

Alternative	Soils Disturbed (acres)	Potentially Problematic Soils
D	93.18	Similar to Alternative C, Alternative D would cross areas of shallow to bedrock soils between I-93 and Ashleigh Drive. Further to the south along NH 28, the alignment would cross an area of Lim-Pootatuck complex before following the same alignment as Alternative A along Tsienneto Road.
F	21.51	An area of Lim-Pootatuck complex, located along Shields Brook in downtown Derry.

**4.9.3 Mitigation**

Impacts associated with the problematic soils described are expected to be relatively minor, regardless of the alternative selected. Design and construction of new roadways frequently require addressing engineering challenges resulting from encountering soils with high water tables, surface seepage, severe frost activity, and ledge outcrops or soils that are shallow-to-bedrock. Typically, these issues can be resolved through the removal of unstable soils, placement of appropriate clean fill and granular base, installation of appropriate drainage structures, and installation of landscape plantings.

During construction, potential impacts associated with soil erosion can also be minimized through implementation of BMPs for erosion control (Rockingham County Conservation District, 1992). These practices could involve such measures as the installation of silt fencing, straw or hay bale barriers, or temporary sediment traps; mulching of disturbed areas, followed by seeding for long-term cover; and use of vegetated swales. Additionally, in areas with poor soil fertility, topsoil or an appropriate soil amendment would be used, as needed, prior to seeding or planting. A combination of these measures would mitigate any potential impacts associated with any of the Build Alternatives.

**4.10 Contaminated Properties and Hazardous Materials**

An environmental review was conducted in an attempt to identify the presence of potential and/or known contaminated properties and hazardous material sites near the alternatives. The liability that may be encountered through acquisition of properties impacted by hazardous materials, as well as worker health and safety issues related to exposure to a potentially hazardous environment, can substantially increase construction costs.

The presence or absence of potential petroleum and hazardous material sites within 500 feet and known petroleum and hazardous material sites within 1,000 feet of the alternatives was assessed based on present or former property use and best professional judgment. This study area is shown on Figure 4.10-1. Hazardous waste sites are regulated by both the Resource Conservation and Recovery Act (RCRA) of 1980 (40 CFR part 261, Subtitle C) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Pub. Law 96-510) as amended by the Superfund Amendments and Reauthorization Act of 1986. Known petroleum and hazardous materials sites include but are not limited to listed National Priorities List “Superfund” sites, CERCLA hazardous waste sites, and NHDES State hazardous waste sites, leaking underground storage tank (LUST) sites, and existing solid waste facilities. Sites

with potential petroleum and hazardous materials include, but are not limited to, sites with registered underground storage tanks (USTs), aboveground storage tanks, registered RCRA generators, facility index system sites, and underground injection control sites. In addition to hazardous material and contaminated sites, the potential to encounter per- and polyfluoroalkyl substances (PFAS) (groundwater contaminants that are by-products of industrial processes) must also be considered. PFAS are groundwater contaminants with effects to human health.

Statewide analytical data collected by NHDOT, as well as nationwide information, indicates that roadside soils commonly contain metals and polycyclic aromatic hydrocarbons at concentrations above background conditions. Soil along existing roadways that will be excavated may contain elevated levels of a number of contaminants due to deposition of airborne particles from vehicles, from asphalt and asphalt sealants, tire treads, or motor oil. These limited reuse soil (LRS) excavated from within the operational ROW shall be addressed in accordance with applicable NHDES rules and/or waivers. Soils that are anticipated to meet the definition of LRS may be subject to management through a Soils Management Plan. Roadside soils currently managed as LRS by NHDES include all topsoil within the limits of the existing ROW, regardless of its depth and any ground or pulverized asphaltic materials. In those instances where there is no measureable topsoil, LRS will be measured from the top of ground to a depth of 6 inches.

#### **4.10.1 Affected Environment**

Potential and known hazardous material, contaminated, and solid waste sites were reviewed by performing a search of State and Federal database records. The search was conducted in October 2016 by Environmental Data Resources, an environmental database subcontractor, and included a search of databases using search radii listed in the American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment standard (E1527-13) (Environmental Data Resources, Inc., 2016). The results of the 2016 database were compared with the results from an environmental database search conducted in 2010 (Environmental Data Resources, Inc., 2010). The 2016 records search was conducted based on a refined study area based on 500-foot and 1,000-foot search radii (Figure 4.10-1) and revealed a total of 260 sites within the search radii; 220 of those sites remained from the 2010 review and 40 were new sites added in 2016. The sites are summarized in Appendix F, which includes a site number, site activity, general site address, the site category or environmental database(s) the site is listed on, and whether the site was an existing database listing from 2010 or a new database listing in 2016. New database listings were also added to each site if applicable, while database listings that were no longer listed were removed. Windshield surveys had been conducted previously for the study areas and had identified a group of potential sites of concern based on field observations. These sites were listed on the summary table as "Field." A windshield survey was not conducted in 2016.

This review meets the government requirements for records search per ASTM E 1527-13. Initial Site Assessments (ISA), which were conducted previously for some sites, followed American Association of State Highway and Transportation Officials guidance for performing such investigations at the corridor level. Of the sites for which ISAs were undertaken, Preliminary Site Investigations (PSIs), which involve subsurface investigations, were recommended for seven sites. The analysis included a review of federal and state environmental databases, review of state and local records, and site reconnaissance. ISAs were not conducted as part of the 2016 study, but new and existing sites were reviewed to determine their relative risk, and ISAs were recommended for five sites. Appendix F lists databases researched as part of this report.

**Potential and Known Petroleum, Hazardous Material, and Solid Waste Sites**

The potential and known petroleum, hazardous materials, and solid waste sites map (Figure 4.10-1) illustrates the approximate location of each site identified through the database searches but does not include actual detailed site information. An arbitrary number has been assigned to each site that corresponds with the numbers on the known and potential petroleum and hazardous materials lists presented in Appendix F. The lists include the site activity, site address, database source for each site and if the site is an existing site from the 2010 review or whether it was added in 2016. Sites listed as CLOSED by NHDES are included in the list.

Several “orphan sites” were identified during the database search. Orphan sites are those sites that have an incomplete address, and therefore their exact locations are not discernible. A limited windshield survey was conducted in 2010 to locate these sites, and it was determined that several of these orphan sites were outside the study area. These sites could not be located and thus remain as “estimated locations.” The 2016 database search also identified several orphan sites. These were attempted to be identified, and any that were located within the search radii are included in the summary table in Appendix F.

**Summary of Findings**

The most common types of contaminated or hazardous material sites within the Project area consist of sites listed on the RCRA/RCRIS and UST databases. RCRA/RCRIS sites include several categories of hazardous material generators: those that produce small, large, and very large quantities of hazardous materials. RCRA/RCRIS sites also include those facilities that transport, store, treat, and/or dispose of hazardous materials. Most listings are of the RCRA NonGen type.

**4.10.2 Environmental Consequences**

Known and potential hazardous material and petroleum-contaminated sites within 1,000 feet and 500 feet of the Alternative footprints, respectively, are tallied in Table 4.10-1. Hazardous material or contaminated sites within 1,000 feet of any Alternative where PSIs were previously recommended, and where ISAs are currently recommended, are identified in Table 4.10-2. The analysis included a review of site locations as depicted on project mapping and as provided by the EDR report. In some cases, site locations were adjusted to reflect locations depicted by NHDES rather than the locations depicted by the EDR report, because the EDR locations are based upon a street address rather than a site location. A comparison of the proximity of the alternatives to known and potential hazardous material or petroleum-contaminated sites reveals that Alternative F is close to the highest number of potential and known remediation sites (119 sites total); Alternative D ranks second in proximity to sites (82 sites total); and Alternatives A, B, and C are in a similar range of proximity to sites (A = 50 sites, B = 42 sites, and C = 49 sites).

**Table 4.10-1. Hazardous Material and Petroleum-contaminated Sites**

Hazardous Site Type	A	B	C	D	F
Known hazardous material or petroleum-contaminated sites (number) within 1,000 feet	23	18	17	27	42
Potential hazardous material or petroleum-contaminated sites (number) within 500 feet	27	24	32	55	77

**Table 4.10-2. Hazardous Material and Petroleum-contaminated Sites Where PSIs Were Previously Recommended or ISAs are Currently Recommended**

Site no.	Site Activity	Site Address	Alternative Footprint within 1,000 feet					2011 PSI rec.	2018 ISA rec.
			A	B	C	D	F		
45	PRINTING BUSINESS	TINKHAM AVENUE	A	B	C	D		PSI	
118	SERVICE STATION	DANFORTH CIRCLE					F	PSI	
52	OIL COMPANY	CRYSTAL AVENUE	A			D		PSI	
53	SCHOOL	GRINNEL ROAD					F		ISA
129	MANUFACTURING FACILITY	MANCHESTER ROAD	A	B	C	D		PSI	
157	MARKET	MANCHESTER ROAD	A	B	C	D		PSI	
209	DRY CLEANERS	LINLEW DRIVE	A	B	C	D			ISA
231	SERVICE STATION	NASHUA ROAD					F	PSI	
71	METAL FINISHING BUSINESS	HILLSIDE AVENUE					F		ISA
245	GENERAL CONTRACTOR	ROUTE 28/ROCKINGHAM ROAD			C	D			ISA

**No Build Alternative**

Because the No Build Alternative would not require any new construction, no impacts on existing potential petroleum-contaminated and hazardous material sites would be expected.

**Build Alternatives**

*Alternative A*

The Alternative A footprint falls within 1,000 feet of 23 known hazardous material or contaminated sites. Seven ISAs were previously undertaken within 1,000 feet of the Alternative A alignment as currently proposed, and PSIs were previously recommended at four of them: two circuit board manufacturing facilities and two sites, a market and a gas station, with ongoing monitoring for remediation of LUSTs. An ISA is recommended at one new site, a dry cleaner, within 1,000 feet of the Alternative A footprint. In addition, there are 27 sites within 500 feet of the Alternative A footprint recognized as potential hazardous material or petroleum-contaminated sites.

*Alternative B*

The Alternative B footprint falls within 1,000 feet of 18 known hazardous material or contaminated sites. Four ISAs were previously undertaken within 1,000 feet of the Alternative B

alignment as currently proposed, and PSIs were previously recommended at three of them: a circuit board manufacturing facility, a printing business, and a store with a LUST remediation file with ongoing monitoring. ISAs are currently recommended at one dry cleaner. Also, there are 24 sites within 500 feet of the Alternative B footprint recognized as potential hazardous material or petroleum-contaminated sites.

### *Alternative C*

The Alternative C footprint falls within 1,000 feet of 17 known hazardous material or contaminated sites. Seven ISAs were previously undertaken within 1,000 feet of the Alternative C alignment as currently proposed, and PSIs were previously recommended at the same three sites recommended for PSIs for Alternative C. ISAs are currently recommended at two sites: a dry cleaner and a general contractor. Also, there are 32 sites within 500 feet of the Alternative C footprint recognized as potential hazardous material or petroleum-contaminated sites.

### *Alternative D*

The Alternative D footprint falls within 1,000 feet of 27 known hazardous material or contaminated sites. Seven ISAs were previously undertaken within 1,000 feet of the Alternative D alignment as currently proposed, and PSIs were previously recommended at the same three sites recommended for PSIs for Alternatives B and C. ISAs are currently recommended at the same two sites as Alternative C: a dry cleaner and a general contractor. In addition, there are 55 sites within 500 feet of the Alternative D footprint recognized as potential hazardous material or petroleum-contaminated sites.

### *Alternative F*

The Alternative F footprint falls within 1,000 feet of 42 known hazardous material or contaminated sites, more than any of the other alternatives because of its highly developed setting. Seventeen ISAs were undertaken along this corridor, and PSIs were recommended at two service stations. ISAs are currently recommended at a school and a metal finishing business within 1,000 feet of this alternative. Also, there are 77 sites within 500 feet of the Alternative F footprint recognized as potential hazardous material or petroleum-contaminated sites.

## **4.10.3 Mitigation**

Mitigation for hazardous material or petroleum-contaminated involvement would follow standard NHDES procedures. Regardless of Build Alternative chosen, all stages of design and construction would address contaminant and project-specific avoidance and remediation measures that may be required. Standard procedures for building demolition, LRS, and PFAS are outlined below.

### *Building Demolition*

Before building structures are removed, a professional hazardous material specialist would complete a building audit to identify and quantify all pertinent building materials and waste materials. Materials that may be identified in the audit include:

- Asbestos;
- Lead-based paint;

- Polychlorinated biphenyls;
- Electrical transformers that may contain polychlorinated biphenyl dielectric oil;
- Mercury-containing fluorescent light bulbs;
- Mercury thermostats;
- Miscellaneous containers of oil or hazardous materials;
- Refrigerants (commonly found in such items as air conditioners, refrigerators, etc.);
- Hydraulic lifts;
- ASTs; and
- USTs.

The level of audit for each location would vary based on building type, age, and current use. Residential buildings would typically be limited to asbestos and lead paint reviews. Commercial buildings would include a more intensive review for all pertinent materials.

Any miscellaneous containers of oil and hazardous materials would be removed before each relevant building is demolished. In addition, tank closure assessments would be completed after each UST is removed. If contaminants are found with the tank closure assessments, remediation may be required.

#### *Limited Reuse Soils*

LRS excavated from within the operational ROW shall be addressed in accordance with applicable NHDES rules, waivers, and/or Soils Management Plans.

#### *Per- and Polyfluoroalkyl Substances*

NHDES identified PFAS as emerging contaminants and has developed Ambient Groundwater Quality Standards (AGQSs) for two PFAS compounds: perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Groundwater that could have PFAS-impacted groundwater above AGQSs may be subject to management with a groundwater management plan.

## **4.11 Surface Waters and Water Quality**

### **4.11.1 Affected Environment**

The Project lies within the Upper Beaver Brook watershed (Level 12 Hydrologic Unit 010700061025) as mapped in USGS' Watershed Boundary Dataset (NHDES, 2017a). Beaver Brook, south of the Project, flows west under I-93 and then south into Massachusetts where it joins the Merrimack River in Lowell. Upper Beaver Brook has been subject to water quality investigations since 2003 in response to proposed development in the watershed, including widening and improvements to I-93 (NHDES, 2008a).

Surface waters of the state are classified as Class A or Class B, pursuant to NH RSA 485-A:8, I-III, Water Pollution and Waste Disposal. Class A waters have the highest quality designation and are required to stay below certain threshold values with regard to bacteria (*Escherichia coli*),