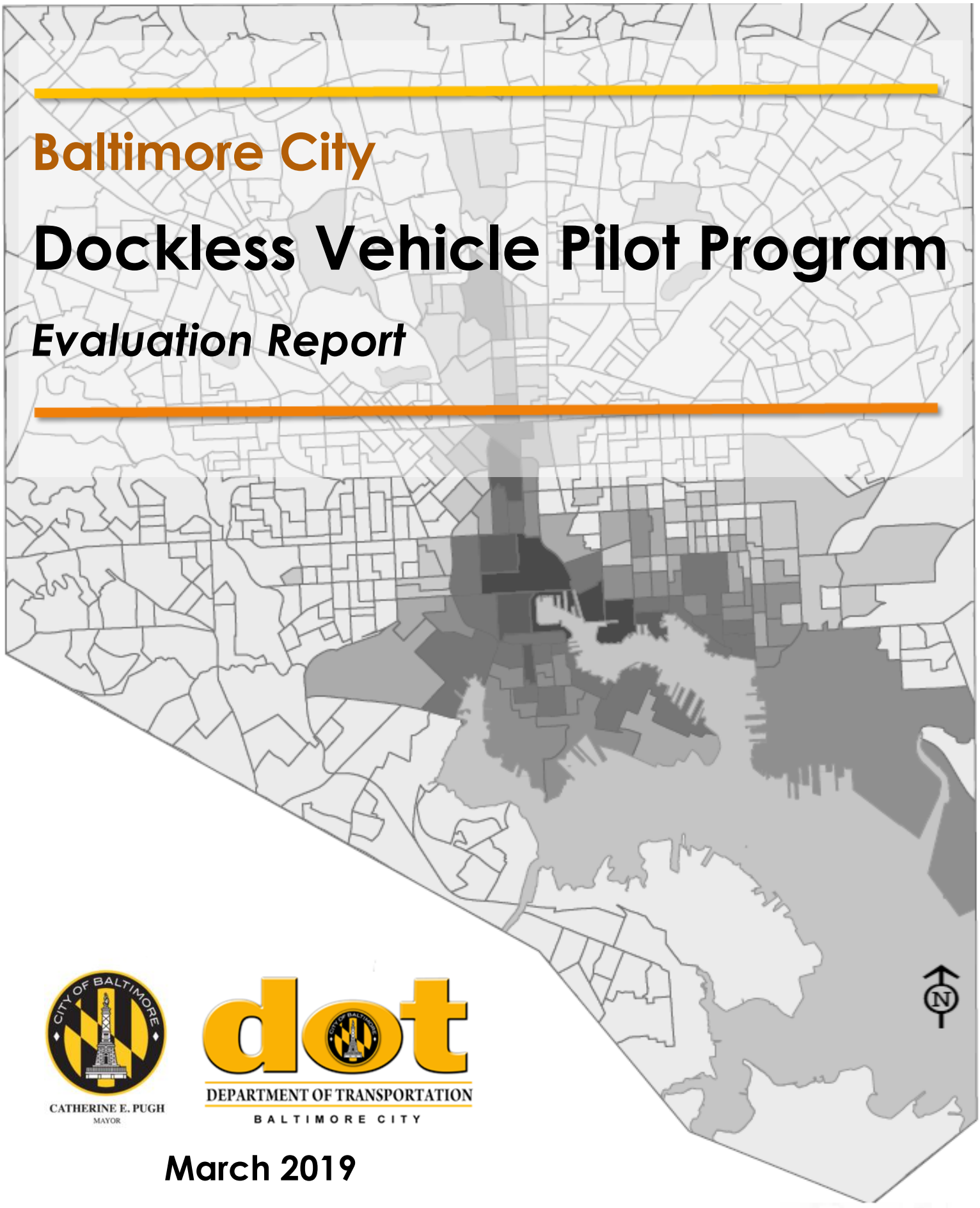
Baltimore City

Dockless Vehicle Pilot Program

Evaluation Report



CATHERINE E. PUGH
MAYOR

DEPARTMENT OF TRANSPORTATION
BALTIMORE CITY

March 2019

"Responding to the needs of those in our city who desire efficient, accessible, and low-cost modes of transportation is the basis of these new partnerships. We're confident that these new dockless options will actually expand transportation access for residents and visitors across our city. In the meantime, we'll continue to assess the demand for these and other innovative options as a 21st century city determined to serve the varied transportation needs of all who live, work, study and visit here. "

MAYOR CATHERINE E. PUGH

About Baltimore City DOT

The Baltimore City Department of Transportation (DOT) provides the City of Baltimore with a comprehensive and modern transportation system that integrates all modes of travel and provides mobility and accessibility in a convenient, safe, and cost-effective manner. DOT is working to promote options that move and connect Baltimore's neighborhoods – making it a livable, vibrant, and safe city where people enjoy living and visiting. DOT is adapting to emerging and future needs by supporting transportation options, such as ridesharing, walking, biking, public transit and new mobility options. By providing access to more transportation modes, DOT is supporting the ability of community members to choose the mode that fits their needs in each circumstance.

Compilation of this report was led by the following DOT team members:

- Meg Young, Shared Mobility Coordinator
- Charles Penny, Transit and Sustainable Transportation Bureau Chief
- Theo Ngongang, Deputy Director of Policy and Planning

A Note from the Director

Dear Citizens,

The Baltimore City Department of Transportation (BCDOT) is excited to share this detailed evaluation report for its dockless vehicle pilot program. The dockless vehicle pilot program represents a business model in which bicycles and scooters are made available for rent but can be located and left nearly anywhere throughout the city — they do not need a fixed station or dock. The pilot program is an innovative, cost effective mobility approach that helps improve traffic and connects residents, businesses and visitors to many locations throughout the City of Baltimore. BCDOT is proud to be a national leader in piloting and thoroughly evaluating the use of shared mobility to improve the transportation system.

The city began its dockless pilot program in August of 2018, and for the past six months, BCDOT has been evaluating the safety, usage and public perception of dockless vehicles on Baltimore's streets. Based on the parameters and goals set forth for the pilot program, BCDOT studied a variety of factors concerning dockless technology and how it performed in diverse neighborhoods that have never before seen this type of transportation initiative. We also worked closely with the Dockless Vehicle Committee and other stakeholders to be sure that the evaluation was fair and comprehensive.

Recently, BCDOT solicited feedback from the community during the pilot period to determine the full impact of dockless technology. Through public engagement and a community survey, BCDOT collected hundreds of concerns and information regarding user experience with dockless vehicles. Based on our findings, BCDOT believes that dockless technology provides everyone in Baltimore with a new mobility option that lets users access a fleet of scooters and e-bicycles throughout the city. These bike and scooter share systems, which operate without any physical stations, have expanded transportation access for residents and visitors throughout the city, and help us to meet our goal of providing alternative mobility options in Baltimore.

With the completion of this evaluation, BCDOT recommends that a permanent dockless program be established. I encourage everyone to explore the use of dockless vehicles which provide convenient, affordable, and sustainable transportation access. In recommending a permanent dockless program in Baltimore, I look forward to continuing to work with local stakeholders, citizens and the business community to provide a 21st century solution for efficient, accessible and low-cost transportation options in the city.

Michelle Pourciau, Director
Baltimore City Department of Transportation

Contents

On the cover: Dockless Vehicle trip origins from August 15, 2018 to January 31, 2018 by census block group

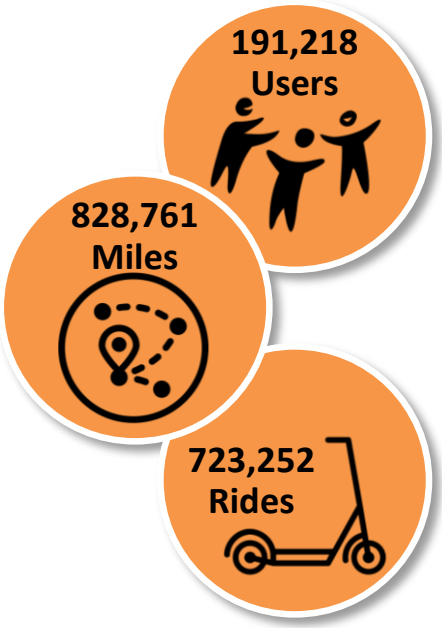
I. Overview

Over the past six months, the Baltimore City Department of Transportation, with the support of a Dockless Vehicle Committee, has evaluated the safety, equity, and impacts of new dockless vehicles introduced to Baltimore streets. The pilot period allowed DOT the time to assure that the introduction of new vehicles would align with City and departmental goals. Based on the evaluation on the following pages, DOT recommends transitioning the pilot program to a permanent permit system that will allow companies to provide micro-mobility options in Baltimore City, provided they adhere to guidelines that assure equitable access for all of Baltimore's communities, as well as responsible enforcement of rules pertaining to safe riding and parking.

Pilot Summary

This report details a six-month pilot program, initiated by DOT, which allowed private companies to provide rental electric scooters and bicycles to city residents, visitors, and workers as an alternative mode of transportation. In the hopes of adding a new mobility option for Baltimore City, DOT drafted a state of the art pilot agreement (Appendix 1) to allow new "dockless" scooters and bicycles to be deployed in the public right of way and available for rent from private providers. The resulting program was a success in terms of ridership; providers have stated that the number of rides-per-vehicle deployed in Baltimore City have been among the highest in the nation – peaking at nearly seven riders per scooter per day in late September. From August 15, 2018 to January 31, 2019, a total of 191,218 users took 723,252 rides, traveling 828,761 miles. Based on the transportation modes that these dockless vehicle trips likely replaced, providers estimate that the equivalent of 738,150 pounds of carbon emissions was avoided.

Rides from August 15, 2018-January 31, 2019



[1]

Based on the parameters and goals set forth by the pilot launch, DOT monitored more than just the ridership of the vehicles. DOT and its partners evaluated the program by tracking related injuries, analyzing data submitted by vendors, and gathering public perception. From these efforts, DOT found that severe injuries tracked did not suggest a need to halt the program, ridership is linked to geography and commuting patterns, and the public sees clear areas for improvement.

With these findings, DOT recommends moving forward with a permanent program tailored to fit the city's needs. It is the position of DOT that dockless vehicles can fill a need within the community as an equitable transportation option; combined with a detailed regulatory framework, the perceived negative effects, from unsafe riding to improper parking, will be reduced. Recommendations for a permanent program were developed based on the pilot experience, incoming data, and best practices nation-wide. The resulting evaluation is amongst the most detailed available to date concerning this emerging and evolving mobility option.

[1] User and ridership graphics courtesy of Supalerk Laipawat, Maxim Kulikov, and Alexander Skowalsky from the Noun Project

Pilot & Evaluation Timeline

August 2018
- Pilot Program Launched August 15
- Dockless provider Bird launched e-scooters in Baltimore City

September 2018
- Dockless provider Lime launched e-scooters in Baltimore City

October 2018
- DOT hired Shared Mobility Coordinator to manage pilot
- Dockless Vehicle Committee formed
- Amendment for Dockless Bicycle fee structure approved

November 2018
- Community Survey drafted with City partners
- DOT gathered feedback at community meetings

December 2018
- Dockless provider Lime launched e-assist bicycles in Baltimore City
- Community Survey launched December 21st
- DOT continued community engagement

January 2019
- Community Survey ended January 20th
- DOT continued community engagement
- Enabling Legislation Bill introduced to City Council January 28th

February 2019
- Pilot Program end scheduled for February 28, but agreements are extended through April 30 for legislative process
- Dockless providers Skip and Jump joined pilot

Dockless Vehicle Committee

The Dockless Vehicle Committee (DVC) was formed to advise DOT on broader perspectives of the pilot program's impacts. The DVC participated in planning and executing a robust pilot evaluation by defining the regulatory needs of a permanent dockless vehicle permit and providing DOT with other operational recommendations throughout the pilot program period. DVC meetings, chaired by DOT, occurred on a bi-weekly basis and adhered to the Maryland Open Meetings Act. The adopted work plan for the DVC can be viewed in Appendix 2 or at https://transportation.baltimorecity.gov/bike-baltimore/dockless-vehicles .

Committee members were not appointed, but voluntarily joined meetings. Each committee member provided invaluable expertise and insight into different facets of a dockless vehicle program. DOT would like to acknowledge the following contributors:

- Edward Reisinger, 10th District Councilmember & Chair of the Land Use and Transportation Committee
- Leon Pinkett, 7th District Councilmember
- Baltimore City Department of Planning
- Baltimore City Health Department
- Baltimore City Law Department
- Baltimore City Office of Information & Technology
- Baltimore City Mayor's Office
- Baltimore City Mayor's Office of Sustainable Solutions
- Baltimore Police Department
- Bike and Brunch Tours
- Bikemore
- Downtown Partnership of Baltimore
- Johns Hopkins Bloomberg School of Public Health
- KO Public Affairs
- Mayor's Bicycle Advisory Committee
- UMB National Study Center for Trauma and EMS
- Waterfront Partnership of Baltimore

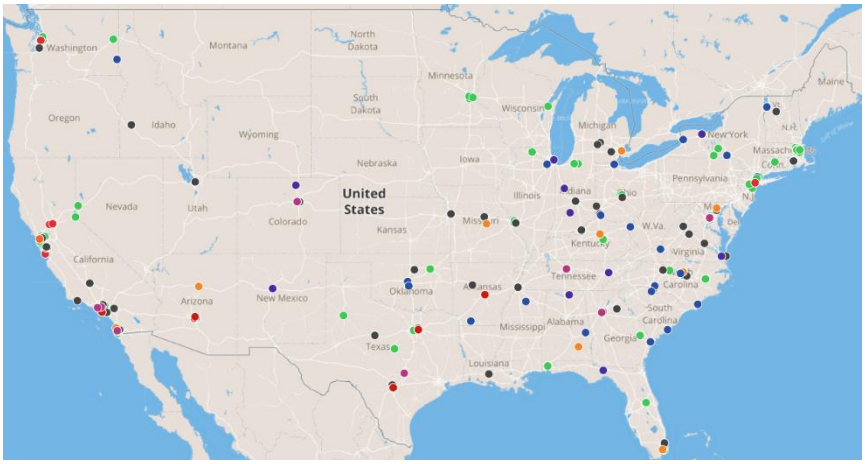
COMMITTEE ACTION TIMELINE									
	10/31	**11/14**	**11/28**	**12/12**	**1/2**	**1/16**	**1/30**	**2/14**	**2/28**
1. PILOT EVALUATION									
Review provider data weekly									
Track injury and crash data									
Design community survey									
Promote survey at Community Events									
Share Social Media Posts									
2. IDENTIFY LEGAL ISSUES									
Follow dockless issues nationwide									
3. RECOMMENDATIONS FOR PERMANENT PROGRAM									
Research national best practices									
Prioritize issues									
Discuss possible provider requirements									
Advise on City support									

II. Context & Goals

DOT is responsible for Baltimore's transportation infrastructure and managing the operation of all transportation modes and uses of the roadway. Dockless vehicles are an innovative new form of micro-mobility that has the potential to transform mobility in Baltimore City. With the introduction of new travel modes, DOT must balance and prioritize the needs of all roadway users to move towards a safe and sustainable future.

Dockless vehicles hit the streets in the United States in 2017 as another innovation in shared micro-mobility—a new transportation landscape in which small vehicles such as bicycles, electric assist bicycles, and e-scooters are publicly available for rent. This emerging market has blossomed, and is especially popular among younger Americans, as an attractive new form of mobility. Small vehicles can be an inexpensive way to finish short trips or complete the first or last mile of a transit commute, and they can provide a mobility option in areas with low vehicle ownership or that are underserved by transit.

Made possible by advancements in vehicle design and tracking technology, the dockless model varies from its bike share predecessor in a few key ways: dockless systems are generally operated by private companies, and the vehicles need not be parked or returned to particular locations. The dockless model also removes two key challenges docked programs have faced: they do not require a large capital investment to build docks, and a time-consuming deliberation over dock locations can be avoided. With reduced startup costs and time, dockless vehicles offered by private companies are spreading at a faster rate than any previous publicly operated bike share service. Within a year and half of their introduction in California in 2017, dockless vehicles have proliferated across the United States and have a presence in 180 US cities. They often sprang up overnight and caught cities off guard by launching operations without seeking permits and needing only a software application to be accessed by users.



On February 1, 2019, dockless vehicles were present in over 180 US cities

As dockless vehicle companies expand their operations, cities and companies are learning to work together, and cities are adapting to the new model by learning what support, rules, and regulations need to be in place for dockless vehicles to be a viable fixture on streets. Baltimore City joined the movement when it launched an agreement with vendors on August 15, 2018 for a six-month pilot program. With the pilot structure predicated on a thorough evaluation, Baltimore City aimed to learn from the experience locally and in peer cities. The evaluation is an essential examination of the costs and benefits of allowing a new business model to operate in Baltimore City and is necessary before making the service permanent. This evaluation is the product of that pilot program and includes recommendations to assure that any permanent dockless vehicle program will be successful in meeting Baltimore City and DOT goals.

Baltimore City Transportation: The Big Picture

While components of transportation system exist, not all are affordable, convenient, dependable, and integrated. Recommended strategies and actions:

- ✓ ***Prioritize local and regional transportation coordination and investments, ensuring equity.***
- ✓ ***Enact policies that promote city and regional priorities for pedestrians, transit, and alternative forms of transportation.***
- ✓ ***Improve reliability, accessibility, safety, and efficiency of transit while reducing the environmental impacts of vehicles.***

A sustainable and equitable transportation system offers access to affordable, integrated, and safe options in transit, biking, and walking—and is less dependent on cars. Increased connectivity and access, particularly for those living in historically under-served areas, is necessary for improving social mobility, quality of life, and economic opportunities.

The 2019 Baltimore Sustainability Plan adopted by the Baltimore City Department of Planning calls for action to improve the lives of Baltimore City residents.

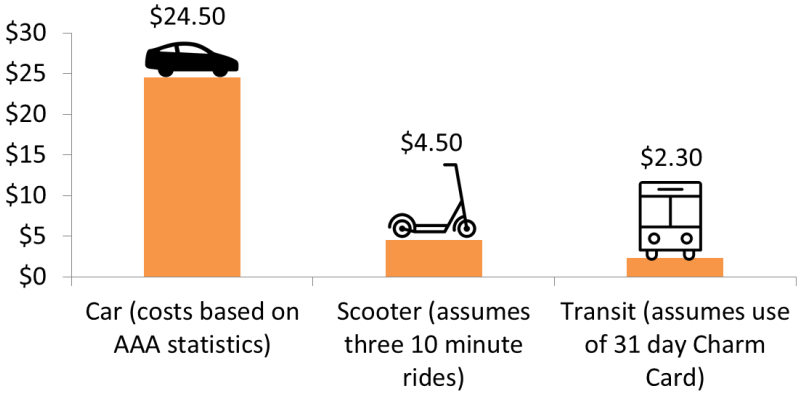
Dockless Program Goals

DOT is tasked with balancing the competing goals, priorities, and transportation needs of Baltimore City's residents, visitors, and workforce. By entering into a pilot agreement with dockless vehicle operators, DOT aimed to introduce a new mobility option and improve the quality of life in Baltimore City, all without compromising the safety of roadway users. When crafting the pilot agreement to which operators must adhere, DOT included regulations that sought to improve equity of access for underserved communities and data requirements to measure the usage and safety of the vehicles as an efficient and sustainable transportation mode.

Improve Equity of Access

In Baltimore City, there is a known need to provide better transportation connections to jobs, healthcare, recreational space, healthy food, and everyday amenities. Residents face obstacles, such as a lack of access to a personal vehicle or inefficient transit, which can make even short trips a challenge. Dockless vehicles have the potential to address these challenges, as well as reduce racial, generational, and geographical transportation disparities that affect the daily lives of Baltimore residents.

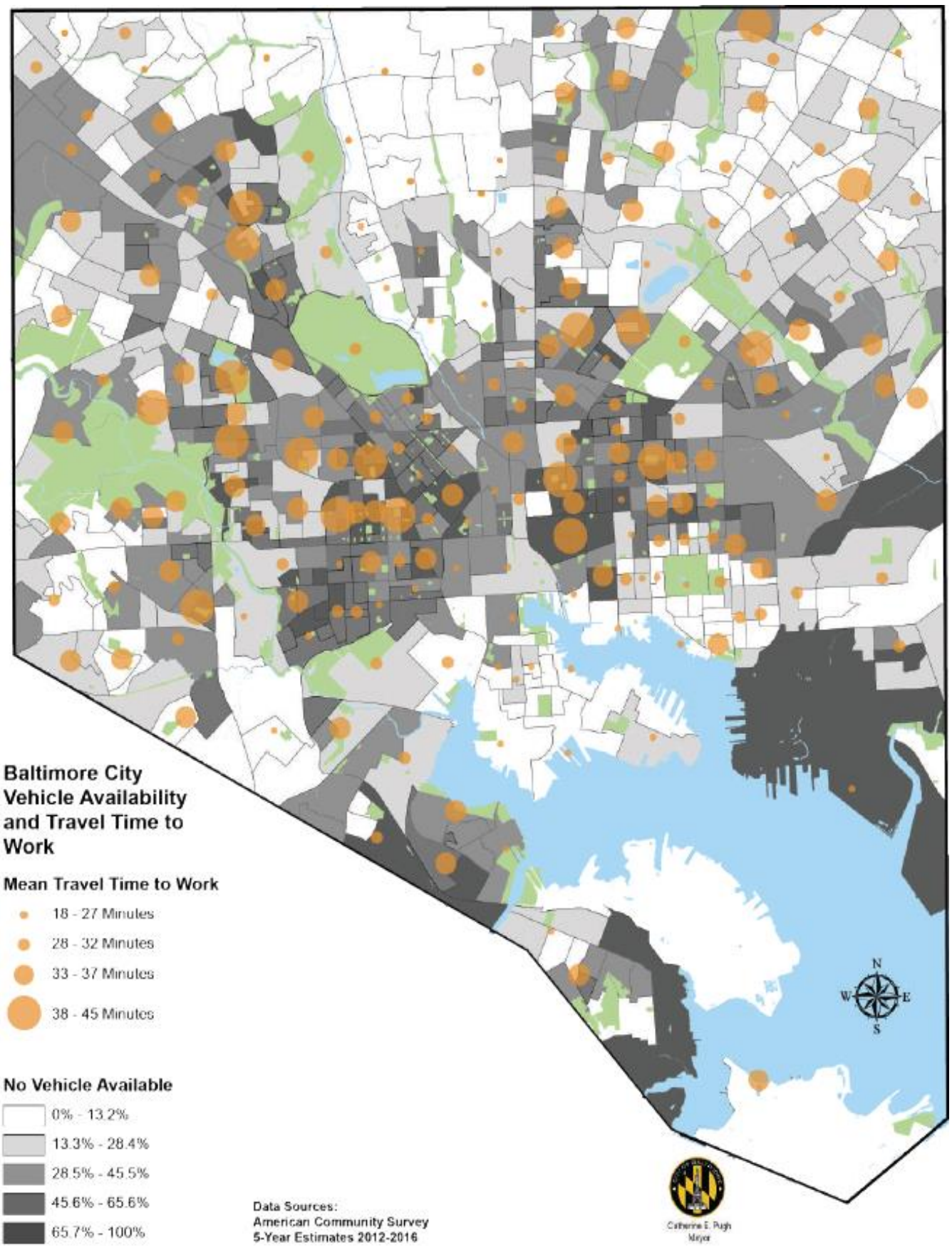
Comparative Daily Costs for Different Travel Modes



Due to the relatively affordable cost of dockless vehicle trips and the ability to access a vehicle in locations throughout the city, dockless vehicles are an affordable and reliable transportation mode that provides new connections to locations underserved by public transit. A major barrier to transportation for many Baltimore residents is access to vehicles: in some neighborhoods, as many as 80% of households do not have access to vehicles. At an average cost of $24.25 per day, owning a vehicle is a burden for low-income residents.[2] According to the Baltimore Neighborhood Indicators Alliance data, the neighborhoods with the lowest vehicle ownership rates correspond almost exactly to East and West Baltimore's historically red-lined communities as established in 1937 by the Home Owners Loan Corporation.[3] Age is also a predictive factor for transportation needs, as millennials are less likely than previous generations to own a car. [4]

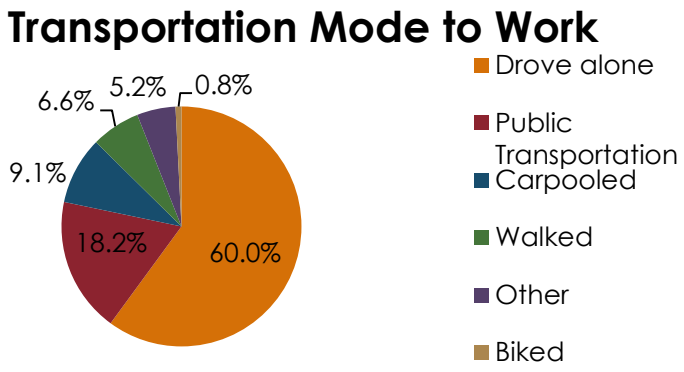
While car ownership should not be a necessity to move around a city, transit in Baltimore does not currently provide efficient connections. Many neighborhoods which are not geographically far from job centers still report an average travel time to work of 45 minutes in each direction. Through equitable access, DOT hopes that dockless vehicles can provide a means of reducing barriers to access by allowing a new transportation option. Accordingly, this evaluation will include measures of how equitable access to dockless vehicles has been during the pilot program, based on both geographic ridership data and on public perception.

[2] https://newsroom.aaa.com/auto/your-driving-costs/
Additional graphics for relative travel mode costs courtesy of lastspark and Laura Beggs from the Noun Project
[3] https://bniajfi.org/wp-content/uploads/2018/04/vs16_FullReport.pdf
[4] Polzin, S.E, Chu, X. & Godfrey, J. (2014). *The impact of millennials travelbehavior on future personal vehicle travel*. Energy Stratgey Reviews, 5, 59-65


Baltimore City
Vehicle Availability
and Travel Time to
Work
Mean Travel Time to Work
18 - 27 Minutes
28 - 32 Minutes
33 - 37 Minutes
38 - 45 Minutes
No Vehicle Available
0% - 13.2%
13.3% - 28.4%
28.5% - 45.5%
45.6% - 65.6%
65.7% - 100%
Data Sources:
American Community Survey
5-Year Estimates 2012-2016
N
W
E
S
Catherine E. Pugh
Mayor

Promote Efficient & Sustainable Transportation

Dockless vehicles aid DOT in reaching goals of reducing car dependency and congestion. These goals are reflected in plans and policies, such as the recently-passed Complete Street Ordinance, the Bike Master Plan, and the Green Network Plan. Currently, approximately 70% of Baltimore commuters drive to work.[5]



The alternatives—active transportation and transit—are better for the environment, safer for people's health, and beneficial to the local economy. By promoting active transportation and transit, Baltimore can lower car dependency, limit wear and tear on infrastructure, and reduce the city's carbon footprint.

Complete Streets are designed to meet the needs of roadway users; they can be designed to have designated zones for each transportation mode which uses that particular street[6]

COMPLETE STREETS

In December 2018, the City of Baltimore adopted a new Complete Streets Ordinance that will change the way the city plans and implements transportation projects. The Complete Streets approach will prioritize the needs of pedestrians, bicyclists, and transit users in planning and roadway design to increase quality of life and mobility in Baltimore City. In order to bolster this work, the Dockless Program must match Complete Street goals:

- ✓ ***Equity***
- ✓ ***Engagement***
- ✓ ***Promotion of active transportation***

The Dockless Vehicle pilot program has already increased the number of residents who will benefit from Complete Streets; by encouraging users to experience streets on a more human scale, dockless vehicles can inspire more use of active modes of transportation and elevate the importance of Complete Streets work undertaken by DOT.

[5] American Community Survey Five-year Estimates 2013-2017

[6] https://streetsillustrated.seattle.gov/street-types/downtown-neighborhood-streets/

III. Evaluation Methodology & Results

To evaluate the performance of the pilot program, DOT investigated crashes and injuries associated with dockless vehicle use, patterns of usage, and public perceptions of the program and the behaviors of its users. Each of these evaluation categories was deemed essential to fully understand, and certain minimum metrics in each category must be met in order to move forward with any permanent program.

GUIDED BY THE DVC, THE DOT EVALUATION SET OUT TO ANSWER KEY QUESTIONS:

- ✓ *How safe are dockless vehicles compared to other transportation modes?*
- ✓ *Where, when, and why do people choose to use dockless vehicles?*
- ✓ *Can the vehicles be accessed in an equitable manner under the current provisions?*
- ✓ *What are the impacts of Dockless Vehicles on other roadway users?*
- ✓ *What structures can be put in place to ensure a successful permanent program?*

Safety

DOT's first priority for this evaluation was to assess the safety of dockless vehicles as a mode of transportation in order to assure the vehicles are suitable for Baltimore City residents. The electric scooters, which have only recently become widespread, specifically require an evaluation of safety. National reports put the number of injuries related to electric scooters in 2017 at over 1,500, but this is miniscule compared to the over **100 daily deaths nationally** that occur on roadways – amounting to the leading cause of death among 5-29 year-olds worldwide.[7]

As a new form of transportation, there is a void of information about scooters, so DOT performed its own evaluation based on Baltimore-specific data on severe scooter crashes. Due to the lack of data available, it was necessary to pursue non-traditional methods to collect any and all safety data concerning dockless vehicles. This ranged from self-reported data on crashes to hospital admittances related to scooters. To measure the safety of vehicles, all data uncovered then had to be examined in a comparable scale to driving, biking, and walking.

Methodology

The first source explored for crash data was the required reporting on behalf of the dockless companies. This proved to be an incomplete source, as the companies reported few injuries or crashes. Based on conversations with companies and riders alike, most riders who experience a crash or fall likely did not report it to the company. Traditional crash data for motor vehicles was also found to be lacking, as only one police report was found during a preliminary search of the ACRS system, where the Maryland State Police record crashes.

The most complete data set available was found through a partnership with the Baltimore City Health Department (BCHD). BCHD analyzed Baltimore City hospital emergency department visits linked to scooters using data from the Maryland Department of Health. While these data do not include minor crashes seen by EMS or when riders do not seek medical care, it encapsulates all serious injuries that might cause DOT not to advance a permanent dockless vehicle permit. To capture these visits, BCHD ran a text analysis for words like

TOWARDS ZERO BALTIMORE

The City of Baltimore's Toward Zero initiative is part of the Baltimore City Strategic Transportation Safety Plan, which focuses on the safety of vulnerable roadway users. The approach aims to lessen the severity of crashes so that they do not result in persons being seriously injured or killed. It focuses on walking, biking, and using other alternative travel modes that are more vulnerable to severe and fatal crashes.

Strategic actions include targeted engineering and roadway improvements, enforcement, and education, as well as encouraging advocacy, partnership, and policy changes. Toward Zero is a bold and important commitment; it sets achievable and measurable goals and aligns with state and national goals and policies. In addition to safety, walkability promotes health and supports tourism and economic vitality in Baltimore city.

[7] https://www.consumerreports.org/product-safety/national-crash-data-from-e-scooter-ride-share-companies-revealed-for-first-time/
https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries
https://www.nhtsa.gov/press-releases/us-dot-announces-2017-roadway-fatalities-down

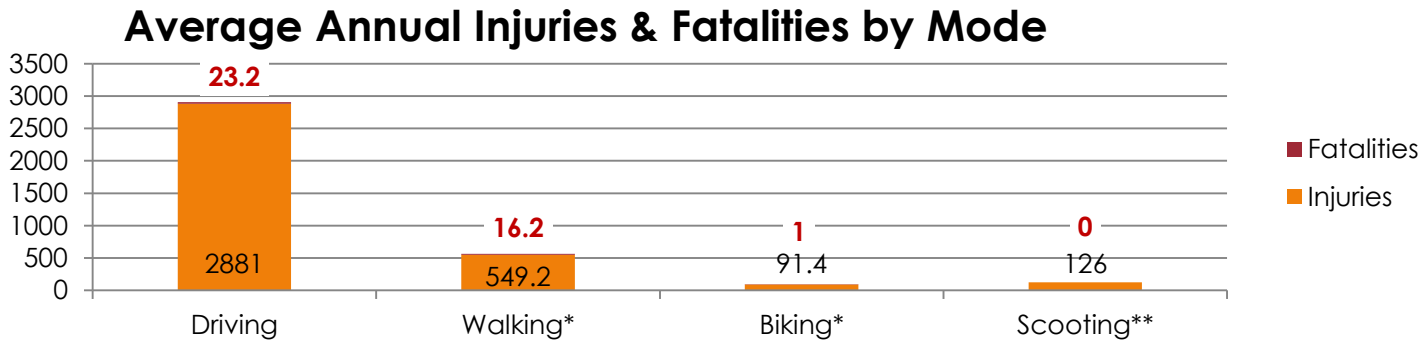
"scooter" in the chief complaint field of patient records that included Baltimore City zip codes for residence location. The assumption is that most, if not all, of these visits occurred as the result of incidents in the city. Records for patients ages 55 and over were excluded to minimize the possibility of electric seated scooters (EPAMDs) for the elderly and disabled being included in the analysis.

In addition to the number and rate of injuries, observations about the nature of crashes were also incorporated into the evaluation in order to ascertain probable causes of these crashes. City partners from the Waterfront Partnership and the Downtown Partnership offered the observations of incidents from their street guides. These street guides spend most of their days patrolling areas with high scooter traffic and can record their experiences. Guides were provided a form accessible by smart phone to record the nature of crashes they witnessed. While these observations do not constitute a scientific study, they provided useful insights about crashes, at least within the Downtown and Inner Harbor areas.

Safety Results and Conclusions

During the pilot period from August 15, 2018 to February 6, 2019, there were 63 admittances to the emergency room that may have been linked to dockless scooters. Scooter-rider related emergency department (ED) visits increased by 62% compared to the same period of 176 days before the scooters were widely available for rent by the dockless providers, when there were 39 emergency department visits. Given the 723,252 trips taken, the injury rate requiring an ED visit is seemingly low at .087 visits per 1,000 scooter rides. ED visits peaked in October with 22 visits, which is also when there were some of the highest ridership counts.[8]

Demographic and environmental data was sought to shape education about scooter safety. Based on the emergency department visit data, 75% of injured riders were male, and the median age was 29. The top patient zip codes with more than 10 injured riders included: 21215, 21213, 21218, and 21230. Within the chief complaints from the ED, 23% included crashes involving motor vehicles, and a few crashes mentioned alcohol. The most common body sites of injury were lower extremities (foot, leg, ankle, and knee), which were injured in 40% of ED visits, followed by the head, which was mentioned in 23%. [9]



**** Driving, Walking and Biking fatalities and injuries included are the annual average from 2013-2017 in Baltimore City. Injuries include incapacitating and non-incapacitating injuries, but exclude counts of possible injuries.*** [10]
***** Scooting injuries are projected based on multiplying August 15, 2018 to February 6, 2019 data to approximate one-year data.***

The available data suggest that scooters are not more dangerous than other modes of transportation. By putting the injury data in the context of other active transportation modes, scooters appear to be involved with fewer injuries than walking and only slightly more than biking. Numerically, there are far fewer scooter injuries than those associated with driving, so putting the crashes in terms of users or drivers gives more context: 2,881 injuries among 326,209 licensed drivers equals a crash rate of 8.8 injuries per 1,000 drivers each year. For scooters, the extrapolated 126 scooter-related injuries per year among 191,218 users in only five and half months equal .66 injuries per 1,000 scooter users each year.

[8] Maryland Department of Health.
[9] Maryland Department of Health.
[10] Crash data are obtained from the State Highway Administration (SHA), which maintains a database derived from crash reports submitted to and approved by the Maryland State Police.

These low injury rates are consistent with the crash observations submitted by street guides working downtown, who have seen hundreds of riders daily, but recorded information on only 12 crashes. Of the crashes, eight involved no one except the rider themselves: one rider was intoxicated, six hit bumps, and one appeared unable to brake. The remaining four were minor bumps with people walking. In all of the observed cases, no one was severely injured, and the minor injuries were mostly scraping on legs and arms.

Based on all available data, severe injuries from dockless vehicles are not frequent enough to require stopping the program. While minor injuries may have gone untracked, these are injuries which DOT hopes to reduce through increased support should the program become permanent though tactics such as safety education and reducing environmental hazards. Despite the extensive work done by public health partners, there are still gaps in data availability. To this end, efforts are underway to standardize the identification and tracking of dockless scooter crashes. Along with Maryland's trauma centers, DOT recommends that a standard ICD-10 code is used to code scooter crashes among hospital admittances. This would allow ongoing tracking of injuries and deeper analysis into the cause of crashes, which can be used to increase safety.

Provider Data Analysis

Using the data reported by providers, DOT can investigate how, when, and where the vehicles were used. Information that dockless vehicle providers were required to report weekly included:

- Trip origin and destination locations
- Vehicle location snapshot around the time of daily vehicle deployment – between 6:00-8:00am
- Vehicle location snapshot at the end of the operating day – between 7:00-9:00 pm
- Total number of rides per day
- Total number of vehicles deployed per day
- Complaints and issues reported by customers (monthly)

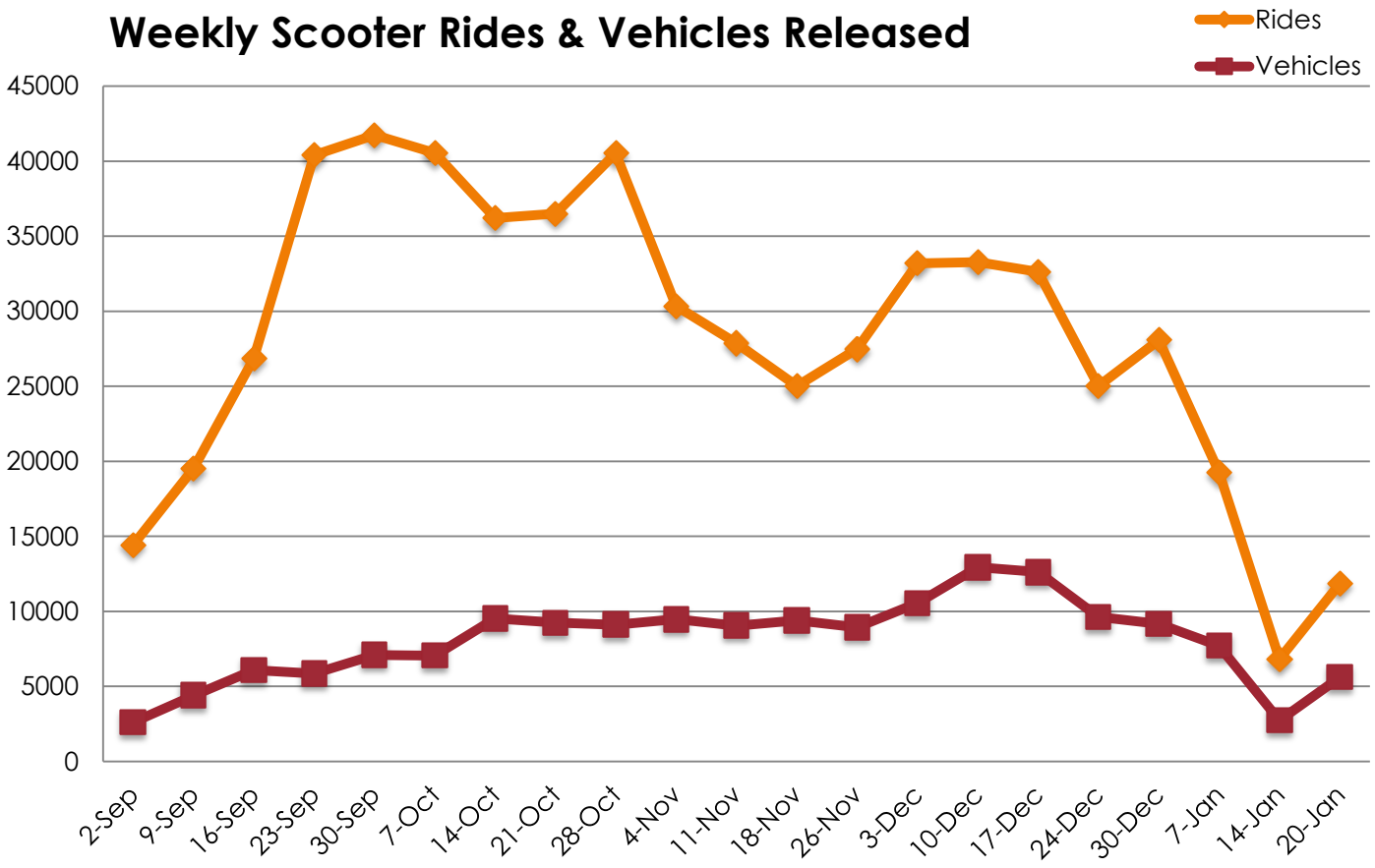
Analysis of this data highlights how the pilot agreement has served the City of Baltimore and will inform the regulations and support measures that define the parameters of any permanent program.

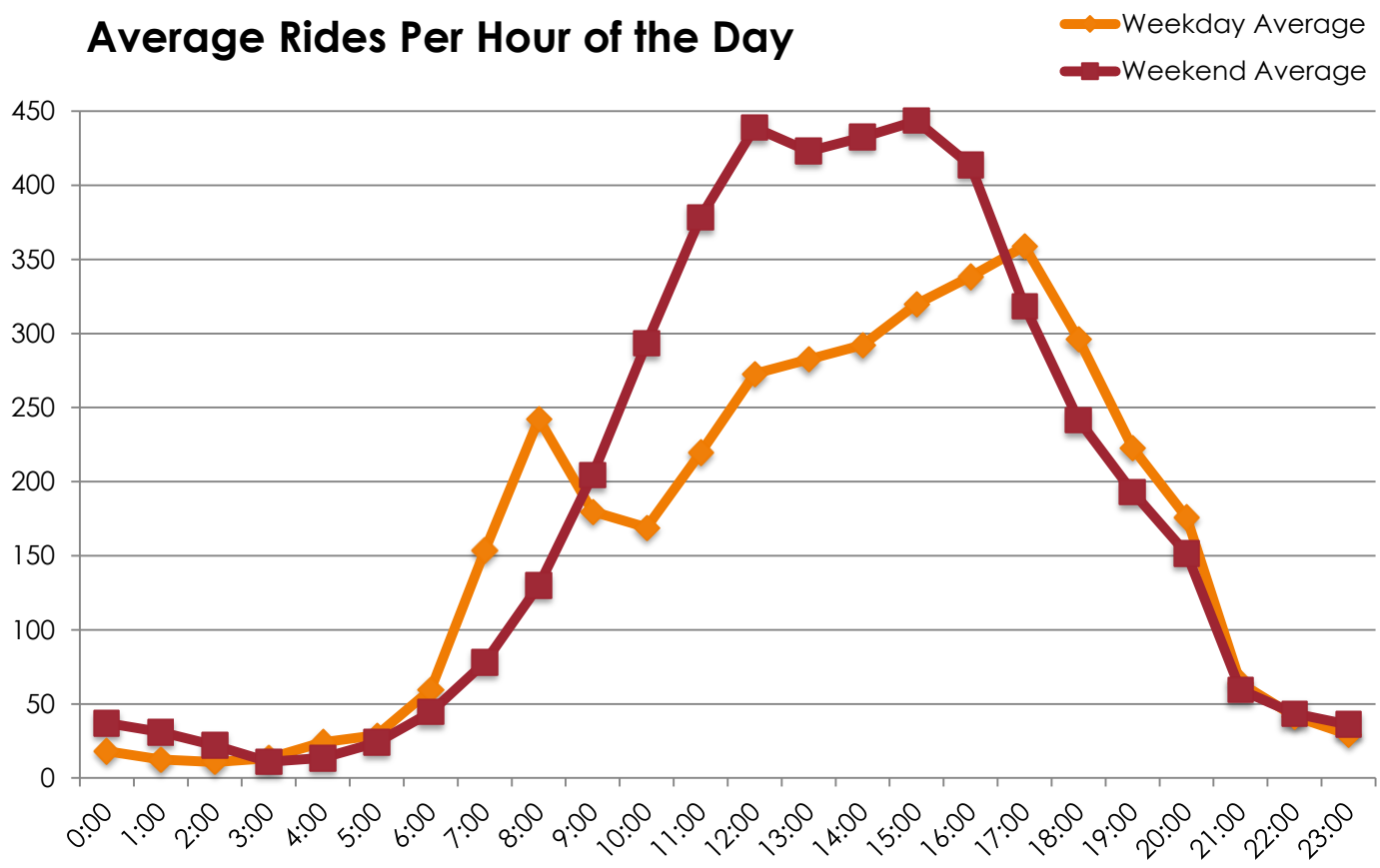
Ridership

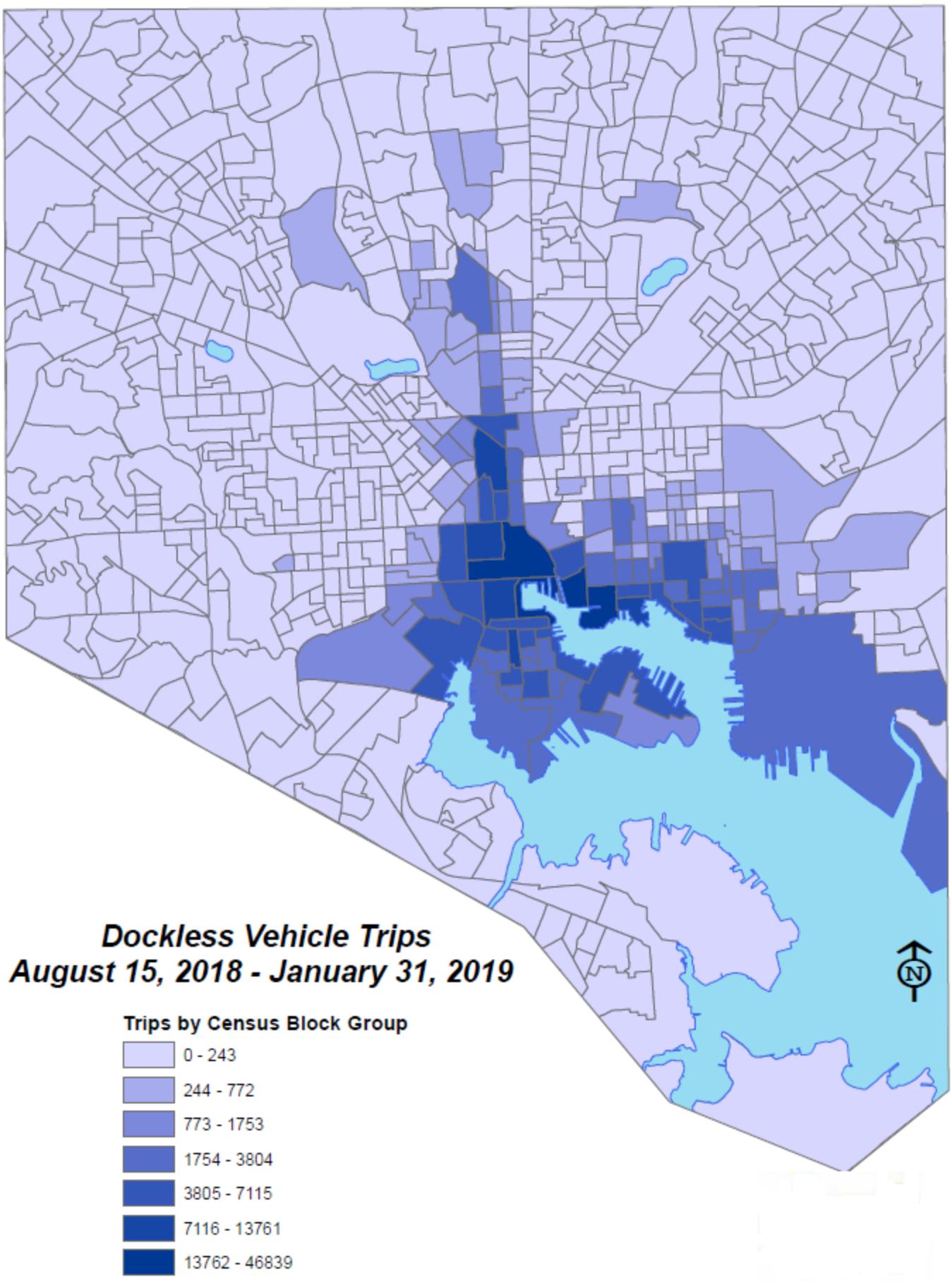
Throughout the pilot period, ridership numbers were high. According to a representative from Lime, the launch in Baltimore was one of their most successful to date in terms of rides per vehicle. From August 15, 2018 to January 31, 2019, 191,218 users took 723,252 rides, travelling 828,761 miles. The average trip was 1.6 miles and lasted 12 minutes. Ridership was highest in September and October, with fluctuations of both vehicles deployed and total rides varying greatly from week to week. While the number of rides varied based on the weather, the companies were not deterred by the winter weather of Baltimore and adjusted vehicle levels to maintain around 3 rides per vehicle per day.

Over the course of the day, ridership was similar to motor vehicle volumes. On weekdays, there was a consistent increase of rides with morning rush hour, followed by a lunchtime increase and peak with the evening rush hour, indicating that the dockless vehicles are being used for commuting and work errands. On weekends, there were more rides, and the rides were less concentrated in the downtown areas. Weekend ride volumes were highest midday and spread out, including areas such as the Fell's Point and Patterson Park neighborhoods, which are known for recreation.

Rides spanned the entire city and even extended past city limits to communities such as Dundalk and Towson. When compared to factors like household income and population density, there were no clear patterns. Geography seemed to be the number one contributing factor, with ridership along areas with active main streets and connections to downtown. Large concentrations of rides occur in the downtown core, as well as along and parallel to the Charles Street Corridor. Other hot spots included main streets from Federal Hill to Highlandtown. This concentration may also be the result of compounding factors, such as the deployment of the vehicles or the existence of shared mobility lanes.


Weekly Scooter Rides & Vehicles Released
Rides
Vehicles
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2-Sep
9-Sep
16-Sep
23-Sep
30-Sep
7-Oct
14-Oct
21-Oct
28-Oct
4-Nov
11-Nov
18-Nov
26-Nov
3-Dec
10-Dec
17-Dec
24-Dec
30-Dec
7-Jan
14-Jan
20-Jan

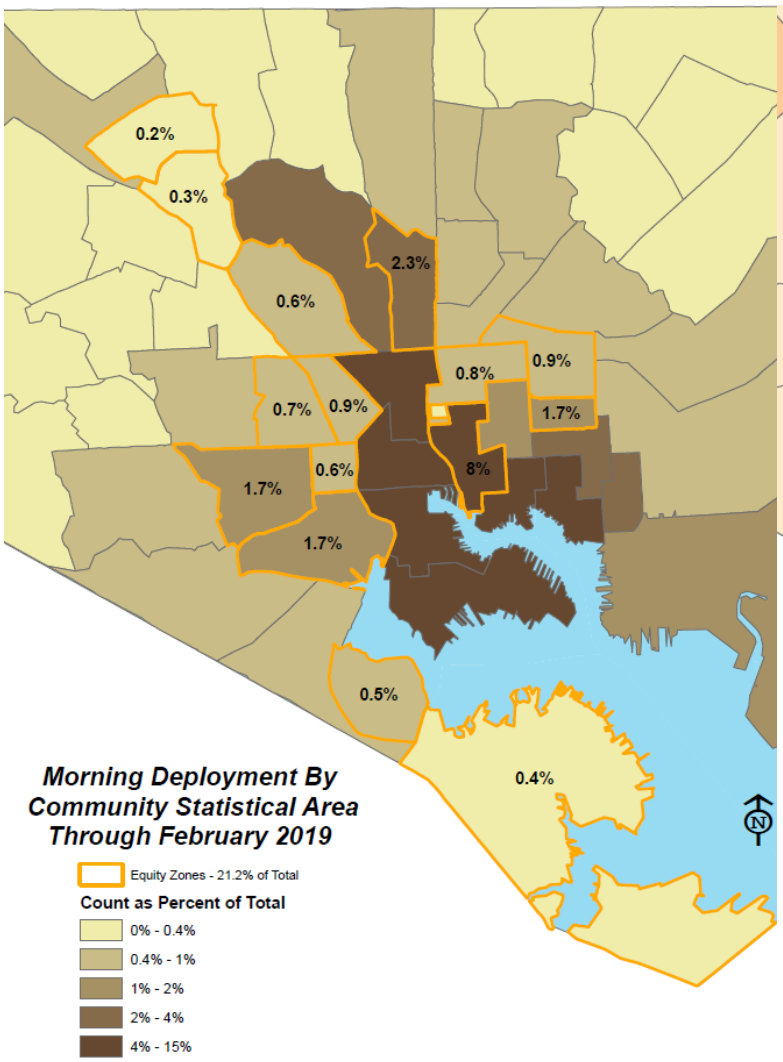

Average Rides Per Hour of the Day
Weekday Average
Weekend Average
450
400
350
300
250
200
150
100
50
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00

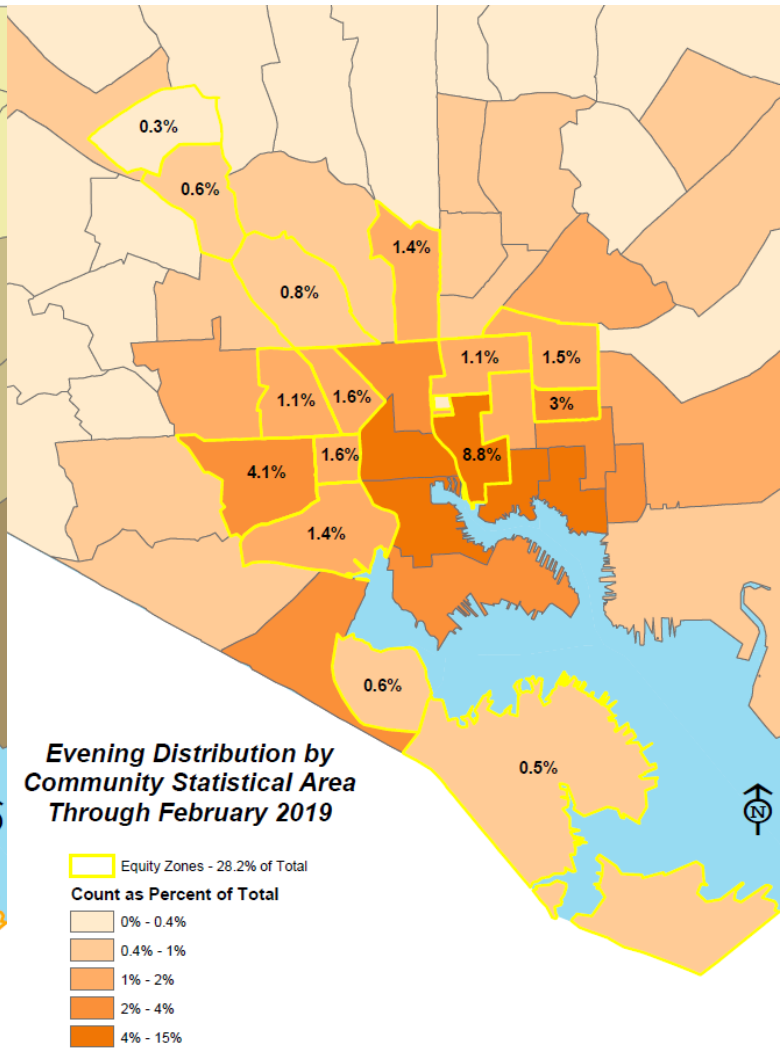

Dockless Vehicle Trips
August 15, 2018 - January 31, 2019
Trips by Census Block Group
0 - 243
244 - 772
773 - 1753
1754 - 3804
3805 - 7115
7116 - 13761
13762 - 46839
N

Equity Analysis

To ensure equitable distribution of dockless vehicles across the city, DOT set equity zones to investigate whether or not the service is creating new transportation options for residents of areas that are historically underserved. A requirement in the pilot agreement with vendors states that 25% of vehicles deployed daily must be placed in the "equity zones," which consist of 15 Community Statistical Areas selected as based on household income levels. While imperfect, this method for selecting equity zones allowed DOT a starting point for understanding ridership in areas that may be underserved by transportation options.

Based on the morning deployment locations submitted by the providers, 21% of vehicles were found in the equity zones at 6:00 am. This is below the 25% requirement, but due to the reporting framework, the number may not include scooters deployed after 6:00am. Looking within the equity zones, vendors often deployed on the borders of the zones, not throughout the entire zone. Throughout the day, 17.4% of total trips originated in the equity zones, and between 7-9pm, 28% of vehicles ended up in the equity zones. These statistics indicate that the service is being used by low income households, seemingly as a component of commuting; evening locations probably correlate with trips home, but trips during the day may be lower due to fewer midday trips. Based on this data, the City may need to do more to ensure continued access to dockless vehicles for these communities. The equity zones provided a good start to achieving equitably-distributed vehicle deployment, but DOT will outline more specific equitable deployment requirements in a permanent dockless program to further improve access.





Provider Data Conclusions

Data from providers has proven to be a powerful tool in assessing how well the pilot program has met its goals. Data reveals that dockless vehicles are making an impact on the goals of access and reducing auto traffic. It also highlights the need for more requirements for distribution in order to reach areas of the city which did not see high deployment or ridership during the pilot. From a logistical standpoint, the pilot program's requirement of submitting weekly spreadsheets to DOT proved to be cumbersome for both the providers and DOT staff. For a permanent program, DOT will need to obtain data through a live feed and continually monitor data in order to make timely adjustments to the program. With the assistance of Baltimore City Office of Information & technology, a dashboard with built-in monitoring for geographic areas and fleet size will allow for real time alerts and analysis of vehicle usage.

Community Engagement & Public Perception

In addition to data, feedback from the Baltimore community was sought to provide a full picture of the impact of dockless vehicles during the six-month pilot. Through community engagement and a community survey, DOT asked to hear concerns and personal experiences involving dockless vehicles.

Feedback Lines

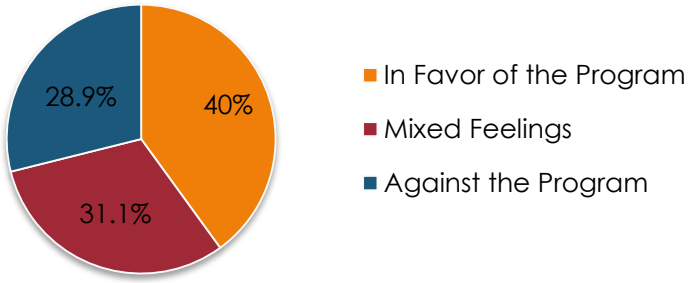
Across all platforms, communities had mixed feelings about scooters. Comments shed light on issues faced around the city and specific to certain environments, many of which can be addressed through regulation. Providing these outlets for discussion through email and community meetings proved essential to considering how the community was being affected and how DOT could add regulation to lessen perceived negative impacts.

During the pilot, community members could contact 311, or email DOT about issues involving scooters. Each outlet served a different purpose in community engagement: 311 operators answered frequently asked questions and then directed callers to email DOT with more in-depth questions or comments. During the pilot period, 311 calls subsided greatly over time, from a peak in September to only a few calls over the last two months. From November 1, 2018 through January 31, 2019, 45 individuals and eight community organizations contacted DOT via email to discuss dockless vehicles. Over the course of the pilot, neighborhood organizations and council members also requested the presence of DOT staff at community meetings to discuss issues specific communities faced. DOT attended 12 community partner meetings to discuss the dockless program.

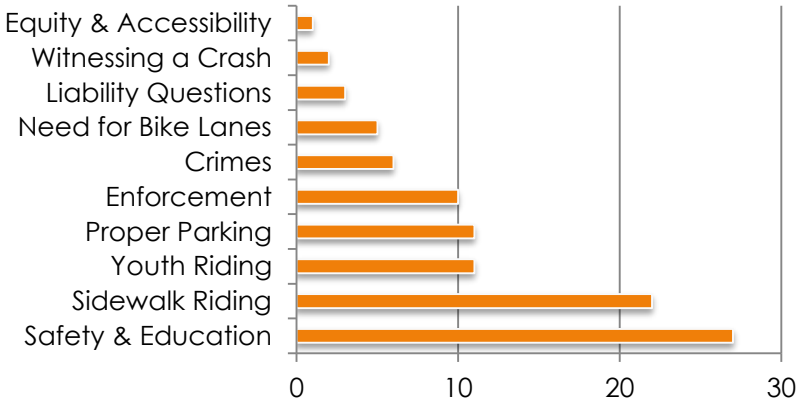
"I am a 53 year old woman who has never ridden one of these scooters. I do not advocate for getting them off the streets, because I believe they serve a purpose; however, the current program is not very civil, nor very polite, yet I believe there is a solution more favorable than removing them from the streets entirely."

– Resident Renée Beale's expression of support that recognizes the need for more regulations was a common sentiment of emails received.

Support of the Dockless Program in Community Emails



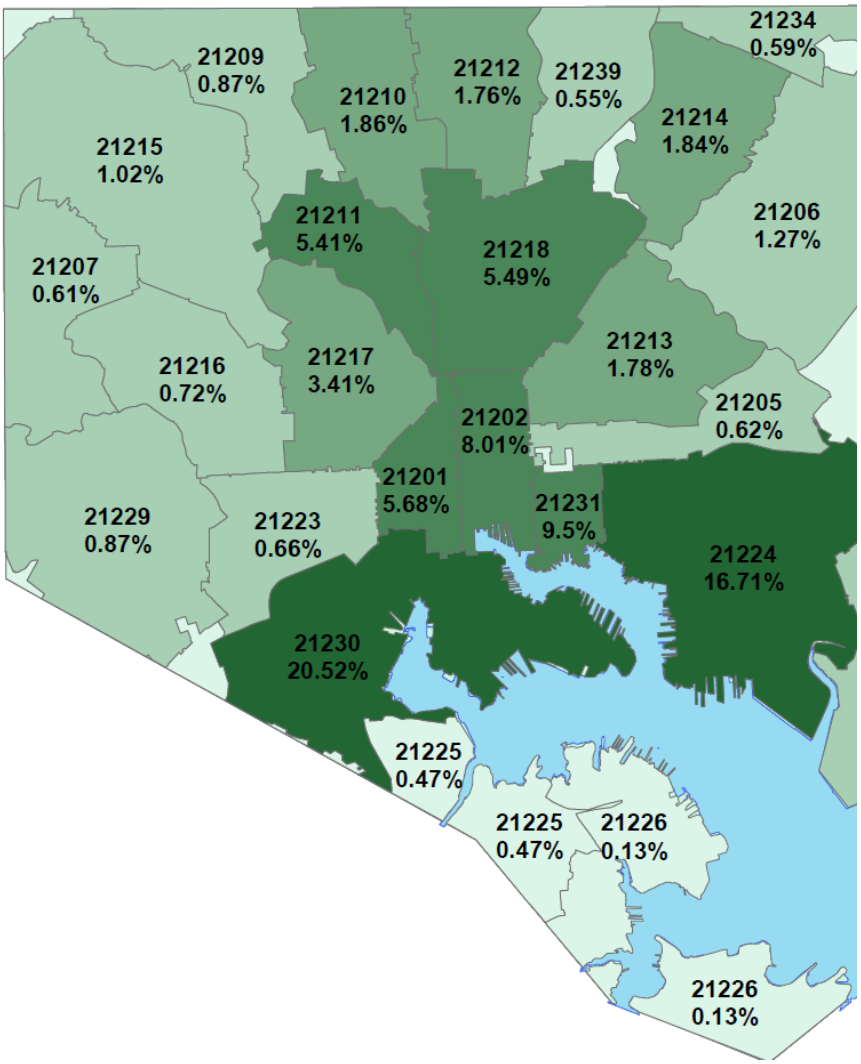
Topics mentioned in Community Emails



Community Survey

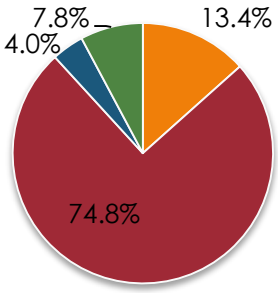
The DOT Community Mobility and Dockless Survey aimed to gauge how the Dockless Vehicle Pilot Program affected mobility across the city. Questions were asked to help DOT learn more about who rides the vehicles, understand how they use them, and guide decisions about permanent program requirements. The survey was open for responses from December 21, 2018 until January 20, 2019 and garnered a total of 5,283 unique responses. The survey was released online, and paper copies were available upon request. Initially, the survey was publicized and distributed by DOT employees, Community Liaisons, DOT social media, members of the Dockless Vehicle Committee, and the Mayor's Office of Neighborhoods. Full survey results can be found in Appendix 3.

Responses by Zip Code



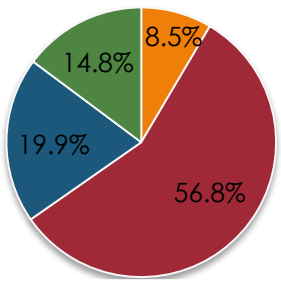
7% of responses came from outside of Baltimore City zip codes

Responses were received from throughout the city, but were more concentrated in zip codes corresponding with high dockless ridership. Respondents were asked to self-identify their gender and race in order to learn more about rider characteristics. Two and three weeks after distribution, DOT performed analyses of responses in order to target outreach to underrepresented populations through community partners. Through this outreach, DOT gathered increasingly diverse responses, but never reached a scientifically representative sample. Men were 56% of respondents and women were 42% of respondents. Race and age were less reflective of Baltimore City's population. While Caucasian people account for 30.3% of the population, they submitted 75% of survey responses. People aged 25-39 were similarly over-represented with 56.8% of responses, while only comprising 25.4% of the city's population.



Race/Ethnicity

- African American
- Caucasian
- Hispanic/Latino
- Other



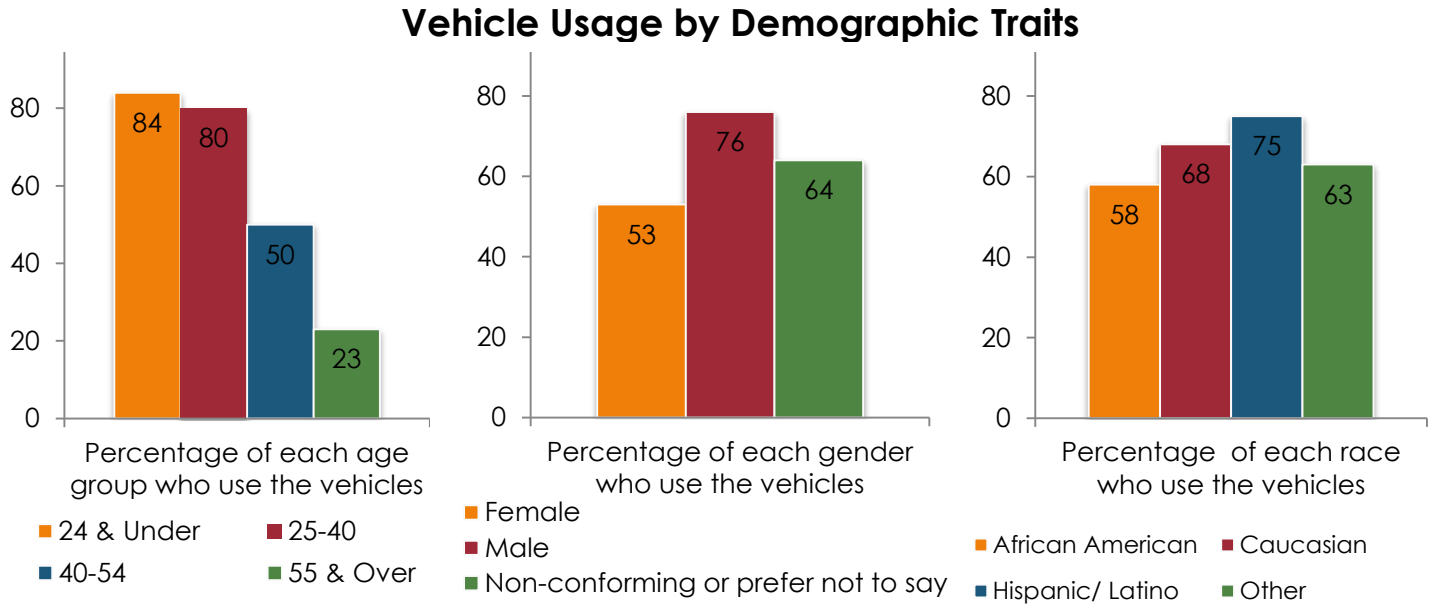
Age of Respondents

- 24 & Under
- 25-39
- 40-54
- 55 & Over

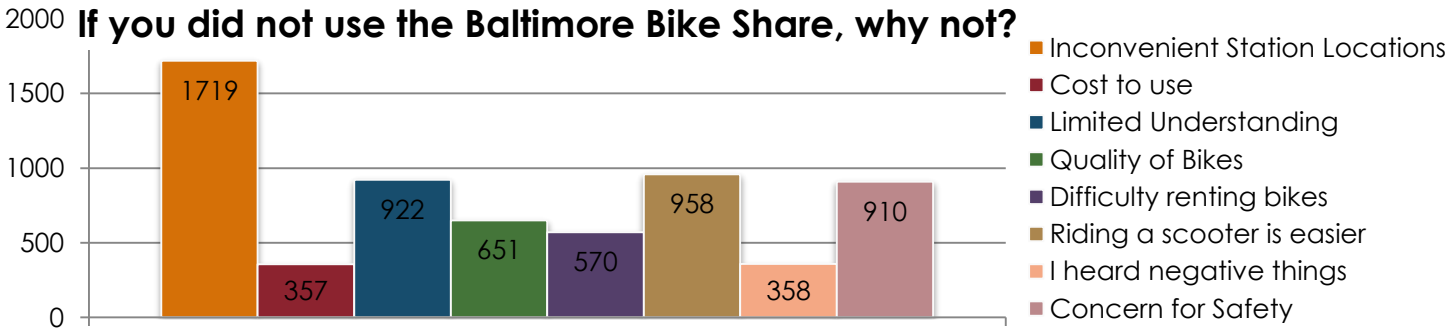
In order to counteract response rates, graphs presented in this report are calculated based on percentages of respondents from each group answering each question.

66% of respondents have used the vehicles

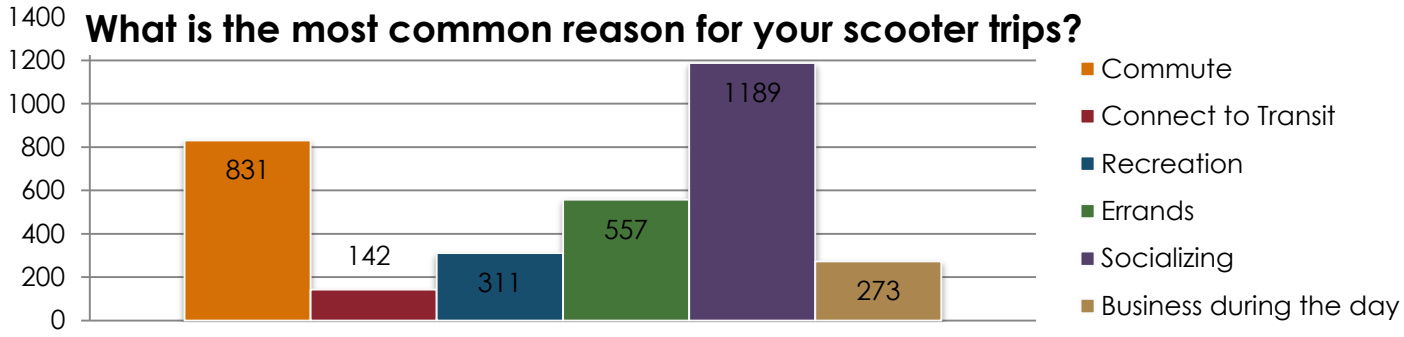
Age proved to be the most determining factor for usage, with younger people again being more likely to have used the vehicles. Usage by gender and by race did not vary as greatly, indicating that the vehicles appeal to a range of users.



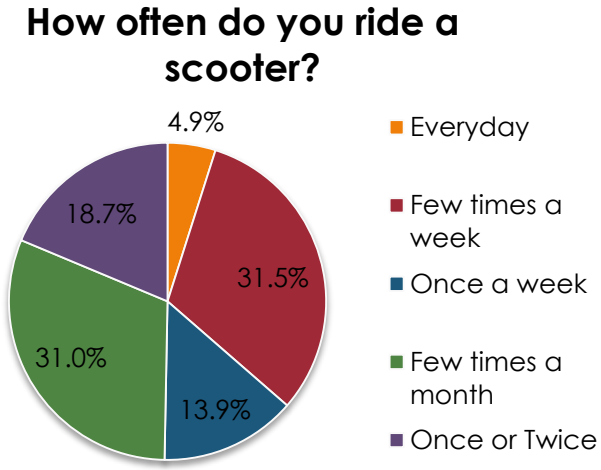
To compare the pilot dockless model to the previous Baltimore Bike Share, respondents were asked about their usage of the Bike Share, in which shared bicycles were available for rent at stations. Only 14.5% of respondents had ever used the recently discontinued docked Baltimore Bike Share, and almost all respondents have now started using dockless vehicles, indicating that the vehicles can provide a similar service. To understand why the Bike Share never had the same high adoption rate as the dockless vehicles now do, the 85.5% of respondents who never rode Bike Share were asked why. The top reason cited by 1719 people for never using the docked Baltimore Bike Share was the inconvenient station locations, while others simply think riding a scooter is easier or had limited understanding of the Baltimore Bike Share system.

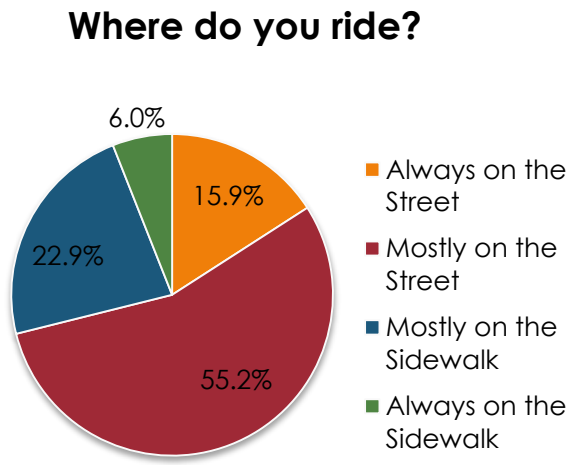


The survey also included questions about rider behavior in order to inform future education and messaging about safely and appropriately riding dockless vehicles. Knowing how people currently ride can shape requirements for vehicle providers and safety campaigns. The most common answer (3039 responses) as to why people choose to use scooters was that they are faster and easier than other modes of transportation. Other common responses included that users were simply curious, used scooters to save money, or think that they are more environmentally friendly. Few users selected scooters because they think of the vehicles as a healthier alternative. The most reported reasons for trips were socializing, commuting, and running errands.



Most users choose dockless vehicles with some regularity—over half of all users use them at least weekly, meaning that the vehicles have been incorporated into their lives. Users mostly (70.1%) try to obey the law by riding mostly or always on the street. When asked how they make the decision about where to ride, 586 respondents cited that they look for bike facilities, 444 said their decision is based on feeling safe, 413 mentioned trying to avoid traffic, and 137 mentioned wanting to avoid pedestrians. These answers suggest that creating on-street facilities that feel safe for dockless vehicle users will decrease sidewalk-riding.



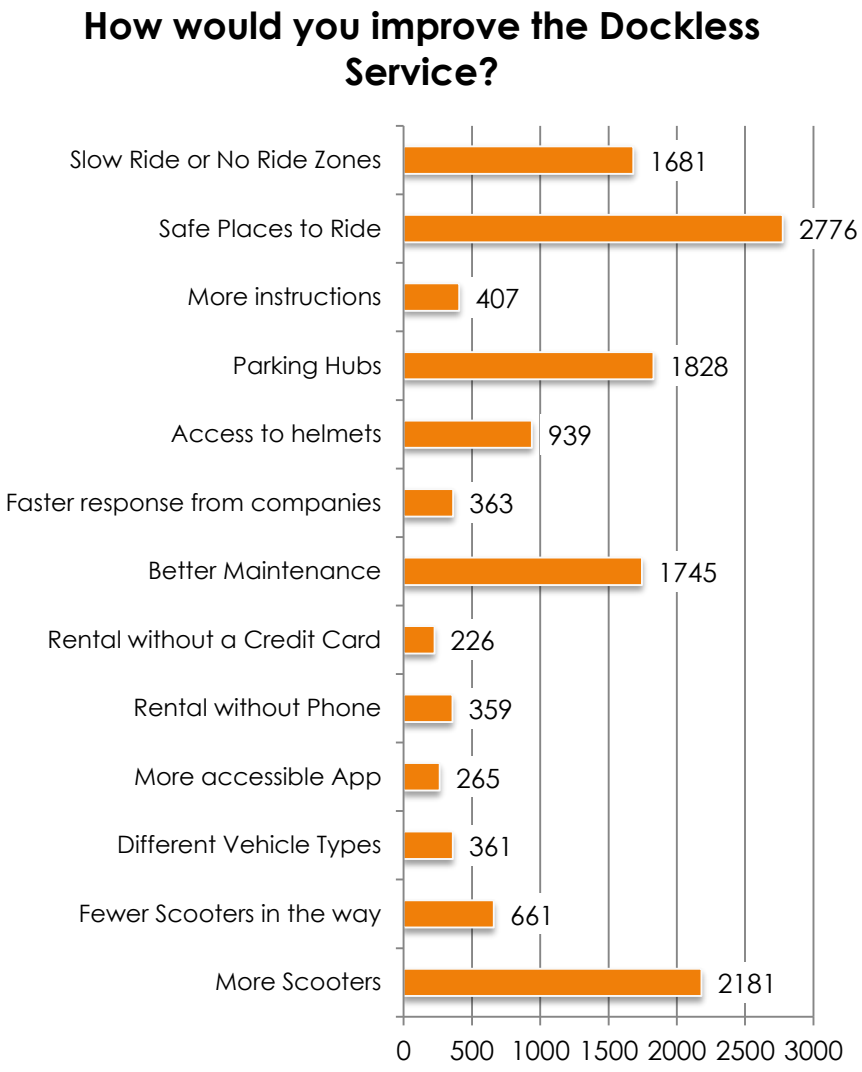


Helmet usage was not widely reported, with 79.5% of users saying they do not wear a helmet when they ride, despite the providers requiring and promoting helmet usage. Users, for the most part, did remember that the providors include parking instructions in the rental, with 88.2% of respondents reporting that they have received instuctions on proper vehicle parking.

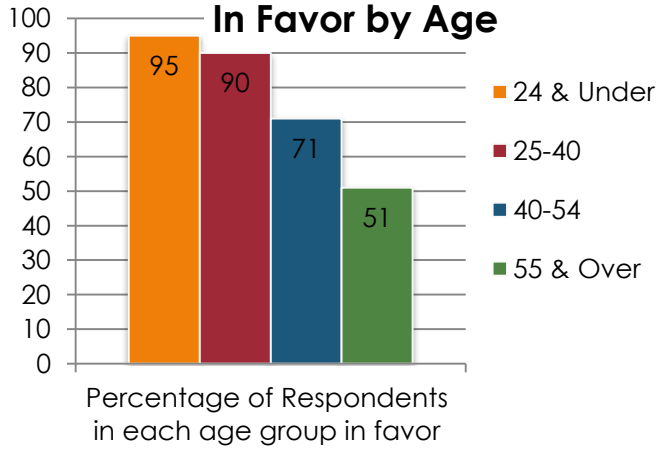
Regarding crashes, the survey asked about whether or not respondents had personally experienced a crash and, if so, the nature of the crash. This was asked in hopes of gathering some of the information about less serious crashes that would not be found in emergency department visits. The question was asked to both users of the vehicles and non-users who interact with the vehicles on the roadway, and respondents could select multiple responses if they had experienced multiple types of crashes. Despite the limitations of self-reported data from a self-selected sample, the responses added depth to the safety study. Among respondents, 87.2% report not having experienced a crash of any sort. Crashes involving no one but the scoooter rider made up the majority (51%) of crashes reported, even though the crashes involving other modes ran the theoretical risk of being reported twice, since both parties involved could answer. The most common crash involving another person was a crash with a pedestrian (28%), followed by a crash with a car (14%), and only a few noted involving a bike (2%). When asked about any injuries sustained, only 4.5% of respondents mentioned injuries.

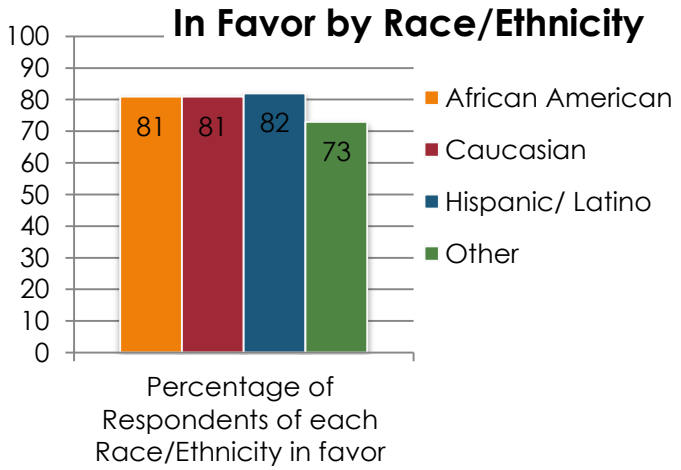
The survey also aimed to gauge effects on roadway operations, which are not well represented in trip data. Responses to questions about how the dockless vehicles changed the respondents' use of other modes indicated that dockless vehicle trips most often replaced driving, taxi, or similar for-hire car trips; 1603 and 1748 responses indicated that they use the modes less often, respectively. While most respondents said their usage of other modes remained the same, the only mode that saw a notable increase due to dockless vehicles was walking, which 255 people said they now do more often. These responses are encouraging and indicate that the new vehicles are achieving progress towards the DOT goal to reduce congestion and replace car trips with a more sustainable option.

When asked how to improve the program, the number one response was to provide safe places to ride- echoing sentiments of users and non-users alike who see a need for a designated place for small vehicles. The second most common answer was a call for more scooters, likely from the 53 percent of respondents said they could only find a scooter some of the time. Parking hubs for the vehicles, better maintenance, and slow ride or no-ride zones also received a significant number of responses and need to be considered in regulations of any permanent program.



The overwhelming majority of respondents (81%) answered that they are in favor of continuing the dockless program. Broken down by different demographic traits, the main factor that affected a person's stance was age—younger people tended to be more in favor of the program. Even though people 55 and over do not favor the program at as high of a rate, more than half of respondents were also in favor.





Among different self-described racial groups, there was no clear division in opinion—all races and ethnicities appear to equally support a dockless program. Of respondents who elaborated on why they are not in favor of the program, the top answers included safety, sidewalk usage, and use by minors. Ultimately, the percentage of in-favor respondents even exceeded the number who had used the vehicles, with 51.5% of people who had not ridden the vehicles still in favor of keeping dockless vehicles on the streets.

Community Engagement Conclusions

Based on survey, in-person, and email responses, the dockless program is seen as an asset to the community, but there is room for improvement, and people have ideas.

- Over 2,000 respondents' desired change to the program was more scooters, reflecting that there's still additional demand for this transportation option
- Over 2,700 respondents requested safe places to ride, suggesting that potential demand is being suppressed by the lack of supporting facilities
- Designated parking/retrieval locations and better management to assure that scooters do not impede pedestrians could improve the experience of people who are sharing streets and sidewalks with dockless vehicles

Even residents who attended community meetings to express frustrations about the vehicles usually left such meetings with ideas for regulations that would combat the specific issues they faced as a result of the vehicles. All of this feedback is being used to design the regulations and supporting programs for a permanent dockless vehicle program.

DVC EVALUATION QUESTIONS REVISITED:

How safe are dockless vehicles compared to other transportation modes?

+ Dockless vehicles are no more dangerous than other transportation modes concerning serious or fatal injuries.
- Reports of crashes with pedestrians and unconfirmed reports of minor injuries will require intervention

Lessons Learned: Based on community emails and the community survey, there is a need for more education about safe riding and a need for more safe places to ride. Males and riders under 29 are the most over-represented in crashes and should be targeted with safety messaging. Bumps and uneven surfaces affect small wheels of scooters and likely contribute to the bulk of crashes that occur with a scooter and no one else.

Where, when, and why do people choose to use dockless vehicles?

+ People use dockless vehicles all over the city, with hot spots mostly located near areas with connections to downtown or with their own main streets. They have peak usage at the same times as motor vehicles—during morning and evening rush hours and lunch hours. People use them to commute and run errands on trips less than three miles in distance.
- Usage and deployment are largely concentrated downtown. Dockless bicycle usage was far below scooter usage.

Lessons Learned: More connection and safe places to ride are needed to spread ridership. Deployment adjacent to commuting routes, transit, and local business districts are needed. DOT will also need to incentivize vehicle types other than scooters to make them viable for companies to provide.

Can the vehicles be accessed in an equitable manner under the current provisions?

+ Vehicles are found across the city of Baltimore. There are large concentrations of short rides in the downtown core and along the Charles Street Corridor. Compliance with the equity requirements on the pilot show there is a market for vehicles in low income areas.
- People sometimes have trouble finding vehicles, and vehicles do not currently reach all neighborhoods with the same service level.

Lessons Learned: More can be done to assure access to vehicles through morning deployment requirements and specific deployment locations. DOT will need to be thoughtful in requiring deployment to areas where the vehicles are likely to be ridden, including main streets throughout the city and not just downtown.

What are the impacts of Dockless Vehicles on other roadway users?

+ Dockless vehicle trips are replacing car and taxi trips. Since trips largely occur during peak travel times, they are likely reducing congestion.
- Many streets lack safe places to ride. Some users then opt to ride on the sidewalk in close quarters with pedestrians.

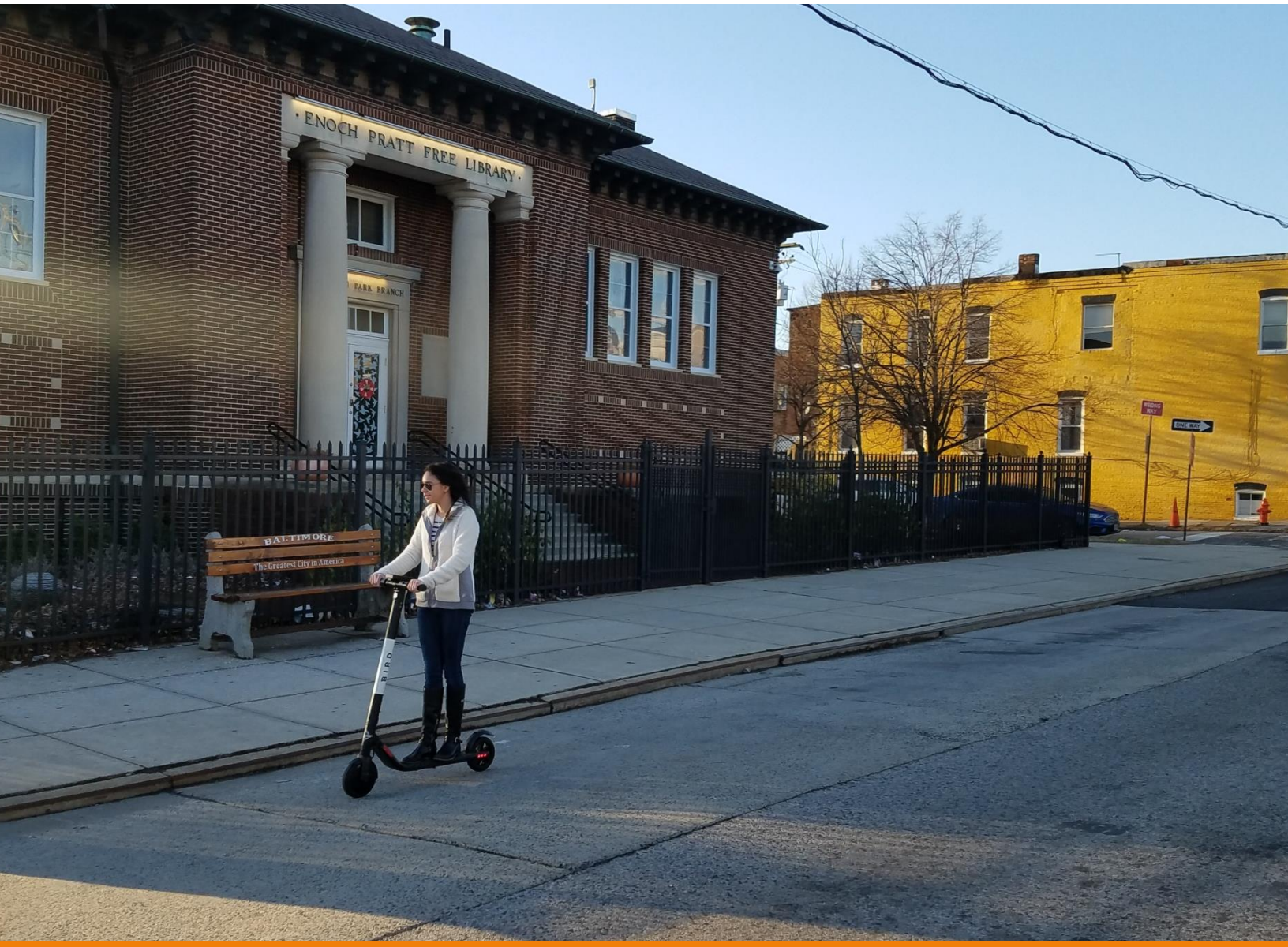
Lessons Learned: The vehicles impact everyone on the roadway. More infrastructure for small vehicles and more education for all roadway users is needed. Motor vehicle drivers need to know how to interact with small vehicles, and dockless users need to know their responsibilities in operating courteously.

What structures can be put in place to ensure a successful permanent program?

+ Companies can quickly adjust to the market by adjusting deployment and messaging in the phone app.
- The pilot agreement was hard to change and did not address all issues; the pilot was a learning process. DOT needs to be able to support the program at a higher level to assure its success.

Lessons Learned: Legislation must leave room for adjusting rules and regulations periodically. The City needs to have detailed rules and regulations for a permitted program and provide their own support to the program.

IV. Recommendations



Based on the results of the Dockless Vehicle Pilot Program Evaluation, DOT recommends the continuation of the Dockless Vehicle program on a permanent basis. This path forward is dependent on legislation signed by City Council and the Mayor, a strong set of vendor requirements to remedy issues found during the pilot, and dedicated fees for the administration of program support by DOT to assure the best implementation possible.

Based on the evaluation of the pilot program, dockless vehicles should remain as a transportation option for Baltimore City. To create a successful program that builds on the pilot's strengths and learns from the shortcomings, DOT and the DVC developed recommendations to move a program forward. These are based on the pilot experience, as well as national and regional best practices. Considering the new and still emerging technology, introducing a new means of transportation to the roadway is a challenging process and will require cooperation and coordination across many agencies, the community, and other stakeholders. DOT recommends clear legislation to outline a program, a permit system, provider requirements that can be adapted annually, and specific DOT support to launch its inaugural year.

Legislation

In consultation with the Baltimore City Law Department (BCLD), DOT drafted and introduced a bill to the Baltimore City Council on January 28th, 2019. The legislation defined the characteristics of dockless vehicles and enabled a DOT permitted program for Dockless Vehicles for Hire. This was done in an expedited manner in order to minimize any gaps in service between the pilot period and a potential permanent program.

The full text of the proposed legislation can be found in Appendix 4. The legislation has a few key elements that were identified as priorities by DOT, BCLD and the DVC:

- Defines e-scooters and e-bikes
- Outlines legal operation and parking of the vehicles
- Establishes a permitting program overseen by DOT
- Lists operational responsibilities of providers
- Sets enforcement and penalties for violations
- Imposes a performance bond and tax on rentals of Dockless Vehicles for Hire

By defining types of vehicles, this bill lays out how both personal and for-hire e-assist bicycles and e-scooters should be operated. Safety and parity of law were the two largest considerations for these sections. The establishment of a permit allows for a competitive approach to the new transportation mode.

Establishing a permit moves away from an RFP or other procurement methods, meaning the City admittedly relinquishes direct management and operations. At the same time, this structure gives DOT the authority to set specific rules and regulations that will govern management and operations by the providers. The providers can then be nimbler in adapting and adopting new technology, as incentivized by a competitive marketplace.

The bill as introduced by DOT is not perfect, but it is one of the first bills of its kind nationwide. As written, the bill is a balance between giving specific requirements and allowing for the program to shift annually with market demands and advancements in technology.

Equitable Implementation

Baltimore City commits to intentionally addressing implicit bias and removing barriers for racial and other marginalized groups. Our goal is to help eliminate the forces that create and sustain institutional and structural racism and other entrenched inequities in Baltimore. When discussing, creating, and implementing policy, projects, and programs, we commit to using our power to achieve equity.

Equity Considerations for Dockless Program:

- ✓ ***Define the program's purpose and intent.***
- ✓ ***Structure budgeting and work plans to support relationship building.***
- ✓ ***Collect relevant data and information to inform equity.***
- ✓ ***Plan inclusive community engagement.***
- ✓ ***Perform an ongoing Equitable Impact Analysis on access, capacity building, economic opportunity.***
- ✓ ***Hold the program accountable.***

The 2019 Baltimore Sustainability Plan, published by the Baltimore City Office of Sustainability, lays out an equity lens for implementing projects and programs in Baltimore City.

Provider Requirement Recommendations

While the enabling legislation gives broad authority to DOT for issuing Dockless Vehicle for Hire permits, DOT must set the requirements for permits. Following best practices nationwide, DOT recommends a competitive but transparent application process and Rules & Regulations that can be adjusted annually to reflect advancements in dockless micro-mobility.

Application Process

Once a permitting program is established, DOT will move swiftly to open an application process. Baltimore City has been an explosive market for dockless vehicles and thus expects a competitive application process. During the Pilot, there were seven companies that expressed interest in entering the market, and four companies officially joined. In order to maintain this level of service, but keep the community from being inundated with different vendors, DOT recommends a limited number of vendors for first permitted year of the program. Both providers who were active during the pilot and new providers will have to apply to DOT to be considered for an annual permit through a competitive process.

The application will detail the Rules & Regulations permit holders will be expected to abide by for the one-year permit duration. As part of their application, vendors will answer questions about how they will fulfill each requirement. It will also include application review for progressive items that DOT would like to encourage each company to provide, such as work plans for innovative community engagement. Each of these items will be considered a bonus on the application. Applications for permits will be reviewed by a team and scored on a matrix. DOT will reserve the right to deny any service provider from receiving a permit based on current or past conduct.

Fees

DOT recommends that dockless vehicle providers who are granted operating permits pay fees twice per calendar year. Under the pilot program, payment was made based on the number of vehicles that providers deployed: $1 per day per scooter and $20 for any bike for the duration of the pilot. The pilot fees were negotiated with the providers and were roughly comparable to Bird Inc.'s Save Our Sidewalks campaign, which pledged $1 per day per vehicle for municipalities to improve infrastructure used by their vehicles. While seemingly fair in price, this payment structure proved to be labor intensive for both the companies and for the City to track. To shift away from this payment structure, DOT proposes fees that fall into three types:

- **Permitting Fees:** These fees pay for the administration of the program and programmatic support from DOT. Any fees to be paid will be reviewed by the Baltimore City Board of Estimates (BOE) along with a line item description of what DOT will use the fees to fund, including many of the DOT support initiatives described in the subsequent section of this report.
- **Refundable Performance Bond:** A one-time performance bond will be charged to companies to assure the proper maintenance and managements of their fleets; this type of bond, or a similar measure, is a standard feature in dockless agreements nationwide. This bond, as described in the introduced bill, could be used to pay for damage to public property caused by dockless vehicles or costs incurred by the City to accomplish the removal and storage of vehicles that are parked illegally. The amount of the bond will be calculated based on project costs and must be approved by the BOE.
- **Excise Tax:** A tax to be levied per rental and remitted twice annually allows for revenue sharing with the companies in a manner that is linked to their success in operations. This tax is similar to other transportation models, such as taxi cab trips.

Proposed cumulative fees for dockless vehicle permits are being analyzed based on program administration needs, national best practices, and with an understanding of the competitive viability of the dockless for-hire providers. From August 15, 2018 to January 31, 2019, there were an estimated 723,252 dockless rides with an average ride duration of 12 minutes. Although this data is imperfect, using the fee schedule of $1 per ride plus $.15 per minute, the estimated revenue for the two companies operating during that time period is $2,025,105.60. While this number may seem large, it does not consider the reduced fare rides, the operation costs of vehicles, vehicle maintenance, contracting to

chargers, and other overhead costs. DOT is using pilot fees as a baseline for proposing permit fees. Combining the permitting fees, refundable performance bond, and excise tax and converting to a "per vehicle per day" amount, the proposed total is projected to be slightly less than the current fees of $1 per vehicle per day.

Rules & Regulations

Providers selected for permits will be required to sign and adhere to rules and regulations set forth by DOT. These rules and regulations will be far more detailed than what is contained in the proposed bill and will act as a contract agreement with the providers. Annual revision to the rules and regulations will be considered in order to reflect the real-life conditions for dockless vehicles.

The following is a summary of the DOT recommendations for the rules and regulations for a Dockless Vehicle Permit. These recommendations have been discussed in detail by the DVC for several months and reflect the national best practices from cities across the nation. On the following pages, they are organized by regulatory area and include the following details:

- **Requirement** – This section contains both what will be formally written into any contract signed by a provider as a non-negotiable requirement, as well as items that DOT will favor during the competitive application process.
- **Intention** – This explains the intention of DOT in setting each requirement.
- **Legal Basis**- All requirements must have a basis in the law. Listed here are the allowances in the current bill to enable a Dockless Permit Program. As a reference, any corresponding requirement from the Pilot period is also listed.

The full rules and regulations set by the Department cannot be finalized until the enabling legislation is passed, at which point they will be released publicly with a time for public comment. Once the rules and regulations are formally adopted, they will be released in a legal format in conjunction with the application for permits.

Rules and regulations will be written to reflect the Baltimore City experience during the pilot. For example, providers will be required to educate users of Baltimore City laws.

	Summary of Requirements	Intent	Legal Basis
Fleet	• Providers must: ○ Adhere to a minimum and maximum fleet size • Providers will be encouraged to offer multiple vehicle types • Providers may apply to expand fleets based on ridership quotas	• Maintain 3 rides per vehicle per day • Allow enough vehicles for companies to profit and for consumers to find vehicles	• Bill allows for a maximum number of total vehicles *Pilot: Set a 1000 vehicle cap for each vehicle type.*

Distribution	• Providers must:
	  ○ Deploy a minimum number of vehicles to City designated deployment zones
	  ○ Deploy a minimum number of vehicles to each hub designated by the City
	  ○ Redistribute vehicles if there is a large over concentration of vehicles is located in any zone
	  ○ Remove from the ROW for severe weather or other emergencies
	• Providers will be encouraged to rebalance multiple times on special event days
		• Assure equitable distribution of vehicles
		• Avoid over concentration of vehicles
		• Remain proactive for emergency events
			• Bill requires equitable access to vehicles
			
			Pilot: Required 25% distribution to 15 CSAs selected by household income level

Parking	• Vehicles can only be deployed on the Baltimore City ROW and must adhere to parking laws
	• Providers must:
	  ○ Not exceed a deployment limit per block face
	  ○ Not deploy vehicles on blocks which contain a k-8 school
	  ○ Respond to non-deployment requests within 48 hours by removing that location from their deployment list
	  ○ Detail plans to encourage proper parking and use of designated parking hubs
		• Encourage legal and courteous parking
		• Maintain orderly sidewalks with four feet of room for the free flow of pedestrian traffic
			• Bill outlines parking laws
			
			• Bill allows seizure of illegally parked vehicles
			
			Pilot: Mandated that vehicles be deployed only on the Baltimore City ROW and adhere to parking laws

Education	• Providers must:
	  ○ Display riding laws in the app for new users and be accessible to all users at any time
	  ○ Attend or host educational event/display in each deployment zone annually
	• Providers will be encouraged to have safety laws pop up on the user app more frequently
		• Educate users about safe and legal operations
		
		• Increase knowledge of dockless vehicles amongst all roadway users
			Pilot: Required in-app education

Engagement	• Providers must:
	  ○ Distribute marketing equally or target communities underserved by transportation
	  ○ Attend a set number public meetings as invited by the department
	• Providers will be encouraged to plan additional engagement plans targeting underserved communities
		• Engage with communities who need more transportation options	• Bill requires equitable access

	Summary of Requirements	Intention	Legal Basis

Equity of Access	• Providers must:
	  ○ Offer non-smart phone and low-income options
	  ○ Make App accessible to visually impaired (talkover, voiceback)
	• Providers will be encouraged to offer a subscription services, especially if paired with a pre-existing pass, such as MTA Charm Card
		• Allow access and app usage by all Baltimore community	*Pilot: Required low income customer plan approved by DOT*

Safety	• City-wide 15 mph • Providers must: ○ Geo-fence reduced speed (10 mph) and no ride zones • Providers will be encouraged to equip vehicles with a constant noise emitting device or develop designs to add one • Providers will be encouraged to offer safety equipment (helmets, reflective gear etc.)	• Monitor the safety of vehicles • Encourage companies to make safety innovations on their fleets	• Bill sets a city-wide speed limit of 15 mph *Pilot: Set a city-wide speed limit of 15 mph*

Vehicles	• All vehicles must have:
	  ○ GPS technology
	  ○ Kick stand
	  ○ Sticker or decal with a unique vehicle identifier, company name, toll free number, and email address for reporting
	  ○ Throttle control technology (scooters only)
	• Providers must
	  ○ Detail vehicle maintenance plan
	  ○ Notify City of all makes and models of vehicles introduced
	• DOT encourages companies to work towards equipping vehicles with additional features such as a lock to device or dual kick stand
		• Assure safe vehicles that can be easily identified	• Bill requires vehicles meet applicable safety standards
			
			Pilot: Required decal with identification

Data Reporting & Privacy	• Providers must:
	  ○ Notify City of Baltimore and users of Data breaches Adhere to data privacy standards
	  ○ Address software glitches in a timely manner
	  ○ Provide City with a data feed in MDS format and a publicly accessible API
	  ○ Submit monthly active user counts, crash reports, parking violations, damaged vehicles, and complaints with response time noted
	  ○ Respond to public in six business hours and to the City in three business hours
	  ○ Agree to distribute a survey to users
	  ○ Maintain 24-hour line with multilingual service
		• Maintain the security and privacy of user information
		
		• Access live data on vehicle usage and patterns in order to adapt regulations and program support
			• Bill details requirement to notify City of data Breaches
			
			Pilot: Detailed weekly reports on rider ship and monthly reports on complaints and user issues.

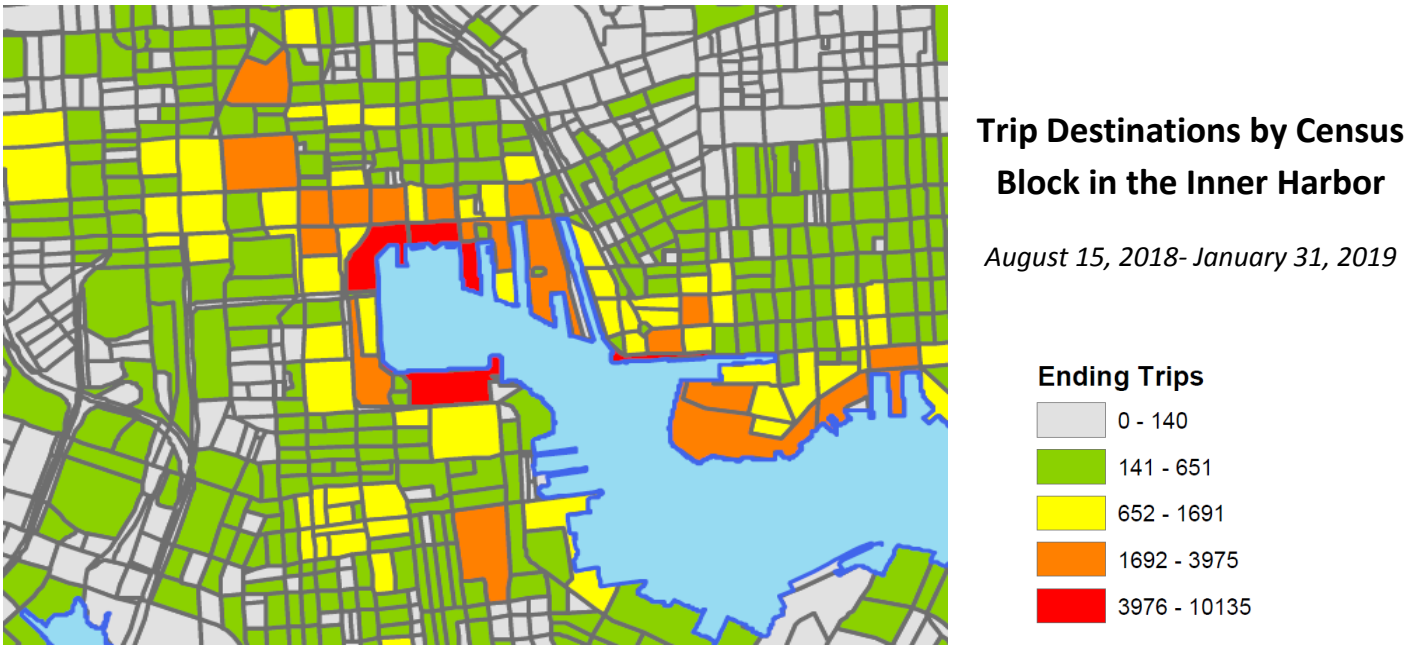
DOT Support

To make a Dockless Vehicle program successful, DOT will need to administer program support. Administration can be paid for through permitting fees. This will be essential to ensure that the new transportation mode rolls out smoothly and safely.

Infrastructure Improvements

To ensure safety and encourage proper parking, DOT needs to support and invest in shared mobility infrastructure. Two main types of infrastructure will support dockless vehicles: safe places to ride and designated parking spots. These two improvement types will increase safety for riders and pedestrians, as well as create order and predictability in the location of parked dockless vehicles.

Providing safe and appropriate places to ride dockless vehicles can greatly reduce the number of conflicts experienced by or with dockless users. Most of the crashes experienced involved solely the rider, followed by those that occurred with pedestrians. This indicates that dockless vehicles should avoid riding on sidewalks, as they can be bumpy and should be reserved for pedestrians. Also noted in the community survey, most respondents who use the vehicles ride in the street when they feel safe, but use sidewalks when street conditions do not feel safe. In order to have safe and comfortable spaces for all travel modes, dockless riders need a safe place to ride on the street, such as bike facilities. Dockless funds can be used for the maintenance of Baltimore City bike lanes so they can function as shared mobility lanes. Using funds to smooth, patch, and fill potholes and clean bike lanes will greatly benefit dockless bicycles and especially benefit scooters with smaller wheels, which can be more acutely affected by road conditions and debris.



Trip origin and destination data can be mapped at a very detailed level and included as criteria to site parking hubs. The Inner Harbor is depicted here as an example, but is not intended to indicate that this is the only place where the hubs will be installed.

The second most frequent issue with dockless vehicles during the pilot was where and how they were parked. Vehicles were observed blocking pedestrian flow or otherwise impeding roadway activity. Additionally, many users noted issues with being able to find vehicles, which could be left anywhere. By creating designated parking hubs, DOT will encourage proper parking by users and proper deployment by providers. These hubs will feature a parking area for both for-hire vehicles and private vehicles. Locations will be selected based on pre-determined criteria, including ridership data, transit proximity, and equity considerations. By requiring that a percentage of vehicles be deployed in the morning to these parking hubs and incentivizing returning vehicles to them, the program can take a step toward improving equity of access across the city.

Preliminary designs for shared mobility parking hubs include spaces for both scooters and bikes. Locations will be selected based on clearly defined criteria.

Community Education and Engagement

To reduce injuries and conflicts with other people on the road, DOT will use dockless permit funds to launch a community education campaign. Although the campaign will be further developed, DOT and the DVC have already identified several educational components currently missing in the pilot program:

- **Tips for riding** – Riding a scooter or other form of dockless vehicle may be new to many people. For this reason, DOT will develop short videos that explain riding and parking laws, as well as tips for safe riding.
- **Handouts with riding laws for distribution** – Based on the experience of BPD Officers and Downtown Guides, riders respond and learn from receiving verbal warnings about improper riding. By distributing small handouts to riders demonstrating unsafe or illegal riding behavior, problem riders can be reached effectively and learn about how they should operate dockless vehicles.
- **Education for non-users** – DOT education will go beyond what could be perceived as the provider responsibility by including education targeted at people who do not use dockless vehicles. DOT will need to educate other roadway users, such as drivers, people walking or biking who may interact with dockless vehicles.
- **Sponsor community events** – In order to reach communities, DOT will work with partners to support events where dockless vehicles can be showcased.

With this improved community education and engagement effort, DOT can impact not only the safety of dockless vehicles users, but of all roadway users who interact with them daily.

Resident Mobility Board

With dockless vehicles posing mobility challenges to pedestrians and others, they bring to light the need to have conversations with residents about their mobility. To work towards dockless program's explicit goal of improving equitable access, DOT recommends establishing a resident board that focuses on the subject of mobility needs. By creating a Resident Mobility Advisors (RMA) program, DOT can engage with residents who are the experts on their own mobility needs and who have insight into the needs of their neighbors and community members. Structure for this Board can be based on the Planning Department's Resident Food Equity Advisors (RFEA). Through this program, residents can advise the Baltimore City Department of Transportation about what is working, what is not, and how to move forward. Based on the RFEA model and insights provided by the Planning Department, the RMA would have clear goals:

- **Provide feedback** about the performance of Dockless Vehicles and other mobility programs or initiatives.
- **Advise on** updates and changes to dockless permit rules and regulations.
- **Discuss obstacles** to access and community connections in each geographical area.
- **Create partnerships** between key community stakeholders and DOT by aligning events for promotion and education around mobility programs or initiatives.

Although the exact structure of the RMA is not set, there are several key aspects necessary for increasing the equity of transportation options:

- **Geographical representation structure –** Choosing advisors who represent the entire city will provide broader insight. Following lines already used, such as council districts or DOT Community Liaison quadrants, can help align with other priorities.
- **Stipends –** The goal of RMA is largely to give a voice to underserved areas. As such, providing a stipend to those representatives, for whom spending time and transportation could be a larger burden would further encourage and enable participation while demonstrating the value of their input.
- **Two-way dialogue –** The board and each meeting should be structured as a dialogue where the advisors and DOT learn from each other. This will improve civic trust in DOT and help DOT to set priorities.
- **Align with Title VI, Complete Streets, and other Equity Requirements –** The RMA program should abide by all equity mandates and initiatives within DOT.

Local Best Practices- Equity

Resident Food Equity Advisors (RFEA) advise the Baltimore City Planning Department on strategy. RFEA are Baltimore residents who influence and advise the City's Healthy Food Environment Strategy, policies, and plans. Their insights include:

- ✓ ***Intentional Recruitment –Strive for an applicant pool that reflects the city's population***
- ✓ ***Application process –The application process need not be an arduous application, and selection should not be based solely on prior knowledge, but on the desire to contribute and the ability to work well in a group setting.***
- ✓ ***Emphasize group work and discussion- Give enough context to start a discussion and then, listen to the advisors.***
- ✓ ***Set a clear goal- Allow the board to delve deep into an issue and see a product from their contribution.***
- ✓ ***Evaluation and Check-Ins – Debriefing and encouraging residents to provide feedback about the structure of each session is essential to making a successful program.***

The 2018 RFEA cohort discussed corner and convenience stores from multiple angles: legislation, zoning and land use, safety and security, community engagement, and business support. Advisors helped the Baltimore Food Policy Initiative create strategies and a policy agenda around corner and convenience stores in Baltimore City.

Staffing

Perhaps the most important piece for DOT program support is dedicated staffing. Nationally, municipalities with dockless programs average two and a half FTE staff positions to run their programs.[11] DOT will need to hire an additional staff person to manage the program and associated projects. This person will assist the DOT Shared Mobility Coordinator to:

- Manage Agreements with vendors
- Assure providers are complying with agreements
- Analyze trip data
- Coordinate infrastructure improvements
- Work with the equity oversight board
- Launch community education campaigns

With this additional staffing, DOT can continue to run an innovative dockless program and plan for quarterly and annual program adjustments

Looking Ahead

DOT recommends that City Council and the Mayor support Council Bill 19-0324. With this legislation, DOT can move forward with one of the most thoughtful Dockless Vehicles programs in the nation to date. This bill was crafted by Baltimore City DOT in conjunction with diverse stakeholders to ensure the City has a fair and responsible regulatory framework for dockless vehicles. This bill defines new vehicle types that were not previously codified and describes how they may be operated and parked. It provides provisions for a for-hire permit outlining vehicle access, safety and enforcement parameters, and principles governing the relationship with dockless vehicle providers. The bill will help a new travel mode exist and flourish in the City of Baltimore, creating additional transportation and mobility options for our residents and visitors.

With an enabling ordinance and proper program support DOT can:

- Issue the first annual permits in summer 2019
- Develop a live dashboard to monitor usage and share aggregated data publicly
- Pilot parking hubs to increase access and encourage courteous parking
- Release a report on dockless vehicle usage annually
- Conduct a scientific survey of users annually
- Adjust permit rules and regulations annually
- Support a 10% increase of rides annually
- Incrementally increase the mode share for active commutes to work
- Develop accurate tracking and reduce injuries associated with dockless vehicles

These additional capabilities will help to address some of the shortcomings identified in the pilot program. Provided the continued support through fees, staffing, and support, the dockless program can play a growing role in reaching equitable access and sustainable transportation goals for the City of Baltimore.

[11] NACTO Bike Share Cities forum

Appendices

APPENDIX 1: Dockless Vehicle Pilot Program Agreements
APPENDIX 2: Dockless Vehicle Committee Work Plan
APPENDIX 3: Community Survey Full Results
APPENDIX 4: Dockless Vehicle Baltimore Council Bill 19-0324

Thank You

Baltimore City DOT would like to thank the Dockless Vehicle Committee who guided this evaluation report and to all of the communities who shared their experiences during the pilot program. A special thank you to Baltimore City Councilman Edward Reisinger, Chair of the Land Use & Transportation Committee, for stewarding the bill which would make the dockless program permanent.