

AUTOMATED FARE COLLECTION AT THE MBTA

TO SUPPORT A STRONGER PUBLIC TRANSIT SYSTEM



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The onset of COVID-19 and associated response measures have elevated the importance of automated fare collection (AFC) as a critical part of building public transit systems that address future pandemic outbreaks. AFC offers contact-less fare options, which is appealing in the wake of the COVID-19 pandemic, when the MBTA has increased its cleaning of “high-touch points,” including fare boxes and fare vending machines to four times a day to reduce the spread. AFC also offers fare flexibility options, which can help speed up response time to crisis situations.

To date, the Fare Transformation project has faced significant challenges related to project delivery, procurement, and management, as well as public outreach and enabling policies. These challenges have mainly been due to lack of experience with public-private partnerships (P3) —the MBTA is not an awarding authority for P3 contracts—high turnover in project leadership, vendor-related issues, and legislative factors. The COVID-19 outbreak underscores the importance of the Fare Transformation project, which supports a new era of more public-health friendly public transit fare systems. There may be a benefit to review the design and implementation plan to consider possible needs post COVID-19.

Supporting amendments to MA General Laws, Chapter 6C, Sections 1 to 74 to allow the MBTA solicit proposals and enter into contracts for design-build-finance-operate-maintain or design-build-operate-maintain services would help strengthen the current institutional framework to manage the Fare Transformation project as well as enhance

INTRODUCTION

In 2015, the MBTA began investigating options for a replacement system to upgrade and modernize fare collection. In 2017, under the recommendation of Secretary Pollack, the MBTA issued its first official public-private partnership (P3) contracts to complete the automated fare transformation (AFC) needed to replace the outdated and decaying system and modernize the system as a whole. The project seeks to improve service times, customer interaction with fares, and help the MBTA reduce revenue losses and experiment with different fare pricing strategies. It would allow customers to choose between paying with a new fare card that could be reloaded at vending machines (as current CharlieCards are) or using the new online system to reload cards electronically, pay with their phone, or a contactless credit card.

In Massachusetts, the legislative foundation of P3s was established with the Massachusetts Transportation Reform Act of 2009 and the MA General Laws, Chapter 6C, Sections 1 to 74. Under these legislative measures, any statutory authority is specific to the State’s Department of Transportation. While the MBTA was not designated as a P3 awarding authority under the reform, in a work around to move the project forward, AFC 2.0 was set up as design-build-plus project with two separate contracts being awarded to private companies to set up new fare vending machines and gate computers and help with the transition from AFC 1.0 to AFC 2.0, as well as physically build, install, and maintain the system.

Several contractual changes and disagreements with

one of the private partners, Cubic Transportation Systems, have caused serious project delays. These issues include policy decisions. Specifically, policy decisions related to increased data privacy, fare cards and sales locations, methods of fare inspection and proof of payment, and the fare structure and products offered by the MBTA. The Fare Transformation team is sifting through customer complaints to adjust plans for the project moving forward. Based on adjustments and contract negotiations with Cubic, the timeline for the initial rollout of the project, which was originally spring 2020, has been pushed back to 2024, increasing total project cost.

When policy makers refocus on the transportation finance bill, there is compelling reason to support P3 enabling legislation that would allow the MBTA to solicit proposals and enter into contracts for design-build-finance-operate-maintain or design-build-operate-maintain services, facilitating the process and building a foundation to strengthen the T's internal capacity to effectively engage in P3s, including the Fare Transformation project.

In light of the COVID-19 pandemic, there is a need to take steps that lead to a healthier, more crisis-resilient public transit system. The contact-less fare options and fare flexibility options offer the MBTA two important ways to mitigate the spread of future pandemics without additional cost. This is a subject for further review and reflection.

AFC 1.0: CHARLIE CARDS

An early adopter of automated fare collection (AFC) technology in 2006, the MBTA's legacy system, "AFC 1.0" once "state of the art" is now in decline and at the end of its life. It neither supports the Agency's current needs nor the Agency's future needs as it looks to put in a place 21st Century public transit system. It is outdated and limited along four key dimensions that are critical to providing a modern, dynamic, efficient, and seamless system to the MBTA and its users: (1) Online reloading; (2) Expandability; (3) Accessible constraints; and (4) Regional integration.

AFC 2.0: THE T'S NEXT GENERATION AUTOMATED FARE COLLECTION

AFC 2.0 is the next generation automated fare collection system to be used by the MBTA. It is a centralized, account-based, and integrated system that allows for a uniform, standardized, cashless payment

approach across all transit modes (commuter rail, bus, subway, ferry) and carriers (RTAs, gated and ungated parking, TMAs/shuttles, suburban buses, private buses, etc.). The system is meant to provide greater flexibility to the operator as well as the customer, simplifying the payment, collection, and tracking processes; improving efficiency in fare recovery; and reducing boarding times. The benefits of the new system for passengers include:

TAP EVERYWHERE: The system will be available on all modes making transfers easier

NEW CHARLIECARD: There is a new contactless fare card with added security and more readily available at vending machines and retailers that is used across the entire system

RELOADING MORE EASILY: Fare cards can be reloaded using cash or card at vending machines and retailers in the MBTA service area, or remotely through a call center or website

USE OF SMARTPHONE OR CONTACTLESS CREDIT CARD: Customers can forgo using a fare card that must be reloaded by using either a smartphone or contactless credit card at gates

ACCOUNT MANAGEMENT: Customers can check their balance, travel history, and reload or replace cards online or through the call center with better security of private information

ACCESSIBILITY IMPROVEMENTS: New fare gates will be wider and website and mobile app will follow recent digital accessibility guidelines

SERVICE IMPROVEMENTS: All-door boarding on buses and Green Line trains above ground will reduce "dwell times" and accelerate service

In addition to improving customer experience, AFC 2.0 technology benefits the MBTA by reducing lost fare revenue from fare evasion (estimated to be between \$10 and \$20 million each year) and enabling more dynamic pricing capabilities, including adjusting fare structures.

AFC 1.0 – THE OLD SYSTEM		AFC 2.0 – THE NEW SYSTEM
CharlieCards, Charlie Tickets	FARE MEDIA	Fare cards, smartphones, contactless credit cards
CharlieCards available at select stations and the CharlieCard Store	FARE MEDIA ACCESS	Fare cards available at all Fare Vending Machines and retail locations
Limited ability to purchase fares outside of stations	AVAILABILITY OUTSIDE STATIONS	Greater ability to purchase fares outside stations via on-street and retail locations
Cash payments on buses and Green Line	CASH POLICY	No on-board cash payments
Not used across all modes in the system	SCOPE	Tap on across all modes in the system
Limited flexibility to make updates or changes to fare policy	FARE POLICY FLEXIBILITY	Significant, built-in, flexibility for new fare policies and products

FIGURE I: Differences between AFC 1.0 and AFC 2.0

AFC 2.0: DELIVERY AND PROCUREMENT PROCESS

Adoption of new technology to modernize the automated fare collection system for the MBTA represents a significant capital investment originally estimated at \$407 million to finance, operate, and maintain the system, and \$56 million to design and build the system, all to be procured and delivered through a public-private partnership (P3).

Although current legislation does not allow the MBTA to award P3 contracts, they were able to experiment with P3 procurement and project delivery for AFC 2.0 specifically through two separate contracts. The first contract as part of AFC 2.0 was issued to Scheidt & Bachmann to upgrade the current system and keep it operational for a longer period of time while the new system is installed. The other contract was awarded to Cubic Transportation Systems, to build the new system, decide where fare vending machines would be located, and preside over the maintenance for a 13-year period to provide incentive to them to ensure the system was fully operational.

In July 2016, the MBTA AFC 2.0 Project Office was established and started the procurement process issuing an RFQ and shortlisting vendors to respond to the project RFP. The procurement process involved internal and external subject matter

THE PROMOTED BENEFITS OF A P3 PROCUREMENT AND DELIVERY METHOD FOR AFC 2.0 INCLUDED:

- **PERFORMANCE-BASED CONTRACTING**
- **ALIGNED INCENTIVES OF THE PRIVATE SECTOR WITH THE GOALS OF THE MBTA**
- **BALANCED, COST-EFFECTIVE RISK ALLOCATION, TRANSFERRING APPROPRIATE RISK TO THE VENDOR**
- **PRIVATE FINANCE AS SECURITY FOR PERFORMANCE**
- **PRIVATE SECTOR VENDOR PROVIDES UPFRONT FUNDING FOR CAPITAL INVESTMENT, PUBLIC SECTOR RETAINS OWNERSHIP OF ASSETS**
- **CLOSE COORDINATION BETWEEN INSTALLATION, MAINTENANCE, OPERATIONS, AND CUSTOMER SERVICE**
- **INTEGRATED PROJECT DELIVERY**
- **SINGLE POINT OF RESPONSIBILITY**
- **EXPEDITED PROJECT DELIVERY**
- **LIFE-CYCLE COST APPROACH TO PROJECT DECISION-MAKING**

experts and lasted one year (November 2016 to November 2017); Cubic Systems Integrator was ultimately selected in November 2017.

The procurement process included three main phases:

- 1. COORDINATION AND NEGOTIATION:** This phase required significant internal and external coordination and was supported by leading industry partners and resulted in a new MBTA precedent for engagement and negotiation of contract prior to award.
- 2. TECHNICAL PROPOSAL EVALUATION:** This phase engaged a selection committee to review the proposals, seek clarification, request subject matter expert review, coordinate field teams, and conduct proposer interviews.
- 3. FINANCIAL PROPOSAL EVALUATION:** This phase used a scoring system—net present value (NPV) —to evaluate the proposal. Each proposer’s price was evaluated on a comparative basis against the lowest price received. The selection of the Systems Integrator was based on the best value approach, considering technical solution and price (evaluated separately).

Four vendors were shortlisted to respond to the RFP.

- SCHEIDT & BACHMANN:** Shortlisted through the RFQ process and engaged during requirements refinement
- ACCENTURE:** Shortlisted through the RFQ process and engaged during requirements refinement
- CONDUENT:** Shortlisted through the RFQ process, engaged during requirements refinement, submitted a technical and financial proposal
- CUBIC:** Shortlisted through the RFQ process, engaged during requirements refinement, submitted a technical and financial proposal

In November of 2017, the contract for AFC 2.0 worth \$723 million, including the operating costs through 2031—was completed and awarded to Cubic. The original timeline for implementation of AFC 2.0 followed an ambitious 5-year schedule from design to project completion. MBTA customers were expected to experience the new system beginning in late 2019 with full implementation coming in mid-2020.

AFC 2.0: A BUMPY ROAD: CHALLENGES ALONG THE WAY

The AFC 2.0 project experienced significant challenges on both the contract management and public outreach fronts. These challenges are mainly due to the MBTA’s lack of experience with public-private partnerships (P3) or institutional arrangements for P3s under current legislation.

P3 - CONTRACT

The MBTA is not an awarding authority for P3 contracts under current legislation, leaving it without the expertise, staff, and experience to effectively navigate the very complex P3 contract process, including allocation of risk and responsibility between the MBTA and external partners. Since 2015, there have been three changes to AFC 2.0’s project leadership. Ronald Renaud is currently the AFC 2.0 program manager and is responsible for the P3 aspects of the program. He works with Laurel Paget-Seekins, Assistant General Manager for Policy, who oversees AFC 2.0’s public outreach and policy components.

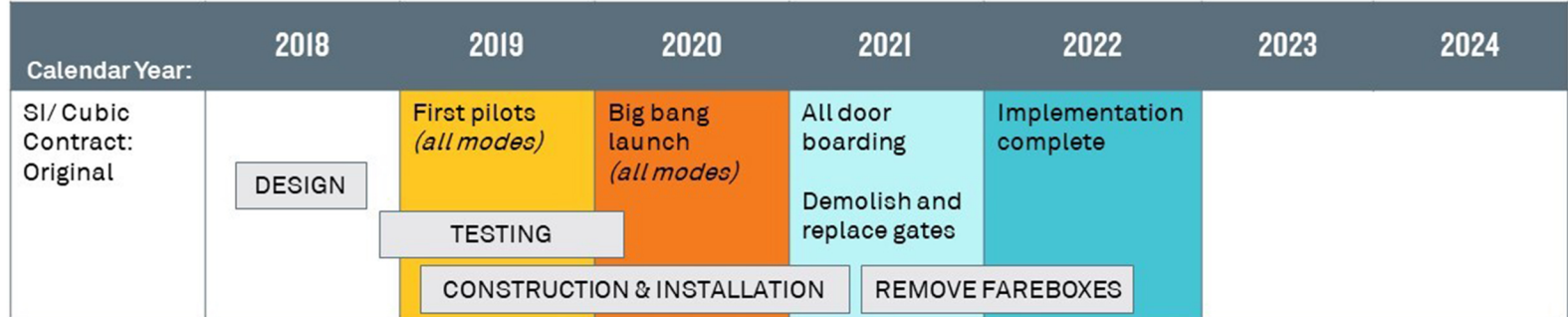


FIGURE 2: AFC 2.0 Initial Timeline

PUBLIC OUTREACH

In order to achieve the goals of AFC 2.0 outlined in Figure 3, there are various policy decisions that need to be made with feedback from the public in mind. The outreach process and underlying enabling policies to support AFC 2.0 goals seem to have been out of synch with the other aspects of the P3 contract, leading to substantial public push back that caused delays in project implementation. These concerns are being addressed in the re-set plan to better integrate public feedback.

RE-SET PLAN

In December 2019, the AFC 2.0 team presented the FMCB with a “re-set” plan for the re-named Fare Transformation project based on customer feedback and subsequent lessons learned. The improvements made under the “re-set” plan are designed to address public concerns and to strengthen the P3 contract to reduce the MBTA’s financial risk and even out the allocation of risk and responsibility between the partners. The re-set will require changes to existing contracts with Scheidt & Bachmann and Systems Integrator/Cubic that will result in additional costs, including internal MBTA costs, investments in the legacy system (\$49 million to Scheidt & Bachmann), and improvements and modifications to the systems integrator contract (\$30 million to Systems Integrator/Cubic).

The Fare Transformation team has taken these concerns and made specific improvements to the fare technologies and operations to address each area of concern and update the new plan for AFC 2.0. These changes have led to delays in the initial timeline to allow proper time for testing, installation, and migrating customers to the new system.

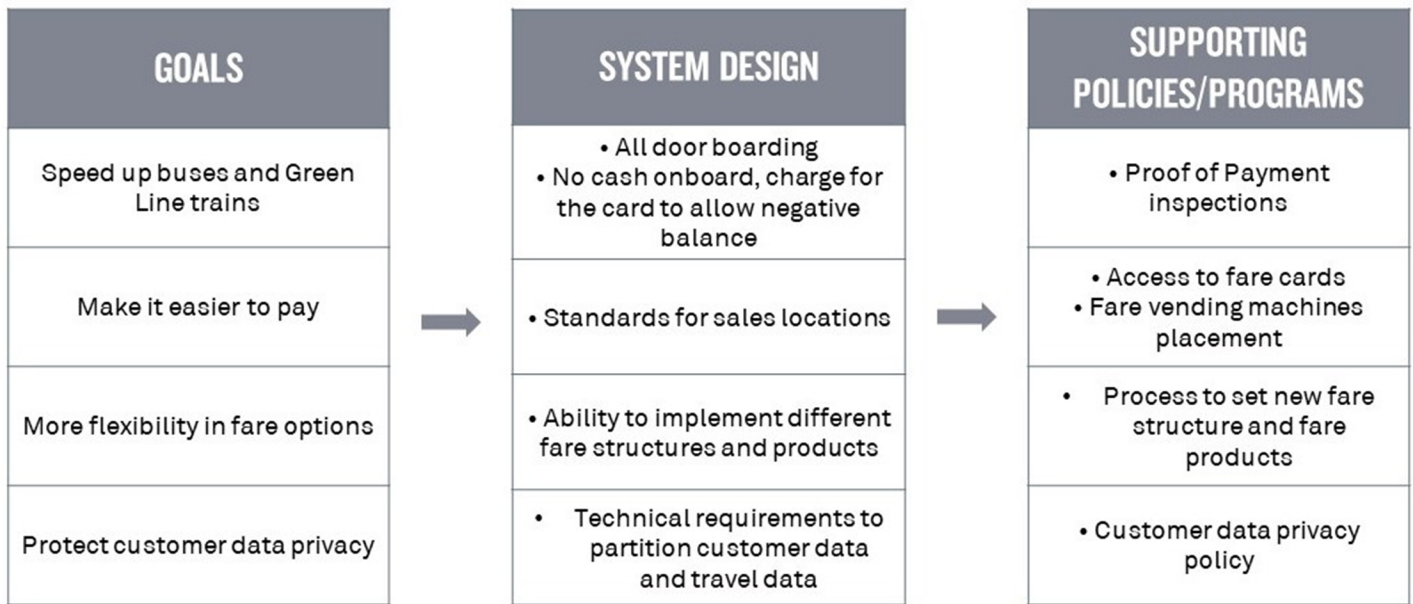


FIGURE 3: AFC 2.0 Supporting Policies and Programs

RESETTING THE PROJECT PLAN

We're making some key changes to the project plan, based on feedback and lessons learned.

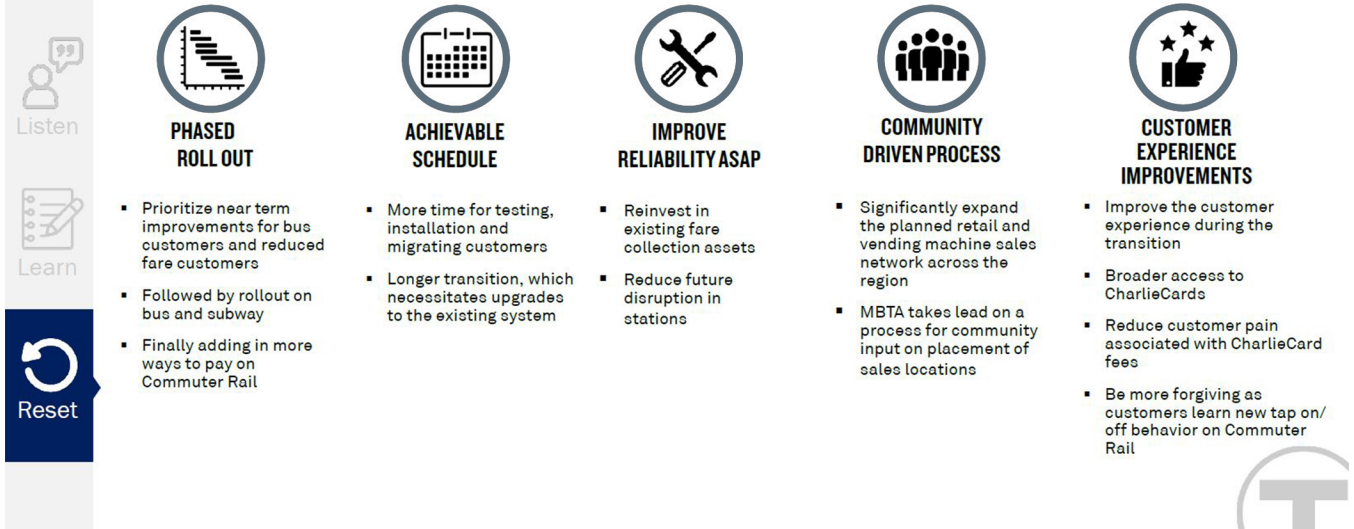


FIGURE 4: Fare Transformation Re-Set

The Fare Transformation team has reworked the rollout schedule into five stages to deliver on high-priority, near term improvements for bus and subway commuters before moving on to reduced fare and bus customers and finally adding ways to pay on the Commuter Rail (see Figure 6). This moves the completion of the rollout from 2020 to 2024 when the tap system will be fully implemented on the Commuter Rail.



AREA OF CONCERN	PRIMARY CONCERNS	IMPROVEMENTS IN THE "RE-SET"
SALES LOCATIONS	Expressed desire to have a community-driven process for determining sales locations	MBTA will use equity analysis and public input in addition to ridership data to determine locations
EXISTING BUS AND SUBWAY	Fare gates are frequently broken and not repaired, it is too difficult to obtain and reload a CharlieCard	Monitoring system to detect gate failures quickly, increased number of vending machines that can dispense and reload CharlieCards
EXISTING COMMUTER RAIL	Paying on the Fairmount Line specifically is inconvenient and there is a general inconsistency in fare collection	The tap system will be installed on the commuter rail to make payment easier while paper tickets will be phased out
EXISTING FARE PAYMENT SYSTEM	It is hassle to get a reduced fare card and unfair CharlieTicket rates are higher	The application and renewal process for reduced fare will be easier, CharlieTicket will be phased out
TAP IN AND OUT ON COMMUTER RAIL	If customers forget to tap on commuter rail, they may be fined or incur a surcharge	Ridership history can be used to replace a missing tap and functionality is with conductor
FEE FOR EACH NEW FARE CARD	The cost of the new fare cards is a barrier of entry for low-income and infrequent riders	Agencies can buy low cost, single use tickets or riders can bundle pass and card costs
PERQ ADMINISTRATORS MANAGEMENT	Companies might spend too much time managing travel benefits for employees	Riders have access to self-service capabilities to change pass type for payroll deductions

FIGURE 5: Primary Concerns & Re-Set Improvements | Fare Transformation Update

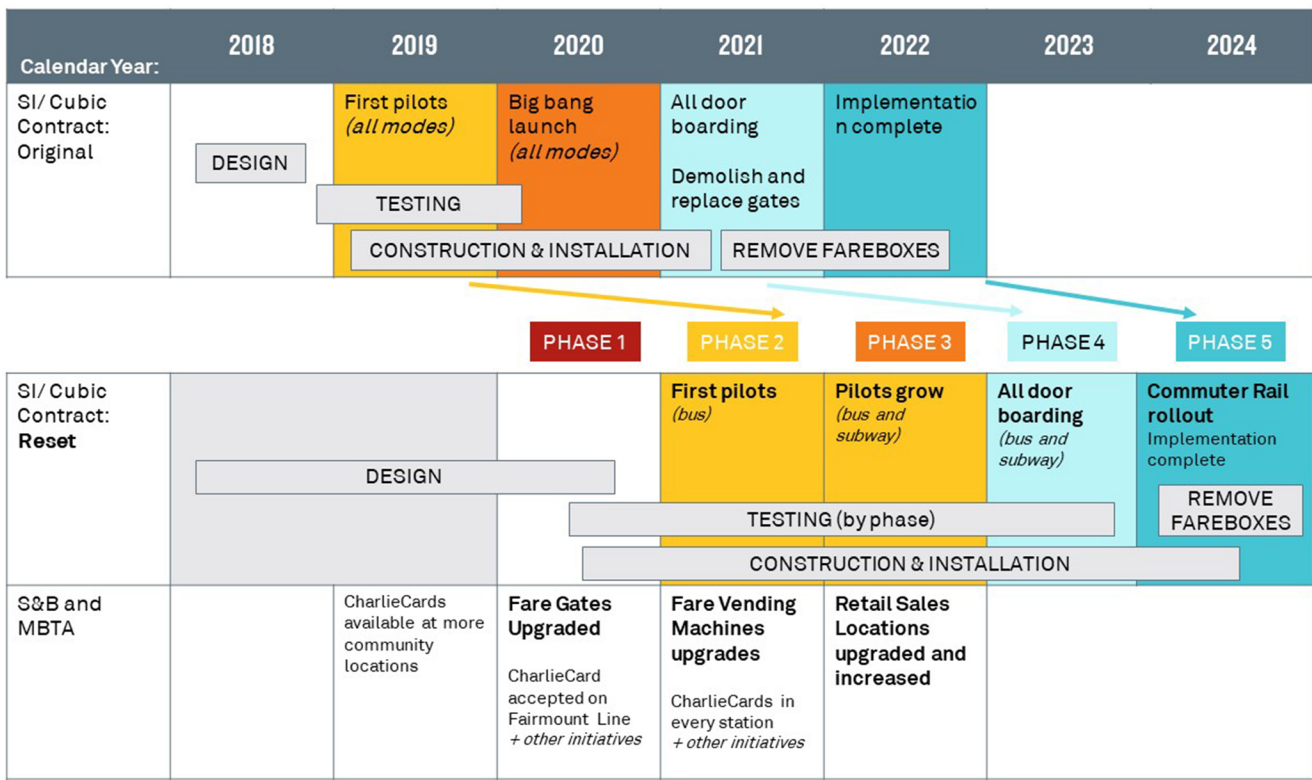


FIGURE 6: Fare Transformation Collection Re-Set Timeline

CONCLUSION

With the re-set plan in place and renegotiations on the P3 contract with Cubic coming to a close, there may be a benefit to review the design and implementation plan to consider possible needs post COVID-19. Automating the MBTA's fare collection system could be critical component to putting in place a stronger public transit system that expedites the MBTA's response to future pandemics and eliminates transmission points and some high-cost sanitation measures.

This project and future large-scale asset and infrastructure investments would benefit greatly from changes to the MA General Laws on P3. When policy makers refocus on the transportation finance bill, there is compelling reason to support P3 enabling legislation that would allow the MBTA to solicit proposals and enter into contracts for design-build-finance-operate-maintain or design-build-operate-maintain services. The legislation would make the MBTA an "awarding authority" for P3 contracts based on competitive bidding, unsolicited bids, or sole-sources of procurement, with a contract limit of \$10 million and 5 years of maintenance unless the contract is reviewed by an independent authority for competence and qualifications.

In the short term, the change in legislation would support MBTA actions to strengthen its ability to manage and monitor the Fare Transformation project by focusing attention on critical institutional arrangements to engage in P3s. Long term, the MBTA would gain experience with P3s and become more adept at using P3s, which would enhance the agency's project delivery and financing toolbox to invest in essential capital improvement projects to achieve and surpass the state of good repair.

SOURCES

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