

## Evaluation of Setting and Enforcing Rational Speed Limits

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

National Highway Traffic Safety Administration                      wais.access.gpo.gov

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[Notices]

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SUMMARY: The Speed Management Team of the U.S. Department of Transportation (U.S. DOT), a multi-modal body including members from FHWA and NHTSA,

The goal of the project is to evaluate a cooperative program in which engineering, enforcement, and education are undertaken in a coordinated manner to manage traffic speeds. Rational speed limits promote public safety by providing drivers with information to help them choose a reasonable and prudent speed that is appropriate for the normal traffic, weather, and roadway conditions. Speed limits are set with the objective of achieving a balance between safety and efficiency. Rational speed limits are determined through a formal review that uses the 85th percentile speed of free-flowing traffic combined with information on roadway geometry, crash characteristics and land use. This procedure results in a speed limit that appears reasonable to most drivers and thereby results in more uniform speeds. Previous research has suggested that speed uniformity is associated with lower crash risk and that the 85th percentile falls within the speed range of lower crash risk. Consequently, strict enforcement of rational speed limits, focused on flagrant speed limit violators and designed to minimize speed variance, may help in promoting safer travel. In addition, an effective public information and education campaign will help citizens understand how the speed limits were determined and the reason for their strict enforcement. Such a combined approach is expected to result in strong support from the public, the police, and the judiciary.

Cooperative agreements will be awarded to support a number of communities in developing and evaluating innovative speed management projects that adopt such a rational speed limit approach. The approach will incorporate the following steps:

- <bullet> An engineering and traffic investigation of existing speed limits.
- <bullet> Revision of speed limits where appropriate.
- <bullet> Education of the public on reasons for revising speed limits.
- <bullet> Enforcement of the rational speed limits fairly and strictly.
- <bullet> Identification of a separate community for comparison purposes.

This notice solicits applications from State and local governments and their agencies. Two to four cooperative agreement awards for demonstration and evaluation projects are anticipated under this

announcement. Interested applicants must submit an application package as further described in the Application Procedures section of this notice. Applications will be evaluated on the basis of the criteria identified in the Evaluation Criteria section of this notice.

DATES: Applications must be received at the office designated below on or before 4:00 p.m. on Tuesday, July 24, 2001.

ADDRESSES: Applications must be submitted to the National Highway Traffic Safety Administration, Office of Contracts and Procurement (NAD-30), ATTN: Maxine Ware, 400 7th Street, SW., Room 5301, Washington, DC 20590. All applications submitted must include a reference to NHTSA Cooperative Agreement Program No. DTNH22-01-H-05221.

FOR FURTHER INFORMATION CONTACT: General administrative questions may be directed to Maxine Ware, Office of Contracts and Procurement at (202) 366-4843. Technical questions relating to this Cooperative Agreement Program may be directed to Paul J. Tremont, Ph.D., Office of Research and Traffic Records (NTS-31), NHTSA, 400 7th Street, SW., Washington, DC 20590, or by e-mail at <[A HREF="mailto:paul.tremont@nhtsa.dot.gov">paul.tremont@nhtsa.dot.gov</A>](mailto:paul.tremont@nhtsa.dot.gov), or by phone (202) 366-5587. Interested applicants are advised that no separate application package exists beyond the contents of this announcement.

#### SUPPLEMENTARY INFORMATION:

##### Background

##### Introduction

Speed limits promote public safety by informing drivers of the maximum reasonable and prudent speed for each road segment. The speed limit should represent a concerted attempt to balance safety and travel efficiency. As such, it establishes a rational basis for enforcement to target violators traveling at unsafe speeds. Posted speed limits seek to confine speeds beneath an upper bound and produce a relatively uniform speed distribution. Previous research has suggested that speed uniformity among vehicles on a roadway is associated with lower crash risk. Rational speed limits are primarily based on existing traffic speed data and often take into account adjustments for roadway conditions, crashes, and land use.

##### General Principles

A guiding principle for setting rational speed limits is that they should provide a high level of compliance and consequently be largely self-enforcing. This requires that drivers understand the basis for the limit and that it appears to be reasonable. Such rational speed limits help to establish a reasonable standard for enforcement and permit authorities to concentrate enforcement efforts on those more flagrant speed limit violators and high-risk drivers who are likely to create unsafe situations. Achieving high compliance will require an effective combination of Public Information and Education (PI&E) and dedicated enforcement. For this cooperative agreement program, the recipient will be required to determine rational speed limits using the engineering

study procedure described in ``Guidelines for Setting Safe and Reasonable Speed Limits''. (Appendix A).

#### Elements of Speed Management

Managing speeds depends on the integration of three key elements: engineering, enforcement, and education. The prevailing speed engineering study is frequently cited as the desired way to achieve high compliance with what drivers choose as reasonable speed limits. For this approach, the 85th percentile of the distribution of free-flowing vehicle speeds is used as the starting point for setting the rational speed limit. To establish credibility of the rational speed limits program, a rigorous enforcement program must be developed and systematically applied. Finally, in order to gain full compliance of rational speed limits, the public must understand the basis for their setting and realize that they will be rigorously enforced. To achieve this, the community must also develop an effective PI&E program.

#### Additional Resources

The following is a list of resources for information on setting and enforcing rational speed limits. Copies are available upon request from Paul Tremont, the designated technical point of contact.

<bullet> Committee for Guidance on Setting and Enforcing Speed Limits. (1998) Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits. Special Report 254. Transportation Research Board, National Research Council, National Academy Press. Washington, D.C.

<bullet> Institute for Transportation Engineers. (1993) Speed Zone Guidelines: A Proposed Recommended Practice. Institute of Transportation Engineers: Washington DC.

#### Objective

The objective of these demonstration and evaluation projects is to determine the extent to which rationally established, well-publicized, and rigorously enforced speed limits lead to

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higher compliance and improved traffic flow, without reducing highway safety.

#### Description of Program Effort

General Requirements. This cooperative agreement program requires each recipient to conduct a carefully planned demonstration of setting and enforcing rational speed limits. The recipient shall designate a specific demonstration community (or group of communities). A demonstration community is the geopolitical area where the rational speed limit demonstration will take place. This could be a State, a county, a city, a township, a borough, or any defined geographic entity or group of geographic entities within the United States with a clear governing body. The recipient will conduct an engineering study of selected road segments and revise the speed limits on those road segments using a rational speed limits approach to manage speeds. The recipient will implement and maintain a speed enforcement program and

provide public information in the demonstration community to fully inform drivers of both the speed management program's rationale and the planned enforcement program. The recipient will collect data on speeds as well as on public outreach and enforcement throughout the demonstration period.

The recipient shall also designate, or at least suggest, a similar community with comparable road segments that could be used as a comparison site during this demonstration. These two communities must be separated geographically so that the demonstration community's speed management program does not influence driver behavior in the comparison community. Below is a listing and description of specific requirements.

## Planning Phase

### Task 1. Kickoff Meeting

Within two weeks of award, a one-day meeting will be held at U.S. DOT headquarters in Washington, DC, during which the recipient will conduct an informal briefing of its demonstration plan, including a discussion of the preliminary list of demonstration streets and highways.

### Task 2. Prepare Work Plan

Based on comments from U.S. DOT at the meeting, the recipient will prepare and submit a final work plan and project schedule in accordance with the schedule of deliverables. The work plan shall specify type and amount of data to be collected, procedures and equipment to be used, and plans for engineering, enforcement and PI&E. The work plan shall also include the final list of demonstration streets and highways along with the name or route number, start and end point, mileage, existing posted speed(s), functional class of road and area type. The demonstration roads may include a mix of existing road types, including arterials, collectors, and local roads. Interstates and other controlled access roads are excluded from this effort.

### Task 3. Conduct Engineering Studies

Conduct an engineering and traffic investigation on the demonstration roads using the engineering analysis described in Appendix A and/or other U.S. DOT approved methods. Speeds should be collected continuously for at least 24 hours using automated equipment capable of recording individual vehicle speeds and identifying free flowing vehicles (i.e. headway or gap greater than 3-5 seconds). Based on the findings from the engineering study, prepare a speed-zoning plan and obtain necessary approvals for the speed zoning changes. A copy of the speed zoning plan will be submitted to the U.S. DOT in accordance with the schedule of deliverables.

### Task 4. Collect Other Baseline Data

Collect enforcement and other data to help establish baseline measures, including:

- <bullet> Citations for speeding on selected road segments,
- <bullet> Crashes for the previous 3-5 years, including details of crash types, contributing factors, and citations issued,
- <bullet> Average daily traffic volume corresponding to same years as the crash data, and
- <bullet> Public attitudes and perceptions toward speed limits and enforcement.

A letter report will be prepared documenting the results this activity. The letter report will be submitted in accordance with the schedule of deliverables.

## Implementation Phase

### Task 5. Develop and Implement Public Information and Education (PI&E) Activities

Each demonstration community will be required to develop and implement a PI&E campaign intended to inform the public of the program, heighten awareness of the expected benefits, and encourage compliance with the new speed limits. The expectation is that with a more comprehensive understanding of the rational basis for the speed limits, drivers will be more likely to comply with them and less overall opposition will be encountered from the community. Accomplishing the PI&E objective requires that key public agencies and public figures support the program and implement it in an effective manner. The PI&E campaign for the demonstration community will include those elements outlined in ``Guidelines for Public Information and Education Programs for Rational Speed Limits'' (Appendix B). The recipient is required to prepare a calendar schedule of PI&E activities (i.e., press conferences, media materials, etc.) in accordance with the schedule of deliverables. All PI&E materials and products should be presented to the U.S. DOT for review and comments in accordance with the schedule of deliverables.

### Task 6. Post Rational Speed Limits

Based on the results of Task 3 above, the recipient will post revised speed limits as necessary.

### Task 7. Enforce Rational Speed Limits

Prosecutors and judges need to be well informed of the basis for rational speed limits and the need for swift and fair adjudication. U.S. DOT will provide information for judges and prosecutors in the demonstration community on speed management principles, the purpose of the demonstration project, and the effects of speeding on traffic safety. This training may include visits to the selected roadway segments where rational speed limits are set and demonstrations of the speed-measuring devices used. Enforcement on the demonstration roads will include those elements outlined in ``Guidelines for Enforcement of Safe and Rational Speed Limits'' (Appendix C).

### Task 8. Collect Post Baseline Data (Ongoing)

The recipient will collect speed data, enforcement data, and PI&E data at various times during the demonstration period. U.S. DOT will assist the recipient in determining the exact data to be collected and the schedule of collection. Because U.S. DOT intends to compare effects of different communities, U.S. DOT will specify the acceptable data elements and format. Data shall be provided in accordance with the schedule of deliverables and shall include:

a. Speed Data. Appropriate speed data will be collected by the recipient quarterly in at least 25% of the speed zones in a manner that will reveal any changes in the speed. There will be at

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least one measurement site on each demonstration road. Speed data will be collected in every speed zone on the demonstration roads at or about one year after the before data was collected. For long speed zones (greater than 5 miles in rural areas or 1 mile in urban areas) multiple locations for speed data collection may be required. Final determination of all ``after'' speed data collection locations shall be determined in conjunction with the U.S. DOT. The speed data shall include:

- <bullet> Individual vehicle speed,
- <bullet> Individual vehicle headway or arrival time, and
- <bullet> Measurement location, dates, and times.

To ensure that the baseline data and post-intervention data are comparable, recipients will be expected to collect the same types of speed data, at the same locations, in the same manner as was used in during the traffic and engineering investigation (see Task 3 above). These data shall be submitted to U.S. DOT on a schedule to be determined.

b. Enforcement Data. Enforcement and safety-related measures are needed to understand the impact of the level of enforcement on speeds and safety. These data should be collected on a schedule that ensures that the information accurately reflects police staffing assignments and other time-sensitive information. The data need to be provided to U.S. DOT quarterly with the delivery of the speed data. In accordance with the schedule of deliverables, the recipient shall provide enforcement data for the demonstration road segments on:

- <bullet> Traffic enforcement person hours,
- <bullet> Number of speed violation warnings, and speeding citations (and cited speeds),
- <bullet> Adjudications, and
- <bullet> Crashes (by crash type).

c. Public Information and Education. Public attitudes and perceptions prior to and following speed limit and enforcement changes are linked to the success of the program, and must be measured to determine how they may change. In the demonstration community, the public attitudes and perceptions should be surveyed before and after the program is implemented. PI&E data will be provided in accordance with the schedule of deliverables.

#### Task 9. Prepare Quarterly Progress Reports

Progress reports will be provided quarterly and should include a summary of the previous quarter's activities and accomplishments, as well as the proposed activities for the upcoming quarter. Any decisions and actions required in the upcoming quarter should be included in the report. The recipient shall supply the progress reports to the U.S. DOT in accordance with the schedule of deliverables.

#### Task 10. Prepare Final Report

The recipient will prepare a brief report (e.g., 25 pages or less), initially in draft, and upon receipt of comments from U.S. DOT, submit a final version, describing the procedures and outcomes associated with the rational speed limit approach to speed management. The report should be prepared according to the following format:

- <bullet> Introduction: Identify project objectives; and describe the demonstration and comparison communities and participating agencies;
- <bullet> Procedures: Describe what was done;
- <bullet> Findings: Present descriptive statistics of the findings regarding speeds, safety, attitudes, etc.; and
- <bullet> Lessons Learned: Present any information that can be used by other communities when implementing a similar program.

#### Task 11. Final Briefing

The recipient will present its findings to U.S. DOT in Washington, D.C. This briefing will be presented in accordance with the schedule of deliverables.

#### Availability of Funds and Period of Support

A total of \$700,000 is available in Fiscal Year 2001 to fund from two to four demonstration and evaluation projects for a performance period of 20 months. It is anticipated that individual award amounts, based upon demonstrated need, will range between \$175,000-300,000. This stated range does not establish minimum or maximum funding levels. Given the amount of federal funds available for these efforts, applicants are strongly urged to seek other funding opportunities to supplement the federal funds.

#### U.S. DOT Involvement and Responsibilities in This Cooperative Agreement Program

- <bullet> Provide a Contracting Officer's Technical Representative (COTR) to participate in the planning and management of each cooperative agreement and to coordinate activities between the recipients and U.S. DOT.

- <bullet> Provide information and technical assistance as determined appropriate by the COTR.

- <bullet> Provide for the collection and analysis of speed, crash, and enforcement data from the comparison community.

- <bullet> Provide for supplemental analysis of speed, crash, and enforcement data from the demonstration community.

#### Eligibility Requirements

Applications for this Cooperative Agreement Program are solicited from State and local governments and their agencies. These demonstration projects will require extensive collaboration among each of the participating state/community organizations in order to achieve the program objective.

#### Application Procedures

Each applicant must submit one original and two (2) copies of the application package to: NHTSA, Office of Contracts and Procurement (NAD-30), ATTN: Maxine Ware, 400 7th Street, SW, Room 5301, Washington, DC 20590. Submission of three additional copies will expedite the evaluation process, but is not required. The application may be single spaced, must be typed on one side of the page only, and must include a reference to NHTSA Cooperative Agreement No. DTNH22-01-H-05221. Only complete application packages received on or before 4:00 p.m. on Tuesday, July 24, 2001 will be considered.

#### Application Contents

1. The application package must be submitted with OMB Standard Form 424 (Rev. 7-97, including 424B), Application for Federal Assistance, with the required information filled in and certified assurances signed. Because the available space on the 424A does not permit a level of detail that is sufficient to provide for a meaningful evaluation of the proposed total costs, a completed 424A is not required. A supplemental budget must be provided which presents a summary of the proposed costs, as well as a detailed breakdown for each of the ten sections (tasks) enumerated in the Description of the Program Effort. The task breakdown shall identify: direct labor costs for each labor category, direct material and equipment costs, travel costs (explaining the relationship to the project), and any overhead/indirect costs. The

applicant shall also identify any financial or in-kind commitment of resources that will be contributed in support of the demonstration project. The SF-424 and 424B may be obtained from the Office of Management and Budget website at <A HREF="http://frwebgate.access.gpo.gov/cgi-bin/leaving.cgi?from=leavingFR.html&log=linklog&to=http://www.whitehouse.gov/omb/grants/index.html">http://www.whitehouse.gov/omb/grants/index.html</A>.

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2. The application shall include a program narrative statement that describes the technical approach in 25 pages or less and addresses the following information in separately labeled sections. Letters of cooperation and intent, as well as personnel resumes, will not count against the page limit.

a. Introduction: A brief overview of the applicant's capabilities to organize and carry out the rational speed limit project in the proposed demonstration community. All participating organizations (e.g., traffic engineering, law enforcement, public information), the principal investigator, and other key personnel shall be identified. The proposed comparison community and, if possible, the key coordinating personnel shall also be identified.

b. Description of Program Effort: The planned technical approach for performing each of the efforts listed below shall be separately described.

(1) Coordination with organizations within demonstration and comparison communities. Describe how cooperation among the various agencies will be obtained. Include:

(a) Letters of intent from the participating agencies in the demonstration community

(b) Letters of intent from the cooperating agencies in the comparison community permitting U.S. DOT to measure speeds and obtain crash and enforcement data

(c) A letter of coordination from the Governor's Highway Safety Representative and State Traffic Engineer.

(2) Identification of a preliminary list of demonstration streets/highways for rational speed limits and basis for selection. Identify the length, functional class, predominant land use of selected road segments.

(3) Traffic and engineering investigations to establish rational speed limits, including speed data collection procedures and equipment and method of determining whether speed limits should be revised.

(4) Implementation of a community outreach and PI&E program to obtain public and official support.

(5) Enforcement plan for the new speed limits.

(6) Collection of data.

c. Program Management and Staffing.

(1) A program organizational chart identifying proposed staff members assigned to the project will be provided. The title and a brief description of each position's responsibilities will be included, as well as the proposed level of effort and allocation of time for each position. One person must be identified as the Project Director. This person will have full responsibility for managing the project's technical progress, staffing and coordination of organizations, and serving as the point of contact for U.S. DOT project staff.

(2) Brief resumes will be provided for the proposed Project



Director and other key personnel.

#### Application Review Process and Evaluation Criteria

Initially, all applications will be reviewed to confirm that the applicant is an eligible recipient and to ensure that the application contains all of the information required by the Application Contents section of the notice. To be considered complete, applications from eligible applicants must include the following information to be considered: (1) The designation of a specific demonstration community, as well as the designation, or at least suggestion, of a similar community that will be used as a comparison site during the proposed demonstration; (2) letters of intent showing that the designated demonstration community agencies have the capabilities and are willing to commit sufficient resources to properly conduct the proposed demonstration, including participating highway engineering departments, law enforcement agencies, prosecutors and judges, department of motor vehicles, public information office, and community government; (3) letters from the appropriate authorities within the comparison community that the appropriate highway engineering department, law enforcement officials, and department of motor vehicles present in the comparison community will cooperate in the demonstration project, and provide U.S. DOT access to the necessary data; and (4) a letter of coordination for the proposed demonstration project from the Governor's Highway Safety Representative and State Traffic Engineer. Each complete application from an eligible recipient will be evaluated by an evaluation panel.

The evaluation panel will be comprised of government personnel from NHTSA and FHWA, as well as a representative from Westat, Inc. Westat, Inc, a research firm located in Rockville, Maryland, will serve as a non-voting member of the evaluation panel and will be providing support services to U.S. DOT for this demonstration project effort. Submission of an application in response to this notice shall constitute an authorization for a representative from Westat, Inc. to review it.

The applications will be evaluated using the following criteria:

1. Technical Approach (50 percent). The applicant's goals are clearly stated and the objectives are time-phased, specific, measurable, and achievable. The application reflects a high likelihood that the applicant will achieve an outcome-oriented result that will revise speed limits using a specific rational procedure, secure the cooperation of the necessary organizations, inform the public, and provide reliable data from which the impact of the program can be assessed. The application clearly describes what the applicant proposes to develop and implement, how this will be accomplished, and the major tasks necessary for completion. This involves anticipating potential technical problems and critical issues related to successful completion of the project. The application clearly describes the planning, scheduling, equipment, and procedures to be used to measure speed data at selected road segments within the demonstration community. An important determining factor shall be the extent and type of road segments included in the demonstration community, the enforcement proposed, the extent to which judicial acceptance is evidenced, and the PI&E campaign planned.

2. Project Management and Staffing (30 percent). The applicant has the capabilities to plan, implement, and evaluate the proposed project. The proposed staff are clearly described, are appropriately assigned, and have adequate skills and experience. Staff members with traffic

engineering, speed data collection, enforcement, PI&E, and data management expertise have been appropriately allocated. The applicant's staffing plan is reasonable for accomplishing the objectives of the project within the established time frame.

3. Cost (20 percent). The budget is sufficiently detailed to allow U.S. DOT to determine that the estimated costs are reasonable and necessary to perform the proposed effort. The amount of financial or in-kind commitment of resources by the applicant organization or other organizations to support the project has been clearly identified. For those applicants that are evaluated as meritorious for consideration for award, preference may be given to those that have proposed cost-sharing strategies and/or have other proposed funding sources in addition to those in this announcement.

Terms and Conditions of Award

1. Prior to award, each recipient must comply with the certification requirements of 49 CFR Part 20,

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Department of Transportation New Restrictions on Lobbying, and 49 CFR Part 29, Department of Transportation Government-wide Debarment and Suspension (Non-Procurement) and Government-wide Requirements for Drug Free Workplace (Grants).

2. Performance Schedule of Deliverables and Milestones:

Task Milestone/deliverable	Activity description Due date after award	
1..... Milestone.....	Kickoff meeting.....	2 weeks.
2..... plan.....	Work plan.....	Revised work 4 weeks.
3..... Plan.....	Conduct Engineering Studies.	Speed Zoning 12 weeks.
4..... Data.....	Data collection.....	Quarterly.
5..... Schedule.....	PI&E.....	12 weeks.
5..... materials.....	PI&E.....	PI&E As developed.
8a, 8b, 8c..... Data.....	Speed, enforcement, and PI&E data.	Every 3 months with full data provided 17 months after award.
9..... progress	Submit quarterly progress reports.	Quarterly reports.
10..... report.....	Submit draft of Final Report.	Draft final 17 months.

- 10..... Submit final version of Final  
report..... 19 months.  
Final Report.
- 11..... Final briefing at U.S. Briefing at  
U.S. DOT... 20 months.  
DOT workshop.
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Note: Four copies of each product will be submitted to the COTR.

3. During the effective performance period of the Cooperative Agreements awarded as a result of this announcement, the agreement as applicable to the recipient shall be subject to the National Highway Traffic Safety Administration's General Provisions for Assistance Agreements, dated July 1995.

Issued on: May 25, 2001.  
Marilena Amoni,  
Acting Associate Administrator for Traffic Safety Programs, NHTSA.  
Frederick G. Wright, Jr.,  
Program Manager, Safety, FHWA.

## Appendix A--Guidelines for Setting Safe and Reasonable Speed Limits

### I. Speed Zoning

The purpose of speed zoning is to establish a speed limit that is the maximum reasonable and safe speed for a section of road. There are many factors that affect driving speed and crash risk including driver, vehicle, roadway, traffic and environmental factors. The prevailing speed of traffic reflects the collective judgement of the driving population on what appears reasonable and safe on a given segment of roadway. The prevailing speed, therefore, provides a measure that objectively accounts for most factors affecting safe speed. Changing a speed limit on a road may, but does not necessarily change the prevailing speed on the road.

Inconsistencies exist for how speed limits are determined for speed zones, in part, because of the subjective nature of the current practice. If the speed limit is too high it can lead to driver error; if it is too low it may result in a lack of compliance and misallocation of enforcement resources. Therefore, it is critical that a standard method for determining the safe and appropriate speed be identified and described.

### II. 85th Percentile Speed

Section III below describes a method for establishing speed limits based on the prevailing speed. Setting speeds using the 85th percentile as a key guideline regulates against the higher speeds that may be unsafe, but still includes a very large percentage of the driving public. Drivers who travel at the 95th percentile speed and above (i.e. fastest 5 percent) have significantly higher crash rates than those who drive at or near the 85th percentile (and also those whose speed is closer to the average speed. Since the purpose of speed zoning is to facilitate safety by informing drivers of maximum speeds for normal conditions, the posted speed limit should reflect the upper limit of the safest speeds (i.e., those near the

85th percentile).

### III. Engineering and Traffic Survey Considerations

#### A. Inventory Road Conditions

Review and document on a site diagram or speed survey sheet the physical characteristics of the road (alignment, grade, roadway width, number of lanes, median type, intersections, etc.), roadside development, parking, and pedestrian activity should. Divide the roadway of interest into homogeneous sections. A homogeneous section is one where:

<bullet> The roadside development is consistent (residential vs. commercial; type and frequency of businesses and driveways, etc.)

<bullet> The roadway features are consistent (lane widths, medians, shoulders, surface roughness, curvature, intersection spacing, etc.)

#### B. Select Measurement Sites

Within each section, select speed measurement sites. The measurement sites should be representative of the entire section of the roadway being zoned. This might require that the roadway be divided into one or more zones and that measurement sites be selected for each zone. In a non-rural area, select at least two measurement sites per mile in each direction (i.e., sites spaced approximately 2000 feet apart). Speed measurement sites should not be located within 500 feet of a speed transition zone (intersection approach, horizontal curve, etc.). If speed measurement sites are needed between intersections and the 500-foot distance cannot be met, use a mid-block location for the speed measurement station. Sites for different directions on the same road do not necessarily need to be in the same location.

#### C. Collect Speed Data

Using automated speed collection measurement techniques, collect 24 hours of speed data for all lanes at each speed measurement site. Speed data must be collected in a manner that does not influence drivers to change their vehicle's speed. The speed measurement technique must also permit free flowing vehicles (i.e., more than 5 sec. of headway to be distinguished from non-free-flowing vehicles. This is necessary to determine the 85th percentile of free-flowing vehicles. Data should be collected during weekdays and should not be collected during inclement weather.

#### D. Select Speed Limit

The following procedure is recommended by the Federal Highway Administration and is based on procedures widely used for speed zoning. Based on the speed data collected, determine the median (50th percentile) and 85th percentile speed for free-flow vehicles at each measurement site. Select the 85th percentile speed rounded to the nearest 5 mph increment as first approximation for the speed limit. Where there are mitigating factors (speed related crash history, heavy non-motorized road user presence, extreme variance of speeds) the selected speed may be reduced to a value not lower than

the median speed rounded up to the next highest 5 mph multiple. If there is a difference of more than 5 mph between two measurement sites, employ a separate speed zone. If potentially hazardous conditions exist within the zone, the conditions should be corrected, or appropriate warning signs should be installed with advisory speed plaques based on the inferred design or ball bank indicator.

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For example, if a sharp curve exists within the zone, do not reduce the speed limit in the entire zone--remove the sharp curve or add the appropriate warning sign.

## Appendix B--Guidelines for Public Information and Education (PI&E) Programs for Rational Speed Limits

### I. Introduction

Speeding--driving in excess of the posted speed limits or driving too fast for conditions--is a contributing factor in approximately 30 percent of all fatal traffic crashes. A comprehensive Public Information and Education (PI&E) program is essential to gain motorist compliance with rational speed limits. All available means that can be used to effectively carry the awareness message to the motoring public should be used.

### II. Methods and Strategies

A plan should be developed that includes media analysis and profiles of target audiences to determine optimum media mix and timing for the campaign. This plan should be followed for the duration of the PI&E program. It should primarily reflect methods for monitoring the effectiveness of the PI&E program prior to its initiation and as it progresses. Improvements in the PI&E program should be made, as necessary, for maximum effectiveness.

All materials should be developed in appropriate languages that reflect the demographics of the public within the target project demonstration area. PI&E activities should be conducted, as appropriate, prior to and during the speed management project.

PI&E strategies should be developed in the following areas:

- <bullet> An overall PI&E awareness program concerning the new speed management techniques to ensure motorist acceptance and compliance. This awareness program should reflect a unified approach across media while maximizing the value and effectiveness of each media program.

- <bullet> A PI&E event schedule, including special press activities and press conferences.

- <bullet> Distributed Materials: Fact sheets, inserts, flyers, posters, print ads, exhibits and displays.

- <bullet> News Media Materials: Press releases, public service announcements, live-announcer scripts.

- <bullet> Press conferences should be used where appropriate. These conferences should occur at the initiation of the demonstration project (and at other key periods) in order to achieve maximum press coverage. Press conferences, when practical, shall include participation from all groups involved in the demonstration

project, (i.e., traffic engineers, law enforcement officers, prosecutors, judges).

## Appendix C--Guidelines for Enforcement of Safe and Rational Speed Limits

Enforcement of traffic laws is successful primarily through the principle of deterrence. The fundamental concept is that credible threats of punishment deter unwanted behavior.

### I. Elements of the Deterrence Process

#### A. Behavior Must Be Definable, Understandable and Detectable

The behavior that we want to stop, in this case, is traveling at unsafe, unacceptable speeds over the newly established rational speed limits. Enforcement operations shall take a top-down approach for establishing the enforcement threshold. Speed measurements at the selected road segments shall be used to determine the top 5 percent of speeds. This information will be used to establish the enforcement threshold. The enforcement threshold should never be less than 5 mph above the new posted speed limit. This top-down strategy will not overwhelm the law enforcement officers, the prosecutors, or the courts. This strategy promotes public and court acceptance of enforcement by targeting only the most egregious violators. The overall goal of the enforcement efforts is motorist compliance, not issuance of citations.

#### B. Deterrence Depends Upon the Perceived Risk of Apprehension

The public must be aware that new speed limits will be strictly enforced. Highly visible, highly publicized enforcement efforts enhance this perception. The involved enforcement agencies shall commit additional resources above the norm for speed enforcement efforts at the selected roadway segments. This effort will provide a consistent law enforcement presence without the appearance of a ``speed trap'' being in operation. The strategy should still allow the enforcement officers to be available to respond to other law enforcement activities as necessary.

#### C. Deterrence Depends on the Swiftmess, Certainty, and Severity of Punishment

Once caught, speeders must be adjudicated quickly with a high likelihood of significant penalties.

### II. Operational Considerations

#### A. Officers

Basic enforcement speed-measuring device (e.g., radar, lidar, vascar, etc.) operator training programs developed by NHTSA will be offered by the U.S. DOT for officers involved in speed enforcement. In addition, officers involved in speed enforcement are encouraged to comply with the enforcement and operational procedures established by U.S. DOT. Traffic officers assigned to patrol the demonstration roads should devote a significant portion of their

shift on speed enforcement.

#### B. Marked Police Vehicles

It is desirable that speed enforcement on the selected roadway segments be highly visible. Marked police vehicles frequently patrolling the roadway segments provide this visibility. The use of unmarked vehicles for speed enforcement should be kept at a minimum. Unmarked police vehicles tend to give the public the perception that the roadway segment is a ``speed trap''. This perception should be avoided.

#### C. Speed-Measuring Devices

All speed-measuring devices used in the speed enforcement efforts should be listed on the International Association of Chiefs of Police (IACP) Consumer Products List (CPL). In addition, selected speed-measuring devices should comply with the testing for accuracy and reliability procedures established by the IACP Speed-Measuring Device Testing Program Administration Guide.

#### D. Speed Display Trailer

The applicant may use speed display trailers on the selected roadway segments to inform the motoring public of their travel speed on the selected roadway segments.

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