Speed Limits and Setting State Speed Zones

NH Route 13

Brookline, NH

Selectmen's meeting

July 30, 2018

New Hampshire DOT Department of Transportation

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New Hampshire Department of Transportation

Bureau of Traffic

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Overview/Objectives

- Review of Relevant Speed Limit Statutes
- Determining State Speed Zones
- Setting Credible Speed Limits
- Speed limit relationship with other traffic control devices
- Summarize NH Route 13 engineering and traffic investigation

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Review of Relevant Statutes

- RSA 265:60 Basic Rule and Maximum Limits
  - Establishes the “reasonable and prudent” standard
    - “No person shall drive a vehicle on a way at a speed greater than is reasonable and prudent under the conditions and having regard to the actual and potential hazards then existing.”

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Review of Relevant Statutes

- RSA 265:60, cont'd
  - "In every event speed shall be so controlled as may be necessary to avoid colliding with any person, vehicle, or other conveyance on or entering the way in compliance with the legal requirements and the duty of all persons to use due care."

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Review of Relevant Statutes

- RSA 265:60, cont'd
  - Defines school zone speed limit
  - 30 mph for business or urban residence district
  - 35 mph for rural residence district and Class V highways (a.k.a. "town roads")
  - 65 mph for interstates, turnpikes, and other multi-lane, divided highways, except I-93 north of Concord (70 mph)
  - 55 mph in other locations

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Review of Relevant Statutes

- RSA 265:62 Establishment of State Speed Zones
  - Requires an engineering and traffic investigation

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Manual on Uniform Traffic Control Devices (MUTCD)

- Recognized as the national standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel
- Section 2B.13 “Speed zones (other than statutory speed limits) shall only be established on the basis of an engineering study that has been performed in accordance with traffic engineering practices. The engineering study shall include an analysis of the current speed distribution of free-flowing vehicles.”

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Determining State Speed Zones

- Components of an “engineering and traffic investigation”
  - Speed study
  - Horizontal and vertical geometry
  - Traffic volume and crash history
  - Segment length
  - Number of lanes and lane width
  - Offset to hazards

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Engineering and Traffic Investigation

- 85th percentile speed
  - Based on research by David Solomon, US Bureau of Public Roads (now FHWA)
  - Compares the relationship between average speed and collision rates of automobiles
  - Generally regarded as the “reasonable and prudent” standard with regard to speed limits

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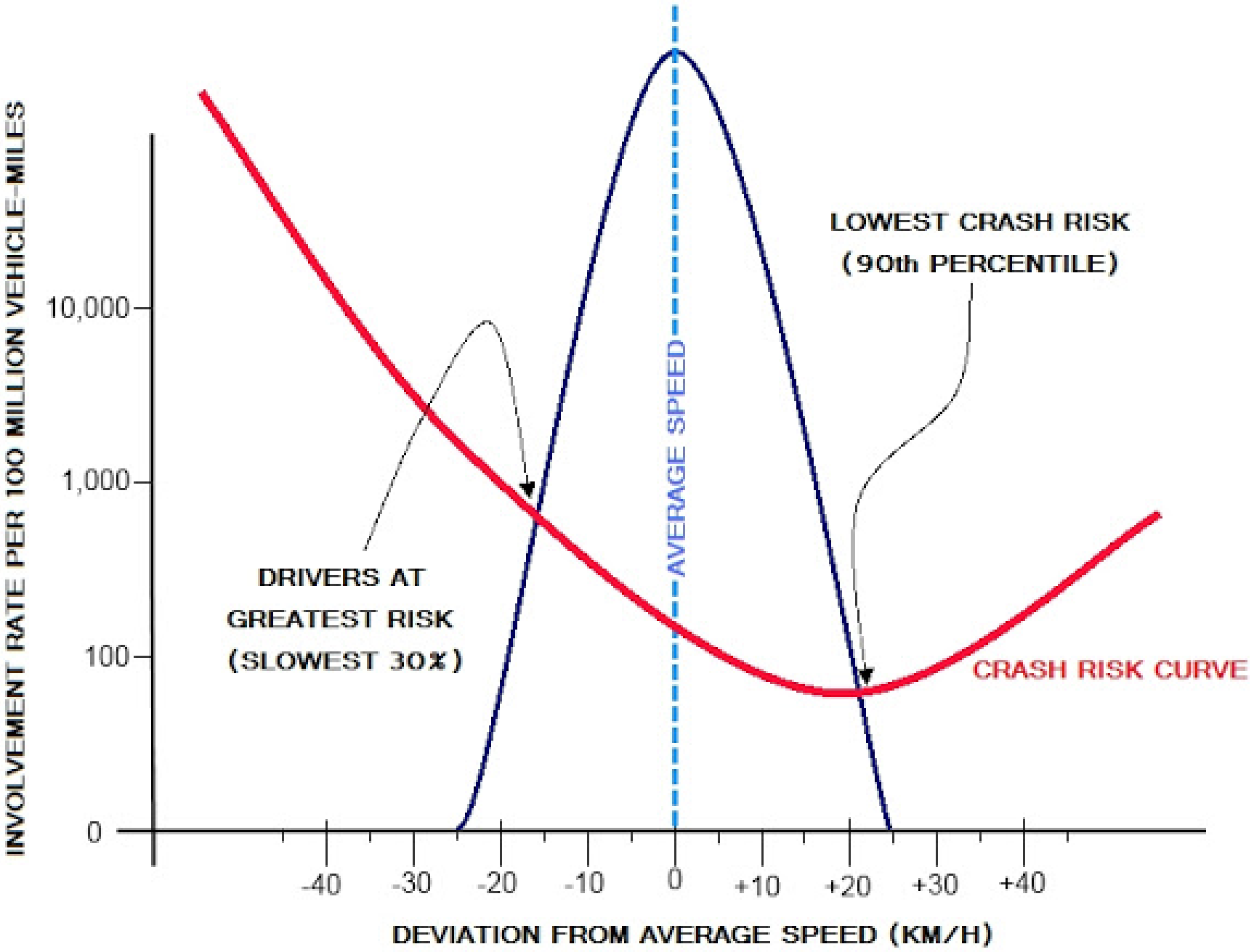
INVOLVEMENT RATE PER 100 MILLION VEHICLE-MILES
10,000
1,000
100
0
-40
-30
-20
-10
0
+10
+20
+30
+40
DEVIATION FROM AVERAGE SPEED (KM/H)
AVERAGE SPEED
LOWEST CRASH RISK
(90th PERCENTILE)
DRIVERS AT
GREATEST RISK
(SLOWEST 30%)
CRASH RISK CURVE

Engineering and Traffic Investigation

- Other factors:
  - Crash history compared to similar segments
  - Highway geometry: design speed does not necessarily relate to posted speed limit
  - Continuity with neighboring speed zones and length of segment relates to credibility

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USLIMITS2

U.S. Department of Transportation

Federal Highway Administration

1200 New Jersey Avenue, SE
Washington, DC 20590
202-366-4000

Safety

HELP

USLIMITS2

A TOOL TO AID PRACTITIONERS IN DETERMINING APPROPRIATE SPEED LIMIT RECOMMENDATIONS

USLIMITS is a web based tool designed to help practitioners set reasonable, safe, and consistent speed limits for specific segments of roads. USLIMITS is applicable to all types of roads ranging from rural local roads and residential streets to urban freeways.

Disclaimer: The U.S. Government assumes no liability for the use of the information contained in this tool. This tool does not constitute a standard, specification, or regulation.

NEW PROJECT

Before beginning a new project, it is recommended that you read through the User Guide and be prepared to enter the necessary data (e.g., 50th and 85th percentile speed, roadway characteristics, and crash history).

To create a new project, click the new project link below. At the end of the process you will be asked to save a project file. The project file can be revised or updated later.

Create A New Project

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Setting Credible Speed Limits

- Individual drivers control their speed according to perceived and actual road conditions, most (85% +/-) are “reasonable and prudent”
- Posted speed limits indicate the maximum legal speed for a specific roadway segment
- Unreasonably low speed limits are not respected by drivers, law enforcement, or the courts

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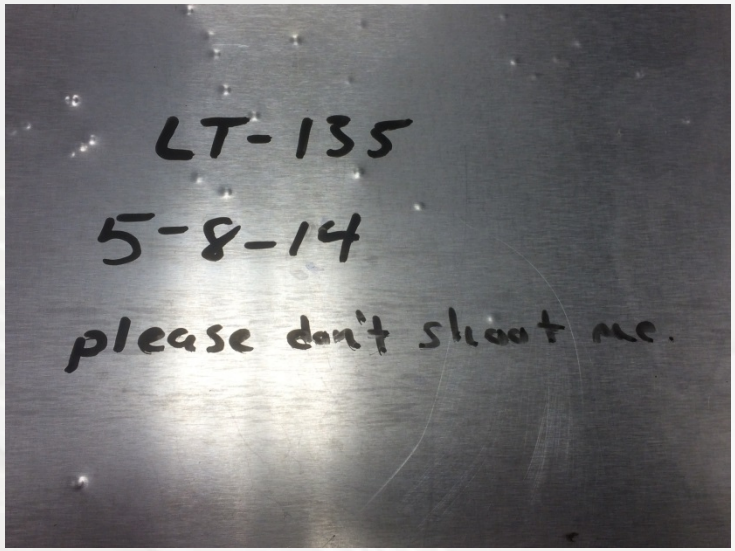

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Hooksett, US 3/NH 28

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STEPHEN G. PERNAW & COMPANY, INC.
PROJECT: US RT 3 & NH RT 28 (0.3 miles North of Greens Marine, Hooksett, NH)
NUMBER: 1024A
POSTED SPEED LIMIT: 40 mph

SPOT SPEED SURVEY

Day	Date	Mean Speed (mph)	85th Percentile (mph)
Mon	5/22/06	52.85 mph	58.12 mph
Tue	5/23/06	52.33 mph	57.54 mph
Wed	5/24/06	52.31 mph	57.47 mph
Thu	5/25/06	52.74 mph	57.96 mph
Fri	5/26/06	52.62 mph	57.78 mph
Sat	5/27/06	53.28 mph	58.49 mph
Sun	5/28/06	50.92 mph	56.04 mph
AVG		**52.44 mph**	**57.63 mph**

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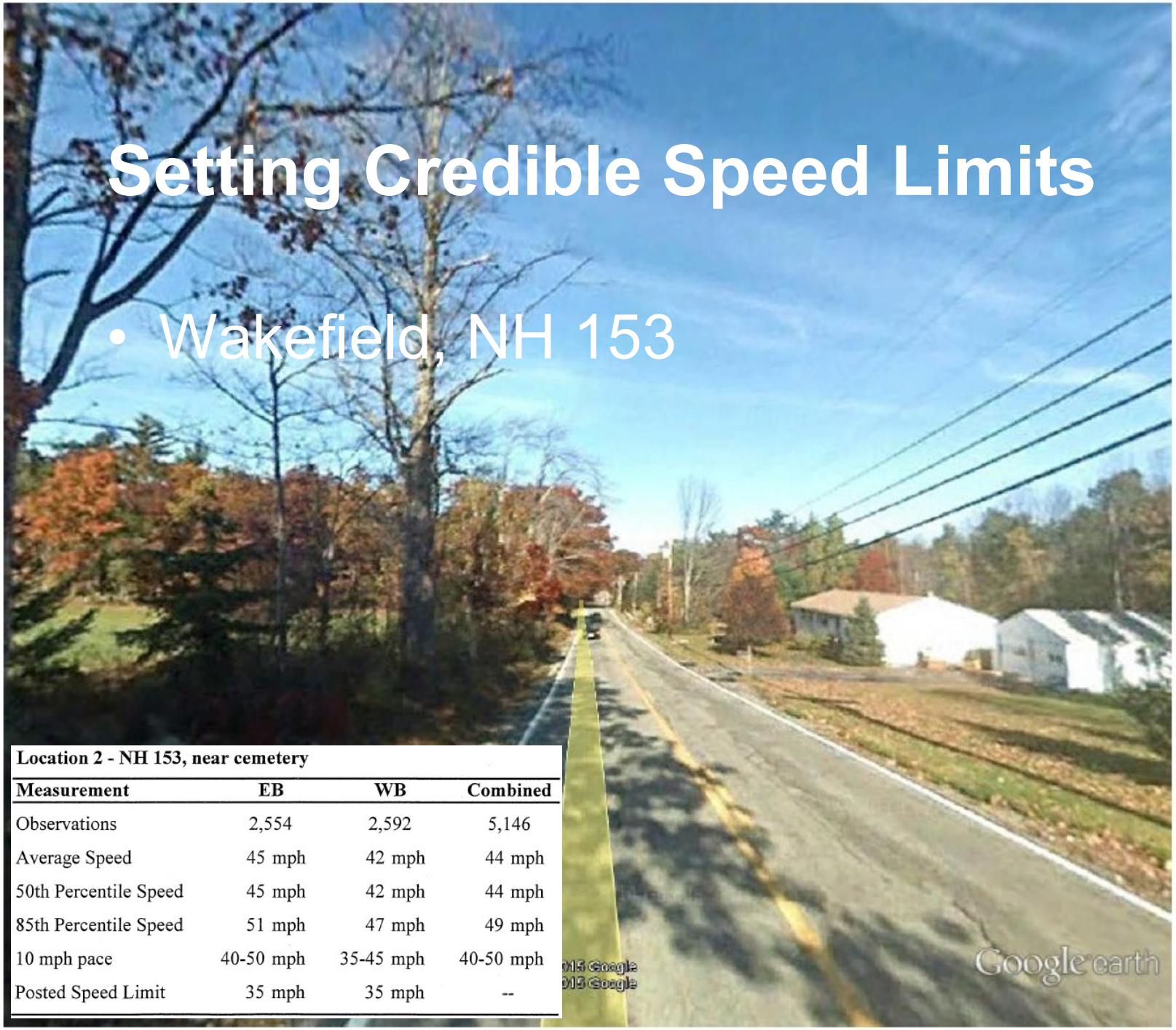
Setting Credible Speed Limits

- Wakefield, NH 153



Location 2 - NH 153, near cemetery			
Measurement	**EB**	**WB**	**Combined**
Observations	2,554	2,592	5,146
Average Speed	45 mph	42 mph	44 mph
50th Percentile Speed	45 mph	42 mph	44 mph
85th Percentile Speed	51 mph	47 mph	49 mph
10 mph pace	40-50 mph	35-45 mph	40-50 mph
Posted Speed Limit	35 mph	35 mph	--

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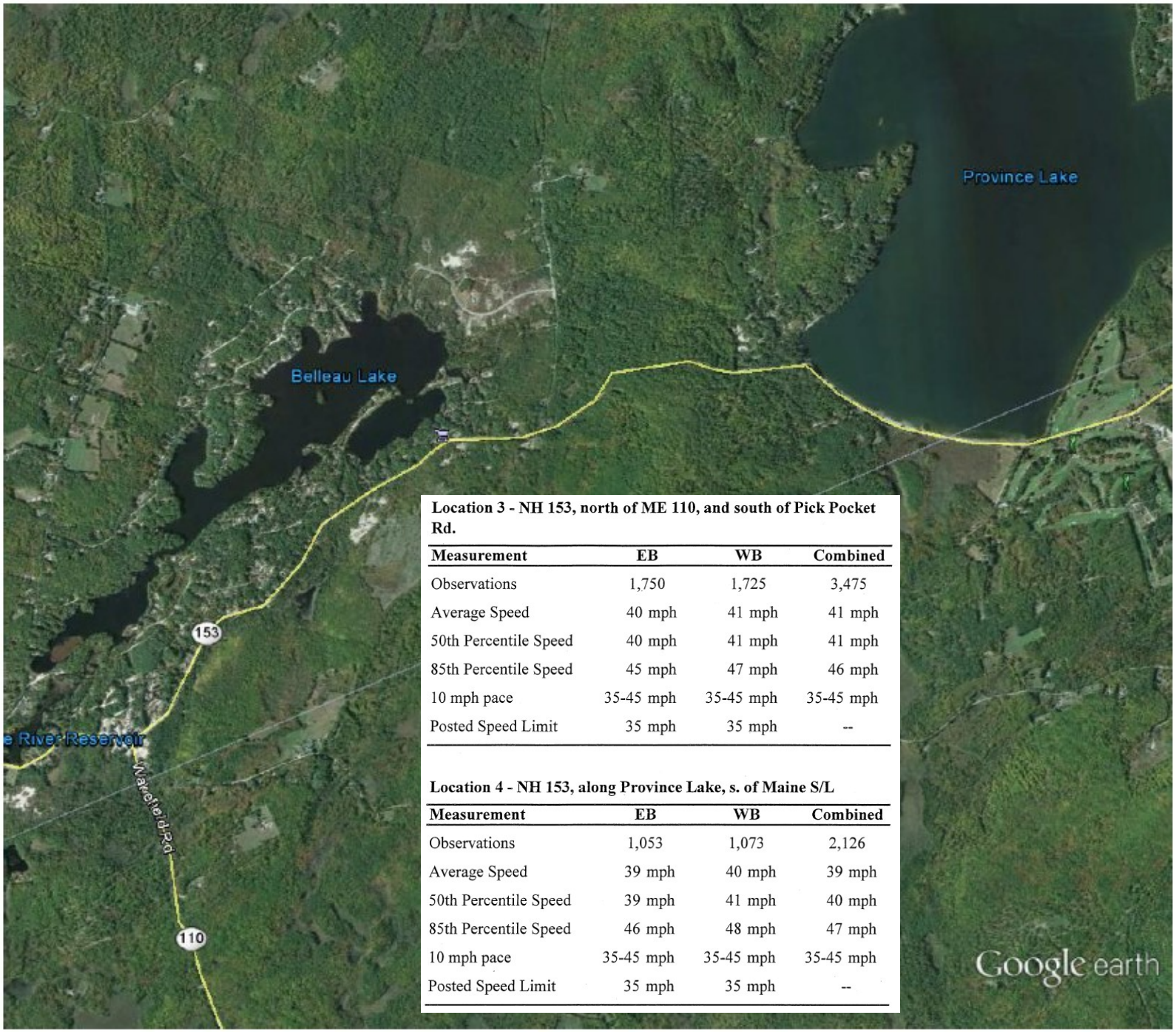

Location 3 - NH 153, north of ME 110, and south of Pick Pocket Rd.

Measurement	EB	WB	Combined
Observations	1,750	1,725	3,475
Average Speed	40 mph	41 mph	41 mph
50th Percentile Speed	40 mph	41 mph	41 mph
85th Percentile Speed	45 mph	47 mph	46 mph
10 mph pace	35-45 mph	35-45 mph	35-45 mph
Posted Speed Limit	35 mph	35 mph	--

Location 4 - NH 153, along Province Lake, s. of Maine S/L

Measurement	EB	WB	Combined
Observations	1,053	1,073	2,126
Average Speed	39 mph	40 mph	39 mph
50th Percentile Speed	39 mph	41 mph	40 mph
85th Percentile Speed	46 mph	48 mph	47 mph
10 mph pace	35-45 mph	35-45 mph	35-45 mph
Posted Speed Limit	35 mph	35 mph	--

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Setting Credible Speed Limits

- Hancock, US Route 202

Location	Posted speed limit (mph)	85th percentile speed (mph)
South of NH 123	45	55
Between NH 123 and Forest Road	55	62
Through Forest Road	40	56
South of NH 137	50	54

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Speed limit relationship to other traffic control devices

- Passing zones
  - Required passing sight distance is a function of the posted speed limit:

Table 3B-1. Minimum Passing Sight Distances for No-Passing Zone Markings

85th-Percentile or Posted or Statutory Speed Limit	Minimum Passing Sight Distance
25 mph	450 feet
30 mph	500 feet
35 mph	550 feet
40 mph	600 feet
45 mph	700 feet
50 mph	800 feet
55 mph	900 feet
60 mph	1,000 feet
65 mph	1,100 feet
70 mph	1,200 feet

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Speed limit relationship to other traffic control devices

- Crosswalks:
  - Stopping sight distance is a function of speed
  - Mid-block crosswalks not allowed where posted speed limit is greater than 40 mph
    - Greater than 35 mph only allowed where additional warning measures are included

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Speed limit relationship to other traffic control devices

- Curve warnings:

Table 2C-5. Horizontal Alignment Sign Selection

Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required

Note: Required means that the sign and/or plaque shall be used, recommended means that the sign and/or plaque should be used, and optional means that the sign and/or plaque may be used.

See Section 2C.06 for roadways with less than 1,000 ADT.

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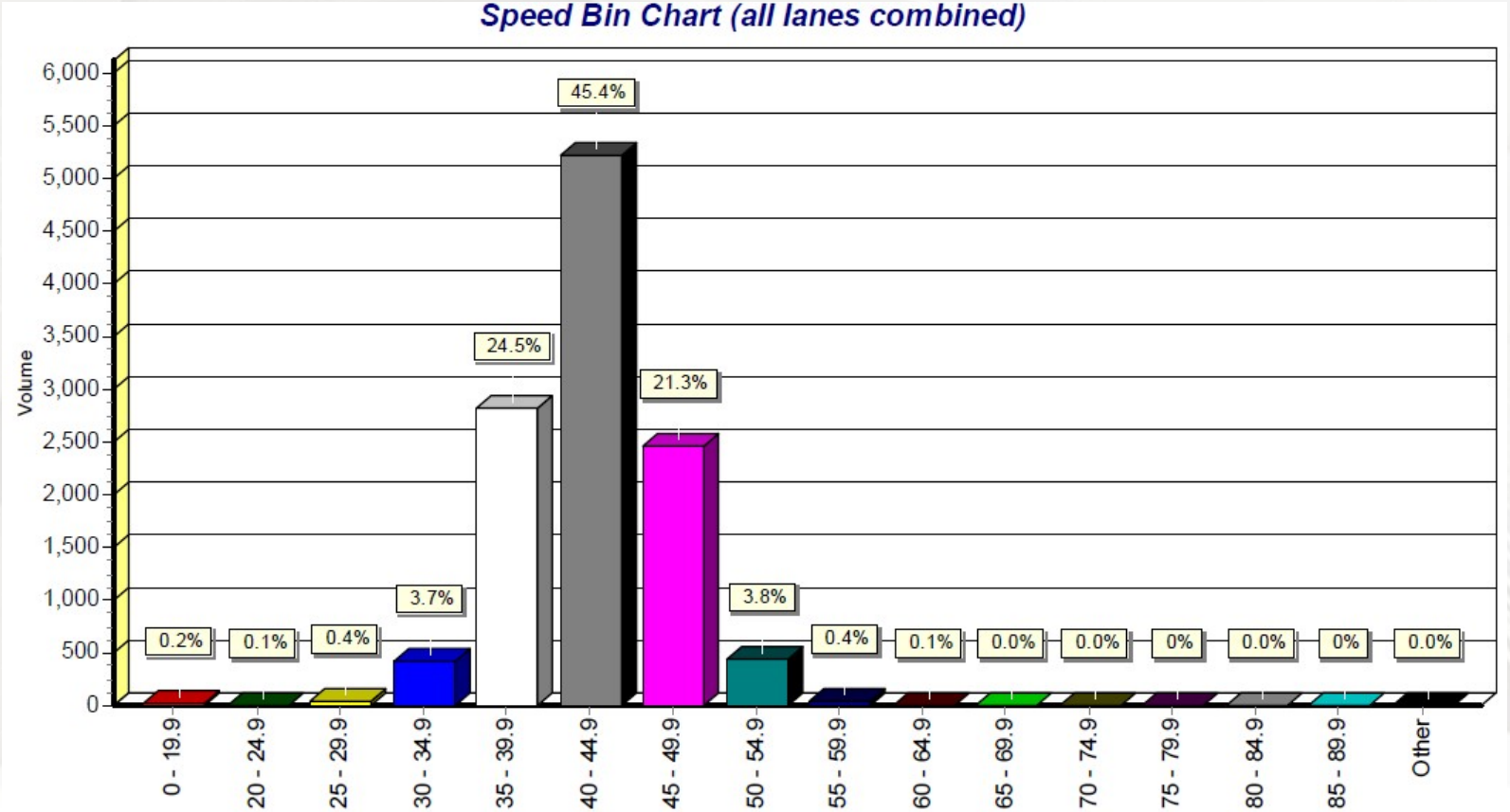
Candia, NH 27
85th percentile approx. 47 mph
Posted speed limit – 35 mph



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NH Route 13 Engineering and Traffic Investigation summary

Brookline, NH

New Hampshire DOT Department of Transportation

Study considered five unique segments

- Segment 1: State line to 500’ +/- north of Bingham Lumber (50 mph)
- Segment 2: From S1 to 1,500’ north of Mason Road (35 mph)
- Segment 3: From S2 to NH 130 (50 mph)
- Segment 4: From S3 to North Mason Road (50 mph)
- Segment 5: From S4 to Milford town line

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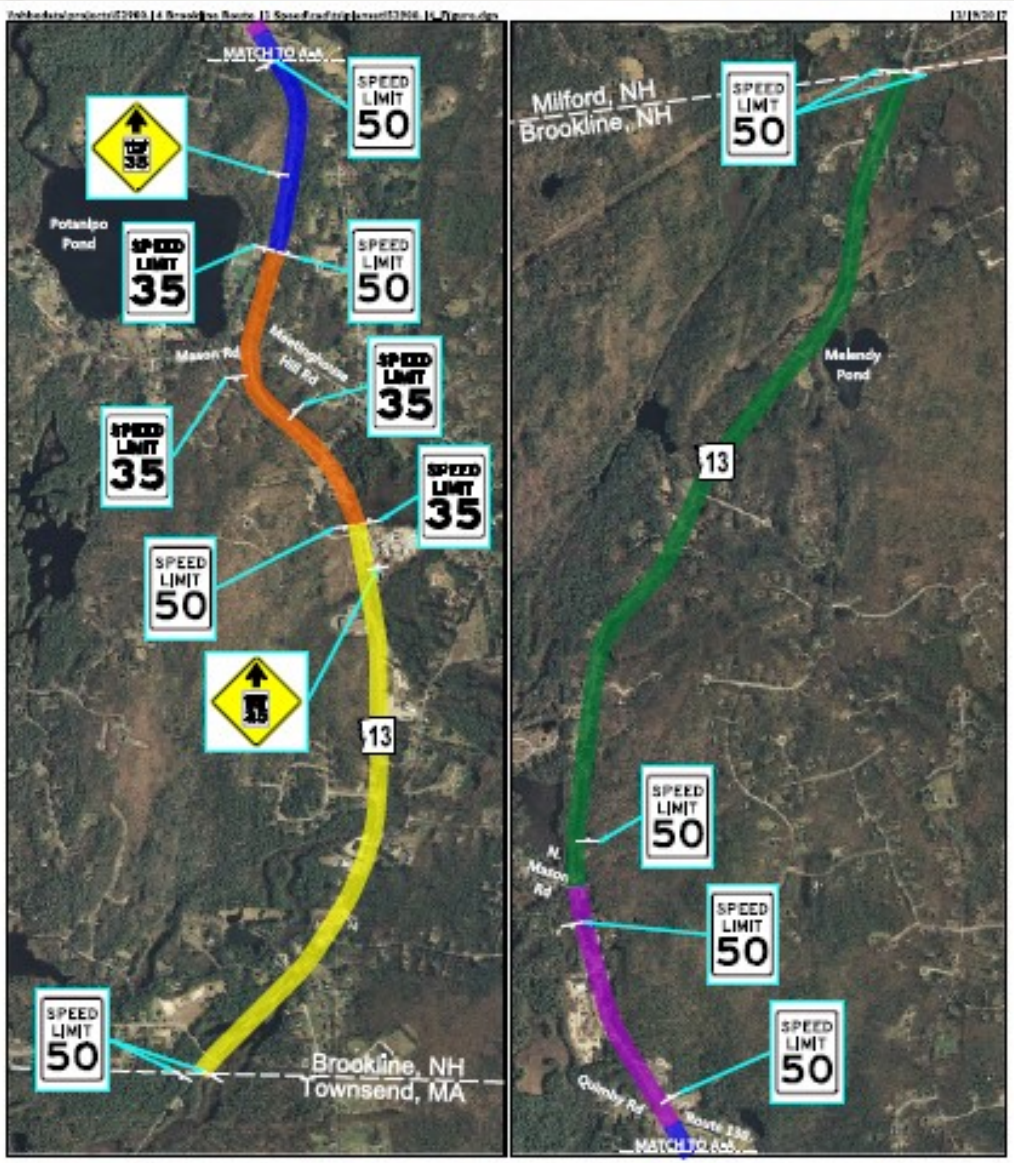

Route 13 Road Segments

1
2
3
4
5

Not to scale

vhb

Figure 1
Existing Speed Limit Sign Locations
NH Route 13 Speed Study
Brook||ne, New Hampsh|re

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Table 1 – Speed Summary by Segment

Location	Posted Speed (mph)	Average Speed (mph)	85th % Speed (mph)	10 mph Pace (mph)	10 mph Pace (%)	ADT (vpd)*
Segment #1						
North of State Line						
Southbound	50	50	54	46-55	70%	3,709
Northbound		50	54	46-55	71%	4,043
Combined		50	54	46-55	70%	7,752
Segment #2						
Near TD Bank						
Southbound	35	40	44	36-45	74%	3,385
Northbound		38	43	31-40	62%	3,611
Combined		39	44	36-45	68%	6,996
Segment #3						
South of Route 130						
Southbound	50	50	54	46-55	75%	3,686
Northbound		49	53	46-55	76%	4,013
Combined		50	53	46-55	75%	7,699
Segment #4						
North of Route 130						
Southbound	50	49	53	46-55	78%	4,458
Northbound		48	53	46-55	71%	4,561
Combined		49	53	46-55	75%	9,019
Segment #5						
North of North Mason Road						
Southbound	50	47	51	41-50	75%	4,257
Northbound		49	54	46-55	67%	4,589
Combined		48	53	46-55	71%	8,846

*vpd – vehicles per day

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USLIMITS2 Speed Zoning Report

Project Name: Segment 2 - Brookline Speed Study

Analyst: CRG

Date: 12-12-2017

Basic Project Information
Project Number: 52900.14
Route Name: NH 13
From: Start of 35mph Zone
To: End of 35mph Zone
State: New Hampshire
County: Hillsborough County
City: Rural
Route Type: Road Section in Undeveloped Area
Route Status: Existing

Roadway Information
Section Length: 0.9 mile(s)
Statutory Speed Limit: 35 mph
Adverse Alignment: No
Divided/Undivided: Undivided
Number of Lanes: 2
Roadside Hazard Rating: 5
Transition Zone: No

Crash Data Information
Crash Data Years: 3.00
Crash AADT: 5800 veh/day
Total Number of Crashes: 11
Total Number of Injury Crashes: 1
Section Crash Rate: 192 per 100 MVM
Section Injury Crash Rate: 17 per 100 MVM
Crash Rate Average for Similar Roads: 131
Injury Rate Average for Similar Roads: 48

Traffic Information
85th Percentile Speed: 44 mph
50th Percentile Speed: 38 mph
AADT: 5800 veh/day

Recommended Speed Limit:

Note: The final recommended speed limit is higher than the statutory speed limit of **35 mph** for this type of road. An engineering study such as the one carried out with USLIMITS is usually required to set a speed limit above the statutory limit.

Note: The section crash rate of 192 per 100 MVM is more than 30 percent above the average for similar roads (131) but below the critical rate (264). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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USLIMITS2 Speed Zoning Report

Project Name: Segment 3 - Brookline Speed Study

Analyst: CRG

Date: 12-12-2017

Basic Project Information
Project Number: 52900.14
Route Name: NH 13
From: Start of 50mph Zone
To: NH 130
State: New Hampshire
County: Hillsborough County
City: Rural
Route Type: Road Section in Undeveloped Area
Route Status: Existing

Roadway Information
Section Length: 0.7 mile(s)
Statutory Speed Limit: 50 mph
Adverse Alignment: No
Divided/Undivided: Undivided
Number of Lanes: 2
Roadside Hazard Rating: 5
Transition Zone: No

Crash Data Information
Crash Data Years: 3.00
Crash AADT: 6000 veh/day
Total Number of Crashes: 3
Total Number of Injury Crashes: 1
Section Crash Rate: 65 per 100 MVM
Section Injury Crash Rate: 22 per 100 MVM
Crash Rate Average for Similar Roads: 131
Injury Rate Average for Similar Roads: 48

Traffic Information
85th Percentile Speed: 53 mph
50th Percentile Speed: 49 mph
AADT: 6000 veh/day

Recommended Speed Limit:

New Hampshire DOT
Department of Transportation

USLIMITS2 Speed Zoning Report

Project Name: Segments 1-5 - Brookline Speed Study

Analyst: CRG

Date: 12-12-2017

Basic Project Information
Project Number: 52900.14
Route Name: NH 13
From: MA State Line
To: Milford Town Line
State: New Hampshire
County: Hillsborough County
City: Rural
Route Type: Road Section in Undeveloped Area
Route Status: Existing

Roadway Information
Section Length: 6.8 mile(s)
Statutory Speed Limit: 50 mph
Adverse Alignment: No
Divided/Undivided: Undivided
Number of Lanes: 2
Roadside Hazard Rating: 4
Transition Zone: No

Crash Data Information
Crash Data Years: 3.00
Crash AADT: 7200 veh/day
Total Number of Crashes: 57
Total Number of Injury Crashes: 11
Section Crash Rate: 106 per 100 MVM
Section Injury Crash Rate: 21 per 100 MVM
Crash Rate Average for Similar Roads: 126
Injury Rate Average for Similar Roads: 46

Traffic Information
85th Percentile Speed: 52 mph
50th Percentile Speed: 47 mph
AADT: 7200 veh/day

Recommended Speed Limit:

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Recommendation

- Current speed limits for Segments 1, 3, 4, and 5 (50 mph) are appropriate and should remain as is.
- Current speed limit for Segment 3 is less than prevailing speed and could be increased to 40 mph
- Segment 2 is unique to corridor so that uniform 50 mph is not recommended

New Hampshire DOT Department of Transportation

Questions?

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