Zagster

City of College Park mBike Bike Share Analysis

Introduction

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mBike Dataset

Coords_ latitude	Coords_ longtitude	Trip_ID	Bike_Event	User_ID	Date_Time
38.9781	-76.9289	Hf3aj78RcGaJJ MGRn	StartTrip	24Tswou857XK T9R65	2017-06-14T 19:02:21
38.9872	-76.9285	tp7QKuiJX9DvL KDcf	EndTripInsideG eofence	24Tswou857XK T9R65	2017-06-15T 20:07:14

- From 6/14/2017 to 1/14/2019
- 1,851,924 rows
- 16 types of bike events

Research Questions

1.The effect of Time/ Weather&Date on mBike ridership

2. Elevation and Duration of trips

3. Popular stations

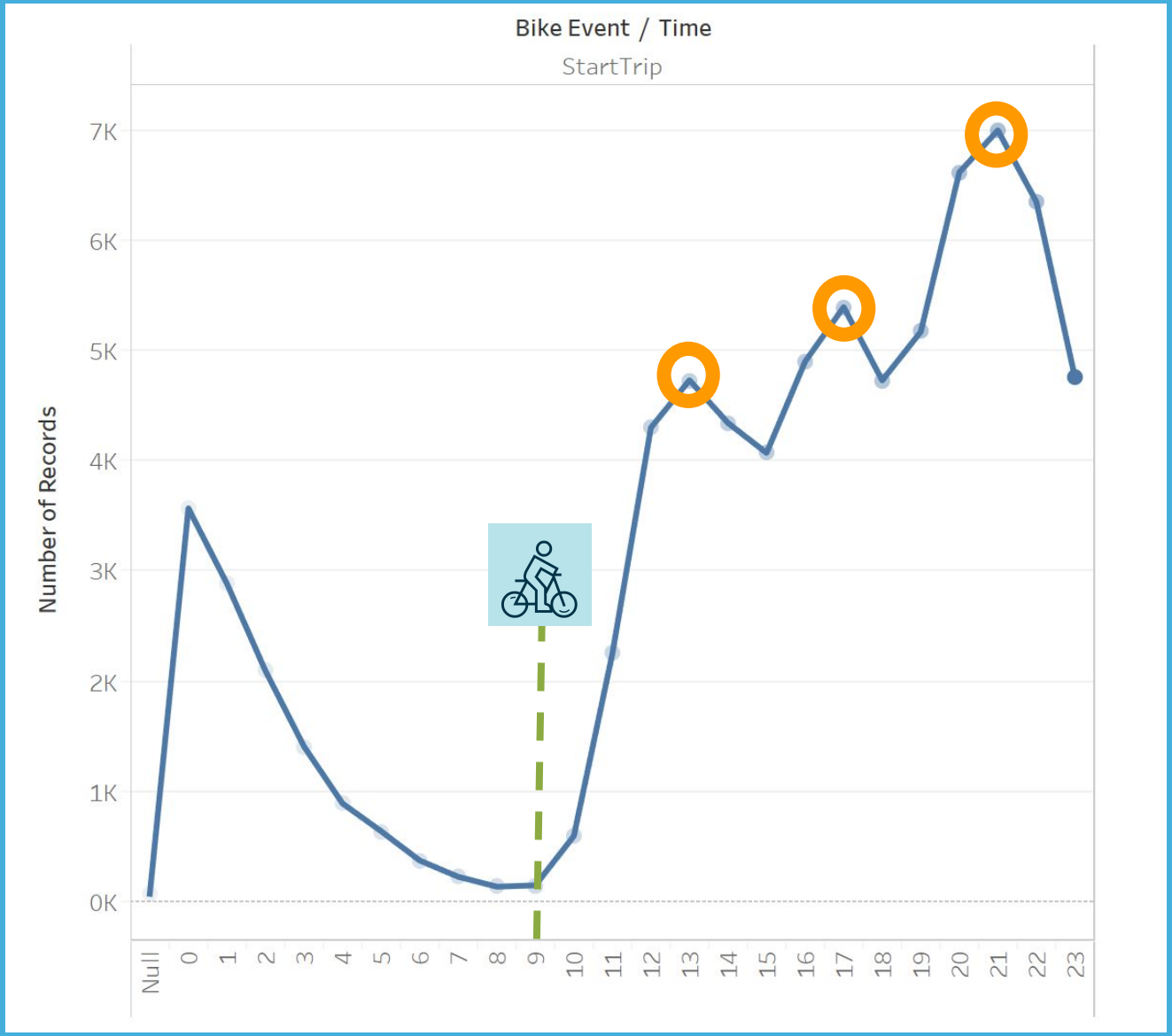
4. Rebalancing bike supply

5. Potential new stations

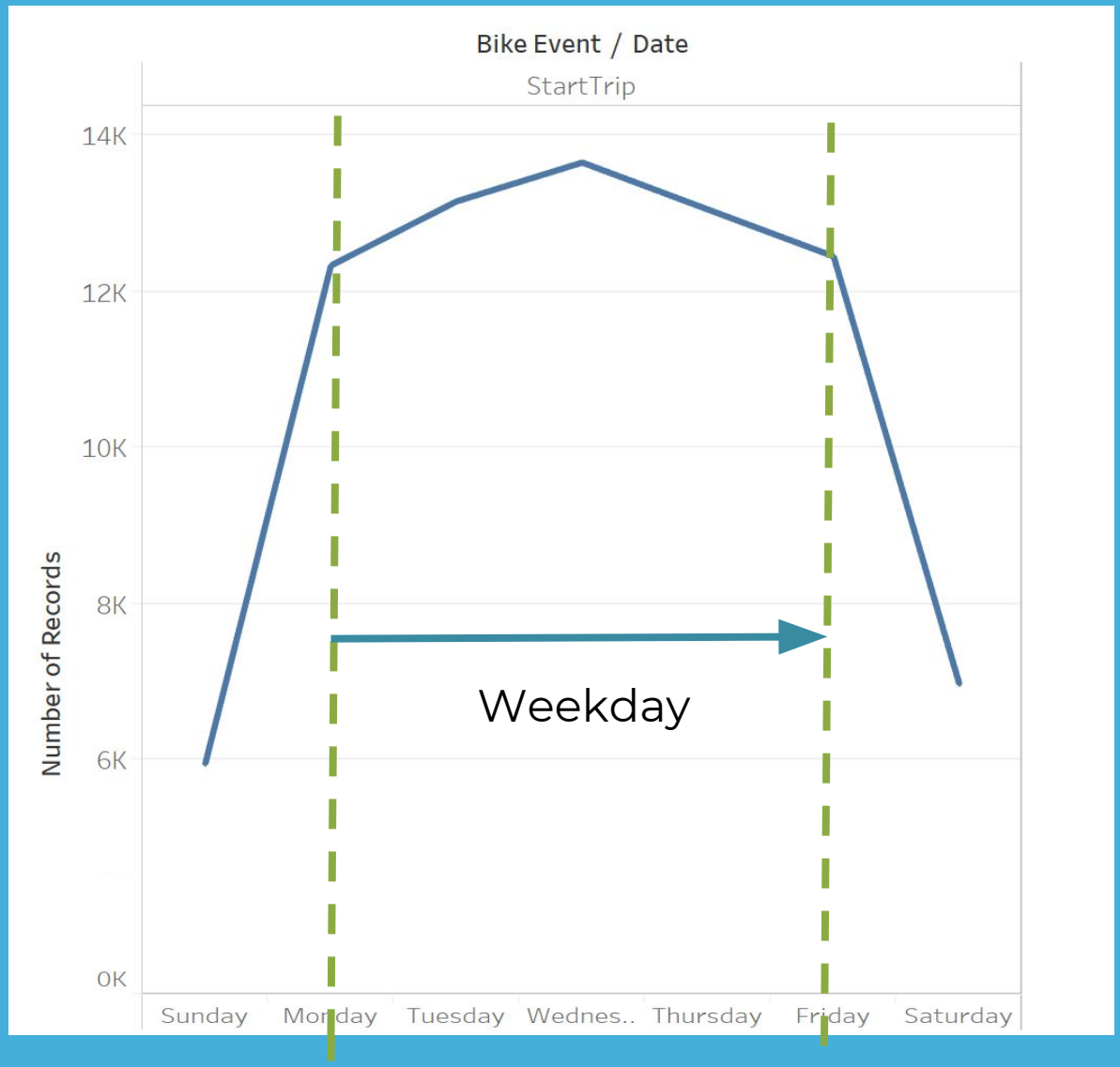
1.
Time/ weather & Date

Riding pattern,
affecting ridership

Time-hour

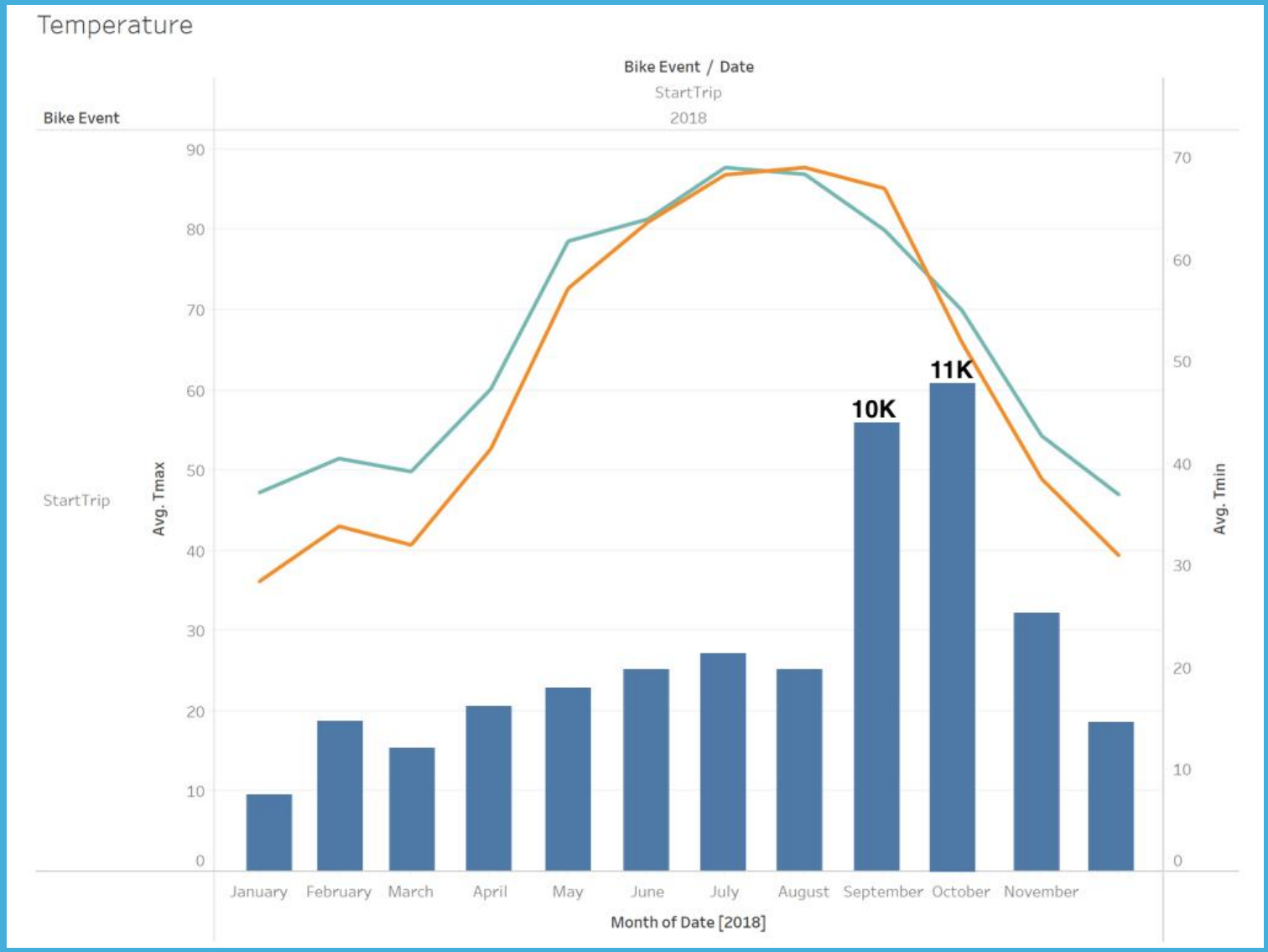

Bike Event / Time
StartTrip
Number of Records
7K
6K
5K
4K
3K
2K
1K
0K
Null
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

Time- weekday vs. weekend



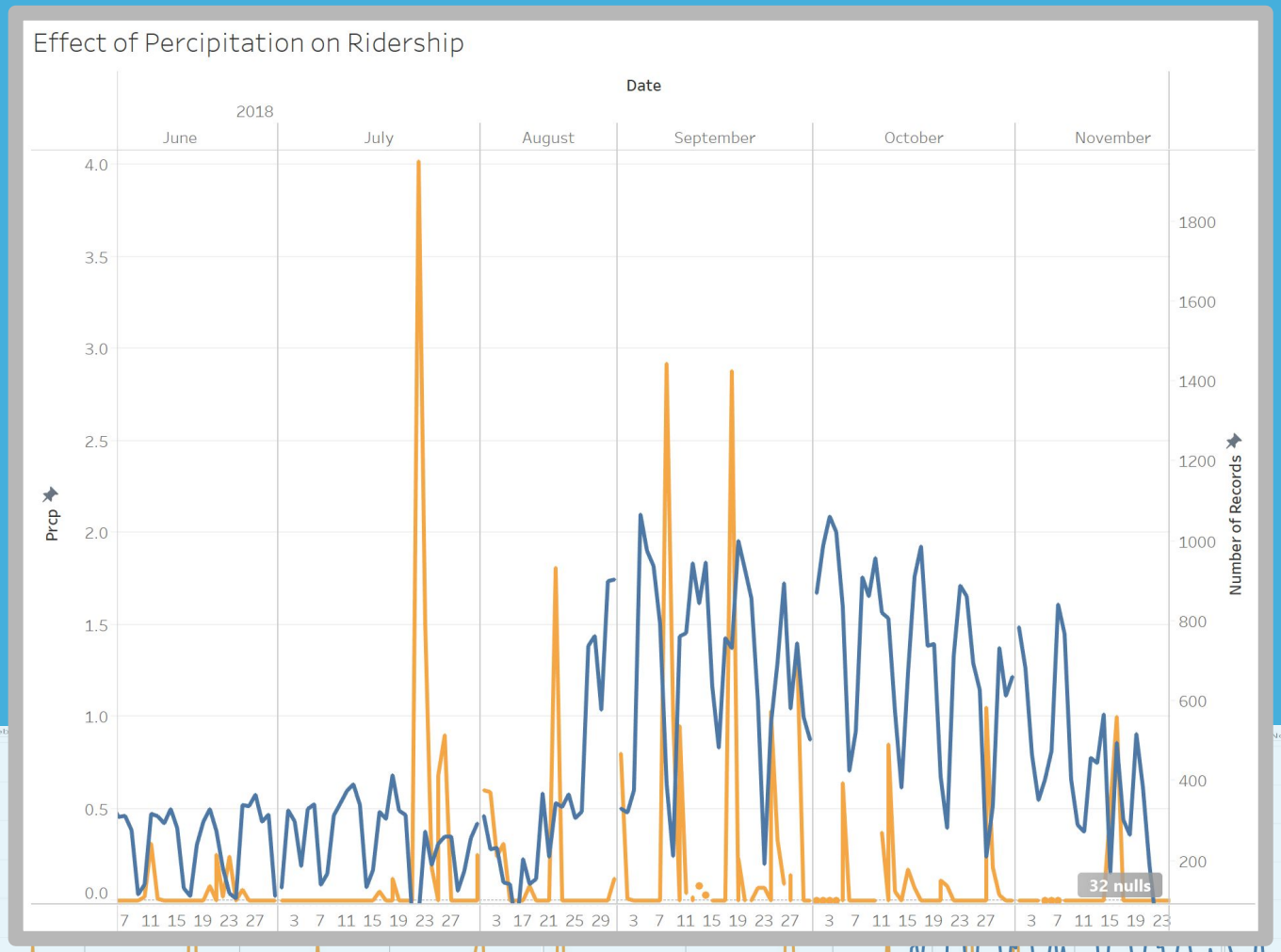
Weather- temprature

Combine NOAA temperature data



Weather- precipitation

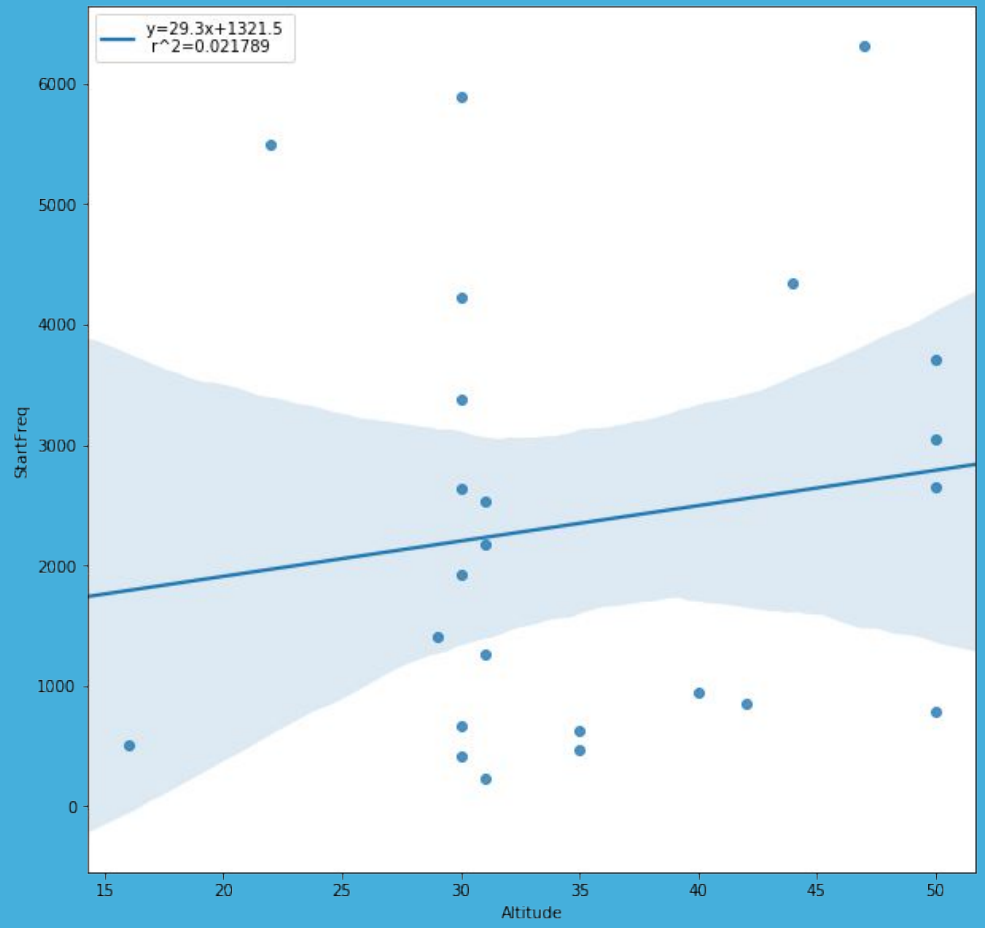
Combine NOAA rainfall data



2.
Elevation & Trip Duration

Elevation

- Assumption: Students are lazy and prefer going downhill

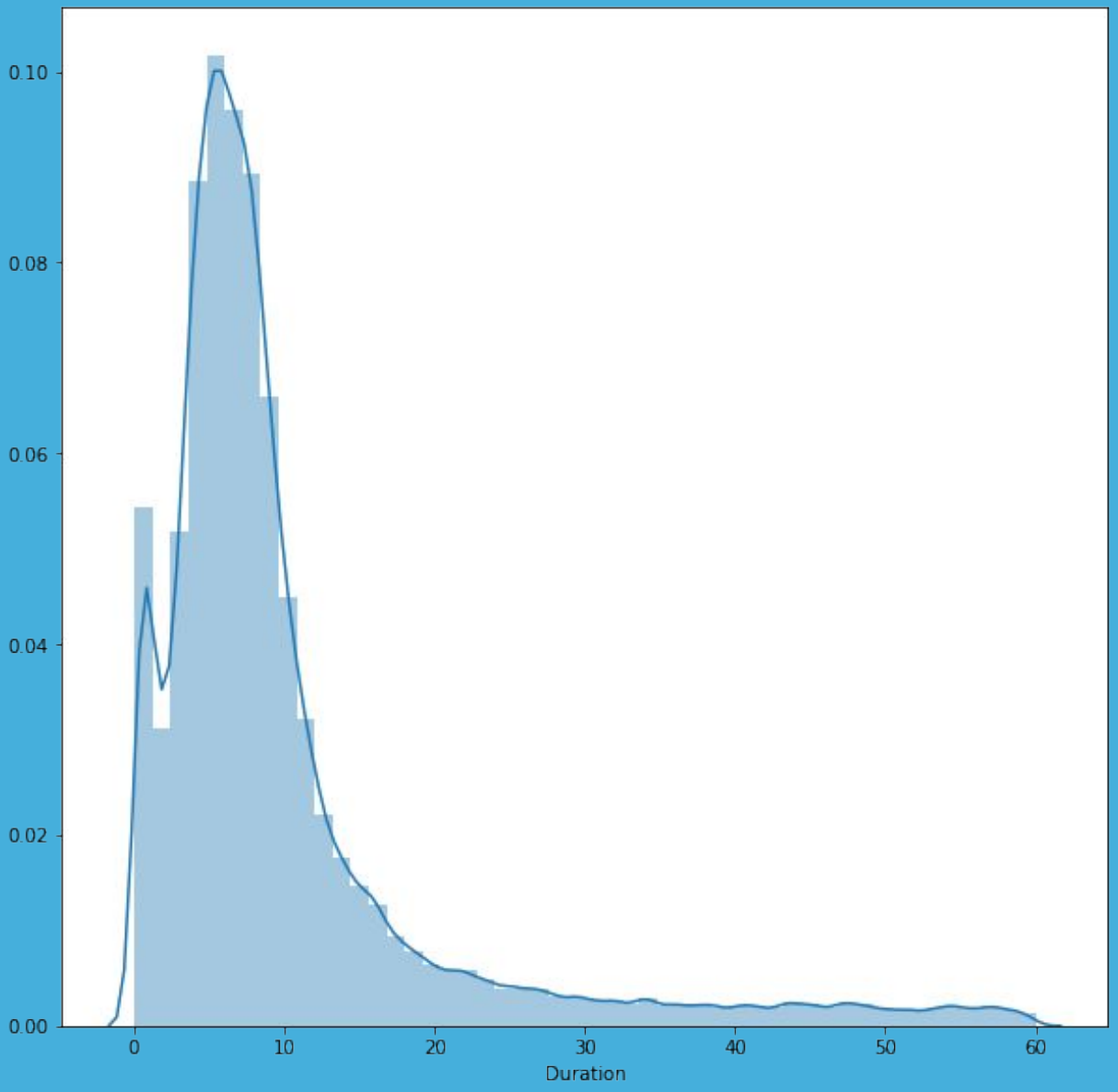


Duration

- We expect many trips to be under 60 minutes, since that is the free limit for students & destinations are not far

  → 96.5% are under 60 minutes
  → 86.2% of trips are under 20 minutes
  → Median trip duration is 7.33 minutes

Trip Duration Distribution



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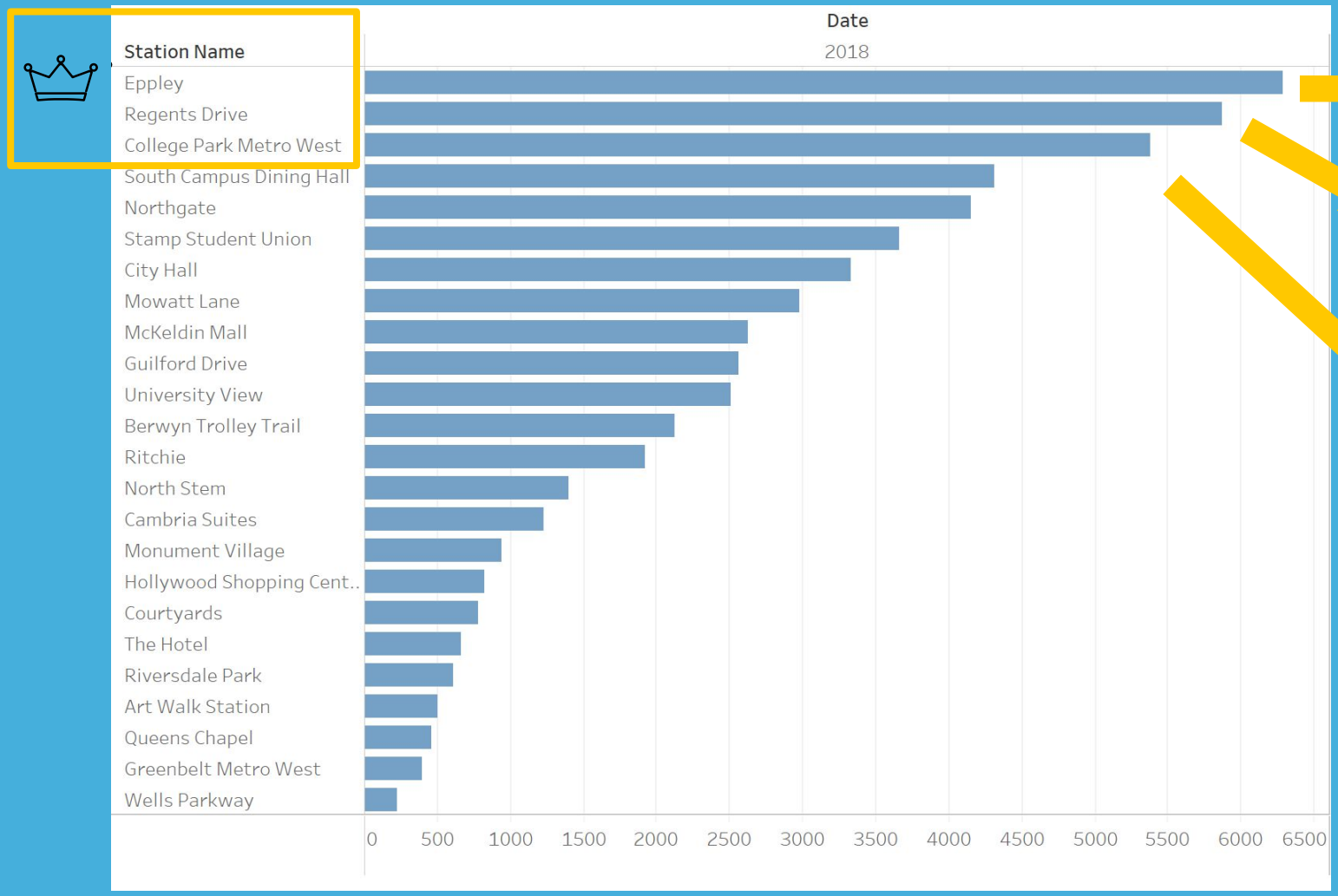
3.
Popular stations

Start Trip

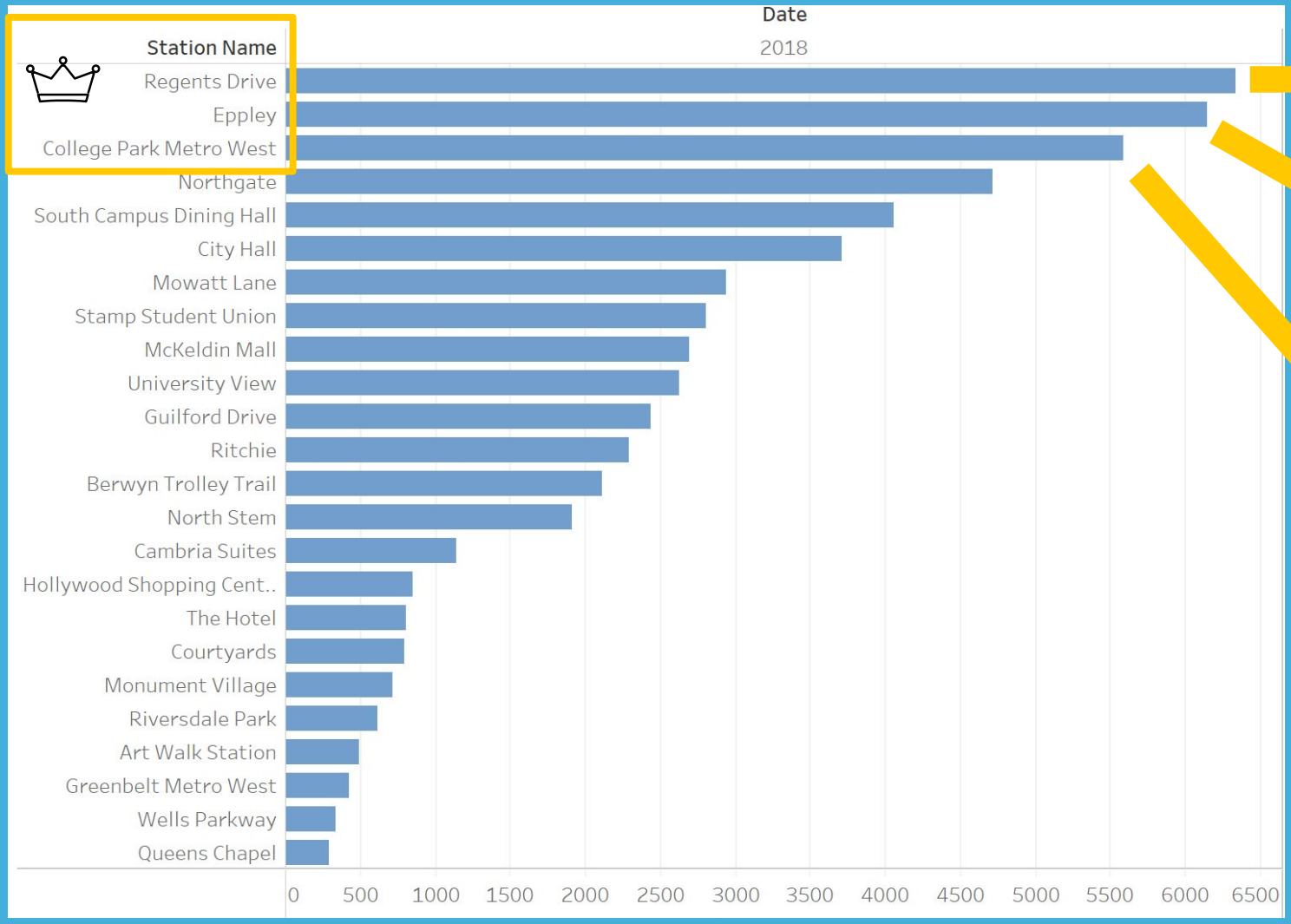


6,291

5,865

5,376

End Trip

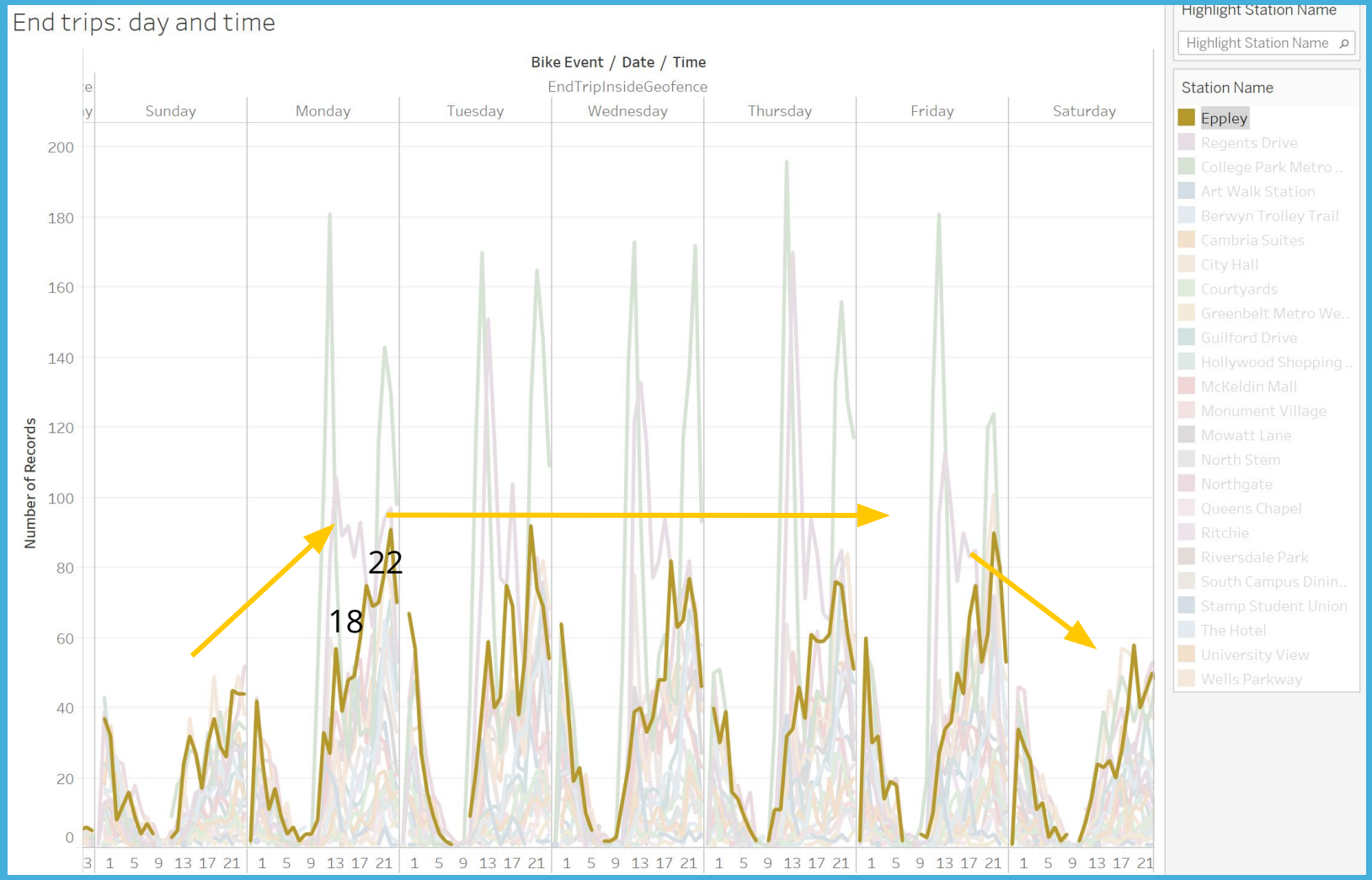


6,328

6,137

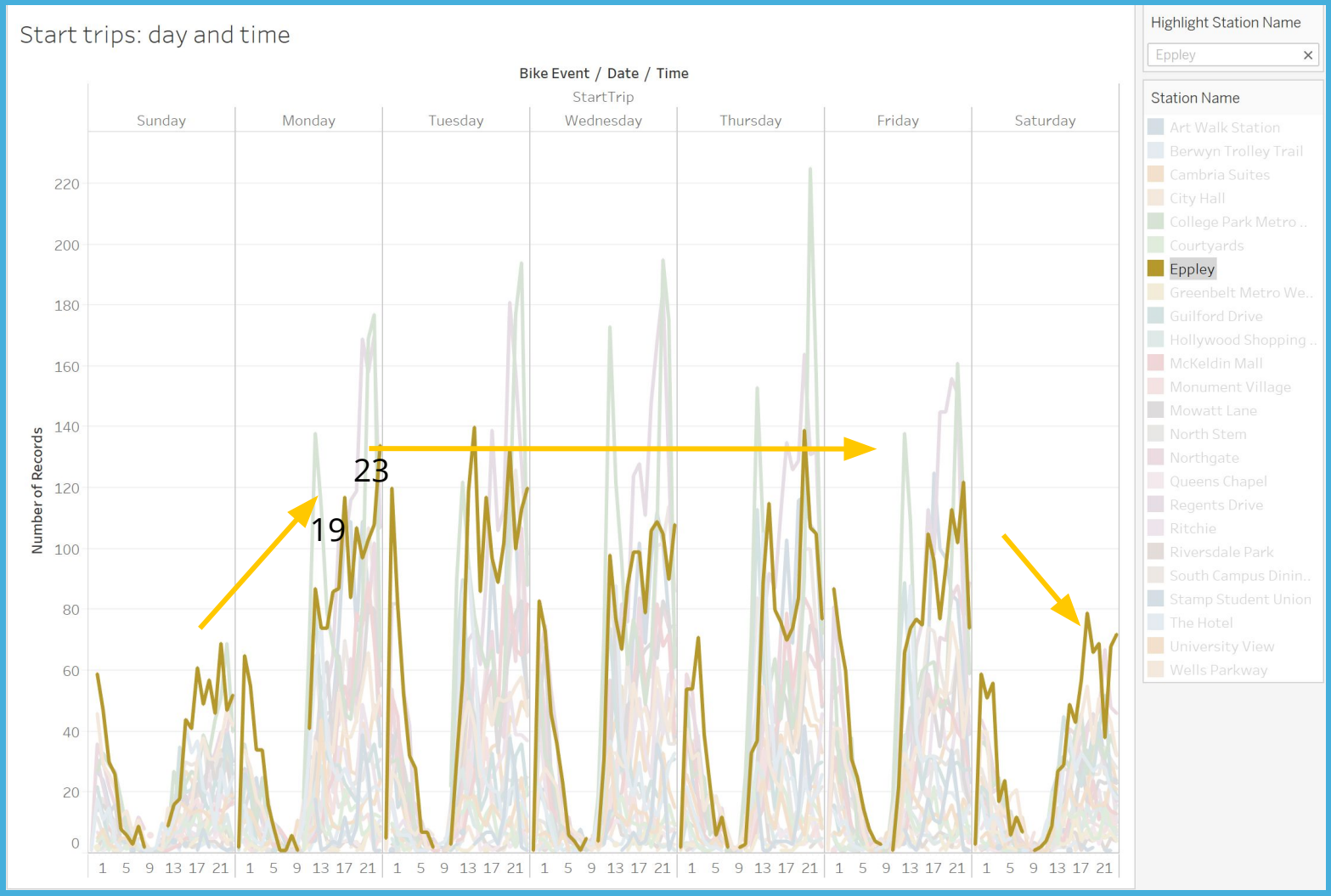
5,414

Eppley Station- End Trip



Note: Our analysis assumed times were in local time. We were informed later that they are UTC, so our times should be - 5 hours.

Eppley Station-Start Trip



Note: Our analysis assumed times were in local time. We were informed later that they are UTC, so our times should be - 5 hours.

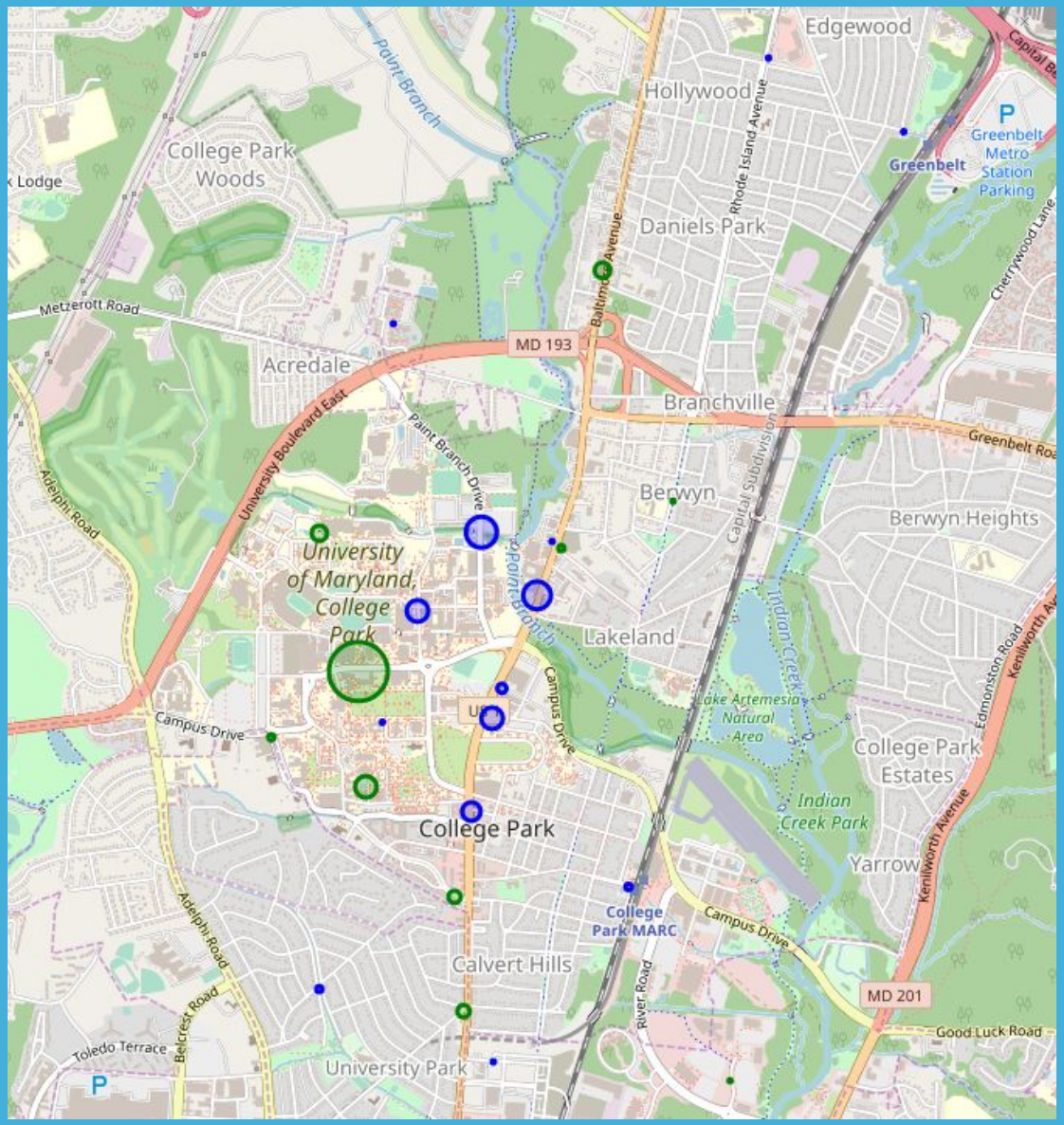
4.
Rebalancing bike supply

Origin & Destination Stations

- Due to the rider population's preferences, problematic imbalances in bikes occur between stations

- We identified these origins and destination stations and quantified how many bikes each is expected to lose or gain per day

Map of O/D


Edgewood
Hollywood
College Park Woods
Paint Branch
Daniels Park
Greenbelt
Greenbelt Metro Station Parking
Metzerott Road
MD 193
Acredale
Branchville
University Boulevard East
Paint Branch Drive
Berwyn
Berwyn Heights
Adelphi Road
University of Maryland, College Park
Lakeland
Campus Drive
Lake Artemesia Natural Area
College Park Estates
Indian Creek Park
College Park
Yarrow
College Park-MARC
Calvert Hills
MD 201
Good Luck Road
Toledo Terrace
University Park

On the average weekday

	Morning Usage	Mid-day Usage	Evening Usage	Late Usage	Bike_Difference
Stamp Student Union	-0.1	0.6	-2.7	-1.0	-3.2
Northgate	0.1	0.8	1.2	-0.2	1.9
North Stem	-0.1	1.0	0.9	0.0	1.8
Regents Drive	0.1	4.1	-0.6	-2.0	1.6
South Campus Dining Hall	-0.0	-1.1	-0.6	0.5	-1.2
Ritchie	0.1	0.1	0.7	0.2	1.1
Monument Village	0.0	-1.2	-0.1	0.5	-0.8
City Hall	-0.1	-0.9	1.0	0.8	0.8
Eppley	0.2	-0.7	0.6	-0.7	-0.6
University View	-0.0	-0.9	0.6	0.8	0.5

Note: Our analysis assumed times were local, each of these should be shifted by - 5 hours. So Mid-day → Morning, Evening → Mid-day, etc.

A busy week (08/27/18- 09/03/18)

- 2241 Trips recorded
- Here, things can be much worse:

	Morning Usage	Mid-day Usage	Evening Usage	Late Usage	Bike_Difference
Eppley	0.4	0.6	9.4	-1.8	8.6
Northgate	0.0	0.6	-2.4	-3.0	-4.8
Stamp Student Union	0.0	2.8	-3.6	-3.8	-4.6
South Campus Dining Hall	0.0	0.6	-5.8	1.2	-4.0
College Park Metro West	NaN	-0.8	2.4	2.2	3.8
North Stem	NaN	-1.0	3.8	0.0	2.8
McKeldin Mall	NaN	4.0	1.8	-3.8	2.0
Ritchie	0.0	0.0	-1.2	0.0	-1.2
Berwyn Trolley Trail	NaN	-3.6	1.0	3.6	1.0
Riversdale Park	NaN	-2.6	1.2	0.4	-1.0

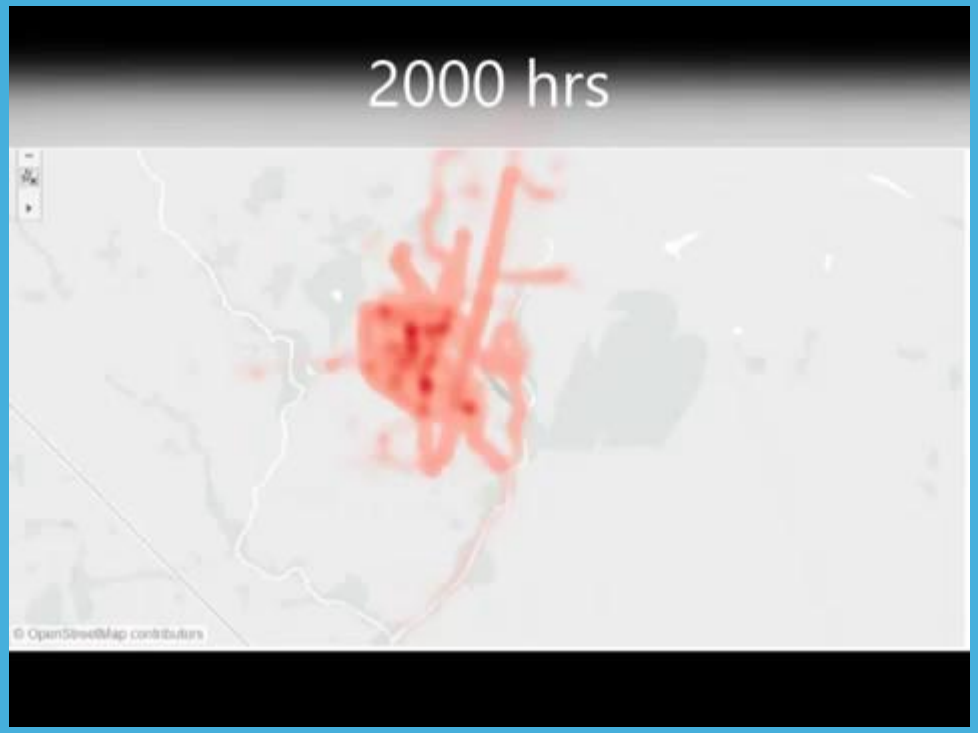
5.
Potential new stations

Factors

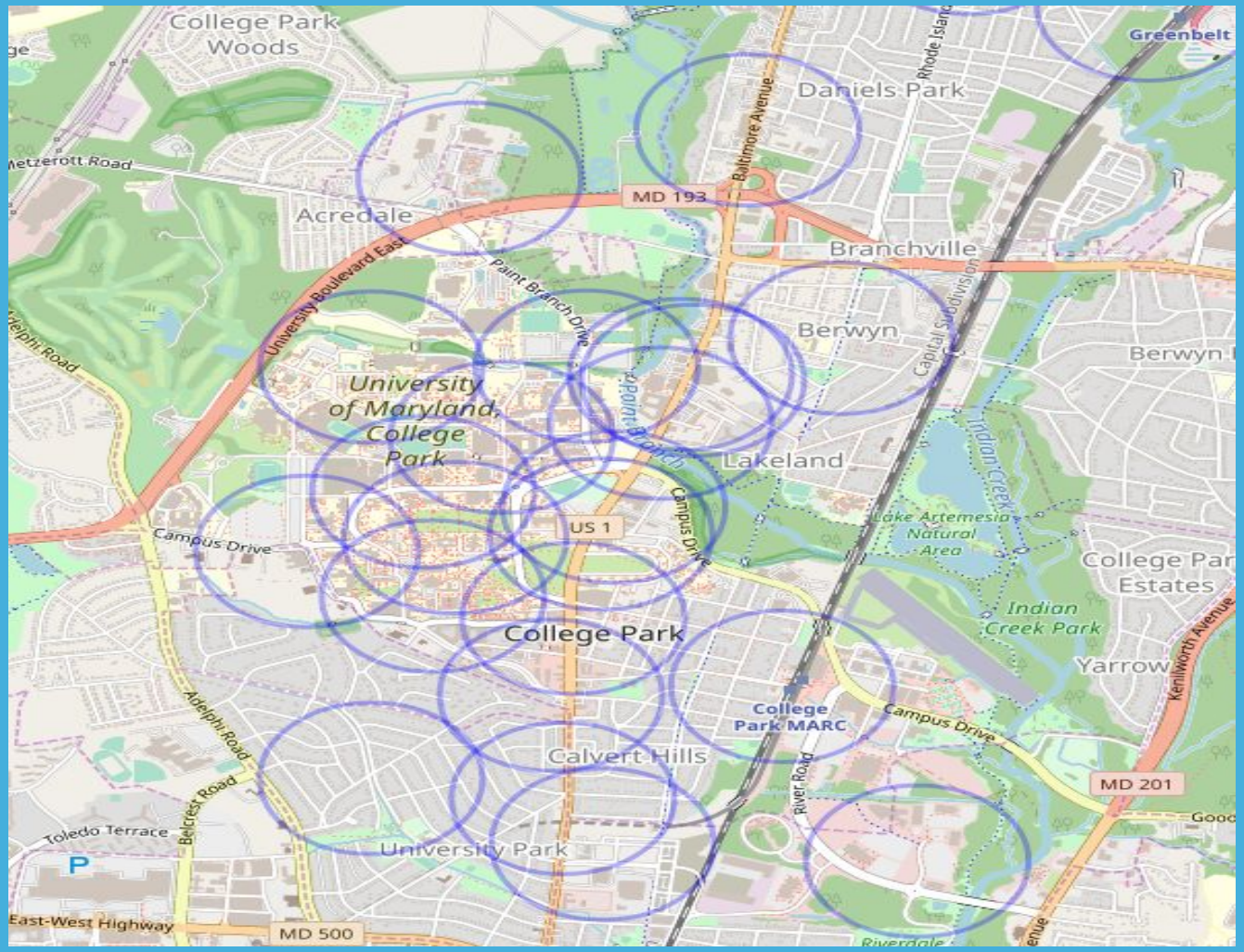
- Coverage - ¼ mile standard[1]
- Meeting demand in a particular area - Reduce the burden on popular stations (Regents)

AMOUNT OF BIKE TRAFFIC BY EACH HOUR OF THE DAY

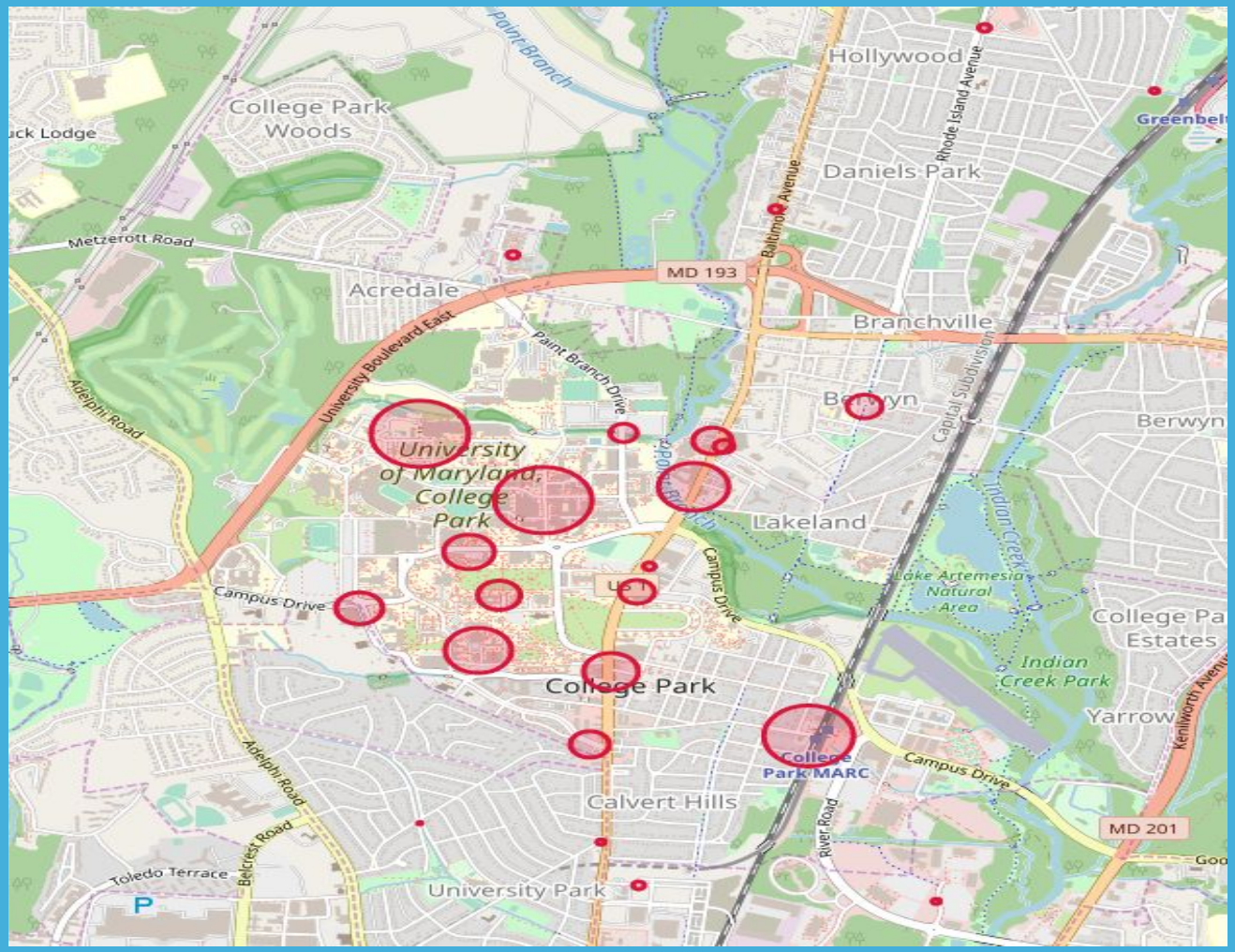
- Data is from 09/10/2018.



COVERAGE OF EXISTING STATIONS



MOST POPULAR STATIONS BY START AND END TRIPS



Predicted new stations (1)

1. South Berwyn Station

(Berwyn House Rd and Potomac Ave)

- Reason: Lack of coverage of major apartment (University Club) and shopping center.

Predicted new stations (2)

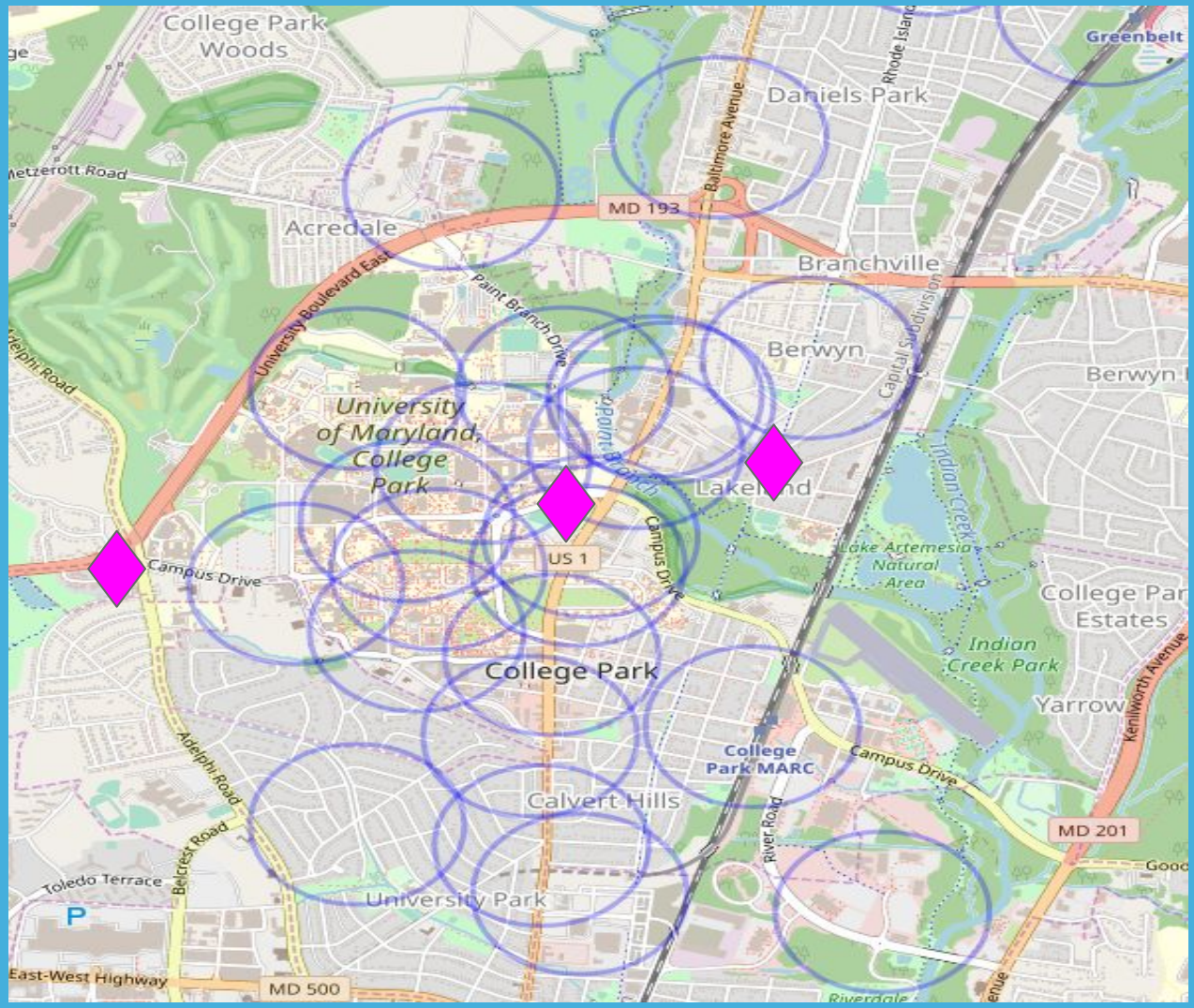
2. Graduate Hills Station
(Adelphi and University Blvd)
- Reason: Lack of coverage of Graduate Hills apartments and major bus stations.

Predicted new stations (3)

3.Brendan Iribe Station
(Campus Dr and Paint Branch Rd)

- Reason: Reduces the burden on Regents Drive and Northgate stations thus making more bikes available for students at any given time. May reduce the need for rebalancing bikes using trucks.

NEW STATIONS



Sources

1. Regional Plan Association (1997). Building Transit-Friendly Communities: A Design and Development Strategy for the Tri-State Metropolitan Region (New York, New Jersey, Connecticut).
2. Eric Jaffe, Citylab (2011). The Methodology of Bike-Share Station Placement in New York City.