

IMPACT OF CARVER SCHOOL BUS LOT ON PUBLIC TRANSIT RELIABILITY

PREMISE: In addition to localized impacts of noise, air pollution, and proximity to homes, a broader issue concerning the proposed Carver bus lot is adverse impact on the quality of public transit in Rockville and along the MD355 and Veirs Mill Road corridors. Such an impact would run counter to City and County Smart Growth objectives. The significance of this is underscored by the fact that in the section of MD355 between Mannakee Street and North Washington, there are 16 southbound transit buses between 6:30 and 7:30am, a “saturation” frequency of a bus every 4 minutes. That frequency is unmatched anywhere else in the County except near Silver Spring Metro. The routes on 355 operate from 6am to after 10pm, originating in Germantown, Shady Grove Metro or Montgomery College (Rockville), and serve all bus stops as far south as Medical Center, Wheaton and Silver Spring. On-going studies of BRT (bus rapid transit) in the Veirs Mill corridor indicate a need for even higher quality service in the future. Staging 100 school buses at Carver would be a step backward in making public transit more dependable and competitive with auto travel.

SUMMARY: The 355/Mannakee Street intersection is the 2nd busiest transit “chokepoint” in the City of Rockville, exceeded only slightly by 355/Church Street at the Metro Station. Currently, 281 Ride On and Metrobus trips are funneled through the Mannakee intersection during hours when most Carver buses would be leaving/returning to the site (6-9am, 2-5pm). These transit routes serve the College and a large number of rush hour commuters and off-peak workers. The College views Ride On as such an essential service that MC students ride free.

If all 100 Carver buses enter/exit via Mannakee onto Route 355, total bus movements through the intersection would increase to 681, and add 200 to 400 more auto trips from bus employee cars. This would result in frequent delays to Ride On routes 45, 46 and 55, and Metrobus routes Q2 and Q6, especially in the time periods 6:45-7am, 8:45-9am, and 4:30-5pm. These delays would degrade bus service reliability to Town Center, Rockville Metro, and would be felt along the entire length of these routes. Delays enroute would compound at Rockville Metro because bus bays at the station are shared between routes and cannot handle

more than one bus at a time. Buses arriving behind schedule would have to wait before unloading passengers, causing even more delay.

Back-ups at 355/Mannakee would affect both Carver buses and transit buses, and might motivate MCPS to save time by diverting some Carver buses to Nelson and Mannakee Streets to reach schools west of I-270. These streets are residential in nature, lined with 125 homes in the Woodley Gardens and West End communities. The two streets already carry many cars headed for the College, and would also bear the brunt of any Carver bus drivers who might commute to work via I-270 at West Montgomery Avenue.

TRANSIT IMPACT BY TIME PERIODS: The conclusions in this report are based primarily on analysis of existing MCPS a.m. bus schedules, since only morning bus information is available on-line. Mid-morning and afternoon periods have not been evaluated to the same depth, but given mid-day College class change times and the volume of car travel in/out of the College, adverse impacts in mid-morning and afternoon from Carver-related traffic can also be expected (described on pages 5 and 6).

Early morning MCPS bus routes and schedules are structured such that most morning departures from the depots are first to the high schools, then middle schools and then elementary schools. Bus arrivals at high schools are generally 7:25am, middle schools 8:00am, and elementary 8:40/8:50am. Buses do not return to their depots until after completing their morning drop-offs at elementary schools. Most bus drivers then drive home by car and return later for afternoon runs, or those runs are operated by other late-report drivers. The pattern reverses in the afternoon. For this analysis, it was assumed that a.m. departures from Carver would be 15 minutes before the first pick-up times.

The table on the next page lists first pick-ups by time period for 70 MCPS bus routes now serving all schools in the Rich. Montgomery/Rockville/Wootton clusters (except 4 R.M. magnet buses and Rock Terrace buses). These routes, now based at Shady Grove, would most likely be based at Carver for operating efficiency. It is also assumed that due to proximity, the 22 buses for Gaithersburg Cluster routes would also be based at Carver, raising the total to 92 buses. (If more-distant clusters were

based at Carver instead, departure times would be earlier, but so would early-morning bus employee car arrivals and bus engine startups.)

Current times for the first a.m. pickups for these 92 buses are as follows:

First student pick-up times

	R-ville clust.	G-burg clust.	Total
Before 6:45am:	1	4	5
Between 6:45 and 6:59:	13	12	25
“ 7:00 and 7:14	35	6	41
“ 7:15 and 7:29	2		2
“ 7:30 and 7:44	5		5
“ 7:45 and 7:59	10		10
“ 8:00 or later	<u>4</u>	<u> </u>	<u>4</u>
	70	22	92 buses

If each bus leaves Carver 15 minutes before their first pick-up, the 92 buses would exit the Carver lot in the times shown below. Ride On and Metrobuses currently operating on eastbound Mannakee during those times are also shown.

	<u>MCPS buses Leaving Carver Lot</u>	<u>Ride On and Metrobus</u>
Before 6:30am	5	7
Between 6:30 and 6:44*	25	4
“ 6:45 and 6:59*	41	6
“ 7:00 and 7:14*	2	6**
“ 7:15 and 7:29*	5	4
“ 7:30 and 7:44	10	6**
“ 7:45 or later	<u>4</u>	<u>6</u>
	92	39

*Times when SB 355 has “saturation level” transit service.

**includes one college-operated shuttle bus.

The heaviest peak time for Carver buses leaving the site would be 6:45 to 6:59am, a time when six transit buses are also using eastbound Mannakee. The traffic signal is timed to favor 355 traffic, resulting in Mannakee getting a green light only six times in a 15-minute period, with each green phase limited to only 27 seconds. Right-turns-on-red can safely take place from eastbound Mannakee only when northbound left turns have a green arrow.

If the 41 Carver buses leaving between 6:45 and 6:59 were evenly spaced, there would be 7 Carver buses in each of the six green cycles. However, it is more likely that they would exit randomly, such that there could be 10 or 12 Carver buses in some of the cycles. In either case, Carver buses would be a major interference to the six transit buses during this period. Queued-up Carver buses, and normal car traffic, would occupy most of the street from the Carver driveway to 355 and would take up most of the green time, making transit buses wait through another signal phase. Further, some transit trips need to stop on EB Mannakee near the intersection to pick up transfer passengers, which can result in missing the green signal a second time. The same impacts on transit service would occur in the 6:30-6:45am time slot, although to a lesser extent.

ALTERNATIVES: There are four “apparent alternatives” that might help mitigate these morning rush hour conflicts with Ride On and Metrobus, but each has significant drawbacks:

1) The volume of Carver buses approaching 355 between 6:45 and 6:59 could be reduced from 41 to 26 if the 15 Wootton Cluster buses were diverted to Mannakee Street or Nelson Street instead of 355. However, a decision to do so would no doubt lead to directing all other Wootton buses (including 10 between 6:30 and 6:45) to use those streets, an action that would be vigorously opposed by the 125 households living on those streets. Not only would this be objectionable in the early a.m. (6:30-7), but Wootton buses would most likely follow the same streets when returning to Carver from both their a.m. and p.m. runs. This would be especially problematic in the p.m., when children cross Mannakee while walking home from Beall Elementary School. It is doubtful whether there are any residential streets in the County where this many school buses (25) pass as many houses----4 times a day.

2) Another alternative would be for the State DOT to allow MCPS to build a right-in/right-out driveway to southbound 355 so that Carver buses headed south would not have to go through the 355/Mannakee intersection when leaving the lot. The 22 buses for Gaithersburg Cluster, and 5 R.M. cluster buses whose first pick-ups are north of Gude Drive, would not use this driveway, but the others might get a faster exit out of the lot depending if there are gaps in on-coming 355 traffic that has passed through the green

light at Mannakee. However, the driveway would likely be within a few hundred feet from the Frederick Avenue signal, and might conflict with transit buses at the bus stop located there that is used by College Square and Lincoln Park (via the Metro pedestrian bridge). In any case, the number of Carver buses on southbound 355, where transit buses now operate at “saturation” spacing” every 4 minutes, would be no different under either scenario. Also, under this scenario, morning and afternoon returns to Carver would still have to pass through 355/Mannakee via the left turn lane signal.

3) To compensate for slower and less dependable bus service caused by the operation of Carver buses, the County and Metro could buy more buses and run them more frequently so that shorter passenger wait times between buses would partially offset the slower speed. No attempt is made in this analysis to determine the (substantial) capital and operating costs of such an alternative (plus costs to add bus bay capacity at Metro stations), and in any case this option would not necessarily solve schedule adherence problems.

4) The capacity of 355/Mannakee to handle more buses could be improved by widening 355 to add a second northbound left turn lane and widen eastbound Mannakee to add a middle lane for optional left and right turns. (Widening would have to be along the west side of the road, removing 25 parking spaces at the M.C. headquarters building.) The net capacity improvement would depend on whether more signal time would need to be available for pedestrians crossing the widened roadways. Also, the benefit of widening would still not address the ability to handle Carver buses south of Mannakee where transit frequency is currently every 4 minutes. However, the timetable for any widening on this part of Rt. 355 is likely many years away.

Mid-morning With elementary school drop-offs occurring between 8:25 and 8:45, most returning buses would probably arrive at Carver between 8:40 and 9am. [Some buses would go instead to the Shady Grove Ride On base for refueling, returning to Carver later.] Mid-morning is a heavy time for Montgomery College student arrivals by car, and with most of the R.M./Rockville/Wootton cluster buses returning from the south, they would congest the 355/Mannakee northbound left turn lane. There would be about 7, 8, or more Carver buses trying to make a left turn in every signal cycle, delaying northbound Ride On and Metrobuses that

make this turn during the same cycles (7 buses in 15 minutes). The left turn green arrow at this intersection is limited to 32 seconds at this time of day, and because of the signal cycle length, the opportunity to turn left on the green arrow occurs only 6 times in a 15-minute period. Buses can turn left after the arrow phase is finished, but they have to yield to on-coming southbound traffic and pedestrians in the crosswalk.

Early afternoon Under the assumed scenario, all 92 MCPS buses would leave the Carver site by about 2:00pm, in time to be fully positioned at the high schools before their 2:30 release. Although the volume of buses leaving Carver would be concentrated in a relatively short period of time, the number of transit buses in service are not as great as in commuter rush hours. Some transit buses might experience delay, but the greatest impact from 2:00pm Carver departures would probably be to cars leaving Montgomery College.

Late afternoon MCPS bus times to Carver in late afternoon would depend on when returning buses drop off their last elementary school student (release times vary between 3:25 and 3:50). Most of the 92 buses assumed in this analysis would probably arrive back at Carver between 4:30 and 5:00, presumably all but 22 returning from the south. During this span of time there are 9 transit buses making northbound left turns into Mannakee. Delays to these 9 buses would be severe because of up to 70 Carver buses making the left turn during those 30 minutes (each left turn green cycle would have to handle 7 to 8 buses total).

April 4, 2016

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