

Permeable Reactive Barrier Installation by The Bio-Polymer Slurry Method at the MDL Site in Needham, MA

Abstract: This project included the construction of approximately 19,000 square feet of permeable reactive wall to depths of 56 feet, designed to intercept and treat groundwater contaminated with chlorinated solvents along Central Avenue in Needham, Massachusetts. The primary contaminant of concern is trichloroethene (TCE) that seeped into the ground from the Microwave Development Laboratories (MDL) site two decades ago. The permeable reactive wall backfill was a mixture of zero-valent iron filings and sand emplaced across the path of the contaminated plume. The wall was designed to have a permeability greater than the surrounding soils, allowing the natural groundwater to passively flow through the wall while the iron filings reduce the contaminants to harmless end products. Geo-Con installed the wall using the Bio-Polymer (BP) slurry trench method. This method includes excavating a deep narrow trench, approximately 550 feet in length, supported by biodegradable slurry during excavation and prior to backfilling. The backfill mix was prepared in an off-site pugmill and delivered to the site in road trucks prior to placement into the trench. Following backfill installation, the degradable slurry was broken and reverted back to water leaving a permeable wall. The deep wall was installed down the center of a public street within 50 feet of several residences and within 10 feet of active utility services. Other work that took place in the congested construction area following closing of the heavily traveled street (17,000 vehicles per day) for 3 months, included: traffic control; police detail; relocation of the storm drain; temporary relocation of water and sewer services; temporary relocation of phone, electric and cable services; installation of inclinometers and monitoring wells; disposing of all excavated spoils; and pavement restoration. The trench was installed with one of Geo-Con's Linkbelt 7400 hydraulic excavator with an extended boom and stick, capable of excavating over 70 feet deep. To effectively manage public relations, the DEP, the Needham Health Department and Geo-Con set up a town meeting prior to project commencement to review all aspects of the project (i.e. scheduling, safety, et. al.) and to answer questions from residents. Regular weekly meetings were held with local residents for the duration of the project. Construction work was restricted to the hours of 7:00 a.m. until 5:30 p.m. to control noise in the community. Driveway access and dust control for local residents also was maintained throughout the project.

