

GEOTECHNICAL AND ENVIRONMENTAL DESIGN INNOVATIONS REQUIRED FOR CHALLENGING DEVELOPMENT PROJECTS

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The need for creativity and innovation in the engineering consulting industry has never been greater. With the increased density of development, the availability of land that is absent of significant challenges is dramatically dwindling, even when compared to just the previous decade. These factors, combined with development and construction budget constraints, demand the services of professionals who are willing to think beyond the conventional - to walk the line with their clients and explore solutions that will bolster project value. While our clients routinely ask Advantage Engineers to address their standard geotechnical and environmental design needs, we have also become known for solving the most challenging design issues associated with site development.

While essential to economic revitalization of urban centers and sustainability from a site selection standpoint, the redevelopment of urban sites and brownfields brings with it the associated challenges of working within a previously developed footprint. Depending upon previous site usage, environmental investigations may need to be conducted and, if issues are encountered, a remediation strategy developed before site development can begin. Geotechnical investigations and design will likely need to account for previous layers of unstable historic fill or obstructions. Excavation of former storage tanks and other subsurface structures is often required prior to construction, necessitating safe excavation design in congested, limited access areas. Finally, in urban redevelopment locations, the presence of existing utilities that require protection and support during construction may pose additional subsurface design and remediation challenges. All of these considerations require a specialized consultant capable of working with project stakeholders and regulatory agencies, while developing innovative cost-effective strategies that comply with the overarching design objectives.

Raw land sites also have associated geotechnical and environmental design challenges. First, site selection may include properties with pre-existing steep slopes that require innovative stabilization methods prior to construction. Site grading on tight sites may also require careful geotechnical evaluation to ensure long-term slope stability, safe and efficient retaining wall design or temporary earth stabilization measures during construction. Second, the presence of carbonate bedrock necessitates a geotechnical consultant that fully understands the risks associated with development of sites in karst regions. While many engineering firms shy away from problematic, sinkhole-prone project sites, Advantage Engineers has successfully navigated hundreds of investigations in even the most challenging karst terrains. Third, many development sites that would be considered "low risk" development areas, such as former farmland, may have environmental issues arising from historic pesticide use, impacted site fill, septic fields and/or buried tanks. On sites where environmental

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contamination may be more widespread, our engineering professionals perform thorough evaluations of all viable alternatives, which may include excavation and consolidation of impacted materials onsite, in situ/ex situ treatment options, alternative fill use or removal options. Finally, most land development projects have environmental permitting requirements that may involve the presence of site wetlands, sensitive ecosystems and nearby waterbodies. Advantage Engineers has the in-house expertise to evaluate these site concerns and work with regulators to implement solutions that allow site development to continue while protecting the natural environment.

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