

# Local Bus Performance and Declining Ridership – Reasons and Responses

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2018 Sustainability & Multimodal  
Planning Workshop

# Introduction

- Background
- Study Methodology
- Findings



# Bus ridership in NYC has declined, in part due to a 'fractured manager finds

Recommendations include the MTA increasing the frequency of bus network

## Decline in NYC Bus Ridership Concentrated in Manhattan and Brooklyn

By David Meyer | Feb 21, 2017 | 16

METRO

## NYC's slowest bus route is about as fast as walking

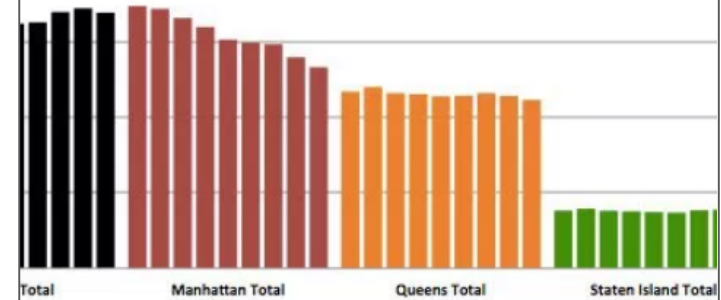
By Susan Edelman

December 23, 2017 | 4:01pm | Updated



Helayne Seidman

Ridership by Borough 2007-2015

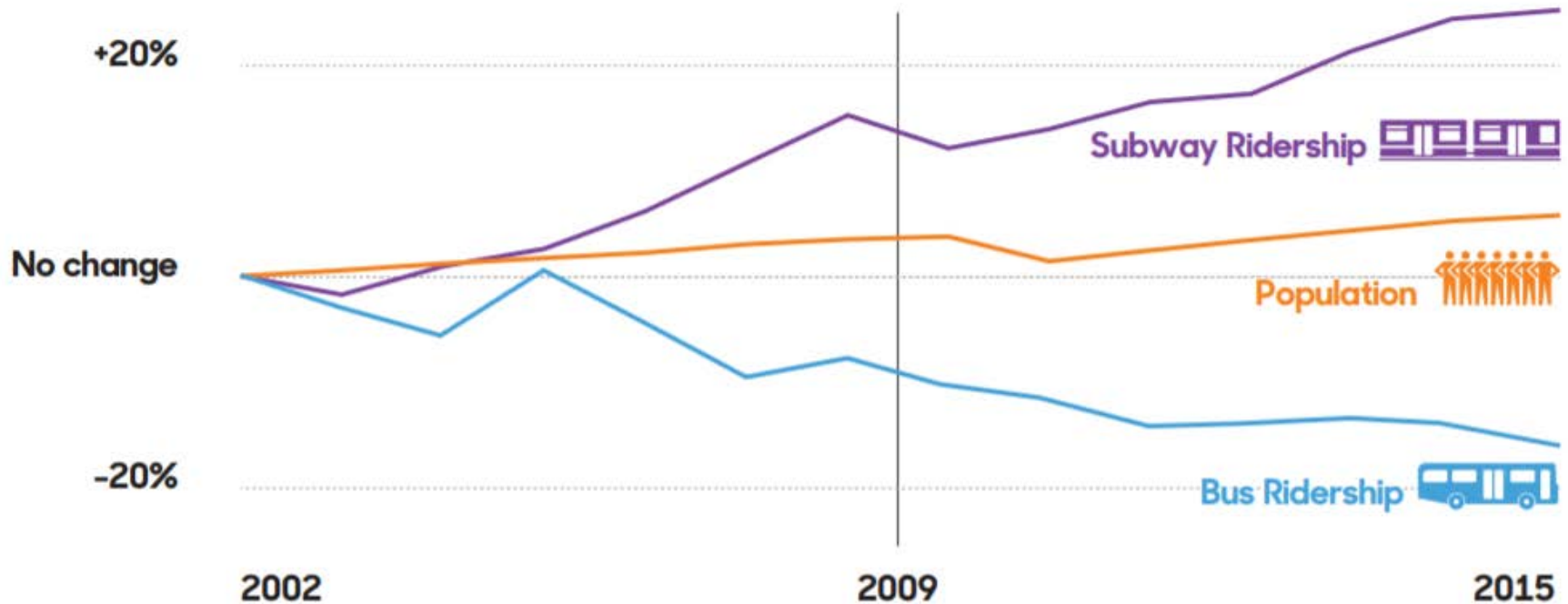


Manhattan and Brooklyn compared to other boroughs. Image: [unclear]

New York City fell 16 percent between 2002 and 2015 that [only gained steam last year](#). A look at the chan

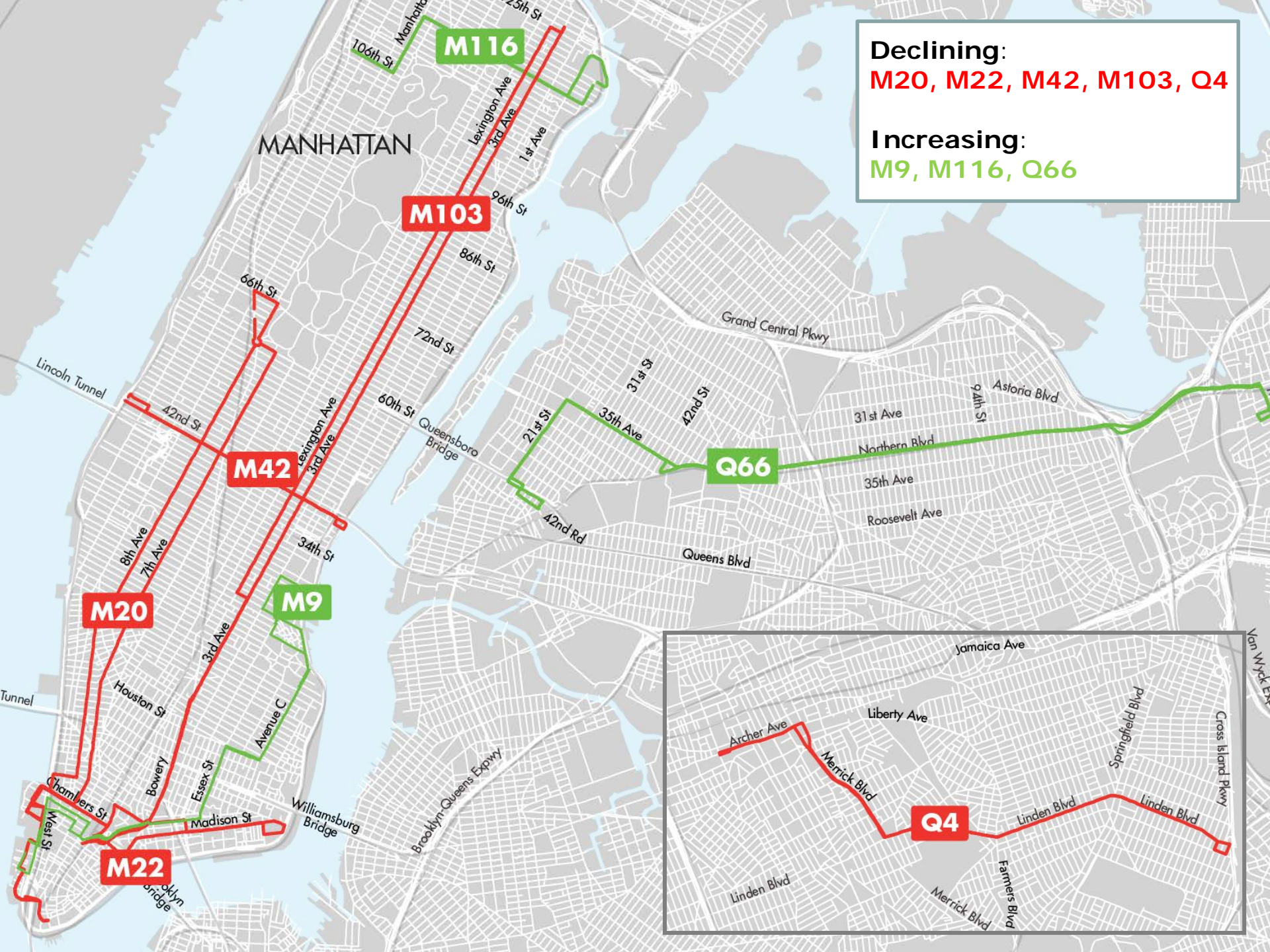
# Background

Relative Change in NYC Transit Ridership and Population  
*Turnaround: Fixing NYC's Buses, Transit Center*



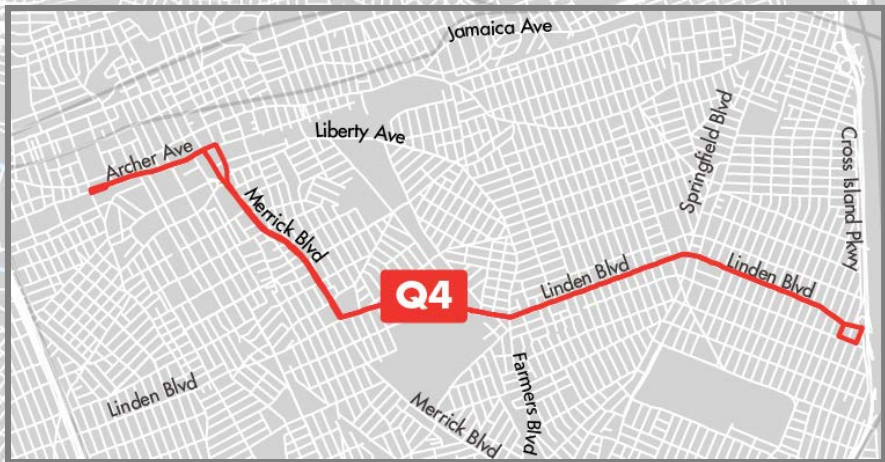
# Study Methodology

Case Study Route	Ridership Trend	Annual Ridership (millions)		
		2010	2016	Change
<b>M9</b>	<b>Increasing</b>	1.5	1.6	<b>10%</b>
<b>M116</b>	<b>Increasing</b>	2.8	3.2	<b>16%</b>
<b>Q66</b>	<b>Increasing</b>	4.1	4.5	<b>9%</b>
<b>M20</b>	<b>Decreasing</b>	1.3	0.8	<b>-40%</b>
<b>M22</b>	<b>Decreasing</b>	1.2	0.8	<b>-34%</b>
<b>M42</b>	<b>Decreasing</b>	4.1	3.1	<b>-24%</b>
<b>M103</b>	<b>Decreasing</b>	4.7	3.2	<b>-32%</b>
<b>Q4</b>	<b>Decreasing</b>	3.3	2.8	<b>-15%</b>

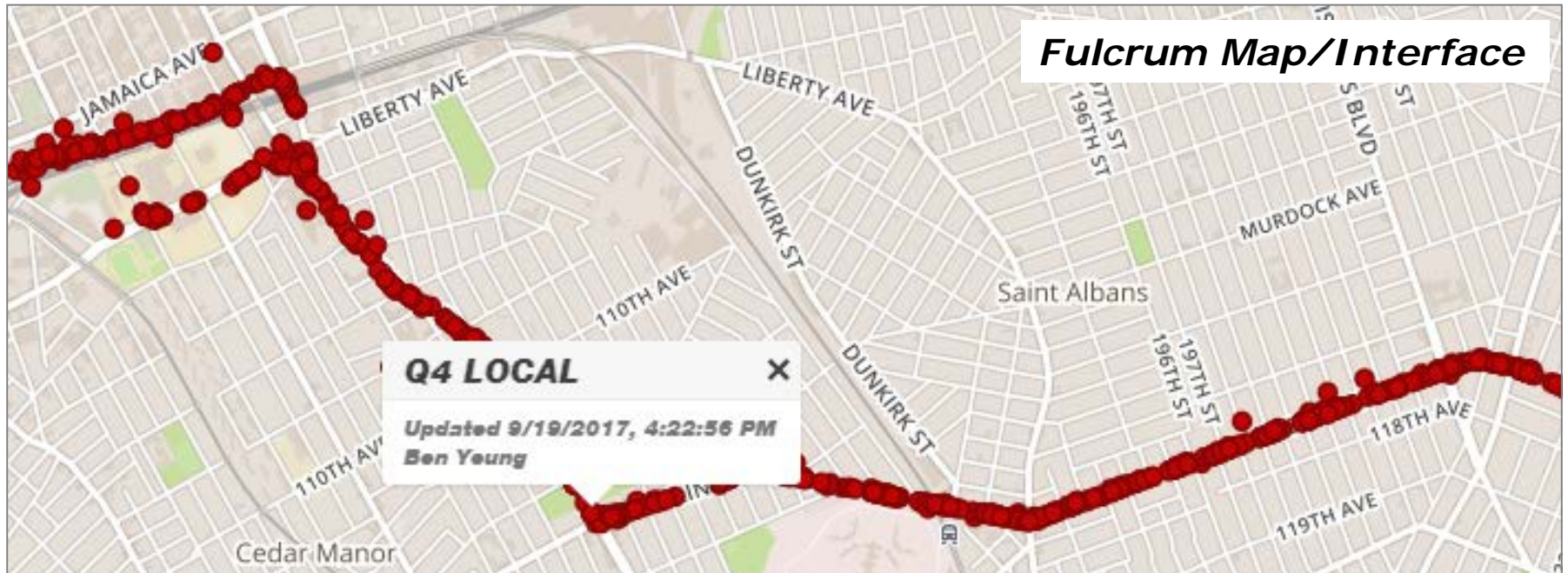


**Declining:**  
M20, M22, M42, M103, Q4

**Increasing:**  
M9, M116, Q66

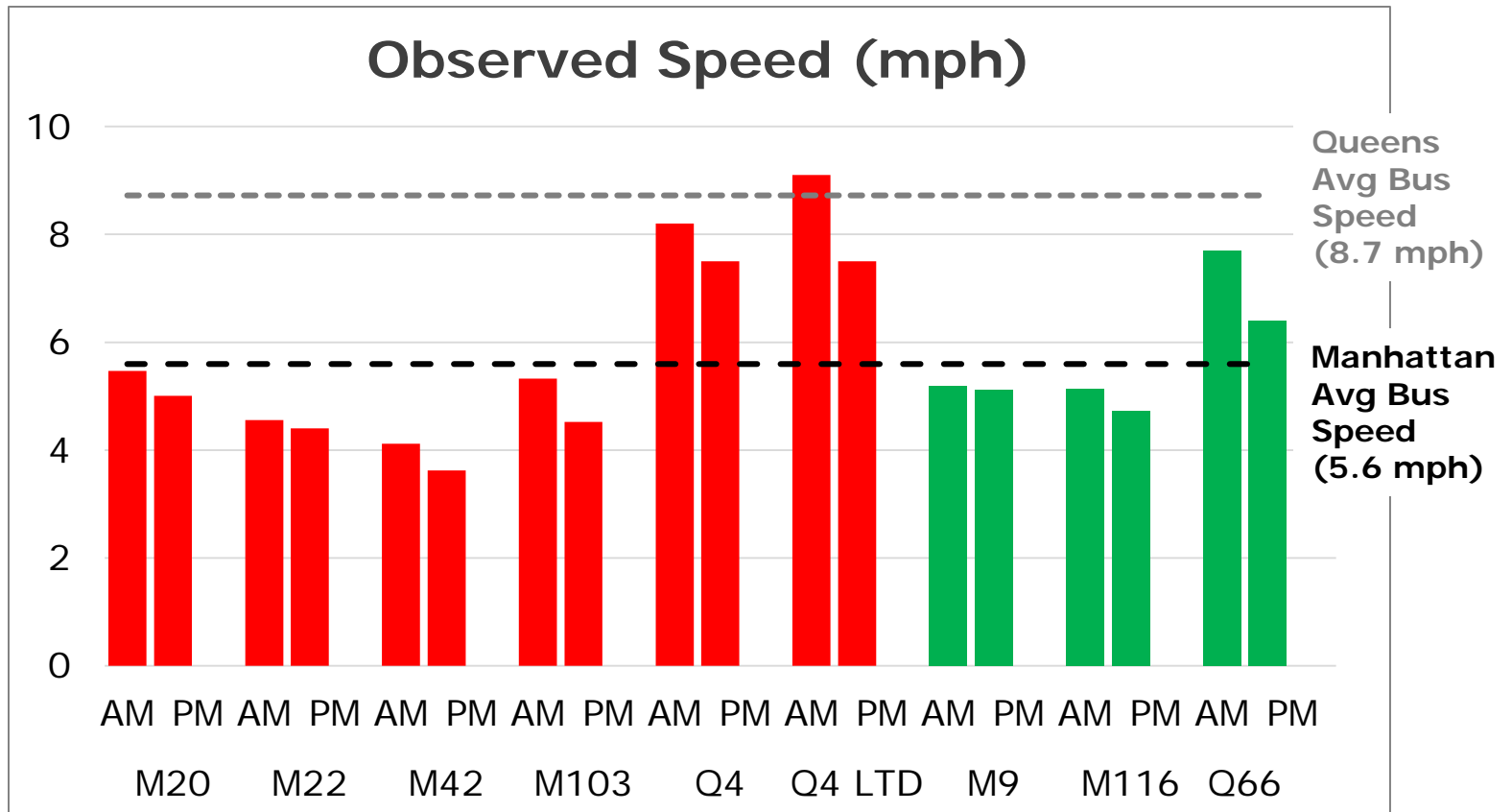


# Study Methodology



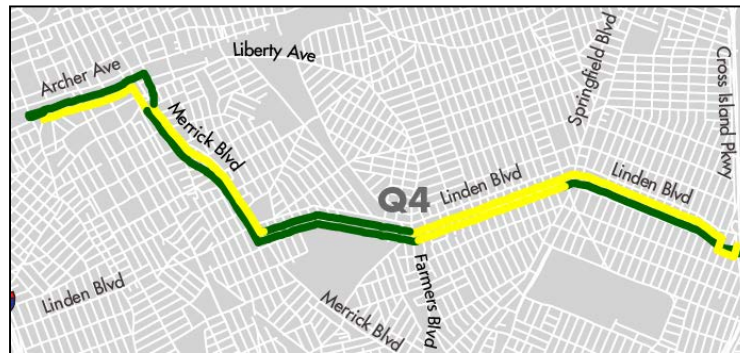
Bus Route	Run Number	Date	Time	Bus Action	Dwell	Elapsed Time
Q4 LOCAL	007	September 19, 2017	19:03	Run End		
Q4 LOCAL	007	September 19, 2017	19:02	PULL INTO STOP	Pause	00:00:23
Q4 LOCAL	007	September 19, 2017	19:01	Stopped At Signal	Pause	00:00:31
Q4 LOCAL	007	September 19, 2017	19:01	Stopped At Signal	Pause	00:00:05
Q4 LOCAL	007	September 19, 2017	19:00	PULL INTO STOP	Pause	00:00:13

# Avg Operating Speed





# Observed Speeds between Timepoints – PM Peak



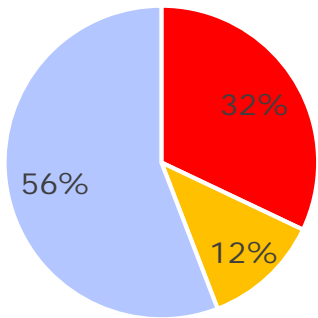
- 2.3 – 4.0 mph
- 4.1 – 8.0 mph
- >8.0 mph

**NYC average walking speed = 3.4 mph**

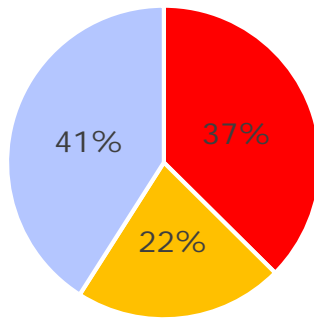
# Observed "Time-in-Motion" Metrics

■ Time at Signals    ■ Time at Bus Stops    ■ Time in Motion

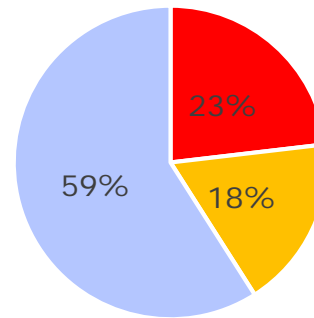
M20



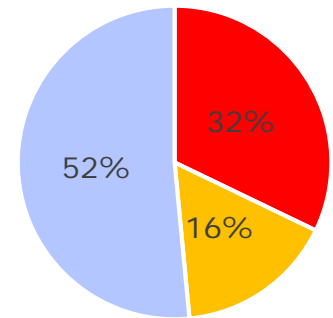
M42



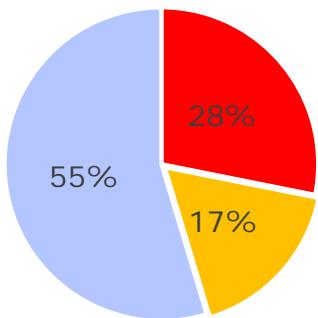
Q4



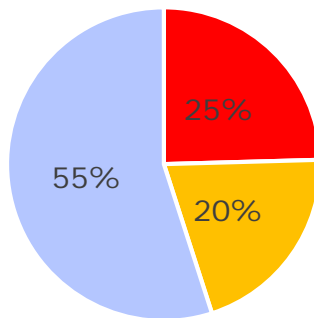
M9



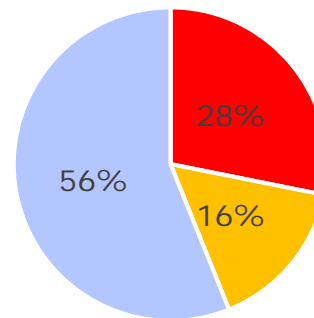
M22



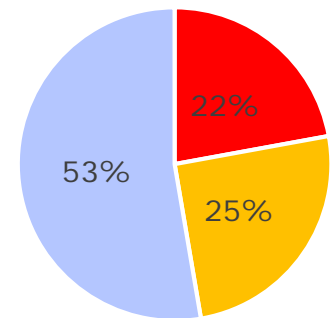
M103



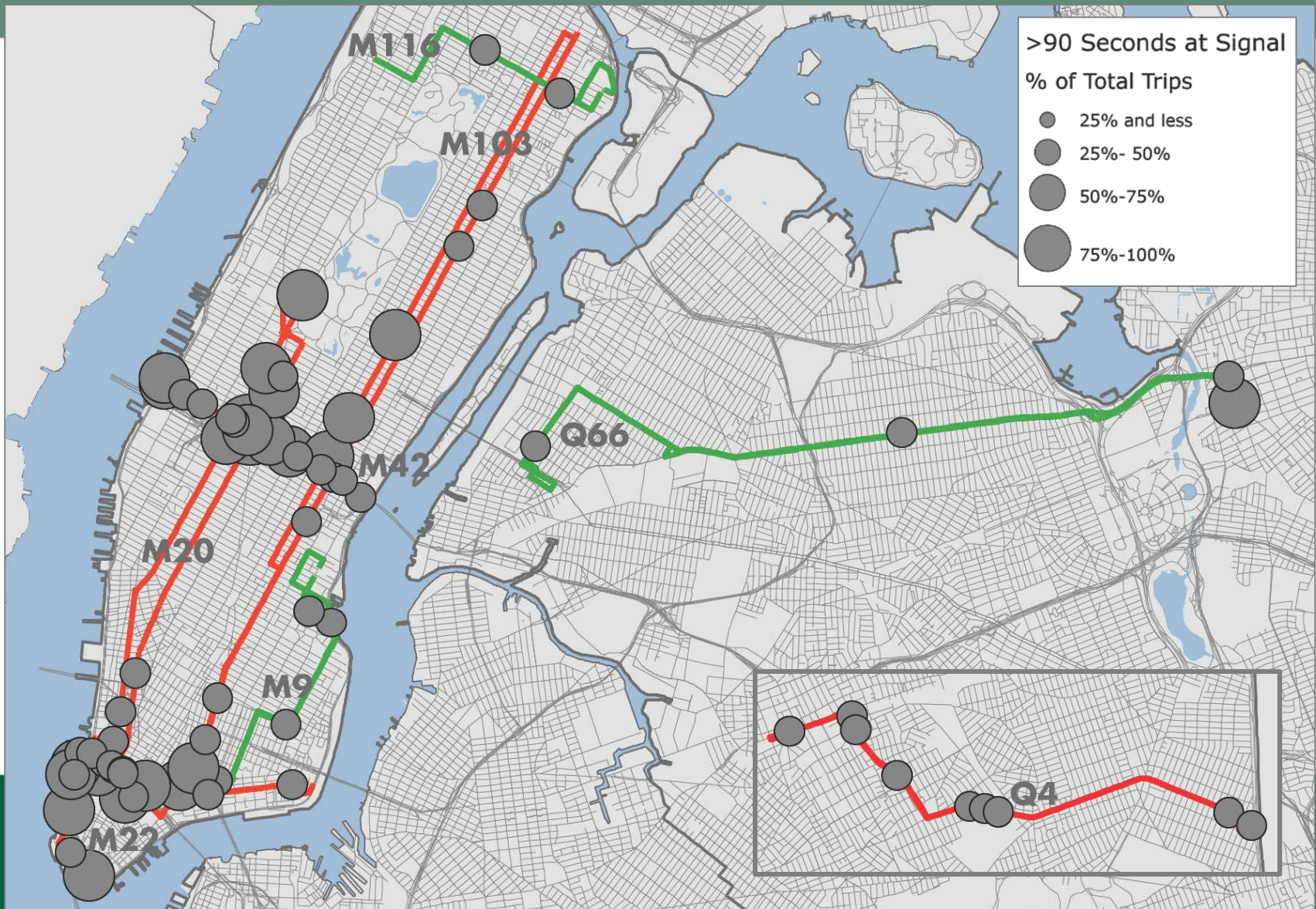
Q66



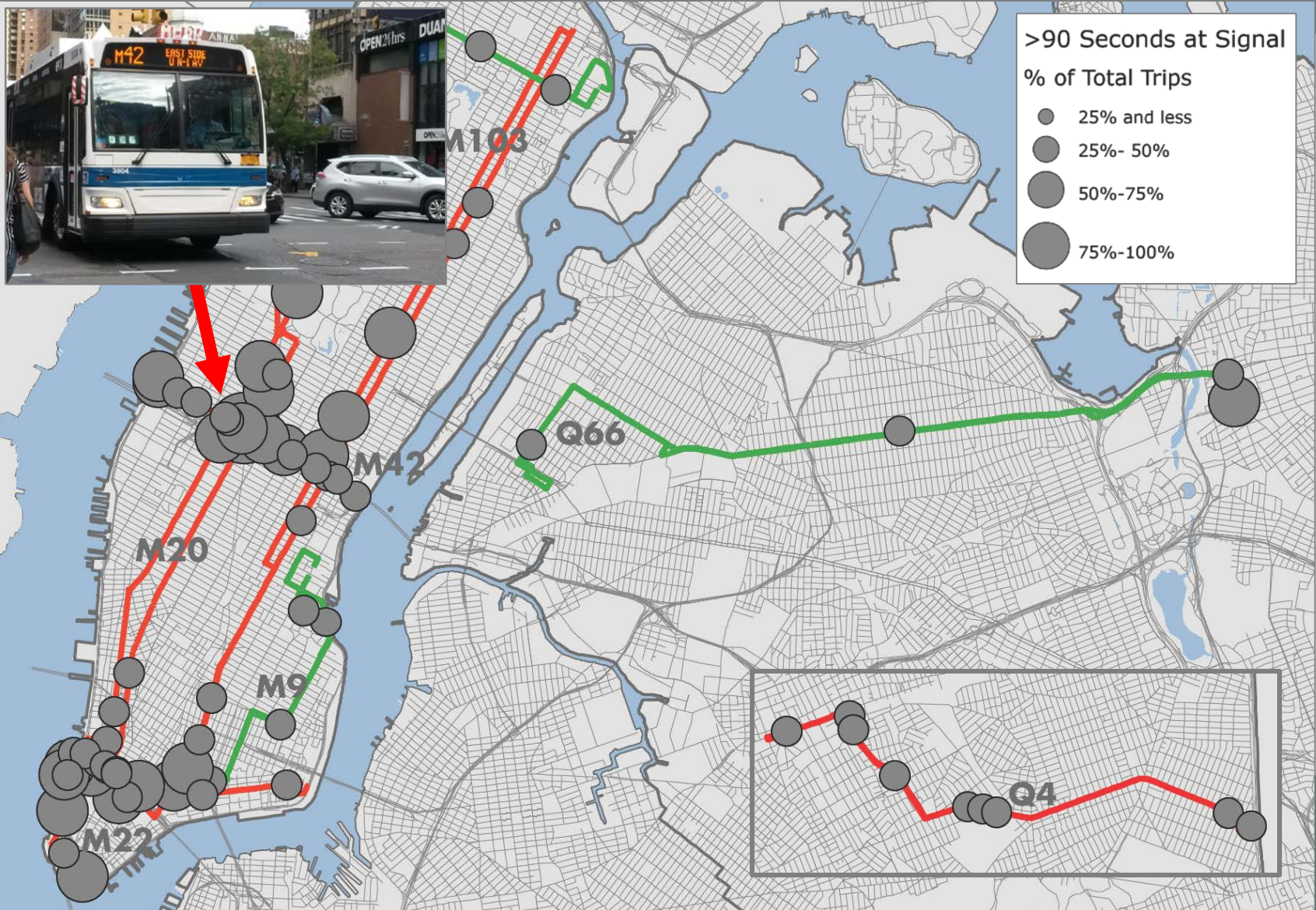
M116



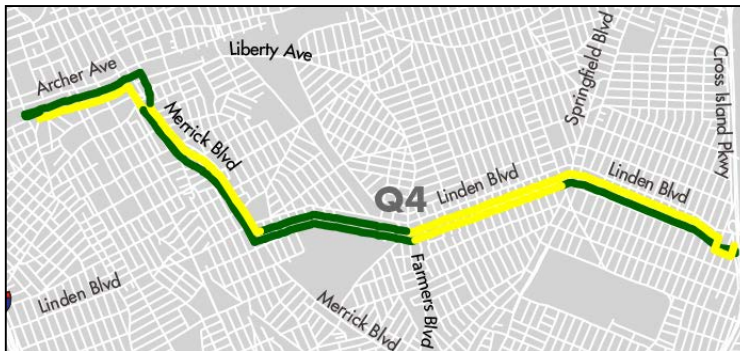
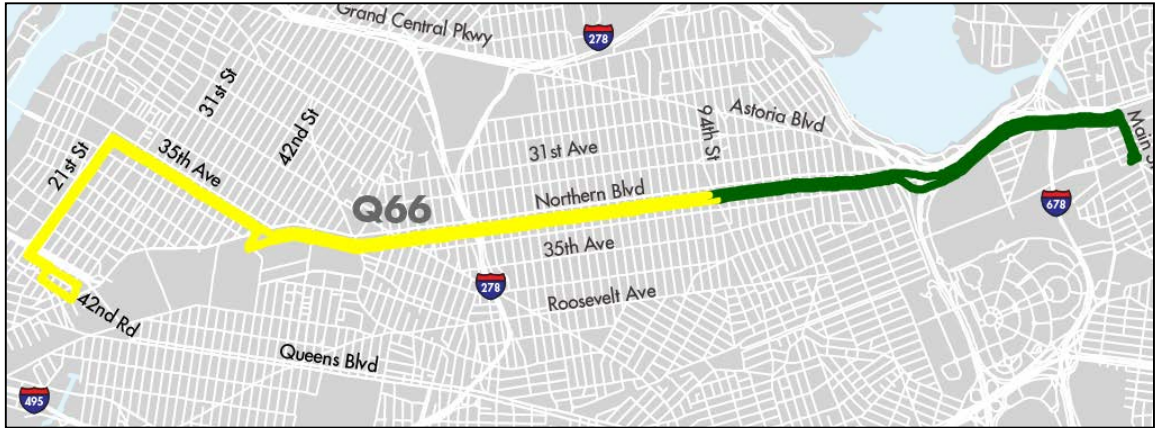
# Time at Signals – PM Peak



# Time at Signals – PM Peak



# Wait Assessment – PM Peak



% of buses arriving within 3 min of their scheduled interval

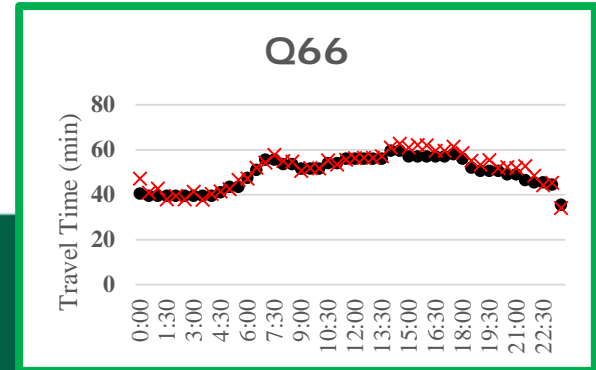
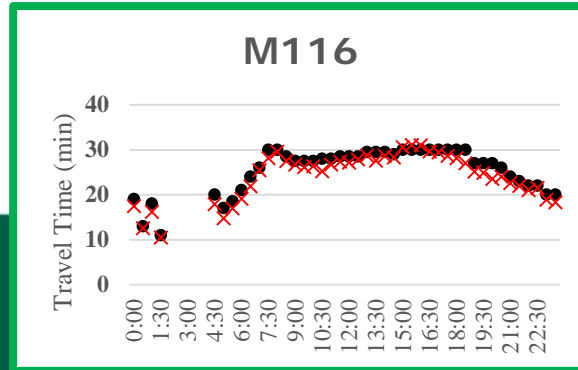
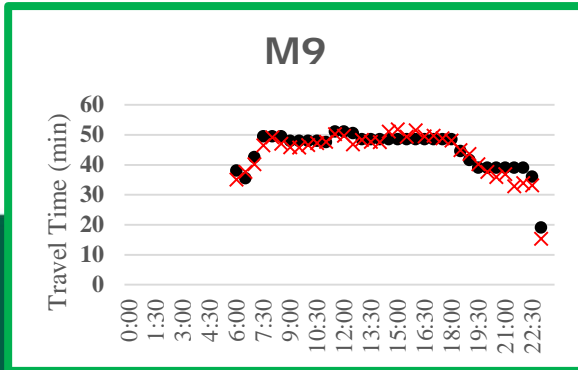
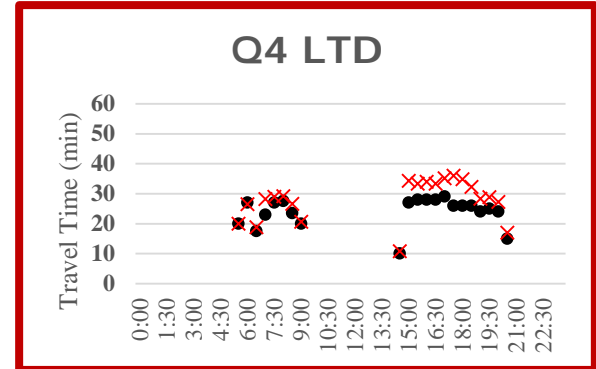
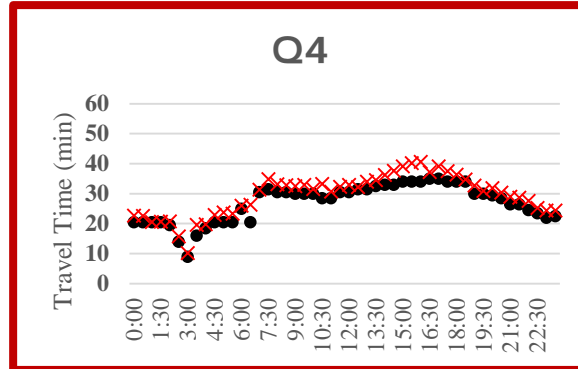
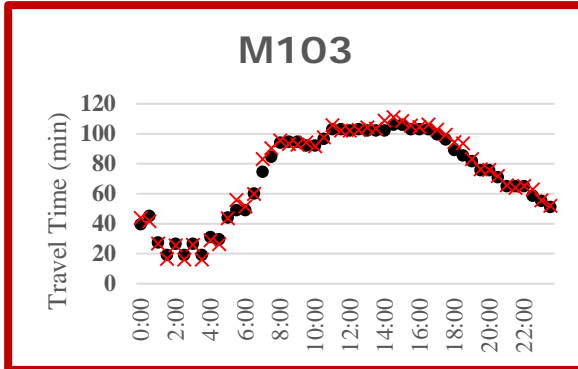
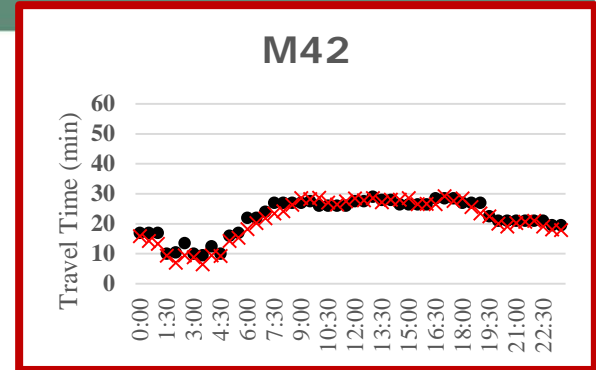
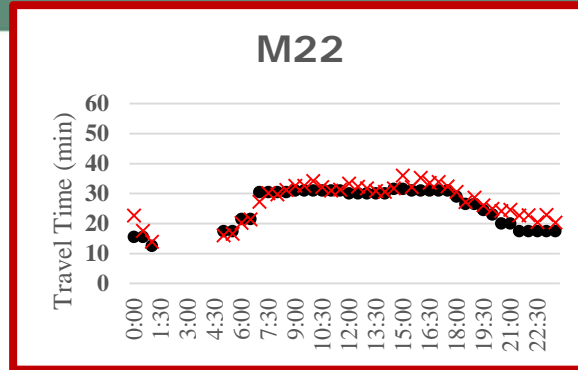
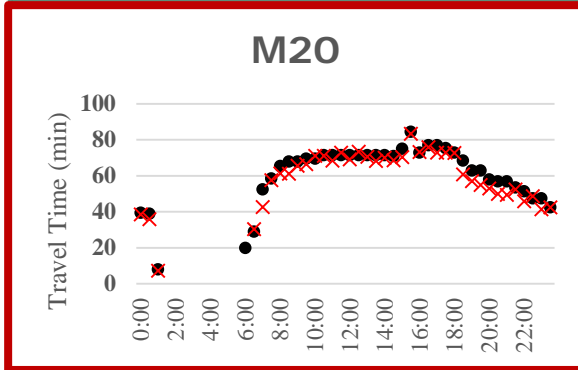
- < 70%
- 70 – 85%
- > 85%

Wait Assessment	AM Avg	PM Avg
<b>Declining Routes</b>	78%	65%
<b>Increasing Routes</b>	81%	68%

# Scheduled Service

Schedule Changes	Avg Change, 2012-2017		
	Total Running Time		# of Trips
	<i>AM Peak</i>	<i>PM Peak</i>	<i>Total</i>
<b>Decreasing Case Study Routes</b>	+1 minute	+1 minute	-7
<b>Increasing Case Study Routes</b>	+3 minutes	+1 minute	2

# Schedule Adherence



# Other Analyses...

- Blocked and skipped stops
- Fare Evasion
- Wheelchair Use
- On-Time Terminal Departure
- Missed Trips
- Reduced Fares



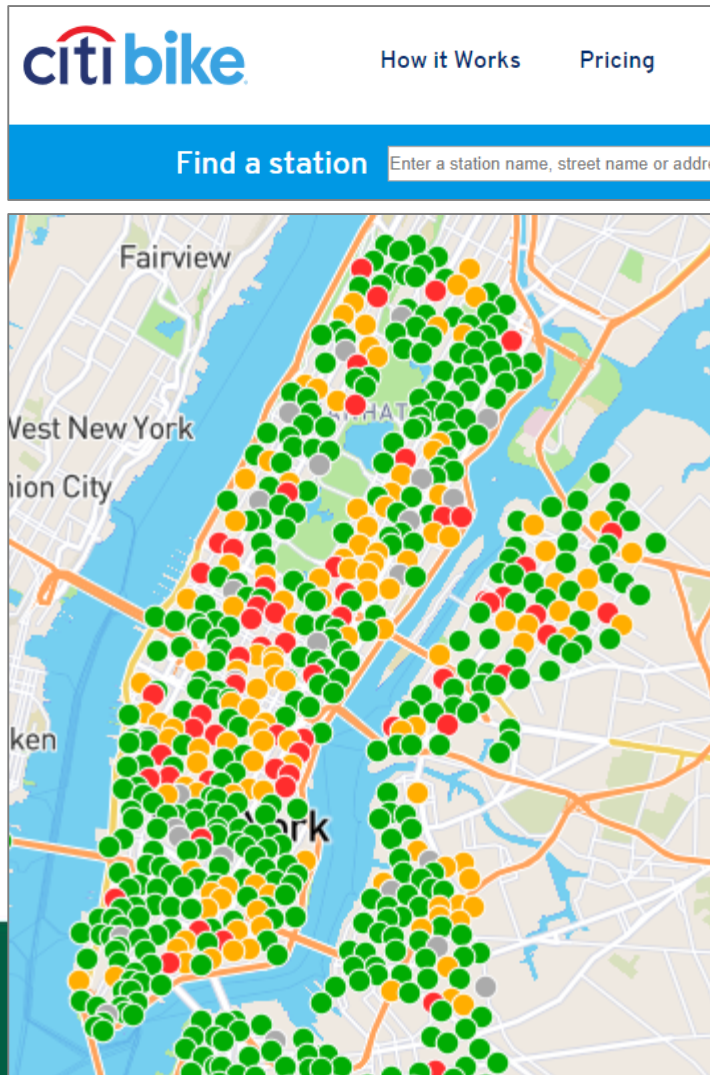
# External Variables – TNC Growth



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TNC Pickups by Borough	2015 total	2016 total	2017 total	Change, 15-17	
<b>Manhattan</b>	30,002,785	53,698,137	76,930,852	46,928,067	156%
<b>Brooklyn</b>	7,961,199	20,513,965	37,871,043	29,909,844	376%
<b>Queens</b>	5,007,041	12,669,289	23,131,017	18,123,976	362%
<b>Bronx</b>	1,971,423	4,109,926	10,477,598	8,506,175	431%
<b>Staten Island</b>	142,152	436,858	1,140,006	997,854	702%
<b>Total</b>	<b>46 M</b>	<b>92 M</b>	<b>150 M</b>	<b>103 M</b>	<b>223%</b>

# External Variables – Bikeshare



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## Sharing riders: How bikesharing impacts bus ridership in New York City



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### ABSTRACT

The objective of this research is to quantify the impact that bikesharing systems has on bus ridership. We exploit a natural experiment of the phased implementation of a bikesharing system to different areas of New York City. This allows us to use a difference-in-differences identification strategy. We divide bus routes into control and treatment groups based on if they are located in areas that received bikesharing infrastructure or not. Our results find a significant decrease in bus ridership on treated routes compared to control routes that coincides with the implementation of the bikesharing system in New York City. Our results from our preferred model indicate that every thousand bikesharing docks added to a bus route is associated with a 2.42% fall in daily unlinked bus trips on routes in Manhattan and Brooklyn. A second model that also controls for the expansion of bikesharing infrastructure during this time suggests that the decrease in bus ridership attributable to bikesharing infrastructure alone may be smaller (a 1.69% fall in daily unlinked bus trips). Although the magnitude of the reduction is a small proportion of total bus trips, these findings indicate that either a large proportion of overall bikeshare members are substituting bikesharing for bus trips or that bikesharing may have impacted the travel behavior of bus riders.

# Conclusions

- Rider sensitivity to speed, short and reliable wait times, and perception of service quality
- Less sensitivity to schedule adherence



# Conclusions

- Address signal timing
- Enforce blocked stops and lanes
- Improve dispatching and on-time departures
- Review stops for potential consolidation
- Be transparent about performance – dashboard launched in March 2018



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## APPENDIX

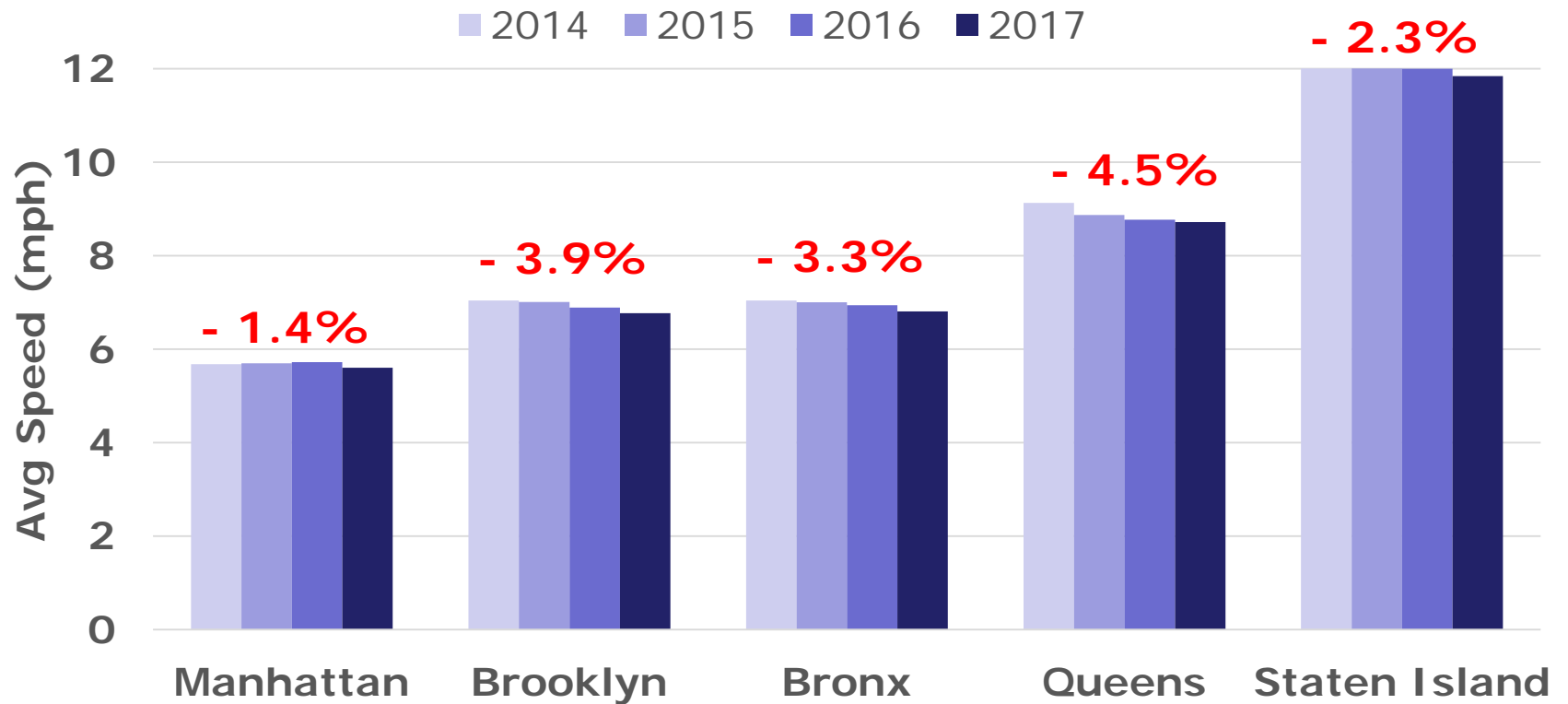


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# Background

## Bus Speed by Borough, 2014-2017



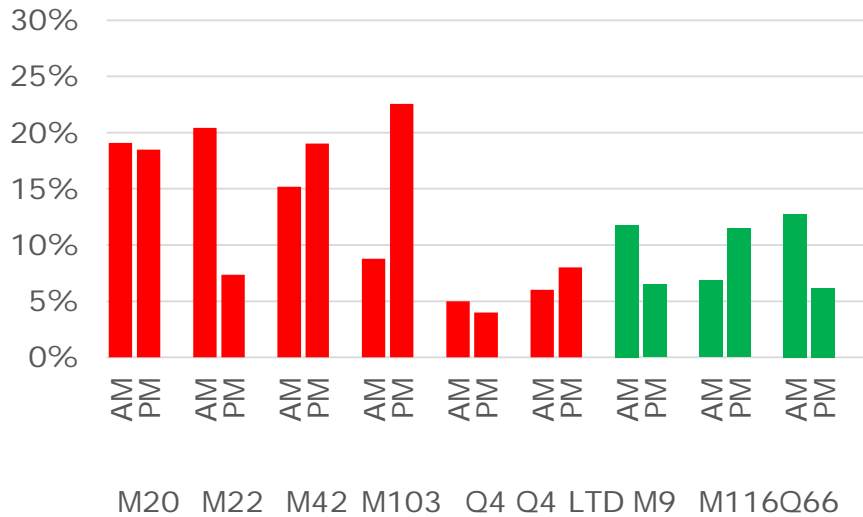
Source: MTA Bus Time

# On-Board Data Collection

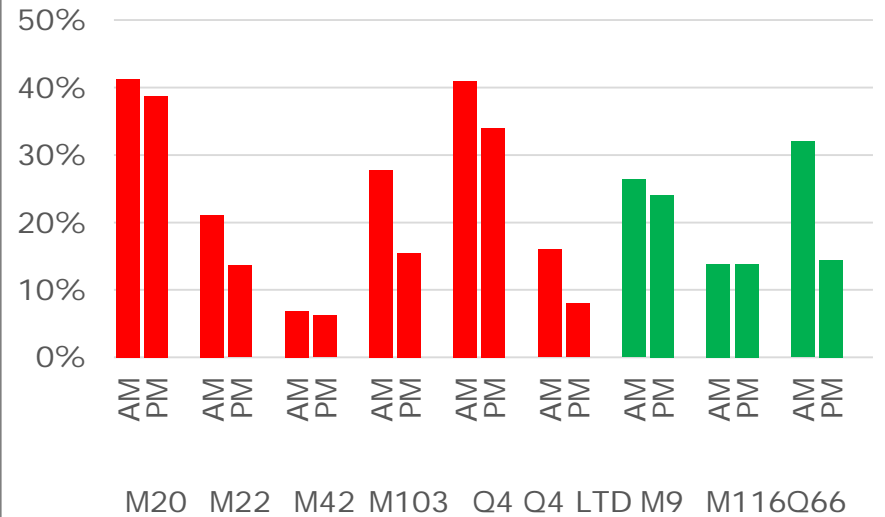
- On-board survey of bus service during the AM and PM peak periods (7–10am and 4–7pm)
- Survey conducted on Tues/Wed/Thurs, in June and September 2017
- Each route observed for an average of 29 one-way trips over the course of a week
- Also reviewed historical performance data

# Blocked/Skipped Stops

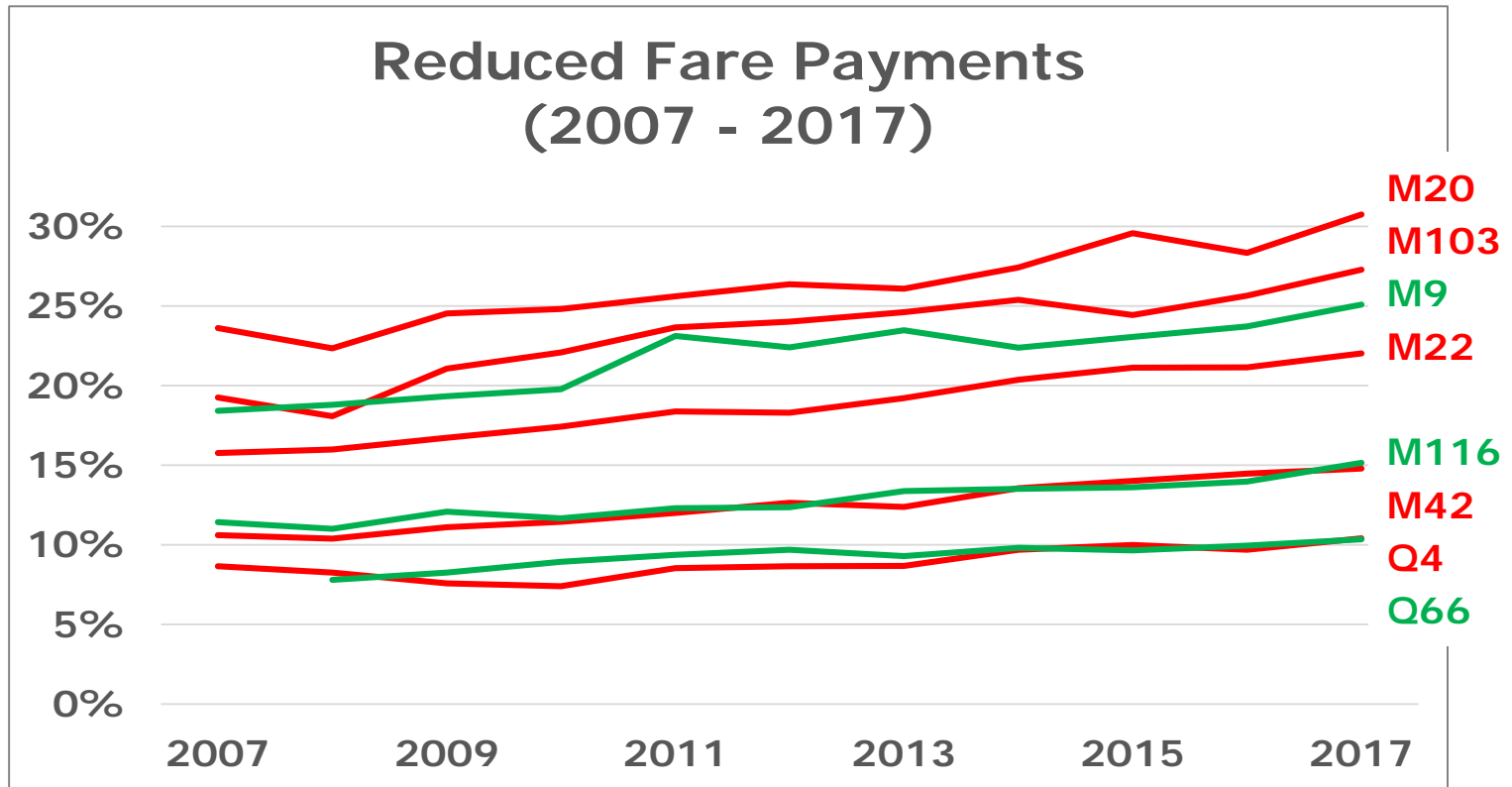
## Observed Blocked Stops (% of Total Stops)



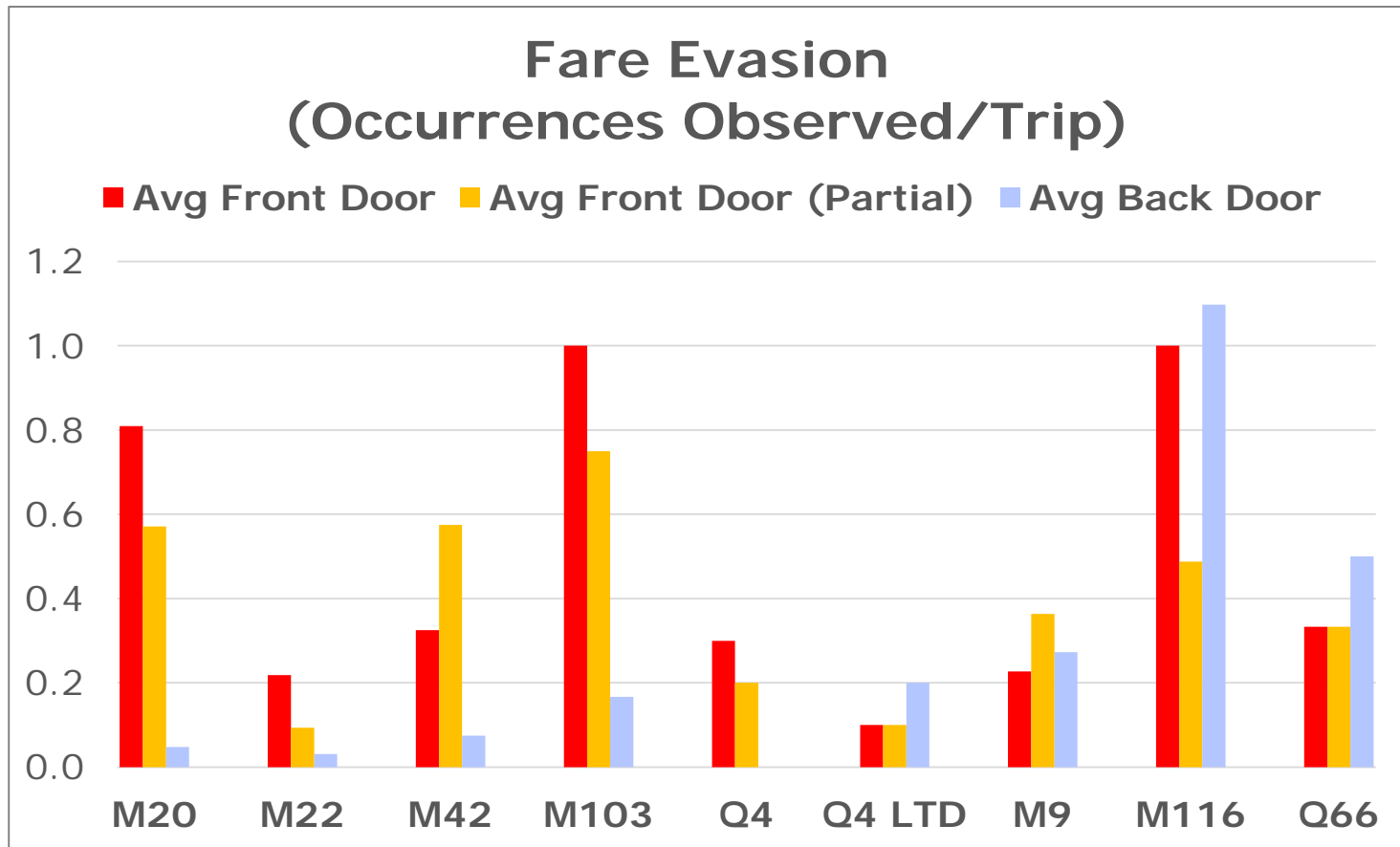
## Observed Skipped Stops (% of Total Stops)



# Reduced Fare Rate



# Observed Fare Evasion



# Observed Wheelchair Use

Wheelchair Boardings + Alightings Per Trip				
Route	Avg Count	Minimum Count	Max Count	Avg Elapsed Time (min)
<b>M20</b>	0.5	0	2	1:19
<b>M22</b>	0.5	0	4	2:33
<b>M42</b>	0.1	0	2	1:31
<b>M103</b>	1.4	0	4	2:56
<b>Q4</b>	-	-	-	-
<b>Q4 LTD</b>	-	-	-	-
<b>M9</b>	0.5	0	6	3:00
<b>M116</b>	0.5	0	4	1:14
<b>Q66</b>	0.1	0	2	0:46