

A decorative graphic consisting of blue circuit-like lines with small circles at the ends, extending horizontally from the left and right sides of the central text box.

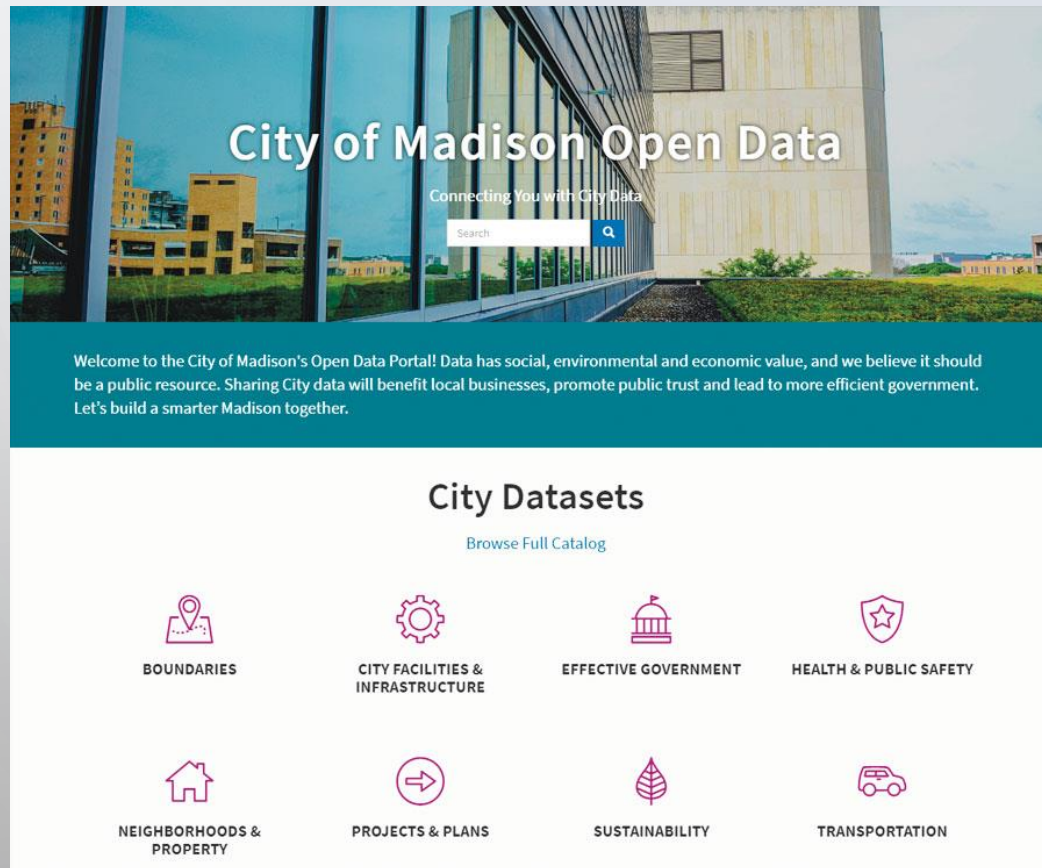
METRO TRANSIT REDESIGN PROJECT EVALUATION

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Introduction

- Evaluate the current situation of the Madison metro transit ridership
- Evaluate if the new BRT route could have good ridership and provide a more frequent and direct bus service for our community
- Review the main issue our community raised at the meeting

Data Collection



- City of Madison Open Data
 - Metro Transit Ridership by Stop
 - Metro Transit Ridership by Route
 - Platted Lots In Parks Lines
- Metro Transit Redesign (by email)
 - Metro Transit Draft Network Shapefiles
 - BRT_Stations
 - Draft_Network

Basic Goals for Public Transportation

- Ridership

Concentrates transit service onto fewer routes with more frequent service, ultimately increasing ridership

- Coverage

Extends transit service to as many people as possible regardless of frequency

Method – Data Analysis



- GeoPandas can make DataFrame into GeoDataFrame converting data into geometry, and helping me visualize data
- Pandas can provide me tools, like DataFrame, to show and check the attribute in my data, and have good compatibility with GeoPandas
- Numpy provides good math calculation functions to do statistical analysis

Method – Data Visualization

matplotlib  **Shapely**



Folium



OSMnx  **NetworkX**
Network Analysis in Python

- Folium

The metro transit data contains lots of information about the bus stops. Folium can allow everyone who uses the Jupyter Notebooks file to zoom in on where they are interested

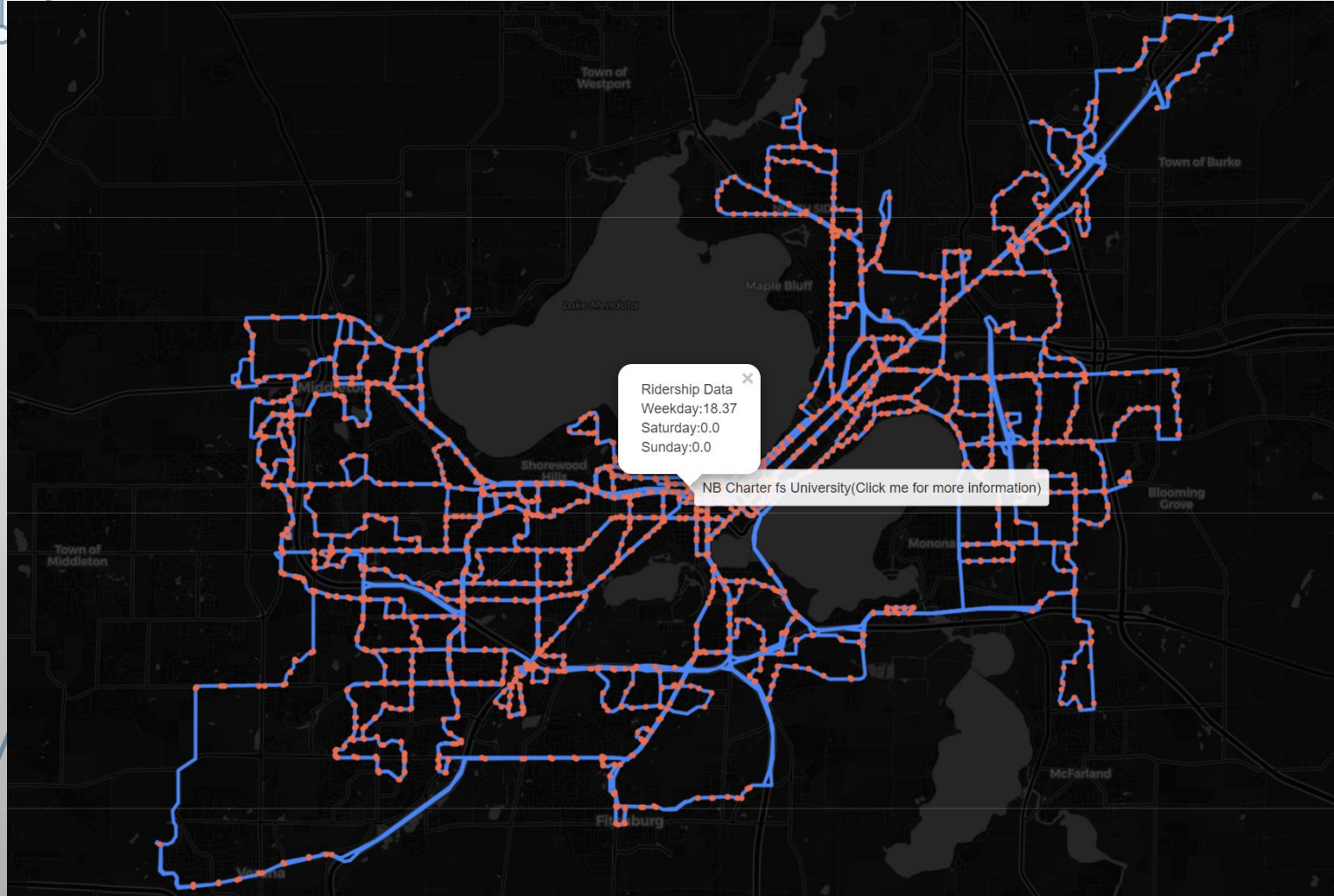
- Matplotlib/ Shapely

For some parts that don't exist in the data source or the part that I want to highlight, I can use Shapely to create Polygons, Points, and Polylines

- OSMnx/ NetworkX

These two packages would not only allow me to download the road network of Madison but generate the shortest path to make a new map

Current Situation


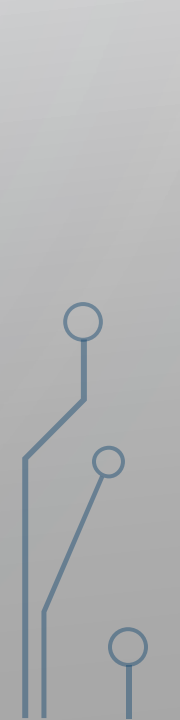


- Lots of the bus stops are only effective on weekdays including the stops outside and inside the downtown area of Madison.
- In this picture, we can see an example that the bus stop at the intersection of Charter St. and University Ave. is barely effective on weekdays.

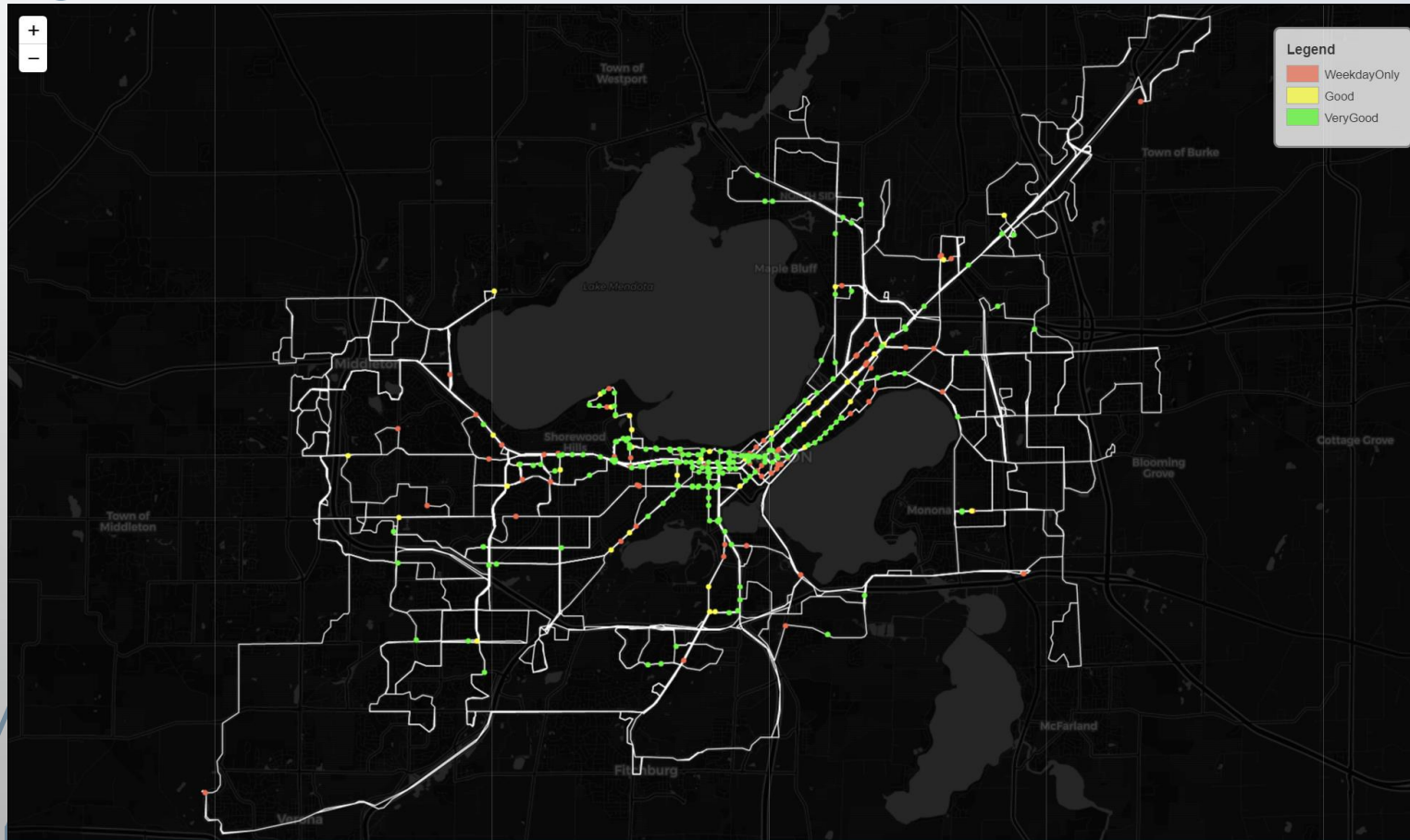


Current Situation – Ridership Analysis

For bus stops, people are considered having different behavior on weekday, Saturday, and Sunday

- Only 13.91% of the bus stop has their ridership above average on weekdays
 - Only 15.64% of the bus stop has their ridership above average on Saturday
 - Only 15.03% of the bus stop has their ridership above average on Sunday
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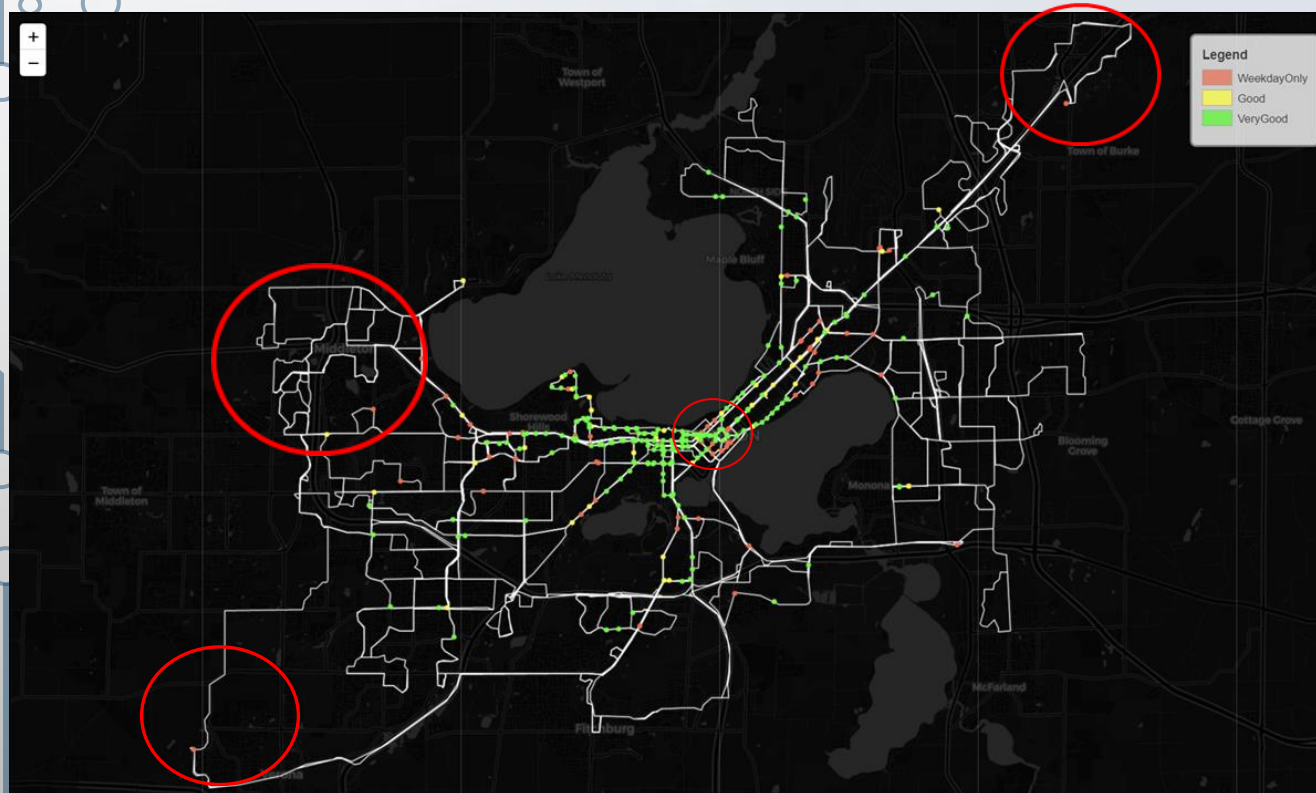
Current Situation – Ridership Analysis Result



Current stops with ridership above average show on the following map

- A bus stop is only effective on weekdays marked WeekdayOnly
- A bus stop is effective on weekday and one of weekends marked Good
- A bus stop is effective on weekday and all of weekends marked Very Good

Current Situation – Findings & Conclusion



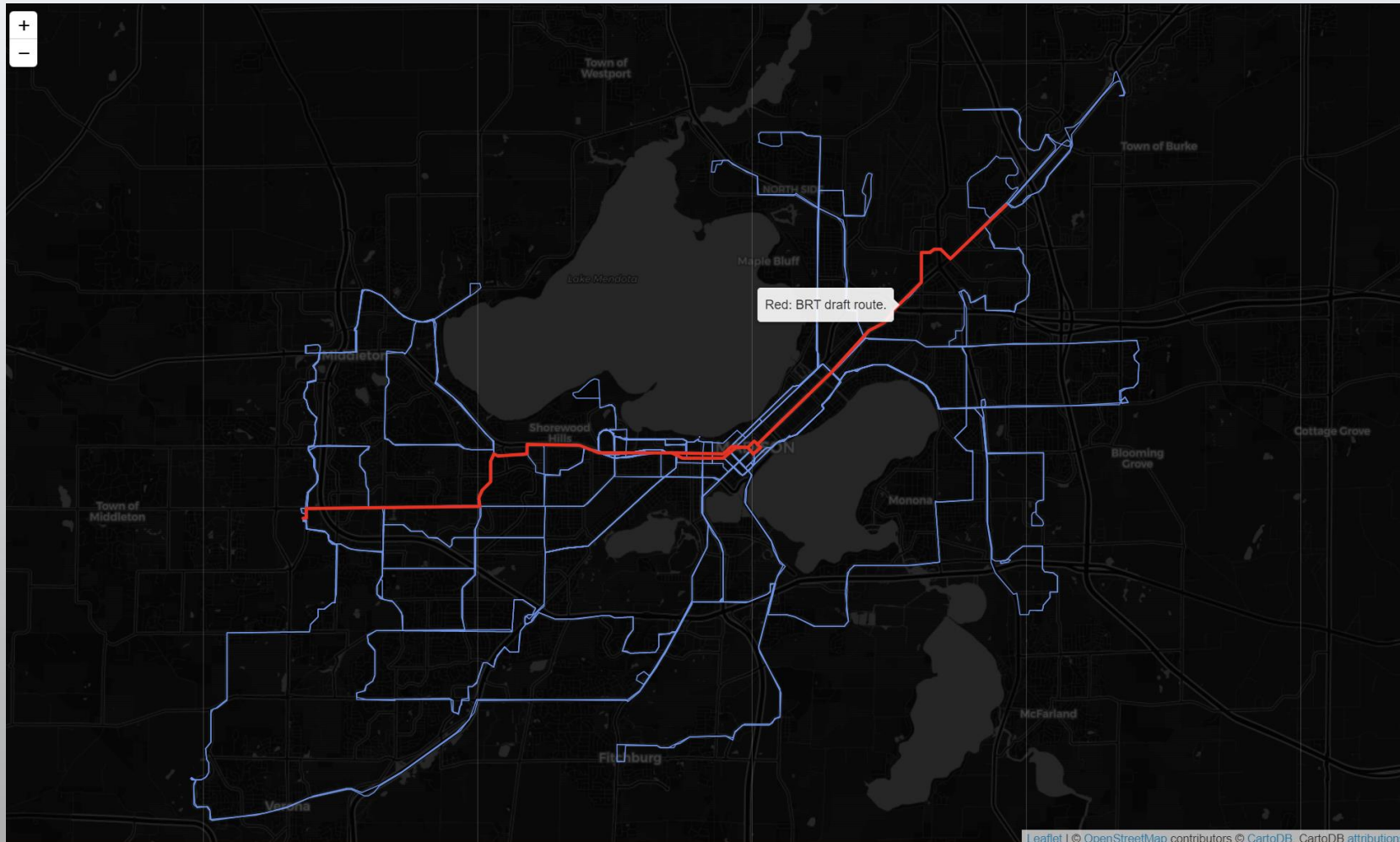
- Findings

As we can see on the result map, the bus stops on the far west side, the far southwest side, the far northwest side, and some around Capitol Square are only effective on weekdays. These bus stops are probably very important for people who use metro transit to work

- Conclusion

From this ridership data, we can learn that most of the bus stops are not used very effectively

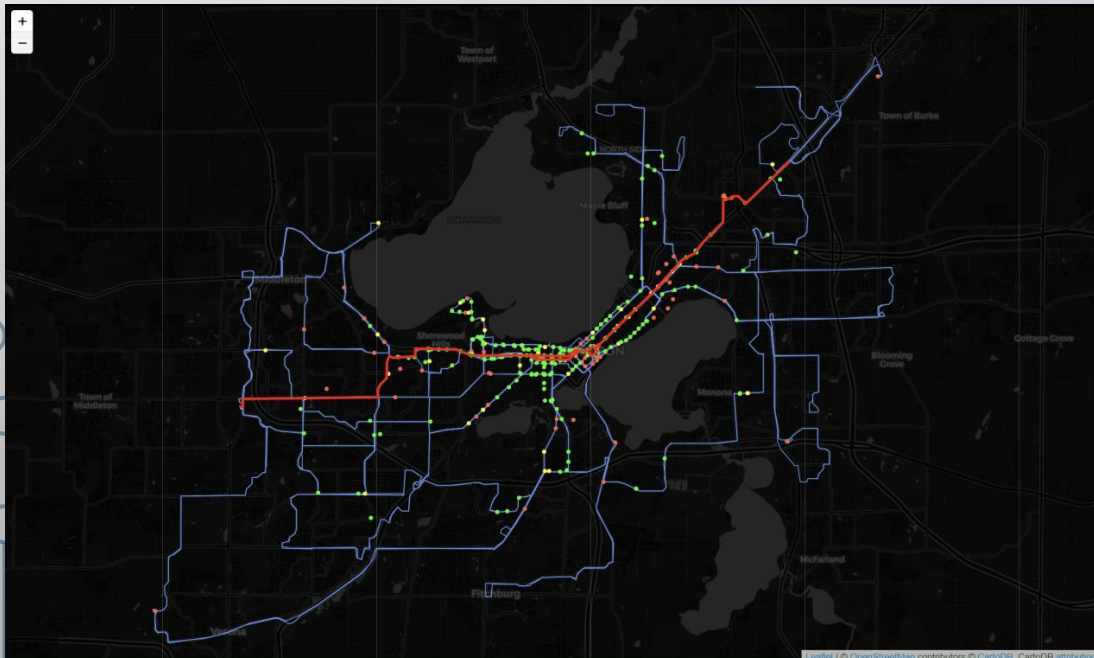
Proposed Metro Transit Network



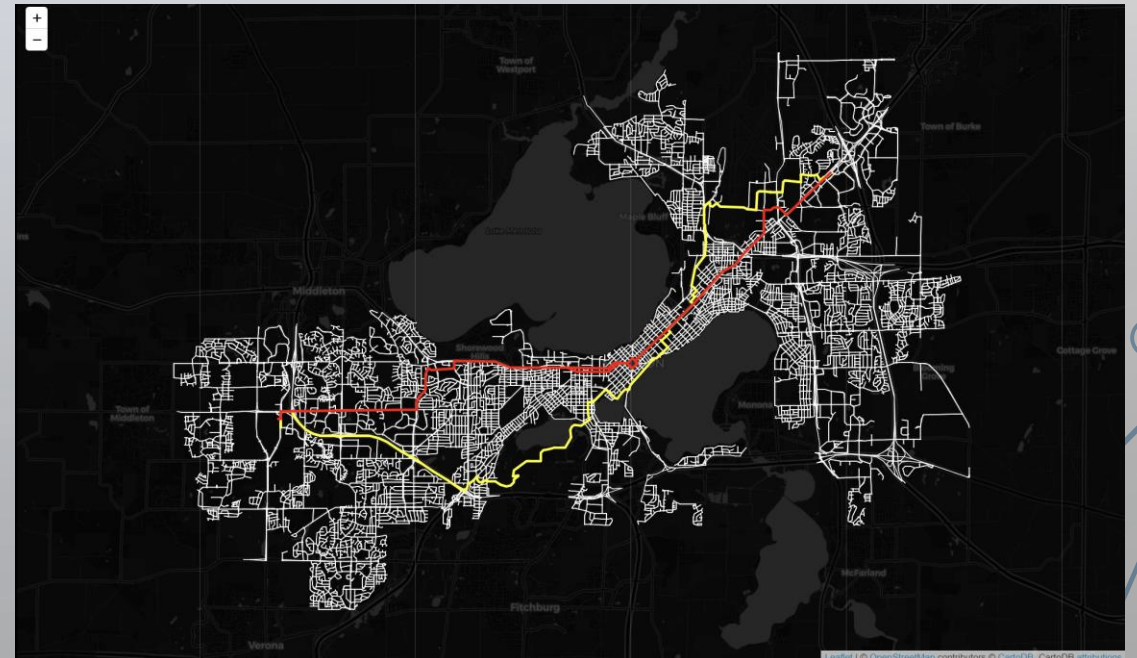
Comparison – Shortest Path vs BRT draft route

Through comparison, the BRT route goes along most of the effective bus stops instead of just a very straightforward shortest path to go into downtown Madison

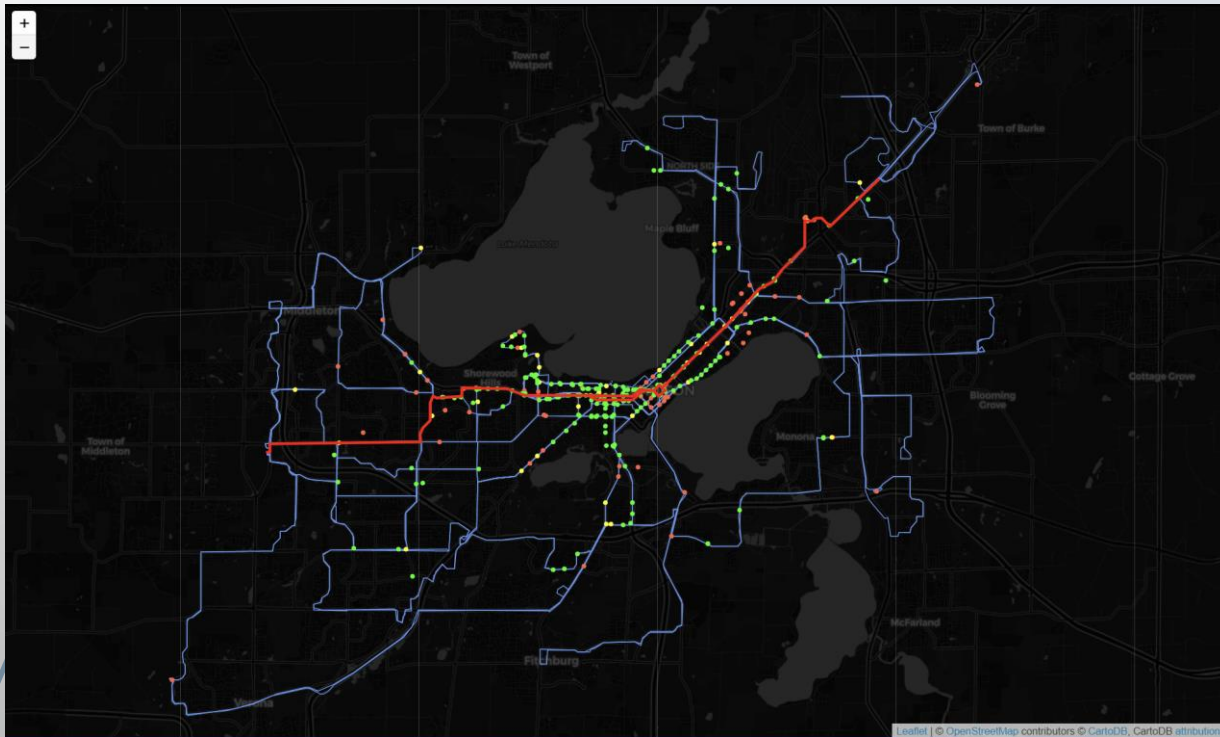
Proposed BRT Route



The Shortest Path



Proposed Metro Transit Network— Findings & Conclusion



For the new BRT design, we have confirmed that the **BRT route is designed based on the ridership** for serving as many people as possible instead of just a direct route into downtown Madison. Thus, the proposed BRT route looks reasonable.

Main Concern for New Transit Network

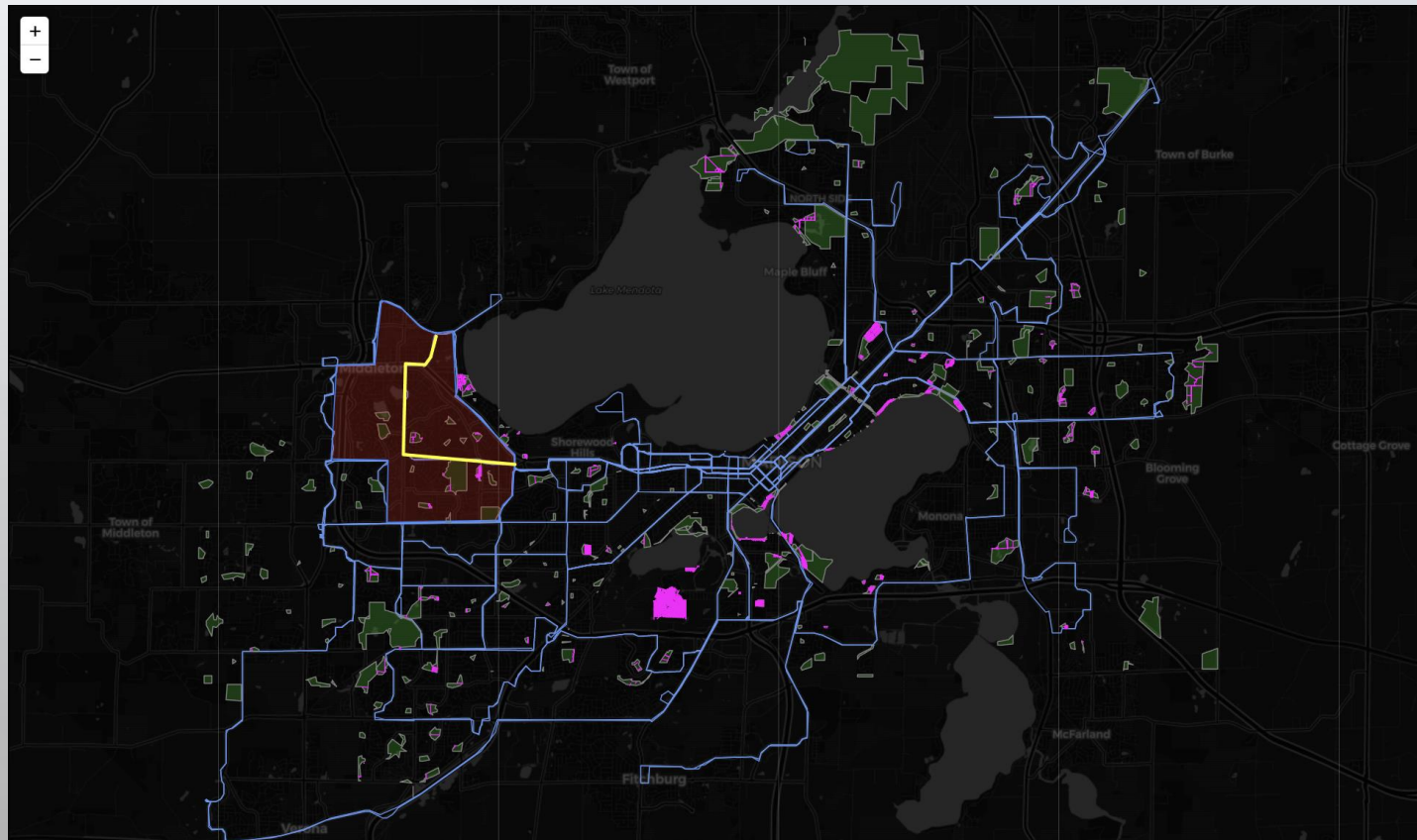


Community concerns mentioned in the meeting:

- The new design is inconvenient for people to transfer from their car
- Residents complain the new network brings negative impacts on them because the new network removes the bus stops near their houses
- Proposed bus route detour causes inefficient for transfer

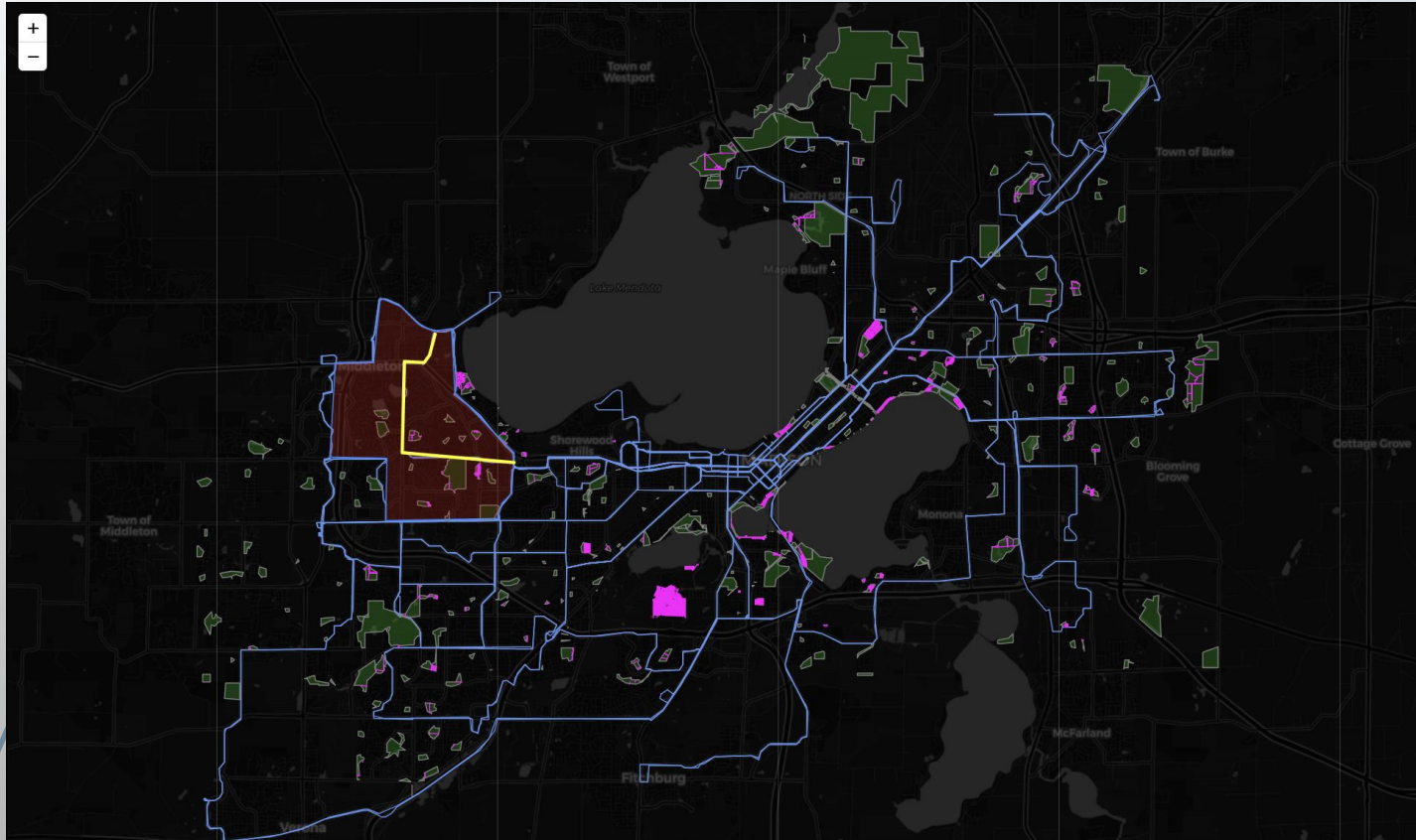
Main Concern for New Transit Network

Park and transit in the park on the west side of Madison (the red area on the map)



The attendees expressed they would transit to bus into downtown Madison after parking their cars in parks

Main Concern for New Transit Network



In this map:

- The red zone is the area that has issue
- The yellow route did not exist in the meeting
- The pinks are the platted lots, which are mostly free parking lots

Main Concern for New Transit Network – Findings & Conclusion

- Findings

The yellow route was added after the meeting

- Conclusion

Many parking lots in parks inside and near the red area, indicating that the comment from attendees is reasonable

The metro transit seems to add the new yellow route into their new metro transit network in the future based on the feedback from the community

Summary

- Redesigning the metro transit system is reasonable because **the percentage of effective bus stops is low**
- Some of the bus stops may be important on weekdays because they may be very important for people who use metro transit to work. Thus, **some of those areas may need to be treated as different cases**. For example, some of the bus routes may only be available on weekdays
- For the new BRT design, we have confirmed that the BRT route is designed based on the ridership for serving as many people as possible instead of just a very direct route into downtown Madison. Thus, the proposed **BRT route** looks **reasonable** as well
- For the proposed network issue on the westside of Madison, near Middleton, we can see that a new route that did not show up in the meeting of April 14 has been added in this draft route file. This new route seems to effectively deal with the west service desert issue. This also means that **the comments and feedback from the community are really being taken into consideration** instead of being ignored. Therefore, I think the metro transit so far is doing a great job for this project

Acknowledgement & References

- Thanks to Michael Smith (Map & Layout Designer) from Metro Transit providing draft network shapefiles.
- Transit Network Redesign
<https://www.cityofmadison.com/metro/routes-schedules/transit-network-redesign>
- Community Engagement (Previous Network Redesign Meetings)
<https://www.cityofmadison.com/metro/routes-schedules/transit-network-redesign/community-engagement>