

## Rogers' Rangers Bridge Replacement Project

Project Name	<i>Rogers' Rangers Bridge</i>
Was a FASTLANE application for this project submitted previously?	<i>No</i>
If yes, what was the name of the project in the previous application?	<i>N/A</i>
<i>Previously Incurred Project Cost</i>	<i>\$1,500,000</i>
<i>Future Eligible Project Cost</i>	<i>\$10,000,000</i>
Total Project Cost	<i>\$11,500,000</i>
FASTLANE Request	<i>\$5,000,000</i>
Total Federal Funding (including FASTLANE)	<i>\$6,500,000</i>
Are matching funds restricted to a specific project component? If so, which one?	<i>No</i>
Is the project or a portion of the project currently located on National Highway Freight Network?	<i>No</i>
Is the project or a portion of the project located on the NHS?	<i>Yes</i>
<ul style="list-style-type: none"> <li>• Does the project add capacity to the Interstate system?</li> </ul>	<i>No</i>
<ul style="list-style-type: none"> <li>• Is the project in a national scenic area?</li> </ul>	<i>No</i>
Do the project components include a railway-highway grade crossing or grade separation project?	<i>No</i>
<ul style="list-style-type: none"> <li>• If so, please include the grade crossing ID.</li> </ul>	
Do the project components include an intermodal or freight rail project, or freight project within the boundaries of a public or private freight rail, water (including ports), or intermodal facility?	<i>No</i>
If answered yes to either of the two component questions above, how much of requested FASTLANE funds will be spent on each of these projects components?	<i>N/A</i>
State(s) in which project is located	<i>New Hampshire, Vermont</i>
Small or large project	<i>Small</i>
Urbanized Area in which project is located, if applicable	<i>N/A</i>
Population of Urbanized Area	<i>N/A</i>
Is the project currently programmed in the:	
<ul style="list-style-type: none"> <li>• TIP</li> </ul>	<i>Yes (TIP)</i>
<ul style="list-style-type: none"> <li>• STIP</li> </ul>	<i>Yes (STIP)</i>
<ul style="list-style-type: none"> <li>• MPO Long Range Transportation Plan</li> </ul>	<i>No</i>
<ul style="list-style-type: none"> <li>• State Long Range Transportation Plan</li> </ul>	<i>Yes (TYP)</i>
<ul style="list-style-type: none"> <li>• State Freight Plan?</li> </ul>	<i>No</i>

**U.S. Department of Transportation**

# Rogers' Rangers Bridge Replacement Project

## FOSTERING ADVANCEMENTS IN SHIPPING AND TRANSPORTATION FOR THE LONG-TERM ACHIEVEMENT OF NATIONAL EFFICIENCIES

### “FASTLANE”

### GRANT APPLICATION

Project Name:	Rogers' Rangers Bridge Replacement Project
Project Type:	Bridge Replacement on NHS
Project Location:	Rural, Lancaster, New Hampshire and Guildhall, Vermont
Funds Requested:	\$5,000,000 (43%)
Other State and Federal Funds	
New Hampshire:	\$5,161,500 (45%)
Vermont:	\$1,383,500 (12%)
Total Project Cost:	\$11.5 million
Contact:	Mr. L. Robert Landry, Jr., P.E. Administrator Bureau of Bridge Design New Hampshire Department of Transportation 7 Hazen Drive, P.O. Box 483 John O. Morton Building Concord, New Hampshire 03302-0483 Telephone: (603) 271-3921 Email: Robert.landry@dot.nh.gov 80-859-1697

DUNS #:

Roger's Rangers Bridge Replacement Project



# Rogers' Rangers Bridge Replacement Project

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# Rogers' Rangers Bridge Replacement Project

## 1) Project Description

### a) Project Details and Background

The New Hampshire Department of Transportation (NHDOT) proposes to replace the Rogers' Rangers Bridge (NHDOT Br. No. 111/129; CT. River Br. No. 26), which carries U.S. Route 2 over the Connecticut River between the towns of Lancaster, New Hampshire and Guildhall, Vermont. The structure is jointly owned by the NHDOT (80%) and the Vermont Agency of Transportation (VTrans) (20%); NHDOT is the submitting State agency for the project. The proposed project will replace the deteriorated bridge with a new bridge located upstream of the current location.

The existing structure, comprised of two High Parker Through Steel Trusses with span lengths of 198 feet (') each and an overall length of 396', was constructed in 1950 and is in poor condition. The structure has a roadway width of 28'-0" (two 12'-0 inch (") travel lanes and 2'-0" shoulders). The bridge is currently load-posted excluding certain single unit vehicles from crossing the bridge. It has a 14'-0" measured vertical clearance, which is below the minimum required vertical clearance of 16'-6", making the bridge the only vertical obstruction on U.S. Route 2 in New Hampshire.



*Figure 1 - Aerial View of the Bridge Carrying US Route 2 over the Connecticut River (Looking Downstream / South)*

Annual Average Daily Traffic (AADT) was 3,500 vehicles per day (1,277,500 annually) in 2015, with 10% being trucks. U.S. Route 2 is the only principal arterial roadway that crosses the Connecticut River between the Canadian border and Littleton, New Hampshire, where Interstate 93 crosses the Vermont border into New Hampshire. With 91% of Coos County being forested, agriculture and timber harvesting is an important industry representing approximately 3% of the employment in the region. Many of the trucks that use the bridge are logging trucks, which can easily be loaded to exceed the vertical clearance of the bridge. During a two-week in-depth bridge inspection in 2011, the top bracing of the bridge was impacted three times. Other freight trucks using the bridge related to the timber industry are pulp trucks and other types of lumber transport related to the expanding pellet fuel industry. With the closure of most paper plants in northern New Hampshire, pellet fuel has become the predominant forestry-related industry in the region. The current capacity of the bridge limits movement of heavier loads (skidders and other special equipment) needed for the forestry-related industry.

The cantilevered sidewalk was added to the bridge in 1996 as part of a federal aid bridge enhancement project. The sidewalk also serves as a means for snowmobile users to cross the Connecticut River as part of the local trail system during the winter months. Approximately 14% of the employment in Coos County, New Hampshire's northernmost county, is in the arts, entertainment and tourism, according to the North Country Council's 2013-2017 "Comprehensive Economic Development Strategy" document. Riding and touring on snowmobiles is one of the highest contributors to the tourism industry in the area during the winter months.

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The project includes replacing the existing truss bridge with a new concrete deck and steel girder bridge upstream of the existing bridge. Replacement of the bridge will result in unlimited vertical clearance to eliminate the potential of vehicular impact with the bridge. Improvements will also include a snowmobile path, improved storm water collection and treatment, and alignment improvement of the intersection of U.S. Route 2 with Vermont Route 102 in Guildhall.

This bridge is a critical facility for the movement of people and goods locally, regionally, nationally and internationally. With limited east-west routes in the northern portions of New Hampshire and Vermont, U.S. Route 2 serves as the primary corridor connecting the region to Interstates 91 and 93 (both of which are on the USDOT Multimodal Freight Network Map), which connects the area to Canada to the north and New England's larger ports and intermodal facilities to the south. The bridge is also important from an emergency services and medical standpoint as well as for the Weeks Medical Center in Lancaster, the closest hospital serving the region. Load posting or closure of the bridge requires the use of a 13-mile detour to the north crossing between Northumberland, New Hampshire and Guildhall.

The safe and dependable operation of this complex structure is critical to providing connectivity for the regional transportation system between these two states and the larger trade corridor. FASTLANE funding will accelerate the reconstruction of the bridge.

Beneficial outcomes of the reconstruction of the bridge include:

- Improve reliability and safety
- Address significant deficiencies in the regional transportation system by reconstructing the structurally-deficient and functionally-obsolete bridge
- Address regional transportation needs, and ensure the continued economic vitality of these two communities and the region
- Facilitate the movement of goods to national and international export markets (U.S. Route 2 extends to the coast of Maine)
- Provide/create jobs in the region for the entire duration of the construction activities
- Enhance the livability of these two communities and the wider region
- Meet USDOT goals on system preservation, and targeting federal funding towards critical National Highway System facilities
- Ensure continued efficient access to nearby medical facilities in the area
- Provide economic opportunities for the forestry industry for the export of pulp and lumber products

NHDOT believes this application meets the criteria for the FASTLANE Grant Program and further, that it represents the type of project envisioned. Receipt of FASTLANE Grant funds will also allow NHDOT to focus, near-term, toward addressing the needs of other bridges which would not otherwise be possible without FASTLANE funding for this project.

b) What will FASTLANE Funds Support?

NHDOT is requesting \$5 million in FASTLANE funds to implement the estimated \$11.5 million project. FASTLANE funds are anticipated to finance approximately 50% of the remaining eligible project costs

# Rogers' Rangers Bridge Replacement Project

and 44% of the total project costs, and will support half of the construction phase with state funds supporting the majority of the remaining project costs.

## c) Regional Significance of the Project

The U.S. Route 2 bridge connects the northern rural areas of New Hampshire to the I-93 and I-91 corridors in eastern Vermont, which connects the area to Canada to the north and Boston and other metropolitan areas to the south, as well as to the Maine seaports to the east. Regionally, the bridge also provides residents to the nearest available medical facility (Weeks Medical Center) in Lancaster. Freight, specifically logging trucks, account for approximately 10% of the daily traffic across the bridge, allowing transport of logs to Canada for processing before returning back to the United States as structural lumber. Without this bridge, the economic impacts to the region would be significant as the shortest detour route suitable for freight traffic is 13-miles long which would effectively add 26 miles to each trip as well as additional travel time. The bridge is also crucial for tourism in the area as snowmobile traffic is carried by the bridge. The project will have a substantial positive and sustainable impact on the economy as well as continued quality of life in the region.

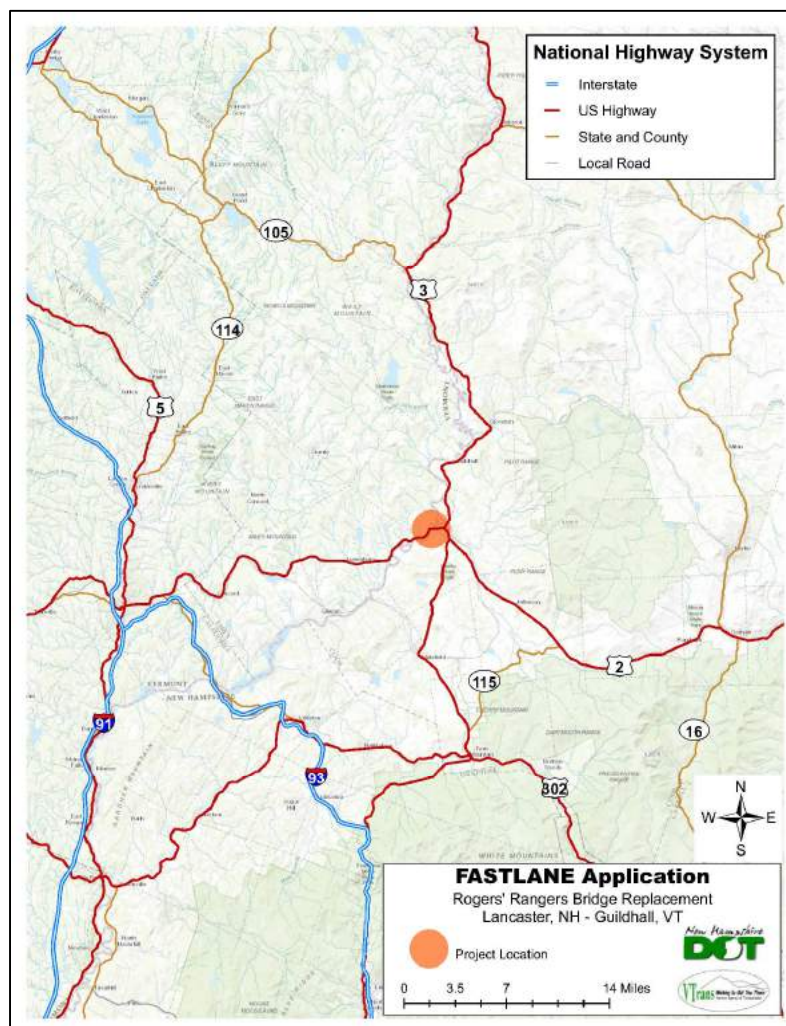


Figure 2 - Immediate Project Area

# Rogers' Rangers Bridge Replacement Project

## d) Expected Users of the Project

The bridge connects rural areas in northern New Hampshire to the national and international interstate trade corridor located in eastern Vermont and carries an AADT of 3,500 vehicles, or 1,277,500 trips annually. Trucks (freight, logging etc.) account for 10% of the AADT (127,750 annual trips) over the bridge. The I-93 and I-91 corridors connect the region to the Canadian trade market as well as New England's major seaports and other intermodal facilities.

The bridge also provides the shortest route from residents in eastern Vermont to Weeks Medical Center in Lancaster, the nearest hospital facility. Without the bridge, the next nearest hospital for residents in this area is a distance of 18 miles away in Littleton, New Hampshire.

Snowmobile users utilize the bridge to connect to trail systems in New Hampshire and Vermont, enhancing the tourism industry in the area.

## e) Transportation Challenges the Project Aims to Address

Structurally-deficient and functionally-obsolete 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 goods and freight movement, making them important not only to the local communities they serve but also to the National Freight Network by having continuous National Highway System (NHS) corridors free of weight and vertical clearance restrictions. For these reasons, New Hampshire has prioritized NHS bridges for reconstruction and replacement, but funding is insufficient to address all of these bridges in a timely fashion resulting in down-posting or a decreased level of service to these bridges.



*Figure 3 - Freight Traffic is Currently Hindered by the Limited Vertical Clearance of the Existing Bridge Leading to Frequent Bridge Impacts Causing Damage to the Bridge and Vehicles*

## f) How the Project will Address these Challenges?

This project will bring the U.S. Route 2 bridge to a state of good repair, and address operational, safety, and economic development concerns. It will ensure that the bridge will not require additional major rehabilitation for several decades ensuring local, national, and international connectivity for this corridor in the National Freight Network and in 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



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medical facilities. It will also ensure that the connection of the northern portions of New Hampshire and Vermont to the vital Boston to Montreal trade corridor operates unimpeded.

## g) Relevant Data Before and After Project is Constructed

### i) Passenger and Freight Volumes

Annual Average Daily Traffic (AADT) on U.S. Route 2 west of the bridge was 3,500 vehicles per day in 2015, or 1,277,500 trips annually. Trucks (freight, logging etc.) account for 10% of the AADT (127,750 annual trips) over the bridge. The I-93 and I-91 corridors connect the region to the Canadian trade market as well as New England's major seaports and other intermodal facilities. As part of the alternatives analysis for the project, it was estimated that traffic volumes will increase by approximately 1% per year from 2015 to 2035, resulting in an estimated 2035 AADT of 4,700.

### ii) Congestion Levels

Peak hourly levels are approximately 300 vehicles in each direction and there are no signalized intersections or other intersections requiring stopping of vehicles at each end of the bridge. A few small businesses are located near the bridge as well as a few residential properties. In light of the peak hour traffic and general surroundings of the bridge, congestion is not an issue in this rural project location.

### iii) Infrastructure Condition

Steel truss members and the concrete pier have deteriorated significantly and to a level that the bridge is in such poor condition that it requires a six-month inspection interval. Typical conditions observed during the inspections include:

- Pavement cracking and potholing,
- Bridge deck concrete cracking and spalling with exposed reinforcement,
- Sidewalk timber deck is weathered with numerous boards having curled ends creating a tripping hazard,
- Bridge rail deterioration,
- Extensive deterioration and section loss of floor system members below the bridge deck,
- Truss bottom chord advanced deterioration, section loss and pack rust between the members,
- Lower half of truss members above the deck have heavy rusting and deterioration on the side exposed to snow and salt spray,
- Bent truss bracing members above the bridge deck,
- Damaged vertical truss members due to vehicular impacts,
- Abutment concrete cracking with light to moderate spalls and
- Significant pier concrete cracking and deterioration.

The bridge has a load posting which restricts New Hampshire single unit certified vehicles as well as permit loads from crossing the bridge. As a result of the load posting and condition, the bridge is structurally deficient. The bridge can also be considered functionally obsolete due to the limited vertical clearance and narrow shoulder widths.

## Rogers' Rangers Bridge Replacement Project

The overall poor condition of the bridge truss members, floor system members and the pier, as well as the near daily vehicular impacts to the bracing are the primary structural and safety reasons for undertaking this project. Approximately 60% of the existing bridge superstructure, including the truss, floor system, bracing and connection plates as well as the pier, in its entirety, would require replacement in order to address the structural deficiencies and poor condition of the existing bridge, making rehabilitation an ineffective alternative as the geometric restrictions would not be corrected.

The following photographs illustrate a sample of the current bridge condition:



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### iv) Safety Experience

The continued deterioration of this bridge results in the high probability of further weight limit restrictions and potential closure which would have significant economic, quality of life and safety impacts for both communities. Load-posting of the bridge will increase response times by emergency services such as ambulances and firefighting equipment due to a significant detour length of approximately 13 miles to the north. To reach areas to the south, the Mount Orne timber covered bridge is inadequate for carrying most emergency response equipment due to the bridge being a single lane structure posted for a 6-ton load limit. The added response time for emergency services personnel increases the public's safety and health risk. Additionally, the loss of this structure would increase travel times for Guildhall students attending Lancaster Junior High School and White Mountains Regional and Groveton High Schools all located in New Hampshire. The added travel distance directly increases the safety risk of the students as they would be required to be on the busses for a greater period of time.

Forestry is an important industry in this region; therefore, many of the approximately 400 trucks, that use this bridge daily, are logging trucks which can easily be loaded to a height that exceeds the bridges'

# Rogers' Rangers Bridge Replacement Project

vertical clearance. Residents have indicated that truss members above the deck are subject to nearly daily impacts and logs have become dislodged and have fallen onto the bridge deck. During the bridge inspection in 2011, the bridge was struck multiple times with logs being dislodged and falling onto the bridge deck. Public safety is compromised when these impacts with displacement of logs occurs.

The purpose of this project is to provide a safe, sustainable, efficient and cost effective multimodal movement of people and goods across the Connecticut River while supporting transportation, commerce, economic development and regional response needs for the region. The proposed replacement of this bridge will satisfy the stated purpose of the project by eliminating a structurally-deficient bridge and offering a new structure that can carry modern highway and bridge design loads, eliminate the substandard vertical clearance, increase the shoulder width and better accommodate snowmobile usage on the state corridor as part of the local trail system.

Weeks Medical Center deploys ambulances across the Rogers' Rangers Bridge to the Towns of Guilford and Gilman, Vermont. An increase in response time of approximately 15 minutes or more in each direction to these towns is a significant decrease in safety for residents of these towns.

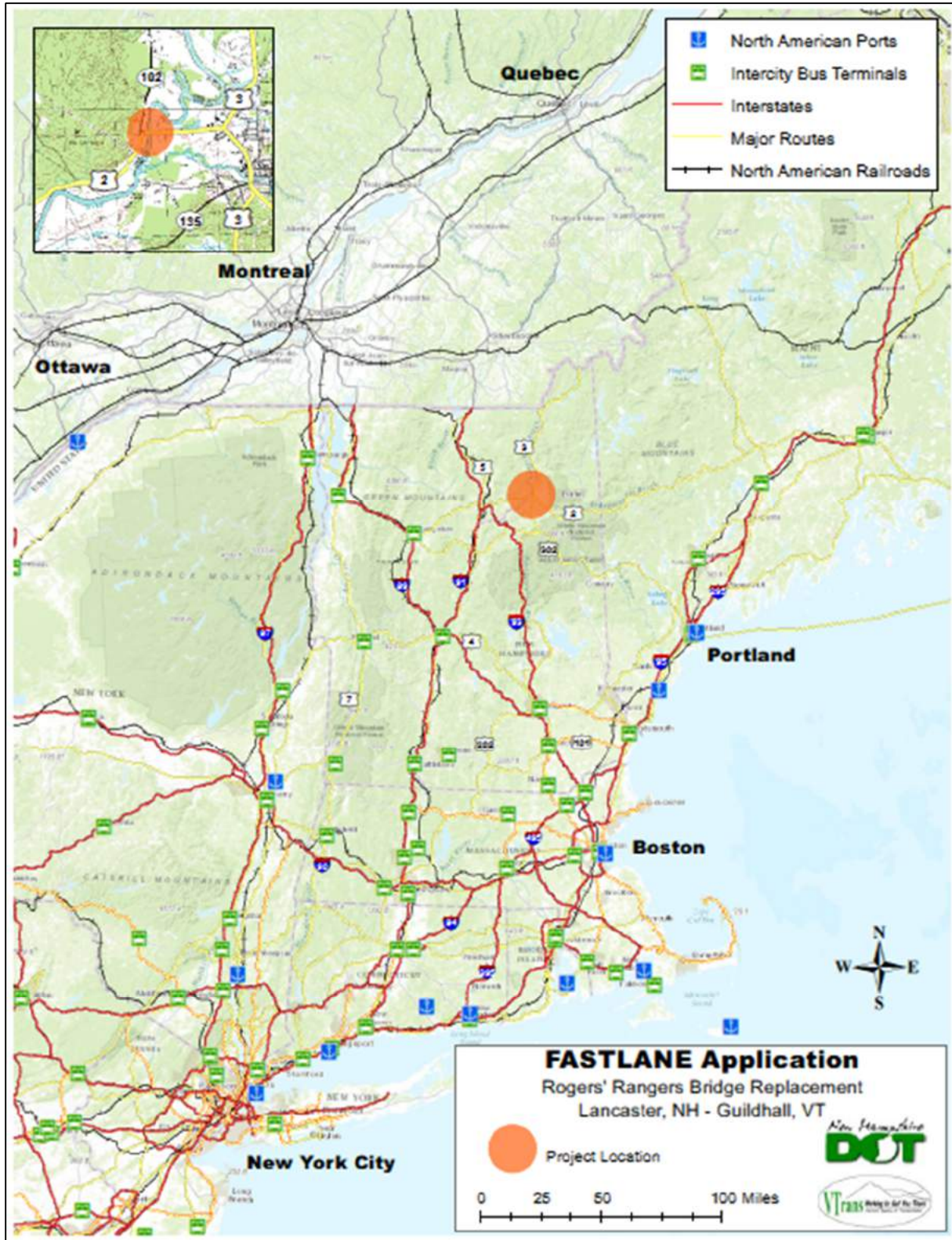
## 2) Project Location

### a. Detailed Description including Connections to Other Infrastructure

The project's location spans the Connecticut River between Lancaster, New Hampshire and Guildhall, Vermont. These two communities are rural, with populations being 3,358 in Lancaster and 261 in Guildhall. U.S. Route 2 provides an important connection to U.S. Route 3 in New Hampshire which allows access to the northernmost New Hampshire Communities and to Interstate 91 and 93 in Vermont, ultimately connecting Montreal to Boston. The following map illustrates the project location and its proximity to these other connecting corridors.

The bridge is a critical facility for the movement of goods and people locally, regionally, nationally and internationally.

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## 3) Project Parties

NHDOT is the principal executive transportation agency for New Hampshire and under state statutes is authorized to seek federal aid for modernization of highways and bridges. NHDOT represents the sole party seeking FASTLANE funding for the reconstruction of this interstate bridge.

## 4) Grant Funds, Sources, and Uses of Project Funds

This project has a total cost of approximately \$11.5 million, of which \$5 million will come from FASTLANE funding, and \$6.5 million will come from New Hampshire and Vermont state and federal funding sources. FASTLANE investments represent approximately 44% of the project's financing. There are no other pending discretionary federal funding requests. Some federal formula costs are dedicated towards this project as detailed below:

Project Costs by State and Project Component

	PE	ROW	Construction	Total
New Hampshire	\$ 1,037,000	\$ 124,500	\$ 9,000,000	\$ 10,161,500
Vermont	\$ 259,000	\$ 124,500	\$ 1,000,000	\$ 1,383,500
Total	\$ 1,296,000	\$ 259,000	\$ 10,000,000	\$ 11,545,000

Project Costs by State and Funding Source

	New Hampshire	Vermont	Total
FASTLANE	\$ 5,000,000	\$ -	\$ 5,000,000
Federal Formula	\$ 1,161,500	\$ 383,500	\$ 1,545,000
State Funds	\$ 4,000,000	\$ 1,000,000	\$ 5,000,000
Total	\$ 10,161,500	\$ 1,383,500	\$ 11,545,000

## 5) Cost-Effectiveness

### a) Benefit Cost Analysis

A Benefit-Cost Analysis (BCA) was performed using the guidelines of the Notice of Funding Availability. It is anticipated that if no major capital improvements are made, this bridge will need to be further down-posted to a level where freight traffic must be completely detoured based upon the current level of deterioration and the assumed progression of future deterioration. In the BCA, this is referred to as the base case or "no build" alternative. Since the bridge carries U.S. Route 2 as the only viable east-west corridor for freight and other traffic in this region of New Hampshire and Vermont, the long-term closure and re-routing of all traffic onto other local or state routes was not considered a viable option. The BCA compares the complete replacement of the existing bridge to the base case or "no build" scenario where maintenance will continue to keep the bridge open to passenger cars, however, freight traffic would be detoured.

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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 to 50 years on average. For this analysis, the analysis period includes the project development stage with the construction anticipated to begin in 2020 and be completed in 2022 with a 50-year operation life for the purposes of the BCA.

The reconstruction of the U.S. Route 2 bridge over the Connecticut River results in a Benefit-Cost Ratio (BCR) of a BCR of 0.86 at a 7% discount rate, and a BCR of 1.29 at a 3% discount rate. Refer to the attached BCA for additional details.

## 6) Selection Criteria

### a) Primary Criteria

#### i) Economic Outcomes

Replacement of the bridge will increase the efficiency and reliability of freight traffic from northern New Hampshire to the freight corridors of Interstates 91 and 93 by providing a new bridge without vertical clearance limitations or weight restrictions. The investment in this important piece of infrastructure is not only critical to the local and regional economy, but the national and international trade market as well, due to the regions proximity to the trade corridor from Boston to Montreal.

#### ii) Mobility Outcomes

The project will maintain and improve the mobility of people and goods throughout the region, including freight, passenger cars, emergency response vehicles, school busses, and snowmobiles. Posting the existing bridge for a "20 Ton" weight limit will exclude use of the bridge by most emergency response vehicles and heavier freight vehicles, therefore, limiting mobility in the region by some of the most important vehicles which provide safety and economic benefits.

#### iii) Safety Outcomes

Traffic accidents are not currently a significant deficiency in the project area, however, a reduction in the carrying capacity of the existing bridge will force trucks over 20 tons in weight to use a minimum of a 13-mile detour to travel from Lancaster to Guildhall. The additional Vehicle-Miles-Traveled (VMT's) will increase the probability of additional accidents by requiring longer trips on more local roadways not designed for consistent and constant use by larger and heavier vehicles.

#### iv) Community and Environmental Outcomes

Benefits to the community include maintenance of an uninterrupted and efficient connection of Lancaster and northern New Hampshire to the international freight corridor of Interstates 91 and 93. This continuance of this important and direct route are vital to the economy and job creation in northern New Hampshire, in particular the forestry and tourism markets. A beneficial environmental outcome is the reduction in emissions which would be realized if freight over the 20-ton weight limit were to be detoured 13 miles to circumvent the existing bridge. The increase in VMT's creates a substantial increase in dangerous emissions including VOC's, CO2 and NOX. The evidence of the benefit to the environment is proven in the Benefit-Cost-Analysis which compares the replacement

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bridge project to the maintenance of the existing bridge with a 20-ton weight limit over a 50-year analysis period.

## b) Other Criteria

### i) Partnership and Innovation

The States of New Hampshire and Vermont have established a strong partnership relative to reconstruction or maintenance of shared interstate infrastructure. New Hampshire and Vermont, along with Maine, are involved in a unique partnership referred to as the “Tri-State Partnership”. This partnership heightens the focus on asset management infrastructure presentation and allows for a continuous and comprehensive assessment of infrastructure system performance, knowledge base transfers, training, coordinated materials procurement to leverage volume pricing, and implementation and support of the Managing Assets for Transportation System (MATS) – a long term asset performance system. These three northern New England states share a unique bond as their economic vitalities are critically linked by shared high-investment infrastructure.

New Hampshire and Vermont are currently utilizing state funds only for the construction of this project – no other federal funds are programmed for construction. As such, the FASTLANE funding would provide significant assistance in completing this project.

In addition to over 6 years of internal coordination between NHDOT and VTrans, two Public Informational Meetings and two Public Hearings were held for the project between 2012 and 2014 to provide opportunities for public input into the project design.

This application enjoys widespread support from many local, state and federal stakeholders as well as elected officials at all levels of local and state government. In addition, New Hampshire and Vermont elected Federal officials fully support the project.

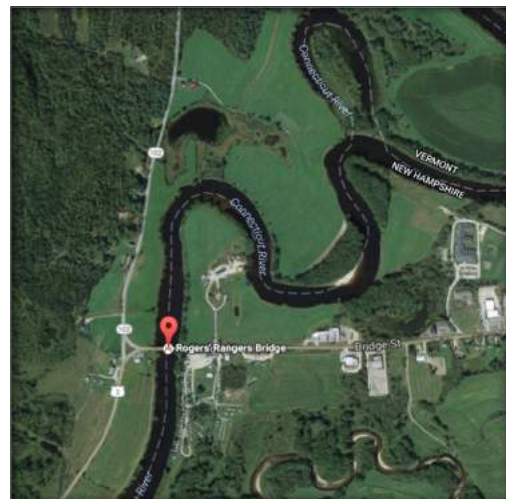
### ii) Cost Share

The low-water mark of the Connecticut River is used as the state line between New Hampshire and Vermont at the project location. Due to the location of the state line, NHDOT and VTrans have agreed to fund the project utilizing an 80/20 split, with New Hampshire paying 80% of the project costs. Furthermore, NHDOT has agreed to administer the design and permitting portion of the project.

## 7) Project Readiness

### a) Technical Feasibility

In 2011, NHDOT and VTrans commissioned the inspection and load capacity rating of the existing truss bridge structure crossing the Connecticut River to precisely determine the existing condition, level of deterioration, safety concerns, and potential upcoming maintenance needs to keep the structure in a





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state of good repair. As a result of this analysis, it was determined that a comprehensive evaluation of rehabilitation and replacement alternatives for the structure was warranted. A 2013 "*Bridge Rehabilitation / Replacement Alternatives Analysis*" report documented viable alternatives and recommended replacement of the bridge as the preferred alternative. The report documented the project viability, design criteria and basis of design, and cost estimates (which have been further refined in subsequent design phases). Contingencies and updated unit costs have been applied to mitigate cost viability as a risk to the feasibility of the project. Project stakeholders and the public were involved in evaluation of alternatives by way of several public informational meetings, public hearings and meetings with local, state and federal resource agencies. The project is feasible, viable and cost-effective when considering initial and long-term costs of construction and future maintenance. The preferred alternative, to replace the existing truss with a concrete deck and steel girder structure upstream of the existing structure, meets the goals of project and fulfills the purpose and need.

NHDOT and VTrans have cost risk-mitigation measures in place including the ability to shift funding between projects to accommodate unforeseen cost overruns, as well as the ability to shift funding between programs if necessary (both state and federal). Both agencies actively use a budget monitoring process whereby technical and finance staff meet regularly with program management staff to monitor costs at both the project and program level. This careful monitoring allows both agencies to identify in advance when and where potential budgetary adjustments may become necessary, and plan accordingly for changes in advance to avoid sudden and more disruptive funding shifts.

# Rogers' Rangers Bridge Replacement Project

## i) Bridge Estimate

<b>Preliminary Bridge Plans Quantity and Cost Estimate</b>					
<b>US Route 2 (Rogers' Rangers) Bridge over the Connecticut River, NHDOT Br. No. 112/130</b>					
<b>NHDOT Project No. 16155</b>					
ITEM NO	ITEM DESCRIPTION	Quantity		Cost	
		Unit	Amount	Unit	Total
209.201	GRANULAR BACKFILL (BRIDGE) (F)	CY	500	\$45.00	\$22,500
403.61	PAVEMENT JOINT ADHESIVE (BRIDGE BASE)	LF	1217	\$2.00	\$2,434
403.911	HOT BITUMINOUS BRIDGE PAVEMENT, 1" BASE COURSE	TON	91	\$150.00	\$13,650
500.02	ACCESS FOR BRIDGE CONSTRUCTION	U	1	\$500,000.00	\$500,000
502.	REMOVAL OF EXISTING BRIDGE STRUCTURE	U	1	\$1,000,000.00	\$1,000,000
503.101	WATER DIVERSION STRUCTURE	U	1	\$40,000.00	\$40,000
503.201	COFFERDAMS	U	1	\$40,000.00	\$40,000
503.202	COFFERDAMS	U	1	\$40,000.00	\$40,000
504.1	COMMON BRIDGE EXCAVATION (F)	CY	420	\$30.00	\$12,600
504.2	ROCK BRIDGE EXCAVATION	CY	50	\$40.00	\$2,000
508.	STRUCTURAL FILL	CY	80	\$50.00	\$4,000
509.1	MOBILIZATION AND DEMOBILIZ. OF DRILLED SHAFT DRILLING EQUIPMENT	U	1	\$325,000.00	\$325,000
509.2	DRILLED SHAFT	LF	200	\$1,200.00	\$240,000
509.3	OBSTRUCTION REMOVAL	LF	15	\$2,000.00	\$30,000
509.4	ROCK SOCKET EXCAVATION	LF	60	\$3,000.00	\$180,000
509.501	CROSSHOLE SONIC LOGGING (CSL) TESTS	EA	4	\$1,000.00	\$4,000
509.62	DRILLED SHAFT REINFORCING STEEL	LB	40000	\$1.50	\$60,000
510.1	PILE DRIVING EQUIPMENT	U	1	\$100,000.00	\$100,000
510.61	FURNISHING & DRIVING STEEL BEARING PILES	LB	150000	\$0.50	\$75,000
510.65	DRIVING-POINTS FOR STEEL BEARING PILES	EA	50	\$175.00	\$8,750
510.9	PILE SPLICES	EA	50	\$125.00	\$6,250
520.0302	CONCRETE CLASS AA APPROACH SLABS (QC/QA) (F)	CY	95	\$450.00	\$42,750
520.12	CONCRETE CLASS A, ABOVE FOOTINGS (F)	CY	380	\$750.00	\$285,000
520.21	CONCRETE CLASS B, FOOTINGS (F)	CY	220	\$550.00	\$121,000
520.213	CONCRETE CLASS B, FOOTINGS (ON SOIL) (F)	CY	200	\$400.00	\$80,000
520.7002	CONCRETE BRIDGE DECK (QC/QA) (F)	CY	665	\$650.00	\$432,250
528.51	PRESTRESSED CONCRETE DECK PANELS (F)	SF	13500	\$25.00	\$337,500
534.3	WATER REPELLENT (SILANE/ SILOXANE)	GAL	95	\$75.00	\$7,125
538.2	BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F)	SY	45	\$50.00	\$2,250
538.5	BARRIER MEMBRANE, HEAT WELDED (F)	SY	1595	\$30.00	\$47,850
541.4	PVC WATERSTOPS, NH TYPE 4 (F)	LF	61	\$10.00	\$610
541.5	PVC WATERSTOPS, NH TYPE 5 (F)	LF	94	\$10.00	\$940
544.	REINFORCING STEEL (F)	LB	90000	\$1.50	\$135,000
544.2	REINFORCING STEEL, EPOXY COATED (F)	LB	140000	\$1.50	\$210,000
544.7	SYNTHETIC FIBER REINFORCEMENT (F)	LB	450	\$10.00	\$4,500
547.	SHEAR CONNECTORS (F)	EA	7220	\$5.00	\$36,100
548.21	ELASTOMERIC BEARING ASSEMBLIES (F)	EA	6	\$2,000.00	\$12,000
548.22	ELASTOMERIC BEARING ASSEMBLIES (F)	EA	6	\$3,000.00	\$18,000
548.23	ELASTOMERIC BEARING ASSEMBLIES (F)	EA	6	\$2,500.00	\$15,000
550.1	STRUCTURAL STEEL (F)	LB	1260000	\$1.75	\$2,205,000
559.41	ASPHALTIC PLUG FOR CRACK CONTROL (F)	LF	94	\$150.00	\$14,100
561.301	PREFABRICATED EXPANSION JOINT, FINGER JOINT (F)	LF	47	\$1,500.00	\$70,500
562.1	SILICONE JOINT SEALANT (F)	LF	72	\$20.00	\$1,440
563.23	BRIDGE RAIL T3	LF	407	\$100.00	\$40,700
563.24	BRIDGE RAIL T4	LF	407	\$150.00	\$61,050
565.232	BRIDGE APPROACH RAIL T3 (STEEL POSTS)	U	2	\$5,500.00	\$11,000
565.242	BRIDGE APPROACH RAIL T4 (STEEL POSTS)	U	2	\$6,000.00	\$12,000
585.21	STONE FILL, CLASS B (BRIDGE)	CY	250	\$45.00	\$11,250
593.411	GEOTEXTILE; PERM CONTROL CL.1, NON-WOVEN	SY	400	\$5.00	\$2,000
692.	MOBILIZATION	U	1	\$694,000.00	\$694,000
1010.41	QUALITY CONTROL QUALITY ASSURANCE (QC/QA) FOR CONCRETE	\$	15000	1	\$15,000
				<b>CONSTRUCTION (CON)</b>	
				<b>CONSTRUCTION SUBTOTAL</b>	\$7,632,099.00
				<b>CONTINGENCY (10%)</b>	\$763,209.90
				<b>BRIDGE TOTAL</b>	\$8,395,308.90
				<b>SAY</b>	<b>\$8,400,000.00</b>

# Rogers' Rangers Bridge Replacement Project

## ii) Roadway Estimate

<b>Highway Slope and Drain Quantity and Cost Estimate</b>					
<b>US Route 2 (Rogers' Rangers ) Bridge over the Connecticut River, NHDOT Br. No. 112/130</b>					
<b>NHDOT Project No. 16155</b>					
<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QUANTITY</b>	<b>UNIT COST</b>	<b>COST</b>
201.1	CLEARING AND GRUBBING (F)	A	0.04	\$ 10,000.00	\$ 400.00
202.2	DEMOLISHING BUILDINGS	U	1.00	\$ 25,000.00	\$ 25,000.00
203.1	COMMON EXCAVATION	CY	5,700.00	\$ 10.00	\$ 57,000.00
203.6	EMBANKMENT-IN-PLACE (F)	CY	13,700.00	\$ 6.00	\$ 82,200.00
214	FINE GRADING	U	1.00	\$ 15,000.00	\$ 15,000.00
304.1	SAND (F)	CY	4,200.00	\$ 16.00	\$ 67,200.00
304.35	CRUSHED GRAVEL FOR DRIVES	CY	320.00	\$ 35.00	\$ 11,200.00
304.4	CRUSHED STONE (FINE GRADATION) (F)	CY	2,100.00	\$ 25.00	\$ 52,500.00
304.5	CRUSHED STONE (COARSE GRADATION) (F)	CY	2,100.00	\$ 22.00	\$ 46,200.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	4,100.00	\$ 85.00	\$ 348,500.00
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	TON	350.00	\$ 110.00	\$ 38,500.00
417	COLD PLANING BITUMINOUS SURFACES	SY	300.00	\$ 3.00	\$ 900.00
606.12	BEAM GUARDRAIL (STANDARD SECTION) (STEEL POST)	LF	800.00	\$ 18.00	\$ 14,400.00
606.1255	BEAM GUARDRAIL (TERM. UNIT TYPE EAGRT 25 FT) (STEEL POST)	U	4.00	\$ 1,600.00	\$ 6,400.00
606.417	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL	LF	500.00	\$ 25.00	\$ 12,500.00
608.13	3" BITUMINOUS SIDEWALK (F)	SY	700.00	\$ 21.00	\$ 14,700.00
609.01	STRAIGHT GRANITE CURB	LF	800.00	\$ 20.00	\$ 16,000.00
				<b>Subtotal:</b>	\$ 808,600.00
	EROSION, SEDIMENT, AND POLLUTION CONTROL (HAY BALES, SILT FENCE, SWPPP, TEMP. WATER POLL. CONTROL)			10%	\$ 80,860.00
	MAINTENANCE OF TRAFFIC			10%	\$ 80,860.00
	MOBILIZATION (ROADWAY & BRIDGE - 7.5M + 1M)		8500000	5%	\$ 425,000.00
	ROADWAY CONTINGENCIES (UTILITY RELOCATIONS, DRAINAGE, LANDSCAPING, ETC)			10%	\$ 80,860.00
	MISCELLANEOUS (FUEL ADJUST., ALTERATIONS)			5%	\$ 40,430.00
				<b>HIGHWAY TOTAL</b>	\$1,516,610.00
				<b>SAY</b>	\$1,600,000.00

# Rogers' Rangers Bridge Replacement Project

## b) Project Schedule

The following project schedule has been developed based upon information contained in the “*Bridge Rehabilitation / Replacement Alternatives Analysis*” and NHDOT and VTrans staff analysis:

- January 2017 – Draft NEPA (Categorical Exclusion) to be submitted
- April 2017 – Completion of NEPA
- February 2017 – Wetlands Permit (ACOE 404, NHDES, USCG, Vermont Storm water and Flood Hazard) applications submittal, Preliminary Plans, Specification and Estimate (PPS&E) submittal
- June 2017 – PS&E submittal
- January 2018 – Right of Way
- February 2018 – Contract Advertisement based upon current funding with FASTLANE grant
- March 2018 – Contract Award
- April 2018 – Construction Begins
  - Build construction trestle
  - River pier construction
  - Abutment construction
  - Superstructure construction
  - Roadway approach construction
  - Shift traffic to new structure
  - Demolition and removal of truss bridge
- October 2020 – Project Completion

Traffic will be maintained on the existing truss bridge during the construction of the new bridge as the facility is too critically important to the region to be closed for any extended duration. During the evaluation of alternatives, other traffic control configurations such as a full detour, and a temporary bridge were evaluated but found to not be viable or cost-effective.

Funding for this project will be obligated well before the obligation deadline of September 30, 2020. Pre-construction activities for the project are well underway and are not anticipated to take an extended amount of time as the NEPA process is largely complete and is anticipated to be a Categorical Exclusion. Right-of-Way procurement is in process and limited impacts in New Hampshire and Vermont are required.

It is important to note that the above schedule is only achievable with FASTLANE grant funding included in the project. In the absence of FASTLANE funding, the earliest feasible construction start based upon available NHDOT and VTrans funding is Federal Fiscal Year 2019.

## c) Required Approvals

### i) Environmental Permits, Reviews and Approvals

No significant impacts to the natural, social or economic environment are anticipated, and the appropriate NEPA document is expected to be a Categorical Exclusion. NHDOT and VTrans are in the process of finalizing environmental documentation to request a Class II (Categorical Exclusion) by April 2017. Beginning in February, 2017, NHDOT will begin the preparation of several applications for

# Rogers' Rangers Bridge Replacement Project

permits which will be required to construct the project, including ACOE 404, NHDES, USCG, Vermont storm water and Flood Hazard. The process to apply for and obtain these permits is anticipated to take approximately 12 months. NHDOT and VTrans have proactively been coordinating with local, state and federal resource and permitting agencies for this project, and as such, no other permits or approvals are anticipated and no issues are anticipated in receiving these required approvals.

## ii) Legislative Approvals

Approvals by elected officials for this project have been obtained. The project is included in the NHDOT 2017-2026 Ten Year Transportation Improvement Plan, the NHDOT Statewide Transportation Improvement Program, and the VTrans Statewide Transportation Improvement Program. These plans contain project priorities, and are based upon input from Regional Planning Commissions, numerous public meetings in both states, and approval by each states Legislature and Governor.

## d) Assessment of Risk and Mitigation Strategies

NHDOT and VTrans have evaluated potential risks to the completion of this project and implemented mitigation strategies to manage them through deliberate actions undertaken throughout the project development process. For this project, risks include schedule delays, NEPA approval and permitting, Right-of-Way procurement, cost escalation and public support. Each of these risks and the associated mitigation strategy are discussed in detail below.

## i) Schedule Delays

The project is being developed through the NHDOT project development process, a process which has been successfully utilized for many similar projects with state and federal funding. NHDOT and VTrans have coordinated the project design through their respective agencies and have assigned personnel with the proper experience to manage internal technical groups as well as the consultant partner assisting with the project design and permitting. An appropriate amount of time has been allotted for the necessary aspects of the project including public outreach, Right-of-Way procurement, permitting, and design. Advertisement is currently programmed for late 2018, but can be accelerated to February 2018 with FASTLANE funding. The design of the project is nearing the completion of the Preliminary Plans, Specifications and Estimate stage, representing approximately 80% complete. The project is on track to advertise by the desired date, however, to avoid the potential for schedule delays, NHDOT and VTrans have accelerated the Right-of-Way procurement process, advanced the design, performed extensive resource agency coordination and appropriated adequate funding for the design and construction of the project.

## ii) NEPA Approval and Permitting

The project is subject to the Section 106 review process and coordination with the State Historic Preservation Office (SHPO) in each state. NHDOT has presented the project to the SHPO on eight occasions to date to discuss the specifics of the existing conditions as well as the preferred alternative. This coordination and investigation into the potential resources of significance associated with the project has resulted in the determination that the existing truss bridge is considered eligible for inclusion in the National Register of Historic Places. Replacement of the bridge with a new bridge

# Rogers' Rangers Bridge Replacement Project

upstream of the existing bridge will require the loss of the eligible resource, therefore, mitigation is required. NHDOT and VTrans have begun discussions with state and federal agencies as to the mitigation required. This coordination is not yet complete, but is anticipated to be complete by April 2017. Final determination of the mitigation requirements will allow for completion of the NEPA process and issuance of an Environmental Classification. This risk of the NEPA process adversely affecting completion of the project is minor, but NHDOT and VTrans have proactively progressed all aspects of environmental review to ensure the NEPA process is completed in a timely fashion.

Permits required for the project are not anticipated to require extensive additional resource agency coordination. NHDOT has presented the project at two Natural Resource Agency meetings to date to discuss environmental aspects of the project, as well as receive feedback and guidance for the project. State and federal resource agencies have raised no unanticipated objections to the environmental permitting aspects of the project and permitting is not anticipated to be a significant risk to the completion of the project.

### iii) Right-of-Way Procurement

Minor Right-of-Way layout adjustments are required to realign a portion of U.S. Route 2 to construct the new bridge upstream of the existing bridge as well as to realign the intersection with Vermont Route 102. Right-of-Way plans have been developed and both the NHDOT Bureau of Bridge Design and the Right-of-Way Section of the VTrans Project Delivery Bureau have begun coordination with affected property owners. While acquisition of Right-of-Way is a risk with any infrastructure improvement project, particularly with regard to cost and schedule, the risk for this project is assumed to be minimal due to the public support for the project and minor nature of required acquisitions.

### iv) Cost Escalation

Cost estimates for construction as well as other project costs such as engineering consultation, Right-of-Way acquisitions, and permitting costs have been prepared and updated at each step in the project development process. Both NHDOT and VTrans maintain an extensive database of weighted average bid prices and have project development procedures in place to produce accurate and reliable construction cost estimates for projects of this type. Inflation of construction costs have been stable and predictable for several years, and is not anticipated to change dramatically over the next few years. Contractor competition is high in New Hampshire and Vermont, keeping escalation of construction bids low. One aspect of the local construction industry is that contractors are increasingly having trouble finding and retaining qualified labor staff. If the shortage of qualified labor continues to decline, salary rates may increase, therefore, having an upward effect on the potential cost of this project and others. NHDOT and VTrans are aware of this risk and classify it as a minimal risk for this project due to the fact that it will be advertised within the next two years.

### v) Public Support

One public information meeting and one public hearing were held in each state (total of four public meetings: 11/8/2012, 6/5/2013, 3/25/2014, and 11/13/2014) to collect feedback from residents and other stakeholders as well as to explain the Right-of-Way process and rights of property owners. Feedback collected from these meetings was generally positive. The public supports this project and lack of public support is not considered a risk.