

## Background

For Winston-Salem residents without the means or ability to drive, the bus system plays a critical role in determining their ability to reach jobs, education, medical care, child care, public benefits, and community activities. The Business 40 infrastructure improvement project presents an opportunity to consider the mobility of all Winston-Salem residents and to focus on how the bus system can be used to advance health equity in our community.

- The NC DOT has designated funds to expand bus service during the Business 40 closure.
  - Both the Piedmont Authority for Regional Transit (PART) and Winston-Salem Transit Authority (WSTA) will receive funds to increase bus services to mitigate the impact of the Business 40 closure on local transportation and traffic.
  - WSTA will receive more than \$7 million in grant funds to expand bus services.
  - The Business 40 closure presents an opportunity to conduct a “natural experiment” to determine the impact of such improvements on the ability to access health resources (Downtown Health Plaza and Novant Health).
- The analysis in Table 1 reflects the current total amount of time it takes citizens from each ward (Map) to reach key healthcare access locations, prior to any increase in transit services.
  - Current time spent on the bus ranges from 27 to 83 minutes, with an average of 54 minutes.
  - Current time spent walking to, waiting for, and riding on public transit ranges from 54 to 166 minutes, with an average of 108 minutes **each way**.

Winston-Salem Points of Interest Examine  
Key Destinations and Starting Points by Ward



Ward Shape File at <http://www.cityofws.org/Departments/Planning/Publications-and-Maps/GIS>

These data are a baseline from which to measure how improvements in bus service impact the amount of time residents spend traveling to health services.

## Method

Our analysis utilizes the Google Transit API (Application Programming Interface) to calculate optimum transit duration from multiple locations in each ward to the major health assets in the community. <sup>1</sup>(Note: Novant Medical Center and Wake Forest Baptist Medical Center are along the same bus routes and are separated by +/- 5 minutes on the bus.)

The API allows for calculation of additional details about the trip including:

- Average Duration in Transit – Time spent in transit.
- Wait + Travel Time – This includes the time in transit as well as the time spent waiting for transit to arrive. (API calculations do not include time spent waiting for the trip to start.)
- Average Time Spent Walking – This is the Google calculated time spent walking to bus stop.
- Average Distance Walked – This is the Google calculated distance walked in order to walk to bus stops and make transfers to reach the final destination.

<sup>1</sup> WSTA has provided Google bus schedule and route information for display on Google Maps. The Google Transit API makes this data available for querying based on specific start times, start locations, and destinations. The addresses utilized for this analysis are available at [http://michaeldewittjr.com/bus\\_analysis/](http://michaeldewittjr.com/bus_analysis/)

Analysis of the Winston-Salem Public Transit System  
Michael DeWitt, Phillip Summers, Jeff Bloomfield, Keena Moore, Megan Irby  
9/17/18

Table 1: Travel Details From Each Ward On Weekdays

Ward	Destination	Avg Duration In Transit (min)	Wait Time + Travel Time (min)	Avg Time Spent Walking (min)	Avg Distance Walked (km)
East	Downtown Health Plaza	26.7	53.5	13.8	1.1
	Novant	60.8	121.6	12.8	1.0
North	Downtown Health Plaza	45.6	91.1	16.5	1.3
	Novant	55.1	110.2	11.4	0.9
Northeast	Downtown Health Plaza	39.0	78.0	16.6	1.3
	Novant	71.5	143.0	15.9	1.2
South	Downtown Health Plaza	70.1	140.2	27.2	2.1
	Novant	54.0	108.0	18.3	1.4
Southeast	Downtown Health Plaza	47.2	94.4	18.9	1.5
	Novant	82.9	165.7	17.9	1.4
Southwest	Downtown Health Plaza	59.1	118.2	26.5	2.1
	Novant	27.6	55.3	27.6	2.2
West	Downtown Health Plaza	71.9	143.9	31.0	2.4
	Novant	45.1	90.3	25.6	2.0
Average Value		54.0	108.1	20.0	1.6

## Conclusions

Economic mobility in Winston-Salem is a pressing concern. For those without the means or ability to access private transportation, it takes a disproportionately greater amount of time to reach important health care assets. The Business 40 closure affords an opportunity to consider how the bus system influences residents' ability to access to health services, and how improvements to bus services may enhance health care access and utilization. This brief analysis is limited to data regarding health care access, though Google API can be broadly used to document transportation equity within our community. Further critical thought about the impact of NC DOT Business 40 closure mitigation funds should be ongoing. We anticipate the expanded bus services will support a more equitable and just public transportation system.

## Recommendations

- Support expansion of Winston-Salem Transit Authority services.
- Examine the critical role of bus services as it pertains to economic mobility in our community.
- Sustain bus service afforded by NC DOT Business 40 closure mitigation funding.