

## EXECUTIVE SUMMARY

The Towns of Derry and Londonderry, New Hampshire (the Towns), and the New Hampshire Department of Transportation (NHDOT), in cooperation with the Federal Highway Administration (FHWA), prepared this Final Environmental Impact Statement (FEIS) for the Interstate 93 (I-93) Exit 4A Project (Project). The Project is located in the Towns and includes construction of a new interchange with I-93 (known as Exit 4A) and other transportation improvements to reduce congestion and improve safety along State Route 102 (NH 102), from I-93 easterly through downtown Derry and to promote economic vitality in the Derry/Londonderry area (Figure ES-1). This FEIS has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA; Public Law 91-190, 42 United States Code [USC] 4321–4347 as amended) and the regulations of the Council on Environmental Quality (CEQ; 40 Code of Federal Regulations [CFR] 1500–1508), as well as applicable FHWA regulations (23 CFR Part 771; 23 USC 138) and guidance (FHWA, 1987).

The I-93 Exit 4A Project dates back to 1985 when the Town of Derry first approached NHDOT regarding the possibility of obtaining funding for a new I-93 interchange. The Southern NH Regional Planning Commission (SNHPC) conducted a transportation study for Derry later that year to evaluate alternatives to relieve traffic congestion along NH 102 in downtown Derry. Based on the results of that study, the Derry Town Council endorsed a new interchange alternative. In May 1987, the NH Legislature passed empowering legislation that directed NHDOT "...to cooperate with the Towns of Derry and Londonderry in the development of an acceptable design for a new exit to I-93 between existing Exits 4 and 5 to serve the Towns of Derry and Londonderry." Funding for the Project was to be provided by the Towns, and it was required that the Project meet current NHDOT highway design standards. Following the passage of this legislation, the Towns initiated preliminary planning and engineering in June 1987. Activities related to the Project continued from 1988 through the publication of the 2007 Draft EIS (DEIS). The Notice of Availability of the DEIS was published in the Federal Register on August 3, 2007 (Vol. 72, No. 149). Prior to publication of this FEIS, funding issues put the Project on hold.

In October 2015, the Governor's office directed NHDOT to accelerate the Project and it was subsequently included in the state's Ten-Year Transportation Improvement Plan for 2017–2026. NHDOT and the Towns entered into an agreement under which NHDOT will provide administrative oversight for completion of the environmental review process, and then the Project will transition to NHDOT control during final design and construction. Because significant time has elapsed since the 2007 DEIS, FHWA requested preparation of a Supplemental DEIS (SDEIS) in accordance with NEPA. The revised Notice of Intent for the SDEIS was published in the Federal Register on December 8, 2016 (Vol. 81, No. 236). The Notice of Availability for the SDEIS was published in the Federal Register on November 16, 2018 (Vol. 83, No. 222). The SDEIS provided a comprehensive reevaluation of the Project, considering changes in environmental regulatory requirements, existing conditions, expected future conditions, and Project design. This FEIS addresses public and agency comments made on the SDEIS during the comment period (see Appendix M for copies of comments received and the lead agency response to each comment).

This page intentionally left blank.

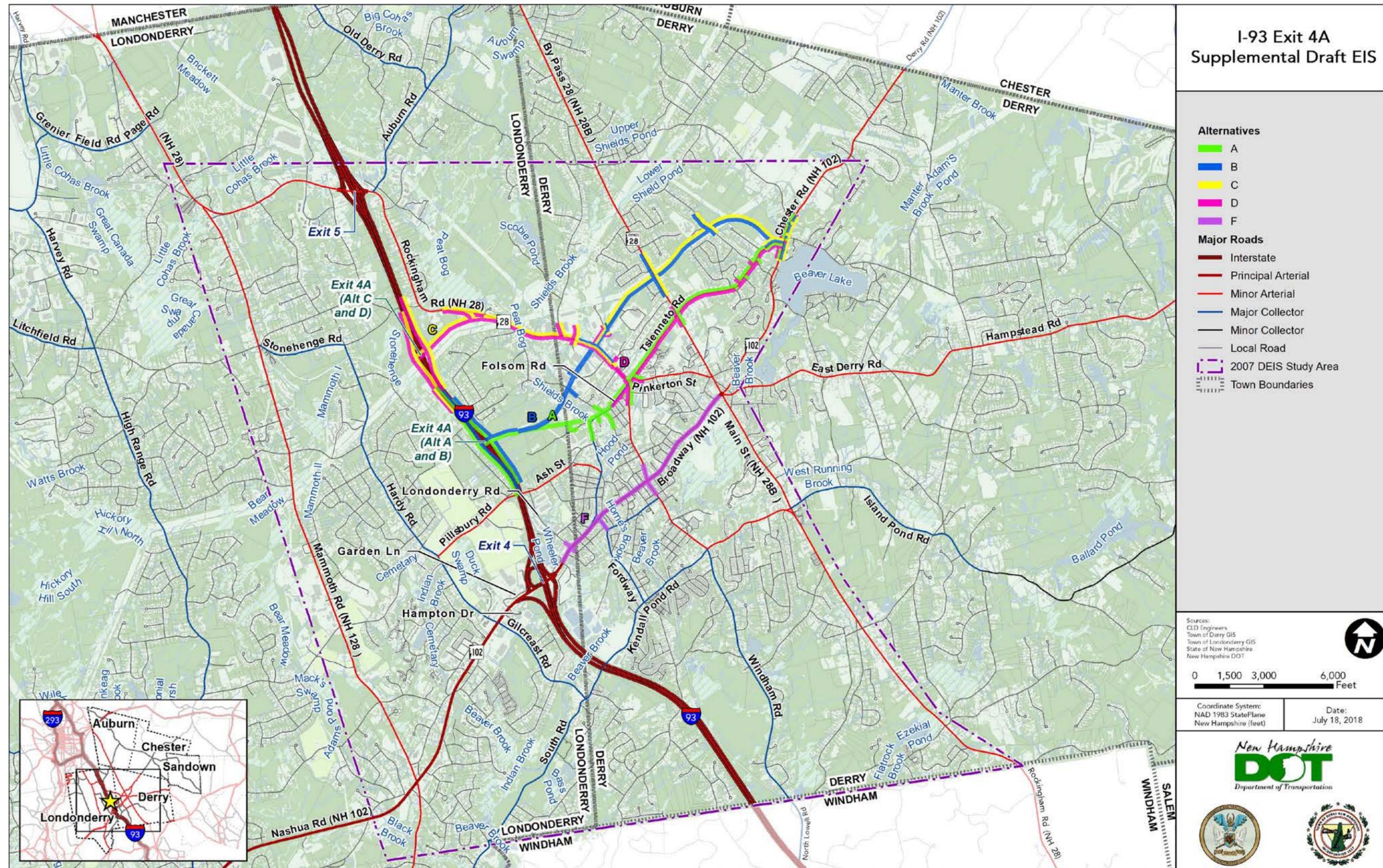


Figure ES-1. Project Location

This page is intentionally left blank.

## ES.1 Purpose and Need

Taking into consideration agency and public input, the purpose and need for the Project was identified early in Project planning. The purpose of the Project is to reduce congestion and improve safety along NH 102 from I-93 easterly through downtown Derry and to promote economic vitality in the Derry-Londonderry area. This Project purpose statement was used throughout the planning process for the identification, evaluation, and screening of potential alternatives (CLD, 2000; CLD, 2001).

### ES.1.1 Purpose

The purpose of this Project includes:

- providing for the safe and efficient movement of people, goods, and services between I-93 and the towns served by NH 102, specifically Derry and Londonderry, that are immediately adjacent to I-93 Exit 4;
- providing an alternative route to the Interstate system for traffic using NH 102 to and from the east, thus removing a large volume of through traffic from the heavily congested downtown Derry street network;
- providing improved Interstate access for commercial and industrially zoned lands near State Route 28 (NH 28) in both Derry and Londonderry, thus allowing for the planned and orderly development of such lands to further locally defined economic development goals and tax base diversification; and
- enhancing and promoting the economic vitality of the downtown Derry area, presently characterized by traffic congestion and decreasing vehicular and pedestrian safety, by separating local, destination-oriented traffic from through traffic destined for the Interstate system.

### ES.1.2 Need

The Towns, working with FHWA, NHDOT, and Citizens Advisory Task Force (CATF) identified several factors demonstrating the need for transportation improvements within the study area, including traffic congestion in and around downtown Derry, economic vitality, and safety. Each of these factors is explained in greater detail in the following sub-sections. The traffic congestion element of the need relates to the poor performance of intersections and roadway segments along the NH 102 corridor through downtown Derry and the performance of I-93 Exit 4 under existing and design year 2040 conditions. The NH 102 corridor also experiences safety deficiencies in carrying high volumes of through traffic it was not designed to accommodate. The economic vitality element of the need relates to providing access to large tracts of undeveloped land near the interstate to allow for the job and tax base growth desired by local land use plans.

#### Traffic Congestion in and around Downtown Derry

NH 102, known as Broadway, is the principal east-west roadway through both Derry and Londonderry and serves as the major route for traffic accessing I-93 via Exit 4. The section of NH 102 passing through downtown Derry serves as its “main street.” The “downtown” area

begins at the NH 102/Fordway intersection and progresses easterly to the NH 102/NH 28 intersection. It is currently a two-lane road from I-93 easterly through the downtown area, with several traffic signals and numerous intersections with side streets, on-street parallel parking, and a steady flow of pedestrian traffic. As a result of these complicating and often conflicting functions, downtown Derry experiences considerable congestion as locally oriented traffic intermingles with Interstate-bound through traffic.

Although operating near capacity, the updated traffic analyses conducted for 2015 existing conditions and the 2040 No Build condition generally show acceptable peak hour Level of Service (LOS) D at the major intersections along NH 102 through downtown Derry, including the NH 102/NH 28 (Crystal Avenue/Birch Street) intersection. Traffic volumes in downtown Derry are projected to increase by approximately 15 percent between 2015 and 2040. Larger traffic increases and higher levels of congestion (LOS E or F) are not projected for Derry because of the availability of alternative routes to disperse traffic. The existing two-lane road is not capable of handling higher volumes without traffic flow breaking down. Therefore, traffic avoids the downtown NH 102 corridor, diverting to other local roads such as Folsom Road and Londonderry Road as alternative access routes to Exit 4. This situation has been observed on Folsom Road where traffic has increased from about 8,700 to 11,768 annual average daily traffic (AADT) between 1998 and 2015.

The traffic diversions to local roads to avoid NH 102 result in congestion issues in additional portions of Derry, such as the intersection of North High Street and Ash Street Extension, which is projected to operate at LOS F in the AM and PM peak hours in 2040. As traffic diverts around NH 102 to points easterly, it increases traffic on local streets not designed for high through-traffic volumes.

In addition to congestion in Derry, the Exit 4 interchange is projected to experience congestion issues by 2040, even with the improvements made by the ongoing I-93 widening project and intersection spot improvements proposed by Woodmont Commons. Specifically, the following intersections in the Exit 4 area would operate at LOS E or F in the 2040 No Build condition:

- NH 102 and Gilcreast Road in AM and PM Peak Hour
- NH 102 and I-93 Exit 4 Southbound Off-Ramp in PM Peak Hour
- NH 102 and I-93 Exit 4 Northbound On- and Off-Ramp in AM and PM Peak Hour
- NH 102 and St. Charles Street/Londonderry Road in PM Peak Hour

The I-93 Exit 4 southbound off-ramp to NH 102 is also projected to operate at LOS F in the 2040 PM peak hour.

## **Economic Vitality**

Economic development issues and opportunities in Derry and Londonderry are discussed in the following sections for each Town. Economic vitality is essential for the Derry downtown area to remain the center of community activity, a clear priority identified in the Derry Master Plan. The 2010 Derry Master Plan notes “The town is also continuing to pursue the I-93 Exit 4A Project which is designed to relieve traffic on NH 102 and promote the safe and efficient movement of people, goods, and services. Businesses in downtown Derry will benefit from the completion of

the I-93 Exit 4A Project through the reduction of traffic and related congestion and improved accessibility” (Town of Derry, 2010).

In Londonderry, large tracts of undeveloped land are adjacent to the east side of I-93 between Exits 4 and 5, the attractiveness of which for commercial or industrial development would be greatly enhanced by a direct connection to I-93. The proximity of the Manchester-Boston Regional Airport to this area also adds to the development potential of this land. As noted in the *Land Use Scenarios Technical Report*, a new exit would provide accessibility to existing undeveloped land, thereby enhancing the development potential. The net effect of these development activities would likely be a number of new, high-paying jobs and increased tax revenue for both Towns.

## **Safety**

Between 2010 and 2014, there were 716 crashes in the Exit 4A study area, including 240 crashes along NH 102 between Exit 4 and Tsienneto Road (NHDOT, 2010–2014). Of the total, approximately 24 percent resulted in an injury or fatality. If traffic using NH 102 to the east could be moved away from the interchange area more efficiently, traffic congestion at the ramp intersections could be reduced and traffic flow improved, resulting in a more orderly and safer flow of traffic through the intersections, as well as elsewhere along NH 102.

The congestion in downtown Derry results in some vehicles seeking alternative routes, many of which result in additional traffic through residential neighborhoods, representing an additional safety concern. On Broadway itself, the congestion results in increased conflicts between through traffic, turning traffic, parked cars, pedestrians, and bicyclists.

## **ES.2 Alternatives Analysis**

As outlined in the 2007 DEIS and summarized in this FEIS, scoping for the Project began in 1998. At the July 1998 scoping meetings, the Project’s purpose and need were discussed, as well as the limits of the Project study area, issues associated with access routes extending to the west of I-93, the public involvement process, anticipated additional future meetings, and an explanation of the steps required as part of the NEPA process. Also discussed were the potential areas of impacts and the reasonable range of alternatives to be studied in the DEIS. The scoping meeting also provided opportunities for federal and state agency representatives, local groups, and public officials to provide guidance on issues salient to the DEIS study.

### **ES.2.1 Conceptual Corridors**

Early in Project planning, a number of conceptual corridors for a new interchange location and connecting roadways were identified. Each corridor was evaluated based on engineering, environmental, cultural, topographic, and socioeconomic constraints. As noted in the 2007 DEIS, a 300-foot-corridor width was used to represent the potential physical characteristics associated with a new location alternative and for the initial screening of alternatives from an environmental impact standpoint. This width was based on the likely required cross-section of the proposed roadway needed to serve projected traffic volumes, as well as the design criteria outlined in the 2007 DEIS. These preliminary design criteria used to develop potential highway alternatives, as well as upgrade options for existing highways, are based on American Association of State Highway and Transportation Officials (AASHTO) policy and the NHDOT Highway Design

Manual (NHDOT, 2007). Conceptual corridor alternatives considered during the screening process for the 2007 DEIS include (1) upgrade existing roadways, (2) new I-93 interchange/connector road options, and (3) combinations of 1 and 2.

Two iterative stages of conceptual corridor screening were outlined in the 2007 DEIS and are summarized in this FEIS. Five alternatives remained after the screening process was completed (referred to as alternatives A, B, C, D and F) and these alternatives are described in ES.2.2.

By letter dated December 12, 2005, the U.S. Army Corps of Engineers (USACE) formally acknowledged, for purposes of its Section 404 permitting, these alignments as constituting the reasonable range of alternatives, along with the No Build Alternative. Under NEPA requirements, the No Build Alternative must be reviewed and considered as an alternative to provide a means of comparison against other alternatives analyzed as part of this Project.

## **ES.2.2 Description of the Alternatives Evaluated in This FEIS**

Five Build Alternatives (A, B, C, D, and F) and the No Build Alternative are described in detail in Chapter 3 of this FEIS (see also Figure ES-1). In addition, transportation system management and transportation demand management alternatives were considered and dismissed from further evaluation.

### **No Build Alternative**

The No Build Alternative assumes that no major new construction would occur except for projects that are already planned and programmed. The planned and programmed transportation projects included in the traffic model for the No Build Alternative were identified from the FY 2017–2020 Transportation Improvement Program, FY 2017–2026 Ten-Year Transportation Improvement Plan, and 2017–2040 SNHPC Regional Transportation Plan. In addition, as noted in the *Land Use Scenarios Technical Report*, known developments and background population and employment growth projected through 2040 are included in the No Build Alternative.

### **Build Alternatives**

#### *Alternative A*

Alternative A (the preferred alternative) includes a corridor that is approximately 3.2 miles in length between the new, proposed I-93 Exit 4A interchange and eastern Derry (see Figures 3.6-1 and 3.6-2, FEIS Volume II). There would be approximately 1 mile of roadway construction on a new alignment and 2.2 miles of existing roadway reconstruction. It would originate from the southern I-93 Exit 4A interchange location, situated approximately 1 mile north of the existing Exit 4, and travel east along new alignment through a wooded area to Folsom Road, near its intersection with North High Street and Madden Road. This alternative would continue to follow Folsom Road to Ross' Corner (Manchester Road/Crystal Avenue [NH 28]) and continue on Tsienneto Road across the NH 28 Bypass to its intersection with NH 102 (Chester Road), adjacent to Beaver Lake.

#### *Alternative B*

The Alternative B corridor is approximately 3.4 miles in length between I-93 and eastern Derry (see Figures 3.6-3 and 3.6-4, FEIS Volume II). With the exception of an 800-foot-long section of

Ashleigh Drive that would be reconstructed, the remaining 3.2-mile corridor would consist of roadway construction on new alignment. It would originate from a new southern I-93 Exit 4A interchange, approximately 1 mile north of Exit 4, and travel northeast along a new alignment through a wooded area to the intersection of Ashleigh Drive and NH 28. From this intersection, this alternative would extend northeast towards the intersection of London Road and the NH 28 Bypass and then continue on new alignment to the intersection of Tsienneto Road and NH 102.

### *Alternative C*

The Alternative C corridor is approximately 3.7 miles in length between I-93 and eastern Derry (see Figures 3.6-5 through 3.6-7, FEIS Volume II). Approximately 2.9 miles of corridor would be on new alignment, while approximately 0.8 mile would reconstruct existing roadways. The alternative would start from a new northern I-93 Exit 4A interchange, approximately 1 mile south of Exit 5, and travel east approximately 0.7 mile along a powerline right-of-way (ROW) to NH 28. Following NH 28 south to the intersection of Ashleigh Drive, it would follow the same alignment as Alternative B to the intersection of Tsienneto Road and NH 102.

### *Alternative D*

The Alternative D corridor is approximately 3.9 miles in length between I-93 and eastern Derry (see Figures 3.6-8 through 3.6-10, FEIS Volume II). Within this corridor, approximately 0.8 mile would be on new alignment, and 3.1 miles of existing roadways would be reconstructed. The alternative would commence from a new northern I-93 Exit 4A interchange, approximately 1 mile south of Exit 5, and travel east approximately 0.7 mile along a powerline ROW to NH 28. Following NH 28 south to Ross' Corner, the corridor would then follow the same path as Alternative A to the intersection of Tsienneto Road and NH 102.

### *Alternative F*

Alternative F focuses all improvements along the existing NH 102 corridor between Exit 4 at I-93 and downtown Derry (see Figures 3.6-11 and 3.6-12, FEIS Volume II). A two-way center left-turn lane would be constructed from Londonderry Road to Crystal Avenue/Birch Street (NH 28). The majority of existing on-street parking spaces would be lost to accommodate the center-turn lane.

## **Summary of Impacts of the Build and No Build Alternatives**

Table ES-1 presents environmental considerations used to evaluate the alternatives. Chapter 4, *Affected Environment and Environmental Consequences*, of this FEIS presents a detailed discussion of the impacts associated with the Build Alternatives and the No Build Alternative. In addition, as noted in Table ES-1, the effect on 2040 traffic volumes in downtown Derry and the potential for economic development were used to consider how well the alternatives meet the purpose and need for the Project. Finally, Project costs were also considered in the identification of a preferred alternative.

This page intentionally left blank.

**Table ES-1. Comparison of Build and No Build Alternatives**

Resource	Impact Calculation	Alternative					
		No Build	A	B	C	D	F
Purpose and Need	Change in 2040 traffic through downtown Derry (NH 102) compared to 2040 No Build Conditions: NH 102 East of Griffin Street	2040 AAWDT: 18,958	-19%	-20%	-22%	-11%	+16%
	Incremental increase in employment in Derry and Londonderry <sup>a</sup>	Derry: 10,479 Londonderry: 20,875	Derry: 346 Londonderry: 4,335	Derry: 346 Londonderry: 4,335	Derry: 0 Londonderry: 0	Derry: 0 Londonderry: 0	Derry: 0 Londonderry: 0
General	Length of roadway (miles)		5.96	5.59	6.25	6.21	2.44
	Additional lane miles <sup>b</sup>		9.1	12.6	12.0	8.1	1.8
	Construction costs <sup>c</sup>		\$38,800,000	\$37,800,000	\$34,700,000	\$35,400,000	\$4,300,000
	Transmission line relocation costs		\$850,000	\$3,530,000	\$7,560,000	\$4,930,000	\$0
Socioeconomic Conditions <sup>d</sup>	Potential residential total acquisitions (number)		14	19	13	0	0
	Potential business displacements (number)		26	11	2	2	16
	Potential commercial total acquisitions (number)		3	2	4	4	2
	Total area of ROW taking (acres)		41.45	52.81	53.35	43.20	1.17
Noise <sup>e</sup>	Single-Family (Number of impacted receptors)	66	83	60	56	67	66
	Multi-Family/Apartment (Number of impacted receptors)	41	44	33	34	38	42
	Community Facility/Park (Number of impacted receptors)	10	11	8	9	10	11
	Commercial w/outdoor use (Number of impacted receptors)	0	0	0	0	0	1
	Total noise impacts	133	138	101	99	115	120
Soils	Total area of disturbance (acres)		75.16	78.69	89.91	93.18	21.51
Contaminated Properties and Hazardous Materials	Known hazardous sites (number) within ASTM search radii		23	18	17	27	41
	Potential hazardous sites (number) within ASTM search radii		27	24	32	56	78
Surface Waters and Water Quality <sup>f</sup>	New stream crossings (number)		5	6	0	0	1
	Existing stream crossings (number)		5	2	4	6	3
	Stream channel impacts (Linear feet)		2,971	1,341	562	557	153
	Stream channel impacts (Square feet)		33,680	20,524	16,202	16,171	2,060
	Lane-miles for chloride loading		7.6	11.1	10.6	8.3	1.3
Wetlands and Vernal Pools <sup>f</sup>	Non-prime non-vernal pool wetlands (acres)		3.46	8.85	8.40	3.60	0.00
	Prime wetlands (acres)		0.08	0.06	0.06	0.03	0.00
	Vernal pools (acres)		1.31	1.09	0.27	0.29	0.00
	Wetlands total (acres)		4.85	10.00	8.73	3.92	0.00
	Vernal pools (number)		7	8	3	4	0

Resource	Impact Calculation	Alternative					
		No Build	A	B	C	D	F
Groundwater	Aquifers, surface area of impacts, 0-1,000 sq ft/day (acres)		23.17	13.56	32.67	37.66	19.15
	Aquifers, surface area of impacts, 1,000-2,000 sq ft/day (acres)		0.00	0.00	0.00	0.00	0.16
	Public wellhead protection areas (number)		6	5	5	6	0
	Wellhead protection areas (new impervious, acres)		0.62	1.16	1.16	0.22	0
	Private wells (number)		0	2	2	0	0
	Private wells (number within 150 ft)		21	16	14	18	4
Floodplains	Floodway (acres)		0.15	0.20	0.45	0.45	0.06
	100-year floodplain (acres)		0.45	0.90	1.87	1.84	0.31
	500-year floodplain (acres)		0.57	0.89	0.20	0.43	3.01
Plant Communities and Wildlife	Wildlife Action Plan (WAP) supporting landscapes (acres)		15.37	22.49	8.69	1.85	0.00
	WAP highest ranked wildlife habitat in biological region (acres)		0.00	0.00	0.17	0.17	0.00
Threatened and Endangered Species	State-listed rare plant and animal occurrences (number)		1	2	2	1	0
Cultural Resources	Archaeological Resources		No impacts to known sites. Low probability of unknown resources.	No impacts to known sites. Low probability of unknown resources.	No impacts to known sites. Low probability of unknown resources.	No impacts to known sites. Low probability of unknown resources.	No impacts to known sites. Low probability of unknown resources.
	Historic Resources		Adverse effect on Manchester-Lawrence Railroad Historic District	Adverse effect on Manchester-Lawrence Railroad Historic District	Adverse effect on the Reed Paige Clark Homestead resources (LON0114)	Adverse effect on the Reed Paige Clark Homestead resources (LON0114)	Adverse effect upon historic resources within the Broadway Historic District (Area B)
Parks, Recreation, and Conservation Lands	Parks and Conservation Lands (name, area)		Rider Fields (0.02 acre)	Rider Fields (1.31 acres)	Rockingham Road Conservation Site (0.035 acre) Dumont Conservation Site (0.048 acre) Rider Fields (1.31 acres)	Rockingham Road Conservation Site (0.035 acre) Dumont Conservation Site (0.048 acre) Rider Fields (0.02 acre)	Hoodcroft Golf Course (0.180 acre)
	Trails and Bicycle Paths (name)		Derry Rail Trail (Planned)	Derry Rail Trail (Planned)	Londonderry Rail Trail (Paved) Londonderry Rail Trail (Unpaved)	Londonderry Rail Trail (Paved) Londonderry Rail Trail (Unpaved)	Rail Trail/Path (On-Road Bicycle Route)

<sup>a</sup> The employment numbers for the No Build Alternative represent the 2040 employment projection for the five-town study area. The employment numbers for Build Alternatives are incremental and would be added to the 2040 employment projections under the No Build Scenario.

<sup>b</sup> Additional lane miles have not been used for chloride application purposes.

<sup>c</sup> The values for Alternative A are based on an alternative comparison level design to determine the preferred alternative. Once Alternative A was identified as the preferred alternative, the design was advanced further and refined in response to a more detailed design approach.

<sup>d</sup> The value of the residential relocations and business displacements will be evaluated.

<sup>e</sup> Noise results shown account for I-93 widening barriers, except sections of barriers in conflict with the alternatives. Results do not include barrier modifications proposed for the Exit 4A Project.

<sup>f</sup> The surface water and wetland/vernal pool impact values for Alternative A reflect a more advanced design than the values for the other alternatives for consistency with state and federal wetland permit applications.

## Description of and Rationale for the Preferred Alternative

To best address the traffic, economic, and safety issues, the Towns, NHDOT, and FHWA identified a preferred alternative. This preferred alternative, identified as Alternative A in this FEIS, would include the following features:

- Construction of a new diamond interchange located approximately 1 mile north of existing Exit 4 that would receive and direct traffic to the east side of I-93.
- Construction of approximately 1 mile of new roadway. This roadway would travel across currently undeveloped land to Folsom Road near its intersection with North High Street. This new roadway would be 72 feet wide from side to side and would include four travel lanes that would be 11 feet wide, with an 18-foot median to accommodate turn lanes with raised islands, and 5-foot shoulders.
- Reconstruction and improvements to approximately 2.2 miles of existing roadway, including sections of North High Street, Folsom Road, and Tsienneto Road, as well as sections of Franklin Street Extension, NH 28, Pinkerton Street, NH 28 Bypass, and NH 102. The specific improvements for each roadway segment are described in Section 3.6.2, but generally include the addition of turning lanes, through-traffic lanes, traffic signals, and minor changes in roadway geometry.

Alternative A was selected as the preferred alternative based on the results of engineering, environmental, and socioeconomic studies (see Table ES-1 and Chapter 4 of the FEIS). Advantages of the preferred alternative compared to the other Build Alternatives include lowest cost, including utilities; least acreage for ROW acquisitions; lowest wetland impacts of the alternatives that meet the purpose and need; and no impact on Wildlife Action Plan (WAP) highest ranked habitat.

The No Build Alternative and Alternative F do not meet the purpose and need of the Project. Even with the upgrades to the existing roadway under Alternative F, traffic in downtown Derry would increase 16 percent compared to the No Build Alternative (see Appendix C: Traffic Technical Report, Table 7). Additionally, Alternative F would not contribute to economic development. Although Alternative C and Alternative D would decrease in traffic in downtown Derry by 22 percent and 11 percent, respectively, these alternatives would not have the same potential for encouraging economic development as Alternative A and B because of the lack of developable land near the northerly interchange location (see FEIS section 5.25 and Appendix B: Land Use Scenarios Technical Report). Although Alternatives A and B both satisfy the traffic and economic development needs of the Project, Alternative A more closely follows existing roads than Alternative B, and Alternative A has considerably less impact on wetlands, wildlife habitat, and parks and recreational lands than Alternative B. For example, Alternative A would impact 4.77 acres of wetlands, and Alternative B would impact 10.0 acres of wetlands. Alternative A would impact 0.02 acre of Rider Fields, and Alternative B would impact 1.31 acres of Rider Fields.

## ES.3 Environmental Consequences

This section summarizes the environmental impacts anticipated from the preferred alternative (Alternative A) and, where applicable, mitigation measures to address these impacts. Detailed

information associated with the affected environment for each resource and the comparative analysis of the environmental impacts from the No Build and five Build Alternatives is provided in Chapter 4. Indirect effects and cumulative impacts from the preferred alternative are summarized in Section ES.4 and provided in more detail for all alternatives in Chapter 5.

### **ES.3.1 Traffic and Transportation**

Under the preferred alternative, trips on east-west roadways including NH 102 and NH 28 would be reduced compared to the No Build. The creation of a new parallel route to NH 102 would shift traffic patterns away from NH 102 through downtown Derry. Comparing the No Build Alternative to the preferred alternative shows the following volume changes:

- Mainline volumes on I-93 between Exits 4 and 4A would decrease an average of 3 percent and between Exits 4A and 5 would increase an average of 10 percent.
- Volumes along NH 102 east of Exit 4 would decrease by 28 percent.
- Volumes along NH 28 east of Exit 5 would decrease by 21 percent.
- Volumes would increase along NH 102 west of Exit 4.

Based on the analysis under the preferred alternative compared to the No Build Alternative, all freeway facilities would operate at LOS D or better. Ten intersections would improve from LOS E or F to LOS B through D or improve from LOS F to LOS E. Four intersections would degrade from LOS B through D to LOS E or LOS F. All new intersections and freeway facilities created under the preferred alternative would operate at LOS D or better.

The creation of a new parallel route to NH 102 in conjunction with the full build-out the Woodmont Commons Planned Unit Development (PUD) area would substantially contribute to changes in the travel pattern and increases in overall study area volumes. Based on the analysis of trip patterns from the SNHPC travel demand model, the preferred alternative would provide a more parallel route to NH 102 and bypass downtown Derry by creating a new connection between I-93 and eastern Derry. Under the preferred alternative, freeway conditions would improve at Exit 4, 11 study area intersection operations would improve, and 4 study area intersections would worsen. Therefore, this alternative would result in beneficial impacts on the freeway operations and the study area intersections (11 improved versus 4 worsened). At least one of the intersections performing worse than the No Build Alternative would be addressed by the Woodmont Commons traffic mitigation requirements imposed by Londonderry.

Based on the Woodmont Commons Memorandum of Understanding, to “unlock” parcels within the PUD for the developer to continue construction, the developer must submit a traffic study to the Londonderry Planning Board to ascertain the level of roadway mitigation necessary to handle the new vehicle trips generated (Pillsbury Realty Development, LLC, 2018). The assessment in this study does not include the future mitigation because the future mitigation is not known until completion of the next set of Woodmont Commons traffic studies. For information on the details of the traffic and transportation analyses, see Section 4.2, Appendix C: Traffic Technical Report, and Appendix D: Interchange Justification Report).

### **ES.3.2 Land Use, Zoning, and Public Policy**

Under the preferred alternative (Alternative A), approximately 41.45 acres of new ROW would be required, and takes would include 14 residential acquisitions and 25 business displacements, most of which are located in a single office complex. Implementation of the preferred alternative would provide direct Interstate access to commercial and industrial lands and be compatible with existing and future commercial and industrial uses. It could be incompatible with existing and future residential land uses, but it would be more compatible than Alternatives B and C, which have more low-density residential use along their alignments. The Salvation Army of Derry (18 Folsom Road) would be displaced by the preferred alternative. No other community facilities would be affected. Residential acquisitions and business displacements are discussed in more detail in Section ES.3.6.

As described in Chapter 5, *Indirect Effects and Cumulative Impacts*, presently, the Town of Derry is undertaking a study to determine whether to rezone several residential properties along North High Street currently zoned as medium-high density residential to an industrial zoning category. Under the preferred alternative, these properties would have direct access to I-93. No other changes to zoning would be attributable to or affected by the preferred alternative.

The preferred alternative would be compatible with public policy in that it would reduce traffic in downtown Derry and provide opportunities for economic development. For additional detailed information, see Section 4.3 of this FEIS.

### **ES.3.3 Air Quality**

The Project area is in attainment for all the criteria pollutants. With respect to transportation conformity, a court decision has required some transportation conformity considerations for the Project area under the revoked 1997 ozone standards. As a regional pollutant, no project-level analysis of ozone is required. The Project is included in the latest conforming SNHPC Transportation Improvement Program and long-range transportation plan (July 23, 2019). Therefore, the Project is in compliance with the transportation conformity rule.

Potential impacts on carbon monoxide (CO) concentrations near congested intersections were evaluated based on a worst-case intersection, NH 102 and Hampton Drive/Garden Lane, where the preferred alternative would result in the highest volume and delay compared to the No Build Alternative. The modeling results show predicted maximum CO concentrations would be well under the 1-hour and 8-hour National Ambient Air Quality Standards. This means that CO impacts at other intersections in the study area with lower volumes and/or less congestion would similarly not have adverse impacts on CO concentrations under the preferred alternative.

Traffic data show that the proposed connector roads would not have the potential for significant adverse impacts on particulate matter less than 2.5 micrometers (PM<sub>2.5</sub>) concentrations and further detailed analysis is not warranted. The potential for PM<sub>2.5</sub> impacts at intersections was also reviewed based on the traffic study. Fewer than 350 heavy duty vehicles approach any of the intersections in the Project area during the AM and PM peak hours. Therefore, the Project would not affect intersections with a substantial volume of heavy-duty vehicle traffic.

Qualitative analyses for mobile source air toxics (MSAT) were conducted based on vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each Alternative. The VMT estimated for the preferred alternative is slightly higher than that for the

No Build Alternative, because the interchange facilitates new development that attracts trips that would not otherwise occur in the area. This increase in VMT means MSAT under the preferred alternative would probably be higher than the No Build Alternative in the study area. There also could be increases in MSAT levels in a few localized areas where VMT increases. However, the U.S. Environmental Protection Agency's (EPA's) vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future than today.

A quantitative greenhouse gas analysis was conducted to provide a relative comparison of the Project in terms of carbon dioxide-equivalent (CO<sub>2</sub>e) emissions from the motor vehicle travel in the region. In terms of tons of CO<sub>2</sub>e per day within the SNHPC model region, the preferred alternative would result in an increase of approximately 1.7 percent relative to the No Build Alternative, and this result is likely due in part to the substantial increase in employment and economic activity added to the SNHPC model associated with induced development. For detailed information on the air quality and greenhouse gas analyses, see Section 4.4 of this FEIS.

### **ES.3.4 Noise**

Design year 2040 predicted noise levels were determined using Version 2.5 of the FHWA Traffic Noise Model. Noise impacts were identified following FHWA and NHDOT policies (see Section 4.5 and Appendix E: Noise Technical Report).

Mitigation was considered for areas along the preferred alternative alignment where noise impacts were predicted for the 2040 analysis year. Detailed noise barrier evaluations were completed for Trolley Car Lane (noise sensitive area [NSA] 4), and Seasons Lane (NSA 5), two neighborhoods where barriers planned as part of the I-93 widening project would be affected by the new interchange ramps under the preferred alternative. Noise barrier evaluations were also conducted along Folsom Road/Tsienneto Road (NSA 6, 7, and 8).

- Based on the studies completed to date, NHDOT is committed to the construction of feasible and reasonable noise abatement measures at Trolley Car Lane (North and South). Preliminary indications of likely abatement measures are based upon preliminary design for two discontinuous barriers with a combined length of approximately 2,700 feet and an average height of approximately 13.5 feet, which would reduce the noise level by at least 5 a-weighted decibels (dB[A]) for 13 residents (see Figures 4.5-4 and 4.5-5, FEIS Volume II). A final decision on the installation of the abatement measure(s) would be made during the final design process following the completion of public involvement.
- Based on the studies completed to date, NHDOT is committed to the construction of feasible and reasonable noise abatement measures at Seasons Lane. These preliminary indications of likely abatement measures are based upon preliminary design for a barrier with a length of about 3,000 feet and an average height of approximately 18.1 feet along northbound I-93 in the proposed Exit 4A interchange area, which would reduce the noise level by at least 5 dB(A) for 16 residents (see Figure 4.5-6, FEIS Volume II). A final decision on the installation of the abatement measure(s) would be made during the final design process following the completion of public involvement.
- Noise barriers were evaluated in 13 locations along Folsom/Tsienneto Road where noise impacts were predicted to occur under the preferred alternative. Ten

barriers evaluated for Tsienneto Road/Folsom Road are either not feasible based on acoustic considerations or not reasonable because they would not meet the NHDOT effectiveness criterion. The remaining three barriers (3, 5, and 10) that were potentially reasonable and feasible based on acoustic performance and the effectiveness criterion were advanced for further evaluation of engineering, environmental, and safety issues. The conclusion of the study was that barriers 3, 5, and 10 would not be feasible from an engineering/environmental perspective and are not recommended for further consideration.

### **ES.3.5 Visual Resources**

The majority of the corridor for the preferred alternative includes existing roads located in highly developed residential and commercial/industrial areas. Therefore, in most areas of the corridor, existing traffic volumes, along with the type of development and its density, make for an environment that is not particularly sensitive from a visual perspective. Following the upgrade of Tsienneto Road, businesses and residences would front a road with improved points of access and egress. In some cases, improvements to the roadway and business entrances and exits would likely result in an enhanced visual environment when compared to existing conditions. One potential area of exception may be the residential neighborhood between the NH 28 Bypass and NH 102. The neighborhood along this section of roadway is primarily residential, and it includes two historic resources (see Section 4.18 of this FEIS) as well as areas of open fields and a large, emergent wetland near the intersection of Tsienneto Road and NH 102. Most of the homes in this area are set back from the road in subdivisions. The preferred alternative would not result in adverse effects to historic structures located along this segment of the corridor. Therefore, the upgrade of Tsienneto Road would have very little impact on the existing viewshed.

Between I-93 and Franklin Street Extension, the preferred alternative would be constructed in an undeveloped area of land. This area likely provides an opportunity for local residents to hike, bird watch, hunt, and participate in other forms of outdoor recreation. From a visual perspective, the area represents a visually pleasing landscape of woodlands and wetlands. However, there is also abundant evidence of past and ongoing illegal dumping activities, as well as all-terrain vehicle usage, which detracts from the overall visual experience. Moreover, a portion of the land that would be used for the preferred alternative is privately owned and posted. Thus, recreational opportunities, including enjoyment of the visual environment on this undeveloped land, would be limited to those individuals with landowner permission to access the property. For more information, see Section 4.6 of this FEIS.

### **ES.3.6 Socioeconomics**

The preferred alternative would require 14 residential relocations and 25 business displacements. In addition to compensation for property acquisition, relocation assistance would be provided to residential, non-profit, and business owners displaced by the Project in conformance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Advisory assistance would be supplied along with financial assistance to eligible displaced persons. It is important to note impacted properties would be revisited at the time of taking, and the cost of the takings would reflect that current year's assessed value (as equalized) plus any premiums, hardships, or relocation expenses as may be required and appropriate. The loss of assessed value would reduce property taxes collected by the Towns from the acquired properties.

Taxable building valuation losses are either partial or total, depending upon the ROW acquisitions.

The preferred alternative could impact community cohesion near residential areas that exist along the eastern portion of the alignment in the Town of Derry. Additionally, the westerly segment of the preferred alternative could have a neighborhood impact in the residential areas of Derry that include Madden and Folsom Road corridors that would be upgraded as part of the interchange. Although much of the land use along this roadway segment is commercial or industrial, it also traverses along the northerly edge of a densely developed residential area. The construction of wider shoulders and a continuous sidewalk will improve safety for pedestrians, bicyclists, and vehicles. Also, sight distance improvements are proposed to improve safety. These elements will help to mitigate the impact of increased traffic associated with anticipated growth and the new interchange. See Section 4.7 of this FEIS for additional information regarding socioeconomics.

### **ES.3.7 Environmental Justice**

Under the preferred alternative, residential relocations and business displacements would occur within two census block groups: census tract 3400, block group 4; and census tract 3701, block group 2. The minority population percentage of these block groups ranges from 1.18 percent to 4.73 percent, and the Hispanic population percentage of these block groups ranges from 0.0 to 8.78 percent. The block groups comprising the study area contain 4.1 percent minority and 3.1 percent Hispanic populations. None of the block groups that would experience relocations or displacements under the Build Alternatives has a median household income that would be classified as “low-income”; however, the percentage of the population living below poverty ranges from 1.1 to 7.5 percent, compared to an average of 3.4 percent living below poverty in the block groups comprising the study area. While some of the relocations and displacements could include minority or Hispanic persons or persons living below poverty, the relocations and displacement associated the preferred alternative would not be disproportionately borne by minority or low-income populations.

NHDOT conducted an additional environmental justice population analysis based on a larger study area, which included a 1-mile radius for the impacted area and a 3-mile radius for the surrounding area. The analysis considered additional populations that are not directly covered by federal environmental justice policies (which focus on low-income and minority populations), such as the elderly. The NHDOT analysis resulted in recommendations about Americans with Disabilities Act access that will be considered as the design is advanced and the identification of organizations related to low-income and elderly populations that should be contacted during Project outreach activities. See Section 4.8 of this FEIS for additional information regarding environmental justice.

### **ES.3.8 Geology, Minerals, and Soils**

The preferred alternative would not result in substantive changes to bedrock or surficial geology. Sand and gravel are the only geologic and mineral resources that have been identified within the study area. American Excavating Corporation is located at 5 Madden Road, adjacent to the preferred alternative. The driveway to access the property would be moved to square it with the North High Street intersection. While part of the property would be acquired for the connector road and to provide access for Madden Road, the property appears to be in use for stock piling,

rather than mining operations. The driveway to American Excavating Corporation would be moved to create a signalized intersection with North High Street. Additionally, a partial acquisition of this property would be used to provide access to provide a connection to Madden Road. Operation of this stockpiling facility is not anticipated to be impacted by the preferred alternative.

The preferred alternative would disturb 75.16 acres of soils and includes two areas of potentially problematic soils: a large area of potential shallow-to-bedrock soils between I-93 and Shields Brook and an area of Walpole, Greenwood, and Ridgebury soils, which are known to have a high water table, located along Tsienneto Road between Jeff Lane and NH 102. Impacts associated with the problematic soils described are expected to be relatively minor. 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. See Section 4.9 of this FEIS for additional information regarding geology, minerals, and soils.

### **ES.3.9 Contaminated Properties and Hazardous Materials**

Within 1,000 feet of the alignment for the preferred alternative, there are 23 known hazardous material or petroleum-contaminated sites (see Section 4.10 and Appendix F: Known and Potential Petroleum and Hazardous Materials Sites). Seven Initial Site Assessments (ISAs) were previously undertaken within 1,000 feet of the alignment as currently proposed, and Preliminary Site Investigations (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 leaking underground storage tanks. An ISA is recommended at one new site, a dry cleaner, within 1,000 feet of the preferred alternative footprint. In addition, there are 27 sites within 500 feet of the preferred alternative footprint recognized as potential hazardous material or petroleum-contaminated sites.

Mitigation for hazardous material or petroleum-contaminated involvement would follow standard New Hampshire Department of Environmental Services (NHDES) procedures. All stages of design and construction of the preferred alternative would address potential contaminants and Project-specific avoidance and remediation measures that may be required. Standard procedures for building demolition, limited reuse soils, and per- and polyfluoroalkyl substances would be followed.

### **ES.3.10 Surface Waters and Water Quality**

Section 4.11 of the FEIS provides a detailed discussion of regulations and existing conditions for surface waters and water quality including total suspended solids (TSS), nutrients, and chlorides. Additional supporting technical information on the assessment of chloride is provided in Appendix G: Chloride Technical Report.

#### **Total Suspended Solids and Total Phosphorus**

The preferred alternative includes development of new roadway in undeveloped areas or areas with non-roadway current land use as well as redevelopment of existing roadway that would

result in new impervious surface within Upper Beaver Brook watershed. The addition of new impervious roadway surfaces that contribute stormwater runoff to surface waters has the potential to add new pollutant loads including TSS and nutrients to the watershed.

The post-construction total impervious surface areas and associated annual pollutant load estimates for the preferred alternative were analyzed and treatment measures proposed in accordance with applicable standards as outlined in Section 4.11.3. The 2017 NH Municipal Separate Storm Sewer System (MS4) general permit has requirements for stormwater treatment based on the total post-construction impervious area that are presented in Section 4.11.2.

The Project would be subject to regulatory requirements including coverage under the 2017 NH Small MS4 general permit, compliance with the Memorandum of Agreement (MOA) exempting NHDOT from the Alteration of Terrain (AoT) permitting process, and Water Quality Certification (WQC) under Clean Water Act (CWA) Section 401. The preferred alternative contains areas of new development (e.g., creation of new roadway in areas of other current land use) and/or redevelopment (e.g., improvements such as redesign and reconstruction or resurfacing of existing roadway). The MS4 permit has stormwater treatment requirements designed to reduce or minimize the effects of land-disturbing projects on water quality, which include the use of stormwater best management practices (BMPs) with specific stormwater retention volumes, treatment volumes, or specific pollutant removal criteria to reduce pollutant loads from runoff (EPA, 2017c).

Final stormwater management plans are not available at the time of this report but are expected to fully meet the required stormwater retention or treatment provisions of the MS4 permit by using BMPs to the maximum extent practicable. The MS4 permit has additional requirements that, for new or increased discharges to impaired waters, no net increase of pollutant(s) for which the waterbody is impaired would occur. The MS4 permit provides conditions for demonstrating no net increase in the pollutants of concern through the use of additional stormwater controls including pollutant-reducing BMPs (EPA, 2017c). NHDOT and the Towns plan to use their coverage under the 2017 NH Small MS4 general permit to authorize stormwater discharges from the Project, expect to meet the conditions of the MS4 permit in operating the Project, and expect no further WQC review (i.e., WQC for the 2017 NH Small MS4 general permit) as a requirement for operating the Project under the MS4 permit. Conditions required for 401 WQC to the USACE Section 404 permit are not available at this time and will be provided by NHDES following submittal and review of a Section 404 permit application.

## **Chlorides**

Although many factors determine annual salt loading rates from winter road and parking lot maintenance, including the timing, frequency, duration, and type of winter precipitation events, and other winter weather elements including temperature and cloudiness (these elements are often evaluated cumulatively as the weather severity index; see NHDES, 2016d), the total winter salt application to roadways (i.e., the salt load) typically varies with the treated roadway area (i.e., treated lane miles). The preferred alternative would result in an increase of 7.60 lane miles, which would be anticipated to result in an estimated salt load of 99.4 tons/year. The Project would implement salt reduction strategies consistent with the total maximum daily load (TMDL) as would be required for Project permits (MS4, 401 WQC, and AoT rules), as discussed further in Section 4.11.2, *Mitigation*.

Indirect impacts from the planned Woodmont Commons East development and additional commercial/industrial development in Derry, and cumulative impacts from the planned Woodmont Commons West development, including Market Basket redevelopment, were also evaluated and are presented in Section 5.4.3 of this FEIS.

Chloride mitigation in the Upper Beaver Brook watershed is addressed in the 2017 NH MS4 permit (EPA, 2017c), which became effective on July 1, 2018, and has specific requirements for new and increased discharges in watersheds impaired with chlorides. The Towns, as well as NHDOT, are required to obtain coverage under the MS4 permit and, consequently, the Project would be subject to all permit conditions, including specific conditions for permittees that discharge into waterbodies subject to an approved TMDL for chlorides. A requirement of the 2017 MS4 permit is for permittees that discharge into a waterbody subject to an approved chloride TMDL to develop a chloride reduction plan by July 2019, as detailed in Appendix F of the MS4 permit. One of the key components to developing a successful chloride reduction plan will be identifying mitigating actions (BMPs) to reduce chlorides and achieve the waste load allocation specified in the applicable chloride TMDL (EPA, 2017c).

NHDOT, Derry, and Londonderry have committed to providing funds for NHDES to continue the in-stream chloride monitoring program in the Upper Beaver Brook watershed as proposed in an NHDES memo dated November 30, 2018, titled “Revised I93 TMDL Implementation Monitoring Plan.” As part of the Beaver Brook chloride TMDL implementation plan (NHDES, 2011a), NHDES identified two monitoring locations on Beaver Brook for determining achievement of the TMDL—Stations 09-BVR (located on Beaver Brook at the outlet of Kendall Pond) and 10A-BVR (located on Beaver Brook at Fordway Ext. Bridge). Although continuous water quality data has been collected at Station 10A-BVR since July 2006, consistent with the TMDL implementation plan, continuous water quality data has not been collected at Station 09-BVR since June 2009. Station 09-BVR is located downstream of the preferred alternative and would be an ideal monitoring location to assess TMDL compliance; however, the site has proven to be logistically difficult for maintaining water quality instrumentation, and the water quality record at this location is sporadic. A new proposed Station 08Z-BVR located just upstream of Station 09-BVR on Beaver Brook (in a comparable but logistically better deployment location compared to 09-BVR) is proposed for long-term TMDL monitoring. Monitoring should also be continued at Station 10A-BVR, in accordance with the TMDL implementation plan, located downstream of portions of the Project impacts. NHDOT and the Towns are committed to supporting the proposed Beaver Brook monitoring efforts. NHDOT has actively coordinated with NHDES to develop a monitoring plan in Beaver Brook and has committed to supporting monitoring for a period of 5 years after construction of the Project. Long-term monitoring at Stations 08Z-BVR and 10A-BVR would provide a baseline condition prior to construction of the Project, allow for effective evaluation of Project direct and indirect impacts over time, and support the overarching Beaver Brook chloride TMDL objectives.

### **ES.3.11 Wetlands and Vernal Pools**

A comprehensive assessment of the existing conditions of wetlands and vernal pools in the project area was completed as documented in Section 4.12, Appendix H: 2014-2015 Vernal Pool Assessment Report and Appendix F: Wetland Functions and Values, and Wetland Photographs. The majority of wetland impacts for the preferred alternative would occur in forested wetlands. Scrub-shrub and scrub-shrub/emergent wetland impacts would generally occur within previously

disturbed wetlands and wetlands in powerlines where vegetation is maintained on a regular basis. Likewise, emergent wetland impacts would generally occur to wetlands situated within maintained powerlines and in areas adjacent to existing roads (see Table ES-2).

**Table ES-2. Summary of Direct Wetland Impacts from the Preferred Alternative**

Wetland Type <sup>a</sup>	Area (acres)
Forested	3.24
Scrub-Shrub	0.02
Scrub-Shrub/ Emergent	0.07
Emergent	0.20
Vernal Pools <sup>b</sup>	1.31
<b>TOTAL</b>	<b>4.85</b>

<sup>a</sup> Wetland cover types determined using National Wetland Inventory mapping, aerial photograph interpretation (high resolution September 2017), and ground-truthing. Wetland cover types are based on classification system of Cowardin et al., 1979. See Section 4.12.1 for wetland cover type descriptions.

<sup>b</sup> Cowardin types are not provided here for vernal pools, but vernal pools within the study area are generally characterized as pockets of open water within forested wetland.

Mitigation for wetland impacts has not yet been finalized, but it would likely involve a payment to the Aquatic Resource Mitigation fund at NHDES and potentially preservation of land for conservation. The in-lieu fee amount and conserved land, if any, would be in accordance with NH Revised Statutes Annotated (RSA) 482-A:28 and NHDES Wetland Rules and with federal Section 404 guidelines in 40 CFR (b)(1)J, and with the USACE's 2016 *New England District Compensatory Mitigation Guidance*. Mitigation for direct and indirect impacts to vernal pools would follow the recommended ratios for mitigation based on the value of the vernal pool as determined by assessment methods provided in the 2016 USACE Mitigation Guidance.

Other potential avenues for wetland mitigation include the Stream Passage Improvement Program, a partnership with NHDOT and NHDES that would use mitigation funds to address culverts within the Project watershed that have inadequate aquatic organism passage and structural condition.

### ES.3.12 Groundwater

The footprint for the preferred alternative overlaps seven wellhead protection areas (WHPAs). However, several of these public wells are located near each other and therefore share largely overlapping WHPAs that occupy much of the same land area. Roadway and intersection improvements on existing alignment would result in 0.27 acre of new impervious area within six WHPAs that encompass Tsienneto Road and connections to five intersecting roads (Fieldstone Drive, Horseshoe Drive, Morningstar Drive, Scenic Drive and Beaver Drive) and the northern end of the alternative on NH 102. Tsienneto Road travels through the area where four WHPAs overlap for a distance of 2,940 linear feet, all of which would involve wider pavement and the addition of sidewalks.

Approximately 128 linear feet of the preferred alternative also crosses two of three overlapping WHPAs associated with the Rand Shepard Hill development at the northern end of the Alternative on NH 102, with a minimal expansion of pavement proposed for this segment of the preferred alternative. No private wells would be affected by the preferred alternative; the alignment is within 150 feet of 21 private wells.

Mitigation measures for potential impacts related to groundwater resources would conform to NHDES rules for protection of groundwater (Env-Wq 1500) and would be consistent with NHDES' *Recommendations for Groundwater Protection Measures When Siting or Improving Roadways* (NHDES, 1995). Structural BMPs such as lined treatment swales and non-structural BMPs such as providing the water supplier, NHDES, and the Office of Emergency Management with site-specific information to aid in isolating a spill would be implemented as practicable.

The operators of the Barkland Acres Association, Morningside Drive, and PEU/Springwood Hills public water supplies will be contacted by NHDOT during the final design process. For additional information on the assessment of groundwater, see Section 4.13 of this FEIS.

### **ES.3.13 Aquatic Life and Essential Fish Habitat**

Development projects, including roadways, may result in impacts on adjacent water bodies and the areas surrounding water bodies. These impacts can affect the physical, chemical, and biological features of a water body, which can result in the loss or degradation of existing habitat for aquatic life. The preferred alternative would result in direct impacts on stream channels at 10 different locations, totaling 3,152 linear feet of disturbance. Five streams would be impacted through the improvement of existing stream crossings, and five streams would be impacted through new stream crossings (one of these is a stream relocation).

Mitigation for stream impacts would be provided as part of the wetland mitigation package. Some of the stream crossings, such as Crossing 2 (Shields Brook) would be widened in accordance with requirements in NHDES Administrative Rules Env-Wt 900 et seq., Stream Crossings. The rules provide that mitigation is not required for any crossing that is "self-mitigating." The improvements proposed would provide improved hydraulic capacity and aquatic organism passage and as such would be self-mitigating. Stream impacts that are not self-mitigating would be mitigated through a payment to the Aquatic Resource Mitigation fund at NHDES and potentially preservation of land for conservation and/or through the Stream Passage Improvement Program. The in-lieu fee amount and conserved land, if any, would be in accordance with NH RSA 482-A:28 and NHDES Wetland Rules and with federal Section 404 guidelines in 40CFR (b)(1)J. For additional supporting information, see Section 4.14.

### **ES.3.14 Floodplains**

The preferred alternative would cross 0.15 acre of floodway and 0.45 acre of 100-year floodplain. Floodplains crossed by the preferred alternative include the Shields Brook floodplain near the existing Folsom Road/Madden Road crossing and near the eastern end of the alignment, near the intersection of Tsienneto Road and NH 102, where a small tributary of Beaver Lake flows under Tsienneto Road. Detailed hydraulic analyses for the preferred alternative would be completed during final design to avoid and/or minimize impacts on the floodway, and in particular to avoid raising the base flood elevation. See Section 4.15 for additional information regarding floodplain impacts.

### **ES.3.15 Plant Communities and Wildlife**

Direct impacts on plant communities under the preferred alternative would result from the removal of vegetation and the conversion of undeveloped land to developed land within the footprint. Adjacent areas would also be subject to indirect effects of vegetation clearing. Indirect effects can include increased sunlight penetrating forested areas, altered hydrology in wetlands, and a potential increase in sediment and toxicants from the new roadway. The most prevalent undeveloped cover types in the Project area are northern hardwood forests and conifer forests and would be the most affected plant community types. Impacts on wetland communities are summarized in Section ES.3.11 and discussed in detail in Section 4.12 of this FEIS. Wetland impacts are under the regulatory jurisdiction of NHDES and USACE under Section 404 of the CWA.

Impacts on terrestrial wildlife as a result of the Project would be primarily indirect, as a result of habitat loss and habitat fragmentation, and due to disturbance. Roadways cause habitat fragmentation both by their physical presence and through road mortality. Habitat loss and habitat fragmentation impacts would be permanent and ongoing and result in a permanent reduction of habitat value in the Project area. Reductions in habitat value would occur because of the reduced amount of habitat; smaller habitat block sizes; and increased amount of edge relative to interior habitat, which can increase predation, parasitism, and lead to changes in plant structure and composition. Disturbance would occur as a result of the noise and activity associated with construction as well as the noise and activity associated with roadway operations. The preferred alternative would impact 16 acres of undeveloped wildlife habitat, 15.3 acres of which is designated as WAP Supporting Landscape.

Currently, the large unfragmented habitat block that would be bisected is sufficiently large to provide suitable habitat for a variety of forest-nesting bird species (e.g., wood thrush, scarlet tanager, red-eyed vireo, broad-winged hawk, barred owl) that are sensitive to the fragmentation and edge effects that the road would create. Habitat suitability for bird species in the remaining forest area would be reduced. Loss of vernal pool habitat and forest block fragmentation would also reduce the suitability of the remaining forest habitat for vernal pool breeding amphibians, which depend on both types of habitat for their annual life cycle. Medium-size mammals (skunk, fox, and raccoon) would primarily be affected by the barrier effect of the road and road mortality. Refer to Section 4.16 for additional information regarding plant communities and wildlife.

### **ES.3.16 Threatened and Endangered Species**

The only federally listed species potentially present within the Project area is the federally listed as threatened northern long-eared bat (*Myotis septentrionalis*). This species is also state listed as threatened. This tree-roosting bat uses forested habitats during its active season from April 15–October 31. The Project has the potential to affect this species via tree clearing, which could reduce roosting habitat or cause direct mortality if an occupied roost tree is felled when bats are present. Therefore, a survey compliant with the U.S. Fish and Wildlife Service (USFWS) 2016 *Range-wide Indiana Bat Summer Survey Guidelines* (USFWS, 2016), which are also applicable to summer survey for NLEB, was conducted, and this species was determined not to be present.

Although the preferred alternative primarily follows an existing roadway in highly developed residential and commercial areas, it also crosses an undeveloped parcel that supports the largest

unfragmented habitat block potentially affected by any of the Build Alternatives. The preferred alternative would directly impact 4.85 acres of wetlands and streams, including 1.31 acres of vernal pool habitat and 0.77 acre of streams. No nearby records for any listed turtle species were found in the vicinity of the preferred alternative, but there are recent records for northern black racer within the footprint of the preferred alternative. Because racers use a wide variety of habitats, the entire undeveloped parcel potentially provides suitable habitat, and the section of the preferred alternative that would cross it would result in habitat loss, habitat fragmentation, and increased potential for road mortality.

Because the majority of the natural habitat that would be impacted by the preferred alternative is forested, the forest-dependent avian species of greatest conservation need (SGCNs), such as the purple finch, scarlet tanager, veery, and woodthrush, are also likely to be affected by this alignment. This impact would be magnified because the alignment bisects a large Unfragmented Habitat Block, and forest-dependent species are typically sensitive to fragmentation effects. However, the preferred alternative would impact the least amount of forest cover type of Alternatives A through D and affect only a small amount of shrubby habitat, minimizing its impacts on SGCNs that depend on these habitat types.

Impact minimization and mitigation for all species would be determined in consultation with the New Hampshire Fish and Game Department (NHFGD), New Hampshire Natural Heritage Bureau (NHNHB), NHDES, USFWS, USACE, and EPA to identify actions that reduce impacts associated with construction and operations.

To reduce the potential for black racer mortality in the portion of the Project area from I-93 to Folsom Road due to Project construction, searches for reptiles would be conducted in the Project footprint, and all materials storage areas would be fenced to exclude reptiles. All fencing would be in place by September 15 to exclude snakes returning to potential hibernacula within the Project site. The searches would be conducted in the Project footprint prior to initial ground-disturbing activities, because racers have the highest potential to be present when undisturbed habitat is still present. Once the new roadway alignment has been graded and compacted, the potential for racers to shelter in the work zone would be significantly reduced, and the potential to crush a hidden racer would be likewise reduced. Coordination would continue with NHFGD during the permitting process to ensure that there are no additional concerns about records of listed wildlife species. Refer to Section 4.17 for additional information regarding threatened and endangered species.

### **ES.3.17 Cultural Resources**

Historic and archaeological resource evaluations are provided in Section 4.18 and supported by technical studies and coordination documentation provided in Appendix K: Cultural Resources. The preferred alternative would not result in adverse effects on known archaeological resources. However, there are two areas of pre-contact Native American archaeological sensitivity crossed by the preferred alternative: (1) sensitive area P7 across the eastern extent of Tsienneto Road, in the vicinity of Jeff Lane; and (2) sensitive area P6 crossed by improvements to NH 102 at the approach to the intersection with Tsienneto Road. In addition, an area of historic-era archaeologically sensitivity is located near a stone foundation, stonewall, and stone culvert at 30 Tsienneto Road. To mitigate for potential impacts to these three areas of potential archaeological sensitivity, Phase IB archaeological testing will be conducted during final design. Additionally, any investigations determined necessary based on the Phase IB (e.g., Phase II, Phase III) will be

conducted. FHWA and NHDHR will be consulting throughout all necessary phases of archaeology. All final mitigation stipulations are formalized in an MOA (see Appendix K).

Effects tables were prepared for the following National Register of Historic Places (NRHP)-eligible historic architectural resources: Palmer Homestead, 76 Tsienneto Road (DER0134); E.F. Adams House, 72 Tsienneto Road (DER0135); Knapp Brothers Shoe Manufacturing, 3 Manchester Road (DER0196); and Manchester & Lawrence Railroad Historic District (MLT-MLRR).

**Palmer Homestead:** Construction of the preferred alternative would be confined to the front (southern) edge of the property along Tsienneto Road, and there would be no change in use. There is a short stone wall on the western front edge of the property that would not be impacted because the fill slope would tie in on the street side of the wall. The Project would introduce a slight increase in noise from an increase in traffic, but this would not diminish the integrity of the design, materials, and workmanship, which are contributing features of the property under Criterion C. The New Hampshire Division of Historical Resources (NHDHR) concurs with the recommended finding of No Adverse Effect.

**E.F. Adams House:** Construction of the preferred alternative would be confined to the front (southeastern) edge of the property along Tsienneto Road and the side (southwestern) edge along Scenic Drive. There would be no change in use, and the proposed back of sidewalk would be in the approximate same location as the existing back of sidewalk. The roadway grade would be lowered in this area resulting in the need to construct a 1- to 3-foot high retaining wall along the frontage beginning at the driveway at minimal height to the east where it would be at maximum height. At the corner of Tsienneto Road and Scenic Drive, a triangular section of brush would be removed to provide safe intersection sight distance. To avoid any impact to the integrity of the setting, NHDOT will coordinate with the property owner to plant new vegetation screening. The Project would introduce imperceptible audible elements with the increase in traffic, but this would not diminish the integrity of the design, materials, and workmanship, which are contributing features of the property under Criterion C. With implementation of the mitigation measures, NHDHR concurs with the finding of No Adverse Effect.

**Knapp Brothers Shoe Manufacturing:** Construction of the preferred alternative would be confined to the frontage of the property that abuts Tsienneto Road and Manchester Road (NH 28), and there would be no change in use. There are no historic physical features within the edge of the property, and vegetation removal would not impact any landscaping that dates to the period of significance. A few bushes would need to be removed. The flagpole would not be impacted. The Project would introduce audible elements with the increase in traffic, but this would not diminish the integrity of feeling and association as a mid-twentieth-century manufacturing and office space, which are contributing features of the property under Criterion A. NHDHR concurs with the recommended finding of No Adverse Effect.

**Manchester & Lawrence Railroad Historic District:** Construction of the preferred alternative would be within the ROW of the former railroad to expand the width of North High Street and create a new intersection with Madden Road at the proposed connector road as well as to accommodate a future proposed continuation of the Derry Rail Trail with an underpass under the connector road rather than allowing an at-grade crossing. There is no existing railway hardware in this section because the rails and ties were removed in the late twentieth century.

There would be no change in use because the rail line is abandoned, privately owned, and presently unused. The existing Derry Rail Trail terminates at its existing intersection with the Hood Park parking lot near Rollins Street, about 1,860 feet to the south of the intersection between the railroad ROW and North High Street. As part of the Project, possible future expansion of the Derry Rail Trail by others would be facilitated by construction of an underpass under Madden Road and provision of a 900-foot paved path connection to the former railroad ROW north of Madden Road that would allow the future proposed expansion of the Rail Trail to cross under Madden Road and back to the former railroad ROW, about 300 feet north of Madden Road. No historic physical features relating to the railroad historic district are within the area of Project construction. The Project would introduce audible elements with the increase in traffic, but this would not diminish the integrity of the railroad historic district as a whole. NHDHR concurs with the finding of Adverse Effect due to the modern intrusion within the NRHP boundary of the rail corridor and subsequent realignment of the historic corridor. A complete Programmatic Section 4(f) evaluation for historic resources is included in Chapter 7 of this FEIS and summarized in Section ES.7. An MOA stipulating mitigation measures to address the adverse effect on the Railroad Historic District has been executed and is included in Appendix K.

### **ES.3.18 Parks, Recreation, and Conservation Lands**

The preferred alternative would permanently impact 0.02 acre of the Rider Fields property (Site #8 on Figure 4.19-1), a 21-acre Section 4(f) resource owned by the Town of Derry that includes athletic fields, parking facilities, and undeveloped land. Within the 0.02 acre, the improvements to Tsienneto Road would result in the need to move the mailbox and sign for the Upper Room Family Resource Center (coordination letter from the Town of Derry dated October 5, 2018 is provided in Appendix A). None of the recreational facilities within Rider Fields would be impacted. Additional information related to the impacts on Rider Fields is provided in Chapter 7, *Section 4(f) Evaluation*. The preferred alternative would not impact any other existing parks, recreation, or conservation lands. The preferred alternative would cross a planned trail corridor, and the design would accommodate an underpass for the planned trail corridor. A complete Section 4(f) evaluation for recreational properties is included in Chapter 7 of this document and is summarized in ES.7. No Section 6(f) properties are affected by the preferred alternative.

## **ES.4 Indirect Effects and Cumulative Impacts**

This section provides a summary of the indirect and cumulative impacts evaluation presented in detail in Chapter 5 and supported by Appendix B: Land Use Scenarios Technical Report.

### **ES.4.1 Development under the 2040 No Build and Build Conditions**

A land use forecasting process was undertaken as an essential element of the assessment of indirect and cumulative impacts for this Project. The 2040 No Build condition is the reasonably foreseeable future development anticipated without construction of the Project. The 2040 Build condition is the reasonably foreseeable future development anticipated if the Project is built and includes both the growth that is attributable to the improved transportation access created by the Project, as well as growth that is independent of the Project. The difference between the No Build and Build conditions is the indirect land use—or incremental—impact of the Project.

To quantify potential indirect effects and cumulative impacts, a range of development footprints were created based on the No Build and Build conditions. The purpose of defining the footprints of each development is to aid in the quantification of potential indirect and cumulative impacts to environmental resources. Detailed assumptions used to generate the development footprints are provided in Chapter 5. Development footprints were created for the following developments:

1. Market Basket Redevelopment
2. Woodmont Commons West—Phase I
3. Woodmont Commons West—Remainder
4. Woodmont Commons East
5. Derry Industrial Development
6. Chester Residential

#### **ES.4.2 Indirect Effects and Cumulative Impacts**

The study area for assessing cumulative impacts consists of the Towns of Derry, Londonderry, Chester, Auburn, and Sandown. This study area is appropriate for cumulative impact assessment because it encompasses the extent of direct and indirect impacts of the Project, as well as the surrounding areas and associated environmental resources. The detailed analysis of indirect and cumulative impacts is focused on those resources that could be substantially affected by the Project in combination with other past, present, and reasonably foreseeable future actions, and resources currently in poor or declining health or at risk even if Project effects are relatively small. The following resources were identified for inclusion in the indirect and cumulative impact analysis based on consideration of the status of each resource, the potential direct and indirect effects of the Project, and areas of concern identified through previous Project public involvement and agency coordination:

- Streams, Wetlands, and Vernal Pools
- Water Quality
- Wildlife Habitat
- Cultural Resources

Indirect effects and cumulative impacts to resources were identified based on the aforementioned development footprints under the Build and No Build conditions. Within the cumulative impacts calculations, direct impacts are based on the preferred alternative. In addition, cumulative impacts related to background growth under the No Build Alternative were considered qualitatively, taking into account the applicable regulatory framework for each environmental resource.

#### **Streams, Wetlands, and Vernal Pools**

Considering maximum footprints from reasonably foreseeable developments, the incremental impact of induced development from the preferred alternative could directly impact up to 73 linear feet of streams, 1.26 acres of wetlands, and 0.435 acre of vernal pools.

Under the preferred alternative, considering the maximum footprints, from reasonably foreseeable development, the cumulative impact on streams, wetlands, and vernal pools include up to:

- 3,346 linear feet of streams;
- 4.89 acres of non-prime, non-vernal-pool wetlands;
- 0.08 acre of prime wetlands;
- 1.754 acres of vernal pools;
- 15.99 acres of terrestrial habitat within 100 feet of vernal pools; and
- 130.15 acres of terrestrial habitat within 750 feet of vernal pools.

In addition, development projects can result in impacts on adjacent water bodies and the areas surrounding water bodies from alteration of stream geomorphology, loss of structural complexity, changes to stream hydraulics, reduction of stream flow, shading by engineered structures, vegetation clearing, changes in water temperature and dissolved oxygen, and increased pollutant loading. These impacts can result in loss or degradation of aquatic habitat.

A Section 404 permit would be required for developments impacting streams, wetlands, and vernal pools. Developers would have to obtain separate Section 404 permits for each individual development and demonstrate that their development proposal avoids and minimizes impacts to the extent practicable in accordance with Section 404 (b)(1) guidelines. Mitigation measures commensurate with the level of impacts to wetland resources would be developed to compensate for unavoidable impacts to water resources. Mitigation would be in accordance with NH RSA 482-A:28 and NHDES Wetland Rules and with federal Section 404 guidelines in 40 CFR (b)(1).

## Water Quality

The Woodmont Commons West and East developments will contribute to future chloride loading in the Beaver Brook watershed. Chloride loadings were determined for parking and new streets (additional lane miles), and, based on maximum footprints, the salt loading from incremental development attributable to the construction of Exit 4A could be 342.7 tons/year.

All future development (including additional development induced by construction of Exit 4A) will require implementation of reasonable and practical BMPs to reduce chloride loading, consistent with the Chloride Reduction Plans required in the MS4 permit and/or AoT permitting (as was required for Woodmont Commons Phase I, included in the *Chloride Technical Report*). The 2017 MS4 permit has additional requirements for private sector salt applicators including requiring all existing and future private parking lot and private roadway owners to only utilize salt applicators who are trained and certified according to Env-Wq-2203 Certification of Commercial Applicators, report annual salt usage to the University of New Hampshire Technology Transfer Center or to the MS4 permittee, and include the private sector in an MS4 permittee's Chloride Reduction Plan. These measures will ensure reduction of salt loads in the private sector including indirect impacts as well as watershed-wide impacts.

New development attributable to indirect Project impacts would result in new, impervious surface within Upper Beaver Brook watershed. The addition of new, impervious surfaces that contribute stormwater runoff to surface waters has the potential to add new TSS and nutrient

loads to the watershed. Based on maximum footprints, the incremental impacts of development induced by the Project could result in the following potential pollutant loads:

- Total phosphorus: 276 lbs/year
- Total nitrogen: 2,455 lbs/year
- TSS: 998,684 lbs/year

Cumulative effects on water quality could occur from the ongoing developments in Woodmont Commons East and West that are planned with or without the Project, construction of Exit 4A, development that is anticipated to occur attributable to the Project, and additional development that may occur within the Beaver Brook watershed not yet anticipated. All new development would be subject to state and federal permitting requirements to manage pollutants within the watershed.

### **Plant Communities and Wildlife**

As noted in Section ES.3.15, direct impacts on plant communities from the Project would result from the removal of vegetation and the conversion of undeveloped land to developed land within the footprint of the roadway. Adjacent areas would also be subject to indirect effects of vegetation clearing. Indirect effects can include increased sunlight penetrating forested areas, altered hydrology in wetlands, and a potential increase in sediment and toxicants from the new roadway. The most prevalent undeveloped cover types in the Project area are northern hardwood forests and conifer forests, and these are the most affected plant community types.

None of the development footprints under the No Build or Build conditions would impact habitat ranked as highest in the biological region. Woodmont Commons West (Remainder) is the only known development that would impact wildlife habitat ranked highest in the state, and these impacts would be expected under both the No Build and Build conditions.

Cumulative impacts from reasonably foreseeable development under the Build condition, considering maximum footprints, could impact 133.86 acres of habitats that are highest ranked in the state and 193.08 acres of supporting landscapes.

It is possible that cumulative impacts to the northern black racer population could occur from the Project and reasonably foreseeable future development. As noted above, through the NHDES AoT permitting process, proposed developments could be required to evaluate potential impacts to the northern black racer, including direct mortality due to construction. Effects from development activity related to habitat loss, fragmentation, and road mortality could occur.

Impacts to wildlife habitat, including habitat for the northern black racer, would be moderated by the countervailing effect of regional planning efforts that focus growth in existing settled areas, substantive protections under environmental protection laws, and the trend of increased land conservation. Despite additional incremental impacts, the overall health of wildlife habitat in the region would not be substantially impacted. Forested lands would continue to make up a substantive proportion of land cover in the region, and some species would continue to recover as a result of improved management and protection.

## Cultural Resources

Historic resources and districts can be protected from alteration through local designations and design review. There are no known NHRP-eligible resources adjacent to Woodmont Commons West, Woodmont Commons East, and Derry Industrial developments. As a result, regardless of the Project, known developments in the study area are not anticipated to result in adverse effects to known historic resources. Specific indirect effects and cumulative impacts on archaeological resources resulting from land use change cannot be reasonably estimated because of the uncertainty associated with the size, type, and location of resources within the development footprints.

When private development requires a federal action, such as a permit to impact waters of the U.S., under Section 404 of the CWA, the potential impacts on archaeological resources would be studied to comply with Section 106 of the National Historic Preservation Act (NHPA)—compliance with Section 106 and other federal laws is a requirement of the Section 404 permit. However, if a permit is not needed, potential effects on archaeological resources would not be evaluated. Therefore, private development, such as the Chester residential development, could result in impacts on unknown archaeological resources. Additionally, there are local programs within the Towns designed to maintain these resources (e.g., preservation easements, preservation tax incentives, local historic districts, and local building codes and review standards for historic structures).

## ES.5 Other Topics

This section provides a summary of the evaluation of other required EIS topics, for additional information on these areas, see Chapter 6 of this FEIS.

### ES.5.1 Energy Consumption

During construction of the preferred alternative, energy requirements (i.e., diesel and gasoline fuel consumption) would depend on several factors, such as the scope of construction activities (e.g., roadway widening versus new construction); length of the corridor; and number and length of any new bridges. Of the new interchange alternatives, the preferred alternative (Alternative A) would have the least impact in terms of lane miles of new road and reconstructed road and would result in the least energy consumption.

Construction of any of the preferred alternatives would improve traffic flow between I-93 and the Towns, thus improving fuel efficiency. As discussed in Section 4.2 of this FEIS, existing traffic conditions on NH 102 through downtown Derry result in substantial delays during the morning and evening peak hours. These conditions result in decreased fuel efficiency and an increase in fuel consumption. In contrast, the preferred alternative addresses these traffic issues and the associated, anticipated delays at key intersections/roadways. By reducing delays and improving the flow of traffic, future energy consumption per vehicle would decrease at intersections where congestion decreases relative to the No Build condition. However, the preferred alternative would increase vehicle miles traveled regionally (see the greenhouse gas emissions analysis under air quality), which could offset these congestion-reduction related improvements.

## **ES.5.2 Construction Impacts**

Short-term impacts associated with construction within the study area would include increased noise, temporary reduction in air quality, potential water quality impacts resulting from soil erosion, removal of vegetation, traffic delays/increases, disturbance of wildlife habitat, and visual impacts. Most of these short-term impacts would be mitigated and would stop after completion of the Project. Mitigation measures outlined in Section 6.2 of this FEIS are anticipated to reduce the magnitude of these impacts.

## **ES.5.3 Relationship between Short-term Use of the Environment and the Maintenance and Enhancement of Long-term Productivity**

Improving traffic flow between I-93 and the Derry-Londonderry area is perceived as a solution to current and forecasted traffic delays and safety issues. It is also viewed as an important factor in facilitating future economic growth in the communities. The proposed roadway improvements address these needs as identified by the communities and are based on comprehensive planning studies that go back more than 20 years and were undertaken in cooperation with NHDOT and FHWA.

As noted in Section ES.5.2, the preferred alternative would have short-term impacts upon environmental resources in the study area. Short-term benefits would include additional employment opportunities and revenues for the local economy realized during the construction period. The total annual property tax losses to the Towns would be small, particularly in relation to the potential additional tax revenues from future development. In addition, loss of residences and businesses would have a minimal impact on the community due to an adequate supply of available properties for sale or lease within the study area as a whole. Therefore, the financial impacts on the Towns and the economic impacts caused by direct displacements are expected to be minor. Natural resource impacts associated with roadway projects can include impacted surface water quality, increased stormwater runoff, and changes in noise levels and traffic patterns. The degradation, loss, and fragmentation of wetlands and wildlife habitat could result in long-term impacts on animal populations within the study area. These negative impacts would likely be partially offset by the permanent habitat protection and enhancement provided through the anticipated Aquatic Resource Mitigation fund payment, and the potential preservation of land for conservation and the Stream Passage Improvement Program. Impacts to known archaeological resources are not anticipated; any potential impacts to archaeologically sensitive areas will be mitigated via all necessary phases of archaeological testing conducted during the Project's design-build phase.

## **ES.5.4 Irreversible and Irrecoverable Commitment of Resources**

Implementation of the Project would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway interchange and connector road. If a greater need arises in the future for use of the land or if the highway facility is no longer needed, the land can be converted to another use; however, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, labor and natural resources would be used in fabrication and preparation of construction materials, and these materials are generally not retrievable. However, such materials are not in short supply, and their use would not have an adverse effect on continued availability of these resources. Any construction would also require a substantial one-time expenditure of local, state, and federal funds which are not retrievable.

The commitment of these resources is based on the concept that residents in Derry and Londonderry would benefit by the improved quality of transportation services, which is anticipated to outweigh the commitment of these resources.

## **ES.6 Section 4(f) Resources**

Chapter 7 of this FEIS contains the Section 4(f) evaluation for the Project. The preferred alternative would affect one recreation resource (Rider Fields) and four historic resources (Palmer Homestead, E.F. Adams House, and Knapp Brothers Shoe Manufacturing properties and the grade-separated crossing of the Manchester & Lawrence [M&L] Railroad Historic District).

Impacts to Rider Fields, Palmer Homestead, E.F. Adams House, and Knapp Brothers Shoe Manufacturing are not considered to be adverse effects and would constitute a *de minimis* use under Section 4(f). The Town of Derry, Parks and Recreation department, has concurred with the *de minimis* finding for Rider Fields. NHDHR concurs with FHWA's determination of impacts to Palmer Homestead, E.F. Adams House, and Knapp Brothers Shoe Manufacturing (Appendix K). Therefore, further analysis of avoidance alternatives and measures to minimize harm are not required.

The preferred alternative would result in an adverse effect to the M&L Railroad Historic District. FHWA conducted a programmatic net benefit evaluation and found that there is no feasible and prudent alternative to use of the land within the M&L Railroad Historic District, and there is a clear net benefit to the resource as a result of the Project based on the mitigations proposed to be incorporated into the Project design. The Project includes all possible planning to minimize harm to the Section 4(f) property resulting from such use. The mitigation measures specifically include interpretive signage and rail trail underpass aesthetic treatments. An MOA between FHWA, NHDOT, NHDHR, and the Town of Derry addressing the Project and subsequent mitigation has been executed (Appendix K, FEIS Volume III).

The potential late discovery of Section 4(f) resources during construction or potential final design changes affecting Section 4(f) resource impacts will be processed according to the Section 4(f) late discovery requirements (23 CFR 774.9(c) and MOA Section V: Post-Review Discoveries (Appendix K, FEIS Volume III).

## **ES.7 Unresolved Issues and Areas of Controversy**

Indirect effects and cumulative impacts, particularly as they relate to impacts on wetlands and vernal pools, has been an area of controversy. A portion of the corridor for the preferred alternative passes through land that is currently undeveloped and that includes several wetlands and vernal pools. During previous agency consultation meetings, federal and state regulatory and resource agency staff expressed their concerns that bisecting the undeveloped land with a new roadway would not only have direct impacts, but would also result in impacts on wetlands,

including vernal pools, outside the roadway footprint as a result of secondary and cumulative impacts. Regulatory and resource agency staff also expressed concerns over additional habitat fragmentation and loss.

As discussed in Chapter 5 of this FEIS and the memorandum, *Consideration of Woodmont Commons East Aquatic Resource Impacts and Mitigation for NEPA and Section 404 Permitting*, even though substantial uncertainty exists on the form future development may take, reasonable assumptions have been made to identify the potential range of impacts. Section ES.4.2 summarizes the indirect effects and cumulative impacts anticipated as a result of the Project. Of specific concern is the impact to wetlands and vernal pools from the Woodmont Commons developments. The control of the Woodmont Commons West and East developments is private; therefore, mitigation costs and responsibilities would remain with the private developer. The developer will need to obtain a separate Section 404 permit and demonstrate that its development proposal complies with the Section 404 (b)(1) guidelines, including demonstration of avoidance and minimization measures, as well as development of a compensatory mitigation proposal for unavoidable impacts to aquatic resources. USACE's Section 404 permitting regulations require that "All compensatory mitigation will be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. Also, all mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable" (33 CFR 320).

## ES.8 Federal and State Actions Required

The actions listed below are required prior to implementing the Project:

- An individual wetland permit application has been submitted to USACE and a Major Dredge and Fill permit application has been submitted to NHDES Wetlands Bureau for their approval. This Project has been developed following USACE's Highway Methodology, which integrates the permit process required under Section 404 of the CWA with the requirements of NEPA.
- A Section 401 (of the CWA) WQC is required from NHDES prior to issuance of the Section 404 permit.
- Pursuant to the requirements of the National Pollutant Discharge Elimination System, a Notice of Intent application to EPA for a General Permit for Construction Activity is required prior to commencement of construction. A Stormwater Pollution Prevention Plan consistent with NHDOT standard specifications and BMPs for soil erosion and sediment control would be developed and submitted with the Notice of Intent application.
- The conditions in the MOA between FHWA, NHDOT, NHDHR, and Town of Derry per Section 106 of the NHPA regarding resolution of effects on the M&L Railroad Corridor Historic District would be addressed as stipulated.
- FHWA would have to approve the Interstate Access Request in accordance with 23 USC 111 (preliminary approval received October 21, 2019, final approval contingent on completion of NEPA process).
- NHDOT and FHWA would have to approve the design of the proposed interchange.

## 1.0 INTRODUCTION

The Towns of Derry and Londonderry, New Hampshire (the Towns), and the New Hampshire Department of Transportation (NHDOT), in cooperation with the Federal Highway Administration (FHWA), prepared this Final Environmental Impact Statement (FEIS) for the Interstate 93 (I-93) Exit 4A Project (Project). The Project is located in the Towns and includes construction of a new interchange with I-93 (known as Exit 4A) and other transportation improvements to reduce congestion and improve safety along State Route 102 (NH 102), from I-93 easterly through downtown Derry, and to promote economic vitality in the Derry/Londonderry area.

This FEIS has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA; Public Law 91-190, 42 United States Code [USC] 4321–4347 as amended) and the regulations of the Council on Environmental Quality (CEQ; 40 Code of Federal Regulations [CFR] 1500–1508), as well as applicable FHWA regulations (23 CFR Part 771; 23 USC 138) and guidance (FHWA, 1987).<sup>1</sup> This FEIS contains three volumes: Volume I contains all text and tables, Volume II contains all figures, and Volume III contains all appendices. Volume I is organized as follows:

- Chapter 1. Introduction
- Chapter 2. Purpose and Need
- Chapter 3. Alternatives Analysis
- Chapter 4. Affected Environment and Environmental Consequences
- Chapter 5. Indirect Effects and Cumulative Impacts
- Chapter 6. Other Topics
- Chapter 7. Section 4(f) Evaluation
- Chapter 8. Public Involvement and Agency Coordination
- Chapter 9. FEIS Distribution List
- Chapter 10. List of Preparers
- Chapter 11. Acronyms
- Chapter 12. References

### 1.1 Project History

The I-93 Exit 4A Project dates back to 1985 when the Town of Derry first approached NHDOT regarding the possibility of obtaining funding for a new I-93 interchange. The Southern NH Regional Planning Commission (SNHPC) conducted a transportation study for Derry later that year to evaluate alternatives to relieve traffic congestion along NH 102 in downtown Derry. Based on the results of that study, the Derry Town Council endorsed a new interchange

---

<sup>1</sup> The referenced regulations and other documentation form the basic guidance requirements in preparing NEPA documents. Subsequent sections of this FEIS include discussion of additional pertinent regulations, guidance, and Presidential Executive Orders and their applicability to resource impacts.