Settlement Analysis

Organization: **SoilStructure.com**
Project Name: **Embankment**
Job #: **6789**
Design by: **LAA**
Date: **3/16/2017**

Foundation Geometry, GWT & Loading

Units: **English**
Embankment Shape: **Rectangle**
Method: **Embankment**

Variable	Value	Variable	Value
Emb. Lower Width	50.00 ft	Ground Water Depth	3.00 ft
Emb. Upper Width	15.00 ft	Embank. Unit Weight	110.0 lb/ft^3
Embankment Length	70.00 ft	Max. Settl. Depth	15.00 ft
Embankment Bottom	0.00 ft	Embankment Height	15.0 ft

Time Rate Inputs

Thickness of Clay	15.00 ft	Drainage Condition	Single Drainage
Coef. of Consolidation	0.150 ft^2/day		

Geotechnical Properties

#	Material Type	USCS	Layer Thick, ft	Consistency	Compr. Ratio Cc/(1+e)	Recompr. Ratio Cr/(1+e)	OC Margin sigma m' lb/ft^2	Unit Wt gamma lb/ft^3
1	Cohesive Soil	CL	3.00 0 - 3	Firm	0.070	0.007	300	115.0
2	Cohesive Soil	CH	12.00 3 - 15	Firm	0.070	0.007	300	115.0

Results

Applied Pressure, q:	1650.0 lb/ft^2	Drainage Height:	15.00 ft
Total Settlement, S:	4.51 in	Time for 99% Consol.:	7.32 years

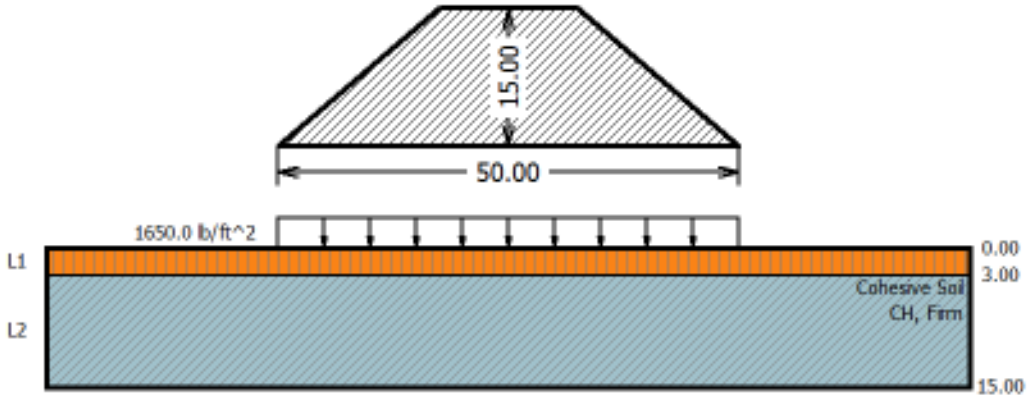

Fig. 1: Plan and Cross Section

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Node #	Depth Below Em (ft)	O.C.+Eff. Str (psf)	Eff. Stress (psf)	Embank. Stress (psf)	Emb. + Eff. Str (psf)
1	0.13	314.38	14.38	1650.00	1664.37
2	0.38	343.13	43.13	1650.00	1693.12
3	0.63	371.88	71.88	1649.99	1721.86
4	0.88	400.63	100.63	1649.96	1750.59
5	1.13	429.38	129.38	1649.92	1779.30
6	1.38	458.13	158.13	1649.86	1807.98
7	1.63	486.88	186.88	1649.76	1836.64
8	1.88	515.63	215.63	1649.64	1865.26
9	2.13	544.38	244.38	1649.47	1893.85
10	2.38	573.13	273.13	1649.27	1922.39
11	2.63	601.88	301.88	1649.01	1950.89
12	2.88	630.63	330.63	1648.71	1979.33
13	3.13	651.58	351.58	1648.34	1999.92
14	3.38	664.73	364.73	1647.92	2012.64
15	3.63	677.88	377.88	1647.43	2025.30
16	3.88	691.03	391.03	1646.87	2037.89
17	4.13	704.18	404.18	1646.24	2050.41
18	4.38	717.33	417.33	1645.53	2062.85
19	4.63	730.48	430.48	1644.73	2075.21
20	4.88	743.63	443.63	1643.86	2087.48
21	5.13	756.78	456.78	1642.90	2099.67
22	5.38	769.93	469.93	1641.84	2111.77
23	5.63	783.08	483.08	1640.69	2123.77
24	5.88	796.23	496.23	1639.45	2135.67
25	6.13	809.38	509.38	1638.10	2147.48
26	6.38	822.53	522.53	1636.66	2159.18
27	6.63	835.68	535.68	1635.11	2170.78
28	6.88	848.83	548.83	1633.45	2182.27
29	7.13	861.98	561.98	1631.69	2193.66
30	7.38	875.13	575.13	1629.81	2204.94
31	7.63	888.28	588.28	1627.83	2216.10
32	7.88	901.43	601.43	1625.73	2227.15
33	8.13	914.58	614.58	1623.52	2238.09
34	8.38	927.73	627.73	1621.19	2248.91
35	8.63	940.88	640.88	1618.75	2259.62
36	8.88	954.03	654.03	1616.19	2270.21
37	9.13	967.18	667.18	1613.51	2280.69
38	9.38	980.33	680.33	1610.72	2291.05
39	9.63	993.48	693.48	1607.81	2301.29
40	9.88	1006.63	706.63	1604.79	2311.41
41	10.13	1019.78	719.78	1601.65	2321.42
42	10.38	1032.93	732.93	1598.39	2331.31
43	10.63	1046.08	746.08	1595.01	2341.09
44	10.88	1059.23	759.23	1591.52	2350.75
45	11.13	1072.38	772.38	1587.92	2360.29
46	11.38	1085.53	785.53	1584.20	2369.73
47	11.63	1098.68	798.68	1580.37	2379.05
48	11.88	1111.83	811.83	1576.43	2388.26
49	12.13	1124.98	824.98	1572.38	2397.35
50	12.38	1138.13	838.13	1568.22	2406.34
51	12.63	1151.28	851.28	1563.95	2415.23
52	12.88	1164.43	864.43	1559.58	2424.00
53	13.13	1177.58	877.58	1555.10	2432.68
54	13.38	1190.73	890.73	1550.52	2441.25
55	13.63	1203.88	903.88	1545.84	2449.72
56	13.88	1217.03	917.03	1541.06	2458.09
57	14.13	1230.18	930.18	1536.19	2466.36
58	14.38	1243.33	943.33	1531.22	2474.54
59	14.63	1256.48	956.48	1526.15	2482.63
60	14.88	1269.63	969.63	1521.00	2490.62

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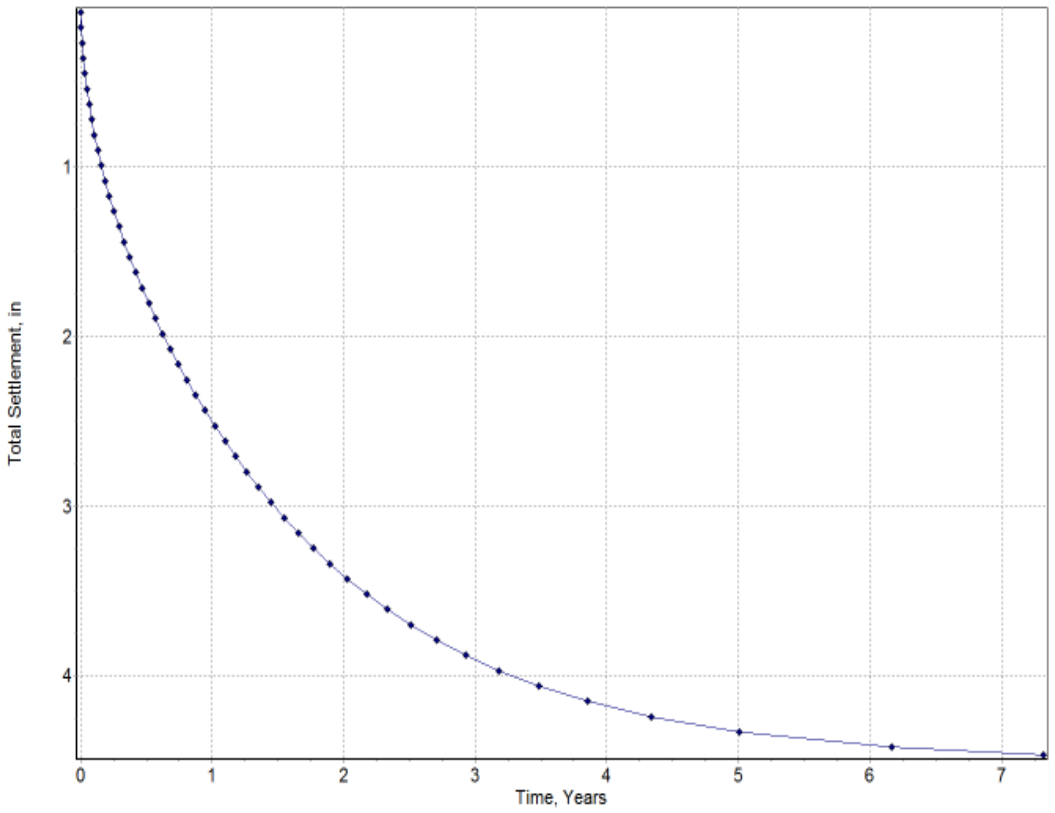
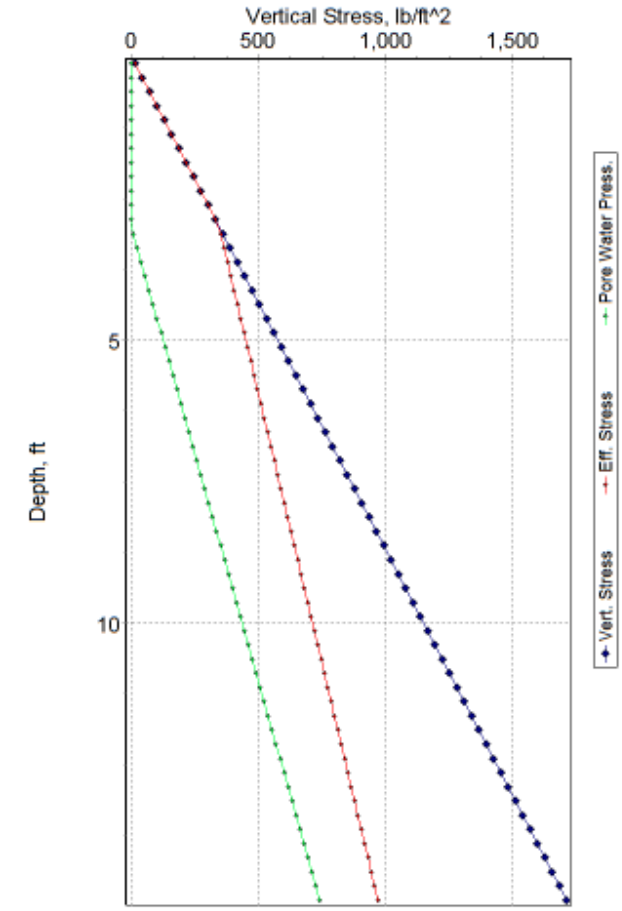
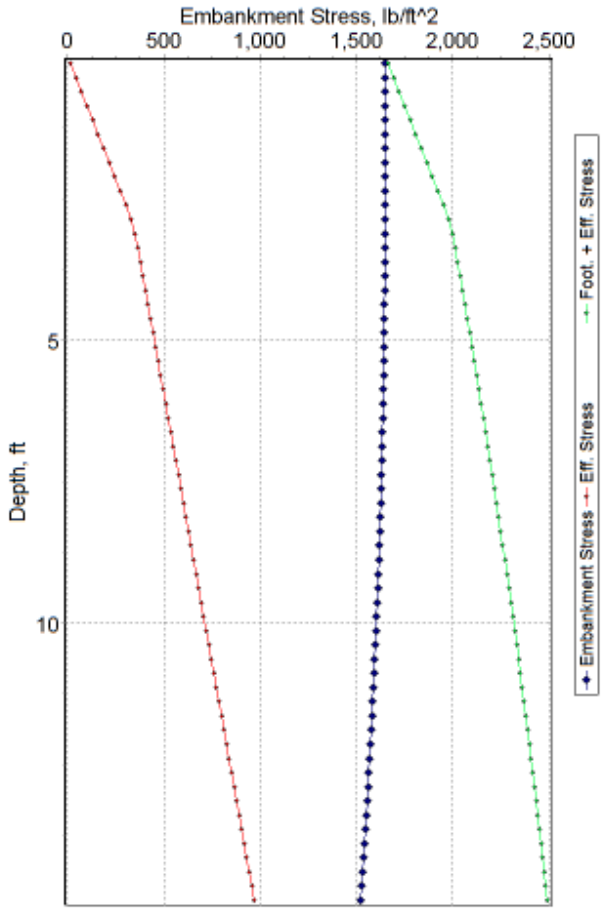
Node #	Strain (%)	Indiv. Sett. (in)	Tot. Sett. (in)	Total Stress (psf)	Pore Water (psf)
1	4.804	0.144	0.144	14.38	0.00
2	4.387	0.132	0.276	43.13	0.00
3	4.127	0.124	0.400	71.88	0.00
4	3.923	0.118	0.517	100.63	0.00
5	3.749	0.112	0.630	129.38	0.00
6	3.597	0.108	0.738	158.13	0.00
7	3.462	0.104	0.841	186.88	0.00
8	3.339	0.100	0.942	215.63	0.00
9	3.227	0.097	1.038	244.38	0.00
10	3.124	0.094	1.132	273.13	0.00
11	3.028	0.091	1.223	301.88	0.00
12	2.939	0.088	1.311	330.63	0.00
13	2.878	0.086	1.397	359.38	7.80
14	2.840	0.085	1.483	388.13	23.40
15	2.804	0.084	1.567	416.88	39.00
16	2.769	0.083	1.650	445.63	54.60
17	2.734	0.082	1.732	474.38	70.20
18	2.701	0.081	1.813	503.13	85.80
19	2.668	0.080	1.893	531.88	101.40
20	2.636	0.079	1.972	560.63	117.00
21	2.605	0.078	2.050	589.38	132.60
22	2.574	0.077	2.127	618.13	148.20
23	2.544	0.076	2.204	646.88	163.80
24	2.515	0.075	2.279	675.63	179.40
25	2.486	0.075	2.354	704.38	195.00
26	2.458	0.074	2.427	733.13	210.60
27	2.430	0.073	2.500	761.88	226.20
28	2.403	0.072	2.572	790.63	241.80
29	2.376	0.071	2.644	819.38	257.40
30	2.350	0.070	2.714	848.13	273.00
31	2.324	0.070	2.784	876.88	288.60
32	2.298	0.069	2.853	905.63	304.20
33	2.273	0.068	2.921	934.38	319.80
34	2.249	0.067	2.988	963.13	335.40
35	2.224	0.067	3.055	991.88	351.00
36	2.200	0.066	3.121	1020.63	366.60
37	2.177	0.065	3.187	1049.38	382.20
38	2.153	0.065	3.251	1078.13	397.80
39	2.130	0.064	3.315	1106.88	413.40
40	2.108	0.063	3.378	1135.63	429.00
41	2.085	0.063	3.441	1164.38	444.60
42	2.063	0.062	3.503	1193.13	460.20
43	2.041	0.061	3.564	1221.88	475.80
44	2.020	0.061	3.625	1250.63	491.40
45	1.998	0.060	3.685	1279.38	507.00
46	1.977	0.059	3.744	1308.13	522.60
47	1.957	0.059	3.803	1336.88	538.20
48	1.936	0.058	3.861	1365.63	553.80
49	1.916	0.057	3.918	1394.38	569.40
50	1.895	0.057	3.975	1423.13	585.00
51	1.875	0.056	4.031	1451.88	600.60
52	1.856	0.056	4.087	1480.63	616.20
53	1.836	0.055	4.142	1509.38	631.80
54	1.817	0.055	4.196	1538.13	647.40
55	1.797	0.054	4.250	1566.88	663.00
56	1.779	0.053	4.304	1595.63	678.60
57	1.760	0.053	4.357	1624.38	694.20
58	1.741	0.052	4.409	1653.13	709.80
59	1.723	0.052	4.460	1681.88	725.40
60	1.704	0.051	4.512	1710.63	741.00

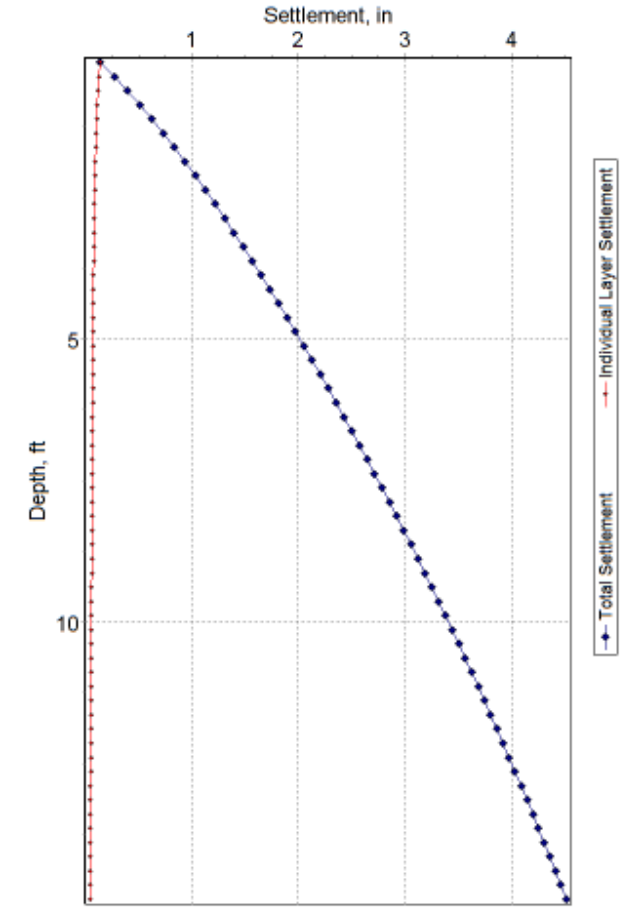
Table of Time Rate Results

Node #	Tot. Sett. (in)	Time Factor (Tv)	Time (years)	Node #	Tot. Sett. (in)	Time Factor (Tv)	Time (years)
1	0.09	0.00030	0.00	26	2.35	0.21200	0.87
2	0.18	0.00013	0.00	27	2.44	0.23000	0.95
3	0.27	0.00283	0.01	28	2.53	0.24800	1.02
4	0.36	0.00502	0.02	29	2.62	0.26700	1.10
5	0.45	0.00785	0.03	30	2.71	0.28600	1.18
6	0.54	0.01130	0.05	31	2.80	0.30700	1.26
7	0.63	0.01540	0.06	32	2.89	0.32900	1.35
8	0.72	0.02010	0.08	33	2.98	0.35200	1.45
9	0.81	0.02540	0.10	34	3.07	0.37700	1.55
10	0.90	0.03140	0.13	35	3.16	0.40300	1.66
11	0.99	0.03800	0.16	36	3.25	0.43100	1.77
12	1.08	0.04520	0.19	37	3.34	0.46100	1.89
13	1.17	0.05310	0.22	38	3.43	0.49300	2.03
14	1.26	0.06150	0.25	39	3.52	0.52900	2.17
15	1.35	0.07070	0.29	40	3.61	0.56700	2.33
16	1.44	0.08030	0.33	41	3.70	0.61000	2.51
17	1.53	0.09070	0.37	42	3.79	0.65800	2.70
18	1.62	0.10200	0.42	43	3.88	0.71200	2.93
19	1.71	0.11300	0.46	44	3.97	0.77400	3.18
20	1.80	0.12600	0.52	45	4.06	0.84800	3.48
21	1.89	0.13800	0.57	46	4.15	0.93800	3.85
22	1.99	0.15200	0.62	47	4.24	1.05500	4.34
23	2.08	0.16600	0.68	48	4.33	1.21900	5.01
24	2.17	0.18100	0.74	49	4.42	1.50000	6.16
25	2.26	0.19700	0.81	50	4.47	1.78100	7.32









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