

APPENDIX B

THE UNIFIED SOIL CLASSIFICATION CHART: RELATIONSHIP BETWEEN SWELL INDEX AND ATTERBERG LIMITS

UNIFIED SOIL CLASSIFICATION CHART: RELATIONSHIP BETWEEN SWELL INDEX AND ATTERBERG LIMITS

The following discussion pertains to the variability study conducted on five map units in Fauquier County. Map units are Davidson, Haymarket, Jackland, Waxpool, and Kelly. See Chapter V for explanation of study design.

RESULTS AND DISCUSSION

Plasticity index, although highly correlated with liquid limit, did not correlate with swell index. However, when plotting swell index in against liquid limit and plasticity index on the Unified Classification System plasticity chart, a trend is observed (Figure B.1). Most soils with high and very high swell indices have high liquid limit and high PI. The line labeled “A” above a liquid limit of 50 separates soils of high plasticity, or fat clays (above line), from elastic clays, soils of low compressibility (below line). At liquid limits less than 50, line “A” separates soils of medium plasticity (above line) from soils of medium compressibility (below “A” line). Using this graph, critical lower limits of liquid limit and plasticity index can be ascertained. Soils that have high or very high shrink-swell potential would have liquid limits greater than 50 and plasticity indices greater than 30. Soils with moderate shrink-swell potential have liquid limits ranging from 25 to 50 and plasticity indices between 15 and 30. Low shrink-swell potentials are indicated by liquid limits less than 25 and plasticity indices less than 15.

SUMMARY

- Plotting liquid limit and plasticity index against swell index on the Unified Soil Classification System plasticity chart, a trend is observed. Almost all soils with high and very high shrink-swell potential have high liquid limit and plasticity index.
- In assessing risk for the map units using liquid limit and plasticity index as expansive soils predictors, low risk soils will have liquid limits less than 25 and PI less than 15. Moderate risk is indicated by liquid limit ranging from 25 to 50 and PI ranging from 15 to 30. High risk can be assumed if liquid limit is greater than 50 and PI is greater than 30.

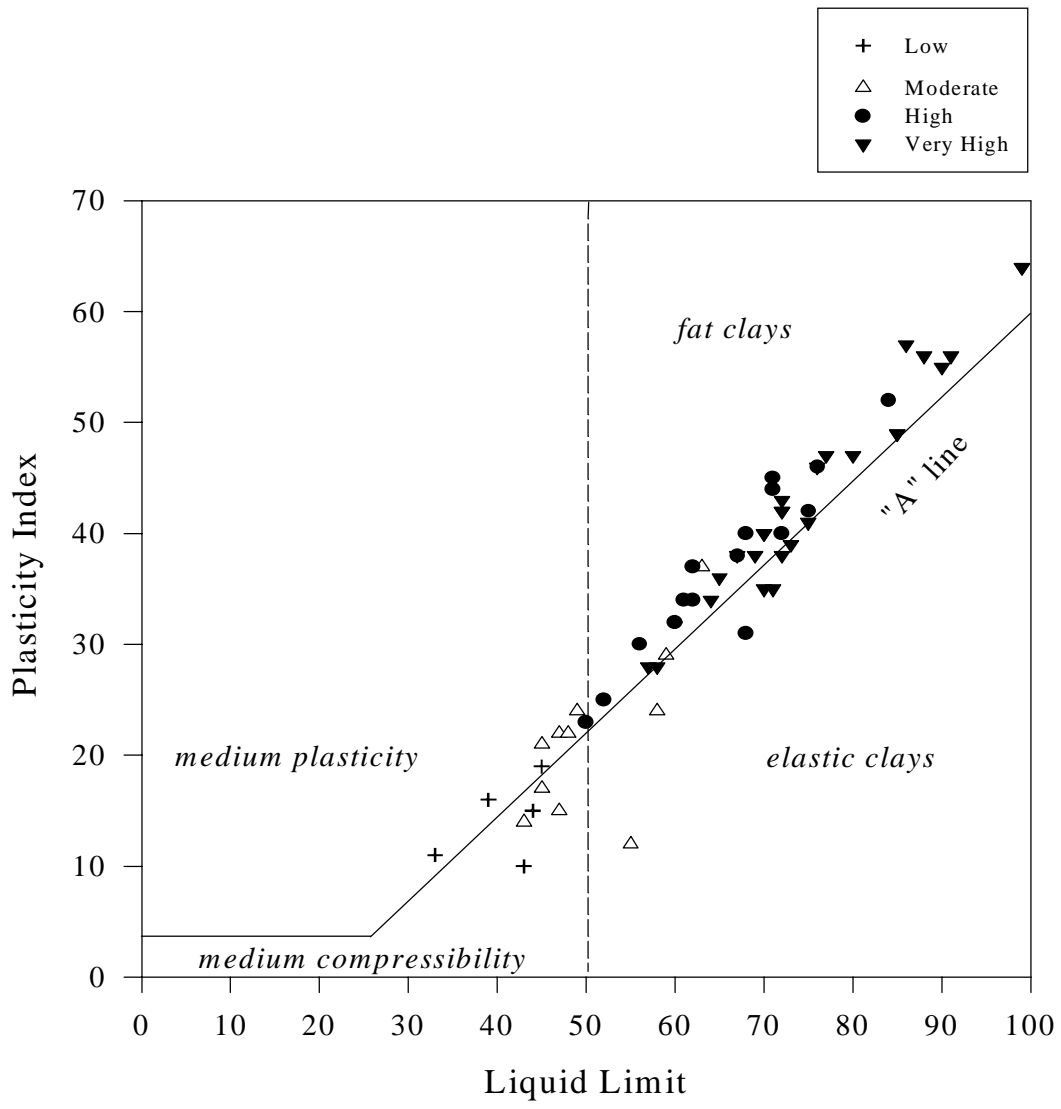


Figure B.1. Swell index as related to liquid limit and plasticity index.