

Baltimore Metropolitan Council Regional MTA/LOTS Transfer Points Study Final - August 2019



Table of Contents

Chapter 1: Introduction, Background, and Schedules	1
Introduction & Background	1
Coordination among Baltimore Region Transit Providers	5
Bus Stop Planning Process	5
Transfer Fares	5
Transfer Information	6
Bus Route Schedules & Transferability	8
Annapolis Transit	9
Anne Arundel County Office of Transportation	10
Harford Transit LINK	11
Queen Anne’s County Ride	12
Regional Transit Administration of Central Maryland	12
Chapter 2: Existing Conditions	14
The Basis of ADA Compliance	14
Methodology	15
Identification of Transfer Stops	15
Assessment	16
Annapolis Transit & Anne Arundel County Office of Transportation	18
Harford Transit LINK	19
Queen Anne’s County Ride	20
Regional Transit Administration of Central Maryland	21
Other Observations & Impediments to Connectivity	22
Chapter 3: Recommended Improvements	23
Prioritization.....	23
Regional Transit Centers.....	24
Annapolis Transit	27
Anne Arundel County OOT	27
Harford Transit LINK	28

Maryland Transit Administration (MTA).....29

Queen Anne’s County Ride.....29

Regional Transit Administration of Central Maryland.....30

Conclusions.....31

Appendix A: Field Survey Data Dictionary

Appendix B: Scheduled Transfers Summary Tables

Appendix C: Annapolis Transit Stop Improvement Profiles

Appendix D: Anne Arundel OOT Stop Improvement Profiles

Appendix E: Harford Transit LINK Stop Improvement Profiles

Appendix F: Queen Anne’s County Ride Stop Improvement Profiles

Appendix G: Regional Transit Administration of Central Maryland Stop Improvement Profiles

Appendix H: Prioritization Rankings

Chapter 1: Introduction, Background and Schedules

INTRODUCTION & BACKGROUND

This report serves as the final, comprehensive document for the Regional MDOT MTA/LOTS (Locally Operated Transit Systems) Transfer Study, commissioned by BMC and completed by KFH Group, Inc. This report has re-organized and refined the prior project technical memorandums into the following three chapters. Included within this report are appendices that contain improvement profiles, line-item cost estimates, and LOTS/MDOT MTA transfer tables for each transfer location.

Multiple transportation providers offer service throughout the Baltimore region; however, this report specifically examines the transfer locations of the following public transportation providers:

Figure I-1: Connecting Public Transportation Providers in the Baltimore Region



Annapolis Transit
City of Annapolis



Office of Transportation
Anne Arundel County



County Ride
Queen Anne's County



Harford Transit LINK
Harford County



MDOT-MTA
Commuter Bus, Light RailLINK,
Local Bus, MARC Commuter Rail
Greater Baltimore Region



Regional Transit Authority (RTA) of Central Maryland
Howard County

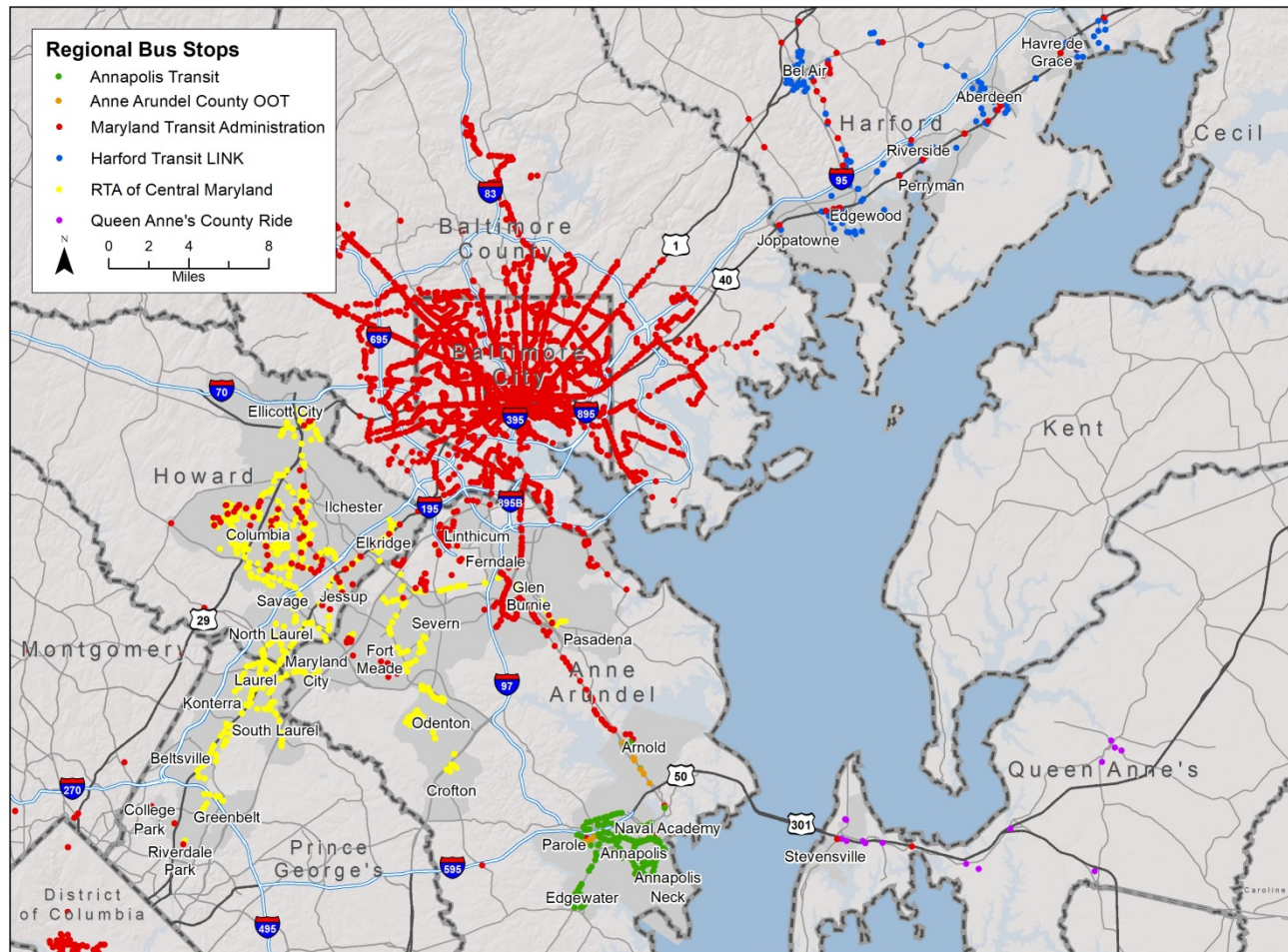
The Baltimore region has an estimated population of three million people and generates approximately 116 million transit trips annually. Many regional trips require a rider to transfer either within the same system or to/from another operator (see Figure 1-2). Seamless transfers throughout the region require coordination between the local transit providers.

Our research and field survey experience have shown there is limited coordination between the regional transit agencies when developing new services, routes, stops or schedules. In some cases, the extent of the coordination is attaching a bus stop sign on an existing bus stop pole of another operator. While stops may appear to be shared, there is minimal coordination on scheduling or sharing of the cost for any improvements and/or maintenance of passenger amenities at the stop. In other cases, different providers have stops located in close proximity to each other where there is no pedestrian connection or transfer information.

Table 1-1: Estimated Number of Transit Stops by Jurisdiction

Service Provider	Anne Arundel County	City of Annapolis	Baltimore County	City of Baltimore	Harford County	Howard County	Queen Anne's County
Annapolis Transit	52	101	-	-	-	-	-
Anne Arundel County Office of Transportation	21	-	-	-	-	-	-
MDOT MTA (CityLink, LocalLink, Commuter Bus, Express BusLink, MARC)	293	13	1,331	3,219	69	123	2
Harford Transit LINK	-	-	-	-	127	-	-
RTA of Central Maryland	140	-	-	-	-	472	-
County Ride	-	5	-	-	-	-	50
Charm City Circulator	-	-	-	108	-	-	-

Figure I-2: Bus Stops of the Baltimore Region



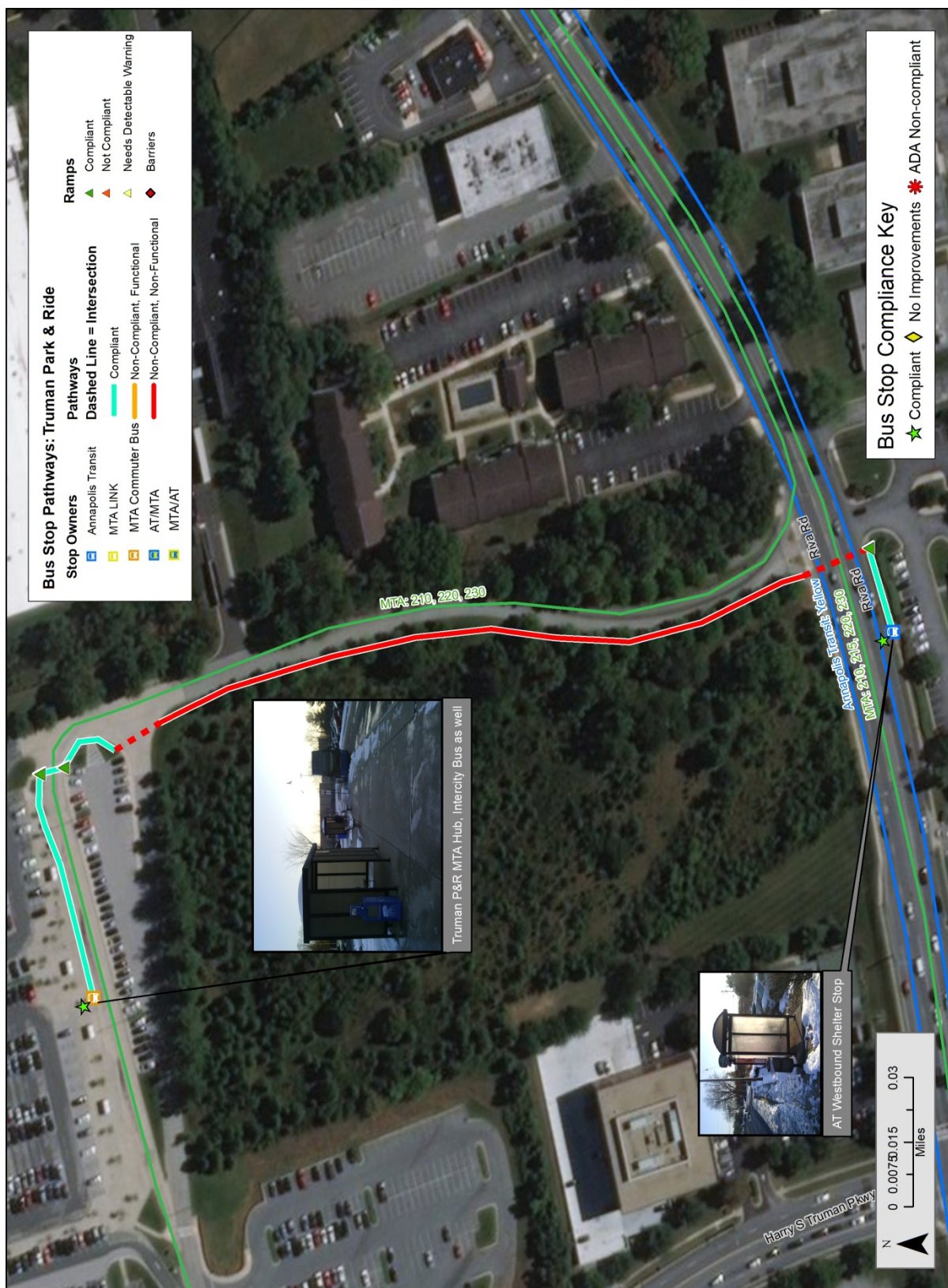
Source: imap.maryland.gov

Truman Park-&-Ride, the most trafficked park-&-ride lot for commuters in the Annapolis area, is indicative of the lack of coordination between transit providers. Over 500 people use MDOT MTA commuter bus service at the Truman Park-&-Ride every day. Both Annapolis Transit and Anne Arundel County Office of Transportation (OOT) operate services along Riva Rd, and Megabus has intercity service from Truman Park-&-Ride to New York City. Although it is a key thoroughfare for regional and national transportation, a lack of coordination between local and regional providers have made transfers at Truman extremely difficult. These oversights include:

- The two local providers that stop near the Park-&-Ride (Anne Arundel County OOT and Annapolis Transit) do not stop in the bus bay.
- The closest LOTS stop is nearly a quarter mile south of the Park-&-Ride on West Street.
- There is not a paved pathway connecting the West Street stop to the Park-&-Ride.
- Shelters at Truman Park-&-Ride do not provide any information about nearby LOTS services.

The following figure demonstrates the lack of coordination between regional providers.

Figure I-3: Truman Park & Ride Pathway Compliance Profile



COORDINATION AMONG BALTIMORE REGION TRANSIT PROVIDERS

Bus Stop Planning Process

One of the objectives of the study was to investigate and document the bus stop planning process for the MDOT MTA and the five LOTS included in the study.

At the time of this report, MDOT MTA was finalizing its first bus stop design guide. The guide provides detailed specifications for bus stop designs, a hierarchy of stops, and guidelines on the placement of passenger amenities. The MDOT MTA's guidelines are currently in draft form and unavailable for public distribution. Once available, they will be a valuable planning tool for regional providers.

The five LOTS included in this study do not have specific guidelines or a standardized process for the installation of bus stops and/or passenger amenities. Each of the LOTS indicated that bus stop planning is a necessary process that is highly variable by location. During the planning process, minimal coordination takes place between the LOTS and MDOT MTA.

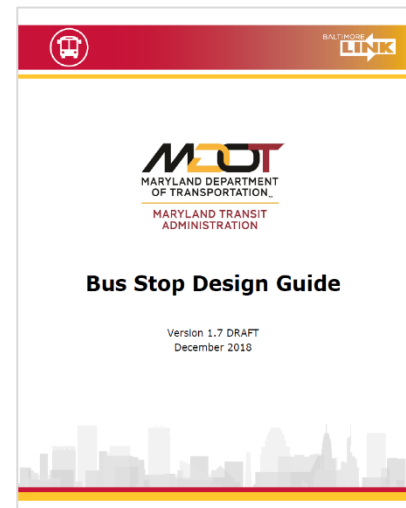


Figure I-4: MDOT MTA Bus Stop Design Guide (Currently in Draft Form)

Source: MDOT-MTA

Transfer Fares

In terms of transfer fares, there is limited coordination among the regional transit agencies. Currently, RTA of Central Maryland provides free transfers to CharmCard and SmarTrip card holders at designated transfer locations. Other than this arrangement there is no reciprocity between any of the other regional transit providers.

Despite the lack of fare coordination in the Baltimore region, the MDOT MTA's CharmCard has reciprocity with the Washington Metropolitan Area Transit Authority's (WMATA) SmarTrip. The fare cards are branded differently but they are one in the same. CharmCard holders may use their card for a trip on any of the Washington, D.C. regional transit providers; including Montgomery County's RideOn and Prince George's County's The Bus.



Figure I-5: CharmCard

Source: www.mta.maryland.gov

Displayed in Table 1-2 are the current fares for each of the five Baltimore area transit providers. Currently, there are no formal transfers between different providers other than the MDOT MTA and RTA. Among the local providers, intra-agency transfers are being phased out in favor of day passes that provide more convenience for both the rider and the agency.

Table 1-2: Baltimore Region Transit Provider Fares

Provider	Fare						
	Base Fare	Day Pass	Week Pass	Month Pass	Ride Passes	Transfer Fare	Other Fare Mediums
Annapolis Transit	\$2	\$4	\$20	\$80	-	No Transfers	-
Harford Transit LINK	\$1	-	-	-	\$10 (12-Rides)	Free (Valid for 2 hrs.)	Token Transit
MDOT MTA ¹	\$1.80	\$4.20	\$20	\$72	-	No Transfers	CharmCard CharmPass
Queen Anne's County Ride	\$3	\$5	-	\$80	\$30 (10-Rides)	Free (one-way trip)	-
RTA of Central Maryland	\$2	\$5	-	\$40	\$15 (10-Rides)	No Transfers ²	-

1. MTA fares are for regular service - Express BusLINK is \$2.30 per trip or \$90 for a 31-day pass; Commuter Bus fares vary by destination.

2. RTA provides free transfers for CharmCards and SmarTrips at designated transfer locations.

Transfer Information

The only marketing materials that highlight potential transfers are provided in RTA and MDOT MTA Commuter Bus schedules. RTA schedules include descriptions of other available transit services at certain stops. Figure 1-6 is the RTA's Route 201 schedule map. At Cromwell Light Rail Station, existing connections to MDOT MTA Light Rail Link and LocalLink services are listed. MDOT MTA Commuter buses utilized different symbols to indicate where other transit services were located, such as an "L" to indicate if a stop was at a light rail station, and an "M" to indicate if a stop was at a Baltimore Metro station. Figure 1-7 shows the legend used to distinguish available services at MDOT MTA Commuter Bus Stops.

Figure 1-6: RTA of Central Maryland Schedule Map with Transfer Information

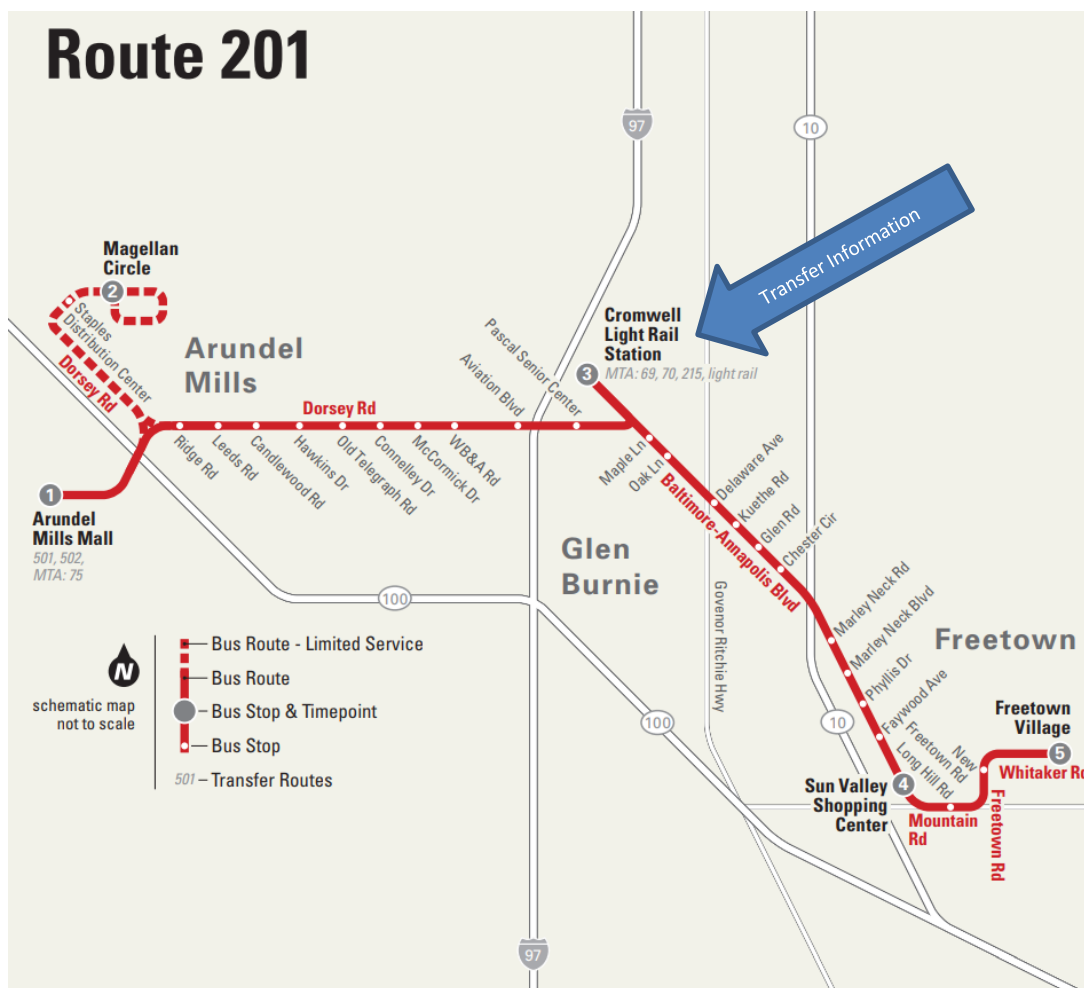
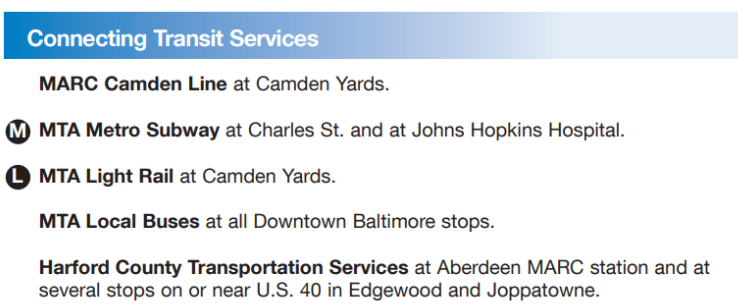


Figure 1-7: MDOT MTA Commuter Bus Transfer Legend



Source: mta.maryland.gov/schedule

BUS ROUTE SCHEDULES & TRANSFERABILITY

A main component of the pre-and-post survey desk review was analyzing MDOT MTA and LOTS schedules to determine the possibility and timing of transfers to other providers' services. For the purposes of this exercise, a maximum wait threshold was set at two hours. Figure 1-8 provides the total number of transfers available between providers within the region. The most possible transfers, 842, were found between RTA of Central Maryland and MDOT MTA LINK services. These connections were available almost entirely within RTA's Anne Arundel County service area.

Figure 1-8: Transfers between Regional Bus Services, Comprehensive

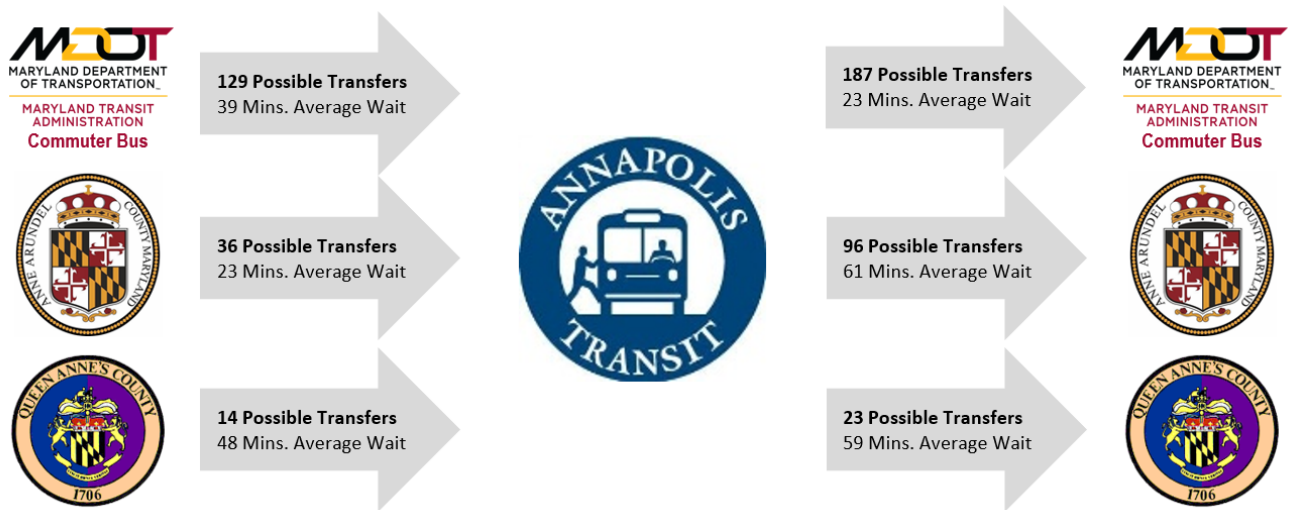
Provider	Annapolis Transit	Anne Arundel OOT	Harford Transit LINK	MDOT MTA Commuter	MDOT MTA LINK	Queen Anne's County Ride	RTA
Annapolis Transit	-	132	0	316	0	37	0
Anne Arundel OOT	132	-	0	136	221	23	NA
Harford Transit LINK	0	0	-	464	0	0	0
MDOT MTA Commuter	316	136	464	-	NA	32	632
MDOT MTA LINK	0	221	0	NA	-	0	842
Queen Anne's County Ride	37	23	0	32	0	-	0
RTA	0	NA	0	632	842	0	-

Transfers were further categorized by wait time: within fifteen minutes, between 15 and 30 minutes, between 30 minutes and one hour, and between one and two hours. Some stops analyzed in the field survey are not timed stops and therefore could not be analyzed for transferability. The following section provides a transfer analysis for all the stops within a particular service area. Comprehensive and individualized stop breakdowns can be found in **Appendix B**.

Annapolis Transit

Annapolis Transit services have transfer options to MDOT MTA Commuter Bus, Anne Arundel County OOT, and Queen Anne’s County Ride services. There are 485 possible transfers with wait times of less than 2 hours in the service area. 124 (25.6%) have wait times of 15 minutes or less, 104 (21.4%) have wait times between 15 and 30 minutes, 118 (24.3%) have wait times between 30 minutes and 1 hour, and 139 (28.7%) have a wait time between 1 hour and 2 hours. Annapolis Transit to MDOT MTA Commuter has the most possible transfers with a wait time of less than 15 minutes (54). Figure 1-9 details the quantity and timing of potential transfers.

Figure 1-9: Annapolis Transit LOTS-MDOT MTA Transferability

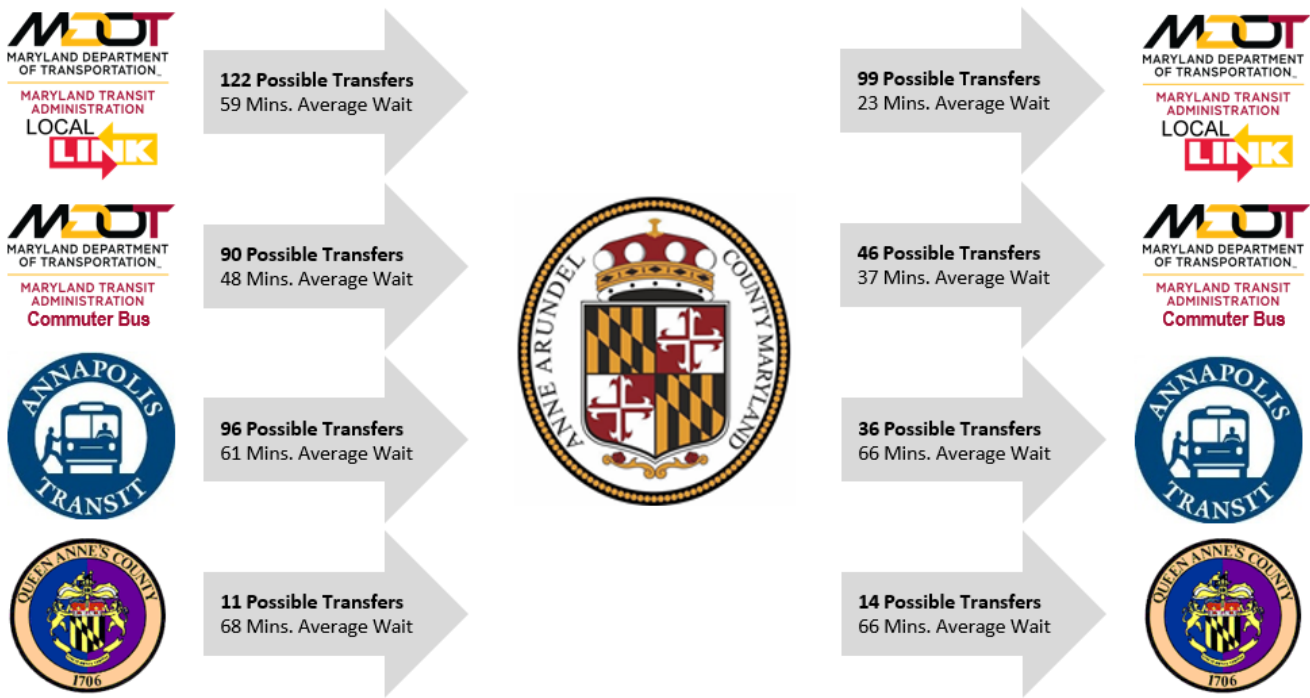


Annapolis Transit Potential Transfers								
Transfer Categories	Annapolis Transit to MDOT MTA Commuter	MDOT MTA Commuter to Annapolis Transit	Annapolis Transit to AA County	AA County to Annapolis Transit	Annapolis Transit to Queen Anne's	Queen Anne's to Annapolis Transit	Total	Percent
≤ 2 hrs	48	24	46	3	10	8	139	28.7%
≤ 1 hr	48	30	25	9	5	1	118	24.3%
≤ 30 min	38	35	12	12	3	4	104	21.4%
≤ 15 min	53	40	13	12	5	1	124	25.6%
Total	187	129	96	36	23	14	485	
Timing Transfers								
Average	0:23	0:39	1:01	0:23	0:59	0:48		
Min	0:00	0:00	0:06	0:01	0:00	0:10		
Max	1:56	1:57	1:57	1:05	2:00	2:00		

Anne Arundel County OOT

Anne Arundel County OOT services have transfer options to MDOT MTA Commuter Bus, MDOT MTA LINK, Annapolis Transit, and Queen Anne’s County Ride services. There are 512 possible transfers with wait times of less than 2 hours in the service area. 79 (15.4%) have wait times of 15 minutes or less, 97 (18.9%) have wait times between 15 and 30 minutes, 135 (26.4%) have wait times between 30 minutes and 1 hour, and 201 (39.3%) have a wait time between 1 hour and 2 hours. MDOT MTA Commuter to Anne Arundel County OOT has the most transfers with a less than 15 minute wait time (17). MDOT MTA LINK to Anne Arundel services has the largest amount (122) of transfers with a wait time less than 2 hours. Figure 1-10 details the possible transfers to and from each area transit provider.

Figure 1-10: Anne Arundel County LOTS-MDOT MTA Transferability



Anne Arundel County OOT Potential Transfers										
Transfer Categories	AA County to MDOT MTA Commuter	MDOT MTA Commuter to AA County	AA County to MDOT MTA LINK	MDOT MTA LINK to AA County	Annapolis Transit to AA County	AA County to Annapolis Transit	Queen Anne's to AA County	AA County to Queen Anne's	Total	Percent
≤ 2 hrs	9	39	32	61	46	3	6	5	201	39.3%
≤ 1 hr	13	20	31	35	25	9	0	2	135	26.4%
≤ 30 min	17	14	20	14	12	12	4	4	97	18.9%
≤ 15 min	7	17	16	12	13	12	1	1	79	15.4%
Total	46	90	99	122	96	36	11	12	512	
Timing Transfers										
Average	0:37	0:48	0:23	0:59	1:01	1:06	1:08	1:06		
Min	0:01	0:02	0:02	0:01	0:06	0:09	0:05	0:09		
Max	1:58	1:57	1:02	1:58	1:57	1:55	1:39	1:55		

Harford Transit LINK

Harford Transit LINK service has transfer options between MDOT MTA Commuter Bus and MARC Commuter Rail services. Overall, there are 532 possible transfers with wait times under 2 hours. 132 (24.8%) have a wait time of less than 15 minutes, 111 (20.9%) have wait times between 10 and 15 minutes, 187 (35.2%) have wait times between 30 minutes and one hour, and 102 (19.2%) have wait times between 1 and 2 hours. MDOT MTA Commuter Bus to Harford Transit LINK has the most transfers with a less than 15 minute wait time (64). MDOT MTA Commuter Bus to Harford Transit LINK also has the most possible transfers with a less than 2 hour wait time (249). Figure I-II details the transfers that can occur within Harford Transit LINK’s service area.

Figure I-II: Harford Transit LINK LOTS-MDOT MTA Transferability



Harford Transit LINK Potential Transfers						
Transfer Categories	Harford Transit LINK to MDOT MTA Commuter	MDOT MTA Commuter to Harford Transit LINK	Harford Transit LINK to MARC	MARC to Harford Transit LINK	Total	Percent
≤ 2 hrs	48	35	12	7	102	19.2%
≤ 1 hr	60	102	7	18	187	35.2%
≤ 30 min	53	48	5	5	111	20.9%
≤ 15 min	54	64	11	3	132	24.8%
Total	215	249	35	33	532	
Timing Transfers						
Average	0:40	0:37	0:42	1:37		
Min	0:00	0:00	0:03	0:02		
Max	2:00	1:57	1:37	1:47		

Queen Anne’s County Ride

Queen Anne’s County Ride has transfer options to Anne Arundel County Office of Transportation, Annapolis Transit, and MDOT MTA Commuter Bus services. There are 92 possible transfers with wait times of less than 2 hours to or from Queen Anne’s County Ride services. 14 (15.2%) of transfers have a wait time of less than 15 minutes, 18 (19.6%) have a wait time between 15 and 30 minutes, 14 (15.2%) have a wait time between 30 minutes and 1 hour, and 46 (50.0%) have a wait time between 1 and 2 hours. Annapolis Transit to Queen Anne’s County Ride has the most transfers with less than 15 minutes (5). Figure I-12 details the possible transfers that can be made using Queen Anne’s County Ride Services.

Figure I-12: Queen Anne’s County Ride Transferability



Queen Anne's County Ride								
Potential Transfers								
Transfer Categories	Queen Anne's to MDOT MTA Commuter	MDOT MTA Commuter to Queen Anne's	Queen Anne's to Annapolis Transit	Annapolis Transit to Queen Anne's	Queen Anne's to AA County	AA County to Queen Anne's	Total	Percent
≤ 2 hrs	7	10	8	10	6	5	46	50.0%
≤ 1 hr	1	5	1	5	0	2	14	15.2%
≤ 30 min	2	1	4	3	4	4	18	19.6%
≤ 15 min	4	2	1	5	1	1	14	15.2%
Total	14	18	14	23	11	12	92	
Timing Transfers								
Average	1:01	0:58	0:48	0:59	1:08	1:06		
Min	0:07	0:00	0:10	0:00	0:05	0:09		
Max	1:53	2:00	2:00	2:00	1:39	1:55		

RTA of Central Maryland

RTA of Central Maryland’s bus service has transfer options between MDOT MTA Commuter Bus and MDOT MTA LINK services. Between the surveyed stops, there are 1,474 possible transfers with less than a 2 hour wait time. 442 (30.0%) have a wait time of under 15 minutes, 335 (22.7%) have a wait time between 15 and 30 minutes, 499 (33.9%) have a wait time between 30 minutes and 1 hour, and the remaining 198 (13.4%) have wait times between 1 and 2 hours. RTA to MDOT MTA Commuter Bus has the most transfers with a wait time under 15 minutes (137). MDOT MTA LINK to RTA of Central Maryland had the most overall transfers, with 493 transfers having wait times under 2 hours. Figure I-13 details the amount of transfers between all the services within RTA of Central Maryland’s service area.

Figure I-13: RTA of Central Maryland LOTS- MDOT MTA Transferability



RTA of Central Maryland Potential Transfers						
Transfer Categories	RTA to MDOT MTA Commuter	RTA to MDOT MTA LINK	MDOT MTA Commuter to RTA	MDOT MTA LINK to RTA	Total	Percent
≤ 2 hrs	83	23	28	64	198	13.4%
≤ 1 hr	67	104	129	199	499	33.9%
≤ 30 min	41	84	96	114	335	22.7%
≤ 15 min	137	93	96	116	442	30.0%
Total	328	304	349	493	1474	
Timing Transfers						
Average	0:39	0:27	0:30	0:35		
Min	0:00	0:00	0:00	0:00		
Max	5:37	1:59	1:58	1:53		

Chapter 2: Existing Conditions

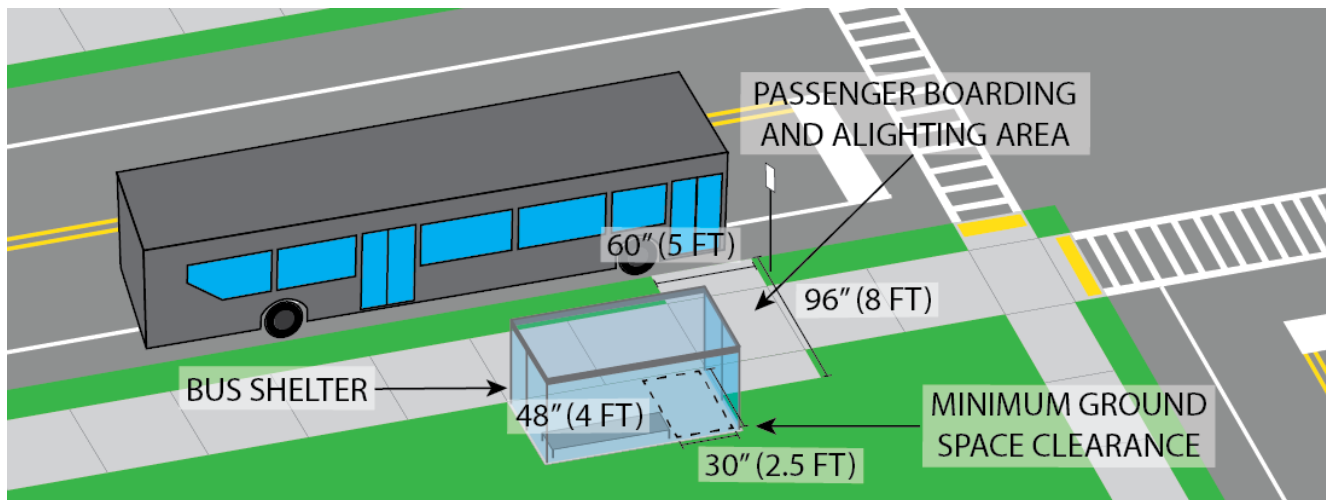
EXISTING CONDITIONS

A field survey was administered to better understand the current ADA compliance and transferability at MDOT MTA and LOTS bus stops in the study area. The majority of the survey was completed between November 27, 2018 and December 18, 2018. Some locations that were not initially surveyed were revisited on January 16, 2019. The following section outlines the basis of the ADA survey, the study methodology, and an analysis of the existing conditions in each LOTS' service area.

The Basis of ADA Compliance

After the passage of the ADA in 1990, the U.S. Access Board developed, and routinely updates the ADA Accessibility Guidelines (ADAAG) that the United States Department of Justice (USDOJ) and the United States Department of Transportation (USDOT) have adopted into enforceable standards. Municipalities are required to comply with the ADAAG when designing, building, and improving elements in the built environment, including: bus stops (guidelines shown in Figure 2-1), sidewalks and other pedestrian facilities.

Figure 2-1: ADA Compliant Bus Stop with Boarding and Alighting Area and Shelter



In 2011, proposed Public Right-of-Way Accessibility Guidelines (PROWAG) built upon the ADAAG and the currently adopted and enforceable USDOT and USDOJ standards. The proposed guidelines provide detailed guidance on pedestrian facilities in the public right-of-way that are not addressed in the ADAAG, and in some cases, establish or change minimum or maximum measurements for items in the current ADAAG.

ONLINE RESOURCES

(click the links below)

ADA Standards for Transportation Facilities (ADAAG)

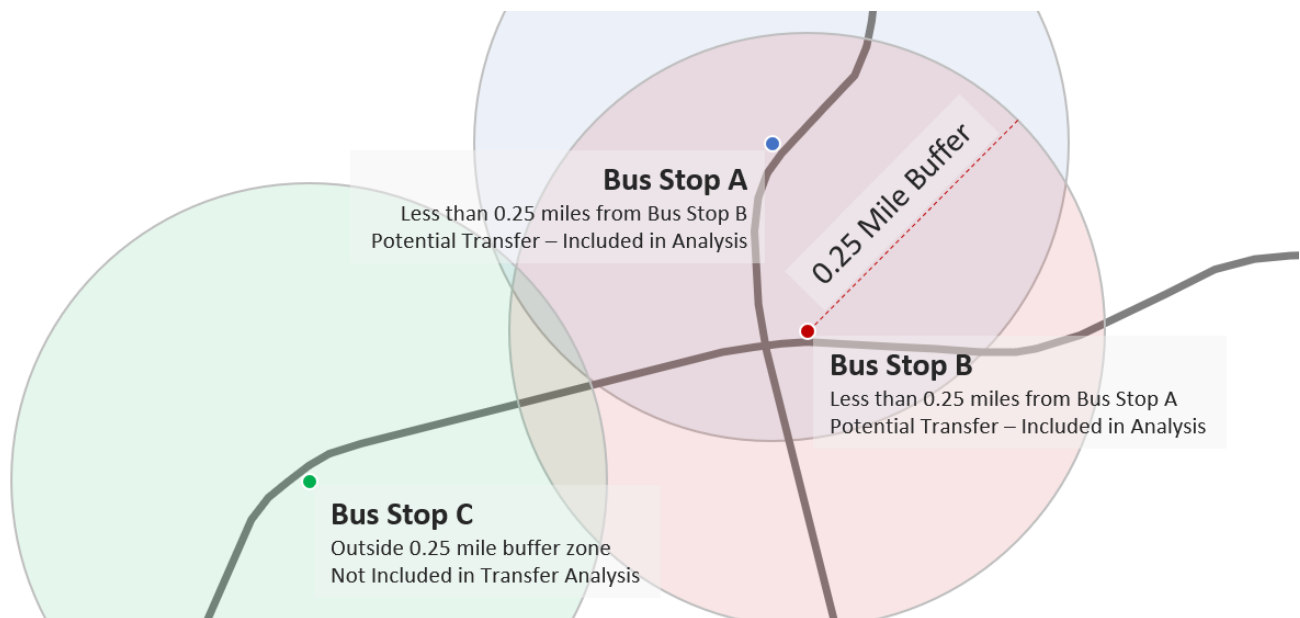
Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)

Methodology

Identification of Transfer Stops

Following a detailed review of the regional services and using data gathered from Maryland's iMAP, stops were uploaded into GIS software for a proximity analysis. The proximity analysis used a buffer of one-quarter (0.25) mile, as this is generally recognized as close walking distance. Bus stops within a quarter mile of one another, seen in Figure 2-2, were selected for further analysis.

Figure 2-2: Transfer Stop Selection Methodology



Following the initial GIS analysis, a more thorough visual analysis was conducted for each transfer location. Identified bus stops were within a quarter mile sight distance; however, that does not necessarily mean that they are a similar walking distance. This second step ensured that each potential transfer location was within walking distance based on the roadway/pathway network.

Assessment

A survey tool was developed to successfully undertake the inventory and assessment of transfer locations. The tool consisted of five major categories that included bus stops, pathway obstructions, curb ramps, intersections, and wayfinding signage.

The survey tool was uploaded onto a Global Positioning Satellites (GPS) enabled hand-held Trimble device (Figure 2-3). This device allowed all bus stop information to be digitally entered and geo-tagged, providing greater efficiency while minimizing the number of entry errors normally associated with manual data entry.

The following Figure 2-4 provides a brief description of the information collected for each of the five major categories. A copy of the complete data dictionary is provided in **Appendix A**.



Figure 2-3: Trimble GPS Device
Source: www.trimble.com

Figure 2-4: Survey Tool Categories

Bus Stops	<ul style="list-style-type: none"> • Location: on street and cross street, orientation, and positioning • Signage: location, visibility, and route/schedule information • Amenities: shelters, benches, trash receptacles, etc. • Accessibility: landing pad and pedestrian connections
Pathway Obstructions	<ul style="list-style-type: none"> • Widths: continuous clear pathways free of obstructions • Grades: minimum cross slopes and running slopes • Surface Condition: firm and stable pathways with flush transitions • Protruding Objects: encroaching edges (e.g. bus stop signs)
Curb Ramps	<ul style="list-style-type: none"> • Position: placement, type of ramps, and tactile surfaces • Slopes: ramps, landing areas, and counter slopes • Connections: sidewalks, crosswalks, and companion ramps
Intersections	<ul style="list-style-type: none"> • Travel Controls: traffic signals, crosswalks, and pedestrian controls • Connection: curb ramps and pedestrian refuge islands
Wayfinding Signage	<ul style="list-style-type: none"> • Location: orientation and positioning • Information: wayfinding information

After the post-survey desk review, bus stops were split into three different compliance categories: Compliant, ADA Non-Compliant, and No Improvements. These categories are defined below.

- **Compliant:** A stop meets all ADA guidelines for bus stops and is connected to a paved pathway.
- **ADA Non-Compliant:** A stop does not meet all ADA guidelines for bus stops.
- **No Improvements:** While technically ADA compliant, this stop is not connected to a paved pedestrian pathway.

The post-survey desk review also categorized the pathways connecting the bus stops by ADA compliance. In order to demonstrate the compliance of each sidewalk and intersection, three compliance categories were created. They are defined below.

- **Compliant:** The sidewalk or intersection satisfies all ADA guidelines and is accessible.
- **Non-Compliant, Functional:** A sidewalk or intersection is not completely ADA compliant, but is still usable (i.e. an intersection between two curb ramps without detectable warnings).
- **Non-Compliant, Non-Functional:** A sidewalk or intersection is not ADA compliant or usable (i.e. an unpaved pathway or intersection without traffic control or marked crosswalk).

Annapolis Transit & Anne Arundel County OOT¹

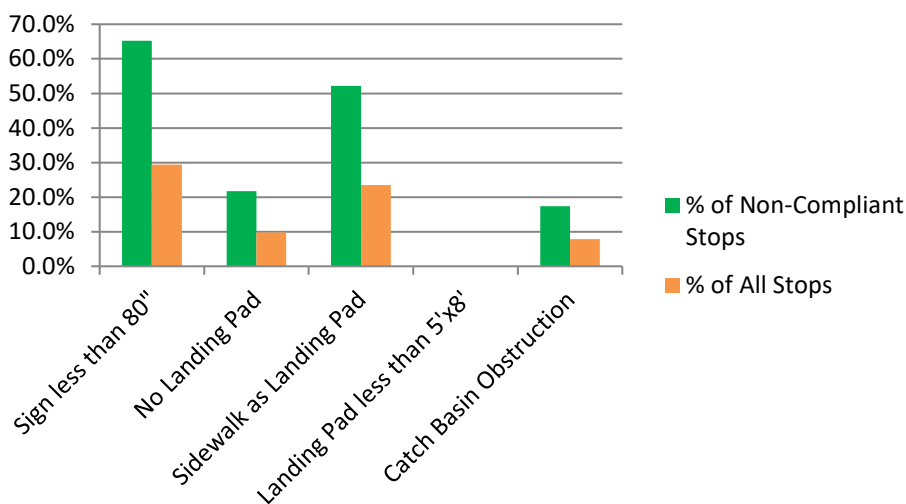


In Annapolis Transit’s service area, 51 bus stops were recorded and surveyed for ADA compliance. Of the surveyed stops, 16 (31%) are owned by Annapolis Transit, 3 (6%) are owned by Anne Arundel County OOT, 18 (36%) are owned by MDOT MTA LINK routes, and 14 (28%) are owned by MDOT MTA Commuter routes. One bus stop at the Anne Arundel Medical Center lacked any signage or indication of ownership. Regardless of stop owner, 22 (44%) stops are Compliant, 26 (52%) are ADA Non-Compliant and 2 (4%) are No Improvements. MDOT MTA LINK (12) owns the most ADA Non-Compliant stops. Table 2-1 breaks down the stop ownership, compliance, and pathway accessible within the Annapolis Transit/Anne Arundel OOT service area. More than half of the 27 ADA Non-Compliant stops in the region have signs less than 80” tall and/or use the sidewalk as a landing pad. Of the 1.7 miles of pathways in the region, 1.1 miles (62.3%) are ADA compliant.

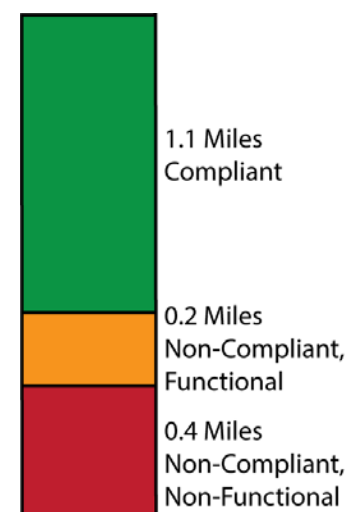
Table 2-1: Compliance Breakdown of Annapolis Transit/AACOOT/MDOT MTA Stops

Annapolis/Anne Arundel County Bus Stop Compliance Overview					
Primary Owner	Compliant	ADA Non-Compliant	No Improvements	Total	Percent
Annapolis Transit	10	6	0	16	30.8%
Anne Arundel County	2	1	0	3	5.8%
MDOT MTA LINK	4	12	2	18	34.6%
MDOT MTA Commuter	7	8	0	15	28.8%
Total	23	27	2	52	
Percent	44.2%	51.9%	3.8%		

Reasons for Non-Compliance



Pathway Compliance



¹ During the survey period, most Anne Arundel County stops were designated as Annapolis Transit stops due to old signage still being present, therefore Anne Arundel County is included within this section.

Harford Transit LINK

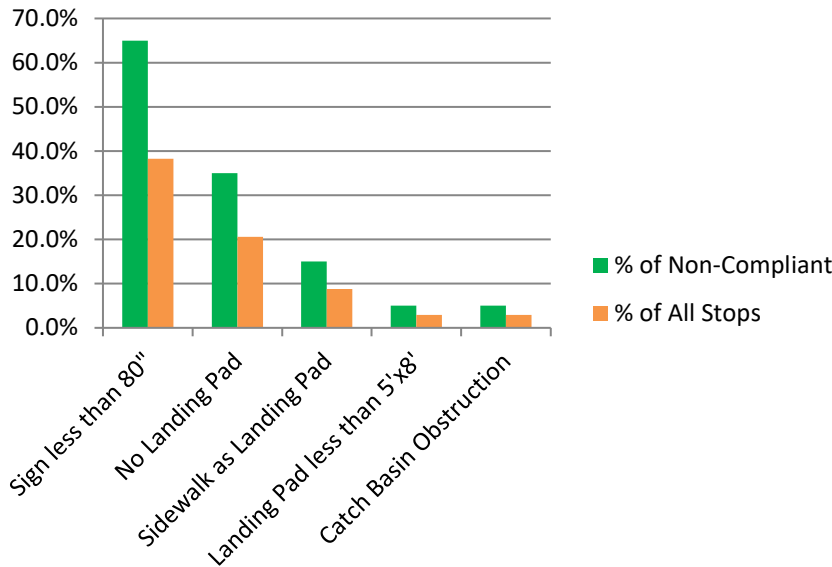


In Harford Transit LINK’s service area, 34 bus stops were recorded and surveyed for ADA compliance. Of the surveyed stops, 16 (47.1%) are owned by Harford Transit LINK and 18 (52.9%) are owned by MDOT MTA Commuter routes. Regardless of the stop owner, 7 (20.6%) stops are Compliant, 20 (58.8%) are ADA Non-Compliant, and 7 (20.6%) are No Improvements. MDOT MTA Commuter (11) owns the most ADA Non-Compliant stops. Over half of ADA non-compliant stops have signs that are less than 80 inches tall. Of the 2.5 miles of pathways that make up the study area, 1.6 miles (63.7%) are ADA compliant.

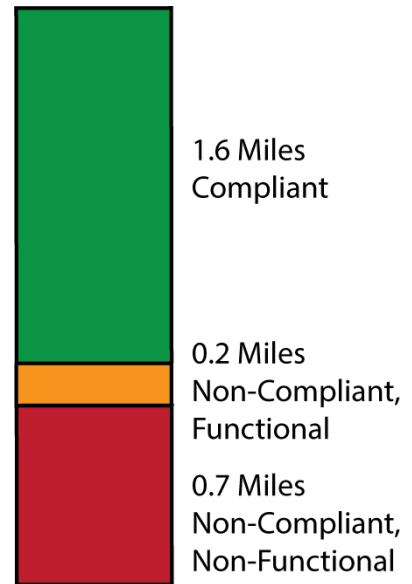
Table 2-2: Compliance Breakdown of Harford Transit LINK/MDOT MTA Stops

Harford Transit LINK Service Area - Bus Stop Compliance Overview					
Primary Owner	Compliant	ADA Non-Compliant	No Improvements	Total	Percent
Harford LINK	3	9	4	16	47.1%
MDOT MTA LINK	0	0	0	0	0.0%
MDOT MTA Commuter	4	11	3	18	52.9%
Total	7	20	7	34	
Percent	20.6%	58.8%	20.6%		

Reasons for Non-Compliance



Pathway Compliance



Queen Anne’s County Ride

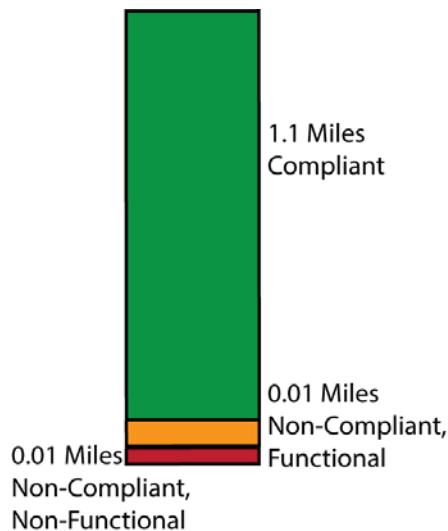


Four County Ride bus stops qualified for the field survey. Out of these stops, three locations are within Annapolis: at Westfield Mall, Anne Arundel Medical Center, and Church Circle. Stevensville Park & Ride is the only surveyed location in Queen Anne’s County. Surveyors initially struggled to locate County Ride stops due to a lack of signage indicating that County Ride stops at any of the locations. At the Anne Arundel Medical Center, County Ride stops at the Sajak Pavilion; however, a specific location could not be determined. County Ride does not own any of its identified transfer stops. The only ADA Non-Compliant stop is at Church Circle because it uses the sidewalk as a landing pad. Of the four locations surveyed for Queen Anne’s County Ride, 0.3 miles of pathways connect the stops to each other. Nearly all of the pathways are Compliant, though there are small portions of pathways that are Non-Compliant, Functional and Non-Compliant, Non-Functional. The breakdown of ADA compliance for the three confirmed Queen Anne’s County Ride stops can be found in Table 2-3.

Table 2-3: Compliance Breakdown of Annapolis Transit/County Ride/MDOT MTA Stops

Queen Anne's County Ride Service Area - Bus Stop Compliance Overview					
Primary Owner	Compliant	ADA Non-Compliant	No Improvements	Total	Percent
Annapolis Transit	0	1	0	1	33.3%
MDOT MTA LINK	0	0	0	0	0.0%
MDOT MTA Commuter	2	0	0	2	66.7%
Total	2	1	0	3	
Percent	66.7%	33.3%	0.0%		

Pathway Compliance



RTA of Central Maryland

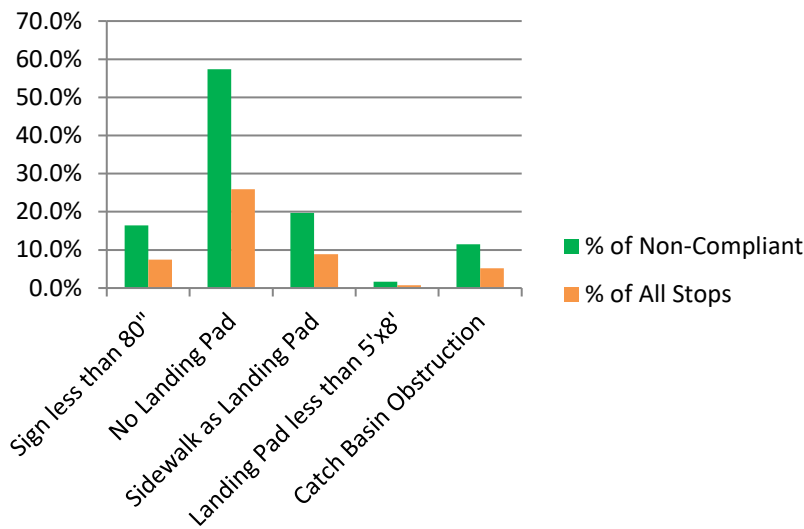


RTA of Central Maryland’s service area, the largest LOTS implicated within this study, produced over half of the stops surveyed. Of the 135 surveyed bus stops, 74 (54.8%) are owned by RTA of Central Maryland, 18 (13.3%) are owned by MDOT MTA LINK, and 43 (31.9%) are owned by MDOT MTA Commuter. Of these owners, RTA of Central Maryland (26) owns the most ADA Non-Compliant stops. Of the 61 stops deemed ADA Non-Compliant, 35 (57.4%) do not have a landing pad. Of the 4.7 miles of observed pathways, 2.9 miles (61.4%) are compliant. Table 2-4 further breaks down the distribution of stop owners and stop compliance in RTA of Central Maryland’s service area.

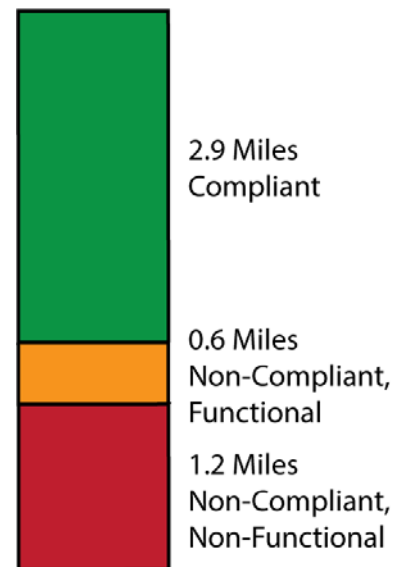
Table 2-4: Compliance Breakdown of RTA of Central Maryland/MDOT MTA Stops

RTA of Central Maryland Service Area - Bus Stop Compliance Overview					
Primary Owner	Compliant	ADA Non-Compliant	No Improvements	Total	Percent
RTA	34	26	14	74	54.8%
MDOT MTA LINK	6	11	1	18	13.3%
MDOT MTA Commuter	13	24	6	43	31.9%
Total	53	61	21	135	
Percent	39.3%	45.2%	15.6%		

Reasons for Non-Compliance



Pathway Compliance



Other Observations & Impediments to Connectivity

During the field survey and post-survey desk review, some common impediments to connectivity were observed. Some of these impediments include:

Damaged Signage



Figure 2-5: Damaged signage. From left, Columbia Gateway & John McAdams, 1257 Ritchie, and Robert

Inconsistent and/or Nonexistent Sign Design



Figure 2-6: Distinct MDOT MTA Sign Designs. From left, Harpers Farm & Twin Rivers, Route 1 & Montevideo, MD Wholesale Food Center, and Riva & Forest

Locations Without Paved Pathways



Figure 2-7: No improvements stop at Dorsey & Candlewood.

None of the four stops at this location are connected to a paved pathway, making transfers extremely difficult for individuals with disabilities.

Locations where Unpaved Pathway Breaks the Connection.



Figure 2-8: Aberdeen Wal-Mart Stop.

Nearside MDOT MTA stop does not have a paved connection to the farside Harford Transit stop, which is an ADA compliant shelter stop. There is not a safe crossing between these stops.

Chapter 3: Recommended Improvements

RECOMMENDED IMPROVEMENTS

After the completion of the post-desk survey, transfer locations and stops were recommended for improvements that will help better facilitate transfers between area transportation providers. Locations were prioritized by land use and ridership to better organize planning efforts so that improvements are made to the stops with higher ridership and larger destinations. The following section discusses the prioritization process, the regional transit centers, and breaks down the costs and reasons for improvement in the study area. Location and stop improvement profiles are separated by LOTS in **Appendices C-G**.

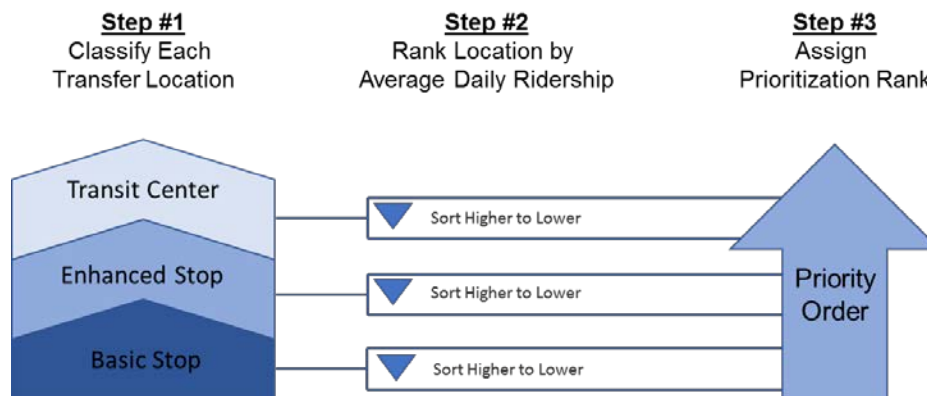
Prioritization

The prioritization of improvements ranks transfer locations rather than specific improvements to specific stops. This highlights the importance of approaching improvements or enhancements through regional coordination. If only one provider makes improvements to their stop, it does not necessarily improve a transit rider's experience when transferring between service providers.

The prioritization process includes two basic factors – the hierarchy of bus stops and the average daily ridership at each stop. This process will be updated with stop level ridership once it is available. Figure 3-1 provides a graphic of the prioritization process.

The first step in the prioritization ranking was classifying each transfer location as either a transit center, enhanced stop, or basic stop. Within each classification, trip frequencies were calculated and ranked from highest to lowest. For example, a transit center with 50 daily trips was ranked higher than a transit center with 40 daily trips. In contrast, an enhanced stop with 60 daily trips would be a lower priority than the transit center with 50 daily trips.

Figure 3-1: Prioritization Methodology



Regional Transit Centers

The field survey and Chapter 2 analyzed 95 locations with transfer possibilities, and found that only 15% currently operate as regional transit hubs with connections to other multi-modal transportation options including neighboring transit systems, light rail, intercity bus, and commuter rail services. The following shopping centers, park & ride lots, and train stations have been categorized as transit centers; they are listed in order by average daily ridership:

1. Columbia Mall
2. Truman Park & Ride
3. Arundel Mills
4. Cromwell Station
5. Broken Land Park & Ride
6. Snowden River Park & Ride
7. BWI Terminal
8. Westfield Mall
9. Stevensville Park & Ride
10. Aberdeen MARC Station
11. Church Circle
12. US 40 & Paul Martin
13. BWI Business District Light Rail
14. BWI MARC Station

The following figures provide an overview of the transit providers, locations, and costs associated with each of the surveyed transit centers. The complete prioritization rankings can be found in **Appendix H**.

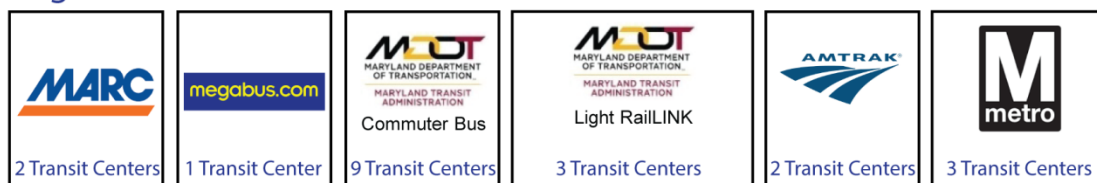
Figure 3-2: Transit Center Overview

14 Transit Centers

Local Transit Providers



Regional Transit Providers



Most Costly:
Truman Park & Ride
\$35,425

Most Trafficked:
Columbia Mall
755 Daily Riders

Total Improvement Cost:
\$132,865

Figure 3-3: Transfer Locations by Prioritization Category

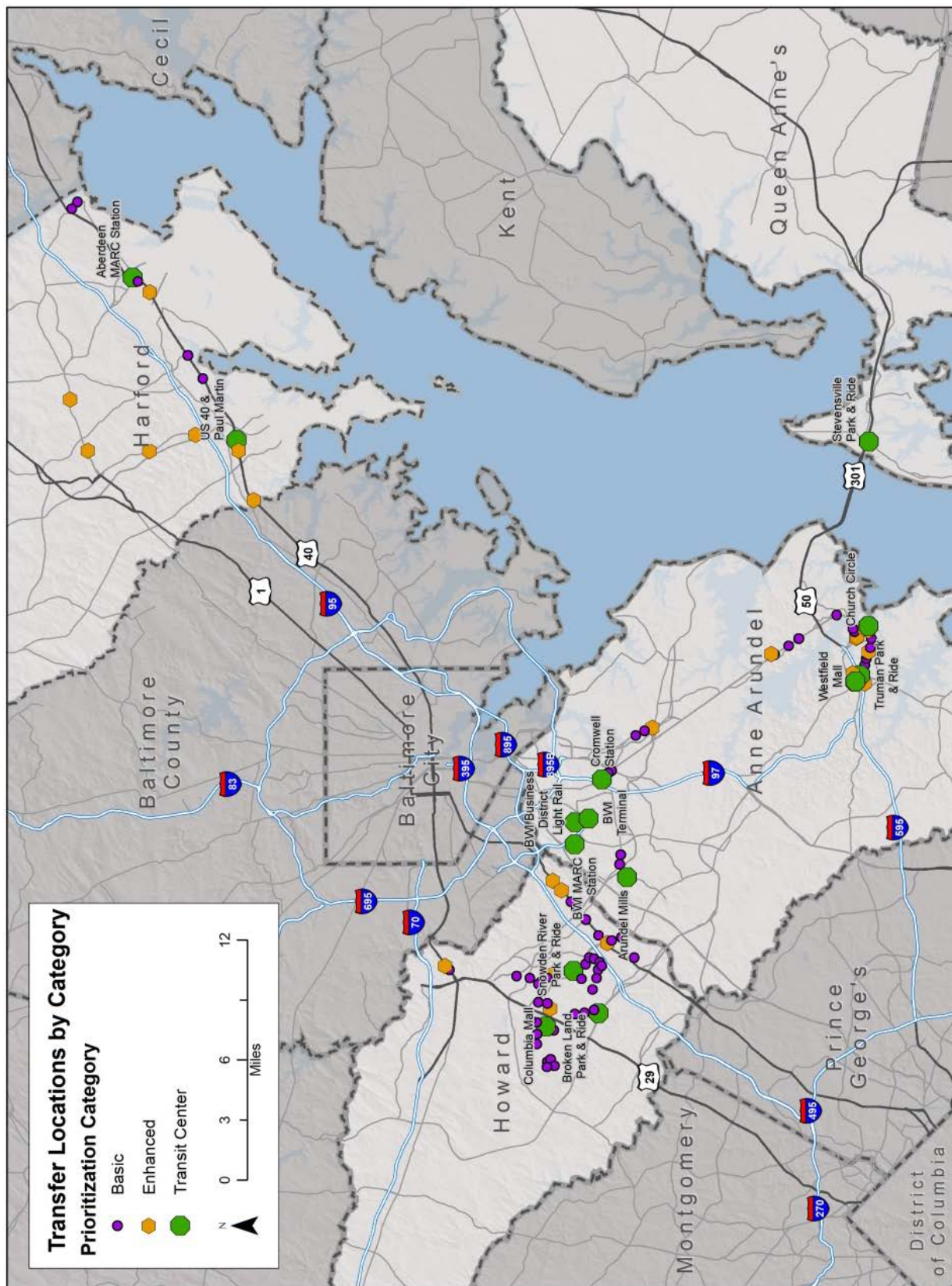


Table 3-1: Transit Center Summary Table

Location	Providers	Most Costly Improvement	Total Cost
Aberdeen MARC Station	Harford Transit LINK, MDOT MTA Commuter, MARC, Amtrak	Landing Pads	\$6,600
Arundel Mill	MDOT MTA Local Link, WMATA, RTA, UMBC Transit, Anne Arundel County	Curb Ramps	\$4,195
Broken Land Park & Ride	MDOT MTA Commuter, RTA	Digital Display	\$1,075
BWI Business District Light Rail	MDOT MTA Light Rail, MDOT MTA Local Link, WMATA, Anne Arundel	Digital Display	\$1,275
BWI MARC Station	MDOT MTA Commuter, MDOT MTA Local Link, MARC, RTA	Shelter	\$16,775
BWI Airport Terminal	MDOT MTA Commuter Bus, MDOT MTA Local Bus, MDOT MTA Light Rail, WMATA, RTA	Digital Display	\$2,475
Church Circle	MDOT MTA Commuter, MDOT MTA Local Link, Annapolis Transit, Anne Arundel County, County Ride	Shelter	\$24,275
Columbia Mall	MDOT MTA Commuter, RTA	Curb Ramps	\$20,195
Cromwell Station	MDOT MTA Light Rail, MDOT MTA Local Link, RTA	Digital Display	\$1,000
Snowden River Park & Ride	MDOT MTA Commuter, RTA	Digital Display	\$1,000
Stevensville Park & Ride	MDOT MTA Commuter, County Ride	Digital Display	\$1,000
Truman Park & Ride	MDOT MTA Commuter, Megabus, Annapolis Transit, Anne Arundel County	New Sidewalk	\$35,425
US 40 & Paul Martin	MDOT MTA Commuter, Harford Transit LINK	Shelter	\$15,475
Westfield Mall	MDOT MTA Commuter, Annapolis Transit, Anne Arundel County, County Ride	Digital Display	\$1,900

The following sections highlight recommended improvements and estimated costs for the six regional transit providers.

Annapolis Transit

Annapolis Transit, which has service at 15 transfer locations, is recommended to make \$119,380 worth of improvements. The costliest improvement category is the creation of three new compliant shelters (\$45,000). Other improvement categories are eight new landing pads (\$32,000) and seven new curb ramps (\$24,500). Location and stop profiles for Annapolis Transit are available in **Appendix C**.



Table 3-2: Annapolis Transit Improvement Summary and Cost Estimates

Annapolis Transit Improvement Summaries		
Improvement Type	Amount	Cost
Crosswalk	4	\$1,200.00
Curb Ramps	7	\$24,500.00
Detectable Warnings	16	\$1,200.00
Digital Display	3	\$3,000.00
Information Case	8	\$4,000.00
Landing Pad	8	\$32,000.00
Obstructions to Remove	1	\$2,900.00
Pedestrian Control	4	\$2,780.00
Shelter	3	\$45,000.00
Signs	14	\$2,800.00
Total		\$119,380.00

Anne Arundel County OOT

The Anne Arundel County Office of Transportation, which has service at 13 of the 95 transfer locations, is recommended to make \$116,225 worth of improvements. The costliest of these improvements is the installation of 2,018 ft. of compliant sidewalk (\$50,450). Other improvement categories are the installation of 12 curb ramps (\$42,000) and 16 bus stop signs (\$3,200). Location and stop profiles for OOT are available in **Appendix D**.



Table 3-3: Anne Arundel County OOT Improvement Summary and Cost Estimates

Anne Arundel County OOT Transit Improvement Summaries		
Improvement Type	Number	Cost
Crosswalks	4	\$1,200.00
Detectable Warnings	12	\$900.00
Landing Pads	3	\$12,000.00
Curb Ramps	12	\$42,000.00
Digital Display	2	\$2,000.00
Information Cases	2	\$1,000.00
Sidewalk (ft)	2018	\$50,450.00
Pedestrian Controls	5	\$3,475.00
Bus Stop Signs	16	\$3,200.00
Total		\$116,225.00

Harford Transit LINK

Harford Transit LINK, which has service at 14 transfer locations, is recommended to make \$203,915 worth of improvements. The installation of 3,656 ft. of compliant sidewalk (\$91,400) is the costliest improvement category. Other improvement categories are the installation of 13 curb ramps (\$45,500) and 10 landing pads (\$40,000). Location and stop profiles for Harford Transit LINK are available in **Appendix E**.

**Table 3-4: Harford Transit LINK Improvement Summary and Cost Estimates**

Harford Transit LINK Improvement Summaries		
Improvement Type	Number	Cost
Crosswalks	8	\$2,400.00
Curb Ramps	13	\$45,500.00
Detectable Warnings	22	\$1,650.00
Digital Displays	1	\$1,000.00
Landing Pads	10	\$40,000.00
Information Cases	1	\$500.00
Shelters	1	\$15,000.00
Sidewalk (ft)	3656	\$91,400.00
Pedestrian Controls	7	\$4,865.00
Bus Stop Signs	8	\$1,600.00
Total		\$203,915.00

MDOT MTA

MDOT MTA's LINK and Commuter Bus have service at all 95 of the transfer locations. The MDOT MTA is recommended to make \$437,415 worth of improvements throughout the study area. The most costly improvement is the installation of 74 landing pads (\$296,000). Other improvements of note are the installation of six shelters (\$90,000) and 53 bus stop signs (\$10,600).



Table 3-5: MDOT MTA Improvement Summary and Cost Estimates

MDOT MTA Improvement Summaries		
Improvement Type	Number	Cost
Crosswalks	2	\$600.00
Curb Ramps	6	\$21,000.00
Detectable Warnings	10	\$750.00
Digital Displays	10	\$10,000.00
Information Cases	7	\$3,500.00
Landing Pads	74	\$296,000.00
Shelters	6	\$90,000.00
Sidewalk (ft)	19	\$475.00
Obstructions	1	\$2,900.00
Pedestrian Controls	2	\$1,390.00
Bus Stop Signs	53	\$10,600.00
Wayfinding Signs	1	\$200.00
Total		\$437,415.00

Queen Anne's County Ride

Queen Anne's County Ride has service at four of the transfer locations but does not own stops at any of these locations. The only recommended improvement for County Ride is the installation of bus stop signs at each of its four locations (\$800). Location and stop profiles for County Ride are found in **Appendix F**.



Table 3-6: Queen Anne's County Ride Improvement Summary and Cost Estimates

QACR Improvement Summaries		
Improvement Type	Number	Cost
Bus Stop Signs	4	\$800.00
Total		\$800.00

RTA of Central Maryland

The RTA of Central Maryland, which has service at 57 of the 95 transfer locations, is recommended to make \$532,396 worth of improvements. The costliest recommended improvement is the installation of 45 landing pads (\$142,500). Other improvements are the installation of 5,700 ft. of compliant sidewalk (\$142,500) and 57 new curb ramps (\$157,500). Location and stop profiles for RTA are available in **Appendix G**.



Table 3-7: RTA of Central Maryland Improvement Summary and Cost Estimates

RTA of Central Maryland Improvement Summaries		
Improvement Type	Number	Cost
Crosswalks	27	\$8,100.00
Curb Ramps	45	\$157,500.00
Detectable Warnings	73	\$5,475.00
Digital Displays	12	\$12,000.00
Information Cases	11	\$5,500.00
Landing Pads	45	\$180,000.00
Median/Side Islands	1	\$156.00
Sidewalk (ft)	5700	\$142,500.00
Pedestrian Controls	27	\$18,765.00
Bus Stop Signs	12	\$2,400.00
Total		\$532,396.00

CONCLUSIONS

This study was administered to assess current bus stop design and placement coordination between transit providers within BMC's jurisdictional area. Current bus stop coordination between LOTS and MDOT MTA services leave much to be desired. Outside of the 14 regional transit centers, there are 81 potential transfer bus stops within the region; many of these stops are inconveniently located, not ADA compliant, and/or lack information about other transit options at their respective locations. Regional transit providers typically use ridership or surrounding land uses to prioritize bus stop improvements. One element that should also be considered when implementing bus stop improvements is transferability between services.

By sheer number of bus stops, MDOT MTA's Commuter Bus is the largest provider of regional trips within the Baltimore region. In many cases, commuter bus stops are co-located or located in close proximity with LOTS bus stops. Despite having two or more providers, these stops are in large part under-improved and lacking key accessibility features. Coordination of bus stop improvements among local providers and regional services is key to enhancing the rider's experience and ridership overall.

As the Baltimore metropolitan area continues to grow, the need for safe, reliable, and convenient public transportation becomes increasingly important. Investing in transit and regional connections can provide an economic benefit to both local residents and the community at large by augmenting mobility to allow for greater employment and social opportunities throughout the region.

This report, the associated survey findings, and improvement profiles can help local and regional transit providers strategically update the transfer bus stops within the region. Transfer bus stops represent just one element of regional coordination. As neighboring transit providers begin to coordinate on potential bus stop improvements this could also foster coordination between other aspects of service; including timed connections at transfer stops, fare reciprocity agreements, etc. As cooperation and collaboration efforts increase in the region, transit connectivity and accessibility will increase in step.