Managing Soils for Construction Purposes in Urban Areas

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Soils vary across the landscape in response to five soil forming factors: parent material, biota, climate, relief, and time. The occurrence of combinations of soil properties is predictable and has been used in making soil maps. Buol et al. (1997) drawing upon Mill (1925), recognized that soils are classified to organize knowledge, understand relationships, remember properties, and establish groups in a manner useful for applied purposes. The value of describing, evaluating and cataloging the soil resource was recognized and undertaken at the federal level by the precursors of the Natural Resources Conservation Service (NRCS), formally the Soil Conservation Service. Soil classification was established initially for agricultural purposes. Other classification systems designed for engineering purposes focus on textural characteristics and other material properties. Therefore, the USDA soil texture classes differ from those of the Unified and the American Association of State Highway and Transportation Officials (AASHTO, formerly AASHO) systems used by engineers. The USDA system describes soil texture to provide meaningful classes to water movement, water retention, and chemical-mineralogical properties. The Unified system classifies texture into groups more meaningful to bearing strength and construction interpretations, while the AASHTO system was specifically intended for interpretation of road, highway and runway construction. As all three systems seek to describe basic properties of soils, each differs from others in properties selected and in class boundaries to make specific interpretations maximally meaningful for its discipline. Each system can be correlated, though imperfectly, to the other allowing development of interpretations outside the original intent of the system.

Bridging disciplines requires either adopting a common base of information or a transfer of information between disciplines. As the National Cooperative Soil Survey is the only group in the USA that has undertaken to map soils at a large scale, and as most of the USA has been mapped, it is imperative that the cooperative soil survey make strides in bridging disciplines to maximize use of soil survey information. Soil scientists have developed terminology and a classification system aimed at soil management for many uses to include the engineering and construction industry’s needs for soil information to design for stability of structures. Buol et al. (1997) discussed the development of soil classification schemes, recognizing U.S.