

TO: Drew Beck, Planning & Scheduling Manager  
FROM: Kate Christopherson, Transit Planner  
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SUBJECT: Average Speed Comparison along Johnson/Gorham Corridor in Winter 2014 and 2015

As recommended in the 2013 – 2017 Transit Development Plan for the Madison Urban Area, as approved by the Transit and Parking Commission (TPC), Metro consolidated bus stops along Gorham Street by removing bus stops at Few and Brearly Streets for the August 2014 pick. On November 14, 2014, Johnson Street reconstruction finished, and the street was reopened to the public with the same consolidated bus stops as Gorham. These consolidations were done to reduce ride times while maintaining an acceptable level of customer convenience.

In order to see if the bus stop consolidation did reduce ride times, Metro’s planning and scheduling department analyzed average vehicle speeds through playback data from the second Tuesday, Wednesday, and Thursday of December in 2013 and 2014 and the fourth Tuesday, Wednesday, and Thursday of January in 2014 and 2015 during peak travel times<sup>1</sup>. First, vehicle speed per trip is determined for each of the six days by dividing the difference in segment<sup>2</sup> distance by the difference in travel time. Trips from routes 2, 5, 10, and 28 are analyzed. Second, Metro calculates the average trip-level speed for the six days per route. In order to see rush hour’s effects, Metro took the average trip-level speed per route and averaged those for different half-hour time periods. In other words, Metro found the average travel speed in the corridor for specific time periods. These average travel speeds are then translated into minutes so that time savings can be seen. Table 1 summarizes the results from Gorham Street.

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<sup>1</sup> Peak travel times are defined as 7:00 a.m. to 9:00 a.m. for morning peak and 4:00 p.m. to 6:00 p.m. for afternoon peak. Morning peak is used for westbound routes using Gorham Street, and afternoon peak is used for eastbound routes using Johnson Street. This is done to reflect peak travel directions.

<sup>2</sup> Segments analyzed are between Hancock Street and Baldwin Street on either Gorham or Johnson Streets. The segments are both about 1 mile long.

**Table 1 –Gorham Street Segment Average Speed Comparison by Time Period**

Time Period	2013/2014 Average	2014/2015 Average	Segment Difference <sup>3</sup>
	Segment Speed <sup>3</sup>	Segment Speed <sup>3</sup>	
7:00 – 7:30 am	12.2	11.9	-0.2
7:31 – 8:00 am	10.1	10.7	+0.7
8:01 – 8:30 am	10.7	12.5	+1.7
8:31 – 9:00 am	11.4	12.1	+0.8
<b>Average (for all trips)</b>	10.5	11.4	+0.9

As seen in Table 1, the average vehicle using the Gorham Street segment during the three December 2014 days and the three January 2015 days gained speed except those traveling during the 7:00 – 7:30 a.m. time period. That period saw a slight decrease in speed for the six days analyzed. The 8:01 – 8:30 a.m. period saw the largest speed increase. Overall, the average speed among all routes and trips along the Gorham Street segment for these six days increased by 0.9 miles per hour. *This translates into an approximate half minute time savings.*

**Table 2 –Johnson Street Segment Average Speed Comparison by Time Period**

Time Period	2013/2014 Average	2014/2015 Average	Segment Difference <sup>3</sup>
	Segment Speed <sup>3</sup>	Segment Speed <sup>3</sup>	
4:00 – 4:30 p.m.	10.9	13.6	+2.7
4:31 – 5:00 p.m.	12.2	12.7	+0.5
5:01 – 5:30 p.m.	10.9	14.3	+3.4
5:31 – 6:00 p.m.	13.7	15.7	+2.0
<b>Average (for all trips)</b>	11.6	14.4	+2.8

Like Gorham, Johnson Street also saw increased average speeds (see Table 2). All time periods during these six days experienced an increase, with the 5:01 – 5:30 p.m. period seeing the largest increase. The prior time period saw the smallest increase but an increase nonetheless. Overall, the average speed among all routes and trips along the Johnson Street segment for these six days increased by 2.8 miles per hour. *This translates into a one minute time savings.*

<sup>3</sup> All reported speeds are in miles per hour (mph)

In summary, the bus stop consolidation plan in the Johnson/Gorham corridor did improve average vehicle speeds but not as significantly as we had hoped. However, it should be noted that we were measuring a very short distance (slightly over a mile), so small factors such as different drivers and comparative loading can have a disproportionate impact on data. Nonetheless, the average time saved going eastbound exceeded a minute (with some trips saving in excess of 2 minutes). Those are huge numbers. For westbound, total average time saved was just under half a minute, but some trips did save a minute or more. Notable in that eastbound/westbound comparison is the fact that Johnson Street was completely reconstructed with bus stops relocated far-side, creating an optimal speed environment for non-BRT transit service. Gorham Street was not similarly improved as bus stops remained near-side and we had to retain one of the bus stops targeted for elimination.

That said, there are benefits beyond an improvement in average speeds as there are fewer bus stops and shelters to maintain and passengers who board and alight east of the segment will perceive the change positively because their bus will make fewer stops and will be moving faster. This is especially important for choice passengers, who often cite speed and frequency as two factors in their transportation mode decision making.