

## LANGAN ENVIRONMENTAL QUALIFICATIONS



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## PINEY BRANCH SHOPPING CENTER

<http://www.langan.com/portfolio/piney-branch-shopping-center/>

Location: Silver Spring, MD

Client: Confidential

Services: Environmental,

### OVERVIEW

This former dry cleaner site is the source of a tetrachloroethylene (PCE) groundwater plume at a multi-tenant shopping center in Silver Spring, MD. Langan conducted monitoring well installation, soil sampling, groundwater sampling, and active and passive soil gas sampling to locate the source of the PCE plume. The source was determined to be a sump located in the basement of the tenant space and Langan designed an active soil vapor extraction system to remediate the source area and groundwater plume. Langan communicated and consulted with Maryland Department of the Environment throughout the project to facilitate the site's participation in the Voluntary Cleanup Program.

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## CONFIDENTIAL SITE - BALTIMORE

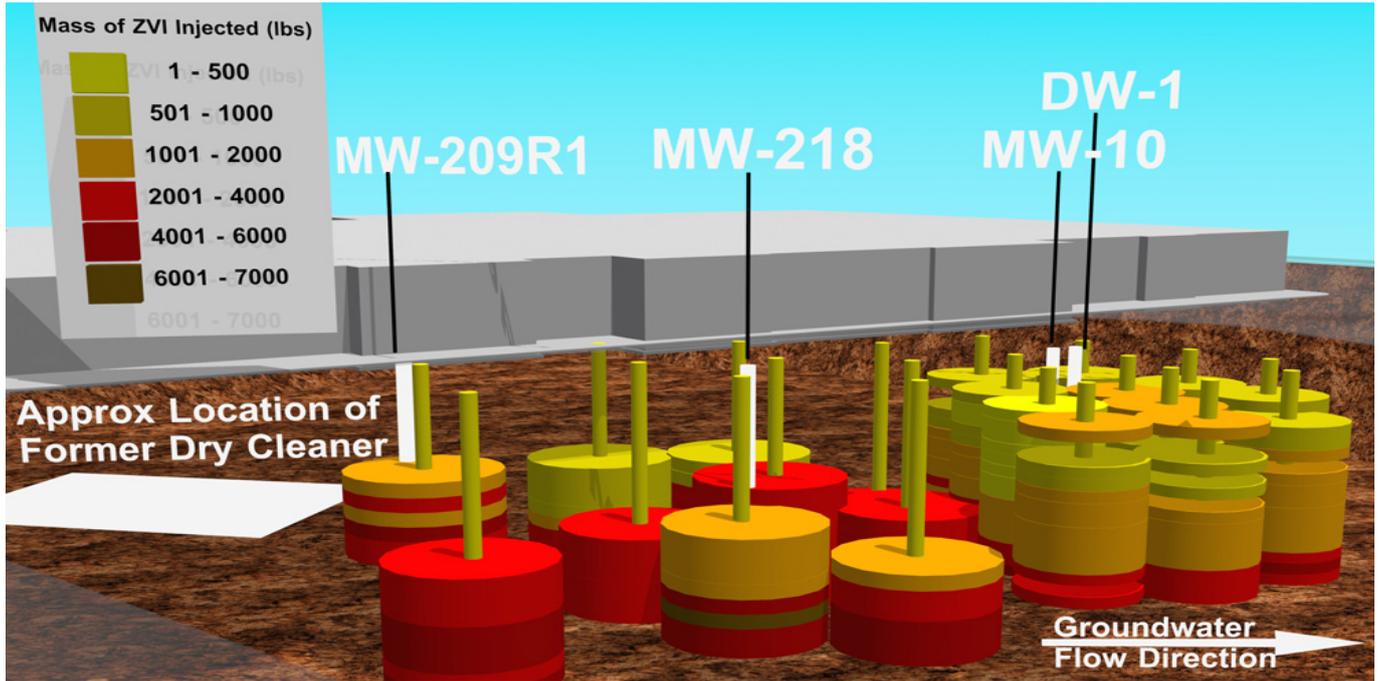
<http://www.langan.com/portfolio/confidential-site-baltimore/>

Location: Baltimore, MD  
Client: Confidential  
Services: Environmental,

### OVERVIEW

This 5.95-acre waterfront property has been used for industrial purposes (documented uses include food packing, a refinery, a print shop, and an auto repair shop) since at least 1890 and has operated as a ship repair yard since 1920. Langan was retained by the client to provide environmental services in support of remediating and redeveloping the site for retail and residential purposes. Langan involved the Maryland Department of the Environment Voluntary Cleanup Program (VCP) in the project at the investigation planning stage to facilitate the VCP process for the client and received positive feedback on the project progress and future plans.

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## PNEUMATIC FRACTURING & INJECTION OF ZERO-VALENT IRON

<http://www.langan.com/portfolio/pneumatic-fracturing-injection-zero-valentiron-saprolite-formation/>

Location: Randallstown, MD

### OVERVIEW

This project was implemented as part of a commercial brownfields redevelopment in Maryland. The 19-acre shopping center is impacted, primarily with tetrachloroethene (PCE), from former dry cleaning operations at concentrations up to 41,400  $\mu\text{g/L}$  in the source area, with the majority of the mass in the saprolite and overlying partially weathered bedrock at depths from approximately 55 to 80 feet below ground surface (bgs). Due to the tight geologic formation, pneumatic fracturing and slurry injection of micro-scale zero-valent iron (ZVI) was selected as the full-scale remedial strategy. Pneumatic fracturing created an interconnected fracture network for ZVI delivery in a dense formation that would have typically yielded very low conventional injection flow rates. As ZVI corrodes in the subsurface, it creates strongly reducing conditions in the aquifer to promote both abiotic and biological degradation of PCE and its daughter products.

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## 535 4TH AVENUE

<http://www.langan.com/portfolio/535-4th-avenue/>

Location: Brooklyn, NY

Client: Slate Property Group

### OVERVIEW

This 0.42-acre parcel, which formerly operated as an automotive repair facility, is being transformed into a 12-story mixed-use residential and commercial building in Brooklyn's Park Slope neighborhood. Langan provided environmental engineering and remediation design services in support of obtaining a Certificate of Completion (COC) for the site, which was remediated under the New York State Brownfield Cleanup Program. A successful in-situ remediation via emulsified vegetable oil and zerovalent iron (EZVI) significantly reduced the contaminant mass and environmental risk at this site. Further, because of the successful in-site remediation, an active system, such as an air sparge/soil vapor extraction system that would have required additional building space and ongoing O&M, was avoided at this site.

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## 1535 BEDFORD AVENUE

<http://www.langan.com/portfolio/1535-bedford-avenue/>

Location: Brooklyn, NY  
Client: Adam America Real Estate  
Architect: Issac & Stern Architects  
Services: Geotechnical, Environmental,

### OVERVIEW

Langan is providing geotechnical and environmental services related to the construction of a 10-story, 28,156-SF residential building in the Crown Heights neighborhood of Brooklyn. Langan performed a remedial investigation that identified a petroleum plume extending to the regional groundwater table, about 130 feet below grade level. Remediation included the excavation of approximately 30,500 tons of soil/fill and the removal of 23 buried tanks, as well as the design and installation of a soil vapor extraction (SVE) system incorporated into the building foundation. Langan also prepared a noise remediation plan that is being implemented to satisfy the noise 'E' requirements. Langan's geotechnical engineers completed a subsurface investigation along with a report that provided foundation design recommendations.

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## FULL SCALE GROUNDWATER REMEDIATION SYSTEM

<http://www.langan.com/portfolio/full-scale-groundwater-remediation-system/>

Location: Brooklyn, NY  
Services: Environmental,

### OVERVIEW

An integrated remedial approach was developed to address two areas of concern (AOCs) with LNAPL impacts within the footprint of a building. One AOC had free product No. 4 Fuel Oil impacts while the other had free product gasoline impacts. The site is a New York State Brownfield Cleanup program site located in Brooklyn, New York.

Because of the extent and nature of the contamination, new building, site-access restrictions, and nearby receptor concerns associated with the highly urban location of the site, the remedial strategy required carefully formulating a remediation technology, health and safety precautions, and design remedy. The integrated remedial approach consisted of a MPE system, a SVE system, and an air sparge system to address both the No. 4 Fuel Oil and gasoline free product impacts simultaneously. In addition, an active vapor mitigation system was designed to mitigate any resulting vapor intrusion issues. Due to the planned residential use of the new building, all treatment wells, manifold, and instrumentation associated with the remediation and vapor mitigation systems were installed below the structural slab of the building.

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## HYBRID LANDFILL GAS MITIGATION SYSTEM IMPLEMENTATION

<http://www.langan.com/portfolio/hybrid-landfill-gas-mitigation-system-implementation/>

Location: North Miami, FL

Services: Environmental,

### OVERVIEW

The site is located in North Miami, Florida and is the site of a former landfill. Langan designed a hybrid landfill gas (LFG) mitigation system to control the potential intrusion of landfill gas (primarily methane) into a recreational building complex proposed to be built atop the former landfill.

The LFG mitigation system consisted of a vapor barrier and hybrid LFG venting system installed under the extents of the building complex floor slab. The innovative hybrid system design allows for both passive and active, if needed, venting of LFG generated below the slab of the building complex.

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## IN-SITU CHEMICAL OXIDATION

<http://www.langan.com/portfolio/environmental-remediation-in-situ-chemical-oxidation/>

Location: New Jersey  
Services: Environmental,

### OVERVIEW

Langan and Viasant performed an in-situ chemical oxidation (ISCO) entailing soil mixing of iron-activated persulfate at a site located in Northern New Jersey. The large-scale soil mixing activities were completed in April and May 2015.

Langan performed a bench-scale treatability study that evaluated three different persulfate activation methods: 1) sodium hydroxide activation, 2) quick lime activation, and 3) iron activation. Iron did not need to be added because of abundant the iron mineral magnetite in the site soil. Based on the treatability test results, soil mixing with iron activation using natural iron and additional iron-EDTA was selected for field implementation.

Under Langan oversight, Viasant completed ISCO remedial implementation consisting of blending approximately 150,000 pounds of sodium persulfate, 110,000 pounds of 25% sodium hydroxide, and 1,000 pounds of iron-EDTA into a 7,000-cubic-yard mixing volume over 13,500 square feet. A dual-axis mixing head enabled even and precise mixing and dosing. The clean overburden was removed before mixing and backfilled after mixing. Before final backfilling, the top 1-foot mixing zone was stabilized with cement to increase the soil strength.

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mixing completion, and their persulfate residual concentrations, pH, and iron levels were measured and evaluated against performance criteria immediately. The mixing cells that failed the criteria were remixed till performance criteria were met.

The performance monitoring results showed that target contaminants were reduced significantly without rebound after one year. Adequate dosage and complete contact results in the successful reduction.

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