

Tinkham Garage Site
Londonderry
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The Tinkham Garage site encompasses 375 acres in Londonderry. The site is bounded by Route 102 to the north, Charleston Avenue to the east, Beaver Brook to the southeast, and an unnamed tributary to Beaver Brook to the west.

Areas of the site were used during the 1970s for the disposal of liquid hazardous wastes, including organic solvents and waste oils. In late 1982 and early 1983, several private drinking water wells, surface water, and soils on the site were found to be contaminated with a variety of volatile organic compounds (VOCs). Concentrations of contaminants in the water were sufficient to require the closing of several private wells and the well supplying the Woodland Village Condominiums in early 1983. In September 1983, the site was placed on the National Priorities List.

In 1983, the State and US EPA (EPA) installed a permanent water line from the neighboring Town of Derry, which provided a municipal water supply to all the residences originally shown to have contaminated well water. The remedial investigation/feasibility study was completed in early 1986. EPA signed a Record of Decision (ROD) on the cleanup plan in September 1986, and an Amended ROD (AROD) in March 1989. The AROD called for treatment of contaminated groundwater and soil.

Soil and groundwater remediation commenced in 1995. Soil remedial activities included the processing of contaminated soils in the garage and condominium areas. Soils were treated by an in-situ dual vacuum extraction system that was designed to simultaneously pump groundwater and extract soil vapor. Groundwater remedial activities involved pumping contaminated groundwater from existing bedrock wells located in the condominium area. However, due to achievement of steady-state VOC concentrations in bedrock groundwater, pumping of bedrock wells was discontinued in July 1996.

In June 2002, the potentially responsible parties (PRPs) submitted a Groundwater Management Permit (GMP) application to NHDES, and the shallow groundwater pumping systems were shutdown. On October 30, 2002, NHDES issued a GMP that required implementation of institutional controls to restrict the use of groundwater within a defined area designated as the Groundwater Management Zone (GMZ). In accordance with the GMP, the PRPs conduct semi-annual groundwater monitoring. The current GMP for the site was renewed on December 28, 2012. The permit-required groundwater sampling program remained unchanged with sampling events scheduled for May and November each year and an Annual Groundwater Summary Report to be submitted in January each year.

In 2009, as part of EPA's third Five Year Review for the Site, concerns were raised about elevated concentrations of 1,4-dioxane and its potential mobility in groundwater at the Site. Subsequently, EPA required additional investigations to evaluate the long-term protectiveness of the existing groundwater monitoring program. Specifically, existing

monitoring wells utilized to monitor bedrock water quality at the Site are constructed as continuous open-hole completions in bedrock, and therefore span and connect multiple fracture zones in each well.

The additional investigations were conducted to evaluate contaminant concentrations in three select bedrock monitoring wells (one source area and two down gradient) to characterize discrete fracture zones, water flow and water quality. From April through October 2014, these investigations were conducted at the Site and the results indicated elevated concentrations (up to 760 ug/l) of 1,4-dioxane within discrete fractures in bedrock intercepted by monitoring well FW-11D. This well is considered to represent bedrock conditions immediately down gradient of the former Tinkham Garage source area. In addition, a 1,4-dioxane concentration of 3.2 ug/l was identified in a water sample collected from a discrete fracture zone in monitoring well FW-28D, which is located in an area considered to represent the south/south-east boundary conditions for the Site and at 4.8 ug/l in monitoring well FW-21 which represents the southwest boundary conditions. The results of this work are summarized in a report titled "Fractured-Bedrock Evaluation, Tinkham Garage Site, Londonderry, New Hampshire," dated October 24, 2014.

Overall, these additional bedrock investigations supported previous conclusions regarding contaminant distribution: VOCs were solubilized from soils to groundwater in the former Tinkham Garage source area and dissolved VOCs migrated in overburden groundwater from the source area towards the east, southeast and south into the nearby wetlands; VOCs migrated through the overburden and entered bedrock fractures within and down gradient from the former source area behind the Tinkham Garage and flowed within fractures striking northeast/southwest; and that 1,4-dioxane is found with varying concentrations within the hydraulically active fractures that extend across the Site. These investigations also demonstrated that the current horizontal and vertical extent of groundwater contamination in bedrock has not been fully delineated.

In December 2014, data generated as part of a state-wide residential water supply sampling program being conducted by the NHDES MtBE Remediation Bureau identified contaminants in residential drinking water wells located northeast of the Site that are similar to those found within and downgradient of the source area (including 1,4-dioxane). In early 2015, additional testing was conducted by NHDES where residential well impacts were found to be greater than drinking water standards. In addition, NHDES installed Point-of-Entry (POE) treatment systems to remove contaminants prior to residential use. Because conventional (carbon filtration) POE systems can be generally unreliable for 1,4dioxane removal, all properties where the NH AGQS standard of 3 ug/l was exceeded were provided with bottled water in addition to POE treatment systems.

EPA issued a draft Explanation of Significant Differences (ESD) for public comment on September 30, 2015 that allows for impacted and potentially impacted homes to be connected to a nearby municipal waterline (all connections were completed by 2016). The ESD also requires that supplemental bedrock investigations be conducted to delineate the full lateral and vertical extent of groundwater contamination, and shall

include the installation of a more robust groundwater monitoring well network designed to support the monitoring requirements established by the GMP, and to demonstrate attainment of the cleanup levels as outlined above. Based on the results of the additional characterization of the bedrock aquifer at the site, a revised GMP will be issued outlining an updated groundwater monitoring program and, if necessary, a revised GMZ to ensure that the institutional controls for the site are protective of human health and the environment.

The Final ESD was issued to the PRPs in March 2016 and a scope of work for required investigations was issued in June 2016. The PRPs conducted accelerated sampling and surveying activities during the second half of 2016. These results were utilized to prepare a draft supplemental Remedial Investigation and Feasibility Study Work Plan (Work Plan) that was submitted to NHDES and EPA in January 2017. After careful review, NHDES and EPA determined that the Work Plan did not meet the intent of, and was not consistent with the expectations for work required to meet the objectives of the 2016 ESD. The PRPs proceeded with a supplemental investigation in 2018, including expanded groundwater, drinking water, and surface water monitoring, and additional data collection to refine the conceptual site model. While the Remedial Investigation and Feasibility Study is currently ongoing, preliminary results from the expanded drinking water sampling effort completed by the PRPs have indicated that site-related contaminants of concern extend beyond the GMZ to the southeast into the residential neighborhood along Ross Drive and Tokanel Road. NHDES and EPA are currently awaiting the final results of this sampling effort, which will likely result in the expansion of the GMZ to ensure that groundwater usage in this area is restricted and the institutional controls put in place at the site are protective of human health and the environment. In the interim, bottled water has been provided to residential properties where sample results have identified groundwater impacts in excess of the Ambient Groundwater Quality Standards for site-related contaminants of concern.