U.S. DEPARTMENT OF TRANSPORTATION
REBUILDING AMERICAN INFRASTRUCTURE WITH SUSTAINABILITY AND EQUITY "RAISE"
GRANT APPLICATION

Project Name:	**Interstate 95 at Hogan Road Improvement Project**
Project Type:	Intersection Safety Improvements/Bridge Replacement
Project Location:	Rural–Bangor, Maine: 2nd Congressional District
Funds Requested:	$25,000,000 – 71.5% of Total Project Cost
Other Federal Funds Matched:	$2,956,000 – 8.5% of Total Project Cost
Non-Federal Funds Matched:	$6,989,000 – 20.0% of Total Project Cost
Total Project cost:	$34,945,000

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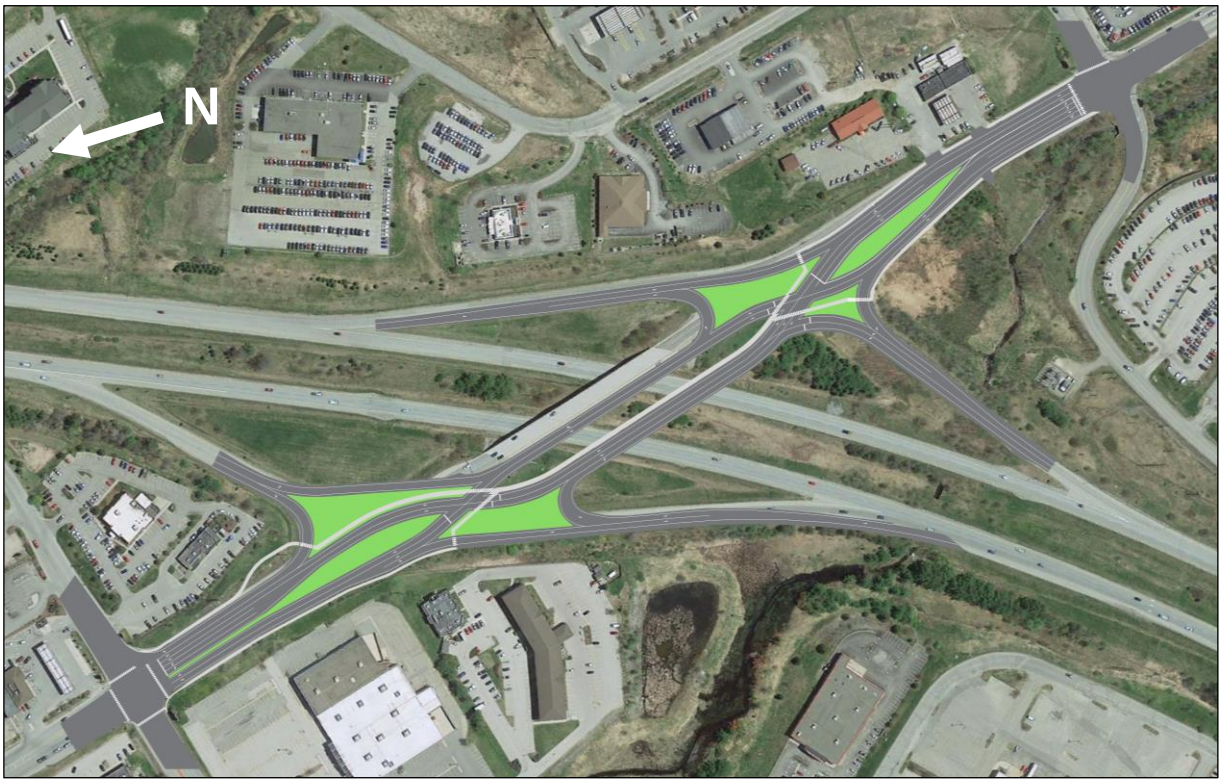

Project Summary

Maine Department of Transportation (MaineDOT) is seeking $25,000,000 (71.5%) from a U.S. Department of Transportation (USDOT) Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant. The total cost of the project is $34,945,000, of which $6,989,000 (20%) will be matched by MaineDOT with the balance, $2,956,000 (8.5%), coming from Maine's Core Federal Funds.

The *Interstate 95 at Hogan Road Improvement Project* ("Project") will:

a) Remove the oldest portion of the current Hogan Road Overpass (circa 1960) in Bangor, Maine, which has deteriorated to the point that the end of its useful life is near and further attempts to repair or rehabilitate that portion will not restore the full integrity of the overpass to meet the traffic capacity levels, load requirements, or the geometric standards of today and the future.
b) Recycle and raise the remaining portion of the overpass (1983) so that today's taller freight can safely pass underneath.
c) Build a separate safer new overpass to replace the 1960-built overpass' capacity.
d) Improve safety and traffic flow by building an inventive Diverging Diamond Interchange ("DDI") at the intersection.
e) Create a safe bicycle- and pedestrian-friendly overpass by including a pathway for walking, biking, and rolling access for the disabled to navigate the busy intersection where none currently exists.
f) Improve response times for first responders and other emergency services providers.

Under the Project, MaineDOT plans to replace the state's busiest diamond interchange with a newer, safer, more efficient, and modern interchange. MaineDOT has routinely ranked the current interchange 'poor' due to the number of crashes that occur there. It is Maine's worst performing interchange in terms of the number of consecutive years the four intersections within the interchange have registered a high number of crashes. The existing five-lane Hogan Road Overpass spans Interstate 95 in Bangor surrounded by the region's only traditional shopping mall as well as numerous big-box retailers, dining establishments, hotels, car dealerships, and much more. The overpass and intersection provide cohesive connections between the region's main commercial center and surrounding communities—both urban and rural—throughout central and northern Maine.

The refurbished southerly overpass (on the east side per DDI configuration) and the newly constructed northerly overpasses (on the west side per DDI configuration) will feature modern width lanes, shoulders, and a barrier-protected multi-use path for pedestrians and bicyclists. Most importantly, these features will result from converting the standard interchange into a Diverging Diamond Interchange, also known as a double crossover diamond interchange, which has numerous benefits, including:

- up to 50% fewer vehicle crashes
- alleviating congestion, increasing mobility, and improving safety by preventing dangerous and costly backups on I-95

- providing a safe easement for pedestrians and bicyclists where none currently exists
- reducing the number of directional intersections which reduces EMS response times
- minimizing disruptions to nearby businesses

These benefits align with USDOT's stated goal to *improve safety* for motorists, freight, bicyclists, and pedestrians. The DDI naturally reduces the number of intersecting vehicle points which, in-turn, reduces the risk of crashes. It also aids in reducing traffic backups and accidents by quickly moving exiting traffic off the interstate during peak travel times. It will provide bicyclists, the disabled, and pedestrians a safe and protected pathway to cross both I-95 and Hogan Road *simultaneously* if desired. Currently there is no sidewalk, shoulder, or bike lanes, making it impossible to safely cross I-95 and Hogan Road.

The Project will *explicitly address climate change* by reducing engine idling caused by traffic congestion and long stops at traffic lights. Additionally, because of the amount of commerce at this I-95 exit, it is an ideal location to house numerous EV charging stations and the City of Bangor realizes the importance of this. As a coastal state, Maine continues to aggressively combat climate change. In 2019, Maine created the *Maine Climate Council*, an assembly of scientists, industry leaders, local and state officials, and engaged citizens responsible for developing an ongoing *Climate Action Plan*.

The Project aligns with USDOT's infrastructure goal by *guiding strategic investments that enable more efficient movement of people and goods*. The new Hogan Road Overpass, as well as the uniquely redesigned intersection, will allow freight, passengers, bicyclists, and pedestrians to move more expeditiously. A component of the Project will even create a bicycle and pedestrian pathway where none currently exists. It is Bangor's hope that this will encourage citizens to be less auto-dependent.

The Project will *apply transformative technology* by using the DDI concept to improve safety and traffic flow. DDIs have been built at more than 100 interchanges in the U.S. because they are such an effective advancement for managing traffic flow. Following careful consideration of multiple traffic engineering ideas, MaineDOT chose the DDI as the most innovative solution for the dangerous interchange and the Project is the first of its kind in Maine.

The Project aligns with USDOT's stated goal of *capital investments in surface transportation that will have a significant local or regional impact*. The Project is significant because the bridge connects people living throughout very rural central and northern Maine to vital goods and services Bangor offers. From appliances to cancer treatment, Bangor is the closest city offering needed items for thousands of people, some living more than 150 miles away.

It aligns with *projects that result in good-paying jobs*. The Project not only creates construction jobs *while* being built, but will link people to available jobs and careers long *after* completion. Hogan Road is a critical route to commerce, manufacturing, farming, and transportation jobs that result in a connected community. It ties the community to teaching jobs at Bangor-area colleges & universities. It connects people to medical jobs, including the growing demand for behavioral health care positions.

While Maine's history has left it one of the least racially diverse states in the nation, MaineDOT considers fostering *racial equity* an essential part of creating mobility solutions. By designing all transportation options with ease and affordability in mind, the state will have a better chance of attracting a more diverse population.

MaineDOT is an experienced, thorough, and responsible recipient of previous TIGER, FASTLANE, INFRA, and BUILD grant funding. USDOT can rely on MaineDOT to fully fund and commence the Project in advance of the 2024 obligation date and complete the Project by the 2029 requirement without risk. This Project will create long-lasting positive impacts to communities throughout the region by preserving efficient access to goods and services vital to residents and tourists in this very rural state.

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Project Narrative

I. Project Description

Figure 1 The current interchange.

Maine's Interstate 95/Hogan Road Interchange (Exit 187) was constructed in 1960. At that time, the original overpass was one lane each direction. Eighteen years later, the adjacent Bangor Mall was built and with the additional traffic generated, the interchange soon became signaled. In 1983, the Hogan Road Overpass was widened from one lane each direction to three lanes each direction. This was accomplished by building a new overpass attached alongside the 1960 overpass with the effect being one wider bridge. In 2001, a nearby interchange with I-95 was constructed one mile to the south at Stillwater Avenue directionally southwest of the Hogan Road Interchange. But congestion still increased. In 2011, MaineDOT performed a Bangor/I-95 Corridor Study resulting from the area's increasing development of retail, hotel, auto dealerships, and other businesses. That study found Exit 187 to be Maine's busiest diamond interchange, hosting 35,000 vehicles daily and 12.7 million annually. It remains the busiest today. Traffic frequently backs up down the offramp and onto I-95 during peak travel times, which spreads intersection safety concerns even further up and down the interstate. For the 5-year period ending December 2020, there were 161 crashes registered. Looking back 10 years ending the same time, there were 304 crashes. There have not been long periods of time like these containing similar high-crash statistics at other interchanges of the same type, capacity, and volume in Maine.

Given the amount of traffic using the overpass, MaineDOT's desire to reduce construction time and costs, and Maine's efforts to consider recycling whenever possible, MaineDOT studied the longevity of the 1983-built portion of the overpass. At this time, it estimates that portion has enough remaining service life that it should be incorporated into the refurbished southbound overpass. A separate new northbound overpass will be built contemporaneously. However once construction begins, should MaineDOT discover the 1983 portion is unsuitable to continue using, it will then construct one new six-lane overpass for


Figure 2 The Bangor Mall.

both northbound and southbound lanes. MaineDOT will cover any and all costs associated with this plan change, should it occur. MaineDOT first studied modernizing the interchange in 2016. At a MaineDOT public meeting at that time, the main concern attendees voiced was the lack of bicycle and pedestrian access on the bridge. This important void still exists. There are no sidewalks, no bike lanes, and no rolling access for the disabled on the bridge, just a small 14-inch-wide southbound "shoulder" to the right of the white outside lane line on the Hogan Road Overpass. This makes it nearly impossible for bicyclists and pedestrians to navigate the intersection. In fact, MaineDOT's Bike/Pedestrian Program Manager Patrick Adams admits it takes a "massive amount of courage" to walk across the bridge. In winter, with snow and ice on the bridge for much of the season, it is particularly dangerous. For years, some have even resorted to using a nearby drainage culvert running under I-95 as a dangerous means to cross. While some may still use the culvert, the city built a new sidewalk parallel to I-95 and connecting with a highway underpass at the next exit south, a longer yet safer route to cross. The City of Bangor has spent the past few years either installing new ADA-compliant sidewalks or modernizing current ones throughout the commercial district, an area known as the *Hogan Road/Sylvan Road/Stillwater Avenue Triangle*. These improvements have included adding wide sidewalks and pedestrian crosswalks at key intersections. There was initially concern about such city improvements leading bicyclists, pedestrians, and tourists to the overpass and "seemingly abandoning them," as Adams says, to dangerously negotiate crossing the overpass. The bike/pedestrian pathway on the overpass is the *final critical link* to connect bicyclists, pedestrians, students, and tourists to shopping, dining, employment, and services commonly found in a regional service center city. This improvement yields $1.40 million in

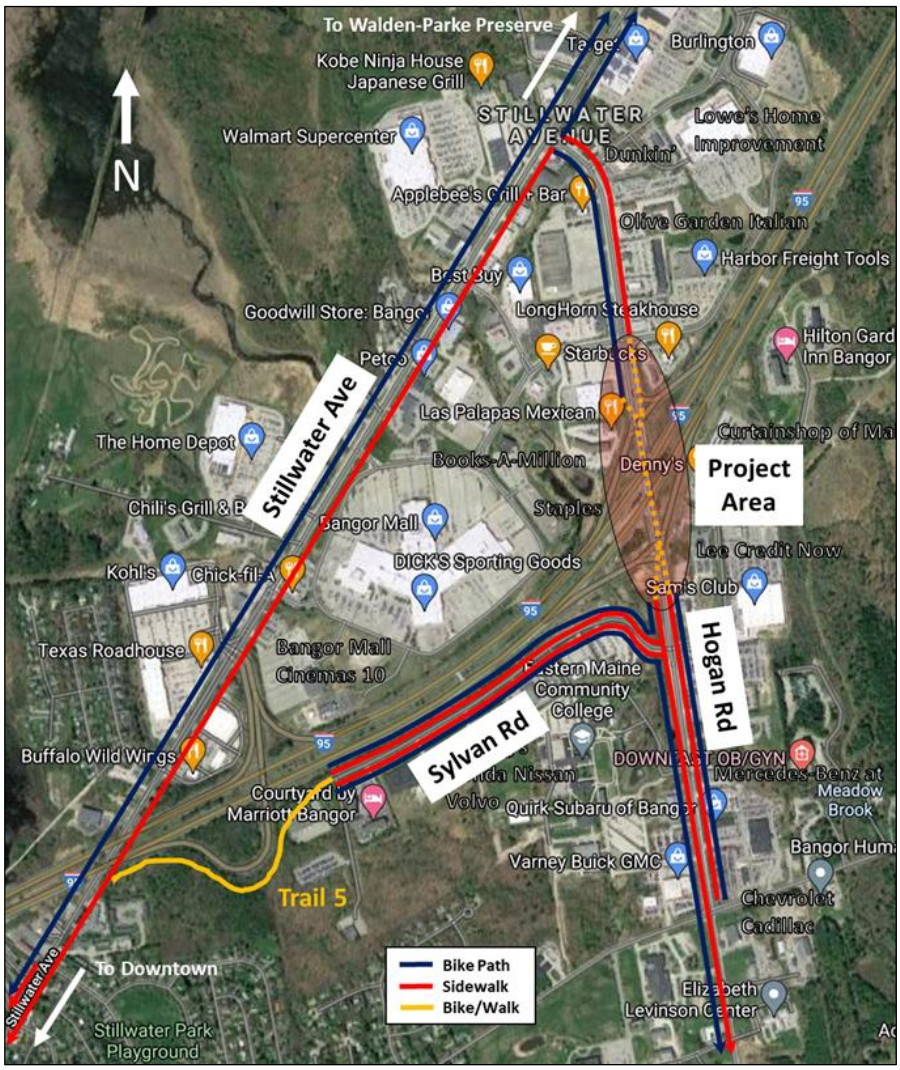


Figure 3 The Hogan Road/Sylvan Road/Stillwater Avenue Triangle. Recent City of Bangor improvements have included wide sidewalks and pedestrian crosswalks at key intersections. The overpass' bike/pedestrian pathway is the final critical link.

travel time savings over the 30-year BCA analysis period.

The DDI configuration solves this problem by providing much needed safe access for pedestrians and bicyclists while also preventing congestion and vehicle crashes by up to 50%. The overall safety economic benefit created by the Project results in more than $23 million in discounted savings during the 30-year analysis period. It increases mobility and minimizes disruptions to businesses that many Mainers and even some Canadians travel great lengths to reach. MaineDOT considered traffic circles as a solution but later deemed them less efficient and consuming of more real estate than a DDI. The Project will not need more right-of-way because additional traffic lanes will not be required which reduces project costs and disruptions to area businesses. DDIs have been thoroughly studied. The evidence they are safer includes:

- A Missouri DOT survey showing 97% of drivers felt safer using a new DDI—the nation's first, located in Springfield, Missouri—compared to the previous diamond interchange located at the interchange.
- Crash data for that DDI showing a 60% reduction in collisions in a five-month period compared to the prior year's same five-month period with the previous interchange.
- A survey for that DDI showing 95% of drivers felt there was less congestion at the new interchange compared to the previous diamond interchange.
- Daily traffic backups that sometimes stretched for more than a mile were eliminated once the new Springfield DDI was complete.
- A Versailles, France study showing a DDI there hosting only 11 reported crashes, all light, within a 5-year period.

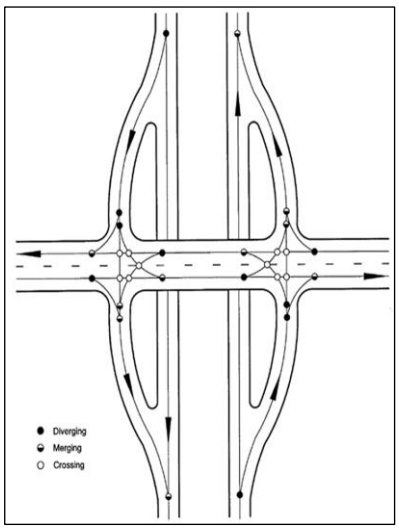
The first DDI was constructed in Springfield, Missouri in 2009. Since then, 25 additional DDIs have been built in that state. Nationally, there have been 123 implemented, with 29 more currently under construction. Seventeen states have DDIs in planning or design stages.[1] Early on, MaineDOT sought a partnership to study the concept of DDIs and turned to the Missouri Department of Transportation, the original entity to implement the concept in the U.S. MaineDOT and City of Bangor planners visited Missouri DOT in 2015 and toured some of the state's DDIs.

One key way the DDI will improve the intersection is by increasing the throughput of the four left-turn movements onto and off of the I-95 ramps. A DDI can increase off-ramp capacity by 50 to 100 percent, reduce delays, and prevent backups. When used with a 2-phase traffic signal programmed for short cycles, delays at the traffic lights can be reduced by 15 to 60 precent. Peak I-95 off-ramp backup times in Bangor are between 2:30 p.m. and 4:30 p.m., resulting from more of a

Figure 4 The Hogan Road Overpass.

[1] https://www.google.com/maps/d/viewer?mid=1MMZKi0RdQqjZjtBxmSTznUVnurY&ll=40.61884751665224%2C-87.55721320203351&z=5

peak shopping time than a peak commuter time. The economic benefits resulting from improvements to travel time and reduced emissions from idling exceed $11.5 million on a discounted basis over the 30-year analysis period.



Conflict Points		
Intersecting Type	Current Hogan Road Interchange	Future Hogan Road Interchange
Diverging	10	8
Merging	10	8
Crossing	10	2
Total	**30**	**18**

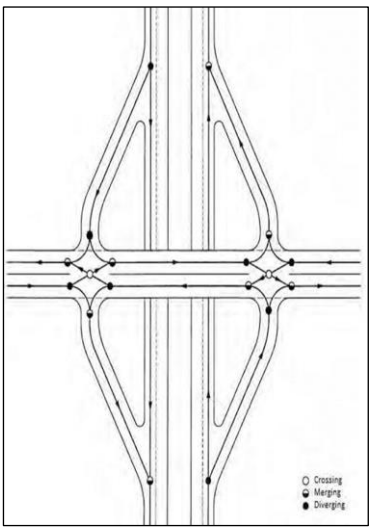


Figure 5-7 The diagram on the left shows the current intersection configuration and the associated diverging, merging, and crossing conflict points while the diagram on the right shows the DDI and the reduced number of conflict points.

If a RAISE grant is not awarded and the Project is postponed, the intersection will continue to deteriorate and tally additional costly crashes. Should the deterioration become so bad that a future inspection reveals the development of a major defect, bridge closure and detours could result. Maintenance and repairs will not change the fact that eventually the bridge will no longer be repairable and will become unsafe to use or require significant expense to maintain, a wasteful use of funds. Avoiding these potential costs to motorists and commercial vehicles saves more than $1.75 million on a discounted basis over the course of the 30-year analysis period.

When assessing parts of any project, MaineDOT utilizes current components if they are deemed to be structurally sound and have adequate useful life remaining. MaineDOT believes in making

Figure 8-10 Below and above deck deterioration. Deck support structure exposed (left). Concrete bents and caps, as well as steel stringers showing the effects of weather and signs of deterioration, including spalling (center). Road surface showing signs of cracking and degrading at the point where the road meets the bridge.

environmentally sound decisions that contribute to recycling current components as much as possible. That's why the plan is to rehab the superstructure of the bridge portion built in 1983 for continued use. It is a 6-span, 448-foot-long, two-lane steel girder bridge that will be raised 21 inches to achieve 16.5 feet of clearance above I-95 travel lanes. The girders above both the northbound and southbound I-95 traffic lanes have been struck by tall trucks in the past. MaineDOT intends to eliminate that as a future possibility. Once renovation of this portion is complete as part of the Project, engineers estimate an additional 20-30 years of useful service life for the bridge deck and 50-60 additional years of useful service life for the rest of the bridge structure. In part, this 'bridge recycle' plan has extended the timeline of design and planning from 2016 to today. That time has also been utilized well to plan for and design the DDI. Once the rehabilitation process begins, should MaineDOT determine that replacing the *entire* bridge is required as the most advantageous option then MaineDOT will do so, but it is doubtful that will need to occur given the inspections that have already been performed and knowledge already gained about the 1983-built structure. Meanwhile, the 1960-built bridge on the east side will be demolished after it is no longer needed to carry traffic during construction.

Figure 11 Under the overpass showing spalling and deterioration to the concrete.

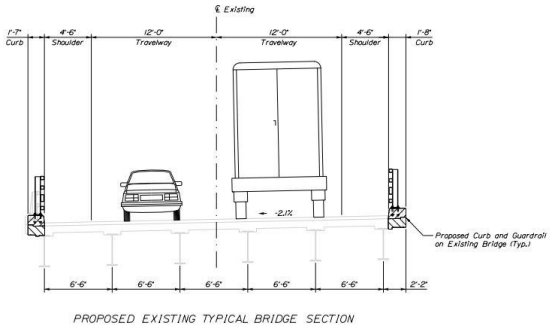


Figure 12 The proposed Northbound bridge.

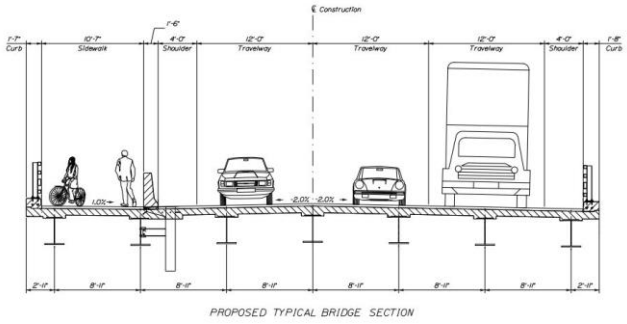


Figure 13 The proposed Southbound bridge.

The 1983-built bridge will be recycled and rehabilitated. MaineDOT is investigating two different rehabilitation alternatives. Under both scenarios, workers will raise the bridge 21 inches from its current height of 14 feet, 8 inches to achieve 16 feet, 5 inches of clearance over I-95 travel lanes. The lower portion of the outer girders over both the northbound and southbound lanes have been struck by tall trucks at times. Abutment seats and backwalls will be raised and wingwalls will be constructed on the east side of both abutments. Soil anchor tiebacks will be installed at both abutments to resist lateral loads from soil and traffic flow. The tops of the piers will be heightened using concrete. New bearings and deck seals will be installed along with a new high-performance membrane and polymer-modified hot mix asphalt wearing surface. The

rehabilitated bridge will have two 12-foot travel lanes and two 4-foot, 6-inch shoulders. The difference in the rehabilitation alternatives for the existing bridge is the extent of concrete deck work performed:

Figure 14 Cracks in concrete caps.

Rehab Option #1:

- The existing deck overhangs will be removed and rebuilt.
- The remaining concrete deck will be repaired and/or patched as required.
- The existing concrete wearing surface as well as concrete island on the north end of the bridge deck will be removed.
- New curbs and steel bridge railings will be installed.
- A new wearing surface will be constructed.

Rehab Option #2:

- The existing deck will be replaced in its entirety with a new concrete deck and wearing surface.
- The new deck will use stainless steel reinforcing components.
- New curbs and steel bridge railings will be installed.
- The existing steel beams will be repainted.

A new bridge will be constructed slightly to the west of the existing bridge to carry traffic in the opposite direction. The new bridge will feature three 12-foot-wide travel lanes, two 4-foot shoulders and a 10-foot-wide multi-use pathway for bicycles and pedestrians. The barrier separating the traffic lanes from the pathway will be made of concrete and will continue onto the approaches. The surface of the multi-use pathway will be paved with either concrete or hot mix asphalt. The bridge superstructure will be supported by metalized steel girders supported by concrete piers and abutments.

Both a three-span structure and a five-span structure are being considered for the new bridge. The five-span bridge option is 453 feet long and will feature four piers and two integral abutments, all supported with steel H-piles. The three-span option is 355 feet long and will feature two pile-supported concrete piers and two soil-supported hinged abutments perched behind mechanically stabilized earth (MSE) retaining walls.

The bridge construction sequence would start with construction of the new bridge, located west of the existing bridges. Traffic would be maintained on the existing bridges. Once the new bridge is complete, eastbound Hogan Road traffic would be shifted onto the new bridge. The newer, existing bridge would then be raised and rehabilitated, maintaining Hogan Road westbound traffic on the older existing bridge. Once rehabilitation is complete, westbound traffic would be shifted onto the rehabilitated 1983 bridge. The older existing bridge would then be removed.

Innovative design elements for the bridges include: new steel girders will be metalized, all concrete reinforcing steel will be stainless steel for the new bridge, new or replacement bridge drains will be constructed of fiber reinforced polymer (FRP). If the three-span option is chosen for the new bridge, all metal components in the mechanically stabilized abutment retaining walls including the concrete reinforcing in the facing panels will be stainless steel.

Quantitative and Other Facts[2]

- The Project's $34,950,000 investment in infrastructure will yield at least $51,000,000 in economic benefits on a discounted basis for the region.
- The Project has a benefit-cost ratio of at least 1.90 to 1 based on an NPV at a 7% discount rate over 30 years (emissions at a 3% discount rate).
- Savings result from reduced maintenance costs, improvements in travel time and miles for both passenger and commercial vehicles, avoided idling time at the individual intersections and the associated reduction in mileage driven and the prevention of highway crashes, injuries and fatalities. Costly detours are avoided in the coming years if the Project is completed and the existing bridges do not deteriorate. The Project has a useful life in excess of the 30-year analysis period and the residual value of the Project is also a benefit.
- Total amount of RAISE FY 2021 funds requested: $25,000,000 (71.5% of the total cost of the project).
- Eligible matching funds are $9,950,000, 28.5 percent of the total project cost, which includes Maine's core federal funding.
- Non-Federal spending on the Project is $6,989,000 committed by MaineDOT.[3]
- Previously incurred expenses are $434,505 as of June 30, 2021.
- Total Cost of the Project: $34,950,000.

II. Project Location

Located on the western bank of the Penobscot River in southern Maine, Bangor is the only city-sized service center in the region. It has a population of 33,000 yet has nearly 5 times that amount who rely on it for significant and essential services. Augusta, the state capital, is 50 miles to the southwest. But for people living throughout central and northern Maine—some as far as 170 miles away—Bangor is the closest city without crossing the border into Canada, an option currently unavailable to most (as of this writing). Due to COVID-19, border crossings are restricted to "essential purpose" travel only. The regional significance of Bangor cannot be overstated. It's Maine's third largest city, the northernmost city, and essentially the final 'wide spot in the road' before the state becomes *very* rural as one travels further north. Bangor features an abundance of medical care, essential services, shopping, dining, entertainment, a 5,800-seat civic center, and a theater—upon which all residents in the rural region east and north of the city greatly rely. When the dollar is weak, Bangor attracts shoppers from Canada more than 80 miles away. Bangor is also the jobs center of the region, providing careers in healthcare, government

[2] See *Appendix A*, Benefit-Cost Analysis.
[3] See *Appendix F*, Match Letter.

services, finance, education, retail, and back-office support. People commute from 60 miles away or more to work in Bangor.

Figure 15 Bangor is the northernmost city. North of there, Maine becomes a collection of small towns and remote forestland.

During much of the 19th century, Maine's forestland was a primary source of lumber for the U.S. as the nation grew. Bangor stood at the center of the industry, giving it recognition as the 'lumber capital of the world'. Through much of the 20th century the lumber industry continued to flourish but has fallen on hard times the past few decades as global investment in U.S. lumber companies and global competition both cut into Maine's share of lumber and paper sales. Today the industry has dwindled but Bangor remains regionally significant because it's the only sizeable commercial, industrial, and cultural center serving eastern and northern Maine and is also an ancillary site for Augusta-based state government.

Taxable retail sales in Bangor amount to around $1.8 billion annually. Retail is as significant to Bangor as it is to the rural residents who rely on it. As with most commercial centers surrounded by very rural areas, strong sales are attributable to rural residents spending at the numerous stores, big box retailers, and the mall. In fact, people tend to think of the small rural towns surrounding the city as 'suburbs' of Bangor.

Bangor's healthcare facilities include two large hospitals—Northern Lights Medical Center and St. Joseph Hospital—which are the primary care centers in the region. For residents north and east of Bangor, these hospitals house the closest cancer care facilities. There are also two mental health facilities in the area, one large state-run hospital just south of the Hogan Road Overpass as well as a private facility in town. Downtown Bangor is also regional headquarters for six commercial banking companies.[4] In recent years, Bangor has found itself in short supply of warehouse space. In fact, city leaders have been approached about, and are considering, amending zoning regulations to allow warehousing activity in vacant store space at the Bangor Mall, proximate to the interchange. Given its close proximity to I-95, this may occur which would undoubtedly bring additional freight traffic to the interchange.

Tourism is another important segment of Maine's economy and Bangor is the gateway for more than 3.4 million people annually who visit Acadia National Park, the park system's 7th most visited in 2019.[5] Bangor's commercial center benefits from tourists visiting Acadia and other scenic parts of Maine's vast coastland. It's also the closest city to Baxter State Park in central Maine, home to Mt. Katahdin, the state's tallest peak and the northern terminus of the famed

[4] https://www.city-data.com/us-cities/The-Northeast/Bangor-Economy.html

[5] https://www.nps.gov/orgs/1207/2019-visitation-numbers.htm

Appalachian Trail.

Figure 16 Hogan Road looking north just north of the overpass.

Bangor hosts the youngest population of the three cities in the state. It's home to four colleges and universities while the University of Maine is 8 miles away in the town of Orono. UMaine is the state's largest university, home to 11,400 students and Bangor is the closest commercial center to campus. The University of Maine at Augusta (UMA) serves 550 students at its campus in Bangor (UMA Bangor). Husson University, the 4th largest in the state by student population, is a private university in Bangor. Beal University is a private college in Bangor with 400 students.[6]

- GPS coordinates: Latitude: 44°49'56.5"N; Longitude: 68°44'30.0"W.
- The project is in Penobscot County, Maine.
- The project is in Maine's 2nd Congressional District, represented by Jared Golden (D-ME). The state is represented by U.S. Senators Susan Collins (R-ME) and Angus King (I-ME).[7]
- Rural Project: While Bangor is located in a *Census-Designated Urbanized Area* (Code:04951), it had a population less than 200,000 in the 2010 Census.
- The Project is not in an *Area of Persistent Poverty*.
- Bangor is in a *Metropolitan Statistical Area*[8], the only one in the northern three-quarters of the state. A portion of downtown Bangor and an area just northwest of downtown is considered a *Food Desert*. *New Markets Tax Credit (NMTC) zone*: The Project is on the border of an *Opportunity Zone*—the border is the part of I-95 that encompasses the Project. The **Opportunity Zone Census Tract Number is 23019000300–Bangor, Maine**. It runs for three miles on the south end of the Project zone with I-95 as the boundary.

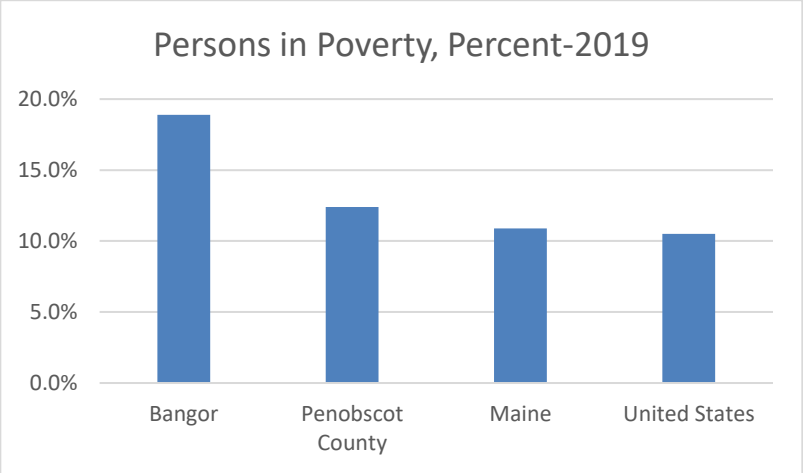
Geographic Area Name	Median Household Income	% of Maine	% of US	Per Capita Income	% of Maine	% of US
Bangor, Penobscot County, Maine	$46,625	81%	74%	$31,412	96%	92%

Penobscot County's census population estimate was 152,148 as of July, 2019. The county covers a large amount of land—3,397 square miles. The City of Bangor's population is 32,262. Retail, medical, banking, and back-office/call center jobs have become the primary source of employment in Bangor. Some areas in Maine have successfully shifted to a tourism-based economy. The Maine Department of Labor reports Penobscot County's current unemployment

6 https://www.collegesimply.com/colleges/rank/colleges/largest-enrollment/state/maine/

7 See *Appendix E*, Letters of Support.

8 https://en.wikipedia.org/wiki/Maine_statistical_areas



rate is 5.4%, Bangor's is 5%, while the state rate is 5.3%.[9] While the percent of persons living in poverty in Penobscot County is 12.4%, Bangor is 18.9%, that's 1.5 percentage points higher than the state percentage and about 2 percentage points higher than the U.S.[10] Of all the states in the U.S., Maine has the highest proportion of its residents living in rural areas at 61.3%.[11] Unlike many western states where rural land is barren and uninhabitable, 89% of the total land in Maine is forestland, remote but habitable.[12]

Regarding Maine's structurally deficient bridges: in 2021 there are 12.6% of highway bridges in Maine, including the Hogan Road Overpass, that qualify as Poor (Structurally Deficient), that's 310 of 2,460 bridges. Based on bridge square foot deck area, 9.05% of Maine bridges qualify as Poor (Structurally Deficient), that's 1,212,385 square feet of bridge deck area, a size comparable to the amount of square footage in Manhattan's Chrysler Building. With so many poor bridges spread across such a vast rural state, MaineDOT prioritizes bridges having the most critical need, despite the likelihood of critical bridges being spread far apart.

The *2020 Report Card on Maine's Infrastructure*[13] gave the state an overall grade of C-, a grade that has not changed since 2012. Like other states, Maine struggles to find new ways to fund infrastructure, but the challenge is great. The Report Card notes, "Maine's highway system includes a total of 3,754 bridges, 58% of which are more than 50 years old. Historic funding levels have not been sufficient to replace bridges before they exceed their expected design life and nearly one out of every seven Maine bridges (13%) is structurally deficient. Accordingly, MaineDOT's current 3-year work plan includes a continued emphasis on bridge maintenance and preservation projects. The number of structurally deficient bridges in Maine has been improving gradually over the past several years. While public support for transportation spending in Maine remains strong, achieving and sustaining long-term improvements requires a comprehensive strategy to address the $68 million shortfall in annual funding needed for Maine bridges." (Infrastructure Report Card, p.18). Also, as Maine's population remains stagnant, the opportunity to grow gas tax receipts does not increase. Meanwhile, MaineDOT has a long history of successfully completing USDOT discretionary grant projects on time and within budget and can

[9] https://www.maine.gov/labor/cwri/laus.html

[10] https://www.census.gov/quickfacts/fact/table/US,ME,penobscotcountymaine,bangorcitymaine/PST045219

[11] https://stacker.com/stories/2779/states-biggest-rural-populations

[12] http://maineforest.org/wp-content/uploads/2016/09/Maines-Forest-Economy-10-12-2016.pdf, page 2 of pdf

[13] https://infrastructurereportcard.org/wp-content/uploads/2016/10/FullReport-ME_2020_UPDATED.pdf

be fully relied upon to ensure that the non-federal match and other funding for the Project is met.

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

a) Costs and Funding Sources and Uses

	MaineDOT	Other Federal	RAISE	Project TOTALs
Preliminary Engineering (PE)	$ 402,000	$ 1,608,000	$ -	**$ 2,010,000**
Right of Way Acquisition (ROW)	$ 17,000	$ 68,000	$ -	**$ 85,000**
Construction Engineering (CE)	$ 6,570,000	$ 1,280,000	$ 25,000,000	**$ 2,850,000**
Construction				**$ 30,000,000**
Project TOTALs	$ 6,989,000	$ 2,956,000	$ 25,000,000	**$ 34,945,000**
Percentage of Project Totals	20.0%	8.5%		
	28.5%		**71.5%**	

Maine is committed to using their own funds and to utilize their core federal funds for the Project.

b) State Matching Funds

Non-Federal funding for the Project comes from MaineDOT. MaineDOT is a cabinet-level state agency with primary responsibility for statewide transportation by all modes of travel. MaineDOT employs approximately 1,800 people and expends or disburses more than $675 million per year, including federal, state, and local funds. The primary source of transportation funding in Maine is gas tax revenue, which by statute, can be used for highways and bridges only. Both nationally and in Maine, this source of funding has decreased as more fuel-efficient vehicles lead to a decrease in the amount of gasoline purchased. The funding source for the Project will be State General Obligation Bonds. In Maine that comes from state bonds to be approved by the legislature and taxpayers in 2022 and 2023. Due to its significant economic and transportation impact on the entire state and region, this Project has been prioritized by MaineDOT. The 2020 bond was approved in June 2020 with 78.7 precent approval from Maine voters. The bond was $105 million and the breakdown was $90 million for highways/bridges and $15 million for multimodal. The 2021 bond going before voters in November 2021 is for $100 million ($85 million highway/bridge and $15 million multimodal) and a projected bond in 2022 at the same amount and breakdown.

MaineDOT has done a full assessment of life cycle costs of constructing and subsequently maintaining the overpass and intersection and is also committed to properly maintaining them throughout their service life. MaineDOT's Asset management strategy is described on their website at: https://www.maine.gov/mdot/about/assets/docs/. The strategy is based on Highway Corridor Priority (HCP) and Customer Service Levels (CSL):

> HCP: *MaineDOT has gathered and analyzed straightforward, common-sense factors including the economic importance of the road as determined from input from regional economic development districts, federal functional classification, heavy haul trucking use*

and the amount of relative traffic on the road by region. With this and other data, MaineDOT has classified all 23,400 miles of Maine public highways into six, easy to-understand priority levels.[14]
CSL: *The next step is defining easy-to-understand customer service levels appropriate to the priority of the state's roads (1-5). We are using another intuitive scale: A, B, C, D and F. Using existing data on the safety, condition and service of the road, we can determine its customer service level. The result is a fair, consistent measure of how a road compares to other roads of the same priority across the state.*

MaineDOT has dedicated NHPP funding from FHWA. The department's Transportation Asset Management Plan outlines the plan for all NHS highways and bridges and can be found at https://www.maine.gov/mdot/publications/docs/plansreports/MaineDOT-Transportation-Asset-Management-Plan-final.pdf.

c) The funds noted above will go towards Preliminary Engineering, Construction Engineering and Right-of-Way Acquisition first with the balance, all BUILD grant funding, going towards project Construction.

d) Project Budget

The following budget shows costs associated with the bridge work:

New Bridge (3-span steel girder 41.515 degree skew)	26,699	SF	×	$400.00	=	$10,680,000
Jack Up Exist 1983 Bridge (42 bearings)	42	EA	×	$10,000.00	=	$420,000
Existing bridge deck removal	16,367	SF	×	$20.00	=	$328,000
Demolish Existing 1960 Bridge (sf of deck)	16,000	SF	×	$35.00	=	$560,000
New concrete deck on existing bridge	16,000	SF	×	$125.00	=	$2,000,000
Paint existing structural steel	16,000	SF	×	$42.00	=	$672,000
New Wingwalls on existing bridge	1	LS	×	$140,000.00	=	$140,000
Add soil anchors to existing bridge abutments	1	LS	×	$150,000.00	=	$150,000
		LS	×		=	$0
DETOUR AND/OR TEMPORARY BRIDGE	1	LS	×	$100,000.00	=	$100,000
REHABILITATION CONTINGENCIES				N/A	=	$0
MISCELLANEOUS (TCP'S, FIELD OFFICE, ETC.)				4%	=	$602,000
MOBILIZATION				8%	=	$1,204,000
				STRUCTURE SUBTOTAL	=	$16,860,000
APPROACHES		LF	×		=	$0
MISCELLANEOUS				7%	=	$0
MOBILIZATION				10%	=	$0
				APPROACHES SUBTOTAL	=	$0
				TOTAL CONSTRUCTION COST	=	$16,860,000
PRELIMINARY ENGINEERING				9%	=	$1,400,000
RIGHT OF WAY- To be included with approach work					=	
CONSTRUCTION ENGINEERING				9%	=	$1,440,000
OTHER:					=	$0
				TOTAL PROJECT COST	=	$19,730,000

[14] https://www.maine.gov/mdot/about/assets/hwy/

The following budget shows costs associated with the DDI work:

Traffic Signals/Lighting		**LS**	×		=	$4,000,000
ROAD BASE		**EA**	×		=	$900,000
ROAD SURFACE		**EA**	×		=	$2,500,000
SAFETY APPLICANCES		**LS**	×		=	$300,000
DRAINAGE		**LS**	×		=	$300,000
CULVERTS		**LS**	×		=	$60,000
TRAFFIC CONTROL		**LS**	×		=	$700,000
CONTINGENCIES					=	$480,000
MISCELLANEOUS (TCP'S, FIELD OFFICE, ETC.)					=	$3,000,000
MOBILIZATION					=	$900,000
TOTAL CONSTRUCTION COST					=	**$13,140,000**
PRELIMINARY ENGINEERING					=	$610,000
RIGHT OF WAY					=	$85,000
CONSTRUCTION ENGINEERING					=	$1,380,000
OTHER:					=	
TOTAL PROJECT COST					=	**$15,215,000**

Estimated contingency amounts are imbedded in the Project costs to cover unanticipated cost increases.

MaineDOT is experienced with bridge rehabilitation and replacement of this magnitude and larger, and plans to complete construction by October 2026, well within the September 2029 statutory deadline.

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
PE	$45,042	$43,060	$43,100	$190,798	$550,000	$550,000	$550,000	$38,000			**$2,010,000**
ROW	$1,485	$1,286	$0	$299	$15,000	$16,930	$50,000				**$85,000**
Construction								$6,000,000	$15,000,000	$9,000,000	**$30,000,000**
CE								$570,000	$1,425,000	$855,000	**$2,850,000**
Total	**$46,527**	**$44,346**	**$43,100**	**$191,097**	**$565,000**	**$566,930**	**$600,000**	**$6,608,000**	**$16,425,000**	**$9,855,000**	**$34,945,000**

Letters of support are being obtained from the Maine Legislative Delegation and others.

IV. Selection Criteria

The rural states of northern New England have not been home to minorities at the same level that other parts of the Northeast and the nation have. As a result, Maine and neighboring New Hampshire and Vermont all have very low minority populations—each with fewer than 2% of their population Black, fewer than 5% Hispanic, and fewer than 1% Native American.[15] In the Civil War era, plantation farming was not part of Maine's economy the way it was in the mid-Atlantic and South. Maine's economy was built on forestry, shipbuilding, and textiles—

[15] https://www.census.gov/quickfacts/fact/table/NH,VT,ME,US/PST045219

industries that traditionally did not employ or attract Blacks in the North in great numbers.[16] Furthermore, extremely challenging winters in northern New England prevented cities from growing to the same size and scale as those farther south and following the Civil War, many Blacks moved to big cities to begin anew. In more recent times, the lack of a solid manufacturing base and the slow and steady decline in the once vibrant lumber and paper industries further contributed to the absence of a diverse population and the prevalence of a rural one. For decades, as the population remained stagnant, these states could not afford the needed investments in infrastructure. That lead to a gradual and steady decline in their rural populations being connected to each other and to the rest of the country in the same manner that urban transportation investment mobilized urban residents. With that history in mind, MaineDOT recognizes, as USDOT does, that now is the time to reverse the trend. Infrastructure investment connects communities to jobs and careers, medical care, education, family, goods, services, and the arts and entertainment. Infrastructure also creates high-paying and meaningful jobs—construction, civil engineering, and a wide array of support jobs—to help the economy thrive. But perhaps most importantly, Maine believes that infrastructure investment will help attract a more racially and ethnically diverse population and the value and vibrancy that it brings. MaineDOT and the City of Bangor recognize the importance of investing in connected communities via walkable, bikeable, and ADA-compliant pathways, improving transportation access and reliability for all, reducing congestion as the EV revolution approaches, and enhancing safety regardless of transportation mode chosen. Leaders are confident that this Project will aid in establishing the foundation to attract a more diverse community.

1) Primary Selection Criteria

    a) Safety

THE BRIDGE: The original overpass was built 61 years ago. That bridge was then widened 38 years ago. Time and the winter freeze/thaw cycle have taken a toll on the bridge. The concrete bents and caps are cracking and deteriorating. Steel beams are corroding. The road surface is wearing away, especially at the seam where the road surface above the ground meets the road surface above the bridge. While the 1983-built section may be incorporated into reconstruction, the 1960-built bridge is well beyond its useful life. Furthermore, both sections of the bridge fail to meet today's clearance standard for interstate traffic traveling below. Tall trucks have hit the bridge girders in past years, creating another safety concern. That's why the 1980-built bridge will be raised.

THE INTERSECTION: Exit 187 is Maine's busiest diamond interchange with 12.7 million vehicles annually, 22,720 Annual Average Daily Traffic (AADT) driving the overpass, and problematic backups onto I-95. MaineDOT's Office of Safety indicates that the 'Hogan Road interchange is at the top of the "poor" list from a crash perspective and is a "worst performer" in terms of the number of consecutive years that collision points within the interchange have registered a high number of crashes.' Nearly every year going as far back as 2006, when their modern system of record keeping began, a high number of crashes were tallied at the

[16] https://www.mainepublic.org/maine/2019-02-19/why-is-maine-so-white-and-what-it-means-to-ask-the-question

interchange. While most injuries are fortunately not severe, the number of crashes and associated costs is cause for concern, and the lack of severity could simply be attributed to luck, not a long-term plan.

SAFETY STATISTICS AND BENEFITS: For the 5-year period ending December 2020, there were 161 crashes registered. For the 10-year period ending the same time, there were 304 crashes. There have not been long stretches with a similar high crash history at other interchanges of the same type, capacity, and volume in Maine. Three of the intersection's four conflict points have experienced a high number of crashes for at least 12 of the previous 14 three-year periods.

Month	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	% of Total
JANUARY	1	5	4	3	1	3	1	4	5	2	29	**9.5%**
FEBRUARY	0	2	4	2	3	7	3	5	0	4	30	**9.9%**
MARCH	3	2	0	2	1	4	3	1	2	0	18	5.9%
APRIL	4	5	2	3	2	2	2	2	1	1	24	7.9%
MAY	0	0	1	0	2	2	2	4	4	0	15	4.9%
JUNE	0	1	0	3	4	2	6	2	1	1	20	6.6%
JULY	1	3	3	1	1	0	4	2	2	1	18	5.9%
AUGUST	2	2	5	1	5	3	1	3	2	2	26	8.6%
SEPTEMBER	4	3	1	1	3	3	2	8	1	2	28	9.2%
OCTOBER	0	4	5	2	3	2	5	2	2	2	27	8.9%
NOVEMBER	4	8	2	1	2	0	2	6	3	5	33	**10.9%**
DECEMBER	6	2	3	2	3	2	4	2	6	6	36	**11.8%**
Total	25	37	30	21	30	30	35	41	29	26	304	100%
		Total 2011-2015 crashes:			143		Total 2016-2020 crashes:			161	13%	
		5-Year Average ending 2015:			28.6		4-Year Average ending 2019:			33.75	18%	

Despite more cars having greater safety features, the number of crashes at the interchange has been ***increasing***. Excluding the effect of COVID-19 which reduced traffic volume and the corresponding number of accidents, the previous four years (2016-2019) averaged 18% more crashes than the five years prior to that (2011-2015). As might be expected in this high-congestion shopping area, the highest number of crashes occur during holiday shopping months, followed by the coldest winter months when road conditions are impacted most. There were 78 people injured in the last 10 years at this intersection. The Project remedies much of this.

MaineDOT realizes that even if the overpass is replaced and the intersection is reconstructed similar to how it is today, that would not solve the high crash problem. More needs to be done–a redesign with safety in mind. That's why MaineDOT selected an innovative DDI to complement the new overpass. It incorporates a roadway design that is proven to improve safety.

The DDI will improve safety by:[17]

- Employing fewer points within this interchange where conflicts between vehicles traveling different directions, or vehicles merging from different lanes into one could lead to crashes: 14 conflict points for the DDI, 26 at the current intersection
- Spreading the conflict points that do remain throughout the interchange, creating a more pleasant driving experience

[17] https://divergingdiamond.com/benefits/

- Creating better sight distance when turning from the off-ramps to Hogan Road
- Virtually eliminating driver confusion
- Employing traffic calming features that slow vehicles along Hogan Road
- Making wrong way entry to I-95 extremely difficult
- Shortening the length of Hogan Road pedestrian crossings
- Making left and right turns simple from all directions because those vehicles will not cross opposing traffic to make a turn
- Increasing left turn lane capacity off the I-95 off-ramps without the need for additional lanes
- Employing simple two-phase traffic lights and doing so on a shorter cycle
- Creating better signal network synchronization
- Increasing the functionality of the intersection during a power outage
- Easily accommodating U-turns from I-95

BIKE/PEDESTRIAN SAFETY: Without a sidewalk or bicycle lane on the overpass, pedestrians and bicyclists dangerously cross the bridge on the edge of active travel lanes. Bangor recently added a 1.2-mile ADA-compliant paved walkway, known as Trail 5, that leads due west to the next interstate overpass. This is a 'detour option' to cross I-95. However, some people are not

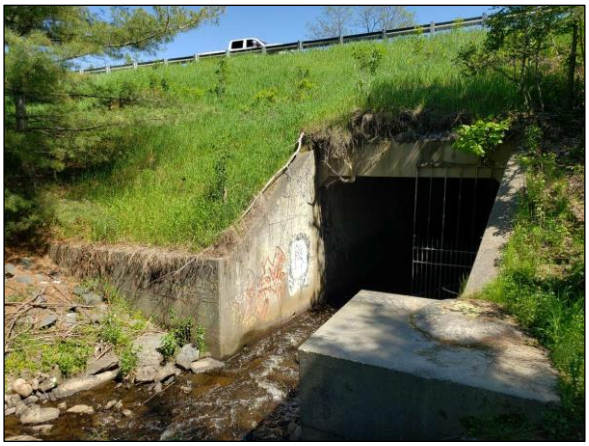


Figure 17, 18 The drainage culvert used by some to cross under I-95.

walking that distance to cross. In fact, people, including students from the nearby community college, use a drainage culvert under I-95 to cross the interstate. The planned DDI includes a safe, protected right-of-way for bicyclists and pedestrians allowing them to safely cross I-95. Innovatively, while doing so they will also have the choice to safely either cross Hogan Road via a crosswalk simultaneously—or remain on the same side of Hogan Road that they started out on. In either case, they will be connected to the Bangor's network of sidewalks leading to a host of businesses up and down the road, as well as to adjacent city street intersections with crosswalks. Furthermore, when pedestrians or bicyclists cross *any* roadway within the DDI, they only have to cross one direction of traffic at a time, not multiple directions of traffic common when crossing a traditional intersection. This is a big safety benefit for all. This Project would complete the 'Bangor Triangle' of bicycle/pedestrian access connecting Stillwater Avenue, Hogan Road, and Sylvan Road/Trail 5 that encompasses the shopping region. *The Project yields nearly **$24 million** in safety benefits on a discounted basis over the 30-year analysis period.*

b) Environmental Sustainability

When planning infrastructure improvements in a state that sees between 50 and 110 inches of average annual snowfall between its southern and northern borders, MaineDOT has always thoroughly considered the impact a changing climate has on mobility. MaineDOT's Climate Initiative is laid out on their website at https://www.maine.gov/mdot/climate/ and MaineDOT is a key partner in the *Maine Climate Council*. Maine also recognizes the importance of reducing greenhouse gas emissions and the looming threat they cause to vulnerable parts of a coastal state. That's why in 2019, Governor Janet Mills signed an Executive Order committing Maine to a target of carbon neutrality by 2045. Additionally, Governor Mills signed legislation requiring Maine's greenhouse gas emissions be reduced 45% by 2030 and at least 80% by 2050.[18] The legislation included creation of the *Maine Climate Council*, an assembly of scientists, industry leaders, bipartisan local and state officials, and engaged citizens all working cohesively to develop a four-year *Climate Action Plan* ("Plan"). Following the release of this Plan, the *Maine Climate Council* will continue to meet at least quarterly to track Plan implementation and progress, as well as to review the latest science, data, and program developments. The Council is also tasked with revising the *Climate Action Plan* every four years going forward.[19] The Plan's focus is widespread and encompasses buildings, infrastructure, transportation, energy, as well as solidifying the resiliency of Maine's communities, industries, and people. Improving the efficiency of roads and eliminating traffic bottlenecks is part of the strategy to reduce engine idle time and resulting emissions. While other Maine interchanges have traffic bottlenecks, Hogan Road has them *as well as* high crash statistics *and* is further north of similar intersections, making it significant to rural communities lacking convenient access to needed commerce and health care.

MaineDOT also realizes weather events that include large amounts of rainfall occur more frequently than in past years. That's why bridges are designed to withstand the effects of 100-year storms. More frequent freeze-thaw cycles, which can degrade bridge components quickly, are also considered.

Anyone driving an EV appreciates an interstate exit allowing drivers to combine vehicle charging with running errands or enjoying a meal. That's why charging stations are commonly found adjacent to shopping, dining, and other everyday services. Exit 187, with its variety of dining and shopping availability, is an ideal location for plentiful charging stations.[20] In Bangor two of the state's seven Priority EV Fast-Charge Corridors intersect.[21] The state is aiming for maximum distance of 70 miles between universal Level 3 chargers. The new interchange complements EVs because it moves all vehicles through the intersection more expeditiously. As the Biden Administration invests in charging infrastructure, Exit 187 is exactly the type of exit

[18] https://climatecouncil.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait_December2020_printable_12.1.20.pdf, page 29.
[19] https://climatecouncil.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait_December2020_printable_12.1.20.pdf, page 108
[20] https://www.efficiencymaine.com/evehicles/charging-station-locator/#/analyze?fuel=ELEC&region=US-ME&show_map=true
[21] https://www.efficiencymaine.com/docs/Maines-EV-Charging-Network-Plan_01_08_2020.pdf

that calls for it. It's the final city prior to traveling north into a much more remote part of the state. When switching to electric vehicles, the impact of Maine's cold climate must be considered. Losses from extreme weather, either very hot or very cold, can reduce plug-in EV range by 25% (US DOE, 2020).[22]

MaineDOT believes in recycling on a large scale. The decision has been made to redevelop existing infrastructure by using the 1983 portion of the overpass within this Project. Other Pine Tree State environmental points of note include:

- In 2019, 80% of Maine's electricity net generation came from renewable energy resources, and hydroelectric power provided the largest share at 31%.
- Maine leads New England in wind-powered generation and ranks sixth in the nation in the share of its electricity generated from wind. In 2019, wind provided about 24% of Maine's in-state net generation.
- Biomass supplies one-fourth of Maine's net generation, the largest share of any state, and most of the biomass Maine uses for electricity generation is wood and wood waste-derived fuels.
- Maine was 1 of fewer than 10 states that produced more electricity from petroleum than from coal until 2019, when petroleum's contribution to Maine's net generation fell below that of coal for the first time.[23]

Figure 19 Maine's seven Priority EV Fast-Charge Corridors

Currently, the transportation sector accounts for 53% and 52% of Maine's carbon dioxide and greenhouse gas emissions, respectively. More than 90% of Maine's transportation energy comes from petroleum. Reducing transportation-related petroleum demand and emissions will benefit Maine. This can be achieved by increasing vehicle efficiency, switching to alternative fuels (e.g., electricity, biofuels) that have lower emissions per mile, and by reducing the demand for motorized transportation.[24] MaineDOT is also working to reduce vehicle idle time and resulting emissions. The DDI Project will aid in this at one of Maine's most problematic traffic areas. *The Project yields more than $1.2 million in avoided emissions benefits on a discounted basis over the 30-year analysis period.*

c) Quality of Life

The Project improves transportation flexibility because completing the final piece of the 'Bangor

[22] https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/GOPIF_STS_REPORT_092320.pdf, page 340
[23] https://www.eia.gov/state/?sid=ME
[24] https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/GOPIF_STS_REPORT_092320.pdf, page 340

Triangle' gives more people—including the disabled—more choices in how they want to safely travel, including making the option of emissions-free walking or biking more appealing. The fact that Maine has the nation's largest population living in rural areas makes the need to have strong, reliable connections to a city service center important for one's quality of life. The overpass and interchange connect individuals to jobs, healthcare, services, retail, restaurants, nature preserves and the state park system, as well as numerous other necessities that Bangor offers. It reduces travel times. Furthermore, it connects tourists to their destinations, including Acadia National Park 40 miles away.

Another Reason Foundation finding holds that Maine ranks 33rd nationwide in annual peak hours spent in congestion per auto commuter. Yet the remaining 17 states ranked worse are all either in the congested Northeast or have one or more top 25 cities by population within them, with the exception of Louisiana, Minnesota, and Oregon—which all have cities in the top 50 by population. Maine's largest city doesn't even rank in the nation's top 300 largest cities by population.[25] *The Project yields more than $1.75 million in avoided travel time delay due to reroutes if completed. The Project also yields more than $1.4 million in pedestrian travel time savings with the shorter route from new walkways. Each savings is on a discounted basis over the 30-year analysis period.*

d) Economic Competitiveness

The interstate highway is the nation's main way to rapidly move goods and people far distances in a cost-effective manner. For Mainers, there is but one primary interstate: I-95. It's the key artery connecting Maine's three large cities, the primary pathway for freight through Maine, and the key connection to the rest of New England and Canada. The current Exit 187 interchange causes backups on I-95 which can hinder efficient movement of goods and people. Bangor is the northernmost commercial center in Maine and Exit 187 is the northernmost commercial exit in Bangor. The fact that it connects people to numerous big box stores, auto dealerships, hotels, and is the closest retail district to Acadia National Park makes it economically significant. And as cities like Bangor struggle meet intense growing demand for warehouse space in the wake of the online retail revolution, they are studying the potential use of empty sections of the Bangor Mall. This would not only put the unused space to good use but also create additional jobs. However, the additional truck traffic that would result at the interchange from the idea makes the Project that more significant. The Project makes this key area of commerce in the city and region more accessible for both shoppers and deliveries. It reduces crashes and their downstream impact on traffic delay in addition to the safety benefits. *The Project yields more than **$12 million** in savings for improved travel times and avoided delays on a discounted basis over then 30-year analysis period.* In a region where per-capita personal income is only $31,412, the Project which generates over $50 million in economic output is worth it over 1,600 additional Mainers, which is regionally significant.

e) State of Good Repair

The Reason Foundation, a nonpartisan public policy research group, found in 2018 that "Maine

[25] https://reason.org/wp-content/uploads/25th-annual-highway-report.pdf, page 34

declined 21 positions from 4th to 25th in the overall [highway performance] rankings, as the state saw dramatic drops of 26, 40, and 26 positions for rural Interstate pavement, rural arterial pavement, and urbanized area congestion rankings, respectively. Maine's ranking last year may have been an aberration, as the year prior the state was 23rd in the overall ranking."[26]

The current overpass is an outdated collection of two older bridges fused together. While the number of travel lanes is adequate, the lack of a bike or pedestrian path is a concern as Bangor's population grows and the nation, state, and city encourage walkable and bikeable communities. Without the rehabilitation the Project provides, the 1983-built portion of the current bridge will continue to deteriorate and create a greater need for repairs, the threat of an eventual outage, and concern about emergency repairs. The 1960-built bridge will undoubtedly bring about these same stability concerns. Left unimproved, the poor condition of the asset will threaten future transportation network efficiency, the mobility of goods and people, and economic growth. The new bridge will be constructed of modern components capable of withstanding a harsh climate and able to, with proper maintenance, be in service for about 60 decades.

The current intersection is crash prone, causes backups, and does not have a safe place for bicycles and pedestrians to cross Hogan Road. With such a busy intersection located so close to many goods and services, redesigning it to be safer and more efficient creates tangible cost benefits. *The Project saves nearly **$11 million** in maintenance costs on a discounted basis over the 30-year analysis period.* These are dollars that MaineDOT can now spend on other critical infrastructure needs.

2) Secondary Selection Criteria

a) Partnership

In June 2015, two individuals from MaineDOT and two from the City of Bangor connected with Missouri Department of Transportation (MoDOT) officials and traveled to Kansas City to learn about the benefits of DDIs. During this meeting, MaineDOT visited several DDI's in the Kansas City area and also received expert input and feedback about the planned Bangor DDI.

Civil engineering firm VHB is under contract with MaineDOT on design and delivery of the Project. VHB has worked on more than 20 projects for MaineDOT in recent years. The firm includes engineers, scientists, planners, and designers who partner with clients in transportation, real estate, and energy industries as well as federal, state, and local governments. The firm focuses on enhancing communities by improving mobility while balancing development and infrastructure needs with environmental care.

b) Innovation

Innovative Technologies – The use of the DDI is innovative because it is a relatively new and advanced method of traffic flow that will alleviate crashes at the interchange. The Hogan Road Interchange DDI will be the first in Maine. Having a sealed pathway for bicyclists and

[26] https://reason.org/wp-content/uploads/25th-annual-highway-report.pdf, pdf page 10, document page 7

pedestrians designed to have them cross only one direction of traffic at a time is innovative as well. Innovative design elements for the bridges include the following: new steel girders will be metalized, all concrete reinforcing steel will be stainless steel for the new bridge, and new or replacement bridge drains will be constructed of fiber reinforced polymer (FRP). If the three-span option is chosen for the new bridge, all metal components in the mechanically stabilized abutment retaining walls including the concrete reinforcing in the facing panels will be stainless steel.

Innovative Project Delivery – Further mitigating any Project delay, MaineDOT and various other state and federal departments have executed agreements to review environmental impacts expeditiously and thoroughly. The parties involved in this grant application are applying an innovative means regarding the NEPA/permitting for this Project through Programmatic Agreements.

Programmatic Agreements

In an effort to mitigate any project delay, MaineDOT has numerous programmatic agreements with reviewing agencies. MaineDOT will take advantage of the following agreements where applicable to streamline the environmental review and approval process:

1. Programmatic Agreement between the Federal Highway Administration, Maine Division and the Maine Department of Transportation regarding the Processing of Actions Classified as Categorical Exclusions for Federal-Aid Highway Projects.
2. Programmatic Agreement among Federal Highway Administration, Federal Transit Administration, the Advisory Council on Historic Preservation, the Maine State Historic Preservation Office, and Maine Department of Transportation regarding implementation of the Federal Aid Highway and Federal Transit Programs in Maine.
3. Cooperative Agreement between U.S. Department of the Interior, Fish and Wildlife Service (USFWS), FHWA and the MaineDOT for State Transportation Reviews by the USFWS in Maine 2015-2020 and 2016-2021.
4. Maine Atlantic Salmon Programmatic Consultation finalized January 23, 2017.
5. Programmatic Agreement for the State of Maine concerning identification of listed and proposed species and designation of non-federal representative under the Federal Endangered Species Act between FHWA, Maine Division USACE, & MaineDOT.
6. USFWS, NOAA's National Marine Fisheries Service Programmatic Agreement for the State of Maine between MaineDOT, FHWA Maine Division, USFWS regarding Endangered Species Act, Section 7 Consultation for Canada Lynx.
7. Memorandum of Agreement for Stormwater Management between MaineDOT, MTA, and Maine Department of Environmental Protection.
8. Nationwide Programmatic Section 4(f) Evaluation for use of Historic Bridges.

Innovative Financing – There is no innovative financing associated with this Project.

V. Environmental Risk Review

a) Project Schedule

Preliminary design is currently underway and has identified a few bridge configurations that have the potential to meet both the goals of the Project and community needs. A more refined analysis of these will be completed to establish a preferred design solution for the overpass. The final recommendations for the project will be summarized in a preliminary design report scheduled for completion in December 2021. Following preliminary design, the preferred solution will be advanced to an approximate 30% design level, including identification of project impacts, by June 2021, so that right-of-way acquisition and environmental approvals can commence. The final design schedule for the project has been developed to support advertisement for construction in April 2024. Constructing the new bridge is expected to begin in spring 2024 and take approximately two years and four months to complete. This schedule would have the new bridge ready to open by winter 2026.

Key Task	Planned Finish
Preliminary Public Meeting	6/28/2021
Preliminary Alignment Complete	7/23/2021
Coachpoint 2	7/23/2021
Draft TAME	9/12/2021
Draft PDR Distribution	10/23/2021
PDR/ Preliminary Plan Complete	12/7/2021
Midway Team Meeting	12/14/2021
Formal Public Contact	5/6/2022
Section 7 Signoff	5/17/2022
Plan Impacts Complete	7/17/2022
Structural Plans Complete	8/21/2022
NEPA Complete	8/28/2022
Utilities Certified	5/12/2023
Environmental Approvals Complete	5/12/2023
Final TAME	9/24/2023
R/W Certified	11/4/2023
PS&E Complete	11/4/2023
Project Advertising	4/19/2024
Local Billing #1	4/19/2024
Contract Award	5/19/2024
Construction Begin	6/19/2024
Local Billing #2	8/10/2025
Construction/Effort Complete	10/31/2026

b) Required Approvals

Environmental Permits and Reviews–MaineDOT has initiated communication with environmental agencies and interested parties. Preliminary baseline data collection to identify natural and cultural resources potentially affected by the Project is complete. This information will be refined during design and will be used to avoid and minimize impact while meeting the purpose and need of the project.

i. **National Environmental Policy Act (NEPA)**: The NEPA process will inform and be incorporated into design efforts. The Project is anticipated to be classified as a Categorical Exclusion in accordance with 23 CFR 771.117(c) (26). MaineDOT is currently reviewing the Project and preparing NEPA documentation in accordance with *Programmatic Agreement Between the Federal Highway Administration, Maine Division and the Maine Department of Transportation Regarding the Processing of Actions Classified as Categorical Exclusions for Federal-Aid Highway Projects*. Should any issues arise, MaineDOT will work directly with the respective agencies to quickly resolve them. The anticipated date for NEPA completion is 8/28/2022.

ii. Other Agencies

Historic and Archeological: MaineDOT and Federal Highway Administration (FHWA) have completed the Section 106 process in accordance with the *Programmatic Agreement among Federal Highway Administration, Federal Transit Administration, the Advisory Council on Historic Preservation, the Maine State Historic Preservation Officer, and Maine Department of Transportation regarding Implementation of the Federal Aid Highway and Federal Transit Programs in Maine*. The Maine Historic Preservation Commission has concurred with MaineDOT's finding that the Project will have no effect to historic or prehistoric archaeological properties or historic architectural properties.

Section 4(f) of the Department of Transportation Act: The MaineDOT Cultural Coordinator has reviewed the Project to identify potential Section 4(f) resources. There are no properties protected by Section 4(f) within the Project area, therefore, no Section 4(f) uses are anticipated.

Endangered Species Act (ESA) and Essential Fisheries Habitat (EFH): MaineDOT has identified the Federal Endangered Species and EFH (where applicable) within the Project areas. MaineDOT and FHWA will coordinate with federal agencies during Project design to avoid and/or minimize effects to ESA/EFH. MaineDOT and FHWA will complete the required consultations well within necessary timelines in 2021.

The Project is located within the range of the federally threatened Northern Long-Eared Bat. MaineDOT anticipates that the Project may affect, but is not likely to adversely affect, Northern Long-Eared Bats. The Project will be eligible for Streamlined Section 7 Consultation pursuant to the U.S. Fish and Wildlife Service Northern Long-Eared Bat 4(d) Rule.

The Project is also located within the range of the federally listed Gulf of Maine Distinct Population Segment (DPS) of Atlantic Salmon (ATS) and within designated ATS Critical Habitat. Informal Section 7 consultation with U.S. Fish and Wildlife Service regarding potential effects to Atlantic Salmon will be required for in-water work. MaineDOT anticipates these activities can be completed in accordance with the requirements of the *Maine Atlantic Salmon Programmatic Consultation finalized January 23, 2017.*

Section 404 Clean Water Act Permit (U.S. Army Corps of Engineers): Freshwater wetland impacts are expected to occur during construction of the Project. MaineDOT will avoid and minimize temporary and permanent wetland impacts to the extent practicable. MaineDOT anticipates that wetland impacts and any in-water work will be eligible for Category 2 Permits under the *Maine Programmatic General Permit*.

Natural Resources Protection Act (Maine Department of Environmental Protection): Wetlands and stream impacts are regulated by the *Maine Natural Resources Protection Act*. MaineDOT anticipates that wetland and stream impacts

associated with the Project will be eligible for *Permit-By-Rule Chapter 305, Section 11*, which is a streamlined permit process for State Transportation Facilities.

iii. Public Engagement

The City of Bangor and MaineDOT have worked together to come up with suitable plans to modernize the intersection and to complete the bicycle and pedestrian 'triangle.' In spring of 2016, MaineDOT hosted a public information meeting to gather feedback from the community about their concerns with the interchange, as well as to introduce them to the proposed improvements and the concept of a DDI. The city has been involved throughout the design process and will continue to be throughout construction to ensure the Project complements any city plans for nearby streets and boulevards. Since plans have progressed farther along than they were in 2016, MaineDOT has planned a virtual public outreach meeting for June 2021 to discuss the Project and receive feedback.

iv. State and Local Approvals

This Project is included in the Statewide Transportation Improvement Program (STIP) and is consistent with MaineDOT's long range plan. It can be found in *Maine Department of Transportation–Statewide Transportation Improvement Program 2021-2022-2023-2024* dated May 13, 2021 and available at https://www.maine.gov/tools/whatsnew/attach.php?id=4651213&an=1. The document is searchable by the Project's WIN number, 018595.10, found on page 262.

c) Assessment of Project Risks and Mitigations

Projects like these have been accomplished by MaineDOT numerous times before and therefore they are generally void of risk. That is the case with this Project.

Project Risks	Mitigations
Environmental permitting/restriction • Federally Endangered Atlantic Salmon DPS and Critical Habitat	Minimize in-water work • Collaborative agreements with MaineDOT, USFWS, USACE, FHWA and MTA under the Endangered Species Act through a process that expedites endangered species consultations and aims to meet both wildlife and Project goals[27] • Choosing a final design that minimizes in water work • Constructability reviews will be completed during design to ensure the selected alternative is buildable given the various environmental restrictions

[27] http://www.maine.gov/mdot/maspc/

Cost control • While the preliminary design phase has begun, the final recommended improvements could lead to scope and cost increases if additional required work is identified	Thorough preliminary evaluation • Multiple alternatives will be evaluated during preliminary design with many scenarios of how to maintain traffic being considered • Constructability reviews will be a key focus during preliminary design with a focus on ***most constructible*** and cost effective.

d) Other

1. **Electric Vehicle Charging Corridors**: In June 2019, Governor Janet Mills signed a law to create the Maine Climate Council to combat climate change. The Council developed a four-year plan for climate action titled *Maine Won't Wait* to help the state meet its greenhouse gas emission reductions goals. Electrification of the transportation sector was identified in the plan as one of the most effective emission reduction strategies for Maine. It involves expanding both the number of electric vehicles on the road along with available charging stations. Greenhouse gas modeling suggests that to meet the emissions reduction goals, Maine will need to have 41,000 light-duty electric vehicles on the road by 2025 and 219,000 by 2030. The widespread adoption of electric vehicles in Maine will be accelerated with a *Clean Transportation Roadmap* that will identify necessary policies, programs, and regulatory changes needed to meet the state's ambitious electric vehicle and transportation emission reduction goals. This will include recommendations on how to provide equitable access to electric vehicles and charging infrastructure. *Efficiency Maine Trust* already provides rebates for electric vehicles. In December 2020, they expanded the program to include used electric vehicles and they increased rebate amounts for low-income customers, governmental entities, tribal governments, and certain non-profits. The rebates address some equity concerns around transportation, but there are still low-income individuals, older adults, and those living in rural areas who continue facing unmet transportation needs.

2. **Environmental Justice**: Maine is addressing Racial Equity and Barriers to Opportunity. MaineDOT recently updated its *Public Involvement Plan* which outlines the department's efforts to ensure disadvantaged populations are afforded meaningful opportunities for public involvement.[28] The Project ensures safe, efficient access for all transportation system users and extends the service life of existing infrastructure while avoiding impacts outside of the existing ROW, which traditionally has the potential to disproportionately impact disadvantaged populations. MaineDOT is working on revising a strategic vision for rural transit to identify gaps and needs in the existing programs as well as an electric vehicle replacement plan. Additionally, MaineDOT will be re-acquiring and expanding the *GO Maine*[29] rideshare program in 2022 to enable users to travel from origin to destination safely and efficiently across modes and providers, regardless of location, income, and disability.

[28] https://www.maine.gov/mdot/planning/docs/2021/pipdraft-02012021.pdf

[29] https://www.gomaine.org/

MaineDOT utilizes the EPA's Environmental Justice Screening and Mapping Tool (EJSCREEN) for all federally-funded projects and Project information may be found in Appendix G, EJSCREEN.[30] According to U.S. Census Block Date, the City of Bangor has several low-income neighborhoods. Hogan Road provides a variety of shopping and other services important to all residents of Bangor, but it also provides a regional service center for a much wider, predominantly rural, geographic area. The project will not require any relocation and will not have significant environmental impacts.

3. **Climate Change/Resilience**: The *Maine Climate Council* developed a four-year plan for climate action titled *Maine Won't Wait* to help meet the state's greenhouse gas emission reductions goals, including a 45% reduction by 2030 and an 80% reduction by 2050. Transportation is responsible for 54% of the state's total greenhouse gas emissions. With such a large portion of emissions from transportation, reductions in this area are critical to reaching emission reduction targets.

VI. Benefit Cost Analysis

7% NPV Summary over 30 Years			
	Costs	Benefits	
CAPEX - Project Cost	$26,895,103		
Maintenance Costs		$10,956,452	
Travel Time & Ops Costs Savings		$10,350,910	
Safety Savings		$23,584,404	
Emissions Savings *(3% discount rate)*		$1,191,367	
Pedestrian Travel Time Savings		$1,405,596	
Travel Time & Ops Costs Avoided		$1,753,975	
Safety Avoided		$83,198	
Emissions Avoided *(3% discount rate)*		$27,561	
Residual Value of the Project		$1,840,213	
TOTAL	**$ 26,895,103**	**$51,193,676**	
Benefit-Cost Ratio			1.90

The BCA estimates more than $51,000,000 in economic benefits resulting from the $34,950,000 investment. Benefits result from the more efficient intersection yielding less waiting time, idling time and emissions, and potential for vehicle interactions which translates directly to fewer crashes, injuries, deaths and damage. Benefits accrue due to the avoided reroute mileage and hours that would be associated with eventual shutdowns of the bridges. That includes the elimination of the potential accidents that would result with additional passenger and commercial miles as well as avoided costs of emissions to the environment of the region. Additionally, the residual value of the new structures after 30 years in service is included. All are discounted over the 30-year period at seven percent to calculate the NPV of each of the cash flows (Emissions are discounted at 3% per BCA Guidance).

Also included as benefits in the BCA are the reduction in maintenance costs for the bridge as the new structure will incur far less on-going maintenance costs than allowing the existing bridge to "limp along" under the current conditions until it must be removed from service. These benefits

[30] https://www.epa.gov/ejscreen

were determined during a full life-cycle cost analysis of maintaining the structures and roadway throughout the 30-year analysis period and beyond.

The Project will produce safer bridges, intersections and sidewalks for motorists, freight haulers, pedestrians, the disabled, and bicyclists. The project is cost effective as stated in the BCA with more than $51,000,000 of benefits (discounted at 7% over 30 years) and a benefit-cost ratio of at least 1.90.

Grant Request Supporters*

MaineDOT's grant request for RAISE funds is supported by a diverse group of elected officials and stakeholders due to the significant economic impact the Project will have on the region. This list of supporters includes:

Members of Congress *(letters will be sent to Secretary's office)*

U.S. Senator Susan Collins
U.S. Senator Angus King
U.S. Congressman Jared Golden

State Elected Officials/Offices

Governor Janet Mills
State Senate President Troy Jackson–Maine Senate District 1
R. Danny Martin–State Representative

Local Government

City of Bangor

State and Local Organizations

Bangor Area Comprehensive Transportation System

Please visit https://www.maine.gov/mdot/grants/raise/

* Due to the impact of COVID-19, numerous letters are not yet available but will be delivered to USDOT. When received, MaineDOT will post all received letters on our website noted above.

APPENDIX