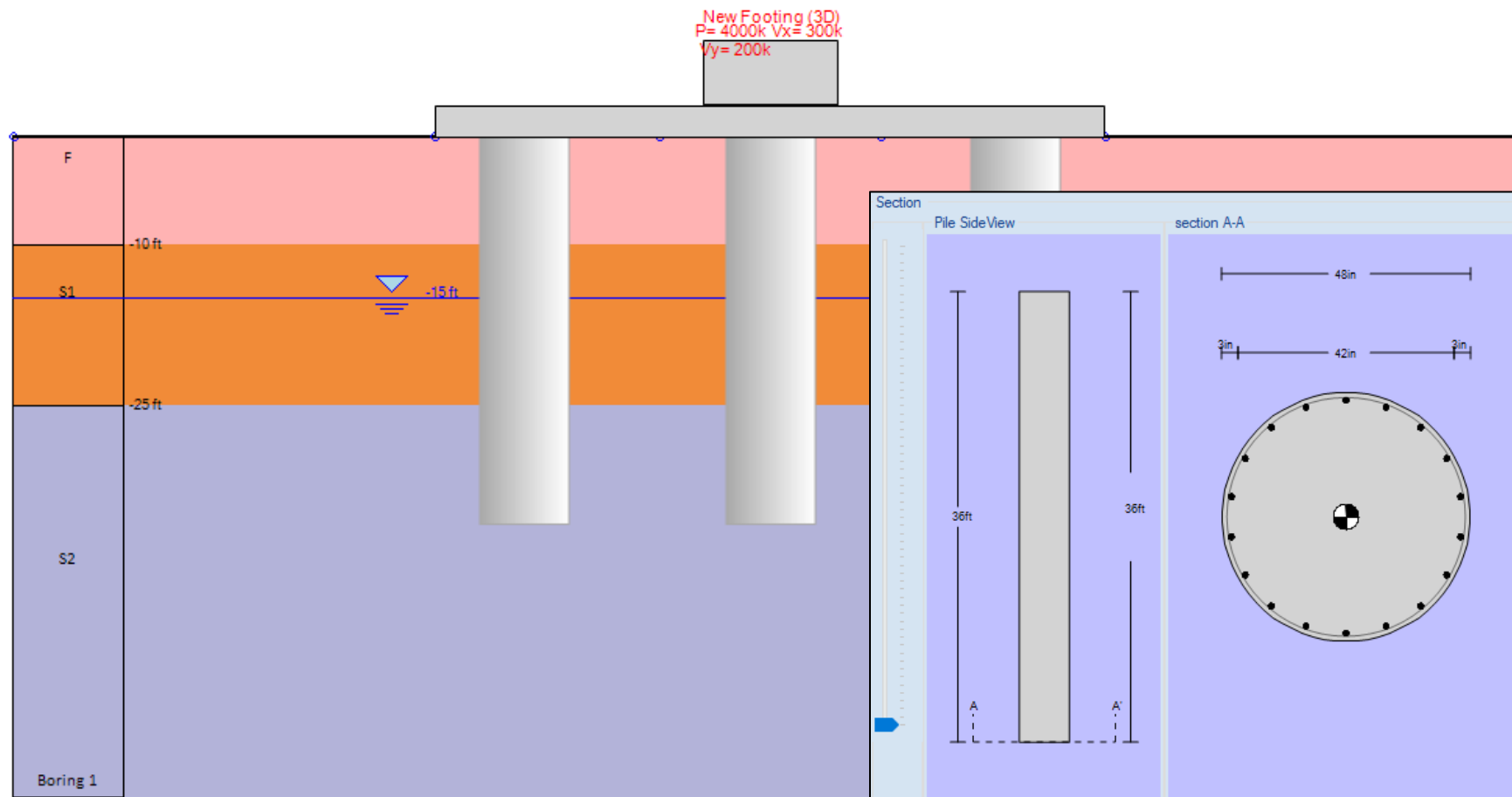


Example 1: Drilled Concrete Piles Single Pile - Rectangular Cap (Group) - Rectangular Raft



A. Soil Properties and Stratigraphy (Soil Layers)

Soil Name	γ _t (pcf)	c' (psf)	Su (psf)	φ' (deg)	K _{sub} (pci)	e ₅₀	Qu (ksf)	RQD (%)	form
F	120	0	-	30	30	-	-	-	-
S1	125	0	-	34	50	-	-	-	-
S2	130	200	-	38	100	-	-	-	-

Elev. (ft)	Soil (-)	γ _t (pcf)	C' or Su (psf)	φ' (deg)	Eoed (ksf)	m (-)	k _{sub} (pci)
0	F - Sand	120	0	30	300	0.5	30
-10	S1 - Sand	125	0	34	400	0.5	50
-25	S2 - Sand	135	200	36	600	0.35	100

1. General Boring Information - Coordinates

Name: Boring 1

Coordinates X: 50 ft Y: 0 ft

The x coordinate controls where the boring is shown in your design section. Each design section uses one boring (soil strata). You can use a different boring for each design section.

2. Boring Layers - Layer Elevations

	Top	Soil type	OCR	Ko
	0	F	1	0.5
	-10	S1	1	0.441
	-25	S2	1	0.412

4. Unit Weights - Density

γ_t: 120 pcf γ_{dry}: 120 pcf γ_': 57.6

5. Strength Parameters and Poisson Ratio

Drained strength properties

c': 0 psf φ': 30 degrees

v: 0.35

5. At-rest coefficients

KoNC: 0.5 nOCR: 0.5

Ko = KoNC * (OCR)^{nOCR}

6. Ultimate bond (grouted piles when bond option is selected)

q_{skin.u}: 20 psi

Select Model for lateral analysis

Available models for sand

Sand API Sand Reese

PY model data

subgrade reaction modulus k: 30 pci

B. Pile Section Properties and Initial Depth

Pile Properties

1. Selection of Support Type
 Type of Support: **Non Helical Pile**
 Installation method: **Drilled**

Use belled bottom

Section name and type
 Section name: **4ft Diam. Drilled Pile**
 Section type: **Circular**
 Non-prestressed section

3. Dimensions
 1.1 Coordinates at top of pile
 X: **0** ft
 Z: **0** ft
 1.2 Angles
 α : **90** deg

2. Pile Sections

Length (ft)	Section Type
40	4ft Diam. Dri...

Section Properties

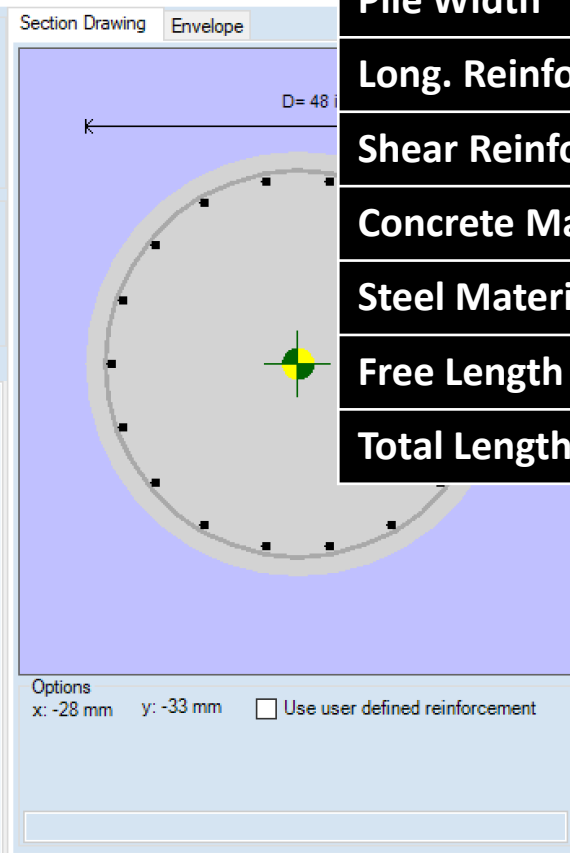
Dimensions
 D: **48** in
 C: **3** in

Reinforcement
 Rebars: Bars # **#9** N **18**

Shear Reinforcement
 Bars # **#4**

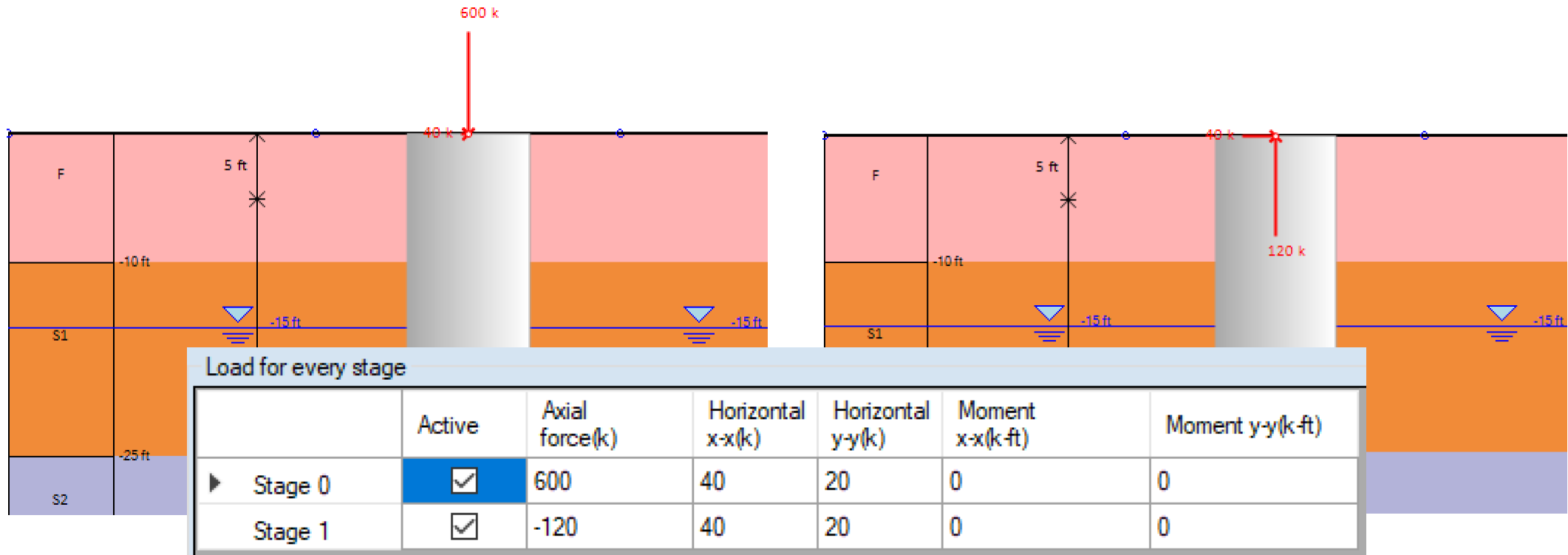
sV : **12** in
 θ : **21.8** deg α : **90** deg
 $\cot \theta = 2.5$

A: **360** in²



X-Coordinate	0
Section Type	Concrete Piles
Pile Width	4ft diam. piles
Long. Reinforcement	18 #9 Bars
Shear Reinforcement	#4 Bars @1ft Spacing
Concrete Material	3ksi Concrete
Steel Material	60ksi Rebar Steel
Free Length	5ft
Total Length (Initial)	40ft

C. Pile Loading



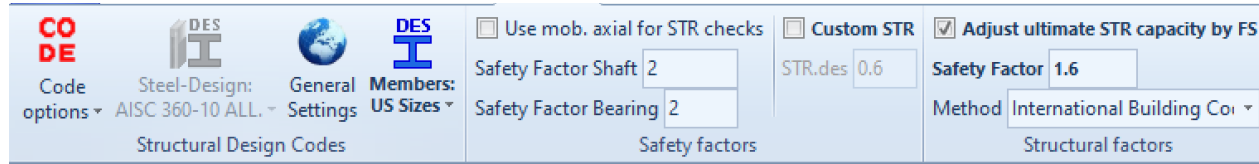
Stage 0: Compression

Stage 1: Tension

**Pile Depth Optimization: Perform Optimization for Selected Loads:
Maximum Depth 50ft, Step: 1ft**

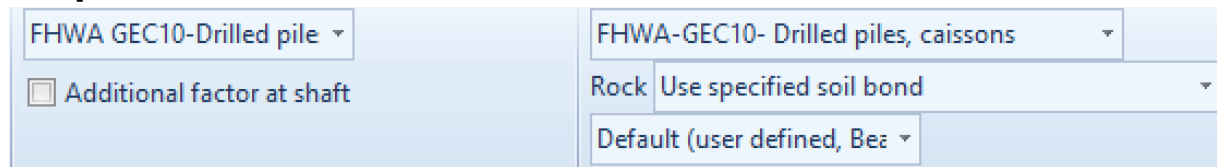
D. Analysis Settings & Design Codes

Service Conditions - shaft resistance & bearing capacity reduced by 2, structural capacities by 1.6



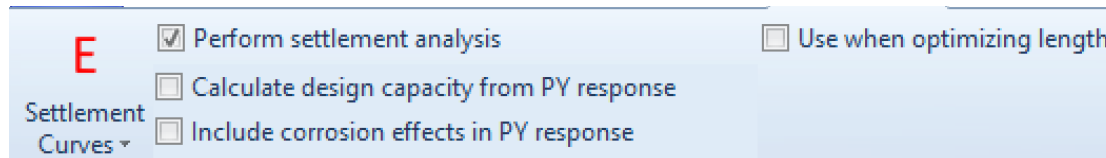
Use mob. axial for STR checks Custom STR Adjust ultimate STR capacity by FS
 Safety Factor Shaft: 2 STR.des: 0.6 Safety Factor: 1.6
 Safety Factor Bearing: 2 Method: International Building Co.
 Structural Design Codes Safety factors Structural factors

Capacity Calculation Method: FHWA GEC 10 for Drilled Piles



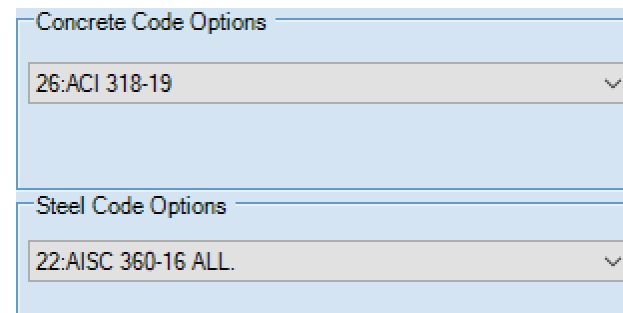
FHWA GEC10-Drilled pile FHWA-GEC10- Drilled piles, caissons
 Additional factor at shaft Rock: Use specified soil bond
 Default (user defined, Be

Estimate Settlements



Perform settlement analysis Use when optimizing length
 Calculate design capacity from PY response
 Include corrosion effects in PY response

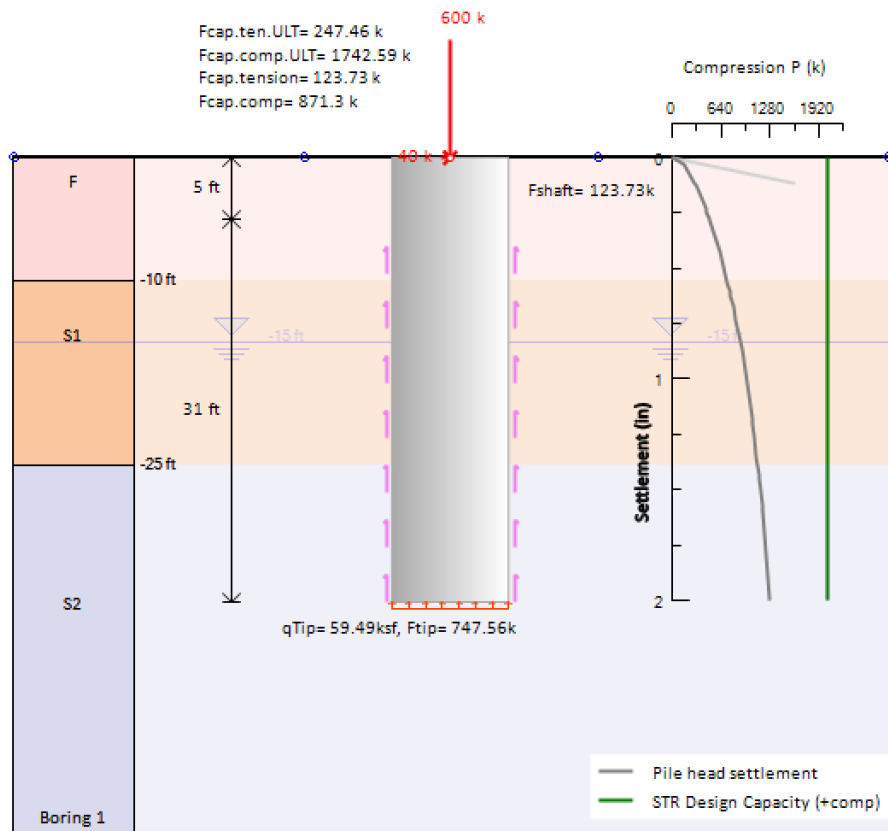
Steel Code: AISC 360-16 Allowable
Concrete Code: ACI 318-19



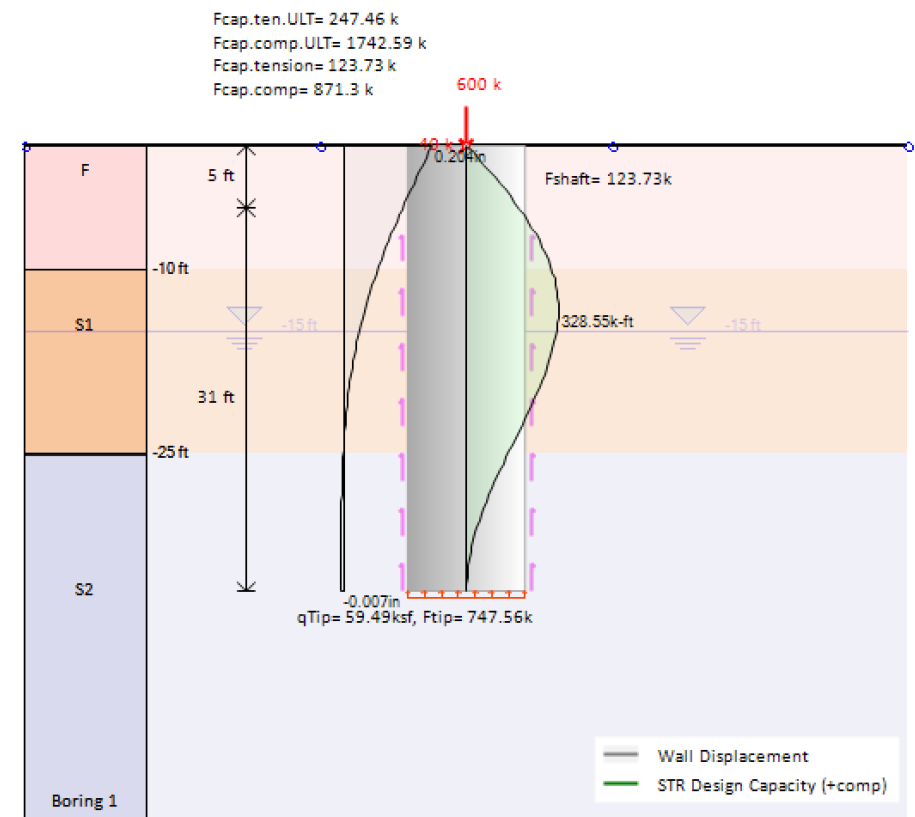
Concrete Code Options
 26:ACI 318-19
 Steel Code Options
 22:AISC 360-16 ALL.

E. Single Pile - Analysis Results

Optimized Pile Depth for Defined Loads: 36ft



Calculated Capacities & Pile Settlement



Pile Moment & Displacement Graphs - X-direction

F. Pile Cap Properties (Shape, size, pile locations, loading)

General | **Pile Layout** | Area Loads | Linear Loads

Name:

X: ft T: ft

Z: ft L: ft

Y: ft Place At Surface

Rectangular pile cap

Plan dimensions: ft By ft

Loading mode:

P: k Torsion: k-ft

Lateral Fx: k Lateral Fy: k

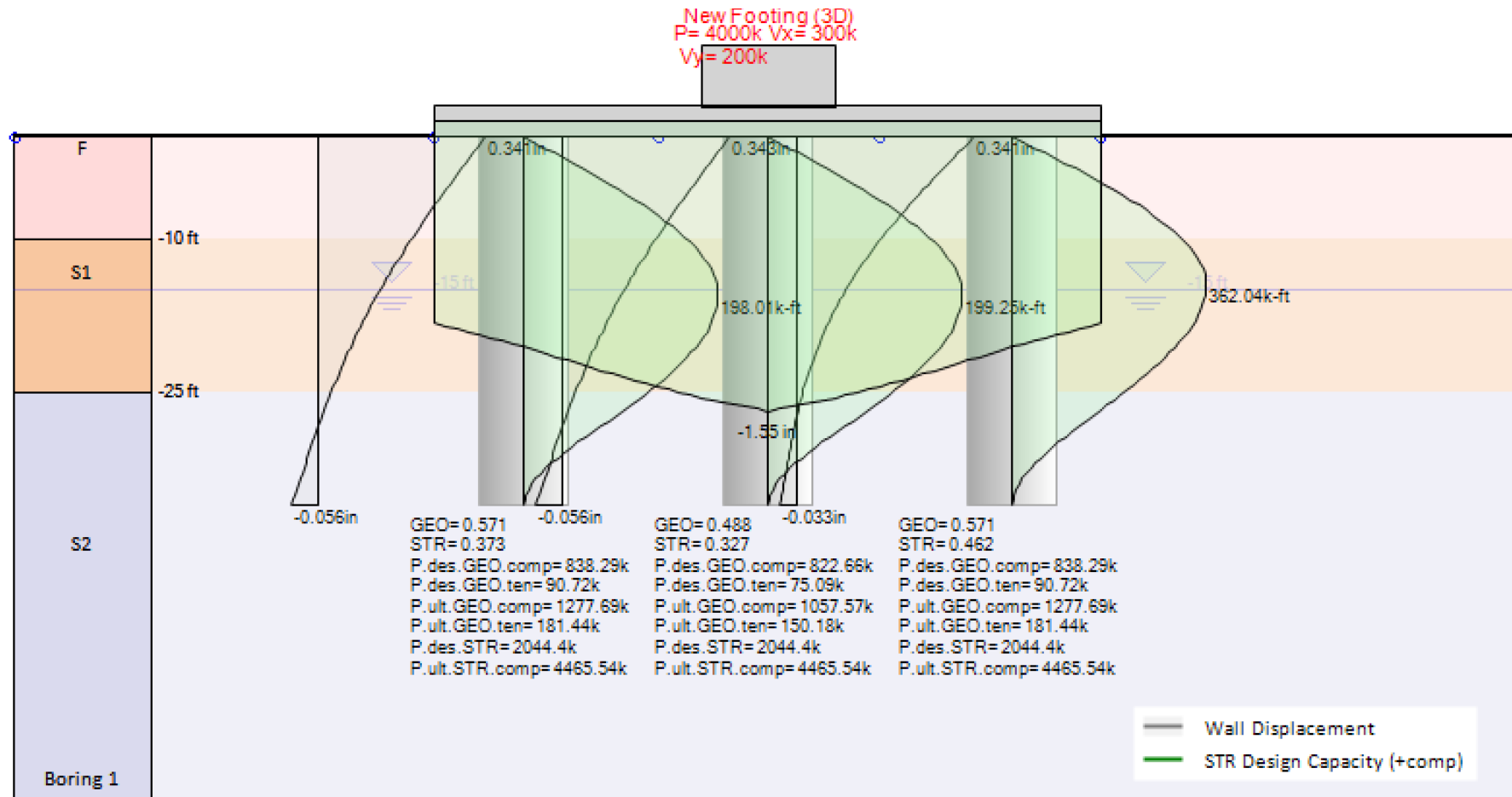
Moment Mxx: k-ft Moment Myy: k-ft

Concrete material:

cal to the pile cap (footing center)

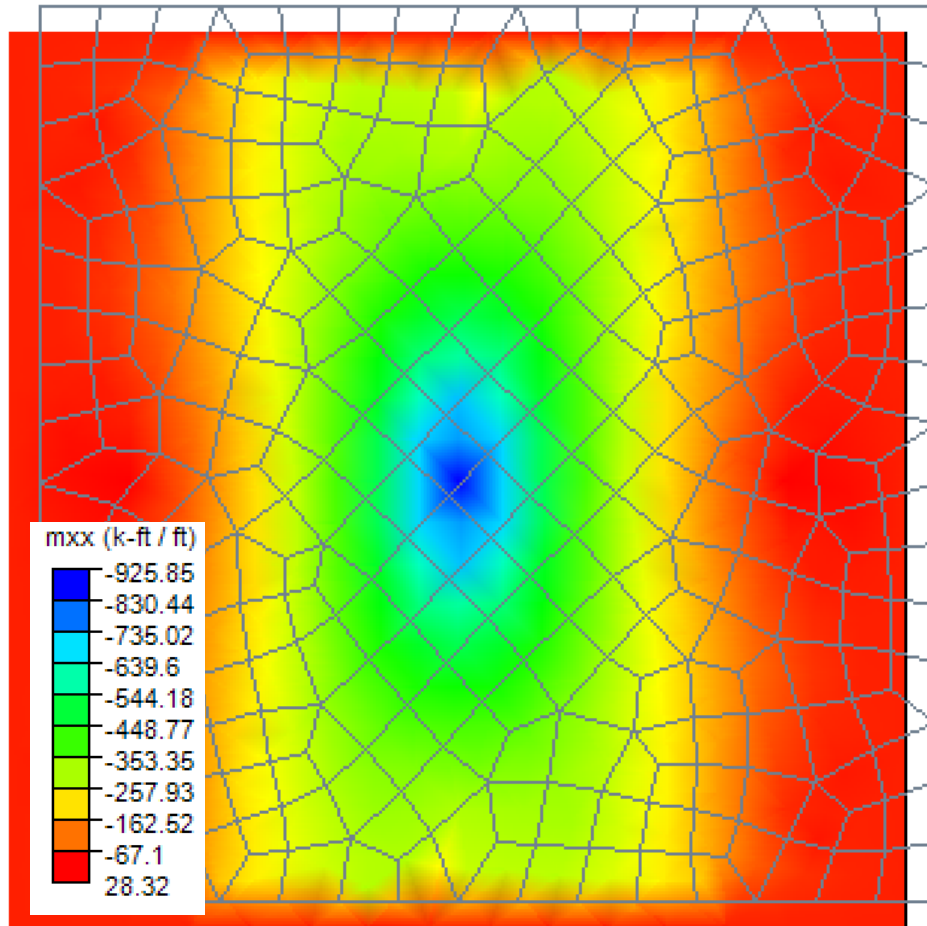
	File Name	x	y	Length	Local Rotation	Edit Pile
▶	P1-1	11	11	36	0	Edit
	P1-2	11	0	36	0	Edit
	P1-3	11	-11	36	0	Edit
	P2-1	0	11	36	0	Edit
	P2-2	0	0	36	0	Edit
	P2-3	0	-11	36	0	Edit
	P3-1	-11	11	36	0	Edit
	P3-2	-11	0	36	0	Edit
	P3-3	-11	-11	36	0	Edit

G1. Pile Group Results (Elevation View)

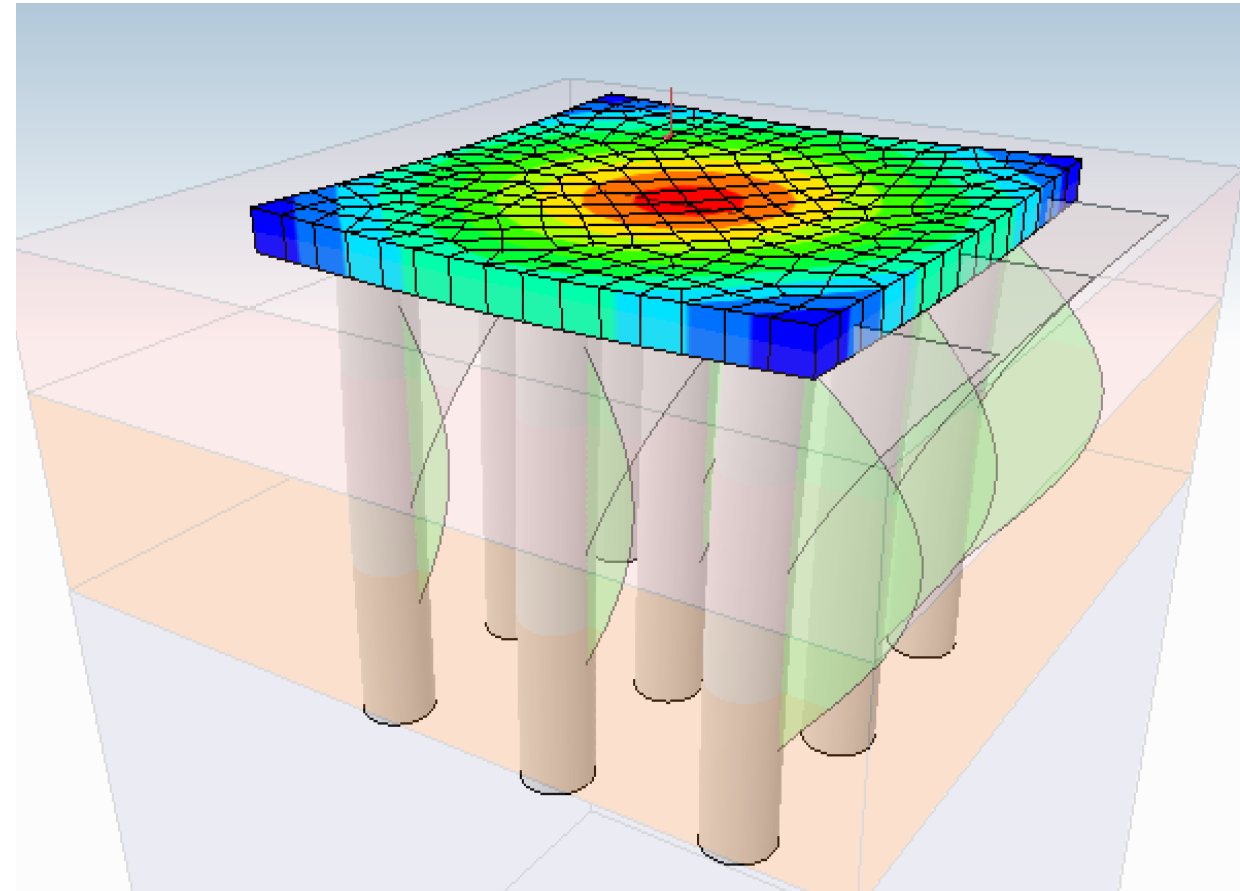


Pile Displacement & Moment Graphs (X-Direction), Pile Capacities & Pile Cap Settlement

G2. Pile Group Results (Top View & 3D)

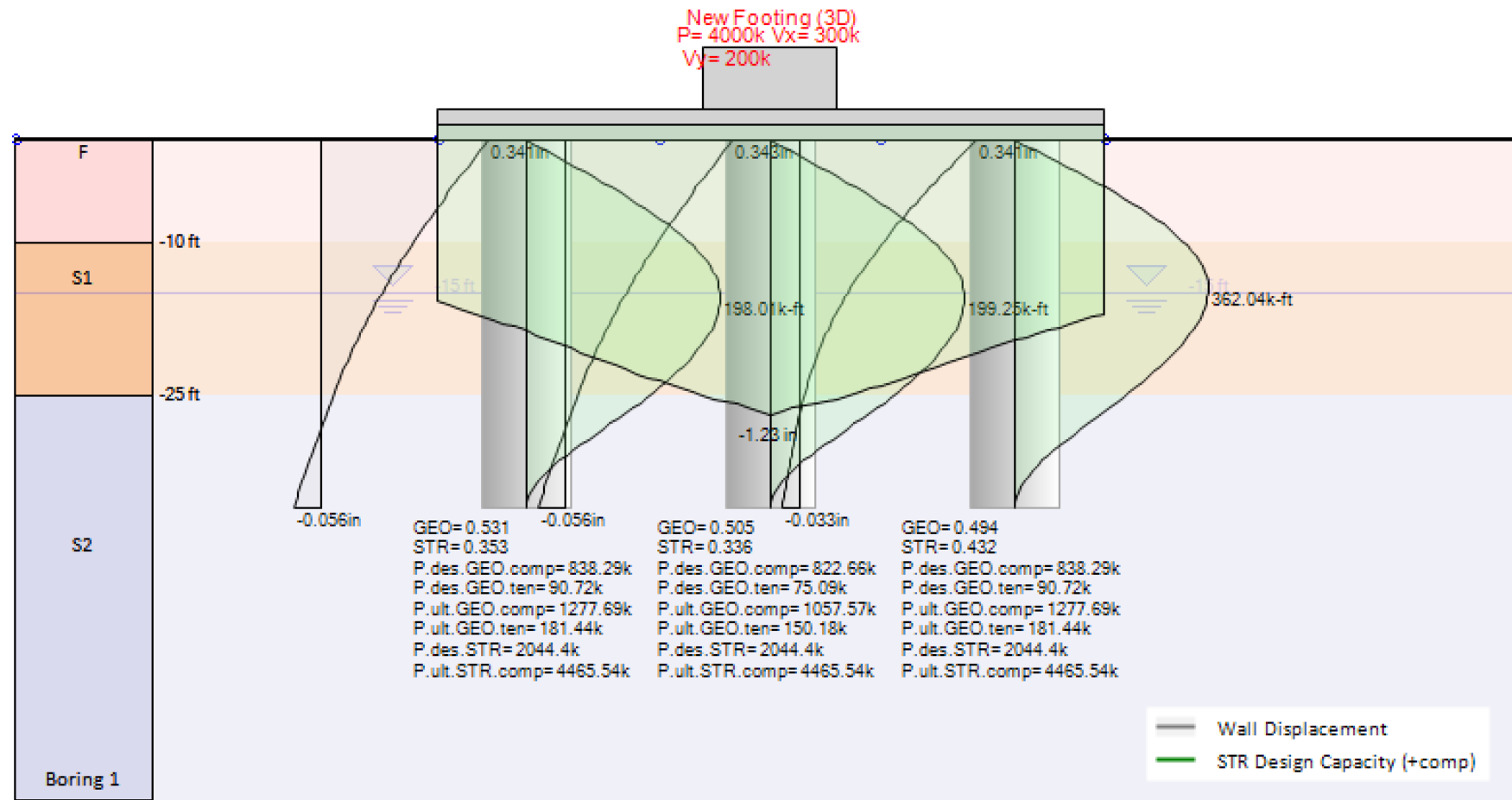


FEM Mesh & Cap Moment Shadings



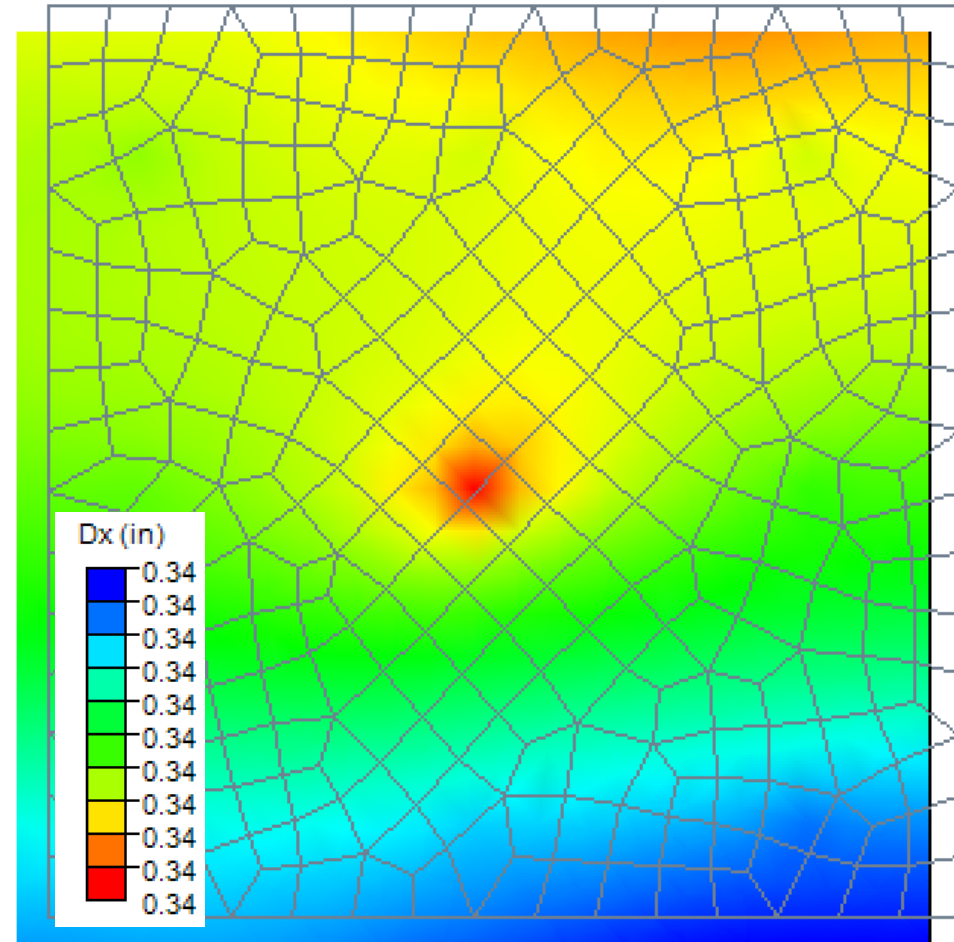
Cap Settlements & Pile Graphs - 3D Model

H1. Pile Raft Results (Elevation View)

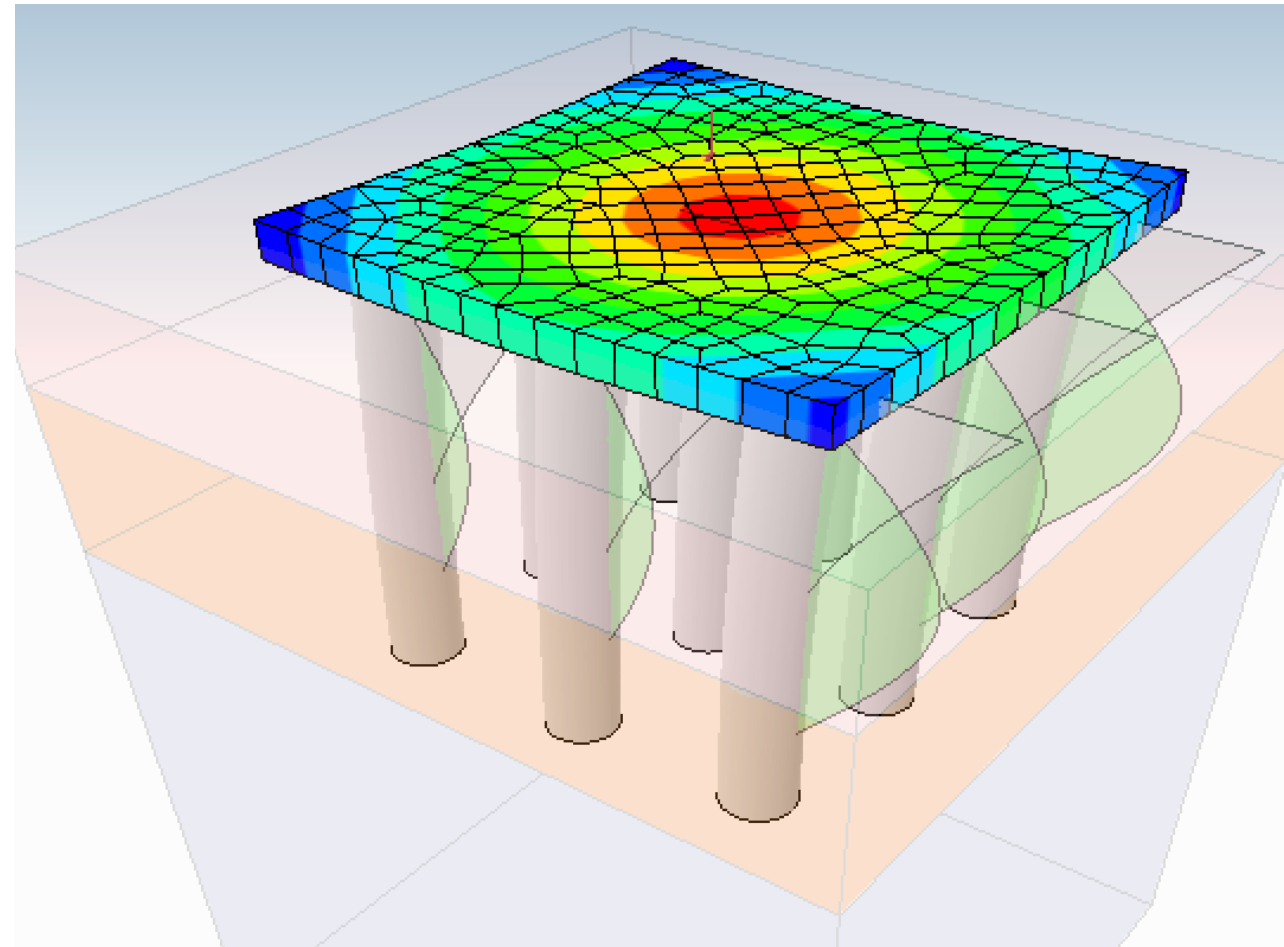


Pile Displacement & Moment Graphs (X-Direction), Pile Capacities & Pile Cap Settlement

H2. Pile Raft Results (Top View & 3D)



FEM Mesh & Cap Displacement Shadings



Cap Settlements & Pile Graphs - 3D Model

Thank You!

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