General Information - Test Set-Up

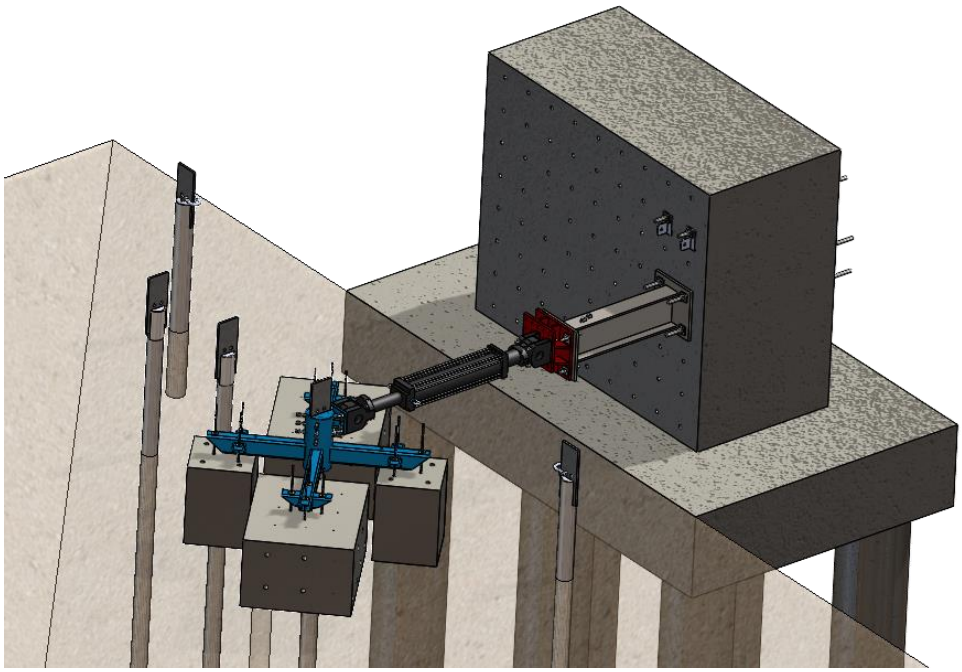


Figure 1: Schematic Rendering of Pile Test

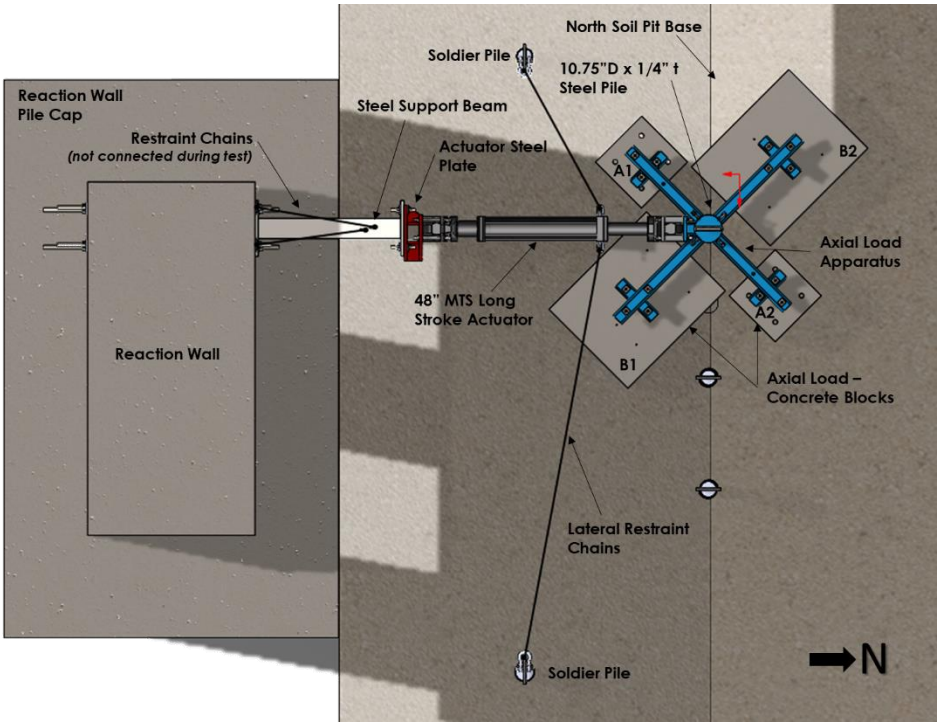
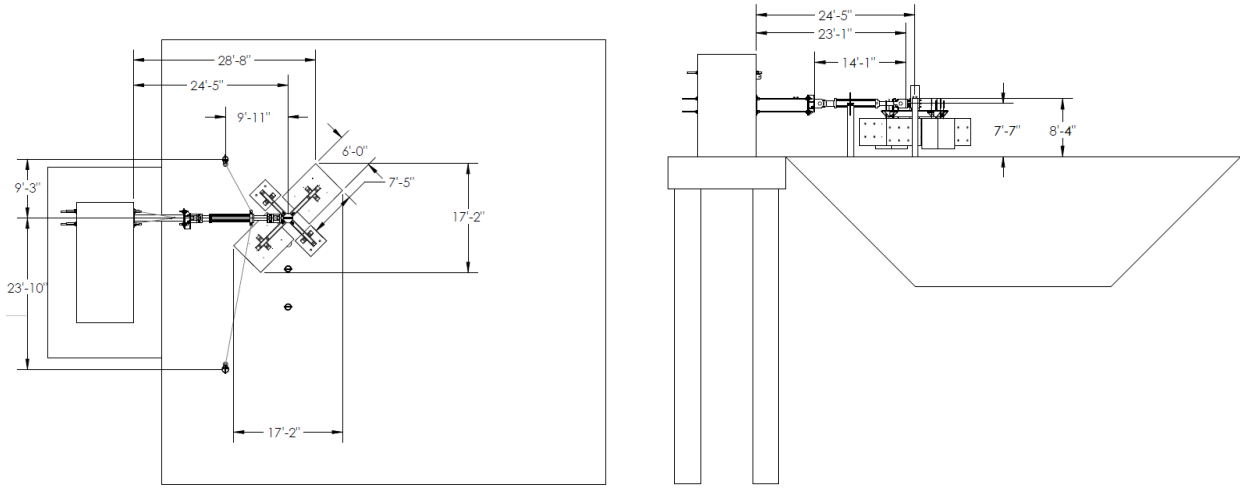


Figure 2: Schematic Plan of Pile Test Set-Up

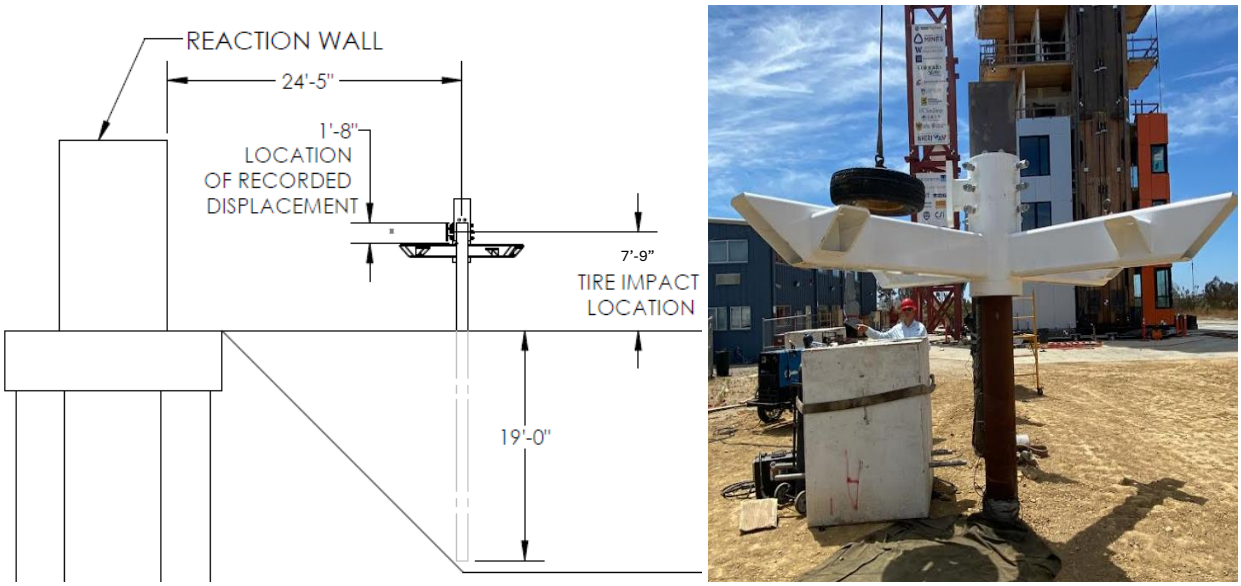
Figure 3: Overview Pile Test Set-Up



(a) Plan View (b) Elevation View

Figure 4: Test-Setup Schematic Drawings

Note: Field dimensions vary slightly up to +/- 6". For the lateral load test, the height of the top of pile from top of ground was measured in the field as 100.5 inches. Thus, the lateral load was applied at 91.5 inches (7.625 ft) above the ground elevation.



(a) Free Vibration Test Schematic (b) Test Set-Up Before Single Force Hit

Figure 5: Free Vibration Test

Note: Measurements provided in all figures are estimates and can vary in field within +/- 6-inches.

General Information – Test Specimen Parameters & Material Properties

Table 1: Specimen Parameters and Material Properties

Pile (Nominal Dim.)		**Total Pile Length**	**Approx. In-Ground Pile Depth**	**Approx. Above Ground Pile Height[3]**	**Top of Soil Plug Depth[4]**
D	t[1,2]				
[in]	[in]	[ft]	[ft]	[ft]	[ft]
10.75	0.25	28	19.67	8.33	12.97

Notes:
[1] Pile thickness varied +/- 2% along length of pile
[2] The pile specimen is specified according to API 5L X52 PSL2.
[3] Measured above ground height of the pile from the top of in-situ soil.
[4] Measured depth of the soil plug from the top of the pile.

Material Properties –

Material Testing using coupons from the pile specimen was performed to obtain the material properties. Refer to the provided Excel file with stress-strain curve.

General Information – Site Geotechnical Parameters

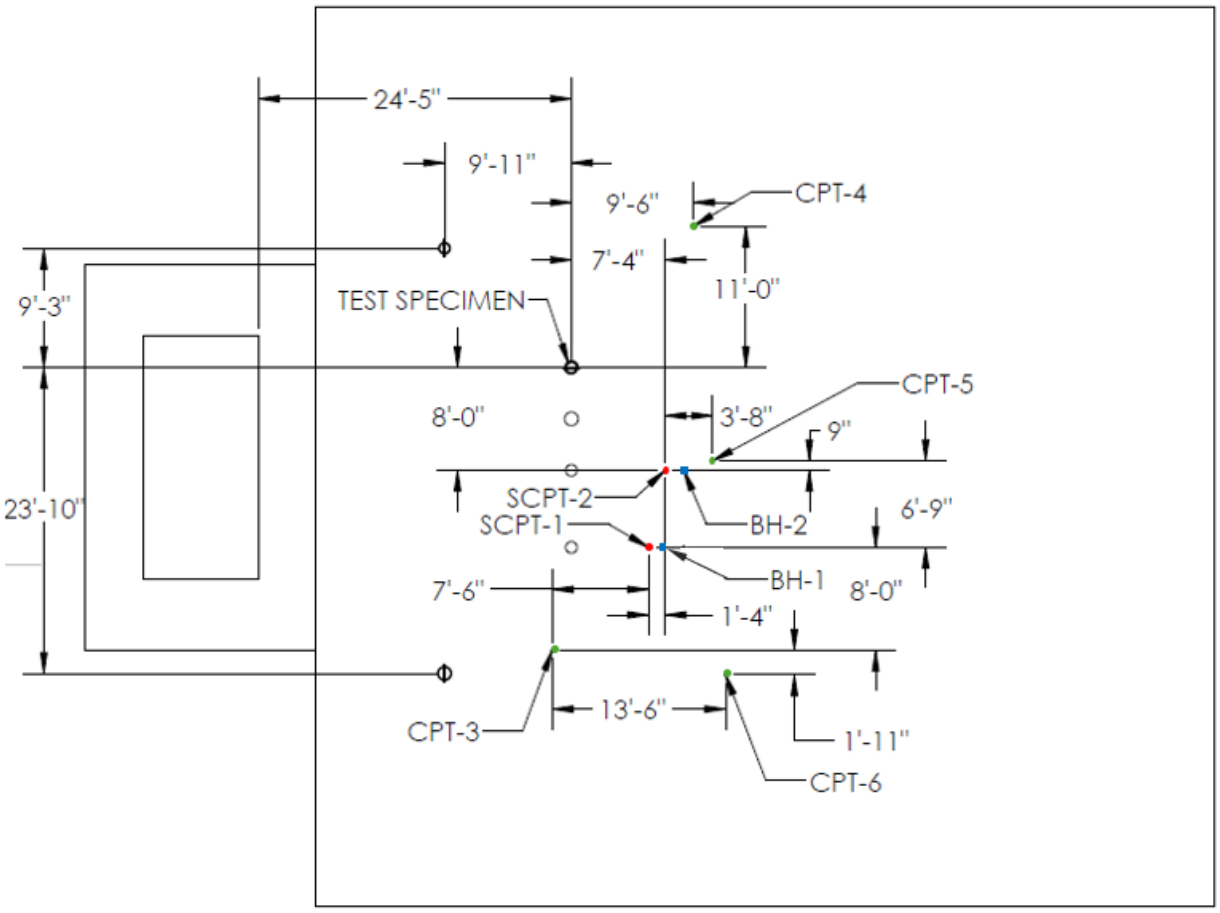


Figure 6: CPT/SCPT and Boring General Locations

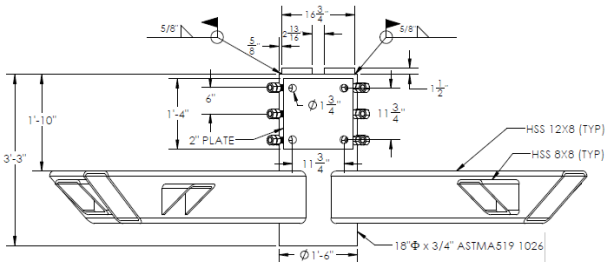
The following is available under the Geotechnical Information:

- Cone Penetration Tests (CPTs)
- Seismic CPTs
- Boring Logs
- Soil Laboratory Tests

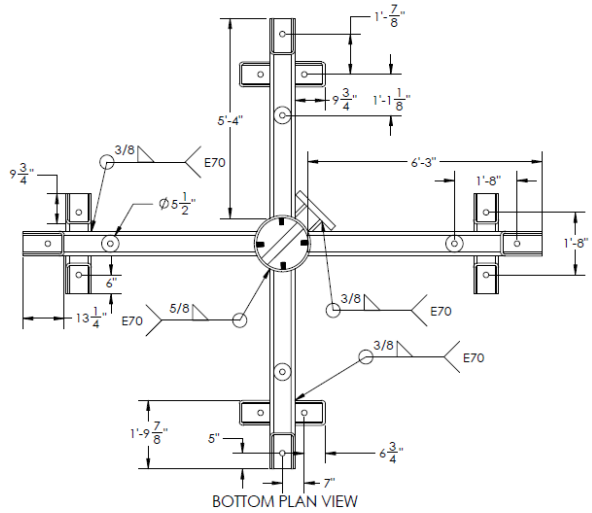
General Information – Test Loading Conditions

Axial loading included:

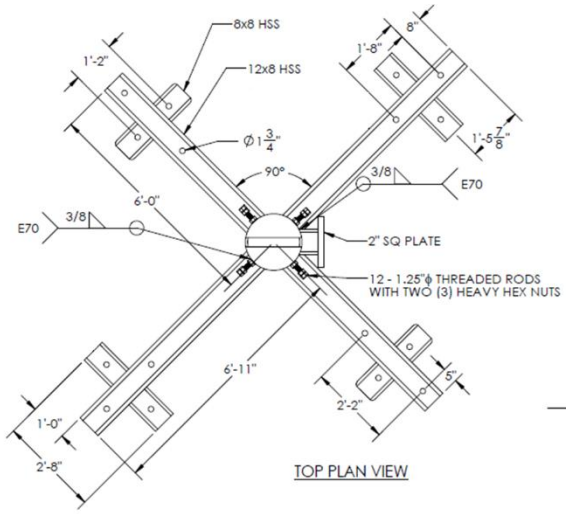
- Steel Loading Frame Apparatus
  - Geometry – Figure 7
  - Mass properties – Figure 8
- 2 pairs of reinforced concrete blocks (Table 2) – 72 kips
- Lateral loading was applied using a 48-inch long stroke MTS actuator (Figure 9) – 5.2 kips



(A) Elevation View



(b) Bottom Plan View



(c) Top Plan View

Figure 7: Steel Loading Apparatus Drawings

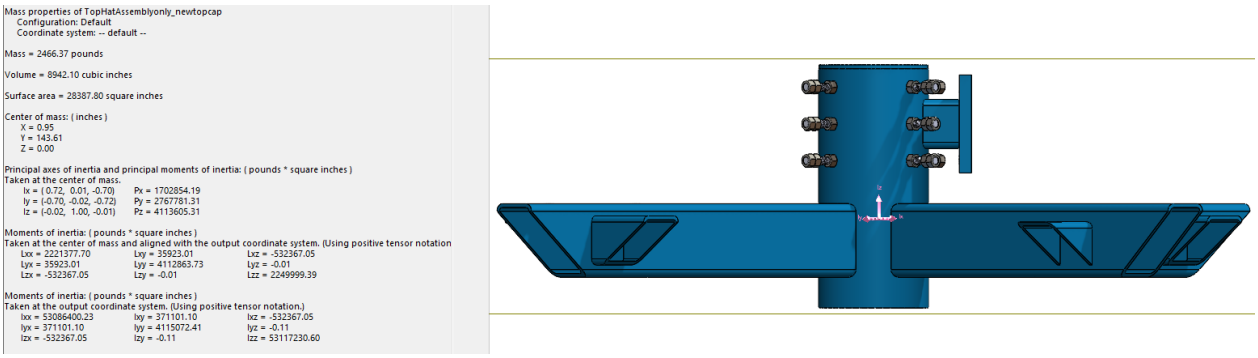


Figure 8: Steel Loading Apparatus Mass Properties per SolidWorks

Table 2: Axial Concrete Block Applied Loading

Description	Unit	A - Blocks	B - Blocks
Block Height	ft	4.7	4.1
Block Width	ft	3.5	6
Block Length	ft	3.5	7.4
Individual Block Weight	kips	8.58	27.26
Number of Blocks	-	2	2
Total Block Pair Weight	kips	17.15	54.51
Approximate Applied Weight (Rounded)	kips	72	

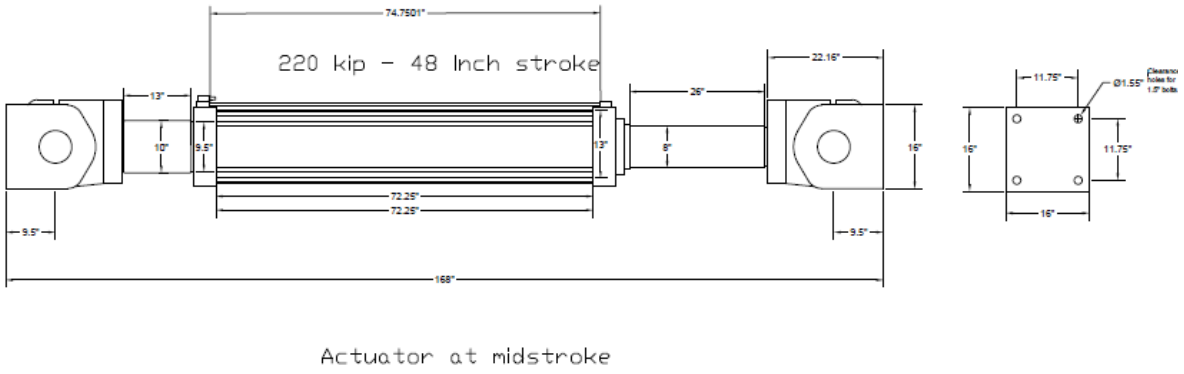


Figure 9: 220kip (48-inch) Long Stroke MTS Actuator Dimensions

Due to the pin of the actuator being eccentric to the pile centerline, the specimen experiences an initial moment before the application of the lateral load. This moment is determined as (5.2 kip/2) * (20.65").

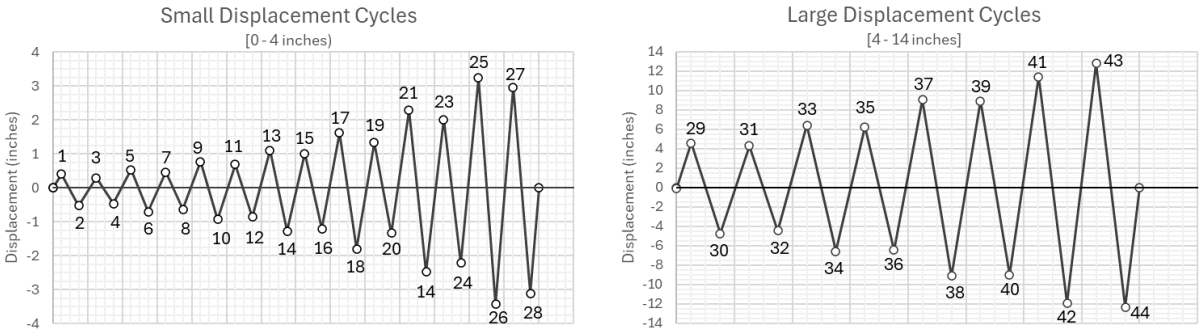
Note: For free vibration testing, the Axial Load Apparatus was fully fixed on the pile to provide mass.

General Information – Free Vibration Loading

The free vibration test considered the test specimen with only the steel loading frame firmly placed on top of the pile. Refer to Figure 5. A vehicular spare tire was used to hit the pile at the center of the 2-inches thick square plate on the steel apparatus, approximately 9-inches below pile top. Accelerations were recorded at 20-inches from the pile top and converted to displacements. A maximum lateral displacement of 0.260-inches was recorded at 20-inches from the pile top. The pile remains elastic during the free vibration tests.

General Information – Lateral Loading Protocol

Each cycle considers two (2) consecutive target displacement cycles with the same amplitude. Refer to Figure 10 and Table 3.



(a) Small Displacement up to Semi-Cycle 28 (b) Large Displacement from Semi-Cycle 29 to 44

Figure 10: Lateral Loading Protocol

Table 3: Cyclic Lateral Loading Protocol Table

Description	Cycle	Semi-Cycle Peak	Peak Displacement
Small Displacement [0 – 4 in)	1	1	0.40
		2	-0.52
		3	0.29
		4	-0.47
	2	5	0.54
		6	-0.70
		7	0.47
		8	-0.63
	3	9	0.77
		10	-0.93
		11	0.69
		12	-0.86
	4	13	1.10
		14	-1.27
		15	1.01
		16	-1.20
	5	17	1.61
		18	-1.80
		19	1.33
		20	-1.33
	6	21	2.29
		22	-2.48
		23	2.02
		24	-2.22
	7	25	3.23
		26	-3.43
		27	2.97
		28	-3.11
Large Displacement [4 – 14in]	8	29	4.58
		30	-4.75
		31	4.31
		32	-4.44
	9	33	6.42
		34	-6.56
		35	6.26
		36	-6.44
	10	37	9.07
		38	-9.12
		39	8.93
		40	-8.98
	11	41	11.43
		42	-11.93
		43	12.82
		44	-12.33