

Consolidating Metro Bus Routes:

Maximizing the Impact of the
BRT while Minimizing Costs

Megan Tabbutt

December 5th 2019

What are the Goals of this project and what are the plans for the BRT?

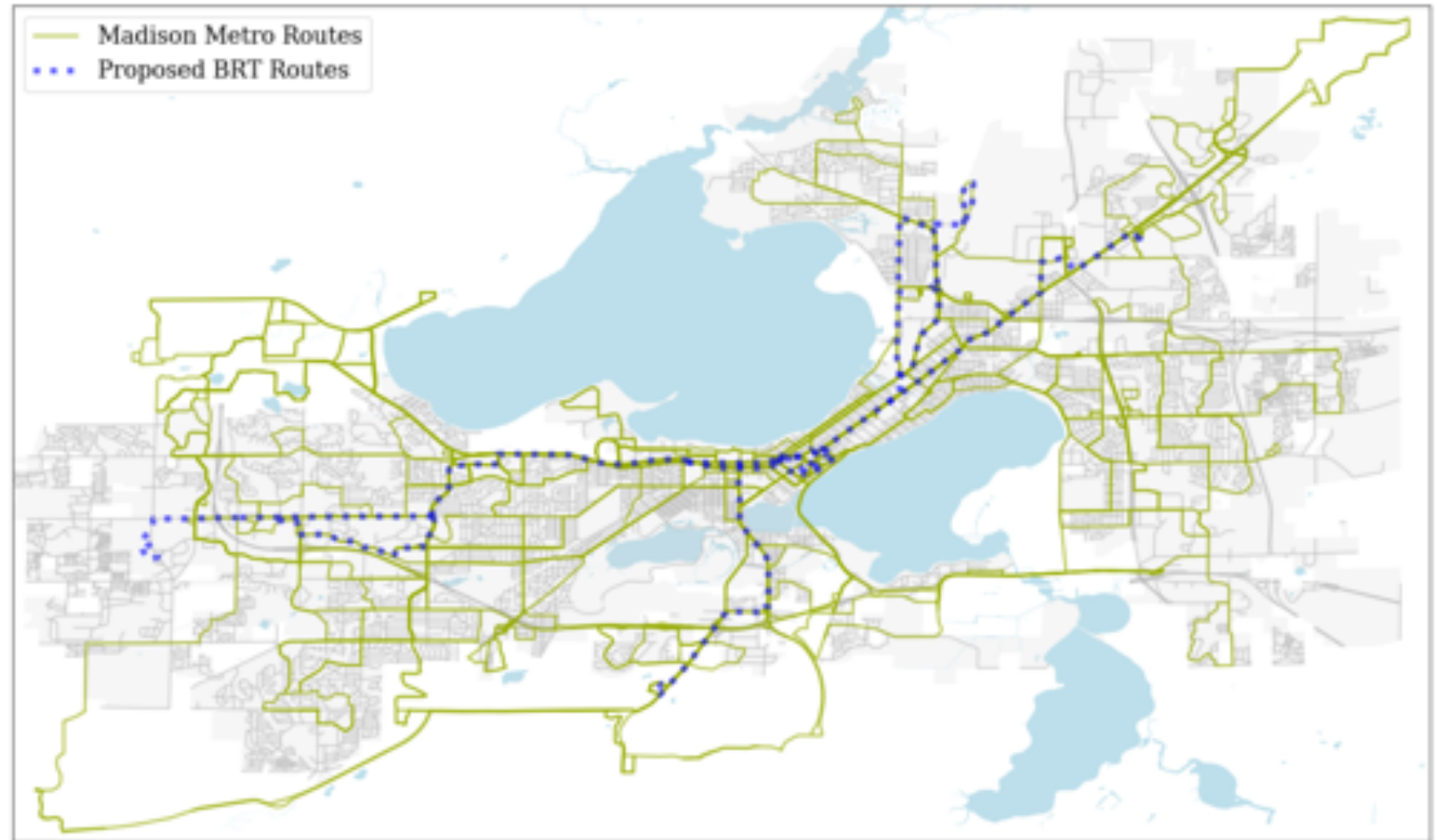
Planned BRT Routes, Current Metro Routes and Goals:



Goals:

- Reduce route redundancy
- Reduce Madison Metro operating costs
- Provide the same or better service

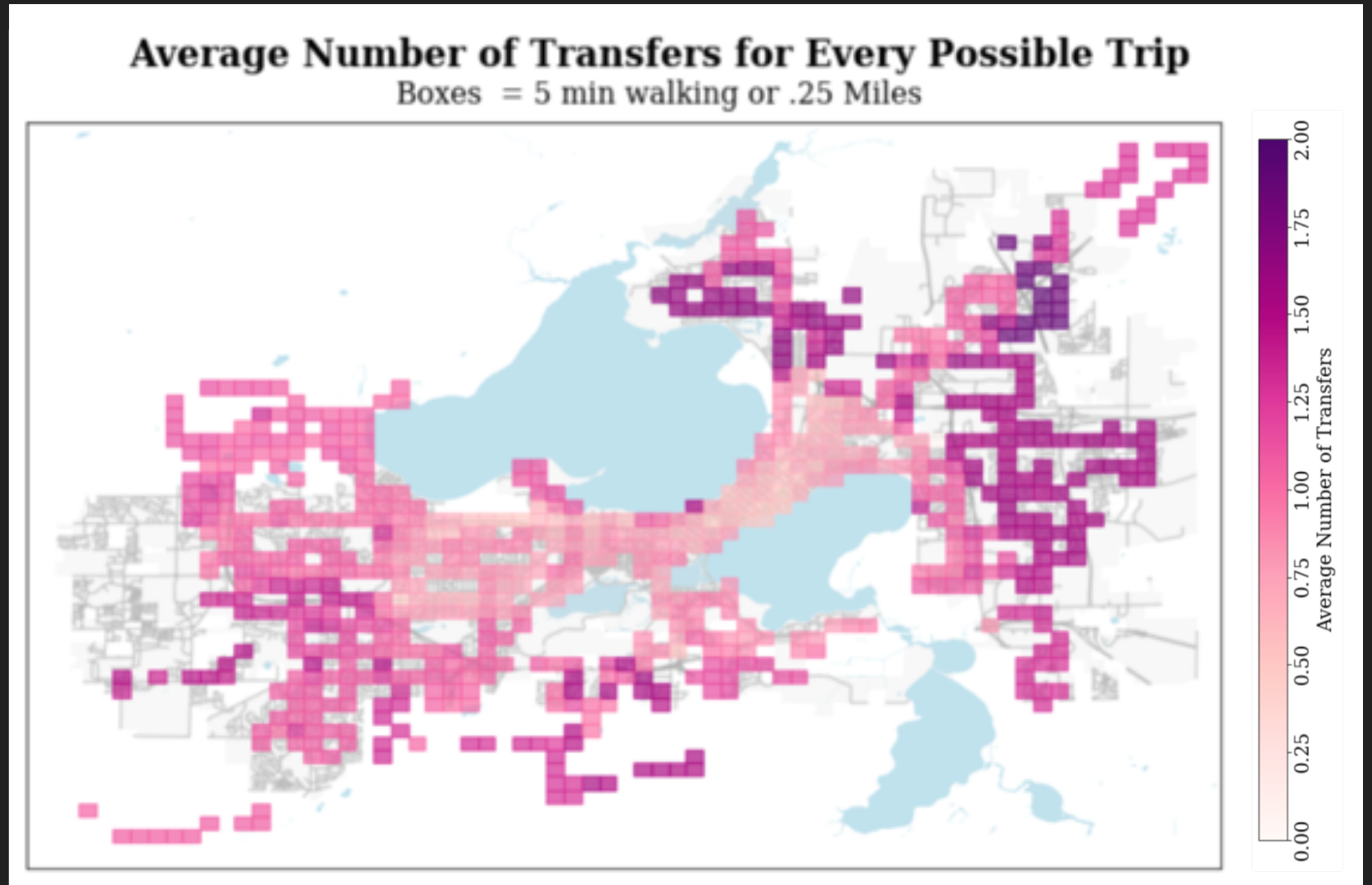
Current Madison Metro Routes and Proposed BRT Routes



**What is the current
accessibility of Madison via
bus and how will the BRT
change this?**

Average Number of Transfers to Get Around via Bus:

- Investigate current accessibility with various parameters
- Need to ensure that the new routes are the same or better
- **Reduce Route redundancy by eliminating sections that overlap with BRT, create new routes that intersect the BRT**
- Places with one or more transfers already are best candidates



Farthest Distance Available on a Single Bus:

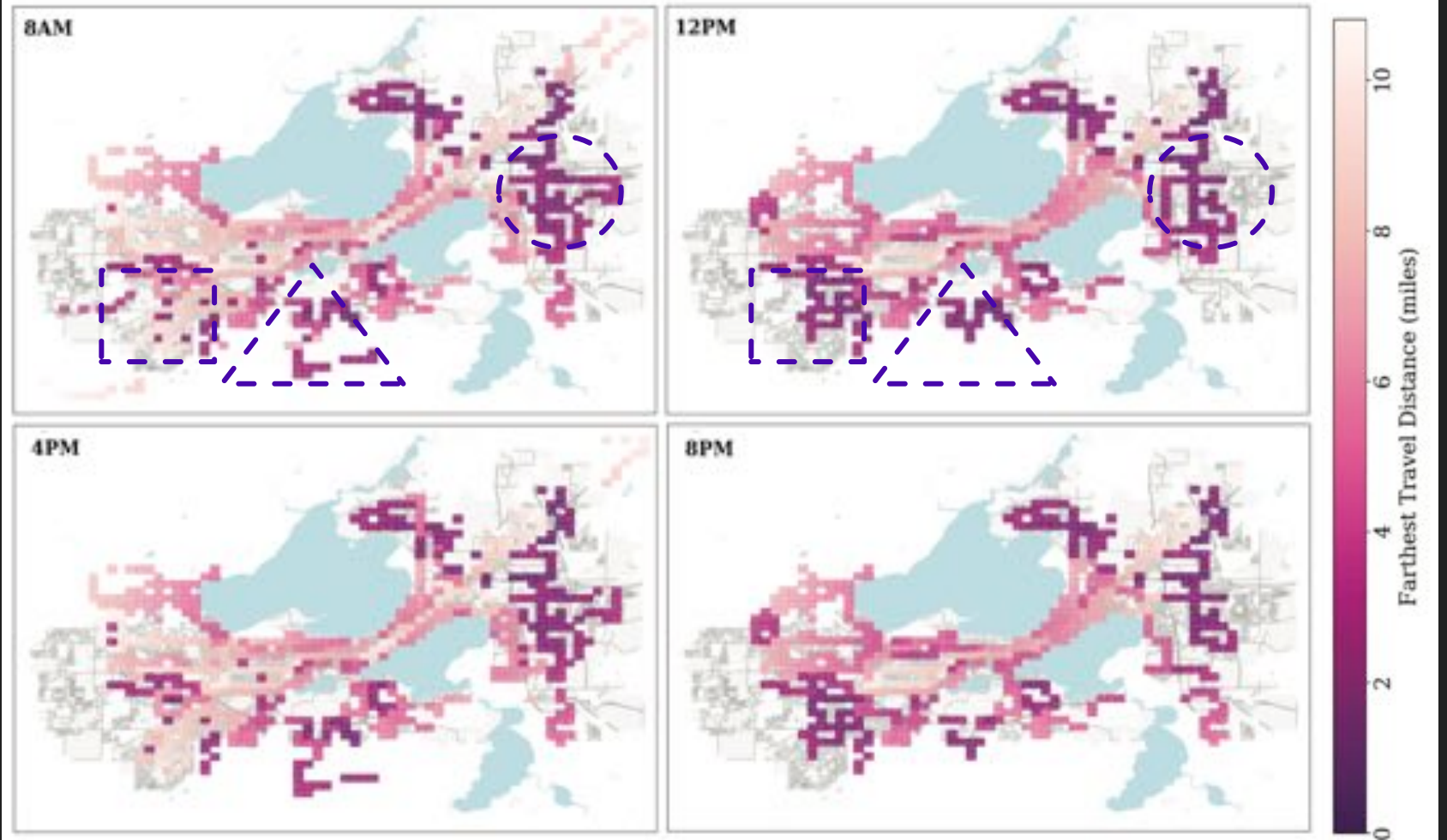
Right: Farthest distance you can get on a single bus starting in a given square

- While still reducing costs can we improve the system for these areas?
- Increase BRT connection service to these areas

Proposed System Frequency of BRT:

Day of Week	Time Period	Hours	Service Frequency
Weekday	Early AM	5:00-6:00am	30 min
	AM Peak	6:00-9:00am	10 min
	Midday	9:00am-3:00pm	15 min
	PM Peak	3:00-6:00pm	10 min
	Evening	6:00pm - Midnight	30 min
Saturday	Morning	7:00-9:00am	30 min
	Midday	9:00-6:00pm	15 min
	Evening	6:00-11:00pm	30 min
Sunday	All-day	7:00am - 11:00pm	30 min

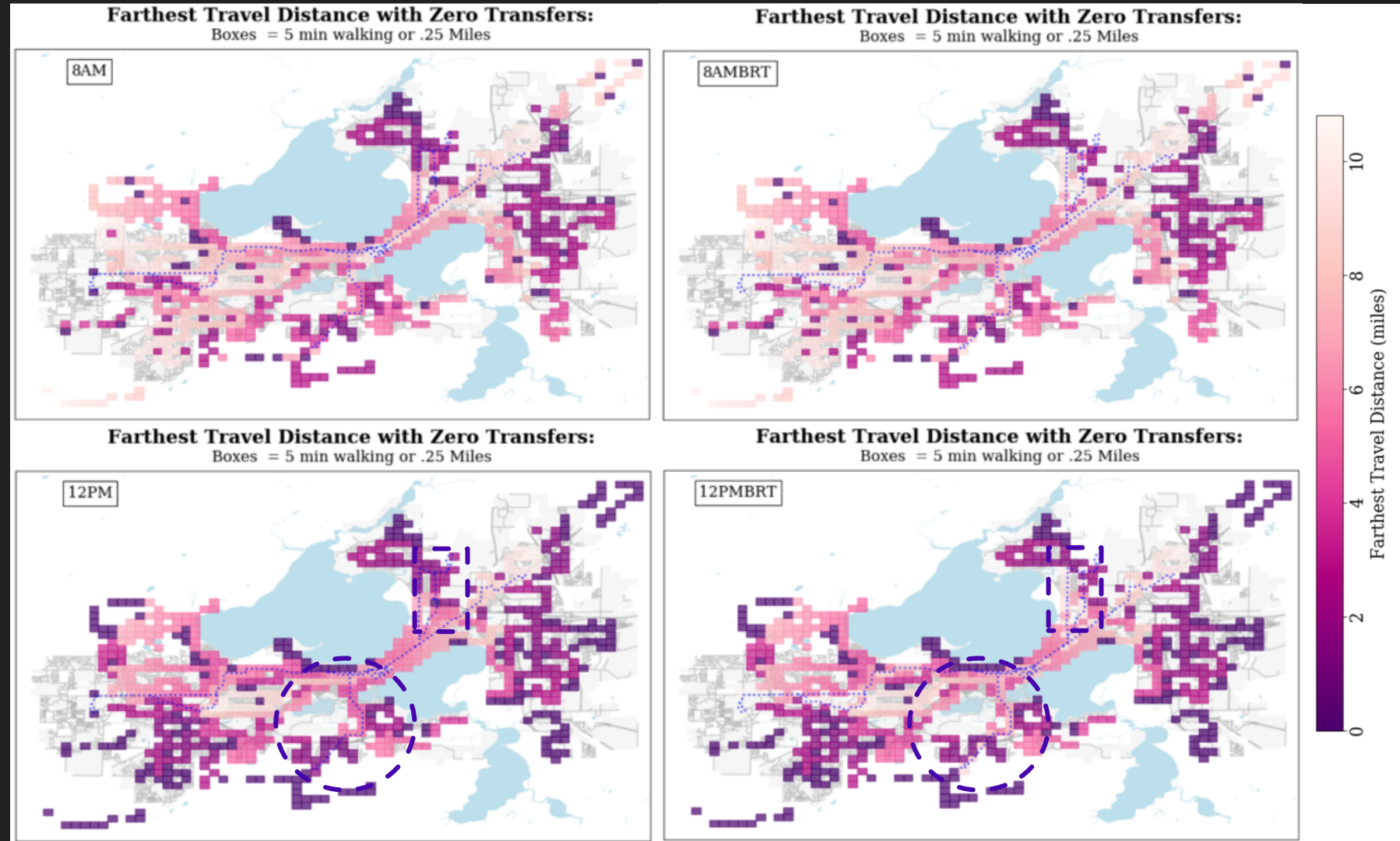
Farthest Distance with Zero Transfers



Farthest Distance Available on a Single Bus Including BRT:

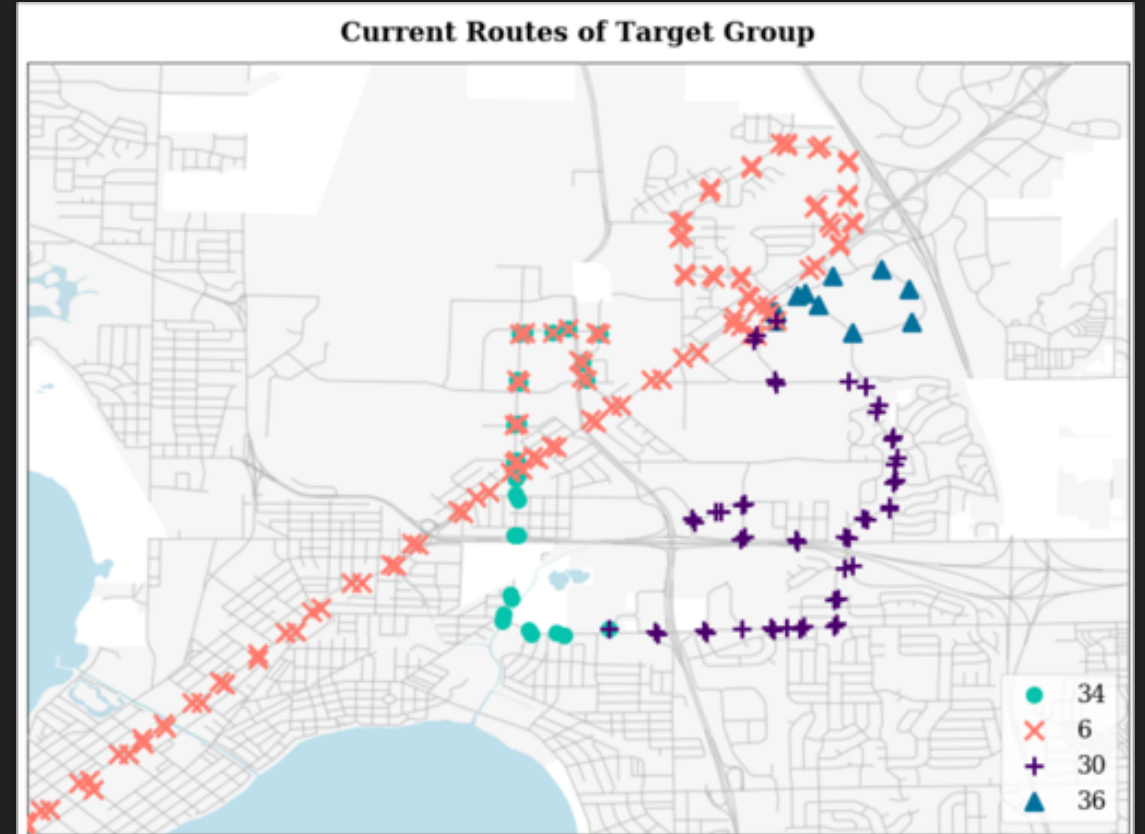
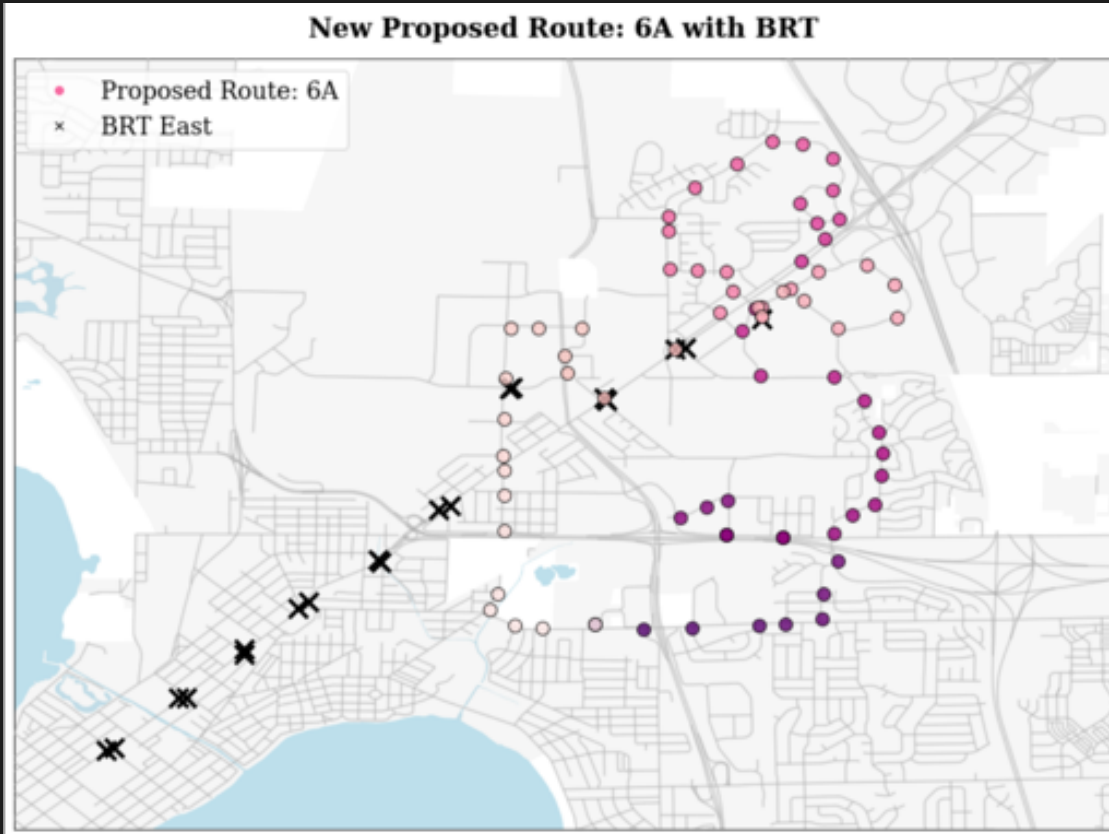
Right: Farthest distance you can get on a single bus starting in a given square with BRT running

- Along BRT, more uniform service across the day
- Able to get farther in general on BRT with no transfers
- **Want to take advantage of this more uniform service offering**



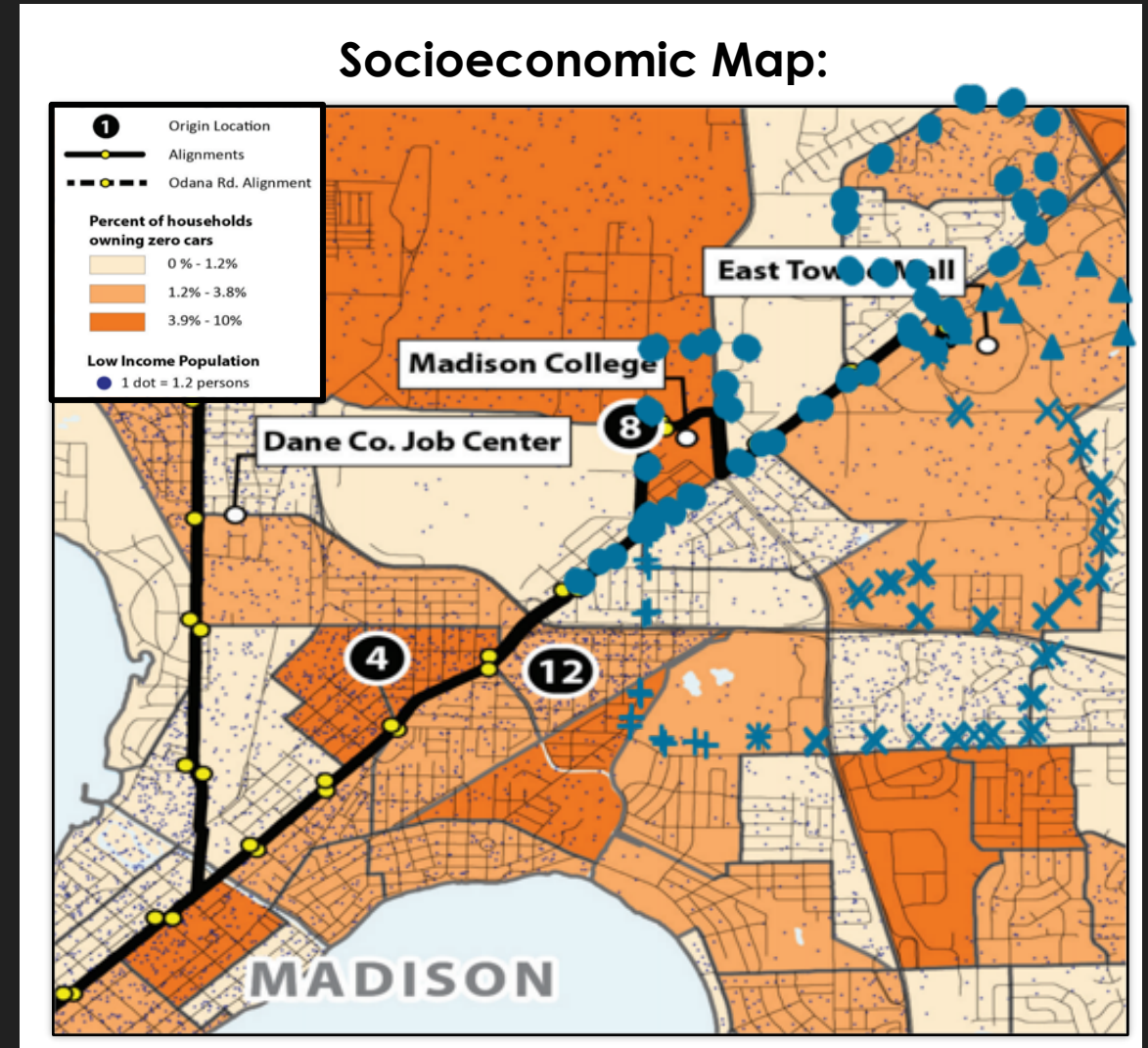
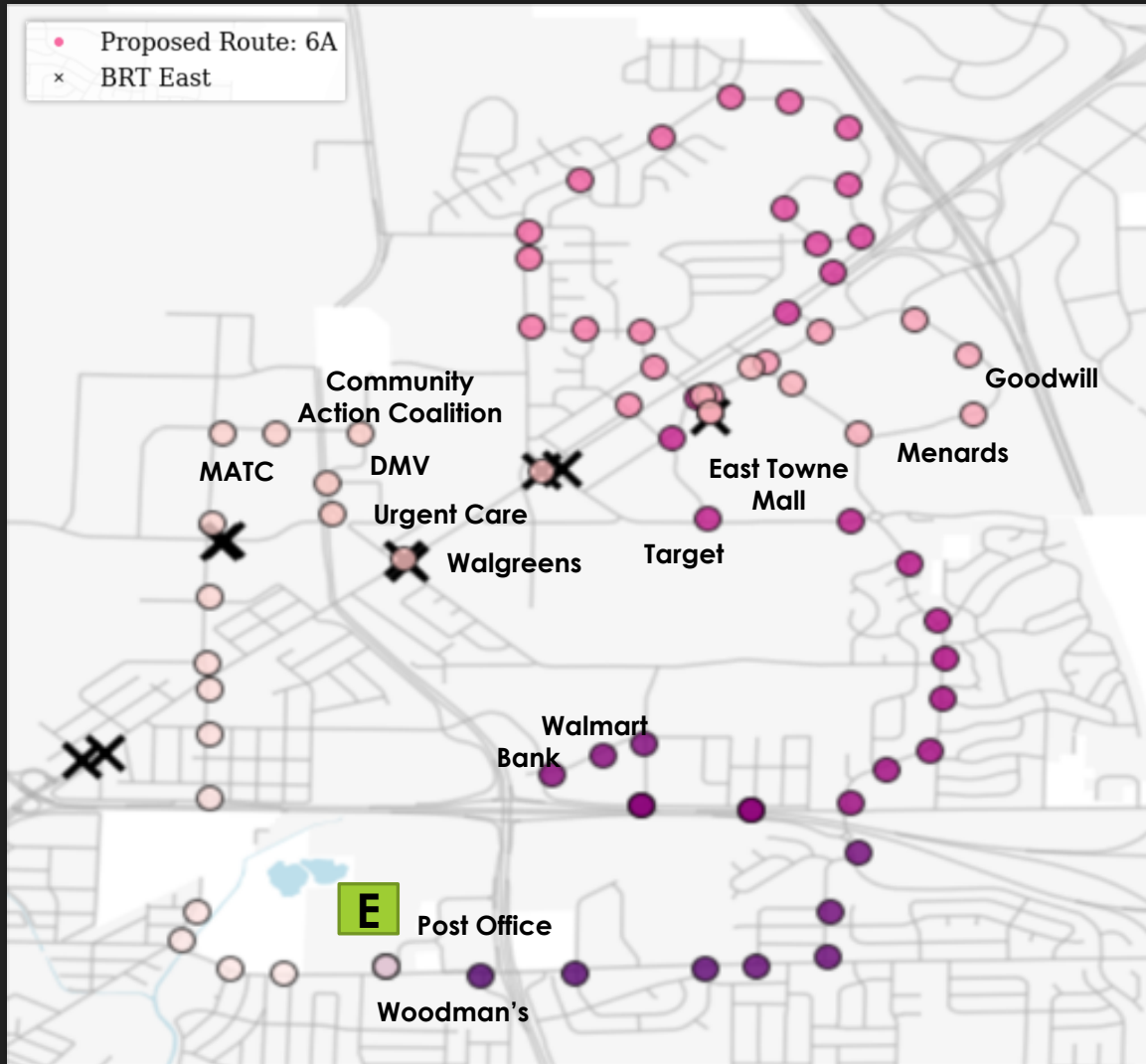
Is there a new route we can propose to address some of these issues and goals?

Combining Routes 6, 30, 34 & 36 Into A New Route:



Eliminate the portion of Route 6 that overlaps the BRT, and combine 30, 34 and 36 into a new route "6A"

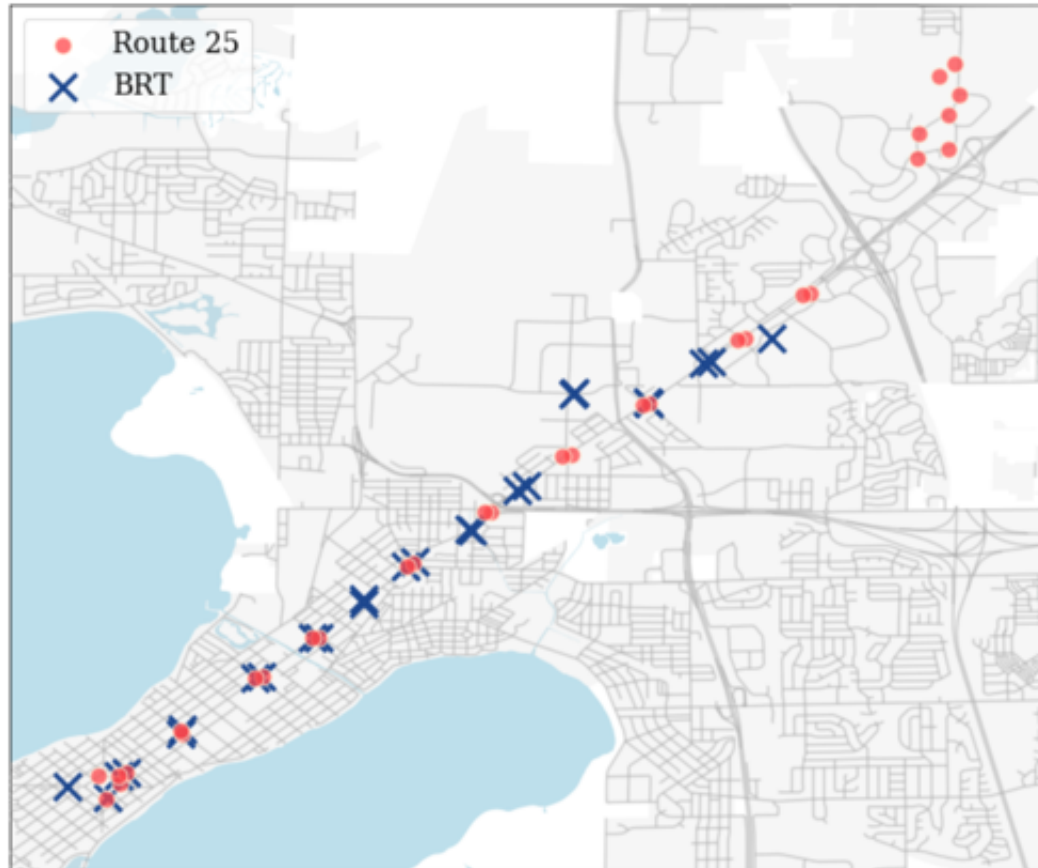
Geographic Points of Interest and Socioeconomic Considerations for Route:



Can we evaluate the effect of combining a route with the BRT in a more simple situation first?

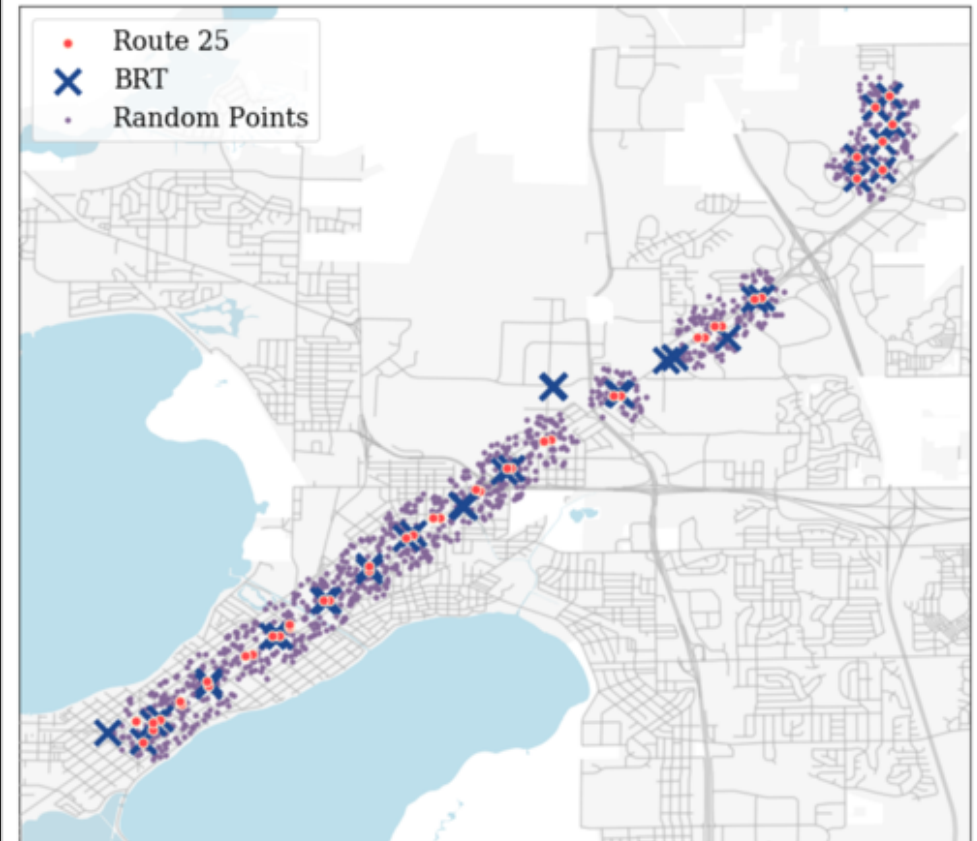
Combining the Current Route 25 with the BRT to create a new route with 1 Transfer

Route 25 and Proposed BRT Stops



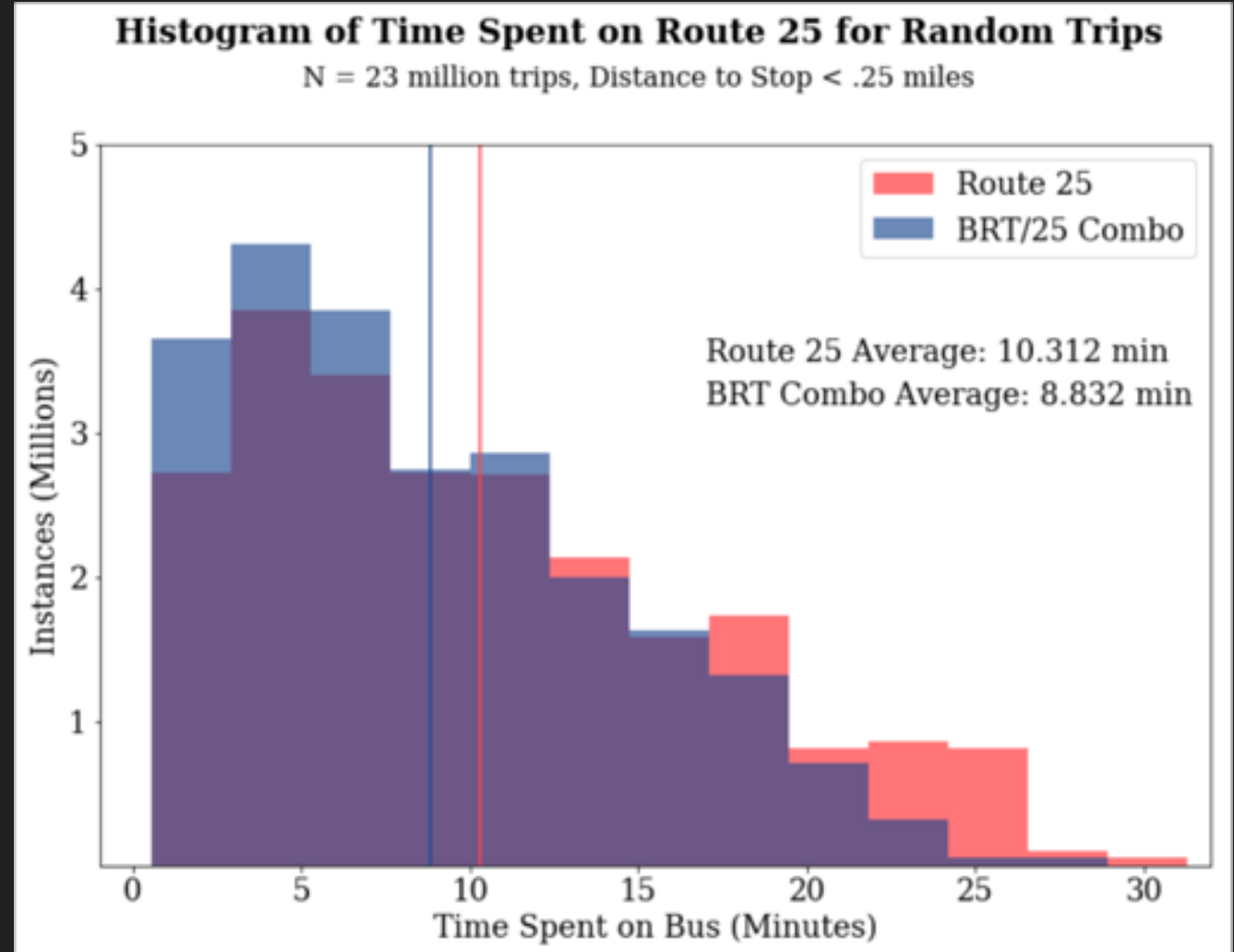
Route 25 Stops and Randomly Generated Points

N = 1000 points, Distance to Stop < .25 miles



Combined Route 25 Simulation Results:

- Run 23 million random trips for locations within .25 miles walking distance (5 min) from current route 25 stops
- Assume no transfer time onto the BRT at the East Towne switching point
- Assume that the BRT East is 19% faster than riding the metro along the same route
- **Combined route is 1.48 minutes faster on average than route 25**
- **14.4% faster than a typical route 25 trip**



**How will the accessibility of
Madison change for route 6A?**

Farthest Distances Reachable with Variable Transfer Numbers for Route 6A:

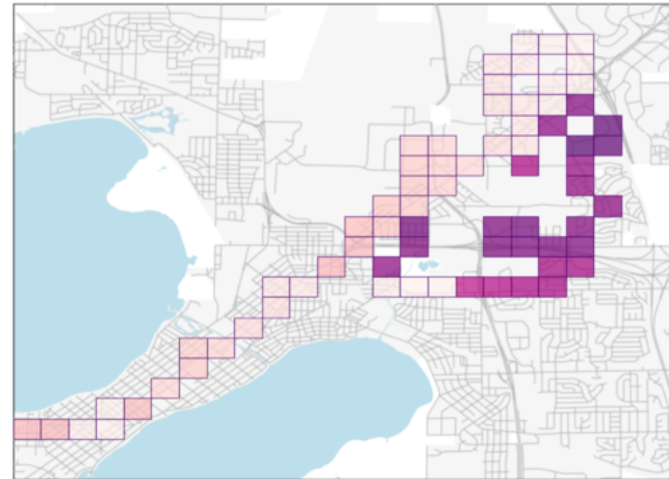
- Number of transfers stays approximately the same
- By transferring to BRT instead of #6, get a boost of 19% faster route for that portion

Percent of Travel Time Saved Using BRT:

Corridor:	Percent
West	17-23%
South	21%
East	19%
North	42%

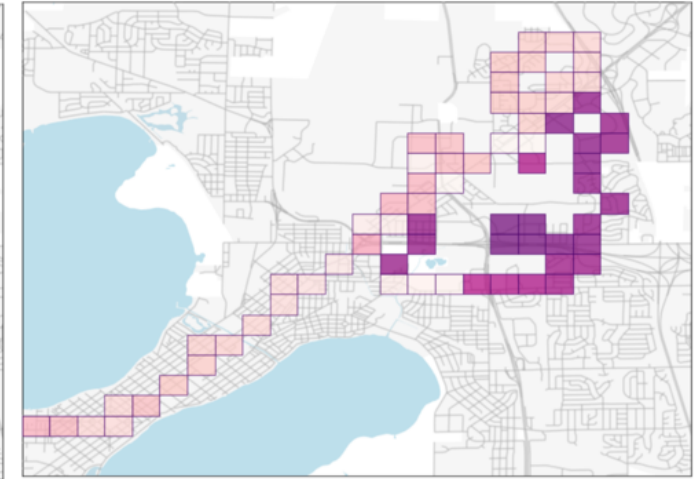
Farthest Distance with Zero Transfers

Boxes = 5 min walking or .25 Miles



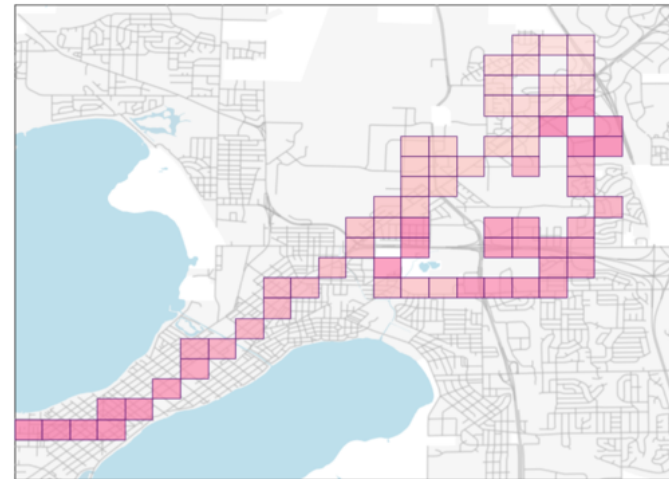
Farthest Distance with Zero Transfers New Route w/BRT

Boxes = 5 min walking or .25 Miles



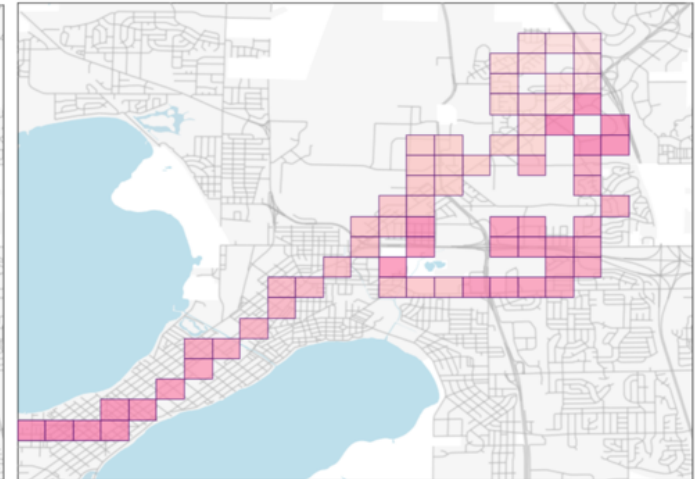
Farthest Distance with One Transfer

Boxes = 5 min walking or .25 Miles



Farthest Distance with One Transfer New Route w/BRT

Boxes = 5 min walking or .25 Miles



Summary of the Benefits of the 6A Route:

Speed Up Benefits:

- Same number of transfers as before on average
- Zero transfers for East Side loop
- Able to get to West, South and North sides on BRT, and more quickly
- Route #6 comes much more frequently than the 30, 34, 36, so get availability boost

Socioeconomic Benefits:

- Taking 3 routes that currently service lower income and lower car availability households
- Routes stop at fundamentally necessary places:
 - Urgent Care, pharmacy, bank, grocery, DMV, etc.

Operating Cost Benefits:

- Current route 6 has 78 stops, this proposed route has 75, essentially the same
- Would be same cost to run 6A with the same schedule as current #6
- Eliminate three routes: 30, 34, 36

Future Prospects of the Project:

- Continue this plan of combining existing routes to eliminate BRT overlap on all bus routes
- Create new routes such that you increase the accessibility of Madison via bus while still reducing operating costs
- Run simulations and analyze the effects on the accessibility of Madison as well as the commute times on more complicated routes

Questions?