Rappahannock-Rapidan Regional Commission
2012 Travel Time Survey

Rappahannock Rapidan
Regional Commission
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Introduction

Travel time, or the time required to traverse a route between any two points, is a fundamental measure in transportation. Elements of a travel time study--operating speed, elapsed travel time and duration and frequency of delays are all performance measures that convey a broader picture of how traffic moves. Beginning with the 2007 study and continuing in through this 2012 program, the Rappahannock Rapidan Commission (RRRC) has conducted the travel time process for the Planning District Nine (Culpeper, Fauquier, Madison, Orange, Rappahannock counties) region.

The primary utility of the travel time study is to compare over time how traffic flows on a corridor. RRRC intends to perform these studies annually, choosing different corridors to review under the direction of the RRRC Rural Transportation Technical Committee (RTC) and RRRC staff. Therefore, data collected during the initial corridor analyses will serve as the base line for the future measurements and can be used to compare traffic flow on specific corridors in the Rappahannock-Rapidan region over time.

RRRC will use the travel time studies, in conjunction with other data such as traffic counts and level of service information, to create an overall Congestion Management System for the PD9 region. Congestion Management Systems are mandated by federal law for metropolitan planning areas and are a useful tool to evaluate and monitor traffic congestion. While there is no MPO in the Rappahannock-Rapidan region, the Travel Time Study data can be used to assist in regional and local transportation and land use planning efforts.

Methodology

The “test vehicle” technique was used during this study. This method consists of a vehicle specifically dispatched to drive with the traffic stream for the express purpose of data collection.

In 2011 and again this year, RRRC staff utilized global positioning system (GPS) and geographic information system (GIS) technologies. The GPS/GIS data gathering and analysis technique efficiently records data for spatial analysis of travel speeds of the selected corridors and allows for an examination of the corridor level of service and congestion, not only from the start to end of the selected corridor, but for specific locations along the route.

The GPS units are used to map and track speeds along identified corridors. Data collection involves a vehicle equipped with a GPS receiver. Vehicle drivers drive with the flow of traffic while not exceeding the posted speed. During each travel time run, the GPS unit collects geographic position, time, and speed data once per second and this data is then fed into a GIS system for analysis. The GIS software is used to conduct data analysis and provide visual displays of the study results. The results show operating speeds and travel times for all of the roadways analyzed in the survey.

Two data collection runs were made in each direction during the morning (7 to 9 a.m.) and afternoon (4 to 6 p.m.) peak hours for each segment. As much as possible, the test car was driven at the legally posted speed limit and, on segments of four-lane divided highways, in the right lane.

Study Corridor Segments

The 2012 RRRC travel time study measured speed and delay along corridors in and around four of the region's towns – Route 29 from Route 230 to the northern intersection with Route 29 Business near the Town of Madison, including both the business and bypass routes; Route 15 within the town limits of the Town of Gordonsville, including the Gordonsville Truck Route along High Street and the business route along Main Street; Route 15 within the town limits of the Town of Orange; and a loop route in and around the Town of Warrenton, beginning and ending at the southern intersection of Route 15/29 Business (East Shirley Avenue) and Route 15/17/29 Bypass. This final route included the following roads – East Shirley Avenue, Broadview Avenue, East Lee Highway and the Eastern Bypass. The segment lengths correspond with sections delineated by the VDOT Traffic Engineering Division to perform their annual average daily traffic volume estimates.

The segments measured were:

Corridor A: Route 29 Business (Madison)	3.90 miles*
Corridor A: Route 29 Bypass (Madison)	2.02 miles
Corridor B: Route 15 (Gordonsville)	1.30 miles
Corridor B: Gordonsville Truck Route	1.45 miles
Corridor C: Route 15 (Orange)	3.53. miles
Corridor D: Warrenton Area	7.51 miles/7.88 miles#

*The Route 29 Business corridor in Madison included collection from Route 230 to the business route/bypass division. The Route 29 Bypass corridor included only the bypass section north of the business/bypass division.
#The Warrenton area corridor mileage differed by direction traveled, due to entrance/exit ramps to the northeast of the town limits.

Results

The results of the travel time analysis are summarized on the following pages in figures 2 through 13 and tables 1 through 4.

In the tables, stopped time refers to periods when the test vehicle traveled below 5 miles per hour. Congested time refers to periods when the test vehicle traveled below 20 miles per hour.

In Corridor A, total stopped time was less than two minutes in each of the eight runs on both the business and bypass routes, with stoppages occurring at traffic signals and at the crossover to Route 29 Business. During the AM runs on the business route, there was a short school zone that is noted on figure 2.

In Corridor B, total stopped time was less than two minutes in seven of the eight runs. During one of the PM runs on the Truck Route, there was a backup at the Gordonsville Traffic Circle that stretched to between High Street and Church Street, resulting in over 4 minutes of 'congested time' at that location. The second PM run on the Truck Route had the second-longest congested time of the runs in this corridor.

In Corridor C, each trip northbound and southbound resulted in at least 2 periods of stopped time and five of the eight trips had more than 2 minutes of congested time. The second northbound PM run had significantly larger delays at Route 20/Berry Hill Road than the other runs.

In Corridor D, most stoppages occurred as a result of traffic signals. On each run, the measured congested time was close to 1 minute with no measured relativity versus stopped time.

TABLE 1: CORRIDOR A DATA

Route & Run	Distance	Avg Speed	Travel Time (h:mm:ss)	# Stops	Stopped Time (h:mm:ss)	Congested Time (h:mm:ss)
Business North AM Run 1	3.9	29.77	0:07:53	4	0:00:54	0:01:23
Business North AM Run 2	3.9	32.72	0:07:10	1	0:00:19	0:00:24
Business North PM Run 1	3.9	30.55	0:07:42	2	0:01:25	0:01:37
Business North PM Run 2	3.9	30.67	0:07:39	2	0:01:23	0:01:34
Business South AM Run 1	3.9	34.41	0:06:48	1	0:00:09	0:00:28
Business South AM Run 2	3.9	37.77	0:06:11	0	0:00:00	0:00:00
Business South PM Run 1	3.9	37.34	0:06:15	0	0:00:00	0:00:02
Business South PM Run 2	3.9	34.56	0:06:46	1	0:00:12	0:00:22
Bypass North AM Run 1	2.02	55.49	0:02:08	0	0:00:00	0:00:00
Bypass North AM Run 2	2.02	46.51	0:02:35	1	0:00:07	0:00:17
Bypass North PM Run 1	2.02	45.99	0:02:34	1	0:00:18	0:00:24
Bypass North PM Run 2	2.02	42.45	0:02:46	1	0:00:23	0:00:29
Bypass South AM Run 1	2.02	55.09	0:02:12	0	0:00:00	0:00:00
Bypass South AM Run 2	2.02	55.77	0:02:08	0	0:00:00	0:00:00
Bypass South PM Run 1	2.02	42.67	0:02:46	1	0:00:13	0:00:28
Bypass South PM Run 2	2.02	45.76	0:02:34	0	0:00:00	0:00:01

TABLE 2: CORRIDOR B DATA

Route & Run	Distance	Avg Speed	Travel Time (h:mm:ss)	# Stops	Stopped Time (h:mm:ss)	Congested Time (h:mm:ss)
Business North AM Run 1	1.3	25.66	0:02:54	1	0:00:03	0:00:10
Business North AM Run 2	1.3	26.07	0:02:54	1	0:00:06	0:00:13
Business North PM Run 1	1.3	25.03	0:03:01	1	0:00:07	0:00:18
Business North PM Run 2	1.3	26.32	0:02:51	0	0:00:00	0:00:14
Business South AM Run 1	1.3	24.94	0:03:05	1	0:00:02	0:00:22
Business South AM Run 2	1.3	22.22	0:03:26	2	0:00:16	0:00:51
Business South PM Run 1	1.3	24.23	0:03:10	1	0:00:05	0:00:28
Business South PM Run 2	1.3	22.88	0:03:20	1	0:00:07	0:00:49
Truck Route North AM Run 1	1.45	20.93	0:04:06	5	0:00:26	0:01:36
Truck Route North AM Run 2	1.45	23.87	0:03:34	2	0:00:17	0:00:50
Truck Route North PM Run 1	1.45	11.97	0:07:10	12	0:03:36	0:04:48
Truck Route North PM Run 2	1.45	20.43	0:04:10	6	0:00:46	0:01:36
Truck Route South AM Run 1	1.43	25.25	0:03:21	2	0:00:11	0:00:37
Truck Route South AM Run 2	1.43	24.31	0:03:29	2	0:00:10	0:00:46
Truck Route South PM Run 1	1.43	25.48	0:03:19	2	0:00:04	0:00:36
Truck Route South PM Run 2	1.43	25.48	0:03:19	2	0:00:11	0:00:48

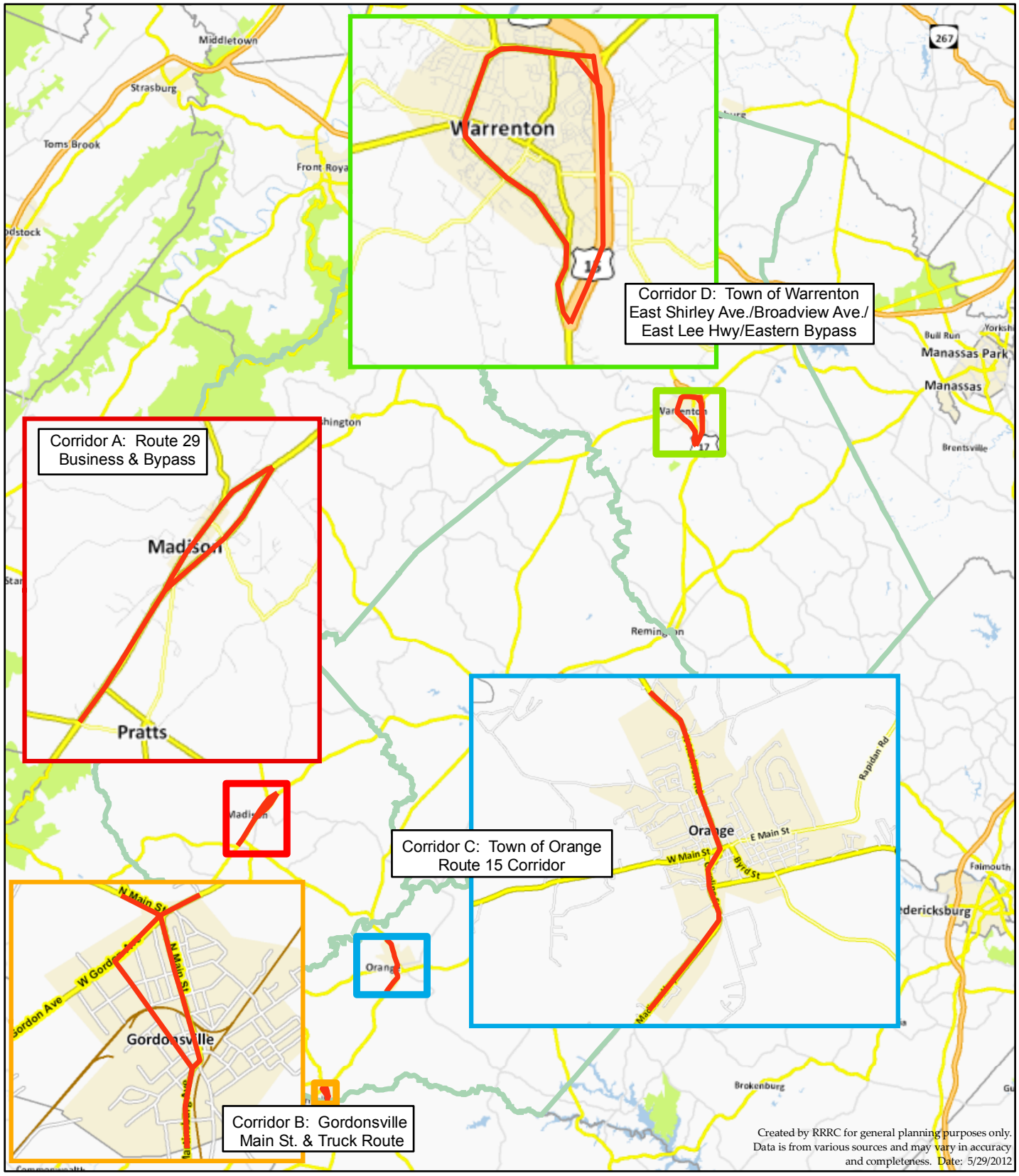
TABLE 3: CORRIDOR C DATA

Route & Run	Distance	Avg Speed	Travel Time (h:mm:ss)	# Stops	Stopped Time (h:mm:ss)	Congested Time (h:mm:ss)
North AM Run 1	3.53	25.34	0:08:26	2	0:01:33	0:02:10
North AM Run 2	3.53	26.51	0:08:05	3	0:00:45	0:02:26
North PM Run 1	3.53	25.56	0:08:23	3	0:00:39	0:02:42
North PM Run 2	3.53	18.72	0:11:23	3	0:04:06	0:05:34
South AM Run 1	3.53	27.56	0:07:45	4	0:00:43	0:01:37
South AM Run 2	3.53	27.92	0:07:38	3	0:00:50	0:01:21
South PM Run 1	3.53	27.57	0:07:46	2	0:00:52	0:01:22
South PM Run 2	3.53	25.53	0:08:19	2	0:01:00	0:02:48

TABLE 4: CORRIDOR D DATA

Route & Run	Distance	Avg Speed	Travel Time (h:mm:ss)	# Stops	Stopped Time (h:mm:ss)	Congested Time (h:mm:ss)
Clockwise AM Run 1	7.51	36.85	0:12:05	5	0:00:56	0:01:52
Clockwise AM Run 2	7.51	28.3	0:15:45	6	0:04:27	0:05:30
Clockwise PM Run 1	7.51	31.06	0:14:22	7	0:02:38	0:03:59
Clockwise PM Run 2	7.51	29.72	0:14:53	5	0:03:08	0:04:07
Counter-Clockwise AM Run 1	7.88	37.86	0:12:36	3	0:01:29	0:01:51
Counter-Clockwise AM Run 2	7.88	32.23	0:14:49	4	0:02:47	0:03:24
Counter-Clockwise PM Run 1	7.88	34.91	0:13:41	5	0:01:03	0:02:23
Counter-Clockwise PM Run 2	7.88	31.93	0:15:03	5	0:02:12	0:03:45

FIGURE 1: 2011 RRRC Travel Time Corridors



2012 Travel Time Corridors

PD9 County Boundary

2012 RRRC Travel Time Study Corridors

Miles

0 10 20 30

N W E S

Rappahannock-Rapidan REGIONAL COMMISSION

FIGURE 2: Corridor B Business Route Northbound Speed Profile

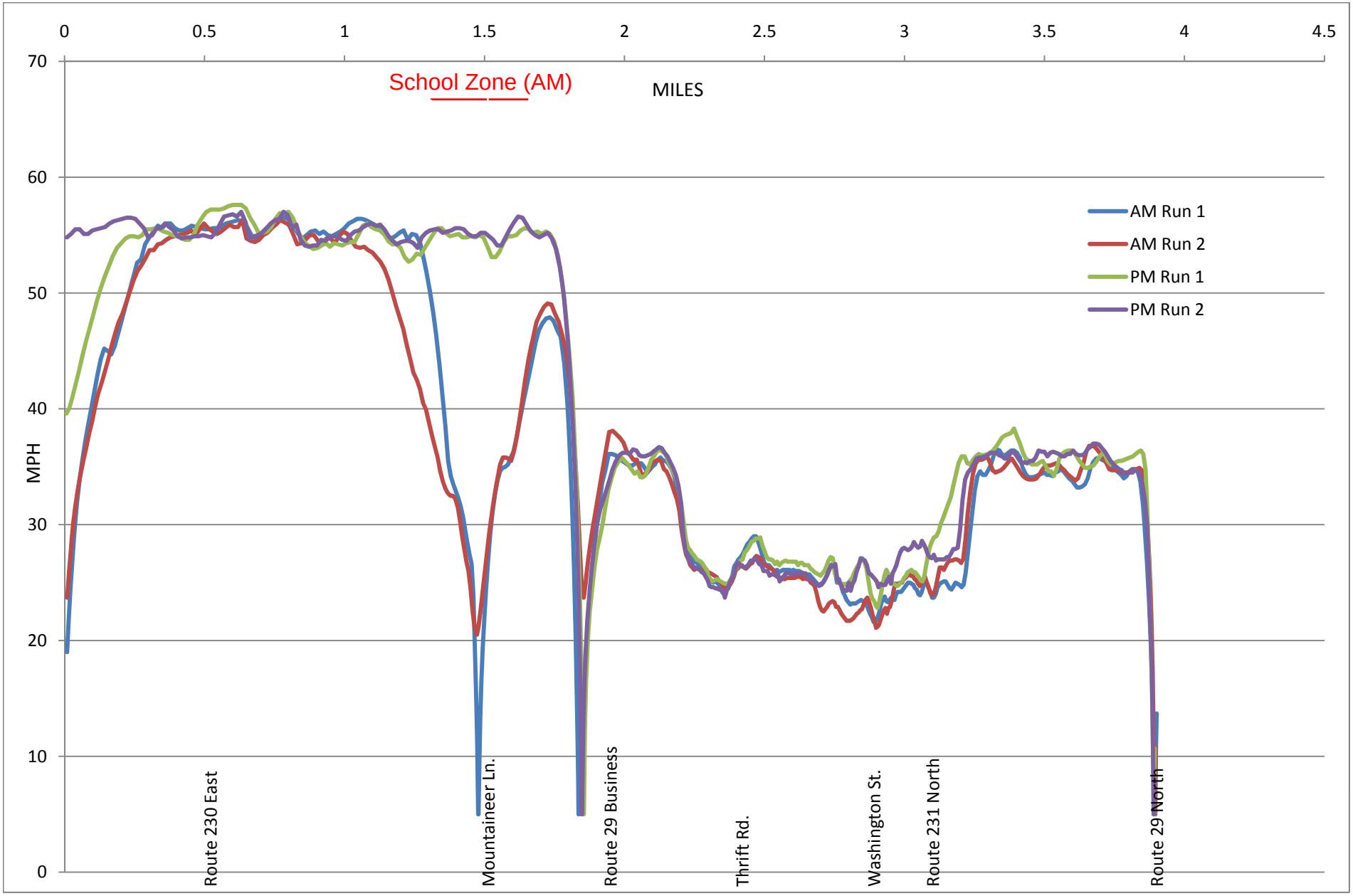


FIGURE 3: Corridor A Business Route Southbound Speed Profile

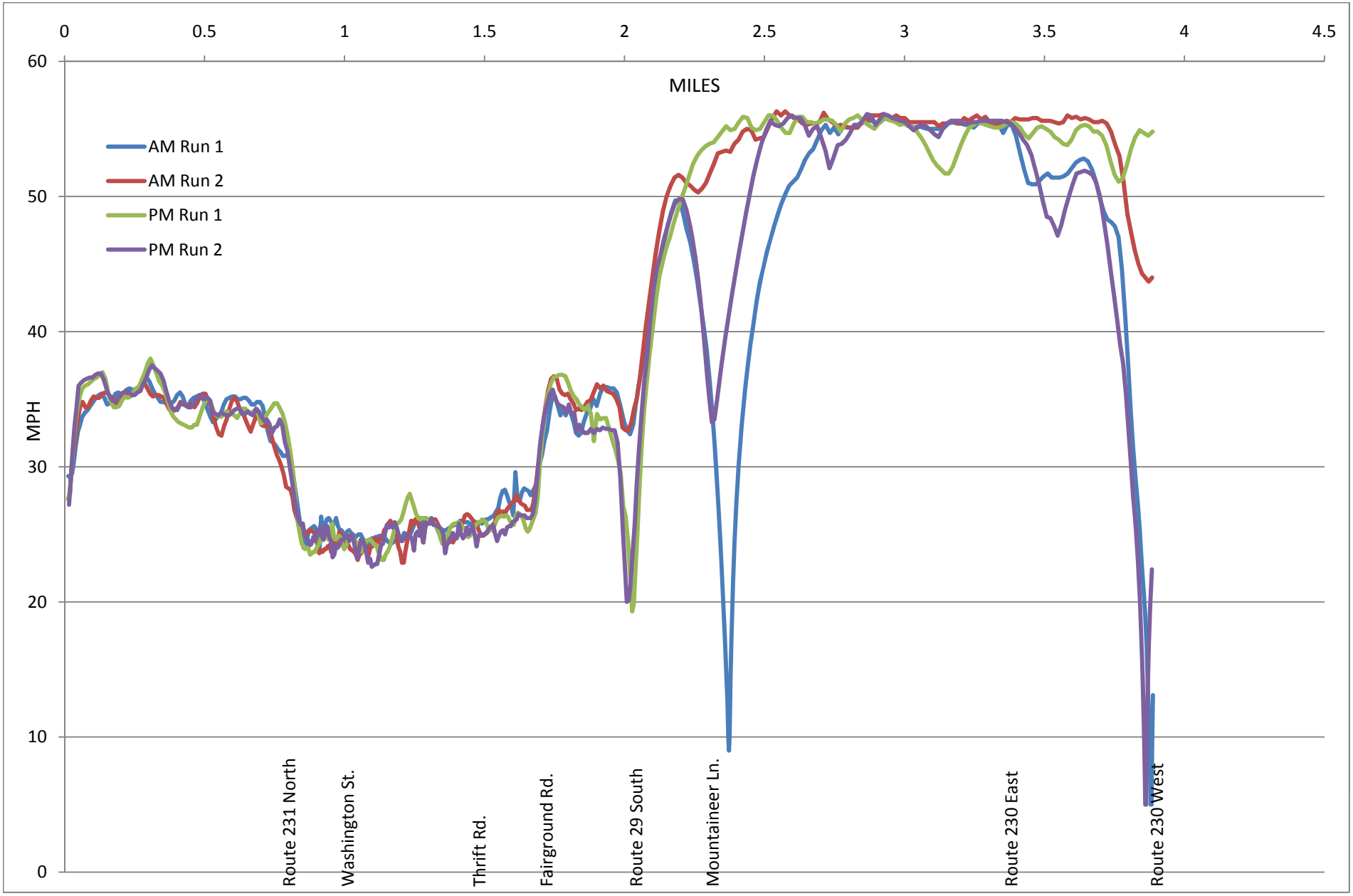


FIGURE 4: Corridor A Bypass Northbound Speed Profile

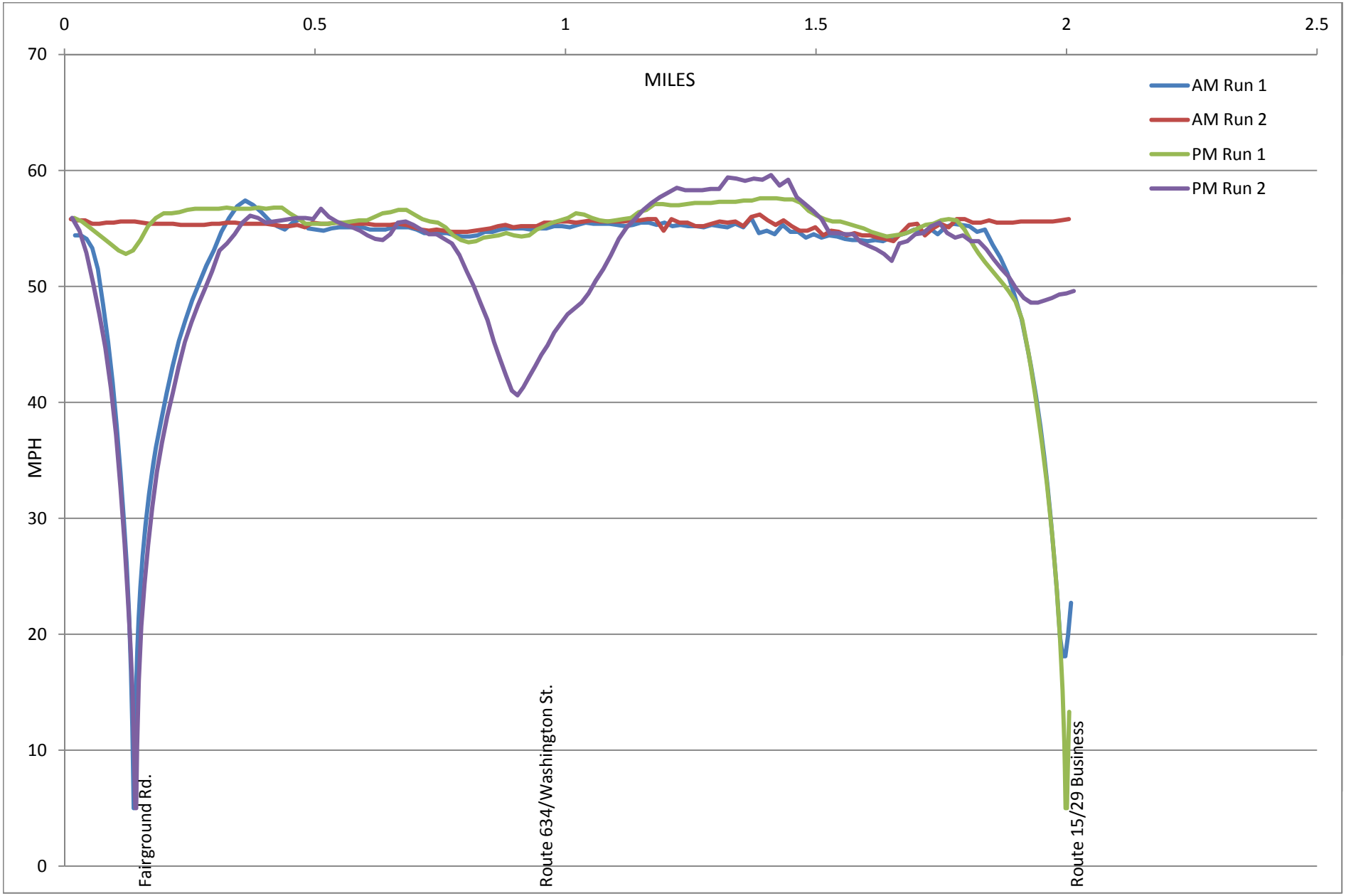


FIGURE 5: Corridor A Bypass Southbound Speed Profile

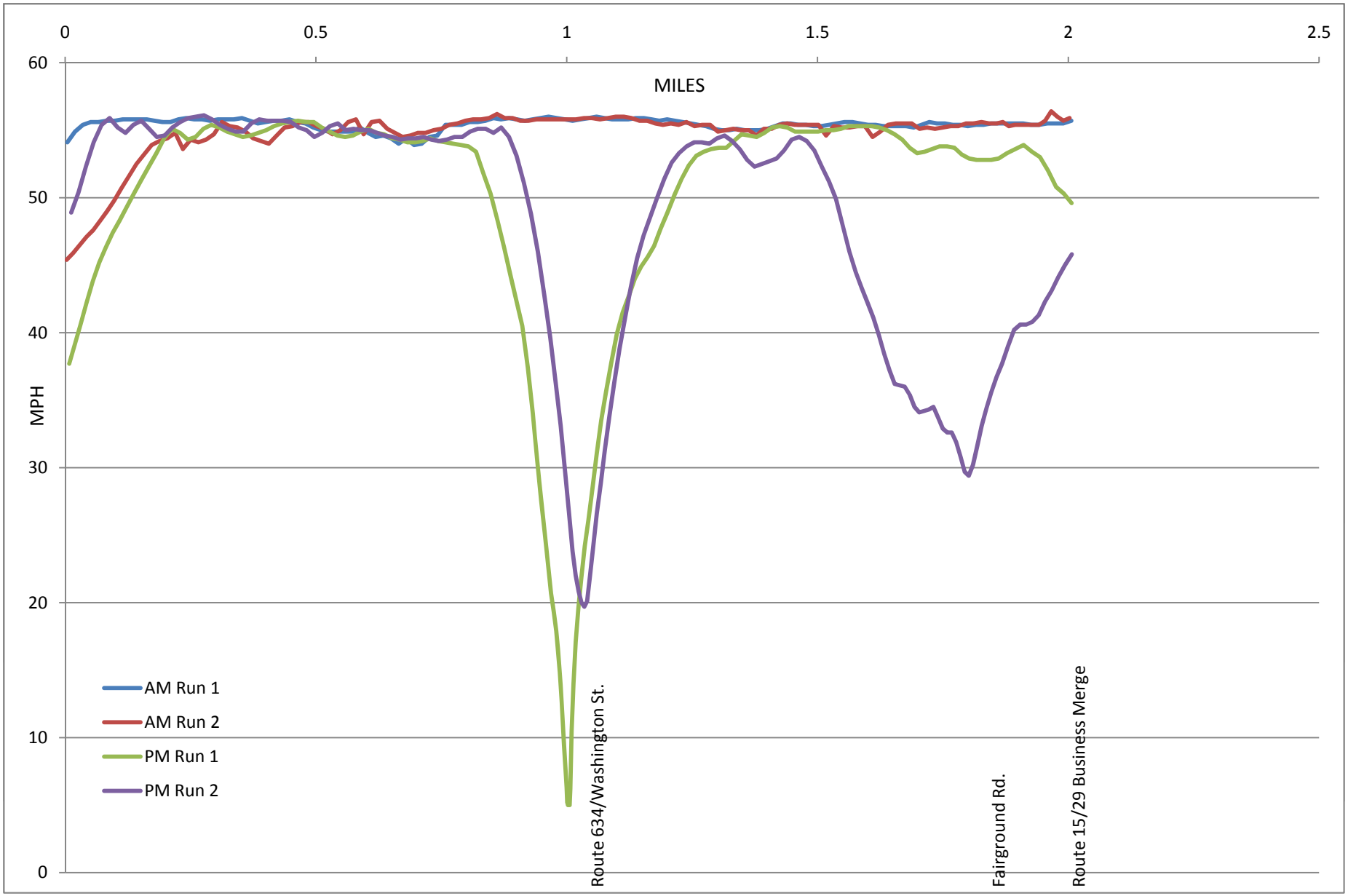


FIGURE 6: Corridor B Truck Route Northbound Speed Profile

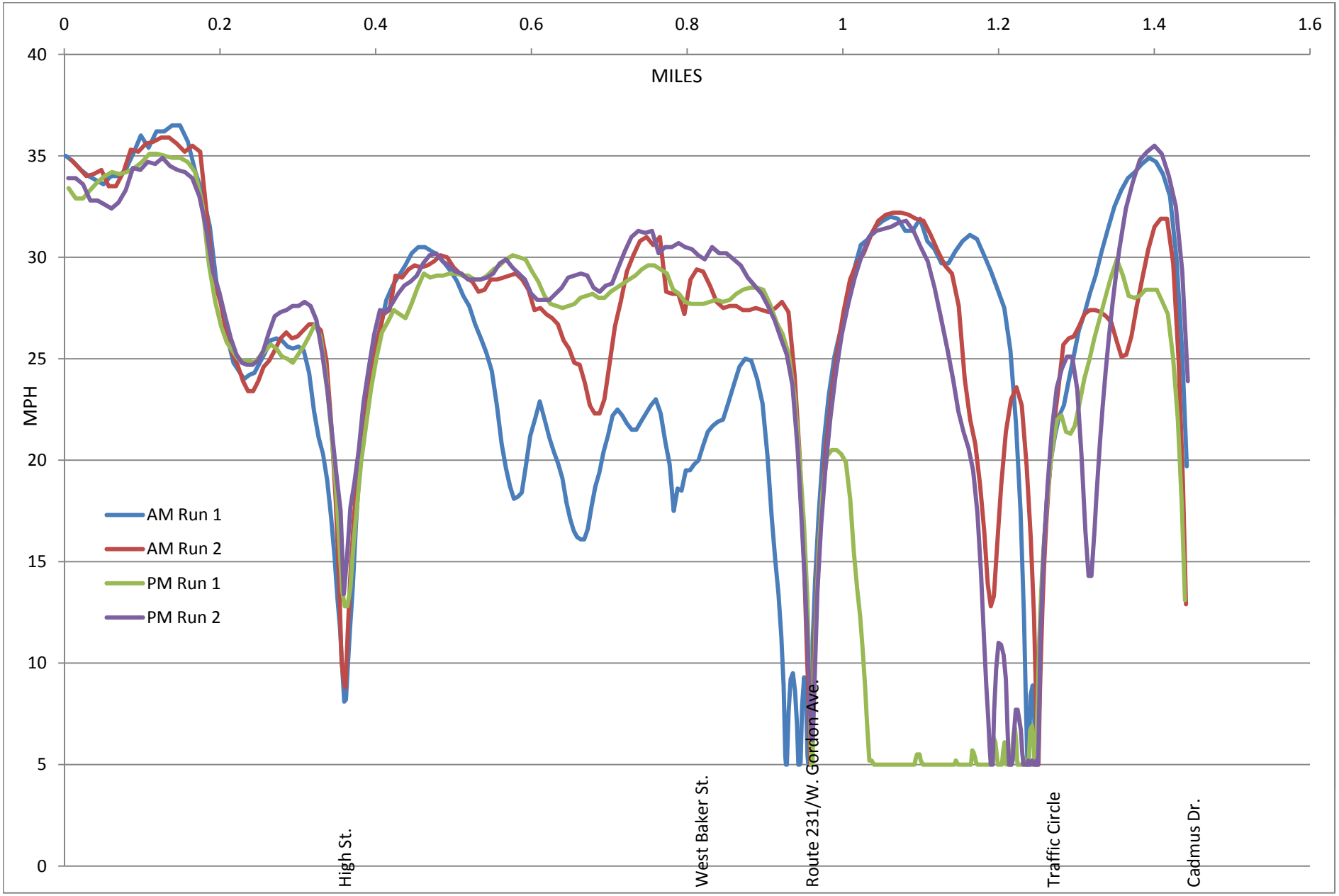


FIGURE 7: Corridor B Truck Route Southbound Speed Profile

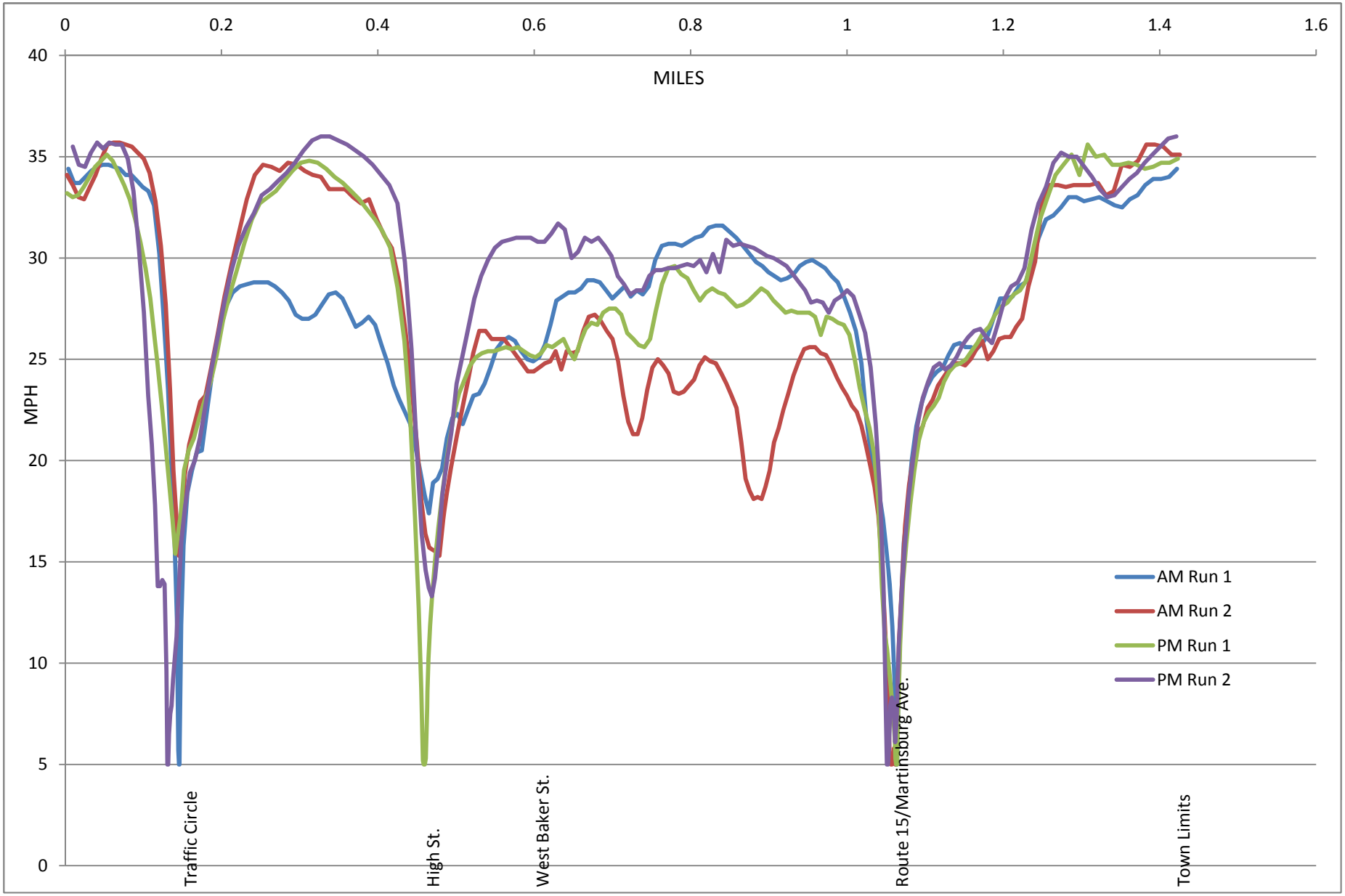


FIGURE 8: Corridor B Business Route Northbound Speed Profile

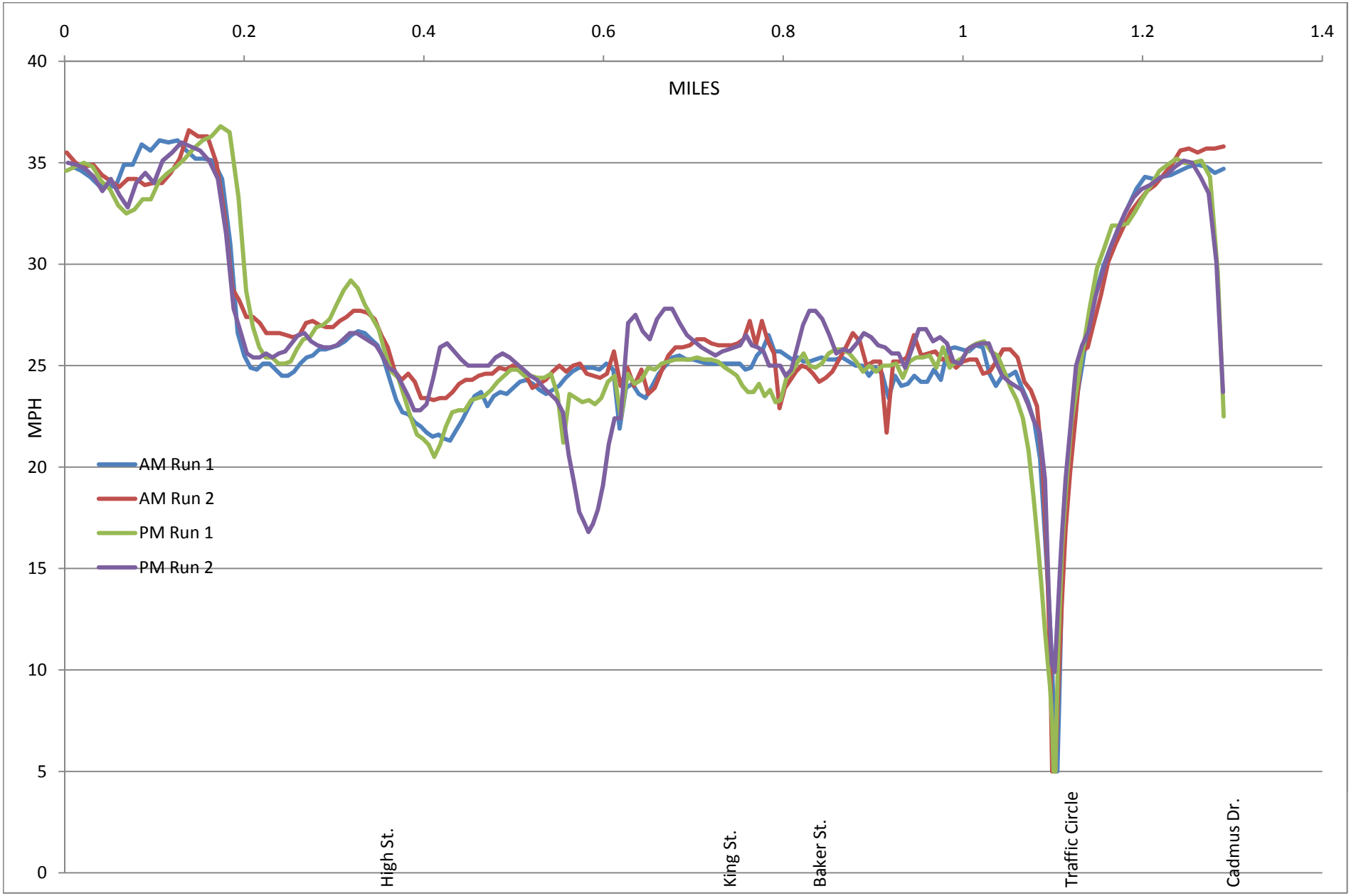


FIGURE 9: Corridor B Business Route Southbound Speed Profile

FIGURE 10: Corridor C Northbound Speed Profile

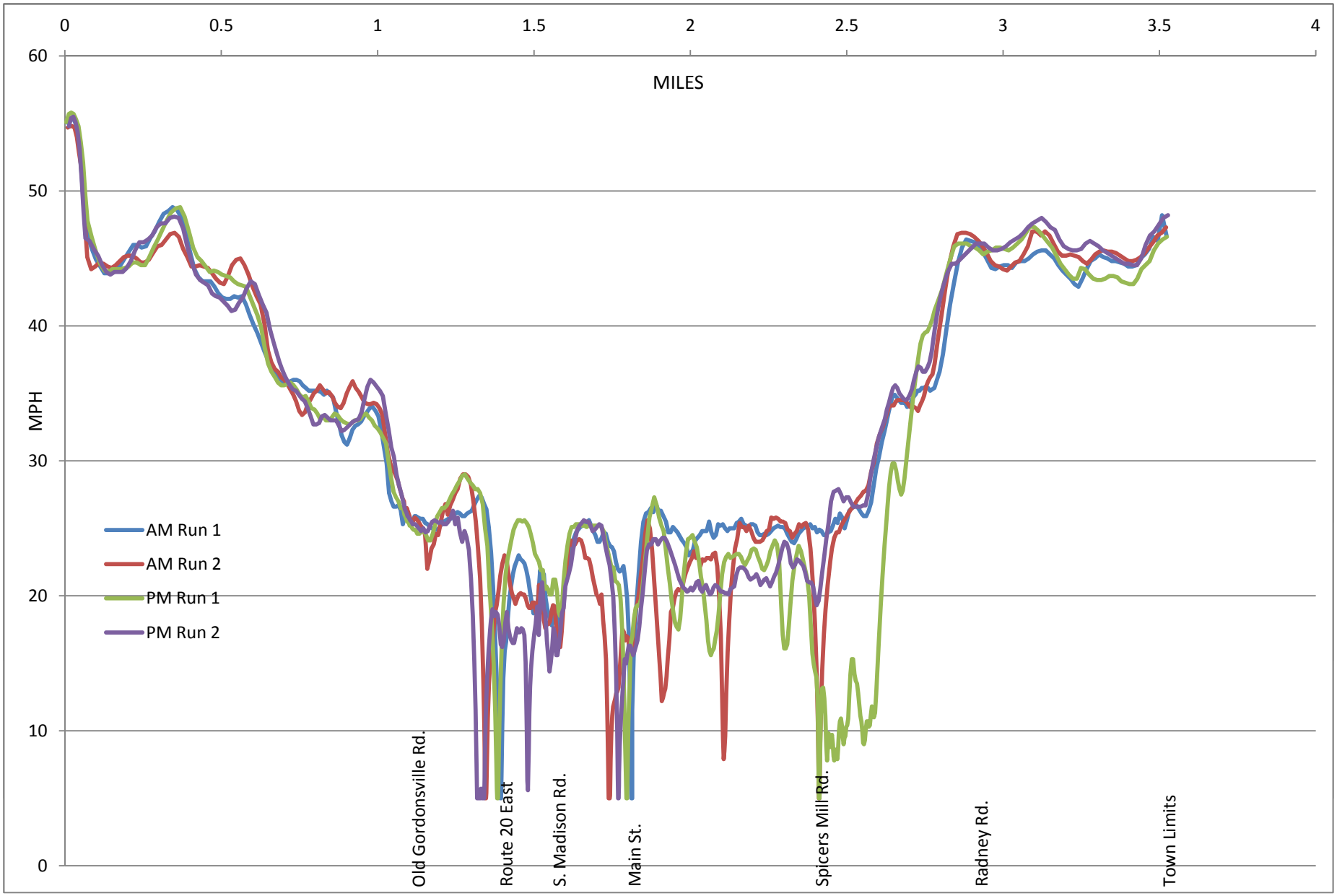


FIGURE 11: Corridor C Southbound Speed Profile

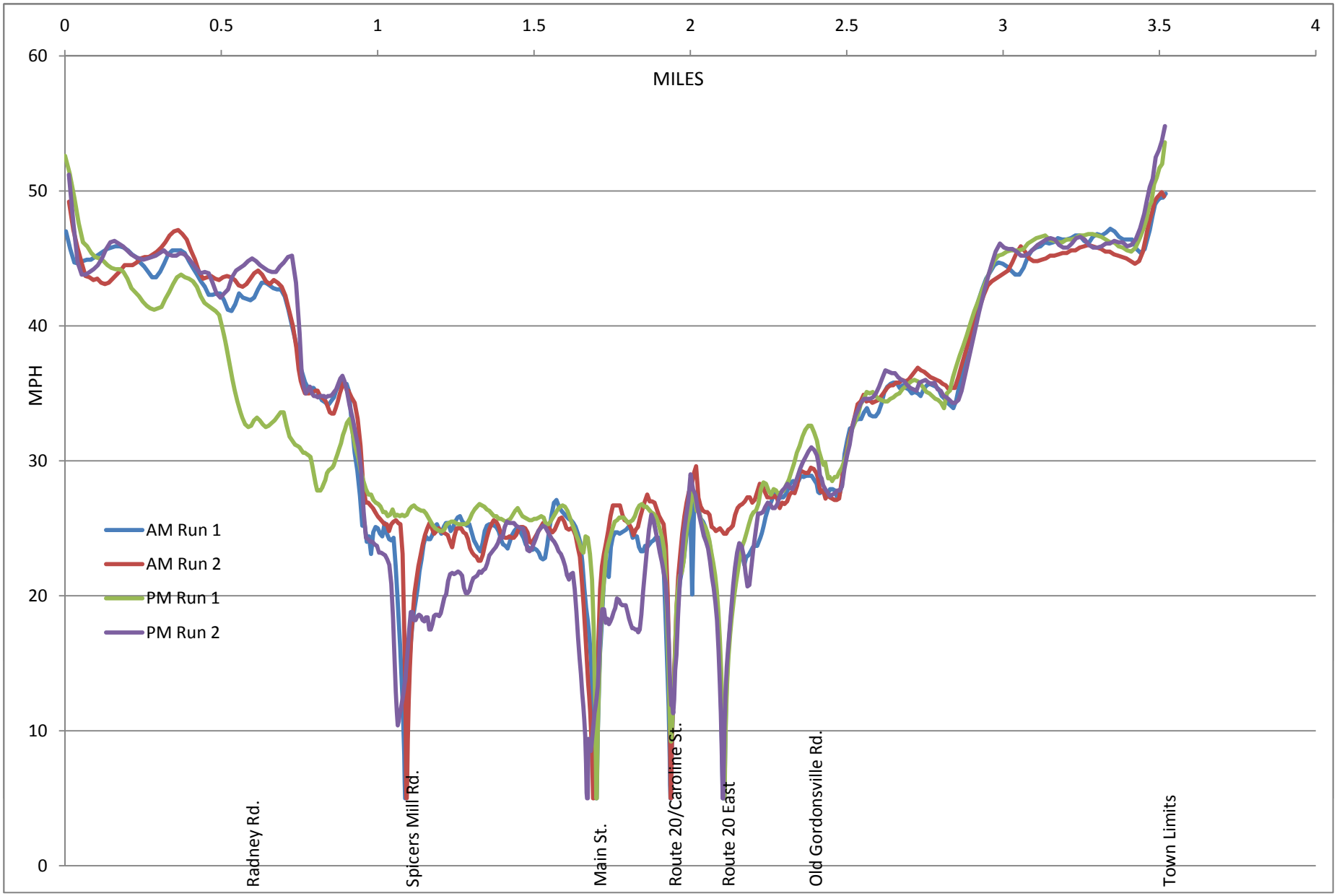


FIGURE 12: Corridor D Clockwise Speed Profile

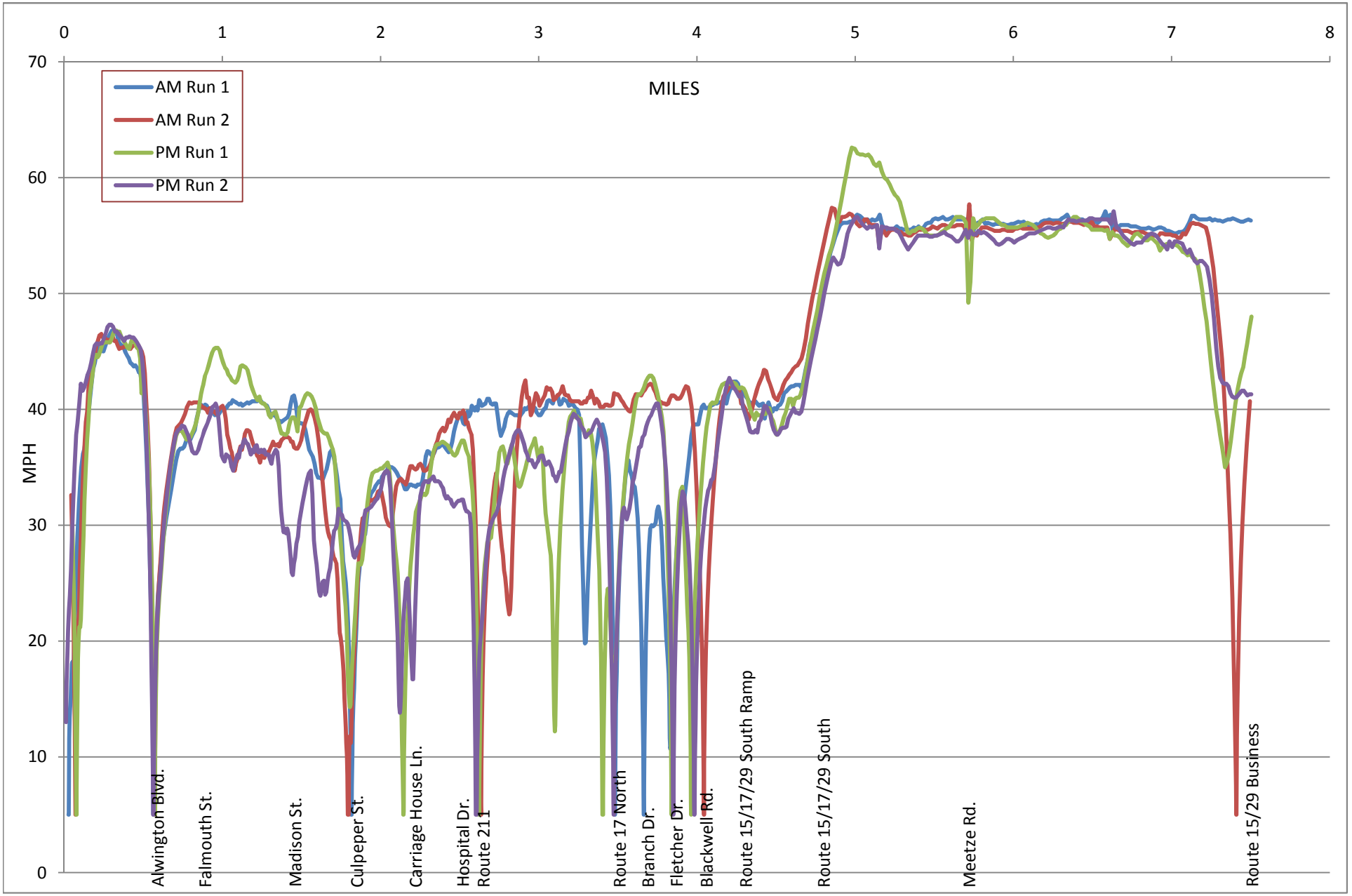
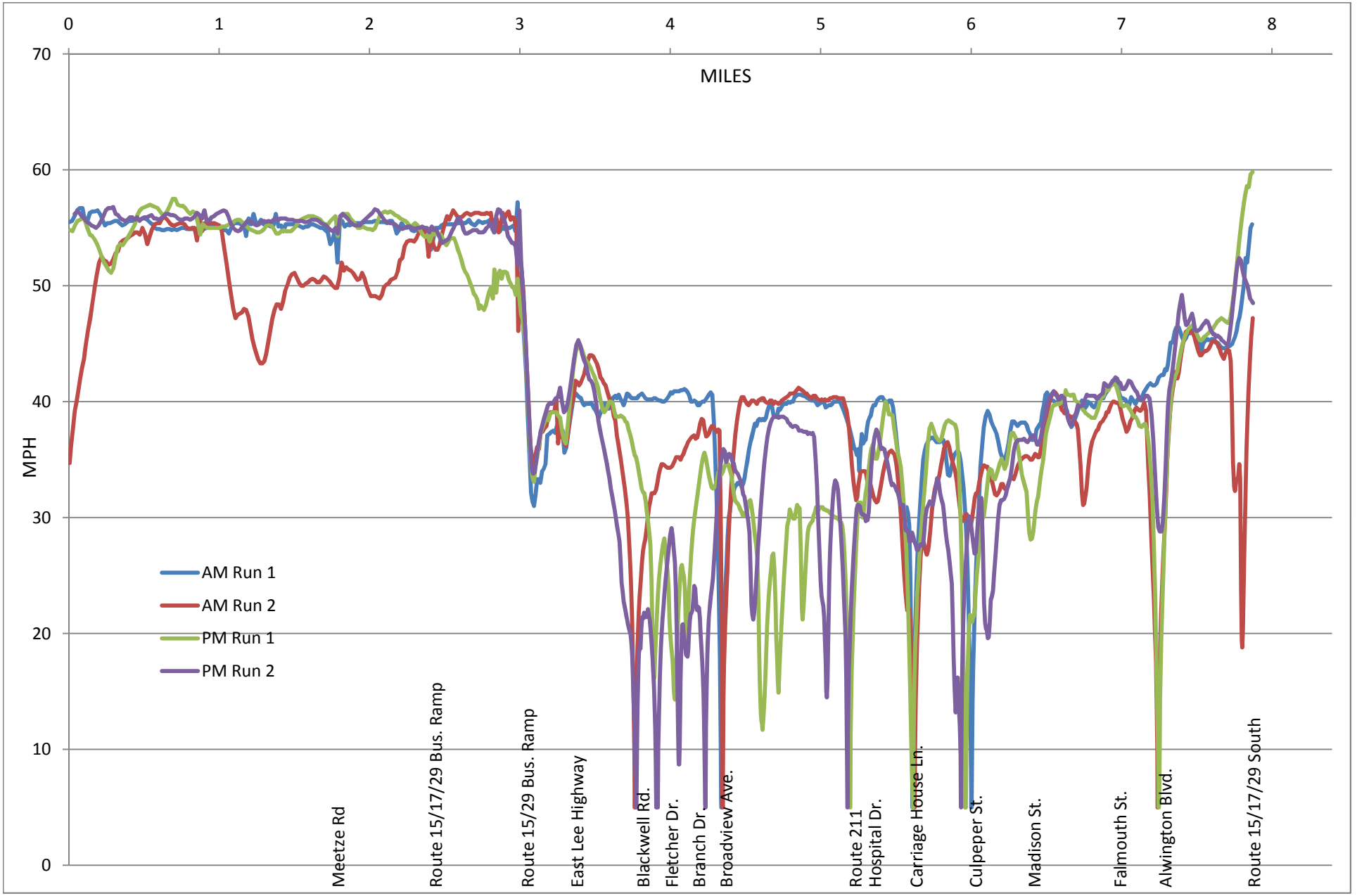


FIGURE 13: Corridor D Counter-Clockwise Speed Profile



DISCLAIMER

Prepared in cooperation with the US Department of Transportation, Federal Highway Administration, and the Virginia Department of Transportation

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