

7. Laboratory compaction test results for a plastic soil are given in the following table:

Test Method ASTM D698		Test Method ASTM D1557	
Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
11.8	100.2	12.0	116.2
13.6	102.8	13.6	117.6
15.7	105.3	14.8	117.9
17.7	106.4	16.1	116.5
19.6	103.7	17.2	113.6
20.8	100.8		

Specifications call for a fill dry density of 114 pcf and further require that the fill be compacted at optimum water content for the field compactive effort. For the following field density test results on a fill, explain how you would alter the field placement operation:

- $\gamma_d = 115$ pcf; $w = 12.5\%$
 - $\gamma_d = 112.5$ pcf; $w = 13.5\%$
 - $\gamma_d = 110$ pcf; $w = 14.5\%$
 - $\gamma_d = 111$ pcf; $w = 17.3\%$
8. A subsurface exploration report shows that the average water content of a fine-grained soil in a proposed borrow area is 22% and that its average natural dry density is 82 pcf. This soil is to be placed in a compacted fill with a dry density specified at 96 pcf. How many cubic yards of borrow will be required to produce 50,000 yd³ of fill? What is the shrinkage factor for the borrow?