Maryland Transportation Authority (MDTA)

I-895 Baltimore Harbor Tunnel:

Enhance Mobility, Improve Safety and Reduce Emissions

Project Description

TABLE OF CONTENTS

1. PROJECT DESCRIPTION

Project Partners

- Maryland Transportation Authority (MDTA)
- Federal Highway Administration (FHWA)
- Maryland Port Administration (MPA)
- Baltimore City Department of Transportation (BCDOT)
- Baltimore City Department of Public Works (BCDPW)

The Maryland Transportation Authority (MDTA), in partnership with the Maryland Department of Transportation and other project partners (listed at right), requests $80 million in funding from the U.S. Department of Transportation's Multimodal Project Discretionary Grant (MPDG) Program for FY 2023-24, in support of the I-895 Baltimore Harbor Tunnel at Frankfurst Avenue Interchange Improvements Project. This $160 million project will streamline traffic flows, enhance safety, and foster economic growth by overhauling a critical juncture in the Baltimore area's interstate system. (Note: MDTA requests a Federal share ($80 million) equal to 50.9% of the total project cost and is aware of the discrepancy with Form SF424C information in Grants.gov (which only accepts whole percentages) in which MDTA indicated a Federal share of 51% for future, eligible grant funded project costs.)

The existing infrastructure in the Project area, including the I-895 mainline, bridges, and interchanges, cannot keep pace with rising traffic demand and the toll plaza represents an aging, crash-prone, pollution-producing bottleneck in the regional interstate highway system. Frequent congestion occurs during peak hours and leads to traffic bottlenecks that create delays, queues, emissions, and noise pollution. Given the infrastructure age and presence of only two crossings within the city limits over the Patapsco River – the Baltimore Harbor Tunnel (BHT) and the Fort McHenry Tunnel – the effects of a BHT shutdown stemming from ongoing deterioration could prove disastrous for the Baltimore region.

"The Baltimore Harbor Tunnel Thruway is a critical junction in Maryland's Interstate system, breaking the historic 'Baltimore Bottleneck' by linking people and goods efficiently across the Patapsco."
– Governor Wes Moore

The Project will **modernize 1.1 miles of transportation assets** and produce significant, measurable safety benefits for motorists; bring heavily used MDTA highway assets into a state of good repair; foster regional economic growth via more efficient commuting and increased freight travel productivity; reduce congestion, emissions, and other air pollution that detract from the public health of residents in the adjacent Environmental Justice communities of Brooklyn and Curtis Bay; and introduce innovative technology that will streamline toll collection, reduce crashes, and improve the BHT's overall functionality.

The Project proposes a highly cost-effective investment of federal and state funds, with a calculated **Benefit-Cost Ratio of 2.07**. The planned improvements to this project area, shown in Figure 1, will include the design, reconstruction, and reconfiguration of the mainline and interchanges along I-895 at Frankfurst Avenue, Shell Road, and Childs Street in Baltimore City.

***Figure 1**: Project Area and Existing Conditions*

BENEFIT-COST SUMMARY (2021 $ MILLIONS)	
Total Benefits	$204.3
Total Costs	$96.7
Benefit-Cost Ratio	2.07

The key benefits of the Project, grouped by outcome criteria category, include:

FIGURE 2: *PROJECT BENEFITS BY OUTCOME CRITERIA*	
Safety	▪ Reduced crashes ▪ Increased vertical clearance for trucks on Frankfurst Avenue beneath I-895 bridge, leading to fewer over-height collisions ▪ Improved pedestrian and driver conditions from installation of new traffic signals outside of Masonville Cove Wildlife Refuge ▪ Safety improvements to CSX at-grade crossing at Shell Road, reducing potential for crossing conflicts and incidents ▪ Upgraded over-height vehicle detection for truckers entering BHT
State of Good Repair	▪ Removal of congestion-prone, aging toll plaza ▪ Replacement of bridges over Frankfurst Avenue and Childs Street to address deterioration and low height clearance ▪ Removal of aged I-895 bridge over BHT campus storage area ▪ Removal of aging flyover ramp from Shell Road to I-895 ▪ Replacement of aged I-895 pavement 25 years past its useful life ▪ Reduced long-term maintenance costs
Economic Impacts, Freight Movement, & Job Creation	▪ More efficient freight movement ▪ Improved travel times for commuters ▪ Creation of 350-400 good-paying jobs for area workforce ▪ Equitable hiring via utilization of Disadvantaged Business Enterprises ▪ Required on-the-job training for women and disadvantaged communities
Climate Change, Resiliency, and the Environment	▪ Reduction of greenhouse gas (GHG) emissions and other pollutant types in surrounding communities ▪ Net reduction in impervious pavement and decreased stormwater runoff ▪ Addition of new stormwater capture facilities ▪ Landscaping improvements
Equity, Multimodal Options, and Quality of Life	▪ Long-term pollution reduction for surrounding communities ▪ Decreased freight traffic traveling in surrounding communities ▪ Job creation benefitting workers from historically disadvantaged communities ▪ Improved mobility on local roads in surrounding communities
Innovation	▪ Implementation of permanent all-electronic tolling (AET) ▪ Incorporation of design-build project delivery model ▪ Lane Use Control Signals ▪ Upgrades to Over-Height Detection System for vehicles entering BHT

This project will benefit surrounding communities via improved mobility on local roads from reduced commercial vehicle traffic, and from the resulting reductions in pollution. These community benefits also include facilitation of safer, easier access to Masonville Cove, an urban wildlife refuge abutting this project area.

1.1 Addressing Transportation Challenges

Congestion and Crashes

The existing I-895 Toll Plaza is a traffic bottleneck for motorists and freight movement, creating congestion, emissions, and crash rates higher than the statewide average. Resulting traffic backups harm the local economy due to lost worker and freight productivity. The status quo presents additional safety hazards for emergency personnel responding to crashes, including those seeking rapid access to MedStar Harbor Hospital in Cherry Hill and Johns Hopkins Bayview Medical Center in Southeast Baltimore, north of I-895 and the BHT.

I-895 experiences severe peak hour delays of more than seven minutes per vehicle with queues exceeding four miles daily under typical conditions. Traffic volumes through the toll plaza are expected to increase by up to 0.6% per year, from 78,250 vehicles per day in 2018 to 90,000 vehicles per day by 2045, according to an MDTA study of traffic patterns from November 2017 to October 2018. Over time, this growth will contribute to further congestion and emissions under a No-Build scenario.

Figure 3: *Crash Snapshot, 2016-2018*

Project Area: 62 Crashes per Million Vehicle Miles (+40%) vs. MD Statewide Average of 42.3 per MVM

Within 1,000’ of Toll Plaza

- 70% - Rear-End Crashes
- 14% - Side-Swipes
- 16% - Other

Surrounding the toll plaza, abrupt speed changes and/or encountering congestion are a leading cause of frequent rear-end and side-swipe collisions. This regrettably common I-895 challenge is documented in a 2016 to 2018 crash data assessment.

This project addresses these challenges through the incorporation of overhead automatic electronic tolling (AET) at highway speeds. The installation of overhead gantries will allow vehicles to move through the toll facility without backups and idling. Following toll plaza removal, speeds will increase from 10 to 50 miles per hour, matching the existing speed limit of the I-895 mainline which will accommodate projected traffic volume increases.

Safety of Interchanges, Bridges, and Rail Crossings

Interchanges

The geometric design and spacing of the interchange ramps at Childs Street and Frankfurst Avenue will be upgraded to safely accommodate higher vehicle speeds through the BHT. The Project will accomplish this by removing flyover ramps from Shell Road to northbound I-895 and replacing the ramps at Childs Street and Frankfurst Avenue.

These upgrades will also add collector-distributor (C-D) lanes that will streamline movement of freight vehicle traffic, providing an added safety benefit amidst an increase in travel speeds.

Bridges

The Project area includes multiple bridges approaching the end of their useful life. These include existing I-895 bridges at Frankfurst Avenue and Childs Street as well as a bridge over the BHT maintenance campus and an aging flyover ramp at Shell Road. Each was built in 1957 and is due to reach the end of its service life of 75 years within the next decade. The Frankfurst Avenue Bridge also has a bridge clearance height of 14'-1" – well below the AASHTO requirement of 16'9" – that has led to recurring bridge strikes by over-height commercial vehicles, making this the most-struck bridge in the MDTA system.

This project addresses these challenges by replacing the Frankfurst Avenue and Childs Street bridges. The Project will also increase the clearance beneath the Frankfurst Avenue bridge to meet the AASHTO requirement and entirely remove the bridge within the BHT maintenance campus and the Shell Road flyover ramp.

Rail Crossings

In collaboration with BCDOT and CSX, which has an at-grade crossing at Shell Road, MDTA will deploy safety improvements reducing road-rail conflicts in the Project area.

1.2 Statement of Work and Project Readiness

The Project has completed National Environmental Policy Act (NEPA) review and obtained an approved Categorical Exclusion (CE), completed 30% designs for the proposed improvements under the CE classification, and has also been included in the Maryland Statewide Transportation Improvement Program (STIP) and the Baltimore Region Transportation Improvement Program (TIP). MDTA plans to issue a Request for Qualifications (RFQ) from qualified Design-Build contractors for this project in Fall 2023.

Figure 4: Major Technical and Engineering Components within Project Area

Further improvements include pavement reconstruction and rehabilitation, geometric modifications, construction of drainage systems, grading, replacement of signage and markers, deployment of intelligent traffic system devices, installation of traffic barriers and retaining walls, and utility relocations.

1.3 Project History and Broader Context

AET Conversion and Interstate Efficiency Projects

The Project will conclude the conversion of legacy toll plazas to highway speed tolling for MDTA. This process began in 2014 with the completion of the MDTA AET Conversion and Prioritization Study. Once this project is completed, all seven of the toll facilities under MDTA jurisdiction will operate at highway speeds utilizing E-ZPass®, pay-by-plate and video tolling.

This project joins a series of recent Baltimore area highway improvements and will leverage other investments made along the I-895, including the recently completed Canton Viaduct and the Patapsco Flats Bridge replacement projects, at a combined investment of $238 million.

Prior Studies and Outreach

The Project is the result of numerous feasibility, prioritization, traffic demand modeling, and planning studies indicating it fulfills the economic, safety, air quality, and infrastructural needs and goals of the Baltimore region.

The Project also included outreach efforts to solicit comments from stakeholders across the Baltimore region in 2020 and 2023 – including targeted outreach to Environmental Justice communities adjacent to the project area and the solicitation of DBE design and construction partners during an industry forum.

1.4 Project Location

The Project is located entirely in the Baltimore, MD, urbanized area, considered to be urban for the purposes of the Multimodal Project Discretionary Grant. The project area includes the I-895 Toll Plaza (coordinates 39.241050, -76.587211) and I-895 from the K-truss bridge over the CSX railroad tracks located approximately 2,000 feet south of the existing BHT toll booths to the southern I-895 tunnel portal, a distance totaling approximately 1.1 miles.

The Project is located in the 7th Congressional District, represented in Congress by Rep. Kweisi Mfume, and in Census Tracts 2505.00 and 2506.00. The project area falls within a federally designated Area of Persistent Poverty for all of Baltimore City. A portion of the project area sits within an Opportunity Zone (24510250500), and the entire project area is located within an Empowerment Zone (24510250600). This area encompasses the existing I-895 mainline and interchanges to neighborhood roads and includes a connection to CSX freight right-of-way with the railroad's at-grade crossing at Shell Road.

Project Outcome Criteria

TABLE OF CONTENTS

1. PROJECT OUTCOME CRITERIA

The I-895 Baltimore Harbor Tunnel at Frankfurst Avenue Interchange Improvements Project ("the Project") will streamline a critical juncture in the Baltimore area's interstate system that directly supports the regional economy. The existing infrastructure in this project area, including the I-895 mainline, bridges, and interchanges, must be overhauled to support an anticipated 15% overall increase in average daily traffic into the BHT between 2018 and 2045, eliminate recurring bottlenecks during rush hour, avoid further deterioration of bridges and interchanges, and reduce pollution that most directly harms the nearby communities of Brooklyn and Curtis Bay.

This project will produce significant, measurable safety benefits for motorists; restore highway assets into a state of good repair; foster more efficient, dependable commutes and freight travel; boost air quality and overall public health of adjacent, low-income neighborhoods; and streamline traffic movement and the overall functionality of the BHT.

This project demonstrates a high level of cost effectiveness. In 2021 dollars, the Project is expected to generate $204.3 million in discounted benefits using the USDOT-prescribed 7% discount rate. When compared to total discounted costs of $96.7 million, this results in a Net Present Value (NPV) of $105.6 million and a Benefit Cost Ratio (BCR) of 2.07.

1.1 Safety

Reducing Crashes and Protecting Travelers

The Project is the most direct solution to the chronic problem of recurring crashes on the interstate and congestion-related threats to motorist safety. While toll collection is already automated via on-ground AET devices rather than operated manually, cars must regularly slow down to safely pass through the existing toll plaza. Safely enabling higher speeds for toll plaza traffic via installation of overhead gantries will eliminate this need, significantly reducing risk for crashes.

Figure 1: *BCA Safety Snapshot*

MDTA's evaluation of crash trends in this study area determined the top causes are abrupt speed changes when approaching the toll plaza and/or encountering congestion, as well as lane changing. Data from a study period of 2016 through 2018, analyzed in MDTA's Interstate Access Point Approval (IAPA) report published in 2022, determined a total of 317 crashes took place between Exit 7, the next exit south of the BHT Toll Plaza, and Exit 10/11, the next exit north of the BHT. Seventy-four crashes (23%) occurred within 1,000 feet of the toll plaza, of which 52 (70%) were rear-end crashes. Another 10 crashes near the toll plaza (14%) were side-swipes. Nine incidents occurred on the interchange ramps within the broader study area between Exits 7 and Exit 10/11. Overall, the rate of 62 crash incidents per 100 million vehicles miles

(MVM) within this same study area was 40% higher than the statewide average of 44.3 crash incidents per MVM.

In terms of crash severity, 3 of the 317 total incidents from 2016 through 2018 resulted in incapacitating injuries while 37 more led to possible incapacitation. Most crashes (78%) resulted in property damage only.

This project's foremost solution for lowering crashes in and around the toll plaza is the introduction of permanent overhead AET. A study of the effects of this project, modeled based on the results of similar toll plaza removal and collection-automation projects in Florida and New Jersey, determined MDTA could reduce the total number of incidents on I-895 in the toll plaza by 50% to 75% by streamlining this operation.

The I-895 bridge over Frankfurst Avenue does not meet AASHTO clearance guidelines. This structure was struck by vehicles seven times from 2010 to 2022, resulting in structural damages that required repair work. At present, this structure is the most frequently struck asset across all of MDTA's facilities. Lowering the portion of Frankfurst Avenue below I-895 as part of this project will increase the bridge clearance from 14'1" to 16'9", as required by the current AASHTO standard.

The BHT has an existing clearance of 14 feet. In this project, MDTA will take steps to enhance the advanced detection and warning of over-height vehicles entering the BHT and decrease overheight collisions with a series of upgrades to the tunnel's Over-Height Detection System. Designed to detect and issue warnings to vehicles that exceed height restrictions, the existing Over-Height Detection System in the project area has two points of detection and notification; the upgraded system will have a total of six notification points, including five on the mainline of I-895 and one on an interchange ramp. (More details in **Section 1.6 – Innovation Areas.)**

Protecting MDTA Personnel

The removal of the toll plaza, to be replaced by overhead AET gantries, as well as its underground access tunnel will eliminate a point of potential harm to MDTA personnel who risk their personal safety during maintenance work. It will also decrease the likelihood of crashes in the toll plaza area, reducing occurrences where MDTA Police and other emergency personnel would be called to respond for crash support.

Improved Grade Crossing Safety

CSX's grade crossing at Shell Road presently poses a safety risk to train operators, motorists, and neighbors. The nearby communities of Curtis Bay and Brooklyn are also at an increased risk of experiencing a rail safety incident, according to USDOT's Equitable Transportation Community Explorer Tool, which lists each tract's railway proximity percentile as 88% in Curtis Bay (census tract #2505) and 94% (2504.01) and 79% (2504.02) in Brooklyn.

Federal Railroad Administration (FRA) accident reports from this crossing (#140356T) indicate there have been seven total collision events between motorists and trains, two of which resulted in injuries. Two of these seven incidents occurred in 2023, one involving a truck-trailer struck by a CSX train and another involving a motorist who struck a CSX train. Working in collaboration with CSX under the project scope, MDTA plans to install safety gates, add new signage, and improve pavement markings to reduce the potential for further collisions moving forward. This will greatly reduce the risk for further collision incidents at this crossing, bring this crossing up to current FRA safety standards, and provide inherent safety to Curtis Bay and Brooklyn, both of which are designated EJ communities.

Alignment with USDOT National Roadway Safety Strategy and State Plans

The USDOT's comprehensive National Roadway Safety Strategy, unveiled in January 2022, adopts a Safe System Approach revolving around five objectives: Safer People, Safer Roads, Safer Vehicles, Safer Speeds, and Post-Crash Care. The Maryland Department of Transportation was an early signatory of this effort and has committed to redoubling efforts to achieve these objectives in 2023. The Project's focus on reducing crashes on I-895's mainline, at the toll plaza, and on surrounding interchanges aligns with the Safer Roads strategy through A) the placement of safety gates at the Shell Road CSX grade crossing to limit the possibility of a train-motor vehicle or -pedestrian collisions, B) the incorporation of overhead AET technology to reduce the frequency of motor vehicle collisions and create overall safer driving conditions, and C) reducing the number of merge and diverge points along the interstate and separating weave movement to Collector-Distributor roadways.

The Project's attention to reducing motorist collision incidents and protecting MDTA worker safety will also fulfill goals of existing state plans. The Maryland Highway Safety Office, a division of the state Motor Vehicle Administration, in December 2020 approved its 2021-2025 Strategic Highway Safety Plan, which includes targets for reducing highway infrastructure injuries, and is driven overall by a Vision Zero philosophy of reducing the number of fatalities on Maryland roads to zero. Governor Wes Moore's administration also launched a Work Zone Safety Group in April 2023, convening experts in transportation, public safety, law enforcement, and other fields to strategize on ways to improve work zone safety. The Project's safety-related outcomes will support both state and federal safety objectives.

1.2 State of Good Repair

Construction on the BHT, its toll plaza, and bridge segments began in 1955 and was completed in 1957. MDTA self-funds maintenance of its assets using toll revenue to keep its facilities, which are critical for freight movement across the National Highway System, in good repair to maximize their lifespans and ensure economic resilience. Despite ongoing and regular maintenance, many of these assets are approaching the end of their useful lives. All related infrastructure in and around the BHT toll plaza has been in service for 66 years and is due to reach its final service life of 75 years in 2032. The ongoing deterioration of these assets threatens the future efficiency of this interstate roadway system.

According to deterioration modeling conducted in 2022 as part of MDTA's Bridge Asset Management Program, components of four I-895 bridges and ramps included in this project are presently rated as being in "fair" (5 out of 10) or "good" condition (6 out of 10) but will have at least one component deteriorating to "poor" condition (4 out of 10) within the next 5 years. A 2020 inspection of the BHT toll plaza tunnel, its travel lanes, and its underground pedestrian tunnel rated their collective overall condition as "fair" (5 out of 10).

The removal of the toll plaza, its pedestrian tunnel, the I-895 bridge over the BHT campus storage area, and the Shell Road flyover ramp over Frankfurst Avenue will help to avoid costly maintenance, including potential emergency repairs. The Project also includes replacement of pavement, which has not been upgraded since the BHT opened in 1957 and has exceeded its original useful life of 40 years by an additional quarter-century. Project components related to the pavement, various bridges, and ramps (listed in **Project Description**) will provide a much-needed new lifespan for this corridor. Replacement of these assets will also help to save MDTA $16.2 million (undiscounted, 2021 dollars) in total maintenance and repair costs over the project lifecycle. The Project will also improve the BHT's ability to alleviate increased congestion burdens caused by traffic diverted from the Fort McHenry Tunnel, MDTA's other operating toll tunnel through the Patapsco River, during periods of maintenance and renovations.

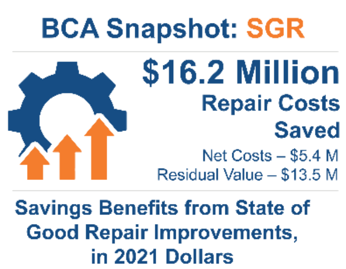


Figure 2: *BCA SGR Snapshot*

Relevant assets with structural state of good repair (SGR) ratings are summarized in Figure 3 below.

Figure 3: I-895 and BHT Toll Plaza Assets' Structural Repair Ratings

Asset	Current Age	Structural Repair Rating (1-10)	Description
BHT Toll Plaza	66 years	5 (Fair) – Plaza	The Project proposes removing this toll plaza. MDTA has determined the toll plaza, travel lanes, and pedestrian access tunnel beneath the plaza are in satisfactory condition. With a projected increase in motorist demand and use of this toll, maintenance needs will continue to increase over time. With the implementation of the overhead AET, the functionality of the plaza, toll booths and the access tunnel will no longer be required.
		5 (Fair) – Toll Lanes	
		5 (Fair) – Pedestrian Tunnel	

Asset	Current Age	Structural Repair Rating (1-10)	Description
I-895 Bridge over Frankfurst Avenue	66 years	6 (Good) – Deck 5 (Fair) – Superstructure 6 (Good) - Substructure	The Project proposes replacing this bridge. An analysis projected the superstructure rating will fall to "poor" in 2027. The bridge's under clearance does not meet the AASHTO requirement for bridges, and as a result, bridge beams have experienced ongoing strikes, requiring constant repairs and making this structure MDTA's most commonly struck asset. Considering the need for major rehabilitation of substructure elements and an estimated $4 million in needed repairs over the next 20 years, MDTA recommends replacing this bridge within 5 to 7 years.
I-895 Ramp over Frankfurst Avenue	66 years	5 (Fair) – Deck 6 (Good) - Superstructure 6 (Good) – Superstructure	The Project proposes removing this ramp. An analysis projected the ramp deck rating will fall to "poor" in 2025. The ramp's reinforced concrete pier cap element will soon drop from "fair" to a "poor" rating and may be too deteriorated for rehabilitation. Considering an estimated $1.4 million in needed repairs over the next 20 years, MDTA recommends removing this ramp.
I-895 Bridge over BHT Maintenance Campus	66 years	5 – Fair (Deck) 6 (Good) – Superstructure 6 (Good) – Substructure	The Project proposes removing this bridge. An analysis projected this bridge deck rating will fall to "poor" in 2027. The bridge's joint and bearing elements are in poor condition and are affecting the superstructure and substructure due to water intrusion. Additional issues have arisen with storing material and fire hazards beneath. Considering an estimated $1 million in needed repairs over the next 20 years, MDTA recommends removing this bridge.
I-895 Bridge over Childs Street	66 years	5 - Fair 6 (Good) – Superstructure	The Project proposes replacing this bridge. An analysis projected the deck rating will fall to "poor" in 2027. Certain elements of the bridge's substructure are rated "fair" or "poor" and will require major rehabilitation, which would create

Asset	Current Age	Structural Repair Rating (1-10)	Description
		6 (Good) – Substructure	a logical opportunity to replace the entire bridge in the process. Considering ongoing needs for deck repairs and likely replacement, and an estimated $1.9 million in needed repairs over the next 20 years, MDTA recommends replacing this bridge within 7 to 10 years.

1.3 Economic Impacts, Freight Movement, and Job Creation

Increasing Freight Mobility and Economic Competitiveness

I-895 crosses under the Patapsco River through the BHT and connects major north-south highways and arterial routes along Baltimore City's industrial waterfront sections, including multiple Port of Baltimore terminals. The Port of Baltimore is one of the country's busiest ports by cargo volume and in 2022 was the busiest vehicle-handling port in the United States. The Port supports some 15,300 jobs directly and nearly 140,000 jobs indirectly linked to Port activities throughout the region.

The project area abuts an adjacent Maryland Port Administration (MPA) roll-on/roll-off cargo lot on the Baltimore Harbor, from which freight traffic frequently enters and exits I-895. In 2022, the Port of Baltimore handled a total of 318,000 automobiles at three terminals in this location, including private operator Amports' Atlantic Terminal and Chesapeake Terminals and the MPA's Fairfield/Masonville Terminal.

This project area serves an existing strategic access point between the Port, the interstate, and CSX freight rail connections that link Baltimore to other key ports along the East Coast and in more inland areas. As part of planned interchange improvements, the Project will also include the installation of two-lane collector-distributor (C-D) roadways along NB and SB I-895 in the project area. This will provide vehicle over-height inspection areas in the widened shoulders of the C-D roadways. Collectively, these changes will streamline processing and movement of freight traffic traveling between port facilities and I-895.

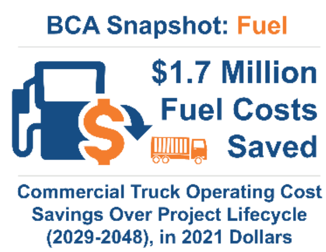


***Figure 4:** BCA Fuel Snapshot*

Improved access from the highway to the adjacent Port facility and CSX rail yards will translate to more efficient movement of goods. The resulting freight efficiency benefits will strategically support the Port and its role as a backbone of the Baltimore regional economy.

Commuter Benefits

The Project is expected to save commuters significant time via reduced congestion in and around the I-895 Toll Plaza. According to cost-benefit analysis of operational demand projections from MDTA's IAPA Report published in 2022, the Project would save motorists an estimated 9.8 million hours over the project lifecycle from 2029 to 2048, amounting to $99.3 million (in 2021 discounted dollars) in quantified time savings benefits from congestion alone. Less time spent stuck in traffic in and around the BHT Toll Plaza will translate to more efficient commuting and increased worker productivity thanks to fewer traffic delays.

Prior Federal Investment

Maryland continues to leverage federal investments benefitting the Port of Baltimore, and MDTA envisions this project as another chance to bolster Baltimore's infrastructure to facilitate more efficient cargo movement to and from the Port. Prior federal investments have included a $15.6 million CRISI grant (2022) for new cranes and rail yard upgrades at the Port of Baltimore, as well as a $124 million INFRA grant (2019) in support of the Howard Street Tunnel project, which will raise the vertical clearance of a 1.7-mile, CSX-owned railroad passage running through the heart of Baltimore City and enable it to accommodate double-stacked freight trains. The Project is yet another opportunity to strengthen the Port of Baltimore and elevate its role in the national and global economy.

Job Creation

This project is poised to generate between 350 and 400 jobs during construction, scheduled to take place between 2025 and 2029. The forthcoming Request for Qualifications (RFQ) will require subcontracting participation by Disadvantaged Business Enterprises (DBEs) on design and construction phases of the Project, as well as a commitment to on-the-job training (OJT) requirements to help the regional workforce develop technical and trade skills, particularly among individuals from marginalized communities. The specific OJT goal is yet to be determined, but procurement documents include provisions that aim to eliminate any discrimination in training and promotion by requiring the Design-Build contractor to:

- Assist in locating, qualifying, and increasing the skills of minority/female employees and applicants.
- Make full use of existing OJT programs and advise existing employees and applicants of available training programs and requirements for enrollment.
- Periodically review the training and promotion potential of minority/female employees and encourage eligible employees to apply for training and promotions.

Altogether, OJT goals and state-imposed OJT hiring requirements will lead to a more robust, skilled construction workforce, while simultaneously helping to alleviate regional inequality.

This Project will also require the prime contractor to hire DBEs for a yet-to-be-determined percentage of total work. DBE requirements specifically benefit companies owned and operated by people of color and other individuals from underrepresented populations. These hiring and training requirements will help ensure greater access to good-paying jobs that will also strengthen the presence of underrepresented groups in the Baltimore region's economy.

The Biden Administration in May 2023 chose Baltimore, among five U.S. cities, to launch a new workforce hub to train workers to step into good-paying jobs in the growing clean energy and infrastructure industries. This new workforce hub will provide high-quality training, apprenticeship programs, technical education programs, and supportive services to Baltimore-area workers – particularly students and people from underrepresented groups – and will help to support this critical infrastructure project.

1.4 Climate Change, Resiliency, and the Environment

Reducing Transportation-Related Pollution

The Project will most directly reduce transportation-related pollution by significantly lowering idling and increasing overall speeds for motorists traveling through this busy corridor, creating a more transportation-efficient design that will reduce greenhouse gas (GHG) emissions and other pollution, such as particulate matter ($PM_{2.5}$).

Figure 5: Average Travel Speeds During Peak Hours, November 2017-2018

Time Range	Average travel speed
Weekday AM Peak (7 AM)	34.5 mph
Weekday PM Peak (5 PM)	19 mph
Weekend Peak (2 PM)	30 mph

The existing design of the I-895 mainline and toll plaza requires drivers to slow down when approaching the toll plaza, creating traffic backups and producing excess and unnecessary emissions by slowed or idling vehicles. Travel speeds on this stretch of I-895 range from nearly 20 mph to 35 mph during peak periods during the morning and evening rush hours, according to a prior MDTA study of peak travel patterns from November 2017 to October 2018. Average speeds fall even further when approaching the toll plaza, dropping to between 10 and 15 mph, far below the standing speed limit of 50 mph on the mainline.

Traffic volumes passing through the toll plaza are expected to increase at a rate of 0.6% per year, from 78,250 vehicles daily in 2018 to 90,000 by 2045. Peak hour volumes alone are also projected to increase at a pace of approximately 0.33% annually between 2020 and 2045. Under a no-build scenario without demolition of the existing toll plaza and construction of a permanent AET facility, this projected growth will contribute to further congestion and resulting emissions.

A benefit-cost analysis of data from the U.S. Environmental Protection Agency's MOVES database indicates the Project is expected to reduce nearly 28,000 tons in emissions over its lifecycle, including for CO_2, nitrous oxide (NO_X), fine particulate matter ($PM_{2.5}$), and sulfur oxide (SO_X).

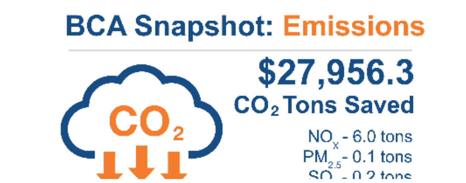


***Figure 6:** BCA Emissions Snapshot*

Prior research supports the prediction that increased speeds and reduced auto congestion in the project area will help to significantly reduce emissions and air pollution and improve public health conditions. Two supporting studies include:

- "Estimating Emission Benefits of Electronic Open-Road Tolling Conversion Projects," a 2022 **study** by researchers from USDOT's Volpe Center in Cambridge, Massachusetts, and FHWA's Office of Natural Environment in Washington, D.C., determined that AET conversions allow for higher average speeds during peak commuting hours and free-flowing traffic conditions during non-peak hours. This translated to a reduction in $PM_{2.5}$ emissions by up to 35% and energy consumption by up to 10% among passenger vehicles using two AET-converted Boston toll facilities.
- A 2020 **study** from Taiwan, "Effect of Implementing Electronic Toll Collection in Reducing Highway Particulate Matter Pollution," determined AET conversions in the city of Tainan significantly reduced both ultra-fine particulate matter and $PM_{2.5}$ pollution downwind from the project area, which led to a 49% reduction in excessive lifetime cancer risks from pollution exposure.

Environmental Impacts on Neighboring Disadvantaged Communities

Figure 7: Characteristics of Adjacent Disadvantaged Census Tracts, in Percentiles

Percentile	Curtis Bay (2505.00)	Brooklyn (2504.01)	Brooklyn (2504.02)
Population (Total)	4,252	3,959	4,614
Asthma Rate	97th	91st	96th
Low Life Expectancy	Not Available	98th	97th
Low Income	82nd	86th	91st
Traffic Proximity/Volume	70th	91st	42nd
Diesel Particulate Matter Exposure	88th	85th	84th
Poverty	81st	89th	92nd

These communities (Curtis Bay and Brooklyn) consisting of 12,825 residents total, suffer from disproportionately high asthma rates and diesel particular matter exposure as well as low average incomes and life expectancy (demonstrated by higher percentiles, indicating higher severity, in **Figure 7**). These census tracts stand to benefit the most from a long-term reduction in pollution.

Reduction of Stormwater Runoff

An additional anticipated result is a net reduction in impervious surface area on I-895 within the project area. Combining the removal of impervious pavement from 14 travel lanes at the BHT toll plaza (to be demolished), as well as reductions resulting from ramp removals, this project is expected to produce a net reduction of 0.8 acres in impervious surface area.

Reducing impervious surface area and resulting runoff that carries pollutants will benefit aquatic species, including fish and plant life, in the Patapsco River. A review of the project area using the National Marine Fisheries Service's (NMFS) online Essential Fish Habitat (EFH) Mapper was already completed as part of this project's NEPA study, which determined no Habitat Areas of Particular Concern (HAPCs) or Essential Fish Habitat Areas Protected from Fishing (EFHA) would be affected.

The Project includes the construction of two submerged gravel wetlands to serve as stormwater management facilities. In capturing stormwater runoff, these additions will treat the stormwater from an estimated 2.9 acres of impervious surface area.

1.5 Equity, Multimodal Options, and Quality of Life

Quality of Life for Disadvantaged Communities

Pollution

The Project will positively impact adjacent communities by streamlining this interstate facility's operational efficiency. The three census tracts closest to I-895 at Frankfurst Avenue suffer from disproportionately high pollution and inequity in life outcomes compared to other parts of the city, due in part to legacy issues with air pollution emanating from I-895. (See **Section 1.4 - Climate Change, Resiliency, and the Environment**.) The Project's will help to reduce air pollution as a result of traffic moving at continuous highway speeds, rather than slowing down at the toll plaza or during backups. This will help improve public health and life expectancy in nearby neighborhoods.

Safety

The Project includes safety-related improvements to the CSX grade crossing at Shell Road that has experienced recurring collisions involving moving trains and motorists over the last four decades. New safety gates and signage and improved pavement markings will reduce the inherent safety risks of this grade crossing for nearby residents. (**See Section 1.1 – Safety**.)

Improving Mobility

Interchange improvements (see **Section 1.2 – State of Good Repair**) and efficiency upgrades from improved truck inspection stations and collector-distributor lanes will help to steer commercial truck traffic away from local roads. Due to bridge height restrictions and congestion at the existing toll plaza, it has become common for trucks moving east toward the Port's roll-on/roll-off lot to travel along Hanover Street, which serves as a main street for the Brooklyn neighborhood.

The presence of frequent commercial truck traffic on local roads in Curtis Bay and Brooklyn has created direct conflicts with the City of Baltimore's plan to introduce safe, accessible bike infrastructure in neighborhoods abutting port facilities and I-895. The City of Baltimore's Separated Bike Lane Master Plan, last updated in 2017, outlines priority zones for a separated bicycle lane network and classifies local roadways based on their stress level for bicycle use. The master plan classifies this stretch of Frankfurst Avenue as a high-stress street requiring a dedicated bike facility to comfortably cross.

The Project works to address both of these issues. Project components addressing congestion near the toll plaza via overhead AET gantries, as well as other interchange and bridge improvements, will make it easier for trucks to travel to and from the port directly via I-895, reducing truck use of local roads. This will translate to safer pedestrian conditions and can create a safer environment for the City of Baltimore to pursue the build-out of bike infrastructure, thereby expanding recreational access for transportation-disadvantaged Brooklyn and Curtis Bay.

Under this project, planned improvements will include installation of a new traffic signal at the intersection outside Masonville Cove, the urban wildlife refuge off of Frankfurst Avenue adjacent to the MPA's roll-on/roll-off facilities. Presently, the refuge's entrance presents clear safety risks to visitors traveling by car or on foot or bicycle due to a lack of sidewalks, bike lanes, separated paths, a traffic signal, or crosswalks. Signalization will slow down or halt truck traffic and enable safer crossings for pedestrians and motorists alike.

This improvement will also capitalize on the Masonville Cove Connector, an MPA-led project to construct a shared-use path extending from Masonville Cove along Frankfurst Avenue to Hanover Street in Brooklyn. The Connector has already received $625,000 through the Federal Highway Administration's Federal Lands Access Program for planning and preliminary design. The Project's proposed intersection improvements outside Masonville Cove would work in tandem with MPA's planned off-street path to improve mobility in Brooklyn.

Equitable Outreach

The project team engaged in extensive outreach with surrounding communities and stakeholders during the project's early planning and design phases. These opportunities included:

- **December 2-30, 2020**: MDTA hosted a 30-day public comment period to solicit feedback from adjacent community members, business owners, and other local stakeholders and interested parties. Members of the public submitted comment forms and emails voicing support for replacing the toll plaza's booths with overhead gantries, for the Project to be completed as quickly as possible, for additional toll booths to be removed on I-895 entrance and exit ramps on Childs Street, to request creation of a map showing proposed improvements, and to be added to the project mailing list.

- **Dec. 16, 2020**: MDTA hosted a virtual public meeting from 7-8 p.m., advertised in digital and print local newspapers and via social media posts on the agency's Facebook and Twitter accounts. The meeting drew 22 attendees. Staff made a live introduction, displayed a pre-recorded presentation about project details, and hosted a Q&A session.

During December 2020, project staff worked proactively to notify residents and business owners in adjacent Brooklyn and Curtis Bay about the public comment period, using e-mail blasts, distributing printed flyers by hand, and flyers mailed directly to churches, libraries, and other community institutions. The provision of a virtual meeting format with online accessibility tools on Dec. 16, 2020, was important for reaching vulnerable residents who could not or did not wish to meet in person during the first year of the Covid-19 pandemic due to health concerns.

Other engagement efforts with project stakeholders have included meetings with key partners – including CSX, Baltimore City DPW, Baltimore City DOT, the Baltimore City Office of Information & Technology, and MDOT MPA – and various public agencies, such as the Maryland Department of the Environment and the U.S. Army Corps of Engineers.

MDTA has more recently engaged with Design-Build contracting partners, construction partners, engineering firms, materials suppliers, and others ahead of the release of the RFQ for this project. On July 19, 2023, MDTA hosted an Industry Forum about the Project at Maryland Department of Transportation headquarters in Hanover. The event drew representatives from 69 total companies, including 29 contractors, suppliers, or professional services firms that also self-identified as DBEs/MBEs. MDTA has retained a list of interested parties from this event and other outreach efforts, and will continue to engage with potential project partners, including the DBE community, leading up to the selection process for its team. MDTA, with assistance from its chosen Design-Build partner, will continue to reach out to adjacent communities, businesses, and other community institutions to keep them informed of the Project status and maintain ingress and egress moving forward.

Hiring of Disadvantaged Populations

This project includes a dedicated goal for Disadvantaged Business Enterprise (DBE) participation (see **Section 1.3 – Economic Impacts, Freight Movement, and Job Creation**), requiring the chosen Design-Build contractor to hire DBEs as subcontractors. MDTA will include a set percentage goal for the overall design and construction work, as well as a separate goal to cover professional services, including engineering design and construction administration/inspection, throughout both the design and construction phases. While specific goals have not yet been established, MDTA utilizes a robust process with its Procurement Readiness Group in the Division of Civil Rights & Fair Practices to assess the types of work performed and the working capacity of DBE firms in the market.

All proposers responding to the RFQ will be required to host at least one outreach event with the DBE community, as well as a summary of the event, as evidence of the submitter's commitment to DBE subcontracting participation. The Project's chosen Design-Build firm will also be required to offer on-the-job (OJT) training (see **Section 1.3 – Economic Impacts, Freight Movement, and Job Creation**). The number of individuals for OJT will be determined in alignment with the federal guidelines utilized by state highway agencies in selecting projects and determining the number of trainees to be provided training found in 23 CFR 211(c).

Racial/Demographic Analysis

MDTA completed a demographic analysis for this project in 2021, examining the racial, ethnic, and economic makeup of the three surrounding census tracts. (For a more recent Environmental Justice (EJ) analysis, see **Section 1.4 – Climate Change, Resiliency, and the Environment**.) The analysis determined nearly one-third of the study area's population was living below the federal poverty level ($26,5000 for a family of four in 2021), and that residents had a lower median household income ($45,000) than Baltimore City ($50,379) and Maryland ($84,405) as a whole. The study area included significant populations of historically disadvantaged minority groups, with nearly 37% of residents identifying as Black/African-American and 24% as Hispanic or Latino, and two-thirds overall identifying as minorities.

Figure 8: Demographic Characteristics of Environmental Justice Study Area, 2021

	Project Study Area	Baltimore City	Maryland
White (%)	33.7%	27.8%	48.7%
Black (%)	36.5%	57.8%	29.5%
Hispanic (%)	24.1%	7.8%	11.8%
Minority (%)	66.3%	72.2%	51.3%
Median Household Income	$45,000	$50,379	$84,805
Living Below Poverty Level (%)	31.5%	21.8%	9.4%

MDTA concluded in its analysis that, given the nature of the proposed improvements and the lack of any displacing effects, any impacts to minority or low-income populations that could occur from construction would be comparable to any potential impacts incurred by non-EJ populations. The analysis concluded the Project would not cause disproportionately high or adverse effects to minority or low-income populations.

1.6 Innovation Areas: Technology, Project Delivery and Financing

1.6.1 INNOVATIVE TECHNOLOGIES

All-Electronic Tolling (AET)

The Project seeks to bring MDTA-operated toll facilities into the 21st century through the implementation of a gantry-based overhead AET facility. This will be the seventh and final toll plaza that MDTA is converting to AET. MDTA has already begun piloting this technology at the BHT toll plaza via the use of temporary setups but seeks a more permanent solution following the demolition of the existing toll plaza.

AET allows traffic to move through toll facilities at continuous highway speeds utilizing E-ZPass®, pay-by-plate registration, and video tolling. AET produces various benefits for motorists, surrounding communities, and the regional economy. Among these are more efficient throughput of vehicles traveling on I-895 and the BHT, reduced possibility for collisions and traffic congestion, reduced GHG am $PM_{2.5}$ pollution, and more efficient commuting for motorists, as well as more efficient movement of cargo via quicker travel to and from port facilities nearby.

Safety Innovations

MDTA's selected Design-Builder shall furnish, install, test, and warrant enhanced Over-Height Vehicle Detection Sensors (OHVDS) to further reduce risks of over-height vehicles entering the BHT and colliding with the roof. OHVDS consists of a system of pole-mounted sensors and active traffic control devices, such as static signs with flashing beacons. OHVDS uses LIDAR or infrared source to detect vehicles, using sensors to measure the height of traveling vehicles and warn drivers if their vehicle is over-height and risks colliding with the ceiling. Upon detection, the system will provide an image of the vehicle in real-time on a downstream color dynamic messaging sign. The expected distance between the detector and the sign shall be a minimum of +300 feet, enabling the display to show a warning in 2 seconds or less. This provides adequate time and distance to allow drivers to avoid an incident. While I-895 already has a basic form of this technology, this project will improve upon the existing system by adding additional points of detection and notification, among other benefits.

1.6.2 INNOVATIVE PROJECT DELIVERY

The Project will utilize a Design-Build (DB) alternative project delivery method with best value selection, in which the design firm and construction firm on a singular project are the same entity. This differs from traditional project delivery, in which the design firm and the contractor work together as separate members of one team. Maryland has extensive experience utilizing DB as a project delivery mechanism. MDTA's successful DB experience includes the I-95 at Belvidere Road Interchange project (estimated completion in 2026) and the Harry W. Nice Memorial/Sen. Middleton Bridge (US 301) Replacement Project (completed in 2022).

The overall benefits of DB include:

- **Faster project delivery:** DB allows for concurrent design and construction phases, helping to accelerate the overall project completion timeline.
- **Enhanced collaboration**: Having a unified team responsible for both design and construction enables better communication and synergy between sequential project phases and simplifies ownership of the work to a single lead organization.
- **Flexibility for innovation**: DB provides project teams more flexibility to implement technological advances or proprietary technologies without constraints common in traditional contracts. For example, the Alternative Technical Concept (ATC) process allows a DB firm responding to a Request for Proposals to suggest changes to MDTA's RFP requirements based on the firm's design capabilities. MDTA subsequently owns the intellectual property of the ATCs developed by unsuccessful proposers that accept a stipend payment and can then provide these ideas to the selected DB contractor. MDTA uses this process to benefit from the best ideas and design innovations from all RFP respondents.

Each DB proposer's bid package during procurement will include a separately evaluated price proposal. This incentivizes proposers to use innovative methods to reduce overall project costs and make the most impact with MDTA's investment of resources, while also allowing MDTA to prioritize technical innovation in making the best value selection. This project's procurement process is slated to begin soon, with a Request for Qualifications due to be published in Fall 2023.

1.6.3 INNOVATIVE FUNDING

MDTA is in a unique position to finance 50% of this project's costs ($80 million) via toll revenue collected at its facilities statewide. MDTA as an agency is financially self-sufficient and receives no gas tax, motor vehicle fees, or other revenue from Maryland's Transportation Trust Fund, a legacy source of public funding for statewide transportation infrastructure projects. MDTA facilities are fully financed, operated, maintained, improved, and protected with toll revenues paid by customers using those facilities. (Note: MDTA requests a Federal share ($80 million) equal to 50.9% of the total project cost and is aware of the discrepancy with Form SF424C information in Grants.gov (which only accepts whole percentages) in which MDTA indicated a Federal share of 51% for future, eligible grant funded project costs.)

By combining federal grant funding received through the MPDG Grant opportunity with existing toll revenues to complete the Project, MDTA envisions these improvements as an extension of the agency's self-sustaining operational model. By maintaining ongoing revenue collection through the lifecycle of this project, the agency will also be better able to fund repairs and improvements for other toll facilities. Removal of the existing BHT toll plaza through this project will also advance this goal, since it will demolish legacy physical infrastructure that is costly to maintain.

Project Readiness

TABLE OF CONTENTS

Table of Contents

1. PROJECT READINESS

1.1 Environmental Risk

- Following the completion of the NEPA (National Environmental Policy Act) review in March 2022 resulting in a Categorical Exclusion (CE) determination, the proposed improvements will have no significant environmental impacts. [See p. 4, Appendix 2]

1.2 Detailed Project Schedule

TABLE 1: ANTICIPATED PROJECT SCHEDULE

Activity	Date
NEPA Review, Commenced Public Involvement, 30% Design	Completed
Advertise RFQ	Fall 2023
Pre-Proposal Conference and Site Visit	Spring 2024
Issue RFP to Reduced Candidate List (RCL)	Spring 2024
Implementation Agreements with Third Parties Executed	Spring 2024
Technical & Price Proposal Due	Summer 2024
Award	Spring 2025
Notice to Proceed	Summer 2025
Release for Construction Complete Plans, Specifications & Estimates (PS&E)	Early 2026
Anticipated Construction Complete	Late 2028

1.3 Required Approvals

1.3.1 ENVIRONMENTAL PERMITS AND REVIEWS

NEPA Status

This project secured approval of a Categorical Exclusion, including approval from FHWA of the NEPA CE determination, in March 2022. [See p. 4, Appendix 2] Following approval with the CE, the project reached 30% design. These designs will be refined through the design-build procurement process while complying with all applicable local, State, and Federal requirements.

Information on Reviews, Approvals, and Permits by Other Agencies

- I-895 Baltimore Harbor Tunnel (BHT) Toll Plaza and Interchange Improvements Interstate Access Point Approval (IAPA) Request [See p. 19, Appendix 2]
- Coordination with the Maryland Port Administration MDOT MPA for potential stormwater treatment efforts on MDOT MPA property [See p. 123, Appendix 2]

Additional permits and approvals, including a Joint Federal/State Nontidal Wetland and Waterway Permit and Erosion and Sediment Control Permit, among others, will be completed by the Design-Build team and MDTA before the Project commences construction in 2026.

Environmental Studies

- I-895/Baltimore Harbor Tunnel (BHT) Toll Plaza and Interchange Improvements Project Categorical Exclusion Memo [See p. 19, Appendix 2]
- Coordination Sheet for MD DNR Environmental Review [See p. 73, Appendix 2]

Federal Transportation Requirements

- Federal Highway Administration (FHWA) approval for a new or revised access point to the Interstate System under Title 23, United States Code (U.S.C.), Section 111. Operational safety analyses were performed in February 2022 to demonstrate that the proposed modifications to the interstate access points would have no significant adverse impact on the safety and operation of the I-895 Toll Plaza facility. These findings are presented in the Interstate Access Point Approval (IAPA) documentation included with this application. [See p. 19, Appendix 2]
- FHWA Area of Potential Effects determination relating to Federal review under Section 106 of the National Historic Preservation Act of 1966. [See pp. 10-11, Appendix 2.]

Right-of-Way Acquisition

- This project requires no right-of-way acquisition. There are plans to coordinate with CSXT and Baltimore City DOT & DPW for improvements in respective rights-of-way.

Public Engagement

- A project webpage was launched on December 2, 2020, to provide project details (i.e., fact sheet, meeting presentation/video, comment card) and will remain available to the public for the life of the I-895/BHT Toll Plaza and Interchange Improvements project. A virtual public meeting was held on December 16, 2020 from 7:00 – 8:00 PM, attended by approximately 22 people. The meeting was advertised in local newspapers (digital and print) and via social media posts (MDTA Facebook and Twitter accounts), e-mail blasts and flyers were mailed to adjacent properties and area businesses, and mailings (flyers) were sent to community facilities such as churches and libraries within areas identified as containing EJ populations. Interested parties were able to access the virtual meeting by computer or phone. The purpose of the meeting was to familiarize interested members of the public and stakeholders with the project planning process, purpose and need, proposed action, preliminary findings from the National Environmental Policy Act (NEPA) study, and to solicit public comment. During the virtual meeting, MDTA staff gave a live introduction, which was followed by a pre-recorded presentation/video and then a question and answer session. Meeting attendees could submit questions via the MS Teams ‘chat function’ during the meeting, or complete and submit a comment card to the project team, which was made available on the project webpage at the time of the webpage launch. Eight questions were posed via chat by participants during the virtual meeting concerning utility impacts, construction schedules, alignment configurations, and subsequent public meetings. Public comments were solicited from December 2, 2020 through December 30, 2020. Three comment forms and two emails were received from the public during that time period. Comments included support for replacing the toll booths with overhead gantries, support for the project to be completed as quickly as possible, a request for tolls to be removed on the Childs Street entrance and exit ramps, a request for a map showing proposed improvements, and a request to be placed on the project’s mailing list. Throughout the project, multiple meetings and/or discussions were held with stakeholders including the CSXT, Baltimore City Department of Transportation (BCDOT), Baltimore City Department of Public Works (BCDPW), Maryland Port Administration, various MDTA divisions (Police, Operations, Office of Engineering and Construction), Baltimore City Office of Information Technology (BCIT), Maryland Department of the Environment (MDE) and the US Army Corps of Engineers to provide an introduction of the project, discuss data needs, and to review conceptual designs and anticipated project schedule. The Proposed Action was also shared with these groups and feedback on potential design elements was solicited.

- On July 19, 2023, MDTA held an Industry Forum for companies interested in working on the project to share information about the project characteristics, procurement schedule and networking between companies looking for partners, including certified-DBE firms.

1.3.2 STATE & LOCAL PLANNING APPROVALS

This project will fulfill all State and Local planning requirements, including:

- Maryland Consolidated Transportation Program FY2023-FY2028 as the AET Conversion with Frankfurst Avenue Interchange Modifications plan (Project ID: 2487). This document is available online here, **https://mdot.maryland.gov/OPCP/CTP_2023/FY23_FY28_CTP_Full_Final_Report_Regular_Resolution_for_viewing.pdf**
- FY 2022-2025 Maryland Statewide Transportation Improvement Program (STIP). This document is available online here, **https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=117**
- FY 2024-2027 Baltimore Region Transportation Improvement Program. This document is available online here, **https://baltometro.org/sites/default/files/bmc_documents/general/transportation/tip/24-27/24-27TIP.pdf**.
- Baltimore Region Long-Range Transportation Plan, Resilience 2050. This document is available online here, **https://www.baltometro.org/sites/default/files/bmc_documents/general/transportation/long-range/2050/Resilience2050_Full.pdf**.

1.3.3 FEDERAL TRANSPORTATION REQUIREMENTS AFFECTING STATE AND LOCAL PLANNING

This project has or will fulfill applicable Federal transportation planning requirements, including:

- FHWA approval for a new or revised access point to the Interstate System under Title 23, United States Code (U.S.C.), Section 111. The Interstate Access Point Approval (IAPA) documentation [see p. 10, Appendix 2] included with this application presents the findings from operational and safety analyses that were performed to demonstrate that the proposed modifications to the interstate access points would have no significant adverse impact on the safety and operation of the I-895 Toll Plaza facility.
- FHWA Area of Potential Effects determination relating to Federal review under Section 106 of the National Historic Preservation Act of 1966. [See pp. 10-11, Appendix 2.]

- A Categorical Exclusion NEPA document is included with this application; it provides evidence that no substantial environmental impacts to socioeconomic, natural, or cultural resources would occur as a result of this project. [See p. 4, Appendix 2]
- The FY 2022-2025 Maryland Statewide Transportation Improvement Program (STIP)

1.4 Assessment of Project Risks and Mitigation Strategies

The risks to this project are (1) Permitting and Approvals, (2) Railroad Requirements Adding Costs and Delays, and (3) Utility Conflicts. To the greatest degree possible at the 30% design stage, the lead agency, MDTA, has taken into consideration the full scope of the Project and determined that the risks outlined in Table 2 constitute the greatest potential threats to the successful completion of the Project. MDTA maintains a project-specific risk register that will be used with the Design-Build team to refine mitigation strategies.

TABLE 2: PROJECT RISKS

Risk	Description	Mitigation Strategy
Permitting and Approvals	Receiving environmental approvals necessary to proceed with construction could impact critical path activities.	Acquire necessary approvals in advance of Design-Builder progressing design to 100% and well in advance of NTP for construction.
Railroad Requirements Add Cost and Delays	Railroad (RR) permits could lead to delays and additional costs (e.g. flagging, RR protective insurance, access restrictions based on rail traffic)	Articulate realistic scenarios for RR requirements in Request for Proposal (RFP) documents.
Utility Conflicts and Delays	Utilities in conflict with construction activities	Coordinate with utility owners ahead of RFP regarding necessary relocations and any agreements that need to be in place between utilities and MDTA

1.5 Technical Capacity

1.5.1 EXPERIENCE WORKING ON SIMILAR SCOPE AND RESOURCES

- MDTA has the following experience working on similar projects:
  - I-95 at Belvidere Road Interchange Project: a $65 million design-build project that improved access to I-95 through the addition of an interchange at I-95 and Belvidere Road. This project was awarded a USDOT Better Utilizing Investments to Leverage Development (BUILD) grant of $20 million due to benefits associated with improved economic competitiveness, quality of life, environmental protection, state of good repair, innovation, and partnership.

- Nice Middleton Bridge replacement: a $465 million replacement of the Governor Harry W. Nice Memorial/Senator Thomas "Mac" Middleton Bridge. This span is over 80 years old and serves as a critical connection between Charles County in Maryland and King George County in Virginia. This project received a $20 million federal loan through the US DOT Transportation Infrastructure Finance and Innovation Act (TIFIA) program.
- Full AET conversions to six of Maryland's seven toll plazas to highway speeds.

1.5.2 FEDERAL REQUIREMENTS

- This project will comply with all applicable Federal requirements including but not limited to Buy America provisions, ADA regulations, and Civil Rights requirements.

1.5.3 EXPERIENCE WORKING WITH FEDERAL AGENICES

- The following is a list of projects that MDTA has previously worked with USDOT and FHWA to complete:
  - I-95 at Belvidere Road Interchange
  - Nice/Middleton Bridge Replacement
  - Chesapeake Bay Crossing Study
  - I-95 Express Toll Lanes (ETL) Section 100 and Section 200
  - I-95 Access Improvements Study
  - Intercounty Connector (ICC)/MD 200

1.5.4 CIVIL RIGHTS COMPLIANCE

- The MDTA Division of Civil Rights and Fair Practices (CRFP) oversees the implementation of the department's Title VI Program. CRFP is responsible for the provision of information, resource, and assistance to participants of MDTA's Minority Business Enterprise (MBE), Small Business Reserve (SBR), and Veteran-owned Small Business Enterprise (VSBE) programs to increase participation and develop partnerships that further MDTA's goals. The Maryland DOT Title VI Program Plan can be found online at TitleVIProgramPlan.pdf (maryland.gov).

1.5.5 PREVIOUS USDOT DISCRETIONARY GRANT EXPERIENCE

- The MDTA has undertaken projects using Federal discretionary grants before, namely:
  - The ongoing I-95 at Belvidere Road Interchange Project was awarded a USDOT discretionary grant of $20 million from Better Utilizing Investments to Leverage Development (BUILD). The project received this award because of the benefits associated with improved economic competitiveness, quality of life, environmental protection, state of good repair, innovation, and partnership. Total project costs were $65 million.
  - MDTA will administer this grant in close partnership with MDOT State Highway Administration (SHA) and adhere to all related federal mandates and requirements. SHA has extensive experience with numerous successful discretionary grant opportunities.

Maryland Transportation Authority (MDTA)

I-895 Baltimore Harbor Tunnel:

Enhance Mobility, Improve Safety and Reduce Emissions

Benefit-Cost Analysis Supplementary Documentation

Executive Summary

A benefit-cost analysis (BCA) was conducted for the I-895 Baltimore Harbor Tunnel: Enhance Mobility, Improve Safety and Reduce Emissions (referred to as “the Project”) for submission to the U.S. Department of Transportation (U.S. DOT) as a requirement of a discretionary grant application for the 2023 Multimodal Project Discretionary Grant (MPDG) program. The analysis was conducted in accordance with the benefit-cost methodology as outlined by U.S. DOT in the Benefit-Cost Analysis Guidance for Discretionary Grant Programs, released in January of 2023. The period of analysis corresponds to 27 years and includes seven years of planning, design, and construction, and 20 years of benefits after operations begin in 2029.

The Project will overhaul the Baltimore Harbor Tunnel’s (BHT) existing toll plaza by removing the current toll booths and replacing with an overhead gantry to enable highway speeds and automatic electronic tolling, and will streamline a 1.1-mile stretch of I-895, including bridges and interchanges that serve two adjacent Environmental Justice neighborhoods and Port of Baltimore facilities. These improvements will collectively include the design, reconstruction, and reconfiguration of the mainline and interchanges along I-895 at Frankfurst Avenue, Shell Road, and Childs Street in Baltimore City. This project is part of an ongoing long-term plan to convert all seven of the toll plazas under MDTA jurisdiction in Maryland to all electronic tolling (AET) at highway speeds using E-ZPass® and video tolling, with no cash transactions occurring on the roadway.

COSTS

The capital cost for this Project is expected to be $145.4 million in undiscounted 2021 dollars through 2028. At a seven percent real discount rate, these costs are $98.7 million. Table ES-1 shows how these costs are allocated across time and major expense category.

Table ES-1: Project Costs by Category and Year, Millions of Undiscounted 2021 Dollars

Cost Category	2021 & Prior	2022	2023	2024	2025	2026	2027	2028	Total
Design and Engineering	0.91	0.91	1.82	1.82	3.63	3.63	0.91	0.91	14.54
Construction	-	-	-	-	-	43.61	43.61	43.61	130.84
Total	**0.91**	**0.91**	**1.82**	**1.82**	**3.63**	**47.25**	**44.52**	**44.52**	**145.38**
Total, Discounted 7%	**0.91**	**0.85**	**1.59**	**1.48**	**2.77**	**33.69**	**29.67**	**27.73**	**98.68**

Source: MDTA

In addition to the upfront capital cost, operations and maintenance (O&M) costs are projected to average $0.05 million per year in the long term. These operations and maintenance costs are estimated to be lower in the Build scenario (compared to $0.86 million annually in the No Build scenario) due to the lack of operational costs associated with the toll booths, as well as the updated structures and improved pavement conditions along the corridor which will contribute to road degradation prevention. Over the entire 20-year analysis period, these costs accumulate to $0.9 million in undiscounted 2021 dollars, or $0.3 million when discounted at seven percent.

BENEFITS

In 2021 dollars, the Project is expected to generate $204.3 million in discounted benefits using a seven percent discount rate. These benefits are mainly from the travel time savings associated with congestion mitigation in the corridor. This leads to an overall project Net Present Value of $105.6 million and a Benefit Cost Ratio (BCR) of 2.07[1]. The overall project benefit matrix can be seen in Table ES-2.

Table ES-2: Project Impacts and Benefits Summary, Millions of Undiscounted 2021 Dollars

Current Status/Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	MPDG Merit Criteria	Economic Benefit	Summary of Results (at 7% discount rate)	Page Reference in BCA Appendix
Heavy congestion along the I-895 corridor	Removal of the mainline toll plaza	Economic Impacts, Freight Movement, and Job Creation	Travel Time Savings	$99.26	13
		Safety	Safety	$28.16	1011
Need to update bridges and pavement that are at the end of their useful life	Replacement of bridges and pavement	Economic Impacts, Freight Movement, and Job Creation	Travel Time Savings	$32.56	14
			Vehicle Operating Cost Savings	$24.77	15
		Climate Change, Resiliency, and the Environment	Emissions Reduction	$1.20	12
All of the Above	All of the Above	State of Good Repair	Residual Value	$13.00	1617
All of the Above	All of the above	State of Good Repair	Reduced O&M	$5.35	16

The overall Project impacts can be seen in Table ES-3, which shows the magnitude of change and direction of the various impact categories.

Table ES-3: Project Impacts for Toll Plaza Project, Cumulative 2029-2048

Category	Unit	Quantity	Change
Vehicle-Hours Traveled	VHT	13,770,744	▼
Vehicle-Miles Traveled	VMT	197,841,847	▼
Injury Accidents	#	396	▼
Property Damage Only (PDO)	#	1,267	▼
Rear End Crashes	#	314	▼
CO_2 Emissions	tons	27,956.3	▼
NO_X Emissions	tons	6.0	▼
$PM_{2.5}$ Emissions	tons	0.1	▼
SO_X Emissions	tons	0.2	▼

[1] Per USDOT guidance, operations and maintenance costs are included in the numerator along with other project benefits when calculating the benefit-cost ratio.

In addition to the monetized benefits presented in Table ES-2, the Project would:

- Facilitate safer, easier access to Masonville Cove, an urban wildlife abutting this Project area;
- Create 350-400 good-paying jobs for the local region's workforce;
- Provide advanced overhead height clearance detection for vehicles entering BHT;
- Include safety improvements to the at-grade CSX rail crossing on Shell Road; and
- Increase in clearance of the I-895 bridge over Frankfurst Avenue reduces the risk of the bridge being hit by over height vehicles, and meets AASHTO requirements.

CONTENTS

1 INTRODUCTION

A benefit-cost analysis (BCA) was conducted for the I-895 Baltimore Harbor Tunnel: Enhance Mobility, Improve Safety and Reduce Emissions ("the Project") for submission to the U.S. Department of Transportation (U.S. DOT) as a requirement of a discretionary grant application for the MPDG 2023 grant program. The following section describes the BCA framework, evaluation metrics, and report contents.

1.1 BCA FRAMEWORK

A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a societal perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as disbenefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off as a result of the proposed Project.

The BCA framework involves defining a Base Case or "No Build" Case, which is compared to the "Build" Case, where the grant request is awarded, and the Project is built. The BCA assesses the incremental difference between the Base Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project lifecycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by the U.S. DOT in the 2023 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.[2] This methodology includes the following analytical assumptions:

- Defining existing and future conditions under a No Build base case as well as under the Build Case
- Estimating benefits and costs during project construction and operation, including 20 years of operations beyond the Project completion when benefits accrue;
- Using U.S. DOT recommended monetized values for reduced fatalities, injuries, property damage, travel time savings, and emissions, while relying on best practices for monetization of other benefits;
- Presenting dollar values in real 2021 dollars. In instances where cost estimates and benefits valuations are expressed in historical or future dollar years, using an appropriate inflation factor to adjust the values;
- Discounting future benefits and costs with a real discount rate of seven percent consistent with U.S. DOT guidance.

1.2 REPORT CONTENTS

Section 2 of this report contains a description of the Project, information on the general assumptions made in the analysis, and a description of the base case compared to the Build case. Section 3 provides a

[2] U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Applications, March 2023. https://www.transportation.gov/sites/dot.gov/files/2023-01/Benefit%20Cost%20Analysis%20Guidance%202023%20Update.pdf Accessed August 3, 2023.

summary of the anticipated project costs. Section 4 reviews the expected economic benefits the Project would generate, including a review of the assumptions and methodology used to calculate the benefits. Finally, Section 5 reports the high-level results of the benefit-cost analysis.

2 PROJECT OVERVIEW

2.1 DESCRIPTION

This Project intends to enhance the safety, operations, traffic capacity, customer experience, and air quality for I-895 Toll Plaza users, the surrounding roadway network, and adjacent communities. This Project intends to produce significant, measurable safety benefits for motorists; bring heavily used MDTA highway assets into a state of good repair; produce economic benefits for the Baltimore region via more efficient commuting and increased freight travel productivity; reduce congestion, resulting emissions, and other air pollution that detract from the public health of residents in the adjacent Environmental Justice communities of Brooklyn and Curtis Bay; and introduce innovative technology to streamline toll collection, mitigate potential for collisions, and improve the overall functionality of the Baltimore Harbor Tunnel (BHT).

Figure 2-1: Project Area and Existing Conditions

Project components include:

- Removal of the mainline toll plaza, and replacement to all electronic tolling (AET) at highway speeds using E-ZPass® and video tolling, with no cash transactions occurring on the roadway.
- Geometric changes designed to maintain all existing access to and from Childs Street, Frankfurst Avenue, and Shell Road, via a system of collector-distributor (C-D) lanes adjacent to two mainline lanes in each direction along I-895 south of the BHT.
- Vehicles coming from intersections would pay the toll electronically by passing under additional gantries placed on the ramps to capture all vehicles not passing under the mainline I-895 gantry.
- The existing I-895 bridges over Childs Street and Frankfurst Avenue would be replaced.

- The existing I-895 bridge south and west of the existing I-895 BHT toll plaza, adjacent to the MDTA Automotive Maintenance and Sign Shop on Frankfurst Avenue, would be removed.

2.2 GENERAL ASSUMPTIONS

The evaluation period for this project includes a seven-year design and construction period, from 2022-2028, during which capital expenditures are undertaken, plus 20 years of operations beyond Project completion within which to accrue benefits, through 2048.

Dollar figures in this analysis are expressed in constant 2021 dollars (2021$). Historical and future costs were inflated and deflated based on GDP Deflator calculations established by the Bureau of Economic Analysis.

The BCA produces several important measures to assess the cost-effectiveness of a proposed infrastructure project. The benefit-cost ratio (BCR) calculated by dividing the Project's discounted societal benefits by its discounted project costs, measures the societal return on each dollar spent in project costs. A BCR of more than 1.0 indicates that for each dollar spent, more than one dollar worth of benefits will be generated by the Project. Another important measure is the net present value (NPV), calculated by subtracting the discounted project costs from the discounted societal benefits created by the Project. This measure indicates the net social worth created by the Project, after accounting for its costs.

However, the BCR and NPV only account for benefits that can be successfully quantified and monetized; some benefits generated by a project may be difficult to quantify or monetize, and are therefore excluded from the measures described above. It is important that the BCR and NPV of a project be considered in conjunction with other criteria when judging a project's overall worth.

The real discount rate used for this analysis was 7.0 percent for most benefits, consistent with U.S.DOT guidance for 2023 MPDG grants and OMB Circular A-94.[3] The real discount rate used for carbon dioxide emissions was 3.0 percent, as recommended by the U.S.DOT BCA guidance for 2023 MPDG grants.

2.3 BASE CASE AND BUILD CASE

The analysis of the Project considered how the balance of costs and benefits resulting from the construction of the Project improvements would result in long-term benefits to the local Baltimore community and general society compared to a future without the Project.

In the "Build" Case, the Project includes replacement of the toll plaza to improve congestion and safety on I-895. Generally, the following improvements are established as part of the Project:

- Complete replacement of the toll booths with gantries, with tolls being collected at highway speeds from equipment mounted to an overhead gantry located between Childs Street and the tunnel using E-ZPass® and video tolling.
- The existing I-895 bridges over Childs Street and Frankfurst Avenue would be replaced.

[3] White House Office of Management and Budget, Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. October 29, 1992. https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/a94/a094.pdf. Accessed August 3, 2023.

— The existing unsignalized and closely spaced intersections on Frankfurst Avenue at Shell Road and the I-895 northbound on-ramps would be reconfigured to consolidate movements at a single signalized intersection.

— Removal of I-895 bridge over BHT campus storage area.

— Removal of flyover ramp from Shell Road to I-895.

The "No Build" Case examines the societal costs of not building these project improvements and assumes that the corridor continues to be an area of safety concern within the region.

3 PROJECT COSTS

3.1 CAPITAL COSTS

This application requests $80,000,000 to complete the Project's $160,000,000 (in 2023 dollars) overall project cost. The total includes $16 million for engineering Design-Engineering and Design Build, and $144 million for construction. (Note: MDTA requests a Federal share ($80 million) equal to 50.9% of the total project cost and is aware of the discrepancy with Form SF424C information in Grants.gov (which only accepts whole percentages) in which MDTA indicated a Federal share of 51% for future eligible grant funded project costs).

The capital costs for this Project amount to $145.4 million in undiscounted 2021 dollars. At a seven percent real discount rate, these costs are $98.7 million. Table 3-1 shows these costs are allocated across time and major expense category.

Table 3-1: Project Costs by Category and Year, in Undiscounted Millions of 2021 dollars[4]

Cost Category	2021 & Prior	2022	2023	2024	2025	2026	2027	2028	Total
Design and Engineering	0.91	0.91	1.82	1.82	3.63	3.63	0.91	0.91	14.54
Construction	-	-	-	-	-	43.61	43.61	43.61	130.84
Total	**0.91**	**0.91**	**1.82**	**1.82**	**3.63**	**47.25**	**44.52**	**44.52**	**145.38**
Total, Discounted 7%	**0.91**	**0.85**	**1.59**	**1.48**	**2.77**	**33.69**	**29.67**	**27.73**	**98.68**

Source: MDTA

3.2 OPERATIONS AND MAINTENANCE COSTS

Operation and Maintenance (O&M) costs are mainly derived from three components of the project: the toll plaza itself, the structural improvements, and the new pavement. The Project assumes $46,886 undiscounted annual O&M costs for the Build Scenario, and $857,301 undiscounted annual O&M costs in the No Build Scenario. The Build O&M cost savings come from reduced operating costs of the automated tolling system, as well as reduced costs from newer pavement maintenance, and reduced maintenance costs of the bridge structures that are at the end of their useful life. The average annual overall operating costs for both the build and no build scenarios are demonstrated in Table 3-2. As is recommended by USDOT, the O&M Costs are included in the numerator of the BCR equation, as they demonstrate an overall reduction of costs to the Project and therefore resemble an additional benefit.

[4] Values presented in table differ from narrative due to cost deflation to 2021 dollars to be consistent with USDOT BCA Guidance.

Table 3-2: Annual Operation and Maintenance Costs (Undiscounted 2021 Dollars)

Variable	Value (Build)	Value (No Build)	Difference
Annual Toll Plaza Operations and Maintenance Costs	$2,818	$28,180	$25,362
Annual Pavement Maintenance Costs	$4,543	$386,166	$381,623
Annual Bridge Maintenance Costs	$39,525	$442,955	$403,430
Total Annual O&M Costs	**$46,886**	**$857,301**	**$810,415**

4 PROJECT BENEFITS

The Project will provide several benefits to the local region, vehicle users, and project area businesses. A summary of the benefits are listed in Table 4-1 and are detailed in the rest of the document.

Table 4-1: Project Benefits

Benefit (Disbenefit) Category	Description	Monetized	Quantified	Qualitative
Safety	Alleviation of congestion due to toll plaza eliminates opportunities of safety concern such as sudden speed changes	√	√	√
Travel Time Savings	Delay reduction due to congestion of tolling area, reduction in travel delay due to potential bridge failure	√	√	√
Vehicle Operating Costs	Fuel consumption, tires, maintenance, and depreciation reduction due to resolving the risk of traffic diversion due to bridge failure	√	√	√
Reduced Emissions	Reduction in vehicle-miles traveled in the event of traffic diversion due to bridge failure	√	√	√
Residual Value	Remaining asset value	√	√	√

4.1 DEMAND PROJECTIONS

4.1.1 *TRAFFIC VOLUMES*

The benefit-cost analysis utilized traffic projections as a part of the analysis. Traffic demand projections were provided in the Interstate Access Point Approval (IAPA) Report on the Project and were based on a review of regional forecasting models (including Maryland Statewide Transportation Model (MSTM) and the Baltimore Metropolitan Council (BMC) model), historical trends, previous studies, and coordination with the MDOT SHA Travel Forecasting and Analysis Division. Due to the nature of the Project, projected traffic volumes, including both peak hour volumes and overall traffic volumes are expected to remain the same for both, Build and No Build scenarios. Overall traffic growth is expected to be 0.6% per year, and peak hour volumes are expected to grow at a slower rate of 0.33%. For peak hour volumes, peak hour volumes were taken from PM peak from Northbound, and Southbound is averaged between the AM Peak and PM Peak, in order to remain consistent with the methodology for the operational analysis, presented in 4.1.2. Since these projections were provided in the IAPA Report for single years (2027 and 2045), linear interpolations were used to identify project information for all years. Truck percentages are determined from historical information on truck percentages along the route, and are estimated to remain at 2018 levels throughout the benefits period.

The resulting traffic volumes are presented in the following table.

Table 4-2: Demand Projections

Variable	Opening Year (2029)		Final Year (2048)	
	No Build	Build	No Build	Build
ADT I-895 Northbound	39,872	39,872	44,672	44,672
ADT I-895 Southbound	40,768	40,768	45,676	45,676
Peak Hour Volume, Northbound	3,719	3,719	3,946	3,946
Peak Hour Volume, Southbound	3,654	3,654	3,878	3,878
Truck %	3.33%	3.33%	3.33%	3.33%

4.1.2 *OPERATIONAL DEMAND PROJECTIONS*

Though traffic demand is expected to stay the same in both the Build and No Build scenario, the system is expected to remain a chokepoint and that problem will only be exacerbated if the toll plaza were to remain in place. Operational analyses were performed using VISSIM, Synchro, and HCS to evaluate existing and future (2027 and 2045) traffic operations along I-895 and the surrounding local street network under No Build and Build conditions. The results present travel times on Northbound and Southbound I-895 through the study area during peak hours. For the purposes of this analysis, the travel times were only taken into consideration for one peak hour, and traffic is assumed to be free flowing in both the Build and No Build at all other times of day. In addition, due to the similarity of the AM and PM peak hours for the Southbound direction, average peak hour travel time was utilized for Build and No Build scenarios, and PM peak was utilized for the Northbound peak hour travel time. Because AM and PM peak are considerably more different for Northbound, PM peak is only used so both directions represent a complete and single "peak hour." Since these projections were provided for single years, linear interpolations were used to identify project information for all years. Speed projections are not considered for the purposes of this analysis, due to identified information in the Interchange Improvements Interstate Access Point Approval (IAPA) Request indicating that speed differences in both the Build and No Build scenarios are less than 5 miles per hour.

The resulting operational demand projections are presented in the following table.

Table 4-3: Operational Demand Projections

Variable	Units	Opening Year (2029)		Final Year (2048)	
		No Build	Build	No Build	Build
Travel Time Northbound	Minutes	17.09	15.93	19.83	19.10
Travel Time Southbound	Minutes	10.44	10.00	12.29	11.90

4.2 SAFETY

The safety benefits assessed in this analysis include a reduction in fatalities and injuries, as well as a reduction in other property damage crash costs resulting directly from the Project. The corridor currently experiences a lot of Property Damage Only (PDO) and rear end crashes that make it a particularly unsafe area.

Crash data along mainline I-895 and interchange ramps within the study area was taken from MDOT SHA for the 3-year period of 2016 to 2018. Averages were taken from the three-year period to identify the total amount of crashes and crash types along the study area.

The assumptions used in the estimation of safety benefits are summarized in Table 4-4.

Table 4-4: Safety Benefits Assumptions

Variable	Unit	Value	Source
Cost of fatality (K)	$ per fatality	$11,800,000	U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2023 (Appendix A, Table A-1: Value of Reduced Fatalities and Injuries)
Cost of incapacitating injury (A)	$ per injury	$564,300	
Cost of non-incapacitating injury (B)	$ per injury	$153,700	
Cost of possible injury (C)	$ per injury	$78,500	
Cost of unknown injury type	$ per injury	$213,900	
Cost of vehicle damage	$ per crash	$4,800	U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2023 (Appendix A, Table A-2: Property Damage Only (PDO) Crashes)
Cost per fatal crash	$ per crash	$13,046,800	U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2023 (Appendix A, Table A-1: Value of Reduced Fatalities and Injuries)
Cost per injury crash	$ per crash	$307,800	
Average Total Crashes, 2018	#	105.67	MDOT SHA
Average Incapacitating Injury, 2018	#	1	MDOT SHA
Average Non-Incapacitating Injury, 2018	#	10	MDOT SHA
Average Possible Incapacitating injury, 2018	#	12.3	MDOT SHA

Variable	Unit	Value	Source
Average Property Damage Only Crashes, 2018	#	82.3	MDOT SHA
Anticipated Traffic Growth Rate	%	0.6	IAPA Report

The applied CMFs included on the FHWA CMF Clearinghouse website are summarized below in Table 4-5. Due to the unknown status of rear-end crashes on the KABCO scale and to avoid double counting, the crash type is not monetized, but is quantified.

Table 4-5: CMFs Associated with Removal of a Mainline Toll Plaza

CMF ID	CMF	Crash Type	Crash Severity	Study Citation
8142	0.25	All	Fatal & Injury (K,A,B,C)	Abuzwidah, M. and M. Abdel-Aty. "Safety assessment of the conversion of toll plazas to all-electric toll collection system". Accident Analysis and Prevention, Vol. 80, (2015) pp. 153-161.
8143	0.32	All	Property Damage Only (O)	
8144	0.2	All	Rear-end	

Monetized benefits are demonstrated in Table 4-6.

Table 4-6: Safety Benefits, Millions of 2021 Dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	**Discounted (7%)**	**Undiscounted**	**Discounted (7%)**
Safety Benefits-PDO	$0.29	$0.17	$6.08	$1.98
Safety Benefits-Incapacitating Injury	$0.45	$0.26	$9.57	$3.12
Safety Benefits-Non-Incapacitating Injury	$1.23	$0.72	$26.08	$8.49
Safety Benefits-Possible Incapacitating Injury	$2.11	$1.23	$44.76	$14.57

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Total	$4.08	$2.38	$86.49	$28.16

4.3 ENVIRONMENTAL SUSTAINABILITY

The Project utilized emissions factors generated from EPA's MOVES software. For this analysis, MOVES data was taken for Baltimore City County, Maryland for the years 2020, 2025, 2030, 2040, and 2060. All inter-years were linearly interpolated. The emissions savings from this project come from the congestion vehicle delay emission savings. Given that the average speeds are overall different for both Northbound and Southbound, different speed bins were used from the MOVES data, with the Northbound speed bin of 20 MPH used, and the speed bin of 30 MPH used for Southbound traffic delays. Table 4-7 demonstrated the overall emissions assumptions and sources. The emission values are demonstrated from the Project open year, 2029.

Table 4-7: Emissions Assumptions and Sources

Variable	Unit	Value	Source
NO_X	$2021/Metric Ton	$18,600	USDOT BCA Guidance, Emission Rates
SO_X	$2021/Metric Ton	$50,400	
$PM_{2.5}$	$2021/Metric Ton	$893,400	
CO_2	$2021/Metric Ton	$63	
NO_X, Auto, 20, Northbound	Metric Ton/Mile	8.44E-09	EPA MOVES Tool
SO_X, Auto, 20, Northbound	Metric Ton/Mile	1.04E-09	
$PM_{2.5}$, Auto, 20, Northbound	Metric Ton/Mile	3.76E-10	
CO_2, Auto, 20, Northbound	Metric Ton/Mile	1.56E-04	
NO_X, Truck, 20, Northbound	Metric Ton/Mile	1.10E-06	
SO_X, Truck, 20, Northbound	Metric Ton/Mile	2.48E-09	
$PM_{2.5}$, Truck, 20, Northbound	Metric Ton/Mile	1.17E-08	
CO_2, Truck, 20, Northbound	Metric Ton/Mile	7.42E-04	
NO_X, Auto, 30, Southbound	Metric Ton/Mile	7.83E-09	EPA MOVES Tool
SO_X, Auto, 30, Southbound	Metric Ton/Mile	8.36E-10	
$PM_{2.5}$, Auto, 30, Southbound	Metric Ton/Mile	3.11E-10	

Variable	Unit	Value	Source
CO_2, Auto, 30, Southbound	Metric Ton/Mile	1.26E-04	
NO_X, Truck, 30, Southbound	Metric Ton/Mile	8.19E-07	
SO_X, Truck, 30, Southbound	Metric Ton/Mile	2.21E-09	
$PM_{2.5}$, Truck, 30, Southbound	Metric Ton/Mile	1.02E-08	
CO_2, Truck, 30, Southbound	Metric Ton/Mile	6.62E-04	

Emission benefits are monetized and presented in Table 4-8.

Table 4-8: Emission Benefits, Millions of 2021 Dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
NO_X Emissions Cost Savings	$0.001	$0.00	$0.11	$0.03
SO_X Emissions Cost Savings	$0.000	$0.00	$0.01	$0.00
$PM_{2.5}$ Emissions Cost Savings	$0.001	$0.00	$0.08	$0.02
CO_2 Emissions Cost Savings	$0.013	$0.01	$2.19	$1.19
Total Emission Cost Savings	$0.015	$0.01	$2.42	$1.20

4.4 ECONOMIC COMPETITIVENESS AND OPPORTUNITY

I-895 crosses under the Patapsco River through the BHT and connects major north/south highways and arterial routes in Baltimore City's industrial sections, including to multiple Port of Baltimore terminals. The Port of Baltimore is one of the country's busiest ports by cargo volume and in 2022 was the busiest vehicle-handling port in the United States. This Project has significant impacts on the local economy, in which only a small portion of these economic benefits can be quantified in the BCA. These benefits mainly come from the ability to move through the corridor without dealing with congestion due to the toll plaza, and also come from the potential delay savings if the bridges become unusable. These economic opportunity benefits are quantified in this analysis in two primary ways: travel time savings and vehicle operating savings.

4.4.1 *TRAVEL TIME SAVINGS: CONGESTION*

Travel time savings from congestion for this project are primarily generated by elimination of the toll plaza. Vehicle travel times in the peak hour through the plaza in both the Build and No Build scenario from the IAPA report were used to generate travel time savings.

Travel time is considered a cost to users, and its value depends on the disutility that travelers attribute to time spent traveling. A reduction in travel time translates into more time available for work, leisure, or other activities.

Table 4-9: Travel Time Savings Assumptions and Sources

Variable	Unit	Value	Source
Value of travel time savings - all purposes	$-per-person-hour	$18.80	USDOT BCA Guidance, January 2023
Value of travel time savings - truck drivers	$-per-person-hour	$32.40	
Average vehicle occupancy - passenger vehicles	$-per-person-hour	1.67	

Variable	Unit	Value	Source
Average vehicle occupancy - trucks	$-per-person-hour	1.00	
Truck percentage, 2018	%	3.33%	IAPA Report

Benefits are presented below in millions of 2021 Dollars.

Table 4-10: Travel Time Savings, Millions of 2021 dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Passenger Travel Time Savings	$13.33	$7.76	$297.86	$95.85
Truck Travel Time Savings	$0.47	$0.28	$10.59	$3.41
Total Travel Time Savings	$13.80	$8.03	$308.45	$99.26

4.4.2 *TRAVEL TIME SAVINGS: DIVERSION*

Travel time savings from diversion for this project is derived from the probability of bridge failure in the coming decade and assumptions period. These assumptions are currently defined for the Project to be 1% in the Project opening year and increase to 20% by the Project design year. These probabilities are linearly interpolated over the analysis period. In addition to the assumptions presented in 4.4.1, the following assumptions in Table 4-11 are presented below.

Table 4-11: Travel Time Savings Diversion Assumptions and Sources

Variable	Unit	Value	Source
Distance of Alternative Route, Southbound	miles	12.9	Google Maps Rendering, Attached in Appendix
Distance of Alternative Route, Northbound	miles	12.1	
Probability of Bridge Closing, Opening Year	%	1	Assumption based on Infrastructure industry knowledge and current bridge grade assessment
Probability of Bridge Closing, 2058	%	20	Assumption based on Infrastructure industry knowledge and current bridge grade assessment

Benefits are monetized and presented below.

Table 4-12: Travel Time Savings, Millions of 2021 dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Passenger Travel Time Savings	$0.77	$0.45	$120.09	$31.44
Truck Travel Time Savings	$0.03	$0.02	$4.27	$1.12
Total Travel Time Savings	$0.80	$0.46	$124.36	$32.56

4.4.3 *VEHICLE OPERATING COST SAVINGS*

Vehicle operating cost savings come from the reduction of vehicle miles traveled along the route from the Project. These savings are derived from the probability of the bridge failure, and vehicle users having to take a longer route. The assumptions used in the estimation of vehicle operating costs are presented in Table 4-13.

Table 4-13: Vehicle Operating Cost Savings Assumptions and Sources

Variable	Unit	Value	Source
Vehicle operating costs - light duty vehicles	$ per vehicle-mile	$0.46	USDOT BCA Guidance 2023, Vehicle Operating Costs
Vehicle operating costs - commercial trucks	$ per vehicle-mile	$1.01	

Vehicle Operating Cost Savings are monetized and presented below.

Table 4-14: Vehicle Operating Cost Savings, Millions of 2021 dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Fuel Cost Savings, Auto	$0.6	$0.3	$88.0	$23.0
Fuel Cost Savings, Truck	$0.0	$0.0	$6.7	$1.7

4.5 STATE OF GOOD REPAIR

The state of good repair condition benefits assessed in this analysis include maintenance and repair savings, deferral of replacement cost savings, and project residual value after a 20 year analysis period.

The assumptions used in the estimation of state of good repair benefits are presented in 3.2 Operations and Maintenance Costs.

Table 4-15: State of Good Repair Benefits, Millions of 2021 dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Net O&M Costs	$0.81	$0.47	$16.21	$5.35
Residual Value	-	-	$80.77	$13.00

5 SUMMARY OF RESULTS

5.1 EVALUATION MEASURES

The benefit-cost analysis converts potential gains (benefits) and losses (costs) from the Project into monetary units and compares them. The following common benefit-cost evaluation measures are included in this BCA:

— Net Present Value (NPV): NPV compares the net benefits (benefits minus costs) after being discounted to present values using the real discount rate assumption. The NPV provides a perspective on the overall dollar magnitude of cash flows over time in today's dollar terms.

— Benefit Cost Ratio (BCR): The evaluation also estimates the benefit-cost ratio; the present value of incremental benefits is divided by the present value of incremental costs to yield the benefit-cost ratio. The BCR expresses the relation of discounted benefits to discounted costs as a measure of the extent to which a project's benefits either exceed or fall short of the costs.

— Internal Rate of Return (IRR): The IRR is the discount rate which makes the NPV from the Project equal to zero. In other words, it is the discount rate at which the Project breaks even. Generally, the greater the IRR, the more desirable the Project.

— Payback Period: The payback period refers to the period of time required to recover the funds expended on a Project. When calculating the payback period, the time value of money (discounting) is not taken into account.

5.2 BCA RESULTS

The table below presents the evaluation results for the Project. Results are presented in undiscounted and discounted at seven percent as prescribed by the U.S. DOT. All benefits and costs were estimated in constant 2021 dollars over an evaluation period extending 20 years beyond Project completion in 2029.

Table 5-1: Benefit Cost Analysis Results, Millions of 2021 dollars

BCA Metric	Undiscounted	Discounted (7%)
Total Benefits	$253.74	$204.29
Safety Benefits	$86.49	$28.16
Travel Time Savings	$432.81	$131.82
Vehicle Operating Cost Savings	$94.63	$24.77
O&M Cost Savings	$16.21	$5.35
Emissions Cost Savings	$2.42	$1.20
Residual Value	$80.77	$13.00
Total Costs	$145.38	$98.68
Net Present Value (NPV)	$108.36	$105.61
Benefit Cost Ratio (BCR)	2.07	
Internal Rate of Return (IRR)	8.49%	
Payback Period (Years)	7	

6 APPENDIX

6.1 DIVERSION ROUTES

Figure 6-1: Diversion Route, Northbound

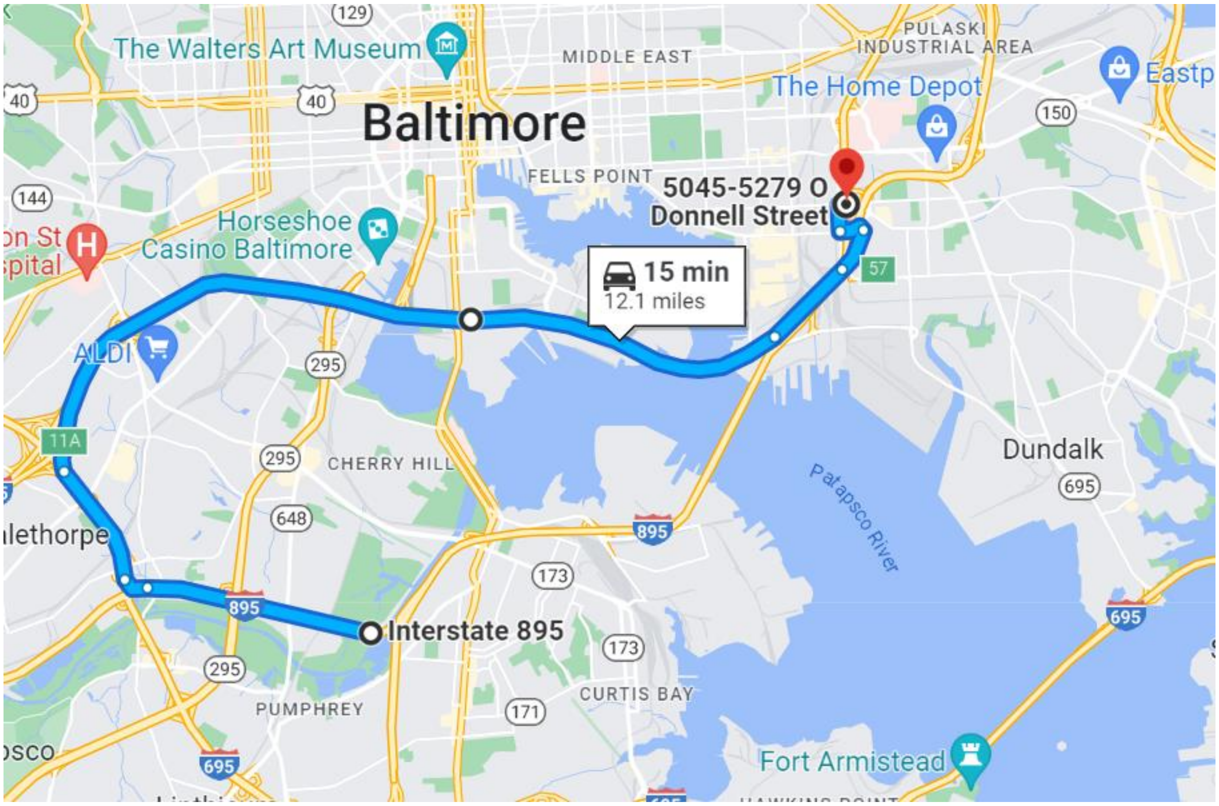
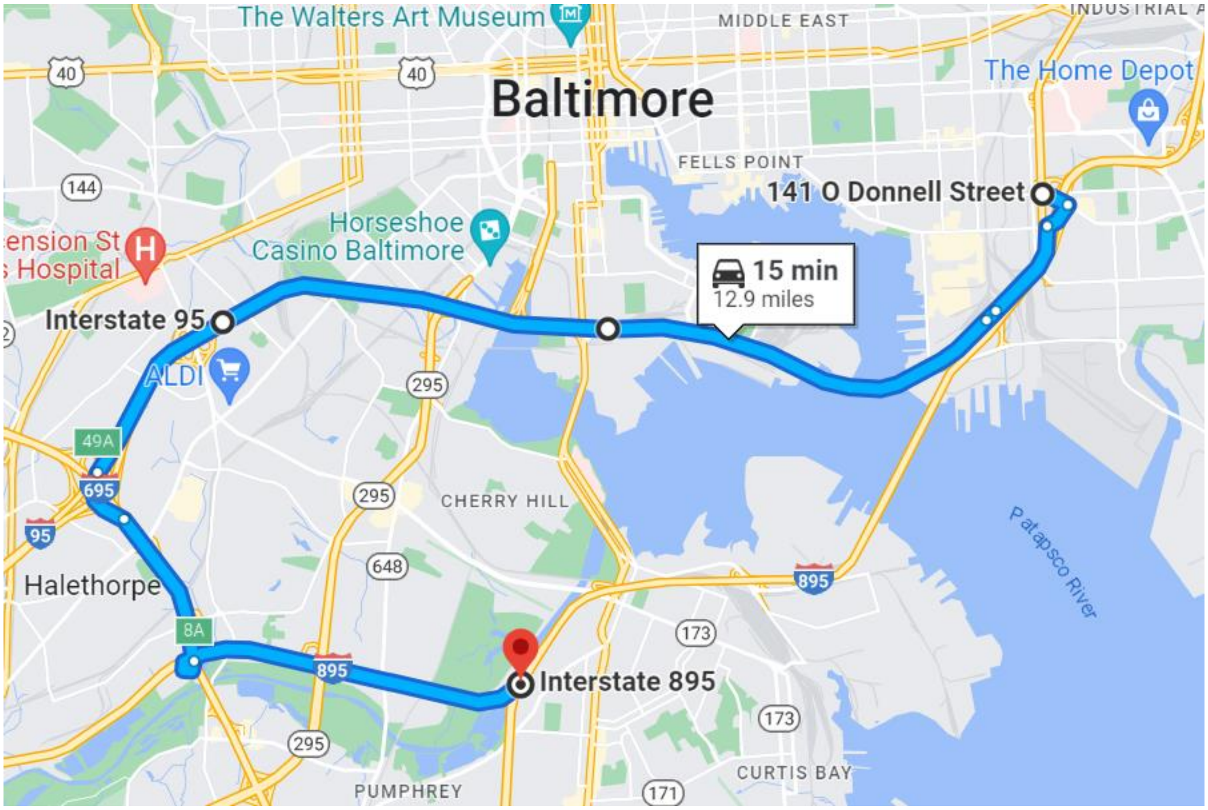


Figure 6-2: Diversion Route, Southbound



Statutory Project Requirements

TABLE OF CONTENTS

The I-895 Baltimore Harbor Tunnel at Frankfurst Avenue Interchange Improvements Project ("the "Project") satisfies all statutory requirements for eligibility in two individual grant opportunities within the Multimodal Project Discretionary Grant program: A) INFRA (Large) and B) Mega. Details are available below for each of the applicable statutory requirements.

1.1 THE PROJECT WILL GENERATE NATIONAL, OR REGIONAL ECONOMIC, MOBILITY, OR SAFETY BENEFITS (INFRA, MEGA)

Economic Benefits

The Project will generate regional and national economic benefits by facilitating more efficient freight movements to and from the Port of Baltimore and along the critical I-895 corridor. The project area is adjacent to a Maryland Port Administration (MPA) roll-on/roll-off cargo lot on the Baltimore Harbor, from which freight traffic frequently enters and exits I-895. Various components of this project, including overhead toll-collection gantries, replacements of interchanges and entrance/exit ramps, and vehicle over-height inspection areas in the widened shoulders of Collector-Distributor lanes, will streamline movement of freight traffic.

The Project will also produce projected time savings for motorists using I-895, translating to an economic benefit resulting from increased commuter worker productivity. According to cost-benefit analysis of operational demand projections from MDTA's IAPA Report published in 2022, the Project would save motorists an estimated 9.8 million hours over the project lifecycle from 2029 to 2048, amounting to $99.3 million (in discounted 2021 dollars) in quantified time savings benefits from congestion alone. Less time spent stuck in traffic will translate to more efficient commuting and increased worker productivity.

Mobility Benefits

Interchange improvements and efficiency upgrades from improved truck inspection stations and Collector-Distributor lanes will help to steer commercial truck traffic away from local roads adjacent to the project area. Commercial trucks have relied upon these local roads as a remedy to frequent congestion in and around the I-895 Toll Plaza in the project area. By facilitating more efficient movement of freight traffic on I-895, the Project will improve mobility conditions in surrounding neighborhoods that suffer from commercial truck traffic on local streets.

The Project also will include the installation of a new traffic signal outside the Masonville Cove wildlife refuge abutting the Port of Baltimore's roll-on/roll-off cargo lot, in a location that presently creates hazardous conditions for drivers, bicycle users, pedestrians, and mobility device users due to a lack of signalization, crosswalks, bike lanes, sidewalks, or separated paths. Signalization of this intersection will directly improve mobility conditions.

Safety Benefits

The foremost safety benefit of the Project is a resulting reduction in congestion and related crashes when approaching the I-895 Toll Plaza. Motorists using this infrastructure must currently slow down to speeds as low as 10 to 15 miles per hour to safely pass through the toll plaza. The installation of overhead gantries for toll collection will enable higher speeds and eliminate the crashes need for drivers to slow down. Data collected in MDTA's 2022 IAPA Report indicated there were a total of 317 crashes in the project study area between from 2016 through 2018, with 23% of these crashes occurring within 1,000 feet of the toll plaza. Overall, the rate of 62 crash incidents per 100 million vehicles miles (MVM) within this study area was 40% higher than the statewide average of 44.3 crash incidents per MVM.

A study of the effects of similar all-electronic toll (AET) projects in other states, such as New Jersey and Florida, determined such projects generate clear safety benefits through a reduction in collisions from traffic moving through plazas at seamless highway speeds. MDTA predicts it can reduce the number of crashes occurring on I-895 in the vicinity of the toll plaza by 50% to 75%.

1.2 THE PROJECT WILL BE COST EFFECTIVE (INFRA, MEGA)

The Project is expected to generate $204.3 million (in 2021 dollars) in discounted benefits using a 7% discount rate, compared to $96.7 million in discounted costs, resulting in a Net-Present Value of $105.6 million and a Benefit-Cost Ratio of 2.07. These project benefits reflect improvements from safety conditions, travel time savings, vehicle operating cost savings, infrastructure operations and maintenance cost savings, and emission cost savings. These are summarized in the table below.

Table 1: Benefit Cost Analysis Results, Millions of 2021 Dollars

BCA Metric	Undiscounted	Discounted (7%)
Total Benefits	$253.74	$204.29
Safety Benefits	$86.49	$28.16
Travel Time Savings	$432.81	$131.82
Vehicle Operating Cost Savings	$94.63	$24.77
O&M Cost Savings	$16.21	$5.35
Emissions Cost Savings	$2.42	$1.20
Residual Value	$80.77	$13.00
Total Costs	$145.38	$98.68
Net Present Value (NPV)	$108.36	$105.61
Benefit Cost Ratio (BCR)	2.07	
Internal Rate of Return (IRR)	8.49%	
Payback Period (Years)	7	

1.3 THE PROJECT WILL CONTRIBUTE TO 1 OR MORE OF THE NATIONAL GOALS DESCRIBED UNDER SECTION 150 (INFRA)

The Project will accomplish multiple national Section 150 goals, specifically in the categories of:

Safety: The Project will directly work towards the national goal of significant reducing traffic fatalities and serious injuries on public roads, in line with the National Roadway Safety Strategy. The Project will reduce crashes on I-895's mainline, at the toll plaza, and on surrounding interchanges and roadways, in line with the Safer Roads strategy. Related components include the placement of safety gates at the Shell Road CSX grade crossing, the incorporation of overhead AET gantries to reduce motor vehicle collisions and improve predictability of driving conditions, and the reduction of merge and diverge points along the interstate.

Infrastructure Condition: A critical goal of the Project is to maintain the infrastructure assets of I-895 in a state of good repair. This project includes design upgrades to interchange ramps at Childs Street and Frankfurst Avenue, replacement of aging bridges approaching the end of their useful life at Childs Street and Frankfurst Avenue, replacement of the interstate mainline pavement, which has exceeded its useful life by 25 years, and removal of infrastructure that will no longer be necessary and is costly to continue to maintain, such as the existing I-895 Toll Plaza and the aging flyover ramp from Shell Road to I-895.

Congestion Reduction: The Project's installation of overhead gantries for toll collection at the existing toll plaza will eliminate the need for cars to slow down when approaching the toll plaza, a main source of congestion along I-895. A cost-benefit analysis of traffic modeling data indicated this project will reduce travel times during peak commuting hours by between 4.4% and 7.7% by 2027, depending on the direction of travel, and by between 3.3% and 4.4% by 2045. MDTA modeling projects travel time reductions will occur even as traffic volumes passing through the toll plaza increase from 78,250 vehicles daily in 2018 to 90,000 by 2045.

Freight Movement and Economic Vitality: The Project's noted freight movement and economic benefits including more efficient movement of freight traffic to and from adjacent Port of Baltimore facilities, and reduced commuting times for workers who experience delays on I-895 during peak hours. Supporting more efficient freight movements to and from the Port of Baltimore, which supports 15,300 jobs directly and nearly 140,000 jobs indirectly throughout the region, will enhance the Baltimore region's economic competitiveness.

Environmental Sustainability: The Project's outcome of reduced congestion and idling by traffic during peak hours on I-895 will translate to emissions savings and pollution reductions that will benefit air quality and health outcomes in surrounding communities. A cost-benefit analysis of emissions reductions over the Project lifecycle from 2029 to 2048 estimated reduced carbon dioxide (CO_2) emissions by 27,956 tons, nitrous oxide (NO_X) emissions by six tons, fine particulate matter ($PM_{2.5}$) emissions by 0.1 tons, and sulfur oxide (SO_X) emissions by 0.2 tons.

1.4 THE PROJECT IS BASED ON THE RESULTS OF PRELIMINARY ENGINEERING (INFRA)

Work performed by the General Engineering Consultant includes 30% design, Maintenance of Traffic concepts, and traffic analyses. The following is included with the application:

Environmental Assessments

- This project secured approval of a Categorical Exclusion, including approval from FHWA of the CE determination, in March 2022 following a NEPA review process.

Following the CE, the project reached 30% design. These designs will be refined through the two-part design-build procurement process while complying with all applicable local, State, and Federal requirements. This document is in Appendix 2.

- Natural Environment Existing Conditions Memo is included in Appendix 2.

Coordination with State Agencies and Departments

- This project included coordination with the Maryland Port Administration MDOT MPA for potential stormwater treatment efforts on MDOT MPA property. This document is included in Appendix 2.
- This project included completion of the Coordination Sheet for MD DNR Environmental Review Related to Project Locations. This document is included in Appendix 2.

Non-environmental Federal Approvals

- Operational safety analyses were performed in February 2022 to demonstrate that the preferred alternative modifications (presented in the CE NEPA document) to the interstate access points would have no significant adverse impact on the safety and operation of the I-895 Toll Plaza facility. These findings are presented in the Interstate Access Point Approval (IAPA) documentation, included in Appendix 2.
- FHWA Area of Potential Effects determination under Section 106 of the National Historic Preservation Act of 1966 is included in Appendix 2.

Other Mapping and Surveying Products

- Indirect and Cumulative Effects Analysis Boundary is included in Appendix 2.
- Environmental Features/Limits of Disturbance Map is included in Appendix 2.

1.5 1 OR MORE STABLE AND DEPENDABLE SOURCES OF NON-FEDERAL FUNDING TO CONSTRUCT, MAINTAIN, AND OPERATE THE PROJECT, AND CONTINGENCY AMOUNTS ARE AVAILABLE TO COVER UNANTICIPATED COST INCREASES (INFRA, MEGA)

Following the inclusion of this project in both the Maryland Consolidated Transportation Program FY2023-FY2028 and the FY2022-2025 Maryland Statewide Transportation Improvement Program (STIP)**,** MDTA has committed 50% of the required funding, or $80 million, to this project. A signed Letter of Commitment from the organization’s Executive Director is included with this application (Appendix 1). A contingency amount of $25,000,000 will be used with this project. (Note: MDTA requests a Federal share ($80 million) equal to 50.9% of the total project cost and is aware of the discrepancy with Form SF424C information in Grants.gov (which only accepts whole percentages) in which MDTA indicated a Federal share of 51% for future, eligible grant funded project costs.)

1.6 THE PROJECT CANNOT BE EASILY AND EFFICIENTLY COMPLETED WITHOUT OTHER FEDERAL FUNDING OR FINANCING AVAILABLE TO THE PROJECT SPONSOR (INFRA, MEGA)

The project is scoped to include various technical elements that combined will improve traffic flows and enhance safety along 1.1 miles of transportation assets. Due to the interrelated nature of these technical elements, it would not be cost-effective for MDTA to pursue only one or a portion. Because MDTA is self-funded by toll revenue paid by motorists using its facilities, the agency is restricted in its capacity to incur any additional debt service with an expectation of timely repayment of a federal loan.

If the MPDG grant is not awarded, not only will the project implementation schedule suffer a major setback until additional financial support can be identified to cover the $80 million needed to fully fund the project, but the key issues at the toll plaza will persist. More information about the scope and the key issues that the project will address can be found in the Project Description included with this MPDG application. It is estimated that the Project Schedule would be set back by no less than 6 years if this application for MPDG funds is not successful.

1.7 THE PROJECT IS REASONABLY EXPECTED TO BEGIN CONSTRUCTION NOT LATER THAN 18 MONTHS AFTER THE DATE OF OBLIGATION OF FUNDS FOR THE PROJECT (INFRA)

If MPDG funds are secured, all necessary activities will be completed to allow MPDG funds to be obligated in advance of September 30, 2026. Environmental Review is complete including FHWA approval of the Categorical Exclusion determination. Design is complete to a 30% level. The project is a 2-part Design-Build procurement and an Industry Forum held on July 19, 2023 detailed a RFQ advertisement date in late 2023. Construction is expected to start in Fall 2025.

1.8 THE APPLICANT HAS, OR WILL HAVE, SUFFICIENT LEGAL, FINANCIAL, AND TECHNICAL CAPACITY TO CARRY OUT THE PROJECT (MEGA)

MDTA is an independent agency responsible for financing, constructing, operating, maintaining, protecting, and improving the State's eight toll facilities, including I-895, with toll revenues paid by customers using those facilities. MDTA maintains eight toll facilities, including two turnpikes, two tunnels, and four bridges. MDTA owns and operates a large and well-diversified system that provides essential transportation infrastructure linkages in a high-volume market.

MDTA is financially self-funded and does not receive State tax dollars or funds from the State Transportation Trust Fund. Toll revenues generated by facility users are able to fully fund operations, maintenance, and improvements. The agency in 2022 had 1,697 employees across 21 divisions, with an annual operating budget of $360.8 million. MDTA has successfully utilized previous federal discretionary grant awards in support of major infrastructure projects, most recently a $20 million BUILD discretionary grant for the I-95 at Belvidere Road Interchange Project. MDTA has managed multiple Design-Build projects, including I-95 at Belvidere Road and the Nice-Middleton Bridge (US 301) Replacement Project (completed in 2022). MDTA maintains sufficient legal, financial, and technical capacities to deliver this project.

1.9 THE APPLICATION INCLUDES A PLAN FOR THE COLLECTION AND ANALYSIS OF DATA TO IDENTIFY THE IMPACTS OF THE PROJECT AND ACCURACY OF FORECASTS INCLUDED IN THE APPLICATION (MEGA)

The application includes a Data Plan (see attached Mega Data Plan) that describes MDTA's process for collecting and analyzing project impact data (e.g., travel time savings).

Letters of Support

Summary of Letters of Support submitted with the MPDG application

Baltimore Regional Transportation Board (BRTB)

Greater Washington Partnership

American Council of Engineering Companies of Maryland (ACEC/MD)

Governor's Office of Small, Minority & Women Business Affairs

Baltimore Development Corporation

Maryland General Assembly

Maryland Minority Contractors Assn. Inc.

Maryland Department of the Environment

Maryland Transportation Builders & Materials Association (MTBMA)

Baltimore Port Alliance

Office of Councilwoman Phylicia Porter

Greater Baltimore Committee

Maryland Motor Truck Association

Maryland Department of Commerce

City of Baltimore – Mayor Scott

Office of the Governor

Maryland Chamber of Commerce

Maryland Port Administration

The Eastern Transportation Coalition

Eastern Atlantic States Regional Council of Carpenters

Baltimore Office of Sustainability

Ports America Chesapeake

Maryland Transportation Authority
MDTA

August 15, 2023

The Honorable Peter Buttigieg
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Buttigieg,

The Maryland Transportation Authority (MDTA) is proud to submit the I-895 Baltimore Harbor Tunnel at Frankfurst Avenue Interchange Improvements Project for the Multimodal Project Discretionary Grant (MPDG) opportunity for FY 2023-2024. This intent of this letter is to demonstrate MDTA's support of the project and express our financial commitment.

The total estimated cost for the project is $160,000,000. The MDTA is requesting $80,000,000 in Federal Highway Administration (FHWA) reimbursement associated with a successful MPDG grant award. This letter confirms MDTA's commitment to fund the balance of the project with toll revenue funds, currently estimated to be no less than $80,000,000.

I urge your careful consideration of this application as we work together to streamline traffic flows, enhance safety, and foster economic growth by overhauling this critical juncture in the Baltimore area's interstate system. Should you have any questions or concerns, please contact Ms. Sushmita Mitra, MDTA Office of Engineering and Construction Director, at 410-537-7873, or smitra1@mdta.state.md.us. Ms. Mitra will be happy to assist you. Of course, you may always contact me directly.

Sincerely,

Joseph G. Sagal
Executive Director

2310 Broening Highway • Baltimore, MD 21224 • mdta@mdta.maryland.gov • 410.537.1000 • 711 (MD Relay) • mdta.maryland.gov • DriveEzMD.com

cc: Mr. Paul J. Wiedefeld, Secretary, MDOT
Ms. Jaclyn Hartman, Director, Office of Finance, MDOT
Ms. Heather Murphy, Director, Office of Planning and Capital Programming, MDOT
Ms. Sushmita Mitra, Director, Office of Engineering and Construction, MDTA
Ms. Deborah Sharpless, Chief Financial Officer, MDTA