

# Setting Speed Limits

## *Vermont Local Roads Guide to setting Speed Limits*

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## **Introduction**

State law and the Manual On Uniform Traffic Control Devices (MUTCD) regulate the procedures for establishing effective and enforceable speed limits. Title 23 V.S.A. Section 1007 authorizes the local governing body to establish effective and enforceable speed limits on town highways at not more than 50 MPH or less than 25 MPH and to do so on the basis of a traffic engineering investigation or study. This provision mandates that any speed limit must be justified and reasonable, based on the conditions that prevail on the particular road or street being considered. Refer to page 27 of this handbook for the text of 23 V.S.A. Section 1007.

This handbook is a guide to be used by Vermont municipal officials in setting reasonable and safe speed limits on town roads and streets. Together with the ten-minute videotape entitled "Setting Speed Limits", this handbook provides the basic information necessary to set speed limits on municipal roads and streets.

### **Assistance Available**

Vermont Local Roads  
Saint Michael's College  
1 Winooski Park, Box 260  
Colchester, VT 05439  
1-800-462-6555

Vermont Agency of Transportation  
Traffic and Safety Division  
133 State Street  
Montpelier, VT 05633  
1-802-828-2181

(The Traffic and Safety Division may be able to print out spot speed study information for towns who send in their raw data. Call the Traffic and Safety Division for information first.)

Check with the staff of your regional planning commission who may be able to assist.

## Principles for Setting Speed Limits

There are basically two principles for setting speed limits to achieve reasonable and safe speeds.

The first is to protect the public and curb unreasonable behavior. Motorists should have some assurance that the risk of having an accident is low on that particular road or street if they obey the speed limit.

Of course, operators have responsibilities. They should drive at speeds that are reasonable and proper for the prevailing conditions such as snow and ice, fog, darkness, heavy traffic, and so on. Speed limits tell the motorist what the maximum speed is. Drivers should use common sense and drive according to the prevailing conditions and surroundings. They also must heed other traffic control devices such as black/yellow warning signs, pavement markings, flashing beacons, and so on.

Second, to effectively enforce a law, the public must believe that the law is reasonable. Local officials should not set a uniform speed limit for all roads and streets, nor should they succumb to pressure by residents to lower speed limits. The random installation of signs and speed limits can be detrimental to safety by breeding disrespect for all speed limits. The majority of motorists will drive at a speed that they perceive to be safe. In the absence of a study identifying that speed limit, setting a speed limit too low merely punishes motorists who otherwise obey the law. Studies indicate that the measured average speed that most drivers perceive safe is at or very close to the speed limit established by a traffic engineering study.

Gravel roads are particularly difficult to assess. They typically do not exhibit the same characteristics as paved roads. Most are more narrow, have more horizontal and vertical curves and are not as heavily traveled as paved roads. One school of thought is not to set a speed limit at all due to the difficulty in assigning a uniform speed limit. Residents often oppose this concept. Each situation should be thoroughly investigated and scrutinized before assigning a speed limit.

Conducting a traffic engineering study provides information for basing judgements on facts and not on guesses or political pressure.

## Recommended Practice

A traffic engineering study allows you to carefully consider the characteristics of each road, its surrounding features, and other factors. You then have the information you need to make a reasonable judgment in assigning a speed limit that is "reasonable and safe."

Conducting a traffic engineering study does not mean you have to be an engineer. But you do have to investigate the conditions. The following criteria comprise the minimum requirements for a traffic engineering study.

Only three forms are necessary. All can be copied. Use the "Traffic Engineering Report" on page 21 for items one through six. Use the "Spot Speed Study Field Data Sheet" on page 23 and the "Spot Speed Study Summary" on page 25 for item 2, monitoring vehicle speeds.

1. Consider the road itself, such as the characteristics of the travel surface, the condition of the shoulder, the road's alignment and sight distance, the width of the road and shoulders and the number of lanes.

Determine the presence of passing zones.

Determine the maximum grade and the degree of critical curves. Steep roads and sharp curves usually require slower speeds.

Consider what motorists might do if you lowered the speed limit because of the presence of a hazard. Would this create a situation where motorists would risk passing slow moving vehicles, for example, thus creating greater danger?

As you travel the road, look for these and other characteristics and record the information on the "Traffic Engineering Report" form.

2. Monitor the speed at which vehicles are traveling. Do this by performing a spot speed study and recording the speeds on the "Spot Speed Study Field Data Sheet." This consists of monitoring a minimum of 100 vehicles and identifying that speed under which most (85%) vehicles are traveling. (Surveying exactly 100 vehicles makes it easier to calculate percentages.) Experience has shown that a posted speed limit near this value is safe and reasonable.

On low volume roads, instead of gathering a sample of 100 vehicles, you might use several time runs and estimate the speed. In fact, the Vermont Agency of Transportation suggests that obtaining the 85<sup>th</sup> percentile speed on low volume roads may not be practical. It may require too much time to obtain a significant sample.

Another method is to determine the pace speed to obtain the 85<sup>th</sup> percentile speed. It is the ten mile-per-hour band of travel speeds containing the largest number of observed vehicles. See the explanation on page 24.

3. Look for roadside development and culture. Is it a densely residential area? A commercial area with many driveways entering the highway? A school zone? A trailer park? Or is it rural farmland? Considering the type and the density of development along the road will help you to decide what is a reasonable and safe speed for those conditions. Record the information on the form.
4. Determine the safe speed for curves or other hazardous locations within the zone, such as intersections.

You can determine the advisory speed for a curve by driving the section in a conventional automobile. Make several passes along the centerline of the travel lane at constant speeds, increasing the speed by 5 mph on each pass. Select the speed that allows you to negotiate the curve safely and comfortably, without excessive braking or feeling a concern for safety. If you find you are leaning in the seat while negotiating a curve, it is an indication you are going too fast.

The Vermont Agency of Transportation sometimes uses a ball bank indicator, also known as a slope meter, to determine the advisory speed of a curve. They cost about \$100.

Use the following chart to determine the maximum safe speed for approaching an intersection based on stopping sight distance.

<b>HIGHWAY CONDITIONS (THREE OR MORE MUST BE SATISFIED)</b>				
Design speed (mph)	Minimum Length of Zone Equals or Exceeds (miles)	Average Distance Between Intersections Equals or Exceeds (feet)	PRELIMINARY	
			Number of Roadside Businesses does not Exceed (per mile)	ESTIMATE OF MAXIMUM SPEED (mph)
20	0.2	no min	no max	20
30	0.2	no min	no max	30
40	0.3	125	8	40
50	0.5	250	6	50
60	0.5	500	4	60
70	0.5	1000	1	70

Use a black on yellow advisory speed plate placed below the warning sign to indicate the safe speed. The advisory speed plate cannot be the same or higher than the posted speed limit.

5. Record the parking practices and pedestrian activity in the area. Record whether parking is on the roadway or off street. Is parking controlled by signs or markings or meters?

Make a note about pedestrian activities. Higher pedestrian activity may require a lower speed.

6. Record the reported accident experience for a recent twelve month period. High accident experience may indicate a need to moderate the speed limit. Consider, however, that accidents are caused by other contributing factors such as turning movements, intersections, DWI, ice and snow, and the like.

On the "Traffic Engineering Report" form, note any other features that may influence traffic movement.

## **Determining the Speed**

With the data you have collected, you can determine a proper speed for the road under consideration. A reasonable and safe speed will give a driver time to react and stop or slow down sufficiently to avoid potential conflicts while driving at a comfortable speed. You can test for the proper speed by driving the road section at constant speeds, increasing the speed by 5 mph on each pass. This is similar to testing for safe speeds on low volume roads.

Towns sometimes tend to set speed limits too low. This merely creates more speeders, since the majority of motorists drive at speeds they perceive to be safe. Speeds set too low can also create more, and sometimes dangerous, passing. Many people will strictly obey the speed limit regardless of whether it is too slow for the majority of drivers.

Generally speaking, the Vermont Agency of Transportation's Traffic and Safety Division does not recommend setting speed limits on Class 3 gravel roads. Most people tend to drive on gravel roads at speeds slower than what towns might set them.

The traffic engineering survey is a reasonable method for helping you make an informed decision about the proper speed for a particular road. No one of the criteria by itself determines "reasonable and safe". To make an informed decision, consider all the criteria.

## **Adopting a Traffic Ordinance**

Once you have decided the speed limits for your streets and highways, the next step is to adopt an ordinance, making speed limits official municipal policy.

A traffic ordinance establishes speed limits and other traffic regulations (STOP, YIELD, parking, etc.) as municipal policy. (Refer to 23 V.S.A. Sections 1007 and 1008, and 24 V.S.A. Section 2291(4).) The ordinance makes the speed limits and other traffic regulations a matter of local law and therefore enforceable. A traffic ordinance can be passed by the local governing body unless petitioned by at least 5% of the people, in which case a vote of the townspeople is also required.

Provisions for passing an ordinance are in Title 24 V.S.A., Section 1972. Follow them carefully. People who challenge speed limits in court often question the procedures the town followed, especially whether the town conducted a traffic engineering study and whether the town followed all the steps in adopting the ordinance.

The traffic ordinance should describe the speed zone accurately. This can be done by referring to a town map, stating a distance from the beginning point to an identifiable point such as an intersection or town line, as well as the direction and distance to the end of the zone. Several speed zones of the same or of different limits may be included in one ordinance. Amendments to the ordinance can be made as the needs arise. Make sure to record the completed traffic study forms and the ordinance in the permanent town records.

The following model suggests what might be contained in a municipal traffic ordinance. A town should produce an ordinance that reflects its own unique conditions.

***A Model Traffic Ordinance***  
**TRAFFIC ORDINANCE**

**Town of \_\_\_\_\_, Vermont**

Pursuant to the provisions of Title 23, Vermont Statutes Annotated, Section 1007 and 1008, and Title 24, Vermont Statutes Annotated Sections 1971 and 2291(1)(4) and (5), and such other general enactments as may be material hereto, it is hereby ordained by the Board of Selectmen of the Town of \_\_\_\_\_ that the following Traffic Ordinance is adopted for the Town of \_\_\_\_\_, Vermont.

**ARTICLE I  
DEFINITIONS**

The definitions of Title 23, Vermont Statutes Annotated, Section 4 are incorporated by reference.

**ARTICLE II  
SCOPE**

The ordinance establishes special traffic regulations on public highways within the Town of \_\_\_\_\_, Vermont.

**ARTICLE III  
TRAFFIC CONTROL DEVICES**

**Section 1.** It shall be unlawful for any person to disobey the direction of a traffic control device except in response to the direction of a law enforcement officer.

**Section 2.** It shall be unlawful for any person to intentionally remove, injure, obstruct, deface, alter or tamper with any traffic control device.

**Section 3.** It shall be unlawful for any person to install any sign or device which may resemble or be mistaken for an official traffic control device, without prior approval of the Town of \_\_\_\_\_, Board of Selectmen.

**ARTICLE IV  
SPEED REGULATIONS**

On the basis of engineering and traffic studies, the following speed limits are hereby established.

T.H. #1 - A maximum speed of 25 m.p.h. from the intersection of VT. Route \_\_\_\_\_ easterly to the intersection of T.H. #2, then a maximum speed of 40 m.p.h.

from the intersection of T.H. #3 easterly and southerly to the \_\_\_\_\_ Town Line.

- T.H.#2 - A maximum speed of 35 m.p.h. from the intersection of VT. Route \_\_\_\_\_ to the \_\_\_\_\_ Town Line.
- T.H.#3 - A maximum speed of 35 m.p.h. from the intersection of T.H.#1 to the \_\_\_\_\_ Town Line.
- T.H.#4 - A maximum speed of 35 m.p.h. for the entire length.
- T.H.#6 - A maximum speed of 35 m.p.h. from the intersection of VT. Route \_\_\_\_\_ to the \_\_\_\_\_ Town Line.
- T.H.#7 - A maximum speed of 30 m.p.h. from the intersection of VT. Route \_\_\_\_\_ to the \_\_\_\_\_ Town Line.
- T.H.#8 - A maximum speed of 30 m.p.h. for the entire length.
- T.H.#16 - A maximum speed of 35 m.p.h. from the intersection of T.H.#20.
- T.H.#26 - A maximum speed of 30 m.p.h. for it's entire length.
- T.H.#31 - A maximum speed of 25 m.p.h. from they intersection of Vt. Route \_\_\_\_\_, extending easterly a distance of 0.83 miles east of Vt. Route \_\_\_\_\_, to intersection of T.H. #1

The above speed limits shall be posted in accordance with the standards set forth in the Manual of Uniform Traffic Control Devices and shall be in effect when so posted.

## **ARTICLE V STOP AND YIELD INTERSECTIONS**

- Section 1.** The following intersections shall be designated is stop intersections and shall be so signed: T.H. #4 entering T.H. #3  
T.H. #16 entering T.H. #3  
T.H. #18 entering T.H. #3  
T.H. #24 entering T.H. #3
- Section 2.** The following intersections shall be designated as "YIELD" intersections and shall be so signed: T.H. #3 entering T.H. #1  
T.H. #4 entering T.H. #1  
T.H. #28 entering T.H. #4

## **ARTICLE VI PARKING REGULATIONS**

- Section 1.** It shall be unlawful to park at any time on either side of T.H. #1 from the intersection of Vt. Route \_\_\_\_\_ easterly for a distance of forty-five (45) feet.
- Section 2.** It shall be unlawful to park on the south side of T.H. #1 from a point two hundred fifteen (215) feet east of Vt. Route \_\_\_\_\_ easterly to the covered bridge.
- Section 3.** It shall be unlawful to park at any time on T.H. #24 between the intersection of Vt. Route \_\_\_\_\_ and the \_\_\_\_\_ town line.

- Section 4.** It shall be unlawful to park on T.H. #1 between the intersections of Vt. Route \_\_\_\_\_ and the covered bridge, and within any municipal parking lot between the hours of 12:00 P.M. and 7:00 A.M. from November 15<sup>th</sup> to April 30<sup>th</sup>.
- Section 5.** Any vehicle parked in violation of the provisions of this Article may be summarily removed at the owner's expense, by order of any law enforcement officer, road commissioner, or selectman.
- Section 6.** If the owner of a vehicle summarily removed under section 5 hereof does not claim such vehicle and pay all towing and storage expenses within thirty (30) days of the date of such removal, the title to such vehicle shall escheat to the Town and the vehicle may be sold or otherwise disposed of in accordance with Title 27, Vermont Statutes Annotated, Section 11.
- Section 7.** Nothing in this Article shall be construed to make unlawful vehicular stops in obedience to the direction of a law enforcement officer or for causes beyond the control of the operator.

**ARTICLE VII  
DESIGNATED ONE-WAY STREETS**

The following street or portion of said street is hereby designated as a one-way street and the direction of travel shall be as follows.

\_\_\_\_\_ Street: Legal direction of travel, from intersection of \_\_\_\_\_ Street and Vermont State Highway Route No. \_\_\_\_\_ shall be south to the intersection of \_\_\_\_\_ Street and \_\_\_\_\_ Street.

\_\_\_\_\_ Road: Legal direction of travel, from intersection of \_\_\_\_\_ Road with \_\_\_\_\_ Road, shall be west to the intersection of \_\_\_\_\_ Road with \_\_\_\_\_ Road.

**ARTICLE VIII  
LOADED VEHICLES**

No vehicle shall be driven or moved on any street unless such vehicle is so constructed or loaded so as to prevent its contents from dropping, sitting, leaking or otherwise escaping therefrom.

**ARTICLE IX  
GENERAL PROVISIONS**

**Section 1. Separate Offenses:**

Each violation of a provision of this ordinance shall be deemed a separate offense.

**Section 2. Penalties:**

The provisions of this ordinance shall be cumulative to the fullest extent permitted by law with respect to all other statutes or ordinances now or hereafter adopted regardless of their order of passage or enactment.

**Section 3. Severability:**

The provisions of this ordinance are declared to be severable and if any provisions hereof be adjudged invalid such judgment shall not affect the validity of any other provisions.

**Section 4. Designation:**

This ordinance may be referred to as the \_\_\_\_\_ Traffic Ordinance and in a prosecution hereunder a copy of such ordinance, certified by the Town Clerk shall be prima facie evidence thereof. An allegation that the act constituting the offense charged is contrary to a specified provision of this ordinance shall be a sufficient reference hereto.

**Section 5. Repeal of Prior Ordinances:**

Any other ordinance or traffic regulation heretofore adopted by the Town of \_\_\_\_\_ is hereby repealed.

**Section 6. Publication and Posting:**

This ordinance shall be published in the \_\_\_\_\_ on \_\_\_\_\_, 19\_\_ and shall be filed with the \_\_\_\_\_ Town Clerk on \_\_\_\_\_, 19\_\_.

Adopted by the Board of Selectmen, Town of \_\_\_\_\_ at its meeting held on the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_.

## **QUESTIONS OFTEN ASKED ABOUT LOCAL SPEED LIMITS**

### **Q. Should the local ordinance be approved by the State Traffic Committee?**

A. No. Title 23 V.S.A., Section 1007, provides an avenue of appeal if there is dissension over the adoption process.

### **Q. Can a single speed limit, for example 35 MPH, be established for all the roads in town and posted at each highway entering the town?**

A. It is doubtful that an engineering and traffic study would indicate that any one speed limit would be proper for all highways in a town. Signing only at the town line does not fulfill the mandate of the law for posting speed limits.

### **Q. What is wrong with installing a few signs where they are needed for whatever good they can do without enforcement?**

A. This does not conform to the law and it will breed disrespect for all speed limits. An enforcement officer who cites someone on the assumption that a speed zone is valid will be embarrassed when trying to prove the case in court. The officer will be reluctant to enforce local regulations further.

### **Q. When is a traffic engineering study required?**

A. To lower or raise existing speed limits. A study is not required to initially establish a 50-mph zone.

### **Q. Do we have to hire a professional engineer to do the study?**

A. No. Anyone can gather the information needed.

### **Q. What if the selectmen receive a petition from a significant number of residents demanding a speed limit in a certain area?**

A. The law states that the speed limit must be based on an engineering and traffic study. A petition may result in a survey, but the decision to establish a speed limit must be based on the results of the study, not the opinion of the petitioners.

### **Q. Should the speed limit be set 5 or 10 mph below what the investigation indicates to make up for the tolerance allowed by enforcement officers?**

A. No. The statutes do not provide for a tolerance. A speed limit set too low is not realistic and will not command the respect of motorists.

### **Q. Should towns install speed limit signs on all of their town highways?**

A. Probably not since the minimum/maximum speed limits are 25 mph and 50 mph respectively. A speed limit of 25 mph might be too high for most class 4 town highways and some class 3 town highways. By the same token, 50 mph signs on gravel town highways would suggest it is safe to drive at that speed when, in fact, it might not be.

**Q. Are advance signs such as "Reduced Speed Ahead" required on the approach to speed limit zone?**

A. No. Such signs are not required but they are recommended where a speed reduction of 15 mph or more is required. If used, the sign must conform to the MUTCD.

**Q. Should a speed limit be set at the safe speed for the worst spot in the proposed zone?**

A. No. A spot hazard such as a sharp curve or intersection should be treated with the appropriate warning sign for the particular hazard. The warning sign may or may not include an advisory speed plate. An established speed limit is not a guarantee that the speed can be maintained throughout the zone. It is a speed that will allow the driver time to react to a variety of situations which may occur within the zone.

**Q. How does a town go about making a change in speed limits on state highways?**

A. Selectmen should write to the Secretary of the State Traffic Committee, Department of Public Safety, Waterbury, VT 05676 requesting a speed limit change and citing their reasons. A copy of the letter should be sent to the District Transportation Administrator. Staff of the State Traffic Committee will conduct a traffic and engineering study and present findings to the Traffic Committee at an open meeting. The Town will be notified of the meeting and will be invited to present testimony.

## **SIGNS**

### **1. Postings Signs**

Title V.S. A. Section 1025 adopts the MUTCD as the standard for all traffic control signs, signals, and markings on town highways in Vermont. The MUTCD lists basic requirements for signs, signals and markings to be effective. They must

- fulfill a need
- command attention
- convey a clear, simple meaning
- allow adequate time for a proper response

Basic suggestions for the selection and use of signs are:

- Use approved signs (size, shape, colors, text)
- Try to achieve uniformity among signs (size, message)
- Keep messages simple.

- Place signs in locations where they will be easily seen; avoid locations just over the brow of a hill or just around a curve
- Use signs only when necessary

## 2. Categories of Signs

Regulatory signs inform drivers that specific regulations apply at specific places and times. Speed limit and stop signs are regulatory signs.

Warning signs advise drivers of potentially hazardous locations, maneuvers or activities.

Guide signs give information about routes, directions, destinations, points of interest and services.

## 3. Size and Spacing of Signs

The MUTCD has guidelines for the size, shape, color, height, distances and reflectivity of signs. The standard size and color are 24" X 30" with black text on reflective white or silver background. The minimum size is 18" X 24". If "Reduced Speed Ahead" signs are used, they must be the same size as the next speed limit sign. Signs must be located at each change in speed limit -- one for traffic entering the zone and one for traffic leaving the zone at each end of the zone. An "end Speed Limit xx" sign can be used if the town does not want to indicate the next zone is 50 mph per state law. A sign is required following each major intersection. Intermediate signs should be posted as needed to remind motorists what the speed is in that zone.

There is no set minimum distance between signs within a speed limit zone. Since intermediate signs remind drivers of the speed limit, the distance between them should be determined based on time and roadside distractions. Based on a 1-minute time span, for example, a 25 or 30 mph limit could be signed about every 1/2 mile and a 40 or 45 mph limit could be signed about every 3/4 mile. This assumes that there are no unusual distractions to occupy a driver's attention such as recreation activities, shop windows, other types of signs, panoramic views and the like.

Another rule of thumb could be 0.3 to 0.4 miles for 25 to 30 mph speed zones and 0.5 to 0.8 miles for 35 to 45 mph zones. Signs within a 50 mph zone can be a mile or two apart since State law indicates the speed limit is 50 mph unless otherwise posted.

Do not use speed zones to warn motorists of hazardous conditions. On rural roads, for example, avoid posting speed limits, say from 40 to 30 to 35 to 45 back to 30 and so on. Rather, try to establish one speed limit and use advisory speed plates as needed for curves, hills and other hazardous conditions.

#### **4. Inspecting and Maintaining Signs**

Signs must be maintained if they are to be effective and enforceable. Survey road signs for damaged or missing signs at least twice a year, under daytime, nighttime (for reflectivity), and inclement weather conditions. Clean all signs to improve reflectivity. Clear away brush, limbs or grass which may obstruct signs. Straighten leaning posts. Missing STOP signs should be considered an emergency and replaced immediately.

Keep a detailed log for every traffic sign. This information may be necessary for legal purposes and for planning replacement of signs. A good record system will list the sign type, date of installation, type of support, and maintenance or replacement activities. It is a good practice to mark the date on the back of each sign panel when it is put in place.

Vermont Local Roads conducts workshops on the Sign Information Management Systems (SIMS). This is an easy-to-use computer program that saves lots of time and energy and provides all the information you need to manage your signs.

If you prefer a hand written method, this one comes from Thomas Szebenyi at the Cornell Local Roads Program.

#### **Create a file of 4 X 6 cards and lay each card out as follows:**

Date: (Today)  
Road: (Name)  
Direction of Travel:  
Starting point: (In miles or kilometers)  
Location: (from reference starting point)  
MUTCD sign code: (This is not essential)  
Text on sign:  
Size: (width x height, and cost)  
Placement: (left, right, center, overhead)  
Pointing which direction: (forward, reverse)  
Support type and cost: (steel channel, pipe, etc.)  
Date installed:

#### **On the back of each card, you can then record:**

Inspection date:  
Condition of sign:  
Defects:  
Date of work order:  
Work order purpose:  
Date work completed:

## **Enforcement**

A speed limit will only be as effective as the enforcement it receives. To be enforceable, a speed limit must conform to both the state statutes and the MUTCD. Enforcement officers need the backing of a traffic ordinance based on an engineering and traffic study.

Enforcement of speed limits is sometimes necessary for maintaining conformance by motorists. Irrational drivers cannot be controlled except by enforcement. Never establish speed limits artificially low to slow irrational drivers. It doesn't work. If speed limits are set too low for a particular road or street, even responsible drivers will usually exceed the limit. Enforcement then becomes unnecessarily time consuming and a drain on resources.

Also consider that local drivers tend to be the frequent violators because they claim to know the road "by heart". This should not give them license to exceed the speed limits.

## **Forms**

The form on the facing page, "Traffic Engineering Report for a Spot Speed Limit Study" was developed for use by the Vermont Agency of Transportation. It encourages a thorough investigation of a road or street for purposes of setting a speed limit.

Gather as much information as you can.

M.P. = mile post

TH = Town Highway

Make copies of this form. One copy is needed for each road section you survey.

### **Spot Speed Survey Field Data Sheet**

1. Fill out the information required at the top of the form. (M.P. stands for mile post.)
2. Circle appropriate direction of travel for vehicles being monitored, either northbound/southbound (NB/SB) or eastbound/westbound (EB/WB).
3. Aim the radar gun in the appropriate direction and wait for a car to drive by. When the car passes through the radar field a number will flash in the target window of the unit. Go down the appropriate column for cars or for trucks and buses, and then the column for direction. Find the speed along the left of the column which coincides with the speed of the vehicle and put down a tic mark. Preceding or following the placement of the tic mark make another tic mark on some scrap paper to represent the vehicle. Continue in this manner until your

scrap paper has 100 tic marks, representing 100 vehicles. Count the tics to be sure you have enough information.

Make copies of this form. One copy is need for each road section you survey.

### **Summary of a Spot Speed Survey**

Modal Speed The modal speed is the speed at which the highest number of vehicles are travelling. Place a check mark next to the modal speed.

Average (Median) Speed The average (median) speed is the speed at which at least 50% of the vehicles are travelling.

85<sup>th</sup> Percentile The 85<sup>th</sup> percentile is the speed at or below which 85% of the sample of vehicles surveyed are travelling. So, of 100 vehicles surveyed,  $100 \times .85$  represents 85 vehicles from the bottom of the column. The 85<sup>th</sup> percentile for sixty-two vehicles, for example, would be  $62 \times .85 = 52.7$ . Round up the number to 53.

Ten Mile Pace The ten mile pace is the block of ten miles per hour which contains the most vehicles. Look for an area that appears to have the most vehicles in it and add them up. Put a line above the ten miles per hour block and another one below it. Now check to see if you can move the lines up or down simultaneously, to increase the total number of cars. If not, then this is the ten mile pace.

Speed Limit Range The speed limit range has two numbers. It has a high number and a low number. The high number of the speed limit range is the lowest of two numbers minus three. The two numbers are 1) the 85<sup>th</sup> percentile, and 2) the high number of the ten mile pace. Choose the lowest of those two numbers and subtract three from it. That is the high number of the percent in pace. Now, the low number of the speed limit range is the low number of the ten mile pace.

Percent in Ten mile Pace This is the percent of vehicles travelling within the ten mile pace. Sum the vehicles in the ten-mile pace and divide them by the total number of vehicles (which should be 100). So, for example, if you have a total of 100 vehicles, 62 of which are in the ten-mile pace, you would have 62 percent in pace.

Make copies of this form. One copy is needed for each road section you survey.

## Definitions

85<sup>th</sup> percentile speed - the speed at or below which 85 percent of the sample of free flowing vehicles are travelling. This speed should be determined by conduction a spot speed study.

Advisory speed - the speed at which a specific feature along the street or highway can be safely traversed.

Basic Speed Law - no person shall operate a motor vehicle at a speed greater than is reasonable and proper for the prevailing conditions.

Manual on Uniform Traffic Control Devices (MUTCD) - the national standard adopted by state law as the standard to be followed by state and municipal authorities in Vermont.

Pace - the 10 miles per hour band of travel speeds containing the largest number of observed vehicles.

Speed Limit - the maximum (or minimum) speed permitted on a section of street or highway.

Tolerance - the numerical difference between the speed limit and the minimum speed at which enforcement action is taken.

### **Text of 23 V.S.A, Section 1007: Local Speed Limits**

- (a) Whenever the legislative body of a municipality determines, on the basis of an engineering and traffic investigation, that a maximum speed permitted under this chapter is greater or less than is reasonable and safe under conditions found to exist upon all or a part of any city, town or village street or highway within its jurisdiction, it may determine and declare a reasonable and safe maximum limit any provision of any municipal charter or ordinance to the contrary notwithstanding which:
- (1) increases the limit, but not to more than fifty miles per hour; or
  - (2) decreases the limit, but not to less than twenty-five miles per hour.
- (b) Whenever the legislative body of a city determines, on the basis of an engineering and traffic investigation, that a maximum speed permitted under this chapter is greater or less than is reasonable and safe under conditions found to exist upon all or a part of any state highway, other than a limited access highway, within its jurisdiction, it may determine and declare a reasonable and safe maximum limit any provision of any municipal charter or ordinance to the contrary notwithstanding which:
- (1) increases the limit, but not to more than fifty miles per hour; or

- (2) decreases the limit, but not to less than twenty-five miles per hour.
- (c) Any altered limit is effective at all times or during hours of darkness or at other times as may be determined when appropriate signs giving notice are erected upon the street or highway.
- (d) The special regulations have the full force and effect of law and are in the case of regulations adopted under subsections (a) and (b) of this section subject to review by the traffic committee, whose decision is final.
- (e) Lack of evidence of a traffic and engineering study will not invalidate a local speed limit ordinance as adopted or amended under this section after five years following the day on which the speed limit ordinance took effect.

## References

Chittenden County Regional Planning Commission Speed Limit Handbook, CCRPC, Essex Junction, VT, 1989.

Manual of Traffic engineering Studies, fourth Edition, Institute of Transportation Engineers, Washington, D.C., 1976.

Manual on Uniform Traffic control Devices, U.S. Government Printing Office, Washington, D.C., 1988 edition.

Setting Speed Limits: A Guide for Vermont Towns, Vermont Local Roads Program, Saint Michael's College, Colchester, VT, 1986.

Sign Inventory Program Using 4 X 6 Index Cards, From "Nuggets and Nibbles", Winter, 1994, Cornell Local Roads Program newsletter.

Speed Zone Guidelines: A Proposed Recommended Practice, Institute of Transportation Engineers, 525 School Street., S.W., Suite 410, Washington, D.C. 20024-2797, 1993, 5 pages.

## SPEED LIMITS ON UNPAVED ROADS

A new State law (S.56) gives municipalities the option of setting speed limits on all or portions of unpaved roads at no less than 35 and no more than 50 mph *without* conducting an engineering and traffic investigation. But the law goes on to require that towns consider four criteria which are part of what is commonly accepted as criteria for conducting an engineering and traffic investigation.

An engineering and traffic investigation helps to base a reasonable speed limit on facts and not on whimsy, assuring motorists that a posted speed limit is safe and reasonable. The Manual on Uniform Traffic Control Devices (MUTCD) sets out six criteria:

1. Road surface characteristics, shoulder condition, grade, alignment & sight distance.
2. The 85<sup>th</sup> percentile speed/pace speed.
3. Roadside development and culture & roadside friction.
4. Safe speed for curves or hazardous locations within the zone.
5. Parking practices and pedestrian activity.
6. Reported accident experience for a recent 12-month period.

In setting speed limits between 35 to 50 mph on unpaved roads, the new law requires selectboards to consider:

- neighborhood character  
(number 3 of the MUTCD criteria)
- abutting land use  
(number 3 of the MUTCD criteria)
- bicycle and pedestrian use  
(number 5 of the MUTCD criteria)
- the physical characteristics of the highway (number 1 & 4 of the MUTCD criteria).

We can assume, therefore, that the legislature means to eliminate the need for considering the 85th percentile and pace speed (#2), parking practices (#5) and accident experience (#6) when considering the reasonable speed limit for unpaved roads (35, 40, 45 and 50 mph).

The Vermont Agency of Transportation, Vermont Local Roads and the VLCT suggest that municipalities take the following steps in establishing speed limits on municipal roads and streets.

### Paved Roads

Follow the standard procedures from the MUTCD which are explained more fully in the handbook Setting Speed Limits: A Guide for Vermont Towns. The handbook also contains a model traffic ordinance.

## Unpaved Roads

1. Physically view the entire length of each road, taking into consideration the four criteria under the new State law (S.56) instead of the six from the MUTCD.
2. Document as much information as possible (necessary for credibility and enforcement).
3. If it appears that the reasonable speed should be 35, 40, 45 or 50 mph, go to step 5.
4. If it is clear that the reasonable speed should be 25 or 30 mph, continue the traffic investigation using all six of the standard criteria.
5. As a selectboard, formally decide what the speed limit is for each road, basing decisions on observations.
6. Incorporate the selectboard's decisions in a municipal traffic ordinance, following carefully all the steps for adopting or amending an ordinance.
7. Record all official actions with the Town Clerk.
8. Erect appropriate signs according to MUTCD guidelines.

For more information, call  
Vermont Local Roads at 1-800-462-6555

# Speed Limits On Unpaved Roads Addendum

State law gives municipalities the option of setting speed limits on all or portions of unpaved roads at no less than 35 and no more than 50 mph *without* conducting an engineering and traffic investigation. But the law goes on to require that towns consider four criteria which are part of what is commonly accepted as criteria for conducting an engineering and traffic investigation.

An engineering and traffic investigation helps to base a reasonable speed limit on facts and not on whimsy, assuring motorists that a posted speed limit is safe and reasonable. The Manual on Uniform Traffic Control Devices (MUTCD) sets out six criteria:

1. Road surface characteristics, shoulder condition, grade, alignment and sight distance.
2. The 85<sup>th</sup> percentile speed/pace speed.
3. Roadside development and culture and roadside frictions.
4. Safe speed for curves or hazardous locations within the zone.
5. Parking practices and pedestrian activity.
6. Reported accident experience for a recent 12-month period.

In setting speed limits 35 to 50 mph on unpaved roads, the new law requires select boards to consider:

- Neighborhood character (number 3 of the MUTCD criteria)
- Abutting land use ( number 3 of the MUTCD criteria)
- Bicycle and pedestrian use (number 5 of the MUTCD criteria)
- The physical characteristics of the highway (number 1 and 4 of the MUTCD criteria).

We can assume, therefore, that the legislature means to eliminate the need for considering the 85<sup>th</sup> percentile and pace speed (#2, parking practices (#5) and accident experience (#6) when considering the

reasonable speed limit for unpaved roads (35, 40, 45 and 50 mph).

The Vermont Agency of Transportation, Vermont Local Roads and the VLCT suggest that municipalities take the following steps in establishing speed limits on municipal roads and streets.

## **Paved Roads**

Follow the standard procedures from the MUTCD which are explained more fully in the handbook *Setting Speed Limits: A Guide for Vermont Towns*. The handbook also contains a model traffic ordinance.

## **Unpaved Roads**

1. Physically view the entire length of each road, taking into consideration the four criteria under the law instead of the six from the MUTCD.
2. Document as much information as possible (necessary for credibility and enforcement).
3. If it appears that the reasonable speed should be 35, 40, 45 or 50 mph, go to step 5.
4. If it is clear that the reasonable speed should be 25 or 30 mph, continue the traffic investigation using all six of the standard criteria.
5. As a select board, formally decide what the speed limit is for each road, basing decisions on observations.
6. Incorporate the select board's decisions in a municipal traffic ordinance, following carefully all the steps for adopting or amending an ordinance.
7. Record all official actions with the Town Clerk.
8. Erect appropriate signs according to MUTCD guidelines.

*Call Vermont Local Roads for more info:  
800-462-6555 or 802-654-2652.*



# APPENDIX A

# TITLE XXI MOTOR VEHICLES

## CHAPTER 265 RULES OF THE ROAD

### *Speed Limitations*

#### Section 265:60

##### **265:60 Basic Rule and Maximum Limits. –**

I. 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. 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 legal requirements and the duty of all persons to use due care.

II. Where no hazard exists that requires lower speed for compliance with RSA 265:60, I, the speed of any vehicle not in excess of the limit specified in this section or established as hereinafter authorized shall be prima facie lawful, but any speed in excess of the limit specified in this section or established as hereinafter authorized shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful:

(a) In a posted school zone, at a speed of 10 miles per hour below the usual posted limit from 45 minutes prior to each school opening until each school opening and from each school closing until 45 minutes after each school closing.

(b) 30 miles per hour in any business or urban residence district as defined in RSA 259:118;

(c) 35 miles per hour in any rural residence district as defined in RSA 259:93, and on any class V highway outside the compact part of any city or town as defined in RSA 229:5, IV;

(d) 55 miles per hour in other locations, except as provided in (e);

(e) 65 miles an hour on the interstate system, the central New Hampshire turnpike and the eastern New Hampshire turnpike in locations where said highways are 4-lane divided highways or other divided highways of 4 or more lanes.

(f) On a portion of a highway where officers or employees of the agency having jurisdiction of the same, or any contractor of the agency or their employees, are at work on the roadway or so close thereto as to be endangered by passing traffic, at a speed of 10 miles per hour below the usual posted limit, but in no case greater than 45 miles per hour. The speed shall be displayed on signs as required by RSA 265:6-a.

III. The limit specified in II(e) shall be the maximum lawful speed and no person shall drive a vehicle on said ways at a speed in excess of such maximum limit. The prima facie speed limits set forth in this section may be altered as authorized in RSA 265:62.

IV. The driver of every vehicle shall, consistent with requirements of paragraph I, drive at an appropriate reduced speed when approaching and crossing an intersection or railway grade crossing, when approaching and going around a curve, when approaching a hillcrest, when traveling upon any narrow or winding roadway, and when special hazard exists with respect to pedestrians or other traffic by reason of weather or highway conditions.

**Source.** 1905, 86:8. 1909, 154:4. 1911, 133:13. 1921, 119:13. PL 103:17. 1927, 76:2. 1937, 125:1. RL 119:29. 1949, 286:1. RSA 263:53. 1963, 330:1. RSA 262-A:54. 1965, 335:1. 1979, 358:4. 1981, 146:1. 1987, 217:1. 1988, 245:11. 1989, 164:1, eff. July 16, 1989. 1997, 11:1, eff. June 21, 1997. 1999, 73:1, eff. July 27, 1999.

# TITLE XXI MOTOR VEHICLES

## CHAPTER 265 RULES OF THE ROAD

### *Speed Limitations*

#### Section 265:62

##### **265:62 Establishment of State Speed Zones. –**

I. Whenever the commissioner of transportation shall determine, upon the basis of an engineering and traffic investigation, or in the event of vehicle or weather emergencies, that any prima facie speed limit hereinbefore set forth is greater or less than is reasonable or safe under the conditions found to exist at any intersection or other place or upon any part of the state highway system, outside the compact part of cities or towns, said commissioner may determine and declare a reasonable and safe prima facie speed limit thereat which shall be effective when appropriate signs giving notice thereof are erected. Such signs may carry either a fixed speed limit legend or a changeable message so designed as to permit display of different speed limits at various times of the day or night. Such a prima facie speed limit may be declared to be effective at all times or at such times as are indicated upon the said signs. The said commissioner shall keep and maintain a full and complete record of all speed zones established by him and all alterations, amendments or removal thereof.

II. Notwithstanding the provisions of paragraph I and RSA 265:60, II, or any other law to the contrary, upon recommendation of the commissioner of transportation and a determination by the governor and council that it is in the public interest to conserve motor vehicle fuels or to conform with other national goals, the governor and council may establish temporary prima facie speed limits upon any part, including, but not limited to, the ways specified in RSA 265:60, II(e), of the state highway system outside the compact part of cities and towns. Such temporary speed limits shall become effective when appropriate signs giving notice of the limits thereby established are erected.

III. The commissioner of transportation shall keep and maintain a full and complete record of all temporary speed zones established pursuant to paragraph II and all alterations, amendments or removal thereof. Such temporary speed limits shall remain in effect until rescinded by the governor and council, or 12 months from the effective date of establishment, whichever occurs first. Said temporary speed limit may be reimposed, with or without lapse, as hereinbefore provided.

IV. (a) The commissioner of transportation, upon the petition of the governing body of a municipality, shall determine if any prima facie speed limit hereinbefore set forth should be reduced to provide reasonable and safe conditions upon any part of the state highway system within the compact part of cities or towns; provided, however, the resulting speed limit shall not be less than 25 miles per hour.

(b) The petition shall designate the area of the state highway system and the reasons for the reduction in the speed limit. The review of the petition shall include an engineering and traffic investigation and consultation with the petitioners. The commissioner shall provide the petitioners, in writing, the results of his findings. The commissioner may recommend a decrease in the posted prima facie speed limit, but in no case shall the resulting speed limit be below 25 miles per hour.

**Source.** 1937, 125:2. 1939, 130:2, 3. RL 119:30. 1949, 286:2. RSA 263:54. 1963, 330:1. RSA 262-A:56. 1965, 335:2. 1974, 45:9. 1981, 146:1. 1989, 175:1, eff. July 16, 1989. 1999, 73:2, eff. July 27, 1999.

# TITLE XXI MOTOR VEHICLES

## CHAPTER 265 RULES OF THE ROAD

### *Speed Limitations*

#### Section 265:63

##### **265:63 Alteration of Limits. –**

I. Whenever local authorities in their respective jurisdictions determine on the basis of an engineering or traffic investigation that the prima facie speed permitted under this chapter is greater or less than is reasonable and safe under the conditions found to exist upon a way or part of a way, the local authority may determine and declare a reasonable and safe prima facie limit thereon which:

- (a) Decreases the limit at intersections;
- (b) Increases the limit within an urban district but not to more than 60 miles per hour;
- (c) Decreases the limit outside an urban district but not to less than 25 miles per hour; or
- (d) Decreases the limit within any business or urban residence district but not to less than 25 miles per hour.

II. Local authorities in their respective jurisdictions shall determine by an engineering or traffic investigation the proper prima facie speed for all arterial streets and shall declare a reasonable and safe prima facie limit thereon which may be greater or less than the prima facie speed permitted hereunder for an urban district.

II-a. Local authorities shall not be required to hire outside consultants to determine the proper prima facie speed limits as provided in paragraphs I and II if the local community has sufficient staff to conduct the required engineering or traffic investigation.

III. Any altered limit established as hereinabove authorized shall be effective at all times or during hours of darkness or at other times as may be determined when appropriate signs giving notice thereof are erected upon such street or way.

IV. Any alteration of limits on state highways or extensions thereof in a municipality by local authorities shall not be effective until such alteration has been approved by the commissioner of transportation.

V. Notwithstanding the other provisions of this section, local authorities shall modify the speed limits authorized herein so that said speed limits shall not exceed the temporary prima facie speed limits established for the state highway system under RSA 265:62, II, so long as the same are in effect.

**Source.** RSA 262-A:56-a. 1965, 335:3. 1974, 45:10. 1981, 146:1. 1989, 306:1. 1990, 74:1, 2, eff. June 9, 1990.