Integrating Remediation Systems with Site Redevelopment: A New York State Brownfield Cleanup Program Site Case Study

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Background/Objectives: Located along the Gowanus Canal, this two-acre project encompasses an entire rezoned city block that previously functioned as a Standard Oil terminal. The development of this project included the construction of a 12-story, 323,000-square feet mixed-use building, a new bulkhead wall, and a public waterfront esplanade through the New York State Brownfield Cleanup Program (BCP) with additional oversight from the United States Environmental Protection Agency (USEPA). A highly dynamic investigation and remedial approach was used for the development of a commercial/residential property in Brooklyn, New York. Upon completion of construction of the Gowanus Canal in 1869, the uplands portions became one of the most densely industrialized areas in the nation. Through decades of heavy industrial use and poor environmental stewardship, many of these uplands sites were left with historical industrial impacts inhibiting potential redevelopment. Investigations completed at the site identified that historical site operations resulted in the presence of multi-phase subsurface contamination, including free product from historical petroleum releases. Based on these impacts the site was listed as a New York State Department of Environmental Conservation (NYSDEC) Spills site.

Approach/Activities: Investigations completed under USEPA, NYSDEC, and New York City Office of Environmental Remediation (NYCOER) oversight identified nine areas of concern (AOCs) requiring remediation, limiting the excavation areas and the volume of soil that required recycling. Remedial actions included: excavation of the nine AOCs primarily impacted with free petroleum product; installation of a passive sub-membrane depressurization system; installation of a site-wide composite system cover; and, a sealed bulkhead wall along the canal, rendering the property suitable for residential use. In addition, an integrated remedial approach was developed to address the remaining soil and groundwater impacts in two AOCs with light non-aqueous phase liquid (LNAPL) impacts within the footprint of a demolished building. One AOC presented free-product No. 4 fuel-oil impacts, the other, free-product gasoline impacts. The remedial approach consisted of a multi-phase extraction (MPE) system, a soil vapor extraction (SVE) system, and an air sparge system to simultaneously address the fuel oil and gasoline impacts. While the MPE system was designed to remove the remaining fuel oil, the SVE and air sparge systems were designed to remove VOCs from the gasoline-impacted unsaturated and saturated soils, as well as remove gasoline. Both systems were ultimately designed to meet groundwater remedial goals. In addition, an active vapor mitigation system was designed to mitigate any vapor intrusion resulting from free-product, soil, and groundwater impacts beneath the slab of the new apartment building and therefore protecting the human health of the new residents.

Results/Lessons Learned: The MPE system design consists of a network of ten extraction wells, while the SVE and air sparge systems consist of seven and four wells, respectively. The active vapor mitigation system design consists of a network of 16 horizontal wells. All SVE and vapor mitigation system process equipment, including control panels, is designed to be explosion- proof, meeting the requirements of the National Electrical Code (NEC) Class I,

Division 1 Standards. Because of the planned residential use of the new building, all treatment wells, manifold piping, and instrumentation associated with the remediation and vapor mitigation systems are installed below the finished grade of the building structural slab. As part of the BCP program, the project and clients will receive significant tax credits due to the dramatic improvement of the environmental quality of the property. Transformed from a neglected site into a vibrant residential community with 430 residential units and a public esplanade, the site is one of the first green spaces and recreational areas along the Gowanus Canal.