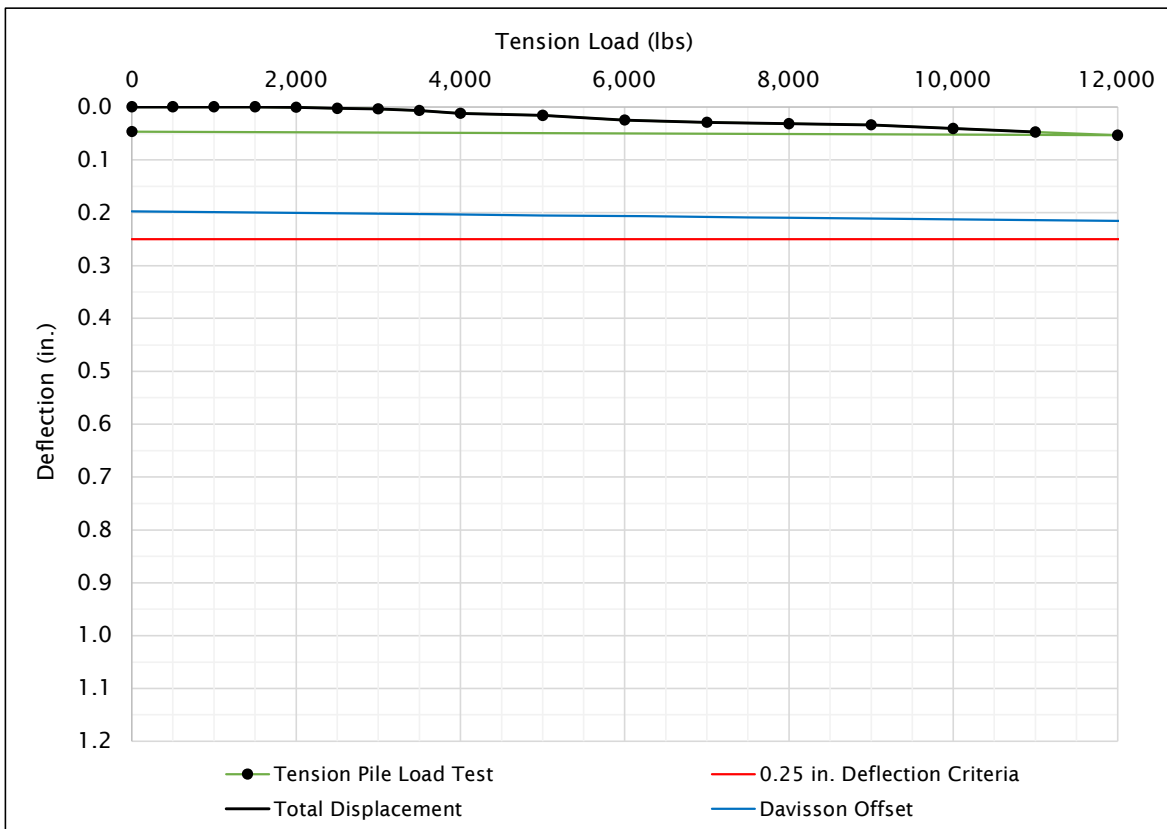


Figure No. 235



Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Lateral Pile Load Test Data



Lateral Pile Load Test

Test Location:	<u>PD-01 (4-in. Relief Hole)</u>	Project Name:	<u>Frontier Solar</u>
Pile Size:	<u>Non-Galvanized W6x9</u>	Project Number:	<u>223429</u>
Embedment Depth:	<u>5.5 feet</u>	GPS Coordinates:	<u>37.62693°, -85.27826°</u>
Load Height:	<u>2.5 feet</u>	Installation Date:	<u>12/16/2023</u>
Gauge Height:	<u>0.5 feet</u>	Test Date:	<u>12/16/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.068	0.072	0.070
3	1,000	0.114	0.153	0.134
4	1,500	0.179	0.250	0.215
5	0	0.048	0.051	0.050
6	1,500	0.200	0.264	0.232
7	2,000	0.295	0.410	0.353
8	2,500	0.467	0.561	0.514
9	0	0.063	0.107	0.085
10	2,500	0.477	0.551	0.514
11	3,000	0.648	0.728	0.688
12	3,700 (maximum)	0.973	1.082	1.028 (maximum)
13	0	0.301	0.412	0.357

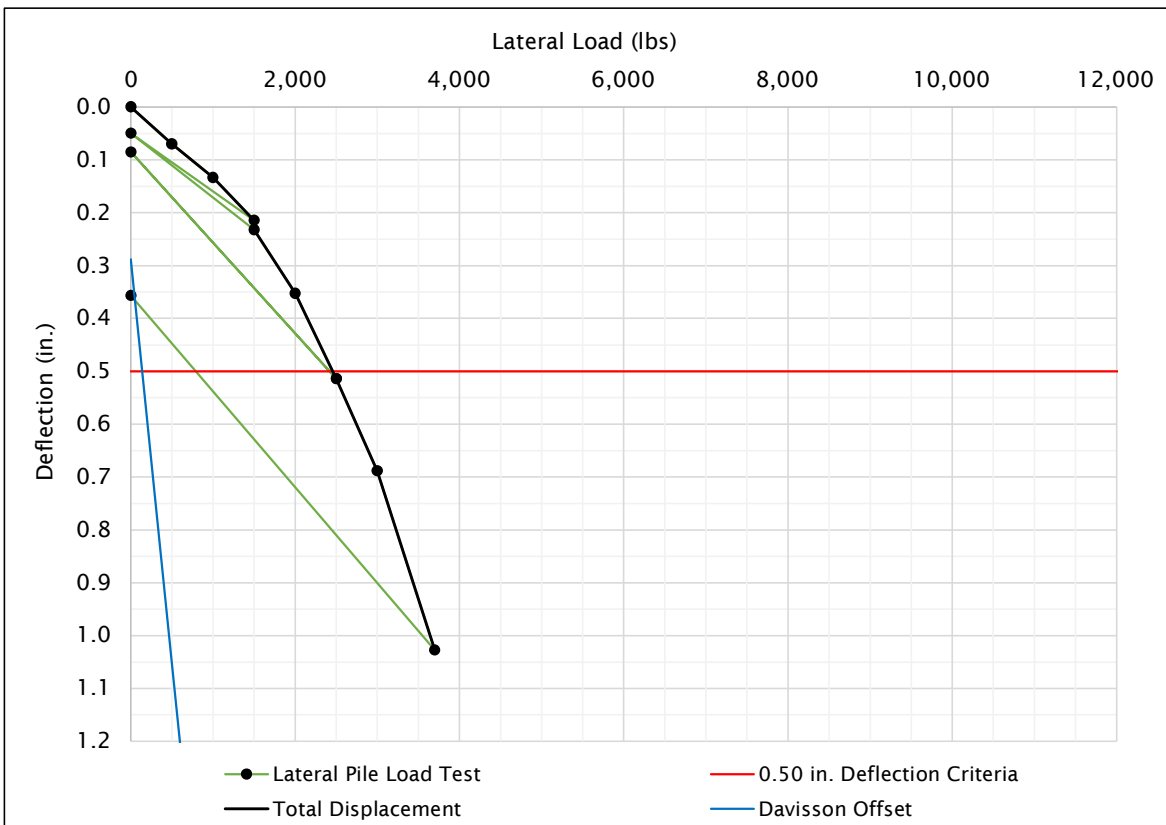


Figure No. 236



Lateral Pile Load Test

Test Location: <u>PD-02 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>6.0 feet</u>	GPS Coordinates: <u>37.65219°, -85.25635°</u>
Load Height: <u>2.5 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.019	0.094	0.057
3	1,000	0.054	0.188	0.121
4	1,500	0.152	0.190	0.171
5	0	0.033	0.058	0.046
6	1,500	0.233	0.263	0.248
7	2,000	0.291	0.349	0.320
8	2,500	0.400	0.542	0.471
9	2,800	0.501	0.669	0.585
10	0	0.092	0.143	0.118
11	3,000	0.642	0.742	0.692
12	4,000 (maximum)	0.983	1.109	1.046 (maximum)
13	0	0.292	0.411	0.352

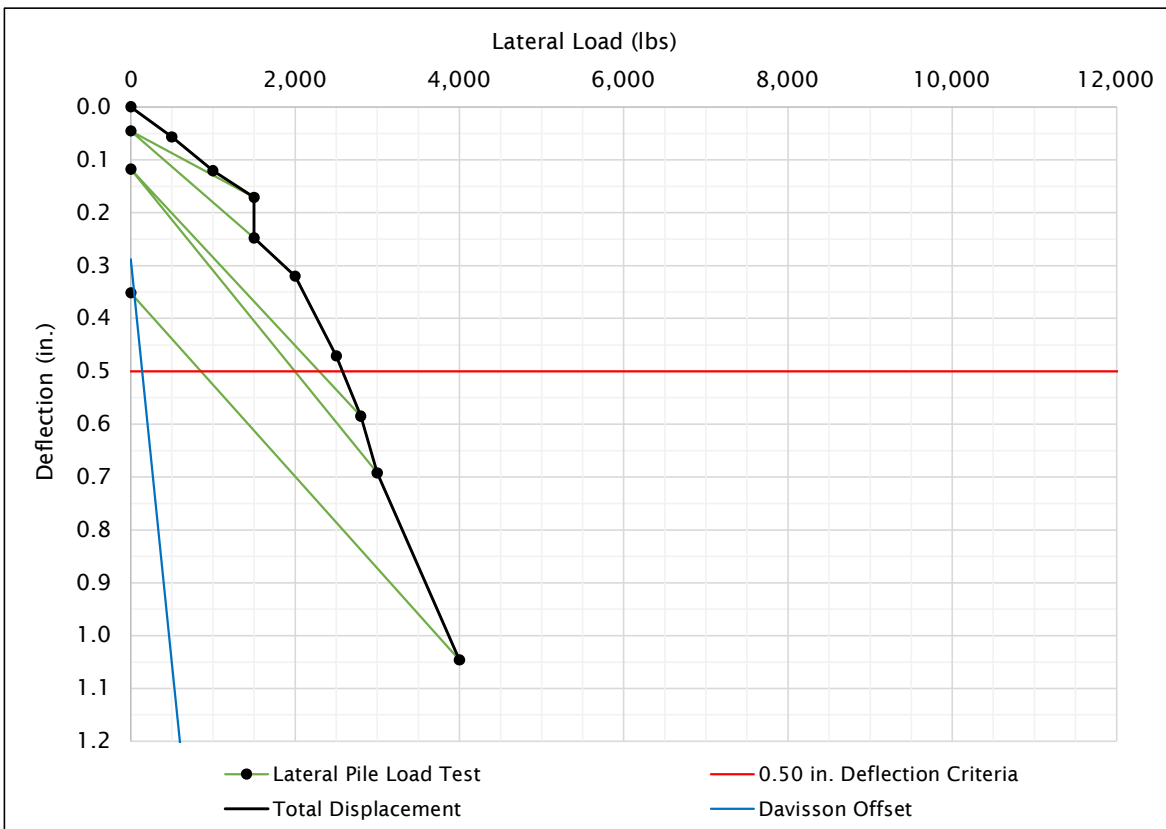


Figure No. 237



Lateral Pile Load Test

Test Location:	<u>PD-03 (6-in. Relief Hole)</u>	Project Name:	<u>Frontier Solar</u>
Pile Size:	<u>Non-Galvanized W6x9</u>	Project Number:	<u>223429</u>
Embedment Depth:	<u>7.0 feet</u>	GPS Coordinates:	<u>37.65641°, -85.26495°</u>
Load Height:	<u>2.5 feet</u>	Installation Date:	<u>12/20/2023</u>
Gauge Height:	<u>0.5 feet</u>	Test Date:	<u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.137	0.201	0.169
3	1,000	0.241	0.323	0.282
4	1,500	0.452	0.591	0.522
5	0	0.192	0.203	0.198
6	1,500	0.592	0.641	0.617
7	2,000	0.763	0.792	0.778
8	3,000 (maximum)	1.012	1.072	1.042 (maximum)
9	0	0.461	0.420	0.441

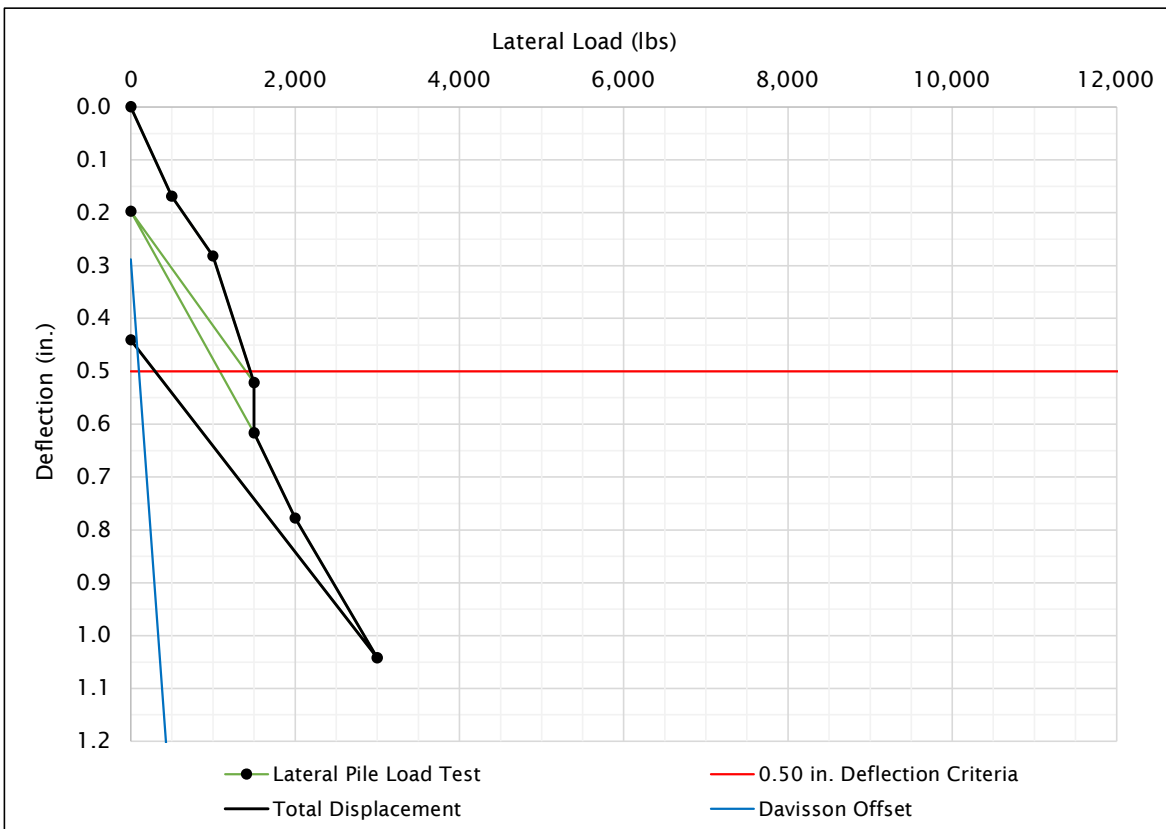


Figure No. 238



CONSULTING GROUP

Lateral Pile Load Test

Test Location: PD-04 (6-in. Relief Hole)
Pile Size: Non-Galvanized W6x9
Embedment Depth: 7.0 feet
Load Height: 2.5 feet
Gauge Height: 0.5 feet

Project Name: Frontier Solar
Project Number: 223429
GPS Coordinates: 37.63909°, -85.27471°
Installation Date: 12/19/2023
Test Date: 12/19/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.078	0.018	0.048
3	1,000	0.170	0.059	0.115
4	1,500	0.269	0.085	0.177
5	0	0.066	0.029	0.048
6	1,500	0.260	0.230	0.245
7	2,000	0.352	0.281	0.317
8	2,500	0.550	0.451	0.501
9	0	0.121	0.101	0.111
10	2,500	0.591	0.488	0.540
11	3,000	0.721	0.600	0.661
12	4,000 (maximum)	1.080	0.951	1.016 (maximum)
13	0	0.303	0.251	0.277

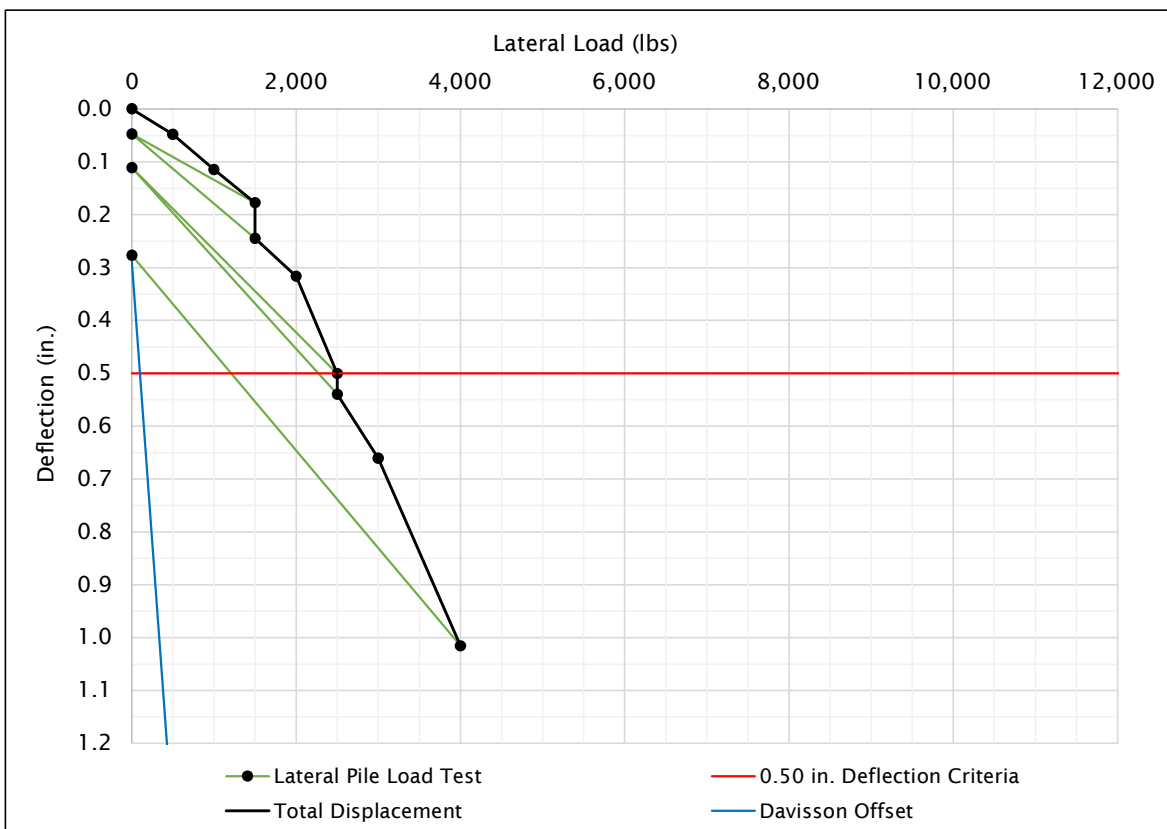


Figure No. 239



Lateral Pile Load Test

Test Location:	<u>PD-05 (6-in. Relief Hole)</u>	Project Name:	<u>Frontier Solar</u>
Pile Size:	<u>Non-Galvanized W6x9</u>	Project Number:	<u>223429</u>
Embedment Depth:	<u>6.0 feet</u>	GPS Coordinates:	<u>37.65601°, -85.25869°</u>
Load Height:	<u>2.5 feet</u>	Installation Date:	<u>12/20/2023</u>
Gauge Height:	<u>0.5 feet</u>	Test Date:	<u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.072	0.061	0.067
3	1,000	0.164	0.122	0.143
4	1,500	0.231	0.179	0.205
5	0	0.032	0.023	0.028
6	1,500	0.262	0.199	0.231
7	2,000	0.340	0.267	0.304
8	2,500	0.431	0.350	0.391
9	3,000	0.542	0.462	0.502
10	0	0.141	0.101	0.121
11	3,000	0.600	0.501	0.551
12	4,000	0.852	0.778	0.815
13	4,500 (maximum)	1.121	1.037	1.079 (maximum)
14	0	0.271	0.272	0.272

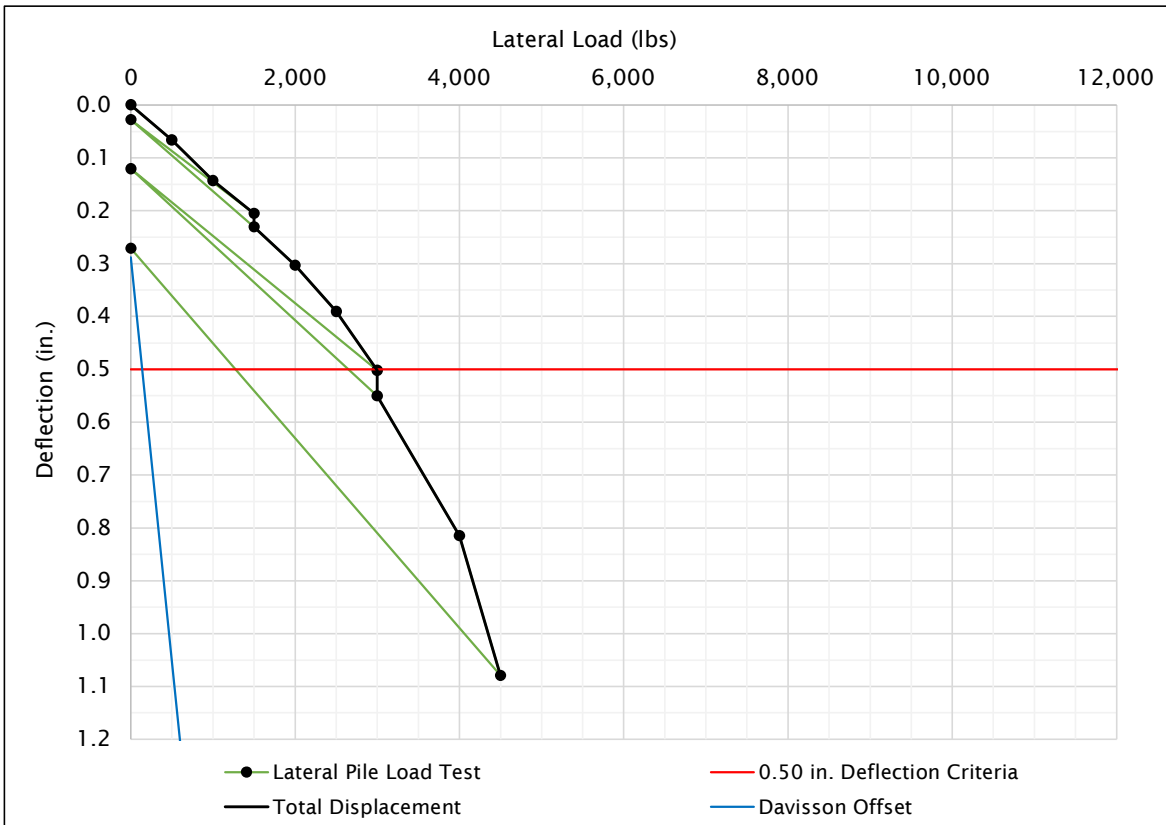


Figure No. 240



Lateral Pile Load Test

Test Location: <u>PD-06 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.65394°, -85.26513°</u>
Load Height: <u>2.5 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.069	0.092	0.081
3	1,000	0.140	0.206	0.173
4	1,500	0.193	0.291	0.242
5	0	0.040	0.047	0.044
6	1,500	0.255	0.348	0.302
7	2,000	0.345	0.492	0.419
8	2,500	0.550	0.571	0.561
9	0	0.081	0.131	0.106
10	2,500	0.598	0.631	0.615
11	3,000	0.700	0.739	0.720
12	4,000 (maximum)	0.997	1.042	1.020 (maximum)
13	0	0.151	0.232	0.192

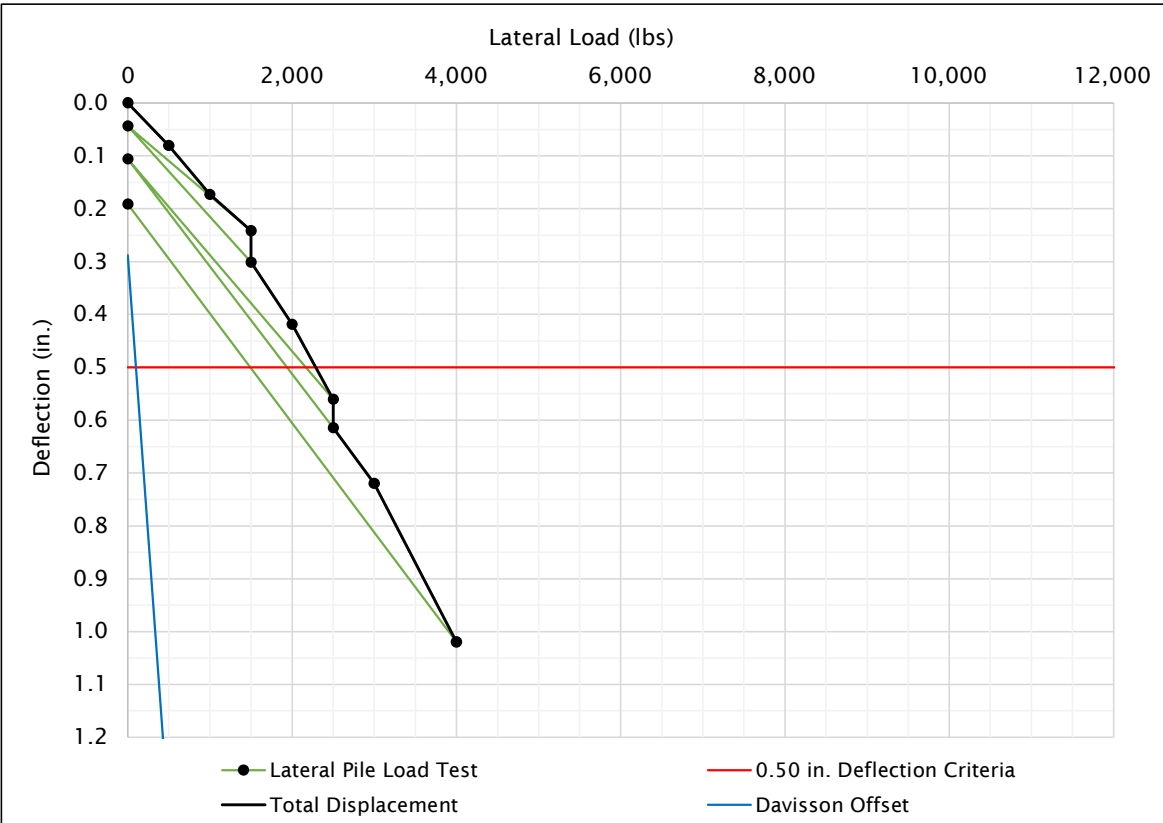


Figure No. 241

Lateral Pile Load Test

Test Location: <u>PD-07 (6-in. Relief Hole)</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>6.0 feet</u>	GPS Coordinates: <u>37.65041°, -85.27135°</u>
Load Height: <u>2.5 feet</u>	Installation Date: <u>12/20/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/20/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.080	0.051	0.066
3	1,000	0.185	0.115	0.150
4	1,500	0.300	0.212	0.256
5	0	0.071	0.039	0.055
6	1,500	0.290	0.269	0.280
7	2,000	0.371	0.335	0.353
8	2,500	0.486	0.450	0.468
9	2,800	0.590	0.554	0.572
10	0	0.241	0.201	0.221
11	3,000	0.681	0.680	0.681
12	4,000 (maximum)	1.053	1.069	1.061 (maximum)
13	0	0.424	0.480	0.452

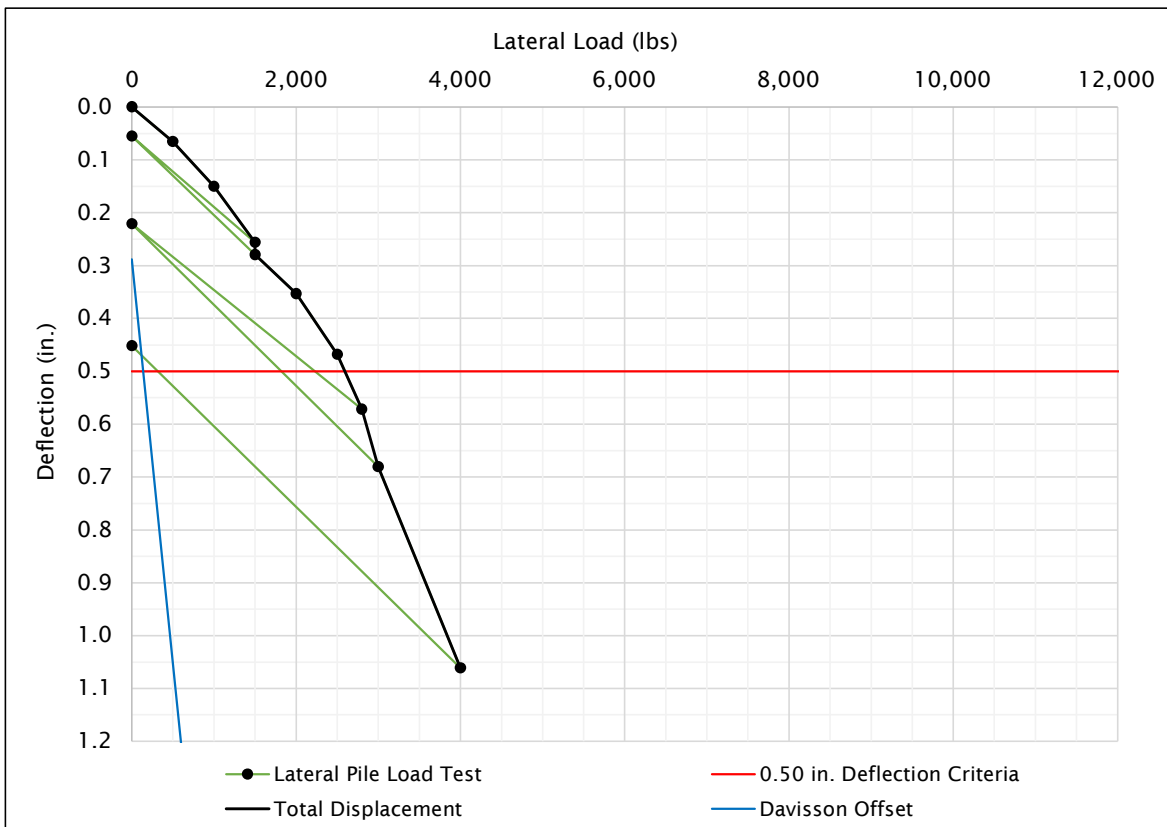


Figure No. 242



Lateral Pile Load Test

Test Location: <u>PLT-03B</u>	Project Name: <u>Frontier Solar</u>
Pile Size: <u>Non-Galvanized W6x9</u>	Project Number: <u>223429</u>
Embedment Depth: <u>7.0 feet</u>	GPS Coordinates: <u>37.63917°, -85.27029°</u>
Load Height: <u>2.5 feet</u>	Installation Date: <u>12/19/2023</u>
Gauge Height: <u>0.5 feet</u>	Test Date: <u>12/19/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.100	0.020	0.060
3	1,000	0.202	0.089	0.146
4	1,500	0.280	0.133	0.207
5	0	0.047	0.020	0.034
6	1,500	0.207	0.259	0.233
7	2,000	0.259	0.301	0.280
8	2,500	0.351	0.371	0.361
9	3,000	0.431	0.459	0.445
10	0	0.051	0.034	0.043
11	3,000	0.440	0.489	0.465
12	3,500	0.532	0.531	0.532
13	0	0.061	0.060	0.061
14	3,500	0.578	0.568	0.573
15	4,000	0.664	0.651	0.658
16	5,000	0.880	0.812	0.846
17	5,500 (maximum)	1.042	0.973	1.008 (maximum)
18	0	0.112	0.089	0.101

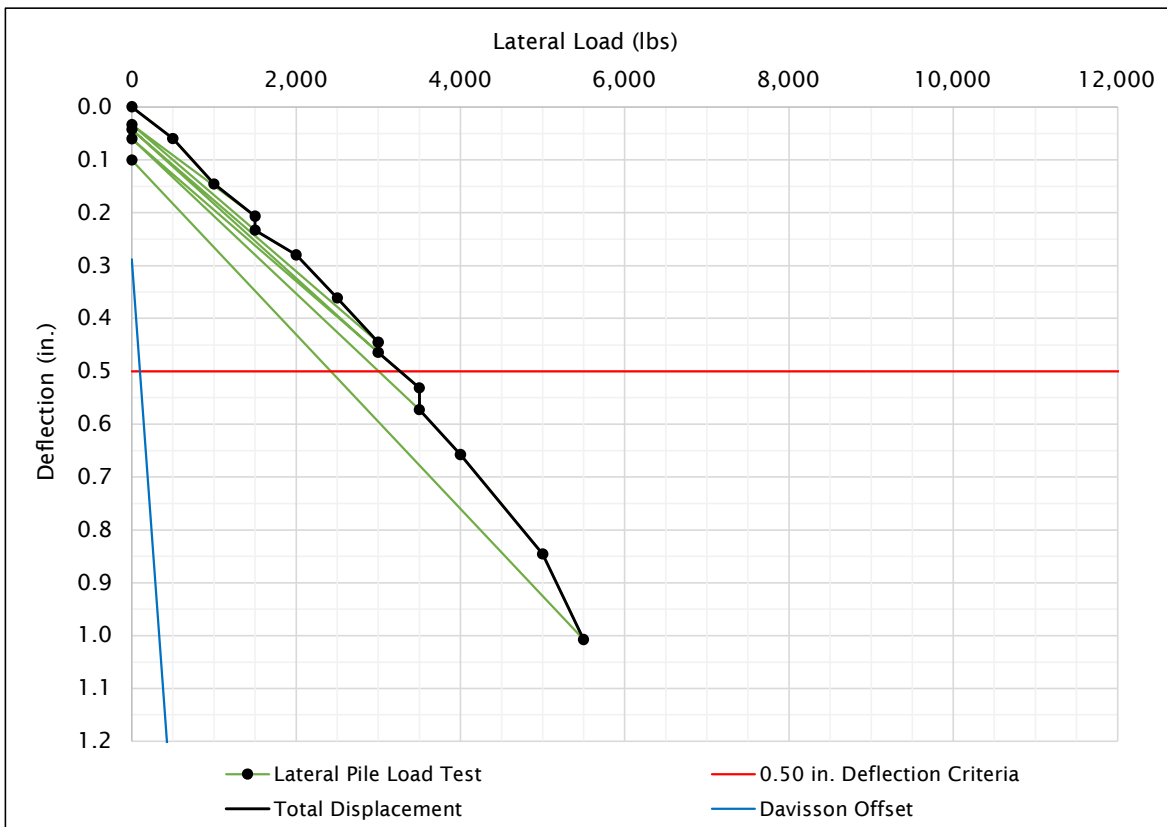


Figure No. 259



Lateral Pile Load Test

Test Location:	<u>PLT-04A</u>	Project Name:	<u>Frontier Solar</u>
Pile Size:	<u>Non-Galvanized W6x9</u>	Project Number:	<u>223429</u>
Embedment Depth:	<u>5.0 feet</u>	GPS Coordinates:	<u>37.62208°, -85.26932°</u>
Load Height:	<u>2.5 feet</u>	Installation Date:	<u>12/16/2023</u>
Gauge Height:	<u>0.5 feet</u>	Test Date:	<u>12/16/2023</u>

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.055	0.010	0.033
3	1,000	0.131	0.053	0.092
4	1,500	0.207	0.101	0.154
5	0	0.032	0.019	0.026
6	1,500	0.187	0.133	0.160
7	2,000	0.223	0.166	0.195
8	2,500	0.322	0.243	0.283
9	3,000	0.427	0.351	0.389
10	0	0.121	0.092	0.107
11	3,000	0.466	0.370	0.418
12	3,500	0.561	0.483	0.522
13	0	0.170	0.121	0.146
14	3,500	0.630	0.529	0.580
15	4,000	0.830	0.721	0.776
16	4,500 (maximum)	1.072	0.959	1.016 (maximum)
17	0	0.472	0.391	0.432

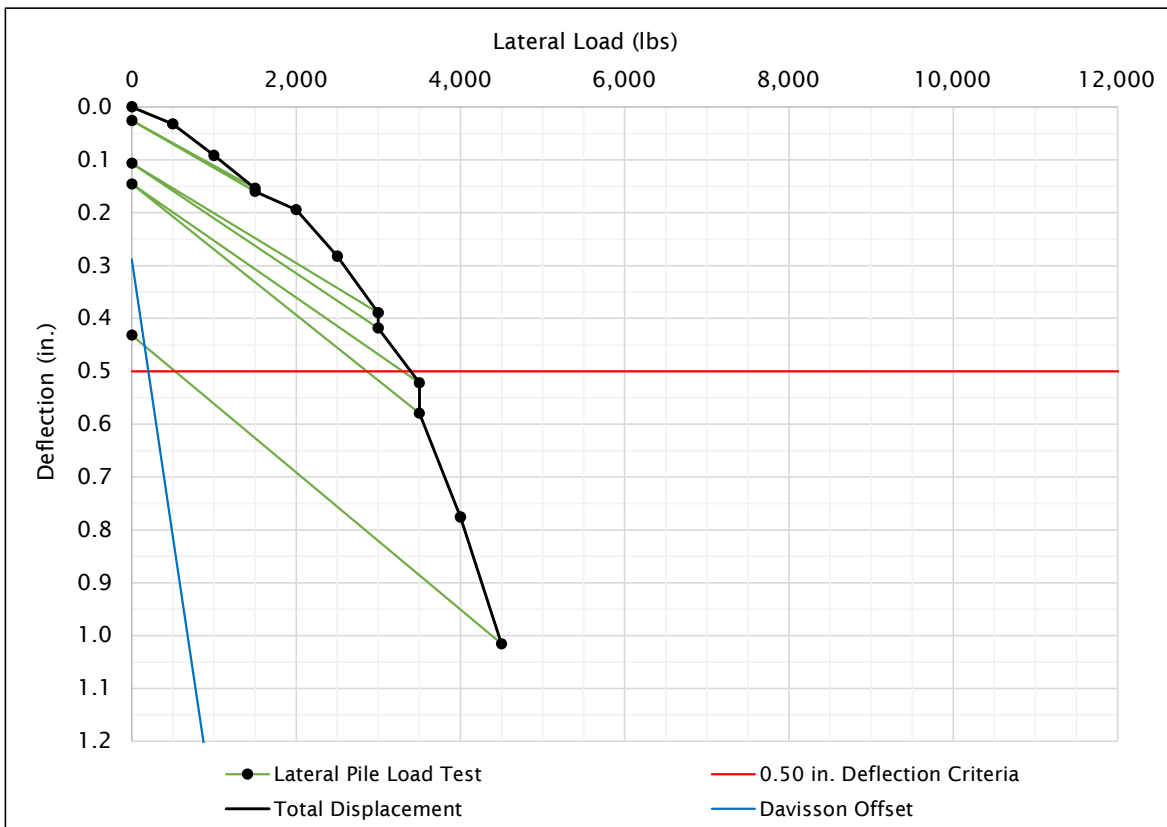


Figure No. 260



Lateral Pile Load Test

Test Location:	PLT-04B	Project Name:	Frontier Solar
Pile Size:	Non-Galvanized W6x9	Project Number:	223429
Embedment Depth:	7.0 feet	GPS Coordinates:	37.62208°, -85.26932°
Load Height:	2.5 feet	Installation Date:	12/16/2023
Gauge Height:	0.5 feet	Test Date:	12/16/2023

Step	Applied Load (lbs)	Deflection (in.)		Average Deflection (in.)
		Gauge #1	Gauge #2	
1	0	0.000	0.000	0.000
2	500	0.052	0.013	0.033
3	1,000	0.121	0.031	0.076
4	1,500	0.163	0.052	0.108
5	0	0.009	0.004	0.007
6	1,500	0.149	0.085	0.117
7	2,000	0.172	0.092	0.132
8	2,500	0.212	0.121	0.167
9	3,000	0.282	0.163	0.223
10	0	0.011	0.015	0.013
11	3,000	0.280	0.191	0.236
12	3,500	0.334	0.209	0.272
13	4,000	0.405	0.267	0.336
14	4,500	0.459	0.332	0.396
15	0	0.017	0.018	0.018
16	4,500	0.489	0.352	0.421
17	5,000	0.553	0.402	0.478
18	5,700	0.681	0.543	0.612
19	0	0.05	0.033	0.042
20	5,700	0.685	0.561	0.623
21	6,000	0.712	0.601	0.657
22	7,000	0.971	0.812	0.892
23	7,200 (maximum)	1.121	0.981	1.051 (maximum)
24	0	0.280	0.193	0.237

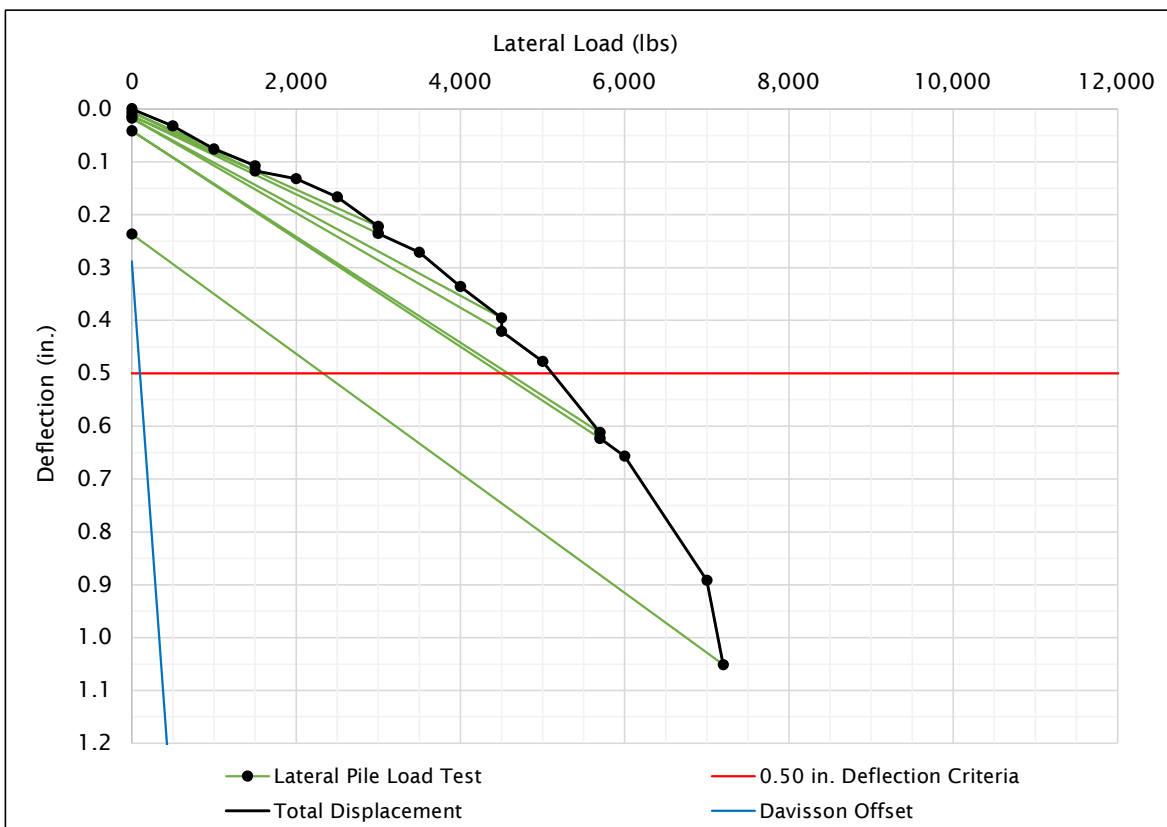


Figure No. 261



Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

APPENDIX D

LPILE Analyses

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 1
Lateral Load Height of 6 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

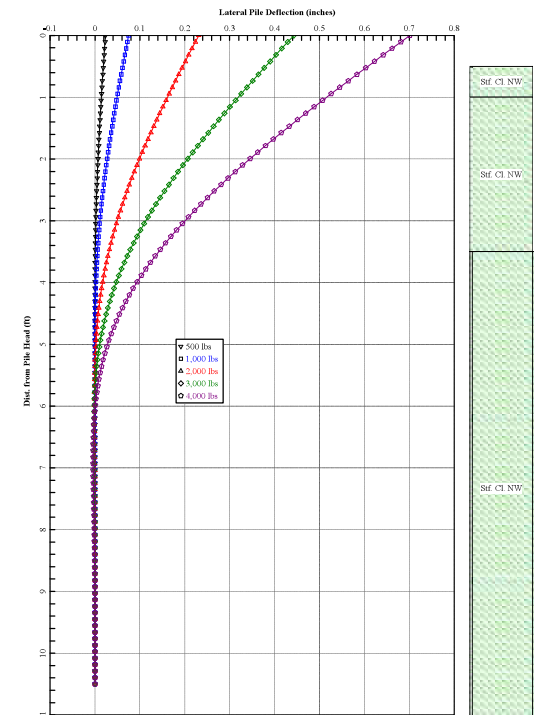
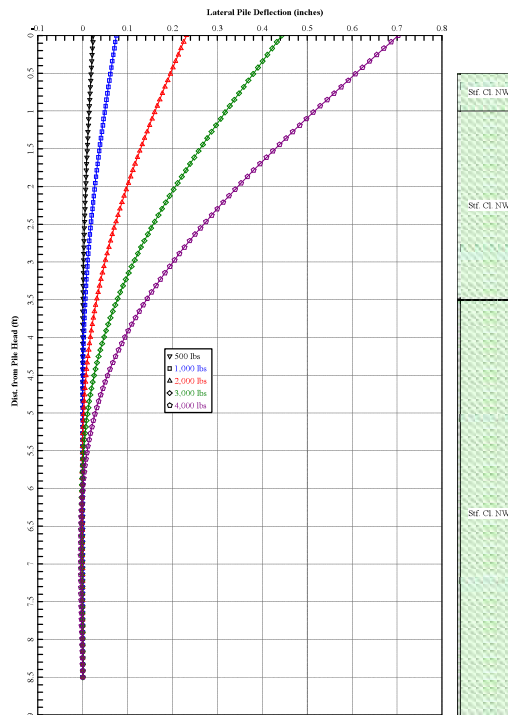
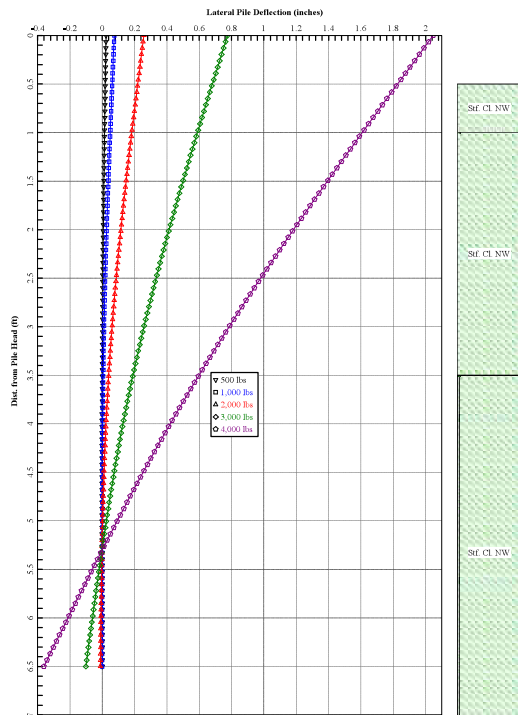


Figure No. 262

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 1
Lateral Load Height of 48 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

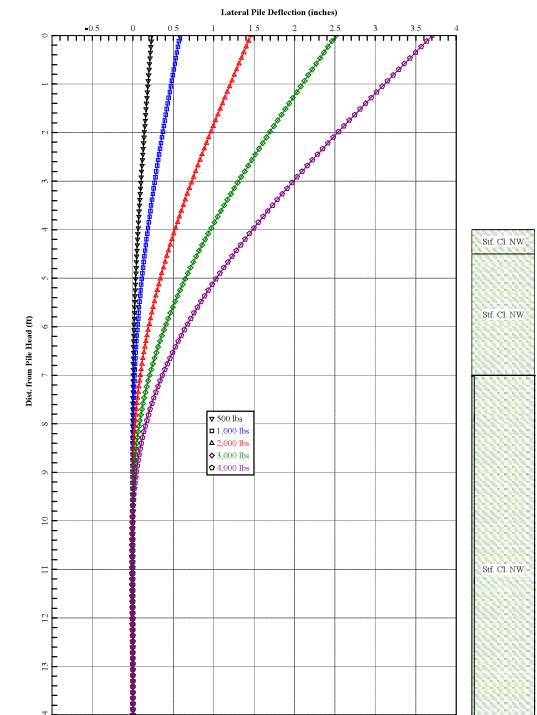
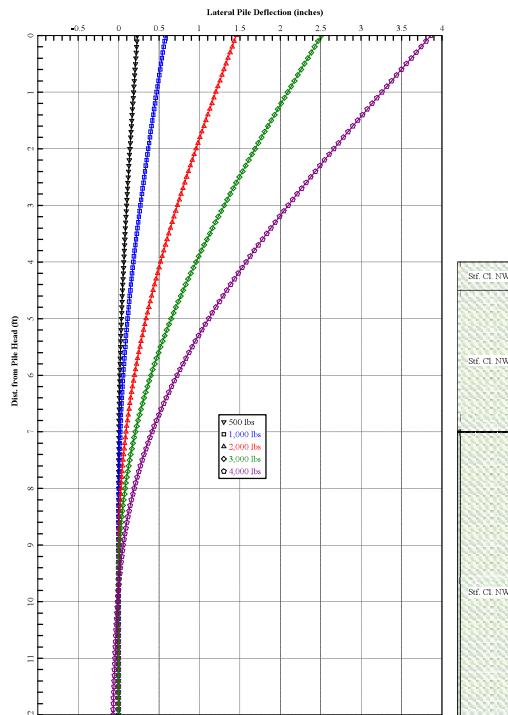
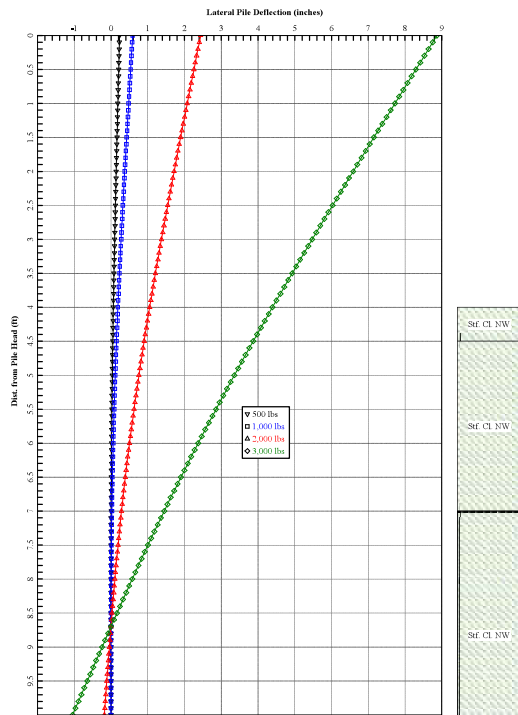


Figure No. 263

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 1
Lateral Load Height of 72 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

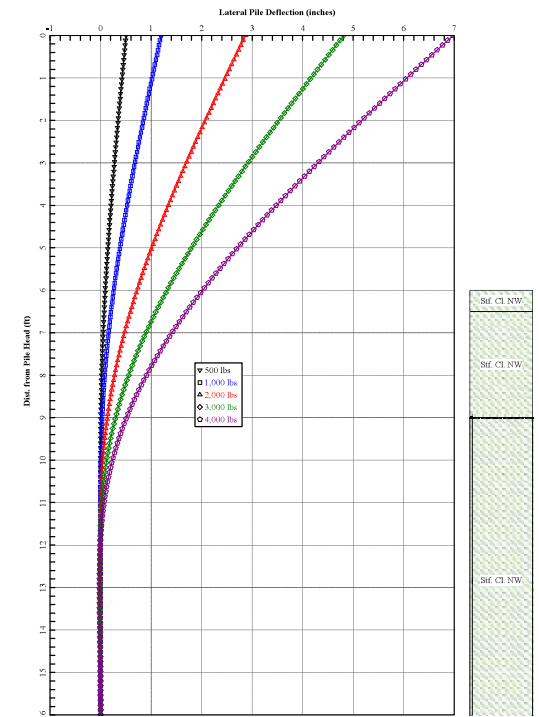
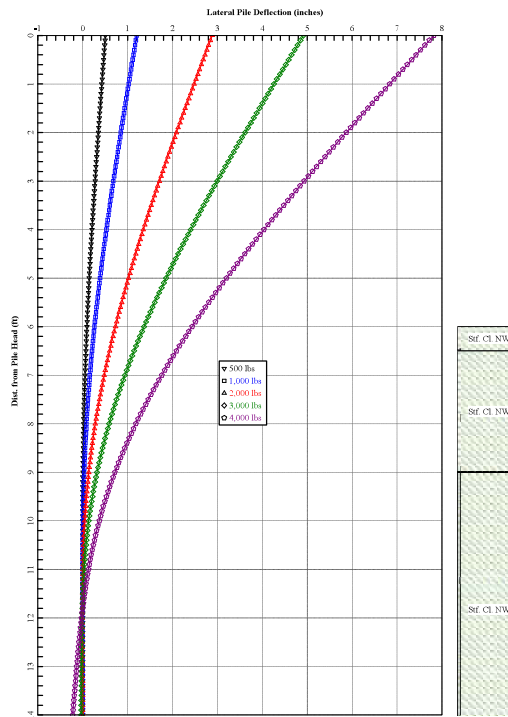
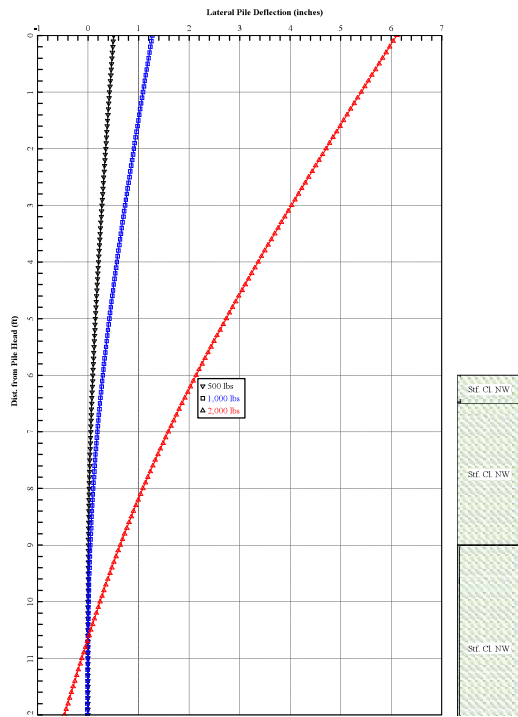


Figure No. 264

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 2
Lateral Load Height of 6 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

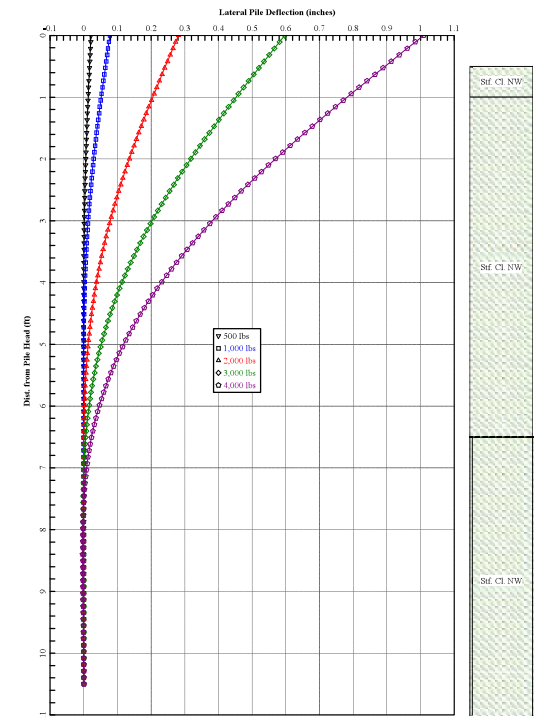
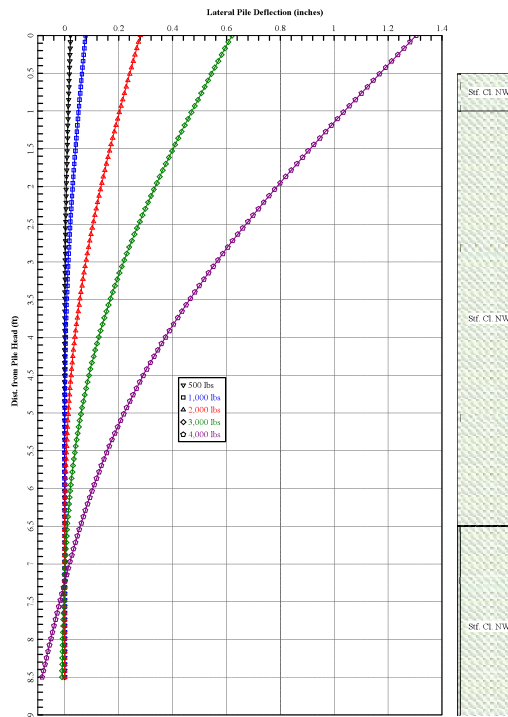
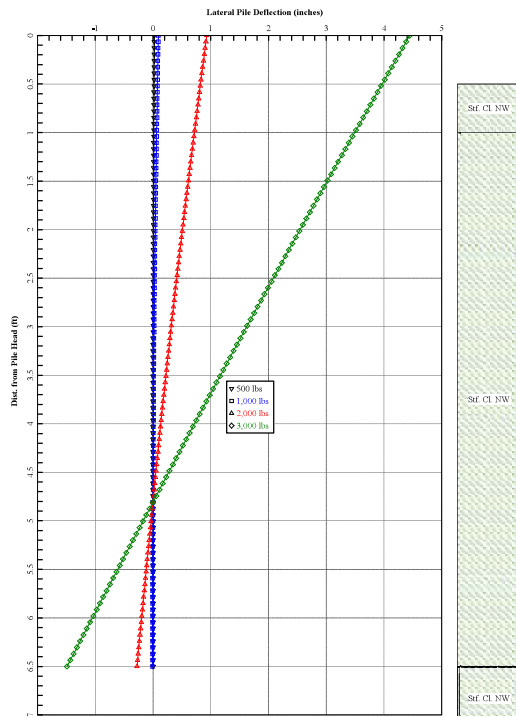


Figure No. 265

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 2
Lateral Load Height of 48 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

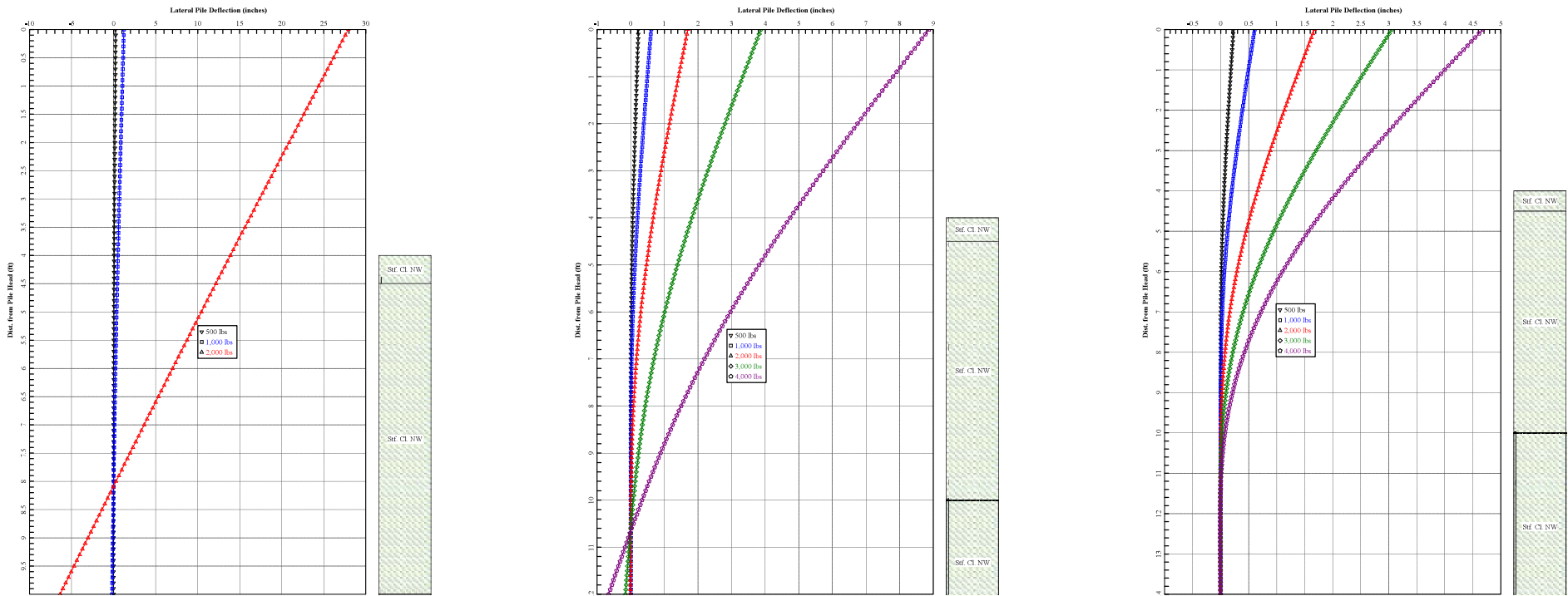


Figure No. 266

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 2
Lateral Load Height of 72 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

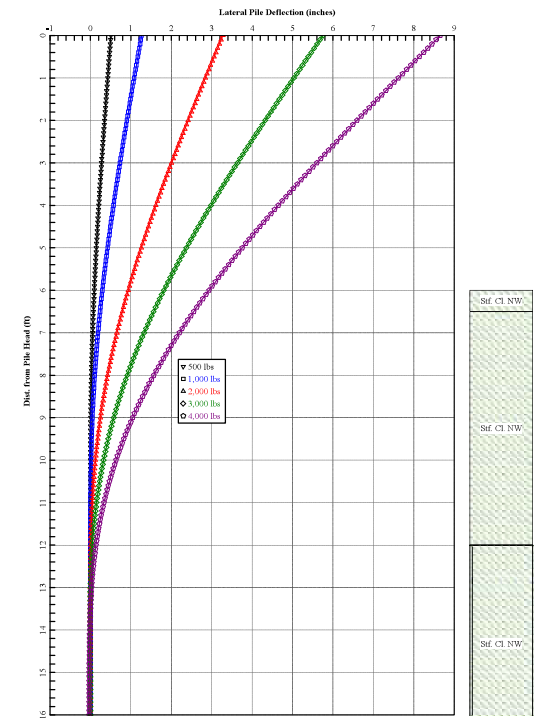
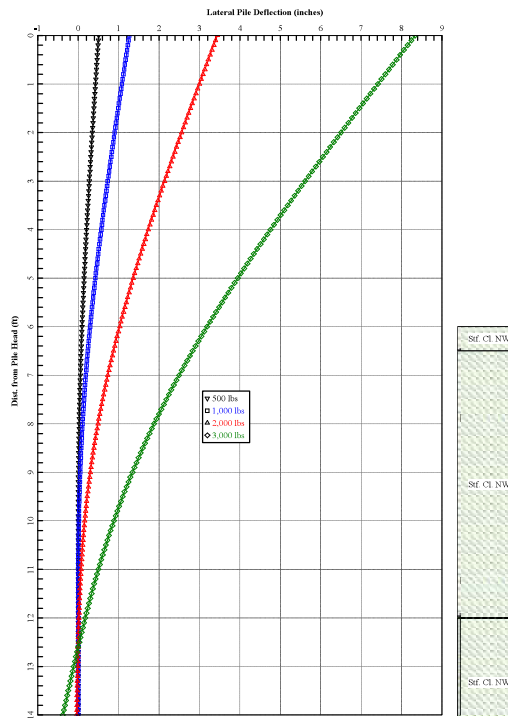
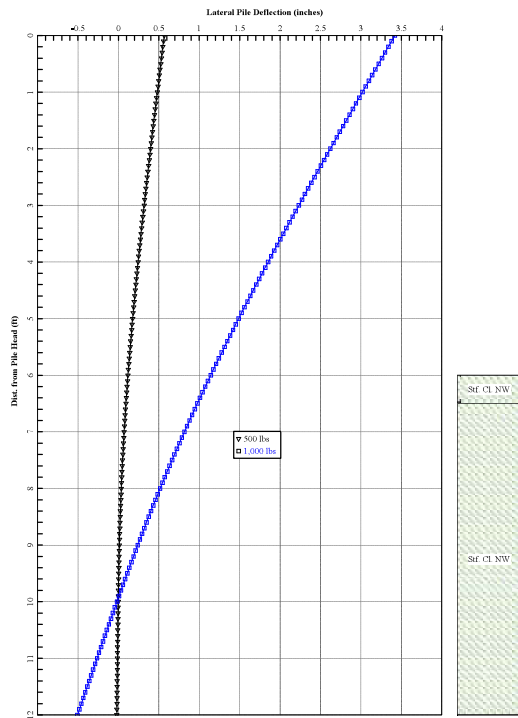


Figure No. 267

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 3
Lateral Load Height of 6 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

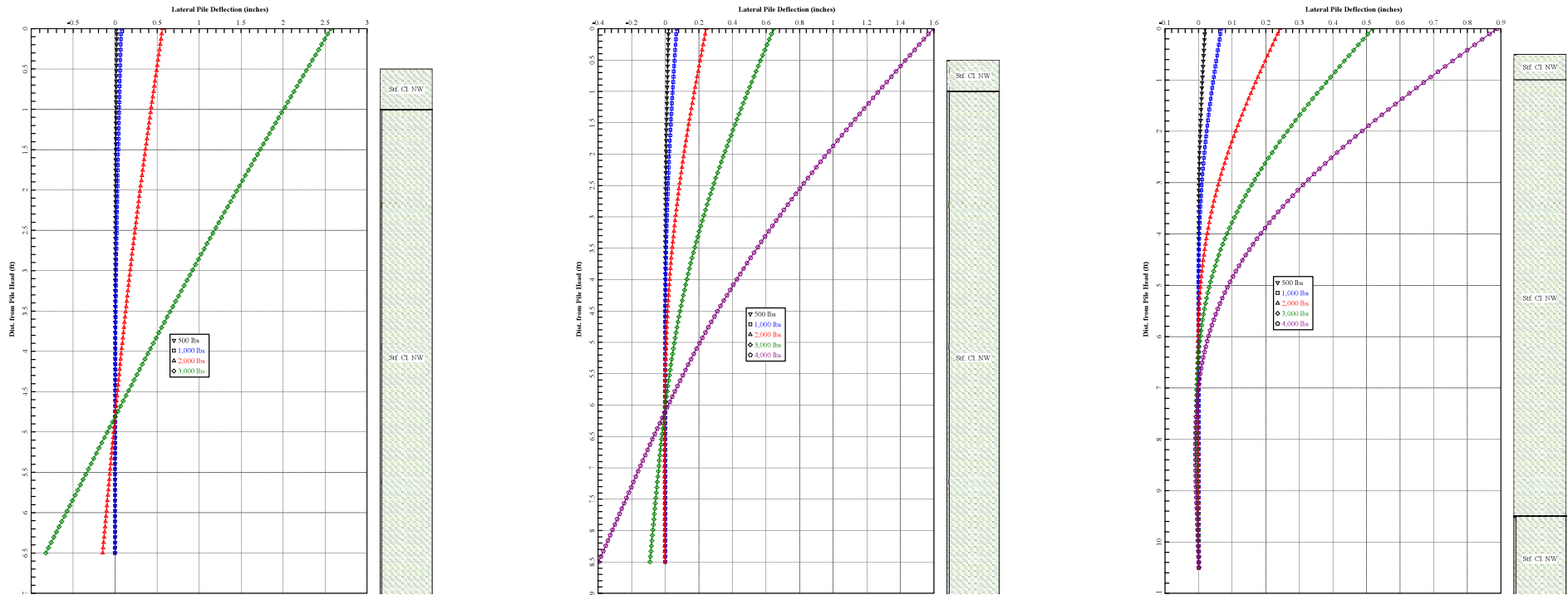


Figure No. 268

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 3
Lateral Load Height of 48 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

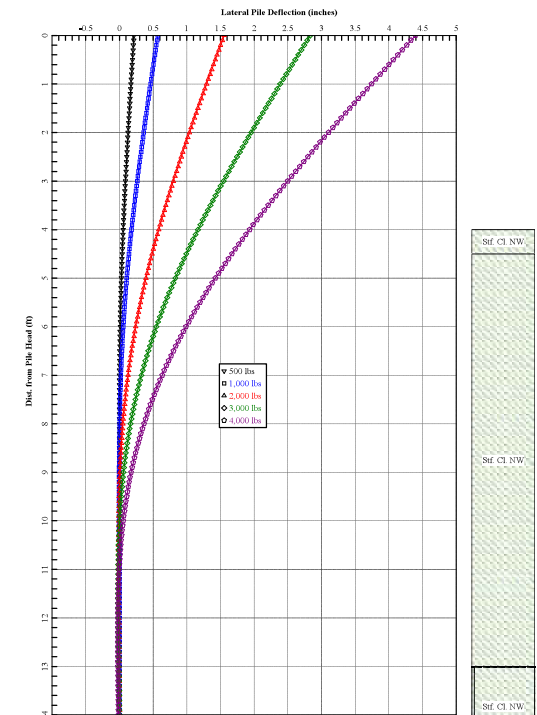
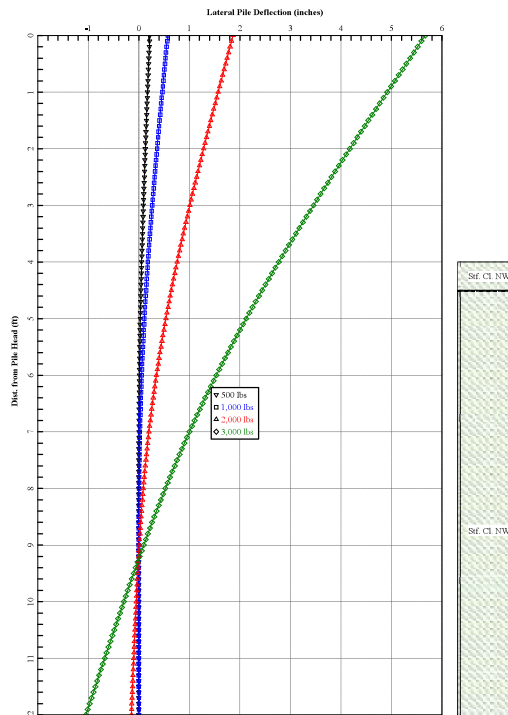
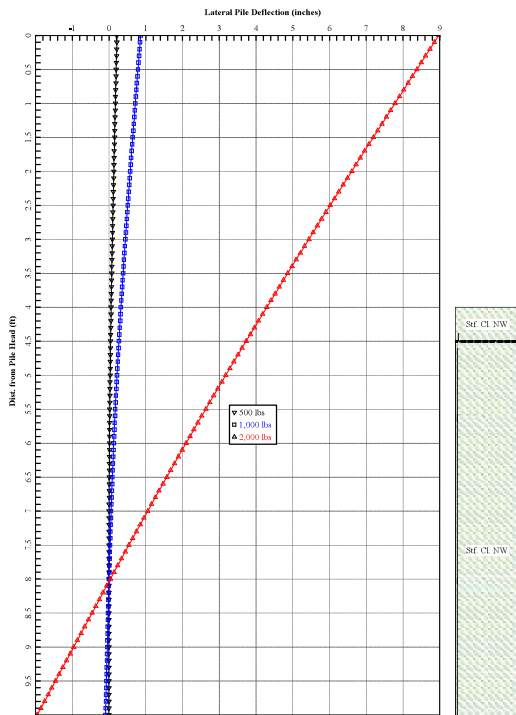


Figure No. 269

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 3
Lateral Load Height of 72 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

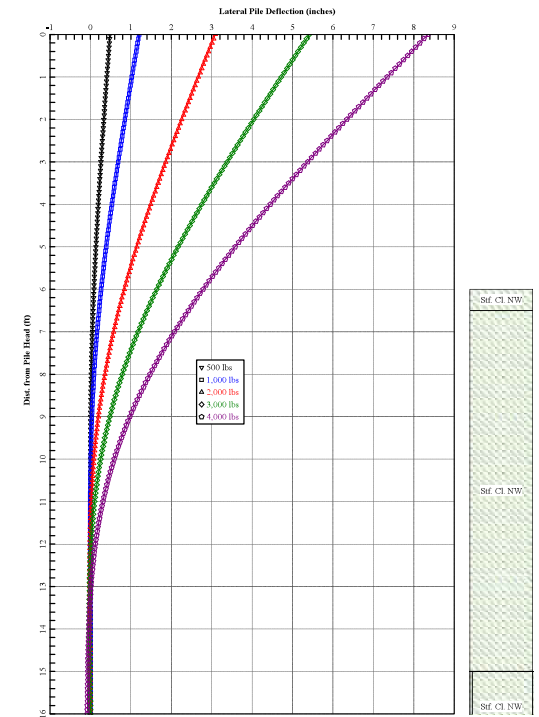
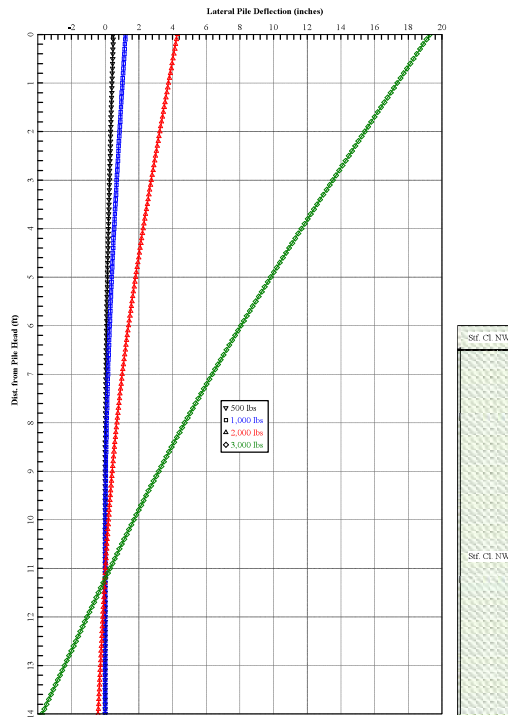
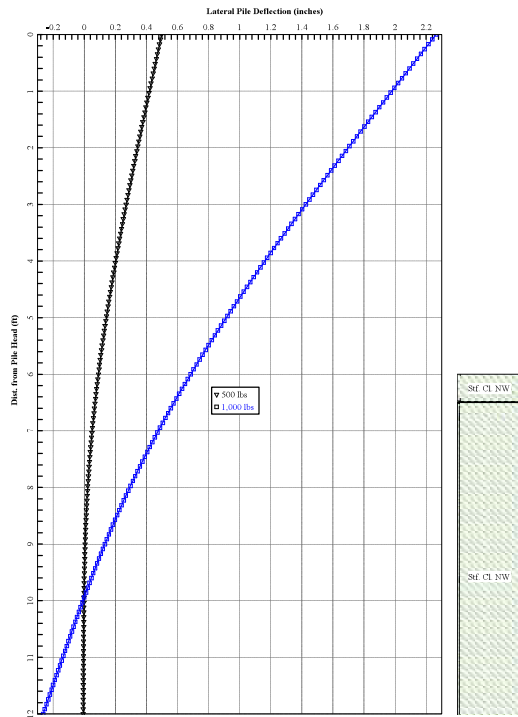


Figure No. 270

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 4
Lateral Load Height of 6 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

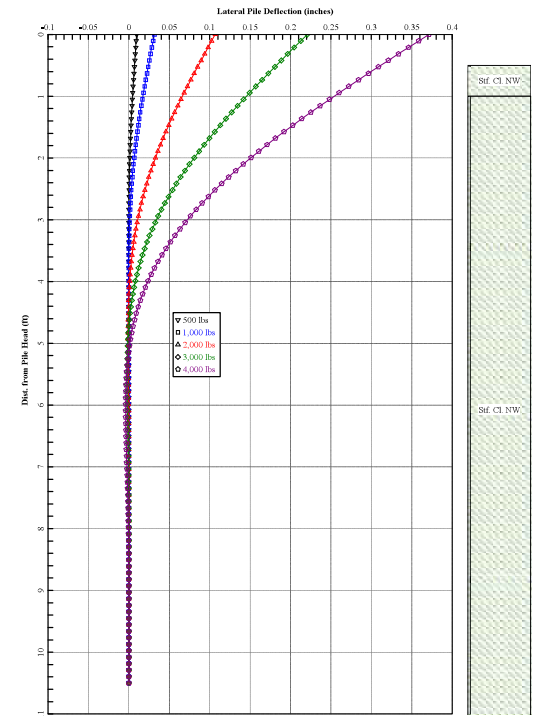
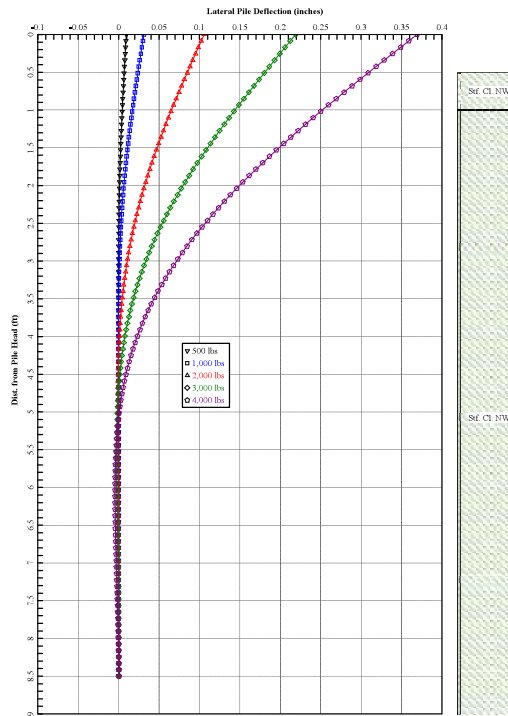
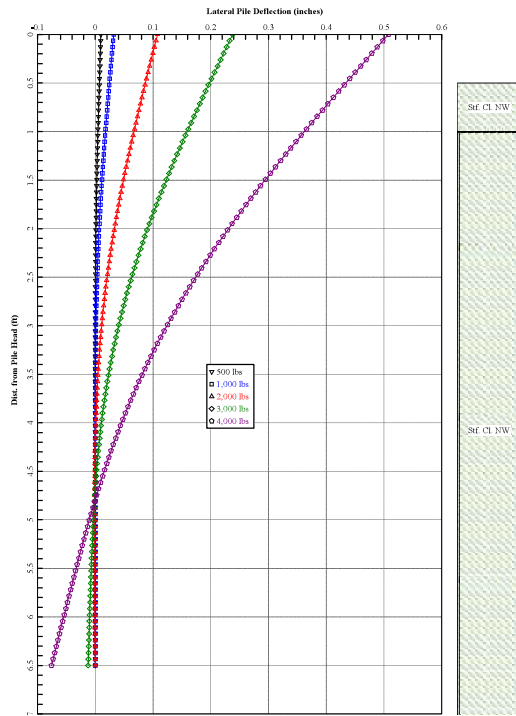


Figure No. 271

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 4
Lateral Load Height of 48 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

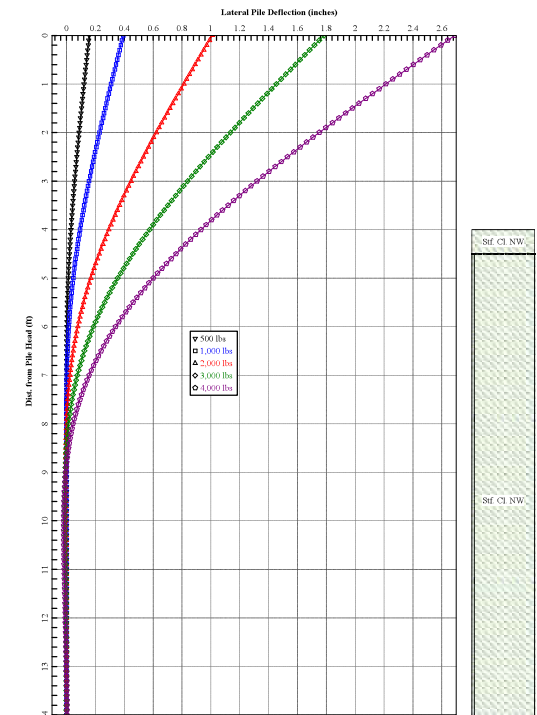
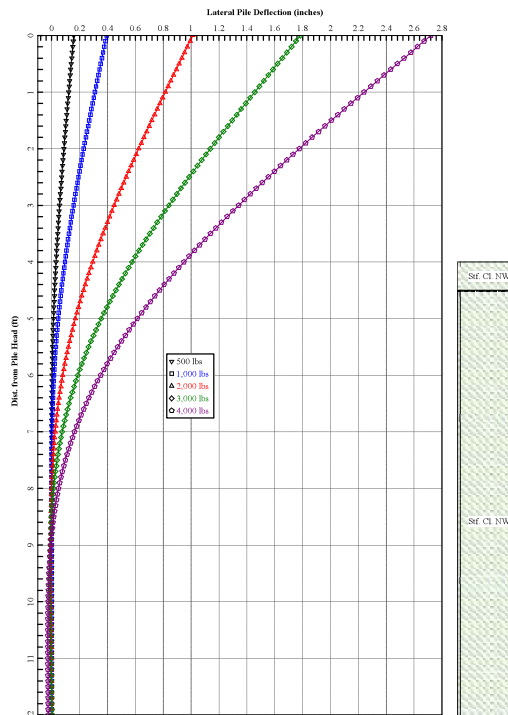
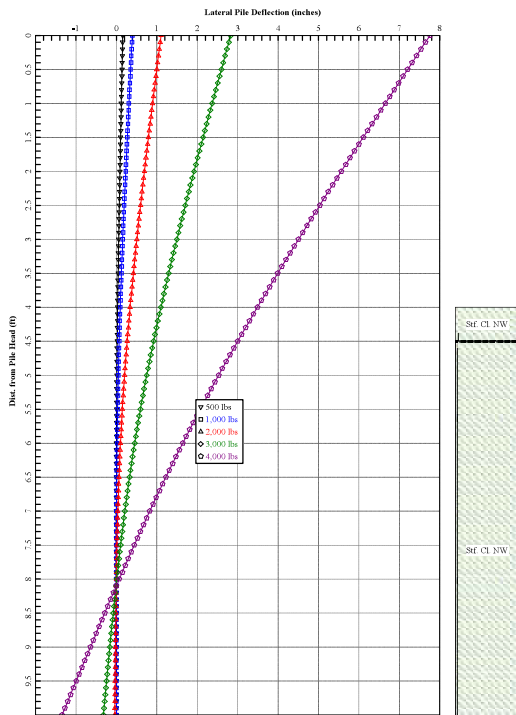


Figure No. 272

Preliminary Lateral Capacity LPILE Curves
Capacity Area No. 4
Lateral Load Height of 72 inches
Embedment Depths of 6 feet (left), 8 feet (middle), and 10 feet (right)
Lateral Loads of 500-lbs (black), 1,000-lbs (blue), 2,000-lbs (red),
3,000-lbs (green), and 4,000-lbs (purple)

G2 Project No. 223429
Proposed Frontier Solar Power Plant

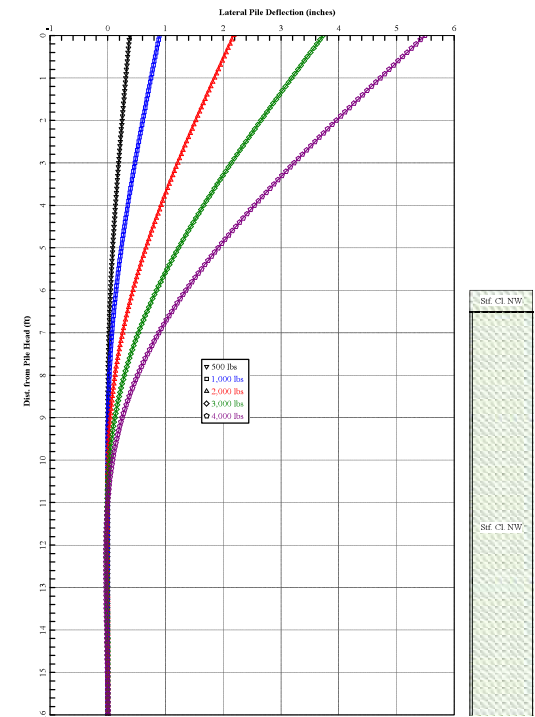
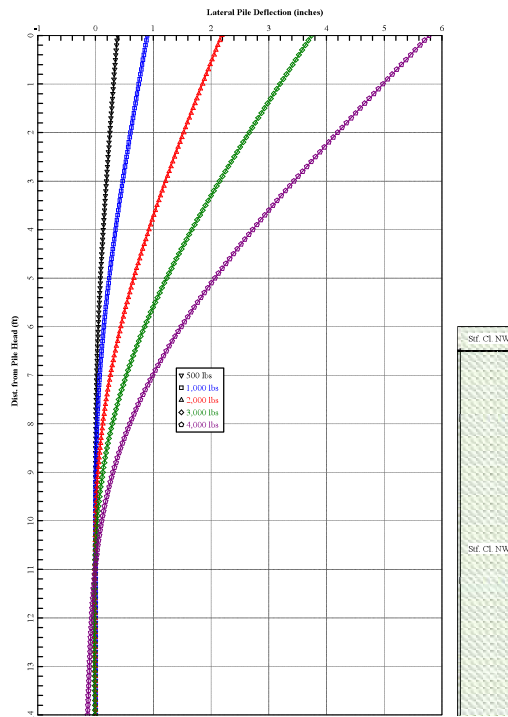
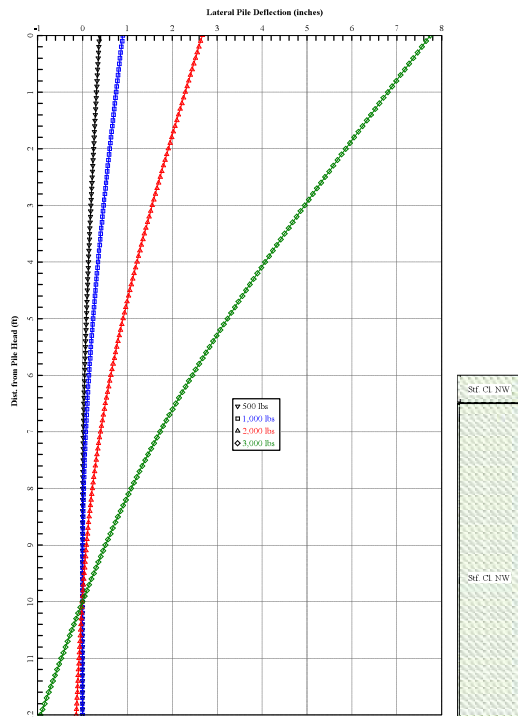


Figure No. 273



Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

APPENDIX E

Attachments

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders	- greater than 12 inches
Cobbles	- 3 inches to 12 inches
Gravel - Coarse	- 3/4 inches to 3 inches
- Fine	- No. 4 to 3/4 inches
Sand - Coarse	- No. 10 to No. 4
- Medium	- No. 40 to No. 10
- Fine	- No. 200 to No. 40
Silt	- 0.005mm to 0.074mm
Clay	- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

Density Classification	COHESIONLESS SOILS Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

- AS - Auger Sample - Cuttings directly from auger flight
- BS - Bottle or Bag Samples
- S - Split Spoon Sample - ASTM D 1586
- LS - Liner Sample with liner insert 3 inches in length
- ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
- PS - Piston Sample - 3 inch diameter unless otherwise noted
- RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

- 1. Untreated Prepared Subgrade
 $D_{BS} = 6$ through 11 inches
 $E_{BS} = 30,000$ psi
 $M_r = 2,325$ psi
 $PSI = 2.5$
 $W_{18,psi} = 2,500$ to 16,000 ESALs

- 2. Lime-Treated Prepared Subgrade
 $D_{BS} = 6$ inches
 $E_{BS} = 30,000$ psi
 $M_r = 10,000$ psi
 $PSI = 2.5$
 $W_{18,psi} = 40,000$ ESALs

Example

$D_{BS} = 8$ inches
 $E_{BS} = 30,000$ psi
 $M_r = 4,900$ psi
 $\Delta PSI = 3.0$
 Solution $W_{18,psi} = 16,000$ (18-kip ESAL)

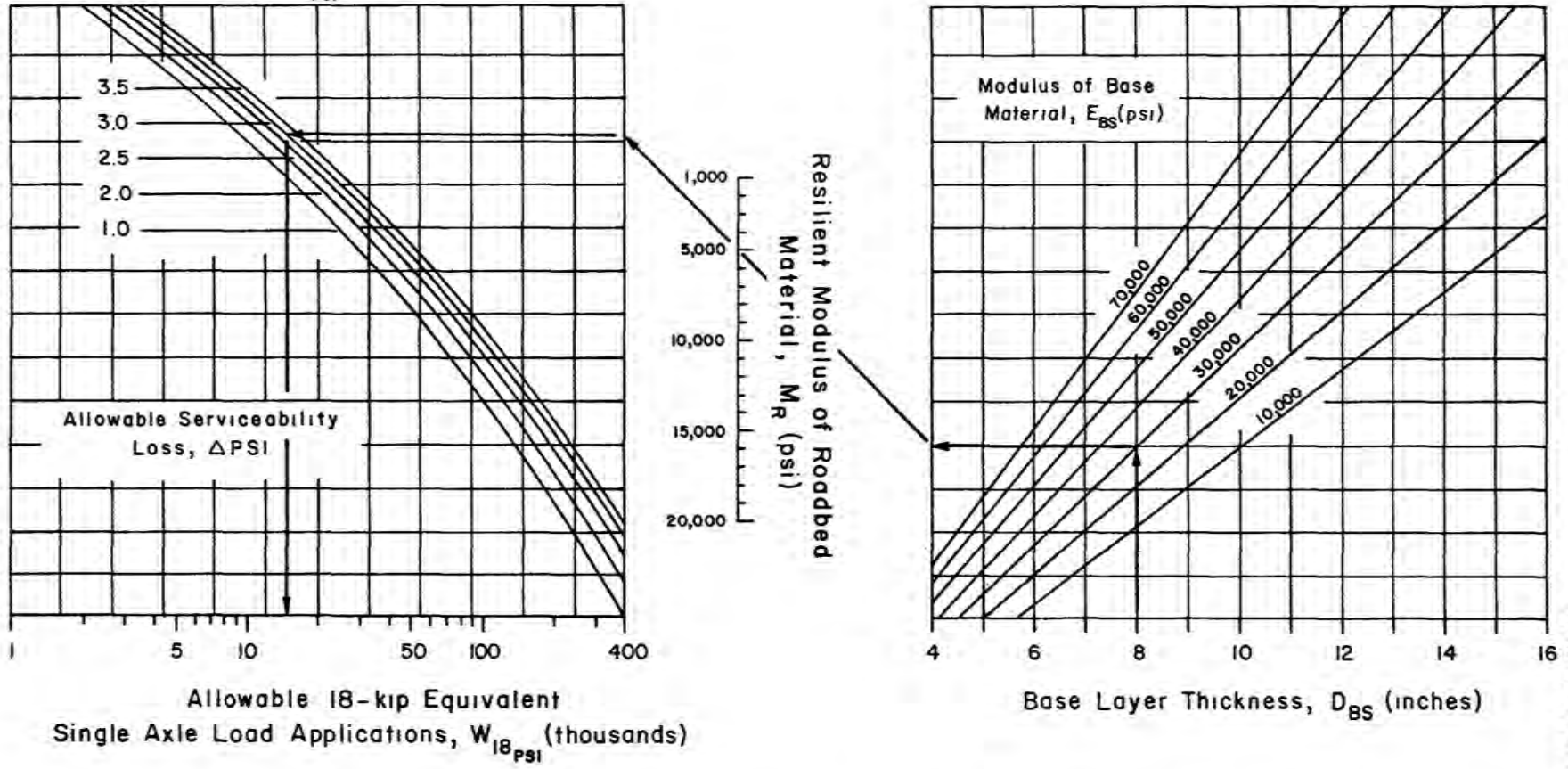


Figure 4.2. Design Chart for Aggregate-Surfaced Roads Considering Allowable Serviceability Loss

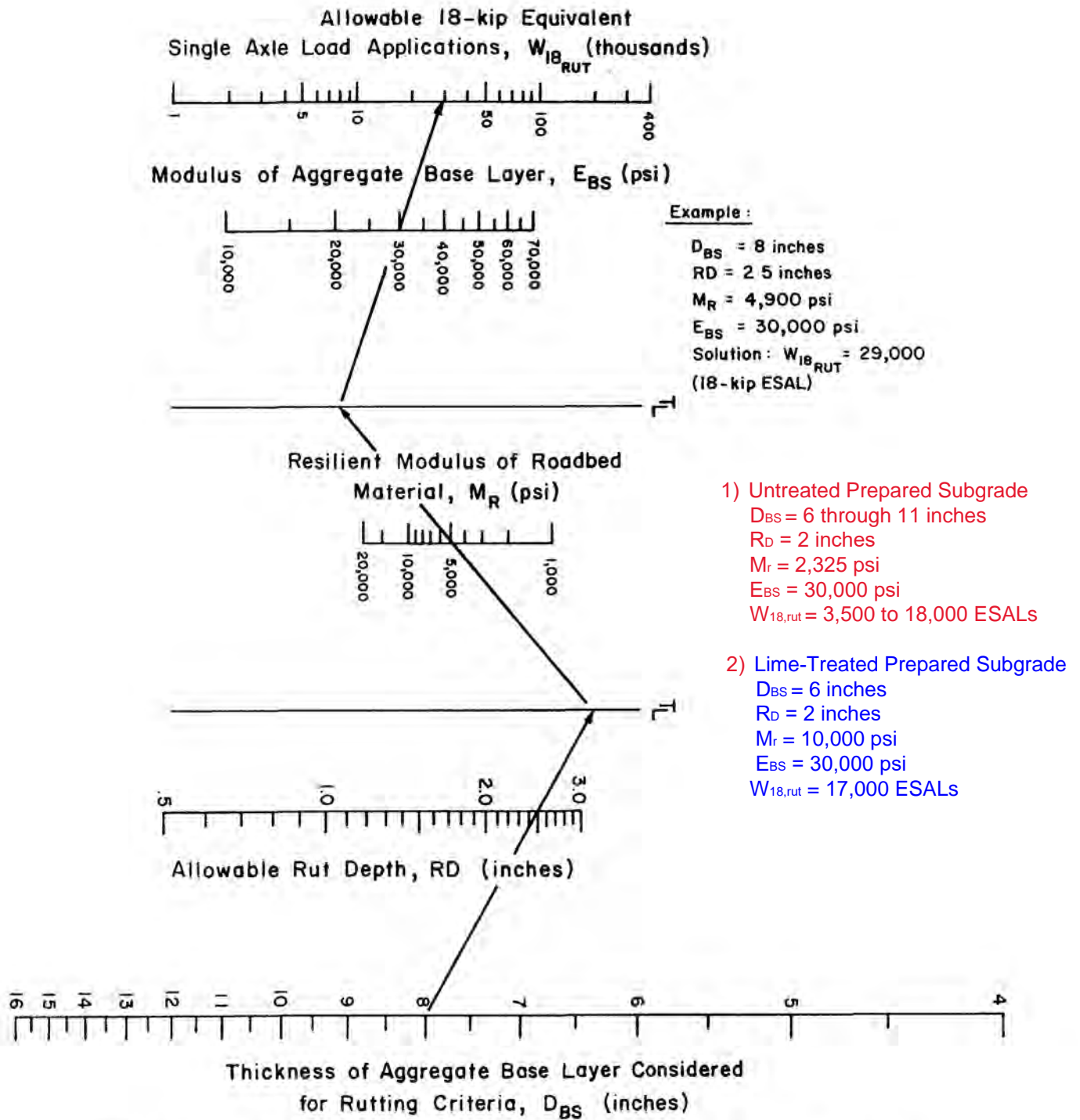


Figure 4.3. Design Chart for Aggregate-Surfaced Roads Considering Allowable Rutting



G2 Consulting Group Laboratory Soil Sample Analysis Results

Project	Sample ID	As-Is Resistivity (ohm-cm)	"Wetted" Resistivity (ohm-cm)	Redox (mV)	pH	Chloride (ppm)	Sulfate (ppm)	Sulfides
#223429	PD-5	19,000	6,600	323	5.2	45	<5	Not Present
	PD-11	17,000	9,600	429	5.6	20	10	Not Present
	PD-17	3,900	2,000	411	7.2	45	<5	Not Present
	PD-13	11,000	4,400	535	6.6	45	<5	Not Present
	PLT-04	3,200	2,100	492	7.4	45	<5	Not Present
	PD-9	12,000	12,000	577	5.6	45	<5	Not Present
	T-SUB	4,100	2,800	443	6.6	45	<5	Not Present
	PD-7	6,100	3,300	334	6.8	20	<5	Not Present
	PD-8	26,000	14,000	508	5.1	20	<5	Not Present
	PD-3	9,600	6,400	470	5.4	45	<5	Not Present
	PD-2	2,500	1,600	497	7.2	45	<5	Not Present
	PLT-01	17,000	11,000	529	5.9	45	<5	Not Present
	PLT-02	7,500	5,200	561	5.1	20	<5	Not Present
	PLT-03	3,600	2,400	305	6.3	20	<5	Not Present
	PD-14	8,000	4,800	500	5.6	45	10	Not Present
	PD-15	2,800	1,900	466	7.1	45	<5	Not Present
	PD-1	4,200	2,600	514	5.6	45	10	Not Present
	PD-6	6,000	4,300	529	6.5	45	<5	Not Present
PD-10	3,300	2,800	622	5.8	45	<5	Not Present	
PD-18	4,000	3,400	461	6.5	45	<5	Not Present	



G2 Consulting Group Laboratory Soil Sample Analysis Results

Project	Sample ID	As-Is Resistivity (ohm-cm)	"Wetted" Resistivity (ohm-cm)	Redox (mV)	pH	Chloride (ppm)	Sulfate (ppm)	Sulfides
223429 Frontier Solar	T-08	34,000	9,300	296	5.8	<20	<5	Not Present
	T-25	7,700	3,300	314	6.2	<20	<5	Not Present

In addition to the mechanical complexities, as soils become more fine-grained, their resistivity generally decreases. Soil resistivity is an important factor controlling the rate of galvanic corrosion, and low resistivity is often associated with aggressive soils. This topic will be discussed in greater detail in the following section.

Durability of buried metal reinforcements

In the many discussions we hold with potential users of Reinforced Earth, the most frequently asked question is: "How long will it last?" Everyone knows that ferrous and other metals corrode and that metallurgists might spend whole careers creating a single exotic alloy to resist the aggressive attack of a predictable environmental setting (such as aluminium boats in sea water). Reinforced Earth structures are normally designed for a service life of 75 to 100 years.

Reinforcements are typically thin metal strips varying in thickness from 3 to 9mm, depending on the physical forces to be resisted and environmental setting in which the structure will be erected. What

special information, therefore, is required to proportion the structural components safely to resist a physical phenomenon that is as undeniable as it is seemingly unpredictable? What margin will exist and what will be the consequences if the predictions are incorrect?

To attempt to answer these questions we must again reflect on the mechanism of corrosion, the results of theoretical studies and whatever actual performance data exists. In interpreting these studies and data, we must be careful to interpret them in the light of our own concerns. For example, a buried metal conduit might be considered to have failed if a pitting type corrosion completely penetrates the conduit wall and fluid or pressure is lost. In contrast, pit type penetrations of a sheet or strip may do little to reduce the effective cross-section resisting stress. Therefore, for the same corrosive effect, the strip is serviceable and the conduit is not. With this in mind, let us examine the phenomenon of corrosion as it applies to the serviceability of Reinforced Earth structures.

The corrosion process is essentially an electrochemical process. The factors gov-

erning the corrosivity of a given soil are well understood and will not be discussed herein. However, the high number of inter-related factors which influence the initial and long-term corrosion rate makes the study of corrosion and service life an inexact science, especially when one considers that many of the parameters will most certainly change with the passage of time. As in other sciences where exact solutions are not possible, and I suggest that soil mechanics is certainly one, it is necessary to determine the possible upper and lower limits to the effects or results under study and then, using prudent engineering judgment, to provide for a reasonable margin of safety. This approach is applicable to the study of corrosion of buried metals.

The most extensive series of field tests on various metals and coatings in all types of soil was begun in 1910 by the US National Bureau of Standards (NBS). These tests continued until 1955 and now constitute the most important source of comprehensive data available in the field of underground corrosion. This information, therefore, constitutes the data base of the entire sub-science, and it is against this data that all new experience and subsequently derived empirical relationships must be compared and contrasted. It is useful, therefore, to briefly review the results of this study.

In the NBS study samples of ferrous and nonferrous metals were buried at 128 sites. Plain and galvanised steel specimens were buried at 47 sites where the soil-water environments were different, but representative of soil conditions in the United States. The resistivity and pH were measured at each site in an attempt to determine a quantitative correlation between these measurable (but somewhat time- and environment-dependent) parameters and metal loss. Romanoff¹⁹, the author of the NBS study, demonstrated that the rate of corrosion is greatest in the first few years after burial and decreases to a much lower constant rate thereafter. He indicated that this damping of corrosion was a more significant parameter than the initial rate. He proposed quantitative empirical relationships to calculate average loss of thickness of plain steel as a function of time.

Darbin²⁰, in his comprehensive review of the NBS data, has selected burial site data more or less consistent with the normal range of environments for buried reinforcing strips and extended this data in accordance with Romanoff's proposals. He compared the results of this extended or extrapolated data with other pertinent studies such as the performance of sheet piles and culverts. This comparison for galvanised steel samples and metal culverts is shown in Fig. 20. This data demonstrates that even in an aggressive environment ($\rho = 13000 \Omega\text{-cm}$, $\text{pH} = 4.7$), the galvanised steel reinforcing strips currently in use would have a service life of 120 years.

The extrapolation of the Romanoff data requires the solution of the exponential equation:

$$x = kT^n$$

where x = average loss of thickness with time

k = a site characteristic

T = time in years

n = site dependent and is always less than 1.0

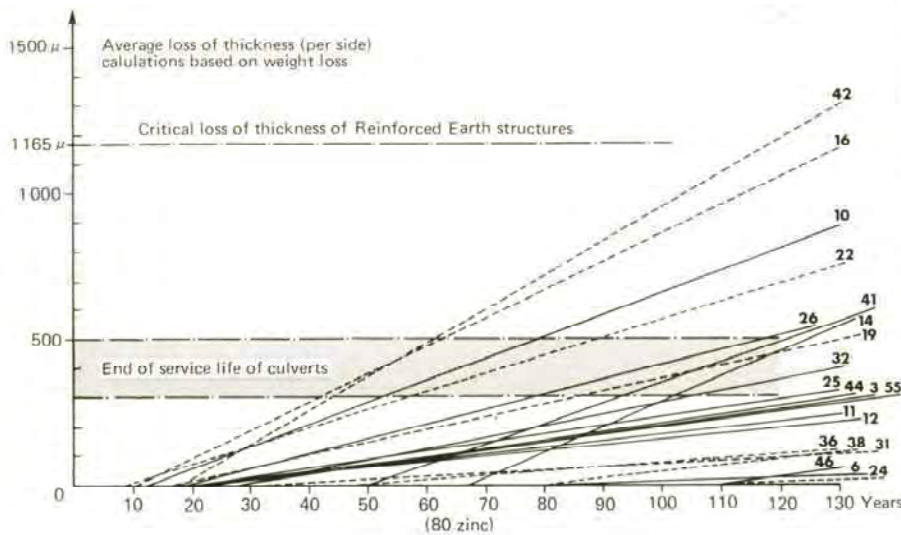


Fig. 20. Synthesis of extrapolated NBS and metal culvert data (after Darbin et al, 1978)

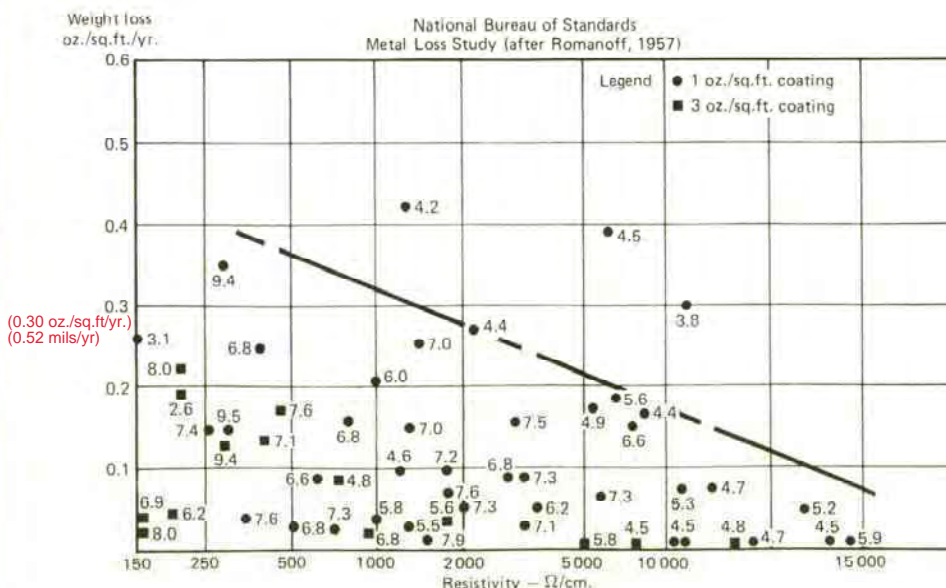


Fig. 21. Weight loss vs. resistivity

4.3 Durability requirements for sheet piling

(1) Unless otherwise specified, in the strength verification of sheet piles for both serviceability and ultimate limit states, the loss of thickness for parts of sheet pile walls in contact with water or with soil (with or without groundwater) should be taken from section 4.4, dependant upon the required design working life of the structure. Where sheet piles are in contact with soil or water on both sides, the corrosion rates apply to each side.

(2) If the aggressiveness of the soil or water is different on opposite sides of a sheet pile wall, two different corrosion rates may be applied.

4.4 Corrosion rates for design

(1) Corrosion rates given in this section should be considered as for design only.

NOTE: Suitable values for corrosion rates may be given in the National Annex, taking into account local conditions. Values that may be used for guidance are given in Table 4-1 and Table 4-2.

(2) The loss of thickness due to atmospheric corrosion may be taken as 0,01 mm per year in normal atmospheres and as 0,02 mm per year in locations where marine conditions may affect the performance of the structure.

NOTE: The following have a major influence on the corrosion rates in soils;

- the type of soil;
- the variation of the level of the groundwater table;
- the presence of oxygen;
- the presence of contaminants.

Table 4-1: Recommended value for the loss of thickness [mm] due to corrosion for piles and sheet piles in soils, with or without groundwater

Required design working life	5 years	25 years	50 years	75 years	100 years
Undisturbed natural soils (sand, silt, clay, schist,)	0,00	0,30	0,60	0,90	1,20
Polluted natural soils and industrial sites	0,15	0,75	1,50	2,25	3,00
Aggressive natural soils (swamp, marsh, peat, ...)	0,20	1,00	1,75	2,50	3,25
Non-compacted and non-aggressive fills (clay, schist, sand, silt,)	0,18	0,70	1,20	1,70	2,20
Non-compacted and aggressive fills (ashes, slag,)	0,50	2,00	3,25	4,50	5,75

Notes:

1) Corrosion rates in compacted fills are lower than those in non-compacted ones. In compacted fills the figures in the table should be divided by two. $(70 \text{ mm} / 2) / (25 \text{ yrs}) = 0.55 \text{ mls} / \text{yr}$

2) The values given for 5 and 25 years are based on measurements, whereas the other values are extrapolated.