



2024 RAISE GRANT APPLICATION

Henderson Phase 2 Multimodal Connections

Moving Beyond a State of Good Repair

Program Name:	Rebuilding American Infrastructure with Sustainability and Equity (RAISE)
Project Sponsor:	Rhode Island Department of Transportation (RIDOT)
Sponsor Address:	2 Capitol Hill, Providence, RI
Date Submitted:	February 28, 2024
Project Website:	www.dot.ri.gov/projects/HendersonPhase2

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1 Project Description

1. Introduction

Rhode Island Department of Transportation (RIDOT) requests \$25 million from the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program to support the **Henderson Bridge Phase 2: Multimodal Connections**, a surface transportation project that will leverage repairs on eight major bridges into a complete, multimodal transportation investment. This \$35 million project builds upon the Henderson Bridge Phase 1 bridge reconstruction to move beyond a state of good repair. This project will create opportunities for Rhode Island to realize its multimodal vision by:

- › **Henderson Parkway:** Converting an existing freeway-style facility into a complete street with a lower design speed, dedicated, separated shared use path for non-motorized use and a roadway design sufficient for future Transit Emphasis Corridor (TEC) implementation by the Rhode Island Public Transit Authority (RIPTA).
- › **Install a roundabout:** Decommission and demolish a fair condition bridge with potential to shift toward poor condition, a loop ramp, and two traffic signals and replace with an at-grade roundabout providing expanded automobile connectivity and supporting Henderson Parkway complete street.
- › **Multimodal Network:** Install two (2) miles of separated, dedicated non-motorized facilities to improve bicycle and pedestrian connections between the cities of Providence and East Providence, and specifically the Blackstone River Bikeway and the East Bay Bike Path serving thousands of riders each year. This connects the isolated two-thirds mile Phase 1 bike path into the regional network. Additionally, this project is designed for future transit lane implementation by RIPTA.
- › **Install Scenic Overlooks:** Building on the Phase 1 project, this Phase 2 project will install two (2) scenic overlooks on the Henderson Bridge (Br #600) over the Seekonk River providing an opportunity to invest in the community and attract non-motorized users.

Taken together, this wide range of improvements will transform non-motorized connectivity on a regional scale by linking major bikeways and on a local scale for residents of East Providence. This project addresses all eight of the RAISE Merit Criteria as summarized in Figure 1-1.

Figure 1-1 Merit Criteria Implementation Strategies

Merit Criterion	Implementation Strategy
Safety	<ul style="list-style-type: none">• Reduce vehicle speeds on Henderson Expressway with conversion to a complete street by reducing the design speed from 50 mph (as designed in 1966) to 35 mph as proposed by this project.• Expand non-motorized access and connectivity by constructing approximately two (2) miles of separated non-motorized facilities linking the two most traveled regional path networks in Rhode Island over the Seekonk River.
Environmental Sustainability	<ul style="list-style-type: none">• Mitigate existing flooding issues in an East Providence neighborhood by installing a Stormwater Treatment Unit sized to alleviate the impacts of existing residential flooding and future extreme weather events.• Reduce overall impervious surface area by reducing the width of the Henderson Expressway and removing loops ramps providing grade separated connection to North Broadway therefore reducing runoff and stormwater collection.• Improve automobile access to East Providence, therefore reducing vehicle miles traveled and vehicle emissions, by providing an eastbound left turn from Henderson Parkway to N. Broadway.• Given the wide range of multimodal improvements, this project will foster mode shift in future years.

Merit Criterion	Implementation Strategy
Quality of Life	<ul style="list-style-type: none"> Expand non-motorized access and connectivity by constructing approximately two (2) miles of non-motorized facilities linking the two most traveled regional path networks in Rhode Island over the Seekonk River. Support the Rhode Island Transit Master Plan vision and RIPTA goals for a Transit Emphasis Corridor by providing sufficient pavement cross-section on Henderson Expressway for a future westbound transit lane and opening land for future development.
Mobility and Community Connectivity	<ul style="list-style-type: none"> Invest in alternative modes including building two miles of dedicated, separated bicycle infrastructure and providing more affordable transportation options. Improve network connectivity for all modes through support for future RIPTA improvements, greatly expanded dedicated bicycle and pedestrian facilities and more efficient access from the Henderson Bridge to North Broadway through an at-grade roundabout facilitating all turning movements (e.g. new eastbound left-turn connection).
Economic Competitiveness and Opportunity	<ul style="list-style-type: none"> Reduce RIDOT right-of way to make additional land available for development. Expand non-motorized facilities which residents have historically cited as a benefit to property values, and which will be a valuable in supporting future development in the vicinity of the Henderson Parkway and along the East Providence Waterfront more broadly.
State of Good Repair	<ul style="list-style-type: none"> Remove North Broadway bridge over Henderson Expressway (Br #597) from RIDOT's asset portfolio. Install an at-grade roundabout to replace Br #597 resulting in removal of two adjacent traffic signals. Replace the Henderson Freeway with the Henderson Parkway, a complete street thus reducing pavement surface.
Partnership and Collaboration	<ul style="list-style-type: none"> Continue to coordinate with RIPTA and leverage this project to support their vision for a Transit Emphasis Corridor along the Henderson Parkway from North Broadway to South Angell Street. Continue to coordinate with the City of East Providence to support their revitalization vision for Watchemoket Square, the South Quay, the Waterfront District, and the city more broadly.
Innovation	<ul style="list-style-type: none"> Implement Safe Transportation for Every Pedestrian (STEP) improvements for pedestrians and cyclists as recommended by FHWA Every Day Counts Innovations Program including road diet, crosswalk visibility enhancements and rectangular rapid flashing beacon (RRFBs). Pilot RRFB installations using passive (automated) detection for more efficient non-motorized user travel.

2. Statement of Work

(a) Technical and Engineering Aspects of the Project

For the purpose of this application, the “Project” includes the start and completion of National Environmental Policy Act (NEPA) and other environmental reviews including permitting, further stakeholder and public outreach, preliminary design completion, plan approvals, specifications, and refined cost estimates.

The Project will serve as a major expansion of the multimodal transportation network connecting East Providence with Providence, connecting the Blackstone River Bikeway with the East Bay Bike Path, and converting the Henderson Expressway (a freeway-type corridor) to the Henderson Parkway, a complete street with separated facilities for all users. This change also allows for removal of a pair of interchange ramps and a bridge. Those facilities will be replaced with a roundabout.

- › **State of Good Repair** | Decommission and remove one bridge; reconstruct a freeway-style facility as a complete street with separated shared use path, and sidewalks; and eliminate a pair of traffic signals and ramps linking Henderson Expressway and North Broadway, replacing them with an at-grade roundabout.
- › **Environmental Sustainability** | Remove approximately 0.7 acres of pavement (impervious surface) and install a stormwater treatment unit in the vicinity of the Henderson Parkway to mitigate existing

flooding impacts in the adjacent residential area and provide capacity to address growing concern for future flooding. This project supports the goals of the drafted Rhode Island Carbon Reduction Plan through providing sufficient roadway capacity and developable land for transit improvements, notably a study area for RIPTA to evaluate in alignment with the Rhode Island Transit Master Plan.

- › **Safety** | Replace a freeway-designed facility with a complete street geared toward speed calming and supporting multimodal travel; replace interchange ramps with an at-grade roundabout.
- › **Transit Enhancements** | Provide project enhancements that are supportive of the Transit Master Plan vision for this corridor including maintaining roadway width for future Transit Emphasis Corridor through westbound transit lane from North Broadway to South Angell Street and make available land for future development – a candidate Local Mobility Hub.
- › **Cycling & Pedestrian Facilities** | Enhance pedestrian crossings at 10 locations; install 0.9 miles of separated shared use paths and 1.1 miles of separated bike lanes to connect the cities of Providence and East Providence and the two most highly traveled bikeways in Rhode Island – the Blackstone River Bikeway and the East Bay Bike Path.
- › **Economic Competitiveness** | Remove loop ramps and reduce right-of-way to support future development.

(b) Current Design Status

Leading up to Phase 2 of the Henderson Bridge and Henderson Expressway project, RIDOT has developed concepts for the proposed structural and roadway improvements to address the safety and efficiency concerns along this corridor. The department has also partnered with the local stakeholders and community members during the first phase of this project, to elicit feedback, address challenges, and communicate the progress of Phase 1 of the Henderson Bridge project. Phase 1 included right-sizing a structurally deficient six-lane bridge to a three-lane bridge converting interchanges to at-grade intersections, and protecting shared use infrastructure. The second phase of this project will continue the investments in this vital corridor in East Providence. The right-sizing of the six-lane bridge and reconfiguration of the at-grade roundabouts resulted in safety improvements and reduced speeds in this location. The reduced speeds alleviate pedestrian and bicycle safety concerns and encourage active transportation.

(c) Transportation Challenges to be Addressed

(i) Challenge 1: Vehicle Speed

The safety of all road users remains a paramount concern for RIDOT when evaluating each project. The Henderson Bridge Phase 2 project was selected for this grant opportunity due in part to the many safety and efficiency benefits to all road users. Pedestrian and bicycle safety have become points of emphasis for RIDOT and our partnering municipalities when designing roadways for all user groups. This project includes mitigation measures to reduce speeds from 50 mph to 35 mph at critical stress points as well as protecting vulnerable users along the corridor. Phase 2 will convert the expressway into a boulevard to encourage active transportation and improve the overall efficiency of this transportation network.

(ii) Challenge 2: Non-Motorized Network Gaps

During the community engagement and public outreach period of Phase 1, participants expressed a desire to further the investments into bicycle and pedestrian infrastructure. The gaps will be filled by making the necessary investments to ensure safe and efficient transportation and installing protected shared use paths along the Henderson Bridge and its surrounding connections. This project will investigate opportunities to improve and reduce the dangers of a highly utilized transportation corridor and will connect existing active transportation networks at a critical connection point.

(iii) Challenge 3: Community Connectivity

As with most large-scale transportation projects constructed in urban areas during the mid-twentieth century, the Henderson Bridge and Henderson Expressway created a physical separation between communities in East Providence. Similar barriers can be seen throughout the region as walkable and localized neighborhoods dealt with automobile centric transportation and land use design. As these assets get closer to deteriorating past their safe and efficient life cycle, RIDOT is provided an opportunity to right-size assets and develop project that begin to reconnect these disjointed communities. This grant provides East Providence the opportunity to revitalize the waterfront district and surrounding project area. Beginning with the design of the transportation infrastructure, this project presents a chance for East Providence to employ smart land use planning that can have dramatic impacts on the quality of life and the economic development of the area. As detailed in the virtual town hall series during Phase 1, RIDOT and the other key stakeholders will consider how to design for the current and future needs of the area.

(iv) Challenge 4: Reducing the Asset Portfolio

Henderson Phase 2 looks to further investigate innovative asset management practices. As assets begin to reach the end of their useful life, RIDOT is presented a chance to not only evaluate the geometry and design of these assets, but also investigate the long-term use and impacts of right-sizing these structures. With nearly 70 years of research and a stronger understanding of how infrastructure, development, and transportation accessibility can impact a community or neighborhood, modern approaches to complete streets design can be explored to better utilize the surrounding land use, but also to better refine RIDOT's asset portfolio. This project continues RIDOT's efforts to bring assets to a state of good repair and focuses on reducing or removing redundant assets. Modifying Henderson Bridge began in Phase 1, eliminating three of the travel lanes on the bridge. Phase 1 also included the reconfiguration of interchanges to at-grade intersections and other geometric design choices. These elements can better align the economic and civic goals of the area with the safety and accessibility of modern infrastructure design.

3. History & Context

(a) Project History

The origins of the Henderson Expressway can be linked to the 1969 construction of the Henderson Bridge. Henderson Expressway was designed to connect I-195 at the Gano Street interchange in Providence to Route 44 Taunton Avenue in East Providence along the west shore of the Seekonk River and over the Henderson Bridge. However, due to a variety of reasons, no connection was made. In the 2010s, RIDOT and East Providence recognized that the Henderson Expressway created barriers to community connectivity, mobility, access, and economic development, caused by high vehicle speeds and at-grade separations in the immediate land parcels around the Henderson Bridge.

(b) Transportation Network & Investment Context

The Henderson Bridge and Henderson Expressway are a critical connection point for services, goods, and people to travel across the state of Rhode Island in a safe and efficient corridor. Despite the geometric constraints of the state's waterways and coastline, this bridge serves approximately 20,000 vehicles daily and as the secondary network connecting vehicles and travelers on the east-west direction. Historically, this area was overbuilt with transportation infrastructure to serve the thriving economies of Rhode Island during the twentieth century. With many of those businesses and industries having since closed or moved, this opportunity for investment can help to reinforce the safe and efficient movement of goods and vehicles, but also explore how the transportation network can impact or augment its surrounding neighborhood for the future of Rhode Island's economy.

In the past ten years, RIDOT has embarked on its [RhodeWorks](#) program, which includes a 10-year [State Transportation Investment Program](#) (STIP), to aid this effort of bringing assets to a state of good repair and evaluating the infrastructure against the current and future needs of the state. Right-sizing the Henderson Bridge and Expressway was in the planning stages for several years as funding was programmed. With limited funding available, the project was broken into phases. Phase 1 construction began in 2021 and will be substantially complete in 2025. Phase 1 was funding-constrained to bridge reconstruction and eliminating the interchange loops at Massasoit Avenue. Non-motorized improvements included shared use paths crossing the Seekonk River but were limited to that geographic scope. The goal of the Phase 1 effort was to shift the network toward safer speeds and providing multimodal facilities. The Henderson Phase 2 project intends to complete the Henderson Bridge & Expressway vision to reduce vehicle speeds, expand multimodal connectivity, and maximize the value of the Phase 1 investment for all modes and for the East Providence community. **Henderson Phase 2: Multimodal Connections** aligns with the following plans:

- › [Rhode Island Freight Goods and Movement Plan](#)
- › [Long-Range Transportation Plan \(LRTP\)](#)
- › [Transit Master Plan \(TMP\)](#)
- › [Congestion Management Process \(CMP\)](#)
- › [Transportation Asset Management Plan \(TAMP\)](#)
- › [Bicycle Mobility Plan \(BMP\)](#)

2 Project Location

The Henderson Bridge Phase 2 project is located in the cities of Providence and East Providence. Phase 2 will construct shared use paths in Providence. The remaining improvements are located in East Providence, including the scenic overlook on the Henderson Bridge, right-sizing the corridor to accommodate a complete street design, and the extension existing bike network. Maps of the General Study Area and a Select Populations Group Equity Transportation Equity Benefits Analysis (TEBA) included in Appendix

(a) Area of Persistent Poverty

Portions of this project are located within census tracts defined by USDOT as an Area of Persistent Poverty, specifically census tracts 35, 102, & 104.

(b) Historically Disadvantaged Community

Portions of this project are located within census tracts defined by USDOT as Historically Disadvantaged Communities, specifically census tract 103. This tract is identified for historic challenges with linguistic isolation (91st percentile) and a lower rate of high school education (21% of adults over 25 with less than a high school diploma).

(c) Urbanized Area

Providence, East Providence, and this project are located in the Providence, RI- MA urbanized area.

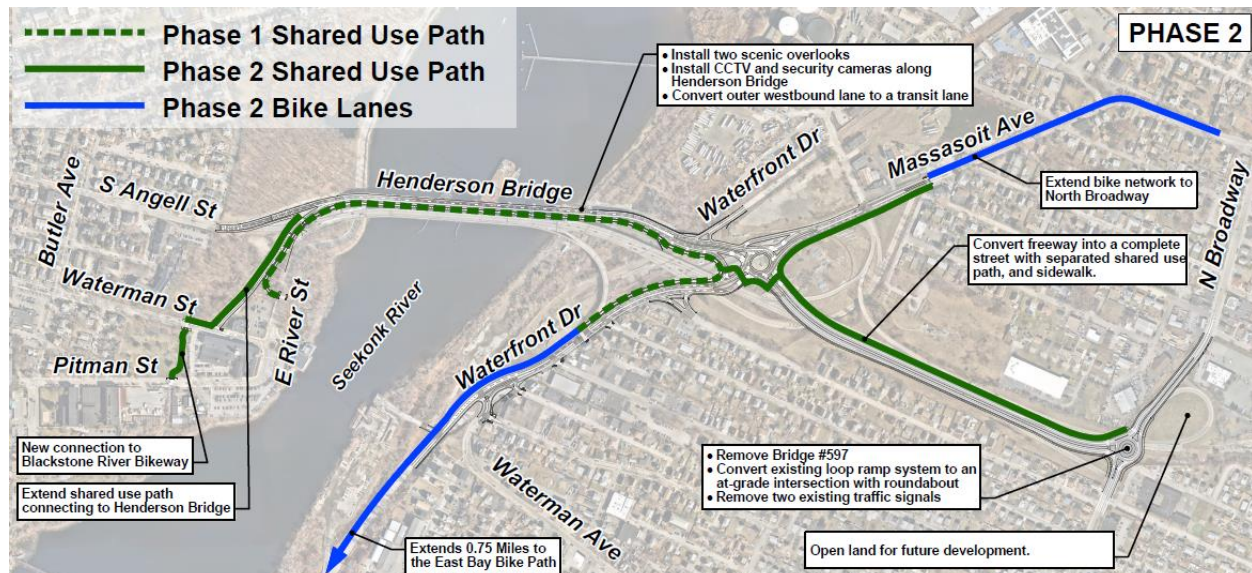
3 Project Budget

1. Budget Overview

Rhode Island Department of Transportation (RIDOT) requests \$25 million from the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program to support the **Henderson Bridge Phase 2: Multimodal Connections**, a surface transportation project that will leverage repairs on eight major bridges into a complete, multimodal transportation investment. This project builds upon the Henderson Bridge Phase 1 bridge reconstruction to move beyond a state of good repair. This project will create opportunities for Rhode Island to realize its multimodal vision by:

- › **Henderson Parkway:** Converting an existing freeway-style facility into a complete street with a lower design speed, dedicated, separated shared use path for non-motorized use and a roadway design sufficient for future transit emphasis corridor implementation by RIPTA.
- › **Install a roundabout:** Demolish a bridge, a loop ramp, and two traffic signals and replace with an at-grade roundabout providing expanded automobile connectivity and supporting Henderson Parkway complete street.
- › **Multimodal Network:** Install two (2) miles of separated, dedicated non-motorized assets to improve bicycle and pedestrian connections between the cities of Providence and East Providence, and specifically the Blackstone River Bikeway and the East Bay Bike Path serving thousands of riders each year. This connects the isolated two-thirds mile Phase 1 bike path into the regional network. Additionally, this project is designed for future transit lane implementation by RIPTA.
- › **Install Scenic Overlooks:** Building on the Phase 1 project, this Phase 2 project will install two (2) scenic overlooks on the Henderson Bridge (Br #600) over the Seekonk River providing an opportunity to invest in the community and attract non-motorized users.

Figure 3-1 General Study Area



NOTE: Phase 1 is currently under construction, Phase 1 is not part of the proposed project. Phase 1 is shown to provide context for the need and benefits of the Phase 2 non-motorized facility extensions.

(a) Costs for the FY 2024 RAISE Project

The future eligible cost of this project is estimated to be \$35 million.

(b) FY 2024 RAISE Grant Funding Request

RIDOT is requesting \$25 Million from the RAISE Grant Program's FFY 2024 funds. The other non-federal funds will be derived from a combination of Rhode Island Capital Plan (RICAP) funds and a \$1 million Community Project Funding allocation from 2022 for eligible expenses.

Table 3-1 RAISE Project Budget Table by Funding Source

Funding Source	Total Funding	Funding Type
RAISE Funding Request	\$25,000,000 (72%)	Grant
Other Federal Funds	\$1,000,000 (3%)	CPF Earmark
Non-Federal Funds	\$9,000,000 (25%)	RICAP
Total Project Cost:	\$35,000,000 (100%)	-

(c) Budget Allocation by Census Tracts and Urbanized Areas

This project is located primarily in census tract 102 but also makes small improvements in adjacent census tracts 35, 103, and 104. The entirety of the project is located in an urbanized area (Providence, RI—MA). The following tables summarize the breakdown of project costs across census tracts.

Table 3-2aProject Budget by Census Tract (2020)

Census Tract	Cost	APP	HDC	Urbanized
35	\$2,700,000	\$2,700,000	-	\$2,700,000
102	\$24,500,000	\$24,500,000	-	\$24,500,000
103	\$7,500,000	-	\$7,500,000	\$7,500,000
104	\$300,000	\$300,000	\$300,000	\$300,000
Total	\$35,000,000	\$27,500,000	\$7,800,000	\$35,000,000

Source: <https://maps.dot.gov/BTS/GrantProjectLocationVerification/>

Note: Within the Project Limits there is no difference between the 2010 Census Tract boundaries and the 2020 Census Tract boundaries.

APP: Area of Persistent Poverty. HDC: Historically Disadvantaged Community

Table 3-2bProject Budget by Census Tract (2010)

Census Tract	Cost	APP	HDC	Urbanized
35	\$2,700,000	\$2,700,000	-	\$2,700,000
102	\$24,500,000	\$24,500,000	-	\$24,500,000
103	\$7,500,000	-	\$7,500,000	\$7,500,000
104	\$300,000	\$300,000	\$300,000	\$300,000
Total	\$35,000,000	\$27,500,000	\$7,800,000	\$35,000,000

Source: <https://maps.dot.gov/BTS/GrantProjectLocationVerification/>

Note: Within the Project Limits there is no difference between the 2010 Census Tract boundaries and the 2020 Census Tract boundaries.

APP: Area of Persistent Poverty. HDC: Historically Disadvantaged Community

Table 3-2cProject Budget by Urban/Rural Census Tracts

Urban/Rural	Project Costs
Urban (2020 Census-designated urban area with a population greater than 200,000)	\$35,000,000
Rural (Located outside of a 2020 Census-designated urban area with a population greater than 200,000)	\$0
Total Project Cost:	\$35,000,000

2. How All Funds May Be Used

(a) Sources, Uses, and Availability

Apart from the requested RAISE Grant, no funding for this project requires satisfying any unique conditions for availability.

(i) Documentation of Funding Commitments

Funding is committed to this project in [Rhode Island's FFY2022-2031 STIP](#), TIP ID 3062. The currently approved version of the STIP identifies \$41.2 million total funding for this project beginning in FFY2024. The project is currently financed with 72 percent federal funding from the RAISE program, 3 percent federal funding, and 25 percent non-federal match comprised of RICAP funds.

If this project is awarded the requested RAISE grant support, RIDOT will immediately revise the STIP to restructure the financing of the project to include RAISE funds and any additional other funding required to fulfill the project's budget obligations. RIDOT would follow the process outlined on the following page to secure funding from other commitments in the program. If this project does not receive RAISE grant support, RIDOT will value engineer the project to reduce costs and seek alternative financing.

(b) Level of Design

At this stage of the Henderson Bridge and Henderson Expressway project RIDOT has developed concepts for the proposed structural and roadway improvements to address safety and efficiency concerns in this corridor. RIDOT has also worked with the local stakeholders and community members throughout the first phase of this project, to get feedback, address challenges, and communicate progress and improvements throughout Phase 1 of improvements at this location. Phase 1 of this project included replacing six lanes of structurally deficient bridge with a three-lane bridge, conversion of interchanges to at-grade intersections, and protected active transportation infrastructure.

The second phase of this project will continue investing in elements of this scope as the corridor and East Providence is brought to a modern, more complete streets design. At this time, design scoping has been completed for Phase 2. Concurrently, preliminary design is nearing completion, and permitting is underway.

(c) Cost Estimates

RIDOT develops "Green Sheets" for projects as early in the process as possible to delineate estimated expenditures on projects by category. These documents are used as the basis for initial project development and updated by RIDOT project managers throughout the lifecycle of a project to ensure that both the overall budget and individual budget categories stay on track. Estimated spending figures in each category are developed from historical project data collected from investments of similar size and scope. The figure below illustrates the anticipated Green Sheet estimates for this project.

Table 3-3 Project Budget by Phase and Task

Phase	Task	FFY	Expected Cost (\$)	Contingency (\$)	Total (\$)
Design	Design, Year 1	2024	\$1,060,200.00	\$117,800.00	\$1,178,000.00
Design	Design, Year 2	2025	\$1,060,200.00	\$117,800.00	\$1,178,000.00
Construction	Construction, Year 1	2025	\$9,580,200.00	\$1,064,466.67	\$10,644,666.67
Construction	Construction, Year 2	2026	\$9,580,200.00	\$1,064,466.67	\$10,644,666.67
Construction	Construction, Year 3	2027	\$9,580,200.00	\$1,064,466.67	\$10,644,666.67
Other	Punchlist & Closeout	2028	\$639,000.00	\$71,000.00	\$710,000.00
Total Project Cost:			\$31,500,000.00	\$3,500,000.00	\$35,000,000.00

Table 3-4 Project Budget "Green Sheet" by Budget Item

Phase	Item	Estimated Expenditure
Design + Construction	Consultant	\$2,350,000
Design + Construction	Other	\$6,850,000
Construction	Contractor	\$22,300,000
Construction	Contingency	\$3,500,000
Total Project Cost		\$35,000,000

(d) Contingency Amount

Given RIDOT's familiarity with the project area, the amount of preliminary work completed to prepare this application, and the contingencies included in the budget shown above, RIDOT is confident that the budget information presented here will ensure that sufficient funding can be obtained to complete this project. The funding requested for this project is expected to support all construction tasks listed above. If, however, the preliminary engineering, design, or bid processes reveal that the project is likely to run short on funding, RIDOT has included \$3.5 million for contingency. In the event that funding is insufficient, RIDOT will deploy a three-step plan to address cost overruns:

- **Convene an Internal Value Engineering Committee** – RIDOT's Planning, Project Management, and Construction staff include experienced engineers with decades of experience. The department has found success in the past convening interdivisional staff to brainstorm ideas for reducing costs, maximizing the value of transportation dollars, and determining a stable path forward. The Value Engineering Team will be deployed here to weigh options and define the additional need. RIDOT's Value Engineering Policy requires a Value Engineering Analysis for projects with an estimated total project cost of \$50 million dollars or more. This analysis is a systemic process of review and analysis of the project by a multidisciplinary team or persons not involved in project that provides recommendations for:
 - Providing the needed functions safely, reliably, efficiently, and at the lowest overall cost;
 - Improving the value and quality of the project; and
 - Reducing the time to complete the project.

The Value Engineering analysis will be done during the scoping and preliminary design phase (10%) in order to produce the maximum benefit to the project. This will allow the proposed Value Engineering

recommendations to be accepted and incorporated into the project design without conflicting or adversely impacting the project's development or construction schedule. The Value Engineering analysis will be facilitated by a Certified Value Specialist (as certified by SAVE International) with experience in Value Methodology.

- › **Apply Proven Prioritization Processes** – RIDOT's [2022 Transportation Asset Management Plan \(TAMP\)](#) defines key processes for Risk Analysis, Project Prioritization, and Investment Strategies. Once the additional financial need is understood, RIDOT would apply these tools to re-prioritize the other investments in the Capital Program with the goal of identifying potential opportunities to shift funds away from other planned projects to fill the void in this one.
- › **Pursue Opportunities for Additional Funding** – In recent years, RIDOT has developed a tested strategy for securing additional funds for major projects. Since 2015, RIDOT has secured more than a dozen discretionary grants totaling \$245 million, issued GARVEE bonds, secured State Revenue Bonds, and received \$186 million in August Redistribution. In the event of a major cost overrun, RIDOT would deploy a combination of these tools to secure the required funding. The department invites opportunities for innovative financing and would entertain all avenues to make the project whole and secure sufficient financing to proceed with construction.

(e) Cost Share or Source of Non-Federal Match

This project will require \$9 million in non-federal match, which will be derived from Rhode Island Capital Plan funds, also known as RICAP. It will also include a \$1 million Community Project Funding allocation from 2022 for eligible expenses.

4 Merit Criteria

1. Project Overview

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- › **Install a roundabout:** Decommission and demolish a fair condition bridge with potential to shift to poor condition, a loop ramp, and two traffic signals and replace with an at-grade roundabout providing expanded automobile connectivity and supporting Henderson Parkway complete street.
- › **Multimodal Network:** Install two (2) miles of separated, dedicated non-motorized facilities to improve bicycle and pedestrian connections between the cities of Providence and East Providence, and specifically the Blackstone River Bikeway and the East Bay Bike Path serving thousands of riders each year. This connects the isolated two-thirds mile Phase 1 bike path into the regional network. Additionally, this project is designed for future transit lane implementation by RIPTA.
- › **Install Scenic Overlooks:** Building on the Phase 1 project, this Phase 2 project will install two (2) scenic overlooks on the Henderson Bridge (Br #600) over the Seekonk River providing an opportunity to invest in the community and attract non-motorized users.

(a) Safety

Safety is a primary purpose of this project with an emphasis on supporting non-motorized travelers. The Henderson Bridge Phase 1 project was funding-constrained and therefore scope-limited to bridge replacement. This opportunity to build-out the non-motorized network will link the two-thirds mile Phase 1 shared use path with the Blackstone River Bikeway and the East Bay Bike Path with a dedicated, separated network.

(i) Protect Non-Motorized Travelers from Safety Risks

Protecting non-motorized users is a primary purpose of this project which will construct two (2) miles of dedicated, separated non-motorized infrastructure. These two (2) miles represent key missing links to broader local and regional non-motorized connectivity that could not be funded through the Phase 1 project. Historically, while this area has few bicycle-specific crashes, the pre-project bicycle facilities are not accommodating for riders of all ages and all abilities.

In addition to constructing dedicated and separated non-motorized facilities, this project prioritizes safety for all users by using roadway design to reduce vehicle speeds. Higher vehicle speeds are linked to increased crash severity.

(ii) Reduce Fatalities & Serious Injuries

Using Highway Safety Manual provided Crash Prediction Models, the No Build (Phase 1) and the Proposed (Phase 2) conditions were modeled to identify the potential safety impacts of this Phase 2 project.

Using FHWA Crash Modification Factors and Proven Safety Countermeasures as a guide, the proposed project includes safety countermeasures that align with historic crash trends and anticipating future safety needs as this growing and changing area develops.

Figure 4-1 Average Annual Crash Reductions by Severity

Severity	Count
K—Killed	0.02
A—Incapacitating	0.08
B—Non-Incapacitating	0.23
C—Possible Injury	1.61
O—No Injury	1.19
Average Annual Crash Reduction	3.12

This project features safety improvements geared toward protecting non-motorized travelers that are recommended by FHWA through their Every Day Counts (EDC) initiative include: STEP enhancements (EDC-5: road diet/road reconfiguration on Henderson Expressway eastbound, pedestrian refuge islands at intersections, rectangular rapid flashing beacons, enhanced signage and markings), and intersection geometric improvements (EDC-2: roundabouts). Each of these improvements is also captured within the FHWA Proven Safety Countermeasure initiative

(PSCi). Other Proven Safety Countermeasures included in the proposed project are install bicycle lanes, install sidewalks, and reduce turn conflicts through eliminating/consolidating existing intersections.

Figure 4-1 summarizes the change in crash patterns anticipated following construction of the proposed project. An annual reduction of 3.12 crashes is projected with more than half of those being fatal/injury crashes. Opportunities for crash reductions are based on expanding non-motorized facilities, removing two existing signalized intersections, reducing travel speeds, and expanding non-motorized safety enhancements (e.g. RRFBs, enhanced crossings).

(iii) Incorporate the National Roadway Safety Strategy

The [National Roadway Safety Strategy](#) (NRSS) is an important guiding document for safety decision-making at RIDOT. The objectives of the NRSS are aligned with the elements of the FHWA Safe System Approach: Safer People, Safer Roads, Safer Speeds, Safer Vehicles, and Post-Crash Care. In 2022 Rhode Island adopted an updated [Strategic Highway Safety Plan](#) which emphasizes the importance of the Safe System Approach as a guiding principle for decision-making. The elements of Safe Roads and Safe Speeds will be improved through this Project.

- › **Safer People:** A key element of the Henderson Phase 2 project is converting the Henderson Expressway into a complete street (Henderson Parkway). This improvement will change driver behavior as they approach the roadway, shifting mindsets away from maximizing travel speed and toward viewing this road as a shared community asset and safer behavioral choices.
- › **Safer Roads:** Under the existing condition, there are few places to cross the Seekonk River which is most apparent to a non-motorized user. This leaves cyclists sharing a freeway facility with vehicles. The proposed improvements will provide dedicated and separated paths or lanes for non-motorized users. Additionally, the expanded network of roadway crossings will greatly improve non-motorized connectivity.
- › **Safer Speeds:** By converting the Henderson Expressway and associated interchange ramps with a complete street (Henderson Parkway) and roundabouts for traffic control the future facility will have a lower, safer, operating speed that match the context of the community. The proposed roadway alignment and roundabout approaches will also support speed control.

(b) Environmental Sustainability

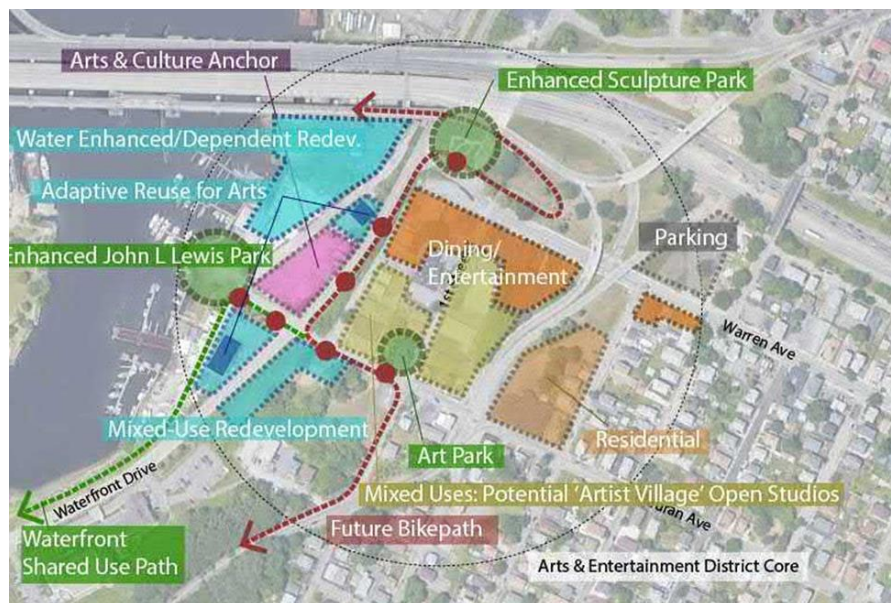
The Henderson Bridge Phase 2 project presents unique opportunities for RIDOT to further invest and investigate feasible and repeatable environmental and sustainable solutions. This project includes a diverse scope that can be utilized to further expand on the State's response to climate change and weather-related impacts.

(i) Implementing Transportation-Efficient Land Use and Design

The Henderson Phase 2 project continues the work identified through years of careful planning in this corridor. This project will provide many of the core elements required for transportation-efficient land use and design. This includes elements of complete streets, a vital connection between the East Bay Bike Path, right sizing the existing Henderson Bridge by removing redundant assets, and the freeing of land for potential transit-oriented development and a community mobility hub. These initial investments will offer the city of East Providence and the city of Providence the opportunity to guide infill development based on the transportation improvements provided by RIDOT.

RIDOT has completed a preliminary environmental justice review of the project area with a 1-mile buffer zone. A complete Title VI Environmental Review will be conducted during design. However, based on the results of the EJSscreen report (available on the [project website](#)) this project is not expected to have adverse impacts on any environmental justice population groups.

Figure 4-2 Average Annual Crash Reductions by Severity



Source: "Watchemocket Square Gateway Improvement Study"

In 2021, East Providence made public their "Watchemocket Square Gateway Improvement Study" which offers a framework for the type of development the city envisions in the along the Seekonk River waterfront, to the south of the project area, including medium and high-density mixed-use development with an emphasis on creative arts in public green spaces. In the Henderson Phase 2 project, RIDOT will install a bike lane along Waterfront Drive, providing a safe non-vehicular connection to the Henderson Bridge and North Broadway to Watchemocket Square.

(ii) Reduce Vehicle Miles Traveled

Reductions in greenhouse gas emissions can be realized through reductions in vehicle miles traveled and shifting individuals out of vehicles and toward other modes. The proposed at-grade roundabout on North Broadway at Henderson Parkway adds connectivity from Henderson Parkway to North Broadway northbound that reduces vehicle miles travels and delay for automobiles, which is documented in the benefit-cost analysis as travel time savings and emissions reductions.

Separately, the benefit-cost analysis outlines assumptions about future shared use path use by cyclists and the proportion of which could be shifted from automobiles to cycling. The mode shift is not included as an

assumption for BCA Travel Time Savings or BCA Emissions Reductions; however, they are captured in reductions in vehicle operating costs and highway externalities (including congestion, noise, and safety).

According to the CEJST Tool, rates of asthma among residents in [census tract 102 are in the 95% and 97% for residents in census tract 103](#). Reductions in automobile emissions would improve air quality and improve asthmas-related outcomes. More broadly, “Transportation currently represents nearly 40% of the state’s greenhouse gas emissions. About [10% of children](#) in Rhode Island children have asthma and [research has found](#) tailpipe emissions are responsible for about 13% of childhood asthma cases.”

This project expands on RIDOT’s investment in the [Bicycle Mobility Plan](#) and encourages non-vehicle movement through this densely population community. Phase 2 of this project presents continued improvements to the efficiency and safety of this corridor, with a major point of emphasis being the improvements and extension of the East Bay Bike Path and extension of the Blackstone River Bikeway. These two vital shared use paths allow and encourage more movement throughout the state, connecting non-vehicle users at a major connector. Investment and improvements in vital transportation infrastructure at this location helps to support East Providence’s larger vision for seeing this location as a thriving mixed-use community. Through encouraging alternative modes of transportation RIDOT will work to reduce the vehicle miles traveled, which will contribute to reducing air emissions an objective outlined in Rhode Island General Assembly’s [2021 Act on Climate](#). RIDOT is also developing its Resilience Improvement Plan (RIP) under 23 U.S.C. § 176 (e)(2) to address surface transportation system resilience to current and future weather events and natural disasters.

The [Rhode Island Carbon Reduction Strategy](#) adopted in 2023 outlines several strategies that RIDOT can use to support greenhouse gas emissions reductions through transportation improvements. This project clearly supports **prioritizing mode shift projects** in programming, as outlined on page 36 including:

- › **Transit service enhancements** consistent with the Transit Master Plan.
- › **Pedestrian and bicycle infrastructure**, including complete streets as well as shared use paths.
- › Electric micromobility, rideshare, and car share services, especially targeting **underserved populations** to improve mobility while also reducing emissions.

(iii) Incorporate Nature-Based Solutions

This project location sits along the edge of the Seekonk River and Providence Harbor. With so much of Rhode Island’s transportation infrastructure being vulnerable to and potentially exposed to coastal events and weather surges along the coast, stormwater solutions are being evaluated for feasibility and resiliency impacts throughout the project location.

The project will mitigate existing residential flooding in the vicinity of Eastern Avenue, Pershing Street, and Clemenceau Street by installing stormwater treatment sized to mitigate the existing flooding and prepared for future extreme weather events.



(c) Quality of Life

Henderson Phase 2 continues RIDOT’s investment into a vital state connector that sits among existing communities and neighborhoods that were divided by the initial infrastructure of the transportation network. This grant opportunity, and project, continue to untangle the difficult constraints and physical barriers dividing these communities. Research and analysis of this area show an increased risk of health burdens

caused partly by the impacts of construction and infrastructure being placed in the backyards of neighborhoods. This project will address and impact the quality of life for its population and users in the following way:

(i) Increase Affordable Transportation Choices

This grant would continue to support RIDOT investments in multimodal accessibility throughout a major connection point in the state: bridging East Providence with the capital city of Providence. Continued investments in bicycle and pedestrian infrastructure, including bicycle travel facilities and accessible sidewalks, will help encourage alternate and affordable modes of travel throughout this densely populated area. This project will install shared use paths in East Providence along the Henderson Expressway from Massasoit Avenue to North Broadway, along Massasoit Avenue from the Henderson Expressway to a midblock crosswalk, a path connection from the Henderson Bridge shared use path to the path along the Henderson Expressway at the Massasoit Avenue and Waterfront Drive roundabout. A shared use path will also be installed across the Seekonk River in Providence; a path from Pitman Street to Waterman Street which will extend the Blackstone River Bikeway. Lastly, a new bike lane will be installed along Waterfront Drive in East Providence, providing a vital connection between the Blackstone River Bikeway and the East Bay Bike Path.

Enhanced signalized crossings will be installed at the Henderson Bridge eastbound right turn crosswalk, the Waterfront Drive approach and departure to the Henderson Expressway at the Massasoit Avenue and Waterfront Drive roundabout, at the Waterman Street crosswalk at the Henderson Bridge ramp, and at the Pitman Street crosswalk at the Blackstone River bikeway. Additionally, the removal of RIDOT pavement and bridge assets along North Broadway Street in East Providence will make available land, giving the [Rhode Island Public Transportation Authority \(RIPTA\)](#) the opportunity to redevelop the parcel into a community mobility hub for frequent and rapid transit. The [Transit Forward RI 2040 Transit Master Plan](#) identifies the area around the project limits as a “Transit Emphasis Corridor” connecting Providence and East Providence. Finally, the connection of the Eastbay Bike Path and the Blackstone Bike Path to a community mobility hub will increase accessibility to safe, reliable, and accessible multimodal transportation options.

(ii) Support Transit-Orientated Development and Reduce Transportation and Housing Cost Burdens

This project would continue construction through the second phase of the Henderson Expressway and Henderson Bridge project. These phased projects are programmed to incrementally encourage safer, non-private vehicle alternatives to transportation while creating a safer, more climate friendly, and efficient transportation network. This phase of the project introduces the opportunity for greater investment in public transportation with an option for a community mobility hub at the newly available land along North Broadway in East Providence. Establishing a community mobility hub at this location will result in more frequent and reliable transit services that will support new transit-oriented development in the immediate area. The North Broadway parcel is large enough to accommodate mixed-use transit-oriented development, supporting a community mobility hub and localized commercial enterprises on lower levels and mid- to high-density residential units in upper levels. RIDOT has initiated discussions with both the city of East Providence and the Rhode Island Public Transit Authority about the appetite for a community-based transit hub in this area.

This phase of the project also introduces an opportunity for RIDOT to help address housing cost-burden issues in the greater East Providence area. [Data from HousingWorks RI at Roger Williams University](#) indicates that 27% of homeowners and 50% of renters within the city of East Providence are housing cost burdened which is slightly higher than the Rhode Island average of 27% and 47% respectively. The introduction of a transit-oriented development (TOD) can ultimately reduce the total number of families that

are housing cost burdened within the project area. In 2023, the [Rhode Island General Assembly passed legislation establishing a TOD pilot program](#) to incentivize higher density residential development adjacent to transit hubs. This program establishes a minimum density of 10 dwelling units per acre and specifies that, at minimum, 10% of all new units are deed restricted affordable units limiting rent costs to 30% of the total monthly income for families earning between 80% and 120% of the area median income. Eliminating the ramp along North Broadway will make available land to further the goals of the state TOD pilot program. Finally, establishing a community mobility hub and completing connections to two adjacent bike paths offer additional and more affordable transportation options beyond private automobiles. Noted in a recent [January draft of East Providence's Comprehensive Plan](#), community engagement highlighted the East Bay Bike Path as “one of the city’s premier recreational assets”. This project aligns with the efforts of East Providence to expand the city’s bike network, specifically calling out bicycle friendly roadways, bicycle boulevards, and dedicated bicycle lanes; similar to the facilities included in this project scope.

(iii) Improve Public Health

This project has demonstrated that it will expand the non-motorized transportation network, therefore, providing new opportunities for active transportation in East Providence. Constructing two (2) miles of non-motorized transportation facilities suitable for all ages and all abilities will open new opportunities for residents to engage in walking and biking, cardiovascular activity that is linked to improved health. According to the CEJST tool, census tracts 102 and 103 in East Providence are in the 74th and 85th percentile for individuals 18 years or older with heart disease. Adjacent census tract 35 on the Providence side of the Henderson Bridge ranks 21st percentile for heart disease diagnoses. Census tract 35 represents a model for what this project could construct in terms of expanding the bicycle/pedestrian network an investing in the community. The proposed bicycle improvements will encourage multimodal connectivity in one of the densest parts of the country and put an existing publicly owned right-of-way to a productive, multimodal use. Encouraging use of non-vehicle movement will also help to reduce the number of vehicle miles traveled through this corridor. The proposed at-grade roundabout on North Broadway at Henderson Parkway adds connectivity from Henderson Parkway to North Broadway northbound that reduces vehicle miles travels and delay for automobiles, which is documented in the benefit-cost analysis as travel time savings and emissions reductions. Rates of asthma among residents in census tracts 102 and 103 rate above the 90th percentile threshold (96th, 97th respectively) established by the Council on Environmental Quality to identify historically disadvantaged communities. Reductions in automobile emissions would improve air quality and improve asthmas-related outcomes.

As described in the Safety Merit Criteria, this project will implement several FHWA Proven Safety Countermeasures, including road diet/road reconfiguration, pedestrian enhancements (refuge islands, rectangular rapid flashing beacons, enhanced signage, and markings), installing a roundabout, bicycle lanes, sidewalks, and reduce turn conflicts through eliminating/consolidating existing intersections. Additionally, by installing a complete street using context and design measures to reduce speeds, crash severity will be reduced.

(1) Promoting Active Transportation

This project has demonstrated that it will expand the non-motorized transportation network, therefore, providing new opportunities for active transportation in East Providence. Constructing two miles of non-motorized transportation facilities suitable for all ages and all abilities will open new opportunities for residents to engage in walking and biking, cardiovascular activity that is linked to improved health. Census tracts 102 and 103 in East Providence are in the [74th and 85th percentile for individuals 18 years or older with heart disease](#). Adjacent census tract 35 on the Providence side of the Henderson Bridge ranks 21st percentile for heart disease diagnoses. Census tract 35 represents a model for what this project could construct in terms of expanding the bicycle/pedestrian network an investing in the community. The

proposed bicycle improvements will encourage multimodal connectivity in one of the densest parts of the country and put an existing publicly owned right-of-way to a productive, multimodal use.

The benefit-cost analysis provided for this application also documents a projection for the number of residents that could benefit from active transportation through improved health benefits. [The International Journal of Behavioral Nutrition and Physical Activity](#), bicycling reduces the rate of all-cause mortality by ten percent, a larger reduction than other forms of physical activity. With the significant population of aging adults in the area, the addition of bicycle infrastructure could yield significant health benefits, including longer lives.

(2) Reduction in Severe Crashes

Improving transportation safety contributes to improving public health. As described in the Safety Merit Criteria, this project will implement several FHWA Proven Safety Countermeasures, including road diet/road reconfiguration, pedestrian enhancements (refuge islands, rectangular rapid flashing beacons, enhanced signage, and markings), install a roundabout, install bicycle lanes, install sidewalks, and reduce turn conflicts through eliminating/consolidating existing intersections. Additionally, by installing a complete street using context and design measures to reduce speeds, crash severity will be reduced.

(3) Reduction in Greenhouse Gas Emissions

As described previously under Environmental Sustainability, there are important opportunities to reduce greenhouse gas emissions, the benefits of which also support improved public health.

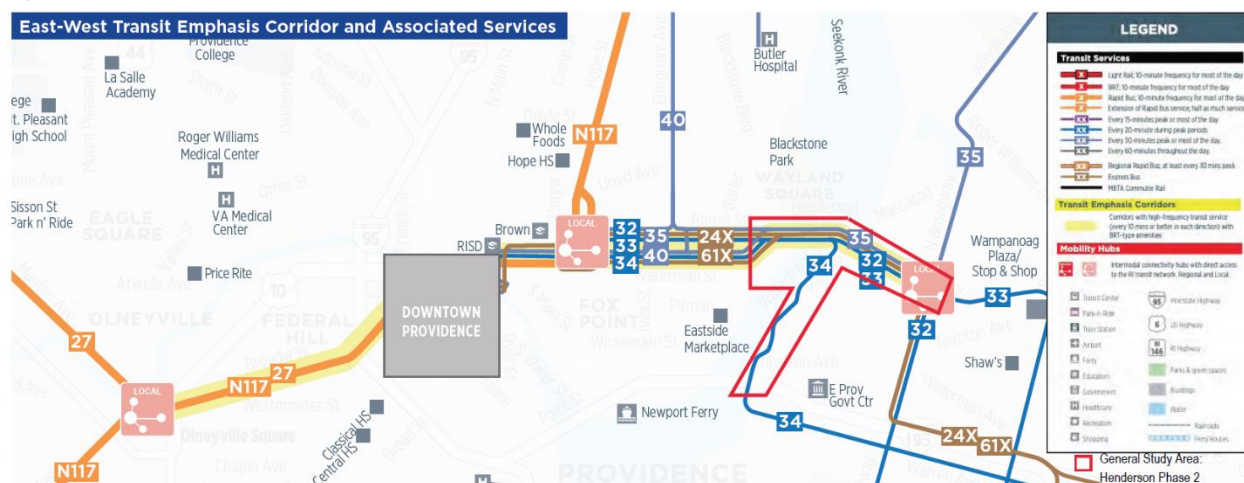
(d) Improves Mobility and Community Connectivity

Phase 2 of the Henderson Bridge project presents a unique opportunity, for RIDOT, to take in and consider community feedback provided during Phase 1 of the project and realize a more modern transportation network designed for all types of user groups. With Phase 1 of construction focused on the bridge infrastructure, this stage of the project can help to mitigate some of the ground-level wayfinding and accessibility throughout the community.

(i) Improve System-wide Connectivity with Access to Transit

RIPTA Local Routes 32, 33, and 34, and Express Route 35, travel across the Henderson Bridge, providing reliable public transit connections from the regional mobility hubs at Kennedy Plaza and Providence Station in Providence to the east bay region of Rhode Island. RIPTA defines a Local Route as a “regularly scheduled service that stops at all bus stops,” while characterizing an Express Route as “weekday only long-distance commuter routes with route segments that operate express peak hours only.” The Kennedy Plaza regional mobility hub serves as the primary bus hub providing bus transit connections across the entire state of Rhode Island and to Fall River, Massachusetts. The Providence Station regional mobility hub serves as a multi-modal connection to Amtrak passenger train and Massachusetts Bay Transportation Authority (MBTA) commuter rail services. The [Transit Forward RI 2040 Transit Master Plan](#) identifies the area around the project limits as a “Transit Emphasis Corridor” (TEC) connecting Providence and East Providence. In corridors such as this, high-capacity transit lines would operate at least partially in dedicated lanes from traffic delays, and Rapid Bus and Regional Rapid Bus routes would operate with queue jump lanes, transit signal priority, and bus-on-shoulder use that would minimize traffic-related delays.

Figure 4-3 Transit Master Plan, East-West Transit Emphasis Corridor and Associated Services



Source: Transit Master Plan: <https://www.ripta.com/wp-content/uploads/2021/07/TFRI-Recs-Briefing-Book-Final-201230.pdf>

The [Transit Forward RI 2040 Transit Master Plan](#) also calls for the creation of a community mobility hub along the Henderson Expressway. The removal of the loop ramp along North Broadway offers the opportunity to redevelop the site into a TOD with a community mobility hub. Community mobility hubs provide mobility services for their immediate surrounding neighborhoods and are generally located in village centers and other activity centers in lower density suburban areas. They typically include bus stops, outdoor shelters, real-time signage, bike/car share, and park and ride lots. Establishing a strong network of mobility hubs will improve connections throughout Rhode Island.

(ii) Incorporating Universal Design Principles and Complete Streets Approach

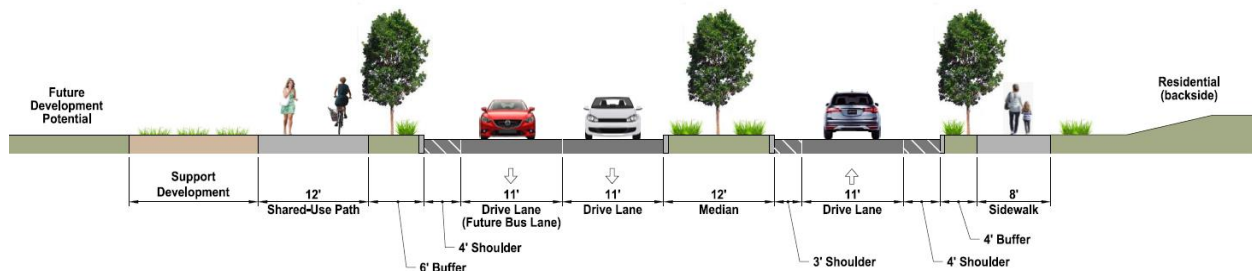
This project engages with the project location aiming to implement a complete streets approach to create multimodal connections throughout this urban core. Each phase of the Henderson Bridge and Henderson Expressway projects were scoped with input and participation from key stakeholders in the area to establish a vision for East Providence and the future of the project location. Through community outreach and communication with the municipalities, RIDOT focused the scope of this phase to include bicycle and pedestrian infrastructure to realize the area as a safer, more connected, community removing barriers created by transportation infrastructure and to reverse the negative impacts of vehicle congestion and movement through the corridor. Collaboration and coordination with municipalities and key stakeholders are critical to the success of each phase of this project and ensuring that each phase is addressing direct concerns and elevating the standards of connectivity and accessibility near Rhode Island's urban core.

(iii) Increase Non-Motorized Travel Accessibility in Underserved Communities

A core aspect of the Henderson Phase 2 project is the vital connection of the Blackstone Bikeway and the East Bay Bike Path, as recommended in the [2020 Statewide Bicycle Mobility Plan](#). The Blackstone River Bikeway is the state's second-longest bike path, with 18.2 segmented miles of bikeway. This bike path is a combination of on and off-road bikeway and connects India Point Park and Woonsocket. The East Bay Bike Path was the first multi-town bike path constructed in Rhode Island, built in four phases starting in 1987 and finishing in 1992. The path travels 14.5 miles from India Point Park in Providence to Independence Park in Bristol, passing many state park and local parks and recreation areas, including Colt State Park, one of Rhode Island's most visited state parks. Connecting neighborhoods, schools, and business districts, the path is popular with commuting cyclists heading into Providence and offers several health and recreational benefits for those accessing any of the many parks along the path. The new bike path connection in the Henderson Phase 2 project will provide access in Disadvantaged Census Tracts 44007010200, 44007010400, and 44007010600 in East Providence, and 44001030700 in Bristol. Building on the

connection to the Blackstone Bikeway will provide a non-motorized travel connection to many of the Disadvantaged Census Tracts along the Blackstone Bikeway in Pawtucket, Central Falls, and Cumberland. Tracts 44007010200 and 44007010400 are in the 76th percentile and 80th percentile for transportation cost burdened, respectively.

Figure 4-4 Streetmix Rendering of Potential Shared Use Path installation



(iv) Community Participation

Henderson Phase 2 Multimodal Connections: Moving Beyond a State of Good Repair supports several community functions beyond transportation. By improving the safety and efficiency of movement throughout the project area, RIDOT can enhance recreational access, neighborhood wayfinding and accessibility to vital community goods or services and create new land use opportunities to be evaluated by their municipalities. Direct improvements to bicycle infrastructure and enhancing the transit network help to reduce the impacts and dangers associated with the transportation network. As detailed throughout the [Virtual Town Hall Meetings for Phase 1](#) of the Henderson Bridge; pedestrian and bicycle safety is a major concern of several of the urban communities in Rhode Island. While bicycle and pedestrian improvements were included in the initial scope of the Henderson Expressway project, RIDOT received multiple comments and requests to address bike and pedestrian infrastructure as part of the Henderson Bridge Phase 1 project. This engagement with key stakeholders is vital to thoroughly addressing and designing infrastructure for municipalities to look forward at how they want to define their land use. Many of these communities and neighborhoods are in the densely populated urban core of the state, in neighborhoods that have historically been bisected by transportation infrastructure. Subsequently, these communities face adverse conditions with data showing the critical impacts the transportation network has had on public health, safety, and sustainability. This project continues investment in these communities and building a transportation network that can service all user groups, providing safe and efficient movement of people and goods.

To continue to encourage community participation, RIDOT will provide opportunities for the public to comment on the project. The public engagement process will be carefully followed by the department, with support from FHWA and relevant community stakeholders. RIDOT will continue to engage with local stakeholders throughout the life of this project through stakeholder meetings and presentations to local neighborhood associations to facilitate dialogues on the scope and programming of the project. The Henderson Bridge Phase 2 would also continue collaboration between RIDOT and key stakeholder East Providence. In November of 2022, the city of East Providence, in cooperation with students and faculty from Roger Williams University, hosted a Riverside Square open house for the public. Many Riverside residents attended the event, as students and faculty presented their findings on the Riverside Square neighborhood.

(e) Economic Competitiveness and Opportunity

(i) Promoting Long-Term Economic Growth

Rhode Island's freight distribution system is fundamentally important to Rhode Island residents and businesses. It facilitates movement of all types of commodities, imported and exported throughout the state and region. For Rhode Island to remain economically competitive, freight must move efficiently throughout this network. When considering the overall supply chain, this project will provide the most benefit for the "Final Mile" phase of freight movement. The final mile is a critical component of the supply chain network, with an estimated 28% of transportation costs occurring in this final stage. Improving the ramp geometry and connectivity improves access to national, and global, freight markets. Through making investments in signalized intersections and removing the loop ramp system there is greater flexibility to manage traffic movement so that approaches supporting freight movement can be prioritized to reduce delays. An adaptive traffic signal system will prioritize traffic movement to shift in response to real-time demand. During traffic surges or demand peaks freight movement can be prioritized and improve travel time reliability for all road users. Rhode Island, and the Providence Harbor, are home to several active ports, port terminals, and active freight rail lines, as detailed in Figures 4-5 And 4-6.

Henderson Phase 2 would provide direct connection to Waterman Avenue and Taunton Avenue which are identified as Major Commercial Corridors in the City of East Providence's Comprehensive Plan. One of the key components of this project is the connection of the Blackstone Bikeway to the East Bay Bike Path, making the final connection along Waterfront Drive. This connection will take the form of a separated bicycle facility with elements of complete street design. This transformation of Waterfront Drive will build off the success of the East Bay Bike Path, [cited in a 2018 report](#) as the "best investment in the State" which has been a helpful incentive for property buyers along the path. The investment also supports the goals of the East Providence Waterfront District zoning designation and the vision for the Watchemoket Square neighborhood.

In 2003, the city of East Providence adopted the East Providence [Waterfront Special Development District Plan](#). The Waterfront Plan articulates a vision with strategies to transform over 300 acres of the city's underutilized waterfront along the Providence and Seekonk Rivers. The vision hopes to achieve a diverse mix of land uses, including commercial, office, medium, and high density residential, light manufacturing, entertainment and hospitality, civic, and recreational uses. Full buildout of the Waterfront District will generate millions of dollars in new tax revenue and create thousands of temporary and permanent jobs that

Figure 4-5 Rhode Island Active Rail Lines

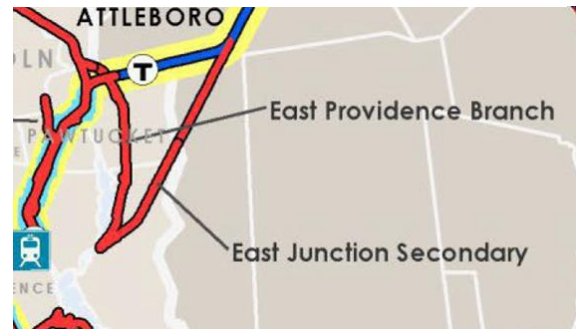


Figure 4-6 Rhode Island Ports and Port Terminals



will provide a strong infusion of new revenue that will create a more stable and diverse local economy in East Providence.

(ii) Economic Opportunities and Disadvantaged Business Enterprises

Beyond improvements to vehicle, bicycle, and pedestrian movements, this project will promote robust job growth, particularly for historically underrepresented groups. RIDOT is expanding its Highway Construction Workforce Partnership (HCWP) pilot to proactively address workforce development challenges under its partnership with the nonprofit [BuildingFuturesRI](#), which operates a nationally recognized quality pre-apprenticeship program(s) for underrepresented populations. RIDOT's State Transportation Employment Program (STEP) provides well prepared diverse candidates for Registered Apprenticeship employment.

In addition to its partnership with BuildingFuturesRI, RIDOT takes additional steps to engage historically underrepresented groups in its projects. RIDOT's Contractor Compliance Program ensures that federally funded construction contracts meet equal employment opportunity and affirmative action requirements. RIDOT prohibits prime contractors and their subcontractors working on Federal-aid construction contracts from discriminating on the basis of race, color, religion, sex, national origin, age, or disability in their employment and contracting practices. RIDOT's primary contractors are signatory to collective-bargaining agreements with the member unions of the Rhode Island Building & Construction Trades Council (RIBCTC).

(iii) Paving the way for Public Transportation Investments

This project sets the stage for further investments in public transit. Investments in public and multi modal transportation can help reduce roadway traffic congestions, with benefits for commercial truck deliveries, employer labor market access, and other aspects of commercial productivity. Improvements on public transit services can enhance reliability, not only for users, but for private vehicles because of less congestion related traffic delays. Unanticipated delays for commuters or the arrival times of product inputs and services can weaken efforts for time-dependent manufacturing and inventory systems, can require increased timing in freight and warehouse scheduling, [and can reduce the productivity of service-based industries](#).

Investments in public transportation supports economic growth through the concentration of economic activity with the clustering of offices, retail, service industries, and other contributing land uses around public transportation stops. Such clustering can provide increased efficiency through reduced labor costs and increased interaction with similar businesses, [resulting in higher productivity and increased economic growth](#).

(f) State of Good Repair

RIDOT has been taking a systematic and data-driven approach to state of good repair since the adoption of the [RhodeWorks Law](#) in 2016. This project continues to uphold a state of good repair as a primary purpose. The following sections describe key challenges and how the proposed project will address them.

(i) Restore and Modernize Core Infrastructure Assets

This project seeks to restore a state of good repair to the Henderson Expressway while eliminating antiquated infrastructure and modernizing design for the current need.

A fiscally constrained program of asset management projects has led RIDOT to incrementally address decades of insufficient maintenance in the Henderson corridor. The Henderson Expressway from Massasoit Avenue to North Broadway was designed as a freeway, however, operates as an arterial. This project will reconstruct and restore this POOR condition roadway (PSHI 70.7) to GOOD condition and modernize the facility with a road diet in the eastbound direction and a complete street facility overall. The complete street facility will feature an alignment that supports reduced operating speeds, a separated shared use path, planted medians, and a westbound lane configuration supportive of future transit lane install by RIPTA.

Figure 4-7 Aerial Photo, Henderson Expressway during Phase 1 Construction



(ii) Reduce Construction and Maintenance Burdens

This project will reduce construction and maintenance burdens by eliminating North Broadway Bridge (#597) over Henderson Expressway on-ramp. This bridge will be demolished and filled. This is less costly than rehabilitating the bridge in the present and eliminates maintenance in the future.

North Broadway (#597) has been maintained in FAIR condition for several years due to lack of funding. The deck remains original (1971) and is anticipated to move into This bridge is proposed to be demolished through this project and replaced with an at-grade roundabout that will improve the management of traffic and add additional connectivity for users. This improvement is a net lower cost than reconstructing.

(iii) Improve Condition and Safety within the Existing Footprint

All safety and structural improvements proposed in this project within the existing transportation footprint, including the three largest changes to the corridor:

- › **Henderson Parkway:** Reconstruct the existing corridor as a complete street within the same footprint with a reduction in pavement surface area.
- › **Install a roundabout:** Install an at-grade roundabout within the existing right-of-way of the North Broadway right-of-way resulting in the eliminate of an existing loop ramp from North Broadway to Henderson Expressway.
- › **Multimodal Network:** Install two (2) miles of separated, dedicated non-motorized facilities within existing curb-to-curb pavement surface.

Overall, the condition and safety improvements proposed through this project will reduce the size of the transportation footprint in the Study Area and restore important environmental resources in the process.

(g) Partnership and Collaboration

This project was selected intentionally for the RAISE grant funding opportunity, partly to continue the momentum of RIDOT's previous collaborative efforts with the cities of Providence and East Providence in this project location. As detailed throughout this grant opportunity, the continuation of the Henderson Bridge

project has the continued support of key stakeholders both remaining from Phase 1 but throughout the project location.

(i) Demonstrated Community Outreach, Engagement, and Support

Phase 2 of the Henderson Expressway and Henderson Bridge project would continue the collaborative efforts of RIDOT and the surrounding communities of public outreach and community engagement to ensure the interventions made in this project will serve the current and future communities. In Phase 1 of this project, RIDOT and key stakeholders held virtual town hall meetings, and arranged for more online and accessible forms of communication to engage with the community. This engagement and support are paramount to a project such as this one, and key pieces of information and feedback helped to align the scope of this phase with the needs of the community. Safe and accessible bicycle and pedestrian infrastructure was a common comment during the feedback of the virtual town hall meetings for Phase 1 and has been programmed as a focus of this Phase.

(ii) Collaboration with Key Stakeholders

The success for each phase and the overall project at the Henderson Expressway and Henderson Bridge is reliant on constant communication and collaboration with key municipal stakeholders and community advocates. Throughout the life of this project, RIDOT has remained in communication with both Providence and East Providence, ensuring that the needs of the community are being accounted for and evaluated with the infrastructure improvements. Cooperation between departments and stakeholders will continue to be an asset as RIDOT continues to modernize this corridor, removing community barriers created by transportation infrastructure, and new land parcels are identified for future development and investment on both sides of the Seekonk River. RIDOT has also been in communication with other departments and agencies, such as RIPTA, to evaluate these open spaces for future investment in alignment with the Transit Master Plan.

(iii) Workforce Development

This project will support direct and indirect job creation for high-quality, good-paying jobs with a free and fair choice to join a union. According to the Bureau of Labor Statistics (BLS), 16.1 percent (81,000) of Rhode Island private and public sector workers were union members in 2022, with an additional 8,000 wage and salary workers being represented by a union or covered by an employee association or contract. In addition, many contractors that work on RIDOT projects are signatories to collective-bargaining agreements with the member unions of the Rhode Island Building & Construction Trades Council (RIBCTC). As is the case in this project, highway contractors need a highly skilled workforce to complete RIDOT projects on time and budget. On-the-job training of registered apprentices is often the only way to produce new journey workers in these high-demand occupations, and to do so, qualified registered apprentice candidates are required. RIDOT has developed relationships with BuildingFuturesRI (BFRI), the only state-certified construction pre-apprenticeship training program, and continues to work with the University of Rhode Island's College of Engineering to encourage the next generation of workforce in the transportation sector.

(h) Innovation

(i) Innovative Technologies

The Henderson Phase 2 project is focused on expanding the non-motorized network and non-motorized travel. As such, implementing Safe Transportation for Every Pedestrian (STEP) improvements for pedestrians and cyclists as recommended by FHWA Every Day Counts Innovations Program is a priority

for this project. STEP recommended improvements include road diet, crosswalk visibility enhancements and rectangular rapid flashing beacon (RRFBs). This project can serve as an opportunity to pilot RRFB installations using passive (automated) detection for more efficient non-motorized user travel. This project is a good candidate for piloting this passive detection technology due to the high volume of non-motorized traffic anticipated based on the network connections this project will provide.

(ii) Innovative Materials

Henderson Phase 2 Multimodal Connections presents a unique opportunity for RIDOT to explore innovative and state-of-the-art materials to better prepare infrastructure assets against the normal wear and tear, or deterioration, associated with high traffic volumes and impacts of coastal weather events. This project will employ the use of Fiber Reinforced Polymer, a composite material used for bridge construction. The material are two-phase materials consisting of a base material and filler material. The diverse combination of base and filler materials paired together, allows RIDOT the opportunity to explore the best solution given the circumstances and constraints of this project. The benefits of a material such as Fiber Reinforced Polymer include:

- › Excellent mechanical parameters, enabling a reduction in weight due to a positive strength/stiffness-density relation;
- › High corrosion resistance, increasing the durability;
- › Low maintenance requirements;
- › Possibility to form varied complex geometries and shapes of bridge elements and structure.

Due to its dynamic qualities and potential for cost- and efficiency- savings, RIDOT will continue to utilize and employ innovative or state-of-the-art materials.

(iii) Innovative Financing

This project has been prioritized and selected from a collection of potential RAISE candidates, in part because of its alignment with the RAISE grant program goals, and synergy with current administration priorities. The project was also identified in a list of [‘Fiscally Constrained Projects’](#) in the State’s 2022 Freight and Goods Movement Plan. Phase 2 of this project is included in the [State’s Transportation Improvement Plan](#) (STIP), with input and collaboration from transportation agencies such as RIDOT, RIPTA, and RIDSP. The management of the STIP program is reliant on concise and constant communication from all agencies. This corridor has been prioritized for investment in National Highway Freight Program formula funds, primarily in the reconstruction and rehabilitation of these assets. The match for the freight formula funds will be comprised of Rhode Island Capital Plan (RICAP) funds, supplied from the Rhode Island Highway Maintenance Account. This account is comprised of proceeds from land sales, and funds set aside for project closeouts. RIDOT will also be using a \$1 million Community Project Funding allocation from 2022 for eligible expenses.

5 Project Readiness

1. Overview

(a) Environmental Risk

(i) Detailed Project Schedule

RIDOT has developed the schedule below based on a presumed announcement of RAISE grant support within approximately 6 months of the submission of this application. This schedule is based on a design-bid-build procurement process. RIDOT is confident that the concepts and phasing proposals described below and detailed graphically in the merit criteria section of this application will provide Scoping and Design teams with a strong basis for technical concepts. If this project receives RAISE grant support, RIDOT will move quickly, construction will begin immediately upon grant approval.

(ii) Required Approvals

(1) Environmental Permits and Reviews

Below details the environmental permits and reviews required of the project including NEPA, as well as other Federal and State permitting agencies.

A. NEPA

Based on a preliminary review, the project is likely to qualify for a Categorical Exclusion (CE) as the project will not have significant individual or cumulative impacts to the interests protected by the National Environmental Policy Act (NEPA). The work included in this project aligns with the following CE-eligible activities under 23 CFR § 771.117 ©:

Item 26: Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes or parking; and

Item 28: Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings.

It is anticipated that the project will occur within the operational right-of-way and will not significantly impact social, economic, or sensitive environmental resources such as floodplains, wetlands, endangered species, wildlife habitat, historic and archaeological sites, parklands, air quality, noise, right-of-way, minority or low-income populations, travel patterns, or environmental grounds.

B. Reviews, permits approvals from other agencies

The project will be required to follow the requirements from the Stormwater Consent Decree among RIDOT, USDOJ, and USEPA in coordination with Stormwater Management, Design, and Installation rules. The project will be reviewed for state and federal permitting requirements including, but not limited to:

- › Section 8 Consultation under the Endangered Species Act (ESA) as administered by the U.S. Fish and Wildlife Service (USFWS);
- › Clean Water Act Section 404 as administered by the U.S. Army Corp of Engineers (may include Programmatic General Permit (PGP));

- › Clean Water Act Section 401 as administered by the Rhode Island Department of Environmental Management (RIDEM) under the Water Quality Certification Program;
- › RIDEM Rhode Island Pollutant Discharge Elimination System (RIPDES) Program Construction General Permit (due to an anticipated soil disturbance > 1 acre); and
- › Rhode Island Coastal Resources Management Council for coastal zone management approval

C. [Environmental Studies and Other Documents](#)

A Corridor Land Use Evaluation (CLUE) will be performed to identify properties along the project alignment that may be a potential source of contamination to any excavation areas. If there are environmental concerns, a more rigorous investigation under a Phase 1 Site Assessment will be required.

D. [Discussions with DOT Field Offices Regarding Compliance](#)

RIDOT will work closely with FHWA-RI throughout the NEPA review process to ensure that the project meets all federal requirements and proceeds on schedule.

E. [Right of Way](#)

All right-of-way required to complete this project is either owned by the State already, or in use for transportation purposes.

F. [Public Engagement](#)

RIDOT will provide multiple opportunities for the public to comment on the project in accordance with 23 CFR 771.105 ©. These requirements will be followed carefully by the Department, with support from FHWA and relevant community stakeholders. RIDOT will continue to engage with local stakeholders throughout the life of this project.

(2) [State and Local Approval](#)

A. [STIP Funding and Approval](#)

This project is included in the STIP, approved by the Metropolitan Planning Organization (MPO)-The State of Rhode Island Planning Council on September 9, 2021, and amended earlier in 2023. The project is listed as TIPID 3062 Henderson Bridge Improvements, Phase 2.

B. [Broad Public Support](#)

This project enjoys broad public support, including endorsements from key stakeholders. Additional support letters are included on the project website.

(3) [Federal Transportation Requirements Affecting State and Local Planning](#)

This project is included in the STIP, and it directly supports the objectives of several other state, metropolitan, and local planning documents, including the [Rhode Island Freight Goods and Movement Plan](#) Operational Efficiency objective.

The project is also in support of the state's [Long-Range Transportation Plan](#) (LRTP) goals by increasing operational efficiency through maintaining the highway and bridge network in a safe, attractive, and less congested condition.

Safe and efficient transportation is a top concern of the state, as outlined in the LRTP planning for the next 30 years. RIDOT's [Transportation Asset Management Plan](#) mandates asset management principles and guides how STIP projects are prioritized, focusing on State of Good Repair (SOGR). The project also is supported by the state's [Transit Master Plan](#) and its call for traffic signal priority, as well as the state's [Bicycle Mobility Plan](#), which lists the area as a key corridor for creating connections in the state.

(iii) Assessment of Project Risks and Mitigation Strategies

The most significant risk to this project is the disruption of traffic flows on the Henderson Expressway and Henderson Bridge, and the immediate transportation network they service. This includes queuing on Massasoit Avenue and North Broadway in East Providence, and Waterman Street and South Angell Street in Providence, which has the potential to impact traffic flows in both directions on I-195, U.S. Route-44, U.S. Route-1A, and RI-152. During peak hours, the Henderson Expressway is used frequently by commuters and transit users moving east to west and vice versa across the state or into the capitol.

As described in the Project Scope, Budget, and Statement of Work sections, this project will utilize lane shifts during bridge construction phase to limit traffic disruptions. Limited lane closures are expected, but RIDOT will work with contractors and local stakeholders to minimize traffic impacts.

(b) Technical Capacity

(i) Prior experience with Federal Discretionary Grant Programs

RIDOT has the technical feasibility and competency to design and construct *Henderson Phase 2 Multimodal Connections* project using federal discretionary grants funds through the RAISE program. RIDOT began aggressively pursuing federal grants in 2016 and has been awarded 14 grants since then totaling more than \$480 million. Notable recent grant awards include \$60 million for the [I-95 Northbound Providence Viaduct](#), \$65 million to [reconstruct RI-146](#), and \$81 million to complete the 'Missing Move' allowing for direct travel from Route 4 to I-95 in all directions. A robust DOT with experienced subject matter experts, RIDOT is well-equipped to deploy discretionary grant funds in a timely fashion, ensuring that the project will begin construction no later than the September 30, 2028, deadline.

(ii) Understanding of Federal Regulations, Contract and Procurement Requirements

RIDOT effectuates its nondiscrimination commitment in projects for the construction and maintenance of multimodal transportation infrastructure through its Title VI/Nondiscrimination Program. Pursuant to [Title VI of the Civil Rights Act of 1964](#) and 23 CFR 200.9 (b)(11), RIDOT's [FHWA Title VI Implementation Plan](#) and [FTA Title VI Program Plan](#) outlines the Department's operating procedures, policies, and practices to ensure compliance with nondiscrimination requirements, and of providing its transportation practitioners, subrecipients, contractors, and consultants with guidance on how to adhere to Title VI principles in their daily planning, implementation, monitoring, evaluation and enforcement operations.

(iii) Project Planning: Incorporating Projects into Existing Plans and Programs

This project is included in the STIP, and it directly supports the objectives of several other state, metropolitan, and local planning documents. This project represents direct implementation of objectives in no fewer than 6 State Transportation Plans. This project will specifically advance the following plans and performance objectives:

- › [Rhode Island Freight Goods and Movement Plan](#)
- › [Congestion Management Process \(CMP\)](#)
- › [Long-Range Transportation Plan \(LRTP\)](#)
- › [Transportation Asset Management Plan \(TAMP\)](#)
- › [Transit Master Plan \(TMP\)](#)
- › [Bicycle Mobility Plan \(BMP\)](#)

(iv) Prior Experience with Similar Project Scope, Size, and Complexity

RIDOT has experience in executing and managing projects with similar scope, size, and complexity. The Department assigns an experienced, dedicated Project Manager who carefully monitors project budgets and schedules from conception to completion. The RIDOT team, consisting of subject matter experts, regularly monitors the project scope to ensure that it remains on budget, on time, and within scope. RIDOT conducts frequent meetings to review project statuses, schedules, and budgets. A key tool to inform the public, RIDOT's [Quarterly Report](#) contains the status of each project and ensure RIDOT's on-time and on-budget targets are being met. The Quarterly Reports are required by the [RhodeWorks](#) legislation and are used to inform the general assembly.

RIDOT Develops project-specific budgets as early in the process as possible to delineate estimated expenditures on projects by category. These documents are used as the basis for initial project development and updated by RIDOT Project Managers throughout the lifecycle of a project to ensure that both the overall budget and individual budget categories stay on track. Estimated spending in each category is developed from historical project data collected from investments of similar size and scope, our budgets account for contingencies such as steel escalation or material inflation. Recent projects completed by RIDOT of similar size, scope and complexity include:

- › [Route 146 Reconstruction](#)
- › [Providence Northbound Viaduct](#)
- › [Reconstruction of the Route 6/10 Interchange](#)

(c) Financial Completeness Assessment

The Financial Completeness Assessment will be based on information contained throughout the budget file of the application.

6 Benefit-Cost Analysis

Narrative

1. Overview

Rhode Island Department of Transportation (RIDOT) requests \$25 million from the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program to support **Henderson Phase 2: Multimodal Connections**, a surface transportation project that will modernize a key connection to the City of Providence by expanding the non-motorized network and reducing vehicle speeds to better suit the context of the future facility. The specific technical aspects of this project include:

- › **State of Good Repair** | Decommission and remove one bridge; reconstruct a freeway-style facility as a complete street with separated shared use path, and sidewalks; and eliminate a pair of traffic signals and ramps linking Henderson Expressway and North Broadway, replacing them with an at-grade roundabout;
- › **Environmental Sustainability** | Remove approximately 0.7 acres of pavement (impervious surface) and install a stormwater treatment unit in the vicinity of the Henderson Parkway to address existing flooding in the adjacent residential area and provide capacity to address growing concern for future flooding. This project supports the goals of the drafted RI Carbon Reduction Plan through providing sufficient roadway capacity and developable land for transit improvements, notably a study area for RIPTA to evaluate in alignment with the RI Transit Master Plan.
- › **Safety** | Replace a freeway-designed facility with a complete street geared toward speed calming and supporting multimodal travel; replace interchange ramps with an at-grade roundabout.
- › **Transit Enhancements** | Provide project enhancements that are supportive of the RI Transit Master Plan vision for this corridor including maintaining roadway width for future Transit Emphasis corridor through westbound transit lane from North Broadway to South Angell Street and make land available for future development – a candidate Local Mobility Hub.
- › **Cycling & Pedestrian Facilities** | Enhance pedestrian crossings at 10 locations; install 0.9 miles of separated shared use paths and 1.1 miles of separated bike lanes to connect the Cities of Providence and East Providence and the two most highly traveled bikeways in Rhode Island – the Blackstone River Bikeway and the East Bay Bike Path.
- › **Economic Competitiveness** | Remove loop ramps and reduce right-of-way to support future development.

Taken together, these improvements will address immediate maintenance and safety issues while simultaneously advancing the long-term goals for robust transit and active transportation infrastructure along this critical corridor in the heart of Rhode Island.

Calculations and assumptions associated with this benefit-cost analysis are included in the USDOT BCA Spreadsheet Template located in in Appendix A.

2. Findings

The **Henderson Phase 2** project has a favorable benefit-cost ratio of 1.17, and a net present value of \$5.23 million. It is therefore a cost-effective investment. Before discounting, the Benefit-Cost Analysis shows that this project generates safety (\$16.1M), emissions (\$2.3M), travel time (\$7.0M), active transportation (\$15.7M), and foregone cost savings (\$24.5M) totaling \$64.7 million over 30 years (\$36.6 million after discounting).

This multimodal project has a wide range of benefits which is evident in the range of benefits documented. Note that the active transportation benefits are only quantified for cycling use due to a lack of pedestrian data. If pedestrian benefits could have been quantified as well then the BCA would have been higher.

While not easily quantified, the project also provides new opportunities for future transit improvements by RIPTA, specifically ensuring lane capacity for a future Transit Emphasis Corridor (transit lanes) from North Broadway westbound to South Angell Street and opening up new development opportunities in the Study Area that can be used for transit-supportive uses.

This Benefit-Cost Analysis follows the USDOT Guidance from December 2023. It assumes benefits are accrued over a 30-year period at a 3.1% discount rate. The 30-year projection was chosen because the project proposed full reconstruction of Henderson Freeway as an arterial (Henderson Parkway), constructs a new network of non-motorized paths and bike lanes that changes non-motorized connectivity on a regional level, and introduces a new connection between Henderson eastbound to North Broadway traveling northbound that removes a circuitous vehicle movement.

Using the USDOT BCA Spreadsheet Template, this project assumes 2024 existing condition, 2027 Opening Year, and a 2056 assumed 30-year Operational Period.

Figure 6-1 Benefit-Cost Analysis Summary

Item	Value
Project Benefits Evaluation Period	30
Discount Rate:	3.1%
Total Discounted Benefits:	\$36,560,895
Total Discounted Costs:	\$31,366,587
Project Benefit-Cost Ratio:	1.17
Net Present Value (NPV)	\$5,194,308

Figure 5 2USDOT BCA Spreadsheet Template Project Information (Table 1)

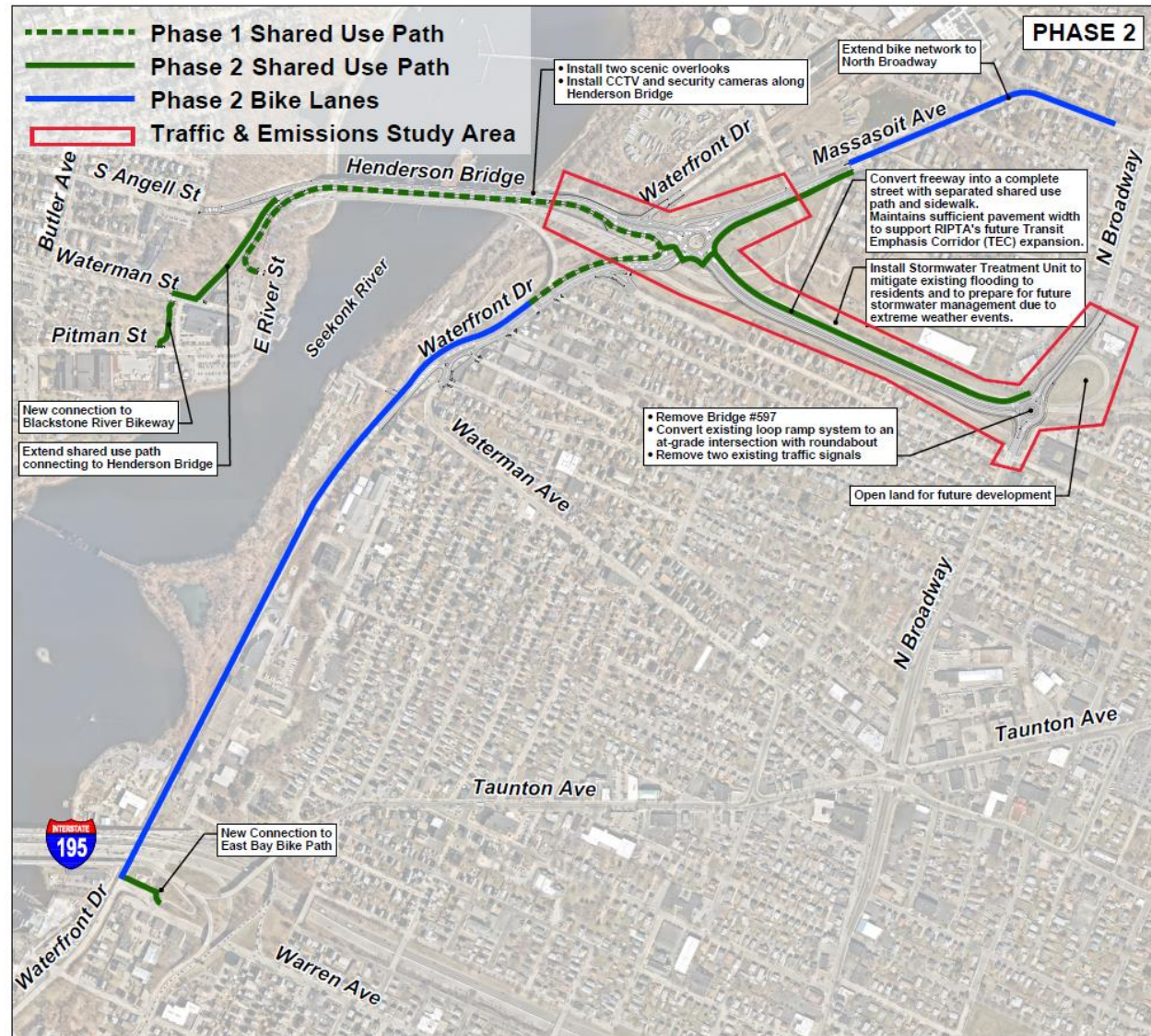
Variable	Value
Model Base Year	2022
First Year of Project Development/Construction	2024
Length of Construction/Project Development Period (in Years)	3
Opening Year	2027
Operational Period Length	30
Final Analysis Year	2056

(a) Spatial Extents

The Full Study Area Extents are shown in Figure 5-3. Phase 1 work was completed previously and is shown as dashed lines only to provide context for the broader shared use path network. Additionally, the roundabout at Henderson Bridge and Massasoit Avenue is under construction during Phase 1. The standalone Phase 1 project is anticipated to be substantially complete in 2024.

The vehicular traffic improvements associated with the Phase 2 project are limited to operations at the Phase 1 (Massasoit Avenue) and proposed Phase 2 (North Broadway) roundabouts and the connecting approach and departure roadways. The red box in Figure 5-3 represents the study area extents for the traffic modeling and by extension the Air Quality Emissions modeling.

Figure 6-3 Full Study Area Extents



(b) Assumptions and Methodology

(i) Baseline

The assumptions and methodology used to produce this analysis are detailed in the attached BCA. The baseline condition for this analysis is unique in that the Phase 1 project is currently under construction in the study area, meaning that the Baseline or No-Build Condition for the proposed project is the roadway network after Phase 1 is complete. This analysis compares the proposed alternative to a baseline/no-build scenario in which all roadway geometry would remain unchanged following Phase 1 construction. The 2056 No-Build and Build Conditions assume higher traffic growth associated with study area development in key parcels that become more accessible following the Phase 1 Massasoit Avenue interchange demolition.

(ii) Assumptions

Detailed technical memoranda are provided in the Appendix to this analysis. Key assumptions for this analysis include:

- › **Safety:** Recent crash history is not considered representative of the baseline (Phase 1) condition due to ongoing construction and substantial change to the roadway network. Recent crash history and traffic volumes are used to model (iSATe) the Phase 1 baseline condition and ultimately the proposed future condition associated with the Henderson Phase 2 project improvements. Application of Crash Modification Factors (CMFs) is the preferred methodology, however, in the case of the interchange reconstruction use of iSATe, the Highway Safety Manual (HSM) crash prediction model is an appropriate surrogate.
- › **Operations & Maintenance (Foregone Costs):** This review recognizes the importance of funding bridge decommissioning to eliminate the future bridge treatments (replacement) and routine maintenance needs to keep the structures open, ensuring safety of structures.
- › **Safety:** Where reasonable, Crash Modification Factors (CMFs) were applied to reflect how specific safety improvements would impact the proposed project.
- › **Safety:** While this project provides great opportunities for modal diversion, no mode shift is assumed in the safety modeling, a conservative approach.
- › **Travel Time:** VISSIM Microsimulation software was used to model the 2024 Existing and future 2027 No Build, 2056 No Build, 2027 Build, and 2056 Build Conditions.
- › **Travel Time:** The modeled travel time results are limited to the smaller study area indicated in Figure 5-3 in red. The full study area was not modeled to avoid over-representing benefits.
- › **Travel Time:** This analysis conservatively assumes that benefits are only accrued on weekdays (270 days per year).
- › **Travel Time:** While this project provides great opportunities for modal diversion, no mode shift is assumed in the travel time modeling, a conservative approach.
- › **Emissions:** Emission factors for the study area were developed using the Motor Vehicle Emission Simulator model (MOVES3) developed by the US Environmental Protection Agency.
- › **Emissions:** Emissions were analyzed for the opening year of operation (2027) and the 30-year projection (2056). Analyses were conducted for the No Build and Build alternatives to determine the emissions reduction associated with the Project.
- › **Emissions:** The emission factors represent the corresponding year of the traffic modeling. The factors were derived by calculating a seasonal average during the evening peak hour with a representative vehicle mix.
- › **Emissions:** While this project provides great opportunities for modal diversion, no mode shift is assumed in the emissions modeling, a conservative approach.
- › **Active Transportation:** Due to the robust expansion of non-motorized facilities (shared use paths and bike lanes) associated with this project there are benefits to providing these amenities, health benefits to the community associated with these non-motorized assets, and slight benefits for modal diversion are quantified here as related to congestion, noise, and safety.
- › **Active Transportation:** Due to insufficient pedestrian data on comparable facilities, pedestrian use volume for the project has not been estimated, no benefits are quantified. This is a conservative approach.

- › **Transit:** This project is designed to accommodate a future westbound transit lane from North Broadway to South Angell Street which can be implemented by RIPTA at a future time. No benefits are quantified for transit improvements.
- › **Workzone Benefit:** This element was included to acknowledge that taking on the demolition of Br. #597 will likely be more impactful to commuters than replacement or rehabilitation. This disbenefit recognizes that challenge and lowers net benefits because of it.

This project will generate benefits for **Operations & Maintenance Costs, Safety, Travel Time, Emissions, and Access to Active Transportation**. The table following summarizes the primary project benefits. Calculations are documented in the Benefit-Cost Analysis Calculations spreadsheet.

Figure 5 4 Summary of Project Benefits

Parameter	Baseline Scenario (No RAISE Funding)	Preferred Action Scenario (With RAISE Funding)
Operations & Maintenance	<ul style="list-style-type: none"> • Bridge 625 – Full Replacement • Henderson Expressway at North Broadway Interchange – maintain • Henderson Expressway – rehabilitate poor condition roadway in-kind 	<ul style="list-style-type: none"> • Bridge 625 – Decommission and Remove, eliminate maintenance • Henderson Expressway at North Broadway Interchange – remove, reduce impervious, remove two (2) traffic signals • Henderson Parkway – reconstruct to a complete street, reduce impervious, reduce maintenance area.
Safety	<ul style="list-style-type: none"> • Project limited to infrastructure maintenance, no substantive safety enhancements. 	<ul style="list-style-type: none"> • Convert the Henderson Expressway at North Broadway interchange to an at-grade roundabout including eliminating two (2) traffic signals. • Convert Henderson Expressway to a complete street, lowering the design speed by 15 mph. • Expand the dedicated, separated non-motorized network through shared use paths, sidewalks, and bike lanes.
Travel Time	<ul style="list-style-type: none"> • Project limited to infrastructure maintenance, no substantive travel time. 	<ul style="list-style-type: none"> • Converting the Henderson Expressway at North Broadway interchange to an at-grade roundabout including eliminating two (2) traffic signals results in improved travel times along North Broadway and new connectivity traveling eastbound on Henderson Expressway (Parkway) to North Broadway northbound, creating new connectivity. • While VMT reductions due to mode shift are likely, that is not captured in this benefit.
Vehicle Operating Costs	<ul style="list-style-type: none"> • Project limited to infrastructure maintenance, no substantive changes to VMT. 	<ul style="list-style-type: none"> • VMT reduction associated with modal diversion results in slight reductions in vehicle operating costs.

Parameter	Baseline Scenario (No RAISE Funding)	Preferred Action Scenario (With RAISE Funding)
Emissions Reduction	<ul style="list-style-type: none"> Project limited to infrastructure maintenance, no substantive travel time and vehicle emissions. 	<ul style="list-style-type: none"> Improved traffic control along North Broadway and improved connectivity result in slight emissions reductions. While VMT reductions due to mode shift are likely, that is not captured in this benefit.
Other Highway Externalities	<ul style="list-style-type: none"> Project limited to infrastructure maintenance, no substantive changes to VMT. 	<ul style="list-style-type: none"> VMT reduction associated with modal diversion results in slight reductions in highway congestion, noise, and degraded transportation safety.
Amenity Benefits	<ul style="list-style-type: none"> No changes to the transportation network for non-motorized or transit modes. 	<ul style="list-style-type: none"> Constructing two (2) miles total of shared use path and bike lanes fillings gaps in the regional path network. Benefit assumed for trips up to one (1) mile long at a rate of \$1.86 for dedicated bike lanes. No benefits assumed for pedestrian use due to lack of data. This project is designed to accommodate a future westbound transit to be implemented by RIPTA. No benefits are quantified.
Health Benefits	<ul style="list-style-type: none"> No changes to the transportation network for non-motorized modes. 	<ul style="list-style-type: none"> Building out the non-motorized network provides new active transportation opportunities which will provide health benefits for users ages 20-64. No benefits assumed for pedestrian use due to lack of data.
Workzone Benefit	<ul style="list-style-type: none"> Conservatively assuming, bridge replacement and pavement maintenance have minimal workzone impacts 	<ul style="list-style-type: none"> Workzone impacts of demolishing bridge 597 and constructing a roundabout are a disbenefit to commuters.

(iii) Data Sources

Key sources of data used to project outcomes include but are not limited to:

- › RIDOT traffic count data;
- › RIDOT crash data from January 1, 2014, to December 31, 2020 (Phase 1 construction began in 2021);
- › Highway Safety Manual iSATe default model and results;
- › VISSIM Microsimulation results;
- › Motor Vehicle Emissions Simulator (MOVES3) model; and
- › RIDOT Office of Bridge Engineering construction and maintenance costs in current dollars.

(iv) Key Input Parameters

In addition to the Data Sources listed, all key input parameters in this analysis are taken from USDOT's "Benefit-Cost Analysis Guidance for Discretionary Grant Programs," December 2023, unless otherwise noted. Safety benefit calculations utilize Crash Modification Factor Clearinghouse (CMF) inputs.

(c) Capital Costs

The costs associated with this project are:

- › The \$35 million future eligible construction and design cost

Detailed budget information can be found in the Project Budget section of this application including a budget by phase and a separate budget by item type, tracked internally by RIDOT from a project's conception to completion.

(d) Project Benefits

This project generates a range of quantified benefits to the state and local communities by directly addressing several baseline challenges with targeted interventions.

To ensure project benefits were not overstated and the highest standard of transparency was maintained, RIDOT (with consultant support) made several enhancements to the benefit-cost analysis preparation process. The enhancements were made in direct response to feedback from USDOT in debriefs of recently submitted grant applications, which included a critique that RIDOT's future BCAs would benefit from additional supporting documentation to improve transparency.

This benefit-cost analysis is accompanied by several supporting technical analysis appended to this narrative to elaborate on assumptions made, methodological considerations, data utilized, scenario assessments, analysis results, model calibrations, and more. They are:

- › **Appendix A – Benefit Cost Analysis:** The calculations spreadsheet is reproduced here for easy reference. The spreadsheet uses the USDOT Spreadsheet Template dated 12/5/23. Each benefit and cost associated with the project is summarized and backup calculations are included. Each backup tab includes, at a minimum, a statement of the Assumptions, methodology, Baseline, Sources of Data, and Key Input Parameters, pursuant to the latest BCA guidance from USDOT (December 2023).
- › **Appendix A-1 – Infrastructure Maintenance Plan:** RIDOT is committed to preserving and maintaining the state's infrastructure, and that commitment starts before a major rehabilitation project like this one even begins. This memo provides historical grounding for anticipated future maintenance costs on bridge 597 in this project to ensure accurate figures are included over the analysis period in the BCA. These maintenance dollars are only applicable to the No Build Condition assuming the bridge must be replaced and maintained.
- › **Appendix A-2 – Safety:** This technical memo explains and documents the strategies and methodologies deployed to estimate safety issues, accident counts, and proposed interventions throughout the Study Area. It identifies, explains, and justifies the use of selected Crash Modification Factors (CMFs) and supplies calculations utilized to arrive at data inputs for the master BCA spreadsheet and the necessary role of predictive modeling in producing relevant results.
- › **Appendix A-3 – Travel Time:** This technical memo documents the methodologies and assumptions used in the development of the VISSIM microsimulation model for the project and provides documentation of the model results. Data collection, model calibration, and travel time segment comparisons are discussed.

- › **Appendix A-4 – Emissions:** This technical memo documents the air quality study undertaken for the project, including a detailed mesoscale analysis over the benefits period.
- › **Appendix A-5 – Cycling Benefits:** This technical memo documents projections for future cyclist use of the expanded non-motorized network and how those projections translate to reductions in vehicle operating costs, other highway externalities (congestion, noise, and safety), amenity benefits, and mortality reduction benefits.

The baseline challenges of this project, proposed adjustments to the baseline, and anticipated benefits are summarized in Figure 5-5.

Figure 6-2 Summary of Baseline Challenges, Changes, and Impacts

Baseline Challenge	Change to Baseline	Impacts
Foregone Operations & Maintenance Costs Outsized asset portfolio	Decommission North Broadway Bridge (Br# 597) and North Broadway interchange. Replace with at-grade intersection	Eliminates on average \$74,616 in maintenance costs annually over 30 years as well as approximately \$22M in bridge replacement. Reduces impervious surface area.
Safety Freeway and interchange facilities supporting higher speeds. Lack of non-motorized facilities	Remove North Broadway interchange, reconstruct Henderson Expressway as a complete street with a 15 mph reduction in design speed. Install a roundabout for additional speed control. Construct a total of two (2) miles of separated, dedicated non-motorized facilities (shared use path, bike lanes)	Reduced operating speeds are linked to reduced crash severity. Net crash reductions totaling \$16M in benefits over 30 years (before discounting)
Travel Time Travel times and congestion are predicted to grow in future years along North Broadway and at the Henderson Bridge at Massasoit Avenue roundabout	Remove Bridge #597 and replace with an at-grade roundabout, two traffic signals are removed. This roundabout creates new connectivity from Henderson EB to North Broadway NB.	By removing Bridge #597 and replacing with an at-grade roundabout, two traffic signals are removed and delay along North Broadway is reduced. This roundabout creates new connectivity from Henderson EB to North Broadway NB. New connections change traffic patterns at the Massasoit roundabout, improving the distribution of traffic and reducing conflicting volumes. The net result is more direct routes and improved traffic flow. Net travel time savings totaling \$7 M in benefits over 30 years (before discounting).
Emissions Travel times and congestion are predicted to grow in future years along North Broadway and at the Henderson Bridge at Massasoit Avenue roundabout	Remove Bridge #597 and replace with an at-grade roundabout, two traffic signals are removed. This roundabout creates new connectivity from Henderson EB to North Broadway NB.	Net emissions reductions totaling \$2.3 M in benefits over 30 years (before discounting).

Figure 6-2 Summary of Baseline Challenges, Changes, and Impacts

Baseline Challenge	Change to Baseline	Impacts
Amenity Benefits: Transit Lacking transit facilities as documented by the <i>RI Transit Master Plan</i>	No change to baseline	No impacts as a result of this project. This project is designed with the physical roadway space needed for a future westbound transit lane to be implemented by RIPTA as part of their vision for a Transit Enhancement Corridor connecting East Providence to downtown Providence.
Amenity Benefits: Cycling Lacking non-motorized facilities as documented by the <i>RI Bicycle Mobility Plan</i>	Construct a total of 2 miles of non-motorized facilities (shared use path, bike lanes)	Provide dedicated, separated facilities for non-motorized travel across modes (e.g. pedestrians, cyclists) results in \$6.7M in benefits over 30 years (before discounting)
Amenity Benefits: Pedestrian Lacking non-motorized facilities as documented by the <i>RI Bicycle Mobility Plan</i>	Construct a total of two (2) miles of non-motorized facilities (shared use path, bike lanes)	Benefits not quantified due to lack of data.
Mortality Reduction Benefits Lack of non-motorized facilities.	Construct a total of two (2) miles of non-motorized facilities (shared use path, bike lanes)	Provide dedicated, separated facilities for non-motorized travel across modes (e.g. pedestrians, cyclists) resulting in \$14M in benefits over 30 years (before discounting). Pedestrian benefits not quantified due to lack of data

7 Appendix B

Figure B-1 General Study Area

NOTE: Phase 1 is currently under construction, Phase 1 is not part of the proposed project. Phase 1 is shown to provide context for the need and benefits of the Phase 2 non-motorized facility extensions.

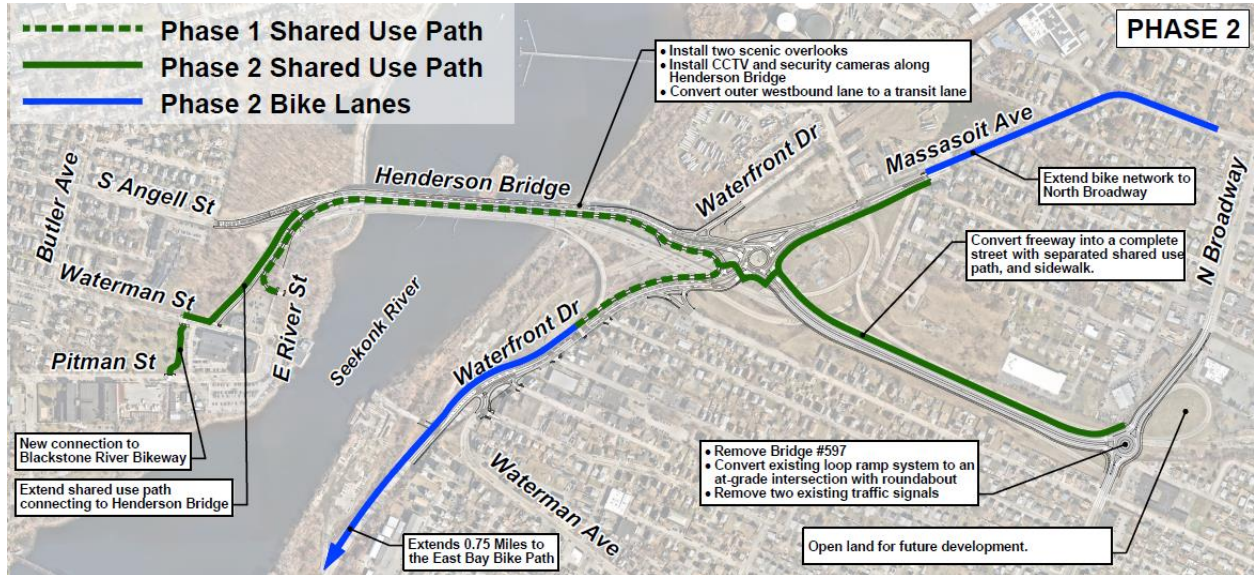


Figure B-2 Select Population Groups Transportation Equity Benefit Analysis (TEBA)

