



# **WINOOSKI RIVER BRIDGE REPLACEMENT**

**Enhancing the Economic and  
Social Connections Between Communities**

**CHITTENDEN COUNTY  
CITIES OF BURLINGTON AND WINOOSKI, VERMONT**

*RAISE Grant Application*  
**SUBMITTED BY:**



*APRIL 14, 2022*



**CITY OF  
WINOOSKI  
VERMONT**

# CONTENTS

**I.** Project Description Pg1

**II.** Project Location Pg9

**III.** Grant Funds, Sources, and Uses of all Project Funding Pg11

**IV.** Merit Criteria Pg12

**V.** Project Readiness Pg20

**VI.** Benefit Cost Analysis Pg23

## **Appendix A:**

Benefit-Cost Analysis

## **Appendix B:**

Letters of Support

## **Appendix C:**

Project Cost Estimate



## I. PROJECT DESCRIPTION

**Overview** - The Vermont Agency of Transportation (VTrans) is pleased to submit this application requesting \$24.8 million through the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant Program. This grant application addresses the need to replace and upgrade a critical connection between the cities of Burlington and Winooski, Vermont. The Winooski River Bridge carries US Routes 2 and 7 (Main Street in Winooski to the north and Riverside Avenue in Burlington to the south) over the Winooski River and serves as a vital connection for all travel modes in the Burlington area.

Main Street/Riverside Avenue is classified as a principal arterial which serves approximately 25,000 vehicles per day traveling between Burlington and Winooski. The existing structure, constructed in 1929, is a 3-span steel multi-girder system supported by reinforced concrete abutments and piers which are founded on bedrock.



**Fig. 1 - Existing Winooski River Bridge Looking East**

The Winooski River Bridge is the only crossing over the Winooski River that connects the downtown areas of two of Vermont's most densely populated cities. As the bridge approaches the end of its service life, it has become apparent that it no longer meets the needs of the communities it serves. The existing structure features narrow vehicle travel lanes, no shoulders, narrow sidewalks, a low parapet, and no dedicated bikeway connecting to the bikeway provided on Riverside Avenue. There is no buffer separating vehicular traffic from pedestrians and bicyclists, creating unsafe and uncomfortable conditions for all travelers. Since the bridge is not serving the community as well as it should and it continues to deteriorate, improvements to the Winooski River Bridge have become a priority as part of the ongoing initiatives to improve connectivity and safety for multi-modal transportation in the region.

As the bridge began showing severe signs of deterioration, and both communities expressed an ongoing need for adequate bicycle and pedestrian accommodations across the river, the Chittenden County Regional Planning Commission (CCRPC), the local metropolitan planning organization, completed a Scoping Study in 2019. See the study here. <https://studiesandreports.ccrpcvt.org/wp-content/uploads/2019/07/FINAL-Winooski-River-Bridge-Scoping-Study.pdf>

That study developed a Purpose and Need Statement that included the following Purpose:

***The purpose of the project is to improve safety while maintaining structural integrity and continuity of this integral link between Winooski and Burlington across the Winooski River. The project will address deficiencies in the bridge while improving multi-modal (bike, pedestrian, vehicular) travel for people and goods. Project recommendations will also complement the context of the natural and cultural environment and provide an aesthetically appealing bridge structure(s) to link the two Cities.***

The following Project Needs were identified:

- *Provide designated lanes for bicyclists*
- *Provide two lanes of traffic in both direction*
- *Improve safety for pedestrians*
- *Address the conditional deficiencies of this aging bridge structure*

The Scoping Study identified five different alternatives. These included: 1) rehabilitation of the existing structure, 2) replacement of the existing superstructure, 3) replacement and widening of the existing superstructure, 4) replacement of the existing bridge utilizing rehabilitated and widened existing piers and abutments, and 5) replacement of the existing bridge with a new two span structure.

**In consultation with the communities, VTrans has identified Alternative 5, the two span replacement option as the preferred alternative. This option would provide a modern, more resilient structure connecting the communities well into the 22nd Century.**

**Condition of the Existing Winooski River Bridge** - The bridge is now over 93 years old and even though it was rehabilitated in 1995 it is showing signs of serious deterioration. Since 2012 VTrans has recommended that the deck be repaired or replaced. Without any repair or replacement, it is believed that the sidewalks on each side of the bridge would need to be closed in 5-10 years and the bridge itself has no more than 10-15 years remaining before it too would need to be closed.

The concrete is deteriorating around the bridge expansion joints, while the bridge rail and sidewalks are showing signs of distress with spalling, exposed reinforcing, and impact damage from plows. **The most recent inspection report completed in 2021 decreased the condition rating of the deck to a 5 (Fair) due to worsening conditions and changed the recommendation from repair to a full deck replacement.** Joint failure is leaking water onto the deck underside, which is accelerating deterioration.



**Fig. 2 - Typical Pack Rust Build-Up and Warping in Girder Bottom Flange**



**Fig. 3 – Typical Deterioration of Bridge Seats, Bearings, and Beam Ends**

The inspection photos shown here indicate that the deck ends are being saturated with advanced efflorescence build up. There are locations of exposed concrete on the top of the deck due to wearing surface and membrane failure and there are locations of spalling with exposed reinforcing throughout the structure. The structural steel itself is showing significant deterioration and protective coating failure while the recent inspection photos show pack rust building in the exterior girder bottom flange and paint failure at joints and other spot locations. Joint failure at all joint locations is accelerating steel deterioration.

In summary, the bridge will soon reach 100 years old, and it has served well beyond its expected life span. It is a riveted, built-up steel structure and there is no record of a modern fatigue analysis being performed. The poor condition, combined with the non-redundant nature of the steel superstructure requires that the bridge be replaced with a modern structure. While the likelihood of a catastrophic failure for this type of structure is not common, it is clear that it is past time to replace the deteriorated structure.



**Fig. 4 - Typical Exposed Deck Reinforcing Under Deck**



**Fig. 5 – Typical Deterioration of Sidewalk Supports**

**Bridge Function and Context** - The Winooski River Bridge is one of three bridges within a one mile stretch of the Winooski River. However it is the only bridge that directly connects the two cities. Less than one mile away I-89 crosses the river upstream of the Winooski River Bridge, but that bridge only accommodates motor vehicles. A smaller two lane structure, the Lime Kiln Road Bridge, crosses the river farther upstream to the east but it is too far away to easily accommodate pedestrians and bicyclists from Winooski or Burlington and is not part of the region’s transit routes. Neither of these structures serves the communities in the way that this bridge on Main Street/Riverside Avenue does, providing a direct connection between the downtown area of Winooski and the northern portion of Burlington, which includes the University of Vermont (UVM) and the UVM Medical Center, and beyond.

The bridge functions poorly as a multi-modal facility as it is not well equipped to serve all of the community needs adequately. Currently, over 25,000 vehicles use the bridge every day as well as numerous bicyclists and pedestrians, especially from April to October. During the warmer months it has been observed that over 500 bicyclists and pedestrians utilize the bridge every day and even in the colder months of early spring and late fall there are still upwards of 200 bicyclists and pedestrians crossing the structure each day. This is in spite of the narrow lanes and lack of shoulders. Although the bridge approaches have four 11’ lanes with 2’ shoulders the bridge itself has four narrow 10.5’ travel lanes and no shoulders, making it minimally adequate for cars and trucks and dangerous for bicyclists. Although the sidewalks on each side are 6’ wide, they are often used by bicyclists that feel unsafe on the roadway, causing conflicts with pedestrians. VTrans minimum standards would provide at least 11’ travel lanes with 5’ shoulders and 5’ sidewalks. However, due to its location and the populations being served, the bridge has been designed to exceed these minimums in order to encourage additional use by cyclists and pedestrians.

The areas both north and south of the bridge are classified as areas of “persistent poverty” as designated by the US Census Bureau. Both Burlington and Winooski have several census tracts that have poverty rates over 20%. Consequently, providing a bridge in this location that remains in a State of Good Repair is critical to the economic and social well-being of both cities.

Downtown Winooski is located directly adjacent to the bridge, including many restaurants, shops, businesses,



**Fig. 6 – Looking West at the Bridge from the Riverwalk**

and apartments. The centerpiece is a historic mill building directly adjacent to the river containing several businesses, a restaurant, and a museum that speaks to the heritage of the community as a mill town. In addition, the dam just downstream of the bridge serves a power plant located west of the crossing. The downtown area is anchored by a circulatory roadway that surrounds Rotary Park, a gathering place for many community festivals and events. A large parking garage is available to serve the variety of businesses and establishments that make this area of the city vibrant. Several years ago the City invested in infrastructure improvements to improve the operations and safety of the circulatory roadway in anticipation of improvements to the bridge.

This area of Winooski also provides housing for many people who commute to jobs in Burlington as well as students that attend UVM. Student housing in the apartment buildings located just east of downtown is critical to the needs of the area as is the low cost housing available throughout the city. More than 60% of the households in Winooski rent and 23% of those do not have access to an automobile, providing a further indication of the need to improve this bridge crossing.

In addition to the downtown area of Winooski, several recreation and nature areas are located in very close proximity to the bridge. South of the bridge in Burlington the Salmon Hole Park is a six acre park providing scenic views of the river as well as hiking trails, fishing areas and a canoe launch. Paralleling the river on the north is the Falls Terrace Park west of the bridge and the Riverfront Park east of the bridge. Both of these parks are directly adjacent to the river and the Riverfront Park is a part of the Winooski River Walk Trail, a 1.3 mile gravel path along the river. Also nearby is the Casavant Nature Area, which covers 104 acres and includes an archeological site. It is accessed from the Winooski River Walk or a parking lot near the end of Winooski Falls Way, just a short walk from the bridge.



**Fig. 7 – Looking South at the Winooski River Bridge with Rotary Park in the Foreground**

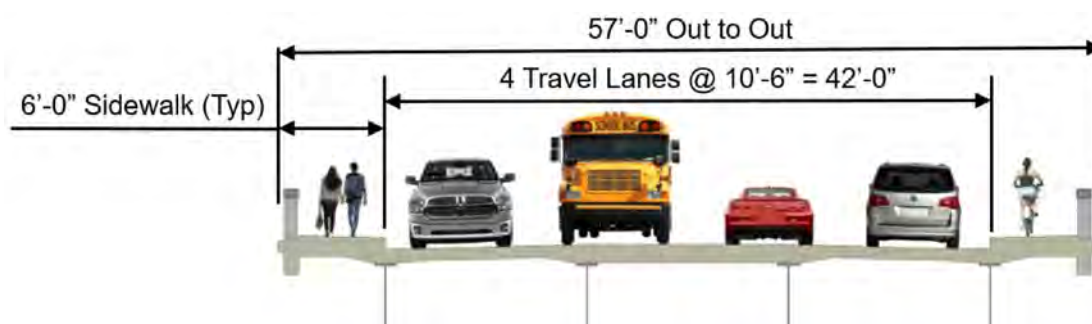
The Burlington side of the river has a decidedly different character with only one old mill building and several small commercial buildings adjacent to the waterway before the area transitions to a largely residential neighborhood of older homes. This area of Burlington is decidedly residential in character and would benefit from an increased connection to the amenities available in Winooski while maintaining its sense of place as a community. Along with the planned improvements to the intersection at Riverside and Colchester Avenue discussed below, the improved safety aspects that a new bridge would provide to pedestrians and bicyclists would allow the residents of northern Burlington to benefit from the job opportunities and activities available just to the north.

Directly south of the bridge in Burlington the roadway splits into Riverside Avenue and Colchester Avenue. US Routes 2 and 7 follow Riverside Avenue which turns west to parallel the Winooski River before turning south towards the center of Burlington. Colchester Avenue heads southwest providing a direct route to the University of Vermont which includes the largest hospital in the region. A project is planned to improve the intersection, reconfiguring it to provide a much safer layout by realigning Riverside Avenue with Barrett Street. The new intersection would provide much improved facilities for pedestrians and bicyclists, including maintaining a connection from the bridge to a shared use path that runs along Riverside Avenue. The intersection improvements would be funded under a separate project and the layout is completely in concert with the proposed improvements to the bridge. A link to this study is provided here. [https://studiesandreports.ccrpcvt.org/wp-content/uploads/2019/04/ColchesterRiverside\\_ScopingReport\\_FINAL\\_20190401.pdf](https://studiesandreports.ccrpcvt.org/wp-content/uploads/2019/04/ColchesterRiverside_ScopingReport_FINAL_20190401.pdf)



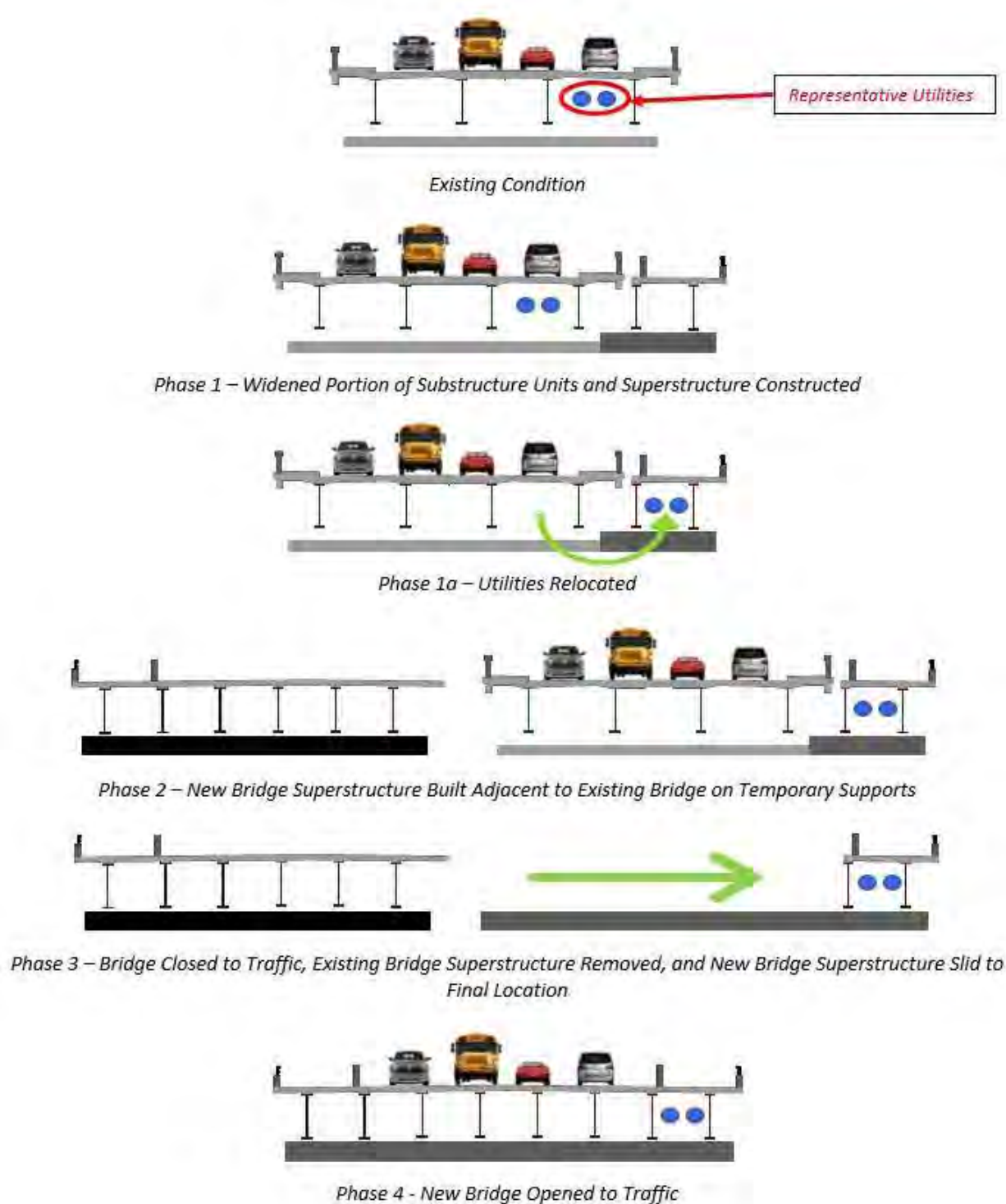
**Fig. 8 - Proposed Bridge Typical Section**

Consequently, the purpose of this project is to improve safety for all users, encourage sustainable modes of travel, improve quality of life, support continued economic growth, and foster a partnership between the cities of Burlington and Winooski while maintaining a state of good repair and continuity of this important link between Winooski and Burlington. In addition, the project should complement the context of the natural and cultural environment by providing an esthetically appealing structure that links the two cities. The new structure will provide a completely multi-modal facility with four 11' travel lanes and 2' shoulders. New sidewalks, meeting the requirements for a shared use path of 12' width would be provided with a low barrier separating vehicular traffic from the bicyclists and pedestrians. Because of the proximity of Winooski's downtown area, as well as the connections between the two communities and the recreational opportunities that exist close by, separating motor vehicles from non-motorized users will provide a safer experience, especially for families with children and other disadvantaged and disabled users who rely on non-motorized travel modes.



**Fig. 9 - Existing Bridge Typical Section**

**Design and Construction** – In order to design and construct the project a design-build procurement process will be utilized. This process requires that preliminary work be accomplished in the areas of roadway and bridge design, right-of-way, and environmental documentation and permitting before advertising for bids from design-build teams.



**Fig. 10 – Phased Slide-In Bridge Construction Sequence**



In order to construct the bridge it is expected that the selected contractor will utilize Accelerated Bridge Construction (ABC) techniques. The need to maintain service and minimize impacts during construction for all travel modes leads one to select an ABC approach. This could include the use of precast elements to facilitate the accelerated construction, but it is also expected that much of the new bridge will be constructed using a lateral slide. This phased approach is illustrated in Figure 10.

Because several utilities are located on the existing bridge the single new pier will be constructed first in Phase 1 adjacent to and underneath the existing bridge. Once the pier is completed the western-most portion of the new bridge will then be constructed. This portion of the bridge will accommodate relocated utilities and pedestrian and bicycle traffic in Phase 2, while also accommodating emergency vehicle traffic if necessary. The remainder of the new bridge will be constructed east of the existing bridge during Phase 2 on temporary supports and then, once the existing bridge is demolished, slid into place during Phase 3. The demolition of the existing bridge during this phase will require a short window where motor vehicle traffic is prohibited over the river. Pedestrians and bicycles will still be able to use the portion built previously.

Using this ABC lateral slide approach will minimize the time required for full closure for vehicles during Phase 3 to approximately 6 weeks. Phase 4 will reopen the bridge to all traffic while finishing up some things like lighting and other minor items. As mentioned above, the areas surrounding the bridge consist of census tracts where persistent poverty is a concern. Consequently, closing the bridge for any length of time to non-motorized users is a concern. Using this ABC approach and building a portion of the bridge adjacent to the existing structure eliminates this concern and reduces the risk of project delay due to utility relocations.

As the new bridge will be constructed in essentially the same location as the existing structure no new right-of-way is required. However, several construction easements will be necessary to construct the project. Most are located on city-owned properties, however some are located on privately-owned parcels which will require acquisition through the normal VTrans right-of-way process which follows federal and state guidelines. In addition, the bridge construction will require that the contractor gain access to the river east of the existing bridge from both banks. This has minimal impacts on the south side but on the north, it will require removing a portion of the large deck (part of the Riverfront Park Walk) that is adjacent to the river. Once the bridge is completed the deck will be rebuilt and brought back to its current configuration.

As the new bridge will be constructed in essentially the same location as the existing structure, very little new right-of-way is required. Several construction easements will also be necessary to construct the project. Most of the impacts are located on city-owned properties, however some are located on privately-owned parcels which will require acquisition through the normal VTrans right-of-way process which follows federal and state guidelines. In addition, there may be impacts to a historic area immediately adjacent to the northwest corner of the bridge in the Falls Terrace Park. Environmental resource impacts, identified in the earlier scoping study, are limited and will be studied in more detail and minimized as the preliminary design is developed. Permits will then be obtained prior to the selection of a design-build contractor team.



**Fig. 11 – Looking North at the Riverwalk Deck and Mill Building**

**Public Outreach and Next Steps** - Both Burlington and Winooski are in full support of a new structure as they recognize the opportunities and benefits it will provide to their residents, the local economy, and the regional transportation network. As part of both the bridge scoping study, as well as the intersection improvement study, a robust public outreach effort that included a steering committee made of public officials and local stakeholders, was used to vet the alternatives. In addition, numerous public meetings were conducted, and a project website was developed to provide information on the projects and allow the public to provide comments and weigh in on the alternatives. In this way the communities were able to determine the best option for improving the safety and operation of the bridge. This robust public outreach effort, including specific outreach to the disadvantaged members of the community, will continue through the preliminary design effort leading to selection of a design-build contractor team.

As it has become apparent that the bridge is approaching the end of its useful life VTrans, the Cities of Burlington and Winooski, and the CCRPC have determined that time is running short to implement a solution to improve this important link between the two cities. Current funding constraints have not allowed it to be placed within the current fiscally constrained Transportation Improvement Plan, however the acquisition of this grant would allow the project to go forward. Obtaining this RAISE grant is a critical element in keeping this important community and regional connection in place, albeit in a much improved condition. If the RAISE grant can be obtained, design work

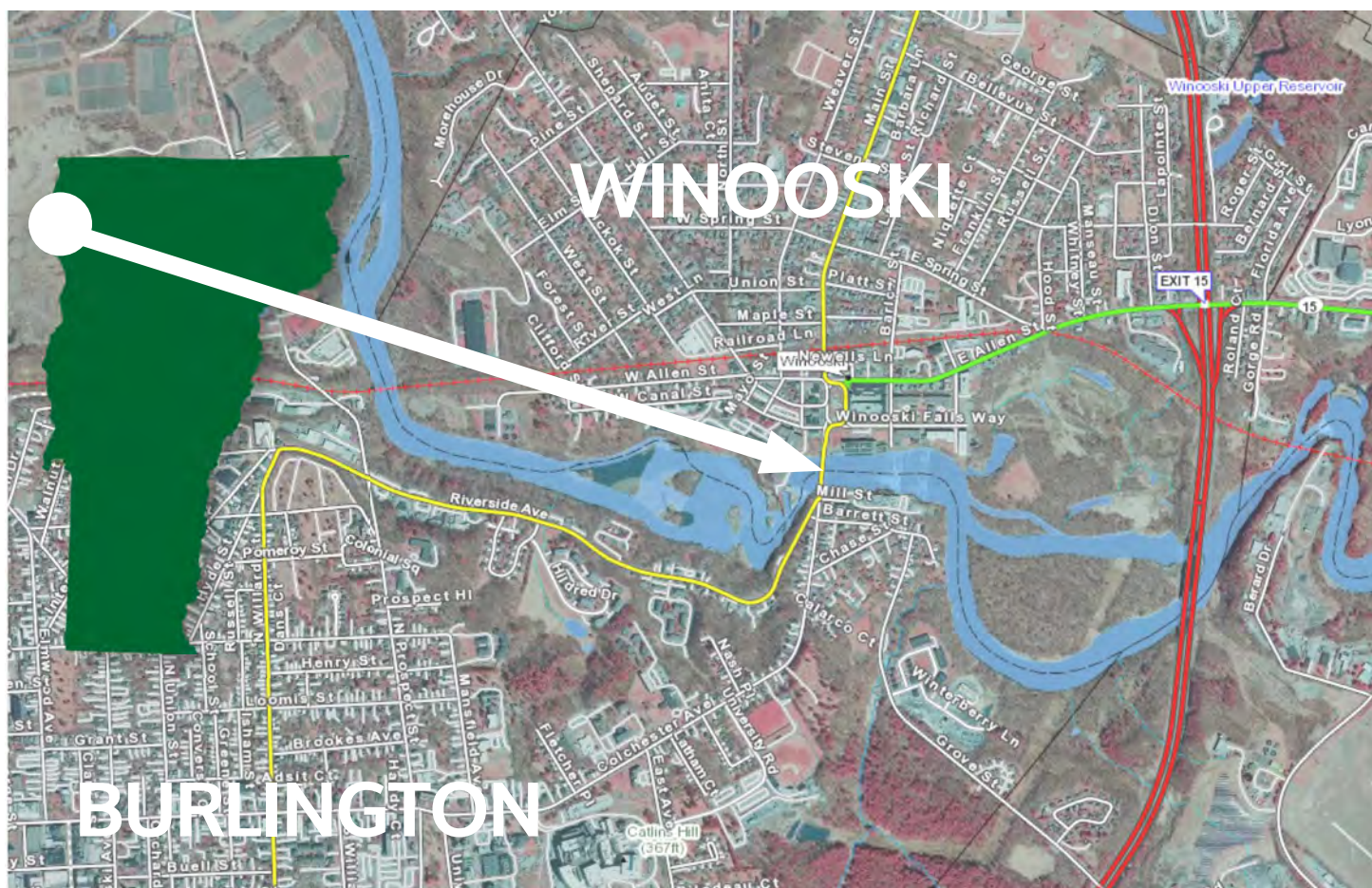


**Fig. 12 – 1928 Plaque on the Parapet of the Existing Bridge**

would begin in 2023, leading to construction starting no later than 2027 and finishing in 2030, avoiding the risk of the existing bridge continuing to deteriorate and needing to be closed. The current cost, including design, environmental documentation, right-of-way, and construction is \$31 million and is shown in more detail in Appendix C and at the link shown here: <https://www.mjinc.com/projects/public/winooski>



**Fig. 13 – The Dam Located Just Downstream of The Bridge Provides Power to Both Cities**



## II. PROJECT LOCATION

Fig. 14 – Project Location Map

The bridge is located in Chittenden County and spans the Winooski River between Burlington and Winooski, Vermont. The general project area and the regional context are shown above in Figure 14. The existing Winooski River Bridge carries US Routes 2 and 7 (Main Street/Riverside Avenue) over the Winooski River. The bridge is 352' long with three equal length spans and is 42' from curb to curb with 6' sidewalks on each side. Including the parapets the bridge deck is 58' wide.

The area is largely residential south of the bridge with some commercial establishments located adjacent to the river while the area north of the bridge is decidedly urban as it is the downtown area of the City of Winooski. Many restaurants, retail shops, and offices are located here. Many apartments are located just to the east along Winooski Falls Way as well.

The bridge is located in an Area of Persistent Poverty under the RAISE grant program requirement of at least 20 percent poverty rate in each census tract adjacent to the bridge structure as measured by the 2014-2018 five year data series. In fact, Census Tract No. 6 in Burlington has a 31.3% Poverty Rate while Census Tracts 24 and 25 in Winooski have Poverty Rates of 37.6% and 25.3%, respectively. In addition, there are seven other adjacent census tracts that have poverty rates above 20% within the City of Burlington. Census Tracts 24 and 25 are also designated as Opportunity Zones. There are other Opportunity Zones located nearby in Burlington, but Census Tract 6 is not considered as such. Figure 15 shows the census tracts.



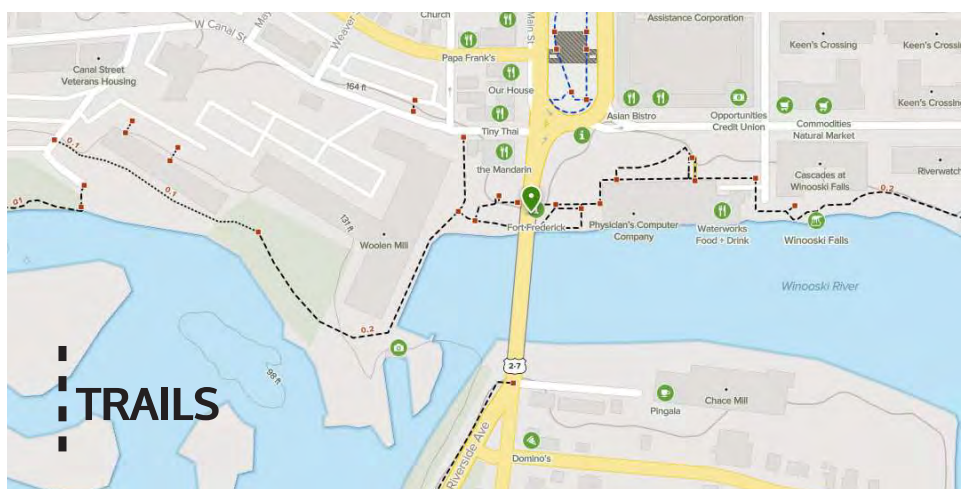
**Fig. 15 - Census Tracts In Burlington and Winooski**

The bridge provides the only direct connection between downtown Winooski and downtown Burlington. The circulatory roadway located just north of the bridge in downtown Winooski allows access to all the streets that converge there. On the south, the intersection with Riverside and Colchester Avenues and Mill and Barrett Streets provides access to different areas of Burlington. Consequently, the bridge is a critical link in the area's vehicular transportation infrastructure. It is also a critical link for bicyclists and pedestrians, although in its current configuration it is also one that needs improvement so that more people see it as a viable alternative for daily usage.

Winooski's downtown has an extensive network of sidewalks that provide access to the bridge. On the Burlington side a shared use path is located on the west side of Riverside Avenue, providing relatively safe access to the bridge. Sidewalks are also located throughout the nearby neighborhoods. Bicycle travel options are good on the Burlington side due to the shared use path along Riverside

Avenue. In addition, a recent project has provided bike lanes at the intersection to the south. However, the lack of wide sidewalks and no shoulders is detrimental to bicycle usage on the bridge. North of the bridge the circulatory roadway is somewhat uncomfortable for cyclists although there are plans to improve the roadway to better accommodate their needs.

Green Mountain Transit (GMT) has three routes that pass over the bridge, serving both Winooski and Burlington. These buses provide regular service throughout the day, providing options for those that do not have motor vehicles or other transportation options. All three routes are part of a larger system that provides service to downtown Burlington and the University of Vermont, as well as many other towns and cities in northwestern Vermont including. GMT provides transportation for a variety of Vermonters but is especially important for those without access to their own motor vehicle. GMT has routes that connect directly to the Burlington Airport, the University of Vermont Medical Center and the main campus, the Burlington rail station, major employers, shopping areas, and many other significant destinations throughout the region. Currently GMT is offering transit service free of charge, making it even more accessible to low income and disadvantaged populations.



**Fig. 16 - The Bridge Makes Trails on Both Sides of The River Easily Accessible.**



### III. GRANT FUNDS, SOURCES, AND USES OF ALL PROJECT FUNDING

VTrans is requesting \$24.8 million in RAISE federal dollars, which is 80% of the estimated remaining project costs, to fund this bridge replacement. The total project cost is estimated to be \$31.0M for the preferred alternative established in the project scoping study. This estimate is based on other representative projects and the total cost per area method. The project cost estimate is included in Appendix C and at the link shown here: <https://www.mjinc.com/projects/public/winooski>

The project will be funded using an 80%-10%-5%-5% funding split between the RAISE Grant, State funds, and local funds, with the municipalities evenly splitting their 10% share. Other federal funds will be supplemented if necessary. See Table 1 below illustrating the project costs broken down by activity and funding source.

Funding for the Winooski Bridge Replacement Project is not currently shown in the CCRPC Transportation Improvement Program (TIP) or the Statewide Transportation Improvement Program (STIP). Since each of these plans is fiscally constrained, a project of this size could not be included in either program. In addition, the STIP has not been updated by VTrans since the decision was made by the CCRPC and the cities to replace the aging structure. In Vermont each of these plans covers a four year period and can be amended at any time as the need arises.

The CCRPC’s 2022-2025 TIP is currently awaiting approval from FHWA. If this project is selected to receive funding under the RAISE program CCRPC will pursue an amendment to the TIP in order to fund the project. Amendments to the TIP are generally easily obtained if funding can be made available.

The current VTrans STIP covers the years 2020 through 2023 so it is due for an update very soon. If this project is selected to receive funding under the RAISE program VTrans will include it in the next version of the STIP in order to fund the project. If it is necessary to amend the STIP, VTrans will develop an amendment. Amendments to the STIP are generally easily obtained if funding can be made available.

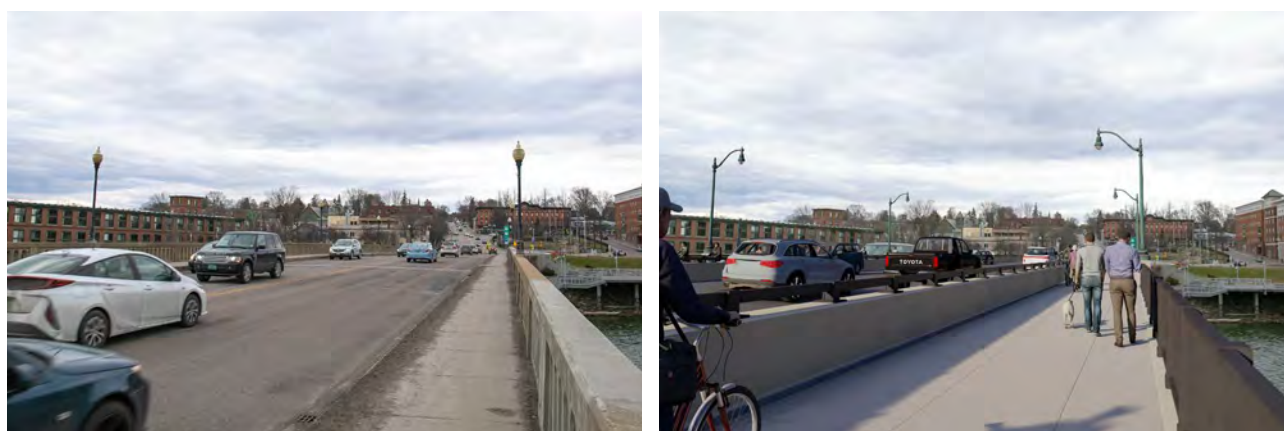
**TABLE 1: PROJECT FUNDING**

PROJECT PHASE	AMOUNT	FUNDING SOURCE			
		RAISE Grant (80%)	VTrans (10%)	City of Burlington (5%)	City of Winooski (5%)
Preliminary Engineering	\$ 3,100,000	\$ 2,480,000	\$ 310,000	\$ 155,000	\$ 155,000
Right-of-Way	\$ 660,000	\$ 528,000	\$ 66,000	\$ 33,000	\$ 33,000
Construction	\$ 27,240,000	\$ 21,792,000	\$ 2,724,000	\$ 1,362,000	\$ 1,362,000
<b>TOTAL PROJECT COST</b>	<b>\$ 31,000,000</b>	<b>\$ 24,800,000</b>	<b>\$ 3,100,000</b>	<b>\$ 1,550,000</b>	<b>\$ 1,550,000</b>

## IV. MERIT CRITERIA

### A. SAFETY

**Bicycle and Pedestrian Safety** – The new bridge will provide dedicated shared use sidewalks separated from motor vehicle traffic by low barriers (see Figure 17 below). Providing a new structure with wider sidewalks will provide a much safer facility by separating non-motorized and vehicular users. From 2016 to 2021 there were 62 crashes on or near the bridge. Of those, 55 were classified as “property damage only.” The other crashes



**Fig. 17 - Existing and Proposed Bridge Sections -  
The Shared Multi-use Path Increases Pedestrian, Bicycle and Vehicle Safety**

resulted in nine injuries. Although none of these crashes were noted as involving bicycles or pedestrians, the close interaction of bicycles with vehicles is likely causing unpredictable movements and contributing to some of the crashes on the bridge. Further, the propensity of crashes in this area and the lack of dedicated facilities for bicyclists has resulted in non-motorized users being apprehensive about using the facility, especially bicyclists. Consistently in public meetings people expressed concern about cycling within this area as riders feel it is unsafe.

As noted, over 500 bicyclists and pedestrians utilize the bridge every day in the warmer months in spite of some of the perceived challenges so providing a safer bridge for these users will provide real safety benefits. To do this the new bridge will have several items that should increase pedestrian and bicycle safety. A crash barrier will prevent motorists from entering the sidewalk area, protecting non-motorized users. The 12’ wide shared use path sidewalks will provide adequate room for both bicycles and pedestrians to interact while staying away from cars and trucks. Finally, a modern LED lighting system will be provided, enhancing the ability of all users to see each other and avoid conflict and enhance the feeling of security at night.

The addition of dedicated bicycle and pedestrian facilities should encourage the use of these alternative travel modes for people of all economic status and especially so for those who only have access to limited resources due to their economic circumstances. Since more than one out of every five people in the surrounding area struggle in this way, the new bridge should help raise the quality of life for everyone in the area.

**Vehicle Safety** – With bicyclists and pedestrians removed from the traffic flow and wider 11’ lanes as well as 2’ wide shoulders the new bridge should be safer for motor vehicle traffic. Many of the crashes were sideswipe and rear end collisions leading to the conclusion that the narrow lanes are at least partly to blame for many of them. Combined with the proposed changes to the intersection south of the bridge, the entire area should become safer for all travel modes reducing the strain on emergency service providers.



**Fig. 18 - Eliminating a Pier Reduces the Vulnerability to Flood Events**

**Safety During Flood Events** – The existing bridge superstructure is well above the 100 year flood, but debris accumulation was the cause of the demise of the previous truss bridge at this location in 1927. The new bridge will reduce the possibility of this reoccurring as it will be a two span structure with only one pier obstructing the flow as opposed to the current three span bridge. The new pier will be founded on bedrock providing a structure that will be reliably resilient and built to last at least 100 years.

**Emergency Response** – Replacing the existing structure with a new wider structure will reduce the need for emergency response in several ways. First, the new bridge is wider and separates vehicular traffic from bicycles and pedestrians. This should reduce crashes of all mode types, decreasing the chances of injury for all users. This should reduce

the number of times emergency responders visit the site. Second, the new bridge will have less chance of accumulating debris, reducing the chance for failure and the risk of an emergency route being disrupted.

In addition, this bridge is the quickest and most direct route for ambulances to reach the University of Vermont Medical Center from the north. If the bridge is allowed to deteriorate and ultimately close, it would lead to increases in response time as well as longer durations in getting patients to hospitals or other healthcare facilities. Ultimately, providing a wider, more resilient structure will enhance emergency response and reduce the drain on resources that could be needed elsewhere.

## B. ENVIRONMENTAL SUSTAINABILITY

**Reducing Transportation-related Air Pollution and Greenhouse Gas Emissions** – By replacing the existing bridge with a new structure the project will reduce transportation-related pollution and emissions in two ways. First, by providing a wider and more multi-modal friendly structure the project encourages the use of travel modes that reduce emissions. By using transit, bicycles, or walking the project reduces the number of vehicles on the road. Second, if the bridge cannot be reconstructed in the near future and is closed, vehicles would need to divert to use one of the other structures, significantly increasing the number of miles driven and increasing congestion on those routes. As shown in the BCA, vehicle miles traveled would increase by almost 50,000 miles per day while vehicle hours traveled increases by more than 2,100 hours each day on the alternate routes.



**Fig. 19 - Restaurants and Shops Surround Rotary Park in Downtown Winooski**

**Land Use and Efficient Design** - The new bridge promotes fiscally responsible land development and transportation efficient design in that it makes it easier for people to live closer to where they work. Downtown Winooski has changed greatly over the last two decades. In the last 14 years 277 mixed-income housing units have been built within a half mile of the bridge, all within walking distance of Winooski’s downtown and, combined with the commercial, dining, and retail opportunities that have sprung up, these elements have made it easier for people to make the choice to live in the

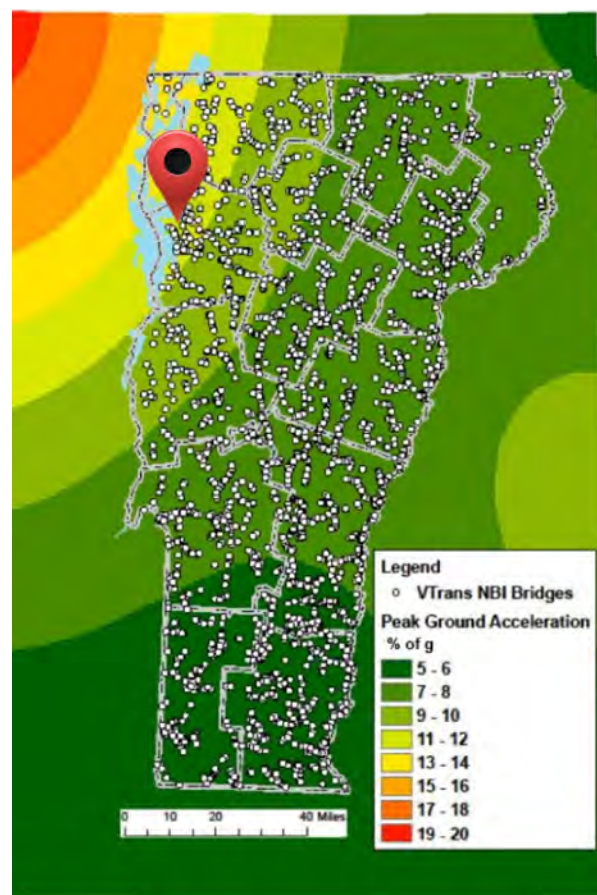
area. Within Winooski total residential units have increased by 295 units between 2018 and 2021. In addition, the new jobs in Winooski’s downtown area are close to residential neighborhoods in Burlington, increasing the frequency of commutes between the two communities. Mill Street in Burlington, located just south of the bridge, also contains a wide variety of small businesses in the former mill, while Winooski hosts some University of Vermont student housing. These supporting and complementary land uses make travel between the communities seamless, except for the uncomfortable and limited options on the bridge itself. Maintaining a good connection across the Winooski River is critical to helping people make good choices regarding where they live and work.

**Infrastructure Resilience** – As mentioned under the Safety Criterion, the new bridge will improve infrastructure resilience by providing a structure that is 50% less at risk with one less pier in the flow path of the Winooski River. As the bridge is expected to be in place for 100 years or more it must be capable of withstanding large flood events. As climate change affects the natural environment, increasing flow rates that were considered “normal,” it is imperative that the design of new structures account for the larger flood events that may occur in the future, providing resilient bridges that can truly last 100 years or more.

It may not be well known but this portion of Vermont is located within the most seismically vulnerable area of the state. Due to its age the existing bridge does not include many of the details that allow a modern bridge to survive a seismic event of the type that is possible in this area. A modern bridge will incorporate seismic details into the design that will make the new bridge much more stable in a predicted event, making it much more resilient.

**Sustainable Materials** – A new structure will utilize sustainable and recyclable materials as much as possible. LED lighting, recycled asphalt, and concrete additives will all contribute to the project and much of the existing structure can be recycled for use in other ways throughout Vermont. In particular the steel beams will be recycled for use elsewhere and the concrete from the deck and abutments will be broken up and used as fill material.

**Underserved, Overburdened, or Disadvantaged Communities** – As much of the area surrounding the bridge is one of persistent poverty it is obvious that an investment in replacing the structure is one that will provide an immediate benefit to communities that are underserved, overburdened, and disadvantaged. Winooski and Burlington have the highest poverty rates in Chittenden County (29.5% and 26.4% respectively) and these two cities account for 28% of the county’s population but are home to 62% of the individuals living below the poverty threshold. In addition, a large percentage of households (over 15%) have no access to a passenger vehicle. People suffering from economic or other disadvantages tend to use transit or less expensive travel modes as cars may be too expensive for some of these individuals to afford. Providing or maintaining walking, biking, and



**Fig. 20 - The Winooski River Bridge is Located in the most Seismically Vulnerable Region of Vermont**



other commuting options is critical to helping these communities improve their economic situation, raising them from poverty.

### C. QUALITY OF LIFE

**Increased Accessibility** – If the existing structure is closed the quality of life for both communities would suffer. The bridge is a direct connection between the two communities offering access to the jobs, housing, and small businesses on both sides of the river as well as the amenities available in downtown Winooski. The existing bridge provides access challenges for those disabled users. The new bridge will address those issues and provide full access for users of all types and the width of the sidewalks on each side will provide a much safer experience for all concerned. With increased accessibility, comes the ability to better connect with the transportation options available through Green Mountain Transit (GMT) as well as the trails and other pedestrian-friendly facilities located on the north side of the river.

One of the most important portions of Winooski north of the bridge is the circulatory roadway and Rotary Park within it. The Park is a centerpiece of the community with events held at or near the Park. These include:

- Winooski Wednesdays, a summer concert series held the first Wednesday evening of each month
- Waking Windows, a large concert held in early May
- Farmer’s Market held each Sunday morning from late May through October
- Halloween festival which lights up the entire downtown area with Jack-O-Lanterns to celebrate the holiday
- Memorial Day Parade held by the Winooski VFW
- Other community celebrations that center on rotary Park because of its central location.

Each of these events are attended by both Burlington and Winooski residents as well as others from within the neighboring towns as well as people coming from farther afield. In each case these events build a sense of community. Without the bridge to provide easy access for both those that have mobility challenges as well as those that do not, these events would struggle to attract the type of audiences necessary to make them successful. The Farmer’s Market especially draws in disadvantaged citizens.



**Fig. 21 - The Winooski Halloween Festival Connects Both Communities**

**Removing Barriers** – Both cities provide access to jobs, business opportunities, and educational opportunities. There are numerous jobs available within the area. According to the Bureau of Labor Statistics there are over 114,000 jobs with an average hourly wage \$28 per hour within the Burlington area. According to the Winooski Chamber of Commerce there are over 500 members in Winooski while there are over 1100 members in the Lake Champlain chamber of Commerce which serves Burlington and many other surrounding towns and cities. While not all of these members are businesses it is clear that there are numerous employment opportunities. Within Burlington, the University of Vermont and the University of Vermont Medical Center are the largest employers. Champlain College is also located within the city while the Community College of Vermont is located

just east of the downtown area of Winooski. Numerous employers are located within two miles of the bridge and access to all manner of services is possible, but only if this bridge remains in place and in a state of good repair.

As mentioned above, with so many local residents below the poverty level, it is clear that more needs to be done to connect the residents with the good paying jobs that are available in the area. The median income of Burlington and Winooski in 2019 was approximately \$51,500 while the median income of Chittenden County as a whole was \$73,650. Decreasing this disparity is critical to the overall health of both communities.

**Enhancing Unique Characteristics** – Maintaining easy access to unique places is part and parcel of what makes a community stand out. A new bridge that enhances access to both sides of the river provides opportunities for many different people with varied interests, whether it is nature, shopping, food, or art. The Winooski River is a wonderful resource for both cities that provides a focal point for community members of all economic station. Because many of the activities surrounding the river are free and maintained by many different organizations, they provide opportunities for underserved, overburdened, or disadvantages members of the community. For instance, the new bridge will provide a much safer connection between the shared use path on Riverside Avenue and the Riverwalk in Winooski, providing a better connection between two well used facilities, enhancing the overall experience available near the river.

Finally, the diversity present in Winooski makes it unique within Vermont. It is the most diverse city within the state with 21.5% of the community born outside of the United States. Census data indicates that Winooski’s residents hail from over 20 different countries with the four largest groups being from Nepal, India, Iraq, and Somalia. Many of these people have left their home country to escape persecution of some kind. Over the last 20 years Winooski has gone from 93% white to 77%. That change has presented challenges as well as opportunities. Removing barriers to assist these recent immigrants in integrating into the community, thereby enhancing the City, is one of the key goals of this project.

**Winooski is Vermont’s  
Most Diverse City With Over 20% of the  
Population Born Outside the US.**

#### **D. IMPROVES MOBILITY AND OPPORTUNITY**

**Increasing Affordable Transportation Choices** –The construction of a new bridge with improved access for all travel modes increases transportation for all local residents, including those that are underserved, overburdened, or disadvantaged by economic conditions or other equity issues. As a substantial percentage of residents near the bridge are below the poverty level, the need to provide them with many transportation options is critical to helping them rise above their economic burden.

For instance, the new barrier to be installed on the bridge separating the shared use sidewalk from motor vehicle traffic will provide a much safer experience for both bicyclists and pedestrians. This will encourage the use of these travel modes, not only for commuting, but for traveling to the nearby recreational opportunities. Maintaining a bridge in this location is also a key component in maintaining transit service through Green Mountain Transit. With this, it makes it easier for residents to access intercity bus service, providing travel to



**Fig. 22 - Shared Use Paths on Both Sides of The Bridge Increase Mobility Options.**



regions both within and outside Vermont using Amtrak or air travel.

**Universal Design** - Universal Design concepts will be used throughout the project, including the bridge and its approaches. The 12' wide sidewalks provide room for stopping to enjoy the view, checking directions, discerning potential hazards, resting, and turning a wheelchair around without slowing foot or bicycle traffic. Spaces on the sidewalk will be clearly defined to provide space for enjoying the river and interacting with other users. The barriers will provide a sense of safety allowing people to travel at their own pace without feeling rushed or the need to move quickly to a safer space.

**The wide protected sidewalks will allow users to move at their own pace while feeling safe on the new bridge.**

Crosswalks are not needed within the bridge but crossings near the bridge approaches will be reconsidered as part of the project to make sure they are in conformance with the final bridge project and how its uses are envisioned. Lighting will be upgraded to provide a comfortable space that invites a slower pace as well. Finally, the type of bridge railing and the use of small viewing platforms along the structure will be considered as part of the final design options to further enhance the sense of place and provide both cities with a signature structure that connects both communities.

**Freight Movement** – Although this bridge does not carry the same amount of regional freight as is carried by the I-89 bridges, there is freight that moves through this area on its way to local delivery sites. Semi-trailer deliveries are somewhat limited but are not rare. In addition, many local businesses rely on the bridge for their weekly and sometimes daily deliveries to keep their customers satisfied. If the bridge is no longer in service, these deliveries would have to be provided in a much less efficient manner.

### E. ECONOMIC COMPETITIVENESS AND OPPORTUNITY

**System Connectivity** – Without this bridge over the Winooski River the economic competitiveness of the City of Winooski is threatened. If the bridge is no longer in service US Route 2 and 7 would almost certainly need to be relocated to a route that would utilize Interstate 189 and Interstate 89 from a point in South Burlington, VT, rejoining the current route in Colchester, VT, north of Winooski. This alternate route would totally eliminate these US routes from both Burlington and Winooski and would increase congestion on the interstate system.

If the bridge is closed both cities would lose connectivity which would be detrimental to many businesses and residents through the corresponding loss of economic viability for many businesses along and near each route. Restaurants and other businesses that rely on pass-by traffic would certainly suffer. Some residents that lose flexibility in their travel routes and modes would almost certainly be required to change employment or

**Maintaining the connectivity over the bridge will ensure that each community remains competitive in the local and regional markets for both customers and workers.**

rethink their daily commutes. In addition, local deliveries would become less efficient, with vendors that serve both communities having to deliver to downtown Winooski before reversing direction back to the interstate highway to then go back into Burlington.

Providing wide sidewalks on both sides of the bridge was a key consideration of the public during the public outreach program. Having these shared use paths on both sides provides complete connectivity for both pedestrians and bicyclists. In addition, using a phased ABC approach as described in the Project Description section of this application will maintain connectivity throughout the project for bicyclists and pedestrians. With the large volume of alternative transportation users this is an important element of the overall project.

In summary, if system connectivity is broken it will have a substantial impact on the economic competitiveness of both cities and lead to upheaval in the lives of both business owners, employees and residents.

## F. STATE OF GOOD REPAIR

**Modernizing Core Infrastructure** – As has been discussed in the preceding Merit Criteria sections, maintaining and improving the state of good repair for a core infrastructure asset is critical to the economic, social, and recreational health of these and all communities. Failing to maintain core assets not only results in a loss of connectivity and many of the other issues already documented above, it leads to an overall malaise in the communities themselves. It suggests to members of the community that their city is on a downward path and that those responsible for taking care of the municipal infrastructure do not care.

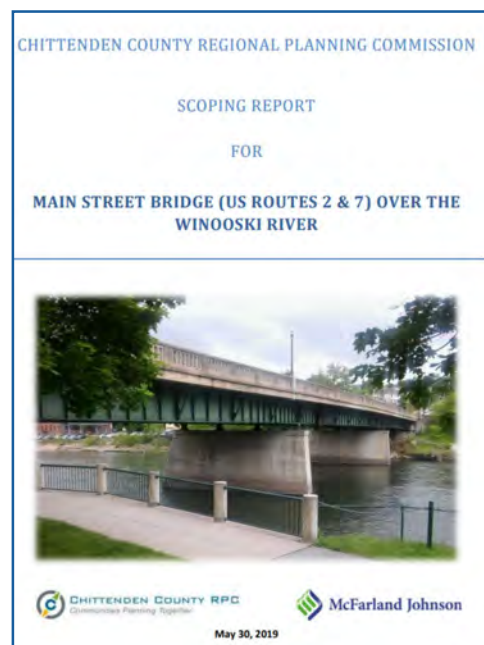
The existing structure has not reached the stage where closure is imminent, but it is a consideration, possibly within the next decade. The condition of the parapets, bridge railing, and sidewalk suggest that, if nothing is done to rehabilitate or replace them, they will need to be closed within 5-10 years and the bridge itself will most likely need to be completely closed within 10-15 years unless a substantial rehabilitation or replacement is completed. The latest inspection report documents the increased deterioration that is continuing to occur as the years go by, emphasizing the need for a new structure to replace the existing bridge that has been there since 1928.

Replacing the existing Winooski River Bridge with a new structure will ensure that this vital link remains open to all users. Vermont's bridge design guidelines provide a 100 year life for structures of this type. The Benefit Cost Analysis is based on the construction of a new bridge utilizing modern materials and design practices that allow bridge design engineers to provide this long life span. Providing safe, long term transportation infrastructure solutions is VTrans number one priority

## G. PARTNERSHIP AND COLLABORATION

**Partnering** – When developing the original scoping study the CCRPC took the lead in developing the study and working through the possible alternatives (including a no-build option). However, the Team was quick to engage stakeholders from both cities and VTrans to assure that the project is a collaborative effort to provide the best solution for all concerned. The advisory committee was comprised of individuals from VTrans and each city, including staff and elected officials, as well as staff from entities like Green Mountain Transit, local alternative transportation groups, and the University of Vermont Medical Center. The advisory committee was part of a robust public outreach effort that also included numerous public meetings and a project website to provide information on the project and allow the public to provide comments and weigh in on the alternatives. This public outreach effort, including specific outreach to the disadvantaged members of the community, will continue throughout the project timeline, including construction, until the project is completed.

This collaborative approach is continuing with the submission of this application through VTrans and will continue throughout the design and construction process. The development of this application was a combined effort of VTrans, the CCRPC and the cities of Burlington and Winooski. During the design the advisory committee will be reconstituted to help the designers with the design



**Fig. 23- The Scoping Study was the Result of Strong Community Collaboration**

details on issues like esthetics, traffic control, and the temporary impacts of construction. During construction, VTrans will continue to involve each city to assure that they stay well informed and are able to participate in the construction process as any changes may arise.

The project has the support of each community as well as many other stakeholder groups. See the letters of support in the attached Appendix B and at the link shown here: <https://www.mjinc.com/projects/public/winooski>

## H. INNOVATION

### *i. Innovative Technologies*

As mentioned above, the phased ABC approach will avoid closing the bridge to the many non-motorized users. For motor vehicles a “slide-in” approach will be utilized to minimize the amount of time that the roadway will be closed. By constructing a portion of the new bridge adjacent to the existing structure to carry the relocated utilities as well as bicyclists and pedestrians, the worst effects of the construction are minimized, reducing the risk project delays. A six week closure will be required to remove the existing bridge and slide in the new structure. This innovative approach will minimize the effects of the full bridge closure on downtown Winooski and the northern portion of Burlington.



**Fig. 24 - Utilizing UHPC Will Reduce The Full Closure Time for Motor Vehicles**

As part of the effort to reduce the bridge closure duration, it is expected that new, innovative materials will be utilized as much as possible. One of the ways to do that is the use of Ultra-High Performance Concrete (UHPC). UHPC will be used to connect the portion of the bridge built initially with the portion to be slid into place. UHPC is able to achieve very high strength within a very short timeframe and it has been used successfully on numerous high-profile projects throughout the country. Using this material will reduce the closure duration while providing superior long-term durability of the joint between the two segments.

In order to provide a 100 year design life for bridge structures, Vermont incorporates several innovative methods and materials into the design process. Stainless steel reinforcing bars are provided within the bridge deck, abutments, and piers to reduce rust induced failure, greatly increasing structure life. Even though epoxy coated reinforcing bars are common, they still rust at some point in time. Stainless steel bars do not rust easily providing increased service life at a minimal cost increase.

### *ii. Innovative Project Delivery*

In order to deliver the project in a timely manner VTrans has chosen to utilize the Design-Build process. VTrans has delivered several large projects using this process over the last decade, including several bridge replacement projects much larger than this Winooski Bridge Replacement Project. The Design-Build process by its nature allows the selected contractor to develop innovative design and construction solutions to provide the best overall value for the Agency. It is expected that this process will provide a new bridge in the quickest possible timeline at the lowest possible cost.

## V. PROJECT READINESS

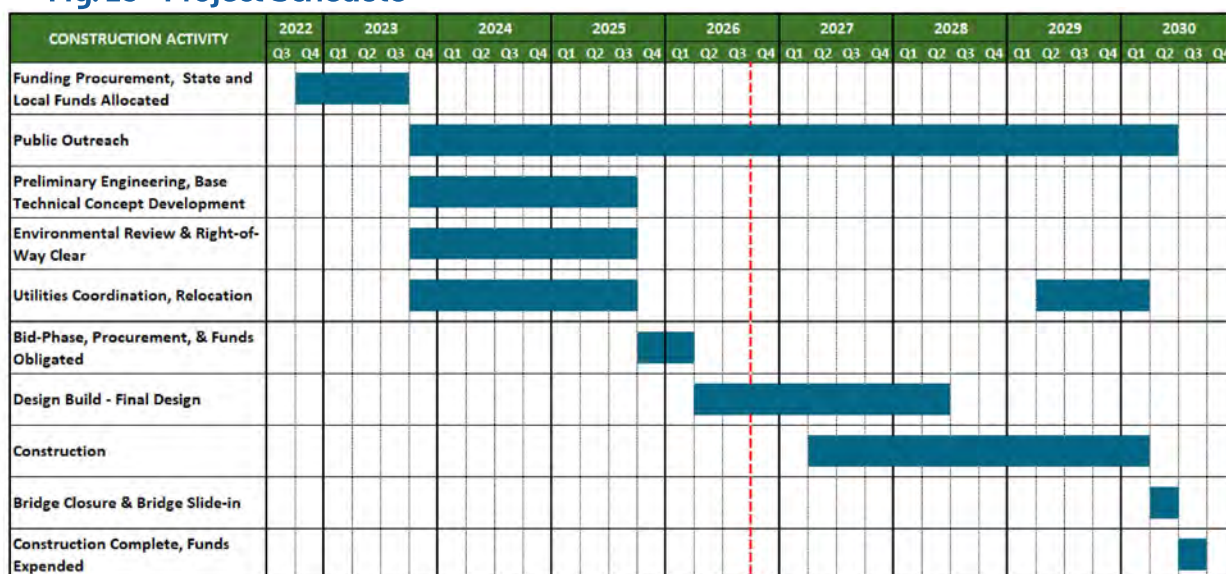
Chittenden County Regional Planning Commission (CCRPC) has completed a scoping study for the replacement of the bridge. The scoping study process has been key to identifying and mitigating environmental risks and other resource impacts. The scoping study also included public outreach, which resulted in unanimous support of the selected project alternative. The scoping study is available for review at: <https://studiesandreports.ccrpcvt.org/wp-content/uploads/2019/07/FINAL-Winooski-River-Bridge-Scoping-Study.pdf>

### PROJECT SCHEDULE

In order to minimize risk of fund expiration and ensure all activities are complete prior to the statutory deadline for fund obligation on June 30, 2026 and expended prior to September 30, 2031, this project will utilize the Design-Build project delivery method. VTrans has a well-defined process and history of success for delivering Design-Build projects.

- August 2022 – Notification of grant award
- July 2023 – Project added to STIP and Begin Design-Build Procurement Development
- October 2023 – Begin Development of Design-Build Base Technical Concept
  - Includes plans, estimate, schedule, ROW Clear, TMP, Utility Agreements
  - Begin resource impact assessment and interagency consultation in compliance with NEPA, Section 106, Section 4(f), Clean Water Act, and other state and federal regulations
  - Begin Public Outreach Program
- September 2025 – Complete NEPA, Section 4(f) Documentation, and state and local permits
- October 2025 – Advertise RFP
- March 2026 – Contract Award and Execution, Grant Funds Obligated
- July 2027 – Final Design, Final Utility Coordination Complete
- April 2027 – Start of Construction
- March 2029 – Begin Final Utility Relocation
- June 2030 – Full Bridge Closure for Lateral Slide
- August 2030 – Bridge open to traffic
- November 2030 – Substantial Construction Complete

**Fig. 25 - Project Schedule**



Grant Funds Obligation Deadline September 30 2026

## REQUIRED APPROVALS

### **Environmental Permits and Reviews:**

The Scoping Report identified the key resources of concern within the project area. It is anticipated that the project will result in impacts to historic resources, publicly owned parks, flood hazard areas, and Waters of the United States. Based on the results of the scoping report, the project is expected to require the Federal, State, and Local approvals and permits listed below:

Required Federal Reviews and Approvals:

- NEPA
- Section 4(f)
- Section 106

### **Federal, State, and Local Permits:**

- Clean Water Act Section 404 Permit (Anticipate authorization under the Army Corps Vermont General Permits)
- Vermont Stream Alteration Permit
- Vermont Operational Stormwater Permit
- Vermont Construction Stormwater Discharge Permit
- Winooski Zoning Permit

### **State and Local Planning and Approvals**

The project is not currently included in the CCRPC Transportation Improvement Program (TIP). Upon notification of a RAISE Grant Award, the CCRPC Executive Director will develop and approve a TIP amendment in consultation with the Executive Committee per the CCRPC TIP Amendment Policy. VTrans will complete a similar process to amend the Statewide Transportation Improvement Plan (STIP).

As previously stated, the scoping study included a public outreach program, which involved holding public hearings and the creation of an advisory committee comprised of community leaders, local and state officials, and local stakeholders. The overwhelming feedback from the initial public outreach was that this project was necessary and important for all stakeholders involved.

### **ROW Acquisition**

Due to the widening of the structure and method of construction, this project will include both permanent and temporary right-of-way impacts. Permanent impacts at each end of the bridge are owned by the respective cities, so there is no foreseeable delay in their acquisition. Small temporary construction easements will be required on adjacent, privately-owned properties. Acquisition activities will begin early in the project development process to mitigate risk and reduce potential schedule impacts. The sole responsibility of the VTrans Right-of-Way Section is to facilitate the acquisition of real property needed for transportation projects and has a proven record of success.



**Fig. 26 - Wider Lanes Will Reduce Sideswipe Crashes**



**Fig. 27 -This Aerial View of The New Structure Illustrates How it Will Fit into the Location, With Minimal Right-Of-Way Acquisition on Each End**

**Assessment of Project Risks and Mitigation Strategies**

As mentioned, the Scoping study was instrumental in identifying potential risks. The preferred project alternative and the project delivery method were chosen because they satisfy the requirements of the purpose and need for the project, as well as mitigate potential risks.

**PROJECT RISK**

**RISK MITIGATION**

**ROW ACQUISITION**

Design-Build project delivery will allow ROW activities to begin earlier in the project development process.

**UTILITY COORDINATION**

The proposed phased construction method and sequence reduces potential utility outages and provides increased time for utility coordination and relocation.

**CONSTRUCTION IMPACTS TO LOCAL TRAFFIC**

There will be an extensive public outreach program to alert, inform, and mitigate impacts from construction. The proposed phased ABC construction method and sequence minimizes impacts and allows ped/bike and emergency vehicle access at the bridge location throughout construction.

**PROJECT COST OVERRUNS**

VTrans and both Winooski and Burlington understand the significance of this structure and will have additional funding on hand for use on an emergency basis.

**PROJECT FUNDING AND SCHEDULING**

The Design-Build project delivery method will be used, which will streamline the project schedule to meet all funding deadlines.





## VI. BENEFIT COST ANALYSIS

The Benefit Cost Analysis for this project was prepared following the guidelines provided in the U.S. Department of Transportation’s (USDOT) Benefit-Cost Analysis Guidance for Discretionary Grant Programs (2022). This BCA uses a 30-year evaluation period. The evaluation period for benefits and costs of this project includes the development stages with design, environmental documentation, and permitting anticipated to begin in 2023 and continue until 2026 when final design and construction will begin. The project is expected to be substantially complete by the end of 2030. This puts the project opening year in 2031, which is the first-year benefits are shown in the analysis and extends through 30-years of operations until 2061.

USDOT-recommended monetized values for crash cost reductions, travel time savings and vehicle operations costs were used to calculate project benefits. All costs in the BCA are stated in 2020 dollars to be consistent with the latest USDOT BCA guidance. Future benefits and costs are discounted at 7% per USDOT guidance. The benefit-cost ratio is calculated by dividing the present value of the projected benefits by the present value of the costs. Table 2 below provides a summary of the benefits and costs for the construction of a new Winooski River Bridge. The Benefit-Cost analysis is included in Appendix A and the project cost estimate is included in Appendix C and at the link shown here: <https://www.mjinc.com/projects/public/winooski>

**TABLE 2: BENEFIT-COST SUMMARY**

CATEGORY	\$2020 Benefit-Cost (Discounted 7%)
<b>Time Savings Benefit</b>	\$ 90,441,585
<b>Vehicle Operating Costs Benefit</b>	\$ 32,314,958
<b>Crash Reduction Benefit</b>	\$ 471,831
<b>Residual Value Benefit</b>	\$ 1,215,403
<b>Total Benefit</b>	\$ 124,443,777
<b>Design/Engineering/ROW Cost</b>	\$ 2,440,780
<b>Construction Cost</b>	\$ 12,808,713
<b>Total Cost</b>	\$ 15,249,493
<b>Benefit-Cost Ratio</b>	8.16

### ***Cost and Benefits Not Addressed Quantitatively***

Additional qualitative benefits include quality of life improvements, increased community connectivity, improved multi-modal access, increased opportunities for underserved residents, and the health benefits which are known to accompany an increase in active transportation. These benefits are not quantifiable.