

Moving Soil Safely – A Brief Overview

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New construction/renovation of any property, more often than not, will include the disturbance, relocation, and/or remediation and restoration of on-site soils. All of these activities carry with them a certain degree of inherent risk that must be adequately addressed by the contractor in order to successfully and safely complete the project. As such, advanced planning and continuous monitoring of construction activities is paramount to any construction project. This article's intent is to address three major areas of concern, with relation to the safe movement of on-site soils – structural properties of soil, environmental consequences of moving soil, and the project logistics.

Structural properties of soil - probably the single greatest determining factor of any construction project cost and scope – can easily make or break a project. Breaking ground on a project in which the contractor plans to use cut & fill techniques, only to find that the cut slope soils consist primarily of silty clay, can cause not only serious delays to the project schedule, but added (and unanticipated) costs to the owner. Additionally, the ability of the contractor to effectively stockpile on-site soils can be severely impacted by soil properties. For projects in urban settings where laydown areas are tight and soil stockpiles can achieve heights in excess of 10 feet, the soil's behavioral and engineering characteristics are very important (soil type aside, jurisdictional and OSHA requirements should always be followed).

The environmental consequences of moving soil are extremely wide, ranging and vary significantly based on geographic location of the project. Environmental consequences/issues can include, but are certainly not limited to subsidence, karst conditions, mine spoils, acid bearing rock, contaminated soils from previous/surrounding land use, and many more. Additionally, the environmental safety of the properties and waterways surrounding a construction site must be addressed through Erosion & Sediment Control Plans and Post Construction Stormwater Management Plans. Both of these documents, although often considered to be the most bothersome aspect of any project, are vital instruments in maintaining the safe movement of soils at a site.

The third area of concern – project logistics – deals primarily with the physical act of moving the soil itself. Every construction site must properly

identify the appropriate types of equipment to move the soil and the necessary transportation routes in order for equipment operators to safely access and egress the site. This is especially important for large scale operations which require the use of multiple subcontractors to transport soil on-, off-, and around the site. Another important aspect which requires appropriate planning is the trenching and excavation of soil. For projects where working within trenches is required, inappropriate benching or excavation support shoring can lead to serious worker injury or death. The same can be said for worker jobsite awareness while working especially given two of the 'Big Four Construction Hazards', as identified by OSHA, fall into the struck by and caught between construction equipment categories.

So how can a contractor avoid the pitfalls and dangers identified above? The first step comes far in advance of any ground breaking and primarily includes a detailed site investigation. Even the most basic site investigation identifies potential environmental issues at a site. Performing a Phase I Environmental Site Assessment (ESA) investigation, which meets the requirements of ASTM E1527-05, will alert the contractor and property owner of potential environmental hazards which may have gone unnoticed during earlier phases of the project.

A thorough Geotechnical (Geotech) Investigation is also recommended in order to determine the physical and chemical properties of soils present at the site. The findings from the Geotechnical Investigation are summarized in a report, usually signed and stamped by a professional engineer, and used to determine a proposed building's foundation bearing capacity and limitations, if any, for moving soils to achieve proposed grades. The Geotech Report can also offer avoidance and mitigation measures for project sites that contain many of the issues discussed above in the 'structural properties of soil' paragraph. But, even a contractor armed with these reports is still susceptible to egregious information or hastily prepared reports. That is why it is important for the contractor to touch base with, or subcontract, a local soils expert. Having a local professional/engineer on the project team, will provide the most valuable source of information pertaining to safely moving soil as they have vast experience, and usually work with the regional soils on a regular basis. Hiring a consultant from outside the project's region that has successfully worked with the contractor on past projects may have its perks, however, the benefit of familiarity often comes at the cost of limited local knowledge with regards to a region's subsurface.