ANALYSIS OF SETTLEMENT OF A UNIFORMLY LOADED RECTANGULAR SPREAD FOOTING

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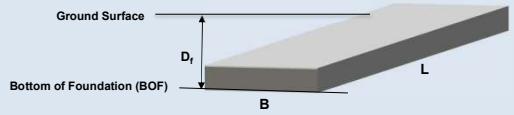
PROJECT INFORMATION	
Project Name	
Project No.	
Project Location	
Analyzed By	
Reviewed By	

INPUT PARAMETERS	
Analysis Description	
Ground Stress Distribution Method	Boussinesq Method
Elastic Settlement Analysis Method	Elastic Theory
Applied Net Bearing Pressure, p	4.00 ksf
Effective Width of Foundation, B	9.00 feet
Effective Length of Foundation, L	25.00 feet
Footing Embedment Depth, D_f	2.00 feet
Groundwater Depth Used for Design, D_w	5.00 feet

COMPUTED FOOTING SETTLEMENTS	
Elastic (Immediate) Settlement, Se	0.944 inches
Primary Consolidation Settlement, Sc	0.000 inches
Secondary Consolidation, Ss	0.000 inches
Total Footing Settlement	**0.94 inches**



REFERENCES:

1. Coduto, D.P., 1994. Foundation Design Principles and Practices, Prentice Hall.
2. Poulos, H.G. and Davis, E.H., 1974. "Elastic Solutions for Soil and Rock Mechanics", John Wiley, pp 54-57, 92-97.
3. Schmertmann, J.H., Hartman, J.P, and Brown, P.R, 1978. "Improved Strain Influence Factor Diagrams," Journal of Geotechnical Division, ASCE, Vol. 104 (GT8), pp. 1131-1135.
4. Soils and Found. Reference Manual, 2006. Volume I, Report No. FHWA-NHI-06-088, December 2006, pp. 7-15 to 7-28.

INPUT SOIL PROFILE DATA

Depth to Top of Soil Layer (feet)	Depth to Bottom of Soil Layer (feet)	Soil Type Model	Total Soil Unit Weight γ_t (pcf)	Elastic Soil Modulus E_s (ksf)	Poisson's Ratio ν	Primary Compression Ratio $C_c / (1 + e_0)$	Recompression Ratio $C_r / (1 + e_0)$	Secondary Compression Ratio $C_\alpha / (1 + e_p)$	Overconsol. Ratio OCR
0.00	2.00	Cohesionless Soil	120.00						
2.00	6.00	Cohesionless Soil	120.00	600.00	0.35				1.00
6.00	7.50	Cohesionless Soil	120.00	300.00	0.35				1.00
7.50	10.00	Cohesionless Soil	120.00	400.00	0.35				1.00
10.00	15.00	Cohesionless Soil	120.00	400.00	0.35				1.00
15.00	20.00	Cohesionless Soil	120.00	550.00	0.35				1.00
20.00	25.00	Cohesionless Soil	120.00	600.00	0.35				1.00

SOIL STRESS AND SETTLEMENT CALCULATIONS

BOF to Soil Depth Z (feet)	Soil Layer Thickness H_i (feet)	Ini. Effective Vert. Stress (bottom) σ'_{vob} (psf)	Ini. Effective Vert. Stress (mid-layer) σ'_{vom} (psf)	Maximum Past Soil Pressure σ_c (ksf)	Stress Change Δp (ksf)	Elastic (Immediate) Settlement Se (inches)	Primary Consolidation Settlement Sc (inches)	Secondary Consolidation Settlement Ss (inches)	Total Soil Layer Settlement (Se +Sc + Ss) (inches)	Cumulative Footing Settlement (inches)
N/A	2.00	240.00	N/A	N/A	N/A	0.000	0.000	0.000	0.000	0.944
2.00	4.00	657.60	448.80	N/A	3.88	0.158	0.000	0.000	0.158	0.785
4.75	1.50	744.00	700.80	N/A	3.17	0.118	0.000	0.000	0.118	0.668
6.75	2.50	888.00	816.00	N/A	2.61	0.131	0.000	0.000	0.131	0.536
10.50	5.00	1,176.00	1,032.00	N/A	1.79	0.211	0.000	0.000	0.211	0.326
15.50	5.00	1,464.00	1,320.00	N/A	1.14	0.146	0.000	0.000	0.146	0.180
20.50	5.00	1,752.00	1,608.00	N/A	0.77	0.180	0.000	0.000	0.180	0.000