

# Baltimore City

## Dockless Vehicle Program

### Annual Evaluation Report: Permit Year One



## Appendix 1: Equity Zone Deep Dive Analysis

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Equity Zones are an essential part of the Baltimore City Dockless Vehicle Permit Program that are designed to help increase access across the city. By requiring each company to deploy three vehicles to each zone each morning, service is provided to underserved areas, and users without smartphones know where they may reliably find vehicles. Zones were selected in collaboration with the Parking Authority of Baltimore City and the Department of Planning. Zones were placed in areas where there was a lack of service during the Dockless Vehicle Pilot. The team also considered proximity to safe infrastructure for riding and to amenities with the potential to spur ridership growth, such as neighborhood main streets, when selecting zone locations. Initially, over 40 zones that were not well served during the pilot were proposed. Each proposed zone was then mapped against equity-related demographic measures, including households in poverty, access to private vehicles, proximity to transit lines, population density, and racial demographics. For the 2019 permit, 20 Equity Zones were ultimately selected.

In this “deep dive” analysis, each Equity Zone is analyzed to measure the effectiveness and trends in the area. For each, a short description of why it was selected as an Equity Zone, a map with frequently traveled routes, and an analysis of trip level data are provided. When analyzing each Equity Zone, trip level data from all scooter companies in Baltimore are combined for August 15<sup>th</sup>, 2019 – February 29<sup>th</sup>, 2020. Metrics that are analyzed include:

**Trip Origins:** The total and daily average number of trips starting from the Equity Zone are calculated to help show how many riders start trips from the specific Equity Zone each day.

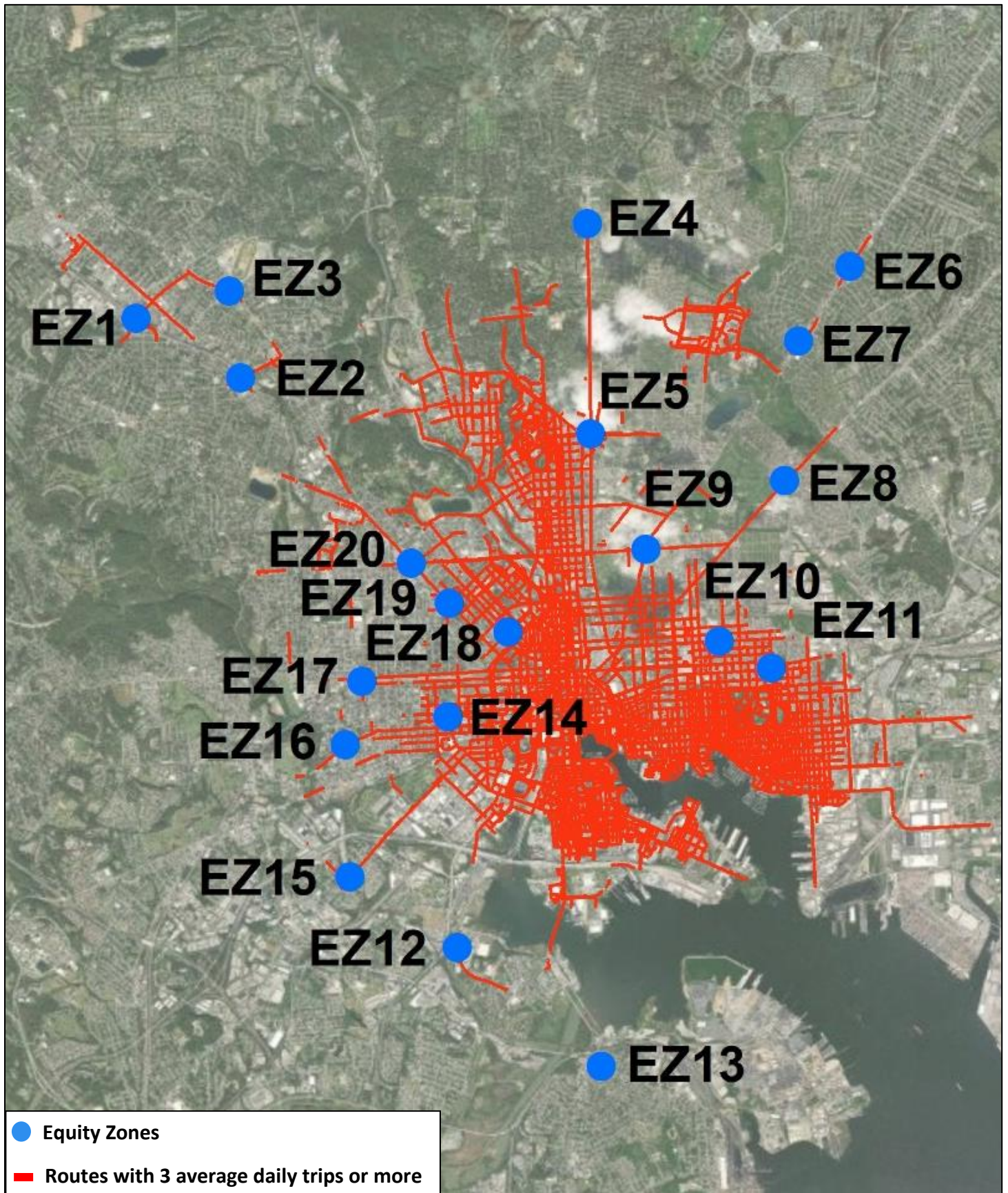
**Utilization:** Utilization is calculated to show if the scooters dropped off in each Equity Zone are being ridden. Utilization is calculated as a percentage: Trip Origins divided by the Scooter Drop Offs (average number of vehicles present between 5:00-9:00am). For example, if 10 scooters are available in an Equity Zone, and 8 scooters are ridden, the utilization is  $8/10=0.8$ .

**Miles Ridden in a ½-Mile Radius:** The Miles Ridden in a ½-Mile Radius of the Equity Zone is calculated to show how scooters may circulate near the Equity Zone; these scooters may induce more trips. For many zones, the scooters dropped off are the only ones in the surrounding area, so even trips outside of the Equity Zone may be a result of a scooter that was originally dropped off there.

**Average Trip Length:** The average trip length is calculated and mapped to capture how far riders are traveling from the Equity Zone. This metric is used to help determine locations to which scooter riders may be traveling and can help to plan for additional zones where scooters may be needed. In the maps below, the white circle represents the average trip length, and the red lines represent street segments that average at least three rides per day.

**Percentage of Daily Trips:** For each day, the percentage of all scooter trips in Baltimore originating at each Equity Zone is graphed. This shows how fluctuations in ridership correlate with those citywide, and, in some cases, shows the extent to which scooters are used as a consistent means of transportation. This graph also helps to show if scooter ridership at each Equity Zone is increasing or decreasing. The average Equity Zone ridership percentage is also graphed alongside every Equity Zone so the individual Equity Zone can be compared to all Equity Zones. The cumulative share of all 20 Equity Zones as a percentage of city-wide rides over time can be found in the evaluation report in Section II.

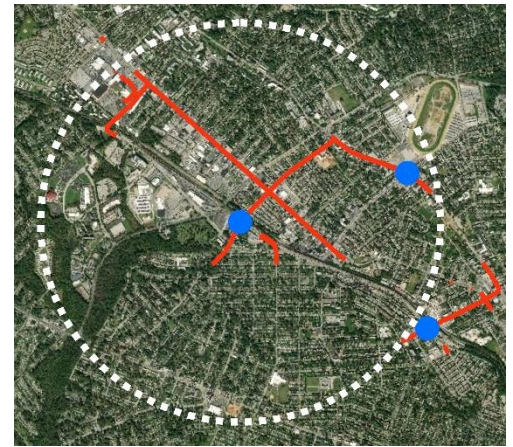
## Equity Zone locations and Frequently Traveled Routes



Equity Zones (EZ #) In Trip Origins ranking order	Metric Rankings				
	Trip Origins	Average Number of Dockless Vehicles Available	Utilization	Miles Ridden within ½-Mile Radius	Average Trip Length (Miles)
Rogers Ave Metro (1)	1	1	4	9	14
33rd at Greenmount (5)	2	4 (Tie)	1	3	15
McCulloh at Preston (18)	3	4 (Tie)	3	1	19
West Cold Spring Metro (2)	4	9 (Tie)	2	14	20
Penn-North (20)	5	4 (Tie)	7	7	6 (Tie)
Library Square (11)	6	9 (Tie)	6	4	8 (Tie)
West Baltimore MARC (17)	7	9 (Tie)	8	12	3
Upton Metro (19)	8	9 (Tie)	9	6	18
Northeast Market (10)	9	9 (Tie)	10	2	16
North Ave at Harford Rd (9)	10	2 (Tie)	13	8	6 (Tie)
Hollins Market (14)	11	19 (Tie)	5	5	13
Cherry Hill Light Rail Station (12)	12	15 (Tie)	11	13	17
Belair Edison Main Street (8)	13	4 (Tie)	15	11	1
Harford Road at Hamilton (6)	14	4 (Tie)	18	18	4
Park Heights at Belvedere (3)	15	19 (Tie)	12	16	12
Harford Rd at Coldspring (7)	16	15 (Tie)	14	17	11
Washington Blvd (15)	17	9 (Tie)	17	15	10
York Road at Bellona (4)	18	15 (Tie)	16	19	5
Westside Shopping Center (16)	19	15 (Tie)	19	10	2
Patapsco Ave (13)	20	2 (Tie)	20	20	8 (Tie)

## 1. Rogers Avenue Metro Station (Northwest District)

The Rogers Avenue Metro Station was selected for its connection to transit, high percentage of nearby households without a private vehicle, and high percentage of nearby resident commutes over 30 minutes. By looking at commonly traveled routes, it is inferred that many of the trips were residential, traveling to the Reisterstown Road Shopping Plaza, or travelling towards the Park Heights neighborhood.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	2,259 (12)	1
Average Number of Dockless Vehicles Available	13	1
Utilization	0.88	4
Miles Ridden within 1/2-Mile Radius	1,135	9
Average Trip Length (Miles)	1.1	14

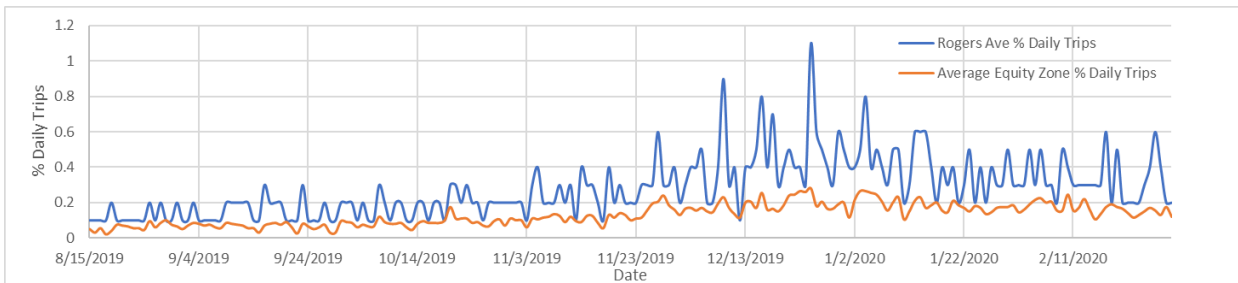
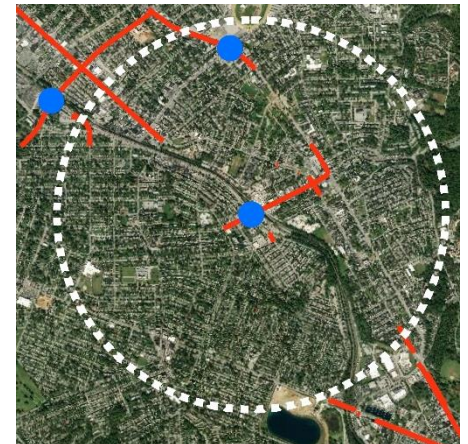


Figure 1: Rogers Avenue Percent Daily Trips. Daily trips at Rogers Avenue are consistent through the year, but the percent of daily trips increases in the winter. This trip shift shows consistent riding, suggesting that riders rely on vehicles for daily transportation.

## 2. West Cold Spring Metro (Northwest and West Districts)

The West Cold Spring Metro Equity Zone was selected as an Equity Zone during the second quarter of the permit to replace Reisterstown Plaza. It was chosen for its connection to transit, nearby amenities, and high percentage of nearby households in poverty and/or reporting commute times over 30 minutes. By looking at commonly traveled routes, many of the trips travel towards commercial corridors on West Cold Spring Lane and Reisterstown Road.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,410 (8)	4
Average Number of Dockless Vehicles Available	8	9
Utilization	0.89	2
Miles Ridden within 1/2-Mile Radius	537	14
Average Trip Length (Miles)	0.9	20

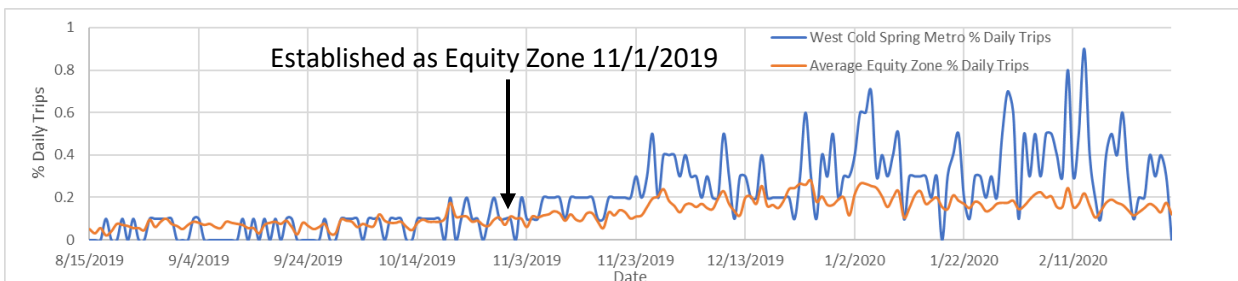
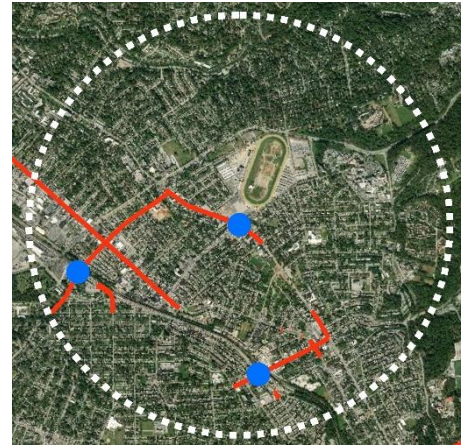


Figure 2. West Cold Spring Metro Percent Daily Trips. This Equity Zone was instated on November 1, 2019 and quickly became very popular. The high rate shows dockless vehicles are being used for daily transportation.

### 3. Park Heights at West Belvedere (Northwest District)

The Park Heights Equity Zone was selected for its proximity to amenities and high percentage of nearby households without a private vehicle and/or reporting commute times over 30 minutes. By looking at commonly traveled routes, it appears that there may be some connection between this Equity Zone and the Hilltop Shopping Center/Rogers Avenue Metro area.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	695 (4)	15
Average Number of Dockless Vehicles Available	6	19
Utilization	0.59	12
Miles Ridden within ½-Mile Radius	378	16
Average Trip Length (Miles)	1.1	12

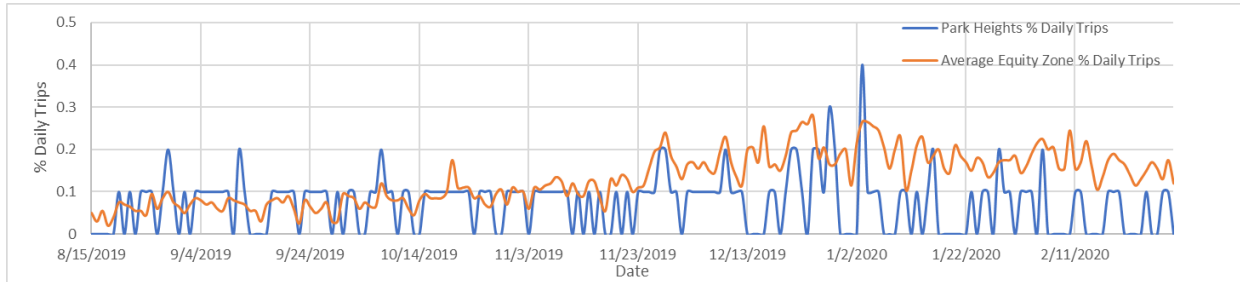
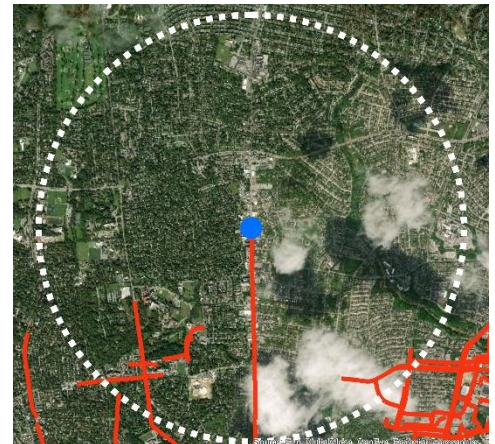


Figure 3. Park Heights at Belvedere Percent Daily Trips. The daily percentage of trips from the Park Heights Equity Zone usually ranks below the average Equity Zone percentage of daily trips.

### 4. York Road at Bellona (North District)

The York Road at Bellona Equity Zone was selected for its immediate proximity to city facilities and services, the CityLink Red bus line, and high percentage of nearby households with commute time over 30 minutes. By looking at commonly traveled routes, many of the trips were traveling south on York Road commercial corridor.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	623 (4)	18
Average Number of Dockless Vehicles Available	7	15
Utilization	0.45	16
Miles Ridden within ½-Mile Radius	292	19
Average Trip Length (Miles)	1.3	5

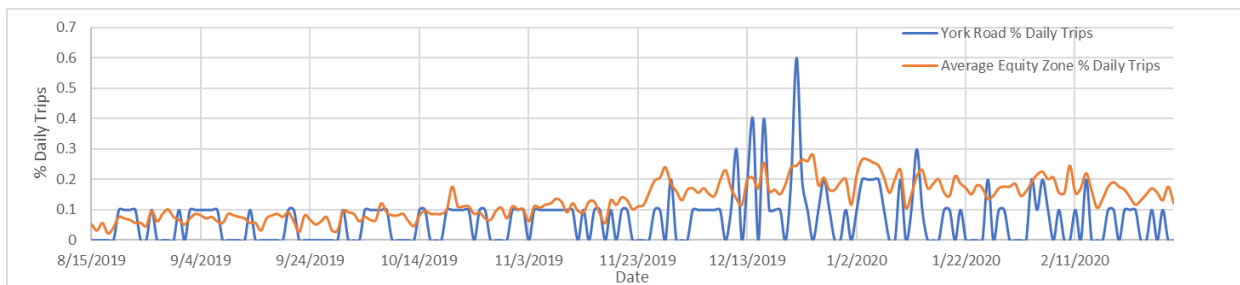


Figure 4. York Road at Bellona Percent Daily Trips. The percentage of daily trips from York Road consistently ranked below all Equity Zones.

## 5. 33<sup>rd</sup> Street at Greenmount Avenue (North District)

The 33<sup>rd</sup> Street at Greenmount Equity Zone was selected for its relatively high population density, percentage of nearby households without a vehicle, and connections to both the CityLink Red bus line and the Guilford Avenue Bike Boulevard. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations located near Johns Hopkins University or Downtown Baltimore. Riders also travelled east on E 33<sup>rd</sup> Street and north on Greenmount Avenue/York Road.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,989 (10)	2
Average Number of Dockless Vehicles Available	9	4
Utilization	1.12	1
Miles Ridden within 1/2-Mile Radius	11,642	3
Average Trip Length (Miles)	1.0	15

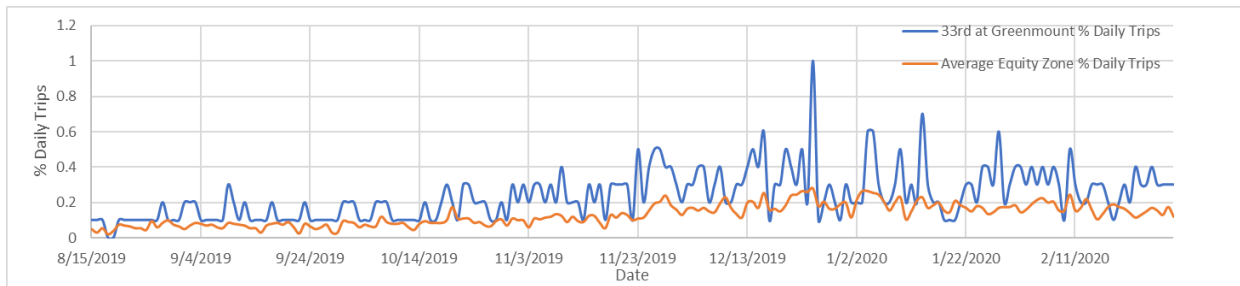
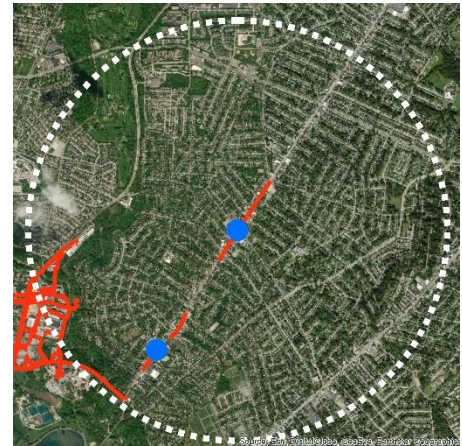


Figure 5. 33<sup>rd</sup> Street and Greenmount Avenue Percent Daily Trips. Daily percentages of trips from 33<sup>rd</sup> Street and Greenmount Avenue were slightly above the average Equity Zone daily percentage of trips when the dockless vehicle program first began. As the year went on, the percentage of scooter trips from this Equity Zone increased, showing that the dockless vehicles became more popular.

## 6. Harford Road at Hamilton (Northeast District)

The Harford Road at Hamilton Equity Zone was selected for its immediate proximity to the Harford Road main street, protected bicycle lanes along Harford Road, and high percentage of nearby households with commute times over 30 minutes. By looking at commonly traveled routes, it seems that many of the trips were traveling along the Harford Road main street.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	708 (4)	14
Average Number of Dockless Vehicles Available	9	4
Utilization	0.4	18
Miles Ridden within 1/2-Mile Radius	303	18
Average Trip Length (Miles)	1.3	4

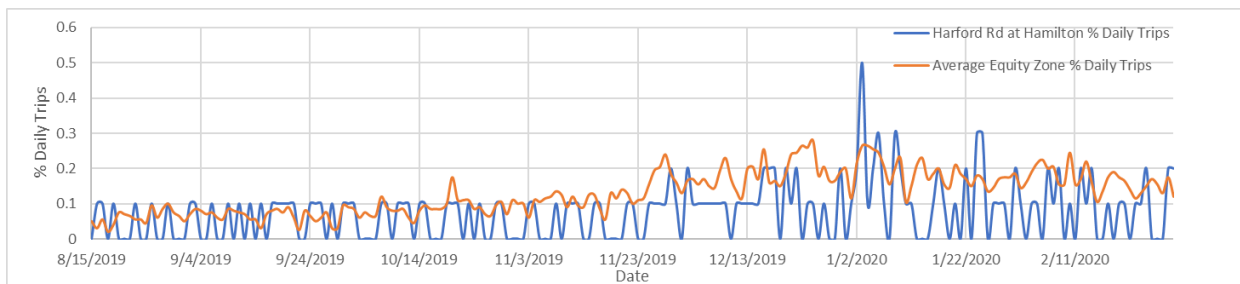
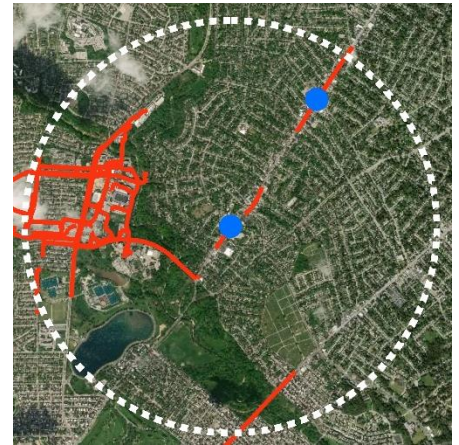


Figure 6. Harford Road at Hamilton Percent Daily Trips. The percentage of daily trips from Harford Road at Hamilton is near or below the average Equity Zone percentage of daily trips.

## 7. Harford Road at Cold Spring (Northeast District)

The Harford Road at Cold Spring Equity Zone was selected for its proximity to city facilities and services and low-volume side streets. By looking at commonly traveled routes, it seems that many of the trips were traveling south on Harford Road towards destinations like Morgan State University.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	683 (4)	16
Average Number of Dockless Vehicles Available	7	15
Utilization	0.5	14
Miles Ridden within 1/2-Mile Radius	347	17
Average Trip Length (Miles)	1.1	11

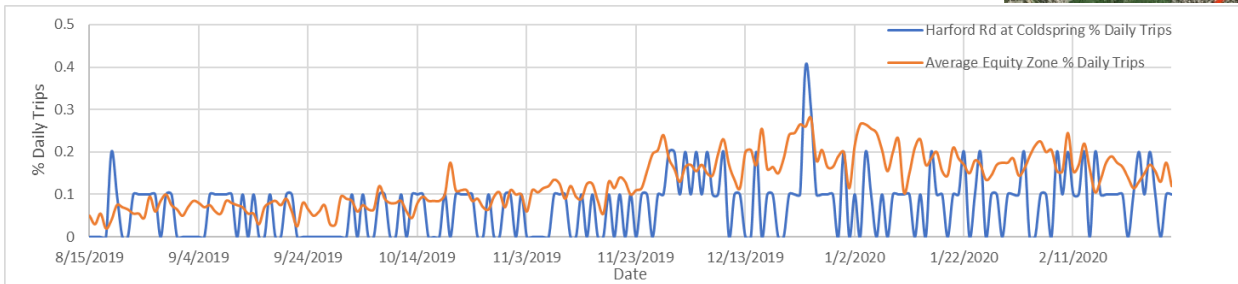
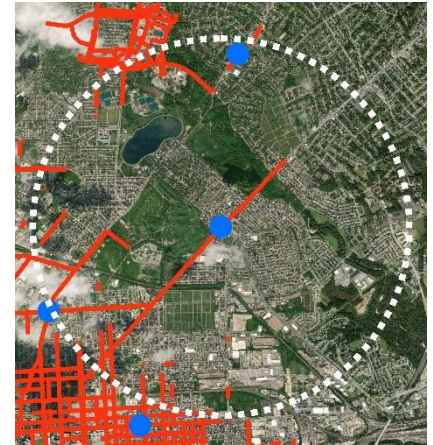


Figure 7. Harford Road at Coldspring Percent Daily Trips. The percentage of daily trips from Harford Road at Coldspring is below the average Equity Zone percentage of daily trips.

## 8. Belair Edison Main Street (East and the Northeast Districts)

The Belair Edison Equity Zone was selected for its immediate proximity to city facilities and services, percentage of nearby households with commutes over 30 minutes, population density, and proximity to the Herring Run Trail/low-volume side streets for riding. By looking at commonly traveled routes, it seems that many of the trips were traveling on Belair Road towards Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	818 (5)	13
Average Number of Dockless Vehicles Available	9	4
Utilization	0.46	15
Miles Ridden within 1/2-Mile Radius	633	11
Average Trip Length (Miles)	1.5	1

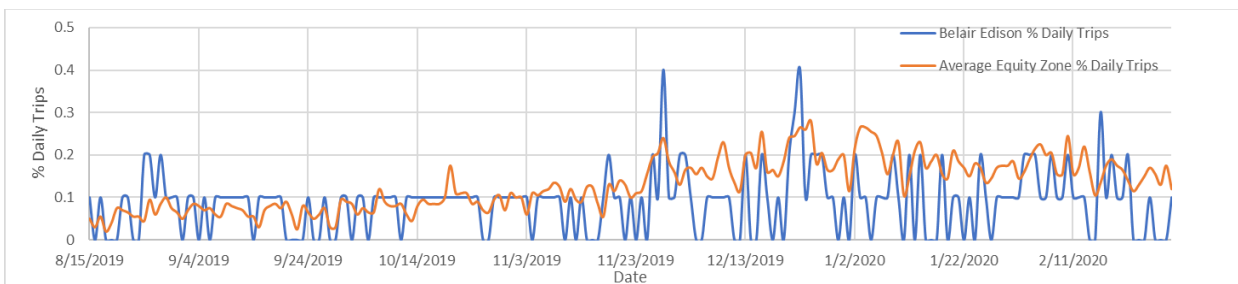
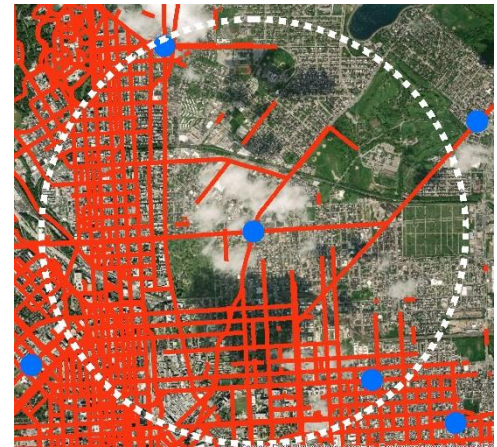


Figure 8. Belair Edison Main Street Percent Daily Trips. Daily trip percentages at Belair Edison Main Street started increasing and becoming more consistent in the winter. This trip shift suggests that riders rely on dockless vehicles for daily transportation.

## 9. North Avenue at Harford Road (East District)

The North Avenue at Hartford Road Equity Zone was selected for its proximity to the future North Avenue bus/bike lanes and high percentage of nearby households in poverty with commutes over 30 minutes and/or without a vehicle. By looking at commonly traveled routes, many of the trips were traveling towards destinations located in the Charles Street corridor and Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,079 (6)	10
Average Number of Dockless Vehicles Available	10	2
Utilization	0.55	13
Miles Ridden within 1/2-Mile Radius	1,774	8
Average Trip Length (Miles)	1.3	6

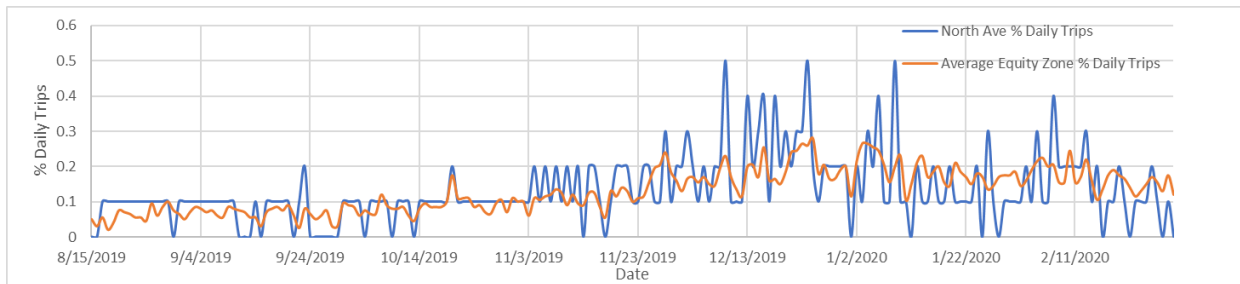
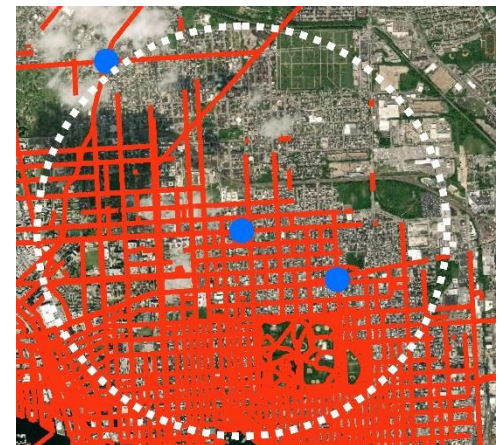


Figure 9. North Avenue at Harford Road Percent Daily Trips. Daily trip percentages at North Avenue at Harford Road increased in the winter, showing that riders at this location rely on dockless vehicles for daily transportation.

## 10. Northeast Market (East District)

The Northeast Market Equity Zone was selected for its proximity to the Monument Street cycle track, immediate proximity to city facilities and services, and high percentage of nearby households in poverty and/or without a private vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations in Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,119 (6)	9
Average Number of Dockless Vehicles Available	8	9
Utilization	0.71	10
Miles Ridden within 1/2-Mile Radius	12,046	2
Average Trip Length (Miles)	1	16

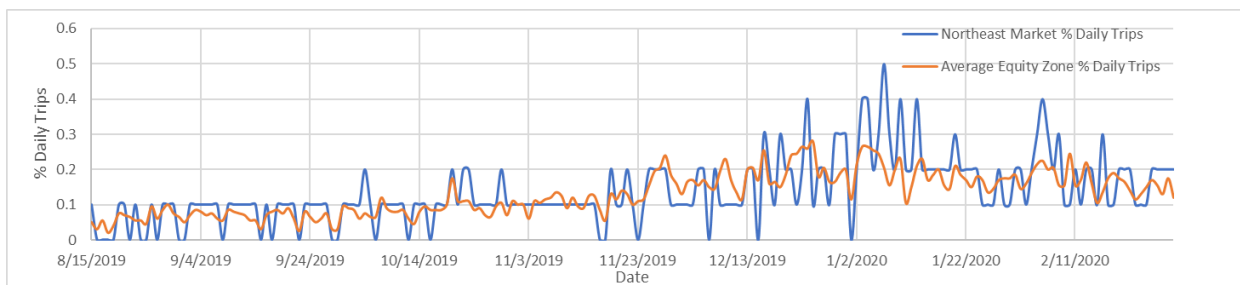
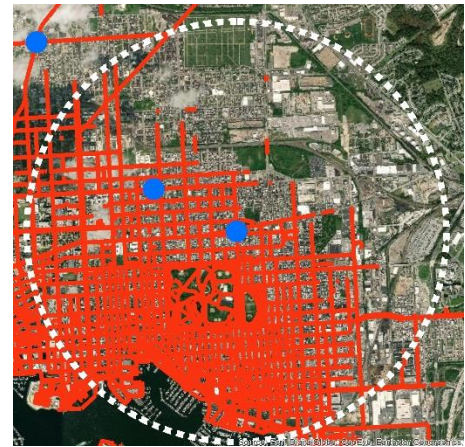


Figure 10. Northeast Market Percent Daily Trips. The percentage of daily trips from Northeast Market closely follows the average Equity Zone daily rider percentage. This trend is expected because, for trip origins, Northeast Market is ranked near the middle (9<sup>th</sup>) of the 20 Equity Zones. The only time period during which the zone increases over the average is during the winter, indicating that riders may rely on dockless vehicles for daily transportation.



## 11. Library Square (East and the Southeast Districts)

The Library Square Equity Zone was selected for its proximity to city amenities, high population density, and high percentage of nearby households with commute times over 30 minutes and/or without a vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations located near Canton, Fells Point, and Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,247 (7)	6
Average Number of Dockless Vehicles Available	8	9
Utilization	0.79	6
Miles Ridden within ½-Mile Radius	11,133	4
Average Trip Length (Miles)	1.2	8

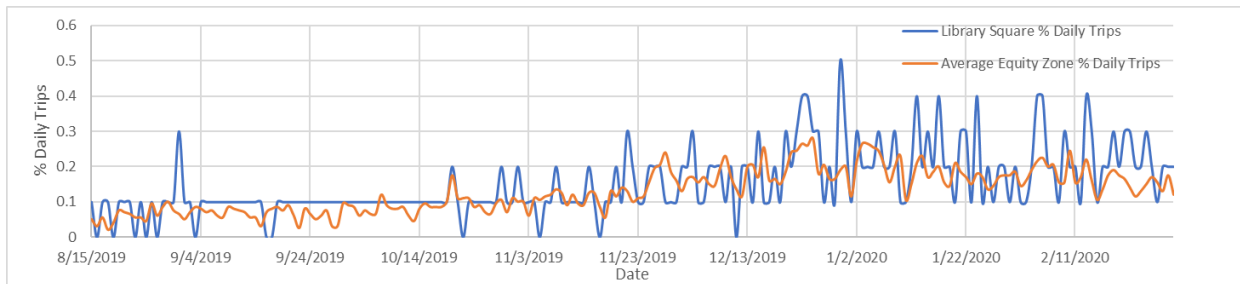
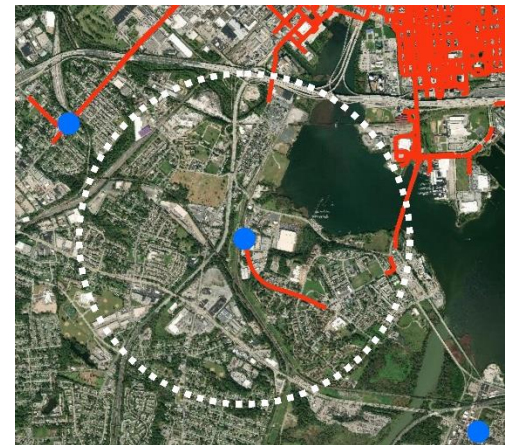


Figure 11. Library Square Percent Daily Trips. Daily trip percentages of dockless vehicles from Library Square closely follows the average Equity Zone percentage of daily trips but consistently peaks above the average percentage of dockless vehicle daily trips.

## 12. Cherry Hill Light Rail Station (South District)

The Cherry Hill Light Rail Station Equity Zone was selected for its connection to transit and relatively high percentage of households in poverty/without a vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations located in the residential portion of Cherry Hill.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	871 (5)	12
Average Number of Dockless Vehicles Available	7	15
Utilization	0.63	11
Miles Ridden within ½-Mile Radius	555	13
Average Trip Length (Miles)	1.0	17

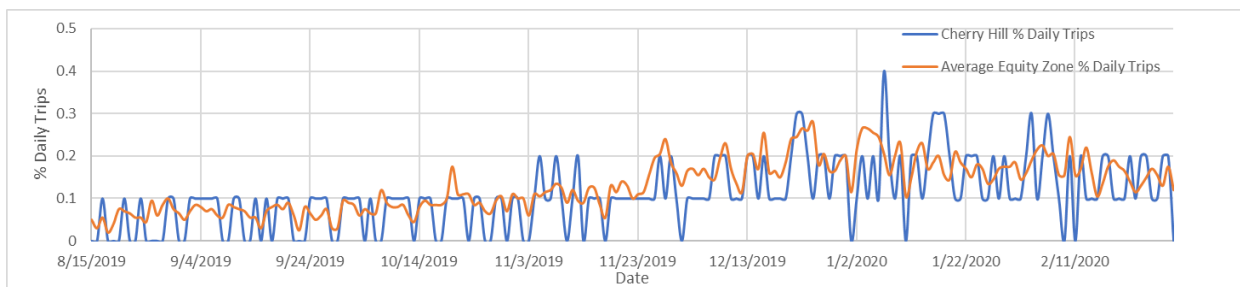
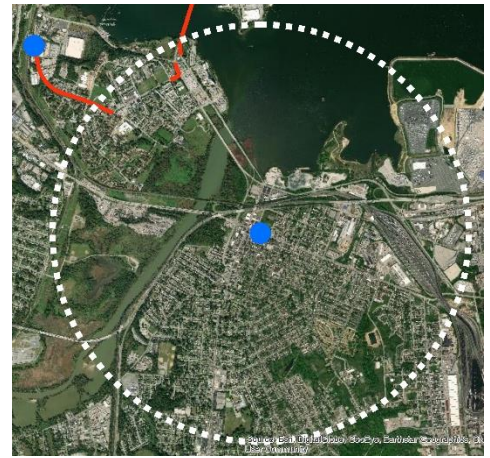


Figure 12. Cherry Hill Percent Daily Trips. The percent of daily trips which originated from the Cherry Hill Equity Zone increases in the winter. This trip shift shows consistent riding, suggesting that riders rely on vehicles for daily transportation.

### 13. Patapsco Avenue (South District)

The Patapsco Avenue Equity Zone was selected to serve the Brooklyn neighborhood, where there is high percentage of households in poverty and reporting a commute time over 30 minutes. Due to the small number of daily trips, commonly traveled routes could not be found.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins- Total (Average Daily)	434 (3)	20
Average Number of Dockless Vehicles Available	10	2
Utilization	0.22	20
Miles Ridden within 1/2 mile radius	0	20
Average Trip Length (Miles)	1.2	8

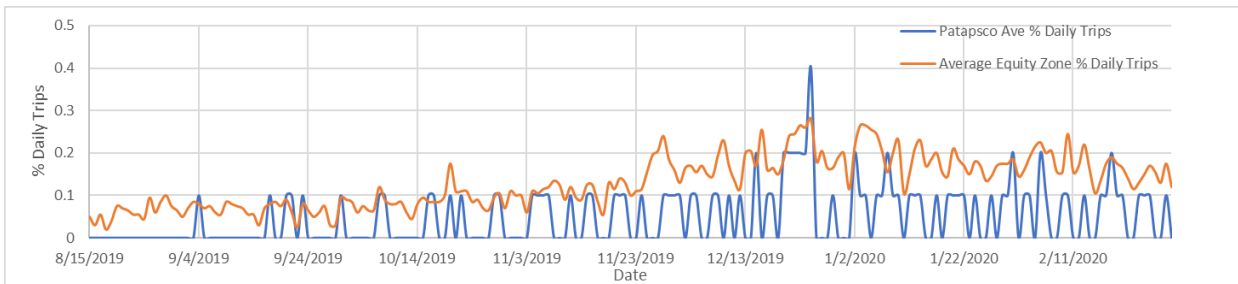


Figure 13. Patapsco Avenue Percent Daily Trips. The percentage of daily trips from Patapsco Avenue consistently ranked below all Equity Zones. The percentage of daily trips from Patapsco Avenue became more frequent in the winter months, showing a slight growth in ridership in this area.

### 14. Hollins Market (Southwest District)

The Hollins Market Equity Zone was selected for its relatively high population density, high percentage of nearby households in poverty and/or without a vehicle, and connections to bike facilities on low stress streets and the Gwynns Falls Trail. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations located across MLK Boulevard around Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origin s- Total (Average Daily)	990 (5)	11
Average Number of Dockless Vehicles Available	6	19
Utilization	0.83	5
Miles Ridden within ½-Mile Radius	6,789	5
Average Trip Length (Miles)	1.1	13

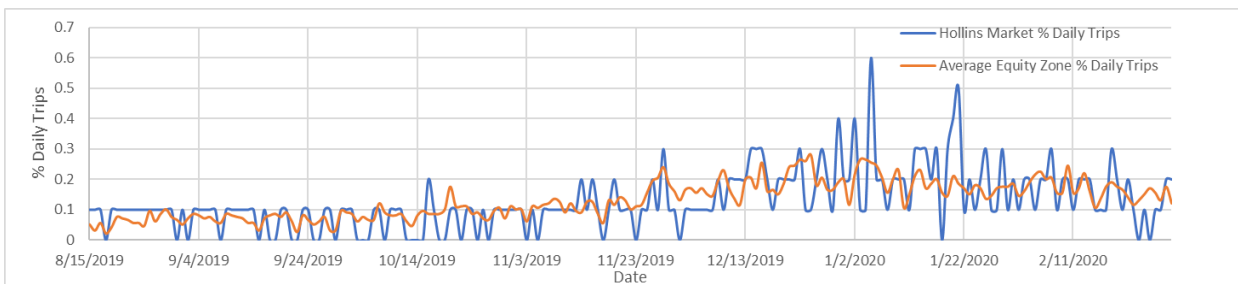
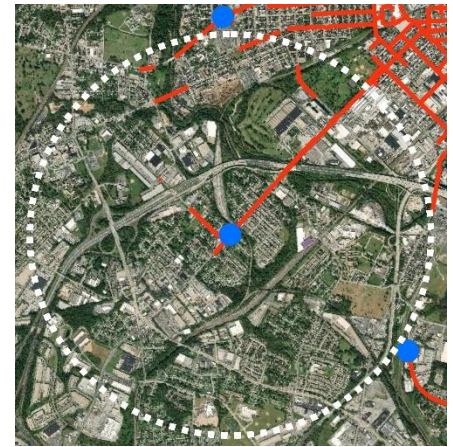


Figure 14. Hollins Market Percent Daily Trips. The percentage of daily trips from Hollins Market closely follows the average Equity Zone daily rider percentage. Overall, the average percentage of total trips from the Equity Zones increases in the winter, showing that riders rely on dockless vehicles for daily transportation.

## 15. Washington Boulevard (Southwest District)

The Washington Boulevard Equity Zone was selected to serve the Southwest district because of its proximity to nearby amenities. By looking at commonly traveled routes, it seems that many of the trips were traveling north on Washington Boulevard towards Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	637 (4)	17
Average Number of Dockless Vehicles Available	8	9
Utilization	0.41	17
Miles Ridden within ½-Mile Radius	436	15
Average Trip Length (Miles)	1.2	10

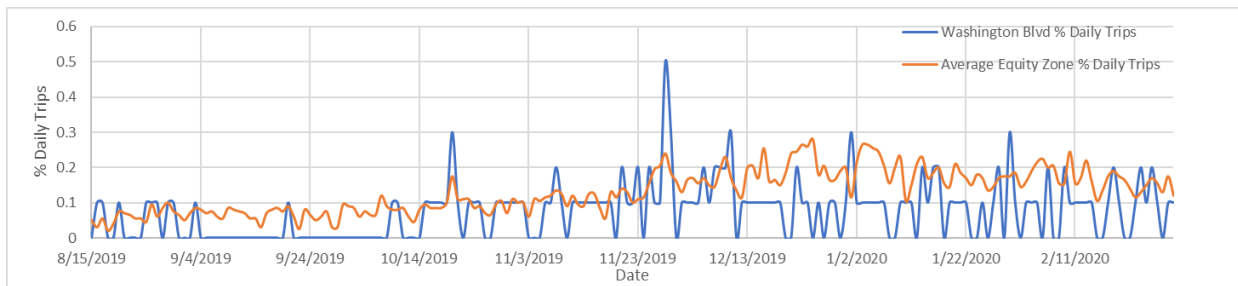
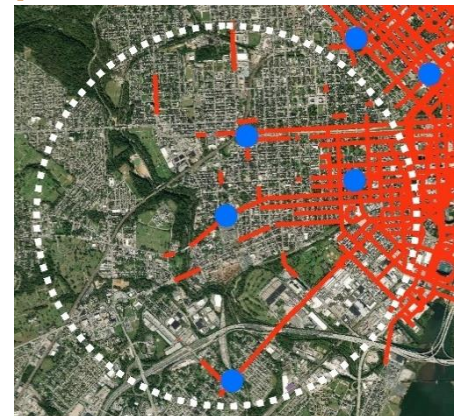


Figure 15. Washington Boulevard Percent Daily Trips. The percentage of daily trips from Washington Boulevard was consistently below that for all Equity Zones. The percentage of daily trips from Washington Boulevard has started to rise, indicating a growth in ridership in the area.

## 16. Westside Shopping Center (Southwest District)

The Westside Shopping Center Equity Zone was selected for its proximity to amenities, high percentage of nearby households in poverty, and high percentage of nearby households without a private vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling towards destinations located in Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	510 (3)	19
Average Number of Dockless Vehicles Available	7	15
Utilization	0.37	19
Miles Ridden within ½-Mile Radius	735	10
Average Trip Length (Miles)	1.4	2

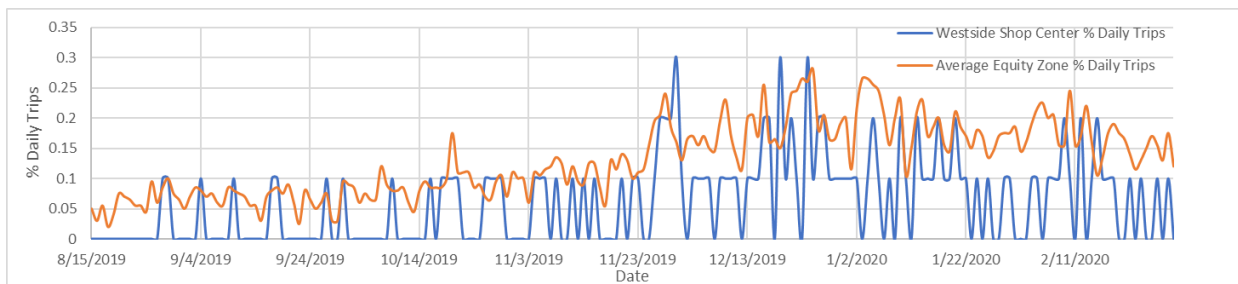
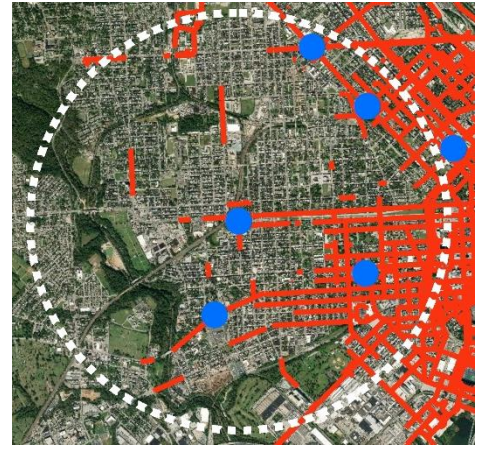


Figure 16. Westside Shopping Center Percent Daily Trips. Daily trips at Westside Shopping Center consistently fall below the average Equity Zone percentage of daily trips.

## 17. West Baltimore MARC (West and Southwest Districts)

The West Baltimore MARC Equity Zone was selected for its proximity to the West Baltimore MARC station as well as its high percentage of nearby households in poverty and/or without a vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling down Mulberry Street and West Franklin Street towards destinations located around Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,213 (7)	7
Average Number of Dockless Vehicles Available	8	9
Utilization	0.77	8
Miles Ridden within ½-Mile Radius	558	12
Average Trip Length (Miles)	1.4	3

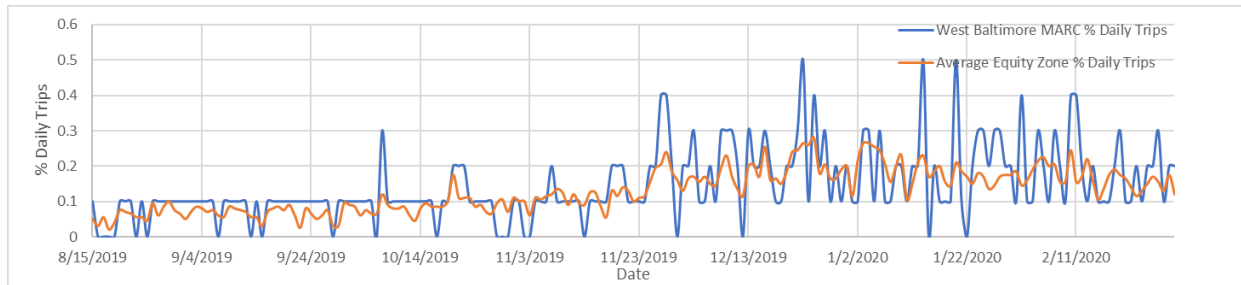


Figure 17. West Baltimore MARC Percent Daily Trips. Daily trip percentages at West Baltimore MARC increase in the winter, showing that riders at this location rely on dockless vehicles for daily transportation.

## 18. McCulloh Street at West Preston Street (West District)

The McCulloh Street at W Preston Street Equity Zone was selected to serve the high population density, high percentage of nearby households in poverty, and high percentage of nearby households without a personal vehicle. By looking at commonly traveled routes, it seems that many of the trips travel towards destinations located across MLK Boulevard in Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,573 (8)	3
Average Number of Dockless Vehicles Available	9	4
Utilization	0.88	3
Miles Ridden within ½-Mile Radius	19,603	1
Average Trip Length (Miles)	0.94	19

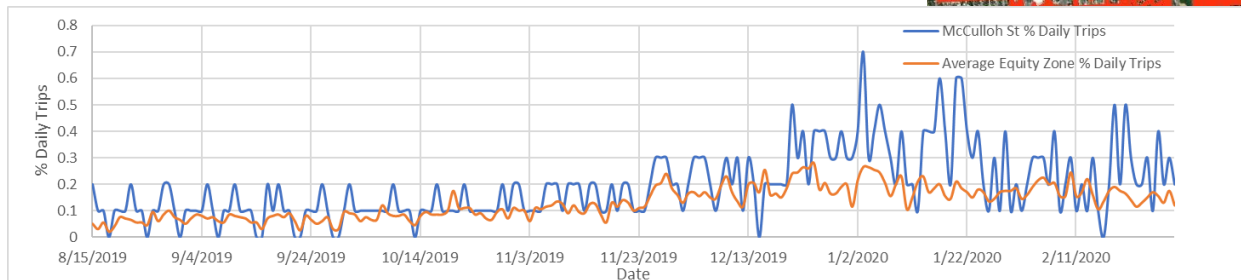
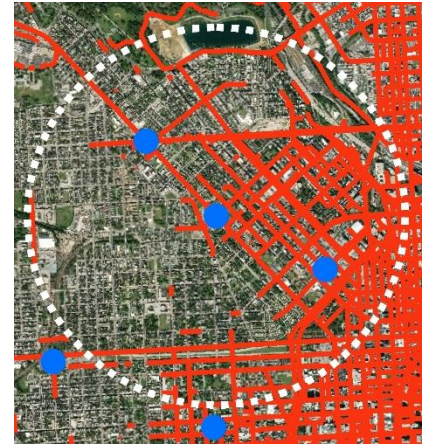


Figure 18. McCulloh Street Percent Daily Trips. The percentage of daily trips which originated from McCulloh Street increase in the winter. This trip shift shows consistent riding, suggesting that riders rely on vehicles for daily transportation.

## 19. Upton Metro (West District)

The Upton Metro Equity Zone was selected for its connections to transit and amenities and its high percentage of nearby households in poverty and/or without a personal vehicle. By looking at commonly traveled routes, riders were traveling towards destinations located across MLK Boulevard around Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,154 (6)	8
Average Number of Dockless Vehicles Available	8	9
Utilization	0.73	9
Miles Ridden within ½-Mile Radius	3,392	6
Average Trip Length (Miles)	1	18

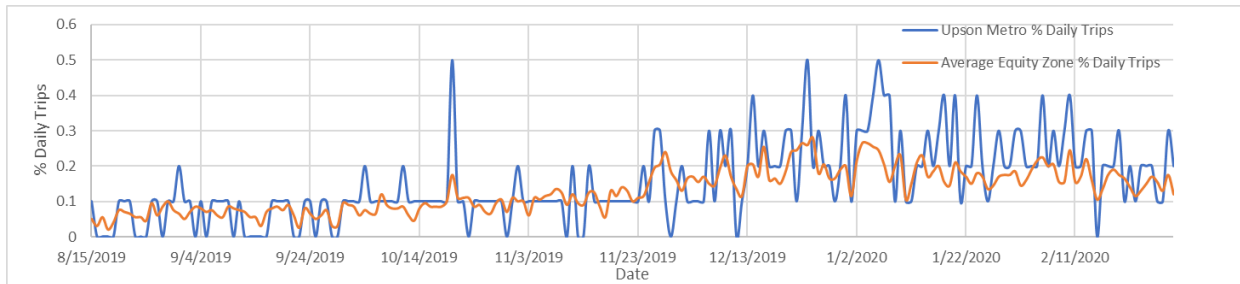
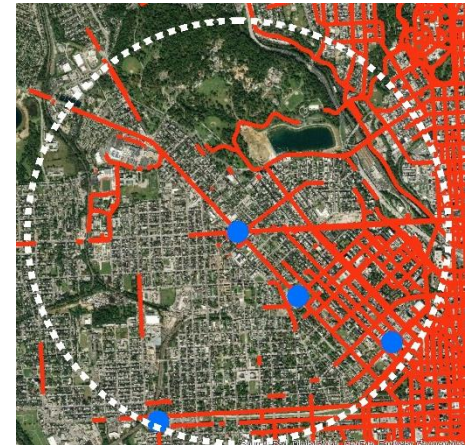


Figure 19. Upton Metro Percent Daily Trips. Daily trips at Upton Metro closely follow the average percentage of daily trips from Equity Zones but consistently peaks above the average. The increase in percent daily trips in the winter suggests that riders at this location rely on dockless vehicles for daily transportation.

## 20. Penn-North (West District)

The Penn-North Equity Zone was selected for its connections to transit, high population density, and high percentage of nearby households in poverty and/or without a private vehicle. By looking at commonly traveled routes, it seems that many of the trips were traveling North and South along Pennsylvania Avenue towards Coppin State University, Druid Hill Park, and Downtown Baltimore.



Evaluation Criteria	Result	Equity Zone Rank
Trip Origins - Total (Average Daily)	1,380 (7)	5
Average Number of Dockless Vehicles Available	9	4
Utilization	0.78	7
Miles Ridden within ½-Mile Radius	2,291	7
Average Trip Length (Miles)	1.3	6

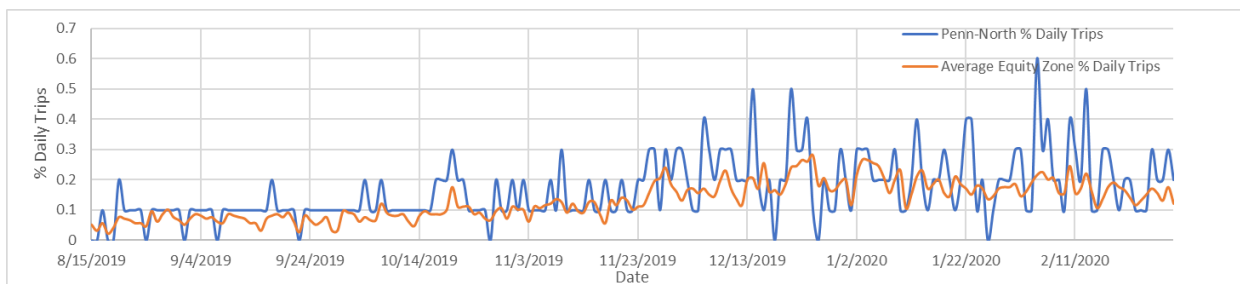


Figure 20. Penn-North Percent Daily Trips. Daily trips at Penn-North closely follow the average percentage of daily trips from Equity Zones but, consistently peak above the average. The increase in percent daily trips in the winter shows that riders at this location rely on dockless vehicles for daily transportation.