Attachment "A"

A RESOLUTION SPECIFYING FURTHER ACTION IN FOLLOW-UP TO THE TRANSPORTATION ADVISORY BOARD REVIEW OF THE RESIDENTIAL TRAFFIC MANAGEMENT PLAN
Resolution No. 75/2004-05

WHEREAS, the Town of Carrboro seeks to ensure that its existing policies are responsive to community concerns; and

WHEREAS, Transportation Advisory Board has reviewed the Town's Residential Traffic Management Plan and compiled materials to assist with the update of this document.

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Aldermen accept the TAB report and refer the report to Town staff for review and recommendations.

Transportation Advisory Board Recommended Updates to the Residential Traffic Management Plan

Response to Citizen Complaint

The TAB recommends that the following procedural change for responding to citizen complaints regarding speed limit violations in their neighborhood.

As in current ordinance, upon receipt of a request for neighborhood street traffic calming signed by 75% of property owners or residents on the project street, town staff shall initiate response. That response shall include:

1. Notifying the police department to request stepped up enforcement in the neighborhood.
2. Town Staff shall evaluate traffic conditions on the street, using the criteria developed by the TAB (see next page).
3. The TAB and Staff will review evaluation results and also take into consideration other special circumstances, and classify the need as a Low, Medium, or High priority need.
4. The TAB will then make specific recommendations to the Board of Alderman, based on that classification
    a. **Low Priority:** eligible for enforcement and neighborhood education programs
    b. **Medium/High Priority:** – eligible for a range of traffic calming measures, including engineering improvements to the street.
5. A street with Medium/High Priority will be reviewed by the TAB and the Town to determine the appropriate courses of action.

Proposed Traffic Calming Criteria

Criteria	Application	Points
Traffic Volume	*Criteria* – 5 points for every 20 % of volume that exceeds expected volume	
85th Percentile Speed	*Criteria* – 2 points for every mph that the 85th percentile speed exceeds the posted speed limit	
Pedestrian Volume	*Criteria* – 1 point for every 10 pedestrians if street has sidewalk, 5 points per 10 pedestrians if no sidewalk. Count made in either the peak traffic hour or the hour when students are traveling to or from school	
Bicycle Volume	*Criteria* – 1 point for every 10 cyclists if street has bike lanes, 3 points per 10 cyclists if no bike lanes. Count made in either the peak traffic hour or the hour when students are traveling to or from school	
Bus Stops	*Criteria* – 1 point for each transit stop and 2 points for each school bus stop on the street	
Proximity to Pedestrian Generator (Retail and Parks)	*Criteria* – 5 points if within 0-0.2 miles; 3 points if within 0.21 and 0.4 miles; 1 point if within 0.41 and 0.6 miles.	
	Total	

Traffic Calming Educational Program

The TAB recommends that the Town Staff and Police Department, in consultation with the TAB, develop a town wide traffic calming educational program. Some of the ideas the TAB considered are:

1. The education program should include the development of a brochure concerning speed reduction for police to distribute at public events, or during routine traffic stops.
2. The education program should include an effort to reach the public wherever possible through town agencies, homeowners associations, insurance agents, civic bodies, and other private entities.
3. The education program should take advantage of radio, television, print, and other media, if possible.
4. When appropriate, there should be a targeted education program when a neighborhood notifies the town of speeding problems.

The Board of Aldermen should pursue these ideas with staff.

Speed Reduction on Neighborhood Streets Town Wide

The TAB has found some evidence that reducing neighborhood traffic speeds to 20 miles per hour could be an effective means to reduce overall traffic speed. We have also found conflicting evidence, indicating that the net effect of this reduction could be negligible. The Police department has given us a similarly mixed response to this proposal.

The TAB recognizes that a town wide policy change of this magnitude demands rigorous scrutiny and understanding from the public.

We therefore make no recommendation for or against this proposal. We instead recommend that the TAB and Board of Alderman re-consider this proposal after consultation with the public through a public hearing.

Recommendation Regarding the Use of Speed Cameras

The TAB believes that the use of speed cameras could be an effective enforcement tool for reducing speeds on neighborhood streets, as well as in other locations throughout town.

However, we also recognize that the use of speed cameras and other traffic monitoring systems raises privacy concerns. We also acknowledge the question of fairness and impartiality, when private entities managing these devices have a strong financial incentive to enforce without sufficient accountability or procedural review.

We recommend that automated traffic speed enforcement program should include

1. Adequate procedural review
2. Town ownership, so that accountability remains clearly with the town
3. Clear procedures for citizen appeal.

The TAB recommends that Town Staff continue to monitor advances in traffic speed enforcement.

ATTACHMENT C

TOWN OF CARRBORO

RESIDENTIAL TRAFFIC MANAGEMENT PLAN
FOR
SPEED AND TRAFFIC CONTROL

ADOPTED BY:

CARRBORO BOARD OF ALDERMEN, JUNE 1996

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INTRODUCTION

Many residents approach the town with concerns over speeding in neighborhoods. The Residential Traffic Management Plan represents a commitment by the Town of Carrboro to promote the safety and livability of residential neighborhoods. The Residential Traffic Management Plan provides a process for identifying and addressing existing problems related to speeding, excessive volumes, and safety on town-maintained residential streets. Based on this policy, proper actions can be taken depending on the severity of the problem. This document also includes traffic control devices. Some of the devices may already be in use and other devices may be new. Both advantages and disadvantages of each device will be included.

PROCESS

The following is the process that must be completed when petitioning for traffic calming devices. This process is available only to citizens who live within the municipality of Carrboro, and who reside on town-maintained, residential streets. See the appendix for the petition.

- Petition: A "Petition To Request Traffic Control Devices" available from the town must be submitted with the signatures of the petitioners. A brief description of the traffic control device and the street desired to be amended is required in the petition as well. The petition must be submitted to the Planning Department. The petition must be signed by at least 75% of the property owners or residents of properties located on the project street. The petitioners are allowed to present no more than three (3) traffic calming devices as alternatives for use along their street. The completed form must be hand-delivered or mailed to:

PLANNING DEPARTMENT
TOWN OF CARRBORO
301 WEST MAIN STREET
CARRBORO, NC 27510

- Planning Staff Recommendation: After receiving and verifying the validity of the petition, a two-day traffic count to monitor traffic volume and traffic speeds will be done by the Planning Department. After which, the data received and the site in question will be analyzed and a recommendation as to the appropriate action to be taken will be forwarded to the representative of the neighborhood in concern. The recommendation will then be sent to the Transportation Advisory Board (TAB).
- TAB: The TAB will make recommendations to the Board of Alderman.
- Board of Alderman: The Board of Alderman reserves the final decision concerning actions to be taken. The Board will review the residents' petition, the staff's analysis, and TAB recommendation. The Board reserves the right to hold a public hearing as necessary if the proposed solution is deemed questionable by the residents.
- The construction and installation of some traffic calming devices may be expensive. The least costly form of traffic calming should be considered as the primary means of discouraging traffic in any specific case. When expensive devices are approved, the

petitioners that qualify may need to wait an extended time for installation. Once the actual date of installation is determined, the neighborhood representative will be contacted in writing.

- Removal of a traffic control device: Unless the TAB initiates a general request to the Board of Aldermen, the traffic calming device will stay in place for a minimum of three years. Removal before the three-year period must necessarily be at the cost to the residents. Unless the device is determined detrimental to the health and safety of the town's citizens by the affected residents and the town's emergency service staff, the process for petition for removal will be the same as the installation of the device. A petition with 75% of the street's occupants' signatures of removal must be done to remove traffic calming devices. Traffic calming devices must be ineffective in reducing average speeds in accordance with posted speed limits and/or vehicle volumes. The 85th percentile speeds must be less than 2 MPH lower than those speeds demonstrated prior to the installation of the devices in order to be considered ineffective. A staff analysis, followed by a TAB recommendation will be forwarded to the Board during a public meeting, and if necessary, for a public hearing.
- Streets that have traffic control devices installed may be excluded from the Snow Removal Plan and street cleaning activities, **depending on the type of device installed.** [PLEASE NOTE: Current devices, as listed, **would not** exclude a street from the Snow Removal Plan.]

EVALUATION CRITERIA FOR STREETS

- The street must operate as a town-maintained residential street.
- The posted speed limit on the affected length of the street must be 25 miles per hour which is the standard speed limit for residential streets.
- The 85th percentile vehicle speeds must exceed 35 MPH (+10 MPH over posted speed limit).
- Actual volume of traffic will be based on traffic counts conducted by Carrboro Planning and Public Works staffs (as recorded through staffs' administrative process).
- Guidelines reviewed by staff as received from the Institute of Transportation Engineers (ITE) that is appropriate for town streets.

LIST OF TRAFFIC CONTROL DEVICES

A comprehensive evaluation of twenty-five (25) traffic control devices has been included in this document (see appendix). A brief definition of each device is given. Also, a chart showing the advantages, disadvantages, and cost of each traffic control device is provided in the appendix.

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APPENDIX

List of Traffic Control Devices

CHICANES
CHOKERS/FAYETTEVILLE CHOKERS
ENFORCEMENT
FORCED TURN CHANNELIZATION
LOWERED STATUTORY MEDIANS
MULTI-WAY STOPS
NO PARKING
PAVEMENT MARKINGS
PORTABLE RADAR
NARROW STREET DESIGN
NO-TURN ON RED
ON-STREET PARKING
ONE-WAY DESIGNATION
PROTECTED PARKING
PUBLIC INFORMATION
RUMBLE STRIPS
TRAFFIC SIGNAL TIMING
SPEED TABLES
SPEED WATCH
STREET CLOSURE
TRUCK RESTRICTIONS
TURN RESTRICTIONS
UNDULATIONS
TRAFFIC CIRCLES

Definition of Traffic Control Devices

CHICANES are a form of curb extension which alternate from one side of the street to the other.

CHOKERS/FAYETTEVILLE CHOKERS involve reconstructing streets to narrow its lanes e.g. narrowing the street to a single lane to discourage traffic. Fayetteville chokers also slow traffic.

ENFORCEMENT involves two levels: 1) the standard level of enforcement, as presently provided by the Police Department, upon request by a citizen or neighborhood, and is dependent upon availability of resources; and 2) the extra enforcement level would target neighborhoods where speeding has been identified as a high level problem and would be an on-going process without citizen request (e.g. a specified number of policemen per neighborhood).

FORCED TURN CHANNELIZATION is installed in the form of a traffic island and prevents traffic from executing specific movements at an intersection.

LOWERED SPEED LIMITS such as a 25 MPH city-wide municipal speed limit.

MEDIANS can limit access from a thoroughfare into a neighborhood by controlling through traffic and reducing the number of speeders.

MULTI-WAY STOPS require a stop sign on all street corners where the streets intersect.

NARROW STREET DESIGN involves narrow street widths and tighter vertical and horizontal curves, which forces driver to drive at a slower speed. Posted speed limits should be less than 35 MPH. Existing neighborhood problems would not be addressed under this strategy since street design is the major component of this strategy.

NO-TURN ON RED involves placing "No-Turn On Red" signs at signalized entrances to neighborhoods.

NO PARKING may allow improved movement on otherwise congested residential streets.

ONE-WAY DESIGNATION involves designating a current two-way street as a one-way street.

ON-STREET PARKING requires on-street parking and may be effective because it forces motorist to slow down and to divert to other routes.

PAVEMENT MARKINGS such as 25 MPH marked horizontally on a road serves as a speed limit reminder.

PORTABLE RADAR could be placed on the road side, left unattended, and will alert motorists when they are speeding.

PROTECTED PARKING provides a landscaped island projecting out from the curb; the island creates protected parking bays.

PUBLIC INFORMATION through a continuous campaign would attack the problem of speeding by changing drivers' attitudes and habits.

RUMBLE STRIPS are ridges either cut in the pavement or laid over top of existing pavement to alert driver to slow down when driven over.

SPEED TABLES are flattened and extended long enough for both the front and rear wheels of a car to be on top of the table at once and can be comfortably crossed at 15 to 25 MPH.

SPEED WATCH is a program similar to the Neighborhood Crime Watch Program. The program helps organize neighborhoods to develop peer pressure programs to address speeding issues. One element involves neighbors reporting speeders to the police, and notifying the vehicle owner of the violation. Signs can be posted on the streets to warn motorists.

STREET CLOSURE involves closing streets to through traffic.

TRAFFIC CIRCLES are islands placed in the middle of intersections which forces the flow of traffic to form a circular pattern which a motorist would follow until exiting onto his/her desired street.

TRAFFIC SIGNAL TIMING limits the green light time motorists have to exit/enter a neighborhood, therefore reducing traffic.

TRUCK RESTRICTIONS restrict large trucks from using neighborhood streets.

TURN RESTRICTIONS do not allow turning and limits access to a neighborhood.

UNDULATIONS are designed so most vehicles can go over them at 20 mph without causing driver discomfort.

TRAFFIC CONTROL DEVICES

SPEED CONTROL DEVICES	ADVANTAGES	DISADVANTAGES	ASSOCIATED COST
STOP SIGNS	**Perceived** effective by residents **May** allow traffic in the immediate vicinity of the stop sign. **May** reduce through traffic if travel time is increased significantly.	**Noise** level increases for residents near the stop sign **May** divert traffic to other streets **Effects** speed in the immediate vicinity of the sign, but not between intersections.	**$50 - $70 each**
SPEED LIMIT SIGNS	**Perceived** effective by residents	**May** not reduce speeding **Increases** enforcement requirements	**$50 - $70 each**
TURN RESTRICTIONS	**Effective** in reducing the number of speeding motorists by reducing through volumes. **Can** improve safety by eliminating turn movement.	**Reduces** access to or from a neighborhood for residents **Can** divert turning traffic to intersections considered less safe. **Increases** enforcement requirements	**$50 - $70 each**
ONE-WAY STREET DESIGNATIONS	**Can** be used to make travel through a neighborhood difficult thus reducing through traffic.	**Residential** street may be unsuitable for one-way operation **Speeds** may be higher on one-way streets **Requires** an increase in signage to make effective	**$50 - $70 each**
TRAFFIC SIGNAL TIMING	**Can** encourage traffic to use the main street **Green** signal time for streets exiting a neighborhood can be controlled to limit through traffic and reduce the volume of speeding motorists	**Residents** complaining about limited green signal time **Motorists** may violate red signals if they feel the controller is not working properly	**$20,000 - $30,000**
NO-TURN ON RED RESTRICTIONS	**Can** be used in conjunction with traffic signal control **Can** reduce through traffic by limiting the amount of time motorists can enter or exit a neighborhood.	**Limits** access to and from neighborhoods	**$50 - $70 each** (Cost may vary if installed in conjunction with traffic signalization.)
TRUCK RESTRICTIONS	**Perceived** to be effective in reducing truck traffic on residential streets	**Difficult** to enforce	**$50 - $70 each**

SPEED CONTROL DEVICES	ADVANTAGES	DISADVANTAGES	ASSOCIATED COST
ON- STREET PARKING	**Can** return a "residential" character to roadway, alerting motorists that they should travel slower.	**Children** crossing or running into street may not be seen due to parked cars.	**$50 - $70 each**
LOWER STATUTORY SPEED LIMIT	**May** be adhered to better than lower speed limits in individual neighborhoods	**Requires** legislature approval	**$50 - $70 each**
CHOKERS/FAYETTEVILLE CHOKERS	**Can** reduce traffic volume under some situations **Several** installations are needed to be effective over a length of roadway. **Improve** pedestrian safety if crossings are made at the location of choker.	**Fayetteville Chokers** designed to have an impact on speed. **Various** forms of chokers may have little impact on speed.	**$7,000 - $10,000** (Fayetteville Chokers can cost within a range of $3,475 to $4,600 per set.)
MEDIAN BARRIER	**Aids** flow of traffic on thoroughfares. **Restricts** through traffic and thus the volume of speeding traffic	**May** direct traffic to other residential streets **May** require street widening to install **Depends** on function or classification of streets	**$10,000 - $20,000**
TRAFFIC CIRCLES	**May** reduce speeds in vicinity of the traffic circle	**Increased** hazard to pedestrians and bicyclists by moving vehicle closure to intersection corners **Present** an obstacle to motorists **Require** parking restrictions, centerline marking, and traffic control signing to be safe **Cannot** be built within most residential street intersections due to minimum size requirements **Requires** lots of signage	**$5,000 - $30,000** Cost sensitive to intersection characteristics, design radius, etc.
ENFORCEMENT	**Frequent**, very visible enforcement can be effective.	**Redirects** police officer efforts away from crime and drug enforcement **Court** system treats speeding as a minor offense and assigns a low priority to prosecuting speeders	No specific costs can be provided.

SPEED CONTROL DEVICES	ADVANTAGES	DISADVANTAGES	ASSOCIATED COST
TRAFFIC DIVERTERS	**Can** reduce through traffic and ce thus reduce the volume of speeding traffic **Can** be constructed within the area of most residential inter-sections	**Barrier** system may need augmenting on private property to control motorists who would drive around the diverter **Some** diverters require enforcement to be effective	**$7,000 - $40,000**
RUMBLE STRIPES AND ROUGH PAVEMENT SUCH AS COBBLESTONE	**May** have some effect on slowing the faster drivers **Causes** driver to become more alert and/or slow down	**Creates** noise that may be objec-tionable to nearby residents	N/A
CUL-DE-SACS AND STREET CLOSURES	**Eliminates** through traffic and thus speeding traffic	**Can** divide a neighborhood into separate pockets **Unpopular** solution to some residents and most non-residents using the street **Should** not be installed on streets l longer than 500 ft long meaning there should be about 20 houses on a street generating 200 trips per day.	(Cost varies depending upon street width and radius design. The mini-mum costs would be no less than $30,000.)
LOWER DESIGN SPEED FOR RESIDENTIAL STREETS	**Can** effect speed since motorists tend to drive at conditions they feel arc safe	**Requires** lower statutory speed limit which requires legislative approval **Can** create a less safe street if horizon-tal curves, vertical profiles, and other geometric controls are not closely controlled	**$50 - $70 each**
SPEED WATCH PROGRAM	**Involves** neighborhoods in applying peer pressure upon residents to obey speed limits	**Cost** of city personnel to collect radar speed information on a routine basis **Not** effective on street or in neighbor-hoods with any significant amount of through traffic **Application** of peer pressure can make residents hostile **Access** to the Police Information Net-work may be restricted	N/A
PUBLIC INFORMATION PROGRAMS	**Re-educate** the public to the dangers of speeding on residential streets. **Can** seek cooperation among residents to observe speed limits everywhere.	**Costs** depends on how information is disseminated	N/A

SPEED CONTROL DEVICES	ADVANTAGES	DISADVANTAGES	ASSOCIATED COST
NARROW STREET DESIGN	**Forces** drivers to slow down	**Can** only be implemented for new streets	**Design specific**
CHICANES	**Long** term effective means of reducing speeds according to study by Seattle Transportation Division in 1988 **Do** not block emergency vehicle access	**Drivers** are more likely to violate chicanes at intersections with low traffic volumes. **To** be recognized, the device requires signs, painted curbs, landscaping, reflectors and street lights..	**$4,000 per bulb.**

PLEASE NOTE: **ASSOCIATED COSTS FOR TRAFFIC CALMING DEVICES MAY VARY BETWEEN GEOGRAPHIC REGIONS OF THE UNITED STATES DUE TO LABOR COST, MATERIAL, AND SITE SPECIFIC CONSTRAINTS.**

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TOWN OF CARRBORO

PETITION: TRAFFIC CONTROL DEVICES

WE, THE UNDERSIGNED RESIDENTS, HEREBY PETITION THE BOARD OF ALDERMEN TO APPROVE THE TRAFFIC CONTROL DEVICES DESCRIBED BELOW UPON THE INDICATED STREET OR PART THEREOF.

THE STREET OR PART THEREOF DESIRED TO BE AMENDED IS:

THAT PART OF _____ STREET FROM
_____ STREET TO
_____ STREET.

WITH RESPECT TO THE TRAFFIC CONTROL DEVICE PETITIONED FOR, WE REQUEST:

_____

_____

_____

[PLEASE NOTE: A MAXIMUM OF THREE (3) TRAFFIC CALMING DEVICES MAY BE REQUESTED.]

SIGNATURES OF PETITIONERS*	
RESIDENT'S SIGNATURES	LOT'S MAILING ADDRESS

*THE ADDRESSES OF PROPERTIES THAT WILL BE DIRECTLY AFFECTED BY THE PROPOSED CHANGE HAVE BEEN DETERMINED BY THE TOWN OF CARRBORO PLANNING DEPARTMENT. BY POLICY, THE BOARD OF ALDERMEN HAS STATED THAT IT WOULD PREFER TO ENTERTAIN REQUESTS FOR CHANGES IN STREET REGULATIONS PROPOSED BY CITIZENS ONLY WHERE 75% OF THE OCCUPANTS OF THE PROPERTIES DIRECTLY AFFECTED BY THE PROPOSED CHANGE HAVE SIGNED A PETITION REQUESTING THE CHANGES.

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CERTIFICATE AS TO

SUFFICIENCY OF PETITION

FOR TRAFFIC CONTROL DEVICE

TO THE MAYOR AND THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO:

I, _____, TOWN CLERK OF THE TOWN OF CARRBORO, NORTH CAROLINA, DO HEREBY CERTIFY THAT THE ATTACHED "PETITION: TRAFFIC CONTROL DEVICES" WAS PRESENTED TO ME ON THE _____ DAY OF _____, 19____; THAT I HAVE INVESTIGATED THE SUFFICIENCY OF THE PETITION; AND THAT THE RESULTS OF MY INVESTIGATION IS AS FOLLOWS:

THE TOTAL NUMBER OF PROPERTIES DIRECTLY AFFECTED BY THE REQUESTED CHANGE IS _____.

WITH RESPECT TO THE SIGNATURES ON THE ATTACHED PETITION, _____ SIGNATURES ARE THOSE OF RESIDENTS OF THE AFFECTED AREA WHICH IS 75% OF THE RESIDENTS ON THE PROJECT STREET.

THIS THE _____ DAY OF _____, 19_____.

_____

Town Clerk's Signature (Seal)

THIS FORM MUST BE ATTACHED TO THE "PETITION: TRAFFIC CONTROL DEVICES" AFTER ALL PETITIONERS' SIGNATURES HAVE BEEN OBTAINED.

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DOCUMENT LAST AMENDED:

[THIS DOCUMENT CAN ONLY BE AMENDED BY OFFICIAL ACTION BY THE CARRBORO BOARD OF ALDERMEN.]

MAY 06, 1997		

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ACKNOWLEDGMENT:

INFORMATION CONTAINED HEREIN WAS RESEARCHED, ANALYZED, AND COMPILED BY KIMBERLY SLEDGE. MS. SLEDGE WAS A GRADUATE STUDENT IN THE DEPARTMENT OF CITY AND REGIONAL PLANNING AT THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL. MS. SLEDGE SERVED AS AN INTERN IN THE PLANNING DEPARTMENT FROM SEPTEMBER 1995 THROUGH JUNE 1996 UNDER THE SUPERVISION OF THE TOWN'S TRANSPORTATION PLANNER, KENNETH WITHROW.

ATTACHMENT D

Updating Traffic Calming Measures in Carrboro, North Carolina

A Report to the Carrboro Transportation Advisory Board
Prepared by Adena Messinger, April 2004

> "Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users."
> -- *Traffic Calming: State of the Practice*, Reid Ewing

Executive Summary

The Town of Carrboro is currently considering revisions to the Residential Traffic Management Plan. In particular, the Transportation Advisory Board (TAB) is examining the policies guiding traffic calming requests. After reviewing the current policies of other cities and towns the following are recommendations for the TAB to consider:

1) Lower the 85th percentile standard, perhaps to + 7 MPH. If this change is implemented within a point system (see recommendation 2 below), then it should better reflect the degree of speeding, yet allow for other factors to be considered when evaluating the situation.
2) Adopt a point system for prioritizing and evaluating these requests.
3) Put forward the idea of educational strategies to the residents to gauge what level of interest and commitment there may be in initiating a community speed watch program.
4) Look at the new developments planned for the town and determine whether or not it is appropriate sense to apply a two-step traffic calming evaluation process.

Introduction

The Town of Carrboro is currently re-evaluating its Residential Traffic Management Plan. In particular they are considering updating the traffic calming policy and exploring new options for implementing traffic calming measures. This initiative is motivated by several new and outstanding requests for speed controls submitted by residents. As the Board of Aldermen (BOA) prepares to revisit the Town's policy and respond to traffic calming requests, the Transportation Advisory Board (TAB) is tasked with providing recommendations that will guide the BOA's decisions. This paper examines a variety of traffic management policies and provides a review of the traditional traffic calming approaches: engineering, enforcement, and education. Processes for evaluating both existing and new developments in Carrboro are considered. In addition, recommendations are included for the TAB to consider before compiling a guidance document for the BOA.

Background

Traffic claming refers to a variety of techniques that help to slow down drivers, usually on residential streets. The different techniques generally fall into one of three categories: engineering, education, or enforcement. Engineering refers to some kind of physical alteration of the street. Engineering measures range from speed humps and rumble strips to traffic circles and chicanes. Education refers to community awareness and neighborhood speed watch groups. The goal of educating community members about speeding issues is to raise awareness that there is a speeding problem, which hopefully results in a behavioral change, i.e., not to speed. Enforcement is generally the jurisdiction of the police department, for example with ticketing drivers that speed[1]. A traffic calming program may include all three approaches, a combination of two, or just one.

While many cities have traffic calming programs in place, Carrboro was one of the first to establish a program in North Carolina in 1996. The program began in response to citizen concerns with speeding on several residential streets[2]. Under the program, the town has considered several engineering measures to reduce speeding: stop signs, chicanes, speed humps, and speed tables. The primary mitigation tools have been speed humps and stop signs (see Figure 1).

The Carrboro residential speed limit is 25 MPH, with a few streets posted at 20 MPH. Most traffic calming programs use the "85th Percentile" rule to determine whether or not traffic calming should be implemented on a street. According to the 85th percentile rule at least 15% of the vehicles monitored on a street in questions have to be exceeding the speed limit by some number of MPH. In Carrboro, that number is 10 MPH.

In August 2000 and May 2002, in response to information provided by the staff and requests from Carrboro residents, the Carrboro Board of Aldermen requested that the TAB review certain aspects of the Residential Traffic Management Plan. In particular they requested the following:

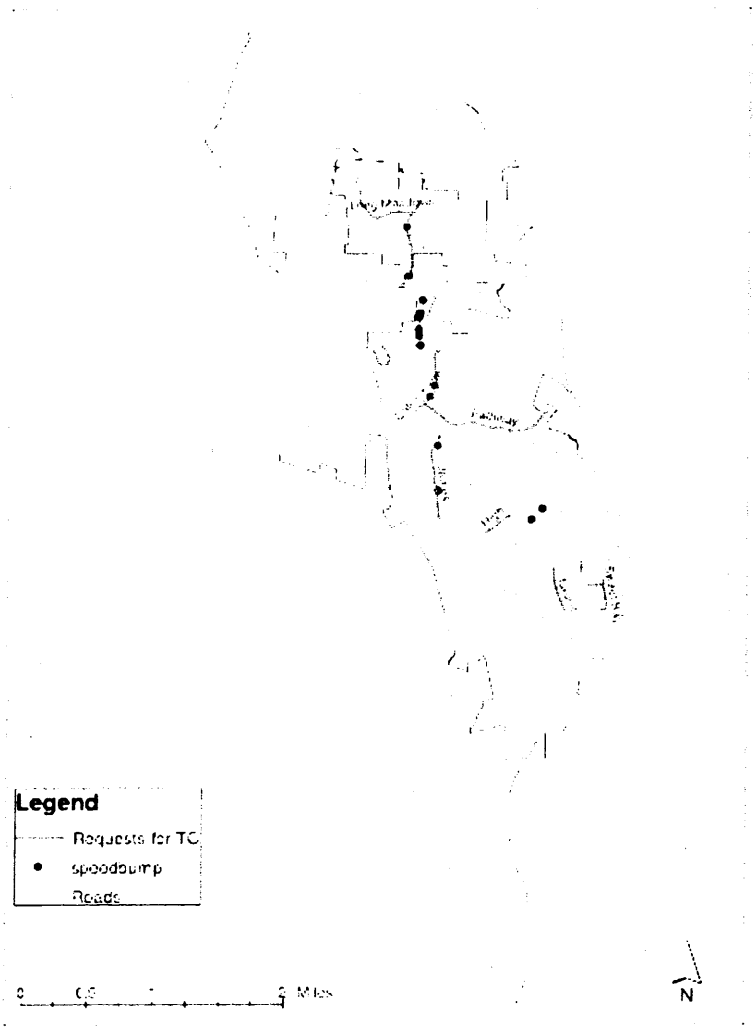
---

[1] Ewing, Reid. "Traffic Calming: State of the Practice," Institute of Transportation Engineers: Washington, DC, 1999.

[2] McKeel, Dale. Personal Communication, April 15, 2004.

- The removal of the phrase that 85th percentile speeds must exceed 35 MPH (i.e., 10 MPH above the 25 MPH speed limit)
- Consideration of other traffic management plans that have been put into place
- Consider developing a provision for special circumstances that may justify deviations from the policy (i.e., schools, playgrounds, etc.)[3]

Figure 1. Speed Bump Locations in Carrboro



[3] McKeel, Dale. Personal Communication, April 15, 2004.

Requests for traffic calming

The general procedure for requesting that some form of traffic calming be implemented on a street requires that the concerned residents submit a petition to the Carrboro Department of Transportation and that the petition is signed by 75% of the residents who would be affected by the approval of the request[4].

Records show approximately 12 requests for traffic calming measures between 1999 – 2004. Two of the requests were approved, three remain unresolved, and the remaining requests were either denied or a final ruling was not in the file. Figure 2 illustrates the locations of these requests.

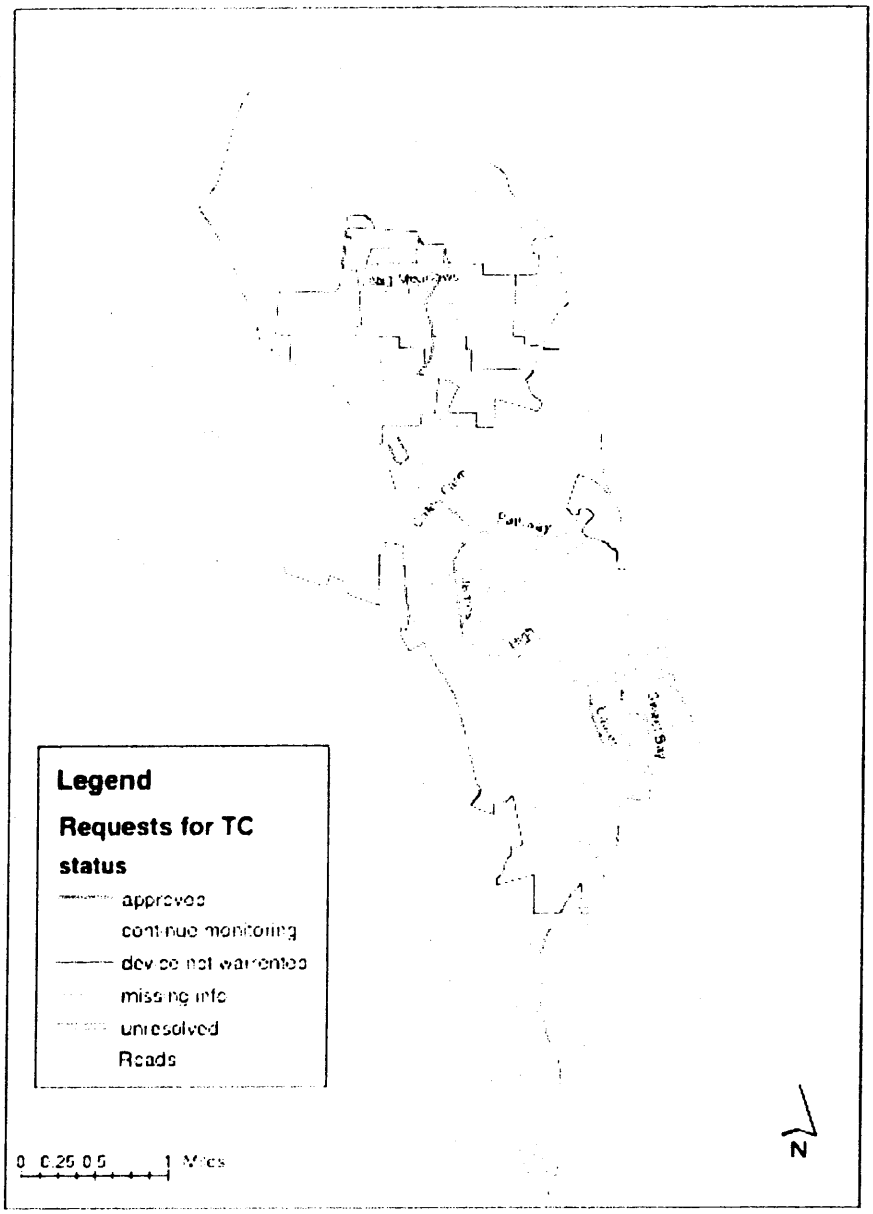
The current Carrboro traffic calming policy following a request is as follows:

> Evaluation Criteria For Streets
> - The street must operate as a town-maintained residential street.
> - The posted speed limit on the affected length of the street must be 25 miles per hour which is the standard speed limit for residential streets.
> - The 85th percentile vehicle speeds must exceed 35 MPH (+10 MPH over posted speed limit).
> - Actual volume of traffic will be based on traffic counts conducted by Carrboro Planning and Public Works staffs (as recorded through staffs' administrative process).
> - Guidelines reviewed by staff as received from the Institute of Transportation Engineers (ITE) that is appropriate for town streets.
>
> Source: *Residential Traffic Management Plan for Speed and Traffic Control*, adopted by the Carrboro Board of Aldermen 1996, updated 1997.

Appendix A includes the entire process for requesting a traffic-calming device for a residential street in Carrboro.

[4] Town of Carrboro. *Residential Traffic Management Plan for Speed and Traffic Control*, adopted by the Carrboro Board of Aldermen 1996, updated 1997.

Figure 2. Traffic Calming Request Locations and Status



Recommendation Methodology

The first step in providing recommendations for the Transportation Advisory Board was to gather Carrboro-specific traffic calming data with the assistance of the Carrboro Transportation Planner (see Table 1).

The second step was to gather general traffic calming information through several web searches. The primary reference was Reid Ewing's "Traffic Calming: State of the Practice," prepared for ITE/FHWA in 1999.

The third step was to select peer towns/cities against which to compare Carrboro's Traffic Management Program. The initial plan was to select these jurisdictions using the following set of criteria:

- Population
- In a neighboring state
- Availability of information

These selection criteria were desired because they would control for potential differences due to size. In addition, a nationwide survey of best practices in traffic calming highlighted on Raleigh's Traffic Calming web page uses population size as the peer factor. The use of neighboring states was intended to narrow the field of cities found with a comparable population size. Using the 2003 *Places, Towns and Townships* reference guide, cities with a population size similar to Carrboro were identified. The third criterion, information, was an unavoidable limiting factor, as not all jurisdictions of the small-ish size of Carrboro have a web page, and those that do, do not always provide the information needed to include them in the comparison.

As it turned out, the ability to collect the appropriate information was more limiting than initially thought. Out of the 16 cities identified that matched the first two criteria (population and neighboring state), only one provided the necessary information. While this at first appeared to be a significant problem, after reviewing traffic calming policies of various other cities across the country, the differences between policies – regardless of population size – were very similar. Therefore, the cities examined were selected primarily based on available information (see Table 2).

A separate group of cities were selected as well because of their proximity to Carrboro. This was included because the TAB expressed that it was important to be aware of the practices that nearby cities and towns are implementing (see Table 3).

The last step was to analyze all of the information with two goals in mind. The first goal was to evaluate Carrboro's policy for implementing traffic calming measures (i.e., the 85th percentile speed is 10 MPH above the speed limit) and recommend to either change or leave the policy as it stands.

The second goal was to identify the best traffic calming measures for Carrboro. It was stated earlier that the most common measures implemented falls under the engineering category, and is usually a speed hump or stop sign. Using the information gathered about

peer group strategies and the costs and benefits of different strategies, the recommendations could be made to the Carrboro TAB.

Findings

Traffic Calming Policies

Tables 2 and 3 illustrate examples of traffic calming policies in other cities. In general, traffic calming policies contain the same four strategies. These include 1) petition requirement from the concerned citizen, with a certain percentage of resident signatures, 2) a survey of the speed conditions on the road in question, 3) an 85th percentile threshold, and 4) approval or denial of the request[5]. These steps are in line with Carrboro's policy. The most significant difference is how each city chooses to use the 85th percentile rule. Carrboro sets the rule for approval at 10 MPH over the posted speed limit. On the other hand, as a contrast, consultants have recommended that Raleigh to use a 5 MPH approval rule[6].

Traffic Calming Measures

Engineering

The Carrboro Transportation Planner has already provided the TAB with a comprehensive evaluation of engineering options for traffic calming (see Appendix A). In general, the advantage of an engineering solution is that is provides a physical barrier to speeding on the particular road on which it is placed. However, engineering solutions are often expensive; even speed humps, which are a less expensive measure, can cost a town around $2,000.00[7]. Physical barriers can also cause unintended consequences on nearby roads. For example, if a particular road has a physical traffic calming measure, drivers may begin to avoid that road, increasing traffic and perhaps speeding on an alternative route. Finally, not all residents want engineering solutions.

Education

There are different types of education programs being implemented across the country, but in general they focus on neighborhood volunteers serving as monitors and speed counters. Some example programs include:

Neighborhood Traffic Management Program/Neighborhood Watch Programs[8].

Tucson, AZ

> Tucson has a volunteer program where citizens are able to borrow equipment to record a vehicle's speed and license number. If a vehicle is breaking the speed limit, the vehicle owner receives a letter from the police department to make

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[5] For example: "Neighborhood Traffic Calming Process," http://www.ci.austin.tx.us/roadworks/process.htm; City of Palo Alto Neighborhood Traffic Calming Program, http://www.cityofpaloalto.org/transportation/ntcp/booklet.html; City of Charlottesville, http://www.charlottesville.org/default.asp?pageid=07BEEF0E-FE64-4602-AC47-8B278BDEAF6E; City of Missoula Traffic Calming, http://www.ci.missoula.mt.us/publicworks/calming.htm

[6] Raleigh Traffic Calming Study, http://www.kimley-horn.com/raleightrafficcalming/

[7] www.trafficcalming.org

[8] Traffic Calming for Communities, http://www.ite.org/traffic/locations.htm

him/her aware of the speed violation. The letter is also intended to make him/her aware that the neighborhood is concerned about speeding. There are no penalties associated with the violation.

Seattle, WA

The Seattle program occurs in three-phases: 1) Volunteer citizens monitor vehicles with a radar gun and then send letters to the speeders, 2) A speed sign is placed at the worst spots and police enforcement is implemented, 3) The Police Department conducts follow-up enforcement.

Phoenix, AZ

The Phoenix program begins with an evaluation process to see if a Neighborhood Watch Program is right for the neighborhood. If so, volunteers collect speeding data and the violators receive notification/education letter, similar to the programs above.

Neighborhood Traffic Control Program

Gresham, OR

A citizen petition that is followed by preliminary data collection initiates this program. If traffic calming is warranted, the next stage involves citizen meetings and a collaborative planning process, during which a course of action is decided upon. They then conduct a test of the recommended action, and if it passes, they begin construction of a full program. The Gresham program has also established criteria for ranking neighborhoods that require attention:

- Volume – ADT
- Speed -- % above speed limit
- Accidents
- Schools
- Other pedestrian generators such as elderly housing and pocket parks

All of these education-based programs require a motivated citizenry and in some cases, cooperation between the Department of Transportation and the police department. The limits to an education program are 1) it carries no real penalty, 2) it requires time and effort on the part of town residents, and 3) it does not guarantee results. Advantages of implementing an education program are 1) it can be a very low-cost measure, compared to an engineering solution, 2) it raises awareness and tries to institute a behavioral change, and 3) has the potential to create a sense of community as well as address a speeding problem.

Enforcement

The third "e" in the traffic calming toolbox is under the jurisdiction of the town's police force. Enforcement employs a penalty system for violators of the speed limit, such a

ticket. The following enforcement strategies are adapted from Portland, Oregon's Neighborhood Traffic Safety Partnership[9]:

- Traffic fines
- Targeted Locations
- School Zone Enforcement
- Pedestrian and Bicycle Law Enforcement
- Traffic Safety Commission / Court Watch
- Automated Enforcement
    - Photo Radar
    - Red Light Cameras
    - Speed Display Boards

While enforcement programs can be effective at short-term speed control, unless enforcement is maintained, there is less incentive for speeders to change their behavior. Coupling enforcement with education is perhaps a more effective route.

A Fourth "E"?

Each of the traditional "three Es" of traffic calming has advantages and disadvantages. Perhaps the addition of a fourth "E," *engagement*, can increase the effectiveness of any of those solutions. Engaging community members in the details of traffic calming takes education one step further by asking for their input and creativity not only in the outreach process (as in a neighborhood watch program), but also in the engineering and enforcement approaches to reducing residential speeding. One engagement mechanism that seems to be popping up in cities across the country is called *street reclaiming*[10]. Street reclaiming can involve activities as well as design. The activity part of street reclaiming involves residents getting outside and having a presence along their street. It can be sitting on a lawn or front porch and reading, having kids playing in front houses, or taking walks along neighborhood streets. The design component "entails changing the psychological feel of streets so they feel less like a corridor owned exclusively by cars and more like a series of interconnected outdoor living rooms."[11] Another form of engagement can involve community meetings where residents and transportation professionals dialogue about possible solutions and how to implement them.

New Developments

The city of Winston-Salem had outlined a two-step procedure for traffic calming in new developments. These two steps are presented in the flow charts below. Essentially the key considerations are whether or not the development warrants any traffic calming, whether the new development will impact existing developments such that they will require traffic calming, and a public process for taking a particular course of action. The implications of this policy for Carrboro are discussed in the *recommendations* section.

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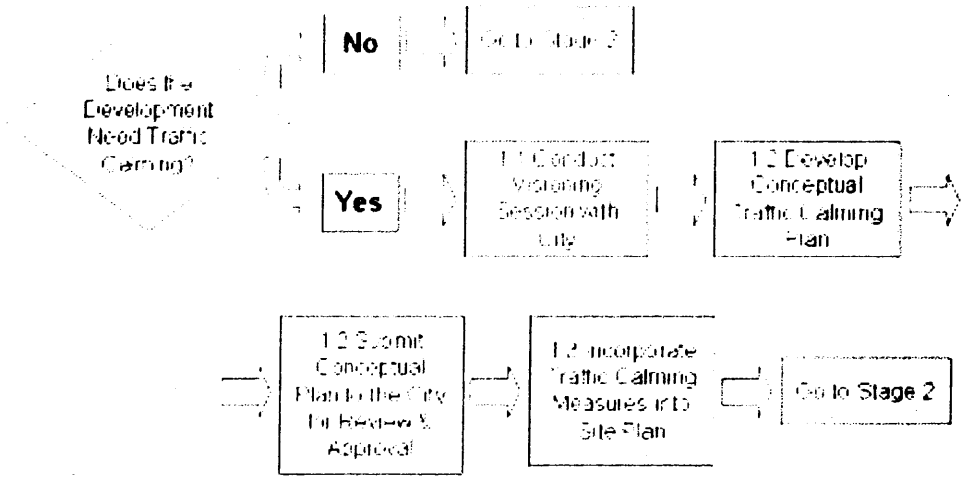
[9] http://www.trans.ci.portland.or.us/Projects/NTSP/default.htm

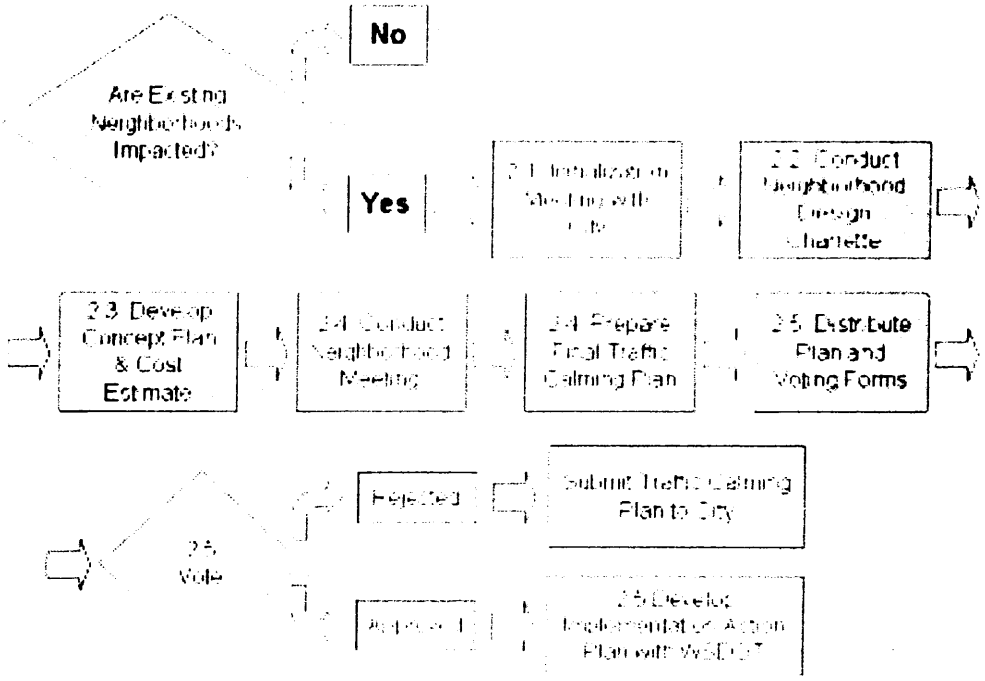
[10] See http://www.lesstraffic.com/Programs/SR/SR.htm

[11] Engwicht, David. "Street Reclaiming – Introduction," www.lesstraffic.com/Articles/Traffic/SR1.htm

Traffic Calming for a New Development – Stage 1



Traffic Calming for a New Development – Stage 2



Source: City of Winston-Salem Traffic Calming Policy, May 2003

Recommendations

Everything in this report up until now has served to set the stage for establishing a set of recommendations regarding the revision of the Residential Traffic Management Plan. The essential issues up for revision include the 85th percentile rule of +10 MPH above the posted speed limit, consideration of other traffic calming programs that cities are implementing, and special provisions for certain situations.

Recommendation #1. For most of the petitions requesting traffic measures the 85th percentile rule was not violated and so the requests were denied. However, for most of those cases the recorded speeds were close to 10 MPH over the posted limit. The question then becomes, is 10 MPH a reasonable standard? There are certainly precedents for using a stricter standard. A consequence of lowering the standard is the approval of more requests. While this may more accurately address residents' concerns, it may also add a financial burden to the town; many of the engineering solutions are costly.
Therefore, the first recommendation is:

> Lower the 85th percentile standard, perhaps to + 7 MPH. If this change is implemented within a point system (see recommendation 2 below), then it should better reflect the degree of speeding, yet allow for other factors to be considered when evaluating the situation.

Recommendation #2. Another strategy employed by more and more cities is a "point system" for deciding how to prioritize traffic calming requests. Based on the point system, like the one below in Table 4, the town can prioritize traffic calming requests. Requests that score low would be considered a low priority and vice versa, enabling the town to direct any available funds to the high priority projects. The low priority requests do not have to be shelved and alternative, low-cost mitigation measures can be applied. This point system also allows for the town to consider special situations, such as school crossings and pedestrian activity. In light of the diversity in Carrboro's requests for traffic calming, it is recommended that the town adopt a point system for prioritizing and evaluating these requests. A point system also allows for a more substantive explanation to residents when a request is denied.

Table 4. Request Prioritization Point System Example

Criteria	Points
Traffic Volume	5 points for every 20% of volume that exceeds the expected neighborhood volume
Speed	1 point for every MPH that the 85th percentile speed exceeds 25 MPH on a local residential street, or 35 MPH on a residential collector or commercial street
Pedestrian/bicycle volume	5 points for every 10 peds/cyclists in the peak hour
Sidewalks	5 points for no continuous sidewalks on at least one side of the street
Crash frequency	5 points for an injury accident, 1 point for a property damage only accident – within the last 3 years
Land use	5 points if residential, 2 if commercial
Street trees/streetscaping	5 points for no or few street trees
School route	5 points if the street is on a designated school walk route
Bus stops	1 point for each transit stop and 2 points for each school bus stop

Adapted from: City of Winston-Salem Traffic Calming Policy, May 2003

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Recommendation #3. An approach that Carrboro has not yet taken is education. Starting up a neighborhood speed watch program can be a low-cost measure and has the potential to result in speed reductions. However, the amount of time it can take to put the program in place, the need for active and concerned citizens, and the uncertainty of resulting improvements can serve a barrier to implementing an education program. Despite those barriers, recommendation 3 is to put the idea of educational strategies to the residents to gauge what level of interest and commitment there may be in initiating a community speed watch program.

Recommendation #4. The Winston-Salem approach to traffic calming in new developments seems to get at the engagement, education, and potentially engineering components of traffic calming. Carrboro should look at the new developments planned for the town and determine whether or not it is appropriate to apply a two-step traffic calming evaluation process.

Conclusion

Traffic calming is, perhaps, not the sexiest of transportation issues, yet it is an integral part of everyday life for residents of any community. As cities and towns continue to grow and develop what was once a suitable traffic calming policy may need to be revised: such is the case with the Town of Carrboro. A review of the current traffic calming requests, the state of the traffic calming practice, and example programs from m around the country revealed that there are opportunities for Carrboro to implement a number of new, low cost, traffic calming policies and measures. This report provided a variety of recommendations for the Carrboro Transportation Advisory Board members to consider as they prepare to provide guidance to the Board of Aldermen.

References

Print

Town of Carrboro, 1997. *Residential Traffic Management Plan for Speed and Traffic Control.*

Internet

Charlottesvile Neighborhood Dev. http://www.charlottesville.org/default.asp?pageid=07BEEF0E-FE64-4602-AC47-8B278BDEAF6E

City of Decatur. http://www.decaturga.com/cgs_citysvcs_eng_traffic.aspx: *Traffic Controls.*

City of Portland Office of Transportation. http://www.trans.ci.portland.or.us/Projects/NTSP/default.htm: *Neighborhood Traffic Safety Partnership.*

ITE, 1999. http://www.ite.org/traffic/tcstate.htm#tcsop: *Traffic Calming: State of the Practice.*

ITE. http://www.ite.org/traffic/locations.htm: *Traffic Calming for Communities.*

Kimley-Horn. http://www.kimley-horn.com/raleightrafficcalming: *Raleigh Traffic Calming Study.*

LessTraffic.com. www.lesstraffic.com/Articles/Traffic/SR1.htm: *Street Reclaiming – Introduction.*

TrafficCalming.org. http://www.trafficcalming.org

Other

Personal Communication, Dale McKeel: Carrboro Transportation Planner. March/April 2004.

Transport for London

Street Management

London Road Safety Unit: Safety Research Report No. 2

Review of 20 mph Zones in London Boroughs

Abstract

London, with 13.5 accidents per 1,000 registered vehicles per year, is the least safe region of Great Britain. It is considerably less safe than other built up regions such as Greater Manchester (9.4) and the West Midlands (7.8) and lags behind the GB average of 8.2 (2000 data).

The Mayor has set targets to reduce the number of killed and seriously injured (KSI) road casualties by 40% and slight casualties by 10% by 2010 compared with the 1994-98 average. In October 2002, to investigate the effectiveness of measures that might help achieve this target, the London Road Safety Unit commissioned TRL Ltd to review the effectiveness of 20 mph zones in London.

In 2002 in Greater London, 36,813 road casualties (89% of the total) occurred on roads with a 30 mph speed limit. The 20 mph zones studied have almost exclusively been implemented on unclassified roads that previously had a 30 mph limit and, prior to the introduction of the 20 mph zone, the number of accidents per km per year was, on average, more than twice that of other unclassified roads.

The research carried out by TRL shows that 20 mph zones are an effective way to reduce the frequency and severity of injury accidents mainly through reducing traffic speeds. The number of killed and seriously injured casualties was shown to have reduced by around 57% and the frequency of injury accidents by around 42%.

Objectives

- To quantify the impact of 20 mph zones on the number and severity of injury accidents and their associated casualties in London.
- To identify which road user groups benefit most from 20 mph zones.
- To identify which characteristics of 20 mph zones are most effective.
- To generate a comparator for how new schemes in London might be expected to perform and how schemes in London compare with those in other locations.

Fact sheet

Introduction

Previous work has shown the positive impact of 20 mph zones through reducing numbers of accidents and the number and severity of casualties. A 1996 TRL study for the DfT of two hundred such zones around the country showed that;

- Speeds were reduced by 9 mph
- Traffic flows were reduced by 27%
- Injury accidents (all severities) were reduced by 61%
- Fatal and serious accidents (KSIs) were reduced by 70%

More recent data from the City of Hull (where 120 zones covering 191km, or 26%, of the city's roads are subject to 20 mph speed restrictions) showed that in 20 mph zones;

- Injury accidents decrease by 56%
- KSI accidents decrease by 90%
- Pedestrian casualties decrease by 54%
- Child casualties decrease by 64%
- Child pedestrian casualties decrease by 74%

The current study has used a similar methodology to that used by TRL in the study undertaken for the DfT looking into the effectiveness of 20 mph zones. This allows a comparison of the changes in accident frequency for the London schemes against 20 mph zones in other areas.

Data provided by the London Boroughs shows that the number of 20 mph zones being installed annually has increased from about five per year prior to 1999 to over thirty per year by 2002, with a total of about 137 installed zones by 2002. Detailed information was received for 115 of these, of which 40 (35%) were purely residential, 70 (61%) contained schools and 5 (4%) were town/city centre or mainly commercial zones. Seventy-eight had been in place long enough for at least a year of 'after' accident data to be available for analysis. 'Before' periods of five years were used and the average length of the 'After' periods available was three years. 20 mph zones have been implemented on around 391 km of borough roads and this analysis includes 253 km of these.

Previous work has shown that average speeds in 20 mph zones are likely to reduce by around 1 mph if signs alone are used to indicate the presence of a zone – hence there is a need for other measures to encourage self enforcement. The main traffic calming measures used within the zones studied were road humps, entrance gateways (figure 1), raised junctions (figure 2) and speed cushions.

Fact sheet

Casualties

The impact on casualties due to the introduction of 20 mph zones in London can be summarised as follows;

- Allowing for background changes in KSI casualty frequencies, the installation of 20 mph zones has reduced the frequency of road user casualties within the zones by about 45% and reduced the frequency of fatal or serious (KSI) casualties by about 57%.
- There were statistically significant reductions in the KSI casualty frequency for most classes of road user within the 20 mph zones.
- The KSI casualty frequency for children also fell significantly -- by 60%.
- The severity ratio (the ratio of KSI casualties to all casualties) fell from 0.16 to 0.12 following zone installation – indicating a reduced severity.
- The average annual reduction in fatal and serious (KSI) casualties per 20 mph zone suggests an annual saving of about 66 KSI casualties across all of London's current 20 mph zones. Using DfT figures this is equivalent to a current annual saving of at least £8.8 million, at 2001 prices.

Table 1: Before and after - Casualties per year per site by road user class

Road user class	All casualties per year per site			KSI casualties per year per site		
	Before[1]	After[2]	% Reduction	Before[1]	After[2]	% Reduction
All casualties	4.96	2.66	46%	0.79	0.32	60%
Pedestrians	1.37	0.83	40%	0.32	0.16	50%
Child pedestrians	0.75	0.39	48%	0.19	0.07	61%
Pedal cyclist	0.64	0.43	33%	0.10	0.05	50%
Child pedal cyclist[3]	0.25	0.10	59%	0.04	0.02	60%
P2Ws[4]	0.53	0.32	41%	0.14	0.05	68%
Car occupants	2.23	0.95	57%	0.21	0.05	77%
Child car occupants[5]	0.19	0.09	51%	0.01	0.00	47%

1. Before has been measured over 4,680 site-months
2. After period measured over 2,930 site-months
3. Small sample size means that KSI data for child pedal cyclists is not statistically significant
4. P2W = Powered Two Wheelers (includes scooters, mopeds and motorcycles)
5. Small sample size means that data for child car occupants is not statistically significant

Fact sheet

Injury accidents

The impact on injury accidents due to the introduction of 20 mph zones in London can be summarised as follows;

- The introduction of 20 mph zones in London has reduced the frequency of injury accidents within the zones by about 42% and reduced the frequency of accidents involving fatal or serious injury (KSI) by about 53%. Both of these reductions allow for the background frequency of injury accidents declining over the period.
- The average ratio of KSI accidents to all injury accidents fell from 0.17 to 0.13 following zone installation.
- Over the 'before' period, the numbers of accidents per km per year on 20 mph zone roads were, on average, more than twice those on other unclassified roads in London.

Concerns that accidents may be migrating away from the 20 mph zones and into the surrounding area (as vehicles may choose to use different routes) were addressed by the study and shown to be unfounded.

Traffic speeds and flows

From the more limited data available on traffic flows and speeds, the impact of the introduction of 20 mph zones can be summarised as follows;

- Mean traffic speeds after installation, measured from twenty-two zones, were about 17 mph.
- Measurements of before and after speeds suggest an average reduction of about 9 mph through the installation of 20 mph zones. Previous research has shown that each 1 mph reduction in speed can expected to reduce the frequency of injury accidents by around 5%.
- Traffic flows, measured in eleven zones, have reduced by an average of about 15%.

Table 2: Before and after - Accidents per year by road type[1]

Road type	All accidents per year per km			KSI accidents per year per km		
	Before[2]	After[3]	% Reduction	Before[2]	After[3]	% Reduction
All unclassified roads[4]	0.58	0.56	4%	0.09	0.08	12%
20 mph Zones	1.31	0.74	43%	0.22	0.10	56%
Non-20 mph Zones	0.56	0.55	1%	0.09	0.08	9%

1. This data does not allow for background declines over the period
2. Before period measured over 5 years
3. After period measrued over 3 years
4. Before period September 1992 to October 1997, after period November 1998 to October 2001

Fact sheet

Conclusions

The results of this study are extremely encouraging, showing that large accident and casualty reductions can be made through the increased use of self enforcing 20 mph zones on unclassified borough roads in London. These accident and casualty reductions appear to largely result from speed reductions associated with self enforcing 20 mph zones.

In recent years 20 mph zones have been implemented in increasing numbers by the London Boroughs. If this trend continues, the casualty reductions measured by this study are likely to be observed in any newly implemented zones, as well as persisting in those currently in place.

Potential

There are around 13,000 km of borough roads in London and in 2002 there were 177 fatal, 3,839 serious and 25,428 slight casualties on these roads which represents 71% of all casualties on London's roads.

It is likely that 20 mph zones would be suitable for implementation over the majority of the borough road network and, if installed, would have the potential to make large casualty savings. For example, if 60% of the borough road network were treated and the results of this study replicated, the KSI number for the treated network could be expected to fall from 2,410 to around 1,040. This would equate to an annual saving of around £248m. An additional reduction in the slight casualties may deliver savings of around £65m.

The cost of installing 20 mph zones on 60%, or around 8,000 km, of the borough road network has been very roughly estimated at £230m.

Selected references

1. Webster, DC and Mackie, AM (1996). Review of traffic calming schemes in 20 mph zones. TRL Report 215. Transport Research Laboratory, Crowthorne.
2. National Statistics / DTLR (2001). Road Accidents Great Britain: 2000 The Casualty Report.
3. DfT (2001). Highways Economics Note No. 1 2001
4. Brightwell (2003). Hull reaps road safety rewards from slowing the city's traffic. Local Transport Today, 5/03.