

To: Curt G. Wilton, Public Works Director
From: Wayne Keefner, PE, PTOE, LEED AP
Re: Great Barrington Road (Route 41) Existing Conditions Study

Date: July 21, 2022
Proj. No. 28487.00

BSC Group (BSC) has prepared this memorandum to analyze the existing traffic conditions, including traffic volumes and crash data along Great Barrington Road (Route 41), specifically between Cobb Road and Long Pond Road, in West Stockbridge. Route 41 is one of the major roads in West Stockbridge, running north/south through the length of the town. This segment of roadway is functionally classified as a Rural Major Collector and it is under Town of West Stockbridge jurisdiction. Great Barrington Road is characterized by several vertical curves and long horizontal tangent sections. Land use along this road is primarily residential in the study area. The study area is displayed in **Figure 1**.

Discussions with the Town indicate that an auto recycling business located in a neighboring town contributes to a significant amount of tractor trailer and tandem trailer traffic along Great Barrington Road. Several residents along Great Barrington Road have expressed safety concerns associated with this truck traffic.

This memorandum outlines the existing conditions of the roadway, including field observations, existing traffic data, existing safety data and recommendations to improve safety along the roadway.

Existing Conditions Observations

BSC Group visited the study area on Wednesday, July 6, 2022 between the hours of 10:00am and 2:00pm. The weather was overcast at times with intermittent sun, with temperatures approximately 80 degrees. During this period, the following observations were made:

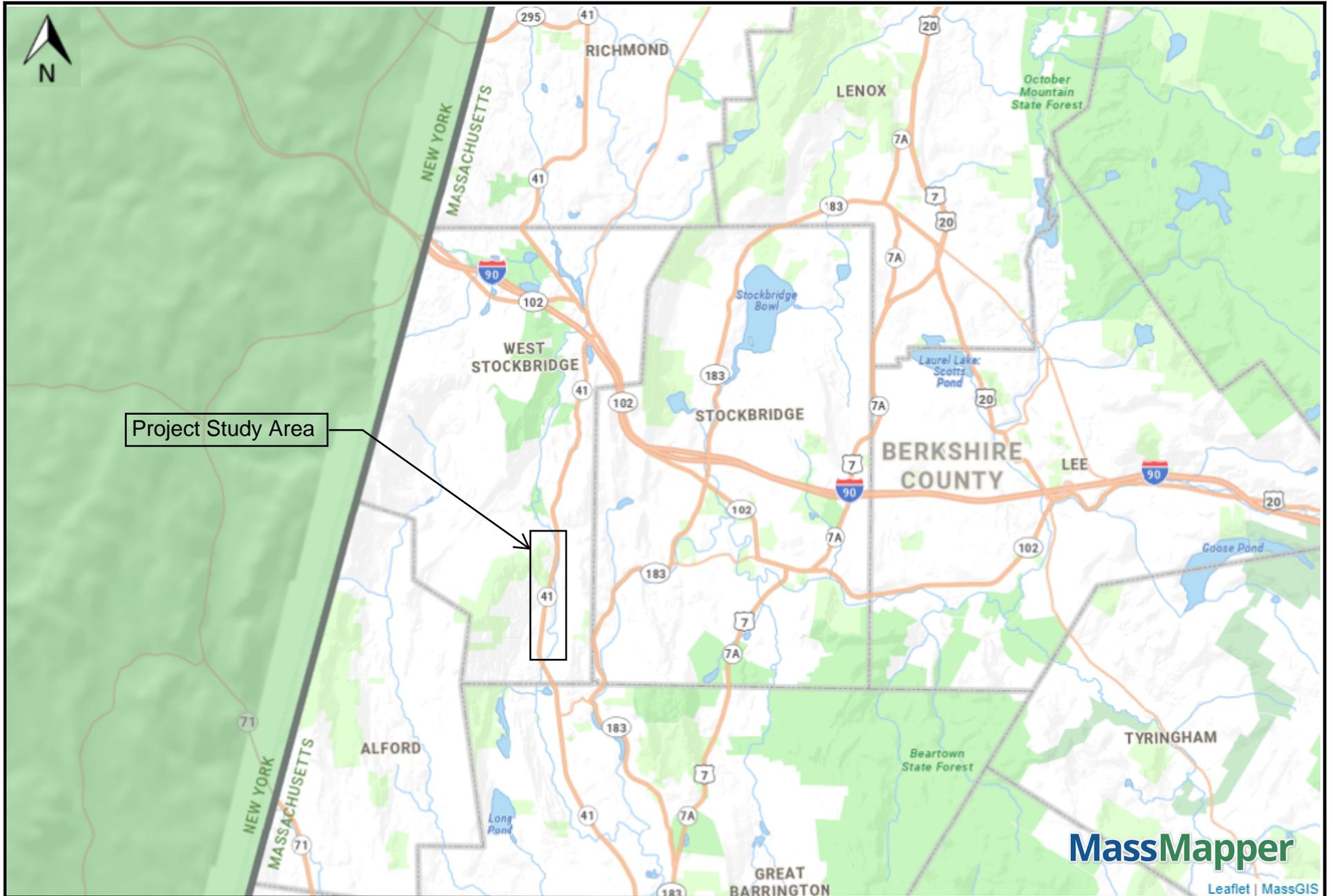
- Roadway section between Cobb Road and Long Pond Road is 10' travel lanes with 1' shoulders with a double yellow center line. Edge of pavement is typically at the edge of the 1' shoulder.
- Speed limits along Great Barrington Road varied from 30mph to 40mph between Cobb Road and Long Pond Road, with an additional two (2) speed limit changes between Long Pond Road and Division Street.
- Vertical and horizontal curves along Great Barrington Road can often impede sight distances while driving along roadway.
- Heavy vehicles encroach on centerline, either driving along centerline or have entirety of tire into opposing travel lane
- Apparent speeding by both heavy vehicles and passenger vehicles.



Great Barrington Road, looking south near Water Street



Truck observed along Great Barrington Road



Study Area Location
 Great Barrington Road (Route 41)
 West Stockbridge, Massachusetts

Figure 1
 Not to Scale

Traffic Volumes

Automatic Traffic Recorder (ATR) Data

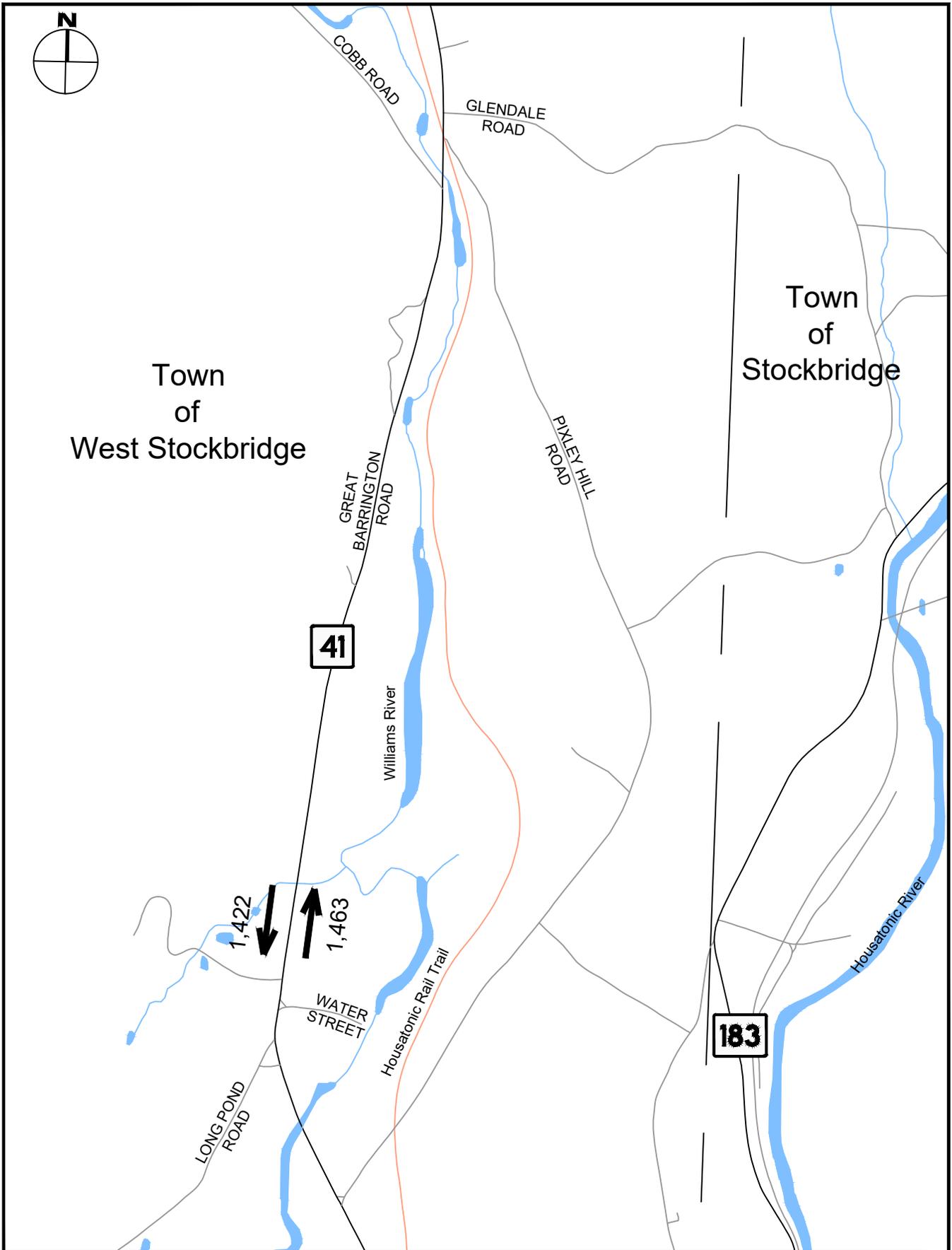
In accordance with the scope of this study, BSC contracted with Precision Data Industries, LLC (PDI) to collect ATR data in June 2022 along Great Barrington Road (Route 41) over a 48-hour period. The data was collected just north of Samantha Lane near 285 Great Barrington Road. The main purpose of the data was to collect volume, classification, and speeds along each direction, and the data is summarized in **Table 1** and shown graphically in **Figure 2**. The complete traffic data is provided in the Appendix.

Table 1 Automatic Traffic Recorder (ATR) Data Summary

Great Barrington Road (Route 41), near #285	
Weekday Daily Volume¹	2,885
Weekday AM Peak Hour	
Volume ²	229
K Factor ³	7.9%
Directional Flow ⁴	60% SB
Weekday PM Peak Hour	
Volume	274
K Factor	9.5%
Directional Flow	59% NB
Heavy Vehicles ⁵	185 (6.4%)
NB Speed (mph) ⁶	44/49/52
SB Speed (mph)	41/46/50

- 1 Average vehicles per day between 06/29/22 and 06/30/22
- 2 Measured in vehicles per hour
- 3 Percentage of daily trips that occur during the peak hour
- 4 Percentage of peak hour traffic by direction
- 5 Heavy Vehicle count data and percentage is compiled from ATR data averaged over two days; defined as “Single Unit Heavy” and “Multi Unit Heavy”
- 6 Speed is average over 48-hours; Median/85th percentile/95th percentile

As shown in **Table 1**, the 85th percentile speeds along Great Barrington Road were measured to be 49 miles per hour in the northbound direction and 46 miles per hour in the southbound direction. These speeds exceed the posted speed limit of 40 miles per hour along this portion of Great Barrington Road.



Project Location & Daily Traffic Volume
 Great Barrington Road (Route 41)
 West Stockbridge, Massachusetts

Figure 2
 Not to Scale

Safety Analysis

Crash Data

Motor vehicle crash data were obtained for the study area from the MassDOT crash database for the most recent complete five-year period for which data is available (2015 to 2019). MassDOT states that crash data for the years after 2019 are subject to change and are not to be considered complete. The data is used to identify correctable safety issues and crash trends. The current MassDOT average crash rate for roadway segments for Rural Major Collectors is 0.96 crashes per million vehicle miles traveled (c/mvmt). **Table 2** presents the motor vehicle crash data for the years 2015 to 2019.

Table 2 Motor Vehicle Crash Data Summary

	Great Barrington Road (Route 41) between Cobb Road and Long Pond Road
Total Crashes	1
Year	
2015	1
2016	0
2017	0
2018	0
2019	0
Severity	
Property Damage Only	1
Non-Fatal Injury	0
Fatality	0
Collision Type	
Angle	0
Rear End	0
Sideswipe	0
Single Vehicle	1
Head-On	0
Time	
7AM – 9AM, Weekday	0
4PM – 6PM, Weekday	0
Weekday, Off-Peak	0
11AM – 2PM, Saturday	0
Weekend, Off-Peak	1
Road Conditions	
Dry	1
Wet	0
Snow/Ice	0
Other/Unknown	0
Non-Motorist Type	
Pedestrian	0
Bicyclist	0
Other	0
Neither	1
Light Conditions	
Daylight	0
Dark, Roadway Lighted	0
Dark, Roadway Not Lighted	1
Dawn/Dusk	0
Average Per Year ¹	0.20
Crash Rate ²	0.13

¹ Average crashes between 2015 to 2019

² Crashes per Million Vehicle Miles Traveled, as defined by the MassDOT Highway Division (calculated for 2015 to 2019)

As shown in **Table 2**, only one crash, a single vehicle property-damage collision, has been reported along this segment of Great Barrington Road from 2015 to 2019. This roadway segment has a crash rate of 0.13 c/mvmt, which is lower than the MassDOT roadway segment average for Rural Major Collectors. The crash data worksheet for this segment is provided in the Appendix.

Sight Distances

As part of the safety analysis for this segment of roadway, sight distances were taken at three side streets and a residential driveway. The sight distances were measured at the following locations:

1. Cobb Road
2. 285 Great Barrington Road Driveway
3. Water Street
4. Long Pond Road

The measured sight distances were compared to the recommended sight distances set forth by the American Association of State Highway Transportation Officials (AASHTO). The recommended sight distances are shown in **Table 3**. The sight distances for the four locations are displayed in **Table 4**.

Table 3 AASHTO Recommended Sight Distances

Design Speed (mph)	Intersection Sight Distance (ft)	
	Left-Turn from Stop	Right-Turn from Stop
15	170	145
20	225	195
25	280	240
30	335	290
35	390	335
40	445	385
45	500	430
50	555	480

Table 4 Field Measured Intersection Sight Distances

Location	Intersection Sight Distance (ft)	
	Right-Turn from Stop	Left-Turn from Stop
Cobb Road	500+ (looking left)	350 (looking right)
285 Great Barrington Road Driveway	500+ (looking left)	500+ (looking right)
Water Street	250 (looking left)	500+ (looking right)
Long Pond Road	500+ (looking left)	325 (looking right)

As shown in **Table 4**, sight distances for several turning movements were recorded to be slightly lower than recommended by AASHTO for 35 and 40 MPH design speeds. The lowest sight distance was measured for vehicles turning right from Water Street onto Great Barrington Road.

Figure 3 analyzes the horizontal curve south of Water Street for comparison with the minimum horizontal curve radius as recommended by the MassDOT Project Development Design Guide. The minimum radius is a function of the design speed (V), roadway superelevation rate (e_{MAX}), and side friction factors (f_{MAX}). For the curve analyzed in **Figure 3**, the minimum radius is calculated below using the most conservative value for the superelevation rate of -2%.

$$R_{MIN} = \frac{V^2}{15(0.01e_{MAX} + f_{MAX})} = \frac{35^2}{15(0.01 * -2 + 0.18)} = 510 \text{ feet}$$

As shown in **Figure 3**, the existing horizontal curve's radius exceeds the minimum design radius.



Great Barrington Road - Horizontal Curve at Long Pond Road
 Great Barrington Road (Route 41)
 West Stockbridge, Massachusetts

Figure 3
 1" = 100'

Truck Traffic and Speed Mitigation Measures

This section discusses various mitigation measures that may be considered to improve safety by reducing the volume and speeds of heavy vehicles along a roadway. The next section presents BSC’s recommendations for which measures are best suited to be implemented along Great Barrington Road.

Heavy Vehicle Exclusion

To implement a Heavy Commercial Vehicle Exclusion (HCVE), a study must be conducted to justify the exclusion of trucks along a roadway. An HCVE is subject to the approval of MassDOT and is dependent on specific criteria outlined in Section 10A-9 of the 2012 Massachusetts Amendments to the Manual on Uniform Traffic Control Devices (MUTCD). The following excerpt from Section 10A-9 is provided below, and the complete Section 10A-9 is provided in the Appendix.

A truck exclusion from a municipal way may be authorized provided a suitable alternate route is available. The alternate route shall have an effective width and pavement structure which can safely accommodate the additional truck traffic. In addition the alternate route must meet one of the following conditions:

- (1) Lie wholly within the community making application,*
- (2) Lie partially in an adjacent community but only on State Highway, or*
- (3) Lie partially in an adjacent community but have the adjacent community’s written approval.*

Numbered routes are ineligible for heavy commercial vehicle exclusions, per Board of Commissioners, November 22, 1995.

As Great Barrington Road (Route 41) is a state numbered route, it is not eligible to be granted an HCVE as described in Section 10A-9.

Travel Lane Width

Narrowing the vehicle lane widths can lead to reductions in vehicle speeds along a roadway. Great Barrington Road currently provides one 10-foot travel lane in each direction, which is the minimum width allowable for this collector roadway, as shown in **Table 5** below. Therefore, it is not feasible to further reduce the travel lanes along this road. On the other hand, widening the roadway would provide vehicles with more room to travel, and could reduce instances of centerline encroachment. Widening the travel way could, however, lead to higher vehicle speeds. **Table 5** is referenced from Exhibit 5-14 of the MassDOT Project Development Design Guide.

Table 5 Range of Travel Lane Widths (In Feet)

Area Type	Roadway Type			
	Freeways	Arterials ¹	Collectors ²	Local Roads
Rural Natural	12	11 to 12	10 to 12	9 to 12
Rural Developed	12	11 to 12	10 to 12	9 to 12
Rural Village	N/A	11 to 12	10 to 12	9 to 12
Suburban Low Density	12	11 to 12	10 to 12	9 to 12
Suburban High Density	12	11 to 12	10 to 12	9 to 12
Suburban Village/Town Center	N/A	11 to 12	10 to 12	9 to 12
Urban	12	11 to 12	10 to 12	9 to 12

¹ Lane widths less than the values shown above may be used if a design exception is obtained. See Chapter 2 for a description of the design exception procedure. Situations where narrower lanes may be considered are described below.

² Minimum 11-foot lanes are required for design speeds of 45 miles per hour or greater.

N/A Not Applicable

Source: Adapted from A Policy on Geometric Design of Highways and Streets, AASHTO 2004, Chapter 4 Cross-Section Elements.

Centerline Rumble Stripes

A rumble strip that is placed underneath a pavement marking is known as a rumble stripe. A centerline rumble stripe is designed to alert distracted or inattentive drivers when they drift on or over the centerline. The milled pavement provides a vibration to alert the driver. A drawback of this vibration is the noise that it emits, which could be a nuisance to residents along Great Barrington Road. Before implementing this measure, the Town should consult with the residents of Great Barrington Road.

Speed Feedback Signage

Electronic speed feedback signage could be installed along Great Barrington Road to display a vehicle's speed for comparison with the posted speed limit. These signs can be installed below the existing speed limit signs along Great Barrington Road or installed with new speed limit signs at locations where the speed limit is not currently posted, such as long tangent sections of Great Barrington Road where speeding may be most prevalent. Studies have shown that drivers tend to reduce their speed when made aware that they are driving over the speed limit.



Speed feedback sign

Changing the Posted Speed Limit

Lowering the speed limit along Great Barrington Road would require collaboration with MassDOT. A speed limit study is required to demonstrate that a roadway warrants a reduction in the posted speed limit based on roadway information, speed data, and crash data. MassDOT follows guidance from the MUTCD, which recommends setting the posted speed limit near the 85th percentile speed, but not more than seven miles per hour below this speed. As shown during the data collection for this study, the 85th percentile speed for Great Barrington Road was recorded to be greater than the posted speed limit by as much as nine miles per hour. Thus, adjusting the speed limit based on the 85th percentile speed would not justify a speed limit reduction along Great Barrington Road.

Reducing the Posted Truck Speed Limit

In certain instances, a truck-specific speed limit may be posted in addition to a road's overall speed limit. These signs could be beneficial where a truck's maximum safe speed is less than that of a passenger vehicle, such as along a horizontal curve in wet roadway conditions. The FHWA suggests that the need to reduce the posted truck speed limit is to be determined necessary by an engineering study considering factors such as roadway grades and horizontal curvature. Based on field observations and the existing horizontal curvature of the roadway, BSC does not believe that a reduction to the posted truck speed limit is warranted along Great Barrington Road.

Conclusion and Recommendations

This memorandum has analyzed the existing traffic and safety conditions along Great Barrington Road (Route 41) between Cobb Road and Long Pond Road, in West Stockbridge. Based on field observations and ATR data, it is evident that the speeds of both passenger vehicles and heavy vehicles tend to exceed the posted speed limit along Great Barrington Road.

BSC recommends the following measure be implemented to reduce speeds along Great Barrington Road:

- Install speed feedback signs in each direction along Great Barrington Road. These signs may be placed prior to intersections with side streets that have reduced sight distances such as Water Street and Long Pond Road, or along the long tangent sections of Great Barrington Road where vehicle speeds may be highest.

BSC also recommends that the Town consider installing centerline rumble stripes to prevent vehicles, especially heavy vehicles, from encroaching on the centerline. The Town should consider garnering feedback from residents along Great Barrington Road before implementing this safety measure.

Restricting trucks from accessing Great Barrington Road is not feasible, as it is a state numbered route. However, implementing measures discussed in this memorandum could reduce instances of speeding along Great Barrington Road and improve safety along this route.