

APPENDIX B: Benefit Cost Analysis

Prepared For:



Bow Concord I-93 Improvements Project

Bow and Concord, NH

Benefit Cost Analysis



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NHDOT Project # 13742
Federal Project #T-A000(018)

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1 Executive Summary

This Benefit Cost Analysis is being prepared for the New Hampshire Department of Transportation (NHDOT) for improvements to Interstate 93 (I-93) in Bow and Concord, New Hampshire. The Benefit Cost Analysis (BCA) was completed in accordance with the U.S. Department of Transportation's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs (2020)* for consistency with BCAs recently completed on other projects and for use by the Department in applying for additional funding opportunities, such as Infrastructure for Rebuilding America (INFRA) Discretionary Grant or other Federal grants.

This study covers a distance of approximately 2½ miles of I-93 from just south of the I-93/Interstate 89 (I-89) Interchange in Bow to just south of Exit 13 on I-93 in Concord. See Figure 1: Study Area Overview.

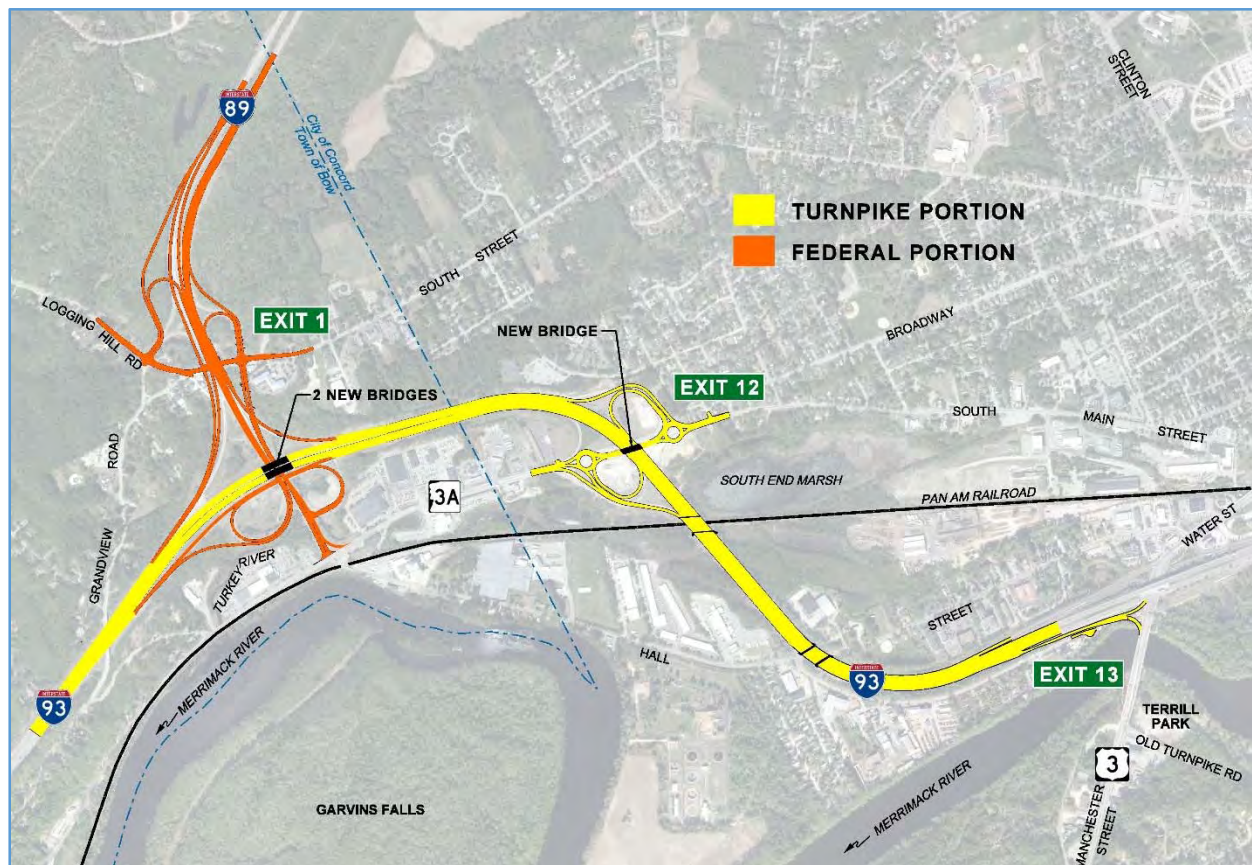


Figure 1: Study Area Overview

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 for several years now. 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 travel speeds, increased density of traffic flow, as well as in the traffic backups at some interchanges during commuting hours and summertime weekends.

During weekday peak hours as well as Friday and Sunday peak hours during summertime weekends, motorists traveling along the I-93 corridor currently experience traffic congestion and substantial travel delay. The congestion not only results in increased travel times, but also contributes to safety issues, as the limited spacing between vehicles does not afford the motorists sufficient time or space 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.

To the maximum extent possible, given the available data, this formal BCA is prepared in accordance with federal grant application guidelines and reflects quantifiable economic benefits. It covers primary long-term impact areas identified in the federal grant application guidelines. Table 1 shows the Executive Summary Matrix.

The improvements to the I-93 corridor in Bow & Concord results in a Benefit-Cost Ratio (BCR) of 3.25, with a BCR of 1.12 at a 7 percent discount rate, and a BCR of 1.94 at a 3 percent discount rate.

Table 1 – Executive Summary Matrix

Current Status / Baseline and Problem to be Addressed	Change to Baseline or Alternatives	Type of Impacts
Continued operation and maintenance of the existing I-89 and I-93 within the project area.	Widening of I-93 to a basic six-lane interstate with auxiliary lanes as well as alterations to four interchanges	<ul style="list-style-type: none"> • Reduced Travel Times • Reduced Fuel Use • Increased Safety • Avoided O&M Costs • Residual Value of New Bridges • Higher O&M Costs

2 Project Description

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 2½ miles from south of the I-93/Interstate Route 89 (I-89) Interchange in Bow to Exit 13 on I-93 in Concord. This segment of I-93 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. There are four existing interchanges within the project limits. Refer to Figure 1: Study Area Overview that depicts the study area and the project limits.

The New Hampshire Department of Transportation (NHDOT) and the Federal Highway Administration (FHWA) have prepared an 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 segment of highway.

I-93 in central New Hampshire was constructed in the late 1950's and early 1960's as part of the Central NH Turnpike. The need to address issues along I-93 in Bow and Concord was first identified in 1990 when the Bow-Concord Widening Project was first placed on the State's Ten-Year Plan.

Since 2012, traffic volumes on I-93 have begun to rise with 2017 having the highest all time average annual traffic. Growth in the region is expected to occur in the coming years and place a greater burden on the transportation system. With an estimated 80,000 vehicle trips per day by the year 2035, increased congestion and increased travel times are expected, unless there is a reduction in demand, implementation of management strategies, or improvements such as those proposed to this important regional travel corridor.

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. Improvements are also proposed at each of the interchanges to increase capacity and improve safety, mainly by reducing or eliminating weaving movements.

This Benefit-Cost Analysis (BCA) was conducted to quantify the benefits and costs of the proposed project compared to a baseline scenario, or the "No-Build" alternative. This analysis was conducted in accordance with the criteria described in the U.S. Department of Transportation's *Benefit-Cost Analysis for Discretionary Grant Programs* dated January 2020. Project benefits from the proposed project include travel time savings, fuel consumption savings, safety benefits, and avoided Operation and Maintenance (O&M)

costs associated with maintaining the existing infrastructure. There are several additional benefits of the proposed project that are difficult to quantify such as environmental protection and increased tourism economics.

3 General Assumptions

Evaluation Period

The evaluation period of benefits and costs of a project are typically for a period that includes the construction of the project and the operational period which is 20-50 years on average. For this project, the analysis period includes the project development stage which is expected to begin in 2021 with the construction programmed to begin in 2023 and be completed in 2026 with a 30-year operational period. Therefore, the BCA calculates all benefits and costs forecasted out until year 2057. As a simplifying assumption, all benefits and costs are assumed to occur at the end of each year.

No-Build Alternative

The No-Build Alternative for this BCA is the continued use and maintenance of the existing I-93 and I-89 infrastructure through Bow and Concord. Due to the critical role these roadways play in the regional transportation network, it is assumed that the roadways and bridges will need to be maintained in a state of good repair for the duration of the analysis period. Therefore, all costs associated with regular operations and maintenance costs will be included in the analysis.

There is also a “Red-List” bridge within the project area. Under the No-Build Alternative, it is assumed that this bridge will need to be reconstructed within the analysis period. This is consistent with the State of New Hampshire’s Department of Transportation’s practice of addressing “Red-List” bridges as a priority.

Real Discount Rate

In an effort to avoid forecasting future inflation rates and the need to grow future values for benefits and costs accordingly, all benefits and cost were valued in 2018 real dollars. Future values are deflated to reflect current values, even in the case where cost is expressed in future year values. The use of current dollar values requires the use of a real discount rate for present value discounting.

In accordance with the BCA Guidance Document, a real discount rate of 7% was used for this analysis. In addition, a 3% real discount rate was used for sensitivity analysis.

Traffic Growth Assumptions

Future year traffic volumes for the 2035 Design Year rely on growth projections developed by the Central New Hampshire Regional Planning Commission (CNHRPC). These projections are consistent with historical traffic trends within the project study area and

were developed in consultation with the municipalities within the region. In general, the 2035 future year traffic volumes are approximately 16% higher than the 2014 Base Year. This growth in traffic equates to a 0.75% increase per year. Since the traffic model does not provide traffic volume data for every year between 2021 and 2057, it was necessary to use the 0.75% growth per year to calculate traffic volumes for the years between 2021 and 2035. This growth rate was also used to predict traffic volumes beyond the year 2035 for use in the BCA.

Vehicle Delay Growth Assumptions

As previously stated, traffic volumes will continue to grow beyond the analysis year 2035. As congestion increases, it is expected that the average amount of delay that vehicles will experience will increase as well.

To determine a relationship between the growth rate of the average annual daily traffic (AADT) and the growth rate of User Delay, several analyses were performed. Traffic counts from 2014 were grown at an annual rate of 0.75% until 2054 to calculate the projected peak hour traffic volumes for the existing conditions. These peak hour volumes values from 2014 until 2054, in five-year increments, were input into Highway Capacity Software (HCS) to determine the free-flow speed and average delay speed of users through the segments of I-89 and I-93 within the limits of this project. The difference between the free-flow speed and the delay speed was used to calculate the average user delay through each segment. This delay was then multiplied by the total number of users through each segment to determine the total user delay.

This process was repeated for the AM and PM peak hours at the I-89 Exit 1 interchanges, and the I-93 Exit 12 and Exit 13 interchanges. This included merge and diverge segments, weaving segments and ramp segments. The results for these three locations were combined into a single data set which was compared to traffic volumes. A regression analysis was performed in Excel which determined that as the AADT increases annually at 0.75%, the total user delay increases annually at 2.05%. This regression analysis has an R Squared value of 0.92. R Squared measures the goodness of fit of the line of best fit to the data. The closer R Squared is to 1, the better the analysis represents the relationship between a single dependent variable and one or more independent variables.

This increase was applied to both the delay experienced during the peak hours of traffic on a typical weekday as well as the delay experienced on busy tourist weekends.

Daily and Annual Traffic Assumptions

The traffic analysis performed for this project analyzed traffic operations during the AM and PM peak hours of travel on a weekday. When computing project benefits, it was assumed that these conditions occurred for five business days a week for fifty weeks a year to account for holidays. It was further assumed that traffic operations for the Build condition would be similar to the No-Build condition for all other hours of the day, i.e. there would be no changes in travel time through the corridor during non-peak hours.

Peak weekend traffic was assumed to occur between Memorial Day weekend and Columbus Day weekend as well as four other times a year for long weekends such as Veteran's Day, Thanksgiving, Martin Luther King, Jr. Day, and President's Day for a total of 24 occurrences.

Crash Data

An assessment was conducted by New Hampshire Department of Transportation for the crash occurrences in the project area from 2007 to 2016.¹ These crash occurrences were averaged over this ten-year period to estimate the number of crashes that occur each year. While it could be argued that crashes would increase at a higher rate than the volume of traffic due to additional congestion and delay, it would be difficult to estimate such an increase. Therefore, it is assumed that the number of crashes would increase in direct relation to the increase in the volume of traffic.

Service Life

Bridges are designed and expected to perform for 75 years of service life. Therefore, new bridges constructed as part of the proposed project will have several years of useful life remaining at the end of the analysis period. A residual value for these bridges has been calculated and included in this BCA to estimate the benefit of these structures at the end of the analysis period. The residual values are estimated assuming a linear depreciation over the service life of the bridge.

4 Benefits

Estimation of Benefits for Highway

The following section provides a detailed explanation and computation of the benefits associated with the proposed project within the project influence area. For the purpose of estimating benefits, it is assumed that the construction of the proposed improvements will begin in 2023 with completion in 2026. Therefore, benefits associated with reduced travel times and fewer crashes will begin to occur in 2027 as the construction is completed.

Value of Travel Time Savings (Weekday Peak Hours)

The proposed project is expected to reduce delay through the project corridor based on the traffic analysis performed by Resource System Group (RSG). This traffic analysis reviewed traffic operations in the year 2035 for both the "No-Build" and Proposed Alternatives. Table 2 shows the comparison of vehicle-hours traveled through the corridor between the No-Build and Proposed Alternatives for both the AM and PM peak hours of travel. Vehicles-hours traveled is a measurement of each vehicles travel time through

¹ *New Hampshire Department of Transportation.*

the corridor during the peak hour of traffic. A more detailed computation showing the vehicle-hours traveled through specific segments of the corridor is included in Appendix A.

Table 2 – Vehicle-Hours Traveled Comparison

	AM Peak Hour		PM Peak Hour		Reduction (Hours)	
	No-Build	Proposed	No-Build	Proposed	AM Peak Hour	PM Peak Hour
Vehicle-Hours Traveled (VHT)	949	663	873	760	286	113
Total					399 VHT	

The yearly travel times savings is determined by multiplying the total daily travel time savings of 399 vehicle hours by 5 business days per week and 50 business weeks per year to account for holidays. This yields a yearly travel time savings of 99,809 vehicle hours.

The value of this travel time savings is determined by applying hourly costs to the mix of vehicles which include passenger cars, both for business and personal use, as well as commercial trucks. The truck percentages were provided by RSG from a traffic count conducted in 2013 between exits 15 and 16 along the I-93 corridor and are shown in Table 3.

Table 3 – Estimated Heavy Vehicle Distribution

Analysis Period	Automobile Traffic	Truck Traffic
Daily	94.0%	6.0%

Based on the BCA Guidance Document, it is assumed that 88.2% of automobile travel is for personal use and the remaining 11.8% is for business use. On average, passenger vehicle occupancy is 1.48 occupants for vehicle for all trips. Commercial trucks are assumed to have an occupancy of 1 person. With this information, the overall vehicle-hours of time saved can be broken down into personal travel time, business travel time, and commercial truck time, each weighted by the number of occupants expected in each vehicle class.

These values of affected persons time are then multiplied by the corresponding value of time to arrive at the total Travel Time Savings. The values in 2018 dollars for personal automobile travel is \$15.20 per hour while the value for business automobile travel is \$27.10 per hour. For truck travel, it was assumed that 100% of the truck traffic is for business use with a value of \$29.50 per hour in 2018 dollars. These rates then applied

to the total affected volume to compute the total travel time savings on a yearly basis as shown in Appendix A. In the analysis, cumulative travel time savings are estimated to be approximately \$2,600,000 for the year 2035, which is the design year for the traffic analysis.

This 2035 value travel time savings was then adjusted to account for increases in traffic volumes as well as increases in average delay per vehicle due to the increases in traffic volumes to determine the travel time savings for the other years within the analysis period. When looking at the entire analysis period, the total value of travel time savings during the weekday peak hours of traffic is estimated to be nearly \$95,500,000.

Value of Travel Time Savings (Tourist Weekends)

The proposed project is expected to also reduce delay through the project corridor during heavy traffic on Friday evenings and Sunday evenings during the summertime and long weekend peak tourist seasons. The traffic backups on northbound I-93 during peak periods can stretch as far south as the Hooksett Toll Plaza, a distance of about ten miles from Exit 14 where the backups begin to dissipate. The traffic backup on southbound I-93 during peak periods can stretch as far north as Exit 17, a distance of about eight miles from Exit 12 where the backups begin to dissipate. While no formal traffic analysis was conducted for these events, the proposed project is expected to greatly reduce the queuing and delay that is occurring during these heavy travel times. It was assumed that the proposed project would reduce total vehicle delay by 80%.

Using the same assumptions to calculate the value of travel time savings as during the weekday peak hours of travel, cumulative travel time savings for peak weekend traffic are estimated to be approximately \$5,000,000 for the year 2035. Also, following the same methodology for accounting for increases in traffic volumes and average delay per vehicle, the total value of travel time savings during the peak weekend hours of traffic is estimated to be over \$182,000,000.

Fuel Cost Savings

The proposed project is expected to reduce the amount of fuel consumption by vehicles traveling through the project corridor during the peak hours of travel based on the traffic analysis performed by RSG. This is due to cars traveling at more constant flow with less stop and go traffic. This analysis reviewed traffic operations in the year 2035 for both the “No-Build” and Proposed Alternatives. Table 4 shows the comparison of fuel use within the corridor between the No-Build and Proposed Alternatives for both the AM and PM peak hours of travel. This table also shows the value of fuel saved per weekday using an average cost of \$2.74 for gasoline and \$3.09 for diesel fuel.

Table 4 – Fuel Use Comparison

	AM Peak Hour		PM Peak Hour		Reduction	
	No-Build	Proposed	No-Build	Proposed	AM Peak Hour	PM Peak Hour
Gasoline Use (Gallons)	1327	1125	1312	1278	202	33
Gasoline Cost (\$2017)	\$3,632	\$3,080	\$3,591	\$3,500	\$552	\$91
Diesel Use (Gallons)	450	372	450	422	78	28
Diesel Cost (\$2017)	\$1,391	\$1,151	\$1,389	\$1,304	\$240	\$85

The yearly fuel savings is determined by multiplying the daily fuel savings of \$968 by 5 business days per week and 50 business weeks per year to account for holidays. This yields a yearly fuel savings of nearly \$241,900 in the year 2035.

This 2035 value of fuel savings was then adjusted by 0.75% per year to determine the fuel savings for the other years within the analysis period. This adjustment is based on the assumption that the amount of fuel saved will grow at the same rate as the traffic volume. When looking at the entire analysis period, the total value of fuel savings during the weekday peak hours of traffic is estimated to be over \$7,900,000.

Crash Reduction Benefits

This project will result in minimal changes to the total Vehicle Miles Traveled (VMT) within this corridor. Therefore, there are no anticipated reductions in vehicle crashes as a result of a change in VMT. However, there are many improvements included in the proposed project that should reduce the amount of crashes through the corridor. These expected reductions in traffic are based on Crash Modification Factors (CMF) which are estimates of how individual improvements impact the rate of crashes expected. The Crash Modification Factors Clearinghouse² was consulted to determine which Crash Modification Factors best represented the intended improvements. Overall, there are seven improvements within the proposed project area that are expected to reduce crashes. Each of these areas is described in more detail below.

² Crash Modification Factor Clearinghouse"; <http://www.cmfclearinghouse.org> .

Weaving on I-89 Between Exit 1 and I-93

Over the 2007-2016 period, 32 total crashes were recorded within the weaving area on I-89 between Exit 1 and I-93. These crashes consisted of 18 Property Damage Only (PDO), 14 reporting injuries, and no fatal crashes. The proposed project will construct new ramps that grade separate these weaving movements, essentially removing them. There is no CMF for eliminating a weave, but the reduction in crashes would be expected to be much greater than the 20% observed when installing an auxiliary lane since the weaving maneuver is completely eliminated. Therefore, a CMF of 0.2 was used for this area.

I-89 Exit 1 Ramp Terminals

Over the 2007-2016 period, 15 total crashes were recorded at the sign-controlled intersections of the I-89 Exit 1 off ramps and South Street / Logging Hill Road. These crashes consisted of 10 PDO and 5 reporting injuries. While no fatal crashes were included in the data set, a fatal crash did occur in April of 2018 and was included in the data set. The proposed project will construct traffic signals at the ramp terminal intersections. A CMF for installing traffic signals at intersections was found to be 0.56 for all crash types and was used in this area.

Weaving on I-93 Collector Distributor Ramp at I-89

Over the 2007-2016 period, 26 total crashes were recorded within the weaving area on the I-93 Collector Distributor Ramp at the I-89 interchange. These crashes consisted of 14 PDO, 12 reporting injuries, and no fatal crashes. The proposed project will construct a new ramp to connect I-93 northbound directly to I-89 northbound which will greatly reduce the amount of traffic within the weaving movement on the Collector Distributor Ramp. There is no CMF for reducing traffic through a weave, but the reduction in crashes would be expected to be proportional to the reduction in the amount of traffic going through the weave, which is expected to be 80% in the AM and 90% in the PM. Therefore, a CMF of 0.2 was used for this area.

Weaving on I-93 Between I-89 Interchange and Exit 12

Over the 2007-2016 period, 71 total crashes were recorded within the weaving area between the I-89 interchange and Exit 12. These crashes consisted of 42 PDO, 28 reporting injuries, and 1 fatal crash. The proposed project will construct an auxiliary lane in both directions of I-93 in this area. A CMF for adding an auxiliary lane was found to be 0.77 for all crash types.

Weaving on I-93 Between Exit 12 and Exit 13

Over the 2007-2016 period, 76 total crashes were recorded within the weaving area between Exit 12 and Exit 13. These crashes consisted of 39 PDO, 37

reporting injuries, and no fatal crashes. The proposed project will construct an auxiliary lane in both directions of I-93 in this area. A CMF for adding an auxiliary lane was found to be 0.77 for all crash types.

Exit 12 Ramp Terminals

Over the 2007-2016 period, 20 total crashes were recorded at the sign-controlled intersections of the Exit 12 off ramps and NH Route 3A. These crashes consisted of 8 PDO, 12 reporting injuries, and no fatal crashes. The proposed project will combine the off ramps from two to one in each direction of the interstate and construct a roundabout at the ramp terminals. A CMF for installing roundabouts at ramp terminal intersections was found to be 0.75 for all crash types.

The BCA Guidance document includes societal costs associated with crashes involving PDO, injuries, and fatalities. These costs are \$4,400 for PDO crashes, \$451,200 for crashes involving an injury, and \$9,600,000 for fatalities. These costs were applied to the reduction in crashes anticipated by the proposed improvements to develop the value of the benefit of fewer crashes. Since the relative occurrence of crashes is a function of the volume of traffic on a given roadway, the rate of increase of crashes was compared to the increase in traffic volumes over the analysis period to determine the anticipated yearly increase in crash occurrences.

The benefit of the reduction in crashes per year was calculated based on the type of crash and summarized as a yearly savings. The cumulative crash reduction savings are estimated to be nearly \$76,200,000 through the analysis period. All data is provided in Appendix A.

Avoided Bridge Replacement & Rehabilitation Projects

As previously stated, under the No-Build alternative, it is assumed that existing bridges that are currently on the “Red-List” would need to be replaced and other bridges would need to be re-decked to keep the roadway in a state of good repair. The cost for the proposed improvement includes replacing all of these bridges. Therefore, with the implementation of the proposed project, the cost to replace the existing “Red-List” bridges and re-deck the remaining bridges would be avoided, making it a benefit for the proposed improvement. It is assumed that the one “Red-List” bridge within the project area would be replaced by 2027. Bridges that required re-decking would be done on a schedule to replace the deck approximately 40 years after being constructed. The cost to replace and re-deck existing bridges was derived by comparing the existing bridges size to recently bid work of similar nature. In total, the avoided costs of bridge replacement and rehabilitation projects would be over \$27,000,000. Table 5 provides a summary of the avoided costs.

Table 5 – Avoided Bridge Replacement & Rehabilitation Projects

Bridge	Priority on Current “Red-List”	Total Costs
I-89 over South St.	24	\$5,775,000
I-93 SB to I-89 NB Ramp over Turkey River		\$3,100,000
I-93 SB over B&M Railroad		\$4,600,000
I-93 NB over B&M Railroad		\$5,300,000
I-93 SB over Hall St.		\$4,200,000
I-93 NB over Hall St.		\$4,200,000

Emissions Reductions Benefits

Due to increases in travel efficiency, the proposed project would have a benefit associated with fewer emissions of sulfur dioxide, nitrogen oxides, fine particulate matter, and volatile organic compounds. While a value could be calculated for this benefit, it is assumed that it would not be a significant amount due to the limited reduction in emissions expected under the proposed project.

Non-Monetized Benefits

In addition to the quantifiable monetized benefits above, the project also generates some benefits that are tangible, but difficult to quantify. Below is a description of some of these benefits.

Economic Competitiveness

Interstate 89 and Interstate 93 are the two main interstate highways serving Concord with links to the State of Vermont, White Mountains and New Hampshire’s seacoast. Interstate 93 through Concord connects with Interstates 89 and 393 continuing down to Bow and serves as a vital link to commuters and a wealth of jobs in northern Massachusetts. One of the largest industries in NH is tourism and this project will provide a safer, more efficient connection between these attractions and their users. Therefore, the proposed improvements will maintain long-term efficiency of the system, travel time reliability for all users, and cost

competitiveness of goods. The benefits to economic competitive focusing on tourism and are further detailed in Applied Economic Research's *Estimate Tourism Benefits* report dated October 29, 2018 which is included in Appendix B.

The Manchester-Boston Regional Airport located 23 miles south of Bow & Concord is the state's largest airport. The Airport is a key transportation facility serving NH and one of the largest economic drivers supporting NH's economy with nearly \$23.7 Million generated in tax revenue for the state of New Hampshire in 2015. It also serves as the central air cargo hub for UPS and FedEx carriers serving northern New England.³ Many businesses in the region rely on this cargo hub for the transportation of goods or persons, including educational and healthcare institutions, large retailers, and financial firms. The proposed improvements will provide a safer, more efficient connection between New Hampshire, Massachusetts, and the region, which is key to maintaining the economic stability and growth of this region.

Quality of Life

Constructing the proposed project will result in improved operations along the corridor and improve safety which will have positive impacts on travel through this area for both business and personal endeavors including work, shopping, school, medical treatment and recreational activities. The proposed improvements will continue to provide safe & efficient access to these facilities ensuring that people are able to continue to obtain excellent medical care.

Environmental Sustainability

Until recently, stormwater runoff along I-93 within the project limits discharged into the adjacent waterbodies with little or no treatment. Recent projects to address Red List bridges in the corridor installed several gravel wetlands to treat portions of the runoff. An additional nine potential treatment areas have been identified as part of the proposed project to provide measurable benefit to the water quality of the Merrimack River.

5 Costs

Capital Expenditures

The total capital expenditures for the proposed project include preliminary engineering and permitting, right-of-way acquisition, mitigation, utility relocation and construction. The estimated cost to construct the proposed project is \$126.4 M. These costs have been adjusted to be current year 2018 values. A detailed cost estimate is shown in Appendix A.

³ 2015 NH State Airport System Plan, New Hampshire Department of Transportation. Individual Airport Summary Report Manchester-Boston Regional Airport, 2015.

Operation and Maintenance Costs

Once constructed, the proposed project will incur future roadway and bridge maintenance costs in order to maintain a state of good repair that are in addition to future roadway and bridge maintenance costs that would occur under the No Build alternative. These additional costs will consist of annual cleaning of the bridge decks and superstructures. Additional pavement preservation costs would occur every 10 years after the project is complete due to the additional pavement area resulting from the proposed project. These additional maintenance and operation costs have been included in the BCA as negative benefits in accordance with the BCA Guidance document.

Similar to the avoided bridge replacement and rehabilitation costs, there is also a pavement preservation project that would occur under the No Build alternative but would not be needed under the proposed project. This avoided pavement preservation is expected to cost approximately \$5,000,000 and has been included as a benefit under the BCA.

Residual Value of New and Replaced Bridges

Another benefit of the proposed project would be the residual value of new bridges and existing bridges that are planned to be replaced. As these bridges would be constructed with a 75-year design life, they would have residual value remaining at the end of the analysis period. The total value of the bridges that are either a new bridge or an existing bridge that will be replaced in current 2018 dollars is over \$32,800,000. As these bridges would have 45 years remaining of useful life at the end of the analysis period, the residual value is estimated at nearly \$19,700,000.

6 Comparing Benefits to Costs

A summary of the benefits and costs quantified for the proposed project are summarized in Table 6 below. Benefits and costs are expressed in real dollars (2018) as well as values that have been discounted at 3% and 7% over the analysis period. The comparison of the benefits to the costs are presented in terms of Net Present Value (NPV) as well as a Benefit to Cost Ratio (BCR).

Table 6 – BCA Summary

Criteria	Real Dollars (2018)	3% Discount Rate	7% Discount Rate
Travel Time Savings (Weekday)	\$95,507,808	\$46,377,346	\$20,229,928
Travel Time Savings (Peak Weekends)	\$182,402,171	\$88,572,114	\$38,635,404
Fuel Savings	\$7,918,791	\$3,963,123	\$1,793,388
Crash Reductions	\$76,243,628	\$38,129,216	\$17,248,005
Avoided Bridge Projects	\$27,175,000	\$18,317,899	\$11,187,872
Residual Value of Bridges	\$19,700,000	\$6,220,345	\$1,407,664
Bridge Operation and Maintenance Costs	-\$310,000	-\$157,885	-\$72,936
Highway Operation and Maintenance Costs	\$2,000,000	\$2,521,698	\$2,231,143
Total Value of Benefits	\$410,637,397	\$203,943,856	\$92,660,466
Total Value of Costs	\$126,420,000	\$104,952,697	\$82,739,087
New Present Value (NPV)	\$284,217,397	\$98,991,159	\$9,921,379
Benefit to Cost Ratio (BCR)	3.25	1.94	1.12

**APPENDIX A
BOW-CONCORD 13742
BENEFIT-COST ANALYSIS**

February 17, 2020

Benefits														
Calendar Year	Project Year ¹	Value of Time Saved (Weekday Peak Hours) (\$2018) ⁴	Value of Time Saved (Tourist Weekends) (\$2018)	Value of Fuel Saved (\$2018) ⁴	Value of Crash Reductions Savings (\$2018) ⁵	Avoided Bridge Projects ⁶	Residual Value of New and Replaced Bridges (\$2018)	Additional Bridge Operation & Maintenance Cost (\$2018) ²	Additional Highway Operation & Maintenance Cost (\$2018) ³	Total Benefits (\$2018)	7% Rate	Total Benefits (\$2018) Discounted 7%	3% Rate	Total Benefits (\$2018) Discounted 3%
2021	1	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.82	\$0	0.92	\$0
2022	2	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.76	\$0	0.89	\$0
2023	3	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.71	\$0	0.86	\$0
2024	4	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.67	\$0	0.84	\$0
2025	5	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.62	\$0	0.81	\$0
2026	6	\$0	\$0	\$0	\$0			\$0	\$0	\$0	0.58	\$0	0.79	\$0
2027	7	\$2,235,383	\$4,269,166	\$227,851	\$2,196,660	\$5,775,000		(\$10,000)	\$5,000,000	\$19,694,060	0.54	\$10,712,264	0.77	\$15,093,857
2028	8	\$2,281,208	\$4,356,684	\$229,560	\$2,205,816	\$4,200,000		(\$10,000)	\$0	\$13,263,269	0.51	\$6,742,373	0.74	\$9,869,117
2029	9	\$2,327,973	\$4,445,996	\$231,282	\$2,233,152			(\$10,000)	\$0	\$9,228,403	0.48	\$4,384,348	0.72	\$6,666,795
2030	10	\$2,375,696	\$4,537,139	\$233,017	\$2,251,464			(\$10,000)	\$0	\$9,387,316	0.44	\$4,168,081	0.70	\$6,584,075
2031	11	\$2,424,398	\$4,630,150	\$234,764	\$2,260,620			(\$10,000)	\$0	\$9,539,933	0.41	\$3,958,733	0.68	\$6,496,230
2032	12	\$2,474,098	\$4,725,068	\$236,525	\$2,278,844			(\$10,000)	\$0	\$9,704,536	0.39	\$3,763,586	0.66	\$6,415,841
2033	13	\$2,524,817	\$4,821,932	\$238,299	\$2,292,600	\$14,100,000		(\$10,000)	\$0	\$23,967,649	0.36	\$8,686,979	0.64	\$15,383,922
2034	14	\$2,576,576	\$4,920,782	\$240,086	\$2,310,780			(\$10,000)	\$0	\$10,038,224	0.34	\$3,400,294	0.62	\$6,255,490
2035	15	\$2,629,396	\$5,021,658	\$241,887	\$2,324,492			(\$10,000)	\$0	\$10,207,433	0.32	\$3,231,412	0.61	\$6,175,665
2036	16	\$2,683,299	\$5,124,602	\$243,701	\$2,342,760			(\$10,000)	\$0	\$10,384,362	0.30	\$3,072,358	0.59	\$6,099,718
2037	17	\$2,738,306	\$5,229,656	\$245,529	\$2,356,516			(\$10,000)	(\$1,000,000)	\$9,560,007	0.28	\$2,643,422	0.57	\$5,451,939
2038	18	\$2,794,442	\$5,336,864	\$247,370	\$2,370,228	\$3,100,000		(\$10,000)	\$0	\$13,838,904	0.26	\$3,576,236	0.55	\$7,662,266
2039	19	\$2,851,728	\$5,446,270	\$249,226	\$2,392,964			(\$10,000)	\$0	\$10,930,187	0.24	\$2,639,783	0.54	\$5,875,514
2040	20	\$2,910,188	\$5,557,918	\$251,095	\$2,406,720			(\$10,000)	\$0	\$11,115,921	0.23	\$2,509,010	0.52	\$5,801,316
2041	21	\$2,969,847	\$5,671,856	\$252,978	\$2,424,944			(\$10,000)	\$0	\$11,309,625	0.21	\$2,385,730	0.51	\$5,730,493
2042	22	\$3,030,729	\$5,788,129	\$254,875	\$2,438,700			(\$10,000)	\$0	\$11,502,433	0.20	\$2,267,666	0.49	\$5,658,435
2043	23	\$3,092,859	\$5,906,785	\$256,787	\$2,452,500			(\$10,000)	\$0	\$11,698,931	0.18	\$2,155,518	0.48	\$5,587,475
2044	24	\$3,156,262	\$6,027,875	\$258,713	\$2,466,168			(\$10,000)	\$0	\$11,899,018	0.17	\$2,048,957	0.46	\$5,517,512
2045	25	\$3,220,966	\$6,151,446	\$260,653	\$2,493,416			(\$10,000)	\$0	\$12,116,481	0.16	\$1,949,910	0.45	\$5,454,707
2046	26	\$3,286,995	\$6,277,551	\$262,608	\$2,511,772			(\$10,000)	\$0	\$12,328,926	0.15	\$1,854,298	0.44	\$5,388,687
2047	27	\$3,354,379	\$6,406,240	\$264,578	\$2,520,928			(\$10,000)	(\$1,000,000)	\$11,536,125	0.14	\$1,621,550	0.42	\$4,895,313
2048	28	\$3,423,144	\$6,537,568	\$266,562	\$2,543,664			(\$10,000)	\$0	\$12,760,938	0.13	\$1,676,368	0.41	\$5,257,337
2049	29	\$3,493,318	\$6,671,588	\$268,561	\$2,557,420			(\$10,000)	\$0	\$12,980,888	0.12	\$1,593,703	0.40	\$5,192,188
2050	30	\$3,564,931	\$6,808,356	\$270,575	\$2,580,244			(\$10,000)	\$0	\$13,214,106	0.11	\$1,516,201	0.39	\$5,131,527
2051	31	\$3,638,012	\$6,947,927	\$272,605	\$2,589,444			(\$10,000)	\$0	\$13,437,988	0.11	\$1,441,019	0.38	\$5,066,474
2052	32	\$3,712,591	\$7,090,360	\$274,649	\$2,603,156			(\$10,000)	\$0	\$13,670,756	0.10	\$1,370,074	0.37	\$5,004,111
2053	33	\$3,788,700	\$7,235,712	\$276,709	\$2,735,516			(\$10,000)	\$0	\$14,026,637	0.09	\$1,313,776	0.36	\$4,984,834
2054	34	\$3,866,368	\$7,384,044	\$278,784	\$2,753,784			(\$10,000)	\$0	\$14,272,980	0.09	\$1,249,392	0.35	\$4,924,641
2055	35	\$3,945,628	\$7,535,417	\$280,875	\$2,767,540			(\$10,000)	\$0	\$14,519,461	0.08	\$1,187,820	0.33	\$4,863,772
2056	36	\$4,026,514	\$7,689,893	\$282,982	\$2,785,808			(\$10,000)	\$0	\$14,775,197	0.08	\$1,129,665	0.33	\$4,805,280
2057	37	\$4,109,057	\$7,847,536	\$285,104	\$2,795,008		\$19,700,000	(\$10,000)	(\$1,000,000)	\$33,726,706	0.07	\$2,409,942	0.32	\$10,649,327
Totals		\$95,507,808	\$182,402,171	\$7,918,791	\$76,243,628	\$27,175,000	\$19,700,000	-\$310,000	\$2,000,000	\$410,637,397		\$92,660,466		\$203,943,856

Costs							
Initial Project Costs (\$2018) ¹	Total Cost (\$2018)	7% Rate	Total Costs (\$2018) Discounted 7%	3% Rate	Total Costs (\$2018) Discounted 3%	Net Present Value AT 7%	Net Present Value AT 3%
\$2,855,000	\$2,855,000	0.82	\$2,330,530	0.92	\$2,612,729	(\$2,330,530)	(\$2,612,729)
\$2,855,000	\$2,855,000	0.76	\$2,178,066	0.89	\$2,536,631	(\$2,178,066)	(\$2,536,631)
\$31,605,000	\$31,605,000	0.71	\$22,533,928	0.86	\$27,262,751	(\$22,533,928)	(\$27,262,751)
\$31,605,000	\$31,605,000	0.67	\$21,059,746	0.84	\$26,468,690	(\$21,059,746)	(\$26,468,690)
\$28,750,000	\$28,750,000	0.62	\$17,904,055	0.81	\$23,376,381	(\$17,904,055)	(\$23,376,381)
\$28,750,000	\$28,750,000	0.58	\$16,732,762	0.79	\$22,695,515	(\$16,732,762)	(\$22,695,515)
\$0	\$0	0.54	\$0	0.77	\$0	\$10,712,264	\$15,093,857
\$0	\$0	0.51	\$0	0.74	\$0	\$6,742,373	\$9,869,117
\$0	\$0	0.48	\$0	0.72	\$0	\$4,384,348	\$6,666,795
\$0	\$0	0.44	\$0	0.70	\$0	\$4,168,081	\$6,584,075
\$0	\$0	0.41	\$0	0.68	\$0	\$3,958,733	\$6,496,230
\$0	\$0	0.39	\$0	0.66	\$0	\$3,763,586	\$6,415,841
\$0	\$0	0.36	\$0	0.64	\$0	\$8,686,979	\$15,383,922
\$0	\$0	0.34	\$0	0.62	\$0	\$3,400,294	\$6,255,490
\$0	\$0	0.32	\$0	0.61	\$0	\$3,231,412	\$6,175,665
\$0	\$0	0.30	\$0	0.59	\$0	\$3,072,358	\$6,099,718
\$0	\$0	0.28	\$0	0.57	\$0	\$2,643,422	\$5,451,939
\$0	\$0	0.26	\$0	0.55	\$0	\$3,576,236	\$7,662,266
\$0	\$0	0.24	\$0	0.54	\$0	\$2,639,783	\$5,875,514
\$0	\$0	0.23	\$0	0.52	\$0	\$2,509,010	\$5,801,316
\$0	\$0	0.21	\$0	0.51	\$0	\$2,385,730	\$5,730,493
\$0	\$0	0.20	\$0	0.49	\$0	\$2,267,666	\$5,658,435
\$0	\$0	0.18	\$0	0.48	\$0	\$2,155,518	\$5,587,475
\$0	\$0	0.17	\$0	0.46	\$0	\$2,048,957	\$5,517,512
\$0	\$0	0.16	\$0	0.45	\$0	\$1,949,910	\$5,454,707
\$0	\$0	0.15	\$0	0.44	\$0	\$1,854,298	\$5,388,687
\$0	\$0	0.14	\$0	0.42	\$0	\$1,621,550	\$4,895,313
\$0	\$0	0.13	\$0	0.41	\$0	\$1,676,368	\$5,257,337
\$0	\$0	0.12	\$0	0.40	\$0	\$1,593,703	\$5,192,188
\$0	\$0	0.11	\$0	0.39	\$0	\$1,516,201	\$5,131,527
\$0	\$0	0.11	\$0	0.38	\$0	\$1,441,019	\$5,066,474
\$0	\$0	0.10	\$0	0.37	\$0	\$1,370,074	\$5,004,111
\$0	\$0	0.09	\$0	0.36	\$0	\$1,313,776	\$4,984,834
\$0	\$0	0.09	\$0	0.35	\$0	\$1,249,392	\$4,924,641
\$0	\$0	0.08	\$0	0.33	\$0	\$1,187,820	\$4,863,772
\$0	\$0	0.08	\$0	0.33	\$0	\$1,129,665	\$4,805,280
\$0	\$0	0.07	\$0	0.32	\$0	\$2,409,942	\$10,649,327
\$126,420,000	\$126,420,000		\$82,739,087		\$104,952,697	\$9,921,379	\$98,991,159

Notes

- Based on Conceptual Cost Estimate (\$2018) dated July 2018
- Bridge Maintenance cost assumed to be yearly cleaning. Additional work such as membrane and deck replacement would occur outside the scope of this BCA timeline
- Highway Maintenance includes additional pavement preservation projects at 10-year interval after opening

Benefit Cost Ratio	
Real Dollars	3.25
7% Discount Rate	1.12
3% Discount Rate	1.94

PROJECT FUNDING ASSUMPTIONS

Begin Design Year	=	2021
End Design Year	=	2024
Design and ROW Costs	= \$	11,420,000
PE/ROW Costs Per Year	= \$	2,855,000.00
Begin Construction Year	=	2023
End Construction Year	=	2026
Construction Costs	= \$	115,000,000
Construction Costs Per Year	= \$	28,750,000.00
Project Opening Year	=	2027
Analysis Period	=	30 Years
End Analysis Year Year	=	2057 Years

Calendar Year	Project Year ¹	Design Costs	Construction Costs	Total Project Costs
2021	1	\$ 2,855,000.00		\$ 2,855,000.00
2022	2	\$ 2,855,000.00		\$ 2,855,000.00
2023	3	\$ 2,855,000.00	\$ 28,750,000.00	\$ 31,605,000.00
2024	4	\$ 2,855,000.00	\$ 28,750,000.00	\$ 31,605,000.00
2025	5		\$ 28,750,000.00	\$ 28,750,000.00
2026	6		\$ 28,750,000.00	\$ 28,750,000.00
2027	7			\$ -
2028	8			\$ -
2029	9			\$ -
2030	10			\$ -
2031	11			\$ -
2032	12			\$ -
2033	13			\$ -
2034	14			\$ -

SHEET NO.	1	OF	
CALCULATED BY	BRC	DATE	02/12/20
CHECKED BY		DATE	
PROJECT NO.	17841	SCALE	

AVOIDED BRIDGE PROJECTS

COST OF BRIDGE PROJECTS IF BOW-CONCORD 13742 PROJECT IS NOT UNDERTAKEN

ASSUME CURRENT RED LIST BRIDGES WOULD NEED COMPLETE REPLACEMENT

ASSUME OTHER BRIDGES THAT BOW-CONCORD WOULD RECONSTRUCT WOULD HAVE NEEDED A DECK REPLACEMENT IF BOW-CONCORD PROJECT IS NOT UNDERTAKEN

RED LIST BRIDGES IN AREA

Bridge	Priority	DECK SF	Cost per SF	Bridge Cost	Other Costs (x2)	Total Cost
I-89 over South St	24	5500	\$350	\$1,925,000	\$3,850,000	\$5,775,000

ASSUME THIS WOULD NEED TO BE DONE BY OPENING YEAR OF BOW-CONCORD PROJECT

OTHER BRIDGES IN THE AREA THAT NEED TO BE REDECKED IF BOW-CONCORD PROJECT DOES NOT ADVANCE

Bridge	TOTAL PROJECT COST	EXPECTED YEAR
I-93 SB RAMP TO I-89 NB	\$3,100,000	2038
I-93 SB OVER B&M RAILROAD	\$4,600,000	2033
I-93 NB OVER B&M RAILROAD	\$5,300,000	2033
I-93 SB OVER HALL STREET	\$4,200,000	2033
I-93 NB OVER HALL STREET	\$4,200,000	2028

SHEET NO.	1	OF	
CALCULATED BY	BRC	DATE	02/12/20
CHECKED BY		DATE	
PROJECT NO.	17841	SCALE	

RESIDUAL BRIDGE VALUE

Estimated Cost of Bridges (New or Replaced Bridges - No Rehab Bridges)

I-89 Area	Ramp I over Turkey River	\$421,400
	Ramp I over Local Road	\$480,900
	Local Road	\$4,237,800
	Ramp C	\$1,153,600
	I-89 Over South St	\$3,165,750
	I-89 (Ramp H) over Turkey River	\$1,365,000
	I-89 (Ramp D) over Turkey River	\$627,900

Exit 12 Area	I-93 NB over PAR	\$4,935,000
	I-93 SB over PAR	\$4,935,000

Exit 13 Area	I-93 NB over Hall St	\$4,537,050
	I-93 SB over Hall St	\$4,537,050
	US 3 over Merrimack River (Slip Ramp)	\$2,424,625

Total Estimated Bridge Construction Cost (\$2018) = \$32,821,075

Service Life of Bridges = 75 Years

Bridge Opening Year = 2027

End of Analysis Year = 2057

Residual Value at End of Analysis Year = \$19,700,000

APPENDIX A

DETERMINE COSTS FOR ADDITIONAL MAINTENANCE

DETERMINE COST OF FUTURE OVERLAY

USE ONLY EXPANDED AREA OF PAVEMENT AS ORIGINAL AREA OF PAVEMENT WOULD HAVE NEEDED AN OVERLAY REGARDLESS OF PROJECT

AREA OF EXPANDED PAVEMENT = 12.25 ACRES OF PAVEMENT
(FROM STORMWATER SUMMARY)
(I-89, Exit 12, & 1/2 Exit 13)

533,610.00 SQ. FT

ASSUMPTIONS 1.5 INCH OVERLAY
152 LB / CF OF PAVEMENT

\$ 70.00 PER TON

QUANTITY OF PAVEMENT ONLY = 5069.3 TONS

COST OF PAVEMENT ONLY = \$ 354,850.65

USING BEDFORD 41174 AS GO-BY

TOTAL CONTRACT COST = \$ 4,175,287.00

COST OF PAVEMENT ONLY = \$ 1,737,650.00

PAVEMENT TO TOTAL RATIO = 2.40

USING CANTERBURY NORTHFIELD 41057 AS GO-BY

TOTAL CONTRACT COST = \$ 5,056,832.50

COST OF PAVEMENT ONLY = \$ 1,580,275.00

PAVEMENT TO TOTAL RATIO = 3.20

USING BOW HOPKINTON AS GO-BY

TOTAL CONTRACT COST = \$ 4,059,045.68

COST OF PAVEMENT ONLY = \$ 1,445,375.00

PAVEMENT TO TOTAL RATIO = 2.81

AVERAGE PAVEMENT TO TOTAL RATIO = 2.80

COST OF BOW-CONCORD USING RATIO = \$ 994,895.33

USE = \$ 1,000,000.00

APPENDIX A

DETERMINE COSTS SAVED FOR AVOIDED MAINTENANCE

DETERMINE COST OF FUTURE OVERLAY OF EXISTING PAVEMENT AREA

AREA OF EXISTING PAVEMENT = 57.75 ACRES OF PAVEMENT
(FROM STORMWATER SUMMARY)
(I-89, Exit 12, & 1/2 Exit 13)

2,515,590.00 SQ. FT

ASSUMPTIONS 1.5 INCH OVERLAY
152 LB / CF OF PAVEMENT

\$ 70.00 PER TON

QUANTITY OF PAVEMENT ONLY = 23898.1 TONS

COST OF PAVEMENT ONLY = \$ 1,672,867.35

USING BEDFORD 41174 AS GO-BY

TOTAL CONTRACT COST = \$ 4,175,287.00

COST OF PAVEMENT ONLY = \$ 1,737,650.00

PAVEMENT TO TOTAL RATIO = 2.40

USING CANTERBURY NORTHFIELD 41057 AS GO-BY

TOTAL CONTRACT COST = \$ 5,056,832.50

COST OF PAVEMENT ONLY = \$ 1,580,275.00

PAVEMENT TO TOTAL RATIO = 3.20

USING BOW HOPKINTON AS GO-BY

TOTAL CONTRACT COST = \$ 4,059,045.68

COST OF PAVEMENT ONLY = \$ 1,445,375.00

PAVEMENT TO TOTAL RATIO = 2.81

AVERAGE PAVEMENT TO TOTAL RATIO = 2.80

COST OF BOW-CONCORD USING RATIO = \$ 4,690,220.83

USE = \$ 5,000,000.00

APPENDIX A

Value of Fuel Savings

Calendar Year	Project Year	Average Annual Traffic (Compared to 2035)	Value of Fuel Saved (\$2018)
2014			
2015			
2016			
2017			
2018			
2019			
2020			
2021	1		
2022	2		
2023	3		
2024	4		
2025	5		
2026	6		
2027	7	0.9420	\$227,851
2028	8	0.9490	\$229,560
2029	9	0.9562	\$231,282
2030	10	0.9633	\$233,017
2031	11	0.9706	\$234,764
2032	12	0.9778	\$236,525
2033	13	0.9852	\$238,299
2034	14	0.9926	\$240,086
2035	15	1.0000	\$241,887
2036	16	1.0075	\$243,701
2037	17	1.0151	\$245,529
2038	18	1.0227	\$247,370
2039	19	1.0303	\$249,226
2040	20	1.0381	\$251,095
2041	21	1.0459	\$252,978
2042	22	1.0537	\$254,875
2043	23	1.0616	\$256,787
2044	24	1.0696	\$258,713
2045	25	1.0776	\$260,653
2046	26	1.0857	\$262,608
2047	27	1.0938	\$264,578
2048	28	1.1020	\$266,562
2049	29	1.1103	\$268,561
2050	30	1.1186	\$270,575
2051	31	1.1270	\$272,605
2052	32	1.1354	\$274,649
2053	33	1.1440	\$276,709
2054	34	1.1525	\$278,784
2055	35	1.1612	\$280,875
2056	36	1.1699	\$282,982
2057	37	1.1787	\$285,104
			\$7,918,791

		AM Peak Hour		PM Peak Hour		Reduction		Percent Reduction	
		No Build	Scenario D	No Build	Scenario D	AM	PM	AM	PM
Travel Time (min)	VHT (hours)	1789	1052	1371	1154	737	217	41.2%	15.9%
	VMT (miles)	59143	59376	66499	66473	-233	26	-0.4%	0.0%
Travel Time (min)	Southbound	14.80	10.20	10.13	9.72	5	0	31.1%	4.1%
	Northbound	18.27	9.72	13.13	9.92	9	3	46.8%	24.4%
Fuel Use (gallons)	Gas	1327	1125	1312	1278	202	33	15.2%	2.5%
	Diesel	450	373	450	422	78	28	17.2%	6.1%
Fuel Cost (dollars)	Gas	\$ 3,632.60	\$ 3,080.85	\$ 3,591.11	\$ 3,500.12	552	91	15.2%	2.5%
	Diesel	\$ 1,391.47	\$ 1,151.66	\$ 1,389.12	\$ 1,304.12	240	85	17.2%	6.1%

Total Fuel Cost Savings Per Day = Fuel Cost Reductions in the AM & PM Peak Hours for both Gas and Diesel

Total Fuel Cost Savings Per Day = \$551.75 + \$90.99 + \$239.80 + \$85.00
 Total Fuel Cost Savings Per Day = \$967.55

5 BUSINESS DAYS PER WEEK
 50 WORK WEEKS A YEAR
 250 BUSINESS DAYS PER YEAR

\$241,886.89 Total Fuel Cost Savings Per Year
 Total Fuel Cost Savings Per Day x Business Days Per Year

- (1) Traffic Growth = 0.75% Per Year
- (2) Fuel Cost Savings is directly related to the volume of traffic

APPENDIX A

Value of Crash Reductions

Calendar Year	Project Year	I-89 Exit 1 Weaves	I-89 CD Road Weave	I-93 Weave Between I-89 and Exit 12	I-93 Weave Between Exit 12 and Exit 13	Exit 12 Roundabouts	I-89 Exit 1 NB Off Ramp Intersection with South Street	I-89 Exit 1 SB Off Ramp Intersection with South Street			Total Crash Reduction Benefit
2014											\$0
2015											\$0
2016											\$0
2017											\$0
2018											\$0
2019											\$0
2020											\$0
2021	1										\$0
2022	2										\$0
2023	3										\$0
2024	4										\$0
2025	5										\$0
2026	6										\$0
2027	7	\$548,260	\$474,528	\$507,904	\$414,816	\$145,308	\$19,720	\$86,124			\$2,196,660
2028	8	\$552,816	\$474,572	\$507,904	\$419,372	\$145,308	\$19,720	\$86,124			\$2,205,816
2029	9	\$561,884	\$479,172	\$512,460	\$423,928	\$149,864	\$19,720	\$86,124			\$2,233,152
2030	10	\$566,484	\$483,728	\$517,016	\$423,928	\$149,864	\$24,276	\$86,168			\$2,251,464
2031	11	\$566,528	\$488,240	\$517,060	\$428,484	\$149,864	\$24,276	\$86,168			\$2,260,620
2032	12	\$571,084	\$492,796	\$521,616	\$433,040	\$149,864	\$24,276	\$86,168			\$2,278,844
2033	13	\$575,640	\$492,840	\$521,660	\$433,084	\$154,376	\$24,320	\$90,680			\$2,292,600
2034	14	\$580,240	\$497,396	\$526,172	\$437,596	\$154,376	\$24,320	\$90,680			\$2,310,780
2035	15	\$584,752	\$501,952	\$526,216	\$442,152	\$154,420	\$24,320	\$90,680			\$2,324,492
2036	16	\$589,352	\$506,508	\$530,772	\$446,708	\$154,420	\$24,320	\$90,680			\$2,342,760
2037	17	\$593,952	\$511,064	\$530,816	\$446,752	\$158,932	\$24,320	\$90,680			\$2,356,516
2038	18	\$598,464	\$511,108	\$535,372	\$451,308	\$158,932	\$24,364	\$90,680			\$2,370,228
2039	19	\$603,064	\$515,664	\$539,928	\$455,820	\$158,932	\$24,364	\$95,192			\$2,392,964
2040	20	\$607,620	\$520,220	\$539,928	\$460,376	\$158,976	\$24,408	\$95,192			\$2,406,720
2041	21	\$612,176	\$524,776	\$544,484	\$460,420	\$163,488	\$24,408	\$95,192			\$2,424,944
2042	22	\$616,732	\$529,332	\$544,528	\$464,976	\$163,488	\$24,408	\$95,236			\$2,438,700
2043	23	\$621,332	\$529,376	\$549,084	\$469,532	\$163,488	\$24,452	\$95,236			\$2,452,500
2044	24	\$625,888	\$533,932	\$549,128	\$474,044	\$163,488	\$24,452	\$95,236			\$2,466,168
2045	25	\$630,444	\$538,488	\$553,684	\$478,600	\$168,000	\$24,452	\$99,748			\$2,493,416
2046	26	\$635,044	\$547,556	\$558,240	\$478,644	\$168,044	\$24,496	\$99,748			\$2,511,772
2047	27	\$639,600	\$547,600	\$558,240	\$483,200	\$168,044	\$24,496	\$99,748			\$2,520,928
2048	28	\$644,156	\$552,156	\$562,796	\$487,756	\$172,556	\$24,496	\$99,748			\$2,543,664
2049	29	\$648,756	\$556,712	\$562,840	\$492,312	\$172,556	\$24,496	\$99,748			\$2,557,420
2050	30	\$657,824	\$561,312	\$567,396	\$496,868	\$172,556	\$24,540	\$99,748			\$2,580,244
2051	31	\$657,912	\$565,824	\$571,952	\$496,868	\$172,600	\$24,540	\$99,748			\$2,589,444
2052	32	\$662,468	\$565,868	\$571,996	\$501,424	\$177,112	\$24,540	\$99,748			\$2,603,156
2053	33	\$671,536	\$574,980	\$672,552	\$505,980	\$177,112	\$29,096	\$104,260			\$2,735,516
2054	34	\$676,136	\$579,536	\$677,108	\$510,536	\$177,112	\$29,096	\$104,260			\$2,753,784
2055	35	\$676,224	\$584,048	\$677,152	\$515,092	\$181,624	\$29,140	\$104,260			\$2,767,540
2056	36	\$685,248	\$584,136	\$681,708	\$519,648	\$181,668	\$29,140	\$104,260			\$2,785,808
2057	37	\$689,848	\$588,692	\$681,752	\$519,648	\$181,668	\$29,140	\$104,260			\$2,795,008

APPENDIX A

INTERSTATE 89 WEAVING AREA BETWEEN EXIT 1 AND INTERSTATE 93 RAMPS
Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	32
PDO	18
Injury	14
Fatal	0

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.2

5. There is no CMF for eliminating a weave, but the reduction in crashes would be expected to be greater than the 20% for providing an auxiliary lane.

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	1.80	1.40	0.00	0.36	0.28	0.00				\$0
2018	0.75%	1.82	1.42	0.00	0.37	0.29	0.00				\$0
2019	1.51%	1.83	1.43	0.00	0.37	0.29	0.00				\$0
2020	2.27%	1.85	1.44	0.00	0.37	0.29	0.00				\$0
2021	3.03%	1.86	1.45	0.00	0.38	0.29	0.00				\$0
2022	3.81%	1.87	1.46	0.00	0.38	0.30	0.00				\$0
2023	4.59%	1.89	1.47	0.00	0.38	0.30	0.00				\$0
2024	5.37%	1.90	1.48	0.00	0.38	0.30	0.00				\$0
2025	6.16%	1.92	1.49	0.00	0.39	0.30	0.00				\$0
2026	6.96%	1.93	1.50	0.00	0.39	0.30	0.00				\$0
2027	7.76%	1.94	1.51	0.00	0.39	0.31	0.00	1.55	1.20	0.00	\$548,260
2028	8.57%	1.96	1.52	0.00	0.40	0.31	0.00	1.56	1.21	0.00	\$552,816
2029	9.38%	1.97	1.54	0.00	0.40	0.31	0.00	1.57	1.23	0.00	\$561,884
2030	10.20%	1.99	1.55	0.00	0.40	0.31	0.00	1.59	1.24	0.00	\$566,484
2031	11.03%	2.00	1.56	0.00	0.40	0.32	0.00	1.60	1.24	0.00	\$566,528
2032	11.86%	2.02	1.57	0.00	0.41	0.32	0.00	1.61	1.25	0.00	\$571,084
2033	12.70%	2.03	1.58	0.00	0.41	0.32	0.00	1.62	1.26	0.00	\$575,640
2034	13.54%	2.05	1.59	0.00	0.41	0.32	0.00	1.64	1.27	0.00	\$580,240
2035	14.40%	2.06	1.61	0.00	0.42	0.33	0.00	1.64	1.28	0.00	\$584,752
2036	15.25%	2.08	1.62	0.00	0.42	0.33	0.00	1.66	1.29	0.00	\$589,352
2037	16.12%	2.10	1.63	0.00	0.42	0.33	0.00	1.68	1.30	0.00	\$593,952
2038	16.99%	2.11	1.64	0.00	0.43	0.33	0.00	1.68	1.31	0.00	\$598,464
2039	17.87%	2.13	1.66	0.00	0.43	0.34	0.00	1.70	1.32	0.00	\$603,064
2040	18.75%	2.14	1.67	0.00	0.43	0.34	0.00	1.71	1.33	0.00	\$607,620
2041	19.64%	2.16	1.68	0.00	0.44	0.34	0.00	1.72	1.34	0.00	\$612,176
2042	20.54%	2.17	1.69	0.00	0.44	0.34	0.00	1.73	1.35	0.00	\$616,732
2043	21.44%	2.19	1.71	0.00	0.44	0.35	0.00	1.75	1.36	0.00	\$621,332
2044	22.35%	2.21	1.72	0.00	0.45	0.35	0.00	1.76	1.37	0.00	\$625,888
2045	23.27%	2.22	1.73	0.00	0.45	0.35	0.00	1.77	1.38	0.00	\$630,444
2046	24.20%	2.24	1.74	0.00	0.45	0.35	0.00	1.79	1.39	0.00	\$635,044
2047	25.13%	2.26	1.76	0.00	0.46	0.36	0.00	1.80	1.40	0.00	\$639,600
2048	26.07%	2.27	1.77	0.00	0.46	0.36	0.00	1.81	1.41	0.00	\$644,156
2049	27.01%	2.29	1.78	0.00	0.46	0.36	0.00	1.83	1.42	0.00	\$648,756
2050	27.96%	2.31	1.80	0.00	0.47	0.36	0.00	1.84	1.44	0.00	\$657,824
2051	28.92%	2.33	1.81	0.00	0.47	0.37	0.00	1.86	1.44	0.00	\$657,912
2052	29.89%	2.34	1.82	0.00	0.47	0.37	0.00	1.87	1.45	0.00	\$662,468
2053	30.86%	2.36	1.84	0.00	0.48	0.37	0.00	1.88	1.47	0.00	\$671,536
2054	31.85%	2.38	1.85	0.00	0.48	0.37	0.00	1.90	1.48	0.00	\$676,136
2055	32.83%	2.40	1.86	0.00	0.48	0.38	0.00	1.92	1.48	0.00	\$676,224
2056	33.83%	2.41	1.88	0.00	0.49	0.38	0.00	1.92	1.50	0.00	\$685,248
2057	34.83%	2.43	1.89	0.00	0.49	0.38	0.00	1.94	1.51	0.00	\$689,848
Total										\$16,424,008	

APPENDIX A

INTERSECTION AT END OF I-89 NB OFF RAMP AT EXIT 1 WITH SOUTH STREET
Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	9 0.9
PDO	8 0.8
Injury	1 0.1
Fatal	0 0.0

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.56

5. Use a CMF of 0.75 for installing roundabouts at ramp terminal intersections

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	0.80	0.10	0.00	0.45	0.06	0.00				\$0
2018	0.75%	0.81	0.11	0.00	0.46	0.07	0.00				\$0
2019	1.51%	0.82	0.11	0.00	0.46	0.07	0.00				\$0
2020	2.27%	0.82	0.11	0.00	0.46	0.07	0.00				\$0
2021	3.03%	0.83	0.11	0.00	0.47	0.07	0.00				\$0
2022	3.81%	0.84	0.11	0.00	0.48	0.07	0.00				\$0
2023	4.59%	0.84	0.11	0.00	0.48	0.07	0.00				\$0
2024	5.37%	0.85	0.11	0.00	0.48	0.07	0.00				\$0
2025	6.16%	0.85	0.11	0.00	0.48	0.07	0.00				\$0
2026	6.96%	0.86	0.11	0.00	0.49	0.07	0.00				\$0
2027	7.76%	0.87	0.11	0.00	0.49	0.07	0.00	0.38	0.04	0.00	\$19,720
2028	8.57%	0.87	0.11	0.00	0.49	0.07	0.00	0.38	0.04	0.00	\$19,720
2029	9.38%	0.88	0.11	0.00	0.50	0.07	0.00	0.38	0.04	0.00	\$19,720
2030	10.20%	0.89	0.12	0.00	0.50	0.07	0.00	0.39	0.05	0.00	\$24,276
2031	11.03%	0.89	0.12	0.00	0.50	0.07	0.00	0.39	0.05	0.00	\$24,276
2032	11.86%	0.90	0.12	0.00	0.51	0.07	0.00	0.39	0.05	0.00	\$24,276
2033	12.70%	0.91	0.12	0.00	0.51	0.07	0.00	0.40	0.05	0.00	\$24,320
2034	13.54%	0.91	0.12	0.00	0.51	0.07	0.00	0.40	0.05	0.00	\$24,320
2035	14.40%	0.92	0.12	0.00	0.52	0.07	0.00	0.40	0.05	0.00	\$24,320
2036	15.25%	0.93	0.12	0.00	0.53	0.07	0.00	0.40	0.05	0.00	\$24,320
2037	16.12%	0.93	0.12	0.00	0.53	0.07	0.00	0.40	0.05	0.00	\$24,320
2038	16.99%	0.94	0.12	0.00	0.53	0.07	0.00	0.41	0.05	0.00	\$24,364
2039	17.87%	0.95	0.12	0.00	0.54	0.07	0.00	0.41	0.05	0.00	\$24,364
2040	18.75%	0.96	0.12	0.00	0.54	0.07	0.00	0.42	0.05	0.00	\$24,408
2041	19.64%	0.96	0.12	0.00	0.54	0.07	0.00	0.42	0.05	0.00	\$24,408
2042	20.54%	0.97	0.13	0.00	0.55	0.08	0.00	0.42	0.05	0.00	\$24,408
2043	21.44%	0.98	0.13	0.00	0.55	0.08	0.00	0.43	0.05	0.00	\$24,452
2044	22.35%	0.98	0.13	0.00	0.55	0.08	0.00	0.43	0.05	0.00	\$24,452
2045	23.27%	0.99	0.13	0.00	0.56	0.08	0.00	0.43	0.05	0.00	\$24,452
2046	24.20%	1.00	0.13	0.00	0.56	0.08	0.00	0.44	0.05	0.00	\$24,496
2047	25.13%	1.01	0.13	0.00	0.57	0.08	0.00	0.44	0.05	0.00	\$24,496
2048	26.07%	1.01	0.13	0.00	0.57	0.08	0.00	0.44	0.05	0.00	\$24,496
2049	27.01%	1.02	0.13	0.00	0.58	0.08	0.00	0.44	0.05	0.00	\$24,496
2050	27.96%	1.03	0.13	0.00	0.58	0.08	0.00	0.45	0.05	0.00	\$24,540
2051	28.92%	1.04	0.13	0.00	0.59	0.08	0.00	0.45	0.05	0.00	\$24,540
2052	29.89%	1.04	0.13	0.00	0.59	0.08	0.00	0.45	0.05	0.00	\$24,540
2053	30.86%	1.05	0.14	0.00	0.59	0.08	0.00	0.46	0.06	0.00	\$29,096
2054	31.85%	1.06	0.14	0.00	0.60	0.08	0.00	0.46	0.06	0.00	\$29,096
2055	32.83%	1.07	0.14	0.00	0.60	0.08	0.00	0.47	0.06	0.00	\$29,140
2056	33.83%	1.08	0.14	0.00	0.61	0.08	0.00	0.47	0.06	0.00	\$29,140
2057	34.83%	1.08	0.14	0.00	0.61	0.08	0.00	0.47	0.06	0.00	\$29,140
Total										\$649,596	

APPENDIX A

INTERSECTION AT END OF I-89 SB OFF RAMP AT EXIT 1 WITH SOUTH STREET
Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	7
PDO	2
Injury	4
Fatal	1

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.56

5. Use a CMF of 0.75 for installing roundabouts at ramp terminal intersections

Fatality added that occurred in 2017

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	0.20	0.40	0.00	0.12	0.23	0.00				\$0
2018	0.75%	0.21	0.41	0.00	0.12	0.23	0.00				\$0
2019	1.51%	0.21	0.41	0.00	0.12	0.23	0.00				\$0
2020	2.27%	0.21	0.41	0.00	0.12	0.23	0.00				\$0
2021	3.03%	0.21	0.42	0.00	0.12	0.24	0.00				\$0
2022	3.81%	0.21	0.42	0.00	0.12	0.24	0.00				\$0
2023	4.59%	0.21	0.42	0.00	0.12	0.24	0.00				\$0
2024	5.37%	0.22	0.43	0.00	0.13	0.25	0.00				\$0
2025	6.16%	0.22	0.43	0.00	0.13	0.25	0.00				\$0
2026	6.96%	0.22	0.43	0.00	0.13	0.25	0.00				\$0
2027	7.76%	0.22	0.44	0.00	0.13	0.25	0.00	0.09	0.19	0.00	\$86,124
2028	8.57%	0.22	0.44	0.00	0.13	0.25	0.00	0.09	0.19	0.00	\$86,124
2029	9.38%	0.22	0.44	0.00	0.13	0.25	0.00	0.09	0.19	0.00	\$86,124
2030	10.20%	0.23	0.45	0.00	0.13	0.26	0.00	0.10	0.19	0.00	\$86,168
2031	11.03%	0.23	0.45	0.00	0.13	0.26	0.00	0.10	0.19	0.00	\$86,168
2032	11.86%	0.23	0.45	0.00	0.13	0.26	0.00	0.10	0.19	0.00	\$86,168
2033	12.70%	0.23	0.46	0.00	0.13	0.26	0.00	0.10	0.20	0.00	\$90,680
2034	13.54%	0.23	0.46	0.00	0.13	0.26	0.00	0.10	0.20	0.00	\$90,680
2035	14.40%	0.23	0.46	0.00	0.13	0.26	0.00	0.10	0.20	0.00	\$90,680
2036	15.25%	0.24	0.47	0.00	0.14	0.27	0.00	0.10	0.20	0.00	\$90,680
2037	16.12%	0.24	0.47	0.00	0.14	0.27	0.00	0.10	0.20	0.00	\$90,680
2038	16.99%	0.24	0.47	0.00	0.14	0.27	0.00	0.10	0.20	0.00	\$90,680
2039	17.87%	0.24	0.48	0.00	0.14	0.27	0.00	0.10	0.21	0.00	\$95,192
2040	18.75%	0.24	0.48	0.00	0.14	0.27	0.00	0.10	0.21	0.00	\$95,192
2041	19.64%	0.24	0.48	0.00	0.14	0.27	0.00	0.10	0.21	0.00	\$95,192
2042	20.54%	0.25	0.49	0.00	0.14	0.28	0.00	0.11	0.21	0.00	\$95,236
2043	21.44%	0.25	0.49	0.00	0.14	0.28	0.00	0.11	0.21	0.00	\$95,236
2044	22.35%	0.25	0.49	0.00	0.14	0.28	0.00	0.11	0.21	0.00	\$95,236
2045	23.27%	0.25	0.50	0.00	0.14	0.28	0.00	0.11	0.22	0.00	\$99,748
2046	24.20%	0.25	0.50	0.00	0.14	0.28	0.00	0.11	0.22	0.00	\$99,748
2047	25.13%	0.26	0.51	0.00	0.15	0.29	0.00	0.11	0.22	0.00	\$99,748
2048	26.07%	0.26	0.51	0.00	0.15	0.29	0.00	0.11	0.22	0.00	\$99,748
2049	27.01%	0.26	0.51	0.00	0.15	0.29	0.00	0.11	0.22	0.00	\$99,748
2050	27.96%	0.26	0.52	0.00	0.15	0.30	0.00	0.11	0.22	0.00	\$99,748
2051	28.92%	0.26	0.52	0.00	0.15	0.30	0.00	0.11	0.22	0.00	\$99,748
2052	29.89%	0.26	0.52	0.00	0.15	0.30	0.00	0.11	0.22	0.00	\$99,748
2053	30.86%	0.27	0.53	0.00	0.16	0.30	0.00	0.11	0.23	0.00	\$104,260
2054	31.85%	0.27	0.53	0.00	0.16	0.30	0.00	0.11	0.23	0.00	\$104,260
2055	32.83%	0.27	0.54	0.00	0.16	0.31	0.00	0.11	0.23	0.00	\$104,260
2056	33.83%	0.27	0.54	0.00	0.16	0.31	0.00	0.11	0.23	0.00	\$104,260
2057	34.83%	0.27	0.54	0.00	0.16	0.31	0.00	0.11	0.23	0.00	\$104,260
Total										\$2,534,484	

APPENDIX A

WEAVING ON CD RAMP AT I-93 AND I89 INTERCHANGE

Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	26
PDO	14
Injury	12
Fatal	0

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.2

5. There is no CMF for reducing traffic through a weave, but the reduction in crashes would be expected to be proportional to the reduction in the amount of traffic going through the weave, which is expected to be 80% in the AM and 90% in the PM. Will use a CMF of 0.20.

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	1.40	1.20	0.00	0.28	0.24	0.00				\$0
2018	0.75%	1.42	1.21	0.00	0.29	0.25	0.00				\$0
2019	1.51%	1.43	1.22	0.00	0.29	0.25	0.00				\$0
2020	2.27%	1.44	1.23	0.00	0.29	0.25	0.00				\$0
2021	3.03%	1.45	1.24	0.00	0.29	0.25	0.00				\$0
2022	3.81%	1.46	1.25	0.00	0.30	0.25	0.00				\$0
2023	4.59%	1.47	1.26	0.00	0.30	0.26	0.00				\$0
2024	5.37%	1.48	1.27	0.00	0.30	0.26	0.00				\$0
2025	6.16%	1.49	1.28	0.00	0.30	0.26	0.00				\$0
2026	6.96%	1.50	1.29	0.00	0.30	0.26	0.00				\$0
2027	7.76%	1.51	1.30	0.00	0.31	0.26	0.00	1.20	1.04	0.00	\$474,528
2028	8.57%	1.52	1.31	0.00	0.31	0.27	0.00	1.21	1.04	0.00	\$474,572
2029	9.38%	1.54	1.32	0.00	0.31	0.27	0.00	1.23	1.05	0.00	\$479,172
2030	10.20%	1.55	1.33	0.00	0.31	0.27	0.00	1.24	1.06	0.00	\$483,728
2031	11.03%	1.56	1.34	0.00	0.32	0.27	0.00	1.24	1.07	0.00	\$488,240
2032	11.86%	1.57	1.35	0.00	0.32	0.27	0.00	1.25	1.08	0.00	\$492,796
2033	12.70%	1.58	1.36	0.00	0.32	0.28	0.00	1.26	1.08	0.00	\$492,840
2034	13.54%	1.59	1.37	0.00	0.32	0.28	0.00	1.27	1.09	0.00	\$497,396
2035	14.40%	1.61	1.38	0.00	0.33	0.28	0.00	1.28	1.10	0.00	\$501,952
2036	15.25%	1.62	1.39	0.00	0.33	0.28	0.00	1.29	1.11	0.00	\$506,508
2037	16.12%	1.63	1.40	0.00	0.33	0.28	0.00	1.30	1.12	0.00	\$511,064
2038	16.99%	1.64	1.41	0.00	0.33	0.29	0.00	1.31	1.12	0.00	\$511,108
2039	17.87%	1.66	1.42	0.00	0.34	0.29	0.00	1.32	1.13	0.00	\$515,664
2040	18.75%	1.67	1.43	0.00	0.34	0.29	0.00	1.33	1.14	0.00	\$520,220
2041	19.64%	1.68	1.44	0.00	0.34	0.29	0.00	1.34	1.15	0.00	\$524,776
2042	20.54%	1.69	1.45	0.00	0.34	0.29	0.00	1.35	1.16	0.00	\$529,332
2043	21.44%	1.71	1.46	0.00	0.35	0.30	0.00	1.36	1.16	0.00	\$529,376
2044	22.35%	1.72	1.47	0.00	0.35	0.30	0.00	1.37	1.17	0.00	\$533,932
2045	23.27%	1.73	1.48	0.00	0.35	0.30	0.00	1.38	1.18	0.00	\$538,488
2046	24.20%	1.74	1.50	0.00	0.35	0.30	0.00	1.39	1.20	0.00	\$547,556
2047	25.13%	1.76	1.51	0.00	0.36	0.31	0.00	1.40	1.20	0.00	\$547,600
2048	26.07%	1.77	1.52	0.00	0.36	0.31	0.00	1.41	1.21	0.00	\$552,156
2049	27.01%	1.78	1.53	0.00	0.36	0.31	0.00	1.42	1.22	0.00	\$556,712
2050	27.96%	1.80	1.54	0.00	0.36	0.31	0.00	1.44	1.23	0.00	\$561,312
2051	28.92%	1.81	1.55	0.00	0.37	0.31	0.00	1.44	1.24	0.00	\$565,824
2052	29.89%	1.82	1.56	0.00	0.37	0.32	0.00	1.45	1.24	0.00	\$565,868
2053	30.86%	1.84	1.58	0.00	0.37	0.32	0.00	1.47	1.26	0.00	\$574,980
2054	31.85%	1.85	1.59	0.00	0.37	0.32	0.00	1.48	1.27	0.00	\$579,536
2055	32.83%	1.86	1.60	0.00	0.38	0.32	0.00	1.48	1.28	0.00	\$584,048
2056	33.83%	1.88	1.61	0.00	0.38	0.33	0.00	1.50	1.28	0.00	\$584,136
2057	34.83%	1.89	1.62	0.00	0.38	0.33	0.00	1.51	1.29	0.00	\$588,692
Total										\$14,077,700	

APPENDIX A

INTERSTATE 93 WEAVING AREA BETWEEN INTERSTATE 89 INTERCHANGE AND EXIT 12
Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	71
PDO	42
Injury	28
Fatal	1

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.77

5. Use a CMF of 0.77 for Adding an Auxiliary Lane in a Weaving Area

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	4.20	2.80	0.10	3.24	2.16	0.08				\$0
2018	0.75%	4.24	2.83	0.11	3.27	2.18	0.09				\$0
2019	1.51%	4.27	2.85	0.11	3.29	2.20	0.09				\$0
2020	2.27%	4.30	2.87	0.11	3.32	2.21	0.09				\$0
2021	3.03%	4.33	2.89	0.11	3.34	2.23	0.09				\$0
2022	3.81%	4.36	2.91	0.11	3.36	2.25	0.09				\$0
2023	4.59%	4.40	2.93	0.11	3.39	2.26	0.09				\$0
2024	5.37%	4.43	2.96	0.11	3.42	2.28	0.09				\$0
2025	6.16%	4.46	2.98	0.11	3.44	2.30	0.09				\$0
2026	6.96%	4.50	3.00	0.11	3.47	2.31	0.09				\$0
2027	7.76%	4.53	3.02	0.11	3.49	2.33	0.09	1.04	0.69	0.02	\$507,904
2028	8.57%	4.56	3.04	0.11	3.52	2.35	0.09	1.04	0.69	0.02	\$507,904
2029	9.38%	4.60	3.07	0.11	3.55	2.37	0.09	1.05	0.70	0.02	\$512,460
2030	10.20%	4.63	3.09	0.12	3.57	2.38	0.10	1.06	0.71	0.02	\$517,016
2031	11.03%	4.67	3.11	0.12	3.60	2.40	0.10	1.07	0.71	0.02	\$517,060
2032	11.86%	4.70	3.14	0.12	3.62	2.42	0.10	1.08	0.72	0.02	\$521,616
2033	12.70%	4.74	3.16	0.12	3.65	2.44	0.10	1.09	0.72	0.02	\$521,660
2034	13.54%	4.77	3.18	0.12	3.68	2.45	0.10	1.09	0.73	0.02	\$526,172
2035	14.40%	4.81	3.21	0.12	3.71	2.48	0.10	1.10	0.73	0.02	\$526,216
2036	15.25%	4.85	3.23	0.12	3.74	2.49	0.10	1.11	0.74	0.02	\$530,772
2037	16.12%	4.88	3.26	0.12	3.76	2.52	0.10	1.12	0.74	0.02	\$530,816
2038	16.99%	4.92	3.28	0.12	3.79	2.53	0.10	1.13	0.75	0.02	\$535,372
2039	17.87%	4.96	3.31	0.12	3.82	2.55	0.10	1.14	0.76	0.02	\$539,928
2040	18.75%	4.99	3.33	0.12	3.85	2.57	0.10	1.14	0.76	0.02	\$539,928
2041	19.64%	5.03	3.35	0.12	3.88	2.58	0.10	1.15	0.77	0.02	\$544,484
2042	20.54%	5.07	3.38	0.13	3.91	2.61	0.11	1.16	0.77	0.02	\$544,528
2043	21.44%	5.11	3.41	0.13	3.94	2.63	0.11	1.17	0.78	0.02	\$549,084
2044	22.35%	5.14	3.43	0.13	3.96	2.65	0.11	1.18	0.78	0.02	\$549,128
2045	23.27%	5.18	3.46	0.13	3.99	2.67	0.11	1.19	0.79	0.02	\$553,684
2046	24.20%	5.22	3.48	0.13	4.02	2.68	0.11	1.20	0.80	0.02	\$558,240
2047	25.13%	5.26	3.51	0.13	4.06	2.71	0.11	1.20	0.80	0.02	\$558,240
2048	26.07%	5.30	3.53	0.13	4.09	2.72	0.11	1.21	0.81	0.02	\$562,796
2049	27.01%	5.34	3.56	0.13	4.12	2.75	0.11	1.22	0.81	0.02	\$562,840
2050	27.96%	5.38	3.59	0.13	4.15	2.77	0.11	1.23	0.82	0.02	\$567,396
2051	28.92%	5.42	3.61	0.13	4.18	2.78	0.11	1.24	0.83	0.02	\$571,952
2052	29.89%	5.46	3.64	0.13	4.21	2.81	0.11	1.25	0.83	0.02	\$571,996
2053	30.86%	5.50	3.67	0.14	4.24	2.83	0.11	1.26	0.84	0.03	\$672,552
2054	31.85%	5.54	3.70	0.14	4.27	2.85	0.11	1.27	0.85	0.03	\$677,108
2055	32.83%	5.58	3.72	0.14	4.30	2.87	0.11	1.28	0.85	0.03	\$677,152
2056	33.83%	5.63	3.75	0.14	4.34	2.89	0.11	1.29	0.86	0.03	\$681,708
2057	34.83%	5.67	3.78	0.14	4.37	2.92	0.11	1.30	0.86	0.03	\$681,752
Total										\$14,701,744	

APPENDIX A

INTERSTATE 93 WEAVING AREA BETWEEN EXIT 12 AND EXIT 13
Value of Life Crash Cost by Type

Type	Cost (\$2017)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴	Average per year
Total	76
PDO	39
Injury	37
Fatal	0

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.77

5. Use a CMF of 0.77 for Adding an Auxiliary Lane in a Weaving Area

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	3.90	3.70	0.00	3.01	2.85	0.00				\$0
2018	0.75%	3.93	3.73	0.00	3.03	2.88	0.00				\$0
2019	1.51%	3.96	3.76	0.00	3.05	2.90	0.00				\$0
2020	2.27%	3.99	3.79	0.00	3.08	2.92	0.00				\$0
2021	3.03%	4.02	3.82	0.00	3.10	2.95	0.00				\$0
2022	3.81%	4.05	3.85	0.00	3.12	2.97	0.00				\$0
2023	4.59%	4.08	3.87	0.00	3.15	2.98	0.00				\$0
2024	5.37%	4.11	3.90	0.00	3.17	3.01	0.00				\$0
2025	6.16%	4.15	3.93	0.00	3.20	3.03	0.00				\$0
2026	6.96%	4.18	3.96	0.00	3.22	3.05	0.00				\$0
2027	7.76%	4.21	3.99	0.00	3.25	3.08	0.00	0.96	0.91	0.00	\$414,816
2028	8.57%	4.24	4.02	0.00	3.27	3.10	0.00	0.97	0.92	0.00	\$419,372
2029	9.38%	4.27	4.05	0.00	3.29	3.12	0.00	0.98	0.93	0.00	\$423,928
2030	10.20%	4.30	4.08	0.00	3.32	3.15	0.00	0.98	0.93	0.00	\$423,928
2031	11.03%	4.34	4.11	0.00	3.35	3.17	0.00	0.99	0.94	0.00	\$428,484
2032	11.86%	4.37	4.14	0.00	3.37	3.19	0.00	1.00	0.95	0.00	\$433,040
2033	12.70%	4.40	4.17	0.00	3.39	3.22	0.00	1.01	0.95	0.00	\$433,084
2034	13.54%	4.43	4.21	0.00	3.42	3.25	0.00	1.01	0.96	0.00	\$437,596
2035	14.40%	4.47	4.24	0.00	3.45	3.27	0.00	1.02	0.97	0.00	\$442,152
2036	15.25%	4.50	4.27	0.00	3.47	3.29	0.00	1.03	0.98	0.00	\$446,708
2037	16.12%	4.53	4.30	0.00	3.49	3.32	0.00	1.04	0.98	0.00	\$446,752
2038	16.99%	4.57	4.33	0.00	3.52	3.34	0.00	1.05	0.99	0.00	\$451,308
2039	17.87%	4.60	4.37	0.00	3.55	3.37	0.00	1.05	1.00	0.00	\$455,820
2040	18.75%	4.64	4.40	0.00	3.58	3.39	0.00	1.06	1.01	0.00	\$460,376
2041	19.64%	4.67	4.43	0.00	3.60	3.42	0.00	1.07	1.01	0.00	\$460,420
2042	20.54%	4.71	4.46	0.00	3.63	3.44	0.00	1.08	1.02	0.00	\$464,976
2043	21.44%	4.74	4.50	0.00	3.65	3.47	0.00	1.09	1.03	0.00	\$469,532
2044	22.35%	4.78	4.53	0.00	3.69	3.49	0.00	1.09	1.04	0.00	\$474,044
2045	23.27%	4.81	4.57	0.00	3.71	3.52	0.00	1.10	1.05	0.00	\$478,600
2046	24.20%	4.85	4.60	0.00	3.74	3.55	0.00	1.11	1.05	0.00	\$478,644
2047	25.13%	4.88	4.63	0.00	3.76	3.57	0.00	1.12	1.06	0.00	\$483,200
2048	26.07%	4.92	4.67	0.00	3.79	3.60	0.00	1.13	1.07	0.00	\$487,756
2049	27.01%	4.96	4.70	0.00	3.82	3.62	0.00	1.14	1.08	0.00	\$492,312
2050	27.96%	5.00	4.74	0.00	3.85	3.65	0.00	1.15	1.09	0.00	\$496,868
2051	28.92%	5.03	4.78	0.00	3.88	3.69	0.00	1.15	1.09	0.00	\$496,868
2052	29.89%	5.07	4.81	0.00	3.91	3.71	0.00	1.16	1.10	0.00	\$501,424
2053	30.86%	5.11	4.85	0.00	3.94	3.74	0.00	1.17	1.11	0.00	\$505,980
2054	31.85%	5.15	4.88	0.00	3.97	3.76	0.00	1.18	1.12	0.00	\$510,536
2055	32.83%	5.19	4.92	0.00	4.00	3.79	0.00	1.19	1.13	0.00	\$515,092
2056	33.83%	5.22	4.96	0.00	4.02	3.82	0.00	1.20	1.14	0.00	\$519,648
2057	34.83%	5.26	4.99	0.00	4.06	3.85	0.00	1.20	1.14	0.00	\$519,648
Total										\$12,407,988	

APPENDIX A

LOUDON ROAD LANE WIDTH ADJUSTMENTS
Value of Life Crash Cost by Type

Type	Cost (\$2018)
PDO ¹	\$4,400
Injury ²	\$451,200
Fatality ³	\$9,600,000

Sources: USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

- (1) Table A-2 - Property Damage Only (PDO) Crashes
- (2) Table A-1 - Value of Reduced Fatalities and Injuries (MAIS 2 - Moderate)
- (3) Table A-1 - Value of Reduced Fatalities and Injuries (Fatal)

Observed Crashes (2007-2016) ⁴		Average per year
Total	20	2.0
PDO	8	0.8
Injury	12	1.2
Fatal	0	0.0

(4) Source: New Hampshire Department of Transportation

Crash Modification Factor ⁵	
Eliminating Weave Movement	0.75

5. Use a CMF of 0.75 for installing roundabouts at ramp terminal intersections

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Crashes will increase at same rate as traffic

Year	Expected Crashes per year based on % increase in traffic volume per year (No-Build)			Expected Crashes per year (Build) Using CMF			Expected reduction in crashes per year			Cost Savings (\$2018)	
	% increase in traffic volume (Compared to 2017 Volumes)	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Injury Crashes		Fatal Crashes
2017	0.00%	0.80	1.20	0.00	0.60	0.90	0.00				\$0
2018	0.75%	0.81	1.21	0.00	0.61	0.91	0.00				\$0
2019	1.51%	0.82	1.22	0.00	0.62	0.92	0.00				\$0
2020	2.27%	0.82	1.23	0.00	0.62	0.93	0.00				\$0
2021	3.03%	0.83	1.24	0.00	0.63	0.93	0.00				\$0
2022	3.81%	0.84	1.25	0.00	0.63	0.94	0.00				\$0
2023	4.59%	0.84	1.26	0.00	0.63	0.95	0.00				\$0
2024	5.37%	0.85	1.27	0.00	0.64	0.96	0.00				\$0
2025	6.16%	0.85	1.28	0.00	0.64	0.96	0.00				\$0
2026	6.96%	0.86	1.29	0.00	0.65	0.97	0.00				\$0
2027	7.76%	0.87	1.30	0.00	0.66	0.98	0.00	0.21	0.32	0.00	\$145,308
2028	8.57%	0.87	1.31	0.00	0.66	0.99	0.00	0.21	0.32	0.00	\$145,308
2029	9.38%	0.88	1.32	0.00	0.66	0.99	0.00	0.22	0.33	0.00	\$149,864
2030	10.20%	0.89	1.33	0.00	0.67	1.00	0.00	0.22	0.33	0.00	\$149,864
2031	11.03%	0.89	1.34	0.00	0.67	1.01	0.00	0.22	0.33	0.00	\$149,864
2032	11.86%	0.90	1.35	0.00	0.68	1.02	0.00	0.22	0.33	0.00	\$149,864
2033	12.70%	0.91	1.36	0.00	0.69	1.02	0.00	0.22	0.34	0.00	\$154,376
2034	13.54%	0.91	1.37	0.00	0.69	1.03	0.00	0.22	0.34	0.00	\$154,376
2035	14.40%	0.92	1.38	0.00	0.69	1.04	0.00	0.23	0.34	0.00	\$154,420
2036	15.25%	0.93	1.39	0.00	0.70	1.05	0.00	0.23	0.34	0.00	\$154,420
2037	16.12%	0.93	1.40	0.00	0.70	1.05	0.00	0.23	0.35	0.00	\$158,932
2038	16.99%	0.94	1.41	0.00	0.71	1.06	0.00	0.23	0.35	0.00	\$158,932
2039	17.87%	0.95	1.42	0.00	0.72	1.07	0.00	0.23	0.35	0.00	\$158,932
2040	18.75%	0.96	1.43	0.00	0.72	1.08	0.00	0.24	0.35	0.00	\$158,976
2041	19.64%	0.96	1.44	0.00	0.72	1.08	0.00	0.24	0.36	0.00	\$163,488
2042	20.54%	0.97	1.45	0.00	0.73	1.09	0.00	0.24	0.36	0.00	\$163,488
2043	21.44%	0.98	1.46	0.00	0.74	1.10	0.00	0.24	0.36	0.00	\$163,488
2044	22.35%	0.98	1.47	0.00	0.74	1.11	0.00	0.24	0.36	0.00	\$163,488
2045	23.27%	0.99	1.48	0.00	0.75	1.11	0.00	0.24	0.37	0.00	\$168,000
2046	24.20%	1.00	1.50	0.00	0.75	1.13	0.00	0.25	0.37	0.00	\$168,044
2047	25.13%	1.01	1.51	0.00	0.76	1.14	0.00	0.25	0.37	0.00	\$168,044
2048	26.07%	1.01	1.52	0.00	0.76	1.14	0.00	0.25	0.38	0.00	\$172,556
2049	27.01%	1.02	1.53	0.00	0.77	1.15	0.00	0.25	0.38	0.00	\$172,556
2050	27.96%	1.03	1.54	0.00	0.78	1.16	0.00	0.25	0.38	0.00	\$172,556
2051	28.92%	1.04	1.55	0.00	0.78	1.17	0.00	0.26	0.38	0.00	\$172,600
2052	29.89%	1.04	1.56	0.00	0.78	1.17	0.00	0.26	0.39	0.00	\$177,112
2053	30.86%	1.05	1.58	0.00	0.79	1.19	0.00	0.26	0.39	0.00	\$177,112
2054	31.85%	1.06	1.59	0.00	0.80	1.20	0.00	0.26	0.39	0.00	\$177,112
2055	32.83%	1.07	1.60	0.00	0.81	1.20	0.00	0.26	0.40	0.00	\$181,624
2056	33.83%	1.08	1.61	0.00	0.81	1.21	0.00	0.27	0.40	0.00	\$181,668
2057	34.83%	1.08	1.62	0.00	0.81	1.22	0.00	0.27	0.40	0.00	\$181,668
Total										\$4,345,968	

APPENDIX A

Value of Travel Time

Calendar Year	Project Year	Increase in Vehicle Delay (Compared to 2035)	Value of Time Saved (\$2018)	Average Annual Traffic (Compared to 2018)	Increase in Vehicle Delay (Compared to 2018)	Summer Weekend Value of Time Saved (\$2018)
2014						
2015						
2016						
2017						
2018				1.00	1.000	
2019				1.00	1.021	
2020				1.00	1.041	
2021	1			1.00	1.063	
2022	2			1.00	1.085	
2023	3			1.00	1.107	
2024	4			1.00	1.129	
2025	5			1.00	1.153	
2026	6			1.00	1.176	
2027	7	0.850	\$2,235,383	1.00	1.200	\$4,269,166
2028	8	0.868	\$2,281,208	1.00	1.225	\$4,356,684
2029	9	0.885	\$2,327,973	1.00	1.250	\$4,445,996
2030	10	0.904	\$2,375,696	1.00	1.276	\$4,537,139
2031	11	0.922	\$2,424,398	1.00	1.302	\$4,630,150
2032	12	0.941	\$2,474,098	1.00	1.329	\$4,725,068
2033	13	0.960	\$2,524,817	1.00	1.356	\$4,821,932
2034	14	0.980	\$2,576,576	1.00	1.384	\$4,920,782
2035	15	1.000	\$2,629,396	1.00	1.412	\$5,021,658
2036	16	1.021	\$2,683,299	1.00	1.441	\$5,124,602
2037	17	1.041	\$2,738,306	1.00	1.470	\$5,229,656
2038	18	1.063	\$2,794,442	1.00	1.501	\$5,336,864
2039	19	1.085	\$2,851,728	1.00	1.531	\$5,446,270
2040	20	1.107	\$2,910,188	1.00	1.563	\$5,557,918
2041	21	1.129	\$2,969,847	1.00	1.595	\$5,671,856
2042	22	1.153	\$3,030,729	1.00	1.627	\$5,788,129
2043	23	1.176	\$3,092,859	1.00	1.661	\$5,906,785
2044	24	1.200	\$3,156,262	1.00	1.695	\$6,027,875
2045	25	1.225	\$3,220,966	1.00	1.730	\$6,151,446
2046	26	1.250	\$3,286,995	1.00	1.765	\$6,277,551
2047	27	1.276	\$3,354,379	1.00	1.801	\$6,406,240
2048	28	1.302	\$3,423,144	1.00	1.838	\$6,537,568
2049	29	1.329	\$3,493,318	1.00	1.876	\$6,671,588
2050	30	1.356	\$3,564,931	1.00	1.914	\$6,808,356
2051	31	1.384	\$3,638,012	1.00	1.954	\$6,947,927
2052	32	1.412	\$3,712,591	1.00	1.994	\$7,090,360
2053	33	1.441	\$3,788,700	1.00	2.034	\$7,235,712
2054	34	1.470	\$3,866,368	1.00	2.076	\$7,384,044
2055	35	1.501	\$3,945,628	1.00	2.119	\$7,535,417
2056	36	1.531	\$4,026,514	1.00	2.162	\$7,689,893
2057	37	1.563	\$4,109,057	1.00	2.207	\$7,847,536

\$95,507,808

\$182,402,171

Assumptions

- (1) Traffic Growth = 0.75% Per Year
- (2) Travel Times Savings (Dollar Rate) Remains Constant
- (3) Total Travel Time Delay Increases at a rate of 2.05% per year

\$4,445,657 Summer Weekend Value of Time Saved in 2018

80% Assumed % proposed improvements will reduce delay

-----< Based on 2035 Traffic Volume Projections

APPENDIX A

DETERMINE VALUE OF BENEFIT OF LESS TRAVEL TIME THROUGH CORRIDOR

TRAVEL TIME SAVINGS =	286.21	VEHICLE HOURS DURING AM PEAK PER BUSINESS DAY
TRAVEL TIME SAVINGS =	<u>113.03</u>	VEHICLE HOURS DURING PM PEAK PER BUSINESS DAY
TOTAL TRAVEL TIME SAVINGS =	399.24	VEHICLE HOURS PER BUSINESS DAY (ASSUMES NO TRAVEL TIME SAVINGS DURING NON-PEAK HOURS AND WEEKENDS)
	5	BUSINESS DAYS PER WEEK
	<u>50</u>	WORK WEEKS A YEAR
	250	BUSINESS DAYS PER YEAR
TOTAL TRAVEL TIMES SAVINGS =	99,809.23	VEHICLE HOURS PER YEAR VEHICLE HOURS PER BUSINESS DAY x BUSINESS DAYS PER YEAR

Recommended Hourly Values of Travel Time Savings (Per Person-Hour) ¹		
Category		(\$2018)
Private Vehicle		
Personal		\$15.20
Business		\$27.10
Commercial Vehicle		
Truck Driver		\$29.50

Sources:

- (1) Table A-3 - Value of Travel Time Savings - USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs
- (2) Table A-3 - Value of Travel Time Savings - USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs, Note 4
- (3) Table A-4 - Average Vehicle Occupancy - USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs

Estimated Percentage of Personal and Business Travel ²	
Business	11.80%
Personal	88.20%

Average Vehicle Occupancy ³	
Passenger Vehicle	1.48
Trucks	1.00

Assuming 6% Trucks (Per Table 3.1 of Environmental Assessment)
 94% Passenger Vehicles
 11.80% Business Passenger Vehicles
 88.20% Personal Passenger Vehicles

Weighted Cost of Truck = % Trucks x Truck Driver Rate x Vehicle Occupancy
 = \$1.77

Weighted Cost of Business Passenger Vehicle = % Business Passenger Vehicle x Business Passenger Vehicle Rate x Vehicle Occupancy
 = \$4.73

Weighted Cost of Personal Passenger Vehicle = % Personal Passenger Vehicle x Personal Passenger Vehicle Rate x Vehicle Occupancy
 = \$19.84

Total Weighted Averages per Vehicle = Weighted Cost of Truck + Weighted Cost of Business Passenger Vehicle + Weighted Cost of Personal Passenger Vehicle
 = \$26.34

TOTAL SAVINGS OF TRAVEL TIME COSTS PER YEAR = \$2,629,396.00 IN ANALYSIS YEAR 2035 IN 2018 DOLLARS

SAVINGS OF BUSINESS TRAVEL TIME COSTS PER YEAR = \$649,033.89 IN ANALYSIS YEAR 2035 IN 2018 DOLLARS

APPENDIX A

DETERMINE REDUCTION IN TRAVEL TIME THROUGH CORRIDOR DURING THE AM PEAK HOUR

Description	2014 No-Build		2035 No-Build			
	Volume (vph)	Travel Time (min)	Volume (vph)	Travel Time (min)	Delay Per Segment (Veh-Hrs)	
I-93 SOUTHBOUND	Exit 13 SB On-Ramp	2920	0.07	3412	0.08	4.27
	Mainline between Exit 13 and Exit 12	2920	0.45	3412	0.46	25.90
	Exit 12 SB Off-Ramp to Rte 3A SB	2769	0.17	3252	0.17	9.09
	Mainline between Exit 12 Off/On-Ramps	2363	0.28	2797	0.28	13.06
	Mainline between Exit 12 On-Ramp and I-93 Off-Ramp to I-89 NB	2659	0.24	3095	0.24	12.42
	Mainline between I-93 Off/On-Ramps from I-89	2020	0.34	2217	0.33	12.32
	Mainline between I-93 Off/On-Ramps from I-89	2020	0.42	2217	0.42	15.40
	I-93 On-Ramp from I-89 SB	3077	0.86	3464	0.86	49.51
	Mainline South of I-89 SB On-Ramp	3077	3.14	3464	3.13	180.62
I-93 NORTHBOUND	Mainline between Exit 12 and Exit 13	3492	0.70	3776	1.54	96.91
	Exit 12 NB On-Ramp	3492	0.10	3776	0.30	19.11
	Mainline between Exit 12 Off/On-Ramps	3051	0.19	3270	0.66	35.77
	Mainline between Exit 12 Off/On-Ramps	3051	0.11	3270	0.38	20.71
	Exit 12 NB Off-Ramp to Rte 3A NB	3302	0.25	3560	0.76	45.07
	Exit 12 NB Off-Ramp to Rte 3A SB	3447	0.27	3720	0.75	46.47
	I-89 SB On-Ramp to I-93 NB	3447	0.06	3720	0.19	11.99
	Mainline between Off/On Ramps to I-89	2290	0.73	2537	2.50	105.77
	Mainline between Off/On Ramps to I-89	2290	0.09	2537	0.22	9.49
	Mainline South of I-89 NB Off-Ramp	3039	3.92	3361	4.20	235.44

Total Delay of Vehicles During AM Peak Hour Through Corridor in Both Directions (2035 No-Build) (Vehicle Hours) = 949.32

Description	2035 Build			
	Volume (vph)	Travel Time (min)	Delay Per Segment (Veh-Hrs)	
I-93 SOUTHBOUND	Exit 13 SB On-Ramp	3445	0.04	2.45
	Mainline Between Exit 13 and Exit 12	3445	0.39	22.35
	Exit 12 SB Off-Ramp	3445	0.36	20.54
	Mainline between Exit 12 SB Off/On-Ramps	2829	0.14	6.51
	Exit 12 SB On-Ramp to I-93 SB Off-Ramp to I-89 NB Weave	3174	0.35	18.64
	Mainline between I-93 Off/On-Ramps from I-89	2234	0.34	12.68
	Mainline between I-93 Off/On-Ramps from I-89	2234	0.42	15.77
	I-93 On-Ramp from I-89 SB	3487	0.87	50.63
	Mainline South of I-89 SB On-Ramp	3487	3.16	183.79
I-93 NORTHBOUND	Mainline Between Exit 13 and Exit 12	3892	0.25	16.19
	Exit 12 NB On-Ramp	3892	0.16	10.15
	Mainline between Exit 12 Off/On-Ramps	3391	0.14	8.06
	Exit 12 NB Off-Ramp	3936	0.23	15.12
	I-93 NB On-Ramp from I-89 SB	3936	0.33	21.37
	Mainline between Off/On Ramps to I-89	2540	0.75	31.56
	Mainline South of I-89 NB Off-Ramp	3364	4.05	227.31
CD ROAD				

Total Delay of Vehicles During AM Peak Hour Through Corridor in Both Directions (2035 Build) (Vehicle Hours) = 663.12

Total Savings (Vehicle Hours) = 286.21

APPENDIX A

DETERMINE REDUCTION IN TRAVEL TIME THROUGH CORRIDOR DURING THE PM PEAK HOUR

Description	2014 No-Build		2035 No-Build			
	Volume (vph)	Travel Time (min)	Volume (vph)	Travel Time (min)	Delay Per Segment (Veh-Hrs)	
I-93 SOUTHBOUND	Exit 13 SB On-Ramp	3664	0.11	4027	0.13	8.98
	Mainline between Exit 13 and Exit 12	3664	0.52	4027	0.56	37.50
	Exit 12 SB Off-Ramp to Rte 3A SB	3483	0.17	3840	0.17	11.17
	Mainline between Exit 12 Off/On-Ramps	3180	0.29	3522	0.29	17.29
	Mainline between Exit 12 On-Ramp and I-93 Off-Ramp to I-89 NB	3637	0.25	4014	0.26	17.14
	Mainline between I-93 Off/On-Ramps from I-89	2362	0.34	2612	0.34	14.65
	Mainline between I-93 Off/On-Ramps from I-89	2362	0.42	2612	0.42	18.34
	I-93 On-Ramp from I-89 SB	3379	0.86	3770	0.87	54.55
	Mainline South of I-89 SB On-Ramp	3379	3.15	3770	3.18	199.57
I-93 NORTHBOUND	Mainline between Exit 12 and Exit 13	3891	0.50	4380	0.68	49.70
	Exit 12 NB On-Ramp	3891	0.09	4380	0.17	12.74
	Mainline between Exit 12 Off/On-Ramps	3151	0.16	3612	0.37	22.30
	Mainline between Exit 12 Off/On-Ramps	3151	0.10	3612	0.21	12.78
	Exit 12 NB Off-Ramp to Rte 3A NB	3336	0.24	3831	0.43	27.44
	Exit 12 NB Off-Ramp to Rte 3A SB	3458	0.26	3958	0.46	30.46
	I-89 SB On-Ramp to I-93 NB	3458	0.05	3958	0.13	8.46
	Mainline between Off/On Ramps to I-89	2559	0.73	2852	1.23	58.34
	Mainline between Off/On Ramps to I-89	2559	0.09	2852	0.10	4.56
	Mainline South of I-89 NB Off-Ramp	3502	3.96	3933	4.07	266.95

Total Travel Time of Vehicles During AM Peak Hour Through Corridor in Both Directions (2035 No-Build) (Vehicle Hours) = 872.93

Description	2035 Build			
	Volume (vph)	Travel Time (min)	Delay Per Segment (Veh-Hrs)	
I-93 SOUTHBOUND	Exit 13 SB On-Ramp	4077	0.05	3.06
	Mainline Between Exit 13 and Exit 12	4077	0.42	28.39
	Exit 12 SB Off-Ramp	4077	0.37	24.82
	Mainline between Exit 12 SB Off/On-Ramps	3569	0.14	8.54
	Exit 12 SB On-Ramp to I-93 SB Off-Ramp to I-89 NB Weave	4091	0.37	25.30
	Mainline between I-93 Off/On-Ramps from I-89	2618	0.34	15.00
	Mainline between I-93 Off/On-Ramps from I-89	2618	0.43	18.66
	I-93 On-Ramp from I-89 SB	3775	0.88	55.55
	Mainline South of I-89 SB On-Ramp	3775	3.20	201.04
I-93 NORTHBOUND	Mainline Between Exit 13 and Exit 12	4399	0.25	18.13
	Exit 12 NB On-Ramp	4399	0.16	11.41
	Mainline between Exit 12 Off/On-Ramps	3635	0.14	8.53
	Exit 12 NB Off-Ramp	4004	0.23	15.13
	I-93 NB On-Ramp from I-89 SB	4004	0.32	21.17
	Mainline between Off/On Ramps to I-89	2853	0.73	34.93
	Mainline South of I-89 NB Off-Ramp	3935	4.12	270.25
CD ROAD				

Total Travel Time of Vehicles During AM Peak Hour Through Corridor in Both Directions (2035 Build) (Vehicle Hours) = 759.90

Total Savings (Vehicle Hours) = 113.03

APPENDIX A

DETERMINE VALUE OF BENEFIT OF LESS DELAY ON I-93 DURING SUMMER WEEKENDS

INFORMATION PROVIDED BY NHDOT

USER DELAY COST - I-93 NB - FRIDAY =	\$1,804,147.00	PER YEAR
USER DELAY COST - I-93 NB - SATURDAY =	\$595,431.00	PER YEAR
USER DELAY COST - I-93 NB - SUNDAY =	\$686.00	PER YEAR
USER DELAY COST - I-93 SB - FRIDAY =	\$34,277.00	PER YEAR
USER DELAY COST - I-93 SB - SATURDAY =	\$10,370.00	PER YEAR
USER DELAY COST - I-93 SB - SUNDAY =	\$1,012,953.00	PER YEAR

TOTAL = \$3,457,864.00 PER YEAR (2018)

THE ABOVE DELAY VALUES ARE BASED ON AN AVERAGE OF \$ 21.45 PER HOUR OF DELAY

Assuming 2% Trucks (Per Table 3.1 of Environmental Assessment
 98% Passenger Vehicles
 2.00% Business Passenger Vehicles
 98.00% Personal Passenger Vehicles

Weighted Cost of Truck = % Trucks x Truck Driver Rate x Vehicle Occupancy
 = \$0.59

Weighted Cost of Business Passenger Vehicle = % Business Passenger Vehicle x Business Passenger Vehicle Rate x Vehicle Occupancy
 = \$0.79

Weighted Cost of Personal Passenger Vehicle = % Personal Passenger Vehicle x Personal Passenger Vehicle Rate x Vehicle Occupancy
 = \$21.61

Total Weighted Averages per Vehicle = Weighted Cost of Truck + Weighted Cost of Business Passenger Vehicle + Weighted Cost of Personal Passenger Vehicle
 = \$22.98

BASED ON PREVIOUS CALCULATIONS, THE AVERAGE RATE IS \$22.98 PER HOUR OF DELAY

ADJUSTED TOTAL = \$3,704,714.41

THIS ABOVE VALUE IS FOR THE SEASONAL DELAY FROM MEMORIAL DAY TO COLUMBUS DAY
 (20 WEEKENDS)

ADDITIONAL WEEKEND DELAY OCCURS DURING SKI SEASON AND OTHER HOLIDAYS OUTSIDE OF
 DATA RANGE ABOVE
 (4 WEEKENDS)

ADJUSTMENT TOTAL 1.2

TOTAL SAVINGS OF TRAVEL TIME COSTS PER YEAR = \$4,445,657.30 IN ANALYSIS YEAR 2035 IN 2018 DOLLARS



APPENDIX B

TRAVEL AND TOURISM BENEFITS :

Synopsis of Findings

This analysis was completed by Applied Economic Research. Its purpose is to identify the significance of the tourist/visitor market and the tourist/visitor benefits of the proposed improvements within the Bow-Concord I-93 study area

The conclusions of this analysis are:

- Travel and Tourism is second only to manufacturing in economic importance in the State;
- Travel and tourism visits support nearly 70,000 jobs and account for over \$5 billion in spending;
- Visitors and second home owners are a major revenue source for the State and local governments;
- The Study Area Corridor is the most important infrastructure serving in the State's tourist/visitor market, carrying an estimated 5 million visitor vehicles per year, despite noticeable congestion during peak visitor weekend periods;
- The current delays are a nuisance to visitors. It is reasonable to presume that current congestion, which results in several miles of backed-up traffic on peak visitor weekends, is probably deterring some visitation and deflecting visitation to other destinations, such as Vermont.
- If the improvements are not undertaken, the current delays are likely to increase and probably become a more significant deterrent to visitors in the coming years;
- Over the long term, the proposed improvements provide protection against the negative impact of future rising peak hour volumes, which would probably result in reduced visitation.
- In the short term, the improvements will reduce the annoyance that current delays generate for the tourist/visitor market. Doing so could increase visitation.

APPENDIX B

TRAVEL AND TOURISM BENEFITS

Travel and tourism are the second largest industry in the State, second only to manufacturing as a source of economic vitality. A healthy tourism sector is important to the State and its municipalities.

Economic Indicators

The State’s tourism sector is multi-faceted, including the strong three-season elements of (1) summer hiking, boating, swimming etc. in the Seacoast, White Mountains and Lakes Region, (2) an internationally prominent Fall foliage season, and (3) winter activities including snowmobiling and (4) cross-country and downhill skiing (18 primary downhill ski areas). It has proven to be less volatile than other sectors of the State’s economy, providing economic support and growth in both good times and bad.

According to the State’s 2015 Travel Barometer compiled by Plymouth State University (a copy of which is appended to this report):

- Travel and tourism accounted for 67,000 jobs in the State—providing employment for nearly 10% of the State’s employed residents;
- The State attracted an estimated 39 million visitor trips;
- Rooms and Meals spending, underlying the State’s Rooms and Meals tax totaled \$3.1 billion, of which \$2 billion arose from visitor spending;
- Total visitor spending was over \$5.3 billion;

An additional facet of the industry in New Hampshire is the prominent inventory of second homes in the State, particularly in Belknap, Carroll, Coos and Grafton counties, which have a collective inventory of over 47,000 second homes, accounting for 31 percent of their total housing inventory:

Seasonal Units in Visitor Counties Served by Study Area			
	Total Units	Seasonal Units	Seasonal Percent of Total %
Belknap County	37,715	11,327	30%
Carroll County	40,287	17,041	42%
Grafton County	51,773	13,414	26%
Coos County	21,277	5,481	26%
Served by Study Area	151,052	47,263	31%
New Hampshire	620,729	66,969	11%

Source: 2012-2016 American Community Survey, Tables B25001; B25003; B25004

\tourism impacts

APPENDIX B

These second homes carry above average assessed values and generate relatively low service demands on their host communities, providing critical support for the funding of municipal services and schools.

The State relies on tourism spending as a major revenue source. The State's Rooms and Meals tax levied at 9%, generated \$330 in revenues in Fiscal Year 2018—13% of total General Fund/Education revenues and a 17% increase since Fiscal Year 2015. Essentially all of the lodging receipts and (according to Plymouth State University) half of the meals receipts are generated by travel and tourism spending.

Recognizing the importance of the industry, the State spends \$#### annually marketing and promoting tourism.

Study Area Influence on Tourism

Interstate 93 provides a critical link between (1) the State's major visitor destinations (the White Mountains and Lakes region) and (2) the affluent primary market served by the State's tourism industry (southern New Hampshire and eastern Massachusetts). The Plymouth State University Travel Barometers analysis examined average Saturday traffic counts (which highlight visitation volumes) among 12 traffic counters approaching or within the State's travel destinations with the following results:

Indicator	Vehicle Counts	% from prior year
US 3 Groveton	2,834	1.4%
US 2 Jefferson	4,492	3.0%
US 302 Bartlett	3,737	4.3%
I-93 Lincoln	10,663	3.5%
NH 12 Claremont	8,453	-1.3%
I-89 Sutton	18,558	1.1%
NH 16 Ossipee	12,602	1.5%
NH 11 Alton	6,363	1.9%
NH 101 Temple	7,583	0.6%
NH 9 Chesterfield	11,406	-0.2%
I-93 S Concord	69,236	0.8%
NH 101 Exeter	38,281	2.5%
Total Traffic Counts	194,206	1.4%

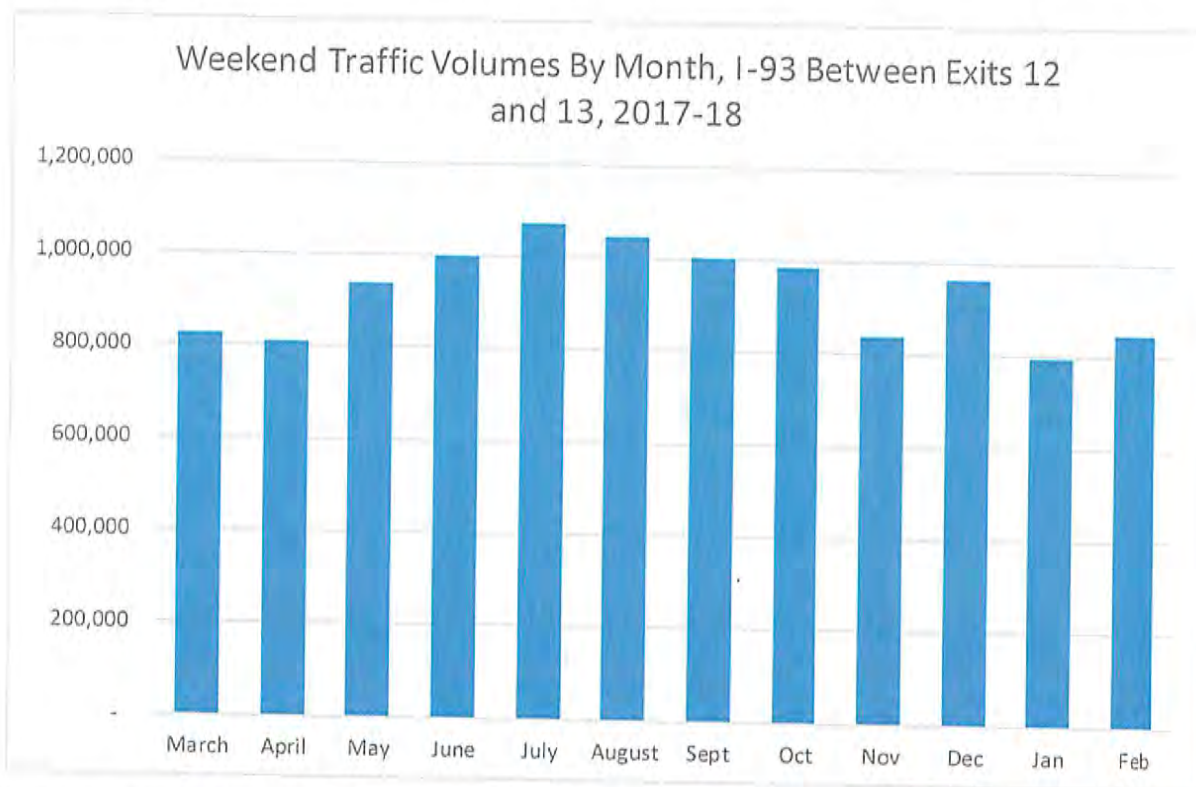
Interstate 93 traffic counts within the Study Area (I-93 S Concord) are well above any other counter compiled by their analysis. In effect, Interstate 93, including the Study Area in particular, is the principal corridor through which tourist visitors pass on their way to destinations in the Lakes and Mountain regions. The study area incorporates travelers arriving from points south via Interstate 293 and the NH Turnpike, from the east via Route 101 and 4, and from the west via Interstate 89.

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Estimated Visitor Traffic Volumes

There is no inventory of visitor traffic flows through the corridor. It is impractical to collect such data. The corridor carries conventional traffic (commuters, shoppers, general business activity, etc.) as well as tourism traffic. It is known, however that a substantial portion (but not all) of tourist/visitor traffic occurs on weekends.

There is a traffic counter between Exits 12 and 13 within the corridor. AER has compiled weekend (Friday, Saturday and Sunday) traffic volumes at this counter for the 12 months beginning March 2017 through February 2018. A copy of the monthly figures is in the Addendum to this report with the following results:



The data reveals a strong seasonality to the flow volumes, most of which can be attributed to tourism/visitors. The counter shows about 800,000 vehicles pass through the counter in March, April and November, months that are not prime visitor/tourist seasons. In contrast, about one million vehicles pass over the counter monthly in May-October, the prime summer and foliage visitor months.¹

These volumes, which peak at about 100,000 vehicles per weekend day in the summer, exceed the capacity of the study area. There are, therefore, substantial back-ups and delays on prime visitor weekends.

¹ January 2018 was atypical for tourism due to a lack of snow.

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Estimating tourist-visitor volumes is complicated by:

- During the prime visitor months weekend trips also include non-visitor trips, particularly daytime Friday traffic;
- The non-prime visitor months include primarily no-visitor traffic, but also include some visitor traffic;
- Visitors also use the corridor during weekdays, although less frequently than on weekends.

These complications and the lack of specific data on how many visitors passing through the corridor mean that this analysis can only be presented as an order-of-magnitude estimate.

AER's estimate begins with April volumes. April does include some tourism/visitation, but lies outside the prime winter, summer, and foliage tourist/visitor seasons. As such, it illuminates the base weekend traffic volume, apart from tourist/visitor volumes, experienced. Monthly variations from the base are generally indicative of the estimated volume of tourism/visitor traffic volumes.

It is appropriate to allow for some visitor traffic in the April counts. Examining the universe of the traffic data, included in the Addendum to this report, suggests that about one-third of the April weekend traffic of 809,057 is attributable to tourist-visitor flows, meaning that two-thirds of the April volume is non-visitor traffic. The resulting base volume, of 542,068, is AER's estimate of the volume of weekend traffic that could be expected in the absence of visitor traffic.

April Weekend Volume	809,057
Less: Allowance for Visitor Volume-%	-33%
Estimated April Visitor Volume	(266,989)
April Base Volume Non Visitor	542,068

The next step is to contrast total weekend traffic counts by month to this figure and compute the variance between the actual total monthly traffic and the 542,068 estimated non-visitor monthly flows, per the figures and chart on the following page.

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	Weekend Count	Less: Non-Visitor Base Volume	Equals Estimated Visitor Volume	Visitor Volume as a % of Total
March	826,010	(542,068)	283,942	34%
April	809,057	(542,068)	266,989	33%
May	936,865	(542,068)	394,797	42%
June	999,109	(542,068)	457,041	46%
July	1,070,780	(542,068)	528,712	49%
August	1,046,683	(542,068)	504,615	48%
Sept	1,003,578	(542,068)	461,510	46%
Oct	985,720	(542,068)	443,652	45%
Nov	840,208	(542,068)	298,140	35%
Dec	963,867	(542,068)	421,799	44%
Jan	796,735	(542,068)	254,667	32%
Feb	846,539	(542,068)	304,471	36%
	11,125,151	(542,068)	4,620,333	42%



The estimate is that visitors account for 4.6 million trips or 42% of weekend traffic volumes in the corridor over the course of a year. In addition, some visitor traffic is experienced Monday-Thursday, possibly resulting in a 10% increase over the course of a year. Recognizing that these are order-of-magnitude estimates, the total annual visitor vehicle count is estimated to be on the order of about 5 million vehicles per year.

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Estimated Benefits

The data in the preceding sections of this report indicate that the Study Area carries an estimated five million tourist/visitor vehicles per year. An interview with the head of the State's tourism division indicated that even with existing congestion during peak weekend tourist flows, the corridor is a vital element of the State's tourism industry.

Traffic delays are common among comparable visitor corridors, including I-95 along the Seacoast and approach to Cape Cod. Visitors are willing to tolerate delays in accessing the State's recreational resources. While it is not possible to quantify the impact of current congestion, it is reasonable to expect that the existing congestion at peak visitor times is discouraging some visitation or deflecting visitation to other destinations—Vermont, for example.

Over time, if no improvements are completed, visitor visits are likely to rise, increasing the delays experienced due to peak hour congestion and probably reducing the State's tourism market penetration.

Conclusion

The conclusions of this analysis are:

- Travel and Tourism is second only to manufacturing in economic importance in the State;
- Travel and tourism visits support nearly 70,000 jobs and account for over \$5 billion in spending;
- Visitors and second home owners are a major revenue source for the State and local governments;
- The Study Area Corridor is the most important infrastructure serving in the State's tourist/visitor market, carrying an estimated 5 million visitor vehicles per year, despite noticeable congestion during peak visitor weekend periods;
- The current delays are a nuisance to visitors. It is reasonable to presume that current congestion, which results in several miles of backed-up traffic on peak visitor weekends, is probably deterring some visitation and deflecting visitation to other destinations, such as Vermont.
- If the improvements are not undertaken, the current delays are likely to increase and probably become a more significant deterrent to visitors in the coming years;
- Over the long term, the proposed improvements provide protection against the negative impact of future rising peak hour volumes, which would probably result in reduced visitation.
- In the short term, the improvements will reduce the annoyance that current delays generate for the tourist/visitor market. Doing so could increase visitation.

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ADDENDUM

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Plymouth State University Travel Barometers

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TRAVEL BAROMETER, Fiscal Year 2015

Overall Performance

The indicators used in the "travel barometer" for New Hampshire show that fiscal year 2015 was a positive period for the State's travel sector when compared with fiscal year 2014. More travelers visited the state and they spent more during fiscal year 2015 than during 2014. In fact, it was the best year in the last two decades. Real spending at lodgings after inflation-adjustment was a record high since the INHS started tracking this data in 1988. The share of day travelers in total increased slightly.

Estimated Visitor Counts and Spending (in millions)

Visitor counts and spending are estimated by the INHS, and are indicative of the health of all tourism industries in the state collectively, which include not only lodging and restaurants, but also arts, entertainment, and recreation, and part of retail and transportation.

Indicator	Sales	% from prior year
R&M	\$3,143	7.5%
Restaurants	\$1,959	8.0%
Rooms	\$529	7.8%
Combination	\$107	7.7%
Other Food Service	\$547	5.4%
R&M_T	\$2,081	10.7%
CPI	237	0.7%

Indicator	Value	% from prior year
Visitor Trips	38.40	5.1%
Visitor Days	60.16	5.2%
Visitor Spending	\$5,361	8.1%
Visitor Spending per Day	\$89	2.8%
Retail Spending	\$1,429	6.0%

Rooms and Meals Sales (in millions)

Rooms and meals sales are the baseline measurement of the tourism sector, which provides the basis of other tourism indicators such as traveler counts and spending. It's the official count of sales as reported by the NHDRA. Nearly all of lodging (Rooms) and meals at hotels and resorts (Combination) are paid by travelers, while only about half of the restaurant meals are estimated to be paid by travelers.

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Employment in Tourism Sector (in thousands)

The number of employed residents in the state is from the Household survey, and is indicative of the health of the state's overall economy. The numbers of jobs in tourism industries are from the Establishment Survey, and collectively indicate the health of the tourism sector. It is the only current tourism indicator that is publicly available and comparable across different states in the country.

Indicator	Level	% from prior year
Employed Residents	714	1.0%
Jobs in Arts, Entertainment, Recreation	11.2	0.3%
Jobs in Accommodations	9.4	2.6%
Jobs in A, E, R and A (sum of the two above)	20.6	1.4%
Jobs in Leisure and Hospitality	67.1	0.6%

Indicator	Value	% from prior year
Vehicle Rentals	\$94.8	7.9%
Airline Passengers	1,033,228	-9.4%
Hotel Occupancy	60.5%	5.2%

Business Travelers

The volume of business travelers may be reflected in such variables as vehicle rentals, airline passengers, and hotel occupancy rate.

Entertainment and Amenities

The tourism sector also includes arts, entertainment, and recreation industries. Snowmobile registration and fishing & hunting licenses here reflect non-resident sales only.

Indicator	Value	% from prior year
Attractions Attendance	978,042	1.6%
Ski Areas Attendance	1,244,092	1.5%
Snowmobile Registrations	15,597	4.8%
Fishing & Hunting Licenses	70,375	-0.4%

Indicator	Vehicle Counts	% from prior year
US 3 Groveton	2,834	1.4%
US 2 Jefferson	4,492	3.0%
US 302 Bartlett	3,737	4.3%
I-93 Lincoln	10,663	3.5%
NH 12 Claremont	8,453	-1.3%
I-89 Sutton	18,558	1.1%
NH 16 Ossipee	12,602	1.5%
NH 11 Alton	6,363	1.9%
NH 101 Temple	7,583	0.6%
NH 9 Chesterfield	11,406	-0.2%
I-93 S Concord	69,236	0.8%
NH 101 Exeter	38,281	2.5%
Total Traffic Counts	194,206	1.4%

Saturday Traffic Counts

The vehicle traffic counts should be reflective of changes in the volume of traveler counts. The vehicle counts are collected on Saturdays, in order to reduce the volume of commuter traffic in the data. Furthermore, 12 recorders are selected nearby major travel destinations to reflect traveler traffic in each of the seven travel regions in the State.

Great North Woods: Groveton, Jefferson
 White Mountain: Lincoln, Bartlett
 Lakes: Ossipee, Alton
 Dartmouth Lakes Sunapee: Sutton, Claremont
 Monadnock: Temple, Chesterfield
 Merrimack Valley: Concord
 Seacoast: Exeter

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Weather

Tourism is one sector whose fortune is left at the mercy of Mother Nature. Snow brings business during winter, while rain does the opposite during summer.

Indicator	Value	% from prior year
Gas Price	2.91	-19.2%
DTTD Guidebook Requests	49,140	-7.6%
Visitnh.gov Total Sessions	1,256,873	3.6%
Canadian Dollar	0.85	-8.6%
British Pound	1.57	-3.2%
Interest Rate Spread	6,531	5.6%

Comparison with New England and U.S. (in thousands)

The number of jobs estimates in the leisure and hospitality sector from the U.S. Bureau of Labor Statistics is the only tourism indicator that is comparable across states in the country. Therefore, it provides a glance of the performance of the state's tourism sector relative to other states in New England and the rest of the country.

Indicator	Days	% from prior year
Days with Precipitation	138	2.2%
Days with Snowcover	61	-1.6%

Leading Indicators

Increases in the leading indicators may be indicative of more businesses for the tourism sector in the near future, while decreases may mean the opposite. An exception is the gas price. A substantial increase in gas prices may discourage traveling.

*The percent change in Visitnh.gov Total Sessions was not reported because the numbers are not comparable between FY12 and FY13. The software used to track the online traffic was changed at the beginning of the FY13, and so was the way in which the traffic was measured.

Indicator	Jobs in Leisure and Hospitality	% from prior year
New Hampshire	67.1	0.6%
Connecticut	153.6	2.8%
Massachusetts	343.5	1.6%
Maine	62.5	-0.6%
Rhode Island	55.7	2.1%
Vermont	36.2	3.9%
New England	720.2	2.3%
United States	14,941	3.1%

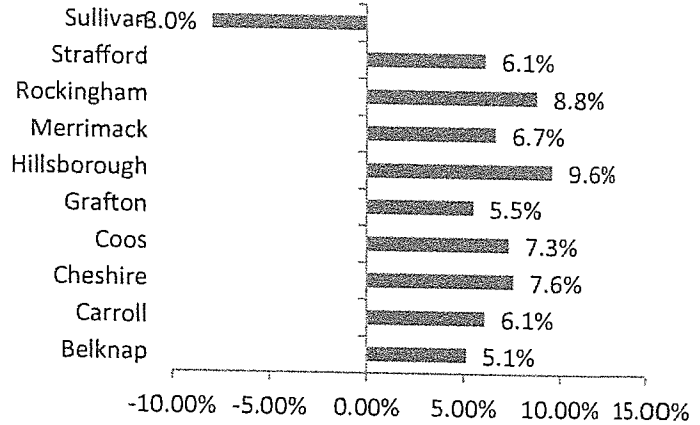
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ROOMS AND MEALS SALES, Fiscal Year 2015

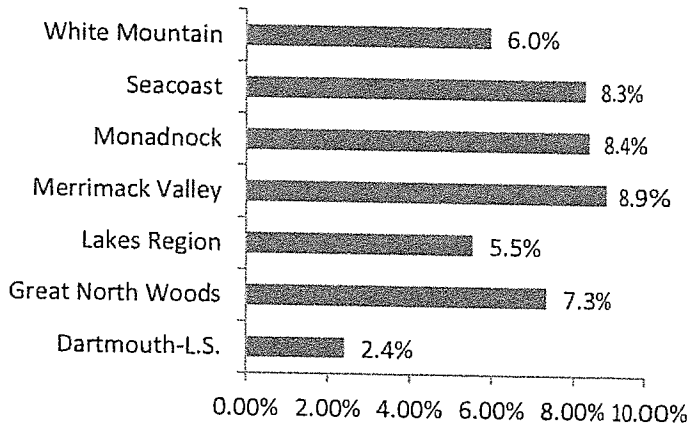
	Sales	% of State
State	\$3,144	100%
County		
Belknap	\$183	6%
Carroll	\$250	8%
Cheshire	\$128	4%
Coos	\$90	3%
Grafton	\$350	11%
Hillsborough	\$810	26%
Merrimack	\$274	9%
Rockingham	\$849	27%
Strafford	\$178	6%
Sullivan	\$33	1%
Region		
Great North Woods	\$29	1%
White Mountain	\$488	16%
Lakes Region	\$340	11%
Dartmouth-L.S.	\$149	5%
Monadnock	\$218	7%
Merrimack Valley	\$1,194	38%
Seacoast	\$726	23%

Sales are in millions of dollars.
It does not include vehicle rentals.

% change from prior year
by county



% change from prior year
by Region

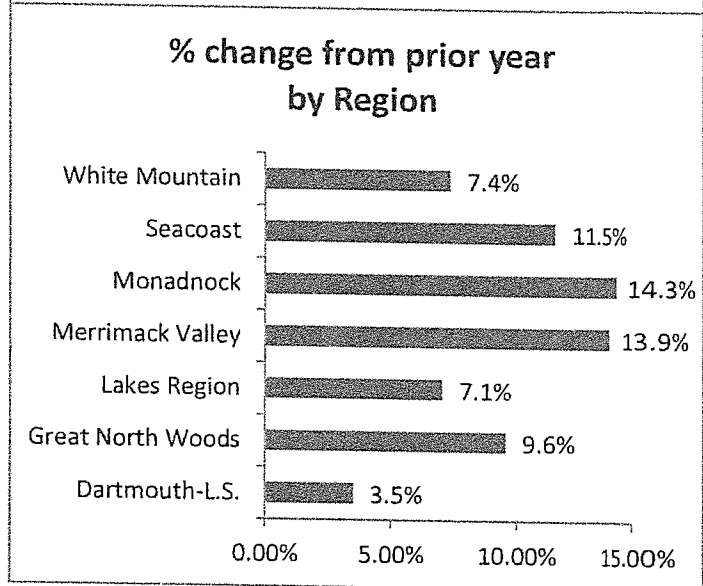
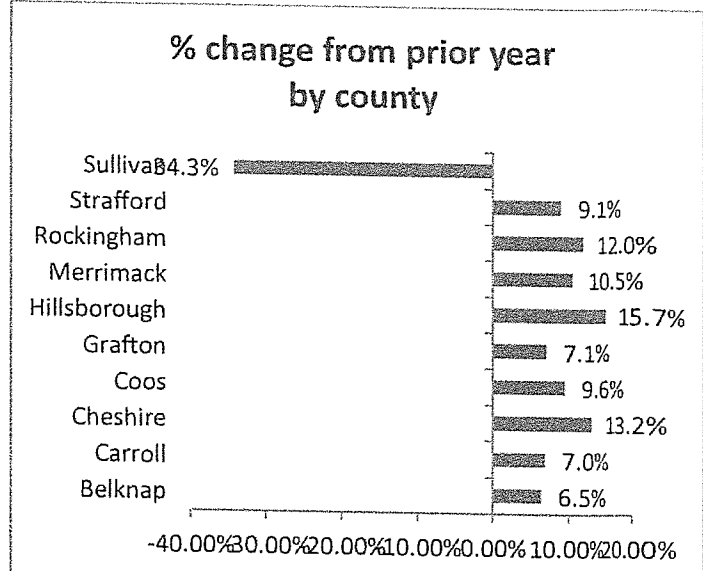


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ROOMS AND MEALS SALES PAID BY TRAVELERS, Fiscal Year 2015

	Sales	% of State
State	\$2,081	100%
County		
Belknap	\$137	7%
Carroll	\$214	10%
Cheshire	\$74	4%
Coos	\$69	3%
Grafton	\$255	12%
Hillsborough	\$471	23%
Merrimack	\$151	7%
Rockingham	\$595	29%
Strafford	\$109	5%
Sullivan	\$6	0%
Region		
Great North Woods	\$19	1%
White Mountain	\$407	20%
Lakes Region	\$235	11%
Dartmouth-L.S.	\$81	4%
Monadnock	\$130	6%
Merrimack Valley	\$698	34%
Seacoast	\$510	25%

Sales are in millions of dollars.
It does not include vehicle rentals.

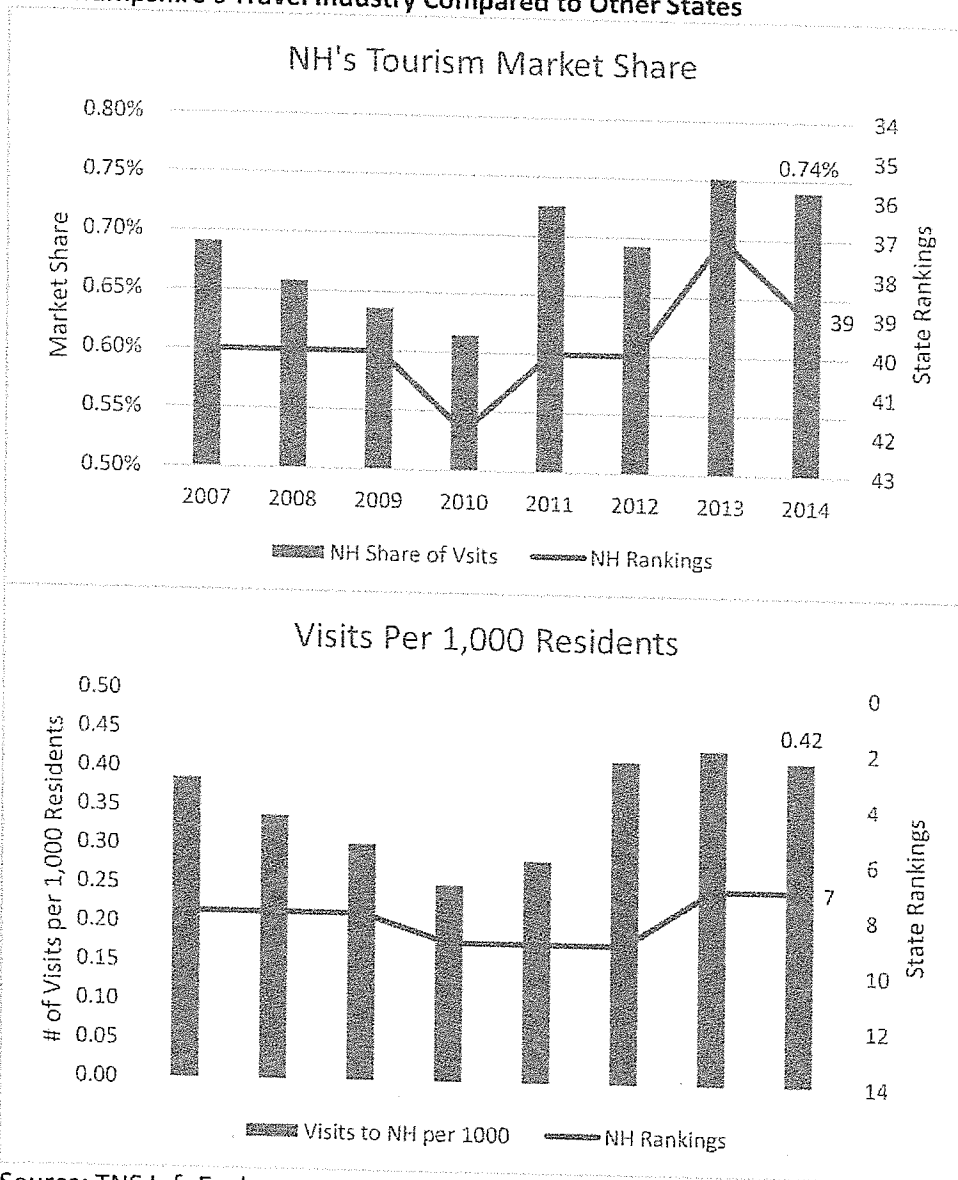


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NEW HAMPSHIRE'S TOURISM SECTOR, RELATIVE TO OTHER STATES

According to the national visitor survey information obtained from TNS Global Market Research, the State makes up 0.74% of the domestic traveler market. The program excludes foreign travelers. Out of 74,513 visits in the United States reported by the survey respondents, 552 visited New Hampshire during calendar year 2014. This ranks the state 39th out of 50 states plus Washington D.C. California and Florida were the top destinations in the country in that order. However, this ranking doesn't take into account the size of the states. In terms of the number of visits per 1,000 residents, New Hampshire ranks 7th, marking 0.42 reported visits per 1,000 residents, compared to 0.17 reported visits per 1,000 residents of California. Washington D.C. topped the country with 0.77 reported visits per 1,000 residents. The state's travel industry has performed well since 2010. The State's domestic market share increased to 0.74% in 2014 from 0.61% in 2010. Its ranking improved to 39th from 42nd during the same period. The number of visits per 1,000 residents increased to 0.42 reported visits in 2014 from 0.25 visits in 2010.

New Hampshire's Travel Industry Compared to Other States



Source: TNS InfoExplorer

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DEFINITION OF THE INDICATORS

Visitor trips and days

A traveler visiting a travel destination in New Hampshire is counted as one visitor trip, whether the traveler is New Hampshire resident or not. If the travel lasts three days, then the trip is counted as three visitor days. Visitor counts are estimated by the INHS based on a multitude of tourism indicators as well as visitor surveys conducted by a third party research firm, and benchmarked to sales and employment data of the tourism industries obtained from the U.S. Census Bureau and the U.S. Bureau of Economic Analysis.

Visitor and retail spending

Total visitor spending represents direct purchases made by travelers to New Hampshire, which includes sales of lodging, restaurant meals, entertainment, amenities, and transportation. Visitor spending is estimated by the INHS based on a multitude of tourism indicators as well as visitor surveys conducted by a third party research firm, and benchmarked to sales and employment data of the tourism industries obtained from the U.S. Census Bureau and the U.S. Bureau of Economic Analysis.

Rooms and Meals Tax Revenues

Rooms and meals tax revenues data is considered as one of the most important indicators for the tourism sector, the one that provides the basis for estimating other tourism indicators. There are two major reasons for this. First, it is an official amount, not an estimate, of tax collected on sales of lodging and meals, as reported by the New Hampshire Department of Revenue. Secondly, the lodging and restaurant industry is a major player in the tourism sector in terms of employment and sales.

Employment

The report includes two different sources of the U.S. Bureau of Labor Statistics employment data – the household survey and the establishment survey. The number of employed residents is estimated from the household survey, and is indicative of the state-wide labor market. On the other hand, the number of jobs in tourism industries is estimated from the establishment survey, and is reflective of the health of the tourism sector.

Gasoline Prices

New England Regular Conventional Retail Gasoline Prices (Dollars per Gallon) are obtained from

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the U.S. Energy Information Administration. A substantial increase in gasoline prices may discourage traveling.

Saturday Traffic Counts

The New Hampshire Department of Transportation collects vehicle traffic counts via 60 plus automatic recorders placed throughout the state. The average Saturday vehicle traffic counts are used, in order to reduce the volume of *commuter traffic* in the data. Furthermore, 12 recorders are selected nearly major travel destinations to reflect *traveler traffic* in each of the seven travel regions in the State.

Hotel Occupancy Rate

The monthly values of the hotel occupancy rate are obtained from the Smith Travel Research once a year. Thus, seasonal values until the next release of the data are estimated by the INHS.

Airline Passengers

It measures the number of passengers enplaning at the Manchester airport. It's one of the indicators for the business travel volume.

Vehicle Rentals

It measures spending on motor vehicle rentals subject to the Rooms and Meals Tax. It's one of the indicators for the business travel volume.

Attractions Attendance

It counts attendance at nine seasonal attractions during summer in the state.

Requests for DTTD Guidebooks

It counts the number of requests for DTTD Guidebooks. It's considered as one of the leading indicators for the tourism sector.

Visitnh.gov Total Sessions

It counts the number of total sessions at www.visitnh.gov. It's considered as one of the leading

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indicators for the tourism sector.

The Canadian Dollar

The value of the Canadian dollar relative to the United States' dollar is an indicator of present and future travel by the Canadian tourist in New Hampshire. Canada is the most important source of foreign tourists in the state. An increase in the value of Canadian dollar per the U.S. dollar makes traveling to the United States more affordable for Canadians in their currency, which may lead to an increase in the number of Canadian travelers to New Hampshire, other things equal. Thus, it is considered as a leading indicator for the state's tourism sector.

The British Pound

Great Britain is the largest source of foreign travelers in New Hampshire after Canada. An increase in the value of British pound per the U.S. dollar makes traveling to the United States more affordable for the British in their currency, which may lead to an increase in the number of British travelers to New Hampshire, other things equal. Thus, it is considered as a leading indicator for the state's tourism sector.

Interest Rate Spread

The interest rate spread, the 10 year Treasury less the Federal Funds, is considered one of the best leading indicators for the national economy. The indicator is the sum of all the past values plus the spread in the current period. Therefore, it decreases when the current spread is negative (the 10 year T rate is lower than the Fed Funds Rate), which is indicative of an impending recession. January 1960 is the base period; the interest rate spread is zero in January 1960.

Weather

Weather is a critical factor determining the traveler volume. More rainy days during summer lead to fewer travelers to the state, while more snowy days during winter lead to more travelers.

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Daily Traffic Volumes By Month

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New Hampshire DOT
02099092: Monthly Hourly Volume for March 2017

Location ID: 02099092
County: MERRIMACK
Functional Class: 1
Location: Interstate 93 S

Seasonal Factor Group: 03
Daily Factor Group:
Axle Factor Group: 03
Growth Factor Group:

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	338	208	172	271	607	1579	3383	5783	5122	4060	4102	4199	4373	4273	4647	5702	6770	6157	3758	2416	1984	1350	875	568	72697
2	370	226	188	247	670	1640	3575	6006	5015	3969	3846	4087	4389	4290	4900	5785	6973	6223	3873	2788	2213	1634	986	644	74537
3	369	258	214	265	624	1533	3371	5651	4954	4199	4479	4846	5091	5117	5938	6867	7664	6773	4993	3295	2566	2020	1370	1037	83494
4	507	323	247	194	284	590	1391	2341	2995	3642	4449	4885	4907	4783	4733	4753	4785	4391	3401	2540	1986	1769	1378	771	62045
5	413	287	155	141	164	347	852	1455	2205	3031	3961	5098	5353	4970	5097	5267	5167	4569	3477	2489	1707	978	707	392	58282
6	252	174	152	276	720	1745	3993	6726	5384	3898	3652	3766	3923	3908	4442	5876	6754	6305	3471	2237	1657	1238	738	501	71788
7	311	186	189	264	707	1686	3865	6674	5257	3804	3444	3592	3905	4079	4440	5646	6929	6224	3511	2214	1695	1277	868	475	71242
8	321	190	186	262	654	1658	3924	6646	5548	3944	3728	3776	3957	4078	4690	5834	7128	6509	3822	2497	2081	1447	866	566	74312
9	350	230	176	278	670	1713	3904	6773	5487	3865	3802	3931	4099	4167	4832	6210	7149	6650	4002	2989	2291	1610	896	666	76740
10	405	240	214	277	650	1579	3754	6627	5183	4162	4065	4412	4804	4908	5553	6732	7399	6861	4198	3247	2835	2018	1274	791	82188
11	448	303	187	199	262	653	1324	2503	3299	3877	4528	5112	5165	4742	5079	4947	4714	4197	3209	2489	1876	1603	1206	751	62673
12	413	330	107	105	211	314	665	1189	1791	2525	3379	4449	5170	5101	5252	4967	4890	4444	3356	2637	1766	1098	714	476	55349
13	285	178	182	296	723	1730	3804	6525	5190	3926	3729	4075	4202	4102	4723	5808	6960	6717	4160	2861	2326	1522	1001	636	75661
14	374	234	205	242	449	1047	1864	2392	1528	980	876	1105	1282	896	744	601	558	437	291	212	246	169	187	148	17067
15	115	89	111	166	433	937	2225	3942	4389	3736	3096	2921	3204	3285	3869	4983	6296	6085	3507	2484	1819	1331	776	606	60405
16	324	249	201	327	703	1696	3795	6667	5625	4297	3720	4060	4106	4106	4911	6250	7117	7072	4484	2996	2428	1884	1014	636	78668
17	445	271	209	300	679	1630	3703	6623	5974	4366	4139	4474	4829	5115	5901	7199	7571	7280	5571	3928	3309	2340	1555	926	88337
18	557	419	239	229	337	771	1702	3100	3634	4074	4571	5139	5117	4988	5135	5306	5355	4963	3854	2807	2425	1856	1337	819	68734
19	446	305	168	132	201	410	897	1751	2424	2875	3972	4988	5304	5176	5390	5663	5329	5204	4161	2773	1956	1170	758	430	61883
20	254	172	193	316	764	1734	3958	6691	5384	3984	3658	3831	4004	4014	4525	5583	6621	6485	3666	2409	1794	1198	787	546	72571
21	322	194	202	274	706	1622	3803	6883	5765	4192	3664	3859	4075	4197	4489	5933	6964	6512	3853	2505	2050	1429	898	573	74964
22	314	213	199	241	669	1599	3815	6628	5717	3931	3659	3755	3915	3994	4591	5667	6805	6407	3728	2446	2147	1398	866	586	73290
23	356	220	190	298	629	1591	3738	6538	5775	4020	3745	4099	4123	4408	4759	6005	7308	6822	4192	2805	2341	1569	1029	627	77187
24	348	267	188	293	628	1512	3567	6412	5587	4149	3851	4374	4439	4483	4811	5736	6622	6321	4703	3485	2614	1856	1166	882	78294
25	485	303	201	180	292	614	1450	2744	3617	4167	4778	4966	5043	4794	4769	4778	4359	3459	2649	2057	1736	1286	780	64257	
26	446	292	174	136	167	316	784	1505	2148	3195	4160	4863	5248	5317	5540	5443	4980	3671	2691	1849	1089	784	434	60474	
27	245	151	162	257	690	1498	3467	5727	5337	3505	3224	3371	3633	3649	4174	5232	6226	6008	3354	2204	1605	1117	694	501	66081
28	315	208	189	279	668	1647	3787	6766	5539	4069	3529	3777	3870	3991	4528	5639	6897	6270	3634	2448	1853	1311	862	533	72609
29	286	189	170	285	656	1617	3855	6650	5621	3992	3748	3834	4052	3981	4732	5867	7056	6564	3810	2579	2043	1375	861	561	74384

A-1

APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for April 2017

Location ID:	Seasonal Factor Group: 03																								TOTAL	
	County: MERRIMACK																									
	Functional Class: 1																									
	Location: Interstate 93 S																									
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00	
1	393	209	163	168	244	329	675	1142	1446	1354	1571	1911	2124	2378	2765	3081	2927	3070	2409	1885	1485	1287	890	620	620	34526
2	353	270	168	158	202	390	963	1947	2720	3407	4127	4850	5177	4978	5272	5386	5232	4675	3625	2647	1922	1159	710	463	463	60801
3	278	199	164	278	682	1735	3876	6798	5608	4085	3772	3924	4079	3985	4569	5678	6787	6454	3777	2552	1960	1308	751	565	565	73864
4	333	206	200	265	654	1576	3561	6294	5285	3753	3214	3578	3566	3699	4098	5284	6595	5994	3650	2352	1847	1262	769	523	523	68558
5	305	227	173	244	682	1676	3861	6907	5842	4085	3788	3937	4069	4241	4655	5983	7230	6590	4106	2608	2107	1454	893	845	845	76508
6	430	263	219	285	687	1672	3947	6501	5800	3946	3737	3822	4119	4181	4462	5530	6609	6202	3855	2548	1992	1519	908	633	633	73867
7	400	231	215	290	635	1632	3737	6550	5440	4156	4169	4420	4604	4969	5643	6864	7686	7034	4800	3541	2725	2038	1417	901	901	84097
8	519	301	232	196	315	640	1628	3000	3838	4479	5025	5438	5374	5242	5171	5482	5261	4802	3627	2877	2281	1668	1291	1019	1019	69706
9	520	313	191	163	205	408	962	1782	2479	3352	4214	4813	5129	4839	5019	5043	4917	4535	3651	2793	2033	1259	800	467	467	59887
10	319	165	174	298	707	1761	3985	6936	5596	4038	3870	3939	4208	3994	4625	6029	6930	6368	3733	2546	1892	1295	794	569	569	74771
11	340	212	213	268	713	1833	4093	6918	5718	4178	3784	4107	4105	4221	4821	6054	7026	6462	3966	2734	2058	1411	878	584	584	76697
12	341	230	191	269	708	1729	4069	6812	5588	4159	3841	3974	4072	4274	4818	5888	6996	6587	3985	2615	2092	1486	848	621	621	76193
13	392	219	193	271	688	1816	4075	6684	5872	4147	3798	4188	4363	4442	4865	6430	7427	7140	4640	3172	2619	2006	1089	716	716	81252
14	444	286	211	301	650	1605	3716	6403	5560	4542	4489	4887	5275	5353	5836	7245	7732	6918	5110	3614	2816	2034	1282	876	876	87185
15	512	297	236	177	290	637	1491	2692	3663	4555	5190	5531	5382	5240	5184	5134	4890	4480	3891	2833	2351	1725	1241	760	760	68382
16	422	271	137	117	165	286	584	1086	1919	3228	4369	5245	5291	4234	3730	4138	4669	5054	4851	3819	2505	1441	813	465	465	58839
17	234	151	155	272	664	1802	4222	6859	5796	4518	4422	4732	4732	4556	5002	6241	7179	6728	3956	2747	2073	1344	823	558	558	79766
18	318	203	194	288	688	1859	4079	6270	5942	4418	4013	4243	4401	4452	5015	6210	7236	6800	4093	2774	2070	1411	842	576	576	78395
19	324	229	194	264	697	1861	4070	6774	6077	4354	4052	4351	4398	4489	5201	6197	7408	6857	4255	2786	2196	1357	895	551	551	79837
20	357	212	209	312	738	1819	4048	6875	5911	4176	4015	4572	4606	4710	5295	6416	7445	7010	4504	3138	2300	1655	1020	619	619	81962
21	339	269	219	317	662	1623	3575	6145	5536	4398	4259	4852	5193	5348	5840	7046	7425	6777	4749	3129	2345	1804	1168	781	781	83799
22	443	296	233	210	419	690	1474	2642	3390	4212	5056	5266	5379	5269	5217	5153	4810	4522	3610	2588	2051	1851	1250	723	723	66754
23	424	279	196	171	249	454	889	1613	2415	3597	4319	4796	5106	4735	4735	4896	4745	4192	3414	2801	2034	1254	803	457	457	58574
24	263	193	189	333	752	1871	3737	6117	5266	4102	3984	4193	4297	4194	4564	5514	6553	6075	3733	2507	1940	1313	788	516	516	72994
25	346	199	186	293	710	1828	3631	5831	5124	4025	3829	4099	4220	4218	4682	5485	6283	5908	3568	2325	1835	1265	776	546	546	71212
26	348	229	193	283	716	1658	3441	5802	5072	3968	4034	4080	4203	4289	4674	5607	6654	6116	3693	2611	1956	1391	958	627	627	72603
27	374	232	199	313	694	1783	3705	5972	5294	4206	4072	4279	4636	4609	4908	5962	6970	6419	4168	3057	2383	1696	1048	688	688	77667
28	416	275	223	309	633	1703	3557	5783	5124	4246	4684	4946	5187	5286	5751	6675	7140	6760	4840	3490	2774	2028	1552	899	899	84281
29	586	365	261	206	348	698	1363	2659	4005	4701	5266	5351	5399	5196	5082	5263	4786	4667	3968	2908	2294	1866	1368	911	911	69517

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for May 2017

Location ID:	Seasonal Factor Group: 03																								TOTAL
County:	Daily Factor Group:																								
Functional Class	Axle Factor Group: 03																								
Location:	Growth Factor Group:																								
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	300	222	208	292	766	1974	4069	6745	5445	4040	3633	3953	4206	4104	4678	5750	6850	6324	3781	2490	1789	1305	817	524	74265
2	346	219	216	275	708	1829	3968	6422	5518	4047	3823	3894	4100	4023	4938	5928	7313	6609	3941	2762	1962	1516	943	680	75980
3	351	222	187	310	712	1950	4223	6870	5764	4173	3967	3891	4244	4369	5103	6503	7244	6961	4224	3007	2327	1595	940	545	79482
4	377	236	232	319	767	1942	4286	6622	6036	4381	4085	4249	4484	4349	5179	6418	7588	7052	4541	3355	2579	1813	1088	697	82675
5	375	251	248	315	709	1771	3873	6247	5576	4456	4377	4673	5015	5070	5751	6775	7081	6406	4545	3147	2331	1844	1268	820	82924
6	541	333	247	210	329	687	1519	2757	3444	4299	5011	5250	5259	5167	5253	5306	4994	4627	3588	2917	2252	2039	1454	844	68327
7	440	291	191	180	224	433	945	1779	2591	3550	2466	1434	5381	5233	5121	5415	5063	4330	3470	2403	1771	1251	760	445	55167
8	295	179	192	263	804	2000	4456	6729	5382	3973	3849	3855	4207	4041	4681	5959	6886	6593	3930	2577	1944	1253	747	553	75348
9	354	197	223	312	749	1909	4261	6703	5596	4200	3821	3892	4195	4071	4869	6129	7182	6574	4013	2640	2027	1400	819	573	76709
10	361	188	216	303	733	2009	4297	6736	5602	4106	3870	3963	4223	4062	4551	5948	7722	6820	4220	3017	2183	1455	914	578	80777
11	394	235	209	311	761	2003	4228	6639	5571	4283	3851	4041	4310	4600	5226	6476	7265	6871	4397	3114	2389	1763	1004	650	80601
12	407	224	221	319	738	1912	4017	6530	5678	4471	4371	4763	5139	5368	6190	7535	7721	7152	5096	3875	2921	2202	1487	1039	89376
13	598	328	237	227	370	757	1701	3079	4417	5061	5553	5663	5717	5678	5721	5648	5453	5075	4363	3265	2468	2015	1436	951	75781
14	419	294	190	146	177	289	616	1137	2109	3200	4378	5315	5451	5299	4896	5002	4626	4333	3530	2861	2070	1248	791	456	58833
15	320	180	183	291	784	2013	4111	6350	5399	4021	4022	4085	4288	4217	4706	5929	6813	6441	3760	2412	1801	1311	837	565	74897
16	360	225	220	310	752	1998	4351	6909	5863	4235	3984	4185	4339	4417	5012	6072	7259	6813	4232	2879	2238	1520	986	744	79903
17	359	203	219	307	759	1920	4247	6901	5893	4460	4082	4312	4424	4369	5222	6448	7513	6858	4363	3105	2608	1670	1003	645	81890
18	453	252	223	330	786	1973	4241	6703	6202	4730	4304	4786	4711	4913	5454	6827	7625	6880	4416	3668	2889	2017	1177	708	86268
19	415	269	269	329	756	1904	3976	6659	6228	5274	4807	5375	5968	5939	6522	7909	7636	7173	5346	3983	3145	2496	1555	1052	94985
20	609	457	332	265	352	871	1956	3546	4656	5149	5622	5789	5823	5548	5600	5693	5687	5211	4291	3250	2806	2280	1560	980	78333
21	556	395	210	208	265	473	1100	1919	2953	4107	5139	5783	5843	5052	5071	5986	5642	5289	4598	3415	2550	1534	891	521	69440
22	343	194	194	323	793	1983	4004	6473	5520	4257	4145	4268	4540	4540	4957	5793	6833	6546	3900	2527	1852	1223	819	558	76585
23	320	220	218	301	777	2051	4387	6764	6089	4227	3971	4262	4215	4452	5032	6377	7389	6839	4180	2891	2328	1549	971	656	80466
24	376	287	209	315	781	2063	4233	6679	5897	4342	4056	4157	4314	4567	5173	6437	7434	6729	4446	3079	2373	1746	1023	668	81384
25	384	266	267	322	742	2004	4233	6738	5820	4248	4301	4654	4918	4939	5696	6612	7584	6864	4624	3282	2705	1802	1106	683	84794
26	506	271	287	332	674	1678	3588	5948	5228	4540	4978	5721	6013	6157	6323	6456	6685	5979	5200	4848	3624	2764	1741	1411	90952
27	820	348	246	235	354	740	1806	3455	4749	5750	5933	6179	5674	5890	5310	5469	4921	4722	3970	3397	2834	2235	1577	1278	77892
28	652	335	198	159	231	451	1024	1768	2832	4226	5330	5886	5786	5229	5087	4965	4954	4918	4455	3884	3052	2154	1394	1117	70087
29	529	217	181	163	277	515	990	1554	2654	4235	5388	5373	5412	5271	4789	4779	4576	4115	3437	2591	1879	1239	835	895	61894
30	285	204	192	308	870	2239	4522	6891	5662	4524	4434	4530	4806	3386	4880	5986	7128	6727	3955	2666	1962	1318	805	597	78877
31	375	207	190	301	765	2056	4317	6846	5576	4360	4093	4159	4384	4313	4945	6182	7364	6647	4170	2987	2107	1507	942	666	79459

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for June 2017

Location ID:	02099092																								Seasonal Factor Group:	03
County:	MERRIMACK																								Daily Factor Group:	
Functional Class	1																								Axle Factor Group:	03
Location:	Interstate 93 S																								Growth Factor Group:	
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	
1	381	230	219	339	759	2086	4342	6899	5913	4722	4325	4476	4703	4849	5461	6762	7980	7224	4659	3413	2886	2086	1203	1025	86942	
2	477	277	251	325	761	1994	4199	6704	5748	4548	4873	5142	5441	5633	6305	7448	7509	7002	5182	3783	3082	2377	1776	1415	92252	
3	649	342	260	208	372	867	2032	3664	4790	4901	5376	5806	6306	5953	5746	5473	5384	4811	4039	3187	2425	2094	1547	1282	77514	
4	597	385	201	172	234	462	1049	1886	2889	4220	5085	5625	5649	5419	5436	5612	5621	5500	4054	2941	2072	1280	971	495	67855	
5	266	191	204	289	787	2022	4240	6797	5527	4229	4114	4276	4418	4372	4954	6084	6886	6454	3702	2387	1844	1265	808	546	76662	
6	316	207	223	308	720	1895	4116	6691	5526	4154	3830	4131	4137	4203	4889	5935	6687	6293	3796	2483	2002	1490	875	573	75480	
7	347	205	216	294	781	2034	4297	6873	5869	4494	4176	4179	4434	4503	5138	6651	7718	6996	4295	3080	2443	2005	1211	681	82920	
8	408	271	263	332	809	2146	4354	6952	6026	4720	4400	4506	4810	4785	5402	6837	7949	7239	4648	3370	2694	2211	1113	735	86980	
9	441	268	291	356	794	2008	4158	6466	5726	4703	4906	5293	5501	6010	6592	7023	7413	6804	5465	4221	3394	2563	1736	1144	93276	
10	642	357	230	200	415	843	1881	3476	4562	5364	5949	5943	6323	5896	5589	5758	5524	5150	4395	3445	2869	2390	1685	1220	80106	
11	632	358	224	167	263	537	1276	2277	3509	4822	5900	6236	6123	5675	5543	5969	5884	5630	5011	4096	3366	2202	1201	720	77621	
12	415	265	220	355	850	2207	4538	6937	5891	4766	4644	4851	4863	4716	5226	6436	7350	6671	4111	2877	2374	1599	1071	686	83919	
13	353	241	233	294	796	2105	4366	6919	5961	4761	4565	4560	4791	4653	5204	6304	7574	6884	4379	2930	2428	1799	1105	678	83883	
14	437	257	213	324	754	2168	4320	6916	6160	4894	4755	4990	5096	4990	5529	6734	7857	7260	4496	3455	2854	1876	1256	808	86399	
15	398	283	252	341	766	2087	4364	6819	5984	5148	4859	5269	5279	5299	5999	6846	7945	7415	4981	3782	3159	2280	1333	859	91747	
16	481	288	293	346	706	1906	3886	6463	5747	5087	5194	5965	5991	6165	6393	6525	7190	5974	5180	4182	3274	2328	1781	1063	92408	
17	596	355	279	231	385	828	1752	3057	4313	5220	6095	6367	6351	6097	5844	5739	5684	5345	4513	3676	2903	2490	1780	1331	81231	
18	712	402	249	190	291	540	1134	2031	3337	4869	6230	6501	6521	5961	5535	5665	5398	5428	4624	3746	3177	1958	1121	615	76235	
19	397	199	211	331	812	2281	4550	6843	5635	4677	4500	4752	4890	4865	5069	5946	6951	6132	3532	2446	1855	1252	755	526	79407	
20	311	222	213	301	765	2092	4298	6867	5851	4412	4313	4436	4672	4652	5259	6259	7592	7100	4412	2893	2516	1692	1120	857	83105	
21	380	229	187	339	821	2148	4290	6864	6089	4637	4518	4835	4815	4949	5469	6402	7778	7080	4413	3145	2468	1849	1097	723	85525	
22	345	258	241	323	768	2125	4510	6860	6141	4927	4877	4924	5143	5098	5699	6911	7968	7207	4886	3662	3094	2430	1433	805	90635	
23	483	281	239	331	752	2002	3988	6256	5766	4981	5563	5994	6174	6589	7109	7355	7323	6737	5916	4749	3586	2647	1705	1291	97817	
24	1109	444	279	238	410	893	1811	3153	4337	5380	6290	6954	6732	6261	5948	5678	5535	5137	4258	3558	2974	2500	1780	1101	82760	
25	646	381	211	214	289	566	1185	2174	3354	4909	5826	6986	6841	6566	5908	6009	5727	5074	5258	4733	3329	2145	1141	922	80394	
26	488	253	250	343	931	2207	4509	6748	5729	4760	4909	5063	5255	5142	5422	6310	7517	7006	4209	3061	2317	1457	902	589	85377	
27	396	210	223	311	806	2131	4240	6567	5826	4543	4622	4662	4868	4699	5567	6113	7408	6609	4075	2716	2078	1454	927	572	81563	
28	331	231	233	312	863	2116	4260	6702	5950	4879	4818	4792	4759	4952	5393	6550	7916	7146	4401	3320	2610	1726	1052	691	86003	
29	422	233	249	326	794	2117	4187	6539	5922	4865	4879	5158	5226	5553	6116	6845	7994	7304	4872	3747	3139	2191	1332	835	90845	
30	549	292	311	363	710	1903	3968	6228	5804	5387	5937	6377	6437	6080	6357	6702	7044	6572	5400	4359	3626	3207	1858	1227	96698	

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for July 2017

Location ID:	02099092																								TOTAL
County:	MERRIMACK																								
Functional Class	1																								
Location:	Interstate 93 S																								
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	907	451	273	272	380	783	1846	3267	4818	5810	6094	6274	5880	5857	5444	4507	5441	4671	4401	3376	2644	2183	1544	1042	78165
2	780	362	272	194	244	575	1193	2112	3432	4983	6163	6181	5953	5776	5305	5296	5131	5238	4812	4372	3535	2647	1903	1262	77721
3	517	263	230	284	519	1320	2841	4415	4625	5061	5877	6150	5898	5734	5761	6132	6241	6020	4391	3614	2956	2197	1737	1202	83985
4	486	307	230	186	322	777	1215	2007	2920	3964	4889	5366	5124	4522	4471	4209	4504	4358	4085	4012	3267	2482	2207	1266	67186
5	517	284	211	317	899	2318	4523	6715	6041	5447	5920	6094	6174	5944	6108	6631	7639	7146	4750	3322	2777	1990	1190	703	93660
6	400	224	236	318	777	2044	4021	6332	5703	5136	5158	5478	5466	5362	5823	6607	7526	7170	4594	3415	2802	2008	1250	746	88596
7	461	253	246	343	700	1965	3734	5839	5297	4961	5160	5889	6336	6326	6671	7439	7540	7052	5705	4306	3522	2397	1563	965	94670
8	626	383	243	229	372	814	1687	2865	3933	5225	6352	7024	6827	6333	6165	5571	5073	4549	3911	3047	2521	2121	1554	957	78382
9	595	355	221	171	315	554	1275	2206	3538	4893	6024	6584	6437	6488	6007	5758	5766	5539	5180	4865	3795	2357	1255	616	80794
10	380	187	221	354	846	2268	4539	6837	5851	5037	4979	5234	5176	5139	5602	6248	7489	6993	4300	3071	2438	1720	1037	636	86582
11	384	225	217	342	789	1995	3971	6345	5790	4659	4446	4782	4959	4948	5365	6210	7503	6911	4307	2967	2444	1947	1100	669	83275
12	390	233	224	311	804	1998	4264	6830	6037	4827	4761	5026	5081	5021	5504	6418	7782	7179	4529	3378	2677	1931	1290	725	87220
13	482	300	253	376	760	1980	3971	6147	5664	4635	4711	5210	5574	5446	6015	6803	7794	7206	4836	3638	2880	2074	1335	782	88872
14	505	313	299	364	756	1995	3959	6240	5806	5320	5680	6218	6684	6787	6891	7169	7677	7220	6364	4889	3824	2551	1752	1400	100663
15	1027	435	289	259	428	873	1886	3004	4330	5284	6535	7286	6838	6487	5957	5727	5440	5236	4184	3667	3626	2818	1862	1149	84627
16	598	380	234	206	337	629	1477	2575	4106	5614	6345	6449	7070	6114	5851	5903	5806	5892	5798	6018	5243	3092	1796	969	88502
17	627	397	344	384	894	2350	4414	6845	6409	5578	5570	5610	5472	5238	5519	6142	7437	7233	4462	3065	2551	1681	1095	676	89993
18	384	243	243	315	758	1995	4116	6623	6083	4928	4696	4983	5180	5016	5687	6558	7692	7113	4436	3049	2566	1940	1220	1092	86916
19	728	320	243	301	770	1981	4180	6511	6214	5066	5045	5357	5179	5302	5537	6620	7546	6374	4603	3469	2726	2059	1185	839	88155
20	474	306	291	348	766	1987	4077	6638	5930	5075	5183	5468	5506	5478	5794	6742	7951	7509	5029	3711	3227	2320	1345	831	91986
21	548	307	256	317	730	1865	3789	6143	5972	5693	5965	6503	6480	6223	6562	6838	7147	6839	6075	5335	4156	3094	1945	1186	99968
22	710	428	283	243	442	952	2054	3012	5241	6143	6460	6799	6477	6220	6228	5967	5644	5364	4720	3917	3256	2688	1845	1181	86274
23	632	393	231	197	274	475	1052	1897	3268	4677	6054	6898	6772	6409	6114	5836	5495	5654	5127	4784	3840	2511	1431	982	81003
24	621	235	243	345	895	2049	4098	6299	5790	4842	4937	5466	5400	5099	4984	6263	6970	6621	4012	2697	2036	1430	993	632	82957
25	369	243	236	347	863	1991	3973	6468	5688	4605	4554	4799	5028	4929	5332	6198	7405	6985	4441	2941	2443	1776	1200	680	83494
26	467	287	203	328	812	1939	4042	6618	6002	5096	5000	5020	5013	5022	5385	6491	7697	7256	4699	3403	2790	2113	1352	766	87801
27	447	298	247	347	727	1940	3946	6370	5661	4776	4948	5365	5414	5439	6319	6798	7872	6986	4994	3694	3137	2184	1415	892	90216
28	497	318	271	354	702	1872	3792	6087	5616	5456	5849	6357	6584	6230	6469	7022	7444	6966	6469	5132	4032	2729	1844	1142	98234
29	716	406	295	263	464	837	1942	3367	4704	5835	6665	5894	6346	6327	6346	6117	5710	5294	4569	3809	3163	2595	1835	1111	84610
30	611	448	259	202	233	474	1199	1921	3321	4872	6412	6808	6622	6227	6002	5843	5697	5482	5129	4854	4458	2861	1341	686	81962
31	374	206	200	321	835	2217	4381	6733	5763	5058	5356	5496	5491	5324	5579	6252	7219	7340	4567	3203	2472	1809	1156	705	88057

APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for August 2017

Location ID: 02099092
County: MERRIMACK
Functional Class: 1
Location: Interstate 93 S

Seasonal Factor Group: 03
Daily Factor Group:
Axle Factor Group: 03
Growth Factor Group:

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	407	237	232	333	786	2017	4038	6631	5669	4905	4858	5024	4978	5087	5351	6431	7334	7049	4650	3288	2776	1939	1348	722	86090
2	476	280	237	287	761	2005	4109	6467	6096	4927	4957	5052	4946	4972	5595	6470	7614	7217	4703	3294	2593	1922	1384	826	87190
3	515	292	276	330	748	1941	4129	6397	5823	5015	5162	5518	5608	5560	6035	6885	7613	7216	5002	3948	3203	2365	1543	858	91982
4	594	354	281	357	767	1799	3752	6096	5674	5267	5537	6361	6473	6673	6912	7123	7089	6663	5613	4764	3644	2707	1697	1154	97351
5	768	457	314	257	408	806	1586	2649	4034	5257	6672	6662	5976	6241	6900	6208	5359	4713	3858	3020	2537	2297	1620	1136	79735
6	794	365	242	198	304	533	1208	2244	3457	5003	6431	7144	6847	6207	5721	5807	5742	5754	5354	4567	4193	2520	1371	1025	83031
7	510	260	201	333	818	2113	4212	6447	5898	4857	4947	5369	5615	5453	5564	6270	7486	7277	4403	2976	2319	1542	973	655	86498
8	374	240	220	303	770	1902	3932	6432	5869	4827	4812	5148	5194	5181	5764	6527	7591	6769	4503	3020	2429	2032	1186	746	88795
9	696	289	195	334	752	1961	4004	6421	5974	5388	5150	5312	5037	5089	5614	6464	7757	7193	4877	3475	2849	2032	1186	746	88795
10	455	330	248	325	741	1941	4072	6376	5962	5131	5298	5549	5616	5573	6092	7142	7985	7358	5276	3843	3379	2278	1419	1183	93572
11	963	361	280	340	709	1744	3735	6004	5761	5736	6183	6414	6423	6534	6568	7048	7275	6896	6070	4813	3656	2796	1657	1296	99262
12	1102	433	339	240	360	712	1603	2750	4150	5546	6835	7361	6930	6904	6748	6187	5780	5268	4224	3569	3170	2319	1612	1011	85153
13	508	349	223	199	263	482	1059	1908	3318	4812	6382	6562	7024	6459	6025	5786	5682	5425	5051	4796	4268	2614	1324	767	81286
14	421	274	210	371	821	2152	4266	6788	5917	4981	5360	5743	5582	5359	5597	6500	7774	7127	4674	3293	2523	1733	1127	728	89321
15	418	292	262	328	803	1946	3981	6400	5877	4759	4841	5062	5246	5326	5705	6459	7762	7227	4560	3147	2402	1723	1176	1007	86709
16	642	274	183	280	764	1918	4022	6635	6042	5273	5396	5371	5449	5290	5962	6603	7909	7406	4948	3525	2781	1993	1162	764	90592
17	496	261	214	331	779	1951	3972	6445	6255	5277	5158	5639	5702	5586	6085	7033	8138	7230	5339	3905	3303	2326	1421	838	93684
18	476	286	255	340	734	1714	3589	5853	5388	4893	5475	6241	6340	6107	5608	5983	6380	6371	5180	4526	3280	2485	1469	972	89945
19	558	379	253	234	387	819	1738	3119	4709	6017	6997	7136	6808	6794	6667	6198	5817	5329	4566	3735	3057	2393	1595	1125	86430
20	641	332	226	177	283	488	1061	2166	3557	5223	6514	7259	6840	6373	5998	5966	5707	5428	5149	4956	4009	2304	1257	671	82585
21	404	210	216	370	853	2049	4134	6642	5864	5129	5369	5613	5663	5208	5064	6104	7441	7213	4530	3294	2572	1620	1057	645	87264
22	377	219	195	335	755	1915	4026	6529	5822	4946	4971	5266	5081	5098	5436	6271	7479	7200	4557	3243	2473	1685	1008	604	85491
23	393	244	220	279	717	1908	4081	6496	5775	4754	4973	5189	5170	5032	5813	6656	7775	7327	4434	3421	2738	1806	1084	705	86990
24	462	275	209	312	754	1921	4035	6341	5926	5021	5124	5427	5657	5437	5989	6919	7970	7259	5091	4007	3078	2119	1296	861	91490
25	432	276	216	325	709	1797	3796	6011	5810	5418	5910	6442	6567	6476	6904	7123	7362	7120	6081	4638	3630	2494	1689	1301	98527
26	919	378	248	223	359	788	1777	3108	4568	5932	6774	6938	6560	6533	6218	5935	5735	5273	4617	3808	3103	2439	1632	1189	84954
27	727	660	300	181	237	450	1087	1676	2815	4708	5950	6650	6564	6548	6121	5903	5836	5478	5192	4327	3322	1835	1065	792	78424
28	383	230	187	324	872	2111	4259	6915	5777	4899	5074	5226	5227	5283	5410	6526	7554	7298	4468	3134	2308	1555	843	591	86454
29	377	232	224	312	756	1917	4093	6846	5822	4617	4579	4645	4727	5001	5098	6325	7526	7099	4439	3180	2139	1497	919	563	82933
30	384	232	202	288	735	1889	4079	6756	5911	4820	4576	4706	4770	4875	5063	6398	7834	7166	4451	3271	2574	1585	962	675	84202
31	434	262	243	288	763	1994	4126	6859	6190	4942	4666	5054	5363	5470	6134	7345	7998	7212	5260	3837	3292	2212	1237	831	92012

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for September 2017

Location ID:	02099092																								Seasonal Factor Group:	03																								TOTAL
County:	MERRIMACK																								Daily Factor Group:																									
Functional Class	1																								Axle Factor Group:	03																								
Location:	Interstate 93 S																								Growth Factor Group:																									
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00																									
1	574	311	255	323	705	1787	3618	5958	5475	5349	5669	6063	6130	6179	6292	6412	6868	6594	5773	5019	4019	3018	1949	1244	95584																									
2	904	375	255	212	354	735	1638	2965	4414	5933	6078	5947	5906	5758	5849	5458	5359	5045	4535	3907	3344	2440	1859	1430	80700																									
3	801	334	214	134	188	334	702	1214	2005	3244	4451	5339	5770	5522	5282	4921	4715	3922	3234	2726	2068	1480	954	576	60130																									
4	372	209	184	182	304	506	1028	1774	2896	4750	5979	6327	6010	5776	5404	5209	5270	5420	4973	4709	3513	1869	1000	501	74165																									
5	328	192	219	324	866	2161	4464	6747	6076	4915	4682	5178	5039	4868	5103	6278	7359	6946	3805	2565	1915	1309	776	514	82629																									
6	327	229	191	279	731	1867	3966	6519	5855	4202	4031	4281	4303	4426	4797	5929	6964	6421	3811	2550	1996	1377	870	602	76524																									
7	384	240	197	287	742	1852	4164	6863	5858	4371	4250	4511	4803	4597	5192	6397	7519	7055	4587	3162	2320	1544	1017	607	82519																									
8	470	326	302	372	699	1782	3983	6554	5828	4803	4742	5322	5651	5850	6473	7233	7457	6984	5712	4286	3214	2230	1489	1090	92852																									
9	627	329	252	237	399	861	1881	3041	4008	4659	5399	6078	6021	5843	5508	5345	5109	4939	4008	3156	2560	1970	1548	1127	74905																									
10	595	301	190	161	256	477	1069	1863	2875	3946	5033	5977	6251	5670	5722	5782	5580	5246	4340	3589	2423	1359	805	447	69957																									
11	279	205	160	304	808	2061	4147	7087	5941	4438	4180	4434	4434	4418	4959	6077	7066	6674	4089	2817	2077	1346	816	541	79358																									
12	342	189	210	291	730	1990	4213	7151	6091	4454	4215	4397	4383	4493	5022	6210	7456	6747	4248	2992	2181	1519	872	623	81019																									
13	393	239	181	279	792	1925	4241	6962	6004	4265	4279	4477	4414	4547	5135	6203	7437	6945	4331	3100	2361	1587	930	550	81577																									
14	411	251	221	305	768	1897	4124	6988	6055	4555	4471	4567	4808	4696	5538	6660	7722	7238	4686	3437	2661	1942	1068	700	85769																									
15	501	312	264	337	788	1750	3978	6342	6066	4923	4937	5561	5865	6048	6899	7476	7489	7290	6017	4607	3625	2451	1580	938	96044																									
16	631	346	239	225	410	843	1839	3480	4848	5538	5976	6227	6186	5793	5482	5635	5431	5060	4495	3827	2983	2209	1611	1050	80364																									
17	610	389	218	178	255	468	966	1879	3005	4474	5785	6382	6244	5630	5532	5538	5459	5457	4804	3914	2517	1616	817	556	72693																									
18	346	220	227	325	809	2047	4297	7072	5939	4562	4442	4578	4646	4587	5152	6219	7187	6944	4045	2736	1959	1349	803	537	81028																									
19	361	231	219	341	741	1932	4174	6575	5764	4420	4067	4156	4416	4375	5030	6358	7163	6777	4186	2748	2010	1337	842	545	78768																									
20	378	216	199	265	687	1860	4104	6879	5934	4221	4156	4152	4460	4424	5036	6285	7444	7166	4457	2780	2322	1656	1095	613	80789																									
21	357	241	245	319	716	1941	4230	6937	6277	4743	4398	4763	5031	5161	5821	6924	7608	7337	5099	3600	2740	1956	1203	1058	88705																									
22	584	275	254	350	736	1820	4049	6678	6023	4907	5188	5677	5937	6151	6811	7431	7394	7338	6198	4912	3770	2481	1638	1357	97959																									
23	889	451	273	246	428	1148	2231	3554	4908	5683	6337	6077	6390	5699	5817	5733	5638	5774	5150	4103	3244	2258	1713	1165	84909																									
24	660	378	228	193	317	674	1597	3152	4465	5720	6237	6603	6798	5864	5333	5595	5884	6229	6030	5503	3465	1983	944	553	84405																									
25	321	191	170	324	795	2160	4459	7166	6554	5214	5141	5073	4788	4786	5184	6374	7219	6838	4323	2841	2035	1363	831	609	84759																									
26	361	200	206	299	757	2022	4256	7116	5980	4491	4280	4332	4536	4402	5062	6373	7406	6879	4232	2939	2186	1450	839	597	81201																									
27	366	189	192	277	734	1976	4243	7025	6086	4431	4257	4373	4475	4696	5284	6373	7625	6698	4366	3104	2230	1541	833	632	82006																									
28	443	244	197	297	732	1956	4208	6961	6124	4544	4276	4557	4759	4860	5429	6166	7280	6908	4851	3623	2583	1768	1063	707	84536																									
29	460	258	227	296	702	1858	3767	6795	5879	4810	4883	5235	5576	5946	6590	7656	7351	7047	5846	4302	3355	2301	1504	960	93605																									
30	609	330	239	211	319	677	1544	2724	3710	4606	5384	5908	5853	5663	5358	5177	5122	4885	3926	3215	2388	1998	1480	1124	72450																									

APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for October 2017

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	624	326	178	166	222	534	1139	2124	3024	4242	5495	6249	6584	5891	5284	5479	5672	5292	5081	3803	2621	1474	805	452	72761
2	262	174	194	326	799	2060	4211	6957	5691	4403	4416	4361	4666	4519	4944	6210	7124	6805	4069	2691	1851	1372	756	508	79369
3	334	197	230	291	817	2018	4211	6806	6036	4466	4178	4319	4466	4472	5025	6288	7307	6864	4270	2851	2132	1445	813	586	80422
4	369	209	212	282	730	1915	4156	6891	5931	4503	4243	4681	4545	4718	5254	6296	7627	6981	4586	3154	2332	1558	900	611	82684
5	388	226	231	296	751	1963	4268	6959	5798	4745	4544	4798	4898	4935	5673	7131	7618	7205	5044	3598	2664	1901	1294	778	87706
6	501	300	227	297	665	1825	3925	6611	5743	4955	5295	6035	6268	6536	7196	7439	7682	7365	6142	5239	3847	3381	1812	1167	100453
7	621	359	242	233	380	807	1943	3764	4952	5834	6421	6319	6396	6185	6510	6321	6299	5983	5116	4169	2973	2566	1705	982	87080
8	562	338	197	161	226	417	838	2042	3102	4401	5716	6727	6687	6107	5690	5595	5428	5097	4387	3794	2805	1752	962	612	73643
9	350	202	185	293	625	1564	3021	5047	4561	4727	5164	5208	5467	5076	5249	5545	5883	5887	4147	2875	2074	1430	783	580	75943
10	372	226	190	322	827	2062	4313	6876	6002	4683	4542	4755	4887	4733	5215	6514	7461	6943	4397	2975	2080	1456	811	576	83218
11	343	244	189	281	765	1954	4160	6938	5767	4576	4136	4448	4457	4625	5200	6514	7391	7089	4417	2882	2106	1528	862	582	81454
12	372	290	189	312	746	1975	4131	6926	5975	4652	4387	4666	4713	4858	5502	6930	7783	7406	5025	3268	2662	2019	1030	663	86480
13	409	266	200	292	723	1864	3943	6598	6107	4861	5118	5546	5682	5804	6858	7600	7320	7280	5832	4424	3449	2496	1533	1051	95256
14	652	383	260	216	376	792	2131	3495	4784	5545	6540	6432	6456	6549	6146	6052	6087	6018	5117	4327	3054	2211	1687	958	86268
15	554	329	178	171	274	459	1117	1894	2876	4449	5710	6804	6785	6192	5736	5644	5451	5388	5003	3692	2310	1600	807	504	79927
16	277	198	181	325	791	2032	4249	6925	5899	4513	4331	4527	4647	4481	4980	6404	7362	6940	3824	2455	1761	1225	712	458	79497
17	335	210	201	284	792	1901	4105	6845	6205	4507	4169	4349	4577	4581	5144	6446	7354	6845	4381	2782	2073	1321	832	590	80829
18	324	227	177	260	747	1974	4251	6895	6171	4449	4201	4346	4486	4531	5097	6389	6981	6516	4374	2913	2218	1470	880	639	80516
19	372	253	213	314	718	1924	4160	7019	5983	4683	4497	4572	4723	4805	5486	6733	7664	7112	4664	3188	2534	1766	1102	653	85138
20	440	263	244	289	705	1814	3903	6593	6178	4936	4965	5504	5711	5843	6908	7515	7108	7316	5374	3949	3234	2358	1436	1013	93599
21	649	379	216	241	403	830	1768	3372	4608	5704	6379	5804	6176	5600	6206	6071	6021	5296	4922	3707	2839	2117	1510	1065	81883
22	578	318	195	164	237	472	938	1956	2998	4187	5320	6388	6328	6382	6043	5858	5468	5377	4800	3588	2174	1196	799	545	72309
23	326	233	235	302	793	1993	4102	6931	5744	4319	4031	4423	4499	4443	4966	6112	7154	6680	3911	2505	1849	1279	766	532	78128
24	343	209	230	296	773	1883	3958	6623	5780	4335	3823	4213	4187	4287	5021	6078	7176	6655	3931	2436	1863	1334	815	533	76782
25	347	207	197	257	696	1707	3915	6459	5810	4119	3958	4111	4138	4286	4885	6073	7001	6635	3897	2417	1953	1516	869	560	76013
26	357	211	206	312	724	1796	3836	6423	5720	4232	3975	4167	4517	4307	5091	6257	7239	6383	4067	2736	2229	1737	966	633	78121
27	418	238	251	295	713	1819	3940	6576	5564	4532	4615	5080	5206	5381	6219	7305	7732	7301	5328	3859	3079	2145	1530	906	89932
28	635	345	256	211	402	837	1680	2852	4040	4801	5406	5619	5667	5775	5274	5636	5616	5350	4498	3260	2425	1802	1508	966	74861
29	633	368	257	187	192	354	800	1378	2179	3227	4459	5439	5779	5084	4522	4470	4519	4100	2885	2217	1559	936	574	391	56509
30	221	172	180	296	621	1498	3177	5059	5085	4147	3902	4095	4216	4172	4452	4954	5822	5677	3494	2395	1817	1251	736	546	67985
31	362	210	210	288	780	1895	3958	6521	5608	4249	3889	4147	4329	4468	4921	6127	7073	5969	3098	2410	1832	1361	749	567	75021

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for November 2017

Location ID:	02099092	Seasonal Factor Group:	03	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	
County:	MERRIMACK	Daily Factor Group:		368	222	213	282	752	1885	4014	6827	6200	4950	3900	4020	4206	4254	4845	6093	7534	6852	4198	2647	2034	1483	1195	595	78949	
Functional Class	1	Axle Factor Group:	03	362	202	231	301	711	1940	3970	6657	5834	4281	3971	4128	4451	4378	5086	6438	7429	6909	4265	2872	2313	1796	993	759	80277	
Location:	Interstate 93 S	Growth Factor Group:		424	236	221	327	700	1813	4084	6327	5869	4485	4266	4834	5085	5199	6124	7148	7665	7000	5157	3031	3122	2118	1351	904	87490	
				518	310	236	217	371	821	1819	2955	3892	4614	5259	5912	5466	5409	5299	5575	5711	5035	4172	3016	2206	1951	1422	914	73100	
				464	341	265	121	242	447	1031	1608	2634	3596	4498	5246	5449	5375	5294	5463	4747	4157	3102	2119	1565	926	612	409	59711	
				262	224	196	308	801	2057	4225	6880	5622	4134	3990	4089	4202	4326	4551	5797	6770	5962	3354	2242	1573	1198	677	498	73938	
				331	210	186	293	757	2029	4198	6961	5618	4303	3869	3961	4107	4275	4303	5072	6137	7401	6753	3874	2681	2084	1499	939	657	78955
				326	213	185	315	841	2009	4251	6970	5851	4279	3961	3948	4406	4732	5538	6688	7712	7132	4610	3430	2631	1820	1093	704	83670	
				383	222	203	302	739	1923	4097	6722	5712	4338	4138	4316	4485	4732	5538	6688	7712	7132	4610	3430	2631	1820	1093	704	83670	
				459	247	203	296	671	1612	3147	4835	4563	4746	5172	5239	5619	5602	6222	6659	6714	6395	4332	3003	2273	1709	1276	828	81822	
				449	325	194	202	297	683	1389	2492	3415	4374	5119	5383	5407	5228	5131	5087	5118	4503	3484	2576	2158	1667	1285	945	66911	
				490	270	170	133	218	362	829	1449	2236	3458	4512	5370	5847	5469	5545	5593	5352	4609	3302	2443	1906	1539	1096	712	482	70672
				275	163	153	314	769	1943	4082	6841	5609	4229	3950	3995	4245	4106	4523	4681	6298	5662	3099	3678	2376	1758	1446	775	560	75926
				344	181	176	301	715	1940	4005	6754	5975	4107	3801	3939	4200	4288	4729	6187	7082	6609	3678	2376	1758	1446	775	560	75926	
				341	226	211	277	706	1910	4108	6929	6054	4299	3940	4052	4421	4347	4991	6253	7264	6819	3901	2665	2026	1360	973	578	78651	
				366	205	220	334	720	1895	3999	6556	6123	4144	3970	4021	4300	4269	4866	6229	7016	6678	3948	2619	2227	1644	983	668	78000	
				403	240	243	313	713	1827	3857	5977	5800	4399	4610	4828	5046	5195	6031	6959	7777	7146	4778	3291	2514	1965	1477	897	86286	
				580	341	247	225	359	809	1608	2750	3752	4568	4861	5536	5522	5419	5383	5133	4877	4372	3401	2241	2020	1714	1295	848	67861	
				537	309	177	144	180	335	740	1144	1917	2951	3899	4881	5140	4813	4834	4841	4247	3570	2734	2184	1585	960	632	439	53193	
				307	153	201	310	754	1968	3972	6761	5697	4362	4105	4061	4328	4427	4887	6052	7034	6530	3867	2487	1876	1278	845	531	76793	
				355	228	235	287	745	1859	4074	6738	5771	4443	4189	4423	4731	4939	5353	6476	7691	6899	4748	3047	2388	1691	1063	847	83220	
				462	273	209	327	684	1757	3387	5494	5075	4366	4526	4988	5411	5121	5964	6332	6086	5609	3642	2549	2081	1468	1057	765	77633	
				497	326	187	180	170	315	601	1090	1880	2947	4786	6298	5339	3343	2388	2527	3431	4254	4313	4142	3109	2093	1262	808	56286	
				496	384	283	336	545	1003	1856	2952	3561	4499	5357	6117	6184	5724	6052	5795	5507	4971	3848	2898	2161	1666	1211	715	74121	
				422	276	207	188	338	578	1057	2040	2927	3997	5029	5716	5680	5410	5323	5504	5151	4739	3949	2845	2241	1730	1303	1012	67662	
				435	273	166	168	238	406	790	1318	2212	3526	4854	5889	5827	5356	5025	4857	4834	4589	3575	2414	1769	1015	670	402	60608	
				275	185	178	295	761	1962	4060	6927	5500	3691	3522	3546	4209	4111	4726	5797	7025	5639	3887	2273	1691	1208	701	501	72670	
				338	187	193	316	666	1850	3950	6651	5661	3607	3210	3256	3949	4168	4785	5890	7237	6557	3668	2448	1760	1193	812	559	72911	
				341	200	199	281	683	1748	3813	6751	5712	3762	3418	3372	3681	4023	4756	5971	7049	6480	3890	2507	1949	1401	818	587	73392	
				343	214	191	287	718	1790	4039	6666	6024	4073	3348	3822	4248	4315	4991	6390	7352	6577	4145	2751	2094	1505	916	627	77426	

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APPENDIX B

New Hampshire DOT
02099092: Monthly Hourly Volume for December 2017

Location ID:	02099092																								Seasonal Factor Group:	03	TOTAL
County:	MERRIMACK																								Daily Factor Group:		
Functional Class	1																								Axle Factor Group:	03	
Location:	Interstate 93 S																								Growth Factor Group:		
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL		
1	402	228	219	309	638	1652	3766	6420	5503	4236	4209	4471	4861	5086	5951	6933	7625	6619	4961	3384	2698	2259	1444	951	84825		
2	551	302	216	218	372	783	1675	2745	3425	4314	4800	5156	5279	5036	5086	5289	5186	4974	3647	2812	2249	2055	1362	858	68390		
3	482	253	162	166	198	395	922	1525	2131	3227	4158	5107	5215	4616	4468	4580	5098	4546	3428	2521	1542	962	814	421	56937		
4	267	179	191	294	746	1913	4063	6521	5710	4114	3837	4059	4288	4248	4668	5844	6966	6526	3674	2247	1736	1250	708	507	74556		
5	345	193	210	281	735	1873	3974	6777	5739	4131	3684	3844	4077	4360	4701	5864	6798	6128	3663	2426	1907	1243	856	553	74362		
6	324	218	188	289	684	1802	3927	6764	5869	4170	3881	3929	4160	4201	4865	5818	7169	6534	3862	2559	2088	1495	846	615	76257		
7	336	233	210	295	711	1798	3917	6624	5797	4227	3863	4056	4475	4492	5021	6253	7326	6565	4003	2643	2228	1625	960	678	78336		
8	379	250	204	300	664	1719	3725	6584	5637	4463	4299	4745	4927	5144	5972	7160	7461	6947	4833	3545	2921	2264	1479	950	86572		
9	493	334	206	207	324	676	1386	2527	3457	4210	4592	4811	4941	4178	3591	3043	2972	2525	1846	1388	1079	1009	825	581	51201		
10	377	215	158	169	191	357	676	1354	1799	2727	3649	3826	4783	4873	5013	5175	4757	4383	3240	2485	1560	986	680	432	53865		
11	256	161	199	281	786	1857	3904	6767	5663	4352	4023	4191	4415	4351	5012	6136	6957	6557	3863	2416	1831	1244	854	555	76631		
12	378	252	217	293	629	1395	2698	3788	3541	2290	1740	1746	1943	1983	2412	2998	3693	3358	1913	1258	934	724	525	462	41170		
13	273	200	199	257	669	1616	3562	6297	5811	4273	3841	3913	4229	4264	4901	5895	7091	6443	4049	2562	2138	1521	847	653	75504		
14	352	252	204	324	698	1745	3723	6623	5737	4404	4108	4279	4584	4546	5296	6345	7558	7000	4388	3012	2347	1917	1319	749	81510		
15	423	312	241	298	631	1636	3501	6385	5819	4412	4462	4932	5299	5331	6486	7519	7468	6693	5226	3580	2778	2285	1642	1071	88430		
16	618	381	247	211	326	660	1436	2513	3342	4378	5063	5656	5615	5404	5561	5120	5136	4150	3016	3016	2452	2143	1880	959	71882		
17	546	325	174	138	166	360	800	1381	2139	3224	4294	5168	5204	5218	5241	5349	5144	4035	3238	2591	2083	1198	718	478	59212		
18	287	208	196	286	739	1778	3589	6042	5300	4121	3815	3888	3798	3843	4499	5427	6217	5815	3522	2260	1656	1111	763	555	69715		
19	355	184	240	293	713	1734	3681	6561	5773	4283	4097	4321	4472	4556	5292	5685	6890	6722	4058	2762	2090	1517	923	635	77837		
20	375	244	216	300	627	1732	3723	6320	5810	4489	4218	4454	4579	4811	5318	6398	7247	6684	4195	2808	2250	1654	1027	687	80166		
21	401	294	217	331	660	1758	3763	6325	5500	4681	4474	4943	4981	5274	5869	6825	7452	6817	5098	3614	2969	2224	1456	931	86857		
22	512	330	270	340	684	1449	2863	4442	3981	3577	3357	3557	3809	3806	3975	3443	3449	2846	2262	1407	1053	970	905	558	53845		
23	400	230	200	207	264	444	790	1308	1452	1854	2398	2812	3081	3265	3495	3305	3018	2559	2135	1644	1412	1186	873	604	38936		
24	354	187	154	129	187	313	741	1295	2214	3488	4579	5439	5518	4762	4376	4326	3993	3766	2823	2358	2386	2147	1495	888	57918		
25	407	189	105	89	93	164	323	351	523	748	1015	1409	2164	2716	2886	2681	2442	2467	2380	2285	1935	1460	786	446	30064		
26	245	146	153	249	580	1138	2303	4066	3972	4136	4856	5643	5881	5758	6114	6001	6552	5827	3819	2727	2009	1508	1003	544	75230		
27	316	220	211	275	615	1379	2899	4970	4609	4064	4693	5229	5325	5313	5882	6368	6917	6196	3962	2764	2099	1531	1042	663	77542		
28	367	233	187	277	583	1346	2729	4625	4320	4009	4432	5159	5308	5373	5857	6277	6844	6150	4057	2702	2212	1661	981	678	76367		
29	371	250	237	317	515	1240	2511	4339	4056	4027	4647	5439	5493	5736	6352	6601	6757	6083	3722	3339	2366	1793	1283	810	78284		
30	453	295	211	218	290	511	1092	1862	2599	3455	4684	5748	5957	5577	5633	5281	5067	4561	3696	2623	2039	1704	1068	713	65337		
31	393	248	162	126	191	289	607	966	1532	2491	3635	4652	4723	4269	4011	3945	3691	3284	2659	1827	1165	1161	710	496	47233		

APPENDIX B

Weekend Traffic Volumes

APPENDIX B

Weekend Traffic Counts, I93, Between Exits 12 and 13

	Friday	Saturday	Sunday	Total
March	83,494	62,045	58,282	203,821
	82,188	62,673	55,349	200,210
	88,337	68,734	61,883	218,954
	78,294	64,257	60,474	203,025
Total	332,313	257,709	235,988	826,010
April	70,332	34,526	60,801	165,659
	84,097	69,706	59,887	213,690
	87,185	68,382	58,839	214,406
	84,821	69,517	60,964	215,302
Total	326,435	242,131	240,491	809,057
May	82,924	68,327	55,167	206,418
	80,601	89,376	78,781	248,758
	94,985	78,333	69,440	242,758
	90,952	77,892	70,087	238,931
Total	349,462	313,928	273,475	936,865

APPENDIX B

Weekend Traffic Counts, I93, Between Exits 12 and 13

	Friday	Saturday	Sunday	Total
Weekend Traffic Counts, I93, Between Exits 12 and 13				
	Friday	Saturday	Sunday	Total
June	92,252	77,514	67,855	237,621
	93,276	80,106	77,261	250,643
	92,408	81,231	76,235	249,874
	97,817	82,760	80,394	260,971
Total	375,753	321,611	301,745	999,109
July	96,698	78,165	77,721	252,584
	88,872	100,663	84,627	274,162
	91,986	99,968	86,274	278,228
	99,234	84,610	81,962	265,806
Total	376,790	363,406	330,584	1,070,780
August	97,351	79,735	83,031	260,117
	99,262	85,153	81,286	265,701
	89,945	86,430	82,585	258,960
	98,527	84,954	78,424	261,905
Total	385,085	336,272	325,326	1,046,683

APPENDIX B

Weekend Traffic Counts, I93, Between Exits 12 and 13

	Friday	Saturday	Sunday	Total
Weekend Traffic Counts, I93, Between Exits 12 and 13				
	Friday	Saturday	Sunday	Total
September	95,584	80,700	60,130	236,414
	92,852	74,905	69,957	237,714
	85,769	96,044	80,364	262,177
	97,959	84,909	84,405	267,273
Total	372,164	336,558	294,856	1,003,578
October	100,453	87,080	73,643	261,176
	95,256	86,268	73,927	255,451
	93,599	81,883	72,309	247,791
	89,932	74,861	56,509	221,302
Total	379,240	330,092	276,388	985,720
November	87,490	73,100	59,711	220,301
	81,822	66,911	61,443	210,176
	86,286	67,861	53,193	207,340
	74,121	67,662	60,608	202,391
Total	329,719	275,534	234,955	840,208

APPENDIX B

Weekend Traffic Counts, I93, Between Exits 12 and 13

	Friday	Saturday	Sunday	Total
Weekend Traffic Counts, I93, Between Exits 12 and 13				
	Friday	Saturday	Sunday	Total
December	84,825	69,390	56,937	211,152
	86,572	51,201	53,865	191,638
	88,430	71,882	59,212	219,524
	53,845	38,936	57,918	150,699
	78,284	65,337	47,233	190,854
Total	391,956	296,746	275,165	963,867
Jan-18	65,439	53,334	48,645	167,418
	80,911	54,588	55,847	191,346
	86,979	72,560	59,046	218,585
	85,917	69,528	63,941	219,386
Total	319,246	250,010	227,479	796,735
Feb-18	82,046	67,978	51,071	201,095
	89,259	70,343	57,050	216,652
	88,341	75,153	60,377	223,871
	86,035	74,589	44,297	204,921
Total	345,681	288,063	212,795	846,539

C:\Users\owner\Documents\concord i93 part 2\2018 10 report materials\[weekend counts tabulated.xlsx]Sheet1