Executive Summary

ES.1 Project Overview

The New Hampshire Department of Transportation (NHDOT) and the Federal Highway Administration (FHWA) have prepared this Environmental Assessment/Draft Section 4(f) Evaluation (EA/4(f)) for proposed improvements to the Interstate Route 93 (I-93) corridor between the Town of Bow and the City of Concord, Merrimack County, New Hampshire. The basic purpose of the I-93 Bow-Concord project is to improve transportation efficiency and reduce safety problems within this approximately 4.5-mile segment of highway.

I-93 is the principal north-south arterial highway within New Hampshire and is part of the National System of Interstate and Defense Highways. I-93 extends a total distance of 132 miles within New Hampshire, from the Massachusetts border to the northern Vermont border. The proposed project covers a distance of approximately 4.5 miles from south of the I-93/Interstate Route 89 (I-89) Interchange in Bow to north of the I-93/Interstate Route 393 (I-393) Interchange (Exit 15) in Concord to just south of the Merrimack River Bridge. The segment of I-93 from Manchester to Exit 14 is also part of the Central Turnpike, commonly known as the F.E. Everett Turnpike. The project also extends along I-89 from its terminus with Route 3A (Bow Junction) approximately 4,700 feet to the west and includes the Exit 1 area. Along I-393 the project extends from just west of the bridge over the Merrimack River to the Route 202/North Main Street intersection, a distance of approximately 4,600 feet. Refer to **Figure ES.1 Study Area Overview** that depicts the study area and the project limits.

Due to population growth, development, and recreational opportunities in New Hampshire, the travel demands for I-93 between Bow and Concord have exceeded the capacity of this existing four-lane facility since about 2000. Population and traffic projections for the next twenty years support the conclusion that the existing facility will be increasingly less able to function at the levels of service (LOS) and safety for which it was originally designed. Decreases in the level of service are evident in reduced traveling speeds, increased density of traffic flow, as well as in the traffic backups at some interchanges during commuting hours.

During weekday peak hours, motorists traveling along the I-93 corridor currently experience traffic congestion and substantial delay. The congestion not only results in increased travel times, but also contributes to safety problems, as the limited spacing between vehicles does not afford the motorists sufficient movement to deal with frequent and abrupt lane change maneuvers, inadequate weaving space and sudden stops. Without substantial improvements, or dramatically reduced demand, traffic operations along this section of I-93 are expected to continue to deteriorate under future conditions as traffic volumes increase. This section of I-93, in central New Hampshire was constructed in the late 1950s and early 1960s as part of the Central Turnpike, more

commonly known as the F.E. Everett Turnpike and as part of the Interstate Highway System. There were no substantial improvements made to the 4.5-mile segment through Bow and Concord until 2002 when reconstruction of Exit 13 in Concord was completed. This reconstruction included a new interchange and the ability to widen I-93 to six lanes at that location to accommodate future widening; however, only four lanes were constructed. Exit 13 was reconstructed with a single-point urban interchange (SPUI), a configuration that is similar to a diamond but includes one signalized intersection that provides control for all ramp movements at a "single point".

"Part A" of a three-part project development process was conducted for the project between 2003 and 2008. It was considered a planning study that was summarized in the *Part A Summary/Classification Report for the Bow-Concord Interstate 93 Transportation Planning Study.* The goals of Part A were to develop a project purpose and need, develop a range of reasonable alternatives, and determine the appropriate type of environmental document. The alternatives deemed reasonable during Part A were then carried forward into Part B of the project. However, funding constraints delayed the start of Part B of the process.

From 2010 to 2016, four Red List bridges within the project limits were taken off the red list due to either rehabilitation or replacement. Red List bridges are identified by NHDOT as those bridges whose condition or weight restriction requires more frequent inspections, at least twice per year instead of once every two years. Red List bridges require more frequent repairs due to known deficiencies, poor condition, or load restrictions, which are usually the result of structural deterioration. The bridge carrying I-93 over Loudon Road (NH Route 9) at Exit 14 was rehabilitated in 2010; however, no widening was included in that project. Replacement of the two bridges carrying I-93 over I-89 in Bow was completed in 2015. These bridges were constructed to accommodate six lanes at that location; however, only five lanes were provided. The bridge carrying NH Route 3A over I-93 at Exit 12 was replaced in 2016. This bridge was constructed to accommodate up to eight lanes (four in each direction) for I-93 and three lanes on NH Route 3A.

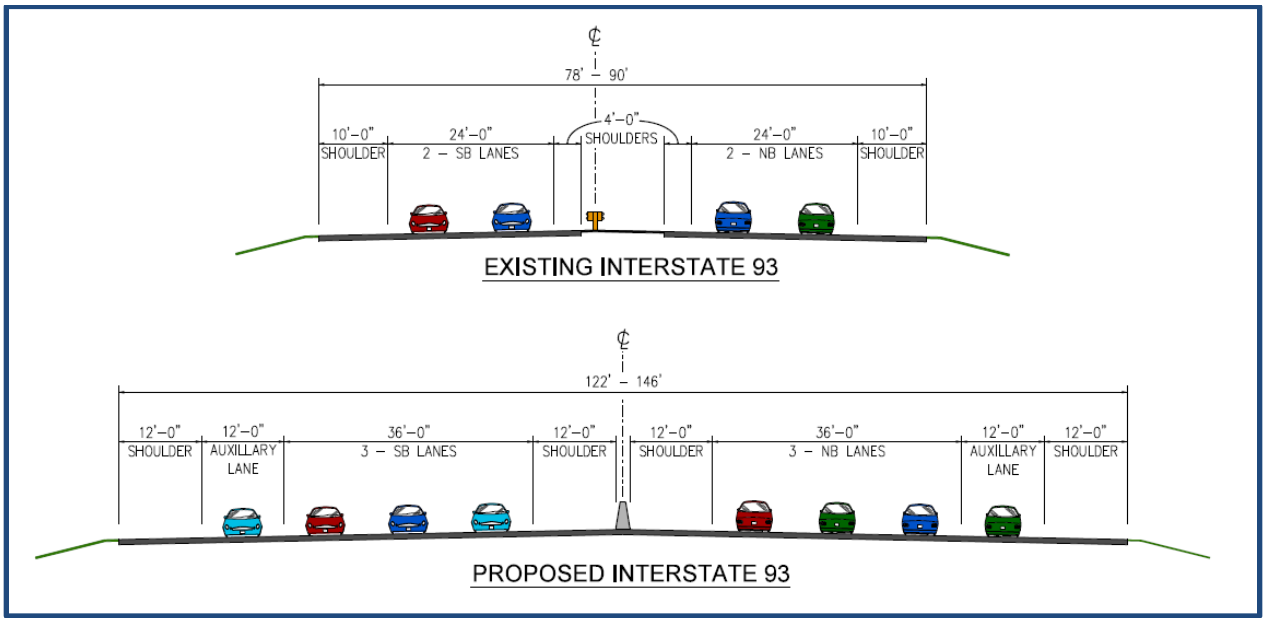
The need to address issues along I-93 in Bow and Concord was identified in 1990 when the Bow-Concord Widening Project was first placed on the State's Ten-Year Plan. New Hampshire RSA 228:99 and RSA 240 require that the NHDOT propose a plan for improvements to the State's transportation system every two years.

This EA documents "Part B", started in 2013, of the three-part project development process by NHDOT. This current part involves additional public involvement, preliminary design of the reasonable alternatives, selection of a preferred alternative, and preparation of the appropriate environmental document to disclose potential impacts as per NEPA.

ES.2 Proposed Action

The Preferred Alternative for the project proposes widening I-93 from a basic four-lane interstate to a basic six-lane interstate, adding one lane in each direction within the project limits. It also includes providing auxiliary lanes in each direction on I-93 between each interchange. I-93 would therefore have eight-lanes segments between the interchanges. See **Figure ES.2** for the proposed typical section.

Figure ES.2 I-93 Typical Sections



The Preferred Alternative is also the combination of the preferred concepts for each of the four project segments. Below is a description of the preferred concept for each project segment focused on the proposed interchange configurations. The widening of I-93 explained above is assumed for each segment.

I-89 Area - Preferred Concept K

Concept K retains the basic configuration of both the I-93/I-89 interchange and I-89 Exit 1. However, it proposes “braided” ramps between the two interchanges. The term “braid” refers to a grade separated crossing that occurs at an acute angle that resembles braids. The braided ramps eliminate the weaving section between the two interchanges. Additional ramps are proposed to allow retention of all of the existing accesses, but without the need for vehicles to cross each other in a weave.

To eliminate the southbound weave between the two interchanges, Concept K proposes a ramp that would accommodate traffic utilizing Exit 1 and travelling southbound on I-93. To eliminate the northbound weave between the two interchanges, Concept K proposes a local connector road between Route 3A and South Street to accommodate

northbound I-89 traffic. This connector road would provide access to South Street from Bow Junction.

Concept K would include construction of a new directional ramp for northbound I-93 to northbound I-89 traffic. The new directional ramp proposed in Concept K would have a 40-mph design speed as compared to the existing loop ramp that has a 25-mph design speed. While the existing northbound C-D Road would remain, a significant portion of the traffic volume in the weave would be diverted since the northbound I-93 to northbound I-89 traffic would use the new directional ramp.

Providing the new directional ramp for northbound I-93 to northbound I-89 traffic would result in the elimination of the direct connection of the I-89 extension to Bow Junction. This traffic could still access Bow Junction, but would have a longer route to do so, using Exit 1 on I-89, Exit 12 on I-93, or the proposed I-93/I-89 interchange.

The existing I-89 Bicycle Path would be abandoned and replaced with accommodation on the new connector road proposed in Concept K.

The total cost for Concept K is estimated at $70.0 million, including mitigation costs.

Exit 12 Area - Preferred Concept F

Concept F proposes to retain the partial cloverleaf configuration of Exit 12 but would eliminate one exit ramp in each direction. Limiting each direction to one exit ramp allows standard exit ramp geometry and proper deceleration distance. The partial cloverleaf configuration was chosen for this concept over a standard diamond as the exit ramps for the diamond would require greater property and environmental impacts.

All exiting traffic would terminate at Route 3A at intersections with hybrid roundabouts. A hybrid roundabout is one that has some two-lane movements and some one-lane movements. In the case of Concept F, the southbound Route 3A traffic would have two lanes and the northbound traffic would have one lane. The northbound ramp intersection roundabout would also include a slip ramp for northbound Route 3A traffic entering northbound I-93.

The total cost for Concept F is estimated at $33.9 million, including mitigation costs.

Exit 13 Area - Preferred Concept B

Concept B proposes retaining the existing configuration of Exit 13 as this interchange was re-constructed in 2002. The northbound exit ramp to Manchester Street would be widened and the right turn would be signalized. This would allow for a dual right turn onto Manchester Street to address this heavy volume of traffic that causes backups onto I-93.

The total cost for Concept B is estimated at $39.0 million, including mitigation costs.

Exit 14 / 15 Area - Preferred Concept F2

Concept F2 proposes a modified diamond interchange at Exit 14 where the northbound entrance ramp would be eliminated. The elimination of the entrance ramp at Exit 14 would also eliminate the northbound weave between Exits 14 and 15. Concept F2 also includes a southbound C-D Road between Exits 14 and 15 that is preferred because there is less traffic and the speeds are lower.

Concept F2 also proposes a cloverstack interchange at Exit 15 where two of the loop ramps would be eliminated. The new directional ramps at Exit 15 would eliminate the four weaving sections that currently exist within Exit 15. The configuration of I-393 Exit 1 would not be altered by the project.

Concept F2 would eliminate the slip lane access to Stickney Avenue from the southbound entrance ramp to I-93 at Exit 15. A new connection from Stickney Avenue to South Commercial Street would be provided. The new connection requires an at-grade crossing of railroad tracks. This is an active railroad but with only sporadic use.

The total cost for Concept F2 is estimated at $125.0 million, including mitigation costs.

Preferred Alternative Summary

The Preferred Alternative is comprised of the preferred concept for each of the four segments as outlined in **Table ES.1** below.

Table ES.1: Preferred Alternative

SEGMENT	CONCEPT	COST
I-89 Area	K	$70.0 million
Exit 12 Area	F	$33.9 million
Exit 13 Area	B	$39.0 million
Exit 14/15 Area	F2	$125.0 million
Total		$267.9 million

See **Figure ES.3 Preferred Alternative** for a composite plan of the Preferred Alternative.

Coordination and input received from the public and resource agencies informed the selection of preferred concepts for the four project areas. The preferred concepts were selected in consideration of the extent to which each concept meets the Project's Purpose and Need. The four preferred concepts together form the Preferred Alternative for the project. The Preferred Alternative was presented to the public at Public Informational Meetings held on February 14 and 15, 2018.

ES.3 Other Alternatives Evaluated

Multiple concepts for each of the four project segments were developed and evaluated on their ability to meet the overall Purpose and Need identified for this project. Those concepts meeting the Purpose and Need were combined to create the Build Alternatives that were advanced and evaluated in this EA. In addition to the Build Alternatives, other alternatives including the No-Build Alternative, Travel Demand Management (TDM), and Transportation System Management (TSM) were evaluated.

The following is a summary of the other alternatives considered and evaluated:

1. The No-Build Alternative, which essentially serves as the baseline condition where no actions are proposed for comparison with the Build Alternatives. Under the No-Build scenario traffic volumes for the corridor are assumed to increase based on projections prepared by the Central NH Regional Planning Commission (CNHRPC). The increased traffic volumes would result in increased congestion, especially during peak periods. Crashes are likely to increase since the existing deficiencies would remain, with higher traffic volumes. Other aspects of the No Build include the continued deterioration of Red List and other bridges as well as the continued discharge of stormwater into area waterways without treatment. The No-Build was eliminated as a viable alternative since it did not meet the project's Purpose and Need because it would not address the future transportation needs of I-93 within the project limits.

2. Travel Demand Management (TDM) strategies aim to reduce the demand for travel during peak travel periods such as the morning and afternoon commuting times, rather than increase the capacity of the transportation system. These strategies require changing travel behavior during peak travel periods to reduce the number of vehicles on the road. By eliminating trips, shortening trips, or shifting trips out of the peak periods, there is less demand for the transportation network to accommodate. TDM was eliminated as a viable alternative since it did not meet the project's Purpose and Need as the TDM strategies would not sufficiently reduce future peak period traffic volumes.

3. Transportation Systems Management (TSM) refers to low cost easy to implement measures to address safety and congestions issues. These measures typically can be implemented without significant impacts or cost. Such measures generally do not address the long-term project purpose and need, but will help to alleviate problems in the near term. TSM was eliminated as a viable alternative since these are designed to be short-term measures and do not meet the project's Purpose and Need to address future mobility needs.

ES.4 Summary of Beneficial and Adverse Impacts of the Preferred Alternative

Impacts associated with all the alternatives that were considered are summarized in Chapter 4. Impacts of the Preferred Alternative including transportation improvements and costs are summarized in Section 4.2.

Relative to air quality, the preferred alternative would not lead to any exceedance of State or Federal Carbon Monoxide (CO) standards. From a mesoscale level, the project will be in compliance with both the Clean Air Act and Amendments and the New Hampshire State Implementation Plan.

Increased noise levels resulting from the reconfiguration of the highway and projected increase of traffic, will necessitate further evaluation of a noise barrier located between I-93 northbound and the New Hampshire Technical Institute campus in the City of Concord. Assuming the benefitted receptors desire a noise barrier, a barrier meets the requirement of the NHDOT Noise Policy between the heights of 16 feet and 25 feet by a length of approximately 1,600 feet.

In addition to the NHTI property, the preferred alternative would result in noise impacts at various receptor locations along the project corridor. Abatement measures for each of these impacts were evaluated however, these additional abatement measures were found not to be feasible and/or reasonable in accordance with the NHDOT Noise Policy. In total, fourteen barriers were modeled but only the NHTI barrier met the criterion.

From a groundwater recharge standpoint, approximately 24 acres of stratified drift aquifer will be unavoidably covered with new, impervious roadway surface. The new impervious surface area is spread out along the project corridor.

From a water quality standpoint, pollutant loading will decrease based upon the proposed stormwater treatment sites, also known as best management practices (BMPs). These measures include detention and retention basins throughout the length of the project corridor. Currently 15 BMP sites are proposed. During final design additional investigation at these locations will be necessary to determine if all 15 sites are viable.

Potential impact to surface waters due to road salt application continues to be an issue of a regional nature. State agencies will continue to monitor chloride levels in selected streams in cooperation with New Hampshire Department of Environmental Services (NHDES) and the U.S. Environmental Protection Agency (USEPA). In addition, widening the highway will require the lengthening of one culvert located where I-93 crosses over Bow Brook. The lengthening of the culvert would result in some loss of aquatic habitat.

Floodplains and floodways are anticipated to be temporarily impacted by construction. Additional coordination will be conducted during final design to ensure that impacts are avoided or minimized to the extent practicable.

Wetland impacts are estimated at 1.8 acres with the possibility that impacts could increase to 3.4 acres if all potential stormwater BMPs are constructed.

The majority of the highway widening and other improvements will take place within the existing right-of-way, therefore, farmland soils are not anticipated to be impacted.

Cilley State Forest is located adjacent to and overlapping the project area within the Town of Bow. The preferred alternative would impact the Cilley State Forest to accommodate the placement of a realigned ramp to provide access to and from I-89 at Exit 1. The impact to Cilley State Forest is estimated at 0.7 acres. Consultation with the New Hampshire Department of Conservation and Natural Resources (NHDCNR) has taken place. Based upon the consultation, NHDCNR concurs with the impact and proposed mitigation. Land that is owned by the NHDOT, adjacent to the impacted area of the Cilley State Forest and which is of similar ecological value, would be offered as mitigation. During final design, the mitigation agreement will be formalized.

The preferred alternative would adversely effect two properties under the jurisdiction of Section 106 of the National Historic Preservation Act. These properties are located at 2 Valley Road (Upton House and Store) and 521 South Street/1 Valley Road (Lamora's Garage) located in Bow. The roadway would be shifted near these properties and the property at 521 South Street/1 Valley Road would be fully acquired by the State and removed. There would be a retaining wall located less than 20 feet from 2 Valley Road, which would impact its setting. Five additional properties under the jurisdiction of Section 106, located in Concord, will be subject to partial acquisitions, but would not be adversely effected. These properties include: Boston, Concord & Montreal RR Historic District; NH Technical Institute Historic District; 22 Bridge Street (Concord Shoe Company/Ralph Pill Building); 24 Bridge Street (Concord Electric Light Station), and the NHDOT Garage Complex. Mitigation will be presented for the two adversely effected properties in a Memorandum of Agreement that will be included in the Revised Environmental Assessment.

The evaluation of properties under the jurisdiction of Section 4(f) of the Transportation Act indicates that the proposed project would result in an adverse effect to two historic properties: Larmora's Garage and House and the Upton House and Store. The proposed project would result in the full or partial acquisition of three historic properties (Lamora's Garage and House; NH Highway Garage Historic District; and the NH Technical Institute Historic Boundary) and would require permanent easement on one historic property (Boston, Concord & Montreal Railroad Historic District) resulting in a direct use of these Section 4(f) resources from the permanent incorporation of land into the transportation facility. The proposed project would also result in temporary impacts to two historic resources: The Concord Shoe Company/Ralph Pill Building and the Concord Electric Light Station. It has been determined that impacts to both resources

will meet the criteria for a temporary occupancy exception and, therefore, would not constitute a 4(f) use. The proposed project would also temporarily impact recreational trails. The first impact consists of the relocation of a 20 to 30 foot section of path within the Healy Park trail system. The second impact consists of the replacement of the Delta drive bridge over I-93. The bridge is on a section of an on-street trail identified as part of the Heritage Trial by the City of Concord. Although the City has designated the sidewalk of this bridge as part of the Heritage Trail, it is part of the local transportation system and functions primarily for transportation. Therefore, this section of the Heritage Trail is not subject to Section 4(f) protection and the proposed bridge replacement would not constitute a 4(f) use. Lastly, the FHWA has made a *de minimus* impact determination for the proposed impacts on three historic properties: the Boston, Concord, & Montreal Historic District; the NH Highway Garage Complex; and the NH Technical Institute Historic District.

There are no properties under the jurisdiction of Section 6(f) of the Land and Water Conservation Fund Act with the project corridor.

Highway construction can have both short-term and long-term impacts on wildlife habitats and populations. Short-term impacts can result from disturbance caused by construction activities including: activities that result in increased noise levels and visual disturbances, tree clearing, earth disturbance, operation of machinery, and the presence of humans. Long-term impacts related to highway construction can include permanent habitat loss and fragmentation. The proposed project is located within an existing highway corridor and the surrounding habitats have already been fragmented by the original construction of the highway and surrounding development. A total of 39.3 acres of forested habitat is proposed for removal, which will occur in areas spread throughout the corridor and would not be concentrated in any one location. Adverse effects are not anticipated and mitigation is not proposed.

Adverse effects are not anticipated to occur to any State or Federal threatened or endangered species, species of special concern or exemplary communities. Based on the results of the acoustic survey, northern long-eared bat (a federally listed species) is considered absent from the project area; therefore, the project would result in a finding of “may affect - not likely to adversely affect” (NLAA). The project adheres to the criteria and conditions of the *Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat (*Version 3, May 2016). Coordination with USFWS would continue throughout final design to ensure compliance with applicable laws and agreements. Consultation with regulatory agencies and stakeholders will continue throughout final design and permitting to ensure that impacts are avoided or minimized to the extent practicable.

From a cultural resources standpoint, the preferred alternative may affect archaeological sensitive sites. Further work in the form of a Phase IB study will be conducted during final design. Appropriate protection and monitoring measures will be incorporated into final design and construction. The preferred alternative will also adversely affect two historic structures eligible for the National Register of Historic

Places (i.e., Upton House and Store and Lamora's Garage). Mitigation will be provided in consultation with Federal Highway Administration (FHWA) and the New Hampshire State Historic Preservation Office (known as the NH Division of Historical Resources) and the consulting parties in the form of a Memorandum of Agreement. The MOA will be included in the Revised Environmental Assessment.

Widening and interchange improvements associated with the preferred alternative will require the acquisition of 11 entire parcels and the partial acquisition of 32 parcels. During final design, refinements to the area of disturbance will be conducted and these estimated acquisitions may increase or decrease.

There will be no environmental justice impacts as no minority or low-income populations are differentially affected by the project. In addition, no community facilities (e.g., schools, fire stations, town buildings, public parks, etc.) will be directly affected. Secondary growth impacts in the I-93 region are not anticipated to occur as a result of this project.

Visual impacts of the preferred alternative would be largely limited to highway profile elevation changes, especially at the I-89/I-93 interchange in Bow and the noise barrier proposed along the New Hampshire Technical Institute campus in Concord. The reduction of the natural vegetation buffer between the highway and adjacent development would also have some negative effect on aesthetics.

There are numerous sites within the 4.5-mile corridor that may contain contamination, including surface, subsurface and within the groundwater. These sites, and the corridor overall, will require further study during final design. None of the contaminated sites is expected to pose a substantial problem.

From an energy standpoint, the preferred alternative will create a more efficient flow of traffic resulting in future fuel conservation as compared to the No Build (or do nothing) alternative. The widening and other improvements will require a higher expenditure of energy for various maintenance activities like plowing, sanding, roadway surface and bridge repairs, as compared to current conditions.

In addition to the project's direct impacts, indirect impacts from the project were also identified and are summarized in Chapter 4. Indirect effects are anticipated to a number of resources and are addressed along with the direct effects in the applicable resource categories. Indirect impacts to wetland systems can result from highway construction. For example, hydrological changes can occur in wetland systems from drainage modifications and/or grading changes. Tree clearing can reduce forested habitat and remove or thin the forest overstory, thereby eliminating shading of wetlands or streams. This has the potential to increase water temperature and have an adverse effect on the ecological community. Construction activities are also anticipated to result in an increase in sedimentation and pollution, which has the potential to adversely affect water quality in wetlands and streams if stormwater treatment BMPs are inadequate or not maintained.

Indirect impacts to wildlife and wildlife habitats are anticipated to result from the preferred alternative and could include increased noise levels associated with the additional travel lanes. This increased disturbance could displace some animals currently living in the vicinity of the project area. Tree clearing would result in some habitat loss, particularly of the edge habitat along the existing highway corridor. Construction of the proposed noise wall could also create barriers to wildlife passage, although the noise wall would be placed between the highway and the NHTI campus, where habitat value is limited.

Highway construction can result in additional indirect impacts including: stream channelization, loss of bank structural complexity, loss of stream flow complexity, shading from bridges or loss of shading from tree clearing, changes in water temperature, alterations in hydrology, and reduction of water quality from highway runoff.

Based upon the foreseeable projects in the region, minimal cumulative impact is anticipated to occur. The New Hampshire Department of Transportation (NHDOT) would closely coordinate the construction of the project with other projects in the region to minimize impacts to the traveling public.

Construction activities necessary to build the preferred alternative would in impacts. These impacts would be short-term and temporary in nature but could potentially result in adverse effects. The primary concerns include air quality, soil erosion and sediment control, traffic, and noise impacts. Consultation with agencies, abutters and stakeholders will continue throughout final design and construction to ensure that impacts are avoided or minimized to the extent practicable.

ES.5 Other Government Actions Required to Implement the Preferred Alternative

The FHWA and NHDOT are not aware of any additional action or any state or local government action within the project study area that could conflict with the proposed project.

The following are the actions remaining by Federal and State Agencies to implement the proposed project:

- In compliance with the requirements of Section 404 of the Clean Water Act and NH RSA 483-A, permit applications must be submitted for the Army Corps of Engineers Individual Permit and the NHDES Standard Dredge and Fill Permit. Compensatory mitigation for wetland impacts must also be approved by these agencies prior to application submittal.

- A Section 401 Water Quality Certificate is required from NHDES before the Section 404 permit can be issued.

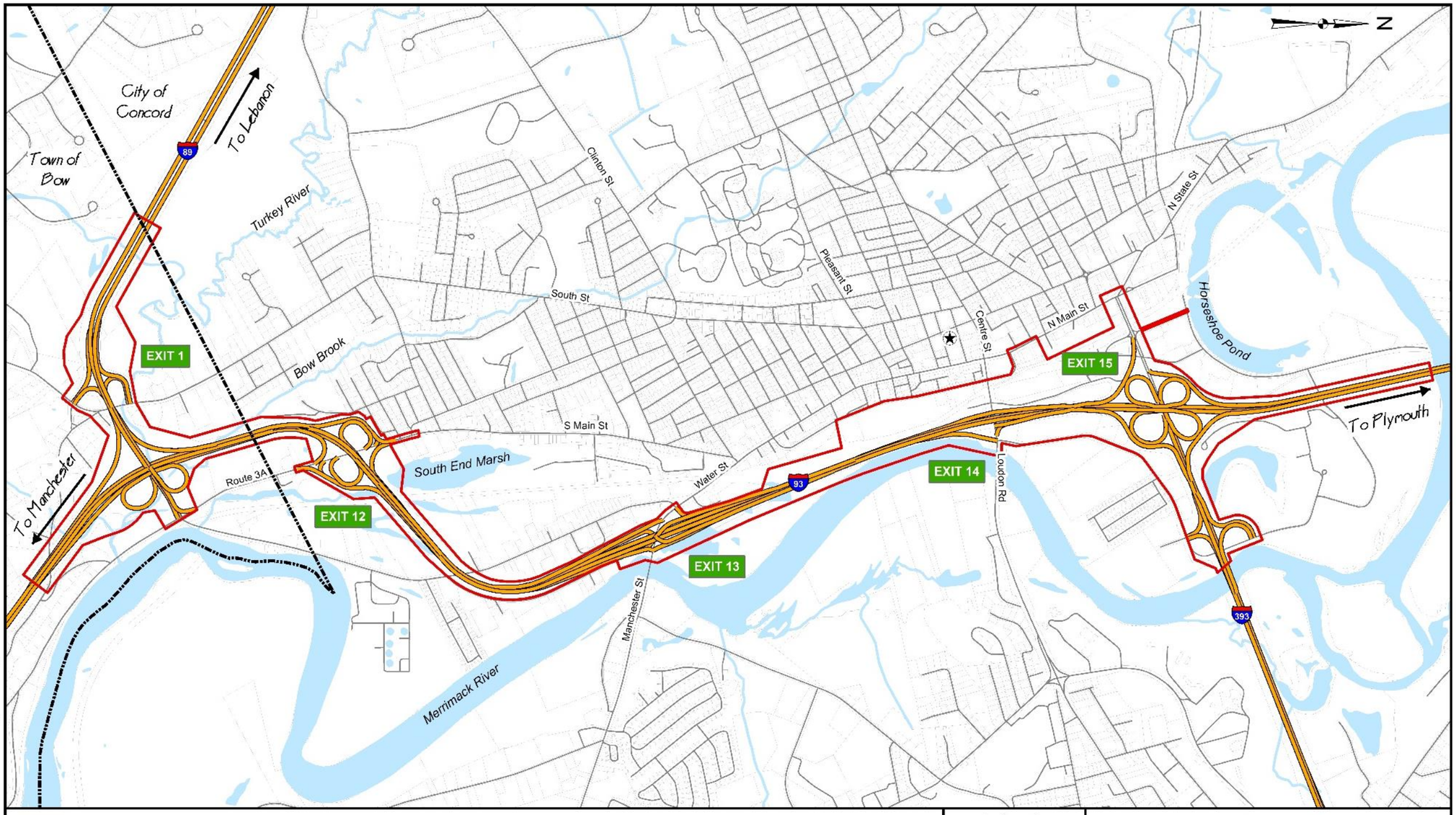
- This project will require a Notice of Intent and Storm Water Pollution Prevention Plan (SWPPP) under the USEPA NPDES Construction General Permit.

- In compliance with the NH Shoreland Water Quality Protection Act, a permit application must be submitted to NHDES for a Shoreland permit for impacts within the protected shoreland of the Merrimack River, Turkey River, Horseshoe Pond, and Fort Eddy Pond.

- Per a Permit Exemption signed by NHDES and NHDOT in 2011, NHDOT projects are not required to obtain an AOT Permit but must still comply with AOT regulations. Therefore, AOT compliance will be required for this project.

- Approval by the FHWA as per the FHWA Interstate Access Policy for the proposed modifications to the existing Interchanges within the project corridor.

- A Finding of No Significant Impact (FONSI), issued by FHWA, is required before this project can proceed to final design. The FONSI is issued no sooner than 30 days after release of the Revised Environmental Assessment.



Legend

- State Capital
- Study Area
- Roadways
- Interstate
- Streams
- Rivers and Ponds
- Parcels

New Hampshire DOT

U.S. Department of Transportation Federal Highway Administration

McFarland Johnson

BOW-CONCORD I-93 IMPROVEMENTS

STUDY AREA OVERVIEW

FIGURE 1.1

DATE: FEBRUARY 2018

SCALE: 1"=1500'

Figure ES.3: Preferred Alternative