



MASONVILLE COVE MULTI-MODAL TRANSPORTATION FEASIBILITY STUDY

Prepared for

Maryland Department of Transportation

Maryland Port Administration

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Executive Summary

The Masonville Cove Campus (Masonville Cove) is comprised of 70 acres of water and 54 acres of wetland and upland habitat, and includes nature trails, a bird sanctuary, and the Masonville Cove Environmental Education Center (MCEEC). Masonville Cove is also the first U.S. Fish and Wildlife Service-designated Urban Wildlife Refuge. This Multi-modal Transportation Feasibility Study for Masonville Cove was developed to identify and consider planning level feasibility options for multi-modal community access to the site. For this study, multi-modal access is defined as: bicycle, pedestrian, mass transit, marine vessels, and shared-use vehicles.

Masonville Cove was developed as part of several mitigation and community enhancement projects tied to the MDOT MPA's construction of the adjacent Masonville Dredged Material Containment Facility (DMCF). The Masonville Cove educational programming and operations are managed by the Masonville Partners: MDOT MPA, MES, Living Classrooms Foundation (LCF), National Aquarium (NA), and the US Fish and Wildlife Service (USFWS).

Masonville Cove is an environmental resource for the local communities including Brooklyn, Curtis Bay, and Cherry Hill; however, this resource is located in an industrial area that is home to port and other industrial commerce important to the economy of the State of Maryland. Heavy truck traffic and few existing bicycle and pedestrian accommodations severely limit the surrounding communities' ability to safely access the site. This study assessed the intersections, roadways, and waterways leading to Masonville Cove, and identified the options with the most potential for future consideration.

Scenarios for possible intersection and roadways improvements near Frankfurst Avenue and S. Hanover Street were investigated to improved safe pedestrian access to Masonville Cove. An assessment was also made of the potential for some entity to implement and/or manage a shared use mobility program to provide community access to programming held at Masonville Cove. Additionally, the topics of water access via kayak, which is currently allowed, and potential water taxi options were investigated along with public transit.

MDOT MPA hosted two community meetings to introduce and discuss the study, present suggestions on the most feasible options and obtain community and local business input. Frankfurst Avenue and S. Hanover Street are traditionally used and important truck routes for the Port of Baltimore and other nearby businesses; as both are designated as [through truck](#) routes by Baltimore City.

The investigation of the various options and communication with the Masonville Partners and surrounding communities found that there are some potentially viable options that could improve access to MCEEC in both the short-term and the long-term, including shared use

mobility, marine access, transit access, and a shared path and intersection improvement concept. Further discussion between the local municipalities and land owners along Frankfurst Avenue and S. Hanover Street would need to continue in order for any multi-modal access projects to move forward. Further analysis of engineering, safety, compatibility, utility relocations, and other factors that may be encountered during construction, would be required by any parties considering advancing any of the options identified in this study. MDOT MPA provides this Masonville Cove Multi-modal Transportation Feasibility Study as feasibility level information for future planning purposes to enhance safe public access to Masonville Cove for the neighboring communities.

Table of Contents

| | |
|---|----|
| Executive Summary..... | i |
| 1 Introduction | 1 |
| 2 Existing Conditions | 4 |
| 2.1 Land Uses | 4 |
| 2.2 Roadway Network..... | 4 |
| 2.3 Maritime | 11 |
| 3 Multi-modal and Transportation Options..... | 12 |
| 3.1 Shared Use Path and Intersection Improvements..... | 12 |
| 3.1.1 Frankfurst Avenue Shared Use Path | 12 |
| 3.1.2 Intersection Improvements Concept 1 | 12 |
| 3.1.3 Intersection Improvements Concept 2: Cycle Track | 13 |
| 3.2 Shared Use Mobility..... | 14 |
| 3.2.1 Shuttle - Contract Provider | 15 |
| 3.2.2 Shuttle - Locally Operated Provider Partnership | 15 |
| 3.2.3 Shuttle – Purchase | 16 |
| 3.2.4 Shuttle - Rental..... | 16 |
| 3.2.5 Rideshare | 16 |
| 3.3 Marine Options | 17 |
| 3.3.1 Kayak..... | 17 |
| 3.3.2 Baltimore Water Taxi | 18 |
| 3.4 Transit | 18 |
| 4 Results of Analysis..... | 23 |
| 4.1 Removed From Consideration | 23 |
| 4.1.1 Intersection Improvements Concept 1: Sharrows, Bike Boxes, Crosswalks | 23 |
| 4.1.2 Shuttle – Contract Provider..... | 23 |
| 4.1.3 Shuttle – Locally Operated Provider Partnership | 23 |
| 4.1.4 Baltimore Water Taxi | 23 |
| 4.2 Possible Short-term Options..... | 23 |
| 4.2.1 Rideshare (Lyft/Uber)..... | 23 |
| 4.2.2 Kayak..... | 24 |
| 4.3 Possible Long-term Options..... | 24 |

| | | |
|-------|--|----|
| 4.3.1 | Intersection Improvements Concept 2: Cycle Track | 24 |
| 4.3.2 | Shuttle – Purchase | 24 |
| 4.3.3 | Shuttle – Rental..... | 24 |
| 4.3.4 | MDOT MTA Transit | 24 |
| 5 | Conclusion..... | 25 |

Table of Figures

| | |
|---|----|
| Figure 1-1. Vicinity Map. | 3 |
| Figure 3-1. Study Area..... | 7 |
| Figure 3-2. Limited Bike Accommodations. | 8 |
| Figure 3-3. Wide Intersection. | 8 |
| Figure 3-4. Pinch Point. | 8 |
| Figure 3-5. Frankfurst Avenue Traffic Count..... | 9 |
| Figure 3-6. S. Hanover Street Traffic Count. | 10 |
| Figure 3-7. Masonville Cove docking structures..... | 11 |
| Figure 3-8. Fixed pier for LCF motorized boats..... | 11 |
| Figure 3-9. Floating Pier. | 11 |
| Figure 4-1. Frankfurst Avenue Shared Use Path. | 19 |
| Figure 4-2. Intersection Improvements Concept 1. | 20 |
| Figure 4-3. Intersection Improvements Concept 2. | 21 |
| Figure 4-4. Baltimore Water Taxi Stops. | 22 |
| Figure 4-5. MDOT MTA CitySilver Route..... | 22 |
| Figure 4-6. MDOT MTA LocalLink 67 Route. | 22 |

List of Appendices

APPENDIX A Summary of Community Meetings

APPENDIX B Key Terms

APPENDIX C Shared Use Path and Intersection Improvement Considerations

APPENDIX D Shared Use Mobility Considerations and Costs

APPENDIX E Marine Considerations

1 Introduction

The Masonville Cove Campus (Masonville Cove) is comprised of 70 acres of water and 54 acres of wetland and upland habitat, including nature trails, a bird sanctuary, and the Masonville Cove Environmental Education Center (MCEEC). Masonville Cove was developed as part of several mitigation and community enhancement projects tied to the MDOT MPA's construction of the adjacent Masonville Dredged Material Containment Facility (DMCF). The Masonville Campus, educational programming and operations are managed by the Masonville Partners which include: MDOT MPA, MES, Living Classrooms Foundation (LCF), National Aquarium (NA), and the US Fish and Wildlife Service (USFWS). The Masonville Campus is located at 1000 Frankfurst Avenue in Baltimore, Maryland (Figure 1-1).

In 2009, the Masonville Cove Environmental Education Center (MCEEC) opened its doors on the Masonville Campus, offering environmental and education programs to local communities and schools. In 2012, public access to the Masonville Cove shoreline was allowed via its newly developed trail network and piers. In 2013, USFWS designated Masonville Cove as the nation's first Urban Wildlife Refuge Partnership. The Urban Wildlife Refuge Program exists to connect urban communities to the value of wildlife refuges and other conservation landscapes. Shortly after the designation, the USFWS conducted a Visitor Services Review of Masonville Cove. The review concluded that improving public access to Masonville is a priority.

The review's finding encouraged the Masonville Partners to begin investigating opportunities for expanding and enhancing accessibility options to the facility. In 2016, MDOT MPA, in partnership with USFWS, secured funding for a multi-modal transportation feasibility study through a Federal Lands Access Program (FLAP) grant to investigate the potential to provide enhanced and safer access to the site to the Masonville Campus for local communities, as well as the greater Baltimore region. The FLAP was established to improve access to facilities that are adjacent to or are located within federal lands. The program supplements state and local resources for public roads, transit systems, and other transportation facilities. This Multi-modal Transportation Feasibility Study was produced using FLAP funds. Analysis and findings outlined in this report are aligned with the requirements of the grant. Sponsorship and funding sources for subsequent phases, beyond this Multi-modal Transportation Feasibility Study have not been identified.

The purpose of the study was to identify feasible multi-modal options that could provide enhanced and safer access to the site from the local communities of Brooklyn, Curtis Bay, and Cherry Hill, as well as the greater Baltimore region (Figure 1-1). The site's unique and desirable location on the Patapsco River has the potential for a wide range of multi-modal transportation options including vehicular transit, bicycle, and pedestrian, along with marine options such as water taxi and kayak. Although there are a number of accessibility options that could be

considered, the site's isolated location, hours of operation, location on a designated truck route, adjacent industrial land uses, and limited on-road access options create a number of physical and safety constraints that would also need be addressed in order to improve safe access to Masonville Cove. Some of these constraints include heavy truck traffic (via a Baltimore City-designated through truck route), limited bike and pedestrian accommodations, chronic flooding along portions of Frankfurst Avenue, safety, access, and security considerations of the adjacent properties (including Vulcan Materials and the MDOT MPA Masonville Marine Terminal), and safety concerns associated with the wide and sparsely delineated intersection of Frankfurst Avenue and S. Hanover Street.

MDOT MPA hosted community meetings at Benjamin Franklin High School in the Brooklyn neighborhood to introduce and discuss the study, present suggestions on the most feasible options, and obtain community and local business input. The first meeting was held on March 17, 2017 to present the project purpose along with initial findings and concepts. Comments and suggestions from this meeting have been incorporated into this report as applicable. An additional meeting was held on May 18, 2017 to present the study findings. A compilation of comments received at the meetings can be found in Appendix A (page A-1).

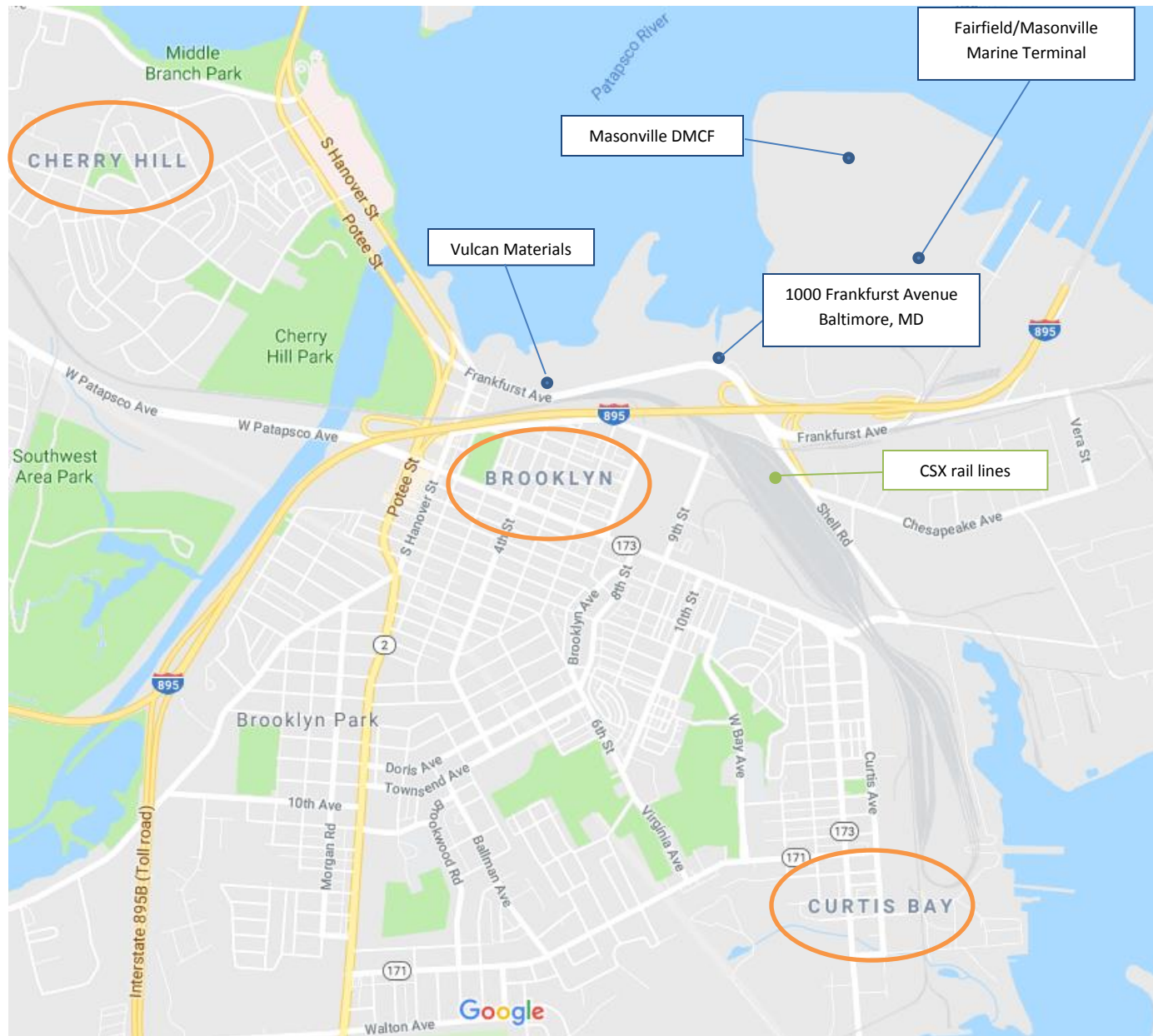


Figure 1-1. Vicinity Map.

2 Existing Conditions

2.1 Land Uses

Masonville Cove is situated on the perimeter of the Brooklyn community in south Baltimore. The site is bordered by the Patapsco River to the north and port-related and/or industrial land-uses to the east, south, and west. Current zoning for the site is M-3, Maritime Industrial Zoning, intended to preserve land with deep water access for industrial and marine uses. Directly to the west of the site is Vulcan Materials, which produces construction aggregate, crushed stone, and gravel. East of the site is the Fairfield/Masonville Marine Terminal, a significant part of MDOT MPA operations in the Port of Baltimore. Across Frankfur Avenue from the site are CSX railroad lines and Interstate 895 (I-895). The core of the Brooklyn community is south of I-895.

Masonville Cove encompasses the Masonville Campus and the MCEEC and it is adjacent to the Masonville DMCF, an active construction site. The Masonville Campus and MCEEC property are being capped with two feet of soil to remediate the property. This effort was undertaken in accordance with a consent decree between MDOT MPA and the Maryland Department of the Environment due to legacy contamination at Masonville Cove. The consent order provides land use standards that limit recreational uses; activities such as picnics and sports are prohibited. The site also has limited hours of operation that change seasonally.

The capping is anticipated to be complete by the end of 2018. Once complete the property of the Campus and MCEEC will be placed under a conservation easement to preserve the remedial cap and the intended use of the site as an environmental education tool for the community.

The campus and the MCEEC are used by the Masonville Partnership to engage the community in environmental stewardship and to bring awareness to the environmental initiatives associated with the creation of the Masonville DMCF. The environmental initiatives associated with Masonville Cove aim to benefit the Middle Branch watershed; while some of the efforts are off-site, many are on-site. The on-campus mitigation furthering education includes substrate improvement within the Cove, placement of reef balls within the Cove, the creation of tidal and nontidal wetlands, a living shoreline and planting of native grass, trees and shrubs.

A list of key terms used in this section can be found in Appendix B (page B-1).

2.2 Roadway Network

The entrance to Masonville Cove is through the Masonville Campus gate, accessed via Frankfur Avenue; beyond the gate is a parking lot for visitors to the MCEEC. The on-site parking lot has 19 public parking spaces, two of which are designated handicapped.

For the purpose of this report, Frankfurst Avenue will be discussed as two separate sections (Figure 3-1). Section 1 begins along Frankfurst Avenue from the Potee Street split just south of the Patapsco River crossing and continues to 2nd Street for approximately 0.13 miles. Section 2 continues along Frankfurst Avenue for an additional 0.74 miles between 2nd Street and the Masonville Campus gate for a total combined length of 0.87 miles.

Section 1 has two signalized intersections; Frankfurst Avenue at Potee Street and Frankfurst Avenue at S. Hanover Street (Figure 3-1). Eastbound Frankfurst Avenue between Potee Street and S. Hanover Street is a two-lane, one-way street. Each lane is approximately 14 feet wide. The northern shoulder is roughly 15 feet wide and includes a 6-foot bike lane (Figure 3-2) and a varying width buffer that is approximately 8.5 feet wide at the intersection. A bike lane crosses Frankfurst Avenue on the west leg of the signalized intersection at Potee Street. At this location, the on-road bike accommodations continue eastbound on Frankfurst Avenue as sharrows in the right lane. These sharrows continue southbound at the S. Hanover Street intersection, toward Brooklyn. A pedestrian sidewalk begins midblock on the southern side of Frankfurst Avenue, between Potee and S. Hanover Streets. There are currently no pedestrian sidewalks on Frankfurst Avenue east of the intersection at S. Hanover Street. East of S. Hanover Street, Frankfurst Avenue is a two-way street with two travel lanes in each direction. Westbound traffic on Frankfurst Avenue approaching S. Hanover Street has the option of using the right lane to turn north onto S. Hanover Street toward Cherry Hill, or using the left lane to turn south onto S. Hanover Street toward Brooklyn. No through movements are available for vehicles on this approach.

North of Frankfurst Avenue, S. Hanover Street is one lane northbound for approximately 700 feet before it merges with northbound Potee Street heading northbound across the Patapsco River. There are an existing sidewalk and northbound bike lane on the east side of S. Hanover Street north of the Frankfurst Avenue intersection that each continue across the Patapsco River. South of Frankfurst Avenue, S. Hanover Street is 40 feet wide with one travel lane in each direction and on-street parking available in both directions. There are existing sidewalks on either side of the roadway of varying widths. There are currently no marked pedestrian crosswalks within the Section 1 limits. The intersection of Frankfurst Avenue and S. Hanover Street is very wide, a factor that determines the ability of a pedestrian or bicyclist to cross the intersection (Figure 3-3).

Section 2 of Frankfurst Avenue (Figure 3-1) is comprised of a curbed, four-lane divided arterial with no existing pedestrian or bicycle accommodations. Each of the eastbound and westbound lanes on Frankfurst Avenue is 12 feet wide. Along a majority of this corridor there is a raised center median that is about 3.5 feet wide. The median width varies in areas such as the entrance to Masonville Cove, where it widens to allow a turn lane to access the MCEEC parking lot. Although functionally listed by Baltimore City as “minor arterial,” Frankfurst Avenue is also designated by the City a [“through truck route”](#) connecting the Fairfield Marine Terminal to I-95.

The continued use of the road by heavy trucks is a priority. Ensuring the safety of pedestrians or bicyclists in this area may not be possible without significant impact to use of the road.

The off-road portion of Frankfurst Avenue has a number of existing features including utility/lighting poles, guardrail segments, vegetation, trees, and chain link fences associated with the properties along the road (Figure 3-4). A majority of the off-road features run parallel to the curb on either side of the roadway at distances of 8-15 feet from the back of curb, making improvements along this corridor difficult.

As part of the assessment of the existing conditions a traffic count took place in November 2016. The results showed that the majority of traffic utilizing Frankfurst Avenue and S. Hanover Street during the weekday is passenger vehicles (Figure 3-5 and Figure 3-6).

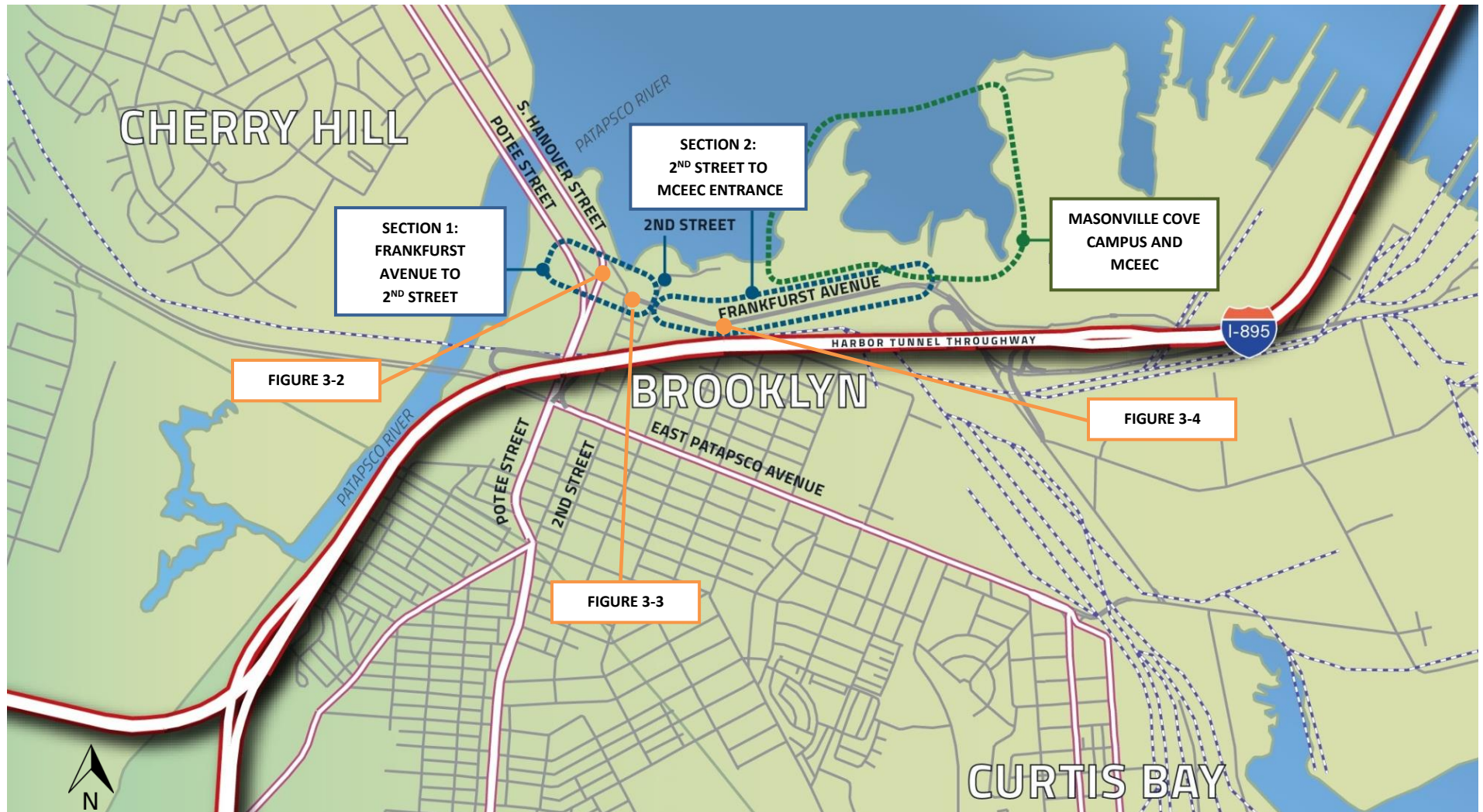


Figure 3-1. Study Area.



**Figure 3-2.
Limited Bike
Accommodations.**

Bike lane with sharrows
on eastbound Frankfurst
Avenue west of Potee
Street.



**Figure 3-3.
Wide Intersection.**

Frankfurst Avenue
merging on northbound
S. Hanover Street.



**Figure 3-4.
Pinch Point.**

Frankfurst Avenue,
looking eastbound at
shared use path location.

EASTBOUND



WESTBOUND

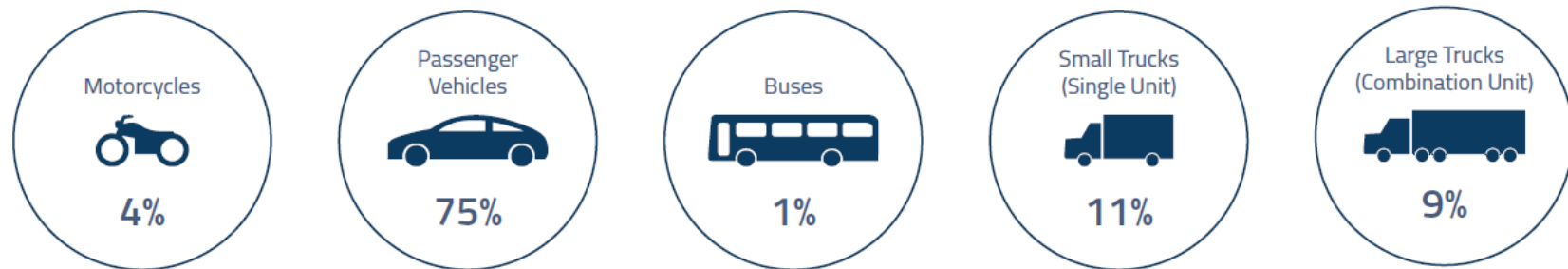
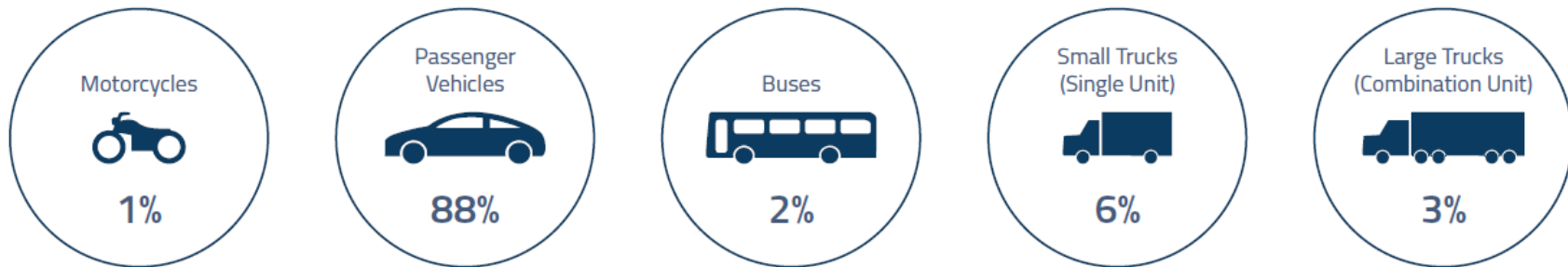


Figure 3-5. Frankfurst Avenue Traffic Count.

Based on a two-day traffic count taken in November 2016, this figure indicates the percentage of vehicle classes currently utilizing Frankfurst Avenue in both the eastbound and westbound directions between the Masonville Cove entrance and S. Hanover Street.

NORTHBOUND



SOUTHBOUND



Figure 3-6. S. Hanover Street Traffic Count.

Based on a two-day traffic count taken in November 2016, this figure indicates the percentage of vehicle classes currently utilizing S. Hanover Street in the northbound and southbound directions between 2nd Street and the S. Hanover Street/Frankfurt Avenue intersection.

2.3 Maritime

Two structures are located on the shore of the Cove that allow for limited marine access (Figure 3-7). One pier allows for motorized boat docking, fishing, and bird watching (Figure 3-8). Though this dock allows for motorized boat docking, boat docking is designated solely for LCF; other vessels are prohibited. A floating pier is available for kayaks and canoes (Figure 3-9).

The piers are used for receiving visitors, but not promoted as launching points to other locations along Baltimore's waterfront. Vehicles are not permitted to access the pier area and limited parking is available within the existing MCEEC parking area; as such the floating pier is not promoted as a launching point, though it is available as one. The piers are open during the MCEEC hours of operation.



Figure 3-7.
Masonville Cove docking structures.



Figure 3-8.
Fixed pier for LCF motorized boats.



Figure 3-9.
Floating pier.

3 Multi-modal and Transportation Options

3.1 Shared Use Path and Intersection Improvements

Several options for possible future enhancement of pedestrian and bicycle connectivity, including possible shared use path and intersection improvement options, were identified and a feasibility level assessment was made.

The scope of this study did not include preliminary engineering or safety assessment for possible shared use options. The scope also did not include consideration of potential costs of utility relocations such as gas, electric, water or sewer, or other factors that may be encountered during construction. Additional analysis would be required should any entity consider advancing any pathway options. Coordination with adjacent land owners would be necessary, and any design should take into consideration an adverse impact to Port or other industrial vehicular traffic. Any further investigation would also require coordination with Baltimore City Department of Transportation.

3.1.1 Frankfurst Avenue Shared Use Path

To accommodate bicycle and pedestrian movements going to and from Masonville Cove and adjacent communities, a shared use path was considered along the westbound side of Frankfurst Avenue (Figure 4-1). In this scenario, a path would run from the signalized intersection at S. Hanover Street to the entrance of the MCEEC parking lot. The path outside of the existing curb line would require an average width of 8 feet. Wherever possible, it would also need to include a 5-foot buffer between the path and the existing westbound travel lanes to increase the comfort level of non-motorized users (i.e. pedestrians & bicyclists). However, along the corridor are multiple pinch points due to existing utility poles, guard rail, and property fences (Figure 3-4) that may prevent the construction of the proposed path in certain locations. Ultimate constructability would require significant additional engineering and safety investigation and analysis.

This shared use path concept was incorporated into the following intersection improvement concepts that were investigated.

3.1.2 Intersection Improvements Concept 1

To facilitate safe bicycle and pedestrian travel to and from the communities adjacent to Masonville Cove, Intersection Improvements Concept 1 and Concept 2 introduce the possible improvement or installation of sharrows, bike boxes, and crosswalks in the vicinity of the Frankfurst Avenue/S. Hanover Street intersection (henceforth called “the intersection”).

Concept 1 considered the addition of a bike lane on the eastbound approach of the intersection; sharrows on northbound approach of the intersection; bike boxes on the southern and western legs of the intersection; and crosswalks at the northern, eastern, and southern legs of the intersection to facilitate bicyclist and pedestrian movements.

The sharrows would retain existing traffic patterns on northbound S. Hanover Street while improving the safety of bicyclists by better informing drivers of the possibility of bicyclists on the roadway.

At the southern leg of the intersection, bicyclists would enter a bike box at the northbound approach of the intersection. From here bicyclists will be able to cross Frankfurst Avenue via a crosswalk on the eastern leg of the intersection and either continue north on S. Hanover Street via the existing bike lane on S. Hanover Street or use the proposed shared use path along Frankfurst Avenue to travel east towards Masonville Cove. This crosswalk would also allow pedestrians using the sidewalk on S. Hanover Street to access the shared use path along Frankfurst Avenue. Pedestrian crosswalks would be necessary across all lanes of the southern leg of the intersection to improve the safety of pedestrians attempting to cross S. Hanover Street.

At the western leg of the intersection, bicyclists currently travel in the right traffic lane before turning right onto S. Hanover Street. Concept 1 considers the continuation of the existing bike lane on the north side of Frankfurst Avenue, keeping eastbound bicyclists in a protected bike lane in what is currently a wide, paved shoulder. In this concept, bicyclists could then use a crosswalk on the north leg of the intersection to ride north in the existing S. Hanover Street bike lane, or continue east on the shared use path.

From this location, bicyclists would also have the option of using a possible bike box on the western leg of the intersection to cross Frankfurst Avenue and continue south on S. Hanover Street.

Vehicles making a right turn onto Frankfurst Avenue from the dedicated right turn lane of S. Hanover Street must yield to bicyclists and pedestrians.

A summary of considerations for intersection improvements can be found in Appendix C (page C-2).

3.1.3 Intersection Improvements Concept 2: Cycle Track

The Concept 2 cycle track was also considered as a possible concept to allow the community a way to safely access the intersection of Frankfurst Avenue/S. Hanover Street. This concept would include the improvements discussed in Concept 1.

In Concept 2, the proposed bike lane on the eastbound approach of the intersection; bike boxes on the southern and western legs of the intersection; and crosswalks at the northern, eastern, and southern legs of the intersection from Concept 1 remain.

In Concept 2, south of the intersection, a two-way, protected cycle track was considered on the northbound side of the road, eliminating the need for sharrows in either direction on S. Hanover

Street and moving all bicycle movements south of the intersection to the proposed cycle track (Figure 4-3).

Bicyclists approaching the intersection from the west who intend to travel south on S. Hanover Street would need to utilize a crosswalk on the southern leg of the intersection to access the cycle track. The existing median could be used as a refuge area to help safely cross the roadway if pedestrians or bicyclists are unable to cross S. Hanover Street with one signal phase.

South of the intersection, S. Hanover Street would continue to have one vehicular travel lane in each direction, but the northbound approach of the intersection at Frankfur Avenue would change from a two-lane approach with a dedicated right turn lane and a dedicated through lane to a single lane that would accommodate both through and right turn movements at the intersection. The cycle track would also eliminate some on street parking along the northbound side of S. Hanover Street.

A summary of considerations for intersection improvements can be found in Appendix C (page C-3).

3.2 Shared Use Mobility

Shared use mobility is a mode of transportation that is shared between multiple users (i.e., cabs, shuttles, rideshare, public transit). Public transit is discussed in Section 4.4. A variety of shared use mobility options could allow local community members to gain better access to Masonville Cove and the MCEEC. Each option has its benefits and drawbacks. Traditional shuttle services may offer more consistency, but at a higher cost. Rideshare options such as Lyft and Uber, which have spawned because of new technologies, may offer lower costs, but also have lower passenger capacity. A full list of shared use mobility considerations and cost estimate assumptions can be found in Appendix D (page D-1).

For cost comparison purposes between the potential options, the following assumptions were made:

Operational Assumptions

- Hours of Operations: MCEEC is open 39 hours a week (avg)
- 50 operating weeks in a year

Non-summer Season Assumptions

- 1 daily round trip (pick up and drop off)
- 6 round trips per week
- 38 weeks in Non-summer Season
- 228 trips in Non-summer Season

- Summer Season Assumptions
- 2 daily round trips (pick up and drop off)
- 12 round trips per week
- 12 weeks in Summer Season
- 144 trips in Summer Season

3.2.1 Shuttle - Contract Provider

The Shuttle - Contract Provider option proposes that a sponsoring entity solicit and enter into a sole agreement with a shuttle service that provides regularly scheduled pick-ups and drop-offs within the service area. This option allows for consistent operations similar to traditional bus transit, but less frequent. Services could be designed around the Brooklyn, Curtis Bay, and Cherry Hill communities and the MCEEC. Such contracted service would pick up and drop off participants at regularly scheduled times and locations.

On average, a 10-12 passenger vehicle costs approximately \$110 - \$120 an hour with a 3-hour minimum. Additional fees and surcharges may also apply.

Factors to consider with a provider contract:

- Assures that participants have access to the MCEEC programs
- Scheduled service only operates when needed
- Costs are known since they are set in the contract
- The length of the contract can be specified
- Depending on the number of participants, either a van or small bus could be arranged
- The sponsoring entity would have administrative responsibility for finding a provider, executing a contract, and monitoring performance

3.2.2 Shuttle - Locally Operated Provider Partnership

The Shuttle - Locally Operated Provider Partnership option assumes that the sponsoring entity partner with a local community group/entity to share shuttle services. The cost of service would be shared between the sponsoring entity and the community partner. This option could be a way to strengthen the partnership between the sponsoring entity and local community group/entity.



Factors to consider with a locally operated provider partnership:

- Assures that participants have access to the MCEEC programs
- Service provided only when needed, but the shared vehicle may not always be available when sought

- The sponsoring entity might need to share van operating and maintenance costs or reimburse the partner for actual operating costs incurred
- The sponsoring entity would have responsibility for identifying the partner, working out a vehicle sharing arrangement, determining the length of the arrangement and assessing the success of the arrangement

3.2.3 Shuttle – Purchase

In this option, the sponsoring entity would purchase a shuttle/van and an employee would be assigned as the driver. It is assumed that no more than 45 minutes per round trip would be required for the employee to drive local routes. Vehicles can be purchased from dealership, or an internet business such as eBay.

Factors to consider with a shuttle purchase:

- Assures that participants have access to the MCEEC programs
- Transportation services could be provided only when needed and could be used for other sponsoring entity purposes
- Maintenance and insurance budget needs to be established
- Labor costs for the sponsoring entity to provide an employee as driver

3.2.4 Shuttle - Rental

For the rental option, some car rental agencies designed customized rental programs designed specifically to meet a company's needs on an as-needed basis. Once enrolled, there are benefits and discounted rates for various rental plans.

Factors to consider with a shuttle rental:

- Assures that participants have access to the MCEEC programs
- Transportation services could be provided only when needed
- Labor costs for the sponsoring entity to provide an employee as driver

3.2.5 Rideshare

Rideshare services such as Lyft and Uber offer limited transportation opportunities that could assist with helping local communities gain access to Masonville Cove and the MCEEC.

Lyft's Local Partnerships program allows non-profits to gain a percentage of profit from affiliate codes that result in transportation services. The Local Partnerships program is a referral program that would allow a non-profit to potentially raise funds if the riders become regular Lyft users or drivers.

Uber Central is rideshare service that allows non-profits to set up an account and request rides for customers/clients. The non-profit arranges the pick-up and is responsible for payment; riders

are not required to have an Uber account. The non-profit sets policies around when and where the rides can be taken.

Factors to consider with rideshare:

- Dedicated funding source must be provided by a sponsoring entity
- Service is on first-come, first-serve basis
- Arrangement can be easily terminated
- Assures that participants have transportation service
- Payments made by Lyft to the sponsoring entity for referrals may not be allowed under the sponsoring entity's by-laws and tax status
- Subjecting riders to a referral program may be unwanted by riders (the goal of program is to gain ridership and drivers for Lyft)
- No control over rideshare driver
- Low ridership capacity per vehicle
- Participant interaction with driver may be unpredictable
- Potential for the sponsoring entity to seek grant funding for this type service through the federal Mobility On-Demand Program

3.3 Marine Options

A full list of marine considerations can be found in Appendix E (page E-1).

3.3.1 Kayak

As stated in the Existing Conditions section of this report, two structures are located on the Masonville Cove shore that allow for marine access. A fixed pier allows for motorized boat docking, fishing, and bird watching. A floating dock is available for kayaks and canoes. Visitors to the facility who arrive via kayak or canoe are responsible for pulling their vessel out of the water and securing it on the kayak racks in the designated area. They are then responsible for walking up to the MCEEC and signing in as a site visitor for the day. Vehicles are not permitted to access the pier area, and limited parking is available within the existing MCEEC parking area; as such the floating pier is not promoted as a launching point, though it is available as one.

An informal partnership between the Masonville Partners and the Canton Kayak Club (CKC) currently exists. The CKC is a non-profit organization that teaches and promotes the use of kayaking as a recreational experience along the Baltimore region's expansive waterfront. The partnership with CKC allows them to identify Masonville Cove's floating dock as a docking location for CKC members. Because CKC members are trained in how to navigate Baltimore's port waters, this partnership, or others like it, may promote safe and sensible use of the Masonville Cove floating dock.

3.3.2 Baltimore Water Taxi

As part of this study, information was received from the Baltimore Water Taxi (BWT), which operates two fleets, its namesake and the Harbor Connector. In 2016, Sagamore Ventures purchased BWT leading to discussions on expanding service to the Middle Branch portions of the Patapsco River. Two primary physical constraints that would impact a stop at Masonville Cove: 1) navigational concerns due to the approximately 2,000 reef balls that were placed as part of environmental mitigation throughout the Cove, and 2) the necessity of a docking structure suitable for the BWT passengers loading and unloading procedures. The existing pier was designed specifically for use by Living Classrooms vessels, so may not meet the needs of BWT vessels.

Operational constraints such as ridership demand and scheduling also impact the viability of adding a stop at Masonville Cove. At this time, this option would only benefit BWT users outside of the Brooklyn, Curtis Bay, and Cherry Hill communities as users would need to board the boat at stops closer to the Inner Harbor (Figure 4-4).

3.4 Transit

Currently the MDOT Maryland Transit Administration (MDOT MTA) does not provide any fixed-route bus service along Frankfur Avenue past Masonville Cove. The MDOT MTA's CityLink Silver route operates daily service nearby through Brooklyn and Curtis Bay, with the nearest bus stop located at the South Baltimore Park and Ride lot (Figure 4-5). The MDOT MTA LocalLink 67 bus route serves Brooklyn with daily trips along Patapsco Avenue from Hanover Street to 10th Street, with the nearest bus stops located at the South Baltimore Park and Ride lot (Figure 4-6).

In 2015, an inquiry was made to MDOT MTA about the desire to add a stop on the then #64 line to serve the MCEEC. At that time, MDOT MTA responded that anticipated ridership did not warrant the provision of bus service to the MCEEC. As part of this study, another inquiry was made to MDOT MTA planning staff about the potential for bus service to be provided along Frankfur Avenue to serve MCEEC. MDOT MTA indicated that there currently are no plans to extend bus service along Frankfur Avenue.

However, MDOT MTA may consider "last mile" alternatives (MDOT MTA services when there are no buses in the area). As stated on the MDOT MTA [website](#), "The MDOT MTA is introducing new, on-demand, and shared use mobility choices to encourage transit use, facilitate first and last mile connections, reduce transportation costs, and improve overall efficiency of Maryland's collective transportation system." There may be potential for future discussions about seeking funding for rideshare services under the Federal Transit Administration's Mobility on Demand grant program.

Figure 4-1. Frankfurst Avenue Shared Use Path.

Plan and Typical Section.

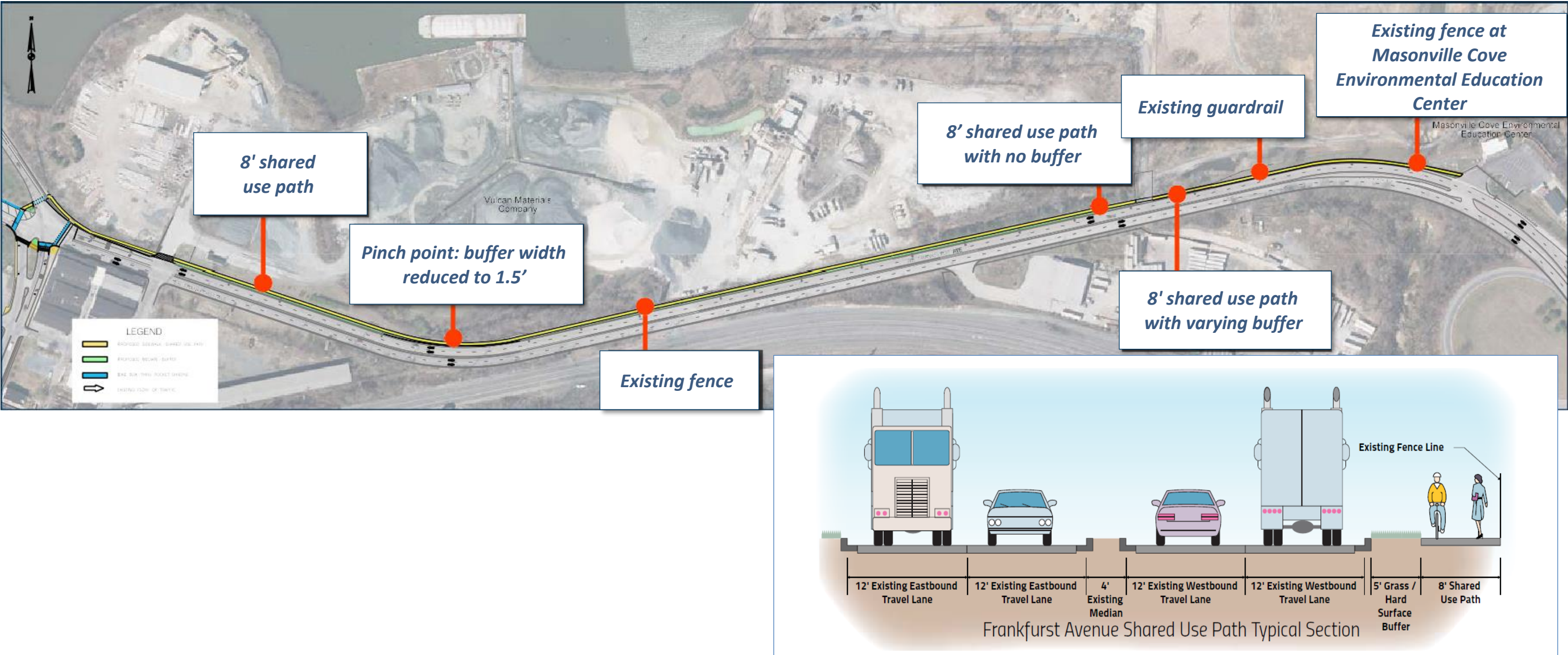


Figure 4-2. Intersection Improvements Concept 1.
Sharrows, Bike Boxes, and Crosswalks.

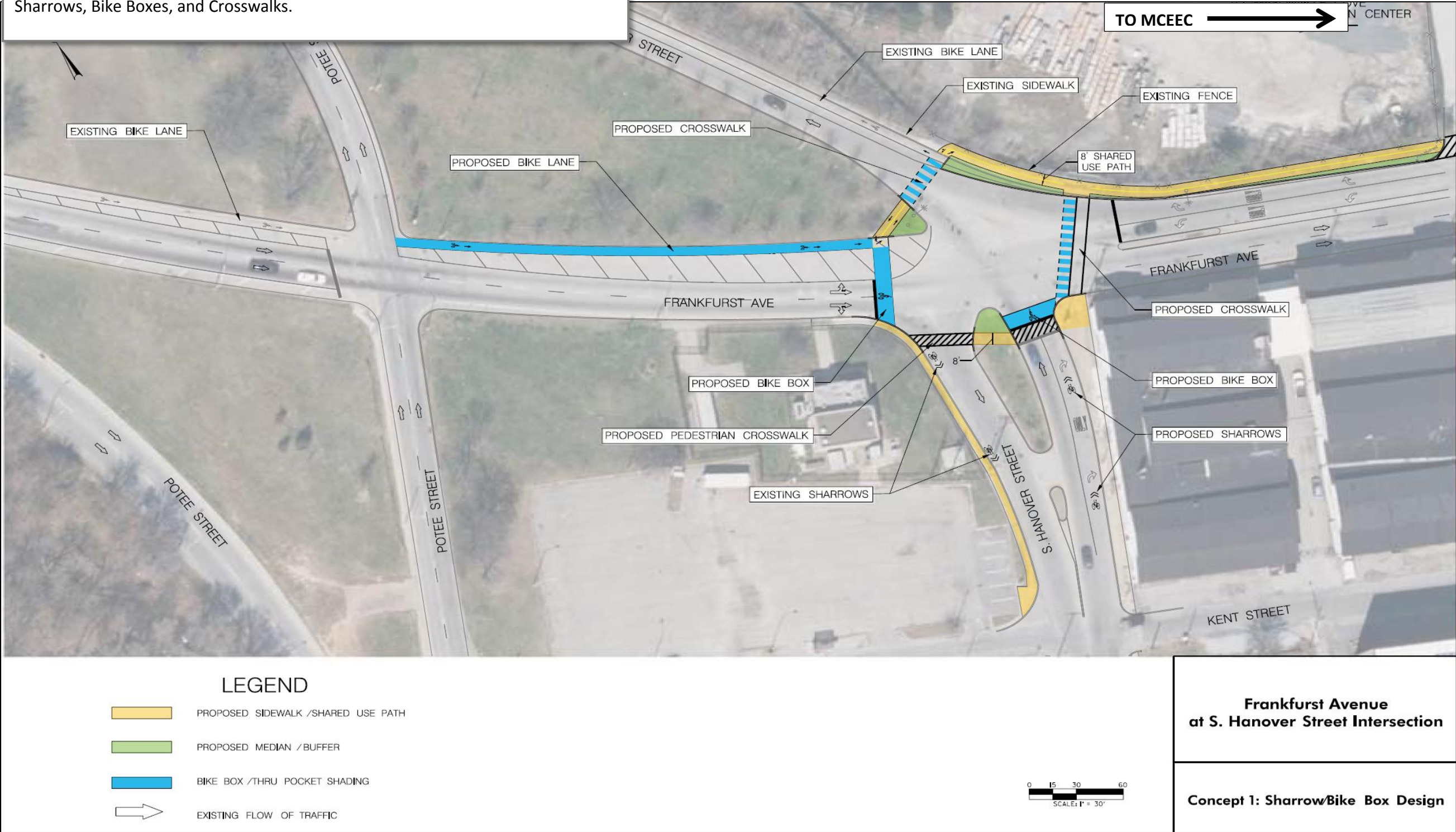
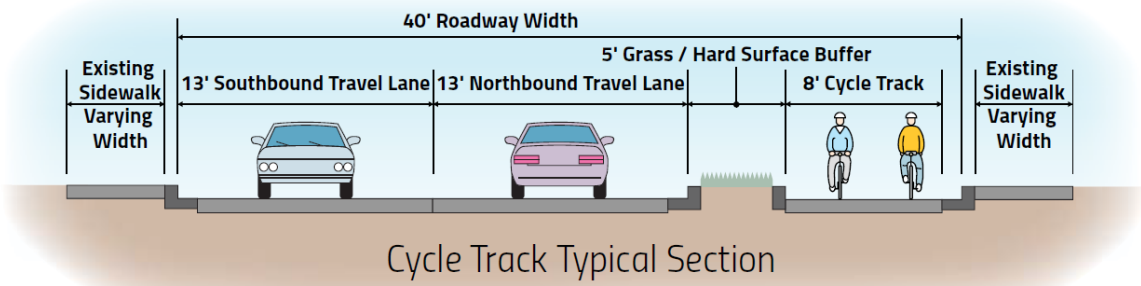
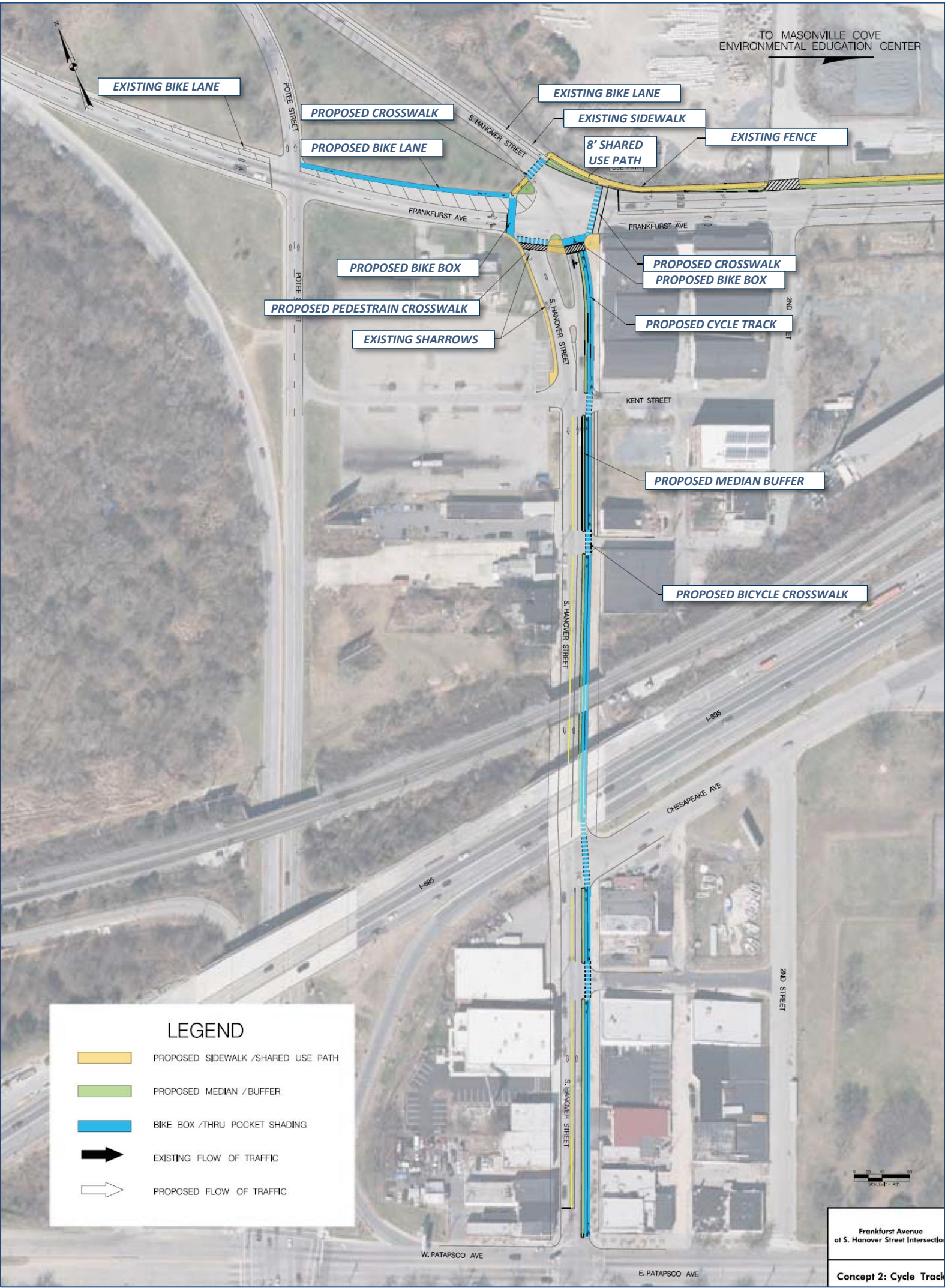


Figure 4-3. Intersection Improvements Concept 2.

Cycle Track and Typical Section.



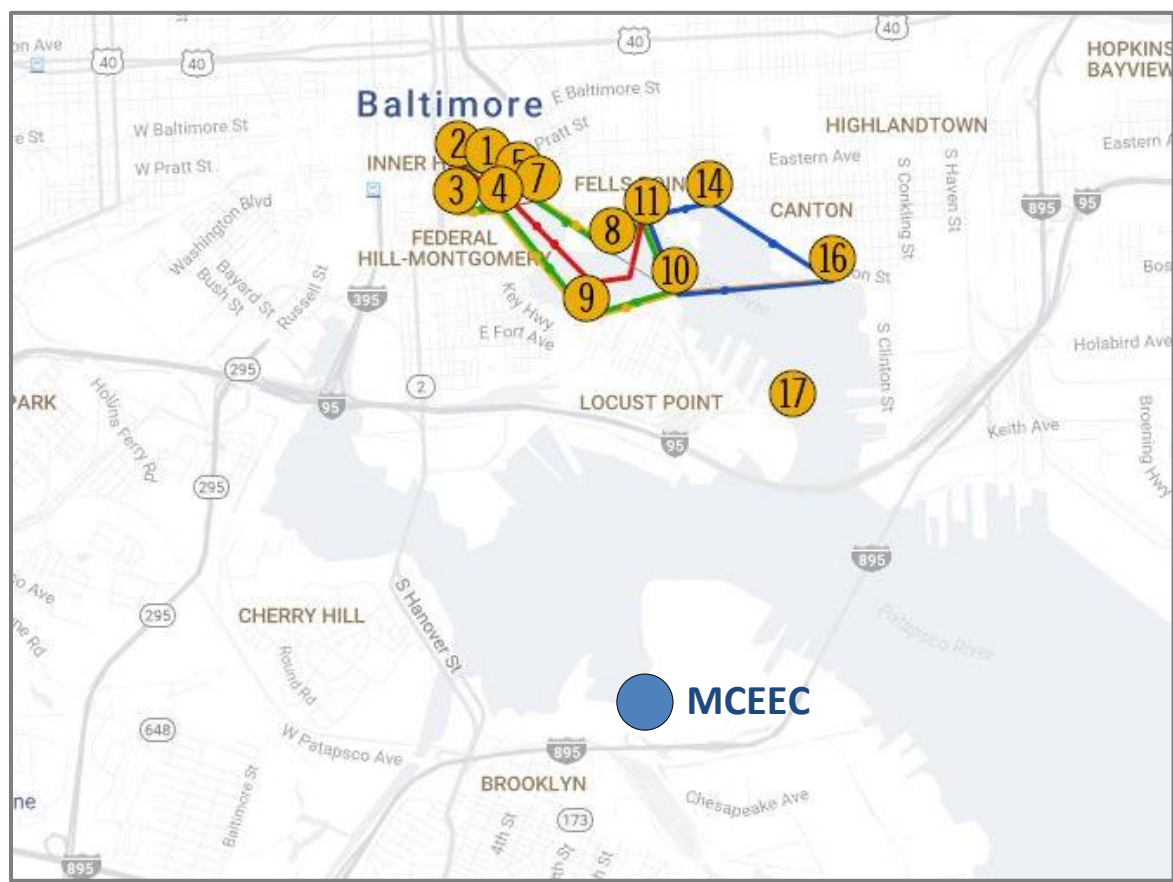


Figure 4-4. Baltimore Water Taxi Stops.

Source: <https://baltimorewatertaxi.com/routes/>

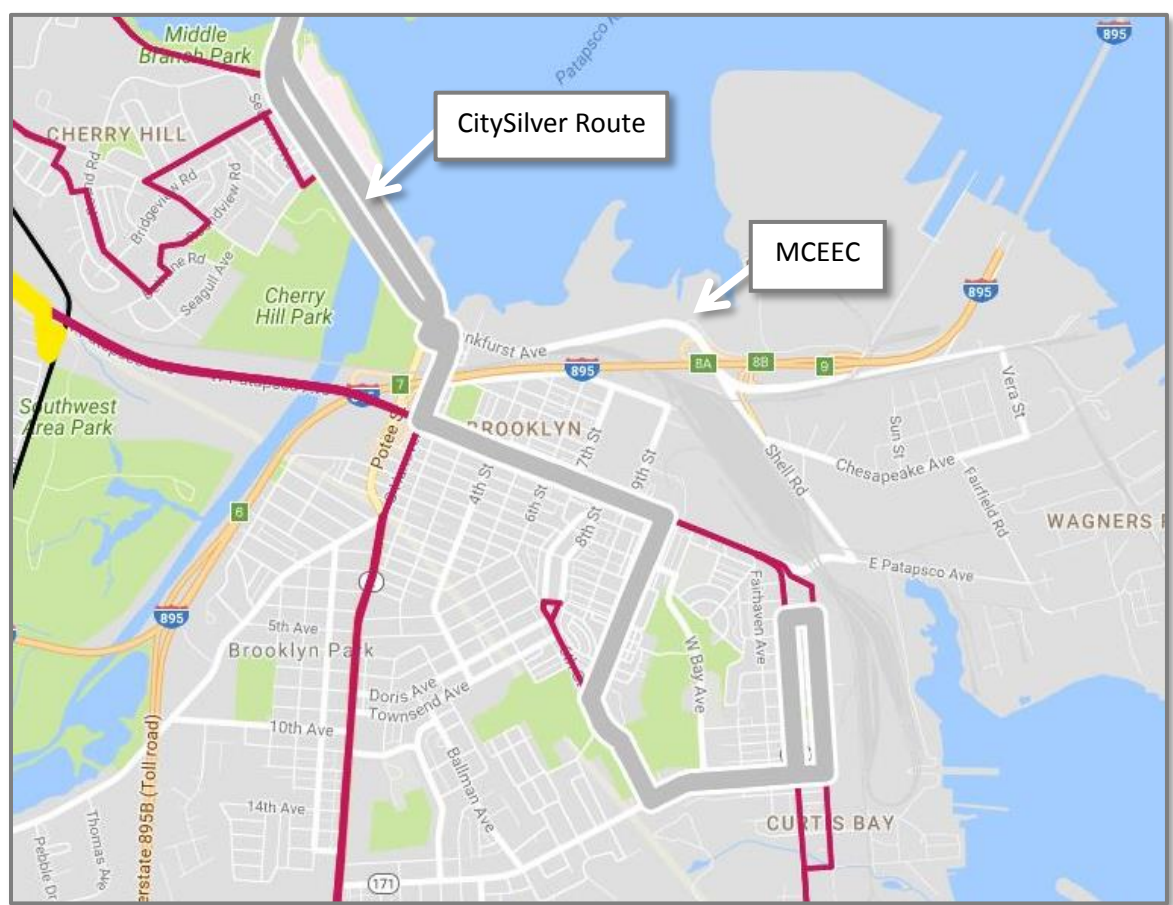


Figure 4-5. MDOT MTA CitySilver Route.

Source: <https://baltimorelink.com/baltimorelink-system-maps/interactive-system-map>

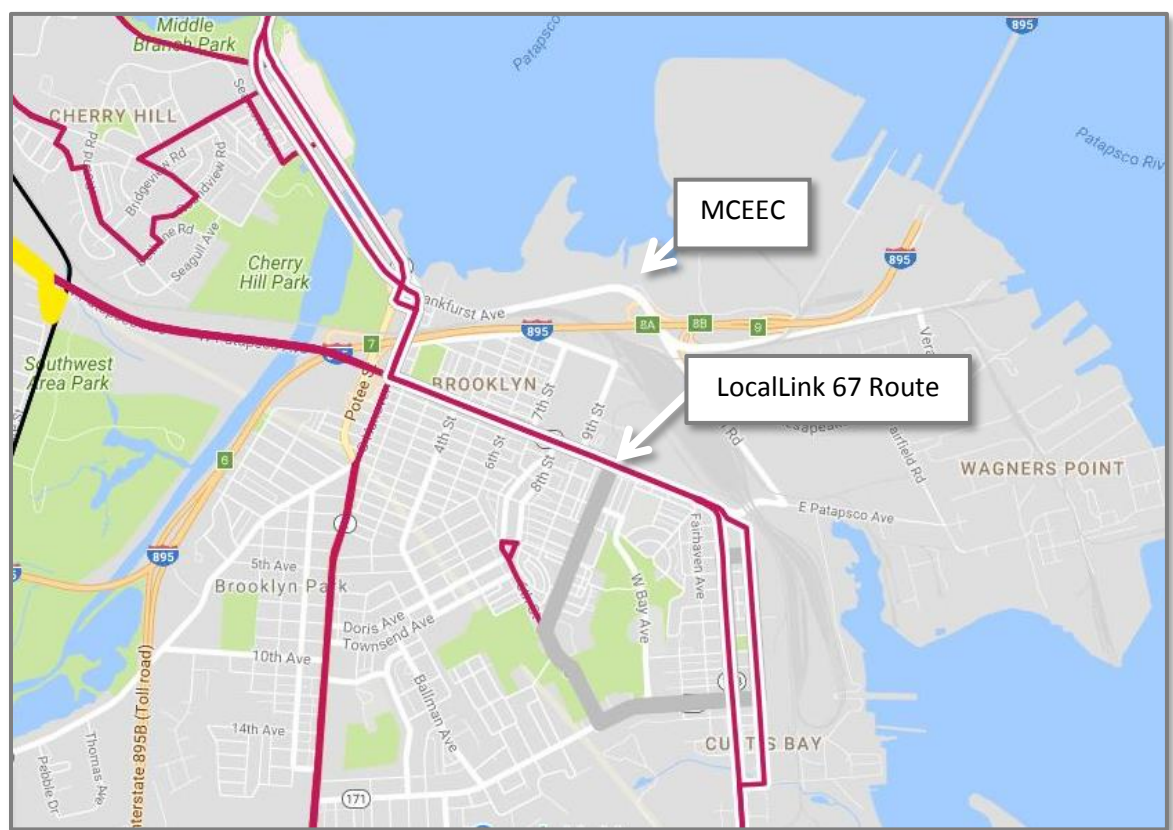


Figure 4-6. MDOT MTA LocalLink 67 Route.

Source: <https://baltimorelink.com/baltimorelink-system-maps/interactive-system-map>

4 Results of Analysis

The following summary outlines both short-term and long-term multi-modal transportation improvements that were identified as possible options for further investigation to improve public access to Masonville Cove and the MCEEC for local communities. Some options were removed from consideration due to safety concerns, high operation costs, and/or coordination challenges.

4.1 Removed From Consideration

4.1.1 Intersection Improvements Concept 1: Sharrows, Bike Boxes, Crosswalks

Concept 1, which considered sharrows, bike boxes, and crosswalks, was eliminated because it does not provide the safest option for bicyclists trying to access the MCEEC. Bicycle safety is best achieved with a separated or protected bike facility, which is not achieved with this option.

4.1.2 Shuttle – Contract Provider

This option was removed from consideration due to its high operational costs. Providing a consistent and reliable transportation service is part of the purpose and need of the study. This option comes at an exceedingly high cost with no guarantee of ridership.

4.1.3 Shuttle – Locally Operated Provider Partnership

This option was removed from consideration due to high costs and coordination challenges. Even with lower costs due to partnership shared responsibility, the challenges that arise from having to coordinate with riders not intending to come to the MCEEC limits flexibility and reliability of the service. Also, there is no guarantee for ridership, which means the sponsoring entity could be effectively subsidizing the cost for its potential partner's transportation needs.

4.1.4 Baltimore Water Taxi

This option was removed from consideration at this time as its benefit is primarily to communities outside of the immediate vicinity of Masonville Cove; in addition MDOT MPA determined that there are considerable issues surrounding navigation safety, protection of in-water mitigation structures, and the potential need to construct additions to the pier to facilitate docking.

4.2 Possible Short-term Options

4.2.1 Rideshare (Lyft/Uber)

To immediately address the need for improved public access to Masonville Cove for the communities of Brooklyn, Cherry Hill and Curtis Bay, rideshare offers the most economical and demand-driven solution. By establishing an account, the sponsoring entity or account holder can allow all persons who wish to visit the facility to do so free of charge. Either the visitors or the account holder can contact the rideshare service electronically and arrange transportation. The account can have fixed prices and is available on a first-come first-served basis. This approach

would allow the sponsoring entity to evaluate the level of demand for the facility and adjust the corporate account accordingly. The rideshare program could be promoted on the MCEEC website and at local community groups.

4.2.2 Kayak

Continued partnering with CKC will likely encourage kayakers to dock at Masonville Cove and enjoy the facility. During special events or programming at the MCEEC, advertisements or promotions could be run with CKC to better inform kayakers of the MCEEC facility.

4.3 Possible Long-term Options

4.3.1 Intersection Improvements Concept 2: Cycle Track

This concept, which provides a protected bicycle facility (cycle track) on S. Hanover Street between Patapsco Avenue and Frankfurst Avenue, may provide an option to connect the communities of Brooklyn and Curtis Bay to Frankfurst Avenue. From Frankfurst Avenue, the separate shared use path could connect bicyclist and pedestrians to the entrance of the MCEEC. This option would require significant additional engineering and safety analysis. Continued coordination with adjacent property owners would be necessary and ongoing.

4.3.2 Shuttle – Purchase

Purchasing a vehicle offers the most flexibility, but is also the least expensive shared use mobility option while providing the most consistent and reliable transportation service. By owning the vehicle, the sponsoring entity controls the vehicle driver, the schedule and frequency, and who can receive the service. Though the upfront capital cost may be large depending on the type of preferred vehicle, the operational costs are substantially lower, meaning year one's capital and operational cost could potentially be lower than all other transportation alternatives except for rideshare.

4.3.3 Shuttle – Rental

Using the assumptions of 372 yearly trips does make costs for this service high; however, the flexibility of using this service on an as-needed basis does make it a potentially viable option, especially for use during specific MCEEC events.

4.3.4 MDOT MTA Transit

The current plans for MDOT MTA transit access do not include a bus stop near the MCEEC; however, options offered by MDOT MTA for last mile connections may provide a level of enhanced access for some visitors.

5 Conclusion

The investigation of the various options and communication with the Masonville Partners and surrounding communities found that there are some potentially viable options that could improve access to MCEEC in both the short-term and long-term, including shared use mobility, marine, transit and a shared path and intersection improvement concept. Further discussion between Baltimore City and land owners along Frankfurst Avenue and S. Hanover Street would need to continue in order for any multi-modal access projects to move forward. Further analysis of engineering, safety, compatibility, utility relocations, and other factors that may be encountered during construction, would be required by any parties considering advancing any of the options identified in this study. MDOT MPA provides this Masonville Cove Multi-modal Transportation Feasibility Study as feasibility level information for future planning purposes to enhance safe public access to Masonville Cove for the neighboring communities.



APPENDIX A

SUMMARY OF COMMUNITY MEETINGS

SUMMARY OF COMMUNITY MEETINGS AND COMMENTS

March 16, 2017

May 18, 2017

Benjamin Franklin High School

Overview

Attendees viewed options presented by MDOT MPA and the project team that showed the most feasible options to potentially improve access to Masonville Cove. The meetings were poster style, allowing community members to view the existing conditions and potential multi-modal transportation options with project team members at each poster.

Community and Stakeholders Comments Summarized

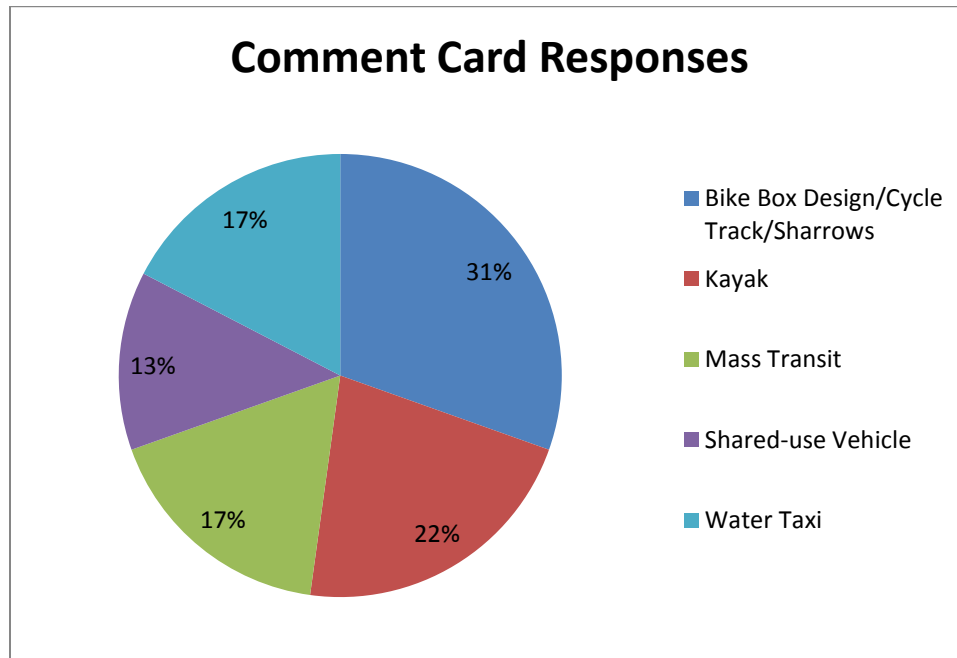
Community members stated that a bike path or shuttle would be the best options for access to the MCEEC.

The MDOT MTA bus could be another option, but there is a lack of ridership. They asked if funding sources had been identified, if easements along Frankfurst Avenue exist, and if the Multi-modal Transportation Feasibility Study report will be shared with community groups. One community member asked if there would be liabilities associated with using rideshare services.

The Stakeholders expressed that better signage for the Masonville Campus is needed to increase visitors; additional hours of operation would potentially increase visitorship. It was suggested that in the future if an organization desires to engage with the Latino community Spanish speaking robo-calls be used.

Community Response

Attendees of the March 2017 community meeting from the target communities and other interested communities provided comments via comment cards. Based upon the comments received the graph below depicts the modes most likely to be used to access Masonville Cove. Respondents were able to mark more than one mode of access.



Local Industry Comments Summarized

Following the final community meeting, local industry members expressed concerns about zoning of the areas along Frankfurst Avenue and S. Hanover Street. They would like the area zoning to be considered before any changes or easements are made. Industry attendees also stated they have safety concerns for pedestrians, and that a sidewalk should not be constructed adjacent to and in direct interference with the existing businesses.

Baltimore City Agencies

Baltimore City agencies were invited to the community meetings, and were consulted during the development of the pedestrian and bicycle multi-modal options. It was expressed that the local government agencies would support pedestrian and bicycle concepts that were beneficial to the communities and industries surrounding Masonville Cove. They suggested that the community and industry representatives communicate about pedestrian and bicycle access along Frankfurst Avenue and S. Hanover Street.



APPENDIX B

KEY TERMS

Bike Box

An area at an intersection approach in front of the stop bar (usually ten feet) that allows a bicyclist an area to wait in front of vehicular traffic (shown in green here).



Bike Lane(s)

An area on the roadway (~5 ft wide), usually along the curb, and specifically marked for use by bicyclists.

photo courtesy bikepedmemphis.com



Buffer

A specified area (can be grass or paved/hard surface) that is designated to create a certain amount of separation between vehicles and other forms of transportation (bicycles and pedestrians).

photo courtesy westword.com



Cycle Track

A section on one side of the roadway, separated from vehicle traffic, designated for use by bicyclists in both directions.

photo courtesy Flickr user "jacobuptown"



Pinch Point

A location along a design where another feature (existing utility pole, fence, wall, guardrail, building, etc.) does not allow for the desired width of sidewalk and/or shared use path at that particular location.



Shared Use Path

A pathway along the curb that can be used by both pedestrians and bicycles.

photo courtesy bikepedmemphis.com



Sharrow(s)

A pavement marking to denote shared vehicle and bicycle travel, represented by a bicycle and two arrows pointing in the direction of travel.





APPENDIX C
SHARED USE PATH AND
INTERSECTION IMPROVEMENT
CONSIDERATIONS

| Frankfurst Avenue Shared Use Path Description | | |
|---|--|---|
| | <ul style="list-style-type: none"> • Off-road, separated shared use path. • Located on the westbound side of Frankfurst Avenue, from the front door of Masonville Cove Environmental Educational Center (MCEEC) to the intersection of Frankfurst Avenue at S. Hanover Street. • Path averages 8 feet wide with 5-foot buffer from curb to path. • Multiple pinch points exist that reduce the path and/or buffer width. • Included in Concept 1 and Concept 2. | |
| Intersection Improvement | Concept 1: Sharrows, Bike Boxes, Crosswalks | Concept 2: Concept 1 + Cycle Track |
| Bike Considerations | <ul style="list-style-type: none"> • Adds bike lane on the eastbound approach. • Adds bike boxes on southern and western legs of the intersection. • Adds crosswalks at the northern, eastern, and southern legs of the intersection. • Adds sharrows on northbound approach. • Bicycle safety along the path must be further analyzed. | <ul style="list-style-type: none"> • Adds bike lane on the eastbound approach. • Adds bike boxes on southern and western legs of the intersection. • Adds crosswalks at the northern, eastern, and southern legs of the intersection. • Adds a 2-way, protected cycle track on northbound S. Hanover Street between Frankfurst Avenue and Patapsco Avenue. • Bicycle safety along the path must be further analyzed. |
| Pedestrian Considerations | <ul style="list-style-type: none"> • Adds crosswalks at northern, eastern, and southern legs of intersection. • Pedestrian safety along the path must be further analyzed. | <ul style="list-style-type: none"> • Adds crosswalks at northern, eastern, and southern legs of intersection. • Pedestrian safety along the path must be further analyzed. |
| Vehicle Considerations | <ul style="list-style-type: none"> • Vehicles making a right turn onto Frankfurst Avenue from S. Hanover St. dedicated lane must yield to bikes and pedestrians. | <ul style="list-style-type: none"> • Cuts northbound S. Hanover Street down to one lane from two (removing the dedicated right turn lane). Vehicles making a right turn on to Frankfurst Avenue must yield to bikes and pedestrians. • Would require eliminating on-street parking on South Hanover Street south of Chesapeake Avenue. |
| Traffic Impacts | Minimal | Moderate |

| Frankfurst Ave Shared Used Path: Asphalt | | | | Masonville | |
|--|------|-----------|----------|------------|------------------|
| | Unit | Unit Cost | Quantity | Cost | Totals |
| CATEGORY 1 - MOT: % of categories 2, 4, 5, and 6 | | | | 30% | \$51,169 |
| CATEGORY 2 - EARTHWORK | | | | | \$0 |
| CATEGORY 3 - DRAINAGE | | | | 15% | \$25,585 |
| CATEGORY 4 - STRUCTURES | | | | | \$0 |
| CATEGORY 5 - PAVEMENT | | | | | \$5,113 |
| 10 Inch White Reflective Thermoplastic Pavement Markings | LF | \$3 | 285 | \$713 | |
| 8 Inch Portland Cement Concrete for Driveways | SY | \$80 | 55 | \$4,400 | |
| CATEGORY 6 - SHOULDERS | | | | | \$165,450 |
| Combination Curb and Gutter Any Height | LF | \$29 | 350 | \$10,150 | |
| 6 Inch Aggregated Base Course | SY | \$30 | 3,260 | \$97,800 | |
| Superpave Asphalt Mix for Surface, PG 64S-22, Level 2 | TON | \$100 | 575 | \$57,500 | |
| CATEGORY 7 - LANDSCAPING | | | | | \$6,357 |
| Placing Furnished Topsoil 4 Inch Depth | CY | \$10 | 489 | \$4,890.00 | |
| Turfgrass Sod Establishment | CY | \$3 | 489 | \$1,467.00 | |
| CATEGORY 8 - TRAFFIC | | | | | \$0 |
| Utilities: % of categories 1-3, 5-8 | | | | 0% | \$0 |
| CONSTRUCTION SUBTOTAL | | | | | \$253,673 |
| Contingency | | | | 30% | \$76,101 |
| Admin / Overhead | | | | 15.3% | \$11,644 |
| Total Construction | | | | | \$341,418 |
| Preliminary Engineering | | | | 15% | \$51,213 |
| ROW | | | | | \$0 |
| TOTAL COST | | | | | \$392,631 |
| ROUNDED TOTAL COST | | | | | \$400,000 |

* Total costs are 2017 estimates and do not include potential maintenance costs

Key Terms

MOT – maintenance of traffic
ROW – right of way

| Frankfurt Avenue Shared Used Path: Pervious Pavement | | Masonville | | | |
|---|------|------------|----------|------------|------------------|
| | Unit | Unit Cost | Quantity | Cost | Totals |
| CATEGORY 1 - MOT: % of categories 2, 4, 5, and 6 | | | | 30% | \$133,981 |
| CATEGORY 2 - EARTHWORK | | | | | \$0 |
| CATEGORY 3 - DRAINAGE | | | | 10% | \$44,660.25 |
| CATEGORY 4 - STRUCTURES | | | | | \$0 |
| CATEGORY 5 - PAVEMENT | | | | | \$5,113 |
| <i>10 Inch White Reflective Thermoplastic Pavement Markings</i> | LF | \$3 | 285 | \$713 | |
| <i>8 Inch Portland Cement Concrete for Driveways</i> | SY | \$80 | 55 | \$4,400 | |
| CATEGORY 6 - SHOULDERS | | | | | \$441,490 |
| <i>Combination Curb and Gutter Any Height</i> | LF | \$29 | 350 | \$10,150 | |
| <i>Pervious 5 Inch Concrete Sidewalk</i> | SF | \$12 | 29,345 | \$352,140 | |
| <i>No. 57 Stone for Pervious 5 Inch Concrete Sidewalk</i> | TON | \$60 | 1,320 | \$79,200 | |
| CATEGORY 7 - LANDSCAPING | | | | | \$6,357 |
| <i>Placing Furnished Topsoil 4 Inch Depth</i> | CY | \$10 | 489 | \$4,890.00 | |
| <i>Turfgrass Sod Establishment</i> | CY | \$3 | 489 | \$1,467.00 | |
| CATEGORY 8 - TRAFFIC | | | | | \$0 |
| Utilities: % of categories 1-3, 5-8 | | | | 0% | \$0 |
| CONSTRUCTION SUBTOTAL | | | | | \$631,601 |
| Contingency | | | | 30% | \$189,480.15 |
| Admin / Overhead | | | | 15.0% | \$28,422 |
| Total Construction | | | | | \$849,503 |
| Preliminary Engineering | | | | 15% | \$127,425 |
| ROW | | | | | \$0 |
| TOTAL COST | | | | | \$976,928 |
| ROUNDED TOTAL COST | | | | | \$980,000 |

* Total costs are 2017 estimates and do not include potential maintenance costs

Key Terms

MOT – maintenance of traffic

ROW – right of way

| Intersection Improvements Concept 1: Impervious Pavement | | | Masonville | | |
|---|------|-----------|------------|-----------|------------------|
| | Unit | Unit Cost | Quantity | Cost | Totals |
| CATEGORY 1 - MOT: % of categories 2, 4, 5, and 6 | | | | 30% | \$15,317.70 |
| CATEGORY 2 - EARTHWORK | | | | | \$0 |
| CATEGORY 3 - DRAINAGE | | | | 15% | \$7,658.85 |
| CATEGORY 4 - STRUCTURES | | | | | \$0 |
| CATEGORY 5 - PAVEMENT | | | | | \$40,384 |
| 24 Inch White Reflective Thermoplastic Pavement Markings | LF | \$4 | 90 | \$360 | |
| 10 Inch White Reflective Thermoplastic Pavement Markings | LF | \$3 | 80 | \$200 | |
| Bike Lane Preformed Pavement Marking with Arrow | SF | \$30 | 20 | \$600 | |
| Bike Lane Preformed Pavement Marking w/out Arrow | SF | \$20 | 10 | \$200 | |
| Sharrow | SF | \$28 | 18 | \$504 | |
| Bike Box/Bike Lane Paint | SF | \$12 | 3,210 | \$38,520 | |
| CATEGORY 6 - SHOULDERS | | | | | \$10,675 |
| Combination Curb and Gutter Any Height | LF | \$29 | 185 | \$5,365 | |
| 5 Inch Concrete Sidewalk | SF | \$6 | 885 | \$5,310 | |
| CATEGORY 7 - LANDSCAPING | | | | | \$0 |
| CATEGORY 8 - TRAFFIC | | | | | \$240,000 |
| Signal Modifications | EA | \$60,000 | 4.0 | \$240,000 | |
| Utilities: % of categories 1-3, 5-8 | | | | 0% | \$0 |
| CONSTRUCTION SUBTOTAL | | | | | \$314,036 |
| Contingency | | | | 30% | \$94,210.67 |
| Admin / Overhead | | | | 15.0% | \$14,132 |
| Total Construction | | | | | \$422,378 |
| Preliminary Engineering | | | | 15% | \$63,357 |
| ROW | | | | | \$0 |
| TOTAL COST | | | | | \$485,734 |
| ROUNDED TOTAL COST | | | | | \$490,000 |

* Total costs are 2017 estimates and do not include potential maintenance costs

Key Terms

MOT – maintenance of traffic

ROW – right of way

| Intersection Improvements Concept 2: Cycle Track | | | Masonville | | |
|---|------|-----------|------------|------------|------------------|
| | Unit | Unit Cost | Quantity | Cost | Totals |
| CATEGORY 1 - MOT: % of categories 2, 4, 5, and 6 | | | | 30% | \$79,284.75 |
| CATEGORY 2 - EARTHWORK | | | | | \$0 |
| CATEGORY 3 - DRAINAGE | | | | 15% | \$39,642.38 |
| CATEGORY 4 - STRUCTURES | | | | | \$0 |
| CATEGORY 5 - PAVEMENT | | | | | \$175,433 |
| <i>24 Inch White Reflective Thermoplastic Pavement Markings</i> | LF | \$4 | 100 | \$400 | |
| <i>10 Inch White Reflective Thermoplastic Pavement Markings</i> | LF | \$3 | 725 | \$1,813 | |
| <i>5 Inch White Reflective Thermoplastic Pavement Markings</i> | LF | \$1 | 1,200 | \$1,200 | |
| <i>5 Inch Yellow Reflective Thermoplastic Pavement Markings</i> | LF | \$1 | 1,900 | \$1,900 | |
| <i>Bike Lane Preformed Pavement Marking with Arrow</i> | SF | \$30 | 120 | \$3,600 | |
| <i>Bike Lane Preformed Pavement Marking w/out Arrow</i> | SF | \$20 | 10 | \$200 | |
| <i>Bike Box/Bike Lane Paint</i> | SF | \$12 | 13,860 | \$166,320 | |
| CATEGORY 6 - SHOULDERS | | | | | \$88,850 |
| <i>Combination Curb and Gutter Any Height</i> | LF | \$29 | 2,650 | \$76,850 | |
| <i>5 Inch Concrete Sidewalk</i> | SF | \$6 | 2,000 | \$12,000 | |
| CATEGORY 7 - LANDSCAPING | | | | | \$2,210 |
| <i>Placing Furnished Topsoil 4 Inch Depth</i> | CY | \$10 | 170 | \$1,700.00 | |
| <i>Turfgrass SOD Establishment</i> | CY | \$3 | 170 | \$510.00 | |
| CATEGORY 8 - TRAFFIC | | | | | \$240,000 |
| <i>Signal Modifications</i> | EA | \$60,000 | 4.0 | \$240,000 | |
| Utilities: % of categories 1-3, 5-8 | | | | 0% | \$0 |
| CONSTRUCTION SUBTOTAL | | | | | \$625,420 |
| Contingency | | | | 30% | \$187,625.89 |
| Admin / Overhead | | | | 15.0% | \$28,144 |
| Total Construction | | | | | \$841,189 |
| Preliminary Engineering | | | | 15% | \$126,178 |
| ROW | | | | | \$0 |
| TOTAL COST | | | | | \$967,368 |
| ROUNDED TOTAL COST | | | | | \$970,000 |

* Total costs are 2017 estimates and do not include potential maintenance cost

Key Terms

MOT – maintenance of traffic

ROW – right of way



APPENDIX D

SHARED USE MOBILITY CONSIDERATIONS AND COSTS

| Hours of Operation Assumptions | | | | | | | | | | |
|--------------------------------|-----------------------------|----------------------|----------------------|--------------------------------|--------------------|---|--------------------------|--------------------|--------------------------------------|--------------------|
| Hours Per Day | Total Hours Per Weekday (5) | Hour Per Weekend (1) | Total Hours Per Week | Daily Round Trips (Non-summer) | Total Weekly Trips | Total Yearly Non-summer Trips =38 Weeks | Daily Round Trips Summer | Total Weekly Trips | Total Yearly Summer Trips = 12 Weeks | Total Yearly Trips |
| 7 | 35 | 4 | 39 | 1 | 6 | 228 | 2 | 12 | 144 | 372 |

| Shuttle - Contract Provider Assumptions & Costs | |
|---|--------------------|
| Total Yearly Round Trips (Non-summer + Summer) | 372 |
| Per Hour Cost | \$110-\$120 |
| Driver's Tip: (20.00%) | \$22-\$24 |
| Fuel Surcharge: (9.00%) | \$9-10 |
| Transaction Fee: (3.65%) | \$4 |
| Estimated Total (Hourly): | \$145-\$158 |
| Total 3 Hours | \$435-\$474 |
| Total Yearly Cost | \$130,200 |

| Shuttle – Locally Operated Provider Partnership Assumptions & Costs | |
|---|-------------------|
| Total Yearly Round Trips (Non-summer + Summer) | 372 |
| Per Hour Cost | \$110-\$120 |
| Driver's Tip: (20.00%) | \$22-\$24 |
| Fuel Surcharge: (9.00%) | \$9-10 |
| Transaction Fee: (3.65%) | \$4 |
| Estimated Total (Hourly): | \$145-\$158 |
| Total 3 Hours | \$435-\$474 |
| Total Yearly Cost | \$130,200 |
| 25% reduction in cost for partnership shared use | (\$32,550) |
| Total Yearly Cost | \$97,650 |

| Shuttle - Purchase Assumptions & Costs | |
|---|---------|
| Total Yearly Round Trips (Non-summer + Summer) | 372 |
| 40 Gal Fuel Tank at 16 miles per gal at \$3.5 per gal | \$1,575 |
| Insurance - \$350 monthly | \$4,200 |
| General Maintenance* | \$1,000 |
| Total Yearly Operational Cost (minus purchase price)** | \$6,775 |

*Assumes 12 miles per trip round trip 24 miles for 6 days a week =144 miles a week *50 weeks a year =7200 max miles driven a year (2 oil change a year). Also assume other general items such as tire replacement, tune-ups etc.

** Purchase prices range from \$6,000 - \$20,000



| Shuttle -Rental Assumptions & Costs | |
|--|----------|
| Per Round Trip | \$210 |
| Rental Days Per week | 6 |
| Cost Per week | \$1,260 |
| Total Weeks (yr) | 50 |
| Total Cost for Year | \$63,000 |

| Rideshare Assumptions & Costs | |
|-----------------------------------|----------------|
| Cost Per Round Trip | \$22 |
| Round Trips Per Week (Non-summer) | 6 |
| Cost Per week | \$132 |
| Number of Weeks (Non-summer) | 38 |
| Total Cost for Non-summer | \$5,016 |
| | |
| Cost Per Round Trip | \$22 |
| Round Trips Per Week (Summer) | 12 |
| Cost Per week | \$264 |
| Number of Weeks (Summer) | 12 |
| Total Cost for Summer | \$3,168 |
| | |
| Total Cost for Year | \$8,184 |



APPENDIX E

MARINE CONSIDERATIONS

| | Baltimore Water Taxi | Kayak |
|-----------------------------|--|--|
| |  |  |
| Description | The Baltimore Water Taxi service plans to expand service into the Middle Branch with potential stops at Port Covington and Cherry Hill. A stop at the Masonville Cove Environmental Education Center (MCEEC) could also be considered, if feasible and warranted. | The MCEEC currently allows kayakers to visit the campus. It is the responsibility of kayakers to know the rules of the Patapsco River to assure safe navigation of the waters, as it is a working commercial harbor. |
| Considerations | <ul style="list-style-type: none"> • Could provide additional access to the MCEEC during hours of operation • Could expand the MCEEC visitor market • Ridership would need to justify the need for a stop • Landing dock must be able to accommodate this type of vessel • A safe route for navigation to the dock would be required, and vessel traffic must not impact existing in-water mitigation including reefballs. • Additional safety and security measures may be required • Visitors would need to walk from the dock to the MCEEC main entrance to sign in • Increased public marine access to the MCEEC site would need to be consistent with the mission and intent of the Masonville Cove wildlife refuge | <ul style="list-style-type: none"> • Provides additional access to the MCEEC • Rack space for kayaks is limited • Hours of operation are limited • Kayakers who are docking at the MCEEC must go up to the main entrance and sign in • Kayakers who are launching must carry their kayak to the dock from the parking lot, as no motorized vehicles are allowed on the site |
| Level of Flexibility | <p>Low</p> <ul style="list-style-type: none"> • If a stop were added, riders would be limited to the schedule and frequency of water taxi access determined by taxi company schedule within MCEEC operating hours | <p>High</p> <ul style="list-style-type: none"> • Access to the site is only limited by the hours of MCEEC site operations |