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Integration of green remediation into a development project is an environmentally conscious choice

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As you know, the missions of the U.S. Environmental Protection Agency (EPA) and state equivalents such as Connecticut's Department of Environmental Protection (DEP) are to protect human health and the environment. Over the past few years, EPA has also been promoting innovative cleanup strategies to restore contaminated sites to productive use, reduce impacts to the community, conserve resources, and promote environmental stewardship. In part, this reflects the desires of multiple stakeholders to restore contaminated properties including brownfields, our underutilized and frequently urban contaminated properties. But this so called "green remediation" goes beyond brownfield reuse and has been defined as "the practice of considering all environmental effects of remedy implementation and incorporating options to maximize net environmental benefit of cleanup actions." Much like green building strategies, green remedial strategies incorporate sustainability and long term social, economic and environmental benefits into the planning process. Essentially, this move is an off-shoot or maybe a side branch of Sustainable Site Development, LEED building construction or LEED neighborhood development. Green remediation focuses on development of a remedial plan that incorporates sustainable principles that are cost effective over the short term and long term and protective of human health and the environment. Green remediation fits neatly into brownfield redevelopment because much of its focus is on integration of remediation with the built environment and natural resources.

Traditionally, soil remediation has encompassed the tried and true approach of "dig it up and cart it away" more often than not. Excavation and off-site disposal has the advantage of speed but often the disadvantage of high cost. As it turns out, it also has other more subtle disadvantages not the least of which is having a large "remediation footprint" due to the required use of heavy machinery for excavation, transport and disposal along with the associated fuel usage and carbon emissions. Over time, we've migrated toward more in-situ solutions such as soil vapor extraction, in-situ chemical oxidation, chemical fixation and a host of other alternatives where these alternatives can provide cost benefits, often at the expense of time. Many of these techniques are fairly well developed, others are in their infancy.

From a sustainable perspective, a remedial plan that focuses on excavation and off-site disposal would likely be the most effective technique to protect human health and the environment, but it would likely be the least effective at meeting sustainable development practices. As part of the green remediation remedial alternatives analysis we evaluate sustainable principles in addition to the standard feasibility study practices. Green remediation addresses six core elements, including: (1) energy requirements of the treatment system; (2) air emissions; (3) water requirements and impacts on water resources; (4) land and ecosystem impacts; (5) material consumption and waste generation; and, (6) long-term stewardship actions.

Opportunities to increase sustainability exist throughout the investigation, design, construction, operation, and monitoring phases of site remediation regardless of the selected cleanup remedy. As cleanup technologies continue to advance and incentives evolve, green remediation strategies offer significant potential for increasing the net benefit of cleanup, saving project costs, and expanding the universe of long-term property use or reuse options without compromising cleanup goals.

Green remediation reduces the energy demand and negative impacts placed on the environment during cleanup actions, avoiding the potential for collateral environmental damage. It requires close coordination of cleanup and reuse planning. Reuse goals influence the choice of remedial action objectives, cleanup standards, and the cleanup schedule. In turn, those decisions affect the approaches for investigating a site, selecting and designing a remedy, and planning future operation and maintenance of a remedy to ensure its protectiveness.

Site cleanup and reuse can mutually benefit one another by leveraging infrastructure needs, sharing subsurface environmental and geotechnical investigation and design data, minimizing deconstruction, demolition and earth-moving activities, re-using structures and demolition materials, and combining other activities that support timely and cost-effective cleanup and reuse. Up-front consideration of green remediation opportunities offers the greatest flexibility and likelihood for related practices to be incorporated throughout the project's life cycle. While early planning is optimal, additional green strategies such as engineering optimization can be incorporated at any time during site investigation, demolition, remediation, design, construction and reuse phases of work.

In summary, integration of green remediation into a development project is a thoughtful, environmentally conscious choice.

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