

# I-89 Lebanon, NH - Hartford, VT Bridge Reconstruction & Widening Project

October 2017



U.S. Department of Transportation  
Transportation Investment Generating Economic Recovery

"TIGER"

GRANT APPLICATION PROJECT NARRATIVE REPORT

Project Name: I-89 Lebanon, NH – Hartford, VT Bridge  
Reconstruction and Widening Project

Project Type: Bridge Rehabilitation

Project Location: Urban, Lebanon, NH and Hartford, VT

Project Website: <https://www.nh.gov/dot/projects/lebhart16148/index.htm>

Funds Requested: \$10,000,000 (28%)

Other State and Federal Funds

New Hampshire:	\$17,056,000 (48%)
Vermont:	\$ 8,544,000 (24%)

Total Construction Costs: \$35,600,000

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Vietnam Veterans Memorial Bridges  
Interstate 89  
Lebanon, NH – Hartford, VT

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## OVERVIEW AND INTRODUCTION

The New Hampshire Department of Transportation (NHDOT) is pleased to submit this application requesting \$10 million through the TIGER IX Discretionary Grant Program (TIGER IX). This grant application addresses the critical condition of the bridges carrying I-89 over the Connecticut River between Lebanon, NH and Hartford, VT (known as the Vietnam Veterans Memorial Bridges). These bridges are structurally deficient and functionally obsolete with a Federal Sufficiency Rating of 49.7 for the southbound structure and 61.6 for the northbound structure (out of 100). These two structures are ranked numbers 2 and 3 on the NHDOT “Red List” Priority for structures based on a number of factors, including their overall condition, volume, and importance within the transportation system. The deck, superstructure, and substructure of each bridge rates only 4 (Poor) or 5 (Fair) as defined using the NBI rating scale, except for the substructure of the southbound structure, which is rated 6 (Satisfactory). The current Annual Average Daily Traffic (AADT) volume is over 41,000 vehicles per day on this critical link between New Hampshire and Vermont. As there are only a few crossings of the Connecticut River in this area many vehicles use the I-89 bridges to simply proceed from one side of the river to the other as part of their normal work commute, shopping trip, or other daily activity.

The interstate itself is also a source of concern as the existing ramps that provide access to I-91 in Vermont and NH Route 12A in New Hampshire have some deficiencies that impact the safety of motorists that utilize this portion of I-89. The existing ramps on both sides of the river in each direction are too close together when considering the current volumes. Merging movements that occur across each bridge in both the northbound and southbound direction are constrained and have resulted in a number of crashes as motorists attempt to enter and exit the interstate. In addition, the existing bridges were built with shoulders only 3’ in width on each side. These shoulders provide no refuge for disabled vehicles and very little room to maneuver if just one motorist encounters a problem. Mitigating



**The I-89 Bridges are the key component in the transportation system of the Upper Valley**

or removing these issues altogether will increase the safety of both the northbound and southbound sections of the interstate.

The purpose of this project is twofold. The first and most important goal is to restore the bridges to a “State of Good Repair.” The second goal is to improve the safety for vehicles crossing the structures while also improving traffic flow and operations. To meet these goals it is proposed that the deck and superstructure of each bridge be completely removed and replaced, while also repairing and rehabilitating the existing substructures. In addition, the bridges will be widened to accommodate traffic control during construction and the construction of a new auxiliary lane across each structure along with providing a full width 10’ right shoulder adjacent to the auxiliary lane between the two adjacent on/off ramps. This configuration requires that a new substructure be constructed between the two existing bridges to support the newly widened bridges. Ultimately, the new bridges will provide three travel lanes and shoulders in each direction that meet the current standards for interstate highways.

Rehabilitation and widening of the I-89 bridges over the Connecticut River will:

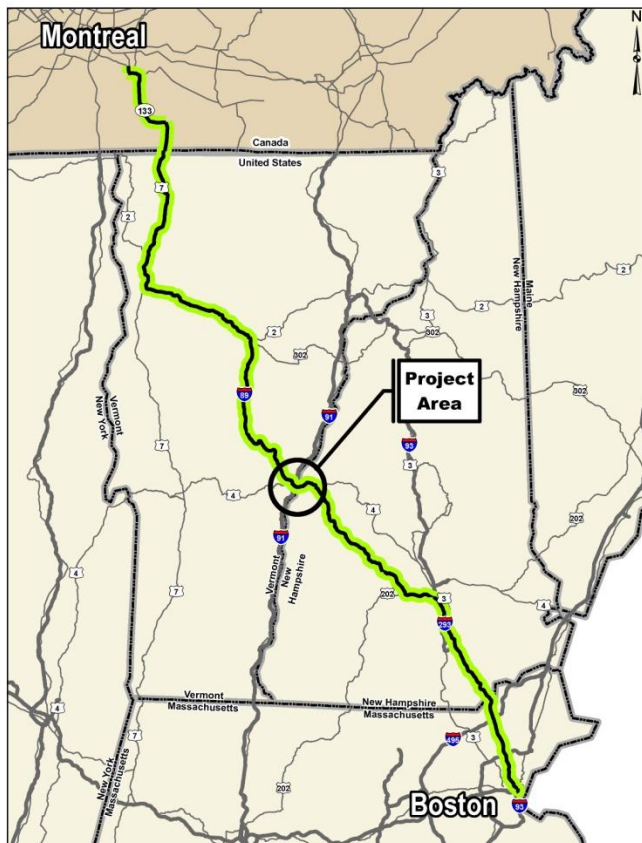
- Address significant deficiencies in the regional transportation system by replacing the existing deck and superstructure and widening each of the structurally deficient structures over the Connecticut River, essentially replacing them with new structures
- Improve the safety of the interstate highway by eliminating the substandard ramp merge distances and providing standard shoulder widths
- Continue to serve the long term mobility needs for not only the Upper Valley region, but New Hampshire and Vermont as a whole
- Ensure continued economic and cultural vitality of both New Hampshire and Vermont by addressing two deficient bridges located within an economic and tourist hub
- Continue to allow commuters to reach their jobs as well as providing flexibility for workers to access new and better employment opportunities
- Allow those in need of medical care to reach the facilities located in both New Hampshire and Vermont
- Provide or create jobs in this region for the entire duration of construction activities (3 to 4 years)
- Enhance the livability of the Upper Valley Region through a direct vehicular connection
- Meet USDOT goals on system preservation, and targeting federal funding towards critical interstate highways.

New Hampshire believes this application meets the criteria for the TIGER IX Grant Program and further, that it represents the type of project envisioned. It is a unique application, addressing

the transportation needs served by the Vietnam Veterans Memorial Bridges. Receipt of TIGER IX Grant funds would also allow the state to advance other structurally deficient bridge needs within the region and across the state.

## PROJECT DESCRIPTION

Originally constructed in 1966, both bridges have deteriorated to the point that they are currently ranked second and third on New Hampshire’s “Red List” Priority ranking and are considered structurally deficient with ratings of 49.7 for the southbound structure and 61.6 for the northbound structure (out of 100). The bridges are designated as the Vietnam Veterans Memorial Bridges to honor those that fought in the war in Southeast Asia. Each bridge contains two 12’ lanes with a 3’ wide shoulder on each side of the travel lanes. The bridges are located high above the Connecticut River and connect Lebanon, NH and Hartford, VT. A diamond interchange, designated as Exit 20, is located directly adjacent to the bridges on the New Hampshire side while a full cloverleaf interchange with Interstate 91 is located directly adjacent to the bridges on the Vermont side. Currently, over 41,000 vehicles use these bridges every day.



These bridges are critical facilities for the movement of people and goods locally, regionally, nationally and internationally. They are located along the major Boston to Montreal international trade route corridor. As noted, they provide a connection to I-91, as well as New England’s major seaports and intermodal facilities, which connect New England with Canadian trade markets.

Project Location Map

The bridges also serve the Upper Valley Region, including the Lebanon micropolitan statistical area (MSA), the nation's largest such area with a population over 218,000 in New Hampshire and Vermont (the MSA includes Grafton County, NH, and Orange and Windsor Counties, VT). The median household income in the region is \$55,726 (2014), slightly higher than the median income for the United States (\$53,657). Major businesses in the area include Dartmouth-Hitchcock Medical Center (8,000), Dartmouth College (3,500), VA Medical Center (700), and Timken Aerospace (600). The bridges are critically important to the connectivity, economy, and quality of life in both New Hampshire and Vermont. Commuters use these bridges to reach employment, medical services, education, and training opportunities. Businesses in the area similarly use the bridges daily to facilitate delivery of goods and services throughout the region. The bridges serve as a link to the downtown areas of Lebanon, NH and White River Junction, VT for retail, tourism, and service industries.

In addition to commuter traffic and freight, intercity buses also rely on this corridor. Both Greyhound and MegaBus provide service along this corridor through Vermont and New Hampshire. The bridges also provide access to the passenger and freight railroad terminal in White River Junction as well as the Lebanon Airport, making it a truly intermodal and multimodal corridor.

As noted above, the condition of the bridges is considered fair to poor for all elements excepting the substructure of the southbound bridge. The bridges exhibit extensive corrosion and, since their opening in 1966, have received no major rehabilitation or reconstruction work. However, there were repairs made in 1984 to each structure, including minor deck repairs, placement of a new wearing course, resetting the granite curbs, and rehabilitation of the existing guardrail system. More recently, supplemental steel plates and members were installed to repair section loss and web cracks at isolated locations.



Currently, the bridges are showing severe signs of distress including cracking and delamination on the bridge decks, pitting and section loss along the steel beams, and even cracking and the formation of holes within the beams and cross members. In December 2011, NHDOT was forced to repair a large crack that had formed in the exterior girder of the southbound bridge. In summary, both bridges now require extensive work and additional monitoring just to keep them functioning and allow traffic to keep flowing.

As the bridges are on the "Red List" the Department is required to inspect them twice yearly,

placing an additional burden on NHDOT inspection crews and utilizing manpower that could be used elsewhere. Due to the narrow shoulders, the increased level of repair and inspection also puts workers at additional risk more often each year that the bridges remain in place in their current condition. A copy of the Bridge Rehabilitation Study Report completed in 2014 is included as an attachment.

## **TRANSPORTATION CHALLENGES THE PROJECT AIMS TO ADDRESS**

Functionally-Obsolete and Structurally-Deficient highway bridges are a national problem, and New Hampshire, from a statistical standpoint, ranks 11th in the nation with over 13% of the state bridge inventory classified as structurally-deficient. Compounding the problem in northern New England are the harsh environmental conditions that accelerate bridge deterioration, particularly winter conditions which require roadway treatment with catalytic de-icing chemicals. With insufficient funding and forces to maintain the bridge inventory in a state of good repair, NHDOT has had to prioritize bridge rehabilitation and replacement projects. Many of these bridges are critical in that they are relied upon for regional, national and international movement of people and goods, making them important not only to the local communities they serve, but also to the National Freight Network. Providing continuous National Highway System (NHS) corridors free of weight and vertical clearance restrictions is a critical priority for all states, as well as the federal government. For these reasons, New Hampshire has prioritized NHS bridges for rehabilitation and replacement, but funding is insufficient to address the entirety of the need in a timely fashion, often resulting in load capacity down-posting or a decreased level of service.



**Large spall in the bridge span**

## **HOW THE PROJECT WILL ADDRESS THESE CHALLENGES**

This project will bring the I-89 bridges to a state of good repair, as well as addressing operational and safety concerns. It will ensure that the bridges will not require additional major rehabilitation for several decades, providing local, national, and international connectivity of this corridor within the National Freight Network and the NHS system. The



operational and safety improvements will ensure that communities in New Hampshire and Vermont continue to prosper, enabling connections to major employers, trade partners, educational and training opportunities, and medical facilities. It will also ensure that the vital Boston to Montreal trade corridor continues to operate efficiently and unimpeded.

## PROJECT PARTIES

NHDOT and VTrans are the principal executive transportation agencies for their states. Under state statutes in their respective states, both NHDOT and VTrans are authorized to seek federal aid for modernization of highways and bridges.

## SELECTION CRITERIA

This important project meets many of the goals envisioned by the TIGER program when it was first proposed. The Primary and Secondary Selection Criteria discussed below provide evidence of how this project meets the goals and criteria of the TIGER IX Program.

### Primary Selection Criteria

#### State of Good Repair

The I-89 bridges are structurally deficient and an increasing amount of funding is required each year to maintain them in a usable condition. Each year the condition gets worse as these



**Rust and scale under relief joint**

bridges age and the work required to maintain them exceeds the funding and personnel available. The bridges have reached the point where a full superstructure and deck replacement is required and is beneficial from a short and long term perspective as shown in the attached Benefit-Cost Analysis. The southbound bridge also has a fixed automated spray technology (FAST) anti-icing system which is costlier to operate and maintain than traditional chloride treatments alone. With the proposed replacement of the bridge superstructure

and deck and the intended improvements to the existing roadway geometry and drainage system, the deteriorated anti-icing system can be discarded.

If the bridges are not repaired, rehabilitated, or improved, eventually it will be necessary to impose weight restrictions, severely impacting interstate commerce and travel. Ultimately, if improvements are not performed, complete closure of the structures may become necessary. This will have a significant effect to the overall transportation system within not only the Upper Valley Region, but New Hampshire and Vermont in total. The local transportation network would be severely disrupted with interstate vehicles being forced to use other roadways like US Route 4 and 5, as well as NH Route 12A and 10 and VT Route 14.



**Bridge abutment showing cracks and spalls**

In addition, the closing of these structures would cause undue hardship for many of the citizens of both states, as well as those that utilize the structures to ship goods and services throughout the region. Truck flows (local/regional deliveries, and national/international trade) account for approximately 10% of the AADT (1.4 million annual trips) along the corridor, the majority of which neither originate in, nor are destined for, New Hampshire or Vermont. The bridges are located along the Boston to Montreal international trade route, and serve as a conduit to both I-91 and I-93, which connect New England with vital Canadian trade markets. According to the Bureau of Transportation Statistics, 440,000 trucks cross Vermont's borders using I-89 (and connecting I-91). The bridges are also a major link that tie New England's major seaports and intermodal facilities. Without the bridges, freight traffic would need to detour 100 or more miles or rely on secondary highways not suited for major commercial flows. The critical need for these bridges extends far beyond New Hampshire and Vermont as they serve as a conduit for trade along the entire eastern seaboard.

Intercity bus transportation is also an important traffic component and is provided by both Greyhound and MegaBus. Combined, these two services provide 6 daily-return trips and transport an estimated 100,000 passengers annually. Finally, the White River Junction Rail Station serves as the Amtrak stop for the daily Vermonter Amtrak Service. The St-Albans-Washington, DC service connects communities in Vermont, New Hampshire, Massachusetts, and Connecticut. Approximately 15,000 trips annually are made at this station, with many of them utilizing the I-89 bridges to arrive at the station.

The new concrete deck and steel girders, as well as the additional pier construction needed to



create the widened portion of the structures, form the core components of this project. These elements have been designed to improve the bridges' ability to withstand natural disasters such as extreme flood events or seismic activity. As part of the design a scour analysis was conducted and the implementation of the resulting scour countermeasures will provide the structures with additional scour resistance against major flooding

events, especially during the winter with high ice flows. The existing bridges have no scour countermeasures and are susceptible to scour from flood events. In addition, although the existing piers have not been upgraded to meet current seismic loadings, the bridge seats will be fitted with new low friction bearings to allow the new beams to slide if seismic activity occurs. This project therefore improves the resilience of the bridge for not only climate change, but seismic activity as well.

The project is consistent with relevant plans to maintain the bridges in a state of good repair. The project is included in both the current NHDOT Ten-Year Transportation Improvement Plan (2017-2026) as well as the Draft Ten Year Plan (2019-2028) currently under review and available for public comment. It is also consistent with the current VTrans Capital Improvement Plan. It is also included in both state's State Transportation Improvement Program. In addition, the project is consistent with both the New Hampshire and Vermont Long Range Transportation Plans System Preservation Goals (providing appropriate investment in infrastructure to preserve the physical condition and operability of the transportation system).

The project is appropriately capitalized and both NHDOT and VTrans use asset management techniques that optimize its long-term cost structure. Both NHDOT and VTrans have a sustainable source of revenue available for the operations and maintenance of the project. This consists primarily of FHWA formula funds and state transportation revenues.

These bridges are also of exceptional importance to the rural economy outside of the immediate Lebanon-Hartford area. Many small family farms and businesses utilize the bridges to bring their goods and services to market. In addition, these small businesses need to obtain raw materials and other items that allow them to remain in business. Both sides of the river, but in particular the Lebanon area, serve many of the needed resources necessary for businesses to not only survive, but thrive. The Vietnam Veterans Memorial Bridges support

commerce and economic growth throughout the region and their disruption or closing would severely limit both.

There are over 2,100 state-owned bridges in the NHDOT bridge inventory and 675 (31%) of them are over 75 years of age. With 12.2% of the state-owned bridges being categorized as Structurally-Deficient, replacement of these bridges with a new, single, low-maintenance structure utilizing TIGER Grant funding will allow NHDOT to accelerate addressing other important statewide bridge needs.

### **Economic Competitiveness**

The project includes auxiliary lanes across both bridges that will stretch between both interchanges and provide improved levels of service and more consistent travel speeds through the corridor. Improving the ability of vehicles on the mainline and ramps to traverse this area in a more efficient manner will result in a reduction of travel times and maintenance costs and will allow local, regional, national and international commercial users to reduce transportation costs, improve their logistics practices, and expand markets for both domestic and international shipments (see the attached Benefit-Cost Analysis).



**Major employers and healthcare providers such as Dartmouth-Hitchcock Medical Center rely on the I-89 Bridges Over the Connecticut River**

These bridges serve as a vital link between New Hampshire and Vermont's tourism sectors, and will provide a safer, more efficient connection between these attractions and their users. In addition, these bridges form one of the major links in the commercial shipping corridor between Canada, Vermont, New Hampshire and points further south throughout New England. The proposed improvements will therefore maintain long-term efficiency, reliability, and cost competitiveness of goods, allowing the US and the region to stay relevant in the global economy.

The Lebanon Municipal Airport, located off Exit 20 in New Hampshire is the state's third largest airport. The Airport is a large economic contributor to the region with nearly \$2.4 million spent in 2013 by airport visitors. It hosts three major aviation service providers and is a critical

resource for the Dartmouth-Hitchcock Advanced Response Team (emergency and quick response air service). Many businesses in the region rely on Lebanon Municipal Airport 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, Vermont, and the region, which is key to maintaining the economic stability and growth of this airport.

Economic benefits will also accrue from the safety component of this project. Savings from avoided crashes directly affect the local communities that provide the emergency service response. The savings associated with fewer emergency response calls may result in lower taxes, allowing communities to stay competitive in attracting and retaining businesses and homeowners.

In addition to the obvious benefits that accrue from moving goods and services, the ability to move quickly and easily between New Hampshire and Vermont provides flexibility within the work force. This allows employees to live and work where they are happiest and most needed. This allows businesses to locate on either side of the Connecticut River, basing their decision on factors other than shortcomings within the transportation system. A stable and efficient transportation system enhances long term job creation and stability. In the short-run this project is anticipated to create approximately 100 jobs in construction and engineering services.



**Lebanon's Downtown is highly dependent on tourism**

The Lebanon-White River Junction area has been reshaped considerably in the past few decades. Primarily a manufacturing hub, the region has transitioned to a mixed industrial-service economy. The availability of a strong transportation infrastructure linking communities, states, local businesses, and the world in general, has helped facilitate this transformation. However, the area outside of the urban hub remains very rural in nature and for those people, the bridges provide an important conduit in so many ways to the outside world. Their connection to not only economic opportunities, but cultural and recreational opportunities, is largely dependent on the roadways and bridges that make up our transportation system,

including the I-89 bridges. A strong and efficient transportation system is also critical to attracting and keeping new businesses, especially privately owned businesses, that can grow and keep the economy thriving. If these bridges are allowed to deteriorate further it sends a strong message that New Hampshire and Vermont are not “open for business.”

## Quality of Life

This project improves the quality of life of area residents by supporting two of the six ‘Livability Principles’ developed by USDOT, along with the Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA) as part of the Partnership for Sustainable Communities – 1) Enhancing Economic Competitiveness, and 2) Supporting Existing Communities.

Livability and community cohesion go hand in hand. The quality of relationships among people in a community, as indicated by the frequency of positive interactions, the number of neighborhood friends and acquaintances, and one’s sense of community connection, is a significant indicator of a region’s livability. Both Lebanon and White River Junction have vibrant downtown areas and well-established neighborhoods. The I-89 bridges connect these communities and contributes to their overall livability by linking the downtown areas, businesses, organizations, civic groups, and individuals.



**White River Junction depends on tourism to sustain its economy**

Maintaining these bridges in a state of good repair, improving the operations of the interchanges, and improving safety all have a positive impact on travel through this area for business and personal endeavors including work, shopping, school, medical treatment, and recreational activities. In addition, this area contains one of the largest VA Hospitals in White River Junction Vermont as well as one of the top cancer research and children’s hospital in the region - Dartmouth Hitchcock Medical Center in Hanover, NH. The proposed improvements will continue to provide safe, efficient access to these facilities, ensuring that residents and visitors continue to obtain excellent medical care.

Since the micropolitan area serves as a hub for the surrounding farms and homes, the bridges provide essential access to commodities that are only available from the retail establishments located within West Lebanon and, to a lesser extent Hartford and White River. Without easy access to these businesses, the many people that live in the rural areas would lose more time during their week simply trying to obtain the day to day items that every family needs; reducing the time available for work or play. Interstate 89 and the bridges over the Connecticut River help ease travel to these everyday destinations.

Finally, the bridges enhance transportation choices by providing quick access to essential services, particularly for transportation disadvantaged groups. As mentioned previously, both Greyhound and MegaBus provide 6 daily-return trips and transport an estimated 100,000 passengers annually and the Rail Station in White River Junction similarly provides access to regional services. These providers allow area residents to reach a wider pool of education and training opportunities, and medical centers.

### **Environmental Sustainability**

The project includes components that will improve water quality and avoid and mitigate environmental impacts. The reconstruction of the bridges includes the construction of two new stormwater treatment facilities to handle stormwater runoff from paved roadway surfaces that were previously untreated. The proposed infiltration ponds will provide improved water quality by increasing the removal of total suspended solids, total nitrogen, and total phosphate from highway runoff into the Connecticut River.



**The Connecticut River, viewed from a New Hampshire-Vermont bridge**

Improving the water quality of the Connecticut River is important to both New Hampshire and Vermont. The Connecticut River is a flagship natural resource throughout New England, just as the Chesapeake Bay is to the mid-Atlantic region. Running 410 miles from the Canadian border to Long Island Sound, it is the region's longest river and one of only 14 American Heritage Rivers designated nationally, recognized for its distinctive natural, economic, agricultural, scenic, historic, cultural and recreational qualities. In May 2012, U.S. Interior Secretary Ken Salazar

designated the Connecticut River as America's first National Blueway, stating that the restoration and preservation efforts on the river were a model for other American rivers.

The project will also benefit the environment due to the addition of the auxiliary lanes in both directions. The addition of these lanes will reduce and practically eliminate congestion at the interchange ramp junctions, at least in the near term, thus reducing emissions, providing a slight benefit to the overall air quality in the region. In addition, on the Vermont side, the river



bank will be graded to provide a shelf or bench. This bench is being provided for two reasons. The first benefit is that it provides floodplain mitigation, necessitated by a slight increase in water surface elevation due to the new pier construction, and the second benefit is that it creates a shelf that allows wildlife to more easily access the river. The existing river bank is very steep in this location, making it difficult for large game animals to access the waterway.

Finally, the project benefitted from FHWA's Every Day Counts program in that design tasks could move forward side by side with the development of the environmental document. This allowed the Department to quickly work through the initial phases of project design, and then continue working, while the details that were necessary to finalize environmental impacts and commitments were worked out. The resource agencies were kept informed at all times and played a role in keeping the project moving. In addition, the Department took a proactive approach when dealing with the resource agencies; specifically, the Corps of Engineers, the Vermont Department of Environmental Conservation (VTDEC), and the NH Department of Environmental Services (NHDES). With each of these agencies the Department began communications and coordination as soon as approval was given to begin the project. Then, as the project progressed, the resource agencies were kept informed and were asked for input on a regular basis, expediting the environmental documentation and permitting as the project moved forward. This has benefitted the project by allowing it to remain on schedule while also reducing the permitting required as it was determined that a Vermont Wetlands Permit was not required. Only early and close coordination with VTDEC made this possible.



## Safety

Improving the safety of the entire roadway system is always an important goal of any project. In this case, the significant deterioration of the structures has made it possible to take a fresh look at the existing configuration and improve it. Since a project of this size does not come along very often, this is the best chance to make improvements. The geometry and layout through this area of I-89 suffer from the following conditions:

- The existing inside and outside shoulder widths on both bridges are only 3' wide and do not meet current standards.
- The on-ramp from northbound Interstate 91 (I-91) to southbound Interstate 89 (I-89) has an insufficient merge distance.
- There is less than the desirable 2,000 feet between the southbound on-ramp from I-91 and the off-ramp to Exit 20.
- There are crashes occurring on the southbound on-ramp from I-91 as a result of geometric deficiencies.

The non-standard roadway cross section on these bridges coupled with the deficient acceleration/deceleration lengths on the adjacent ramps has led to a large number of crashes. Within the project area, there were a total of 114 reported crashes with 21 injuries and one fatality in the period between 2007 and 2016. These deficiencies can be corrected by providing an auxiliary lane on each bridge (in each direction) and by providing full width shoulders (a 12' wide shoulder on the right side of the travel lanes and a 4' wide shoulder on the left side of the travel lanes). The auxiliary lane allows more room for vehicles, both entering and exiting, to merge comfortably by providing more room for acceleration and deceleration outside the travel lanes. In addition, the wider shoulders allow traffic to flow more freely and allow motorists more room to maneuver in emergency situations. Each of these items reduces the potential for crashes and injuries.



**Crashes occur on the I-89 bridges and the adjacent areas.**

Auxiliary lanes and wider shoulders also have the additional benefit of providing more room for emergency and maintenance vehicles to operate on the bridges during incidents, as well as routine clean up, repair work, and inspections. A safety analysis was conducted to determine if any of the existing deficiencies contribute to the crashes in the area. One area in particular, the

on-ramp from northbound I-91 to southbound I-89, indicates that the poor geometry likely contributes to the high number of multiple vehicle crashes.



One added safety benefit of this project is the addition of stormwater treatment facilities. Stormwater treatment basins were added on both sides of the river to collect stormwater from pavement areas that previously received no treatment at all. These basins have outlet structures that can, in an emergency, be closed off. If a hazardous materials spill occurs, closing these outlets could prevent

harmful chemicals from reaching the Connecticut River. Since the river is a source of drinking water for many communities downstream, this is an important issue.

## **Secondary Selection Criteria**

### **Innovation**

In order to move this project as quickly as possible to construction, the NHDOT followed the “Every Day Counts” process. Within this process, both design and environmental documentation and coordination occur simultaneously. As discussed above in the Environmental Sustainability Section, this process helped expedite both the environmental work as well as the design work. Both tasks could keep moving, thus minimizing project delays.

On the financing side, the NHDOT is utilizing GARVEE bonds to fund a portion of the project. These bonds are cost-effective in that can be used to construct projects now, when interest rates are low, as opposed to waiting when it is likely that interest rates are much higher. This should provide a real benefit to the citizens of New Hampshire as they will enjoy the benefits of the project sooner, rather than later, saving money over the long term.

### **Partnership**

New Hampshire and Vermont (along with Maine) are involved in an innovative partnership to further highway performance and safety. Referred to as the “Tri-State Partnership,” the States are involved in, and jointly participate in, continuous and comprehensive assessment of system performance, knowledge base transfers, training exercises, coordinated materials procurement, and implementation and support of the Managing Assets for Transportation System (MATS) - a long-term asset performance system.

This project to renew the Vietnam Veterans Memorial Bridges is another example of the two states working together to complete a project that benefits both states. New Hampshire and Vermont are using a combination of state transportation revenues, federal formula funds, toll

credits, and GARVEE bonds to supplement TIGER funding for this project. Only 28% of the project costs are anticipated to come from TIGER funds. Receiving TIGER funds for this project will allow New Hampshire to address other structurally deficient bridge needs that are also sorely needed in the region and across the state.

In addition to several meetings among NHDOT and VTrans project staff and executive staff, a public information meeting was held in June 2014 to allow the surrounding municipalities and the public to have input into the project design. Both Lebanon, NH and Hartford, VT have also participated in the planning of this bridge project and have been willing partners in support of completing the project as soon as possible. This application enjoys widespread support from many stakeholders in these communities and elected officials at all levels of state and local government (See the attached letters of support).

### **BENEFIT-COST ANALYSIS**

A benefit-cost analysis was performed using the guidelines of the Notice of Funding Availability. The analysis focuses on the reconstruction of the existing bridges, including the full replacement of the steel superstructure, concrete deck replacement, and bridge widening to provide improvements to the existing geometry while maintaining the required travel lanes during construction. The project is evaluated by comparing the existing conditions, which is considered the baseline, and a future scenario where the superstructure and concrete deck have been widened and replaced. It is anticipated that if no major capital improvements are made, these bridges would need to be down posted and ultimately closed. Because the bridges carry interstate traffic, the long-term closure and rerouting of traffic on other state and local routes was not considered a viable option.



The evaluation period of the 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 analysis, the analysis period includes the project development stage with the construction anticipated to begin in 2019 and be completed in 2023 with a 50-year operation life. The life expectancy of the bridge is 75 years so a residual value at the end of the 50-year operational life was determined in the BCA.

The reconstruction of the two I-89 bridges over the Connecticut River results in a Benefit-Cost Ratio (BCR) of 2.05, with a BCR of 0.43 at a 7 percent discount rate, and a BCR of 0.87 at a 3 percent discount rate. Please refer to the attached Benefit-Cost Analysis for more detail.

## **PROJECT READINESS**

### Technical Feasibility

NHDOT commissioned the I-89 Bridges Rehabilitation Study Report (2014) which examines the technical feasibility of this project. The report lays out the project feasibility (also examining other alternatives such as full replacement), sets out the design criteria and basis of design, and develops cost estimates which were further refined to bring them to 2016 levels. Contingency levels have been applied to all phases of this project to reduce cost risk.

Both NHDOT and VTrans have cost risk-mitigation measures in place. Both agencies have sufficient flexibility to shift funding between projects to accommodate unforeseen cost overruns, and can also shift funding between programs if necessary (both state and federal funds). Both agencies use an active budget monitoring process whereby finance and budget staff meet regularly with program management staff to monitor expected costs at both a project and overall program level of detail. This careful monitoring allows both agencies to identify in advance when and where potential budgetary adjustments may become necessary, and plan for the changes in advance to avoid sudden and more disruptive funding shifts.

The contract drawings have incorporated and refined the preferred alternative as defined within the I-89 Bridges Rehabilitation Study Report. These drawings are approximately 85% complete and should be completed and ready for advertisement early in 2018. Shown below are the latest cost estimates illustrating all the components that make up the estimated cost of \$35.6 million. This estimate also includes the cost for construction observation and administration to be performed by NHDOT.

## Bridge Estimate

Lebanon / Hartford - Contract 16148

Bridge No's. 044/103 & 044/104

Interstate 89 N.B. & S.B. over the Connecticut River

### CONSTRUCTION COST ESTIMATE OCTOBER 2017

ITEM NO.	ITEM DESCRIPTION	UNIT	TYPE	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
203.1	COMMON EXCAVATION	CY	S	135	\$15.00	\$2,025.00
207.3	UNCLASSIFIED CHANNEL EXCAVATION	CY	S	14,800	\$25.00	\$370,000.00
209.201	GRANULAR BACKFILL (BRIDGE) (F)	CY	S	1,100	\$40.00	\$44,000.00
209.4	GRANULAR BACKFILL (GRAV)	CY	S	2,020	\$35.00	\$70,700.00
403.911	HOT BITUMINOUS BRIDGE PAVEMENT, 1" BASE COURSE	TON	S	560	\$190.00	\$106,400.00
500.02	ACCESS FOR BRIDGE CONSTRUCTION	U	SP	1	\$1,850,000.00	\$1,850,000.00
502	REMOVAL OF EXISTING BRIDGE STRUCTURE	U	S	1	\$1,870,000.00	\$1,870,000.00
503.201	COFFERDAMS	U	S	1	\$130,000.00	\$130,000.00
503.202	COFFERDAMS	U	S	1	\$80,000.00	\$80,000.00
503.203	COFFERDAMS	U	S	1	\$155,000.00	\$155,000.00
503.301	COFFERDAMS WITH SHEETING LEFT-IN-PLACE	U	S	1	\$235,000.00	\$235,000.00
503.302	COFFERDAMS WITH SHEETING LEFT-IN-PLACE	U	S	1	\$240,000.00	\$240,000.00
503.303	COFFERDAMS WITH SHEETING LEFT-IN-PLACE	U	S	1	\$285,000.00	\$285,000.00
503.304	COFFERDAMS WITH SHEETING LEFT-IN-PLACE	U	S	1	\$360,000.00	\$360,000.00
504.1	COMMON BRIDGE EXCAVATION (F)	CY	S	1,200	\$21.00	\$25,200.00
504.25	ROCK BRIDGE EXCAVATION MECHANICAL METHODS	CY	SP	50	\$150.00	\$7,500.00
508	STRUCTURAL FILL	CY	S	80	\$60.00	\$4,800.00
510.1	PILE DRIVING EQUIPMENT	U	S	1	\$240,000.00	\$240,000.00
510.61	FURNISHING & DRIVING STEEL BEARING PILES	LB	S	892,000	\$0.90	\$802,800.00
510.65	DRIVING-POINTS FOR STEEL BEARING PILES	EA	S	140	\$225.00	\$31,500.00
510.9	PILE SPLICES	EA	S	159	\$200.00	\$31,800.00
511.00	CONCRETE BRIDGE DECK PAVEMENT REMOVAL (F)	SY	S	2,630	\$17.00	\$44,710.00
512.02	PREPARATION FOR CONCRETE REPAIRS, CLASS II	SY	S	320	\$650.00	\$208,000.00
520.02	CONCRETE CLASS AA, ABOVE FOOTINGS (F)	CY	S	1,720	\$1,200.00	\$2,064,000.00
520.0201	CONCRETE CLASS AA, ABOVE FOOTINGS	CY	SP	8	\$1,300.00	\$10,400.00
520.0302	CONCRETE CLASS AA APPROACH SLABS (QC/QA) (F)	CY	S	200	\$400.00	\$80,000.00
520.12	CONCRETE CLASS A, ABOVE FOOTINGS (F)	CY	S	260	\$675.00	\$175,500.00
520.21	CONCRETE CLASS B, FOOTINGS (F)	CY	S	900	\$360.00	\$324,000.00
520.6	CONCRETE CLASS T, FOUNDATION SEAL	CY	S	1,050	\$250.00	\$262,500.00
520.7002	CONCRETE BRIDGE DECK (QC/QA) (F)	CY	S	2,100	\$950.00	\$1,995,000.00
526.3	HIGH MOLECULAR WEIGHT METHACRYLATE CRACK SEAL FOR CONCRETE BRIDGE DECKS	GAL	SP	140	\$450.00	\$63,000.00
528.51	PRESTRESSED CONCRETE DECK PANELS (F)	SF	S	68,100	\$19.00	\$1,293,900.00
534.3	WATER REPELLENT (SILANE/SILOXANE)	GAL	S	170	\$75.00	\$12,750.00
538.2	BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F)	SY	S	140	\$45.00	\$6,300.00
538.6	BARRIER MEMBRANE, HEAT WELDED - MACHINE METHOD (F)	SY	S	12,350	\$21.00	\$259,350.00
540.31	CONCRETE ARMOR MATRIX COMPONENT	EA	SP	16,500	\$55.00	\$907,500.00
541.1	PVC WATERSTOPS, NH TYPE 1 (F)	LF	S	220	\$10.00	\$2,200.00
541.2	PVC WATERSTOPS, NH TYPE 2 (F)	LF	S	90	\$10.00	\$900.00
544	REINFORCING STEEL (F)	LB	S	263,000	\$1.10	\$289,300.00
544.01	REINFORCING STEEL	LB	SP	800	\$1.25	\$1,000.00
544.11	REINFORCING STEEL- MECHANICAL CONNECTORS (F)	LB	S	20,300	\$6.00	\$121,800.00
544.2	REINFORCING STEEL, EPOXY COATED (F)	LB	S	570,000	\$1.30	\$741,000.00
544.7	SYNTHETIC FIBER REINFORCEMENT (F)	LB	S	1,400	\$8.00	\$11,200.00
547	SHEAR CONNECTORS (F)	EA	S	35,500	\$5.00	\$177,500.00
550.1	STRUCTURAL STEEL (F)	LB	S	3,308,000	\$1.65	\$5,458,200.00
550.210	BRIDGE SHOES - DISC (F)	EA	SP	84	\$5,000.00	\$420,000.00
561.3001	PREFABRICATED FINGER EXPANSION JOINT (F)	LF	S	224	\$1,400.00	\$313,600.00
562.1	SILICONE JOINT SEALANT (F)	LF	S	180	\$15.00	\$2,700.00
563.23	BRIDGE RAIL T3	LF	S	1,770	\$165.00	\$292,050.00
563.921	PROTECTIVE SCREENING FOR OVERPASS STRUCTURES T2 OR T4 RAIL	LF	SP	205	\$40.00	\$8,200.00
565.232	BRIDGE APPROACH RAIL T3 (STEEL POSTS)	U	S	4	\$4,750.00	\$19,000.00
585.21	STONE FILL, CLASS B (BRIDGE)	CY	S	7,000	\$37.50	\$262,500.00
585.3	STONE FILL, CLASS C	CY	S	150	\$50.00	\$7,500.00
593.411	GEOTEXTILE, PERM CONTROL CL.1, NON-WOVEN	SY	S	3,230	\$3.00	\$9,690.00
606.413	SINGLE SLOPE CONCRETE MEDIAN BARRIER, PRECAST	LF	SP	840	\$125.00	\$105,000.00
606.4174	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL - BRACED	LF	SP	1,690	\$100.00	\$169,000.00
692	MOBILIZATION	U	S	0.80	\$2,352,500.00	\$1,882,000.00
1002.1	REPAIRS OR REPLACEMENTS AS NEEDED - BRIDGE STRUCTURES	\$	SP	1	\$100,000.00	\$100,000.00
1010.15	FUEL ADJUSTMENT	\$	SP	0.80	\$250,000.00	\$200,000.00
1010.2	ASPHALT CEMENT ADJUSTMENT	\$	SP	0.80	\$50,000.00	\$40,000.00
1010.41	QUALITY CONTROL QUALITY ASSURANCE (QC/QA) FOR CONCRETE	\$	SP	1	\$103,800.00	\$103,800.00

Note: 1) Superstructure Item Payment Breakdown is 76% NHDOT, 24% Vtrans  
 2) Substructure Item Payment Breakdown is per Substructure Unit. Abut A, Piers 1, 2, 3, 4 are Owned by NHDOT. Pier 5 & Abut. B Owned by Vtrans  
 3) Project Wide Item Payment Breakdown is 76% NHDOT, 24% Vtrans  
 4) Unit Costs Based on Year 2016 Costs

**SUBTOTAL =** \$25,386,775  
**Contingency (5%) =** \$1,269,339  
**BRIDGE TOTAL =** \$26,656,114  
**SAY = \$ 26,700,000**

## Highway Estimate

Lebanon / Hartford - Contract 16148

Bridge No's: 044/103 & 044/104

Interstate 89 N.B. & S.B. over the Connecticut River

### CONSTRUCTION COST ESTIMATE OCTOBER 2017

ITEM NO.	DESCRIPTION	UNIT	UNIT PRICE	TOTAL QUANTITY	TOTAL COST
201.1	CLEARING AND GRUBBING (F)	A	\$6,000	1	\$3,000
202.31	FILL ABANDONED PIPE	CY	\$200	48	\$9,600
202.41	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	LF	\$15	1,500	\$22,500
202.5	REMOVAL OF CATCH BASINS, DROP INLETS, AND MANHOLES	EA	\$300	24	\$7,200
202.7	REMOVAL OF GUARDRAIL	LF	\$2	8,400	\$16,800
203.1	COMMON EXCAVATION	CY	\$10	13,100	\$131,000
203.2	ROCK EXCAVATION	CY	\$50	105	\$5,250
203.55543	GUARDRAIL EAGRT OFFSET PLATFORM, TL 3	U	\$7,000	4	\$28,000
203.6	EMBANKMENT IN PLACE (F)	CY	\$10	7,400	\$74,000
214.	FINE GRADING	U	\$100,000	1	\$100,000
304.1	SAND (F)	CY	\$20	3,500	\$70,000
304.4	CRUSHED STONE (FINE GRADATION)(F)	CY	\$25	4,700	\$117,500
304.5	CRUSHED STONE (COARSE GRADATION)(F)	CY	\$25	2,900	\$72,500
403.X	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	T	\$75	19,300	\$1,447,500
403.99	TEMPORARY BITUMINOUS PAVEMENT	T	\$80	2,860	\$228,800
417	COLD PLANING BITUMINOUS SURFACES	SY	\$4	15,200	\$60,800
603.00212	12" R.C. PIPE, 2000D	LF	\$60	54	\$3,240
603.00215	15" R.C. PIPE, 2000D	LF	\$65	4,700	\$305,500
603.00218	18" R.C. PIPE, 2000D	LF	\$70	960	\$67,200
603.00224	24" R.C. PIPE, 2000D	LF	\$95	1,700	\$161,500
603.30115	15" R.C. END SECTIONS	EA	\$700	4	\$2,800
603.30118	18" R.C. END SECTIONS	EA	\$800	3	\$2,400
603.30124	24" R.C. END SECTIONS	EA	\$1,000	4	\$4,000
603.80215	15" PLASTIC PIPE (SMOOTH INTERIOR)	LF	\$45	30	\$1,350
603.80218	18" PLASTIC PIPE (SMOOTH INTERIOR)	LF	\$50	70	\$3,500
604.0007	POLYETHYLENE LINER	EA	\$200	52	\$10,400
604.12	CATCH BASINS, TYPE B	U	\$3,000	40	\$120,000
604.125	CATCH BASINS, TYPE B 5 FT DIAMETER	U	\$3,250	1	\$3,250
604.15	CATCH BASINS, TYPE E	U	\$3,000	35	\$105,000
604.155	CATCH BASINS, TYPE E 5 FT DIAMETER	U	\$3,250	1	\$3,250
604.324	DRAINAGE MANHOLE, 4 FT DIAMETER	U	\$2,500	10	\$25,000
604.4	RECONSTRUCTING / ADJUSTING CATCH BASIN	LF	\$450	7	\$3,150
604.9101	OUTLET CONTROL STRUCTURE	U	\$4,000	2	\$8,000
606.1254	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 3) STEEL	U	\$2,000	4	\$8,000
606.127	BEAM GUARDRAIL (TERMINAL UNIT TYPE G-2) STEEL	LF	\$600	5	\$3,000
606.18001	*31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCKS (STEEL POST)	LF	\$16	6,300	\$100,800
606.28001	*31" DOUBLE FACED W-BEAM GUARDRAIL WITH 8" OFFSET BLOCKS	LF	\$22	1,200	\$26,400
606.413	SINGLE SLOPE CONCRETE MEDIAN BARRIER, PRECAST	LF	\$80	2,400	\$192,000
606.417	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL	LF	\$25	7,200	\$180,000
609.01	STRAIGHT GRANITE CURB	LF	\$35	415	\$14,525
609.216	STRAIGHT GRANITE SLOPE CURB 6" HIGH	LF	\$20	2,500	\$50,000
609.811	BITUMINOUS CURB, TYPE B (4" REVEAL)	LF	\$8	5,000	\$40,000
615.10001	FULL TRAFFIC SIGN STRUCTURE	U	\$100,000	2	\$200,000
615.20001	CANTILEVER TRAFFIC SIGN STRUCTURE	U	\$70,000	1	\$70,000
MAJOR HIGHWAY ITEM SUB-TOTAL COST					\$4,108,715
Costs Estimated by Percentages of Major Highway Items**:			Contract %	Estimate	
TRAFFIC ITEMS (PAVEMENT MARKINGS & SIGNS)			5.00%	\$205,436	
OTHER ITEMS AND CONTINGENCIES			20.00%	\$821,743	
ROADWAY ITEMS SUB-TOTAL COST					\$5,135,894

<b>Estimate Summary</b>						
Lebanon / Hartford - Contract 16148						
Bridge No's: 044/103 & 044/104						
Interstate 89 N.B. & S.B. over the Connecticut River						
<b>CONSTRUCTION COST ESTIMATE</b>						
<b>OCTOBER 2017</b>						
					ROADWAY ITEMS SUB-TOTAL COST	\$5,135,894
					TOTAL BRIDGE COST (INCLUDING MOBILIZATION)	\$26,700,000
					ROADWAY AND BRIDGE ITEMS SUB-TOTAL COST	\$31,835,894
					CONSTRUCTION ENGINEERING	
					** Percentages Estimated from other similar NHDOT projects	
					ROADWAY CE (PERCENTAGE OF ROADWAY ITEMS SUB-TOTAL COST)	\$308,154
					BRIDGE CE (PERCENTAGE OF TOTAL BRIDGE COST)	\$1,602,000
					OVERALL TOTAL PROJECT COST	\$35,531,883
					<i>Use</i>	<b>\$35,600,000</b>
					CONSTRUCTION ITEMS SUB-TOTAL COST	\$33,621,730
					TRAFFIC CONTROL & SMART WORK ZONE ITEMS	\$636,718
					EROSION CONTROL ITEMS	\$636,718
					CONTRACT BID ITEMS	
698.11	FIELD OFFICE TYPE A	MON	\$2,500	48		\$120,000
698.2	PHYSICAL TESTING LABORATORY	MON	\$900	36		\$32,400
1010.15	FUEL ADJUSTMENT	\$	\$250,000	1		\$250,000
1010.2	ASPHALT CEMENT ADJUSTMENT	\$	\$50,000	1		\$50,000
1010.3	QUALITY CONTROL QUALITY ASSURANCE (QC/QA) ASPHALT	\$	\$60,000	1		\$60,000

## Financial Feasibility

NHDOT and VTrans have put forward a project finance plan which includes TIGER funds, federal formula funds, GARVEE bonds, toll credits, and state funds. Both agencies have stable and reliable capital and operating funding – both federal and state – to maintain this project through its lifecycle. The primary funding for interstate bridge maintenance are National Highway Performance Program funds, provided by FHWA by apportionment. Through 2020 (FAST Act), New Hampshire and Vermont will receive approximately \$1.1 billion in NHPP funds. Other FHWA formula funds (such as the STBGP funds) can also be used for interstate bridge maintenance. Some \$545 million in STBGP funds will be made available to both States through 2020 FAST Act apportionments.

In addition to federal funds, NHDOT and VTrans maintain state transportation revenues – a flexible source of highway funding that can be used for future capital and operating requirements. These funds total approximately \$500 million between the two States annually.

The financial condition of both NHDOT and VTTrans is excellent. Neither agency has any debt, and the New Hampshire and Vermont State bond ratings are AA and AA+ respectively (Standard and Poor).

NHDOT has experience in managing discretionary grants, including TIGER grants. Recent TIGER grants include:

- Memorial Bridge Replacement (NHDOT, 2010) \$20 million
- Sarah Mildred Long Bridge (NHDOT, 2014) \$25 million

This project has a total cost of \$35.6 million, of which \$10 million will come from TIGER funding, and \$25.6 million will come from New Hampshire and Vermont state and federal funding sources. TIGER investments represent approximately 28% of the project’s financing. Please refer to the technical feasibility section of this grant application for a detailed cost estimate for each project component.

### Total Construction Costs by State

	PE	ROW	Construction	Total
New Hampshire	\$1,968,400	\$20,000	\$27,056,000	\$29,044,400
Vermont	\$621,600	\$20,000	\$ 8,544,000	\$9,185,600
Total	\$2,590,000	\$40,000	\$35,600,000	\$38,230,000

### Source of Funds

	VT	NH	
TIGER	\$0	\$10,000,000	
GARVEE Bonds	\$0	\$8,939,200	
Federal Formula	\$6,905,190	\$0	
Toll Credits	\$0	\$5,411,200	
State Funds	\$1,638,810	\$2,705,600	
	<u>\$8,544,000</u>	<u>\$27,056,000</u>	\$35,600,000



## Project Schedule

The following project schedule has been developed, informed by both the Rehabilitation Report and NHDOT/VTrans staff analysis:

- April 2016 - Draft NEPA (Categorical Exclusion) submitted
- September 2016 - Completion of NEPA
- September 2016 - Wetland permits (ACOE 404, NHDES, USCG, Vermont stormwater and Flood Hazard) application submitted Preliminary Plans, Specification & Estimate (PS&E) submittal
- May 2017 - PS&E submittal
- July 2017 - Securing easement and access agreement with Railroad property in Vermont
- August 2019 - Contract advertisement based on current funding with TIGER grant
- December 2019 - Contract Award
- January 2020 - Construction of trestle begins
- April 2021 - Foundation and substructure efforts for widened portion completed
- October 2021 - Completion of Phase 1, new superstructure completion, (median widen)
- June 2022 - Completion of Phase 2, replacement of existing southbound superstructure
- June 2023 - Completion of Phase 3, replacement of existing northbound superstructure
- September 2023 - Completion of Phase 4, new median barrier installed
- November 2023 - Project Completion

The schedule also accounts for continued operation during construction. The facility is too important to be closed during construction. This will be addressed by filling in the median during Phase 1 of the efforts, allowing the current narrow 30' wide bridges to maintain existing traffic configurations until Phase 1 is completed. Once Phase 1 is completed, traffic will be moved to the newly completed section to allow for superstructure replacement and abutments rehabilitation to take place on the northbound bridge. Once Phase 2 is completed, northbound traffic will be shifted to newly reconstructed bridge and the southbound traffic will be placed in median area during superstructure reconstruction of the southbound bridge. Once Phase 3 is completed, the median concrete barrier will be constructed along with final lane stripping.

Funding for this project will be obligated well before the obligation deadline of September 30, 2020. Pre-construction activities are not anticipated to take substantial time, as the NEPA document for this project is anticipated to be a Categorical Exclusion, and no permanent right-of-way is needed (only temporary right-of-way from the railroad operating below will be required).

Without TIGER funds, additional GARVEE bonds will need to be secured, potentially resulting in delays to the above noted construction schedule.

## Required Approvals

### **Environmental Permits and Reviews**

No significant impacts to the natural, social, or economic environment are anticipated, and the appropriate NEPA document anticipated is a Categorical Exclusion. NHDOT has received concurrence from FHWA on April 12, 2017 on the Class II (Categorical Exclusion), pursuant to the NEPA. NHDOT has begun the process of obtaining all the required permits. These permits include the ACOE 404 (both NH and VT General Permit), NHDES Wetlands and Shoreland, Vermont Operational and Construction Stormwater and Flood Hazard). All permits are expected to be obtained by early 2018.

### **Legislative Approvals**

Approvals for this project have been obtained. The I-89 bridge is included in the New Hampshire Department of Transportation's (NHDOT) current Ten Year Transportation Improvement Plan, the VTrans Capital Improvement Plan, and in both state's State Transportation Improvement Program. These plans contain project priorities, and are based on input from the Regional Planning Commissions, numerous public meetings in both State, and approval by the State Legislatures and Governors.

A potential risk for projects of this scale is cost overruns. However, NHDOT and VTrans have mitigation strategies in place to deal with any potential risk. The project includes cost contingencies, which can buffer unforeseen increases in materials and labor costs. In addition, both agencies have stable funding – both federal and state – to offset any unforeseen increase in project costs. The primary funding for interstate bridges are National Highway Performance Program funds, provided by FHWA by apportionment. Through 2020 (FAST Act), New Hampshire and Vermont will receive approximately \$1.1 billion in NHPP funds. Other FHWA formula funds (such as the STBGP funds) can also be used for interstate bridge maintenance. Some \$545 million in STBGP funds will be made available to both States through 2020 FAST Act apportionments.

In addition to federal funds, NHDOT and VTrans maintain state transportation revenues – a flexible source of highway funding that can be used for future capital and operating requirements. These funds total approximately \$500 million between the two States annually.

### **FEDERAL WAGE RATE CERTIFICATIONS**

NHDOT adheres to all federal wage rate requirements and has included federal wage rate certifications with this application.