

3.0 ALTERNATIVES

3.1 Introduction

This chapter provides a description of the No Build Alternative and the 2005 Selected Alternative evaluated in this DSEIS, as well as a summary of other Build Alternatives considered and rejected previously in the development of the project. This DSEIS does not reexamine the alternatives screening decision on the alternatives to carry forward for detailed study in the 2002 DEIS. This screening decision was made through rigorous technical analysis and involved extensive agency coordination and public involvement as documented in Chapter 2 of the 2004 FEIS and the January, 2001 Rationale Report. Similarly, this DSEIS does not reexamine alternatives and design options from the 2004 FEIS that are not included as part of the 2005 Selected Alternative. During the reevaluation of the 2005 Selected Alternative, no information was found that would require the reexamination of other alternatives previously rejected.

3.2 Description of the Alternatives Evaluated in this DSEIS

3.2.1 No Build Alternative

The future condition without the proposed project is called the No Build Alternative. The No Build Alternative does not meet the purpose and need for the project. Analysis of the No Build Alternative is required by the National Environmental Policy Act (NEPA) and is used as a baseline for the evaluation of the environmental effects of the 2005 Selected Alternative.

Reasonably foreseeable transportation projects that would be completed by 2020 or 2030 were identified for inclusion in the No Build Alternative roadway network based on discussions and communications between the New Hampshire Department of Transportation (NHDOT), the Central New Hampshire Regional Planning Commission, the Southern New Hampshire Planning Commission, the Nashua Regional Planning Commission, the Rockingham Planning Commission and the Commonwealth of Massachusetts. The following major roadway projects were included as part of the 2020 No-Build for Scenario 1 and Scenario 2:

- Bedford-Manchester, F.E. Everett Turnpike Airport Access Road
- Manchester, I-293 Exit 5 (Granite Street) interchange
- Windham- Salem, NH 111 Bypass
- Nashua, Broad Street Parkway
- Derry-Londonderry, I-93 Exit 4A

The following major roadway project was included as part of the 2030 No-Build for Scenario 2:

- Bow-Concord, Widen I-93 to six lanes between I-89 and Exit 15

For the 2020 roadway network it was assumed that the portion of I-93 in northern Massachusetts would have its current configuration of 3 lanes in each direction plus use of the breakdown lane as a travel lane in the peak periods. For the 2030 roadway network, it was assumed that the

fourth travel lane would be fully operational and that the shoulder would be restored. These assumptions were based on input from the Massachusetts Executive Office of Transportation (MA EOT).

The No Build Alternative does not include the bus-on-shoulder service recommended by the I-93 Bi-State Transit Investment Study Preliminary Definition and Evaluation of Alternatives report. At this time the bus-on-shoulder service is not foreseeable because it is based on preliminary strategic planning and requires major infrastructure improvements in Massachusetts. Key steps to the implementation of the bus-on-shoulder concept have not yet been taken, such as the creation of an implementation agreement between NHDOT, MA EOT, MassHighway, transit agencies and operators, Federal Transit Administration (FTA), FHWA, and area regional planning commissions (RPCs). The bus-on-shoulder concept and infrastructure improvements are not currently included in statewide or metropolitan planning organization (MPO) fiscally constrained long-range transportation plans. For more information on the I-93 Bi-State Transit Investment Study and the decision to not include the conceptual bus-on-shoulder service in the No Build Alternative, see Appendix A: Traffic Written Reevaluation/Technical Report.

3.2.2 2005 Selected Alternative

Description of the 2005 Selected Alternative

The main element of the 2005 Selected Alternative involves widening I-93 from the existing two-lane highway in each direction to a four-lane highway in each direction. The 2005 Selected Alternative begins in the Town of Salem, NH at the Massachusetts/New Hampshire State line and extends northerly through Salem, Windham, Derry and Londonderry, and into Manchester, ending at the I-93/I-293 interchange. In addition, the proposed project includes the following design modifications and infrastructure improvements for the five interchanges and local roads within the project corridor:

- Replace the red-listed Cross Street Bridge in the Exit 1 Interchange area.
- Reconstruct the Exit 1 interchange to improve substandard ramp geometry and replace seven red-list bridges.
- Reconstruct the Exit 2 interchange to a diamond-type interchange configuration and replace four red-listed bridges.
- Widen and reconstruct Pelham Road from Policy Road to Stiles Road.
- Replace the Brookdale Road bridge.
- Replace four bridges, including two red-listed bridges, and relocate both the northbound and southbound barrels of I-93 into the median area in the vicinity of Exit 3.
- Reconfigure the Exit 3 interchange ramps with a diamond interchange design.

- Reconstruct and widen NH 111 beginning just west of the NH 111/NH 111A intersection.
- Relocate NH 111 north of its existing location before tying into existing NH 111 near the NH 111/Wall Street intersection.
- Relocate NH 111A on a new alignment near the NH 111/Wall Street intersection.
- In the Exit 4 Interchange area, widen I-93 to the east, retaining the existing layout for the southbound ramps.
- Reconstruct the existing Exit 4 northbound ramps diamond configuration with longer ramps.
- Reconstruct and widen NH 102 from Londonderry Road to the southbound ramps.
- Replace the NH 102 bridge over I-93 with a new bridge built directly south of the existing bridge.
- Reconstruct the Ash Street/ Pillsbury Road Bridge off-line.
- Reconstruct and widen NH 28 on-line from Symmes Drive to Liberty Drive including the reconstruction of the Perkins Road, Vista Ridge and Symmes Drive approaches, as well as the reconstruction of a portion of both Liberty and Independence Drives.
- Reconstruct the existing substandard diamond interchange at Exit 5 and replace four red-listed bridges.

In addition to the overall corridor highway improvements, the proposed project includes three new park-and-ride lots at Exits 2, 3 and 5, improvements to the existing park-and-ride facility at Exit 4, and new bus terminals at Exits 2, 4 and 5.

- Construct a 470-space park-and-ride facility and bus terminal at Exit 2 adjacent to the interchange in the SE quadrant with access via Pelham Road (eastbound traffic only) and from South Policy Street via Raymond Avenue (all directions).
- Construct a park-and-ride lot at Exit 3 adjacent to the relocated northbound barrel in the SE quadrant of the reconstructed interchange. Access would be from NH 111 east of the Exit 3 Interchange and from relocated NH 111A. Other locations are being considered within the immediate area of the interchange.
- Retain the existing parking lots at Exit 4 and construct a new bus terminal building.

- Construct a park-and-ride lot and bus maintenance facility at Exit 5 in the NW quadrant of the interchange just west of the southbound off-ramp. The park-and-ride lot access is from NH 28 (westbound traffic only) and from Symmes Drive (all directions) connecting to NH 28. This maintenance facility supports the implementation of the Expanded Bus Services provided by Boston Express.

Design Refinements Since the 2004 FEIS

Since the 2004 FEIS, the design of the 2005 Selected Alternative has been advanced. The reevaluation of the environmental impacts in this DSEIS takes into account these design refinements on a resource by resource basis.

Expanded Bus Service

NHDOT has developed a program to provide expanded intercity and commuter bus service in the I-93 corridor. In November 2008, the Boston Express bus service began operating between the Exit 5, Exit 4, and Exit 2 bus terminals and South Station and Logan Airport. The service operates seven days a week from Exits 5 and 2 and weekdays only from Exit 4, providing up to 22 roundtrips on weekdays and 18 roundtrips on weekends. The bus service is a public/private partnership funded through the Congestion Mitigation and Air Quality Program (CMAQ). Estimated total ridership for the expanded service is 371,000 passenger trips for the first year of operation, increasing to 522,000 by the third year.

Intelligent Transportation Systems

Intelligent Transportation System (ITS) technologies and Incident Management strategies are an integral part of the overall transportation improvement strategy for the I-93 corridor. NHDOT proposes to implement some of these measures such as variable message boards, highway advisory radio broadcasts, web site information, emergency reference markers, and coordination strategies among safety agencies before the highway widening. Additional measures will be added when the highway widening is completed.

NHDOT, FHWA, the New Hampshire Department of Safety (NHDOS) and local emergency responders have initiated a program to address the mobility and safety implications of traffic incidents on the I-93 corridor before, during and after the construction of the 2005 Selected Alternative. Traffic incident management training workshops and meetings were held with state and local stakeholders to solicit their input on the needs and opportunities seen in the corridor. A multi-disciplined Incident Management Work Group of NHDOT employees was tasked with developing an action plan from the feedback gathered from these sessions. A Technical Steering Committee, established in 2007, and formalized with local chairmanship in 2008, adopted the I-93 Traffic Incident Management Plan (TIMP) on March 26, 2008. The plan established the following goals:

- Goal #1: Minimize the impacts of incidents on travel
- Goal #2: Improve safety at the incident scene
- Goal #3: Reduce the probability of secondary incidents

- Goal #4: Foster inter-agency cooperation
- Goal #5: Establish a sustainable traffic incident management program

The plan outlined the following strategies to achieve these goals:

- Strategy 1.1: Service Patrols. Service patrols involve assisting motorists stranded with minor vehicle problems to reduce congestion and safety issues caused by drivers shying away from vehicles stopped on the shoulder.
- Strategy 1.2: Intelligent Transportation System (ITS) Devices. ITS devices include cameras, traffic sensors, dynamic message signs, Highway Advisory Radio and phone-based “511” traveler information systems.
- Strategy 1.3: Communications Protocols. Communications protocols deal with the way in which ITS strategies are implemented to provide coordinated response to incidents and communicate information to travelers.
- Strategy 1.4: Emergency Detour Routes. Emergency detour routes help alleviate the traffic congestion on local roads as well as on the interstate during traffic incidents by allowing traffic to bypass the section of the interstate that is affected by an incident.
- Strategy 1.5: Individual Work Zone Traffic Incident Management Plans. This strategy involves the development of detailed traffic incident management measures specific to individual construction projects along the corridor.
- Strategy 1.6: Emergency Responder Support Infrastructure. Emergency responder support infrastructure includes issues such as access to the highway, turnaround points, and access to water sources.
- Strategy 1.7: Memorandums of Agreement (MOA). Examples of the types of MOAs between state agencies, local communities, and private entities envisioned by this strategy include standardization/interoperability of radio communications, traffic signal operations and maintenance, video and data sharing, utility (fire access and standpipe) maintenance and towing services.
- Strategy 1.8: Public Education and Awareness. A public outreach campaign will disseminate information about upcoming construction activities, TIMP strategies and traffic conditions.
- Strategy 1.9: Technical Steering Committee (TSC). The TSC is intended to improve interagency coordination and implementation of the TIMP strategies.
- Strategy 1.10: Post Incident Review Process. A formal post incident review process will improve coordination between responders and identify areas for improvement.
- Strategy 1.11: Enhanced Reference Location Signs. Improved mile marker signs will be installed to increase the accuracy of incident location identification and response times.

Potential Future Mass Transit Accommodations

The 2005 Selected Alternative does not include rail service within the I-93 corridor, or along the former Manchester and Lawrence Rail Line Corridor. However, the 2005 Selected Alternative will accommodate space for potential future mass transit opportunities between the MA/NH state line northerly to the Exit 5 Interchange. The potential rail line within the highway corridor could be a link in a future service between Lawrence, MA or Woburn, MA (and ultimately Boston, MA) to the south and the Manchester Airport and/or the City of Manchester, NH to the north. In

addition, the proposed layout provides provisions, such as bridge replacements and continued grade separated crossings, to facilitate, and not preclude, the reestablishment of future rail service on the Manchester- Lawrence line.

NHDOT and the Commonwealth of Massachusetts are evaluating potential public transportation alternatives for the I-93 corridor as part of the separate I-93 Bi-State Transit Investment Study. While the transit service alternatives being evaluated by the Bi-State study would enhance mobility in the corridor, they would not divert sufficient vehicle trips from I-93 to eliminate the need to widen I-93 to four-lanes in each direction. For detailed information on the projected transit ridership levels supporting this conclusion, refer to the I-93 Transit Investment Study Ridership Memo provided in Appendix A: Traffic Written Reevaluation/Technical Report.

Project Costs

An initial total project cost of \$425 million was estimated in 2002 for the DEIS and Public Hearing. A total revised project cost of \$480 million was estimated prior to the June 2005 ROD to coincide with the start of final design. This estimate updated the conceptual DEIS estimate by a simple across the board increase of 10%. As part of the 2008 Financial Plan update for the project, NHDOT has prepared a detailed total cost estimate of \$795 million (inflated to the future year of construction dollars), see Table 3-1. The major causes of the increase in the project cost estimate include:

- Construction costs escalation (2003- 2006).
- Escalation in right-of-way acquisition costs due to higher than anticipated costs for acquired parcels, post-acquisition settlements, and planned acquisition of larger parcels.
- Ancillary projects such as the start-up costs of the expanded bus service and more detailed cost estimates for Intelligent Transportation Systems (ITS) and Incident Management (IM) elements. These costs were not anticipated in the previous cost estimates.
- Increases in engineering costs as a result of existing consultant contracts, the need to complete the SEIS and general state engineering increases.

**Table 3-1
 Current Cost Estimates**

		Estimated Cost (millions)
Construction	Early Action	\$73.8
	Mainline Priorities	\$302.1
	Mainline Capacity Improvements	\$235.5
	<i>Subtotal</i>	<i>\$611.3</i>
Right-Of-Way	Acquisitions	\$65.4
	Mitigation	\$46.6
	<i>Subtotal</i>	<i>\$111.9</i>
Engineering		\$71.2
Total		\$794.4

Source: I-93 Improvements 2008 Financial Plan

NHDOT is using a prioritized implementation strategy, utilizing the existing financial resources and available and expected bonding capacity to advance the construction of the project with an emphasis on the areas of greatest concern for safety, capacity and infrastructure condition. It is important to note that all work completed on the corridor will be functional and will be used to manage traffic volumes as construction along the corridor advances. Every segment will be usable once it is complete.

3.3 Summary of Alternatives Considered and Rejected

Section 3.3.1 summarizes the alternatives considered and rejected through the scoping process for the 2002 DEIS. Section 3.3.2 identifies the reasonable range of alternatives analyzed in the 2002 DEIS and 2004 FEIS. Section 3.3.3 explains the rationale for the 2005 Selected Alternative. During the reevaluation of the 2005 Selected Alternative, no information was found that would require the reexamination of other alternatives previously rejected.

3.3.1 Alternatives Screening

Conceptual alternatives were identified and discussed in the Scoping Report (VHB, May 2000) and the subsequent Rationale Report (VHB, January 2001). Both of these documents were provided to the appropriate federal and state resource agencies and comments solicited. In addition, a series of agency coordination and public information meetings were conducted as part of the alternatives screening process, see Sections 2.4.1 and 2.4.2 of the 2004 FEIS. The conceptual alternatives identified provided a range of potential solutions or actions to address the purpose and need of the I-93 Salem-Manchester project. The six basic types of alternatives were:

- No-Build,
- Implementation of Transportation System Management (TSM) actions,
- Providing additional lanes to the existing highway (highway widening),
- Implementation of Transportation Demand Management (TDM) strategies
- Providing alternative modes of transportation (a form of TDM),
- A combination of these.

Alternative highway corridors involving the relocation of I-93 (or sections thereof) to bypass existing I-93 were not considered viable options because of the magnitude of investment required, presumed environmental impacts, and current traffic patterns associated with the existing facility.

Transportation System Management

A variety of transportation system management (TSM) measures were considered, including interchange geometry improvements, ramp metering, shoulder lane use, and Intelligent Transportation Systems (e.g. incident management, cameras, dynamic message signs). It was concluded that TSM measures alone would not address all the long-term safety and capacity needs of the I-93 corridor, but some TSM actions can provide short-term relief in advance of a more comprehensive solution. Specifically many of the interchange TSM actions would, in the short-term, enhance the safe and efficient flow of traffic in the vicinity of the interchanges. In

addition, Intelligent Transportation Systems (ITS) technology will be incorporated into the overall improvements to I-93. Such systems will supplement and complement regional and statewide efforts currently underway in New Hampshire, and will serve in the long-term to enhance the safety and capacity of the I-93 corridor. Ramp metering was not proposed to be carried forward for further study as its effectiveness relative to improving I-93 would be limited to the southbound barrel in the morning peak period, and the resulting backups on secondary roads within the interchange area would be excessive. The evaluation of shoulder lane use did not support its continued consideration because of safety, cost and construction scheduling issues.

Highway Widening and Interchange Improvements

Highway widening alternatives considered included a three-lane alternative, four-lane alternative and a combination alternative. In addition, numerous interchange reconstruction alternatives were evaluated. Environmental, socioeconomic and engineering constraints were taken into account during the development of these alternatives with impacts to resources minimized as practicable. It was concluded that all three of the highway widening alternatives should be advanced for detailed analysis in the EIS. In addition, several of the interchange options were advanced.

Transportation Demand Management

Transportation demand management (TDM) encompasses strategies that are designed to change personal travel behavior to reduce the demand for automobile use and the need for highway capacity expansion. TDM measures considered included employer-based incentives, congestion pricing, High Occupancy Vehicle (HOV) lanes, park-and-ride lots, bus service improvements, and rail service improvements.

Congestion pricing was not proposed for further study as it would do little to address current congestion levels, there is a lack of alternative routes or modes and heavy public opposition was anticipated.

Based on the study of potential ridership and its affect on highway level of service, bus service, rail service and the use of HOV lanes, either alone or in combination with each other, do not eliminate the need to widen the highway, if acceptable levels of service are to be achieved over the next 20 years. The mode options will help alleviate the number of hours over which congestion occurs, but the peak hour of congestion will remain, and under many of the mode combinations tested, the 3+ hour period of congestion will remain. These measures do not result in enough diversion to influence the need to widen the highway and would result in major additional expenditures for construction and long term operation. They also require substantial investment by the State of Massachusetts. With this in mind, it was concluded that further consideration of HOV lanes and rail service would be discontinued as part of this project.

Expanded bus service, new park-and-ride lots and enhanced ridesharing opportunities were proposed for further evaluation. In addition, given the possibility that rail service will be required to meet the long-range needs of transportation in the area served by I-93, it was

proposed that space be reserved within the I-93 highway corridor for a possible future passenger rail line. By reserving such space, future opportunities for rail service, and possibly as an interim measure for bus service, will remain available.

In the 2004 FEIS NHDOT committed to conducting a study with the Commonwealth of Massachusetts to evaluate long-term transit alternatives between Boston, MA and Manchester, NH. The objective of the I-93 Bi-State Transit Investment Study is to determine future transit investments necessary to meet mobility needs within a study area which encompasses the study area for the I-93 project as well as part of Massachusetts, and to develop a strategic plan for funding and phased implementation of the recommended options. As part of the study, a Preliminary Draft Definition and Evaluation of Alternatives report was issued evaluating conceptual alternatives and recommending implementation of bus-on-shoulder service on I-93 and preservation of the Manchester & Lawrence right-of-way for potential future use (NHDOT and MAEOT, 2008). The bus-on-shoulder service was found to have roughly the same ridership at half the cost of rail. Therefore, a new rail transit service was found to not meet cost effectiveness criteria in comparison to the bus-on-shoulder alternative, but may be feasible in the future, possibly beyond the study's 2030 horizon year.

3.3.2 Identification of a Reasonable Range of Alternatives

Based on the collective consideration and analysis summarized in Section 3.3.2, the following seven alternatives or combination thereof were selected as a “reasonable range of alternatives” for more detailed evaluation in the 2002 DEIS and 2004 FEIS:

1. The No-Build Alternative, which essentially serves as the baseline condition for comparison with the Build Alternatives.
2. Transportation Systems Management (TSM) measures; specifically minor improvements such as ramp lengthening and lane widenings that can be accomplished within the existing ROW at minimal expense. Such measures generally do not address the long-term project purpose and need, but can help to alleviate problems in the near term. Two other TSM measures, ramp metering and shoulder lane use, were determined to be impractical and were not proposed for further consideration.
3. Widening I-93 to 4-lanes in each direction the entire length of the corridor including interchange improvements, in addition to constructing or expanding park-and-ride lots at Exits 2, 3, 4, and 5, and providing room and, as practical, constructing sub-grade for future rail transit service within the highway corridor.
4. Widening I-93 to 3-lanes in each direction for the entire length of the corridor including interchange improvements, in addition to the same park-and-ride lot construction and provision for future rail transit service as noted with the 4-lane widening alternative.
5. Widening I-93 to 4-lanes in each direction south of Exit 3 and 3-lanes in each direction north of Exit 3 including interchange improvements, along with the provisions proposed with either the 3 or 4-lane widening schemes. This is the so called “Combination Alternative”.

6. Transportation Demand Management (TDM) measures; specifically Intelligent Transportation Systems (ITS) techniques as well as employer based measures utilizing incentives and disincentives to encourage people to not drive alone. It was concluded that congestion pricing, another TDM measure, would be impracticable.

7. Improvements in bus service to include expanding existing service and providing enhanced ride-sharing opportunities to employment centers in northern Massachusetts. After ridership studies, it was concluded that neither rail service nor HOV lanes would be effective alone or in combination with other mode options in satisfying the need for the project.

In a Memorandum of Agreement signed in the Fall of 2002, the U.S. Army Corps of Engineers (ACOE), U.S. Environmental Protection Agency (EPA), U.S. Fish & Wildlife Service (USFWS), Federal Transit Administration (FTA), NHDES, New Hampshire Fish and Game Department (NHF&GD), and the New Hampshire Division of Historical Resources (State Historic Preservation Office - SHPO) agreed that these alternatives represented a reasonable range of alternatives.

3.3.3 Rationale for the 2005 Selected Alternative

The No Build Alternative would not meet the purpose and need for the project. The four-lane alternative rather than the three-lane alternative or combination alternative was selected as the final configuration, since four lanes provide an adequate level of service for future traffic projections, with limited additional direct impacts to the environment, and at a similar cost (5% increase) (See Section 2.7 of the 2004 FEIS). On December 30, 2003 ACOE issued a letter to NHDOT identifying the four-lane alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA) under the Section 404(b)(1) Guidelines. The information gathered during the reevaluation of the 2005 Selected Alternative for this DSEIS does not change the validity of the decision to select the four-lane alternative instead of the three-lane or combination alternative.